eKitEngine USG6000F-S Series Hardware Guide

Issue 04

Date 2025-10-17

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Contents

1 Using the Info-Finder

Info-Finder is a tool platform. It allows you to search for key product information by product series and model. The key product information includes basic information such as the software specifications, life cycles, and hardware information, and operation and maintenance information such as the licenses, alarms, logs, commands, and MIBs. The hardware-related tools are as follows:

- Product image gallery: provides product photos and network element icons for you to produce design drawings and networking diagrams.
- Hardware configuration: automatically generates hardware configuration diagrams after you select components are required and calculates the weight, power consumption, and heat consumption.
- Hardware center: provides the technical specifications of devices and components, as well as the mapping between devices, components, and versions.
- 3D model: Using this function, you can query product images, product overview, and component insertion/removal videos, enabling you to quickly obtain product information in one-stop mode.

2 Software Versions Compatible with Hardware

This section describes software versions compatible with the USG6000F-S hardware.

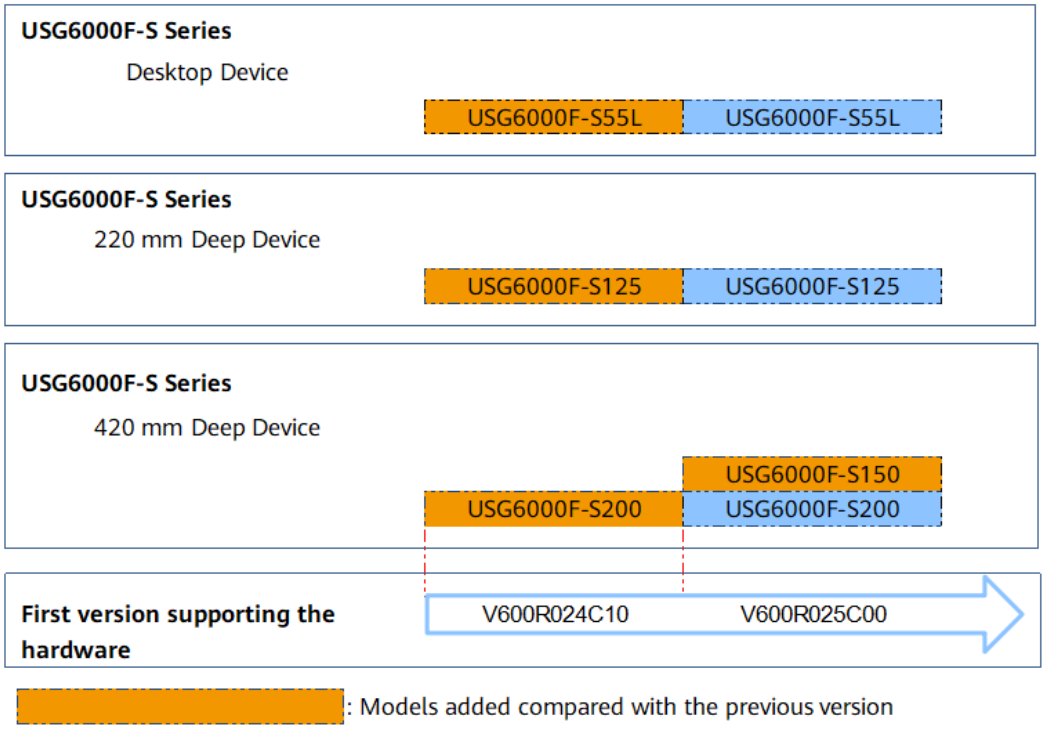
Since its debut, USG6000F-S has undergone multiple updates and optimizations. You can use either of the following methods to query the supported software versions, evolution roadmaps of software versions, and software-hardware mappings.

- Method 1: Info-Finder tool. Select a product and click **Hardware Center**, In the **Part type** area, click the component to be queried. In the **Specifications** area, view the **First supported version** of the component.
- Method 2: *Hardware Guide*. For the first supported version of a chassis, see the **First Supported Version** column in the **Overview** section of the corresponding product model. For the mapping between components and chassis, see the **Version Mapping** section of the corresponding component.

NOTE

- As documentation and software versions are evolving, the *Hardware Guide* may describe a collection of all hardware of a product series, which does not mean that all hardware in this document is supported in this version. Before using hardware, carefully check the **First Supported Version** of the hardware in Hardware Guide.
- The *Hardware Guide* describes all the device models supported in a version, and these models may not be available for sales currently. To obtain accurate subscription information, regularly check the official **https://support.huawei.com/enterprise** for product change notices (PCNs) and lifecycle management bulletins, or you can use the Info-Finder tool to query product EOX information.

Figure 2-1 Software versions compatible with hardware



3 Hardware Overview

This chapter describes hardware information for all USG6000F-S series and main components.

3.1 Chassis

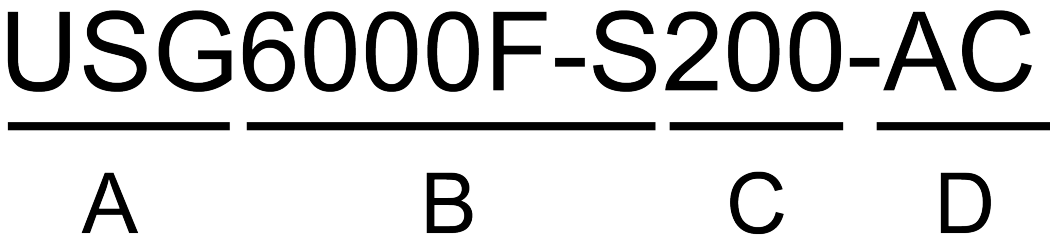
This chapter describes hardware information for all USG6000F-S series, including hardware appearance, front and real panels, power supply system, heat dissipation system, and technical specifications.

NOTE

- The model shown on the panel of the some USG6000F-S is the series number USG6000F-S. For the specific model, see the nameplate attached on the bottom of the USG6000F-S.
- The device series number can be provided using laser marking on the panel or film silkscreen. The device functions are the same regardless of the series number presentation mode.
- The appearance colors of delivered devices may vary. Devices with dark-colored appearance will be gradually switched to devices with light-colored appearance. No matter which color is used, the functions and performance of the devices are the same.

3.1.1 Naming Conventions

Figure 3-1 Device naming conventions



NOTE

The device name in the figure is only an example and does not represent a specific device model.

Table 3-1 Device naming conventions

Identifier	Meaning	Description
A	Product series name	Product series name (USG for short)
B	Market positioning	USG6000F-S indicates a distribution model.
C	Generation and performance series identifier	C represents the specific model identifier.
D	Power supply type	• AC: The chassis can be configured with AC & high-voltage DC power modules. • DC: The chassis can be configured with DC power modules.

3.1.2 USG6000F-S55L

Overview

Table 3-2 Basic information about the USG6000F-S55L

Description	Part Number	Model	First supported version
USG6000F-S55L(HTM) AC Host(4*GE SFP +8*GE RJ45+LTE,1*Built-in AC Power,include SSL VPN 100 users)	02356XGW	USG6000F-S55L-AC	V600R024C10

Appearance

Figure 3-2 Appearance of the USG6000F-S55L (front view)

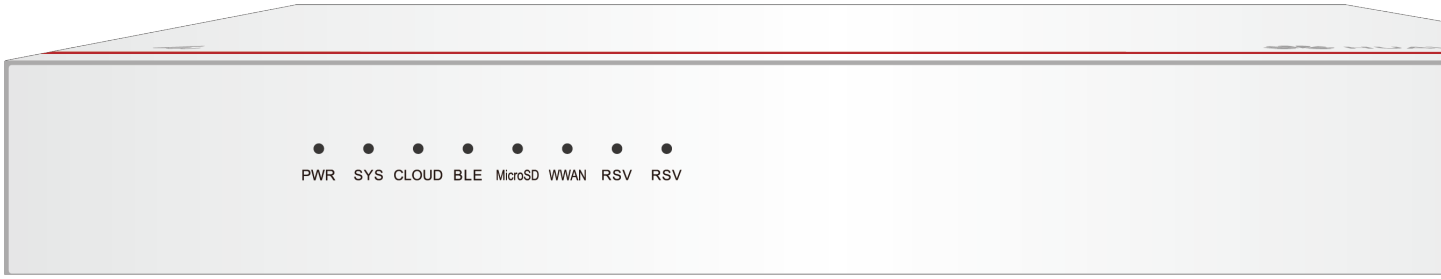
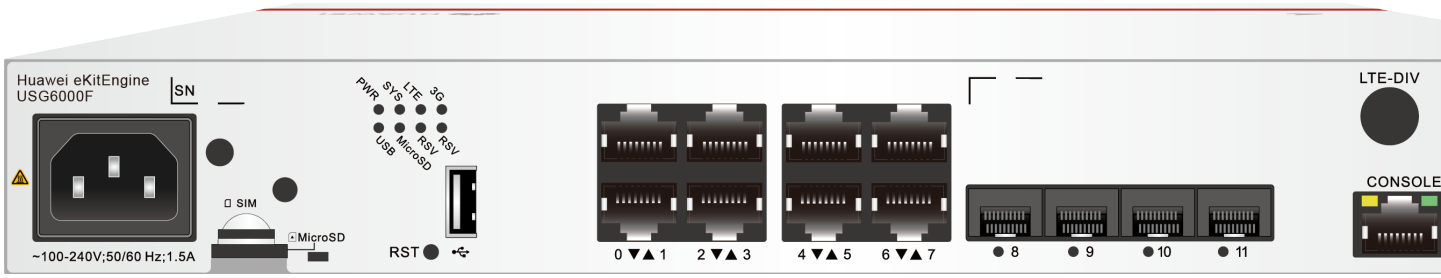
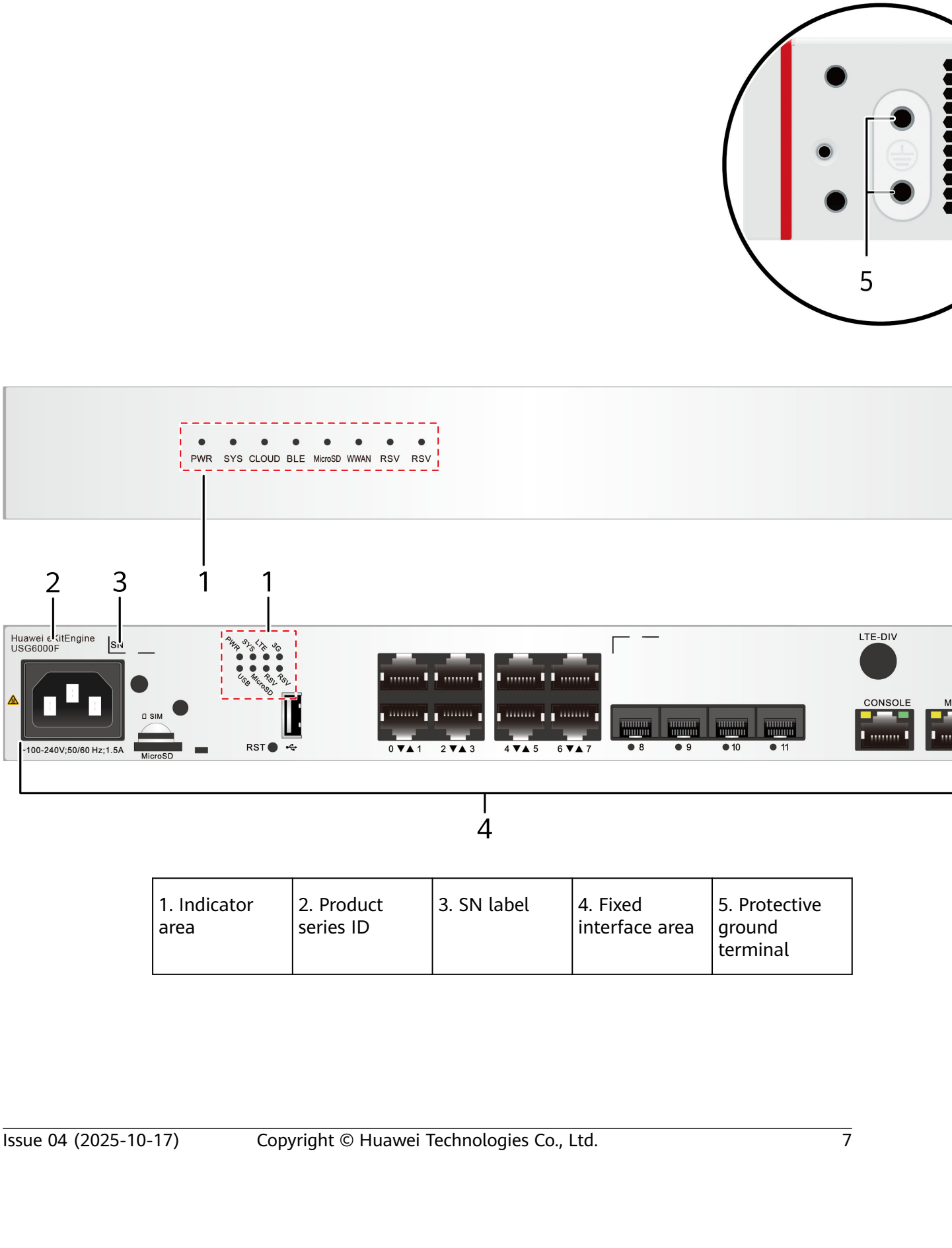


Figure 3-3 Appearance of the USG6000F-S55L (rear view)



Structure

Figure 3-4 Components of the USG6000F-S55L



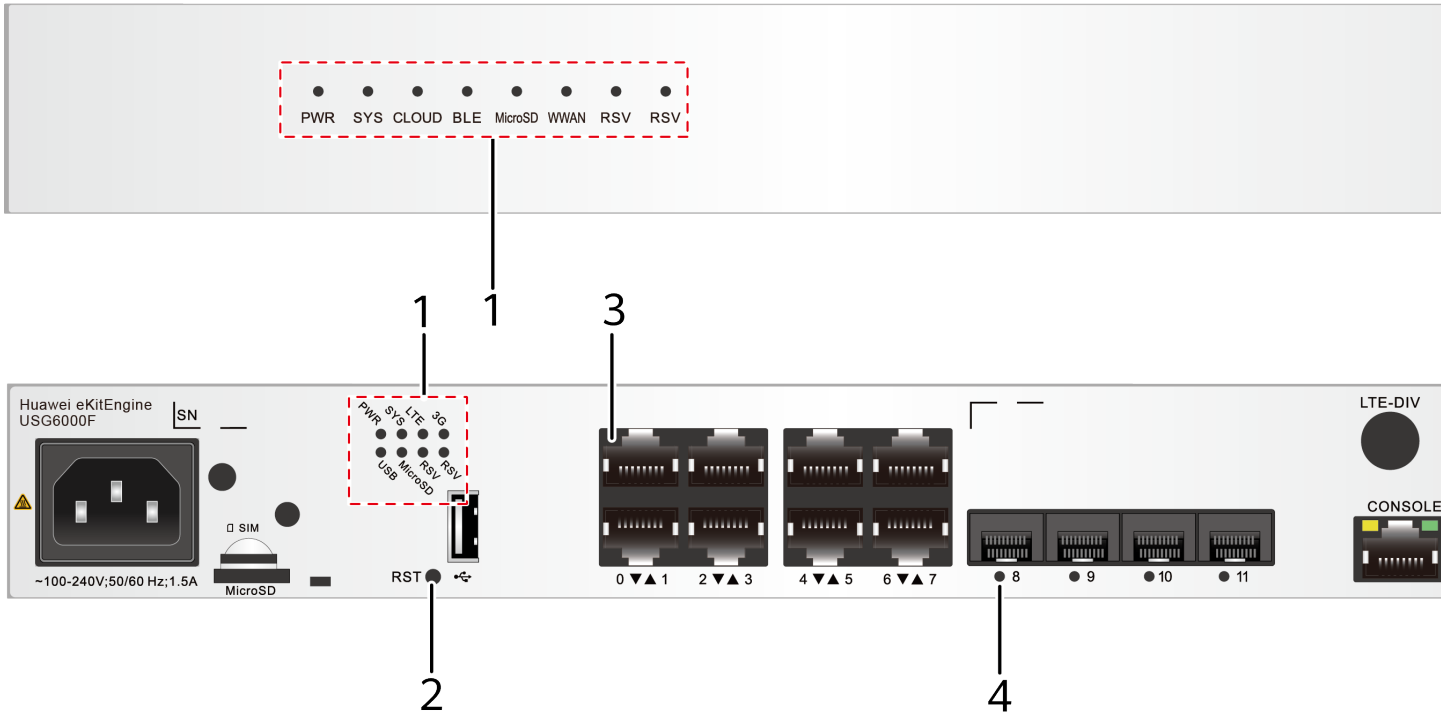
1. Indicator area	2. Product series ID	3. SN label	4. Fixed interface area	5. Protective ground terminal

Table 3-3 Component functions

Name	Description
Indicator area	Provides various indicators to display the device running status in real time.
Product series ID	Indicates the product series of the device. For details about the product model, see the nameplate in the lower part of the device.
SN label	Uniquely identifies the device, which needs to be provided for the local technical support personnel to apply for a license.
Fixed interface area	• Provides clip hole and power receptacle. • Provides service ports, USB ports, console ports, and out-of-band management ports for device configuration and maintenance. • Houses a Micro SD card to store logs and reports. • Houses a SIM card to provide LTE/3G networks for subscribers. • The LTE antenna ports consist of the main antenna port (MAIN) and diversity antenna port (DIV). The main antenna port is used to receive and transmit LTE signals, whereas the diversity antenna port is used to receive only LTE signals.
Protective ground terminal	Connects the M4 OT terminal of a PGND cable to the cabinet or the ground bar in the equipment room.

Indicators and Buttons

Figure 3-5 Indicators and Buttons of the USG6000F-S55L



1. PWR, SYS, CLOUD, BLE, MicroSD, WWAN, RSV, USB, LTE and 3G indicators	2. RST button	3. GE electrical port indicator	4. GE optical port indicator	5. MGMT port ACT indicator
6. MGMT port LINK indicator	-	-	-	-

Table 3-4 Indicators on the USG6000F-S55L

Silkscreen	Name	Color	Status	Description
PWR	Power indicator (system indicator panel)	Green	Steady on	The power module is working properly.
		-	Off	The power module is faulty or the device is not powered on.

Silkscreen	Name	Color	Status	Description
SYS	SYS indicator (system indicator panel)	Green	Steady on	The system is being powered on or restarted.
		Green	Blinks once every 2 seconds (0.5 Hz).	The system is running normally.
		Green	Blinking four times every second (4 Hz)	The system is starting.
		Red	Steady on	A system fault occurs.
		-	Off	The system is not running.
USB	USB indicator	Green	Steady on	USB-based deployment has been completed.
		Green	Blinking four times every second (4 Hz)	The system is reading data from the USB flash drive.
		Red	Steady on	USB-based deployment fails.
		-	Off	USB-based deployment is disabled (default state).
MicroSD	Micro SD indicator	Green	Steady on	The micro SD card is present.
		-	Off	The micro SD card is not detected.
LTE	LTE indicator	Green	Steady on	The LTE signal strength is high.

Silkscreen	Name	Color	Status	Description
		Green	Blinking four times every second (4 Hz)	The LTE signal strength is medium.
		Green	Blinks once every 2 seconds (0.5 Hz).	The LTE signal strength is low.
		-	Off	No LTE signal is available.
3G	3G indicator	Green	Steady on	The 3G signal strength is high.
		Green	Blinking four times every second (4 Hz)	The 3G signal strength is medium.
		Green	Blinks once every 2 seconds (0.5 Hz).	The 3G signal strength is low.
		-	Off	No 3G signal is available.
PWR	Power indicator (interface panel)	Green	Steady on	The power module is working properly.
		-	Off	The power module is faulty or the device is not powered on.
SYS	SYS indicator (interface panel)	Green	Steady on	The system is being powered on or restarted.
		Green	Blinks once every 2 seconds (0.5 Hz).	The system is running normally.
		Green	Blinking four times every second (4 Hz)	The system is starting.

Silkscreen	Name	Color	Status	Description
		Red	Steady on	A system fault occurs.
		-	Off	The system is not running.
CLOUD	CLOUD indicator	-	Off	Reserved function. This function is not enabled.
BLE	Bluetooth indicator	-	Off	Reserved function. This function is not enabled.
MicroSD	Micro SD indicator	Green	Steady on	The micro SD card is present.
		-	Off	The micro SD card is not detected.
WWAN	WWAN indicator	Green	Steady on	An LTE/3G/2G connection has been established or is active.
		Green	Blinking four times every second (4 Hz)	Data is being transmitted on the LTE/3G/2G network.
		-	Off	The LTE/3G/2G connection has not been established or is inactive.
RSV	RSV indicator	-	Off	Reserved function. This function is not enabled.
-	ACT indicator of the MGMT port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.

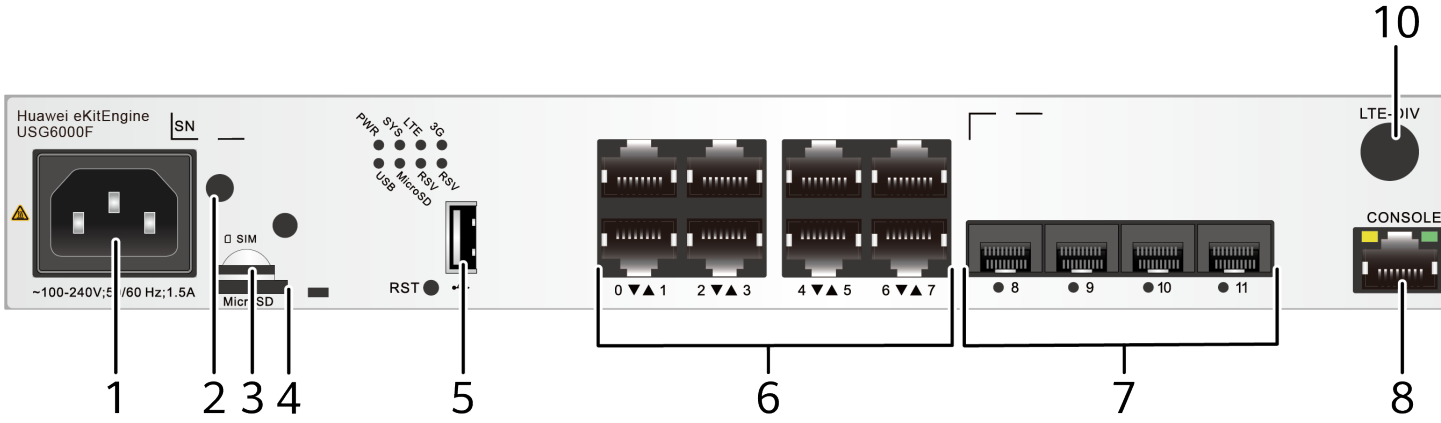
Silkscreen	Name	Color	Status	Description
		-	Off	The port is not sending or receiving data.
-	LINK indicator of the MGMT port	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	GE electrical port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.
-	Optical port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.

Table 3-5 Buttons on the USG6000F-S55L

Silkscreen	Name	Description
RST	RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. This button enables you to restore the default settings with one click. To be specific, you can press and hold down the RST button for 5 seconds and then release it to restore the default settings and restart the device.

Ports

Figure 3-6 Ports of the USG6000F-S55L



1. Power receptacle	2. Clip hole	3. SIM card slot	4. Micro SD card slot	5. USB 2.0 port
6. GE electrical port	7. GE optical port	8. Console port	9. MGMT port	10. LTE-DIV antenna port
11. LTE-MAIN antenna port	-	-	-	-

Table 3-6 Ports on the USG6000F-S55L

Port	Connector Type	Description	Available Components
Clip hole	-	The hole is used to install the power cable clip, which is used to bind and fix the power cable.	Power cable clip
Power receptacle	-	The receptacle connects to the tuning fork plug of the power adapter.	Power cable
GE electrical ports (0 to 7)	RJ45	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GE0/0/0 to GE0/0/7. **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.	**Ethernet Cable**
GE optical ports (8 to 11)	SFP	4 GE Ethernet optical ports, numbered from GE0/0/8 to GE0/0/11.	• **100Mbps SFP Optical Modules** • **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **GPON & EPON Optical Modules**

Port	Connector Type	Description	Available Components
Micro SD card slot	Micro SD	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 from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.	BOM code: 02315NSC or 06010308, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm(0.04 in. x 0.59 in. x 0.43 in.) **NOTE** Formatting is performed for devices with BOM code 02315NSC and not performed for devices with BOM code 06010308 before delivery.
SIM card slot	-	Inserts a SIM card to provide LTE/3G networks for subscribers. The SIM card is optional and purchased by the customer.	SIM card
USB 2.0 port	USB 2.0 Type A	USB port allows you to insert an USB flash drive for system software upgrades. For details on upgrades through USB flash drives, refer to the Upgrade Guide delivered with the device.	USB flash drive

Port	Connector Type	Description	Available Components
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.	Console Cable

Port	Connector Type	Description	Available Components
MGMT port	RJ45	Outband management interface, which is a 10/100/1000 Mbit/s RJ45 auto-sensing Ethernet interface. The interface number is MEth0/0/0 and the default IP address is 192.168.0.1. Connect this interface to the network port of the PC or a reachable network interface of the PC using a network cable. You can use Telnet to access the command configuration interface of the device or use a web browser to access the web configuration interface of the device to configure, manage, and maintain the device. **NOTE** The MGMT interface cannot be used as a service interface.	**Ethernet Cable**

Port	Connector Type	Description	Available Components
Two LTE antenna ports	SMA-K (external thread + inner hole)	The LTE antenna ports consist of the main antenna port (MAIN) and diversity antenna port (DIV). The main and diversity LTE antenna ports can work at the same time. The main antenna port is used to receive and transmit LTE signals, and the diversity antenna port is used to receive only LTE signals to increase the downlink receive rate. Interface standards and supported frequency bands: EC200A-EH: LTE FDD:Band 1/3/5/7/8/20/28 LTE TDD:Band 38/40/41 WCDMA:Band 1/5/8 GSM:900/1800 (MHz) Supported rate: LTE FDD: 50 Mbit/s in the uplink and 150 Mbit/s in the downlink LTE TDD: 30 Mbit/s in the uplink and 130 Mbit/s in the downlink DC-HSPA+: 5.76 Mbit/s in the	**LTE Whip Antenna** **NOTE** The LTE whip antenna with the LTE antenna interface is delivered with the installation accessory package.

Port	Connector Type	Description	Available Components
		uplink and 42 Mbit/s in the downlink HSPA+: 5.76 Mbit/s in the uplink and 21.6 Mbit/s in the downlink WCDMA PS: 384 kbit/s in the uplink and 384 kbit/s in the downlink WCDMA CS: 64 kbit/s in the uplink and 64 kbit/s in the downlink EDGE: uplink 236.8 kbit/s, downlink 236.8 kbit/s GPRS: uplink 85.6 kbit/s, downlink 85.6 kbit/s GSM: 9.6 kbit/s in the uplink and 14.4 kbit/s in the downlink	

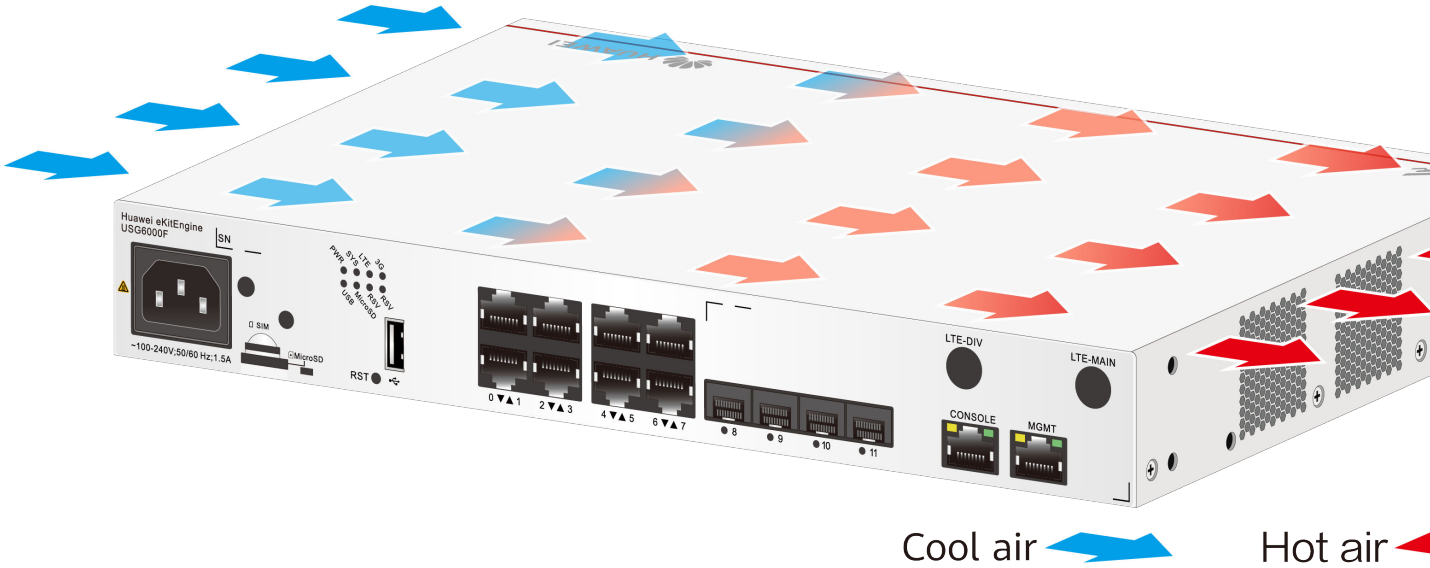
Power Supply System

The device has a built-in power module, and power is supplied to the device through a power cable.

Heat Dissipation System

The heat dissipation system of the device consists of two built-in fans. The system draws air from the left and discharges air from the right. The air intake ventis on the left side, and the air exhaust vent is on the right side. The fan module locates at the air exhaust of the system.

Figure 3-7 System air flow of the USG6000F-S55L



Technical Specifications

Table 3-7 Technical specifications of the USG6000F-S55L-AC

Item	Specification
Installation Type	• Rack • Work bench • Against the wall
Cabinet installation standard	Cabinet with a depth of 300 mm or above
Dimensions without packaging (H x W x D) [mm(in.)]	• Typical dimensions (the depth excludes the parts protruding from the body): 43.6 mm x 320 mm x 220 mm (1.72 in. x 12.6 in. x 8.66 in.) • Maximum dimensions (the depth is the distance from ports on the rear panel to the front panel): 43.6 mm x 320 mm x 230 mm (1.72 in. x 12.6 in. x 9.06 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	225 mm x 485 mm x 385 mm (8.86 in. x 19.09 in. x 15.16 in.)
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	4.45 kg (9.81 lb)
Weight without packaging [kg(lb)]	2.34 kg (5.16 lb)
CPU	1 CPU, 4 cores/CPU, up to 1.4 GHz

Item	Specification
Memory	4 GB DDR4 ECC memory
NOR Flash	64 MB
NAND Flash	2 GB
Hard disk	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Console port	RJ45
Eth Management port	RJ45
Typical power consumption [W]	30.5 W
Typical heat dissipation [BTU/hour]	104.1 BTU/hour
Maximum power consumption [W]	34.1 W
Maximum heat dissipation [BTU/hour]	116.4 BTU/hour
MTBF [years]	46.77 years
MTTR [hours]	1 hours
Availability	0.999998
Power supply mode	AC built-in
Number of power modules	1
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current [A]	2 A/built-in power module
Rated output power [W]	70 W/12 V
Maximum output power [W]	70 W/power module
Types of fans	Built-in
Number of fan modules	2
Automatic fan speed adjustment	Supported
Heat dissipation mode	Absorbing cold air into the device
Airflow direction	Right-to-left
PoE	Not supported
Noise at normal temperature (acoustic power) [db(A)]	≤55db(A)
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F)

Item	Specification
Storage temperature [°C(°F)]	–40°C to +70°C (–40°F to +158°F)
Storage environment	ETSI EN 300 019-1-1 Class 1.2 **NOTE** • The product has a valid storage period of one year. • The valid storage period refers to the period during which the product maintains the required quality when stored with packing materials in an environment that meets the preceding requirements.
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Storage relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)
Storage altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)

NOTE

- The width does not include the size of mounting ears.
- The height is 1U (1U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- 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.

3.1.3 USG6000F-S125

Overview

Table 3-8 Basic information about the USG6000F-S125

Description	Part Number	Model	First supported version
USG6000F-S125 AC Host(10*GE RJ45+2*10GE SFP+,1*Built-in AC Power,Include SSL VPN 100 users)	50050167	USG6000F-S125-AC	V600R024C10

Appearance

Figure 3-8 Appearance of the USG6000F-S125 (front view)

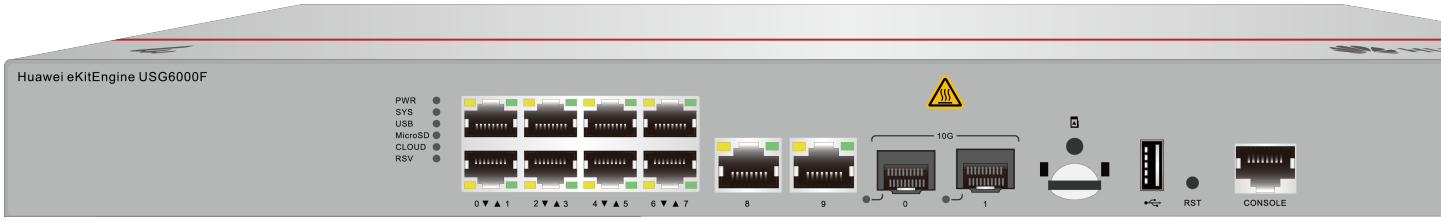
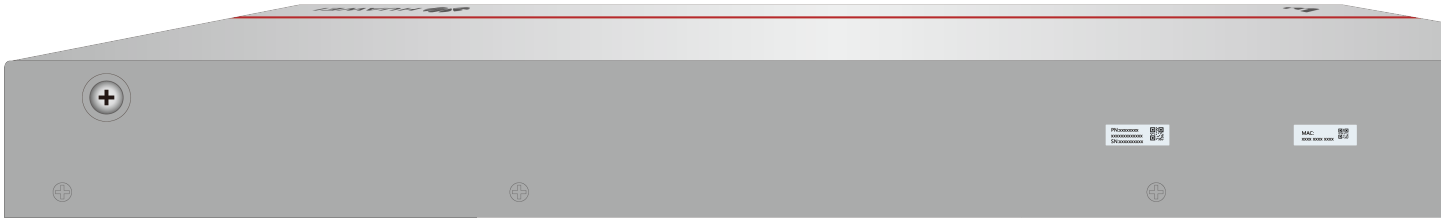
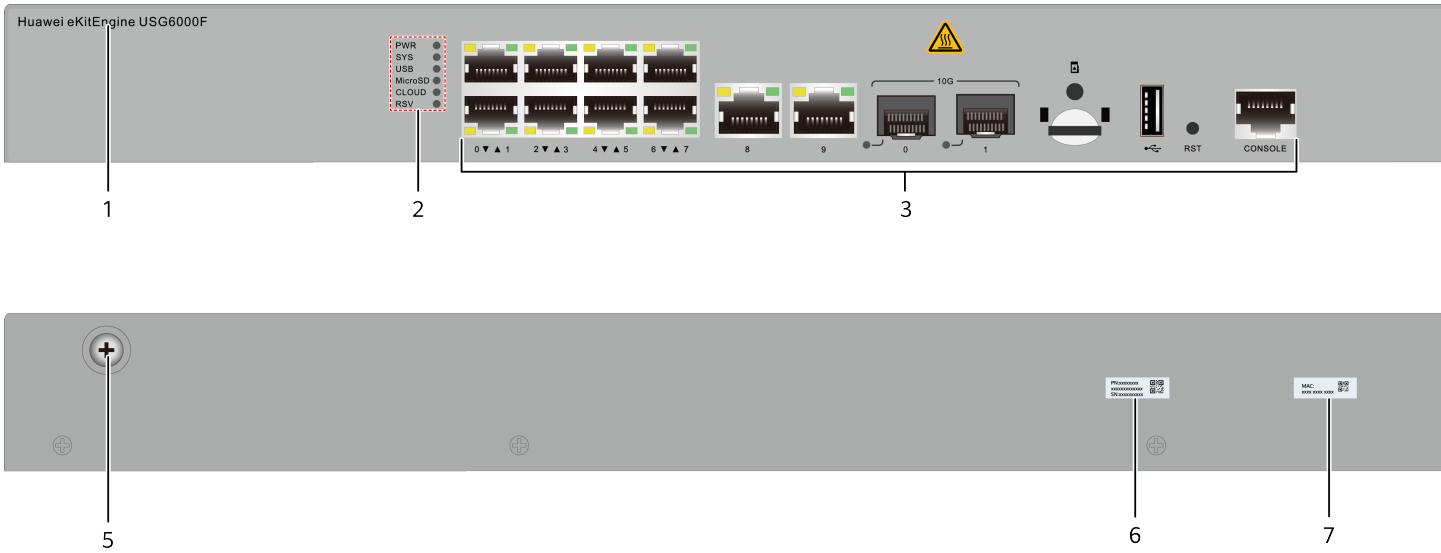


Figure 3-9 Appearance of the USG6000F-S125 (rear view)



Structure

Figure 3-10 Components of the USG6000F-S125



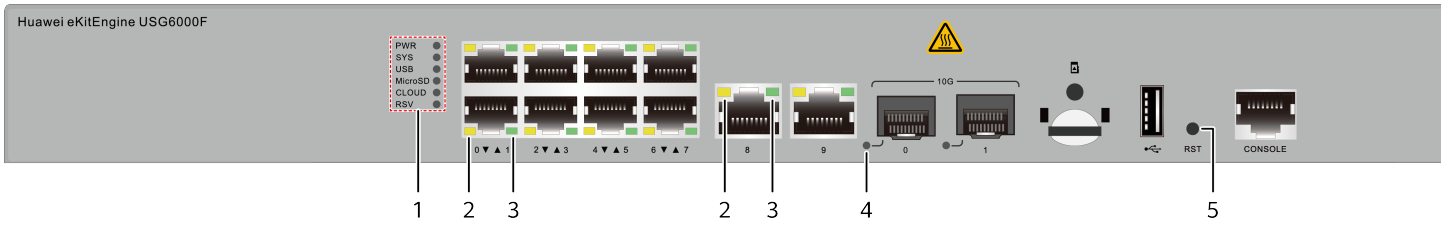
1. Product series ID	2. Indicator area	3. Fixed interface area	4. Registration/ deployment label	5. Protective ground terminal
6. SN label	7. MAC label	-	-	-

Table 3-9 Component functions

Name	Description
Product series ID	Indicates the product series of the device. For details about the product model, see the nameplate in the lower part of the device.
Indicator area	Provides various indicators to display the device running status in real time.
Fixed interface area	• Provides clip hole and power receptacle. • Provides service ports, USB ports, console ports, and out-of-band management ports for device configuration and maintenance. • Houses a Micro SD card to store logs and reports.
Registration/ deployment label	Scans the QR code for registration or deployment. If the device is not activated, use the eKit app to scan the QR code on the front panel of the device to obtain the verification code. Enter the verification code to activate the device.
Protective ground terminal	Connects the M4 OT terminal of a PGND cable to the cabinet or the ground bar in the equipment room.
SN label	Uniquely identifies the device, which needs to be provided for the local technical support personnel to apply for a license.
MAC label	Uniquely identifies the MAC address of the device, which is required during network forwarding configuration.

Indicators and Buttons

Figure 3-11 Indicators and Buttons of the USG6000F-S125



1. PWR, SYS, USB,MicroSD, CLOUD and RSV indicators	2. GE electrical port ACT indicator	3. GE electrical port LINK indicator	4. Optical port indicator	5. RST button

Table 3-10 Indicators on the USG6000F-S125

Silkscreen	Name	Color	Status	Description
PWR	Power indicator	Green	Steady on	The power module is working properly.
		-	Off	The power module is faulty or the device is not powered on.
SYS	SYS indicator	Green	Steady on	The system is being powered on or restarted.
		Green	Blinks once every 2 seconds (0.5 Hz).	The system is running normally.
		Green	Blinking four times every second (4 Hz)	The system is starting.
		Red	Steady on	A system fault occurs.
		-	Off	The system is not running.
USB	USB indicator	Green	Steady on	USB-based deployment has been completed.
		Green	Blinking four times every second (4 Hz)	The system is reading data from the USB flash drive.
		Red	Steady on	USB-based deployment fails.
		-	Off	USB-based deployment is disabled (default state).

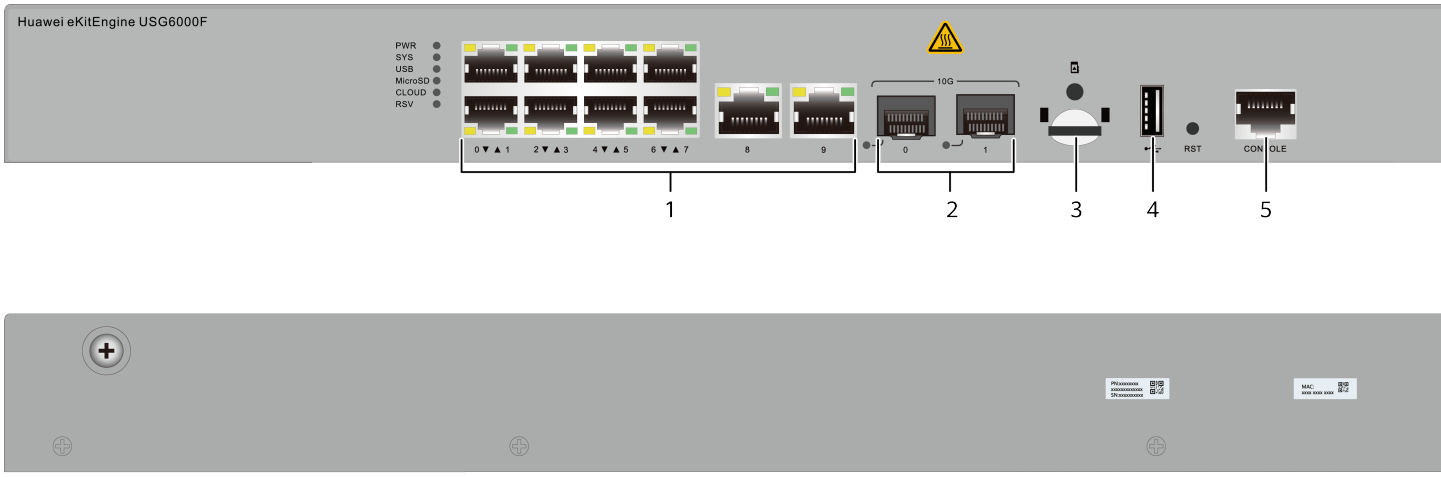
Silkscreen	Name	Color	Status	Description
CLOUD	CLOUD indicator	-	Off	Reserved function. This function is not enabled.
MicroSD	Micro SD indicator	Green	Steady on	The micro SD card is present.
		-	Off	The micro SD card is not detected.
-	ACT indicator of the GE electrical port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	The port is not sending or receiving data.
-	LINK indicator of the GE electrical ports	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	Optical port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.
RSV	RSV indicator	-	Off	Reserved function. This function is not enabled.

Table 3-11 Buttons on the USG6000F-S125

Silkscreen	Name	Description
RST	RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. This button enables you to restore the default settings with one click. To be specific, you can press and hold down the RST button for 5 seconds and then release it to restore the default settings and restart the device.

Ports

Figure 3-12 Ports of the USG6000F-S125



1. GE electrical port	2. 10GE optical port	3. Micro SD card slot	4. USB 2.0 port	5. Console port
6. Clip hole	7. Power receptacle	-	-	-

Table 3-12 Ports on the USG6000F-S125

Port	Connector Type	Description	Available Components
GE electrical ports (0 to 9)	RJ45	Ten 10/100/1000M autosensing Ethernet electrical ports, numbered from GE0/0/0 to GE0/0/9. GE0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through Ethernet cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device. **NOTE** For GE0/0/0 to GE0/0/7, 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.	**Ethernet Cable**

Port	Connector Type	Description	Available Components
10GE optical ports (0 and 1)	SFP+	Two 10GE auto-sensing Ethernet optical ports, numbered 10GE0/0/0 and 10GE0/0/1. They can be used as GE optical ports.	• **100Mbps SFP Optical Modules** • **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **10Gbps SFP+ Copper Modules** • **10Gbps SFP+ Optical Modules** • **GPON & EPON Optical Modules** • **10G GPON & EPON Optical Modules**
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 from Huawei if needed. You are advised to install an anti-theft board delivered with the device to protect the micro SD card.	BOM code: 02315NSC or 06010308, capacity: 64GB, dimensions (H x W x D): 1 mm x 15.00 mm x 11.00 mm(0.04 in. x 0.59 in. x 0.43 in.) **NOTE** Formatting is performed for devices with BOM code 02315NSC and not performed for devices with BOM code 06010308 before delivery.

Port	Connector Type	Description	Available Components
USB 2.0 port	USB 2.0 Type A	The USB port allows you to insert a USB flash drive for system software upgrades. For details about the upgrade through a USB flash drive, see the Upgrade Guide delivered with the version.	USB flash drive
Console port	RJ45	The console port is connected to a console for on-site configuration. You can use a console cable to connect the console port (RJ45) on the device to the COM port on your PC and use the terminal emulation program on the PC to access the CLI of the device to configure, manage, and maintain the device.	**Console Cable**
Clip hole	-	The hole is used to install the power cable clip, which is used to bind and fix the power cable.	Power cable clip
Power receptacle	-	The receptacle connects to the power cable.	Power cable

Power Supply System

The device has a built-in power module, which supplies power to the switch through a power cable.

Heat Dissipation System

The device has no fans and uses natural heat dissipation.

Technical Specifications

Table 3-13 Technical specifications of the USG6000F-S125-AC

Item	Specification
Installation Type	• Rack • Work bench
Cabinet installation standard	Cabinet with a depth of 600 mm or above
Dimensions without packaging (H x W x D) [mm(in.)]	• Typical dimensions (excluding the parts protruding from the body): 43.6 mm x 442 mm x 220 mm (1.72 in. x 17.40 in. x 8.66 in.) • Maximum dimensions (the depth is the distance from ports on the front panel to the handle on the rear panel): 43.6 mm x 442 mm x 253 mm (1.72 in. x 17.40 in. x 9.96 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	390 mm x 570 mm x 485 mm (15.35 in. x 22.44 in. x 19.09 in.)
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	3.27 kg (7.21 lb)
Weight without packaging [kg(lb)]	2.32 kg (5.11 lb)
CPU	1 CPU, 4 cores/CPU, up to 1.2 GHz
Memory	4 GB DDR4 ECC memory
NOR Flash	64 MB
NAND Flash	2 GB
Hard disk	Optional. Purchase one 64-GB micro SD card from Huawei as required.
Console port	RJ45
Eth Management port	RJ45
Typical power consumption [W]	20.98 W

Item	Specification
Typical heat dissipation [BTU/hour]	71.3 BTU/hour
Maximum power consumption [W]	27.4 W
Maximum heat dissipation [BTU/hour]	93.49 BTU/hour
MTBF [years]	62.57 years
MTTR [hours]	0.96 hours
Availability	0.999998
Power supply mode	Power adapter external
Number of power modules	1
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current [A]	0.8 A/power module
Rated output power [W]	32 W/12 V
Maximum output power [W]	32 W/power module
Types of fans	None
Number of fan modules	0
Heat dissipation mode	Has no fan and uses natural cooling.
PoE	Not supported
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F)
Storage temperature [°C(°F)]	–40°C to +70°C (–40°F to +158°F)
Storage environment	ETSI EN 300 019-1-1 Class 1.2 **NOTE** • The product has a valid storage period of one year. • The valid storage period refers to the period during which the product maintains the required quality when stored with packing materials in an environment that meets the preceding requirements.
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Storage relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)
Storage altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)

NOTE

- The width does not include the size of mounting ears.
- The height is 1U (1U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- 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.

3.1.4 USG6000F-S150

Overview

Table 3-14 Basic information about the USG6000F-S150

Description	Part Number	Model	First supported version
USG6000F-S150 AC Host (2*GE RJ45 + 8*GE COMBO + 2*10GE SFP+, 1* AC Power, Include SSL VPN 100 Users)	02356WMS	USG6000F-S150-AC	V600R025C00

Appearance

Figure 3-13 Appearance of the USG6000F-S150 (front view)

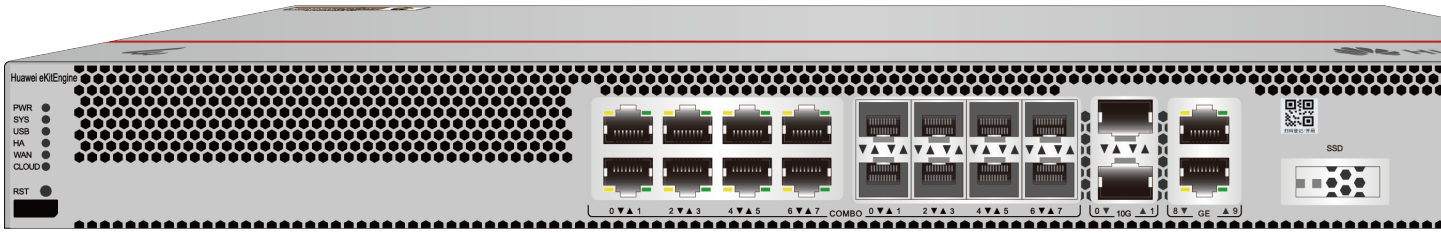
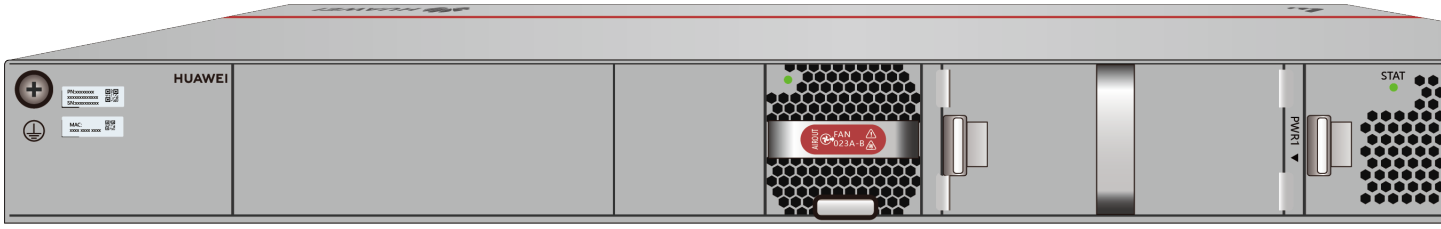
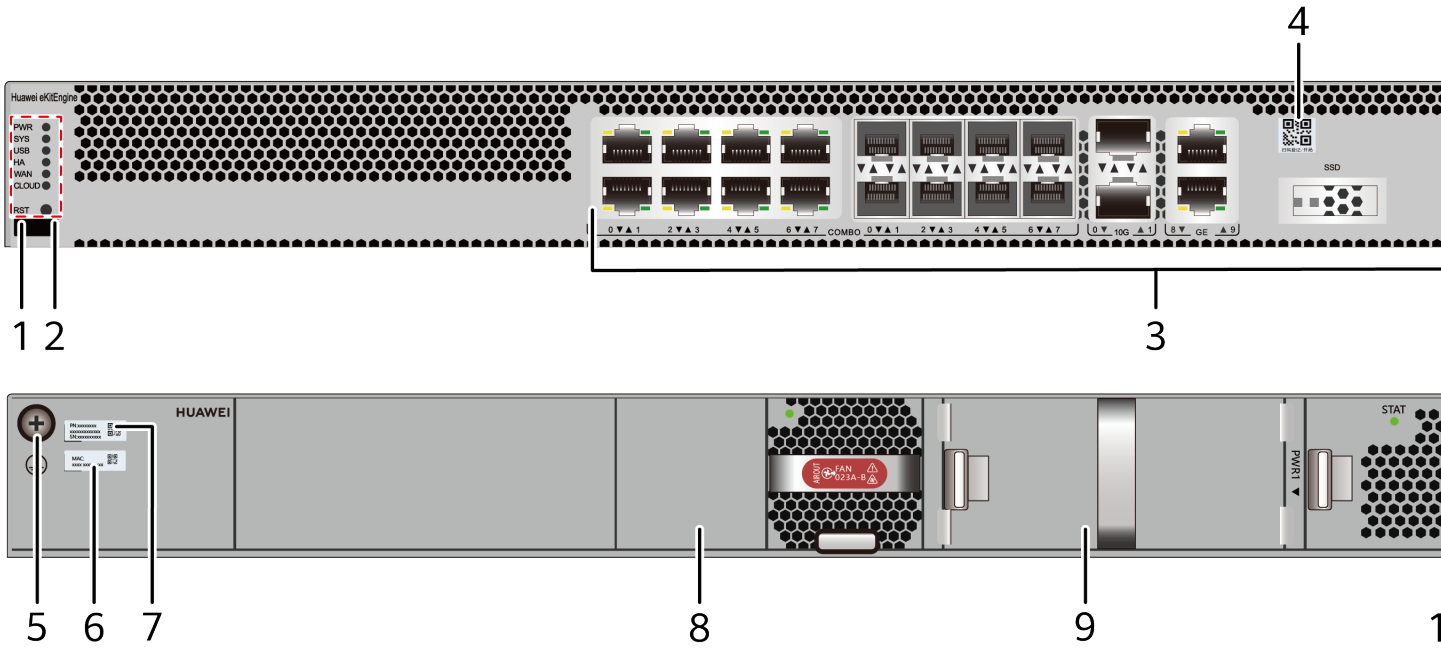


Figure 3-14 Appearance of the USG6000F-S150 (rear view)



Structure

Figure 3-15 Components of the USG6000F-S150



1. Product series ID	2. Indicator and button area	3. Fixed interface area	4. Registration/ deployment label	5. Protective ground terminal
6. MAC label	7. SN label	8. Fan module	9. Optional power module slot	10. Power module

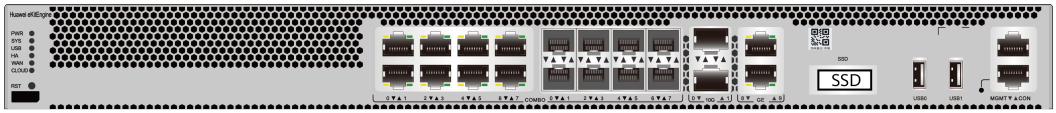
Table 3-15 Component functions

Name	Description
Product series ID	Indicates the product series of the device. For details about the product model, see the nameplate in the lower part of the device.
Indicator and button area	Provides multiple indicators to display the running status of the device in real time and provides the RSTand OFL buttons for emergency maintenance.
Fixed interface area	Provides service ports, USB ports, console ports, and out-of-band management ports for device configuration and maintenance.

Name	Description
Registration/ deployment label	Scans the QR code for registration or deployment. If the device is not activated, use the eKit app to scan the QR code on the front panel of the device to obtain the verification code. Enter the verification code to activate the device.
Protective ground terminal	Connects the M4 OT terminal of a PGND cable to the cabinet or the ground bar in the equipment room.
MAC label	Uniquely identifies the MAC address of the device, which is required during network forwarding configuration.
SN label	Uniquely identifies the device, which needs to be provided for the local technical support personnel to apply for a license.
Fan module	Dissipates heat for the device and is swappable. The fan module can be removed for no more than 1 minute.
Power module	Provides power input and distribution for the device. Two power modules are included in the standard configuration to provide 1+1 power redundancy. When one power module is running properly, the other one is hot swappable.

Slot Layout

Figure 3-16 Slot Layout of the USG6000F-S150



Front

Rear

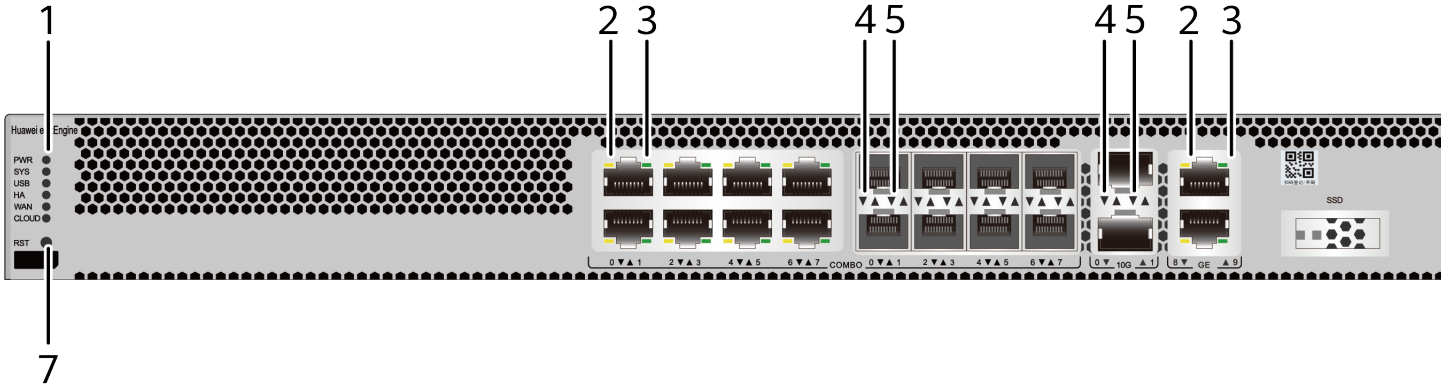
Table 3-16 Slots on the USG6000F-S150

Slot Type	Slot ID	Slot Direction	Remarks
SSD slot	-	Horizontal	M.2 SSDs (64 GB/240 GB/960 GB) can be configured.

Slot Type	Slot ID	Slot Direction	Remarks
Fan module (FAN) slot	-	Horizontal	If a fan module is faulty, replace it immediately.
Power module (PWR) slot	Slots 1 and 2	Horizontal	Power modules are plug-and-play.

Indicators and Buttons

Figure 3-17 Indicators and Buttons of the USG6000F-S150



1. PWR, SYS, USB, HA, WAN and CLOUD indicators	2. GE electrical port ACT indicator	3. GE electrical port LINK indicator	4. Optical port ACT indicator	5. Optical port LINK indicator
6. MGMT port indicator	7. RST button	-	-	-

NOTE

Arrowheads of optical ports show the positions of the ports. A down arrowhead indicates a port in the upper part, and an up arrowhead indicates a port in the lower part.

Table 3-17 Indicators on the USG6000F-S150

Silkscreen	Name	Color	Status	Description
PWR	Power indicator	Green	Steady on	The power module is working properly.

Silkscreen	Name	Color	Status	Description
		-	Off	The power module is faulty or the device is not powered on.
SYS	SYS indicator	Green	Steady on	The system is being powered on or restarted.
		Green	Blinks once every 2 seconds (0.5 Hz).	The system is running normally.
		Green	Blinking four times every second (4 Hz)	The system is starting.
		Red	Steady on	• The system is faulty. • The power supply is abnormal. • The fan module is abnormal. **NOTE** If the system starts with two power modules and one power module is not powered on, the SYS indicator is steady red, but the system is running properly.
		-	Off	The system is not running.
USB	USB indicator	Green	Steady on	USB-based deployment has been completed.

Silkscreen	Name	Color	Status	Description
		Green	Blinking four times every second (4 Hz)	The system is reading data from the USB flash drive.
		Red	Steady on	USB-based deployment fails.
		-	Off	USB-based deployment is disabled (default state).
HA	HA indicator	Green	Steady on	Hot backup, managing the master device
		Green	Blinks once every 2 seconds (0.5 Hz).	Hot backup, managing the slave device
		Red	Steady on	Dual-system hot backup is faulty.
		-	Off	The dual-system hot backup function is disabled.
WAN	WAN indicator	-	Off	Reserved function. This function is not enabled.
CLOUD	CLOUD indicator	-	Off	Reserved function. This function is not enabled.
-	ACT indicator of the GE electrical port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	The port is not sending or receiving data.

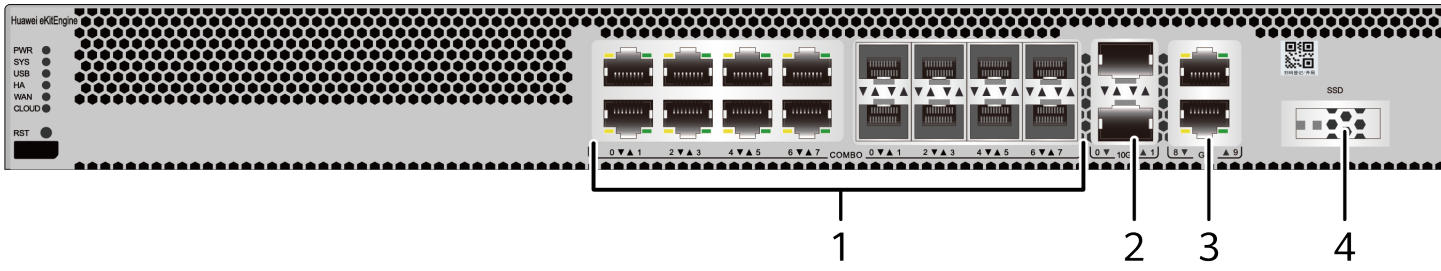
Silkscreen	Name	Color	Status	Description
-	LINK indicator of the GE electrical ports	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	LINK indicator of the optical port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	The port is not sending or receiving data.
-	LINK indicator of an optical port	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	MGMT port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.

Table 3-18 Buttons on the USG6000F-S150

Silkscreen	Name	Description
RST	RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. This button enables you to restore the default settings with one click. To be specific, you can press and hold down the RST button for 5 seconds and then release it to restore the default settings and restart the device.

Ports

Figure 3-18 Ports of the USG6000F-S150



1. Combo port	2. 10GE optical port	3. GE electrical port	4. SSD card slot	5. USB 2.0 port
6. Console port	7. MGMT port	-	-	-

Table 3-19 Ports on the USG6000F-S150

Port	Connector Type	Description	Available Components
Combo ports (0 to 7)	RJ45 + SFP	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 0/0/0 to GigabitEthernet 0/0/7. By default, the combo port is used as an electrical port. You can use the combo enable fiber /undo combo enable fiber command to set the working mode of combo ports according to network requirements.	• **Ethernet Cable** • **100Mbps SFP Optical Modules** • **1Gbps eSFP Optical Modules** • **GPON & EPON Optical Modules**

Port	Connector Type	Description	Available Components
		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.	
10GE optical ports (0 to 1)	SFP+	2 10GE optical ports numbered from 10GE0/0/0 to 10GE0/0/1, which can be reduced to GE optical ports. You can run the following command to switch the switch based on the networking requirements: speed 1000-switch to GE undo speed 1000-undo switch	• **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **10Gbps SFP+ Copper Modules** • **10Gbps SFP+ Optical Modules** • **GPON & EPON Optical Modules** • **10G GPON & EPON Optical Modules**
GE electrical ports (8 to 9)	RJ45	2 10/100/1000M autosensing Ethernet electrical ports, numbered from GE0/0/8~GE0/0/9.	**Ethernet Cable**
SSD card slot	-	The M.2 module is inserted to record logs and reports in real time. The M.2 module is optional. You can purchase the M.2 module as required.	• **Hard Disk Unit M.2-SATA64G-A** • **Hard Disk Unit M.2-SATA240G-A** • **Hard Disk Unit M.2-SATA960G-A** • **Hard Disk Unit M.2-SATA64G-B**

Port	Connector Type	Description	Available Components
USB 2.0 port or USB0	USB Type A	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 flash drive
USB 2.0 port or USB1	USB Type A	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 flash drive
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.	**Console Cable**

Port	Connector Type	Description	Available Components
MGMT port	RJ45	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is METH 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 device. **NOTE** The MGMT port cannot be used as a service port.	**Ethernet Cable**

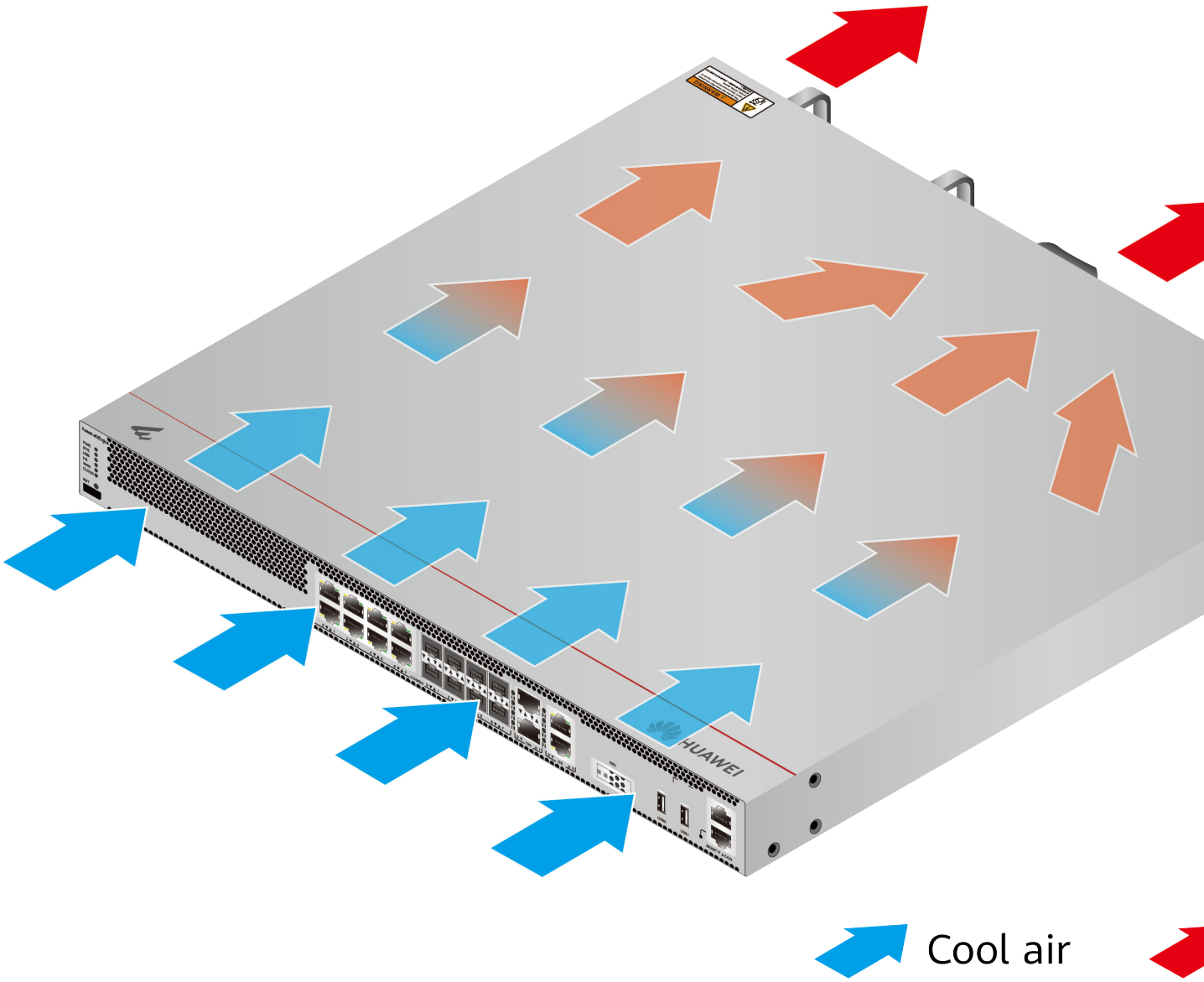
Power Supply System

The power supply system has one PAC60S12-AR AC power module. Two power modules can be configured for 1+1 power redundancy.

Heat Dissipation System

The heat dissipation system uses one FAN-023A-B module to dissipate heat for the system. From the front panel, the device provides a front-to-rear air flow. The fan module locates at the air exhaust of the system.

Figure 3-19 System air flow of the USG6000F-S150



Technical Specifications

Table 3-20 Technical specifications of the USG6000F-S150-AC

Item	Specification
Installation Type	• Rack • Work bench
Cabinet installation standard	Cabinet with a depth of 600 mm or above

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	• Typical dimensions (the depth excludes the parts protruding from the body): 43.6 mm x 442 mm x 420 mm (1.72 in. x 17.4 in. x 16.54 in.) • Maximum dimensions (the depth is the distance from ports on the front panel to the handle on the rear panel): 43.6 mm x 442 mm x 453 mm (1.72 in. x 17.4 in. x 17.83 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	175 mm x 550 mm x 650 mm (6.89 in. x 21.65 in. x 25.59 in.)
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	7.83 kg (17.26 lb)
Weight without packaging [kg(lb)]	5.46 kg (12.04 lb)
CPU	1 CPU, 4 cores/CPU, up to 1.4 GHz
Memory	8 GB DDR4 ECC memory
NOR Flash	64 MB
NAND Flash	2 GB
Hard disk	Optional, M.2 SSD, hot-swappable. For details, see the description of M.2 in Storage Devices > Hard Disk.
Console port	RJ45
Eth Management port	RJ45
Typical power consumption [W]	29.2 W
Typical heat dissipation [BTU/hour]	99.6 BTU/hour
Maximum power consumption [W]	49.5 W
Maximum heat dissipation [BTU/hour]	168.9 BTU/hour
MTBF [years]	68.98 years
MTTR [hours]	1 hours
Availability	0.999998
Power supply mode	AC pluggable
Number of power modules	1
Redundant power supply	Dual power modules can be purchased to form 1+1 redundancy backup.

Item	Specification
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 290 V, 47 Hz to 63 Hz
Maximum input current [A]	2 A/power module
Rated output power [W]	60 W/12 V
Maximum output power [W]	60 W/power module
Types of fans	Pluggable
Number of fan modules	1
Automatic fan speed adjustment	Supported
Heat dissipation mode	Absorbing cold air into the device
Airflow direction	Front-to-back airflow
PoE	Not supported
Noise at normal temperature (acoustic power) [db(A)]	≤55dB(A)
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F)
Storage temperature [°C(°F)]	–40°C to +70°C (–40°F to +158°F)
Storage environment	ETSI EN 300 019-1-1 Class 1.2 **NOTE** • The product has a valid storage period of one year. • The valid storage period refers to the period during which the product maintains the required quality when stored with packing materials in an environment that meets the preceding requirements.
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Storage relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)
Storage altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)

NOTE

- The width does not include the size of mounting ears.
- The height is 1U (1U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- 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.

3.1.5 USG6000F-S200

Overview

Table 3-21 Basic information about the USG6000F-S200

Description	Part Number	Model	First supported version
USG6000F-S200-AC Host(16*GE RJ45 + 8*GE COMBO + 2*10GE SFP+, Supporting bypass, 1*AC power, including 100 SSL VPN users)	02356PXU	USG6000F-S200-AC	V600R024C10

Appearance

Figure 3-20 Appearance of the USG6000F-S200 (front view)

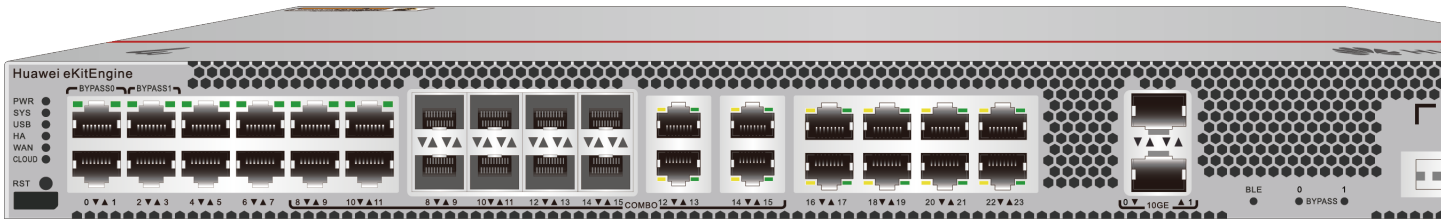
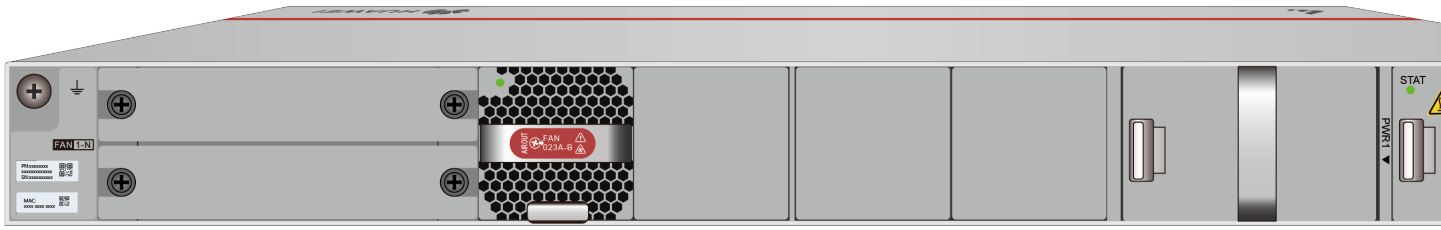
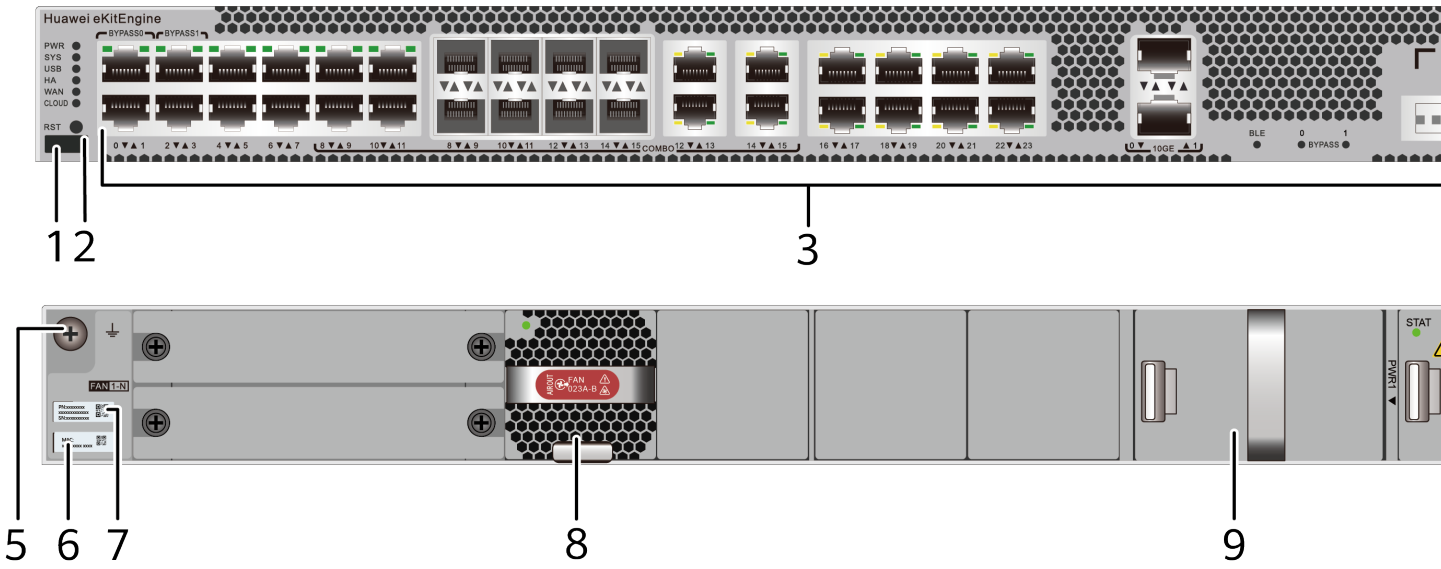


Figure 3-21 Appearance of the USG6000F-S200 (rear view)



Structure

Figure 3-22 Components of the USG6000F-S200



1. Product series ID	2. Indicator and button area	3. Fixed interface area	4. Registration/ deployment label	5. Protective ground terminal
6. MAC label	7. SN label	8. Fan module	9. Optional power module slot	10. Power module

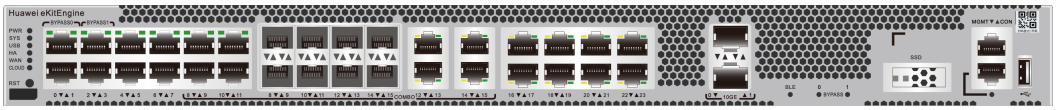
Table 3-22 Component functions

Name	Description
Product series ID	Indicates the product series of the device. For details about the product model, see the nameplate in the lower part of the device.
Indicator and button area	Provides multiple indicators to display the running status of the device in real time and provides the RST and OFL buttons for emergency maintenance.
Fixed interface area	Provides service ports, USB ports, console ports, and out-of-band management ports for device configuration and maintenance.
Protective ground terminal	Connects the M4 OT terminal of a PGND cable to the cabinet or the ground bar in the equipment room.

Name	Description
MAC label	Uniquely identifies the MAC address of the device, which is required during network forwarding configuration.
SN label	Uniquely identifies the device, which needs to be provided for the local technical support personnel to apply for a license.
Fan module	Dissipates heat for the device and is swappable. The fan module can be removed for no more than 1 minute.
Power module	Provides power input and distribution for the device. Two power modules are included in the standard configuration to provide 1+1 power redundancy. When one power module is running properly, the other one is hot swappable.

Slot Layout

Figure 3-23 Slot Layout of the USG6000F-S200



Front

Rear

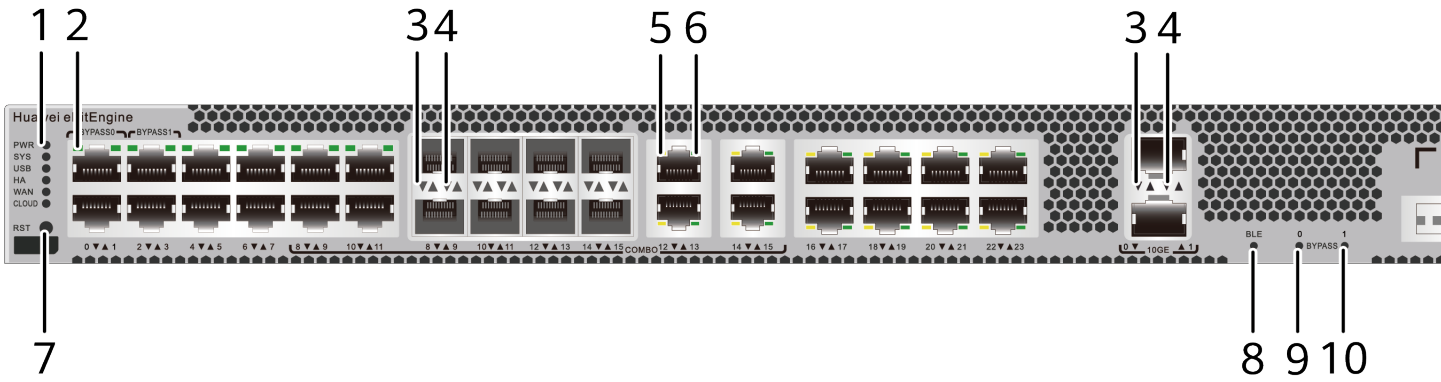
Table 3-23 Slots on the USG6000F-S200

Slot Type	Slot ID	Slot Direction	Remarks
SSD slot	-	Horizontal	M.2 SSDs (64 GB/240 GB/960 GB) can be configured.

Slot Type	Slot ID	Slot Direction	Remarks
Fan module (FAN) slot	1	Horizontal	At the normal temperature range, the system can operate properly for a short time after a single fan module fails. You are advised to replace the faulty fan module immediately.
Power module (PWR) slot	Slots 1 and 2	Horizontal	Power modules are plug-and-play.

Indicators and Buttons

Figure 3-24 Indicators and Buttons of the USG6000F-S200



1. PWR, SYS, USB, HA, WAN and CLOUD indicators	2. GE electrical port indicator	3. Optical port ACT indicator	4. Optical port LINK indicator	5. GE electrical port ACT indicator
6. GE electrical port LINK indicator	7. RST button	8. BLE indicator	9. BYPASS 0 indicator	10. BYPASS 1 indicator
11. MGMT port indicator	-	-	-	-

NOTE

Arrowheads of optical ports show the positions of the ports. A down arrowhead indicates a port in the upper part, and an up arrowhead indicates a port in the lower part.

Table 3-24 Indicators on the USG6000F-S200

Silkscreen	Name	Color	Status	Description
PWR	Power indicator	Green	Steady on	The power module is working properly.
		-	Off	The power module is faulty or the device is not powered on.
SYS	SYS indicator	Green	Steady on	The system is being powered on or restarted.
		Green	Blinks once every 2 seconds (0.5 Hz).	The system is running normally.
		Green	Blinking four times every second (4 Hz)	The system is starting.

Silkscreen	Name	Color	Status	Description
		Red	Steady on	• The system is faulty. • The power supply is abnormal. • The fan module is abnormal. **NOTE** If the system starts with two power modules and one power module is not powered on, the SYS indicator is steady red, but the system is running properly.
		-	Off	The system is not running.
USB	USB indicator	Green	Steady on	USB-based deployment has been completed.
		Green	Blinking four times every second (4 Hz)	The system is reading data from the USB flash drive.
		Red	Steady on	USB-based deployment fails.
		-	Off	USB-based deployment is disabled (default state).
HA	HA indicator	Green	Steady on	Hot backup, managing the master device

Silkscreen	Name	Color	Status	Description
		Green	Blinks once every 2 seconds (0.5 Hz).	Hot backup, managing the slave device
		Red	Steady on	Dual-system hot backup is faulty.
		-	Off	The dual-system hot backup function is disabled.
WAN	WAN indicator	-	Off	Reserved function. This function is not enabled.
CLOUD	CLOUD indicator	-	Off	Reserved function. This function is not enabled.
BLE	BLE indicator	-	Off	Reserved function. This function is not enabled.
BYPASS	BYPASS indicator 0	Green	Steady on	The device is powered on. BYPASS0 is in short-circuit protection state.
		Green	Blinks once every 2 seconds (0.5 Hz).	The device is powered on. BYPASS0 is in normal state.
		-	Off	The device is powered off. BYPASS0 is in short-circuit protection state.

Silkscreen	Name	Color	Status	Description
BYPASS	BYPASS indicator 1	Green	Steady on	The device is powered on. BYPASS1 is in short-circuit protection state.
		Green	Blinks once every 2 seconds (0.5 Hz).	The device is powered on. BYPASS1 is in normal state.
		-	Off	The device is powered off. BYPASS1 is in short-circuit protection state.
-	GE electrical port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.
-	ACT indicator of the GE electrical port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	The port is not sending or receiving data.
-	LINK indicator of the GE electrical ports	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	LINK indicator of the optical port	Yellow	Blinking (12 Hz)	The port is sending or receiving data.

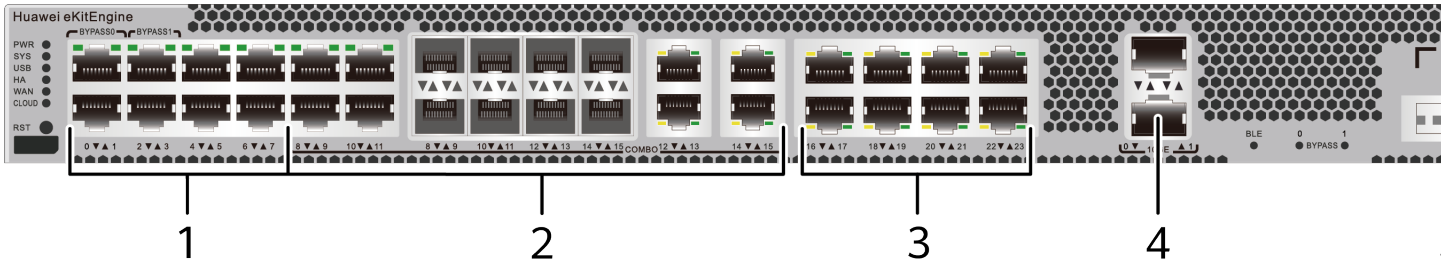
Silkscreen	Name	Color	Status	Description
		-	Off	The port is not sending or receiving data.
-	LINK indicator of an optical port	Green	Steady on	The port link is connected.
		-	Off	No link is established on the port.
-	MGMT port indicator	Green	Steady on	The port link is connected.
		Green	Blinking (12 Hz)	The port is sending or receiving data.
		-	Off	No link is established on the port.

Table 3-25 Buttons on the USG6000F-S200

Silkscreen	Name	Description
RST	RST button	To restart the device, press the RST button. Ensure that the running configuration is saved before pressing the RST button. This button enables you to restore the default settings with one click. To be specific, you can press and hold down the RST button for 5 seconds and then release it to restore the default settings and restart the device.

Ports

Figure 3-25 Ports of the USG6000F-S200



1. GE electrical port	2. Combo port	3. GE electrical port	4. 10GE optical port	5. SSD card slot
6. Console port	7. MGMT port	8. USB 2.0 port	-	-

Table 3-26 Ports on the USG6000F-S200

Port	Connector Type	Description	Available Components
GE electrical ports (0-7)	RJ45	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GE0/0/0~GE0/0/7. Among the four GE ports from GE0/0/0 to GE0/0/3, GE0/0/0 and GE0/0/1 are a pair of two bypass interfaces, and GE0/0/2 and GE0/0/3 are another pair. When the interfaces of each bypass interface pair work at Layer 2, they can form an electrical bypass link. For more information about bypass, see High Availability Configuration > Hardware Bypass Configuration in the Configuration Guide.	**Ethernet Cable**

Port	Connector Type	Description	Available Components
Combo ports (8-15)	RJ45 + SFP	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 GE0/0/8 to GE0/0/15. By default, the combo port works as an electrical port. You can run the combo enable fiber command to enable the combo port to work as an optical port or run the undo combo enable fiber command to enable the combo port to work as an electrical port based on networking requirements.	• **Ethernet Cable** • **100Mbps SFP Optical Modules** • **1Gbps eSFP Optical Modules** • **GPON & EPON Optical Modules**

Port	Connector Type	Description	Available Components
		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.	
GE electrical ports (16-23)	RJ45	8 10/100/1000M autosensing Ethernet electrical ports, numbered from GE0/0/16~GE0/0/23.	**Ethernet Cable**
10GE optical ports (0-1)	SFP+	Two 10GE auto-sensing Ethernet optical ports numbered from 10GE0/0/0 to 10GE0/0/1. They can be used as GE optical ports.	• **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **10Gbps SFP+ Copper Modules** • **10Gbps SFP+ Optical Modules** • **GPON & EPON Optical Modules** • **10G GPON & EPON Optical Modules**

Port	Connector Type	Description	Available Components
SSD card slot	-	The M.2 module is inserted to record logs and reports in real time. The M.2 module is optional. You can purchase the M.2 module as required.	• **Hard Disk Unit M.2-SATA64G-A** • **Hard Disk Unit M.2-SATA240G-A** • **Hard Disk Unit M.2-SATA960G-A** • **Hard Disk Unit M.2-SATA64G-B**
USB 2.0 port	USB Type A	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 flash drive
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.	**Console Cable**

Port	Connector Type	Description	Available Components
MGMT port	RJ45	Out-of-band 10/100/1000M RJ45 autosensing Ethernet management port. The interface number is METH 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 device. **NOTE** The MGMT port cannot be used as a service port.	**Ethernet Cable**

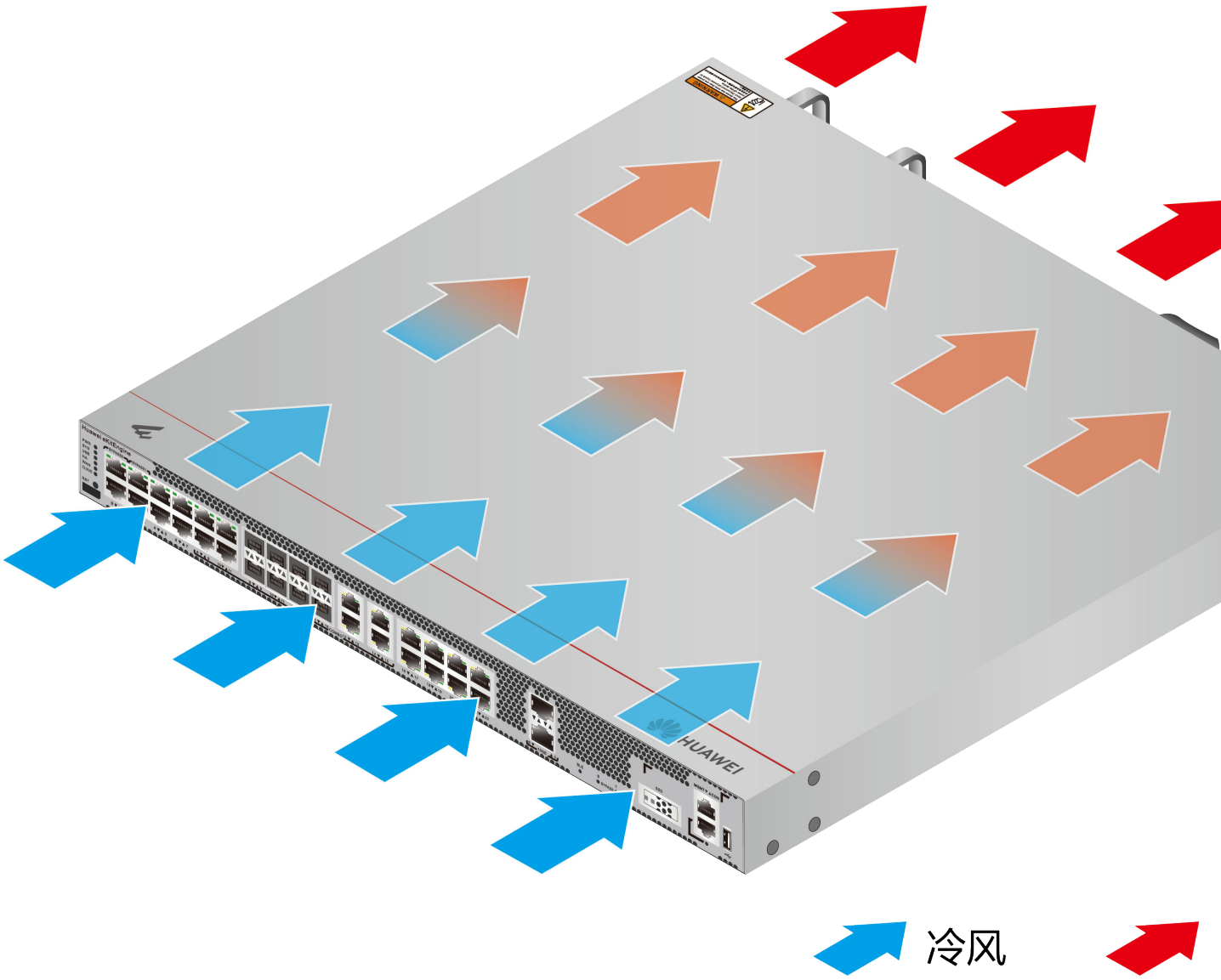
Power Supply System

The power supply system has one PAC80S12-CN or two for 1+1 powerredundancy. In high-voltage 240 V DC scenarios, the AC power module PAC180S12-CN can be configured.

Heat Dissipation System

The heat dissipation system uses one FAN-023A-B module to dissipate heat for the system. From the front panel, the device provides a front-to-rear air flow. The fan module locates at the air exhaust of the system.

Figure 3-26 System air flow of the USG6000F-S200



Technical Specifications

Table 3-27 Technical specifications of the USG6000F-S200-AC

Item	Specification
Installation Type	• Rack • Work bench
Cabinet installation standard	Cabinet with a depth of 600 mm or above

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	• Typical dimensions (the depth excludes the parts protruding from the body): 43.6 mm x 442 mm x 420 mm (1.72 in. x 17.4 in. x 16.54 in.) • Maximum dimensions (the depth is the distance from ports on the front panel to the handle on the rear panel): 43.6 mm x 442 mm x 453 mm (1.72 in. x 17.4 in. x 17.83 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	175 mm x 550 mm x 650 mm (6.89 in. x 21.65 in. x 25.59 in.)
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	8.786 kg (19.37 lb)
Weight without packaging [kg(lb)]	5.816 kg (12.82 lb)
CPU	1 CPU, 8 cores/CPU, up to 2.2 GHz
Memory	8 GB DDR4 ECC memory
NOR Flash	16 MB
NAND Flash	2 GB
Hard disk	Optional, M.2 SSD, hot-swappable. For details, see the description of M.2 in Storage Devices > Hard Disk.
Console port	RJ45
Eth Management port	RJ45
Typical power consumption [W]	45.19 W
Typical heat dissipation [BTU/hour]	154.2 BTU/hour
Maximum power consumption [W]	53.2 W
Maximum heat dissipation [BTU/hour]	181.5 BTU/hour
MTBF [years]	33.48 years
MTTR [hours]	1 hours
Availability	0.999997
Power supply mode	AC pluggable
Number of power modules	1
Redundant power supply	Dual power modules can be purchased to form 1+1 redundancy backup.

Item	Specification
Rated input voltage [V]	• AC: 100 V to 240 V, 50 Hz/60 Hz @ 80 W/180 W power module • High-voltage DC: 240 V DC @180 W power module
Input voltage range [V]	• AC: 90 V to 290 V, 45 Hz to 65 Hz @ 80 W/180 W power module • High-voltage DC: 190 V DC to 290 V DC @180 W power module
Maximum input current [A]	• 80 W power module: 2 A • 180 W power module: 3 A
Rated output power [W]	• 80 W/12 V@80 W power module • 180 W/12 V@180 W power module
Maximum output power [W]	• 80 W/80 W power module • 180 W/180 W power module
Types of fans	Pluggable
Number of fan modules	1
Automatic fan speed adjustment	Supported
Heat dissipation mode	Absorbing cold air into the device
Airflow direction	Front-to-back airflow
PoE	Not supported
Noise at normal temperature (acoustic power) [db(A)]	≤55dB(A)
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F)
Storage temperature [°C(°F)]	–40°C to +70°C (–40°F to +158°F)
Storage environment	ETSI EN 300 019-1-1 Class 1.2 **NOTE** • The product has a valid storage period of one year. • The valid storage period refers to the period during which the product maintains the required quality when stored with packing materials in an environment that meets the preceding requirements.
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Storage relative humidity [RH]	5% RH to 95% RH, non-condensing

Item	Specification
Long-term operating altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)
Storage altitude [m(ft.)]	0 m to 5000 m (0 ft to 16404 ft)

NOTE

- The width does not include the size of mounting ears.
- The height is 1U (1U = 1.75 inches, or about 44.45 mm), which is a height unit defined in International Electrotechnical Commission (IEC) 60297 standards.
- 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.

3.2 Power Modules

This chapter describes hardware information for power modules of the USG6000F-S, including hardware appearance, functions, and technical specifications.

3.2.1 PAC180S12-CN (180W AC Power Module(no fan, small form factor))

Overview

Table 3-28 Basic information about the PAC180S12-CN

Item	Details
Description	180W AC Power Module(no fan, small form factor)
Part Number	02131754
Model	PAC180S12-CN

Appearance

Figure 3-27 Appearance of the PAC180S12-CN

Version Mapping

Table 3-29 Mappings between PAC180S12-CN and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-28 Panel of the PAC180S12-CN

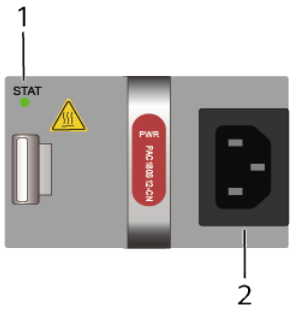


Table 3-30 Indicators on the PAC180S12-CN

Silkscreen	Name	Color	Status	Description
STAT	Power status indicator	Green	Steady on	Power output of the AC power module is normal.
		-	Off	• Power input of the AC power module is abnormal (no input, input overvoltage, or input undervoltage). • Power output of the AC power module is abnormal (undervoltage or overtemperature).

Table 3-31 Ports on the PAC180S12-CN

Port	Connector Type	Description	Available Components
Power receptacle	C13 straight female	Connect the C13 plug of the AC power cable. For details about AC power cables, see AC Power Cables.	C13 AC power cable

Functions and Features

Table 3-32 Functions and features of the PAC180S12-CN

Functions and Features	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	Natural heat dissipation
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Technical Specifications

Table 3-33 Technical specifications of the PAC180S12-CN

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	39.6 mm(in.) x 66 mm(in.) x 215 mm(in.)
Weight without packaging [kg(lb)]	1 kg (2.2 lb)
Rated input voltage [V]	• AC: 100 V to 240 V, 50 Hz or 60 Hz • High-voltage DC: 240 V, DC
Input voltage range [V]	• AC: 90 V to 290 V, 45 Hz to 65 Hz • High-voltage DC: 190–290 V, DC
Maximum input current [A]	3 A (100 V AC to 240 V AC) 2 A (240 V DC)
Rated output voltage [V]	12 V
Rated output current [A]	15 A
Rated output power [W]	180 W
Hot swapping	Supported
Type of power cables	C13

3.2.2 PAC60S12-AR (60W AC Power Module)

Overview

Table 3-34 Basic information about the PAC60S12-AR

Item	Details
Description	60W AC Power Module
Part Number	02312SLE
Model	PAC60S12-AR

Appearance

Figure 3-29 Appearance of the PAC60S12-AR

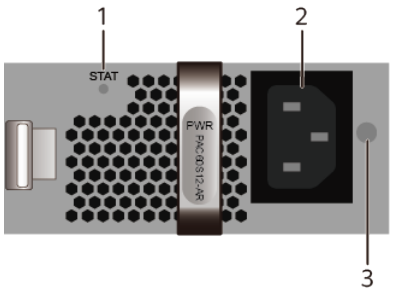
Version Mapping

Table 3-35 Mappings between PAC60S12-AR and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-

Panel

Figure 3-30 Panel of the PAC60S12-AR



1. Power status indicator	2. Power receptacle	3. Clip hole

Table 3-36 Indicators on the PAC60S12-AR

Silkscreen	Name	Color	Status	Description
STAT	Power status indicator	Green	Steady on	Power output of the AC power module is normal.
		Green	Blinking	The output power is out of range. For example, overvoltage, overcurrent, or short circuit has occurred.
		-	Off	• Power input of the AC power module is abnormal (no input, input overvoltage, or input undervoltage). • Power output of the AC power module is abnormal (undervoltage or overtemperature).

Table 3-37 Ports on the PAC60S12-AR

Port	Connector Type	Description	Available Components
Power receptacle	C13 straight female	Connect the C13 plug of the AC power cable. For details about AC power cables, see AC Power Cables.	C13 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.	-

Functions and Features

Table 3-38 Functions and features of the PAC60S12-AR

Functions and Features	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.

Functions and Features	Description
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 60 W power module without interrupting device operation.

Technical Specifications

Table 3-39 Technical specifications of the PAC60S12-AR

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	39.8 mm x 90 mm x 214.3 mm (1.57 in. x 3.54 in. x 8.44 in.)
Weight without packaging [kg(lb)]	0.68 kg (1.5 lb)
Number of inputs	1
Rated input voltage [V]	100 V AC to 240 V AC (50 Hz/60 Hz)
Input voltage range [V]	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current [A]	2 A
Rated output voltage [V]	12 V
Rated output current [A]	5 A
Rated output power [W]	60 W
Power dissipation Mode	Fanless design and natural heat dissipation
Hot swapping	Supported
Type of power cables	C13

3.2.3 PAC80S12-CN (80W AC Power Module(no fan, small form factor))

Overview

Table 3-40 Basic information about the PAC80S12-CN

Item	Details
Description	80W AC Power Module(no fan, small form factor)
Part Number	02131835
Model	PAC80S12-CN

Appearance

Figure 3-31 Appearance of the PAC80S12-CN

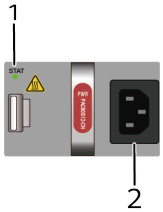
Version Mapping

Table 3-41 Mappings between PAC80S12-CN and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-32 Panel of the PAC80S12-CN



1. Power status indicator	2. Power receptacle

Table 3-42 Indicators on the PAC80S12-CN

Silkscreen	Name	Color	Status	Description
STAT	Power status indicator	Green	Steady on	Power output of the AC power module is normal.
		-	Off	• Power input of the AC power module is abnormal (no input, input overvoltage, or input undervoltage). • Power output of the AC power module is abnormal (undervoltage or overtemperature).

Table 3-43 Ports on the PAC80S12-CN

Port	Connector Type	Description	Available Components
Power receptacle	C13 straight female	Connect the C13 plug of the AC power cable. For details about AC power cables, see AC Power Cables.	C13 AC power cable

Functions and Features

Table 3-44 Functions and features of the PAC80S12-CN

Functions and Features	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	Natural heat dissipation
Hot swap	The device has 1+1 power module redundancy. You can hot-swap a power module without interrupting device operation.

Technical Specifications

Table 3-45 Technical specifications of the PAC80S12-CN

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	39.6 mm(in.) x 66 mm(in.) x 215 mm(in.)
Weight without packaging [kg(lb)]	1 kg (2.2 lb)
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 290 V, 45 Hz to 66 Hz
Maximum input current [A]	2 A
Rated output voltage [V]	12 V
Rated output current [A]	6.67 A
Rated output power [W]	80 W
Hot swapping	Supported
Type of power cables	C13

3.3 Fan Modules

This chapter describes hardware information for all fan modules of the USG6000F-S, including hardware appearance, and technical specifications.

3.3.1 FAN-023A-B (FAN-023A-B,Fan box(B,FAN panel side exhaust))

Overview

Table 3-46 Basic information about the FAN-023A-B

Item	Details
Description	FAN-023A-B,Fan box(B,FAN panel side exhaust)
Part Number	02312DKW
Model	FAN-023A-B

Appearance

Figure 3-33 Appearance of the FAN-023A-B

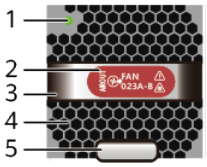
Version Mapping

Table 3-47 Mappings between FAN-023A-B and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-34 Panel of the FAN-023A-B



1. Indicator	2. Airflow flag  : back-to-front airflow	3. Handle
4. Fan air vent	5. Lock	-

Table 3-48 Indicators on the FAN-023A-B

Silkscreen	Name	Color	Status	Description
-	Fan module indicator	Green	Blinking once every 2 seconds (0.5 Hz)	The fan module is running properly.
		Red	Steady on	The fan module is faulty and needs to be replaced. For details about the alarm information, see VCMU_1.3.6.1.4.1.2011.5.25.219.2.6.1 hwFanRemove and VCMU_1.3.6.1.4.1.2011.5.25.219.2.6.3 hwFanFail.
		Red	Blinking once every 2 seconds (0.5 Hz)	The fan module has an alarm, and the alarm must be handled as soon as possible. For details about the alarm information, see VCMU_1.3.6.1.4.1.2011.5.25.219.2.6.5 hwFanInvalid.
		-	Steady off	The fan module is absent.

Functions and Features

Table 3-49 Functions and features of the FAN-023A-B

Functions and Features	Description
Basic function	The fan module is hot swappable and consists of a fan tray, fans, and light pipe.
Automatic fan speed adjustment	When the fan modules communicate normally with the MPU, the MPU controls the speed of fans according to temperature of the chassis.
Hot swapping	Supported
Heat dissipation	Back-to-front airflow

Technical Specifications

Table 3-50 Technical specifications of the FAN-023A-B

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	40 mm x 40 mm x 100.3 mm (1.57 in. x 1.57 in. x 3.95 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Number of fans	1
Typical power consumption [W]	7.2 W
Operating voltage range [V]	7 V DC to 15 V DC
Maximum airflow [CFM]	25.29 CFM
Maximum noise level [dB(A)]	59 dB(A)
Maximum wind pressure [Pa]	531.94 Pa
Airflow direction	Air extraction

3.4 Storage Devices

This chapter describes hardware information for hard disk modules of the USG6000F-S, including hardware appearance, functions, and technical specifications.

3.4.1 Hard Disk

3.4.1.1 M.2-SATA240G-A (M.2 SSD,SATA 6Gb/s-240GB,Hot-Swappable)

Overview

Table 3-51 Basic information about the M.2-SATA240G-A

Item	Details
Description	M.2 SSD,SATA 6Gb/s-240GB,Hot-Swappable
Part Number	02312DLK
Model	M.2-SATA240G-A

Appearance

Figure 3-35 Appearance of the M.2-SATA240G-A

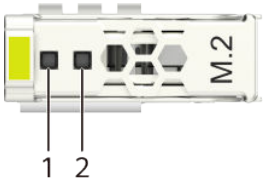
Version Mapping

Table 3-52 Mappings between M.2-SATA240G-A and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-36 Panel of the M.2-SATA240G-A



1. ALM indicator	2. RUN indicator

Table 3-53 Indicators on the M.2-SATA240G-A

Silkscreen	Name	Color	Status	Description
-	ALM indicator	Orange	Steady on	The hard disk fails.
		-	Off	The hard disk is running properly.
-	RUN indicator	Green	Steady on	The hard disk is in position.
		Green	Blinking	Data is being read from or written to the hard disk.
		-	Off	The hard disk is not detected or the device is not powered on.

Functions and Features

Table 3-54 Functions and features of the M.2-SATA240G-A

Functions and Features	Description
Basic functions	Storage log.
Hot swap	Supports hot swap.
Restrictions and limitations	Do not low-level format the hard disk. Otherwise, the hard disk cannot be used.

Technical Specifications

Table 3-55 Technical specifications of the M.2-SATA240G-A

Item	Specification
Form factor	M.2

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	10 mm x 25 mm x 110 mm (0.39 in. x 0.98 in. x 4.33 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Storage capacity [GB]	240
Port type	SATA
Maximum power consumption [W]	5 W
Maximum heat dissipation [BTU/hour]	5 BTU/hour

3.4.1.2 M.2-SATA64G-A (M.2 SSD,SATA 6Gb/s-64GB,Hot-Swappable)

Overview

Table 3-56 Basic information about the M.2-SATA64G-A

Item	Details
Description	M.2 SSD,SATA 6Gb/s-64GB,Hot-Swappable
Part Number	02312DLJ
Model	M.2-SATA64G-A

Appearance

Figure 3-37 Appearance of the M.2-SATA64G-A

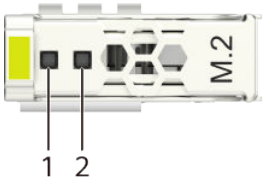
Version Mapping

Table 3-57 Mappings between M.2-SATA64G-A and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-38 Panel of the M.2-SATA64G-A



1. ALM indicator	2. RUN indicator

Table 3-58 Indicators on the M.2-SATA64G-A

Silkscreen	Name	Color	Status	Description
-	ALM indicator	Orange	Steady on	The hard disk fails.
		-	Off	The hard disk is running properly.
-	RUN indicator	Green	Steady on	The hard disk is in position.
		Green	Blinking	Data is being read from or written to the hard disk.

Silkscreen	Name	Color	Status	Description
		-	Off	The hard disk is not detected or the device is not powered on.

Functions and Features

Table 3-59 Functions and features of the M.2-SATA64G-A

Functions and Features	Description
Basic functions	Storage log.
Hot swap	Supports hot swap.
Restrictions and limitations	Do not low-level format the hard disk. Otherwise, the hard disk cannot be used.

Technical Specifications

Table 3-60 Technical specifications of the M.2-SATA64G-A

Item	Specification
Form factor	M.2
Dimensions without packaging (H x W x D) [mm(in.)]	10 mm x 25 mm x 110 mm (0.39 in. x 0.98 in. x 4.33 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Storage capacity [GB]	64
Port type	SATA
Maximum power consumption [W]	2.7 W
Maximum heat dissipation [BTU/hour]	2.7 BTU/hour

3.4.1.3 M.2-SATA64G-B (M.2 SSD,SATA 6Gb/s-64GB,Hot-Swappable)

Overview

Table 3-61 Basic information about the M.2-SATA64G-B

Item	Details
Description	M.2 SSD,SATA 6Gb/s-64GB,Hot-Swappable
Part Number	02314JAM
Model	M.2-SATA64G-B

Appearance

Figure 3-39 Appearance of the M.2-SATA64G-B

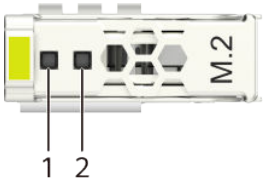
Version Mapping

Table 3-62 Mappings between M.2-SATA64G-B and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-40 Panel of the M.2-SATA64G-B



1. ALM indicator	2. RUN indicator

Table 3-63 Indicators on the M.2-SATA64G-B

Silkscreen	Name	Color	Status	Description
-	ALM indicator	Orange	Steady on	The hard disk fails.
		-	Off	The hard disk is running properly.
-	RUN indicator	Green	Steady on	The hard disk is in position.
		Green	Blinking	Data is being read from or written to the hard disk.
		-	Off	The hard disk is not detected or the device is not powered on.

Functions and Features

Table 3-64 Functions and features of the M.2-SATA64G-B

Functions and Features	Description
Basic functions	Storage log.
Hot swap	Supports hot swap.
Restrictions and limitations	Do not low-level format the hard disk. Otherwise, the hard disk cannot be used.

Technical Specifications

Table 3-65 Technical specifications of the M.2-SATA64G-B

Item	Specification
Form factor	M.2

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	10 mm x 25 mm x 110 mm (0.39 in. x 0.98 in. x 4.33 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Storage capacity [GB]	64
Port type	SATA
Maximum power consumption [W]	2.7 W
Maximum heat dissipation [BTU/hour]	2.7 BTU/hour

3.4.1.4 M.2-SATA960G-A (M.2 SSD,SATA 6Gb/s-960GB,Hot-Swappable)

Overview

Table 3-66 Basic information about the M.2-SATA960G-A

Item	Details
Description	M.2 SSD,SATA 6Gb/s-960GB,Hot-Swappable
Part Number	02313XEF
Model	M.2-SATA960G-A

Appearance

Figure 3-41 Appearance of the M.2-SATA960G-A

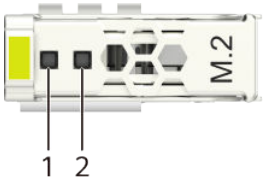
Version Mapping

Table 3-67 Mappings between M.2-SATA960G-A and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
USG6000F-S150	USG6000F-S150-AC (02356WMS)	V600R025C00	-	-
USG6000F-S200	USG6000F-S200-AC (02356PXU)	V600R024C10	-	-

Panel

Figure 3-42 Panel of the M.2-SATA960G-A



1. ALM indicator	2. RUN indicator

Table 3-68 Indicators on the M.2-SATA960G-A

Silkscreen	Name	Color	Status	Description
-	ALM indicator	Orange	Steady on	The hard disk fails.
		-	Off	The hard disk is running properly.
-	RUN indicator	Green	Steady on	The hard disk is in position.
		Green	Blinking	Data is being read from or written to the hard disk.

Silkscreen	Name	Color	Status	Description
		-	Off	The hard disk is not detected or the device is not powered on.

Functions and Features

Table 3-69 Functions and features of the M.2-SATA960G-A

Functions and Features	Description
Basic functions	Storage log.
Hot swap	Supports hot swap.
Restrictions and limitations	Do not low-level format the hard disk. Otherwise, the hard disk cannot be used.

Technical Specifications

Table 3-70 Technical specifications of the M.2-SATA960G-A

Item	Specification
Form factor	M.2
Dimensions without packaging (H x W x D) [mm(in.)]	10 mm x 25 mm x 110 mm (0.39 in. x 0.98 in. x 4.33 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Storage capacity [GB]	960
Port type	SATA
Maximum power consumption [W]	5 W
Maximum heat dissipation [BTU/hour]	5 BTU/hour

3.5 Optical/Electrical Modules

This chapter describes hardware information for optical/electrical modules of the USG6000F-S.

3.5.1 Before You Start

Before using the optical module, please understand the risk of using the non-certified optical module and how to How to Identify Huawei-Certified optical modules.

NOTICE

- A USG6000F-S must use optical modules that have been certified for use. Non-certified optical modules cannot ensure transmission reliability and may affect service stability. Huawei is not liable for any problem caused by the use of non-certified optical modules and will not fix such problems.
- The methods provided here are only for reference. To confirm whether optical modules you are using have been certified for use on Huawei USG6000F-S, contact Huawei technical support.

Risks of Using Non-Huawei-Certified Optical Modules

During certification of optical modules for USG6000F-S, Huawei completes comprehensive functionality verification to ensure quality of optical modules. The verified items include optical module plug/unplug, transmit optical power, receive optical power, signal transmission quality, data reading, error tolerance, compatibility, electromagnetic compatibility (EMC), and environmental parameters.

Non-Huawei-certified optical modules may cause the following problems:

- Non-standard structure and size cause failures to install optical modules on adjacent optical interfaces.

  Structures or sizes of some non-Huawei-certified optical modules do not comply with the Multi-Source Agreement (MSA). When such an optical module is installed on an optical interface, the size of this optical module hinders optical module installation on adjacent optical interfaces.
- Data bus defects cause suspension of a USG6000F-S's data bus.

  Some non-Huawei-certified optical modules have defects in data bus designs. Using such an optical module on a USG6000F-S causes suspension of the connected data bus on the . As a result, data on the suspended bus cannot be read.
- Improper edge connector size damages electronic devices of optical interfaces.

  If a non-Huawei-certified USG6000F-S optical module with improper edge connector size is used on an optical interface, electronic devices of the optical interface will be damaged by short circuits.
- Unnormalized temperature monitoring causes incorrect alarms.

  The temperature monitoring systems of some non-Huawei-certified USG6000F-S optical modules do not comply with industry standards and report temperature values higher than the real temperature. When such optical modules are used on a , the system will report incorrect temperature alarms.
- Improper register settings cause errors or failures in reading parameters or diagnostic information.

Some non-Huawei-certified USG6000F-S optical modules have improper register values on page A0, which can cause errors or failures when the system attempts to read parameters or diagnostic information from a data bus.

- Some non-Huawei-certified USG6000F-S optical modules are not designed in compliance with EMC standards and have low anti-interference capability. Additionally, they bring electromagnetic interference to nearby devices.
- The operating temperature ranges of non-Huawei-certified optical modules cannot meet service requirements. When they are used under relatively high temperature, the optical power decreases, resulting in service interruption.

How to Identify Huawei-Certified Optical Modules

Method 1: Check the label of the optical module.

1. The labels of Huawei-certified optical modules contain **HUAWEI**, as shown in **Figure1 The label of a Huawei-certified optical module**.
2. Check the BOM number of the optical module. The BOM number starting with 02 indicates that the optical module is certified by Huawei. Otherwise, the optical module is not a Huawei-certified one.

Figure 3-43 The label of a Huawei-certified optical module

Method 2: Run the display interface transceiver command

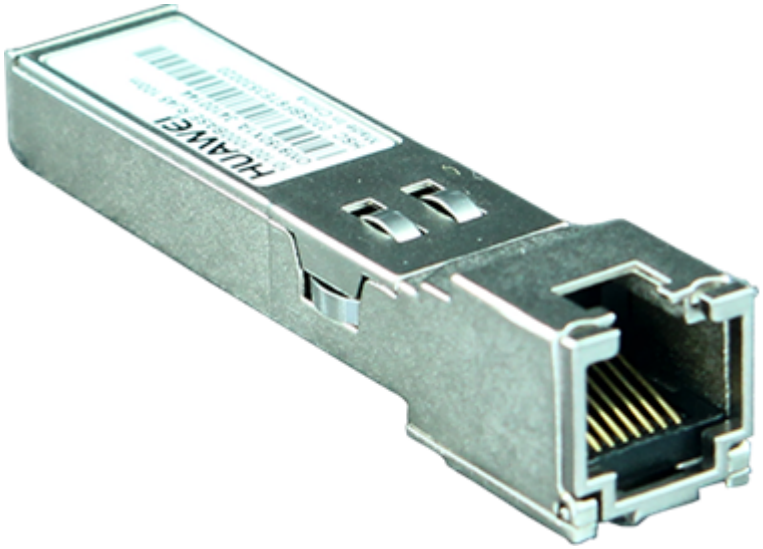
1. If **VendorName** is **HUAWEI** in the **display interface transceiver** command output, the optical module has been certified by Huawei. Otherwise, it is not a Huawei-certified optical module.
2. If the **Non-Huawei-certified transceiver** field is displayed under **Alarm information**, the optical module is not certified by Huawei.

3.5.2 Understanding Copper Modules

Copper modules are also called RJ45 modules. Unlike optical modules, copper modules do not perform electrical-optical conversion. When two optical interfaces have copper modules installed, the interfaces can be connected using a copper cable.

Figure 3-44 shows a copper module.

Figure 3-44 Appearance of a copper module

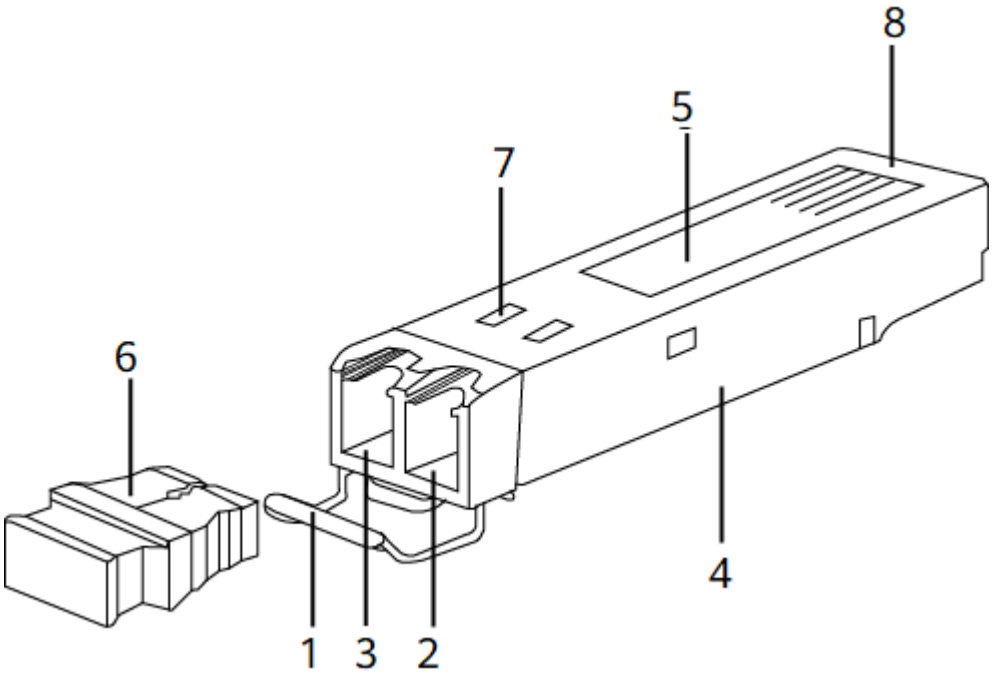


3.5.3 Understanding Optical Modules

3.5.3.1 What Is an Optical Module

On an optical network, a sender needs to convert electrical signals into optical signals before sending them to a receiver, and the receiver needs to convert received optical signals into electrical signals. An optical module is a component that completes electrical/optical conversion on an optical network. **Figure 3-45** shows the structure of an optical module.

Figure 3-45 Structure of an optical module (using an SFP/eSFP optical module as an example)



1. Handle	2. Receiver	3. Transmitter
4. Shell	5. Label	6. Dust plug
7. Spring	8. Connector	-

Figure 3-46 shows an SFP/eSFP optical module.

Figure 3-46 SFP/eSFP optical module

Figure 3-47 shows the appearance of an SFP+ optical module.

Figure 3-47 Appearance of an SFP+ optical module

Figure 3-48 and Figure 3-49 show the appearance of a QSFP+ optical module.

Figure 3-48 Appearance of a QSFP+ optical module (for LC optical fibers)

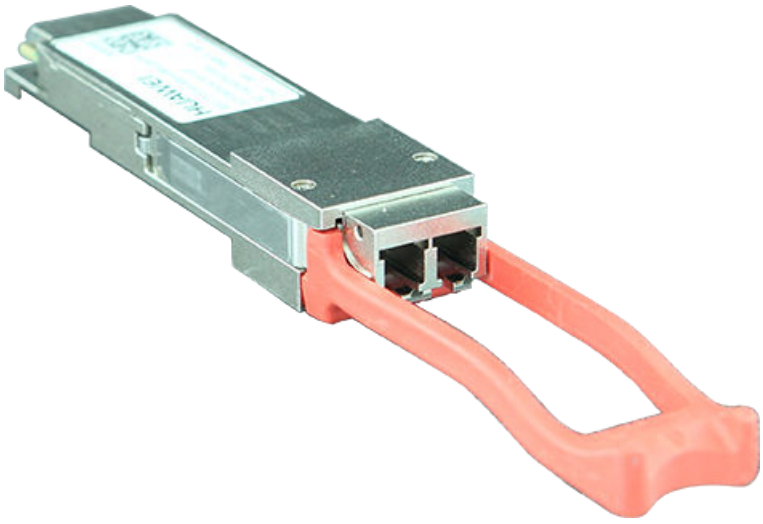
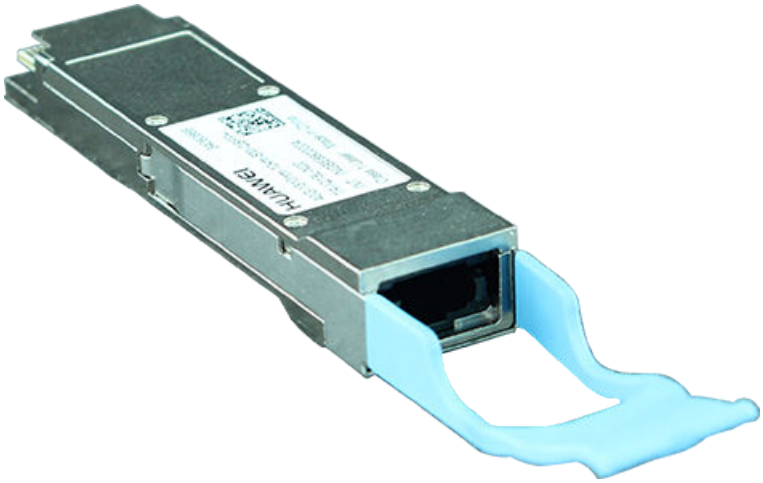


Figure 3-49 Appearance of a QSFP+ optical module (for MPO optical fibers)



NOTICE

The side with an L-shaped notch close to the connector is the top of a QSFP+ optical module, as shown in **Figure 3-48**. When connecting a QSFP+ optical module to a port, keep the top side upward. Do not insert the QSFP+ optical module upside down.

Currently, there is no formal standard for 40G Ethernet. Therefore, a device may not display complete diagnostic information about 40GE optical modules. This is an acceptable fact in the telecommunications industry and does not affect functions of 40GE optical modules.

Figure 3-50 and **Figure 3-51** show the appearance of a QSFP28 optical module.

Figure 3-50 Appearance of a QSFP28 optical module (for MPO optical fibers)

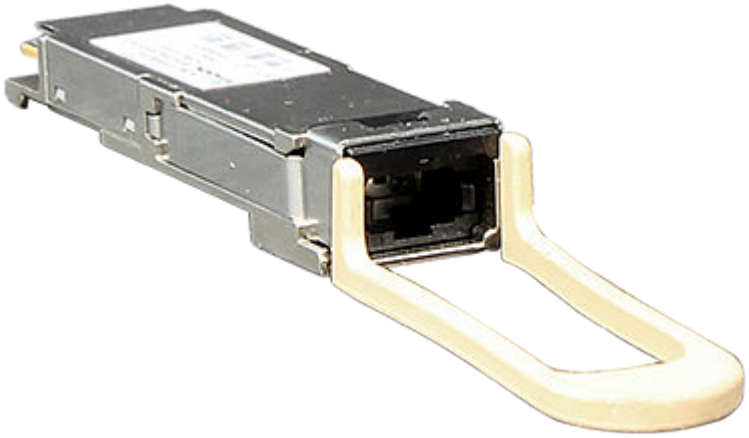


Figure 3-51 Appearance of a QSFP28 optical module (for LC optical fibers)

3.5.3.2 Types of Optical Modules

Optical modules are available in various types to meet diversified requirements.

- **Classified by transmission rates**

  Depending on transmission rates, optical modules are classified into 100GE, 40GE, 25GE, 10GE, FE, and GE optical modules.

- **Classified by encapsulation types**

  The higher transmission rate an optical module provides, the more complex structure it has. Optical modules are encapsulated in different modes to provide different structures. Huawei S series devices support optical modules of the following encapsulation types: CFP, QSFP+, QSFP28, XFP, SFP, eSFP, and SFP+. All optical modules are hot swappable.

  - SFP: small form-factor pluggable. SFP optical modules support LC fiber connectors.
  - eSFP: enhanced small form-factor pluggable. An eSFP module is an SFP module that supports monitoring of voltage, temperature, bias current, transmit optical power, and receive optical power. Therefore, eSFP is also called SFP sometimes.
  - SFP+: small form-factor pluggable plus, SFP with a higher rate.
  - XFP: 10 Gigabit small form-factor pluggable. X is the Roman numeral 10, meaning that all XFP optical modules provide a 10 Gbit/s transmission rate. XFP optical modules support LC fiber connectors. They are wider and longer than SFP+ optical modules.
  - SFP28: with the same interface size as an SFP+ module. An SFP28 interface can use a 25GE SFP28 optical module.
  - QSFP+: quad small form-factor pluggable. QSFP+ optical modules support MPO fiber connectors and are larger than SFP+ optical modules.

  - CFP: centum form-factor pluggable. The dimensions of a CFP optical module are 144.75 mm x 82 mm x 13.6 mm (L x W x H). CFP is a new optical module standard that can be used in data communication and telecommunications fields.
  - QSFP28: with the same interface size as a QSFP+ module. A QSFP28 interface can use a 100GE QSFP28 optical module or a 40GE QSFP+ optical module.
- **Classified by physical layer standards**

  Different physical layer standards are defined to allow data transmission in different modes. Therefore, different types of optical modules are produced to comply with these standards. For details, see **Standards compliance** of the specific optical module.
- **Classified by modes**

  Optical fibers are classified into single-mode fibers (SMFs) and multi-mode fibers (MMFs). Therefore, optical modules are also classified into single-mode and multi-mode modules to support different optical fibers.
  - Single-mode optical modules are used with single-mode fibers. Single-mode fibers support a wide band and large transmission capacity, and are used for long-distance transmission.
  - Multi-mode optical modules are used with multi-mode fibers. Multi-mode fibers have lower transmission performance than single-mode fibers because of modal dispersion, but their costs are also lower. They are used for small-capacity, short-distance transmission.

Wavelength division multiplexing modules differ from other optical modules in center wavelengths. A common optical module has a center wavelength of 850 nm, 1310 nm, or 1550 nm, whereas a wavelength division multiplexing module transmits lights with different center wavelengths. Wavelength division multiplexing modules are classified into two types: coarse wavelength division multiplexing (CWDM) and dense wavelength division multiplexing (DWDM). Within the same band, DWDM modules are available in more types and use wavelength resources more efficiently than CWDM modules. DWDM and CWDM modules allow lights with different center wavelengths to be transmitted on one fiber without interfering each other. Therefore, a passive multiplexer can be used to combine the lights into one channel, which is then split into multiple channels by a demultiplexer on the remote end. This reduces the optical fibers required. DWDM and CWDM modules are used for long-distance transmission.

The transmit power of a long-distance optical module is often larger than its overload power. Therefore, when using such optical modules, select optical fibers of an appropriate length to ensure that the actual receive power is smaller than the overload power. If the optical fibers connected to a long-distance optical module are too short, use an optical attenuator to reduce the receive power on the remote optical module. Otherwise, the remote optical module may be burnt.

3.5.3.3 Parameter Description

Transmit optical power	Output optical power of an optical module when it is working properly. When two optical modules are connected, the transmit optical power of one end must be within the range of receive optical power on the other end.
Receive optical power	Average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). The upper limit of this parameter is the overload optical power and the lower limit is the maximum receiver sensitivity. When two optical modules are connected, the receive optical power on one end determines the range of transmit optical power on the other end.
Maximum receiver sensitivity	Minimum average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). When two optical modules are connected, the maximum receiver sensitivity on one end determines the minimum value of transmit optical power on the other end.
Overload optical power	Maximum average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). When two optical modules are connected, the overload optical power on one end determines the maximum transmit optical power on the other end.
Extinction ratio	Minimum ratio of the average optical power with signals transmitted against the average optical power without signals transmitted in complete modulation mode. The extinction ratio indicates the capability of an optical module to identify signal 0 and signal 1. This parameter is a quality indicator for optical modules. Optical modules with a large extinction ratio may not have good quality. Qualified optical modules should have an extinction ratio complying with IEEE 802.3.
Fiber mode	Mode of optical fibers defined based on core diameters and features of optical fibers. Optical fibers are classified into single-mode and multimode fibers. Generally, multimode fibers have large core diameters and severe dispersion, so they transmit optical signals over short distances. Single-mode fibers have low dispersion and can transmit optical signals over long distances.
Modal bandwidth	Bandwidth measured at a point with transmit power several dB lower than that of the point with the peak center wavelength. Modal bandwidth reflects spectrum characteristics of multimode fibers. The higher modal bandwidth a multimode fiber has, the longer transmission distance the fiber supports.
Fiber diameter	Diameter of the core of a fiber. According to international standards for optical fibers, the diameter of a multimode fiber is 62.5 um or 50 um, and the diameter of a single-mode fiber is 9 um. Select optical fibers with diameters supported by the optical modules.

Fiber class	Optical signals with different wavelengths have their best working windows in different optical fibers. To help efficiently adjust wavelengths or dispersion features of optical fibers and change their refractive indexes, the following fiber classes are defined: multimode fiber (G.651), common single-mode fiber (G.652), shifted dispersion fiber (G.653), and non-zero shifted dispersion fiber (G.655). G.651 and G.652 are commonly used fiber classes. Optical fibers of higher classes support longer transmission distances. When selecting optical fibers for optical modules, determine the classes of fibers based on the required transmission distances.
Connector type	Type of the interface on an optical module to accommodate a fiber. Commonly used connector types are LC (applicable to all the SFP, SFP+, and XFP modules), SC, and MPO (applicable to 150 m QSFP+ and CXP modules). Select optical fibers with connectors supported by the optical modules.
Transmission distance	Maximum distance over which optical signals can transmit. Optical signals sent from different types of sources can transmit over different distances due to negative effects of optical fibers, such as dispersion and attenuation. When connecting optical interfaces, select optical modules and fibers based on the maximum signal transmission distance.
Interface rate	Maximum rate of electrical signals that an optical component can transmit without bit errors. The interface rates defined in Ethernet standards include 125 Mbit/s, 1.25 Gbit/s, 10.3125 Gbit/s, and 41.25 Gbit/s. When connecting optical interfaces, select optical modules and fibers based on the maximum signal transmission rate.
Center wavelength	Wavelength measured at the midpoint of the half-amplitude line in the transmit spectrum. Two connected optical modules must have the same center wavelength.
MSA	Multi-Source Agreement, a non-profit organization jointly established by optical module manufacturers. This agreement defines the structure and dimensions of optical transceivers by referring to Optical Internetworking Forum (OIF) and International Telecommunication Union (ITU) standards.

3.5.3.4 How to View Optical Module Parameters

Viewing the Hardware Description

If you know the model or type of an optical module, you can view the section "Pluggable Modules for Interfaces" in the *Hardware Description* to look up parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

Using a Command

If an optical module is installed in a running device, you can run the **display interface transceiver** command to view parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

3.5.3.5 Rules for Optical Module Interoperation

Interoperation Rules

Optical modules with the same standards can interoperate with each other. The standards define the rate, wavelength, and transmission distance of optical modules, but not their encapsulation modes (two interoperated optical modules can have different encapsulation modes).

If you need to achieve interoperability between optical modules with different standards, contact technical support personnel.

When S series devices are connected to other products such as routers, comply with the preceding optical module interoperation rules.

Standards Description

The following describes the standards, using 1000BASE-LX10 as an example:

- 1000 indicates the rate (1000 Mbit/s, in this case). Other rates include 10 Mbit/s, 100 Mbit/s, 10 Gbit/s, 40 Gbit/s, and 100 Gbit/s.
- BASE indicates baseband transmission.
- L represents a center wavelength of the laser. Currently, the following center wavelengths are available: S (short wavelength: 850 nm), L (long wavelength: 1310 nm), E (extra long wavelength: 1550 nm), and B (single-fiber bidirectional long wavelength).
- X represents the encoding format. The encoding formats include T (twisted pair), X (8B/10B), R (64B/66B), and W (WIS).
- 10 indicates the number of channels. Currently, the value can be 4 or 10. If there is no number, the value is 1.

NOTE

This example provides the definitions in IEEE standards, which are not applicable to all optical modules, for example, non-standard optical modules.

The following organizations or agreements define standards related to optical modules:

- IEEE 802.3, which defines MAC and PHY standards
- Small Form Factor (SFF) committee or Multi-Source Agreements (MSAs), which define optical module hardware, software, and structure standards

3.5.4 100Mbps SFP Optical Modules

3.5.4.1 S-SFP-FE-LH40-SM1310

Table 3-71 S-SFP-FE-LH40-SM1310 specifications

Item	Value
Basic Information	

Item	Value
Module name	S-SFP-FE-LH40-SM1310
Part Number	02317344
Model	S-SFP-FE-LH40-SM1310
Form factor	eSFP
Application standard	STM-1
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155Mbit/s
Target transmission distance [km]	40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5 dBm
Minimum extinction ratio [dB]	10.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-37 dBm
Overload power (AVG) [dBm]	-10 dBm

3.5.4.2 S-SFP-FE-LH80-SM1550

Table 3-72 S-SFP-FE-LH80-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-FE-LH80-SM1550
Part Number	02317345
Model	S-SFP-FE-LH80-SM1550
Form factor	eSFP
Application standard	STM-1
Connector type	LC

Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155Mbit/s
Target transmission distance [km]	80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5 dBm
Minimum extinction ratio [dB]	10.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-37 dBm
Overload power (AVG) [dBm]	-10 dBm

3.5.4.3 SFP-FE-LX-SM1310-BIDI

Table 3-73 SFP-FE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1310-BIDI
Part Number	02315203
Model	SFP-FE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	100BASE-BX
Connector type	LC/PC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155Mbit/s
Target transmission distance [km]	15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1550/RX1310

Item	Value
Maximum Tx optical power [dBm]	-8 dBm
Minimum Tx optical power [dBm]	-15 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-32 dBm
Overload power (AVG) [dBm]	-8 dBm
NOTE BIDI optical modules must be used in pairs. For example, SFP-FE-LX-SM1310-BIDI must be used with SFP-FE-LX-SM1550-BIDI.	

3.5.4.4 SFP-FE-LX-SM1550-BIDI

Table 3-74 SFP-FE-LX-SM1550-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1550-BIDI
Part Number	02315202
Model	SFP-FE-LX-SM1550-BIDI
Form factor	eSFP
Application standard	100BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155Mbit/s
Target transmission distance [km]	15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1550/RX1310
Maximum Tx optical power [dBm]	-8 dBm
Minimum Tx optical power [dBm]	-15 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	

Item	Value
Rx sensitivity (AVG) [dBm]	-32 dBm
Overload power (AVG) [dBm]	-8 dBm
NOTE BIDI optical modules must be used in pairs. For example, SFP-FE-LX-SM1550-BIDI must be used with SFP-FE-LX-SM1310-BIDI.	

3.5.4.5 SFP-FE-SX-MM1310

Table 3-75 SFP-FE-SX-MM1310 specifications

Item	Value
Basic Information	
Module name	SFP-FE-SX-MM1310
Part Number	02315233
Model	SFP-FE-SX-MM1310
Form factor	SFP
Application standard	100BASE-FX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
Transmission rate [bit/s]	100 Mbit/s
Target transmission distance [km]	Multimode fiber (50 μm or 62.5 μm diameter): 2 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-14.0 dBm
Minimum Tx optical power [dBm]	-19.0 dBm
Minimum extinction ratio [dB]	10 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-30.0 dBm
Overload power (AVG) [dBm]	-14.0 dBm

3.5.4.6 eSFP-FE-LX-SM1310

Table 3-76 eSFP-FE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	eSFP-FE-LX-SM1310
Part Number	02315205
Model	eSFP-FE-LX-SM1310
Form factor	eSFP
Application standard	STM-1
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155Mbit/s
Target transmission distance [km]	15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-8 dBm
Minimum Tx optical power [dBm]	-15 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-28 dBm
Overload power (AVG) [dBm]	-8 dBm

3.5.5 1Gbps SFP Copper Modules

3.5.5.1 SFP-1000BaseT

Table 3-77 SFP-1000BaseT specifications

Item	Value
Basic Information	

Item	Value
Module name	SFP-1000BaseT
Part Number	02314171
Model	SFP-1000BaseT
Form factor	SFP
Application standard	1000BASE-T
Connector type	RJ45
Optical fiber type	-
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10-1000M
Target transmission distance [km]	0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-
Overload power (AVG) [dBm]	-

3.5.5.2 SFP-1000BaseT-G2

Table 3-78 SFP-1000BaseT-G2 specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT-G2
Part Number	02314BDD
Model	SFP-1000BaseT-G2
Form factor	SFP
Application standard	1000BASE-T
Connector type	RJ45

Item	Value
Optical fiber type	-
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10-1000M
Target transmission distance [km]	0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-
Overload power (AVG) [dBm]	-

NOTE

This module can only be used on a device running V600R025C00 or a later version.

3.5.6 1Gbps eSFP Optical Modules

3.5.6.1 LE2MGSC40DE0

Table 3-79 LE2MGSC40DE0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40DE0
Part Number	02310KVV
Model	LE2MGSC40DE0
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF

Item	Value
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490 nm (RX) 1310 nm (TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-23 dBm
Overload power (AVG) [dBm]	-3.0 dBm

3.5.6.2 LE2MGSC40ED0

Table 3-80 LE2MGSC40ED0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40ED0
Part Number	02310KVU
Model	LE2MGSC40ED0
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	1310 nm (RX) 1490 nm (TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-23 dBm
Overload power (AVG) [dBm]	-3.0 dBm

3.5.6.3 S-SFP-GE-LH40-SM1310

Table 3-81 S-SFP-GE-LH40-SM1310 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1310
Part Number	02317346
Model	S-SFP-GE-LH40-SM1310
Form factor	eSFP
Application standard	1000base-LX/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	

Item	Value
Rx sensitivity (AVG) [dBm]	-23 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.4 S-SFP-GE-LH40-SM1550

Table 3-82 S-SFP-GE-LH40-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1550
Part Number	02317347
Model	S-SFP-GE-LH40-SM1550
Form factor	eSFP
Application standard	1000BASE-LX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5 dBm
Minimum extinction ratio [dB]	9.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-22 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.5 S-SFP-GE-LH80-SM1550

Table 3-83 S-SFP-GE-LH80-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH80-SM1550
Part Number	02317348
Model	S-SFP-GE-LH80-SM1550
Form factor	eSFP
Application standard	1000BASE-ZX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	-2 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-23 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.6 SFP-GE-LX-SM1310

Table 3-84 SFP-GE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310
Part Number	02315200
Model	SFP-GE-LX-SM1310

Item	Value
Form factor	eSFP
Application standard	1000BASE-LX10/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3 dBm
Minimum Tx optical power [dBm]	-9 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx operating wavelength range [nm]	-
Rx sensitivity (AVG) [dBm]	-20 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.7 SFP-GE-LX-SM1310-BIDI

Table 3-85 SFP-GE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310-BIDI
Part Number	02315285
Model	SFP-GE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	1000base-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C

Item	Value
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1310/RX1490
Maximum Tx optical power [dBm]	-3 dBm
Minimum Tx optical power [dBm]	-9 dBm
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-19.5 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.8 SFP-GE-LX-SM1490-BIDI

Table 3-86 SFP-GE-LX-SM1490-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1490-BIDI
Part Number	02315286
Model	SFP-GE-LX-SM1490-BIDI
Form factor	eSFP
Application standard	1000base-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1490/RX1310
Maximum Tx optical power [dBm]	-3 dBm
Minimum Tx optical power [dBm]	-9 dBm

Item	Value
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-19.5 dBm
Overload power (AVG) [dBm]	-3 dBm

3.5.6.9 eSFP-GE-SX-MM850

Table 3-87 eSFP-GE-SX-MM850 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-SX-MM850
Part Number	02315204
Model	eSFP-GE-SX-MM850
Form factor	eSFP
Application standard	1000base-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to 85°C
Transmission rate [bit/s]	2.125Gbit/s
Target transmission distance [km]	- Multimode fiber (with diameter of 62.5 μm): 220 m - Multimode fiber (OM1) (with diameter of 62.5 μm): 275 m - Multimode fiber (with diameter of 50 μm): 500 m - Multimode fiber (OM2) (with diameter of 50 μm): 550 m
Modal bandwidth [MHz*km]	- Multimode fiber: 160 MHz*km - Multimode fiber (OM1): 200 MHz*km - Multimode fiber: 400 MHz*km - Multimode fiber (OM2): 500 MHz*km
Transmitter Optical Characteristics	

Item	Value
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-17 dBm
Overload power (AVG) [dBm]	0 dBm

3.5.6.10 eSFP-GE-ZX100-SM1550

Table 3-88 eSFP-GE-ZX100-SM1550 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-ZX100-SM1550
Part Number	02315206
Model	eSFP-GE-ZX100-SM1550
Form factor	eSFP
Application standard	1000base-ZX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	1.25Gbit/s
Target transmission distance [km]	100 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	8 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-30 dBm

Item	Value
Overload power (AVG) [dBm]	-9 dBm

3.5.7 10Gbps SFP+ Optical Modules

3.5.7.1 OMXD30000

Table 3-89 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000
Part Number	02318169
Model	OMXD30000
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Bit error ratio (BER)	-
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	0.3 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-9.9 dBm
Overload power (AVG) [dBm]	-1 dBm

3.5.7.2 OSX010000

Table 3-90 OSX010000 specifications

Item	Value
Basic Information	
Module name	OSX010000
Part Number	02318170
Model	OSX010000
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-12.6 dBm
Overload power (AVG) [dBm]	0.5 dBm

3.5.7.3 OSX040N01

Table 3-91 OSX040N01 specifications

Item	Value
Basic Information	
Module name	OSX040N01
Part Number	02310CNF
Model	OSX040N01

Item	Value
Form factor	SFP+
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	-4.7 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-14.1 dBm
Overload power (AVG) [dBm]	0.5 dBm

3.5.7.4 SFP-10G-BXD1

Table 3-92 SFP-10G-BXD1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXD1
Part Number	02310QDT
Model	SFP-10G-BXD1
Form factor	SFP+
Application standard	10GBase-BIDI
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	2.5Gbit/s-11.3Gbit/s

Item	Value
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1330/RX1270
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-14.4 dBm
Overload power (AVG) [dBm]	0.5 dBm

3.5.7.5 SFP-10G-BXU1

Table 3-93 SFP-10G-BXU1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXU1
Part Number	02310QBJ
Model	SFP-10G-BXU1
Form factor	SFP+
Application standard	10GBase-BIDI
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	2.5Gbit/s-11.3Gbit/s
Target transmission distance [km]	10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	TX1270/RX1330
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB

Item	Value
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-14.4 dBm
Overload power (AVG) [dBm]	0.5 dBm

3.5.7.6 SFP-10G-USR

Table 3-94 SFP-10G-USR specifications

Item	Value
Basic Information	
Module name	SFP-10G-USR
Part Number	02310MNW
Model	SFP-10G-USR
Form factor	SFP+
Application standard	10Gbase-USR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	10.31Gbit/s
Target transmission distance [km]	0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-10.7 dBm
Overload power (AVG) [dBm]	0.5 dBm

3.5.7.7 SFP-10G-ZR

Table 3-95 SFP-10G-ZR specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZR
Part Number	02310SNN
Model	SFP-10G-ZR
Form factor	SFP+
Application standard	10Gbase-ZR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	9.95Gbit/s-10.31Gbit/s
Target transmission distance [km]	80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-24 dBm
Overload power (AVG) [dBm]	-7 dBm

3.5.8 10Gbps SFP+ Copper Modules

3.5.8.1 SFP-10GBaseT-SR

Table 3-96 SFP-10GBaseT-SR specifications

Item	Value
Basic Information	

Item	Value
Module name	SFP-10GBaseT-SR
Part Number	02314PHV
Model	SFP-10GBaseT-SR
Form factor	SFP+
Application standard	10GBASE-T
Connector type	RJ45
Optical fiber type	-
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	-
Transmission rate [bit/s]	1 Gbit/s 10 Gbit/s
Target transmission distance [km]	10GE: 30 m (Cat6a S/FTP or above) GE: 100 m (Cat5e or above)
Transmitter Optical Characteristics	
Center wavelength [nm]	NA
Maximum Tx optical power [dBm]	NA
Minimum Tx optical power [dBm]	NA
Minimum extinction ratio [dB]	NA
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	NA
Overload power (AVG) [dBm]	NA
NOTE 1. For 10GBASE-T electrical ports, use Category 6A STP or higher category twisted pairs. Category 6A STP and Category 7 twisted pairs can prevent alien crosstalk. These cables can be used together with other types of cables and must be bundled on supporting objects because they are heavy. 2. Strong interference may cause a packet loss rate of no more than 1% on Ethernet electrical interfaces. To prevent this problem, keep the device away from interference sources or take adequate anti-interference measures. 3. Copper modules can be used only in an indoor equipment room. In other application scenarios, it is recommended that a network port surge protector be deployed.	

NOTE

This module can only be used on a device running V600R025C00 or a later version.

3.5.9 GPON and EPON Optical Modules

3.5.9.1 S600E

Table 3-97 S600E specifications

Item	Value
Basic Information	
Module name	S600E
Part Number	98031391
Model	S8M600EG01
Form factor	SFP
Application standard	1244 Mbps Tx, 2488 Mbps Rx Asymmetric Data Rate
Connector type	SC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-40~85°C
Transmission rate [bit/s]	1244 Mbps Tx, 2488 Mbps Rx Asymmetric Data Rate
Target transmission distance [km]	20km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310nm
Maximum Tx optical power [dBm]	5dBm
Minimum Tx optical power [dBm]	0.5dBm
Minimum extinction ratio [dB]	10dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-27dBm
Overload power (AVG) [dBm]	-8dBm

NOTE

This module can only be used on a device running V600R024C10 or a later version.

3.5.10 10G GPON and EPON Optical Modules

3.5.10.1 S800E

Table 3-98 S800E specifications

Item	Value
Basic Information	
Module name	S800E
Part Number	50084457
Model	S800EXGS01
Form factor	SFP
Application standard	9.953 Gbps Tx, 9.953 Gbps Rx Asymmetric Data Rate
Connector type	SC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-40~85°C
Transmission rate [bit/s]	9.953 Gbps Tx, 9.953 Gbps Rx Asymmetric Data Rate
Target transmission distance [km]	20km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310nm
Maximum Tx optical power [dBm]	5dBm
Minimum Tx optical power [dBm]	0.5dBm
Minimum extinction ratio [dB]	10dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-27dBm
Overload power (AVG) [dBm]	-8dBm

NOTE

This module can only be used on a device running V600R024C10 or a later version.

3.6 Cable

This section describes the PGND cable, power cable, configuration cable, Ethernet cable, and optical fiber of the USG6000F-S.

3.6.1 PGND Cable

3.6.1.1 PGND Cable

Connection

A ground cable is connected as follows:

- The M4 lug is connected to the ground point on the USG6000F-S.
- The M6 lug is connected to the ground point or equipotential terminal on a cabinet.

Appearance and Structure

A PGND cable has two OT terminals and a copper cable with yellow/green plastic encapsulation, One end of the cable is the 90° right angle terminal. **Figure 3-52** shows the appearance of a type of PGND cables.

NOTE

The figure is for reference only.

Figure 3-52 Appearance of the PGND cable

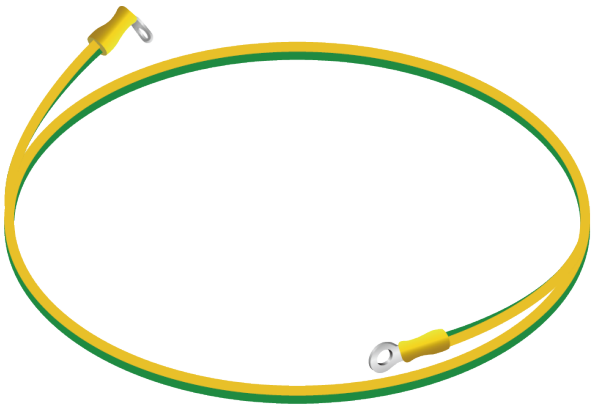


Figure 3-53 shows the appearance of the OT terminal.

Figure 3-53 OT terminal

Technical Specifications

Table 3-99 Technical specifications of the PGND Cable

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,0.4m, 6mm^2,Yellow&Green,OT6-4,H07Z-K-6^2G&Y, OT6-6,LSZH	04150052	CGND04600	14170017: OT6-4	14170023: OT6-6	0.4 m
Power Cable,0.4m, 4mm^2,OT6-4,227IEC02-4^2G&Y,OT6-6	04150617	IEC401	14170017: OT6-4	14170023: OT6-6	0.4 m
Power Cable,0.5m, 4mm^2, (OT6-4), (H07Z-K-4^2G&Y), (OT6-6),LSZH,YES	04152464	AC05001	14170635: OT6-4	14170637: OT6-6	0.5 m

3.6.2 AC Power Cable

3.6.2.1 AC Power Cable

Connection

An AC power cable is connected as follows:

- The C13 straight female connector is connected to the AC power socket of the USG6000F-S.
- The PI straight male, PB straight male, PD angle male, or PG angle male connector is connected to an external power source.

Use a single-phase 3-line electrical outlet that has been properly grounded. The grounding point of the power supply must be reliably grounded in the building.

Generally, the grounding point of the power supply system of the building has been buried in the grounding during the construction and wiring of the building.

NOTICE

Make sure that the power system of the building has been grounded before you connect the USG6000F-S with AC power cables.

Appearance and Structure

The USG6000F-S provides both the European-standard and North American-standard AC power cables. **Figure 3-54** list the reference specifications. You can select the desired power cables based on your site conditions. You can select the desired power cables based on your site conditions. For details about the power cable appearance, see **Quick Reference Tables of Power Cables**. You can view the photo of a power cable according to the corresponding BOM.

Figure 3-54 North American-standard AC power cable

Table 3-100 lists the connectors of AC power cables.

Table 3-100 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 3-101 Technical specifications of the AC Power Cable

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,America AC Power Cable,125V 10A,3.0m,PBSM,18SJT(3C),C13SF,Black	04020728	CC13NA300	PB straight male	C13 straight female	3 m
Power Cable,Japan AC Power Cable 125V12A,3.0m,PBSM,HVCTF-1.25mm^2(3C),C13SF,Black	04040887	CC13JP300	PB straight male	C13 straight female	3 m
Power Cords Cable,Australia AC Power Cable,250V 10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	04040888	CC13AU300	PI straight male	C13 straight female	3 m
Power cord,BS546 250V10A,3.0m,PM-IAM,H05VV-F-1.5mm^2(3C),C13SF,250V,10A,Black	04040889	CC13HK300	PM-I angle male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM , H05VV-F-1.0mm^2(3C),C13SF,Black	04040890	CC13UK300	PG angle male	C13 straight female	3 m
Power cord,Europe AC Power Cable,250V 10A,3.0m,PFSM, (H05VVF 1.0^2(3C)), C13SF,250V,10A,BLack	04041056	CC13EU300	PF straight male	C13 straight female	3 m
Power Cords Cable,China AC Power 250V10A,3.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04041104	CPACH0301	PI straight male	C13 straight female	3 m
Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM , H05VV-F-1.0mm^2(3C),C13AF-L,Black	04041117	CC13UK301	PG angle male	C13 left angle female connector	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,Switzerland AC Power Cable 250V10A,3.0m,PJSM , H05VV-F-1.0mm^2(3C),C13SF,Black	04041119	CC13CH300	PJ straight male	C13 straight female	3 m
Power Cable,Italy AC Power Cable 250V10A,3.0m,PLSM,H05VV-F-1.0mm^2(3C),C13SF,Black	04041120	CC13IT300	PL straight male	C13 straight female	3 m
Power Cords Cable,China AC Power 250V10A,10.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04042697	C3X1CHN00	PI straight male	C13 straight female	10 m
Power Cords Cable,China AC Power 250V10A,15.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04042698	CPWR00102	PI straight male	C13 straight female	15 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,China AC Power 250V10A,20.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04042699	CC13CN200	PI straight male	C13 straight female	20 m
External Power Cable, Power Cable 250V2.5A,2m,2X0.75mm^2,Black,PASM,227IEC53-0.75^2(2C)-I,C7SF	04043491	CPC7SF201	PA straight male	C7 straight female	2 m
Power cord,Europe AC Power 250V2,2.0m,PCSM,(H03VVH2F-0.5^2(2C)),C7SF,Black	04044216	C0C7EU200	PC straight male	C7 straight female	2 m
Power Cords Cable,Japan AC Power 125V7A,2.0m,PASM,VCTFK-0.75^2(2C),C7SF,Black	04044496	C0C7JP200	PA straight male	C7 straight female	2 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,America AC Power Cable 125V7A,2.0m,PASM,18 NISPT-1(2C),C7SF,Black	04044497	C0C7NA200	PA straight male	C7 straight female	2 m
Power Cable, Britain AC Power Cable 250V2.5A,2.0m,PGAM, H05VVH2-F-0.75mm^2(2C),C7SF, Black	04044533	C0C7UK200	PG angle male	C7 straight female	2 m
Power Cords Cable,Australia AC Power 250V2.5A,2.0m,PISM-I,H03VVH2F-0.75^2(2C),C7SF,Black	04044577	C0C7AU200	PI-I straight male	C7 straight female	2 m
Power Cords Cable,India AC Power 250V2.5A,2.0m,PC-IISM,IS 694-0.75^2(2C),C7S, 250V,2.5A, Black	04045094	C0C7IN200	PC-II straight male	C7 straight female	2 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,Korea AC Power 250V2.5A,2.0m,PCSM-I,K60227 IEC 52 0.75mm^2(2C),C7SF,250V,2.5A,Black	04045785	C0C7KO200	PC-I straight male	C7 straight female	2 m
Power Cords Cable,Argentina AC Power 250V10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	04047785	CC13AR300	PI straight male	C13 straight female	3 m
Power Cords Cable,China AC Power Cable,250V 10A,3m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04050139	CC13CN300	PI straight male	C13 straight female	3 m
Power Cords Cable,China AC Power 250V10A,1.5m,C14SM,227IEC53(RVV)1.0mm^2(3C),C13SF,PDU Cable	04050188	IDS2PWRCBL00	C14 straight male	C13 straight female	1.5 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,China AC Power Cable 250V10A,1.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	04050206	CC13SA300	PI straight male	C13 straight female	1 m
Power Cable,China AC Power Cable 250V10A,5.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	04050206-001	W-AC250-5	PI straight male	C13 straight female	5 m
Power Cable,China AC Power Cable 250V10A,2.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	04050517	CPC13SF00	PI straight male	C13 straight female	2 m
Power cord,China AC Power Cable,250V10A,3.0m,C14SM,(227IEC53-1.0^2(3C)),C13SF,250V,10A,Black,PDU Cable	04050846	-	C14 straight male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,China AC Power Cable,250V 10A,6.0m,C 14SM, (227IEC53-1.0^2(3C)), C13SF,250V ,10A,Black, PDU Cable	04050847	W-AC250-6	C14 straight male	C13 straight female	6 m
Power Cords Cable,Chin a AC Power,250 V10A,1.5m, PISM,227IE C53(RVV)1. 0mm^2(3C),C13SF,250 V,10A,Black	04050955	IDSV2DKB M55	PI straight male	C13 straight female	1.5 m
Power cord,India AC Power 250V6A,3m ,PM-IIAM,IS 694-1.0^2(3C),C13 SF,250V,6A, Black	04051035	CC13ID300	PM-II angle male	C13 straight female	3 m
Power cord,South Africa AC Power 250V10A,3 m,PMAM,H 05VV-F-1.0mm^ 2(3C),C13S F,250V,10A, Black	04051080	CC13SA300	PM angle male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,BS546 250V2.5A,2 m,PD-IAM,H03VV H2-F-0.75mm^ 2(2C),C7SF, 250V,2.5A, Black	04051081	C0C7OT20 0	PD-I angle male	C7 straight female	2 m
Power cord,2m,IR AM2063 Straight Male,H05V VH2-F 2*0.75^2(2 C),C7 Straight Female,250 V,2.5A,BLA CK	04051997	-	IRAM2063 straight male	C7 straight female	2 m
Power cord,Taiwa n AC 125V11A,3. 0m,PBSM, HVCTF 3*1.25mm2 ,C13SF,125 V,11A,Black ,BSMI	04052137	CC13TW30 0	PB straight male	C13 straight female	3 m
Power cord,Taiwa n AC 125V7A,2.0 m,PASM,VC TFK2*0.75 mm2(2C),C 7SF,125V,7 A,Black,BS MI	04052138	-	PA straight male	C7 straight female	2 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,AC Power Cable 250V2.5A,2.0m,C14SM,H05VVH2-F-0.75mm^2(2C),C7SF,250V,2.5A,Black,Non-standard AC power cable	04052181	-	C14 straight male	C7 straight female	2 m
Power cord,Britain AC Power 250V10A,3.0m,PGAM,H05VV-F-1.0mm^2(3C),C13SF,250V,10A,Black-Only for Saudi Arabia,Split from 04040890	04053153	CC13UK302	PG angle male	C13 straight female	3 m
Power Cords Cable,Europe AC 250V10A,1.8m,C14SM,H05VV-F-3*1.00^2,C13SF,PDU Cable	0405G019	CC13EU180	C14 straight male	C13 straight female	1.8 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,South Africa AC Power 250V2.5A,2m,PDAM,H03VVH2-F-0.75^2(2C),C7SF	0405G025	C0C7SA200	PD angle male	C7 straight female	2 m
Power Cords Cable,Korea AC Power 250V10A,3m,PFSM,H05VV-F 3*1.0^2(3C),C13SF,Black	0405G028	CC13KO300	PF straight male	C13 straight female	3 m
Power Cords Cable,North America AC Power 250V10A,1.8m,C14SM,SJT 18AWG(3C),C13SF,PDU Cable	0405G029	IDS2PWRCBL0A	C14 straight male	C13 straight female	1.8 m
Power Cords Cable,Japan AC Power 250V12A,1.8m,C14SM,HVCTF 1.25^2(3C),C13SF,PDU Cable	0405G02D	IDS2PWRCBL09	C14 straight male	C13 straight female	1.8 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,Australia AC Power 250V10A,1.8m,C14SM,H05VV-F-1.0^2(3C),C13SF,PDU Cable	0405G02F	IDS2PWRCBL08	C14 straight male	C13 straight female	1.8 m
Power Cords Cable,Korea AC Power 250V10A,1.8m,C14SM,H05VV-F-1.0^2(3C),C13SF,PDU Cable	0405G02H	IDS2PWRCBL07	C14 straight male	C13 straight female	1.8 m
Power Cords Cable,Denmark AC Power 250V10A,3m,PKSM,H05VV-F-3*1.0^2(3C),C13SF,Black	0405G02K	CC13DE300	PK straight male	C13 straight female	3 m
Power Cable,Brazil AC Power Cable 250V10A,3.0m,PNSM ,H05VV-F-1.0mm^2(3C),C13SF,Black	04150258	CC13BR300	PN straight male	C13 straight female	3 m

NOTICE

You must connect the AC power cable in compliance with local standards and requirements.

3.6.3 Optical Fiber

3.6.3.1 Optical Fiber

Connection

Optical fibers are used for carrying signals on Gigabit networks or networks with higher packet rates. An optical fiber is a carrier of optical signals and transmits optical signals over a short distance. An optical fiber is connected as follows:

- One end is connected to the optical port on the USG6000F-S through the corresponding optical module.
- The other end is connected to the optical port on the peer device.

Select optical modules and fibers based on peer device interfaces.

NOTICE

You are advised to use Huawei optical modules. Optical modules from other vendors may cause incompatibility issues and lead to faults on the USG6000F-S.

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. 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.

Appearance and Structure

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. Indoor single-mode optical fibers usually have a yellow jacket, as shown in **Figure 3-55**. The jacket of the LC/PC-LC/PC multi-mode optical fiber is orange, as shown in **Figure 3-56**, and that of the MPO/PC-MPO/PC multi-mode optical fiber is cyan, as shown in **Figure 3-57**. Optical fibers are not delivered with the USG6000F-S. Purchase optical fibers separately as required.

Figure 3-55 Appearance of the LC/PC-LC/PC single-mode optical fiber

Figure 3-56 Appearance of the LC/PC-LC/PC multi-mode optical fiber

Figure 3-57 Appearance of the MPO/PC-MPO/PC multi-mode optical fiber

NOTICE

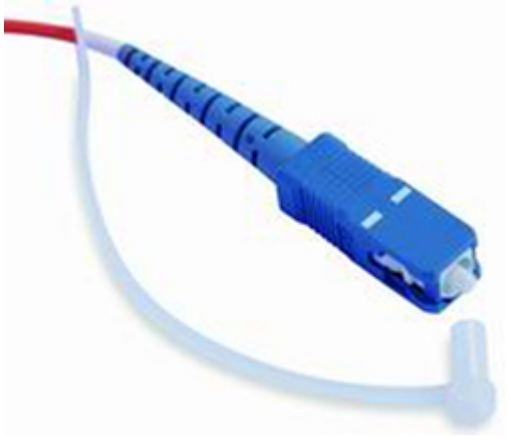
- To ensure the normal transmission of optical signals, do not use single-mode optical fibers to connect multi-mode optical modules, nor multi-mode optical fibers to connect single-mode optical modules.
- To connect extension optical fibers, purchase LC/PC-LC/PC adapters.

Optical fibers have multiple types of connectors. Common connectors types include LC/PC, SC/PC, FC/PC and MPO/PC.

- LC/PC connector

  The procedure for inserting and removing LC/PC connectors is as follows:
  - Insert and remove the connector along the axis without rotating the connector.
  - When you insert the fiber, carefully insert the fiber head into the optical interface on the interface board.
  - To remove the optical fiber, squeeze the pinch on the fiber connector, gently push on the fiber connector, and then pull it out.
- SC/PC connector



The procedure for inserting and removing SC/PC connectors is as follows:

- Insert and remove the connector along the axis without rotating the connector.
- When you insert the fiber, carefully insert the fiber head into the optical interface on the interface board.
- To remove the optical fiber, gently push on the fiber connector, and then pull out the connector.

- FC/PC connector

The procedure for inserting and removing FC/PC connectors is 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 clockwise, 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 loosens. Then gently pull out the optical fiber.

- MPO/PC optical fiber connector

Note the following points when removing and inserting an MPO/PC fiber connector:

- When inserting the connector, hold the shell labeled "PUSH" and feed the male connector into the female connector until you hear a clicking sound. The male and female connectors are securely installed.
- To disassemble the connector, hold the shell labeled "PULL" and remove the male connector.

There are four types of optical fibers for the USG6000F-S: LC/PC-LC/PC, LC/PC-SC/PC, LC/PC-FC/PC, and MPO/PC-MPO/PC, which are based on the types of connectors on both ends of the fibers, as listed in **Table 3-102**.

Table 3-102 Common optical fiber types

Type	Transmission Mode	Connector	
		On the USG6000F-S	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
MPO/PC-MPO/PC	Multi-mode	MPO/PC	MPO/PC

Technical Specifications

Table 3-103 Technical specifications of the Optical Fiber

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Patch Cord,SC/PC,SC/PC,Single-mode,5m,G.652D,3mm	14130098	SS-OP-D-SC-S-5	SC/PC	SC/PC	5 m	30 mm
Patch Cord,LC/PC,SC/PC,Single-mode,5m,G.652D,2mm	14130193	SS-OP-LC-SC-S-5	LC/PC	SC/PC	5 m	30 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Patch Cord,LC/PC-LC/PC,Single mode,G.652D,2mm,5m	14130195	SS-OP-D-LC-S-5	LC/PC	LC/PC	5 m	30 mm
Patch Cord,LC/PC,SC/PC,Single-mode,10m,G.652D,2mm	14130196	SS-OP-LC-SC-S-10	LC/PC	SC/PC	10 m	30 mm
Patch Cord,LC/PC,FC/PC,Single-mode,10m,G.652D,2mm	14130197	SS-OP-LC-FC-S-10	LC/PC	FC/PC	10 m	30 mm
Patch Cord,LC/PC,LC/PC,Single-mode,10m,G.652D,2mm	14130199	SS-OP-D-LC-S-10	LC/PC	LC/PC	10 m	30 mm
Patch Cord,LC/PC,FC/PC,Multi-mode,10m,A1b,2mm	14130221	SS-OP-LC-FC-M-10	LC/PC	FC/PC	10 m	30 mm
Patch Cord,LC/PC,LC/PC,Multi-mode,10m,A1B,2mm	14130222	SS-OP-D-LC-M-10	LC/PC	LC/PC	10 m	30 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Patch Cord,LC/PC,SC/PC,Multi-mode,10m,A1b,2mm	14130223	SS-OP-LC-SC-M-10	LC/PC	SC/PC	10 m	30 mm
Optical adapter-LC/PC-LC/PC-Blue-Shell:Plastic-Sleeve:Zirconia-Square	14130248	QW1P0FIBER06	LC/PC	LC/PC	-	-
Patch Cord,LC/PC,LC/PC,Single-mode,20m,G.652D,2mm	14130251	SS-OP-D-LC-S-20	LC/PC	LC/PC	20 m	30 mm
Patch Cord,LC/PC,SC/PC,Multi-mode,30m,A1b,2mm	14130275	SS-OP-LC-SC-M-30	LC/PC	SC/PC	30 m	30 mm
Patch Cord,LC/PC,SC/PC,Single-mode,30m,G.652D,2mm	14130276	SS-OP-LC-SC-S-30	LC/PC	SC/PC	30 m	30 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Patch Cord,LC/PC,SC/PC,Multi-mode,20m,A1b,2mm	14130279	SS-OP-LC-SC-M-20	LC/PC	SC/PC	20 m	30 mm
Patch Cord,LC/PC,SC/PC,Single-mode,20m,G.652D,2mm	14130280	SS-OP-LC-SC-S-20	LC/PC	SC/PC	20 m	30 mm
Patch Cord,LC/PC,LC/PC,Multi-mode,20m,A1b,2mm	14130295	SS-OP-D-LC-M-20	LC/PC	LC/PC	20 m	30 mm
Patch Cord,LC/PC,LC/PC,Multi-mode,5m,A1b,2mm	14130296	SS-OP-D-LC-M-5	LC/PC	LC/PC	5 m	30 mm
Patch Cord,LC/PC,SC/PC,Multi-mode,50m,A1b,2mm	14130311	SS-OP-LC-SC-M-50	LC/PC	SC/PC	50 m	30 mm
Patch Cord,LC/PC,SC/PC,Single-mode,50m,G.652D,2mm	14130312	SS-OP-LC-SC-S-50	LC/PC	SC/PC	50 m	30 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Patch Cord,LC/PC,LC/PC,Single-mode,6m,G.652D,2mm	14130360	SS-OP-D-LC-S-6	LC/PC	LC/PC	6 m	30 mm
Optical Cable Parts,MPO/PC,MPO/PC,MULTI-MODE,2m,8 CORES,0m/0m,GJFH-8A1A.2(OM3),3.5MM,LSZH,43MM SHORT MPO,BENDING INSENSITIVE	14130823	F00MPMP01	MPO/PC	MPO/PC	2 m	18 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Optical Cable Parts,MPO/PC,MPO/PC,Multimode(OM3,Bending Insensitive),30m,8 Cores,0m/0m,GJFH8A1a,3.5mm,LSZH,42mm Short MPO,Indoor	14130823-002	FMMM03001	MPO/PC	MPO/PC	30 m	17.5 mm
Optical Cable Parts,MPO/PC,MPO/PC,Multimode(OM3,Bending Insensitive),100m,8 Cores,0m/0m,GJFH8A1a,3.5mm,LSZH,42mm Short MPO,Indoor	14130823-003	FMMM10001	MPO/PC	MPO/PC	100 m	17.5 mm

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Optical Cable Parts,MPO/PC,MPO/PC,MULTI-MODE,15m,8 CORES,0m/0m,GJFH-8A1A.2(OM3),3.5MM,LSZH,60mm MPO,Bending insensitive	14130923	SS-OP-D-MPO12-M-15	MPO/PC	MPO/PC	15 m	18 mm
Optical Cable Parts,MPO/PC,MPO/PC,Multi-mode,10m,8 cores,GJFH-8A1a.3(OM4),3.5mm,0mm,LSZH,Bending Insensitive	14134486	MPO12-MPO12-M4-10	MPO/PC	MPO/PC	10 m	17.5 mm

3.6.4 Antenna

3.6.4.1 LTE Whip Antenna

Connection

The LTE whip antenna is directly connected to the LTE antenna port of the device.

Appearance and Structure

Figure 3-58 Appearance of the LTE Whip Antenna

NOTE

An LTE whip antenna is delivered with a router or card that provides the LTE function. It is used on an LTE antenna interface to provide LTE access.

Technical Specifications

Table 3-104 Technical specifications of the LTE Whip Antenna

Description	Part Number	Model	Connector X1	Frequency bands supported	Maximum gain	Standing wave ratio	Polarization	Direction
Isotropic Antenna,698MHz~960MHz/1420MHz~2690MHz,2.1dBi(max)(698-960/2110-2170MHz)/4.6dBi(max)(1710-1990/2500-2690MHz),vertical,Omni,5W,SMA-J,No Bracket	27011207	TN-702701-1B1	SMA-J	- 698 MHz to 960 MHz - 1710 MHz to 2690 MHz	- 2 dBi - 4.5 dBi	2.5	Vertical	Omnidirectional

3.6.5 Console Cable

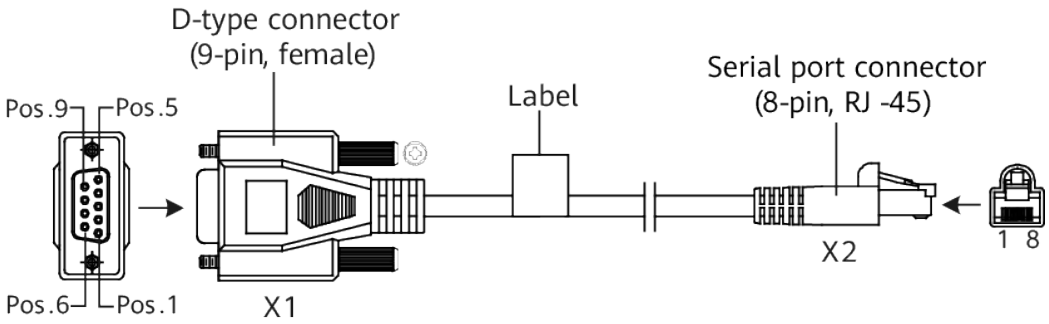
Appearance and Structure

Figure 3-59 shows the appearance of a console cable.

Figure 3-59 Console cable appearance

[Figure 3-60](#) shows the structure of a console cable.

Figure 3-60 Console cable structure



Pin Assignments

[Table 3-105](#) lists the pin assignments of console cable connectors.

Table 3-105 Pin assignments of console cable connectors

Connector	X1 (DB9)	X2 (RJ45)
Pin assignment	2	3

Connector	X1 (DB9)	X2 (RJ45)
	3	6
	5	5

Connection

A console cable connects the console port of a switch to the serial port of a console, enabling users to commission or locally maintain the device. A shielded cable or an unshielded cable can be used according to the onsite situation.

A console cable connects a device and a console as follows:

- The 8-pin RJ45 connector is connected to the console port of the switch.
- The DB9 female connector is connected to a maintenance terminal, such as a computer.

3.6.6 Ethernet Cable

Types of Ethernet Cables

Ethernet cables are classified into straight-through cables and crossover cables:

- Straight-through cable: **Table 3-106** lists the pin assignments of the RJ45 connectors on the two ends of a straight-through cable.
- Crossover cable: **Table 3-107** lists the pin assignments of the RJ45 connectors on the two ends of a crossover cable.

Appearance and Structure

NOTE

- Straight-through cables and crossover cables are standard unshielded twisted pairs that use RJ45 connectors.
- A straight-through cable and a crossover cable have the same appearance.

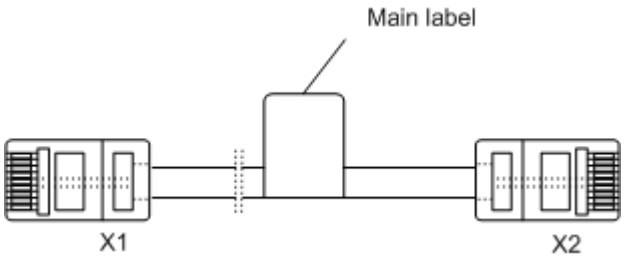
Figure 3-61 and **Figure 3-62** show the appearance of an Ethernet cable.

Figure 3-61 Ethernet cable appearance (1)

Figure 3-62 Ethernet cable appearance (2)

Figure 3-63 shows the structure of an Ethernet cable.

Figure 3-63 Ethernet cable structure



Pin Assignments

Table 3-106 lists the pin assignments of a straight-through cable.

Table 3-106 Pin assignments of a straight-through cable

X1 Pin	Wire Color	X2 Pin
1	White and orange	1
2	Orange	2
3	White and green	3
4	Blue	4
5	White and blue	5
6	Green	6
7	White and brown	7
8	Brown	8

Table 3-107 lists the pin assignments of a crossover cable.

Table 3-107 Pin assignments of a crossover cable

X1 Pin	Wire Color	X2 Pin
1	White and orange	3
2	Orange	6
3	White and green	1
4	Blue	4
5	White and blue	5
6	Green	2

X1 Pin	Wire Color	X2 Pin
7	White and brown	7
8	Brown	8

NOTE

To achieve the best electrical transmission performance, ensure that the wires connected to pins 1 and 2 and to pins 3 and 6 are twisted pairs.

Connection

Ethernet cables connect network devices to each other to enable the devices to communicate or to allow local maintenance and remote management.

- A straight-through cable connects a terminal (such as a PC or switch) to a network device.
- A crossover cable connects two terminals (such as PCs and switches).

4 Hardware Installation

This chapter describes hardware installation procedures and precautions.

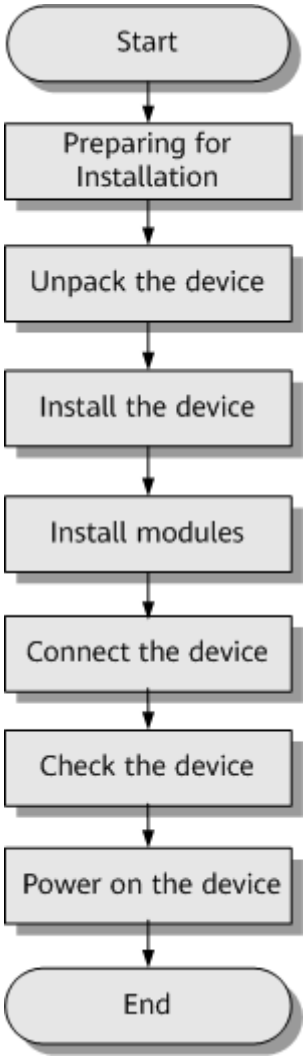
4.1 Installation Procedure

This section describes the installation procedure of the USG6000F-S.

Procedure and precaution for unpacking and checking the products before installation has started.

Figure 4-1 shows the USG6000F-S devices installation procedure.

Figure 4-1 Installation flowchart



4.2 Installation Preparation

This section describes the safety precautions that you must observe and the tools that must be prepared before you install the USG6000F-S.

4.2.1 Precautions

This section describes the precautions that you must observe before installing the USG6000F-S. Misoperation may cause personal injury or damage to the USG6000F-S.

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.

4.2.2 Installation Environment Check

Before you install a USG6000F-S, verify that the installation environment meets requirements to ensure the normal running and extended life time of the USG6000F-S.

Table 4-1 lists installation environment check items.

Table 4-1 Installation environment checklist

Check Item	Requirement	Compliance
Ventilation and heat dissipation	Complies with requirements in **Device Position**.	□ Y □ N □ N/A
Stability		□ Y □ N □ N/A
Grounding		□ Y □ N □ N/A
Temperature	Complies with requirements in **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 **ESD Requirements**.	□ Y □ N □ N/A
Surge protection	Complies with requirements in **Lightning Protection and Grounding**.	□ Y □ N □ N/A
Power supply facility	Complies with requirements in **Power Supply**.	□ Y □ N □ N/A
Electromagnetic shielding	Complies with requirements in **Electromagnetic Protection**.	□ Y □ N □ N/A

4.2.3 Instruments Required for the Installation

This section describes the instruments and meters for installing the USG6000F-S.

Table 4-2 lists the required instruments and meters for USG6000F-S installation.

Table 4-2 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.
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. • Floating nut mounting bar: used to install floating nuts to the mounting bars of the cabinet. • 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.

Category	Instrument/Meter
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).

4.3 Installing a Desktop Device

This chapter provides the cabinet-mounting, workbench-mounting, wall-mounting, and cable connection methods of the USG6000F-S55L.

4.3.1 Mounting a Device to a Specified Location

The USG6000F-S55L can be mounted in a 19-inch standard cabinet.

4.3.1.1 Mounting a Device in a Cabinet

The USG6000F-S55L can be mounted in a 19-inch standard cabinet using mounting ears.

Precautions

Before installing the USG6000F-S, check the following items:

- Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG6000F-S is rusted or soggy. Then, investigate causes and contact the supplier.
- The cabinet is stable.
- The position for the USG6000F-S in the cabinet is well arranged.
- Ensure that the USG6000F-S 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 USG6000F-S chassis towards the front door of the cabinet. In this manual, the front panel of the USG6000F-S is towards the front door of the cabinet.

Tools and Accessories

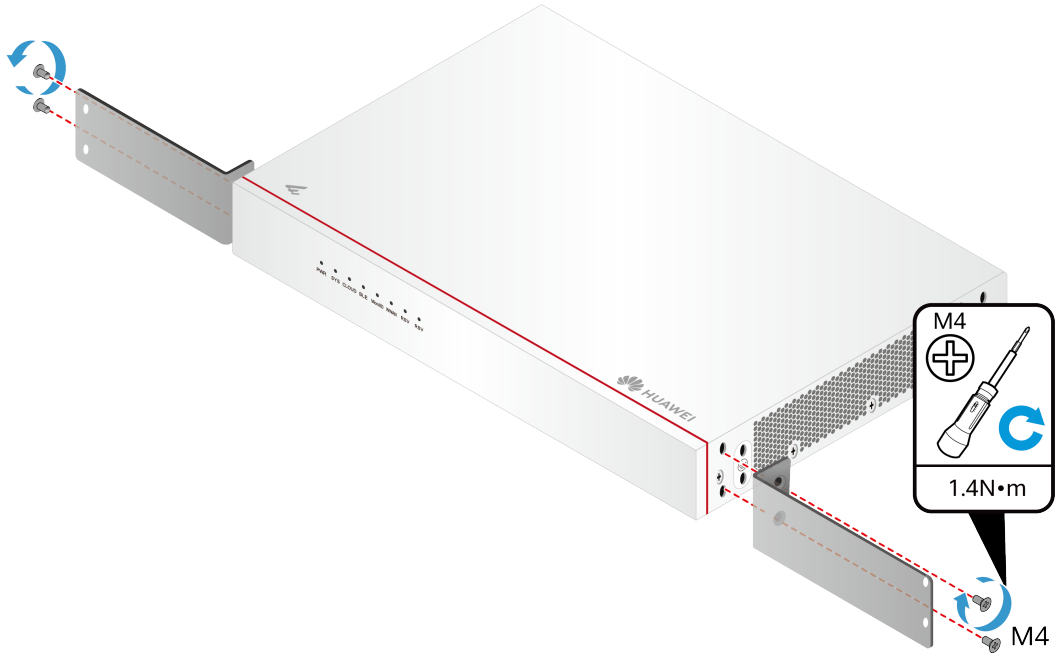
- Phillips screwdriver
- Floating nuts and matching screws
- Floating mounting bar
- Mounting ears and matching screw
- Holding plate and matching screw (purchased separately, BOM numbers: 21243646)

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 4-2**.

Figure 4-2 Installing the mounting ears on the chassis



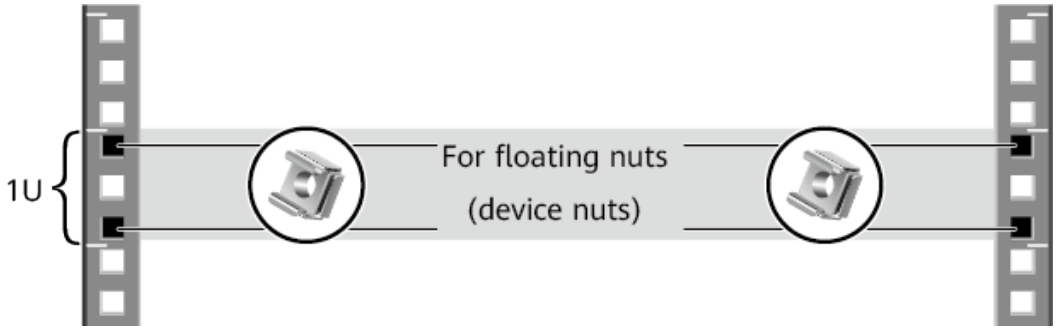
NOTE

If the tray installation mode is used, skip this step.

Step 2 Install floating nuts.

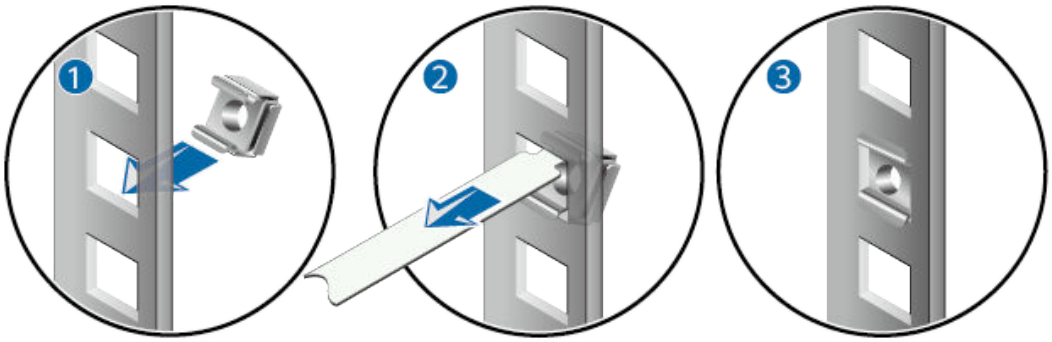
Figure 4-3 illustrates the positions of floating nuts.

Figure 4-3 Positions of floating nuts



Use M6 screws to fix the floating nuts at the positions specified in **Figure 4-3**, as shown in **Figure 4-4**.

Figure 4-4 Installing floating nuts

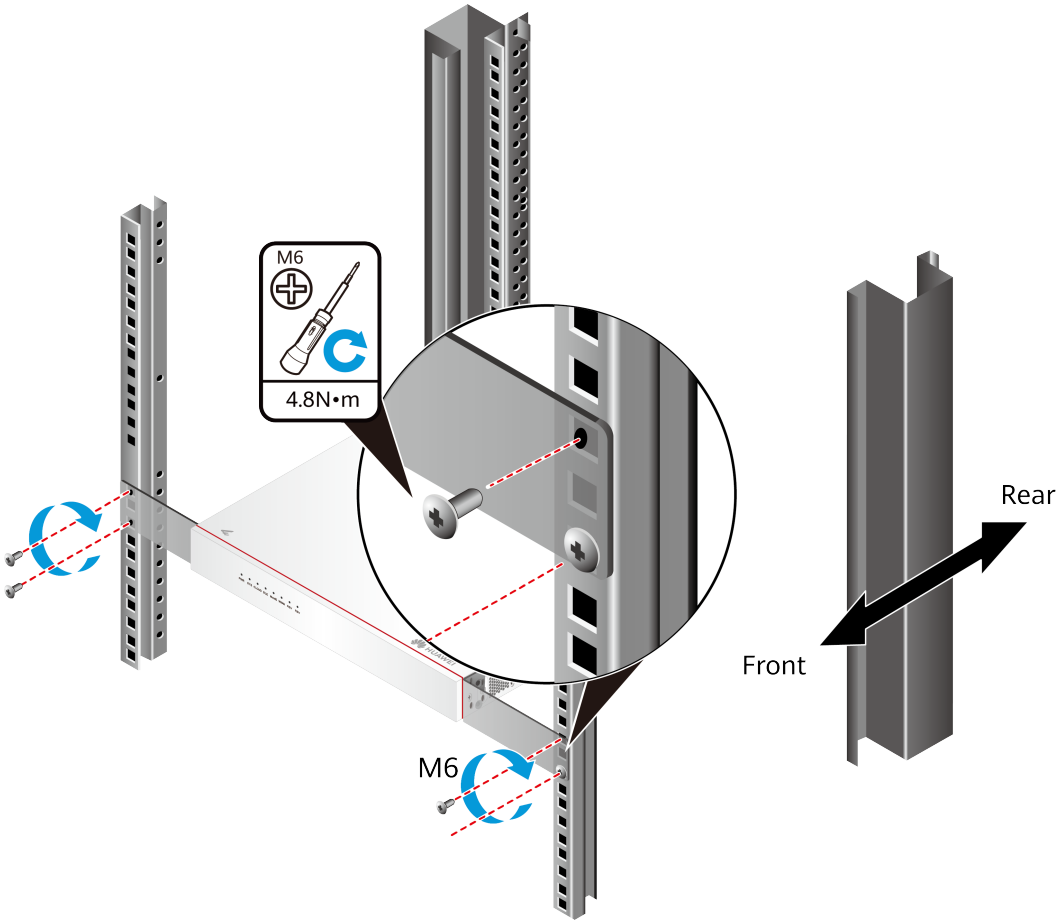


Step 3 (Optional) Install the device to a tray. For details, see the installation guide delivered with the tray.

Step 4 Mount the USG6000F-S in the cabinet.

1. Lift the USG6000F-S and move it to the cabinet.
2. Use a Phillips screwdriver to install M6 screws and fix the USG6000F-S into the cabinet through mounting ears, as shown in **Figure 4-5**.

Figure 4-5 Mounting the USG6000F-S in a cabinet



----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG6000F-S is placed securely inside the cabinet.
- Ensure that the exhaust of the USG6000F-S is not blocked by other objects.

4.3.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6000F-S on a workbench.

Precautions

Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG6000F-S is rusted or soggy. Then, investigate causes and contact the supplier.

The workbench must be:

- Reliably grounded.
- Clean, firm, and securely installed.

Accessories

Four rubber feet

Procedure

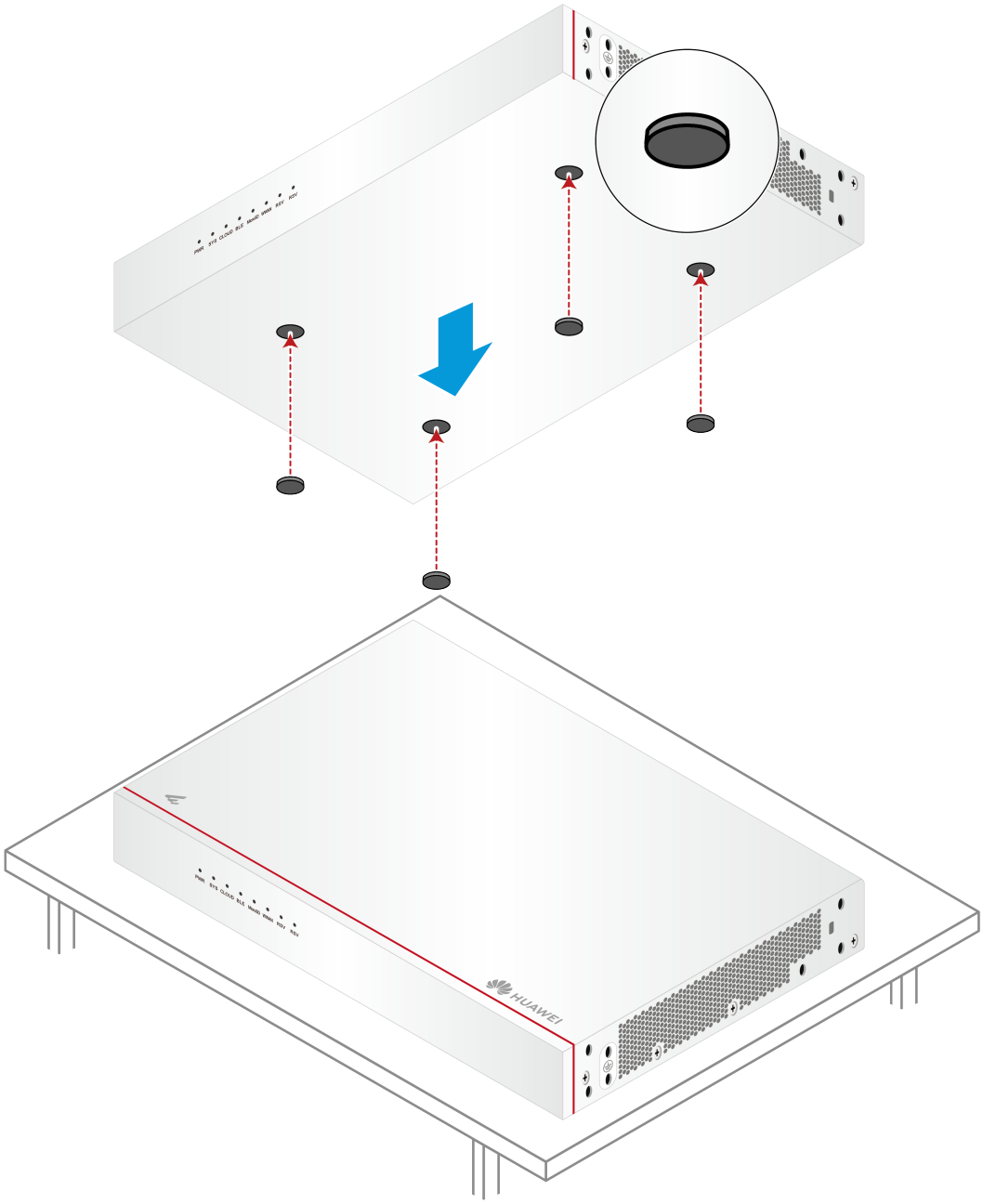
Step 1 Fix the rubber feet to the round notches at the bottom of the USG6000F-S.

NOTE

Install foot pads at the bottom of the USG6000F-S to ensure smooth contact between the USG6000F-S and the workbench and avoid friction between the surface of the and the workbench.

Step 2 Place the USG6000F-S on the workbench.

Figure 4-6 Placing the USG6000F-S with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG6000F-S is securely placed on the workbench.
- No object blocks the exhaust of the USG6000F-S, and there is at least 10 cm of distance between the USG6000F-S and surrounding devices.
- There are no heavy objects on the USG6000F-S.

4.3.1.3 Mounting a Device Against a Wall

When no cabinet is available, you can mount the USG6000F-S on a wall. The customer must have expansion screws for wall-mounting.

Precautions

Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG6000F-S is rusted or soggy. Then, investigate causes and contact the supplier.

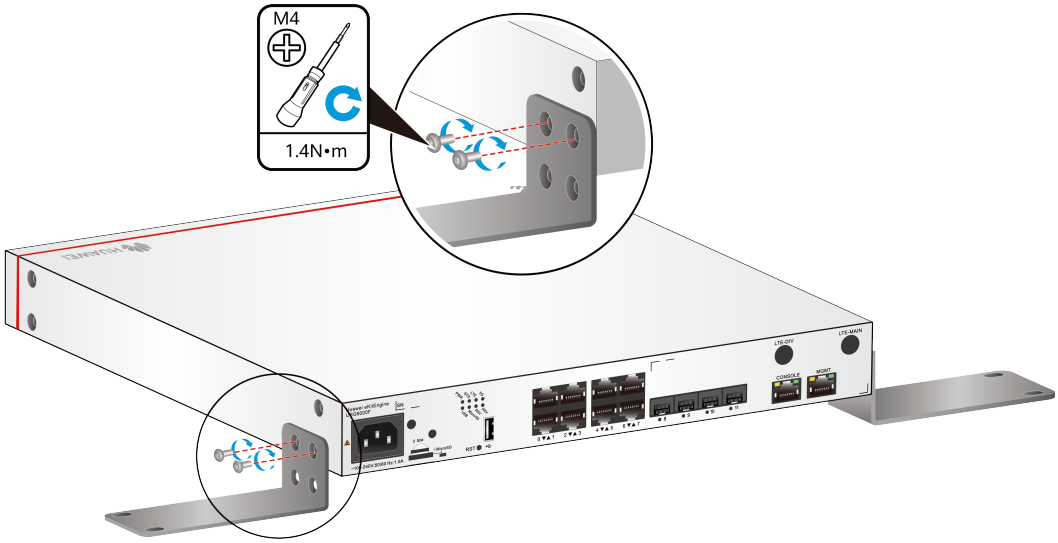
Tools and Accessories

- Ruler
- Marker
- Hammer drill
- Vacuum cleaner
- Hammer
- Phillips screwdriver
- Mounting ears and matching screw (purchased separately, BOM numbers: 21240477)

Procedure

Step 1 Fix mounting ears to both sides of the panel with ports using M4 screws.

Figure 4-7 Installing the mounting ears on the chassis

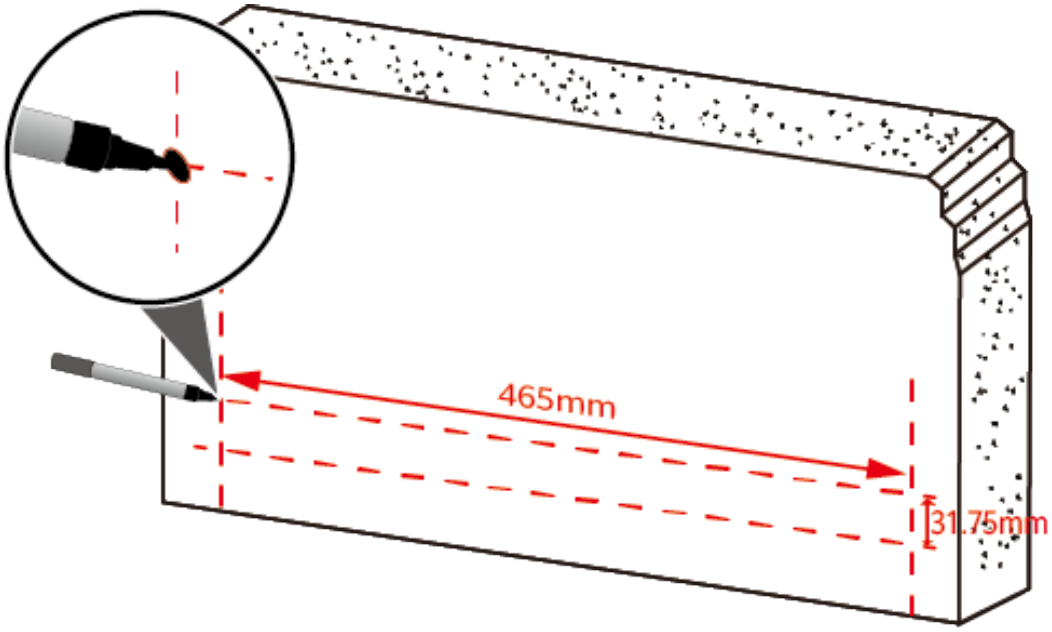


Step 2 Determine the locations of four mounting holes on the wall using a ruler and mark the mounting holes with a marker.

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 4-8 Spacing between mounting holes



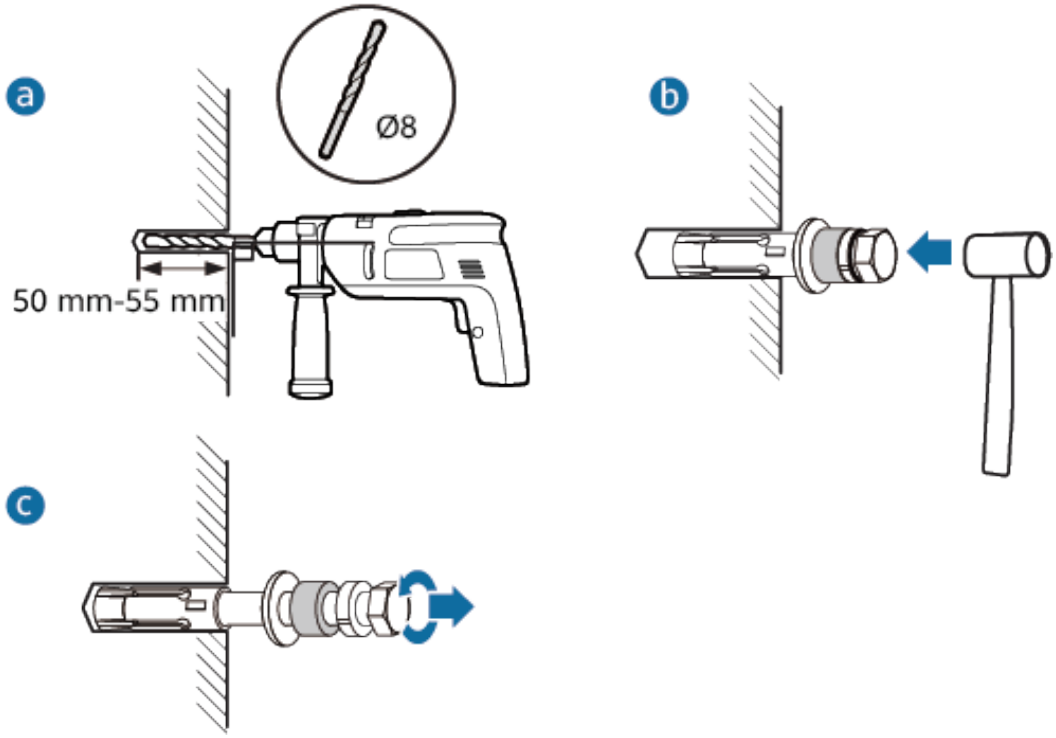
Step 3 Drill holes and install expansion bolts.

NOTICE

Ensure that the expansion bolts are secure and reliable. Otherwise, the tension after cables are connected may cause the USG6000F-S to fall.

1. Use a ϕ8 drill bit to drill holes in the marked positions.
2. Insert expansion bolts into the holes and screw the nuts to fasten the expansion bolts.
3. Remove the nut, flat washer, and spring washer.

Figure 4-9 Drilling holes and installing expansion bolts

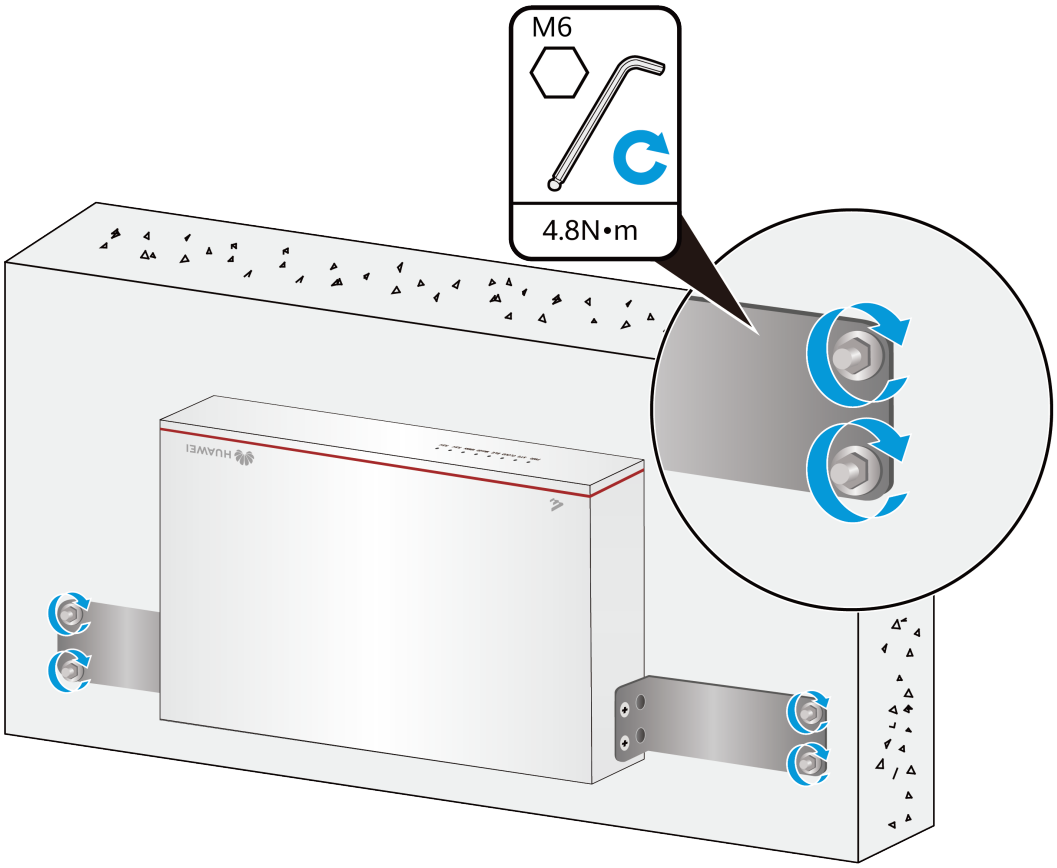


Step 4 Secure the USG6000F-S on the wall and fasten the flat washers, spring washers, and nuts in order.

NOTE

The USG6000F-S supports upward mounting and downward mounting. To prevent water from entering into ports and causing device damage, you are advised to mount the USG6000F-S with ports facing downward.

Figure 4-10 Mounting the USG6000F-S on a wall



----End

Follow-up Procedure

After wall-mounting is complete, verify that:

- The USG6000F-S is securely fixed on the wall.
- A clearance of 10 cm is maintained around the USG6000F-S and the air flow is not blocked.

4.3.2 Connecting a PGND Cable

Precautions

Connecting the PGND cable of a USG6000F-S correctly is a key measure of surge protection and resistance to interference. Before using the USG6000F-S, correctly connect the PGND cable. Otherwise, the USG6000F-S may be damaged.

The USG6000F-S has been installed inside a cabinet.

Tools

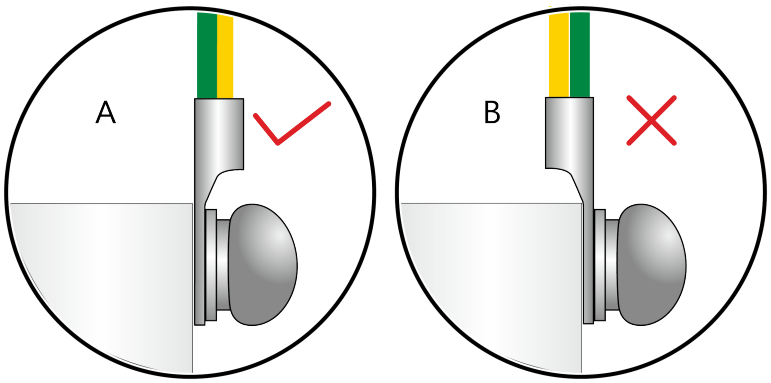
- Phillips screwdriver
- Multimeter

Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG6000F-S rear panel.

Step 2 Connect the OT terminal at one end of the PGND cable to the connection hole of the USG6000F-S with the conducting wire upward, and tighten the M4 screw, as shown in A of **Figure 4-11**, and tighten the M4 screw. The tightening torque is 1.4 N·m.

Figure 4-11 Installing the OT terminal

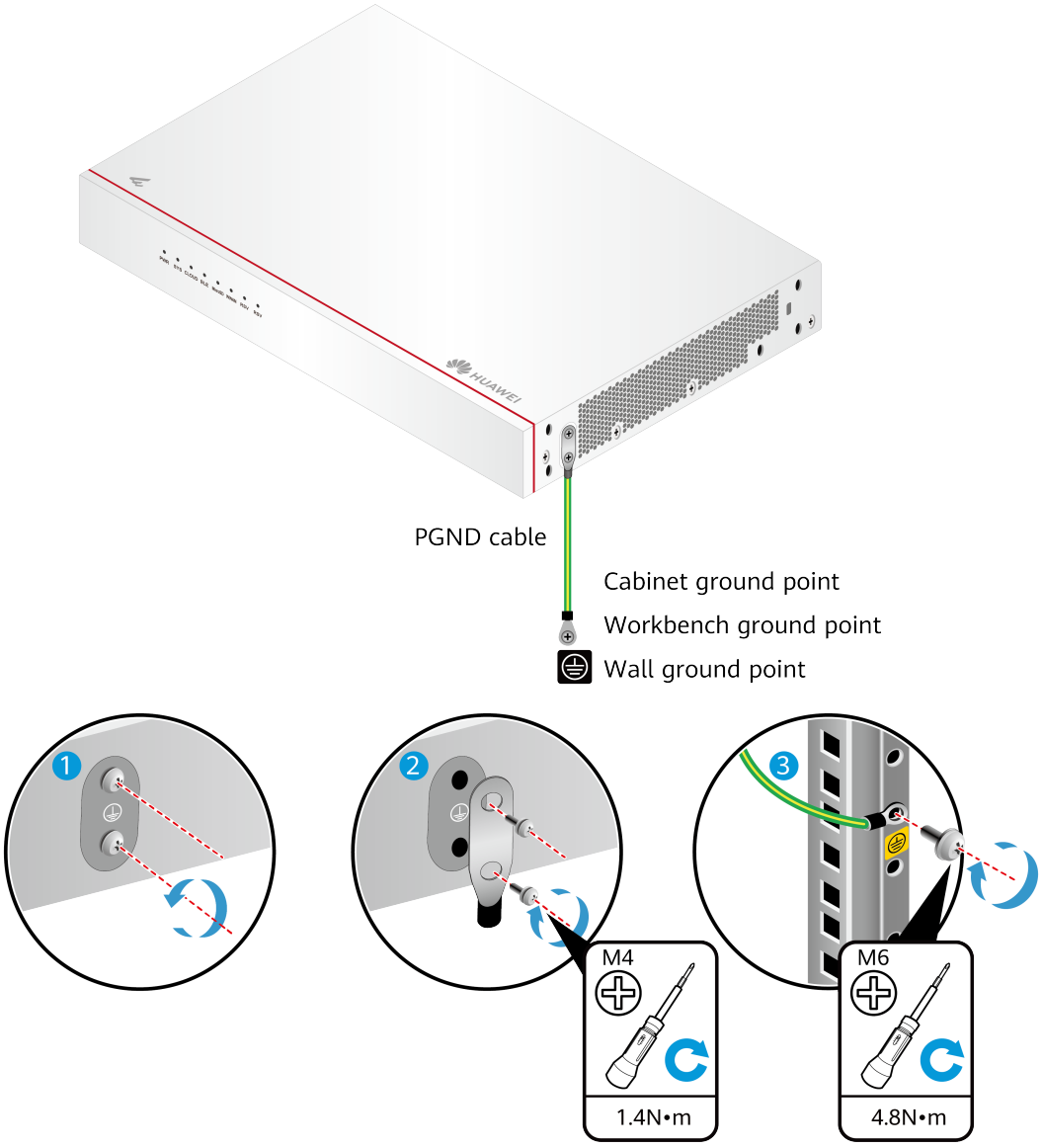


NOTE

The ground cable of the USG6000F-S must be routed upwards.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet, workbench, or wall. The tightening torque of the M6 screw is 4.8 N·m.

Figure 4-12 Connecting a PGND cable



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.

----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 0.1 ohm on a multimeter.

4.3.3 Installing Antennas

The USG6000F-S provides an internal LTE module to provide the LTE access function. The LTE access functions require antennas. This section describes how to install the antennas.

Context

NOTICE

- Do not install the antennas when the USG6000F-S is powered on to prevent USG6000F-S or antenna damage.
- The LTE antenna is quite long. You need to fasten it with cable ties during cabling.

NOTE

The LTE whip antenna is delivered with the router installation accessory package.

Procedure

Step 1 Determine the interfaces for installing the antennas. The interfaces with the "LTE-DIV" and "LTE-MAIN" 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 USG6000F-S.
3. Adjust the direction of the antenna. In different scenarios, the directions of the antennas are different. When the USG6000F-S is installed in a cabinet on the workstation, the antenna should be vertical to the floor. When the USG6000F-S.

----End

Follow-up Procedure

After the antennas are installed, do as follows:

- Before the USG6000F-S is powered on: Check whether the cables and connectors are free of damage or breakage and are connected properly.
- After the USG6000F-S 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 meets the requirements. Otherwise, adjust the antennas.

4.3.4 Installing a Micro SD Card

This section describes how to install a micro SD card for the first time to avoid damages.

Precautions

- 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 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.
- To replace the micro SD card when the USG6000F-S is powered on, you must run the **disk offline** command in the User 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 **Replacing a Micro SD Card**.
- 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.

Tools

- Phillips screwdriver
- ESD wrist strap

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.

NOTICE

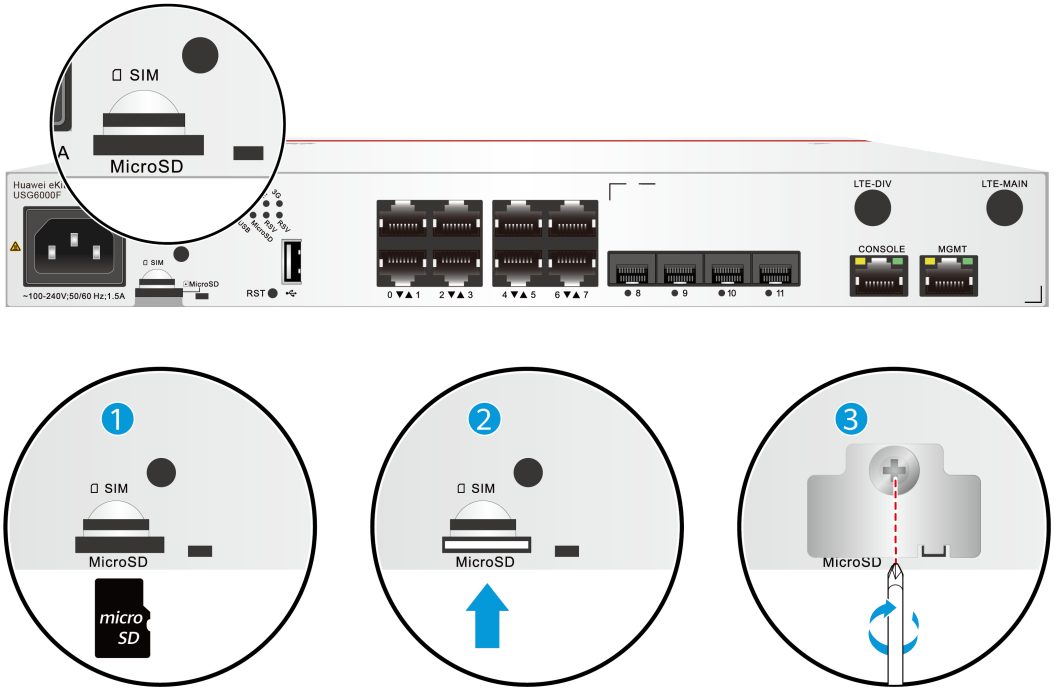
If an micro SD card is inserted for the first time, format the SD card. If the SD card is not formatted, it may fail to be mounted because the file system does not match the device.

NOTE

- Note that the USG6000F-S micro SD card must be installed with the face with words upwards. Note that the USG6000F-S micro SD card must be installed with the words with face 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 4-13 Installing the micro SD card and anti-theft board



----End

Follow-up Procedure

For a new microSD card, when it is installed for the first time, run the **format** command to format the microSD card and then run the **mount disk partition** command to mount it. (The SD card has been formatted for devices with BOM code 02315NSC. Therefore, the SD card does not need to be formatted at the first installation.)

After the micro SD card is installed, power on the USG6000F-S and run the **display device disk** command in diagnostic view to check the micro SD card installation and file system mounting status. If **Present** is Present , **Power** is On and **Register** is Registered, the micro SD card is working properly.

- If **Present** is Absent, re-install the micro SD card and try again. If **Present** remains the same, the USG6000F-S may fail to identify the micro SD card. You are advised to use another micro SD card.

- If **Register** is UnRegistered, the micro SD card format might not be **ext4.** You need to run the **format disk partition** command in the diagnostic view to format the micro SD card.

4.3.5 Installing a SIM Card

The USG6000F-S55L provides an internal LTE module which provides the LTE access function. To use the LTE access function, install the SIM card as instructed.

Precautions

- The USG6000F-S55L supports standard Nano SIM cards. Exercise caution when you remove and insert the SIM card.
- The USG6000F-S55L supports 4G FDD LTE/TDD LTE, 3G TD-SCDMA/WCDMA, and 2G GSM. You need to purchase a SIM card of the corresponding network standard.

NOTICE

- SIM cards are not hot swappable. Therefore, do not install the SIM card when the USG6000F-S 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.

Tools

- Phillips screwdriver
- ESD wrist strap

Procedure

Step 1 Determine the slot (the slot with a SIM silkscreen on the rear panel) for installing the SIM card.

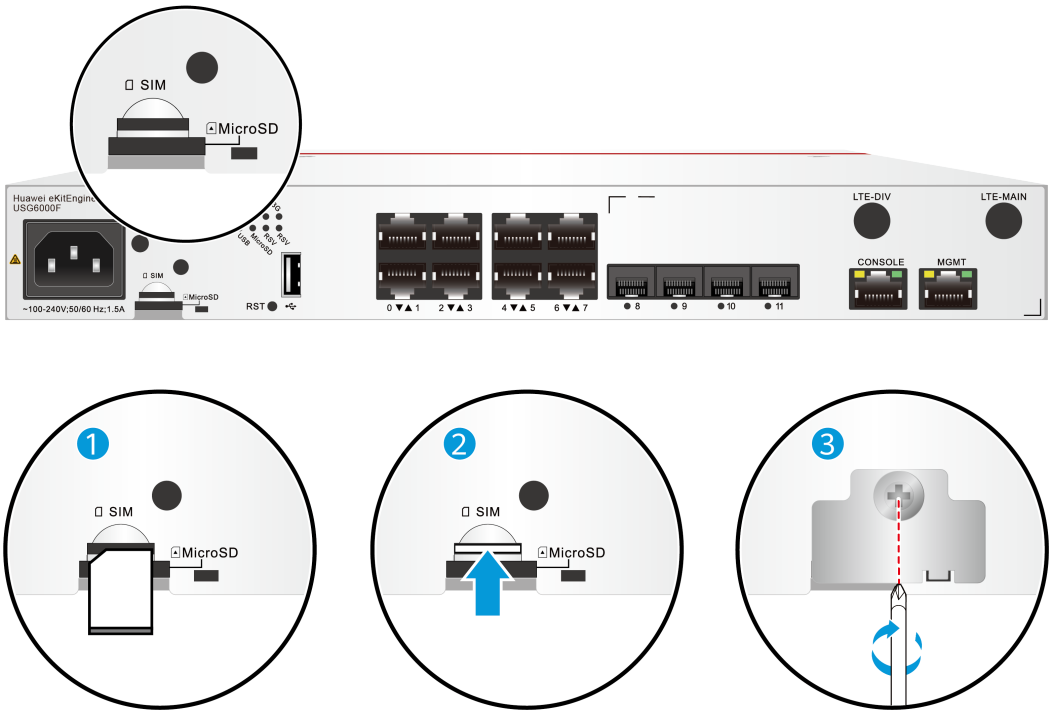
Step 2 Install the SIM card and anti-theft board.

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 4-14 Installing the SIM card and anti-theft board(USG6000F-S55L)



----End

Follow-up Procedure

After the SIM card is installed and the USG6000F-S 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 **Normal**, the SIM card is working properly and has been identified by the USG6000F-S

4.3.6 Connecting a Console Cable

After connecting a PC to the console port of a USG6000F-S with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6000F-S.

Precautions

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG6000F-S 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 USG6000F-S are connected to the same ground point. Otherwise, the console port of the USG6000F-S 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.

Tools

Console cable (prepared by the user)

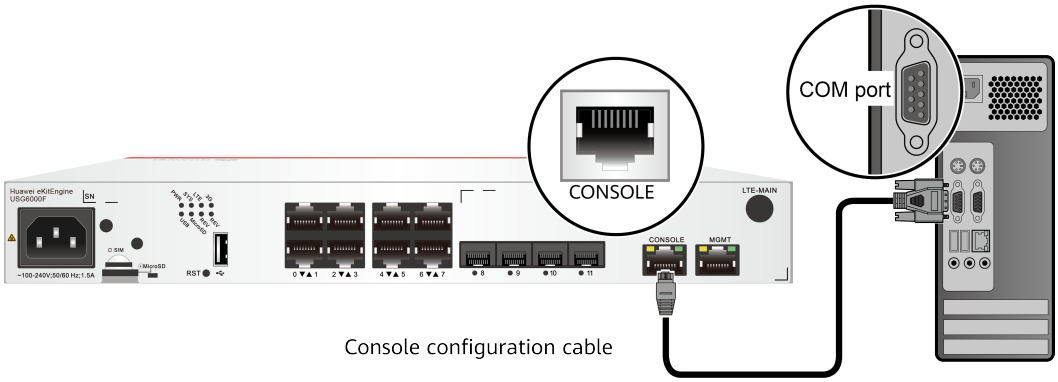
Procedure

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 USG6000F-S.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 4-15 Connecting a console cable to the USG6000F-S



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.

For details on the console login, refer to the Configuration Guide.

4.3.7 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6000F-S 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.

NOTICE

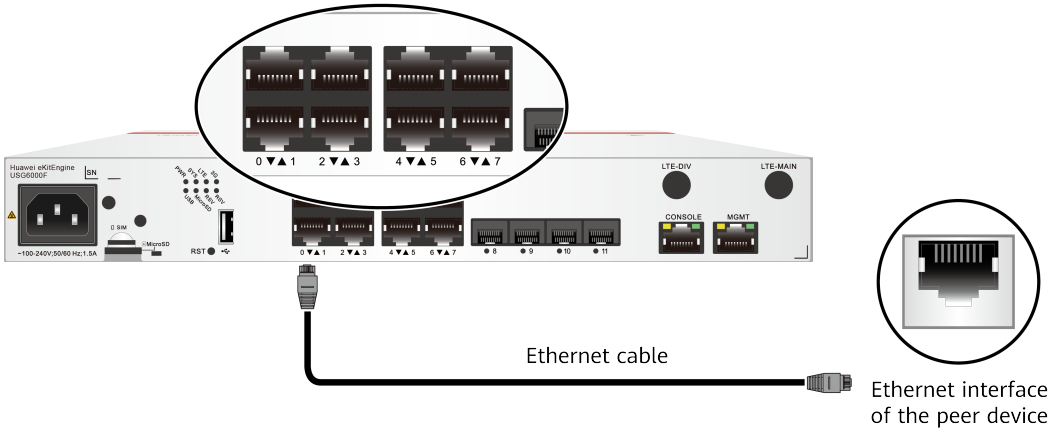
- Only shielded cables are supported on the USG6000F-S.
- Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.
- Strong interference may cause a packet loss rate of no more than 1% on Ethernet electrical interfaces. To prevent this problem, keep the device away from interference sources or take adequate anti-interference measures.

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 USG6000F-S and the other end to the Ethernet port of the peer device based on the network plan.

Figure 4-16 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.

4.3.8 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 USG6000F-S supports both 1 Gbit/s 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, FC/PC, or MPO/PC-MPO/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 USG6000F-S 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 USG6000F-S.

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.

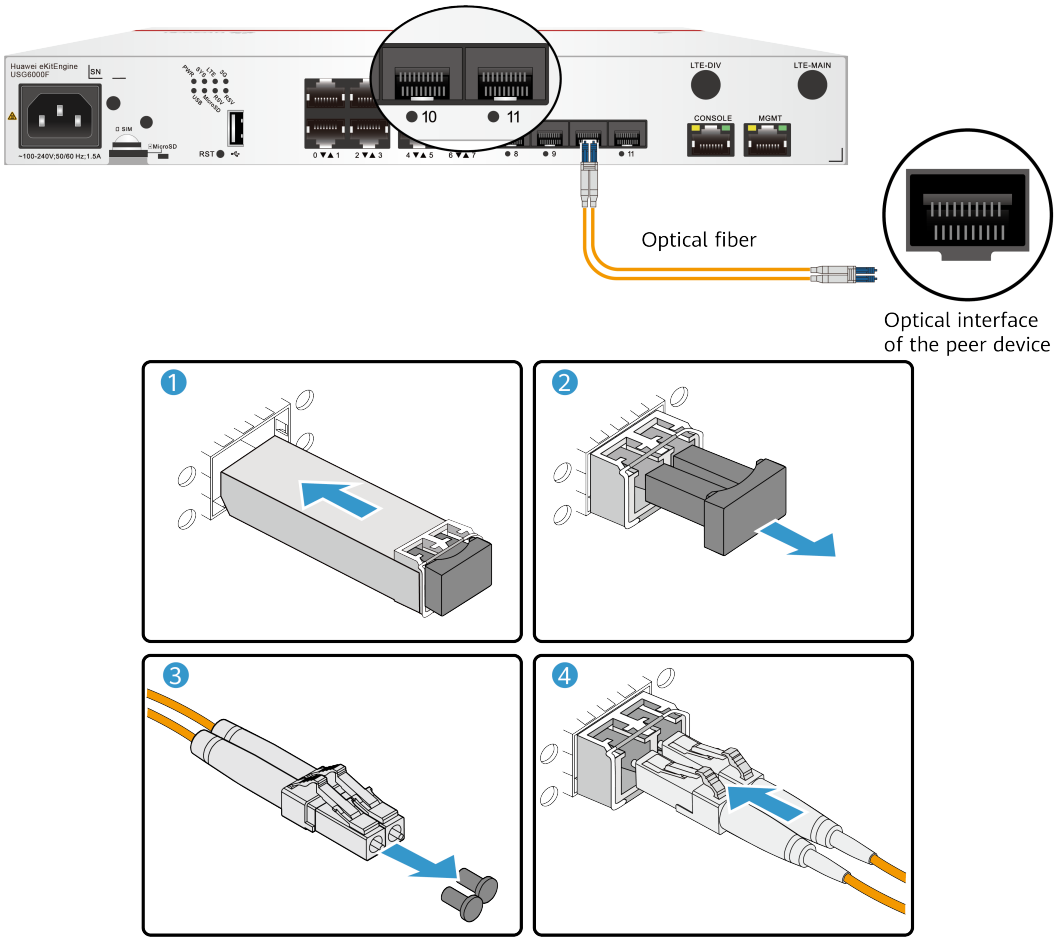
Step 4 Remove protective caps from optical fiber connectors, insert optical fibers into the optical transceiver, and connect the fiber to the peer device.

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 4-17 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 USG6000F-S, 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.

4.3.9 Connecting AC Power Cable

USG6000F-S55L has a built-in power module, which supplies power to the device through a power cable.

Prerequisites

Before connecting the power cables, ensure that the AC power supply in the equipment room meets the input requirements of the USG6000F-S.

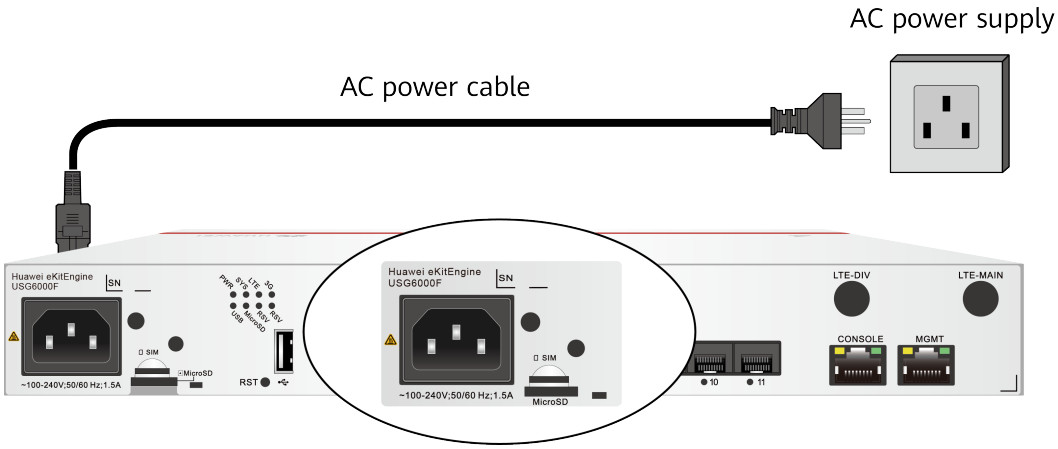
DANGER

Do not connect or disconnect the power cables when the USG6000F-S is powered on.

Procedure

1. Plug one end of the C13 power cable to the power socket of the USG6000F-S power module.
2. Plug the other end of the power cable to the AC power socket or the output of the AC power supply device.

Figure 4-18 Connecting AC power cables(USG6000F-S55L)



Follow-up Procedure

Verify the following after the connection is complete:

- The power cable is firmly connected to the power supply socket.
- If multiple USG6000F-S are deployed, the power cables of each USG6000F-S are correctly labeled for distinction.

4.3.10 Powering On or Off the Device

This section describes how to power on or off the USG6000F-S55L. To ensure the normal start and security of the USG6000F-S55L, strictly follow the operation guide to power on or off the USG6000F-S55L.

Context

Before you power on the USG6000F-S, 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.

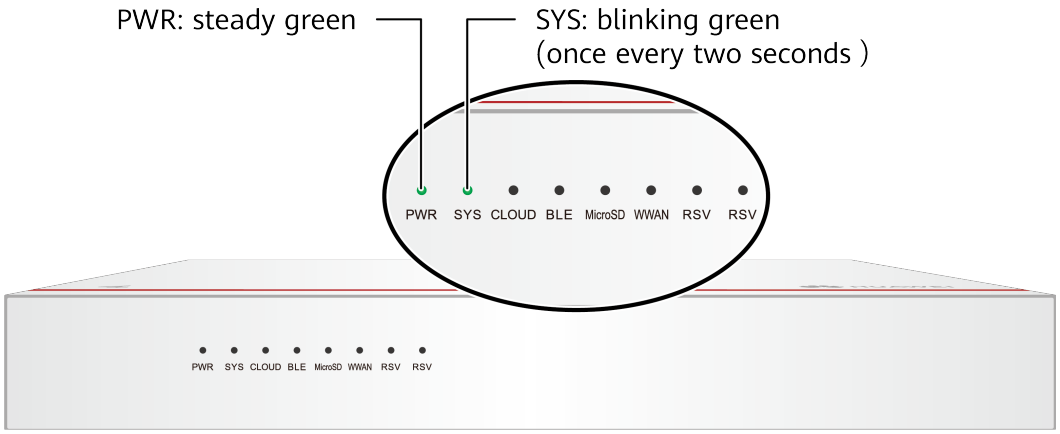
Procedure

- Power on the USG6000F-S.

  The USG6000F-S starts after the switch of the power supply device is turned on.

  You can identify the USG6000F-S status based on indicators on the front panel. Indicators shown in **Figure 4-19** indicate that the is running normally.

  Figure 4-19 Indicators when the USG6000F-S runs normally

- Power off the USG6000F-S.

  NOTICE

  Before powering off the USG6000F-S, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

  If the USG6000F-S will be administratively shut down for a long time, turn off the power switch. After powering off the USG6000F-S, set it aside properly according to storage requirements.

----End

Follow-up Procedure

After the USG6000F-S is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the Configuration Guide.

4.4 Installing a 220 mm Deep Device

This chapter provides the cabinet mounting, component installation, and cable connection methods of the USG6000F-S.

4.4.1 Mounting a Device to a Specified Location

4.4.1.1 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6000F-S125 on a workbench.

Precautions

Before unpacking the device, ensure the packing is intact and not damaged or wet. If the device is found eroded or damped, stop unpacking, check for the reason, and contact the device supplier.

The workbench must be:

- Well grounded.
- Clean, firm, and securely installed.

Tools and Accessories

Four rubber feet

Procedure

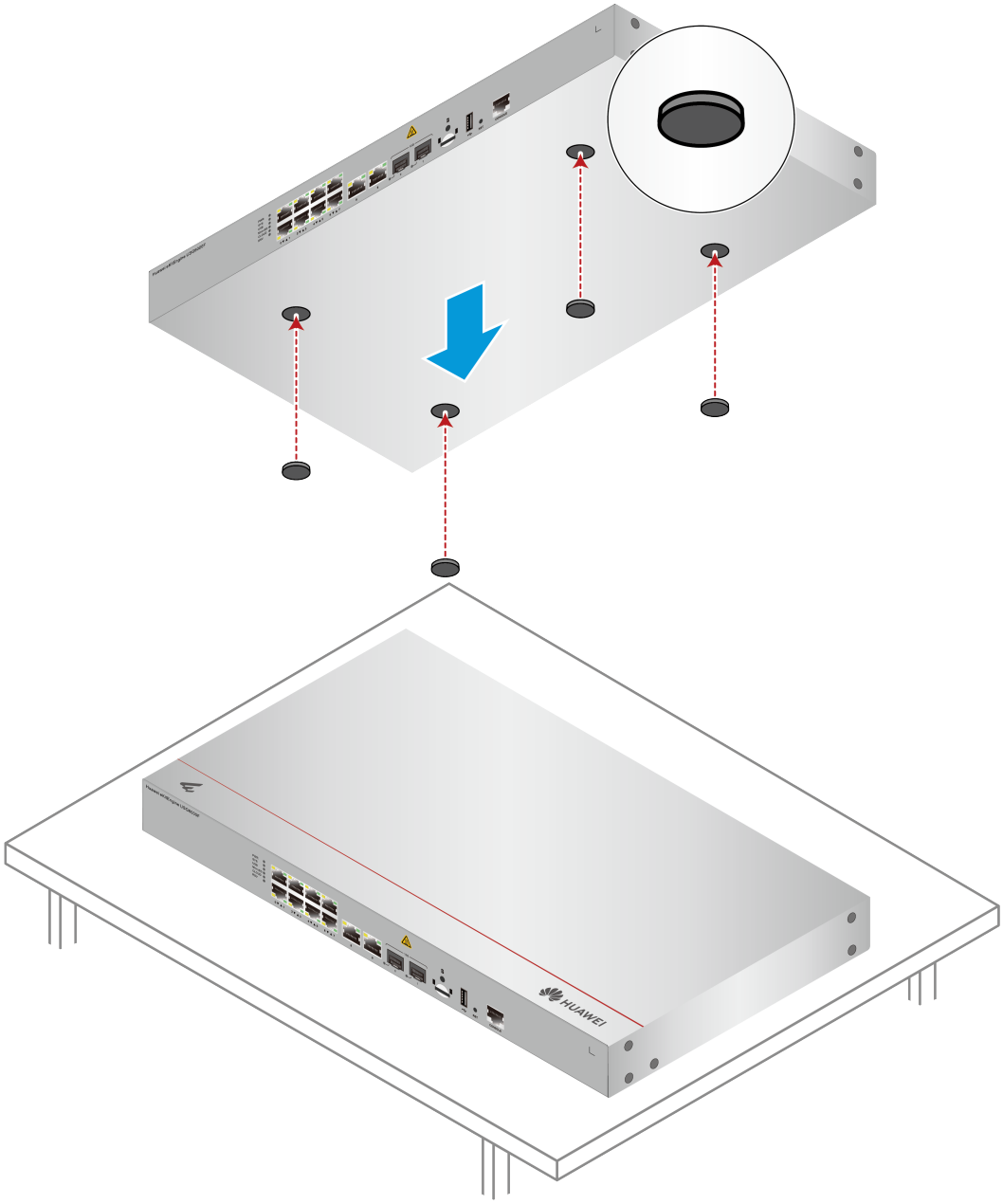
Step 1 Stick the rubber feet to the four round notches at the bottom of the USG6000F-S.

NOTE

Install the rubber feet at the bottom of the USG6000F-S to ensure smooth contact between the USG6000F-S and the workbench and avoid friction between the surface of the USG6000F-S and the workbench.

Step 2 Place the USG6000F-S on the workbench.

Figure 4-20 Placing the USG6000F-S with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG6000F-S is securely placed on the workbench.
- A clearance of 10 cm around the USG6000F-S is reserved for heat dissipation and the air flow is not blocked.
- No objects are placed on the USG6000F-S.

4.4.1.2 Mounting a Device into a Cabinet

Install the USG6000F-S125 to the cabinet through the expandable rear mounting brackets or adjustable guide rails.

Precautions

Before the installation, check the following items:

- Before unpacking the device, ensure the packing is intact and not damaged or wet. If the device is found eroded or damped, stop unpacking, check for the reason, and contact the device supplier.
- The cabinet is well fixed.
- The device installation position in the cabinet is determined and arranged properly.
- A minimum spacing of 1 U between the USG6000F-S and other devices mounted in the same cabinet and 150 mm between the USG6000F-S and other devices mounted in different cabinets is maintained.
- The USG6000F-S to be installed is available and placed near the cabinet for convenient movement.

The USG6000F-S can be mounted with the front panel or rear panel facing the cabinet door. The following example describes the mounting of the USG6000F-S with the front panel facing the cabinet door.

Tools and Accessories

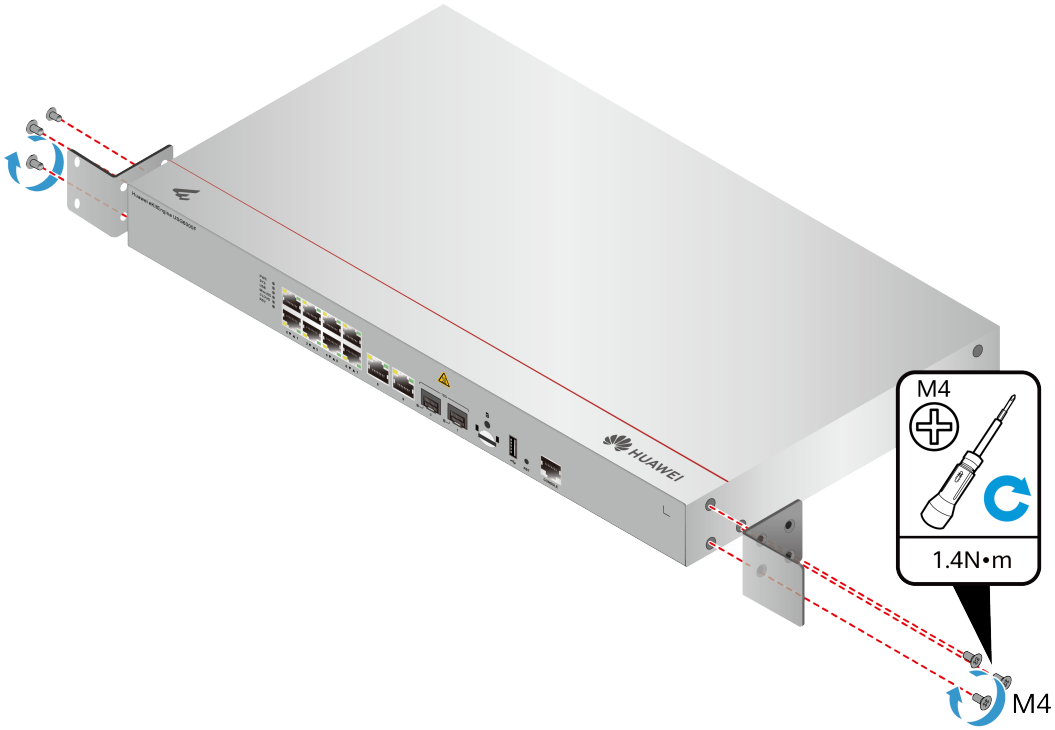
- Phillips screwdriver
- Floating nuts and matching screws
- Floating nut mounting bar
- Front mounting brackets and matching screws

Procedure

Step 1 Install mounting brackets on the chassis.

Use a Phillips screwdriver to fix the mounting brackets to both sides of the chassis with M4 screws, as shown in **Figure 4-21**.

Figure 4-21 Installing mounting brackets on the chassis



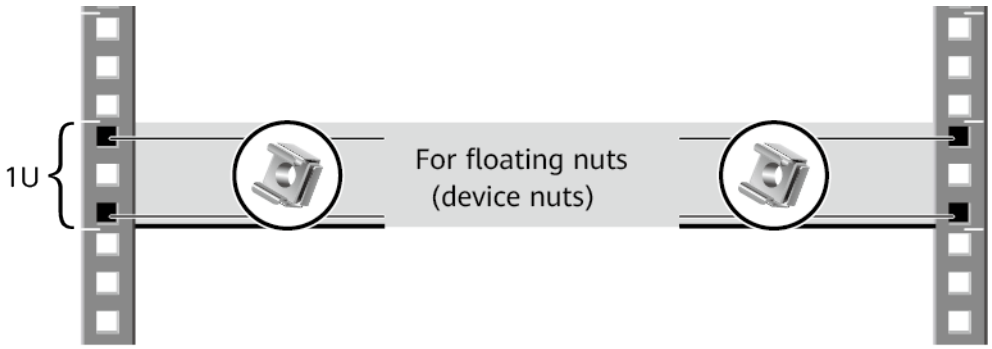
NOTE

If the tray installation mode is used, skip this step.

Step 2 Install floating nuts.

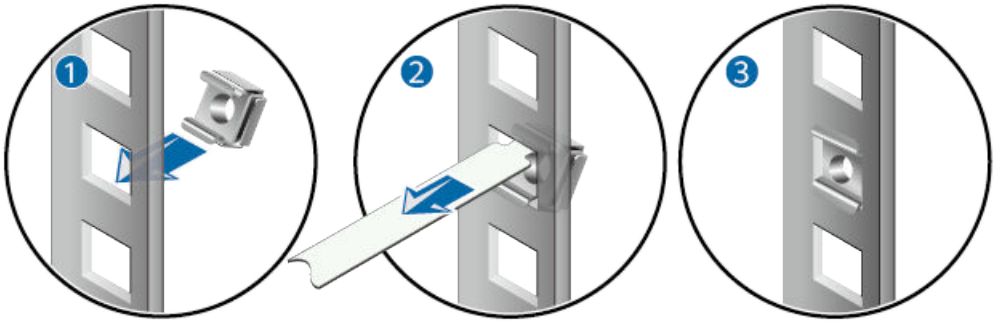
Figure 4-22 shows the installation positions of floating nuts.

Figure 4-22 Installation positions of floating nuts



Install the floating nuts that match M6 screws at the positions marked in Figure 4-22. Figure 4-23 illustrates how to install a floating nut.

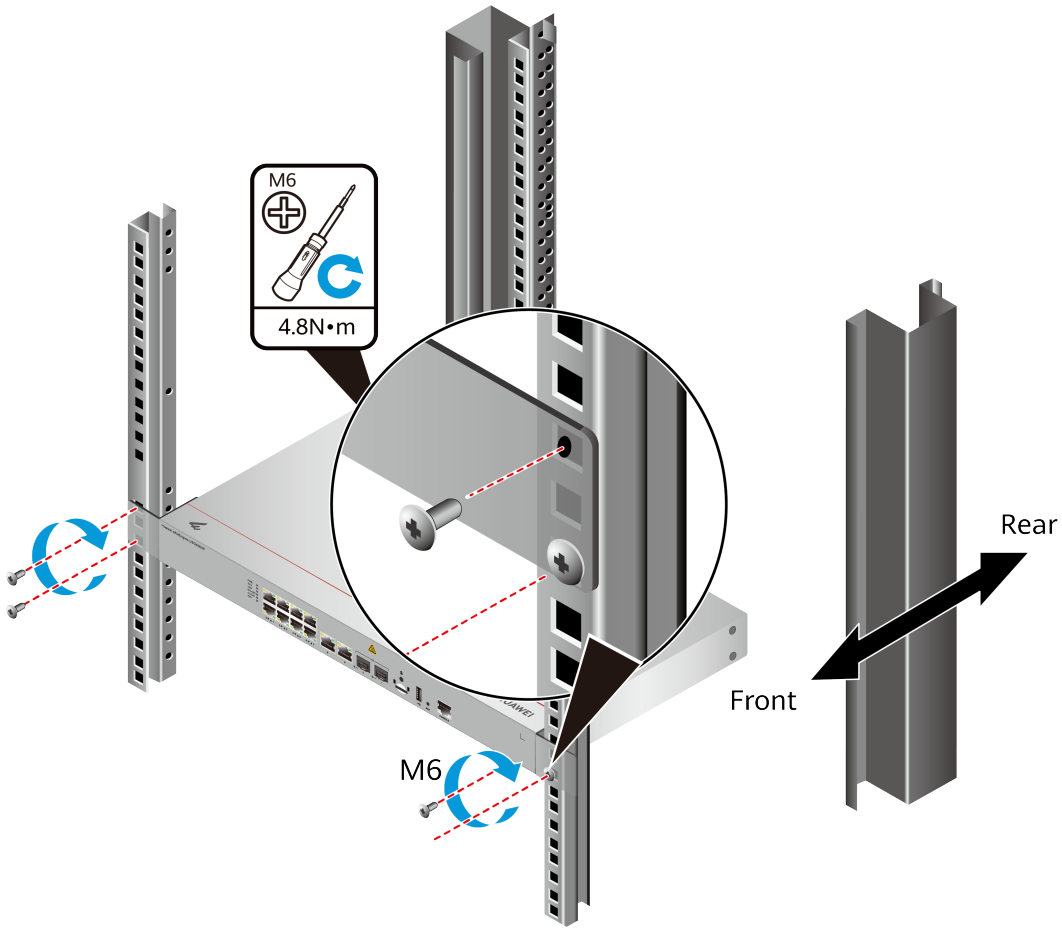
Figure 4-23 Installing floating nuts



Step 3 Mount a device into the cabinet.

1. Lift the device, slowly move it to the front of the cabinet, align the rear mounting brackets with the guide rails, and gently push the device into the cabinet.
2. Use M6 screws to fix the device to the cabinet through the mounting brackets, as shown in **Figure 4-24**.

Figure 4-24 Mounting the device into a cabinet



----End

Follow-up Procedure

Verify the following after the installation:

- Verify that the USG6000F-S is securely mounted in the cabinet.
- There is no object that affects heat dissipation around the USG6000F-S.

4.4.2 Connecting a PGND Cable

Connecting the PGND cable of the USG6000F-S125 correctly is a key measure of surge protection and resistance to interference. Before using the USG6000F-S125, make sure that the PGND cable is well connected. Otherwise, the USG6000F-S125 may be damaged.

Precautions

The USG6000F-S has been mounted to a specified location, for example, a cabinet or workbench.

Tools

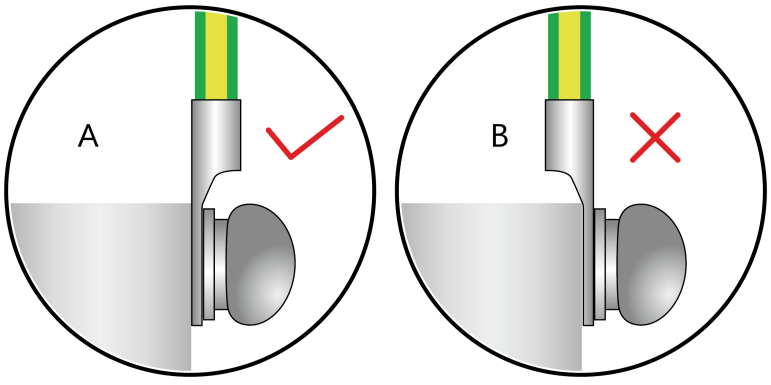
- Phillips screwdriver
- Multimeter

Procedure

Step 1 Loosen and remove the screw of the ground terminal on the rear panel of the USG6000F-S.

Step 2 Align the M4 lug of the PGND cable with the screw hole of the ground terminal on the USG6000F-S, with the conductor upward, as shown by callout A in **Figure 4-25**. Then tighten the M4 screw with a torque of 1.4 N·m.

Figure 4-25 Installing an OT bare crimp terminal

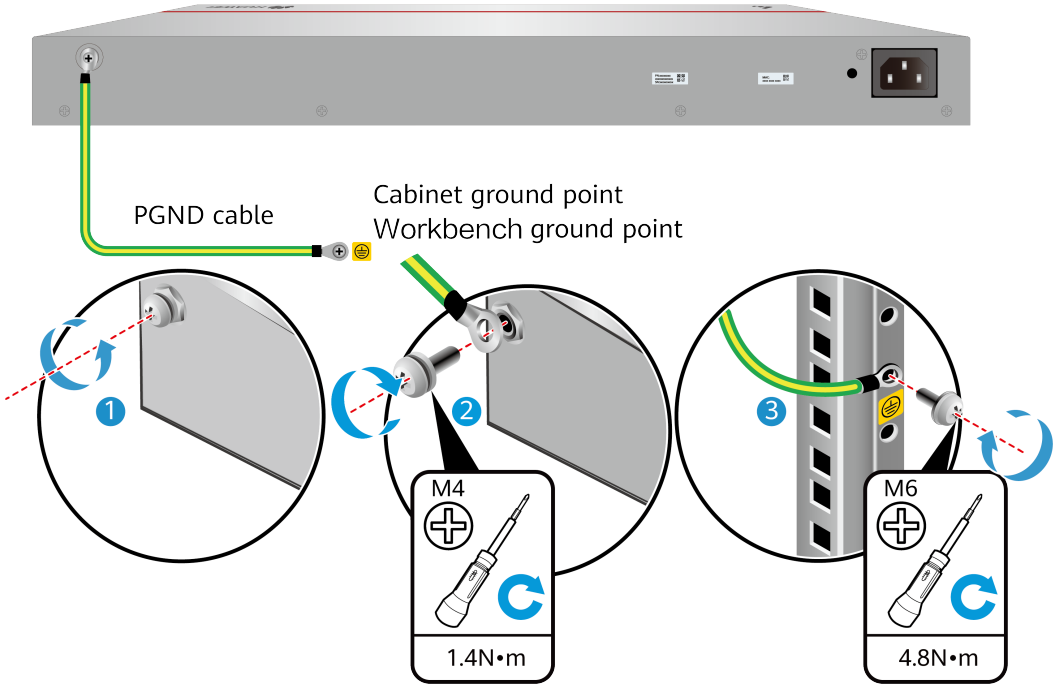


NOTE

The ground cable of the USG6000F-S125 must be routed upwards.

Step 3 Connect the M6 lug of the PGND cable to the ground terminal on the cabinet, workbench, or wall, and tighten the M6 screw with a torque of 4.8 N·m.

Figure 4-26 Connecting a PGND cable



NOTICE

The OT terminal may rotate. Make sure that it is never in contact with other terminals or metal components.

----End

Follow-up Procedure

Verify the following after connecting the PGND cable:

- The PGND cable is securely connected to the ground terminal.
- The electrical resistance between the ground terminal and ground point is less than 0.1 ohm on a multimeter.

4.4.3 Installing a Micro SD Card

This section describes how to install a micro SD card for the first time to avoid damages.

Precautions

- 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 capacity of the micro SD card is 64 GB, and the dimensions (H x W x D) are 1 mm x 15 mm x 11 mm.
- The micro SD card can be installed no matter whether power is on or off. The installation methods are the same. In this section, the micro SD card is installed when the device is powered off.

- Before replacing a micro SD card while power is on, you must run the **disk offline** command in the User view. Remove the micro SD card only after the system displays a message indicating that the micro SD card goes offline successfully. This prevents damage to the micro SD card and data loss. For details, see **Replacing a Micro SD Card**.
- 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.

Tools

- Phillips screwdriver
- ESD wrist strap

Procedure

Step 1 Determine the slot (slot marked with the micro SD card icon on the rear panel) for installing the micro SD card.

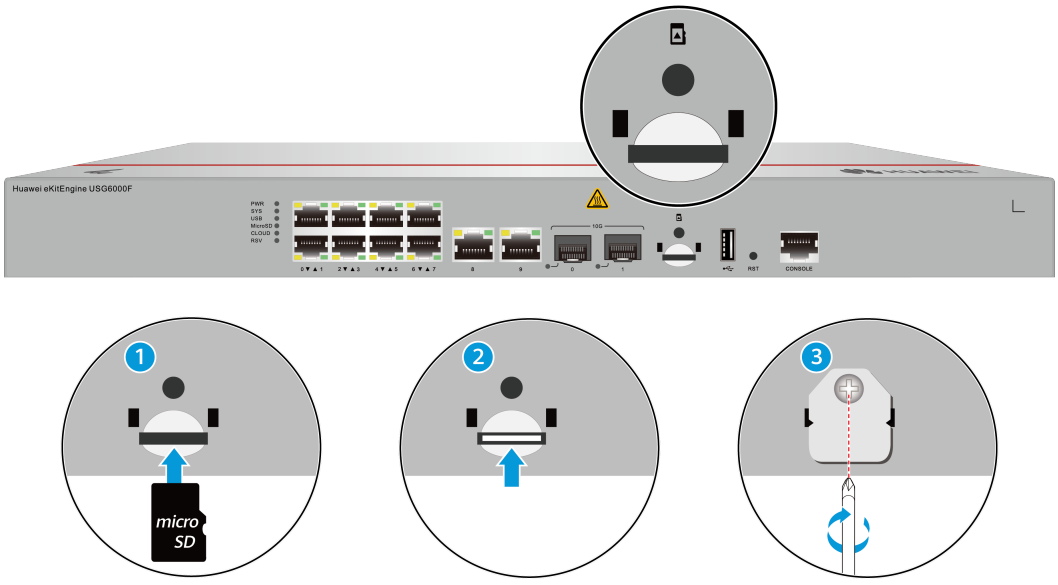
Step 2 Install the micro SD card and anti-theft board.

NOTE

- Note that the micro SD card of the USG6000F-S125 must be installed with the face with words upwards.
- Do not use too much force. Otherwise, the micro SD card or micro SD card slot might be damaged.

1. Horizontally slide the micro SD card along the guide rail into 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 4-27 Installing a micro SD card and anti-theft board



----End

Follow-up Procedure

For a new microSD card, when it is installed for the first time, run the **format** command to format the microSD card and then run the **mount disk partition** command to mount it. (The SD card has been formatted for devices with BOM code 02315NSC. Therefore, the SD card does not need to be formatted at the first installation.)

After the micro SD card is installed, power on the USG6000F-S and run the **display device disk** command in the diagnostic view to check the micro SD card installation and file system mounting status. If **Present** is **Present**, **Power** is **On**, and **Register** is **Registered**, the micro SD card is working properly.

- If **Present** is **Absent**, reinstall the micro SD card and try again. If **Present** remains unchanged, the USG6000F-S may fail to identify the micro SD card. In this case, you are advised to use another micro SD card.
- If **Register** is **UnRegistered**, the micro SD card format might not be **ext4**. In this case, run the **format disk partition** command in the diagnostic view to format the micro SD card.

4.4.4 Connecting a Console Cable

After connecting a PC to the console port of the USG6000F-S125 with a console cable, you can use the serial port terminal software on the PC to access the command line interface (CLI) of the USG6000F-S125.

Precautions

Before connecting a console cable, perform the following operations:

- Check construction conditions.

  A PC is ready, the USG6000F-S has been installed, and the ports to be connected are planned.
- Label the cable.

  The cable must be labeled before being connected to the devices.

NOTICE

- Make sure that the PC and the USG6000F-S are connected to the same ground point. Otherwise, the console port of the USG6000F-S 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 device may be damaged.

Tools

Console cable (prepared by the customer)

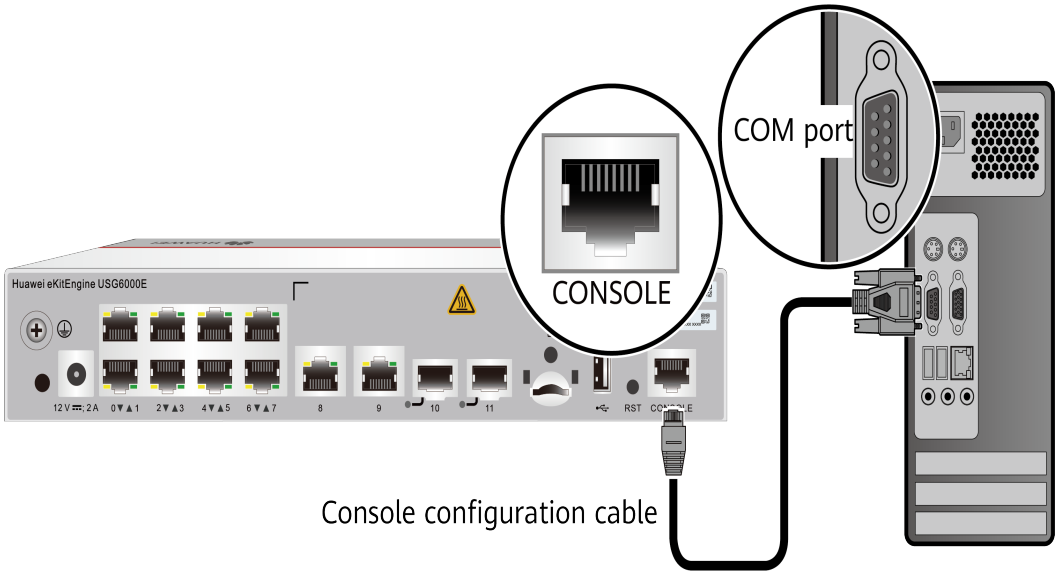
Procedure

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 USG6000F-S.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 4-28 Connecting a console cable to the USG6000F-S



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 the following items:

- Labels are correctly filled and securely attached to both ends of the cable, with texts facing the same direction.
- The cable and connector are complete, intact, and tightly connected. All cable connections are correct.

For details on the console port-based login, see the *Configuration Guide*.

4.4.5 Connecting Ethernet Cables

According to the networking plan, connect one end of an Ethernet cable to an Ethernet port of the USG6000F-S125 and the other end to an Ethernet port of the peer device.

Context

The preparations for connecting Ethernet cables are as follows:

- 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 has been calculated based on the cabling route.
- Label the cable.

  The cable must be labeled before being connected to the devices.

NOTICE

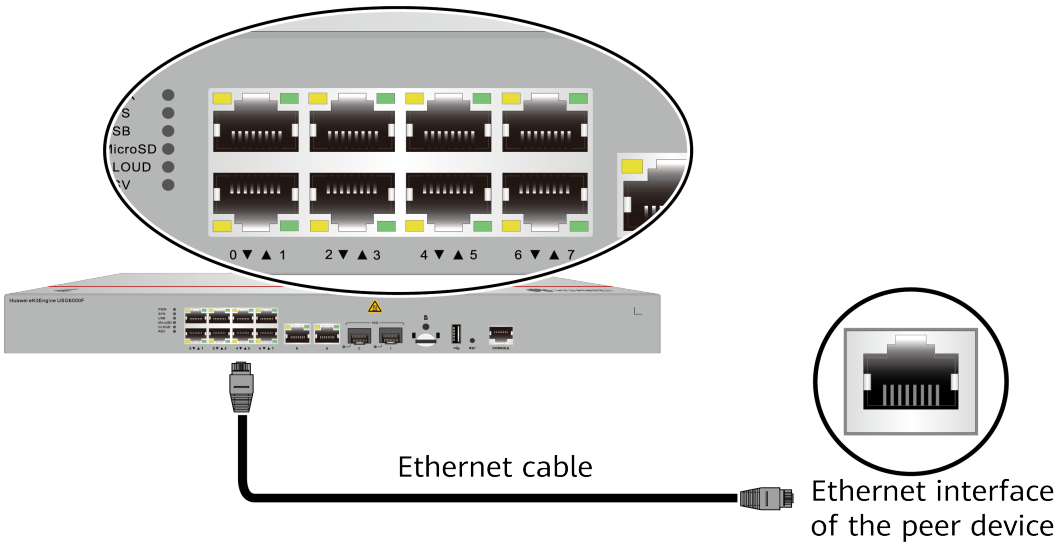
- Only shielded cables are supported on the USG6000F-S. If unshielded cables are used, the device functionality cannot be guaranteed.
- Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device may be damaged.
- Strong interference may cause a packet loss rate of no more than 1% on Ethernet electrical interfaces. To prevent this problem, keep the device away from interference sources or take adequate anti-interference measures.

Procedure

Step 1 If multiple Ethernet 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 USG6000F-S and the other end to the Ethernet port of the peer device based on the network plan.

Figure 4-29 Connecting an Ethernet cable



Step 3 Lead the Ethernet cable into the cabinet from the top cable inlet (for overhead cabling) or bottom cable inlet (for on-ground cabling), and route the cable along one side of the cabinet.

Step 4 Remove the temporary labels and attach labels (2 cm away from connectors) to both ends of the Ethernet cable.

----End

Follow-up Procedure

After installing the Ethernet cable, verify the following items:

- Labels are correctly filled and securely attached to both ends of the Ethernet cable, with texts facing the same direction.
- The Ethernet cable and connector are complete, intact, and tightly connected. All cable connections are correct.

4.4.6 Connecting Optical Modules and Optical Fibers

According to the networking plan, install an optical module on the SFP or SFP+ port and connect it to the corresponding port of the peer device using an optical fiber.

Context

The USG6000F-S supports GE optical modules. Select the local optical module based on the peer optical module, including the optical fiber type (single-mode or multi-mode), optical fiber connector type (LC/PC, SC/PC, FC/PC, or MPO/PC-MPO/PC), and rate. For example, single-mode optical modules can be connected only through single-mode optical fibers (yellow), and multi-mode optical modules can be connected only through multi-mode optical fibers (orange or gray). If the optical modules at both ends are of different types, communication may fail.

NOTICE

Huawei optical modules are recommended. The optical modules of other vendors may cause device faults due to incompatibility.

⚠ CAUTION

Do not look into the optical port of a working optical module or the optical fiber connector without eye protection to avoid injury to your eyes.

Before connecting optical fibers, pay attention to the following points:

- Do not overbend optical fibers. The bend radius of an optical fiber must be no less than 40 mm.
- Do not bundle optical fibers too tight. Otherwise, the transmission performance of optical fibers may be degraded, affecting the communication quality between devices.

Procedure

Step 1 Insert an optical module into the SFP/SFP+ port of the USG6000F-S.

Step 2 Remove the dust plug from the optical module.

NOTE

Keep the dust plug of the optical module properly. After removing optical fibers from optical modules, use the dust plugs to protect the optical modules from dust.

Step 3 Before installing optical fibers, attach temporary labels to both ends of each optical fiber to identify them.

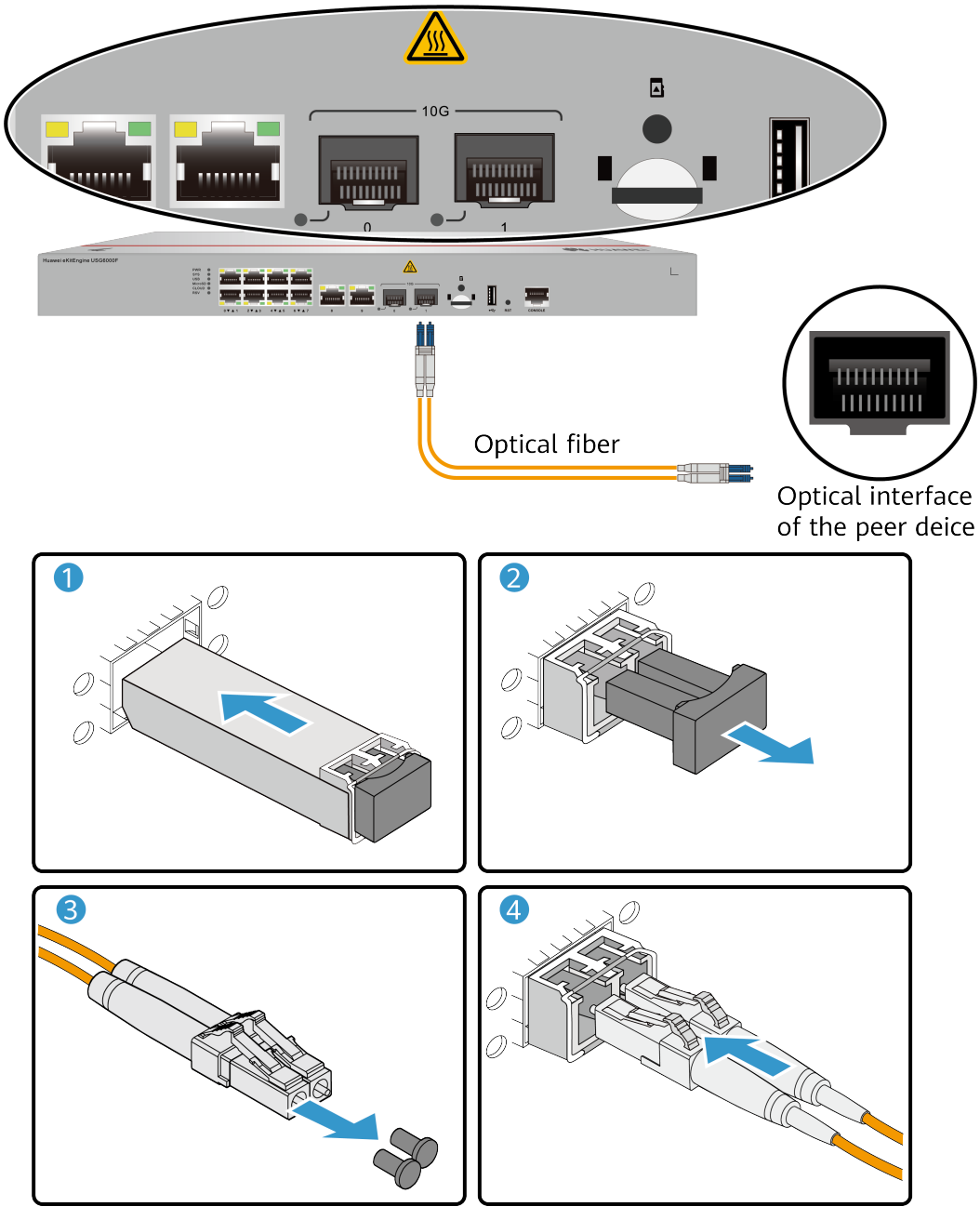
Step 4 Remove the protective cap from the optical fiber connector. Connect one end of the optical fiber to the optical module and the other end to the peer device.

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 are connected to the Rx and Tx ports (respectively) on the other end.

Figure 4-30 Installing optical modules and connecting optical fibers



Step 5 Repeat steps **Step 1** to **Step 4** to install all the optical modules and optical fibers.

----End

Follow-up Procedure

After the USG6000F-S is powered on, observe the indicator status of the optical port connected to the optical fiber. If the indicator is steady on or blinking, a link is established or data is being forwarded. If the indicator is off, no link is established. Possible causes for link disconnections are as follows:

- The optical fiber is improperly inserted. Pull out the optical fiber and re-insert it.

- The Rx and Tx ports of the optical port are connected reversely. In this case, turn over the optical fiber and reinstall it.
- The optical module is damaged or the optical fiber is broken. In this case, replace the optical module or optical fiber.

4.4.7 Connecting the AC Power Cable

The USG6000F-S125 has a built-in power module, and power is supplied to the device through a power cable.

Prerequisites

Before connecting an AC power cable, ensure that the power source of the equipment room meets the input requirements of the power module on the USG6000F-S.

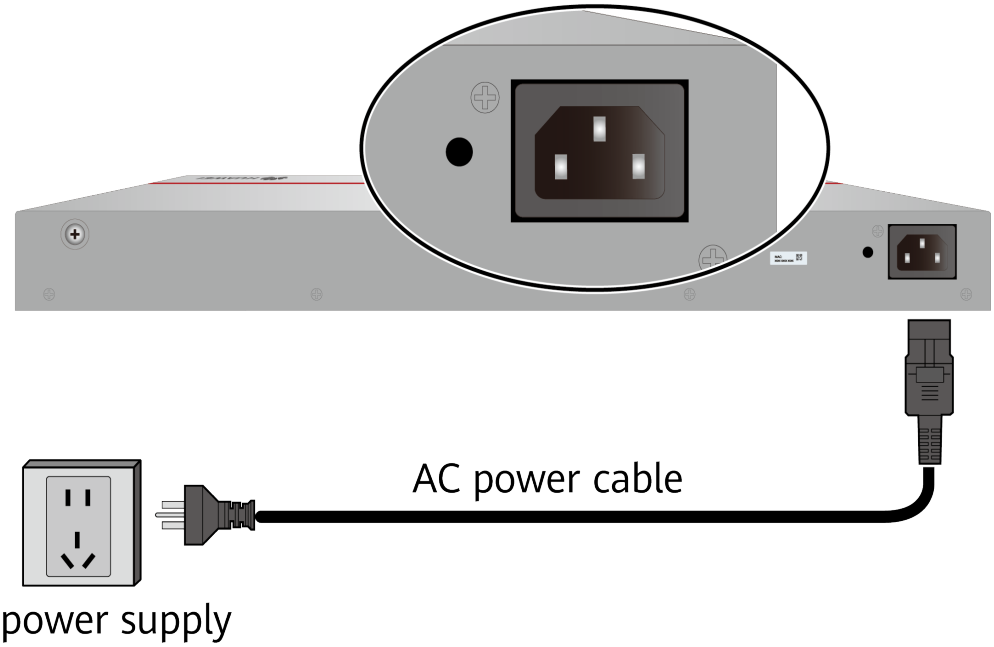
DANGER

Do not install the power cable when the power is on.

Procedure

1. Insert the C13 connector of the USG6000F-S power cable into the power socket of the USG6000F-S.
2. Plug the other end of the power cable to the AC power socket or the output socket of the AC power supply device.

Figure 4-31 Connecting the AC power cable (USG6000F-S125)



Follow-up Procedure

Verify the following after connecting the power cable:

- The power cable is securely connected to the power socket.
- If multiple USG6000F-S devices are installed, attach labels to both ends of each power cable and write numbers on the labels to identify them.

4.4.8 Power-On and Power-Off

To ensure that the USG6000F-S125 can be started properly and is secure, strictly follow the power-on and power-off requirements.

Context

Observe the following items before powering on the device:

- The power cables and ground cables have been 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.

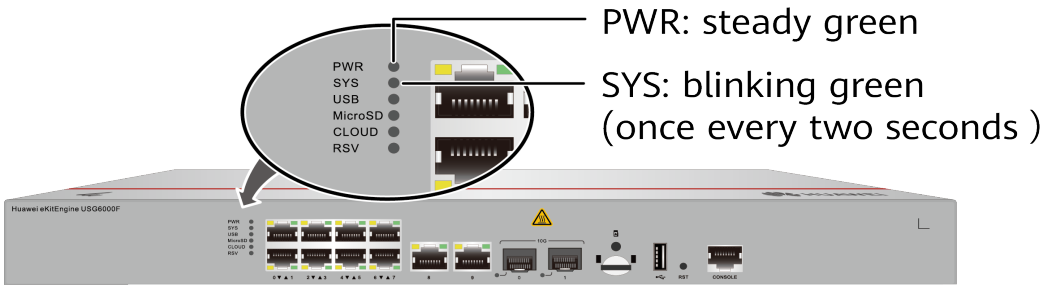
Procedure

- Power on the device.

  Turn on the power switch of the power supply device. The USG6000F-S starts.

  After the USG6000F-S is started, check whether the USG6000F-S is running properly based on the status of the indicators on the front panel. **Figure 4-32** shows the indicator status when the USG6000F-S is running properly.

  Figure 4-32 Indicator status when the USG6000F-S is running properly

- Power off the device.

  NOTICE

  Before powering off the device, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

  If the device is not used for a long time, turn off the power switch to power off the device. After powering off the device, keep it properly according to storage requirements.

----End

Follow-up Procedure

After the USG6000F-S is powered on, you can log in to its CLI to configure, manage, and maintain the device. For details, see the corresponding configuration guide.

4.5 Installing a 420 mm Deep Device

This chapter provides the cabinet-mounting, component installation, and cable connection methods of the USG6000F-S series.

4.5.1 Mounting a Device to a Specified Location

4.5.1.1 Mounting a Device in a Cabinet

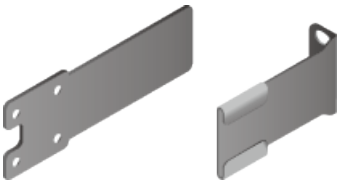
Install the USG6000F-S to the cabinet through the expandable rear mounting ears or adjustable guide rails.

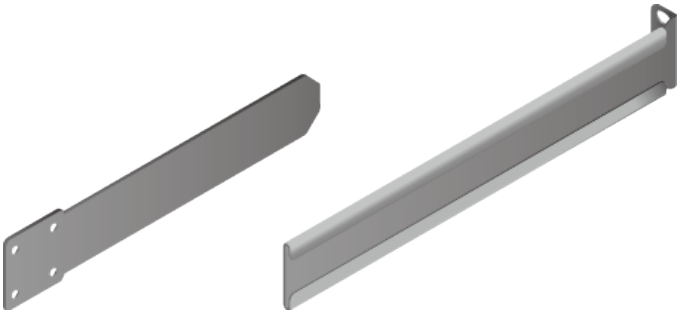
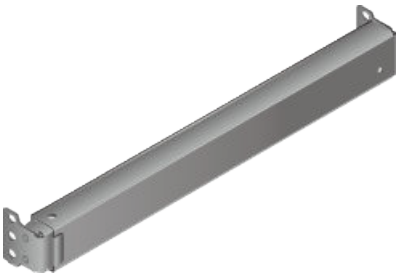
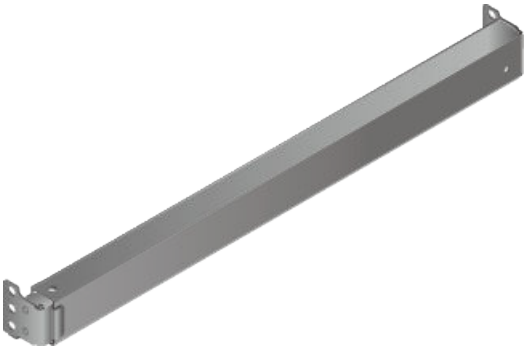
Precautions

Before installing the USG6000F-S, check the following items:

- Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG6000F-S is rusted or soggy. Then, investigate causes and contact the supplier.
- The cabinet is stable.
- Before installing the expandable rear mounting ears or adjustable guide rails on the USG6000F-S, adjust the distance between the front and rear angle gauges (rack mounting rails/vertical columns) to satisfy the installation requirements. The specific scope of application is as follows:

Table 4-3 Expandable rear mounting ears and adjustable guide rails

Distance Between the Front and Rear Mounting Bars and Cabinet Type	Expandable Rear Mounting Ears and Adjustable Guide Rails
Expandable rear mounting ears (BOM number: 21240492) • Distance between the front and rear mounting bars: 310 mm to 538 mm • Cabinet depth: 600 mm to 800 mm	

Distance Between the Front and Rear Mounting Bars and Cabinet Type	Expandable Rear Mounting Ears and Adjustable Guide Rails
Expandable rear mounting ears (BOM number: 21240537) • Distance between the front and rear mounting bars: 638 mm to 835 mm • Cabinet depth: 1000 mm to 1200 mm	
Adjustable guide rails (BOM number: 21242247) • Distance between the front and rear mounting bars: 370 mm to 585 mm • Cabinet depth: 600 mm to 800 mm	
Adjustable guide rails (BOM number: 21242246) • Distance between the front and rear mounting bars: 500 mm to 850 mm • Cabinet depth: 1000 mm to 1200 mm	

- The position for the USG6000F-S in the cabinet is well arranged. Ensure that the USG6000F-S 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 USG6000F-S to be installed is staged near the cabinet for convenience.
- In the front view, the air flow of the USG6000F-S is front to rear. If the USG6000F-S and a device whose air flow is rear to front must be mounted in the same cabinet, maintain certain spacing between them to prevent hot air recirculation.

You can place either end of the USG6000F-S chassis towards the front door of the cabinet. In this manual, the front panel of the USG6000F-S is towards the front door of the cabinet.

NOTE

The method of installing expandable rear mounting ears (BOM number: 21240492) is the same as that of installing expandable rear mounting ears (BOM number: 21240537). The following uses the expandable rear mounting ears (BOM number: 21240492) as examples.

Tools and Accessories

- Phillips screwdriver
- Floating nuts and matching screws
- Floating mounting bar
- Front mounting ears and corresponding screws
- Expandable rear mounting ears and corresponding screws (purchased separately, BOM numbers: 21240492 and 21240537)
- Adjustable guide rails and matching screws (purchased separately, BOM numbers: 21242247 and 21242246)

Procedure

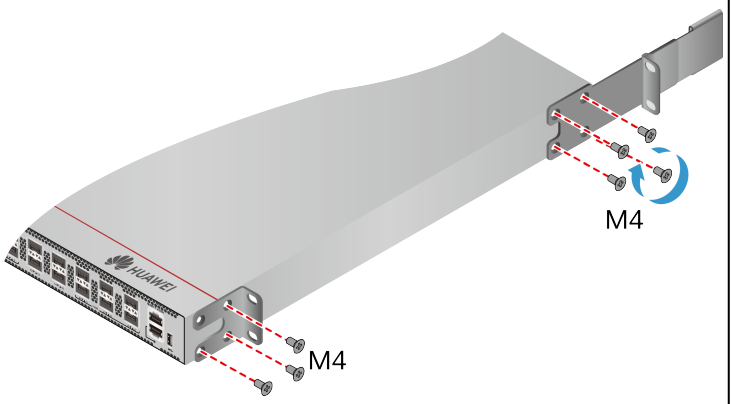
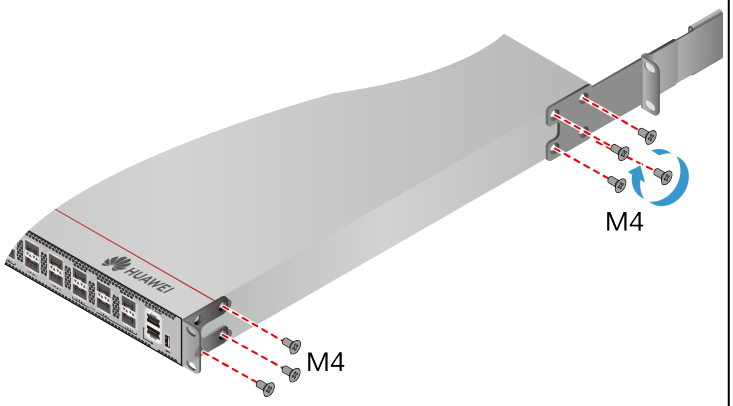
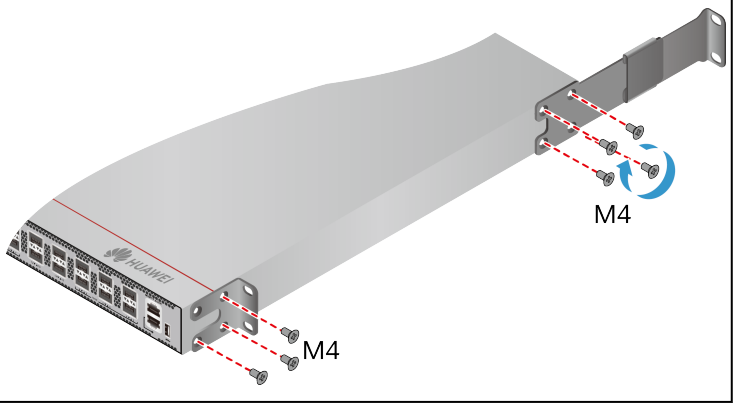
Step 1 Install mounting ears on the chassis.

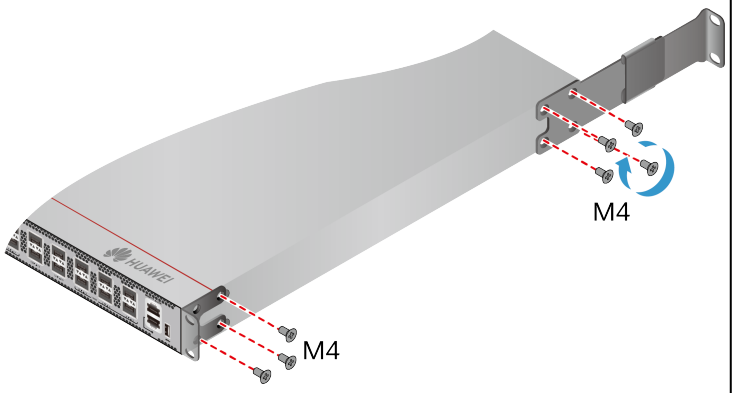
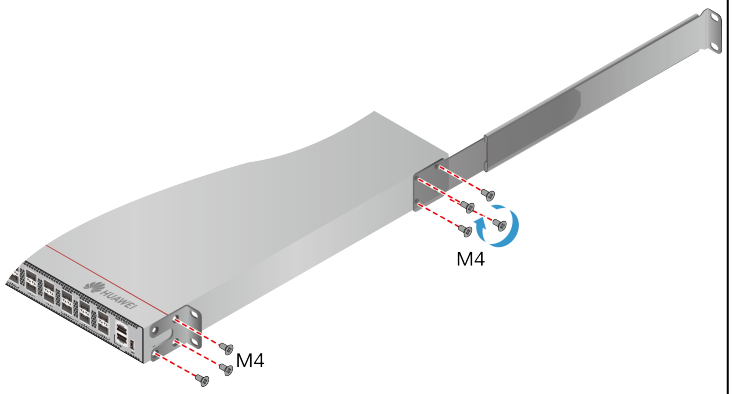
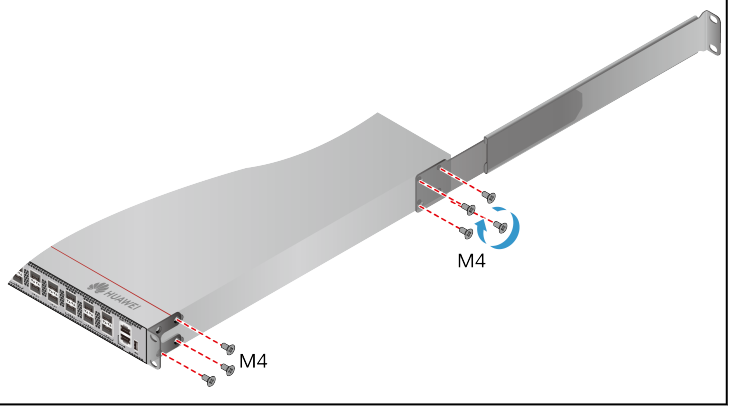
Use a Phillips screwdriver to fix the mounting ears to both sides of the chassis with M4 screws. The maximum torque is 1.4 N m. For details about how to install the mounting ears, see the installation methods in **Table2**.

NOTE

- The front mounting brackets, rear mounting brackets, and rear mounting bracket guide rails must be installed on both sides of the USG6000F-S. **Table2** shows the installation on one side. Install them on the other side in the same way.
- To ensure sufficient cabling space, reserve at least 130 mm of vertical distance from the USG6000F-S's port side to the interior side of the cabinet door.
- After the installation is complete, the rear mounting brackets and rear mounting bracket guide rails will not block cables routed from the ports or touch the cabinet door.

Table 4-4 Installation of front and rear mounting ears

Distance Between Front and Rear Mounting Rails	Installation of Front Mounting Brackets, Rear Mounting Brackets, and Rear Mounting Bracket Guide Rails
310 mm to 351 mm	
369 mm to 410 mm	
438 mm to 479 mm	

Distance Between Front and Rear Mounting Rails	Installation of Front Mounting Brackets, Rear Mounting Brackets, and Rear Mounting Bracket Guide Rails
497 mm to 538 mm	
638 mm to 696 mm	
697 mm to 835 mm	

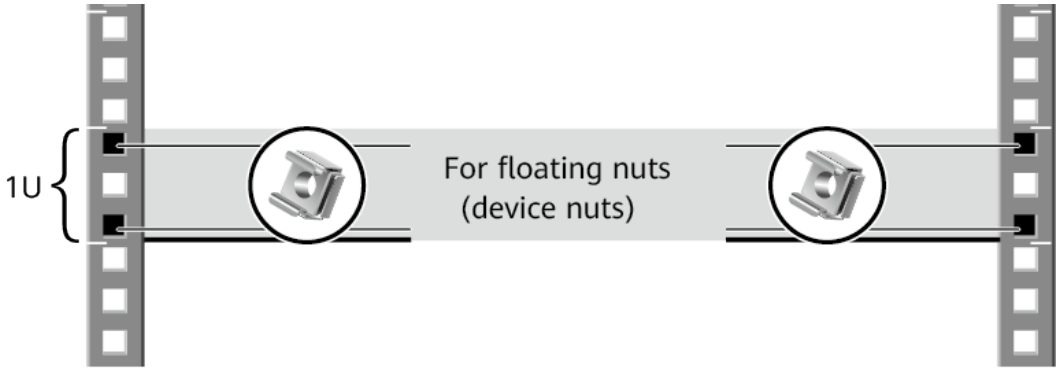
Step 2 Install floating nuts and cabinet guide rails.

1. Determine the positions for installing the guide rails and floating nuts, as shown in **Figure1**.

NOTICE

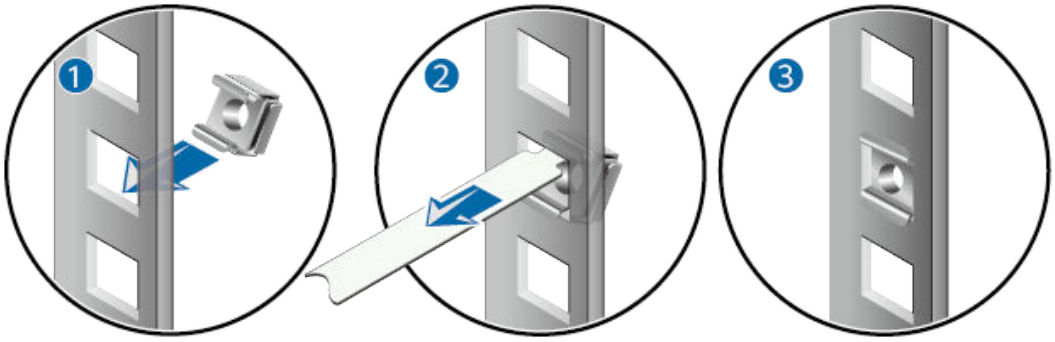
Install the two guide rails at the same height to ensure that the device is level.

Figure 4-33 Positions of floating nuts



2. Install the floating nuts that match M6 screws at the positions marked in **Figure1**. **Figure2** illustrates how to install a floating nut.

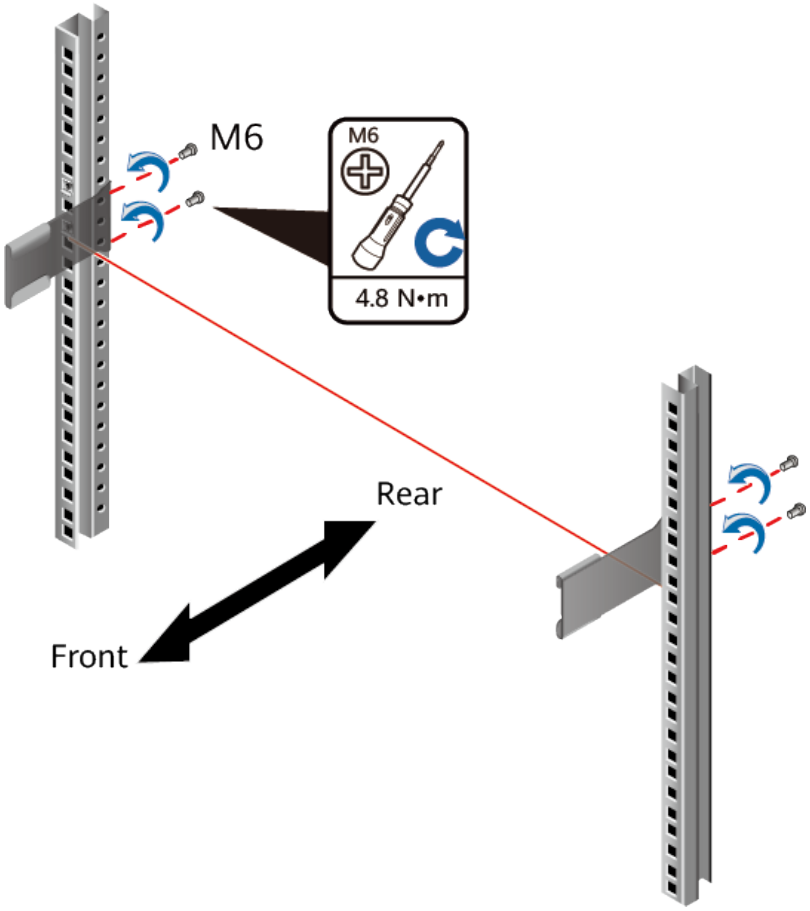
Figure 4-34 Installing floating nuts



3. Install guide rails in the correct direction. Identify the left and right guide rails, and the front and rear ends of each guide rail.

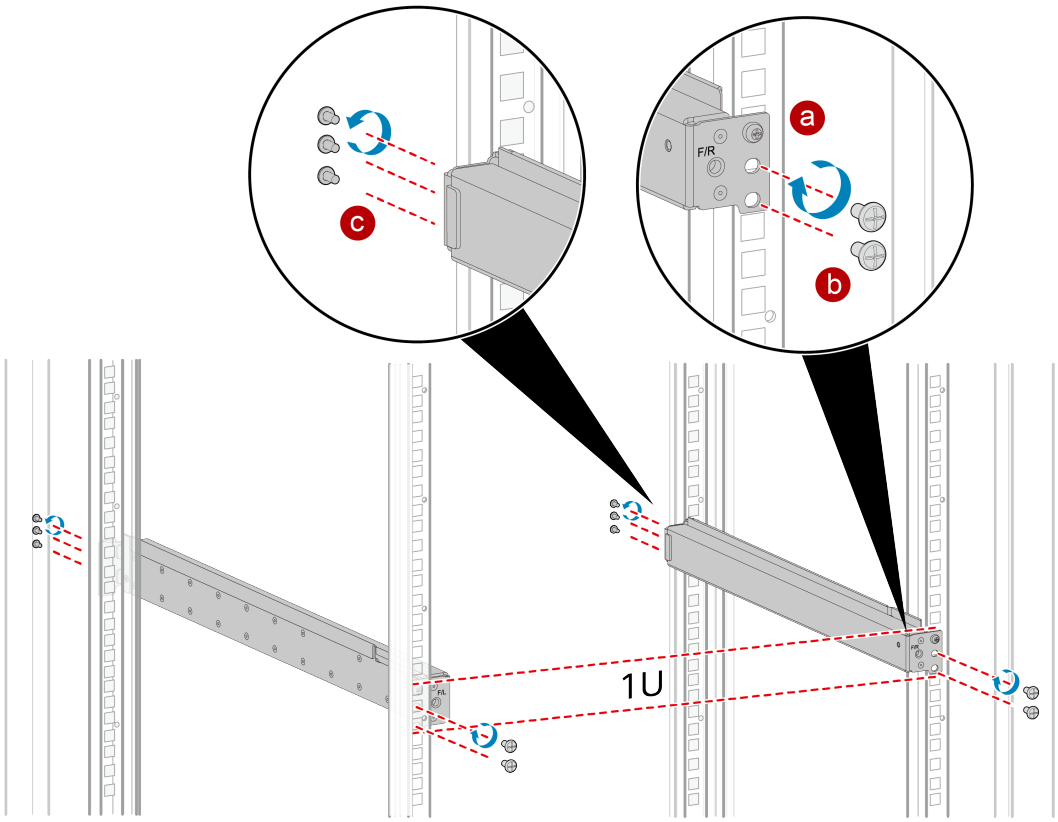
   Fix expandable rear mounting ears and adjustable guide rails (at the positions marked in **Figure1**) to the left and right of the cabinet with M6 screws, as shown in **Figure3**.

Figure 4-35 Installing guide rails



4. (Optional) Install adjustable guide rails (BOM numbers: 21242247 and 21242246), For details, see **Figure4** (The following steps install one guide rail. The two guide rails are installed in the same way.)
   a. Hold a guide rail horizontally with the side marked FRONT facing the front of the cabinet, and move it to the planned installation position. Expand the guide rail to attach its front and rear sides to the front and rear guide rails, and hook the guide rail onto the mounting rails. Ensure that the three holes on the guide rail are in the same 1 U space.
   a. Insert plugs in the top holes on the front and rear sides of the guide rail to secure the guide rail.
   b. Install an M6 screw in the lowest hole on the rear side of the guide rail to secure the guide rail.
   c. (Optional) If you want to improve the shock resistance capability of the switch and secure it more tightly, install an M6 screw in the lowest hole on the front side of the guide rail.

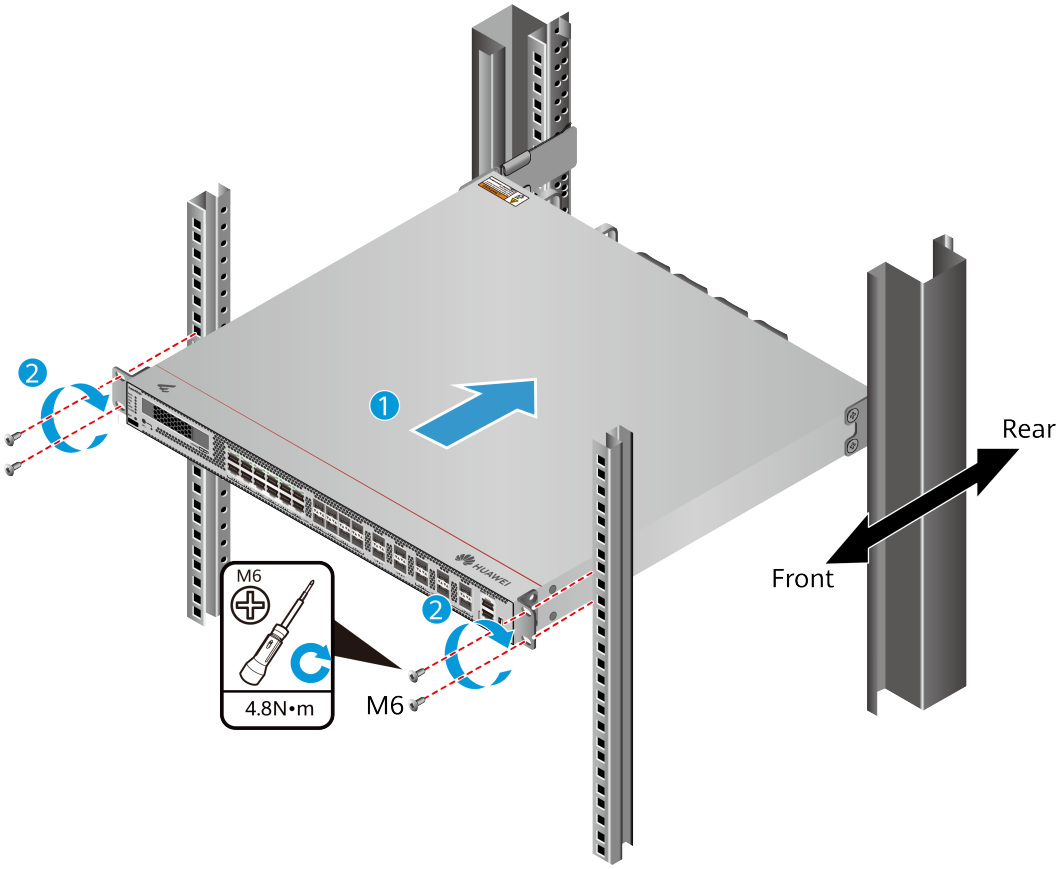
Figure 4-36 Installing an expandable guide rail



Step 3 Mount the USG6000F-S in the cabinet.

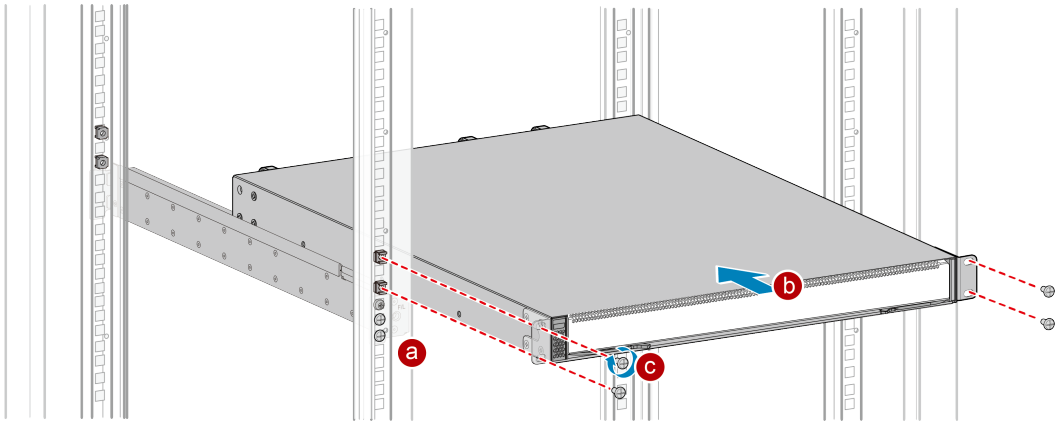
1. Hold the bottom of the USG6000F-Swith both hands and move the USG6000F-S into the cabinet. Align the rear mounting ears with the rear mounting ear guide rails and slowly slide the USG6000F-S along the guide rails.
2. Place the device on the guide rails, slowly push it into the cabinet, and then tighten screws with the Phillips screwdriver to secure the device.Insert the device into the rear mounting ear guide rails and slide it into the cabinet.
3. Use M6 screws to fix the mounting ears of the USG6000F-S to the mounting rack, as shown in **Figure5**.

Figure 4-37 Mounting the USG6000F-S in a cabinet



4. (Optional) Install the device into the cabinet using adjustable guide rails, as shown in **Figure6**.
   a. Lift the switch onto the expandable guide rails. This operation should be performed by two persons.
   b. Slowly push the switch into the cabinet until the front mounting brackets are closely attached to the floating nuts on the mounting rails.
   c. Secure the front mounting brackets on the mounting rails with M6 screws.

Figure 4-38 Installing a device into a cabinet



----End

Follow-up Procedure

Perform the following checks after the installation:

- Ensure that the USG6000F-S is placed securely inside the cabinet.
- Ensure that the exhaust of the USG6000F-S is not blocked by other objects.

4.5.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6000F-S on a workbench.

Precautions

Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG6000F-S is rusted or soggy. Then, investigate causes and contact the supplier.

The workbench must be:

- Reliably grounded.
- Clean, firm, and securely installed.

Accessories

Four rubber feet

Procedure

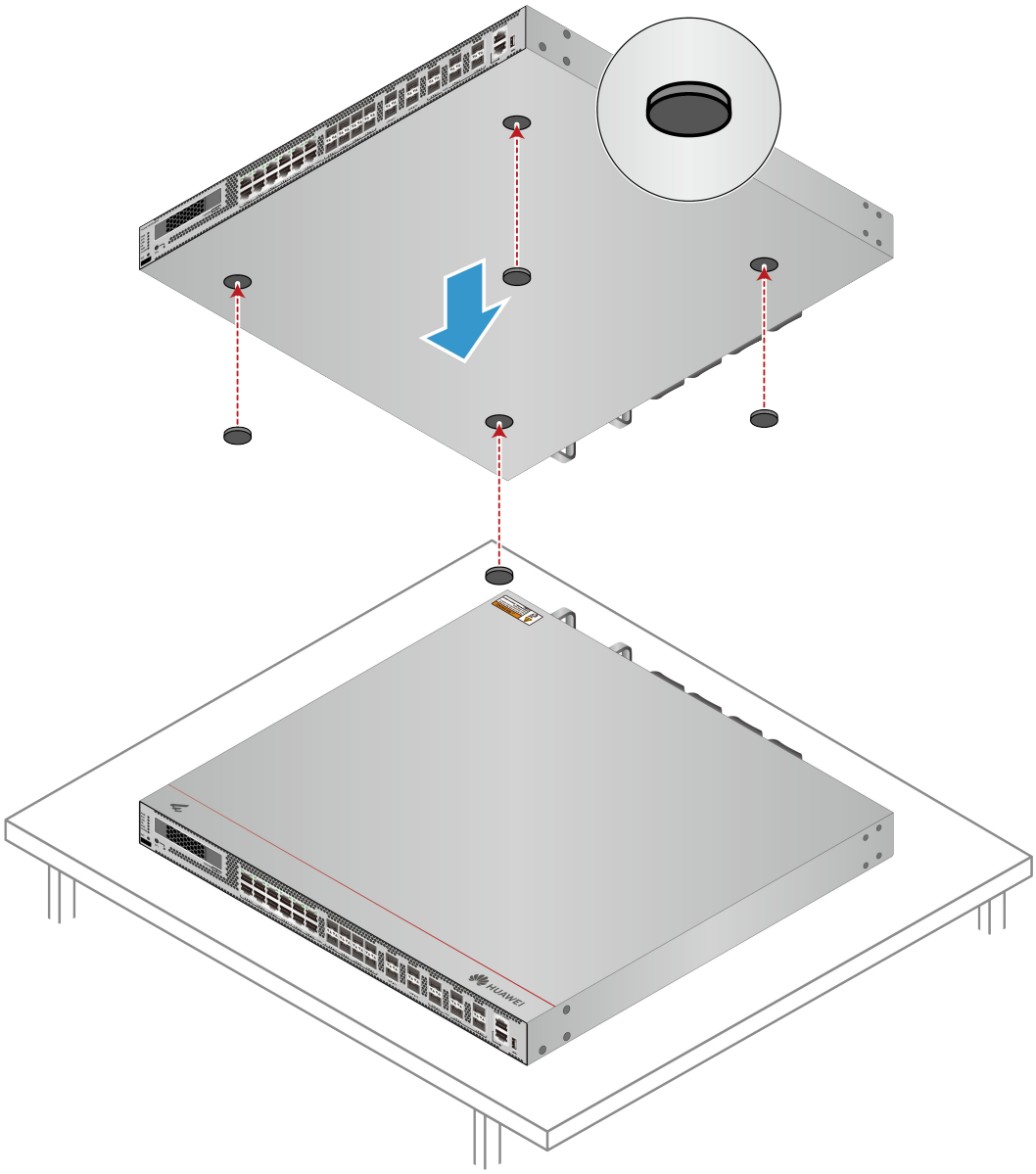
Step 1 Fix the rubber feet to the round notches at the bottom of the USG6000F-S.

NOTE

Install foot pads at the bottom of the USG6000F-S to ensure smooth contact between the USG6000F-S and the workbench and avoid friction between the surface of the USG6000F-S and the workbench.

Step 2 Place the USG6000F-S on the workbench.

Figure 4-39 Placing the USG6000F-S with rubber feet on a workbench



----End

Follow-up Procedure

Verify the following after the installation:

- The USG6000F-S150, USG6000F-S200 is securely placed on the workbench.
- No object blocks the exhaust of the USG6000F-S150, USG6000F-S200, and there is at least 10 cm of distance between the USG6000F-S150, USG6000F-S200 and surrounding devices.
- There are no heavy objects on the USG6000F-S150, USG6000F-S200.

4.5.2 Installing Other Parts

This section describes the optical bypass card and hard disk installation methods of the USG6000F-S150, USG6000F-S200.

4.5.2.1 Installing a Hard Disk

This section describes how to install a hard disk units for the first time to avoid hard disk damage.

Precautions

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 USG6000F-S 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.
- For mapping relationships between the USG6000F-S and hard disks, see **Hardware Overview**.

Tool

ESD bag

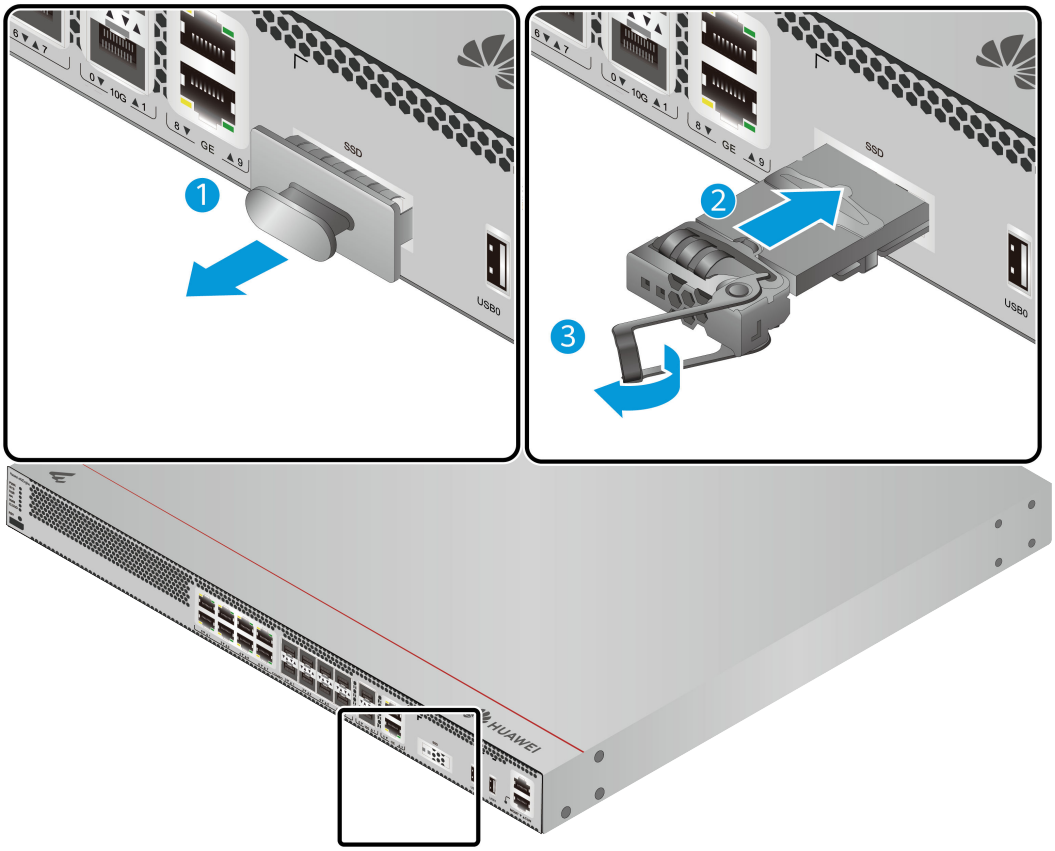
Installing The Hard Disk (USG6000F-S150, USG6000F-S200)

Step 1 Remove the baffle plate from the hard disk slot.

Step 2 Hold the handlers of the hard disk and push the hard disk along the guide rails till the hard disk aligns with the panel of the USG6000F-S.

Step 3 Press the hard disk handler inwardly to restore the module.

Figure 4-40 Installing the hard disk (USG6000F-S150, USG6000F-S200)



Step 4 After the installation is complete, perform the following operations:

NOTE

Operations after the USG6000F-S power-on must be performed after all installation tasks are complete.

- Before the USG6000F-S is powered on, ensure that the hard disk is correctly installed.
- After the USG6000F-S is powered on, run the **display device disk** command in the diagnostic view to check whether the Present value is Present.

----End

4.5.3 Connecting a Device

This section describes the methods and precautions for connecting the PGND cable, configuration cables, Ethernet cables, optical modules, optical fibers, and power cables of the USG6000F-S.

4.5.3.1 Connecting a PGND Cable

Connecting the PGND cable of a USG6000F-S correctly is a key measure of surge protection and resistance to interference. Before using the USG6000F-S, correctly connect the PGND cable. Otherwise, the USG6000F-S may be damaged.

Prerequisites

The USG6000F-S has been installed inside a cabinet.

Tools

- Phillips screwdriver
- Multimeter

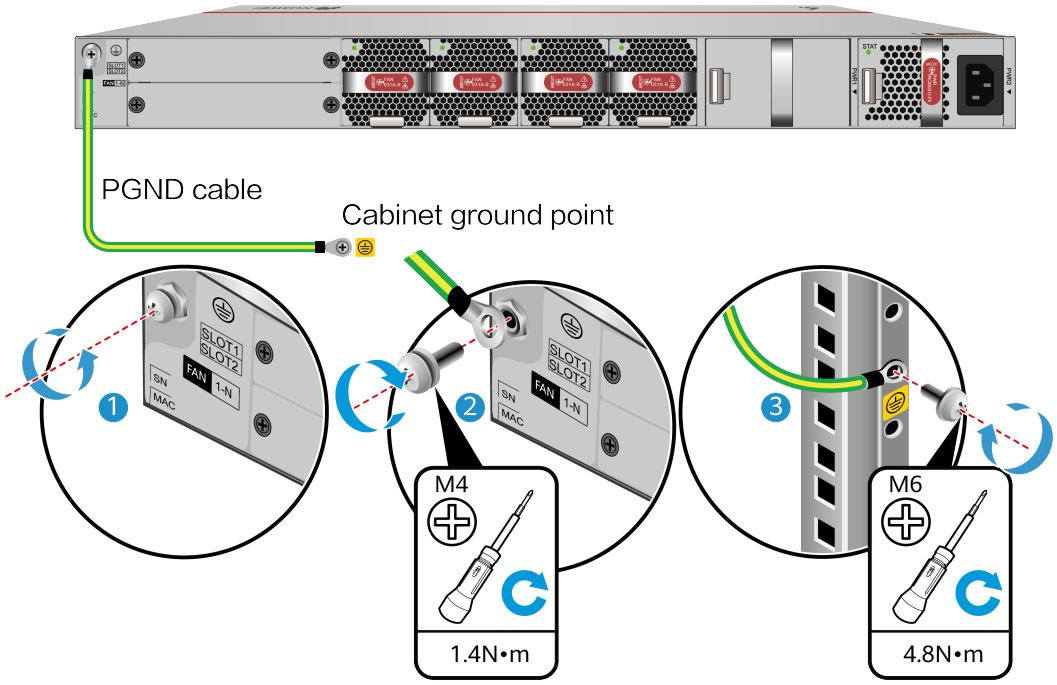
Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG6000F-S rear panel.

Step 2 Connect the 90° right angle OT terminal at one end of the PGND cable to the connection hole of the USG6000F-S, with the conducting wire upward, and tighten the M4 screw. The tightening torque is 1.4 N·m.

Step 3 Connect the M6 end of the PGND cable to the ground terminal of the cabinet. The tightening torque of the M6 screw is 4.8 N·m.

Figure 4-41 Connecting a PGND cable



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.

----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 0.1 ohm on a multimeter.

4.5.3.2 Connecting a Console Cable

After connecting a PC to the console port of a USG6000F-S with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6000F-S.

Prerequisites

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG6000F-S 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 USG6000F-S are connected to the same ground point. Otherwise, the console port of the USG6000F-S 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.

Tools

Console cable (prepared by the user)

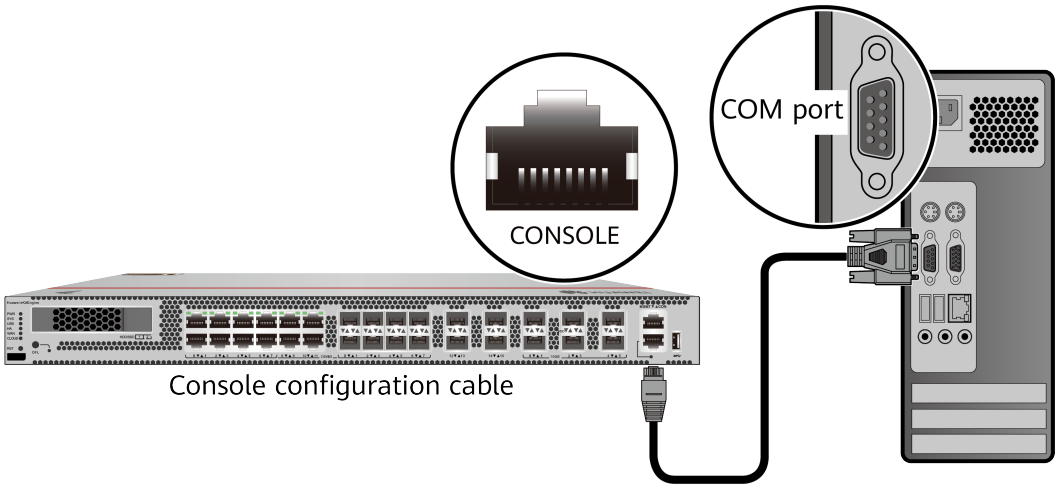
Procedure

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 USG6000F-S.

Step 3 Connect the DB9 connector of the console cable to the COM port of the management PC.

Figure 4-42 Connecting a console cable to the USG6000F-S



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.

For details on the console login, refer to the Configuration Guide.

4.5.3.3 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6000F-S and the other end to the Ethernet port of the peer device.

Prerequisites

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.

NOTICE

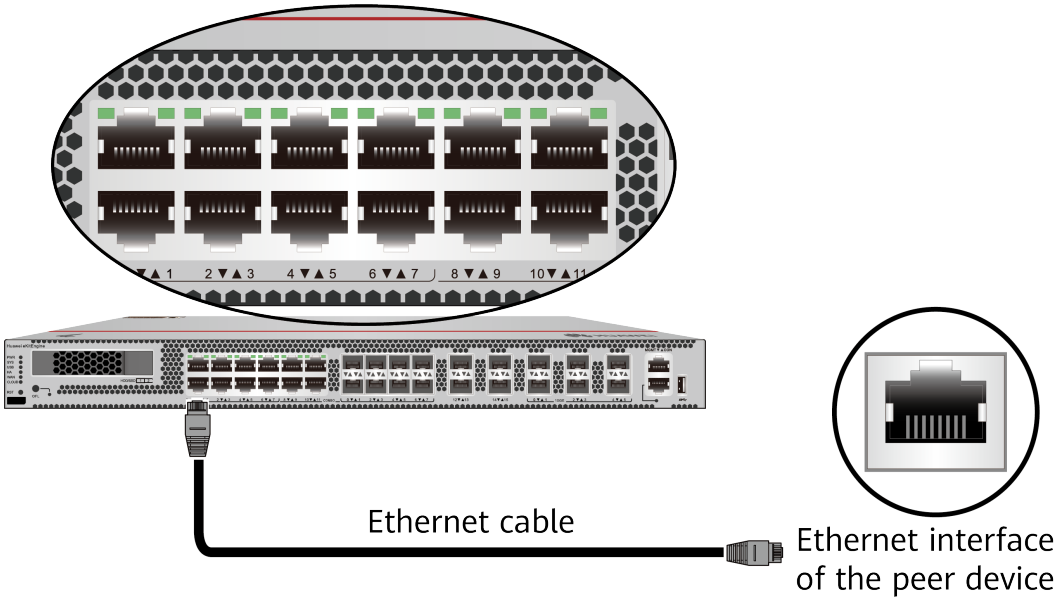
- Only shielded cables are supported on the USG6000F-S.
- Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.
- Strong interference may cause a packet loss rate of no more than 1% on Ethernet electrical interfaces. To prevent this problem, keep the device away from interference sources or take adequate anti-interference measures.

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 USG6000F-S and the other end to the Ethernet port of the peer device based on the network plan.

Figure 4-43 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.

4.5.3.4 Connecting the Optical Transceiver and Optical Fiber

This section describes how to install optical transceivers on the GE , 10GE optical ports of the USG6000F-S and connect them to the ports of the peer device using optical fibers according to the network plan.

Precautions

The USG6000F-S supports both 1 Gbit/s , 10 Gbit/s 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, FC/PC, or MPO/PC-MPO/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 USG6000F-S 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.
- The optical module has been installed.

Procedure

Step 1 Insert an optical transceiver into the GE , 10GE optical port of the USG6000F-S.

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.

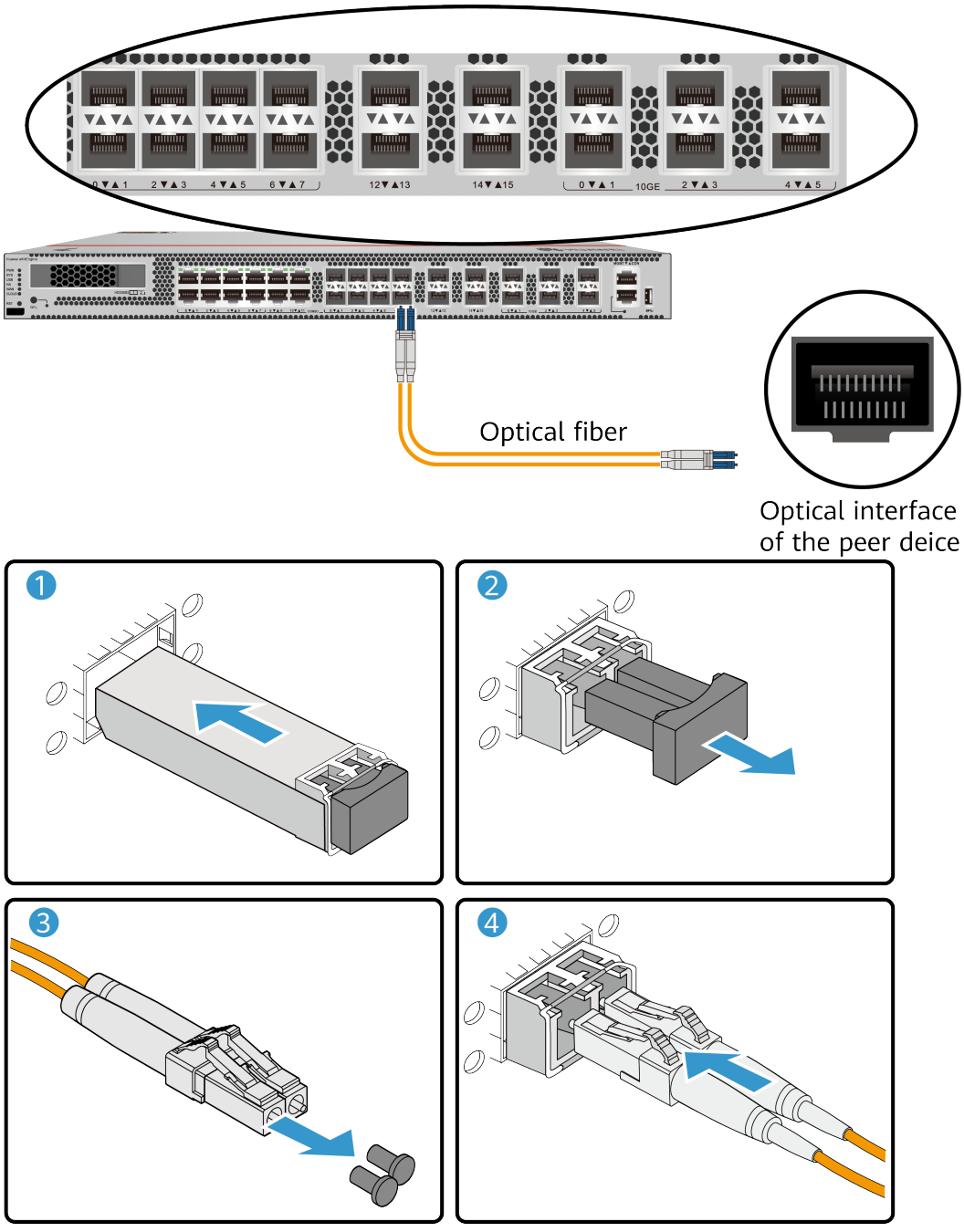
Step 4 Remove protective caps from optical fiber connectors, insert optical fibers into the optical transceiver, and connect the fiber to the peer device.

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 4-44 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 USG6000F-S, 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.

4.5.3.5 Connecting AC Power Cable

By default, the USG6000F-S150, USG6000F-S200 comes with one AC power module. However, two AC power modules are supported, each AC power module requires an AC power cable.

Prerequisites

Before connecting the power cables, ensure that the AC power supply in the equipment room meets the input requirements of the USG6000F-S.

DANGER

Do not connect or disconnect the power cables when the USG6000F-S is powered on.

Procedure

Step 1 Ensure that the PGND cable is adequately grounded.

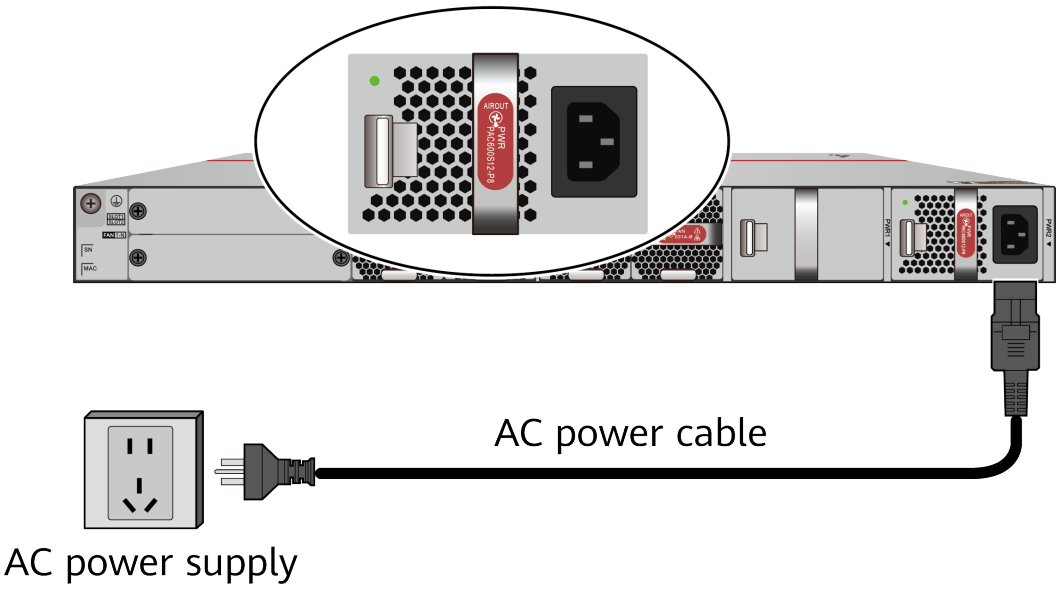
Step 2 Connect AC power cables to AC power modules.

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 USG6000F-S power module.
2. Plug the other end of the power cable to the AC power socket or the output of the AC power supply device.

Figure 4-45 Connecting AC power cables(USG6000F-S)



----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 USG6000F-Ss are deployed, the power cables of each USG6000F-S are correctly labeled for distinction.

4.5.4 Powering On or Off the Device

This section describes how to power on or off the USG6000F-S. To ensure the normal start and security of the USG6000F-S, strictly follow the operation guide to power on or off the USG6000F-S.

Prerequisites

Before you power on the USG6000F-S, 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.

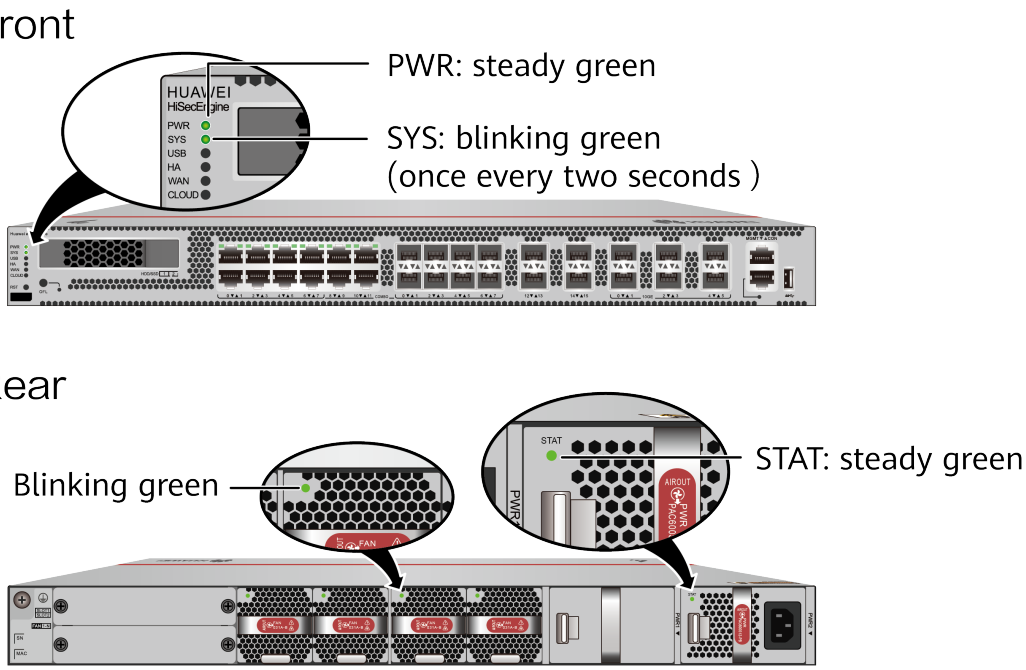
Procedure

- Power on the USG6000F-S.

  Turn on the switch of the power supply device. The USG6000F-S starts.

  You can identify the USG6000F-S status based on indicators on the front and rear panels. Indicators shown in **Figure 4-46** indicate that the USG6000F-S runs normally.

Figure 4-46 Indicators when the USG6000F-S runs normally



- Power off the USG6000F-S.

NOTICE

Before powering off the USG6000F-S, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

If the USG6000F-S will be administratively shut down for a long time, turn off the power switch. After powering off the USG6000F-S, set it aside properly according to storage requirements.

----End

Follow-up Procedure

After the USG6000F-S is powered on, you can log in to the configuration page for management and maintenance. For details, refer to the Configuration Guide.

5 Maintaining a Device

The power modules, fan modules, expansion cards, and hard disks of the USG6000F-S are replaceable. You can replace them as instructed.

5.1 Replacing a Power Module

This section describes how to replace a faulty power module.

Context

When two power modules are installed on the USG6000F-S, 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.
- Do not install DC power modules and AC power modules on the same device.

Replacing the Power Module

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:
  a. Press the baffle on the cable retention clip and remove the cable retention clip from the AC power cable. (Skip this step if the power module does not have any cable retention clip.)
  b. Pull out the power cable from the socket on the power module.

- To remove the DC power cable:
  a. Remove the fastening screws from the OT terminals of the DC power cable.
  b. Pull out the power cable from the socket on the power module.

Step 5 Replace the power module.

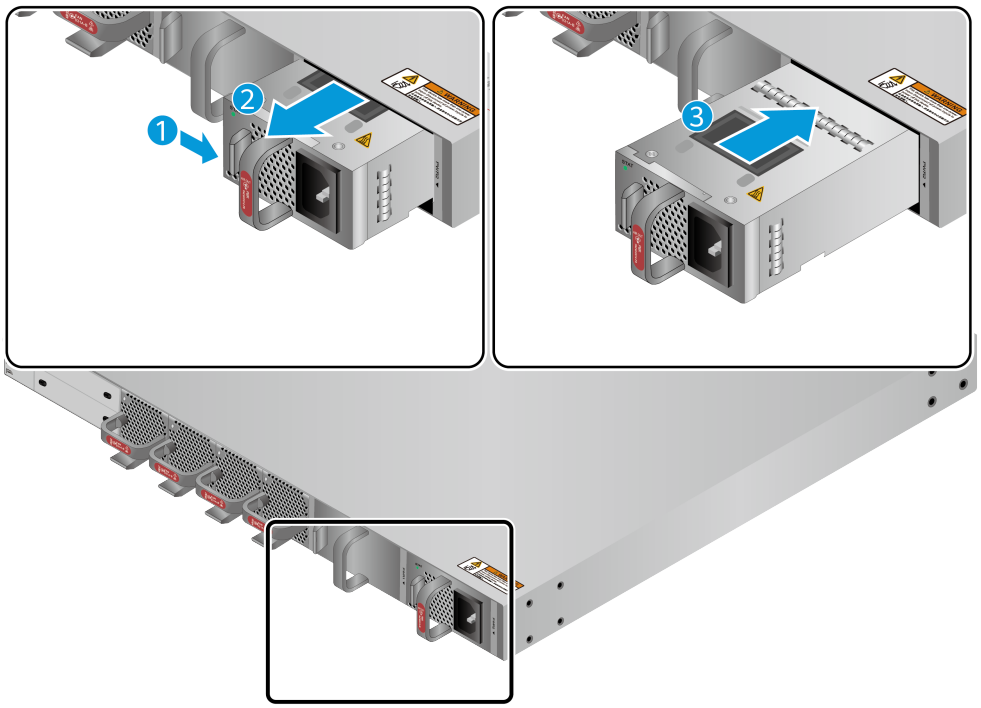
1. Press the cable retention clip of the power module to the right, hold the front panel of the power module, and pull out the power module.

   NOTE

   When replacing a DC power module, push the locking button leftwards, hold the handle of the power module, and pull out the power module. Perform operations according to the actual situation.

2. 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.
3. Take the new power module from the packing box and check whether its model is the same as the replaced one.
4. Gently push the new power module into the chassis along the power slot. After the latch on the power module is tightened, pull the power module gently to check whether it can be removed.
5. Connect the power cable to the socket on the new power module. For details, see **Connecting AC Power Cables**.

Figure 5-1 Replace the power module



6. Switch on the power supply device. If the STATUS indicator on the new power module of the USG6000F-S is steady green, the power module works properly.

----End

Follow-up Procedure

After replacing the power module, collect all tools. If the replaced power module is faulty, fill in the **Repair Transmission Sheet** and send the faulty module with the Repair Transmission Sheet to the equipment supplier or the specified repair service provider.

5.2 Replacing a Fan Module

If the only fan of the USG6000F-S fails, replace the fan module immediately. Otherwise, heat dissipation of the device is affected. If the USG6000F-S has two or more fans and two or more fans fail, replace the faulty fan modules immediately. Otherwise, heat dissipation of the device is affected.

Context

The fan module of the USG6000F-S is hot swappable. Therefore, when the fan module is faulty, you can replace the fan module without powering the USG6000F-S off.

NOTICE

To prevent USG6000F-S overheating, replace the fan module within 1 minute.

Procedure

Step 1 Wear an ESD wrist strap.

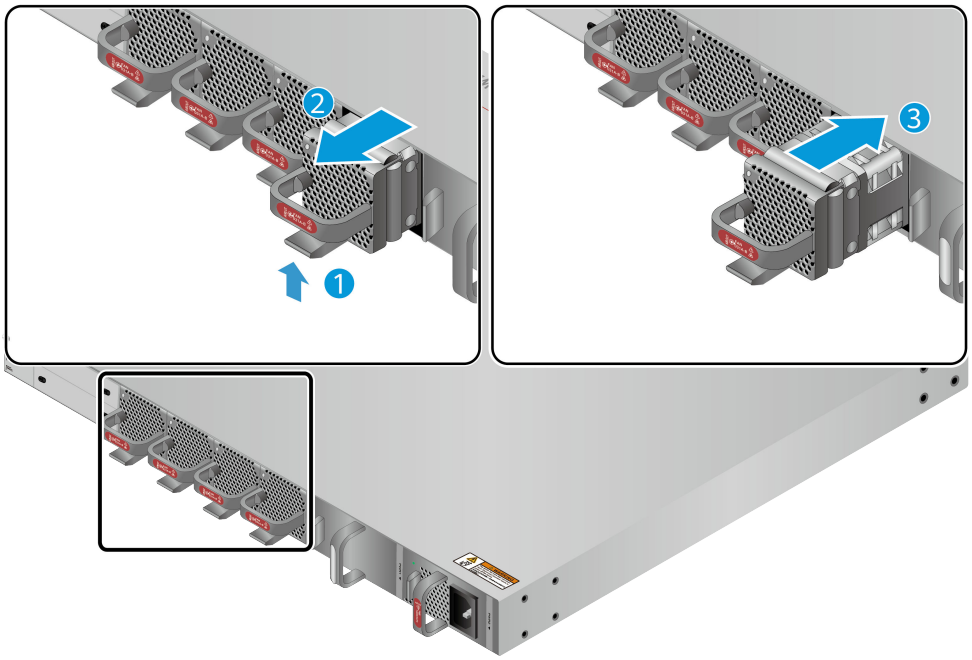
Step 2 Remove the faulty fan module.

Press upwards the fan module latch, hold the handle of the fan module, and pull out part of the fan module. After the fan stops rotating, slowly pull out the fan module from the chassis.

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. After the latch on the power module is tightened, pull the fan module gently to check whether it can be removed.

Figure 5-2 Replacing the 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

After replacing the fan module, collect all tools. If the replaced fan module is faulty, fill in the **Repair Transmission Sheet** and send the faulty module with the Repair Transmission Sheet to the equipment supplier or the specified repair service provider.

5.3 Replacing the Hard Disk

This section describes how to replace the hard disk as well as the precautions.

Precautions

Precautions for using the hard disks

- Use hard disks purchased from Huawei. Otherwise, the system may not identify them.
- Powering off the USG6000F-S interrupts services. Install or replace the hard disks during off-peak hours.
- Wear the ESD wrist strap while working on the USG6000F-S to avoid possible damages to the USG6000F-S 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.

- For mapping relationships between the USG6000F-S and hard disks, see **Hardware Overview** .

Tools

ESD bag

Replacing the Hard Disk (USG6000F-S150, USG6000F-S200)

If a hard disk is faulty (for example, a hard disk failure log is generated on the USG6000F-S), you can replace the hard disk. The hard disk can be replaced no matter when the USG6000F-S is powered on or off. If the USG6000F-S 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 USG6000F-S is powered on:

Step 1 Ensure that all configurations are saved.

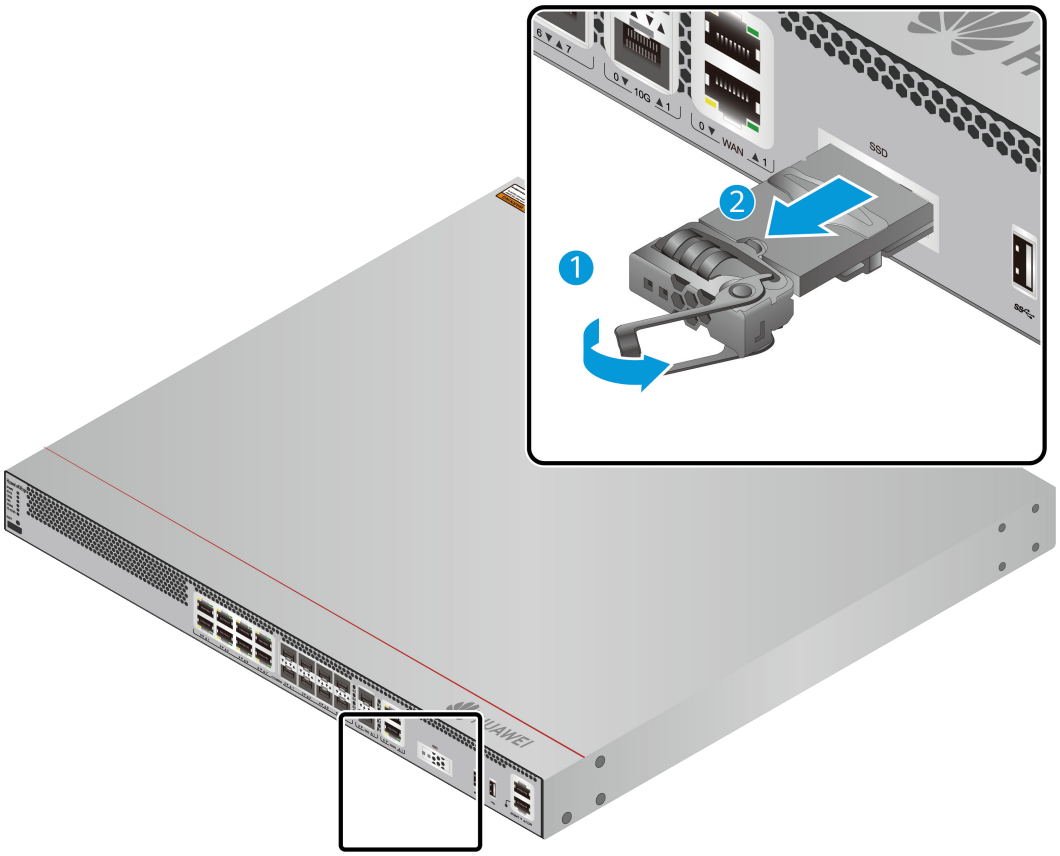
Step 2 Run the **disk offline** command in the User view. Wait about 30 seconds until the system indicates that the hard disk stops working and then remove the hard disk to be replaced.

NOTE

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.

1. Use the handler to pull the hard disk out of the slot.
2. Put the replaced hard disk into an ESD bag.

Figure 5-3 Removing the hard disk (USG6000F-S150, USG6000F-S200)



Step 3 Install the new hard disk, see **Installing a Hard Disk**.

Step 4 Run the **disk online** command in the system view and then the **display device disk** command. Check the basic status and information of the hard disk.

----End

Follow-up Procedure

After replacing the hard disk, collect all tools. If the replaced hard disk is faulty, fill in the **Repair Transmission Sheet** and send the faulty module with the Repair Transmission Sheet to the equipment supplier or the specified repair service provider.

5.4 Replacing a Micro SD Card

This section describes how to replace the micro SD card and the precautions.

Precautions

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 USG6000F-S 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 USG6000F-S generates the micro SD card full alarm: ENTEXT_1.3.6.1.4.1.2011.5.25.31.2.0.17 hwEntityExtDiskFull.

Read the precautions on using the micro SD card:

- 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 the capacity is 64 GB, and dimensions (H x W x D) are 1 mm x 15 mm x 11 mm (0.04 in. x 0.59 in. x 0.43 in.).
- 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.

The micro SD card can be replaced no matter when the USG6000F-S is powered on or off. If the USG6000F-S is powered off, skip the **disk offline** command. The following procedure guides you through micro SD card replacement while the USG6000F-S is powered on.

Tools

- Phillips screwdriver
- ESD wrist strap

Procedure

Step 1 Ensure that all configurations are saved.

Step 2 In the User view, run the **disk offline** command. When the system displays a message indicating that the SD card is offline, remove the micro SD card to be replaced.

NOTE

- Before replacing a micro SD card, run the **disk offline** command to prevent micro SD card damage and data loss.
- 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 5-4 Removing a micro SD card (USG6000F-S125)

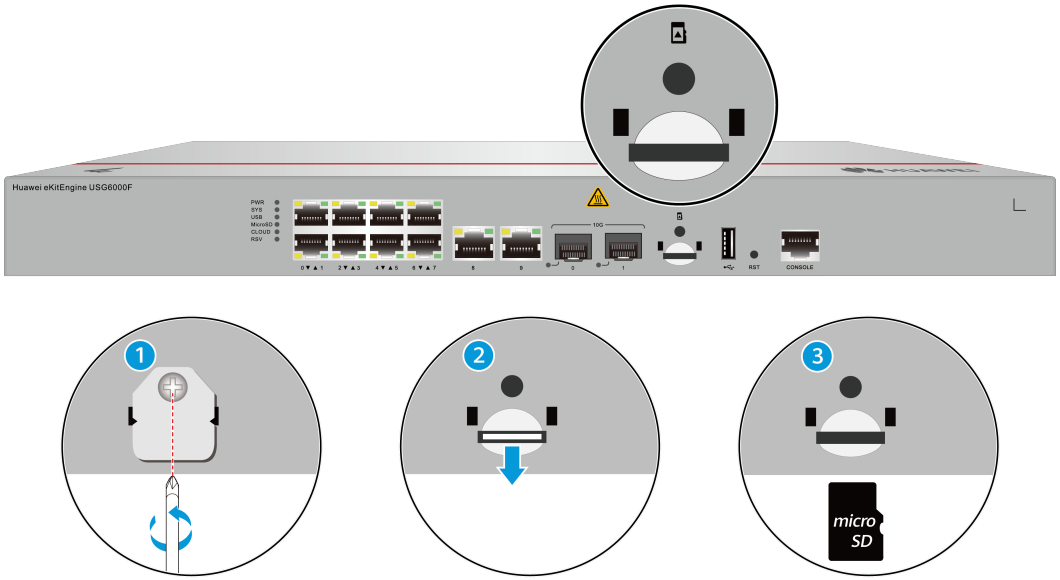
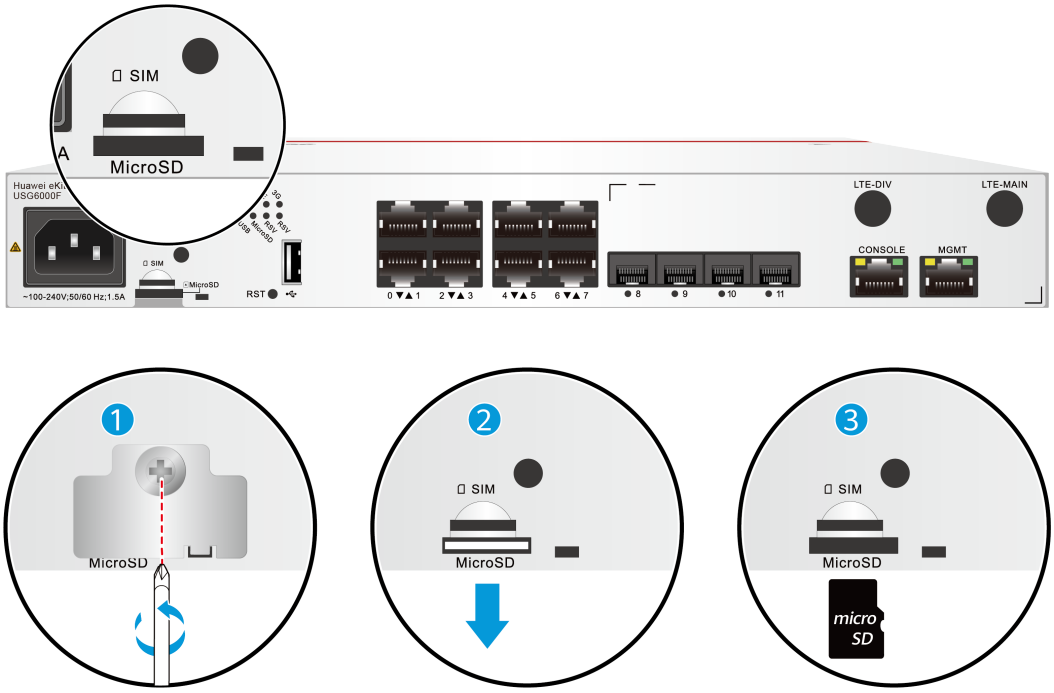


Figure 5-5 Removing a micro SD card (USG6000F-S55L)



Step 3 Install the new micro SD card and anti-theft board.

NOTE

- Note that the USG6000F-S125, USG6000F-S55L 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 5-6 Installing the micro SD card and anti-theft board (USG6000F-S125)

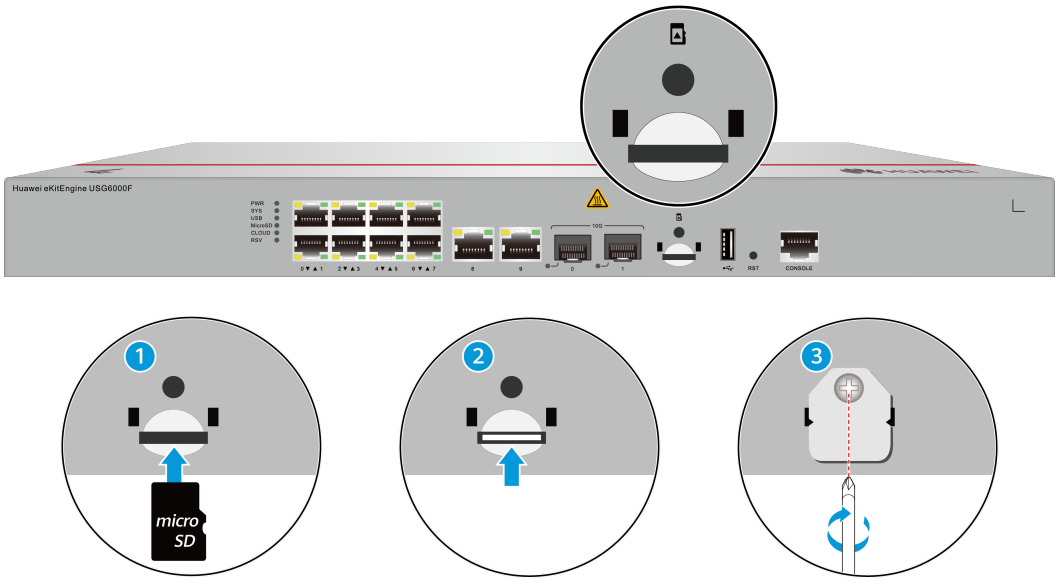
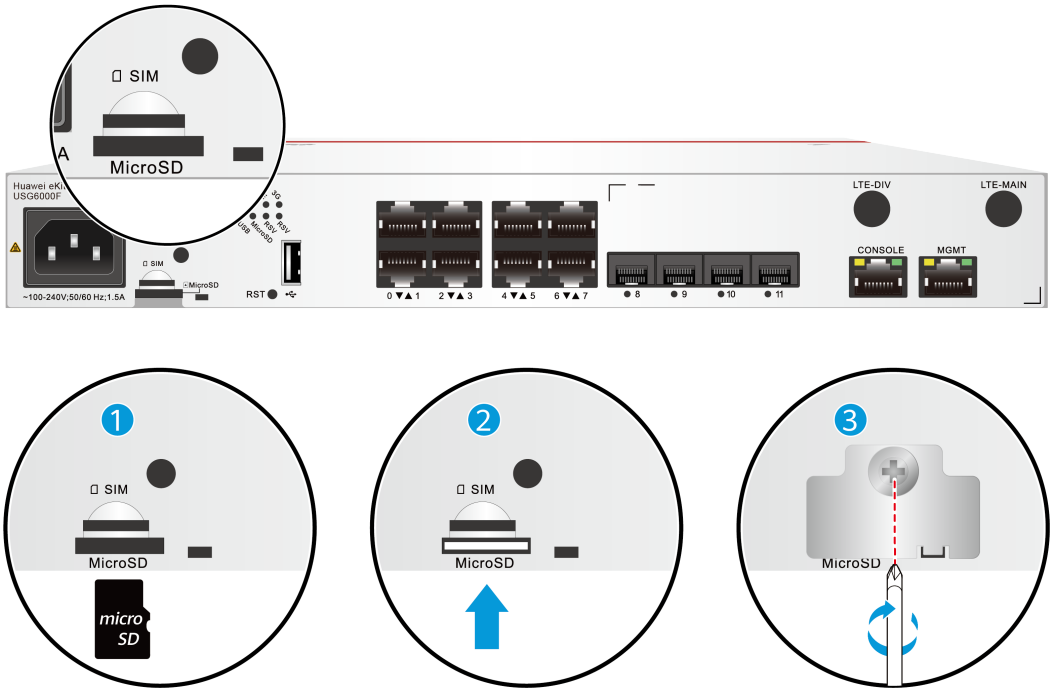


Figure 5-7 Installing the micro SD card and anti-theft board (USG6000F-S55L)



Step 4 In diagnostic view, run the **display device disk** command to check the micro SD card installation and file system mounting status. In the command output, **Present** should be Present, **Power** should be On, and **Register** should be Registered.

- If **Present** is Absent, re-install the micro SD card and try again. If **SD Card Physical State** remains the same, the USG6000F-S may fail to identify the micro SD card. You are advised to use another micro SD card.

- If **Register** is UnRegistered, the micro SD card format might not be **ext4.** You need to run the **format disk partition** command in the diagnostic view to format the micro SD card.

----End

Follow-up Procedure

After replacing the micro SD card, collect all tools. If the replaced micro SD card is faulty, fill in the **Repair Transmission Sheet** and send the faulty module with the Repair Transmission Sheet to the equipment supplier or the specified repair service provider.

5.5 Replacing a SIM Card

Precautions

If the SIM card is damaged or needs to be replaced with a SIM card with different standards, follow the instructions in this section.

- The USG6000F-S55L supports standard Nano SIM cards. Exercise caution when you remove and insert the SIM card.
- The USG6000F-S55L 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 USG6000F-S 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.

Tools

- Phillips screwdriver
- ESD wrist strap

Procedure

Step 1 Ensure that all configurations are saved.

Step 2 The USG6000F-S does not have a power switch. Select either of the following methods to power off the USG6000F-S:

- Disconnect the power adapter of the USG6000F-S from the power supply equipment.

- Power off the power supply equipment.

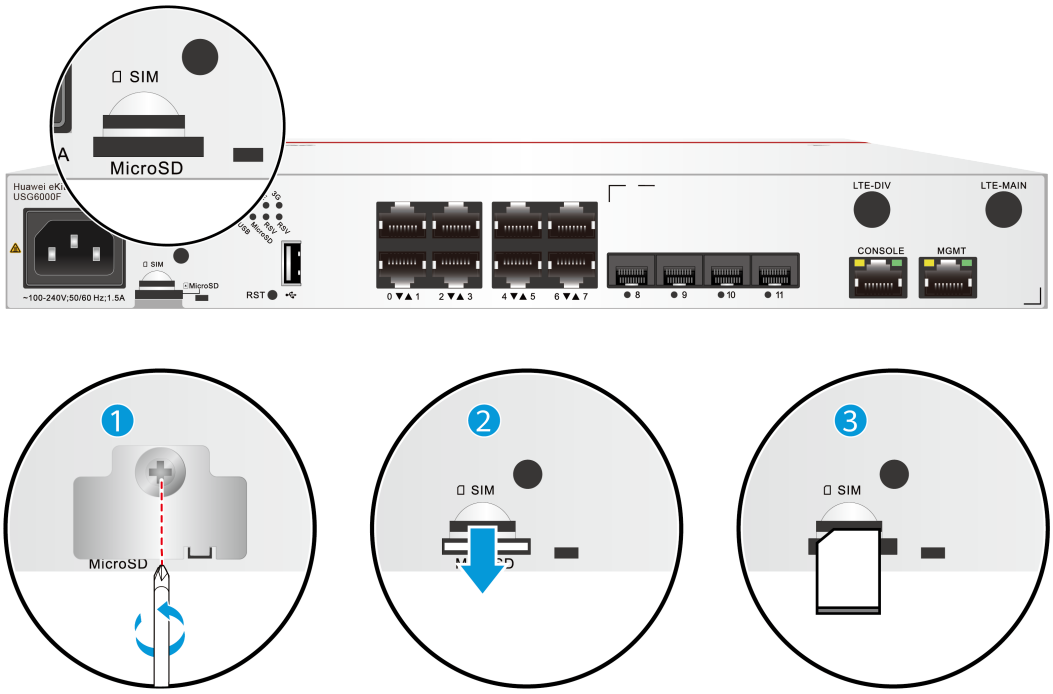
Step 3 Remove the SIM card to be replaced.

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 5-8 Removing a SIM card(USG6000F-S55L)



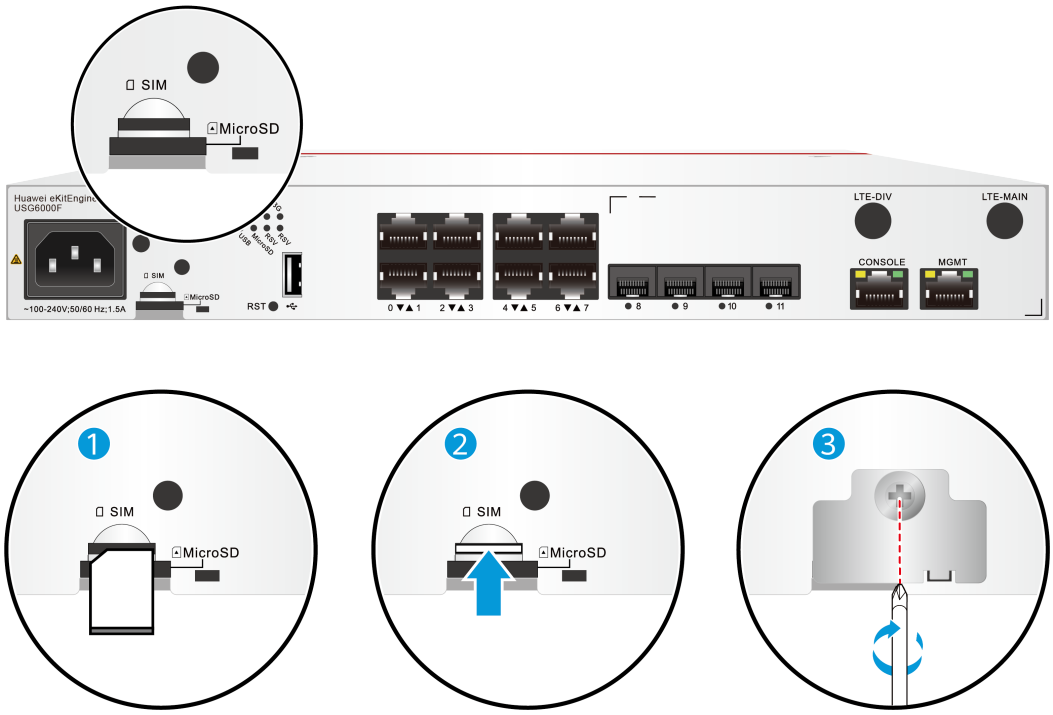
Step 4 Install the new SIM card and anti-theft board.

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 5-9 Installing the new SIM card and anti-theft board(USG6000F-S55L)



----End

Follow-up Procedure

Power on the and start the . After the is started, run the **display cellular** command in any view to check the SIM card status. If **SIM Status** in the command output is **Normal**, the SIM card is working properly and has been identified by the USG6000F-S.

6 Appendix

This section describes the requirements for the installation environment and **Fault Tag** template.

6.1 Quick Reference Tables of Power Cables

AC Power Cables for the Power Modules Directly Connected to the Socket

Table 6-1 AC power cables for the power modules directly connected to the socket

Part Number	Description	Image
04020728	Power Cable,America AC Power Cable,125V10A,3.0m,PBSM,18 SJT(3C),C13SF,Black	

Part Number	Description	Image
04040887	Power Cable,Japan AC Power Cable 125V12A,3.0m,PBSM,HVCTF-1.25mm^2(3C),C13SF,Black	
04040888	Power Cords Cable,Australia AC Power Cable,250V 10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	
04040889	Power cord,BS546 250V10A,3.0m,PM-IAM,H05VV-F-1.5mm^2(3C),C13SF,250V,10A,Black	
04040890	Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM ,H05VV-F-1.0mm^2(3C),C13SF,Black	

Part Number	Description	Image
04041056	Power cord,Europe AC Power Cable,250V10A,3.0m,PFSM,(H05VVF 1.0^2(3C)),C13SF,250V,10A,Black	
04041117	Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM ,H05VV-F-1.0mm^2(3C),C13AF-L,Black	
04041120	Power Cable,Italy AC Power Cable 250V10A,3.0m,PLSM,H05VV-F-1.0mm^2(3C),C13SF,Black	

Part Number	Description	Image
04042697	Power Cords Cable,China AC Power 250V10A,10.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	
04042699	Power Cords Cable,China AC Power 250V10A,20.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	
04047785	Power Cords Cable,Argentina AC Power 250V10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	
04050139	Power Cords Cable,China AC Power Cable,250V10A,3m,PISM,227IEC53-1.0^2(3C),C13SF,Black	

Part Number	Description	Image
04050206	Power Cable,China AC Power Cable 250V10A,1.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	
04050517	Power Cable,China AC Power Cable 250V10A,2.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	
04050955	Power Cords Cable,China AC Power,250V10A,1.5m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,250V,10A,Black	
04051035	Power cord,India AC Power 250V6A,3m,PM-IIAM,IS 694-1.0^2(3C),C13 SF,250V,6A,Black	

Part Number	Description	Image
04051080	Power cord,South Africa AC Power 250V10A,3m,PMAM,H05VV-F-1.0mm^2(3C),C13SF,250V,10A,Black	
0405G028	Power Cords Cable,Korea AC Power 250V10A,3m,PFSM,H05VV-F 3*1.0^2(3C),C13SF,Black	
0405G02K	Power Cords Cable,Denmark AC Power 250V10A,3m,PKSM,H05VV-F-3*1.0^2(3C),C13SF,Black	

AC Power Cables for the Power Modules Directly Connected to the PDU

Table 6-2 AC power cables for the power modules directly connected to the PDU

Part Number	Description	Image
04050188	Power Cords Cable,China AC Power 250V10A,1.5m,C14SM,227IEC53(RVV)1.0mm^2(3C),C13SF,PDU Cable	
04050846	Power cord,China AC Power Cable,250V10A,3.0m,C14SM,(227IEC53-1.0^2(3C)),C13SF,250V,10A,Black,PDU Cable	
04050847	Power cord,China AC Power Cable,250V10A,6.0m,C14SM,(227IEC53-1.0^2(3C)),C13SF,250V,10A,Black,PDU Cable	

Part Number	Description	Image
0405G019	Power Cords Cable,Europe AC 250V10A,1.8m,C14SM,H05VV-F- 3*1.00^2,C13SF,PDU Cable	
0405G029	Power Cords Cable,North America AC Power 250V10A,1.8m,C14SM,SJT 18AWG(3C),C13SF,PDU Cable	
0405G02D	Power Cords Cable,Japan AC Power 250V12A,1.8m,C14SM,HVCTF 1.25^2(3C),C13SF,PDU Cable	

Part Number	Description	Image
0405G02F	Power Cords Cable,Australia AC Power 250V10A,1.8m,C14SM,H05VV-F-1.0^2(3C),C13SF,PDU Cable	
0405G02H	Power Cords Cable,Korea AC Power 250V10A,1.8m,C14SM,H05VV-F-1.0^2(3C),C13SF,PDU Cable	

6.2 Requirements for Installation Environment

This section describes the requirements for the USG6000F-S installation environment, such as the device position, humidity and temperature, cleanness, antistatic measures, lightning protection measures, power supply, and anti-magnetic measures.

6.2.1 Device Position

This section describes the USG6000F-S position requirements to ensure its security. Do not connect USG6000F-S to device with leakage current or leakage voltage. If leakage current or leakage voltage occur on the peer device, abnormal energy can enter the USG6000F-S through the connected network cable, causing the USG6000F-S to become faulty.

Table 6-3 lists the requirements for the device position.

Table 6-3 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.

6.2.2 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 USG6000F-S 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 6-4 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	Cl_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

Item	Description									
		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 6-4**, 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.

6.2.3 ESD Requirements

This section describes the ESD requirements. Ensure that the equipment room meets these requirements because static electricity may damage the USG6000F-S components and cause the USG6000F-S to malfunction.

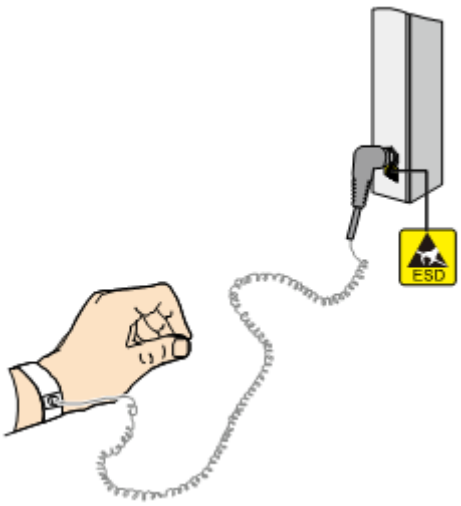
The absolute value of the static voltage must be less than 1000 V. To meet the requirement, take the following measures in the equipment room:

- 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 USG6000F-S boards from damage caused by static electricity discharge, take the following measures:

- Ensure that the USG6000F-S is properly grounded according to the grounding requirements.
- Wear an ESD wrist strap before performing any operations on the USG6000F-S.
- 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 USG6000F-S, as shown in **Figure 6-1**. In addition, wearing ESD gloves is recommended.

Figure 6-1 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.

6.2.4 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 USG6000F-S.

Table 6-5 lists the lightning protection and grounding requirements.

Table 6-5 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.

Item	Requirement
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 the 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.

Item	Requirement
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.

6.2.5 Power Supply

Normal power supply is the prerequisite for proper running of the USG6000F-S. 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 6-6** lists the low-voltage AC nominal voltage and frequency.

Table 6-6 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 6-7 lists the DC power supply specifications.

Table 6-7 DC power supply specifications

Item	Specifications
Voltage fluctuation range allowed for the -48 V input end	-48 V to -60 V
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.

6.2.6 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 USG6000F-S.

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.

6.3 Fault Tag

*Customer name:						
Address:						
Contact person:						
Tel.:		Fax:				
Category*: □ RMA □ Return □ Analysis						
BOM Code	Product Description	Bar Code*	Fault Occurring Date*	Description of the Fault Phenomena*	Category No.*	Software Version*

Reasons for Repairing (Category No.):
Category No. includes the following eight types: F001 - Wear out damaged (◊ In warranty Period ◊ Out of warranty period) F002 - Deployment damaged F003 - Intransit damaged F004 - Version upgrade F005 - Batch replace F007 - Overdue spare parts inspecting F008 - Others F011 - Running circumstance change
Note: • For optical interface cards returned, the optical interfaces should be covered with protection caps. • In general, the analysis card will not be returned to you. If you have any special requirements, please contact Huawei. • One **Fault Tag** should be adapted in one return category, such as RMA/ Return/Analysis. • The items marked with "*" are the mandatory fields that you must fill in.

