HUAWEI eKit

eKitEngine USG6000E-S Series

Hardware Guide

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Contents

1 **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, Visio-format templates, 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 Hardware Overview

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

Chassis

Power Modules

Fan Modules

Storage Devices

Optical/Electrical Modules

Cables

2.1 Chassis

This chapter describes hardware information for all 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 USG is the series number USG6000E. For the specific model, see the nameplate attached on the bottom of the USG.
- 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.

2.1.1 USG6000E-S03

Overview

Table 2-1 Basic information about the USG6000E-S03

Description	Part Number	Model	First supported version
USG6000E-S03-AC Host(10*GE RJ45+2*10GE SFP+,1*Adapter,Include SSL VPN 100 Users)	02355YXH	USG6000E-S03-AC	V600R007C20SPC605

Appearance

Figure 2-1 Appearance of the USG6000E-S03 (front view)

Figure 2-2 Appearance of the USG6000E-S03 (rear view)

Components

Figure 2-3 Components of the USG6000E-S03

1. Indicator area	2. Product model ID	3. Protective ground terminal	4. Fixed interface area	5. MAC label
6. SN label	-	-	-	-

Table 2-2 Component functions

Name	Description
Indicator area	Provides various indicators to display the device running status in real time.
Product model ID	Indicates the product model of 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.
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.
MAC label	Uniquely identifies the MAC address of the device, which is required during network forwarding configuration.

Name	Description
SN label	Uniquely identifies the device, which needs to be provided for the local technical support personnel to apply for a license.

Indicators and Buttons

Figure 2-4 Indicators and buttons on the USG6000E-S03

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

Table 2-3 Indicators on the USG6000E-S03

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.

Silkscreen	Name	Color	Status	Description
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).
CLOUD	CLOUD indicator	Green	Steady on	Connected to the cloud management platform.
		Green	Blinking four times every second (4 Hz)	Connecting to the cloud management platform, transmitting or receiving data.

Silkscreen	Name	Color	Status	Description
		-	Off	The device is not connected to the cloud management platform.
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.

Table 2-4 Buttons on the USG6000E-S03

Silkscreen	Name	Description
RST	RST button	When the device is running properly, you can press the RST button to restart the device. You are advised to save the current configuration before pressing the RST button.
		This button can also be used to restore the default settings with one click. If you press and hold the RST button for 5 seconds and then release the RST button, the device restores its default settings and restarts.
		NOTE If needed, you can run the factory-configuration prohibit command in the system view to disable the function of restoring the factory settings by holding down the RST button. To enable this function again, run the undo factory-configuration prohibit command.

Ports

Figure 2-5 Ports on the USG6000E-S03

1. Clip hole	2. Power receptacle	3. GE electrical port	4. 10GE optical port	5. Micro SD card slot

| 6. USB port | 7. Console port | - | - | - |

Table 2-5 Ports on the USG6000E-S03

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.	**36 W Power Adapter (02221468)**

Port	Connector Type	Description	Available Components
GE electrical ports (0 to 9)	RJ45	10 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/0 to GigabitEthernet 0/0/9. GigabitEthernet 0/0/0 is an inband management port and its default IP address is 192.168.0.1. After this port is connected to your PC through Ethernet cables, you can log in to the device using Telnet, STelnet, or web UI to configure or manage the device. **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**
10GE optical ports (0 to 1)	SFP+	2 GE/10GE autosensing Ethernet optical ports, numbered from XGigabitEthernet 0/0/0 to XGigabitEthernet 0/0/1.	• **100Mbps SFP Optical Modules** • **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **10Gbps SFP+ 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.	SDSDQAE-064G (BOM code: 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)
USB port	USB 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**

Power Supply System

The device has no built-in power modules and uses a 36 W Power Adapter (02221468) for power supply.

Heat Dissipation System

The device has no fans and uses natural heat dissipation.

Technical Specifications

Table 2-6 Technical specifications of the USG6000E-S03-AC

Item	Specification
Installation Type	● Rack ● Work bench ● Against the wall
Cabinet installation standard	Cabinet with a depth of 600 mm or above
Dimensions without packaging (H x W x D) [mm(in.)]	43.6 mm x 250 mm x 210 mm (1.72 in. x 9.84 in. x 8.27 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	110 mm x 470 mm x 335 mm (4.33 in. x 18.5 in. x 13.19 in.)

Item	Specification
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	2.3 kg (5.07 lb)
Weight without packaging [kg(lb)]	1.57 kg (3.46 lb)
CPU	1 CPU, 4 cores/CPU, up to 1.2 GHz
Memory	DDR4 2 GB
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
Maximum power consumption [W]	22.3 W
Maximum heat dissipation [BTU/hour]	76.08 BTU/hour
MTBF [years]	57.29 years
MTTR [hours]	2 hours
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]	1 A
Maximum output power [W]	36 W
Types of fans	None
Number of fan modules	0
Heat dissipation mode	Has no fan and uses natural cooling.
Long-term operating temperature [°C(°F)]	0°C to 45°C
Storage temperature [°C(°F)]	-40°C to 70°C
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
Storage altitude [m(ft.)]	0 m to 5000 m

- 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.

2.1.2 USG6000E-S13

Overview

Table 2-7 Basic information about the USG6000E-S13

Description	Part Number	Model	First supported version
USG6000E-S13-AC Host(2*GE RJ45 + 8*GE COMBO + 2*10GE SFP+,1 AC power,Include SSL VPN 100 Users)	02355YXM	USG6000E-S13-AC	V600R007C20SPC 605

Appearance

Figure 2-6 Appearance of the USG6000E-S13 (front view)

Figure 2-7 Appearance of the USG6000E-S13 (rear view)

Components

Figure 2-8 Components of the USG6000E-S13

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

Table 2-8 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 button 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.
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.

Name	Description
Fan module	Dissipates heat for the device and is swappable. The fan module can be removed for no more than 1 minute. The slot number of the fan module is 4.
Power module	Provides power input and distribution for the device. One power module is included in the standard configuration. Two power modules can be configured to achieve 1+1 power redundancy. When one power module is running properly, the other one is hot swappable. The silkscreens of the power module slots are PWR1 and PWR2, and the corresponding slot numbers are 2 and 3 respectively.

Indicators and Buttons

Figure 2-9 Indicators and buttons on the USG6000E-S13

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 2-9 Indicators on the USG6000E-S13

Silkscreen	Name	Color	Status	Description
PWR	Power indicator	Green	Steady on	The power module works properly.
		-	Off	The power module is faulty or the power cable is disconnected.
SYS	System indicator	Green	Steady on	The system is being powered on or restarted.
		Green	Blink every two seconds (0.5 Hz)	The system is running normally.
		Green	Blink four every second (4 Hz)	The system is starting.
		Red	Steady on	- A system fault occurs. - The power module is abnormal. - The fan module is abnormal. **NOTE** If the system starts with dual power modules but one power module is not powered on, the System indicator is steady red, but the system is operating properly.
		-	Off	The system is not running.

Silkscreen	Name	Color	Status	Description
USB	USB indicator	Green	Steady on	USB-based deployment is complete.
		Green	Blink four every second (4 Hz)	The data of USB-based deployment is being read.
		Red	Steady on	USB-based deployment fails.
		-	Off	If USB-based deployment is disabled, the system is in the default state.
HA	HA indicator	Green	Steady on	Management master device in hot standby.
		Green	Blink every two seconds (0.5 Hz)	Management backup device in hot standby.
		Red	Steady on	Hot standby is faulty.
		-	Off	The hot standby function is disabled.
WAN	WAN indicator	-	Off	Reserved.
CLOUD	CLOUD indicator	Green	Steady on	Connected to the cloud management platform.
		Green	Blink four every second (4 Hz)	Connecting to the cloud management platform, transmitting or receiving data.

Silkscreen	Name	Color	Status	Description
		-	Off	Not connected or registered to the cloud management platform.
-	ACT indicator for GE Ethernet electrical ports	Yellow	Blink (12 Hz)	Data is being sent or received through the port.
		-	Off	No data is being sent or received through the port.
-	LINK indicator for GE Ethernet electrical ports	Green	Steady on	The link of the port is connected.
		-	Off	The link of the port is disconnected.
-	ACT indicator for optical ports	Yellow	Blink (12 Hz)	Data is being sent or received through the port.
		-	Off	No data is being sent or received through the port.
-	LINK indicator for optical ports	Green	Steady on	The link of the port is connected.
		-	Off	The link of the port is disconnected.
-	Indicator for MGMT port	Green	Steady on	The link of the port is connected.

Silkscreen	Name	Color	Status	Description
		Green	Blink	Data is being sent or received through the port.
		-	Off	The link of the port is disconnected.

Table 2-10 Buttons on the USG6000E-S13

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 can enable you to restore the default settings with one click. To be specific, you can hold down the RST button for 5 seconds and then release it to restore the default settings and restart the device.
		NOTE If needed, you can run the factory-configuration prohibit command in the system view to disable the function of restoring the factory settings by holding down the RST button. To enable this function again, run the undo factory-configuration prohibit command.

Ports

Figure 2-10 Ports on the USG6000E-S13

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

Table 2-11 Ports on the USG6000E-S13

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 { copper | fiber } command to set the working mode of combo ports according to network requirements.	**Ethernet Cable** **100Mbps SFP Optical Modules** **1Gbps eSFP 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 XGigabitEthernet 0/0/0 to XGigabitEthernet 0/0/1. **NOTE** By default, the rate of 10GE optical ports are 10GE. You can run the set device port-config-mode [10ge | ge] command to set the rate of 10GE optical ports are to 10GE or GE as required.	• **1Gbps SFP Copper Modules** • **1Gbps eSFP Optical Modules** • **10Gbps SFP+ Optical Modules**
GE electrical ports (8 to 9)	RJ45	2 10/100/1000M autosensing Ethernet electrical ports, numbered from GigabitEthernet 0/0/8 to GigabitEthernet 0/0/9. The device is connected to the WAN or cloud management center using a network cable.	**Ethernet Cable**

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-SATA64G-B** • **Hard Disk Unit M.2-SATA240G-A** • **Hard Disk Unit M.2-SATA960G-A**
USB0	USB 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
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

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	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, but 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 2-11 System air flow of the USG6000E-S13

Cool air   Hot air

Technical Specifications

Table 2-12 Technical specifications of the USG6000E-S13-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.)]	43.6 mm x 442 mm x 420 mm (1.72 in. x 17.4 in. x 16.54 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	220 mm x 550 mm x 530 mm (8.66 in. x 21.65 in. x 20.87 in.)
Chassis height [U]	1 U
Weight with packaging [kg(lb)]	7.93 kg (17.48 lb)
Weight without packaging [kg(lb)]	5.95 kg (13.12 lb)
CPU	1 CPU, 4 cores/CPU, up to 1.4 GHz
Memory	DDR4 4 GB
NOR Flash	64MB

Item	Specification
NAND Flash	2 GB
Hard disk	Optional. M.2 SSD (64GB/240GB/ 960GB), hot-swappable.
Console port	RJ45
Eth Management port	RJ45
Maximum power consumption [W]	45.3 W
Maximum heat dissipation [BTU/hour]	154.4 BTU/hour
MTBF [years]	68.98 years
MTTR [hours]	2 hours
Power supply mode	Built-in AC
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 290 V, 47 Hz to 63 Hz
Types of fans	Pluggable
Number of fan modules	1
Heat dissipation mode	Absorbing cold air into the device
Airflow direction	Air flows in from the front panel and exhausts from the rear panel.
Redundant power supply	Dual power modules can be purchased to form 1+1 redundancy backup.
Long-term operating temperature [°C(°F)]	0°C to 45°C
Storage temperature [°C(°F)]	-40°C to 70°C
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
Storage altitude [m(ft.)]	0 m to 5000 m

📖 **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.

2.2 Power Modules

This chapter describes hardware information for power modules of the USG6000E, including hardware appearance, functions, and technical specifications.

2.2.1 HW-120300D1D (36W AC Power Module)

Overview

Table 2-13 Basic information about the HW-120300D1D

Item	Details
Description	36W AC Power Module
Part Number	02221468
Model	HW-120300D1D

Appearance

Figure 2-12 Appearance of the HW-120300D1D

Version Mapping

Table 2-14 Mappings between HW-120300D1D and product models

Product	Product Model	First Supported Version
USG6000E-S03	USG6000E-S03-AC (02355YXH)	V600R007C20SPC605

Functions and Features

Table 2-15 Functions and features of the HW-120300D1D

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

Technical Specifications

Table 2-16 Technical specifications of the HW-120300D1D

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	32 mm x 53.95 mm x 99.45 mm (1.26 in. x 2.12 in. x 3.92 in.)
Weight without packaging [kg(lb)]	0.205 kg (0.45 lb)
Number of inputs	1
Rated input voltage [V]	100 V AC to 240 V AC (50 Hz/60 Hz)

Item	Specification
Input voltage range [V]	90 V AC to 264 V AC (47 Hz to 63 Hz)
Maximum input current [A]	1 A
Rated output voltage [V]	12V DC
Rated output current [A]	3 A
Rated output power [W]	36 W
Type of power cables	C7

2.2.2 PAC60S12-AR (02312SLE-001: 60W AC Power Module)

Overview

Table 2-17 Basic information about the PAC60S12-AR

Item	Details
Description	60W AC Power Module
Part Number	02312SLE-001
Model	PAC60S12-AR

Appearance

Figure 2-13 Appearance of the PAC60S12-AR

Version Mapping

Table 2-18 Mappings between PAC60S12-AR and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-14 Panel of the PAC60S12-AR

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

Table 2-19 Indicators on the PAC60S12-AR

Silkscreen	Name	Color	Status	Description
STAT	Power status indicator	Green	Steady on	The 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.

Silkscreen	Name	Color	Status	Description
		-	Off	• The input of the AC power module is out of range. For example, no AC input, AC input overvoltage, or AC input undervoltage has occurred. • The output of the AC power module is out of range. For example, undervoltage, or overtemperature has occurred.

Table 2-20 Ports on the PAC60S12-AR

Port	Connector Type	Description	Available Components
Power receptacle	-	Connects the C13 plug of the AC power cable. For details, see AC Power Cables.	-
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 2-21 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.
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	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 2-22 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 8.43 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
Hot swapping	Supported
Type of power cables	C13

2.2.3 PAC60S12-AR (02312SLE: 60W AC Power Module)

Overview

Table 2-23 Basic information about the PAC60S12-AR

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

Appearance

Figure 2-15 Appearance of the PAC60S12-AR

Version Mapping

Table 2-24 Mappings between PAC60S12-AR and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-16 Panel of the PAC60S12-AR

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

Table 2-25 Indicators on the PAC60S12-AR

Silkscreen	Name	Color	Status	Description
STAT	Power status indicator	Green	Steady on	The 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	● The input of the AC power module is out of range. For example, no AC input, AC input overvoltage, or AC input undervoltage has occurred. ● The output of the AC power module is out of range. For example, undervoltage, or overtemperature has occurred.

Table 2-26 Ports on the PAC60S12-AR

Port	Connector Type	Description	Available Components
Power receptacle	-	Connects the C13 plug of the AC power cable. For details, see AC Power Cables.	-
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 2-27 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	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 2-28 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 8.43 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
Hot swapping	Supported
Type of power cables	C13

2.3 Fan Modules

This chapter describes hardware information for all fan modules of the USG6000E, including hardware appearance, and technical specifications.

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

Overview

Table 2-29 Basic information about the FAN-023A-B

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

Appearance

Figure 2-17 Appearance of the FAN-023A-B

Version Mapping

Table 2-30 Mappings between FAN-023A-B and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-18 Panel of the FAN-023A-B

1. FAN indicator

Table 2-31 Indicators on the FAN-023A-B

Silkscreen	Name	Color	Status	Description
–	FAN indicator	Green	Blink every two seconds (0.5 Hz)	The fan module is running normally.
		Red	Steady on	The fan module is faulty. For example, the fans stop running or are blocked, the power supply of the fan is abnormal, the rotation speed of the fan does not match, or the fan module is not in position. For details, see SRM_ENTITY_ 1.3.6.1.4.1.201 1.5.25.219.2.6. 1 hwFanRemov e_137216, SRM_ENTITY_ 1.3.6.1.4.1.201 1.5.25.219.2.6. 5 hwFanInvalid_ 139264, SRM_ENTITY_ 1.3.6.1.4.1.201 1.5.25.219.2.6. 5 hwFanInvalid_ 139267.

Silkscreen	Name	Color	Status	Description
		Red	Blink every two seconds (0.5 Hz)	The fan module generates an alarm, for example, indicating the air extraction and blowing mode is incorrect. s, see SRM_ENTITY_ 1.3.6.1.4.1.201 1.5.25.219.2.6. 5 hwFanInvalid_ 139265.
		-	Off	The fan module is not installed.

Functions and Features

Table 2-32 Functions and features of the FAN-023A-B

Functions and Features	Description
Basic function	The fan module supports hot swapping. It consists of the fan module frame, fan, and light pipe.

Technical Specifications

Table 2-33 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

Item	Specification
Maximum power consumption (40°C) [W]	8.64 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

2.4 Storage Devices

This chapter describes hardware information for hard disk modules of the USG6000E, including hardware appearance, functions, and technical specifications.

2.4.1 Hard Disk

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

Overview

Table 2-34 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 2-19 Appearance of the M.2-SATA240G-A

Version Mapping

Table 2-35 Mappings between M.2-SATA240G-A and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-20 Panel of the M.2-SATA240G-A

1. ALM indicator	2. RUN indicator

Table 2-36 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 2-37 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 2-38 Technical specifications of the M.2-SATA240G-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]	240
Port type	SATA
Maximum power consumption [W]	5 W
Maximum heat dissipation [BTU/hour]	5 BTU/hour

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

Overview

Table 2-39 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 2-21 Appearance of the M.2-SATA64G-A

Version Mapping

Table 2-40 Mappings between M.2-SATA64G-A and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-22 Panel of the M.2-SATA64G-A

1. ALM indicator	2. RUN indicator

Table 2-41 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.

Silkscreen	Name	Color	Status	Description
		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 2-42 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 2-43 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

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

Overview

Table 2-44 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 2-23 Appearance of the M.2-SATA64G-B

Version Mapping

Table 2-45 Mappings between M.2-SATA64G-B and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-24 Panel of the M.2-SATA64G-B

1. ALM indicator	2. RUN indicator

Table 2-46 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 2-47 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 2-48 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

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

Overview

Table 2-49 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 2-25 Appearance of the M.2-SATA960G-A

Version Mapping

Table 2-50 Mappings between M.2-SATA960G-A and product models

Product	Product Model	First Supported Version
USG6000E-S13	USG6000E-S13-AC (02355YXM)	V600R007C20SPC605

Panel

Figure 2-26 Panel of the M.2-SATA960G-A

1. ALM indicator	2. RUN indicator

Table 2-51 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.
		-	Off	The hard disk is not detected or the device is not powered on.

Functions and Features

Table 2-52 Functions and features of the M.2-SATA960G-A

Functions and Features	Description
Basic functions	Storage log.
Hot swap	Supports hot swap.

Functions and Features	Description
Restrictions and limitations	Do not low-level format the hard disk. Otherwise, the hard disk cannot be used.

Technical Specifications

Table 2-53 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

2.5 Optical/Electrical Modules

This chapter describes hardware information for optical/electrical modules of the USG6000E.

2.5.1 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 USG 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 USGs, contact Huawei technical support.

Risks of Using Non-Huawei-Certified Optical Modules

During certification of optical modules for USG, 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 USG's data bus.

  Some non-Huawei-certified optical modules have defects in data bus designs. Using such an optical module on a USG causes suspension of the connected data bus on the USG. 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 USG 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 USG 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 USG, the system will report incorrect temperature alarms.

- Improper register settings cause errors or failures in reading parameters or diagnostic information.

  Some non-Huawei-certified USG 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 USG 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 USG 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 for "HUAWEI" on the label

If an optical module has been certified by Huawei, its label contains "HUAWEI", as shown in **Figure 2-27**.

Figure 2-27 "HUAWEI" on the label of a Huawei-certified optical module

Method 2: Run the display esn interface command

If **Certified** is **YES**, and **VendorName** is **huawei** in the **display esn interface** command output, the optical module has been certified by Huawei. Otherwise, it is not a Huawei-certified optical module.

2.5.2 100Mbps SFP Optical Modules

2.5.2.1 S-SFP-FE-LH40-SM1310

Table 2-54 S-SFP-FE-LH40-SM1310 specifications

Item	Value
Basic Information	
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

2.5.2.2 S-SFP-FE-LH80-SM1550

Table 2-55 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
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

2.5.2.3 SFP-FE-LX-SM1310-BIDI

Table 2-56 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

Item	Value
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
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.	

2.5.2.4 SFP-FE-LX-SM1550-BIDI

Table 2-57 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

Item	Value
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	
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.	

2.5.2.5 SFP-FE-SX-MM1310

Table 2-58 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

Item	Value
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

2.5.2.6 eSFP-FE-LX-SM1310

Table 2-59 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	

Item	Value
Rx sensitivity (AVG) [dBm]	-28 dBm
Overload power (AVG) [dBm]	-8 dBm

2.5.3 1Gbps SFP Copper Modules

2.5.3.1 SFP-1000BaseT

Table 2-60 SFP-1000BaseT specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT
Part Number	02314171
Model	SFP-1000BaseT
Form factor	SFP
Application standard	1000BASE-T
Connector type	CAT5 UTP/STP
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]	-

2.5.4 1Gbps eSFP Optical Modules

2.5.4.1 OSU015N00

Table 2-61 OSU015N00 specifications

Item	Value
Basic Information	
Module name	OSU015N00
Part Number	02310CPX
Model	OSU015N00
Form factor	eSFP
Application standard	-
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C
Transmission rate [bit/s]	155M-2.67G
Target transmission distance [km]	15 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]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-21 dBm
Overload power (AVG) [dBm]	0 dBm

2.5.4.2 S-SFP-GE-LH40-SM1310

Table 2-62 S-SFP-GE-LH40-SM1310 specifications

Item	Value
Basic Information	

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

2.5.4.3 S-SFP-GE-LH40-SM1550

Table 2-63 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

Item	Value
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

2.5.4.4 S-SFP-GE-LH80-SM1550

Table 2-64 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

Item	Value
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

2.5.4.5 SFP-GE-LX-SM1310

Table 2-65 SFP-GE-LX-SM1310 specifications

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

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

2.5.4.6 SFP-GE-LX-SM1310-BIDI

Table 2-66 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
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

2.5.4.7 SFP-GE-LX-SM1490-BIDI

Table 2-67 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
Minimum extinction ratio [dB]	6 dB
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-19.5 dBm
Overload power (AVG) [dBm]	-3 dBm

2.5.4.8 eSFP-GE-SX-MM850

Table 2-68 eSFP-GE-SX-MM850 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-SX-MM850
Part Number	02315204
Model	eSFP-GE-SX-MM850

Item	Value
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	
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

2.5.4.9 eSFP-GE-ZX100-SM1550

Table 2-69 eSFP-GE-ZX100-SM1550 specifications

Item	Value
Basic Information	

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

2.5.5 10Gbps SFP+ Optical Modules

2.5.5.1 OMXD30000

Table 2-70 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000
Part Number	02318169
Model	OMXD30000
Form factor	SFP+

Item	Value
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

2.5.5.2 OSX010000

Table 2-71 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

Item	Value
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

2.5.5.3 OSX040N01

Table 2-72 OSX040N01 specifications

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

Item	Value
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-14.1 dBm
Overload power (AVG) [dBm]	0.5 dBm

2.5.5.4 SFP-10G-BXD1

Table 2-73 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
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

2.5.5.5 SFP-10G-BXU1

Table 2-74 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
Receiver Optical Characteristics	
Rx sensitivity (AVG) [dBm]	-14.4 dBm
Overload power (AVG) [dBm]	0.5 dBm

2.5.5.6 SFP-10G-USR

Table 2-75 SFP-10G-USR specifications

Item	Value
Basic Information	
Module name	SFP-10G-USR
Part Number	02310MNW
Model	SFP-10G-USR

Item	Value
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

2.5.5.7 SFP-10G-ZR

Table 2-76 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

Item	Value
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

2.6 Cables

This section describes the PGND cable, power cable, configuration cable, Ethernet cable, and optical fiber of the USG.

2.6.1 PGND Cable

2.6.1.1 PGND Cable

Connection

A ground cable is connected as follows:

- The M4 lug is connected to the ground point on the USG.
- 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. **Figure 2-28** shows the appearance of a type of PGND cables.

📖 **NOTE**

The figure is for reference only.

Figure 2-28 Appearance of the PGND cable

Figure 2-29 shows the appearance of the OT terminal.

Figure 2-29 OT terminal

Technical Specifications

Table 2-77 Technical specifications of the PGND Cable

Description	Part Number	Model	Connector X1	Connector X2	Cable length	Bend radius
Power Cable,0.4 m,4mm^2,OT6-4, 227IEC02 -4^2G&Y, OT6-6	0415061 7	IEC401	1417001 7: OT6-4	1417002 3: OT6-6	0.4 m	-
Power Cable,4m ,OT2-16- 8,H07Z- K-16^2G &Y,OT16- 6,LSZH	0415274 8-001	-	OT2-16-8	OT16-6	4 m	30 mm

2.6.2 AC Power Cable

2.6.2.1 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 USG.

- 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.

<div style="border:1px solid #000;">

NOTICE

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

</div>

Appearance and Structure

The USG provides both the European-standard and North American-standard AC power cables. **Figure 2-30** list the reference specifications. You can select the desired power cables based on your site conditions. For details about the power cable appearance, see **A.1 Quick Reference Tables of Power Cables**. You can view the photo of a power cable according to the corresponding BOM.

Figure 2-30 Appearance of the North American-standard AC power cable

Table 2-78 lists the connectors of AC power cables.

Table 2-78 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 2-79 Technical specifications of the AC Power Cable

Description	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cable,America AC Power Cable,125V10A,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,250V10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	04040888	CC13AU300	PI straight male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
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
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,250V10A,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

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),C13AF-L,Black	04041117	CC13UK301	PG angle male	C13 left angle female connector	3 m
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

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,Chin a AC Power 250V10A,1 5.0m,PISM, 227IEC53-1 .0^2(3C),C 13SF,Black	04042698	CPWR0010 2	PI straight male	C13 straight female	15 m
Power Cords Cable,Chin a AC Power 250V10A,2 0.0m,PISM, 227IEC53-1 .0^2(3C),C 13SF,Black	04042699	CC13CN20 0	PI straight male	C13 straight female	20 m
External Power Cable, Power Cable 250V2.5A,2 m,2X0.75m m^2,Black, PASM,227I EC53-0.75^ 2(2C)- I,C7SF	04043491	CPC7SF201	PA straight male	C7 straight female	2 m
Power cord,Europ e AC Power 250V2,2.0 m,PCSM, (H03VVH2 F-0.5^2(2C)),C7SF,Bla ck	04044216	C0C7EU20 0	PC straight male	C7 straight female	2 m

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,Japa n AC Power 125V7A,2.0 m,PASM,VC TFK-0.75^ 2(2C),C7SF, Black	04044496	C0C7JP200	PA straight male	C7 straight female	2 m
Power Cable,Amer ica AC Power Cable 125V7A,2.0 m,PASM,18 NISPT-1(2C),C7SF,Blac k	04044497	C0C7NA20 0	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	C0C7UK20 0	PG angle male	C7 straight female	2 m
Power Cords Cable,Austr alia AC Power 250V2.5A,2 .0m,PISM- I,H03VVH2 F-0.75^2(2 C),C7SF,Bla ck	04044577	C0C7AU20 0	PI-I straight male	C7 straight female	2 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
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
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,250V10A,3m,PISM,227IEC53-1.0^2(3C),C13SF,Black	04050139	CC13CN300	PI straight male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
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
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

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,China AC Power Cable,250V 10A,3.0m,C 14SM, (227IEC53-1.0^2(3C)), C13SF,250V ,10A,Black, PDU Cable	04050846	-	C14 straight male	C13 straight female	3 m
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 Cable,Brazil AC Power Cable,250V 2.5A,2m,PC-IIISM,H05V VH2-F 2*0.75^2(2 C),C7SF,25 0V,2.5A,Bla ck	04050956	C0C7BR200	PC-III straight male	C7 straight female	2 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
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
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

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
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
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

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
Power cord,Britain AC Power 250V10A,3. 0m,PGAM, H05VV-F-1.0mm^2(3C),C13S F,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,C 13SF,PDU Cable	0405G019	CC13EU180	C14 straight male	C13 straight female	1.8 m
Power Cords Cable,South Africa AC Power 250V2.5A,2 m,PDAM,H 03VVH2-F-0.75^2(2 C),C7SF	0405G025	C0C7SA200	PD angle male	C7 straight female	2 m
Power Cords Cable,Korea AC Power 250V10A,3 m,PFSM,H05VV-F 3*1.0^2(3C),C13SF,Black	0405G028	CC13KO300	PF straight male	C13 straight female	3 m

Description	Part Number	Model	Connector X1	Connector X2	Cable length
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
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

Descriptio n	Part Number	Model	Connector X1	Connector X2	Cable length
Power Cords Cable,Den mark AC Power 250V10A,3 m,PKSM,H 05VV- F-3*1.0^2(3C),C13SF, Black	0405G02K	CC13DE30 0	PK straight male	C13 straight female	3 m
Power Cable,Brazil AC Power Cable 250V10A,3. 0m,PNSM , H05VV- F-1.0mm^ 2(3C),C13S F,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.

> **NOTE**
>
> - The cable with the C7 straight female X2 connector only to the desktop devices USG6000E-S03.
> - The cable with the C13 straight female X2 connector and non-C14 straight male X1 connector applies to non-desktop-mounted scenarios.
> - The cable with the C13 straight female X2 connector and C14 straight male X1 connector applies to non-desktop models in PDU installation scenarios.

2.6.3 Console Cable

2.6.3.1 Console Cable

Connection

A console cable is connected as follows:

- The RJ45 connector is connected to the console port of the USG.
- The DB9 connector is connected to the COM port on a maintenance terminal.

Appearance and Structure

A console cable is an 8-wire shielded cable. **Figure 2-31** shows the console cable.

Figure 2-31 Appearance of the Console Cable

Name	Description
DB9	DB9 connector(female). The connector has 9 pin holes with IDs from 1 to 9. It connects to the COM port of a PC.
RJ45	RJ45 connector
Pos	Pin position

Pin Assignments

Table 2-80 lists the pin assignments of a console cable.

Table 2-80 Pin assignments of a console cable

USG	Signal Description	RJ45 Pin ID	Signal Direction	DB9 Pin ID
NA	RTS (Request to Send)	1	←	7
NA	DTR (Data Terminal Ready)	2	←	4
TXD	TXD (Transmit Data)	3	→	2

USG	Signal Description	RJ45 Pin ID	Signal Direction	DB9 Pin ID
NA	DCD (Data Carrier Detect)	4	→	1
GND	GND	5	-	5
RXD	RXD (Receive Data)	6	←	3
NA	DSR (Data Set Ready)	7	→	6
NA	CTS (Clear to Send)	8	→	8

NOTE

Pins in the same row are connected to each other using a cable.

The symbol → indicates that the signal travels from the RJ45 connector to the DB9 connector, whereas the symbol ← indicates that the signal travels from the DB9 connector to the RJ45 connector.

Pos. 9 of the DB9 connector is empty.

Technical Specifications

Table 2-81 shows the technical specifications of the console cable.

Table 2-81 Technical specifications of the console cable

Item	Description
Connector 1	DB9 connector - D model - 9PIN - female
Connector 2	RJ45 Network Interface Connector, Crystal Connector, 8PIN, 8BIT, Shielded, Plug
Cable	Single Cable, Console Serial Port Cable, 3 m, D9F, CC4P0.48B(S), MP8-VI
Wire	8

2.6.4 Ethernet Cable

2.6.4.1 Ethernet Cable

Connection

The Ethernet cable, also called the network cable, is used for carrying signals on Gigabit networks or networks with a lower packet rate.

Ethernet cables are classified into straight-through and crossover cables according to the wiring scheme used at the two ends of the cables. The interfaces of the USG can dynamically adapt to straight-through cables and crossover cables.

NOTICE

Figure 2-32 and **Figure 2-33** show how to distinguish and make straight-through cables and crossover cables. You need to strictly observe the wiring scheme to ensure the quality of services.

- Straight-through cable

  The straight-through cable is also called the standard cable. Both ends of the cable use wiring scheme EIA/TIA T568A or EIA/TIA T568B. You are advised to use wiring scheme EIA/TIA T568B when you make straight-through cables. **Figure 2-32** shows the detail.

  Figure 2-32 Schematic diagram of the connection scheme of straight-through cables

  You can use straight-through cables to connect:
  – A switch or hub with an USG6000E
  – Computers (including servers and workstations) with a switch or hub
- Crossover cable

  The crossover cable uses wiring scheme EIA/TIA T568A for one end and EIA/TIA T568B for the other, as shown in **Figure 2-33**.

Figure 2-33 Schematic diagram of the connection scheme of crossover cables

You can use the crossover cables to connect:

– Two USG6000Es

– An USG6000E and a computer

– Two hubs

– A switch and hubs

– Two switches

– Two computers

Appearance and Structure

Network cables are classified into shielded and unshielded ones based on whether the twisted pair and RJ45 connector are shielded, as shown in **Figure 2-34** and **Figure 2-35**.

Figure 2-34 Appearance of a shielded cable

Figure 2-35 Appearance of an unshielded cable

☐ **NOTE**

The figure is for reference only.

An Ethernet cable consists of twisted pairs and RJ45 connectors, as shown in **Figure 2-36**.

Figure 2-36 Structure of the Ethernet Cable

Name	Description
RJ45	RJ45 connector
Cable	Category 5 or higher twisted pair network cable
PIN1 to PIN8	8 pins. Each pin has an ID ranging from 1 to 8.

Pin Assignments

The twisted pair network cable has eight wires. The connection between wires and RJ45 connector pins complies with wiring scheme EIA/TIA 568A or EIA/TIA 568B, as shown in **Figure 2-37**.

Figure 2-37 Wiring scheme EIA/TIA 568A or EIA/TIA 568B

EIA/TIA 568A		EIA/TIA 568B	
PIN[a]	Wire[b]	PIN	Wire
1	Green/White	1	Orange/White
2	Green	2	Orange
3	Orange/White	3	Green/White
4	Blue	4	Blue
5	Blue/White	5	Blue/White
6	Orange	6	Green
7	Brown/White	7	Brown/White
8	Brown	8	Brown

NOTE

- a. An RJ45 connector has eight pins.
- b. The wire of a twisted pair connects to the RJ45 connector pin. The color of the plastic jacket is considered as the name of the wire.

Technical Specifications

Table 2-82 lists the technical specifications of the Ethernet cable.

Table 2-82 Technical specifications of the Ethernet cable

Item	Description
Connector 1 and 2	Shielded RJ45/Unshielded RJ45
Cable	Category 5 or higher shielded/unshielded twisted pair network cable
Wire	8

2.6.5 Optical Fiber

2.6.5.1 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 USG 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 USG6000E.

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 2-38**. The jacket of the LC/PC-LC/PC multi-mode optical fiber is orange, as shown in **Figure 2-39**, and that of the MPO/PC-MPO/PC multi-mode optical fiber is cyan, as shown in **Figure 2-40**. Optical fibers are not delivered with the USG6000E. Purchase optical fibers separately as required.

Figure 2-38 Appearance of the LC/PC-LC/PC single-mode optical fiber

Figure 2-39 Appearance of the LC/PC-LC/PC multi-mode optical fiber

Figure 2-40 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 USG6000E: 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 2-83**.

Table 2-83 Common optical fiber types

Type	Transmission Mode	Connector	
		On the USG6000E	**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 2-84 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

Descripti on	Part Number	Model	Connect or X1	Connect or X2	Cable length	Bend radius
Patch Cord,LC/ PC-LC/ PC,Single mode,G.6 52D,2m m,5m	1413019 5	SS-OP-D- LC-S-5	LC/PC	LC/PC	5 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Single - mode,10 m,G.652 D,2mm	1413019 6	SS-OP- LC-SC- S-10	LC/PC	SC/PC	10 m	30 mm
Patch Cord,LC/ PC,FC/ PC,Single - mode,10 m,G.652 D,2mm	1413019 7	SS-OP- LC-FC- S-10	LC/PC	FC/PC	10 m	30 mm
Patch Cord,LC/ PC,LC/ PC,Single - mode,10 m,G.652 D,2mm	1413019 9	SS-OP-D- LC-S-10	LC/PC	LC/PC	10 m	30 mm
Patch Cord,LC/ PC,FC/ PC,Multi- mode,10 m,A1b,2 mm	1413022 1	SS-OP- LC-FC- M-10	LC/PC	FC/PC	10 m	30 mm
Patch Cord,LC/ PC,LC/ PC,Multi- mode,10 m,A1B,2 mm	1413022 2	SS-OP-D- LC-M-10	LC/PC	LC/PC	10 m	30 mm

Descripti on	Part Number	Model	Connect or X1	Connect or X2	Cable length	Bend radius
Patch Cord,LC/ PC,SC/ PC,Multi- mode,10 m,A1b,2 mm	1413022 3	SS-OP- LC-SC- M-10	LC/PC	SC/PC	10 m	30 mm
Optical adapter- LC/PC- LC/PC- Blue- Shell:Plas tic- Sleeve:Zir conia- Square	1413024 8	QW1P0FI BER06	LC/PC	LC/PC	-	-
Patch Cord,LC/ PC,LC/ PC,Single - mode,20 m,G.652 D,2mm	1413025 1	SS-OP-D- LC-S-20	LC/PC	LC/PC	20 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Multi- mode,30 m,A1b,2 mm	1413027 5	SS-OP- LC-SC- M-30	LC/PC	SC/PC	30 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Single - mode,30 m,G.652 D,2mm	1413027 6	SS-OP- LC-SC- S-30	LC/PC	SC/PC	30 m	30 mm

Descripti on	Part Number	Model	Connect or X1	Connect or X2	Cable length	Bend radius
Patch Cord,LC/ PC,SC/ PC,Multi-mode,20 m,A1b,2 mm	1413027 9	SS-OP-LC-SC-M-20	LC/PC	SC/PC	20 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Single -mode,20 m,G.652 D,2mm	1413028 0	SS-OP-LC-SC-S-20	LC/PC	SC/PC	20 m	30 mm
Patch Cord,LC/ PC,LC/ PC,Multi-mode,20 m,A1b,2 mm	1413029 5	SS-OP-D-LC-M-20	LC/PC	LC/PC	20 m	30 mm
Patch Cord,LC/ PC,LC/ PC,Multi-mode,5m ,A1b,2m m	1413029 6	SS-OP-D-LC-M-5	LC/PC	LC/PC	5 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Multi-mode,50 m,A1b,2 mm	1413031 1	SS-OP-LC-SC-M-50	LC/PC	SC/PC	50 m	30 mm
Patch Cord,LC/ PC,SC/ PC,Single -mode,50 m,G.652 D,2mm	1413031 2	SS-OP-LC-SC-S-50	LC/PC	SC/PC	50 m	30 mm

Descripti on	Part Number	Model	Connect or X1	Connect or X2	Cable length	Bend radius
Patch Cord,LC/ PC,LC/ PC,Single - mode,6m ,G.652D,2 mm	1413036 0	SS-OP-D- LC-S-6	LC/PC	LC/PC	6 m	30 mm

3 Hardware Installation

This chapter describes hardware installation procedures and precautions.

Installation Procedure
This section describes the installation procedure of the USG6000E.

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

Installing a Desktop Device
This chapter provides the cabinet-mounting, workbench-mounting, wall-mounting, and cable connection methods of the USG6000E-S03.

Installing a 420 mm Deep Device
This chapter provides the cabinet-mounting, workbench-mounting, and cable connection methods of the USG6000E-S13 series.

3.1 Installation Procedure

This section describes the installation procedure of the USG6000E.

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

Figure 3-1 shows the USG devices installation procedure.

Figure 3-1 Installation flowchart

3.2 Installation Preparation

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

3.2.1 Precautions

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

◻ **NOTE**

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

Safety Precautions

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

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

Local Laws and Regulations

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

Basic Installation Requirements

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

- Only qualified and trained engineers can install, operate, and maintain Huawei equipment.
- Only qualified professionals can remove safety facilities and troubleshoot Huawei equipment.
- Only authorized or certified personnel can replace Huawei components (including software).
- Installation and maintenance personnel must report all faults and errors that may cause safety issues to the person in charge.

Personal Safety Warnings

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

Device Security Precautions

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

3.2.2 Installation Environment Check

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

Table 3-1 lists installation environment check items.

Table 3-1 Installation environment checklist

Check Item	Requirement	Compliance
Ventilation and heat dissipation	Complies with requirements in **A.2.1 Device Position**.	□ Y □ N □ N/A
Stability		□ Y □ N □ N/A
Grounding		□ Y □ N □ N/A
Temperature	Complies with requirements in **A.2.2 Humidity, Temperature, and Cleanness**.	□ Y □ N □ N/A
Relative humidity		□ Y □ N □ N/A
Cleanness		□ Y □ N □ N/A
Electrostatic discharging	Complies with requirements in **A.2.3 ESD Requirements**.	□ Y □ N □ N/A
Surge protection	Complies with requirements in **A.2.4 Lightning Protection and Grounding**.	□ Y □ N □ N/A
Power supply facility	Complies with requirements in **A.2.5 Power Supply**.	□ Y □ N □ N/A
Electromagnetic shielding	Complies with requirements in **A.2.6 Electromagnetic Protection**.	□ Y □ N □ N/A

3.2.3 Instruments Required for the Installation

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

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

Table 3-2 Required instruments and meters

Category	Instrument/Meter
Measuring and lineation instruments	● Ruler: used to measure length. ● Marker: used to indicate specific lengths with drawn lines.
Fastening tools	● Flat-head screwdriver: used to fasten small screws and bolts. ● Phillips screwdriver: used to fasten small screws and bolts.

Category	Instrument/Meter
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.
Meters	• Network cable tester: used to test whether a network cable is connected and check the connection sequence in a network cable. • Optical power meter: used to test the optical power. • Optical attenuator: used to measure optical attenuation. • Multimeter: used to test insulation within the cabinet, cable connections, and electric performance specifications of the device, such as the voltage, current, and resistance. • Ground resistance tester: used to measure the ground resistance. • Configuration terminal (A common PC is also applicable).

3.3 Installing a Desktop Device

This chapter provides the cabinet-mounting, workbench-mounting, wall-mounting, and cable connection methods of the USG6000E-S03.

3.3.1 Mounting a Device to a Specified Location

The USG6000E-S03 can be mounted in a 19-inch standard cabinet. When no cabinet is available, install the USG6000E-S03 on a workbench or a wall.

3.3.1.1 Mounting a Device in a Cabinet

The USG6000E-S03 can be mounted in a 19-inch standard cabinet using mounting ears.

Precautions

Before installing the USG, check the following items:

- Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG is rusted or soggy. Then, investigate causes and contact the supplier.
- The cabinet is stable.
- The position for the USG in the cabinet is well arranged.
- Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.
- The device to be installed is staged near the cabinet for convenience.

You can place either end of the USG chassis towards the front door of the cabinet. In this manual, the front panel of the USG 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 (purchased separately, BOM numbers: 21240477)
- 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 3-2**.

Figure 3-2 Installing the mounting ears on the chassis

📖 **NOTE**

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

Step 2 Install floating nuts.

Figure 3-3 illustrates the positions of floating nuts.

Figure 3-3 Positions of floating nuts

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

Figure 3-4 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 USG in the cabinet.

1. Lift the USG and move it to the cabinet.

2. Use a Phillips screwdriver to install M6 screws and fix the USG into the cabinet through mounting ears, as shown in **Figure 3-5**.

Figure 3-5 Mounting the USG in a cabinet

----End

Follow-up Procedure

Perform the following checks after the installation:

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

3.3.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6000E-S03 on a workbench.

Precautions

Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG 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 USG.

☐ **NOTE**

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

Step 2 Place the USG on the workbench.

Figure 3-6 Placing the USG with rubber feet on a workbench

----End

Follow-up Procedure

Verify the following after the installation:

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

3.3.1.3 Mounting a Device Against a Wall

When no cabinet is available, you can mount the USG6000E-S03 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 USG 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 3-7 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 3-8 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 USG6000E-S03 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 3-9 Drilling holes and installing expansion bolts

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

> ⬛ NOTE
>
> The USG supports upward mounting and downward mounting. To prevent water from entering into ports and causing device damage, you are advised to mount the USG with ports facing downward.

Figure 3-10 Mounting the USG on a wall

----End

Follow-up Procedure

After wall-mounting is complete, verify that:

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

3.3.2 Connecting a PGND Cable

Connecting the PGND cable of a USG6000E-S03 correctly is a key measure of surge protection and resistance to interference. Before using the USG6000E-S03, correctly connect the PGND cable. Otherwise, the USG may be damaged.

Precautions

The USG has been installed inside a cabinet.

Tools

- Phillips screwdriver
- Multimeter

Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG rear panel.

Step 2 Connect the OT terminal at one end of the PGND cable to the connection hole of the USG, with the conducting wire upward, and tighten the M4 screw, as shown in A of **Figure 3-11**, and tighten the M4 screw. The tightening torque is 1.4 N·m.

Figure 3-11 Installing the OT terminal

NOTE

The ground cable of the USG6000E-S03 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 3-12 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.

3.3.3 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 micro SD card model is SDSDQAE-064G, the capacity is 64 GB, and dimensions (H x W x D) are 1 mm x 15 mm x 11 mm (0.04 in. x 0.59 in. x 0.43 in.).

- 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 USG is powered on, you must run the **sd-card offline** command in the system view first. After the system displays a message indicating that the micro SD card is offline, remove the micro SD card. Otherwise, the micro SD card might be damaged, and the data may be lost. For details, see **4.4 Replacing a Micro SD Card (USG6000E-S03)**.
- 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.

◻ NOTE

- Note that the micro SD card must be installed with the face with words upwards.
- Do not use too much force; otherwise the micro SD or micro SD card slot might be damaged.

1. Insert the micro SD along the guide rail to the micro SD card slot.
2. When you hear a click, the micro SD card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 3-13 Installing the micro SD card and anti-theft board

----End

Follow-up Procedure

After the micro SD card is installed, power on the USG and run the **display sd-card information** command in any view to check the micro SD card installation and file system mounting status. If **SD Card Physical State** is **Present** and **SD Card File System State** is **Mounted**, the micro SD card is working properly.

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

- If **SD Card File System State** is **Unmounted**, the micro SD card format might not be **ext4.** You need to run the **reset sd-card** command in the system view to format the micro SD card.

3.3.4 Connecting a Console Cable

After connecting a PC to the console port of a USG6000E-S03 with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6000E-S03.

Precautions

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG has been installed, and the ports to be connected are planned.

- Prepare cable labels.

  Before cable connection, labels must be prepared for the cable.

NOTICE

- Make sure that the PC and the USG are connected to the same ground point. Otherwise, the console port of the USG may be damaged.
- Pay attention to port numbering and make sure that the cable is connected to the correct port, preventing damage to ports or the device.

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 USG.

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

Figure 3-14 Connecting a console cable to the USG

Step 4 Remove the temporary labels and attach labels 2 cm away from connectors at both ends of the console cable.

----End

Follow-up Procedure

After the cable connection is complete, verify that:

- The labels at both ends of a cable are correct, clear, neat, and facing the same direction.

- Cables and connectors are free of damage or breakage and are connected properly.

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

3.3.5 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6000E-S03 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 USG.
- Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of the USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-15 Connecting an Ethernet cable

Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

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

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.3.6 Installing Optical Transceivers and Connecting Optical Fibers

This section describes how to install optical transceivers on the SFP or SFP+ ports and connect them to the ports of the peer device using optical fibers according to the network plan.

Context

The USG supports both 1 Gbit/s , 10 Gbit/s, and 40 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 USG due to incompatibility.

⚠ **CAUTION**

Do not look into the optical interface of the optical module or the optical fiber connector without eye protection.

Before connecting optical fiber cables, read the following precautions:

- Do not overbend optical fibers, and the radius should not be shorter than 40 mm.
- Do not bundle the optical fibers too tight. Otherwise, the transmission performance of the optical fibers and the communication between devices might be adversely affected.

Before connecting optical ensure the following:

- The optical module has been installed.

Procedure

Step 1 Insert an optical transceiver into the SFP or SFP+ port of the USG.

Step 2 Remove the dust cap from the optical transceiver.

📖 **NOTE**

Set aside the dust cap properly for future use. After optical fiber are disconnected for maintenance, use the dust cap to prevent the optical transceiver from dust.

Step 3 Before connecting an optical fiber, attach temporary labels to both ends of the optical fiber for identification.

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

📖 **NOTE**

Ensure that the Tx and Rx ports are correctly connected.

Ensure that the TX and RX ports on one end of the optical fiber cable are connected to the RX and TX ports (respectively) on the other end.

Figure 3-16 Installing optical transceivers and connecting optical fibers

Step 5 Repeat **Step 1** to **Step 4** to install all optical transceivers and connect all optical fibers.

----End

Follow-up Procedure

After you power on the USG, check the connection by observing the optical port indicator. If the indicator is on or blinks, the link is connected or data is being transmitted. If the indicator is off, the link is disconnected. Possible causes for the disconnection are as follows:

- The optical fiber is improperly inserted. Pull out the optical fiber and re-insert it.
- The RX and TX optical ports are inserted reversely. Pull out the optical fibers, change their position, and re-insert them.
- The optical module is damaged or the optical fiber is broken. Replace the optical module or the optical fiber.

3.3.7 Connecting a Power Adapter

A power adapter can be used to supply power for a USG6000E-S03. Prepare an AC power cable to connect the power connector and the power source of the equipment room.

Context

Before connecting a power connector, ensure that the power source of the equipment room meets the input requirements of the USG power module.

Procedure

Step 1 Ensure that the PGND cable is properly grounded.

Step 2 Insert a cable-retention clip into the jack next to the power socket.

Step 3 Connect a power adapter.

1. Plug the C7 plug of the AC power cable into the C14 socket of the power adapter.

2. Insert the tuning fork plug connector of the power adapter into the power socket on the USG rear panel and adjust the cable-retention clip to an appropriate position.

3. Use a cable-retention clip to bundle the cable of the power adapter and adjust the cable-retention clip to fasten the cable.

4. Plug the other end of the AC power cable to the AC power socket or the output of the AC power supply device.

   ☐ NOTE

   The USG does not have any power switch. The power supply switch determines the power-on and power-off of the USG.

Figure 3-17 Connecting a power adapter to the

----End

Follow-up Procedure

Verify the following after the connection is complete:

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

3.3.8 Powering On or Off the USG6000E-S03

This section describes how to power on or off the USG6000E-S03. To ensure the normal start and security of the USG6000E-S03, strictly follow the operation guide to power on or off the USG6000E-S03.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.
- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

Procedure

- Power on the USG.

  The USG starts after the switch of the power supply device is turned on.

  You can identify the USG status based on indicators on the front panel. Indicators shown in **Figure 3-18** indicate that the USG is running normally.

  Figure 3-18 Indicators when the USG runs normally

- Power off the USG.

  NOTICE

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

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

  ----End

Follow-up Procedure

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

3.4 Installing a 420 mm Deep Device

This chapter provides the cabinet-mounting, workbench-mounting, and cable connection methods of the USG6000E-S13 series.

3.4.1 Mounting a Device to a Specified Location

The USG6000E-S13 can be mounted in a 19-inch standard cabinet. When no cabinet is available, you can mount the USG6000E-S13 on a workbench.

3.4.1.1 Mounting a Device in a Cabinet

Install the USG6000E-S13 to the cabinet through the expandable rear mounting ears or adjustable guide rails.

Precautions

Before installing the USG, check the following items:

- Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG 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 USG6000E-S13, 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 3-3 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 USG in the cabinet is well arranged. Ensure that the USG is 1 U of clearance from any devices above and below and 150 mm of clearance from any devices on the right or left.

- The USG to be installed is staged near the cabinet for convenience.

- In the front view, the air flow of the USG is front to rear. If the USG 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 USG chassis towards the front door of the cabinet. In this manual, the front panel of the USG 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 **Table 3-4**.

◫ **NOTE**

- The front mounting brackets, rear mounting brackets, and rear mounting bracket guide rails must be installed on both sides of the USG. **Table 3-4** 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 USG'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 3-4 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 **Figure 3-19**.

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

Figure 3-19 Positions of floating nuts

2. Install the floating nuts that match M6 screws at the positions marked in **Figure 3-19**. **Figure 3-20** illustrates how to install a floating nut.

Figure 3-20 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 **Figure 3-19**) to the left and right of the cabinet with M6 screws, as shown in **Figure 3-21**.

Figure 3-21 Installing guide rails

4. (Optional) Install adjustable guide rails (BOM numbers: 21242247 and 21242246). For details, see the installation guide delivered with the adjustable guide rails.

Step 3 Mount the USG in the cabinet.

1. Hold the bottom of the USG with both hands and move the USG into the cabinet. Align the rear mounting ears with the rear mounting ear guide rails and slowly slide the USG 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 USG to the mounting rack, as shown in **Figure 3-22**.

Figure 3-22 Mounting the USG in a cabinet

----End

Follow-up Procedure

Perform the following checks after the installation:

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

3.4.1.2 Mounting a Device on a Workbench

If you do not have a cabinet, you can mount the USG6000E-S13 on a workbench.

Precautions

Before unpacking the carton, ensure that the packing carton is intact and not damaged or soaked. Stop unpacking if the USG 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 USG.

📖 **NOTE**

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

Step 2 Place the USG on the workbench.

Figure 3-23 Placing the USG with rubber feet on a workbench

----**End**

Follow-up Procedure

Verify the following after the installation:

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

3.4.2 Connecting a PGND Cable

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

Precautions

The USG has been installed inside a cabinet.

Tools

- Phillips screwdriver
- Multimeter

Procedure

Step 1 Loosen and remove the screw of the ground terminal on the USG rear panel.

Step 2 Connect the OT terminal at one end of the PGND cable to the connection hole of the USG, with the conducting wire upward, and tighten the M4 screw, as shown in A of **Figure 3-24**, and tighten the M4 screw. The tightening torque is 1.4 N·m.

Figure 3-24 Installing the OT terminal

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 3-25 Connecting a PGND cable

NOTE

In the dual-OT scenario, connect the ground terminal on the side panel of the USG.

Figure 3-26 Connecting the ground terminal in the dual-OT scenario

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.

3.4.3 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 USG and hard disks from electrostatic damage.
- Hold the two side surfaces of a hard disk, do not touch the PCB board or squeeze the hard disk, and do not vibrate, bump, or stack hard disks.
- For mapping relationships between the USG and hard disks, see Hardware Overview.

Tool

ESD bag

Installing The Hard Disk (USG6000E-S13)

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 USG.

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

Figure 3-27 Installing the hard disk (USG6000E-S13)

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

☐ **NOTE**

> Operations after the USG power-on must be performed after all installation tasks are complete.

- Before the USG is powered on, ensure that the hard disk is correctly installed.
- After the USG is powered on, run the **display disk information** command in the user view to check whether the **Filesystem Status** value is **Mounted**.

----End

3.4.4 Connecting a Console Cable

After connecting a PC to the console port of a USG6000E-S13 with a console cable, you can use the terminal emulation program on the PC to access the command configuration interface of the USG6000E-S13.

Precautions

Before connecting a console cable, perform the following operations:

- Check preparations.

  A PC is ready, a USG has been installed, and the ports to be connected are planned.

- Prepare cable labels.

  Before cable connection, labels must be prepared for the cable.

NOTICE

- Make sure that the PC and the USG are connected to the same ground point. Otherwise, the console port of the USG may be damaged.
- Pay attention to port numbering and make sure that the cable is connected to the correct port, preventing damage to ports or the device.

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 USG.

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

Figure 3-28 Connecting a console cable to the USG

Console configuration cable

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.

3.4.5 Connecting an Ethernet Cable

Based on the network plan, you can connect one end of an Ethernet cable to the Ethernet port of a USG6000E-S13 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 USG.
> - Before connecting a cable, note the label on the port and make sure that the cable is inserted into the correct port. Otherwise, the port module or the device might be damaged.

Procedure

Step 1 If multiple network cables need to be connected, attach temporary labels to both ends of each cable for identification.

Step 2 Connect one end of an Ethernet cable to the Ethernet port of a USG and the other end to the Ethernet port of the peer device based on the network plan.

Figure 3-29 Connecting an Ethernet cable

Step 3 Lay out the Ethernet cable along a cabinet and route the cable through the cable hole for the signal cables at the top (overhead cabling) or bottom (underfloor cabling) of the cabinet.

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

----End

Follow-up Procedure

Verify the following after the installation:

- The labels at both ends of the cable are correct, clear, neat, and facing the same direction.
- The cables and connectors are free of any damage or breakage and are connected properly and reliably.

3.4.6 Installing Optical Transceivers and Connecting Optical Fibers

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

Context

The USG supports both 1 Gbit/s , 10 Gbit/s, and 40 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 USG due to incompatibility.

⚠ CAUTION

Do not look into the optical interface of the optical module or the optical fiber connector without eye protection.

Before connecting optical fiber cables, read the following precautions:

- Do not overbend optical fibers, and the radius should not be shorter than 40 mm.
- Do not bundle the optical fibers too tight. Otherwise, the transmission performance of the optical fibers and the communication between devices might be adversely affected.

Before connecting optical ensure the following:

- The optical module has been installed.

Procedure

Step 1 Insert an optical transceiver into the GE , 10GE optical port of the USG.

Step 2 Remove the dust cap from the optical transceiver.

□ NOTE

Set aside the dust cap properly for future use. After optical fiber are disconnected for maintenance, use the dust cap to prevent the optical transceiver from dust.

Step 3 Before connecting an optical fiber, attach temporary labels to both ends of the optical fiber for identification.

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

📖 **NOTE**

Ensure that the Tx and Rx ports are correctly connected.

Ensure that the TX and RX ports on one end of the optical fiber cable are connected to the RX and TX ports (respectively) on the other end.

Figure 3-30 Installing optical transceivers and connecting optical fibers

Step 5 Repeat **Step 1** to **Step 4** to install all optical transceivers and connect all optical fibers.

----End

Follow-up Procedure

After you power on the USG, check the connection by observing the optical port indicator. If the indicator is on or blinks, the link is connected or data is being transmitted. If the indicator is off, the link is disconnected. Possible causes for the disconnection are as follows:

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

- The RX and TX optical ports are inserted reversely. Pull out the optical fibers, change their position, and re-insert them.

- The optical module is damaged or the optical fiber is broken. Replace the optical module or the optical fiber.

3.4.7 Connecting AC Power Cables

By default, the USG6000E-S13 comes with one AC power module. However, two AC power modules are supported. The comes with two AC power module. Each AC power module requires an AC power cable. When two AC power modules are used, connect power cables to both AC power modules.

Context

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

⚠️ **DANGER**

Do not connect or disconnect the power cables when the USG is powered on.

Procedure

Step 1 Ensure that the PGND cable is adequately grounded.

Step 2 Connect AC power cables to AC power modules.

📖 **NOTE**

When two power modules are used, connect them to different power sources to improve availability.

1. Plug one end of the C13 power cable to the power socket of the USG power module and adjust the cable-retention clip to an appropriate position.

2. Bundle the AC power cable using a cable-retention clip and adjust the cable-retention clip to fasten the AC power cable.

3. Plug the other end of the power cable to the AC power socket or the output of the AC power supply device.

Figure 3-31 Connecting AC power cables (USG6000E-S13)

----End

Follow-up Procedure

Verify the following after the connection is complete:

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

3.4.8 Powering On or Off the USG6000E-S13

This section describes how to power on or off the USG6000E-S13. To ensure the normal start and security of the USG6000E-S13, strictly follow the operation guide to power on or off the USG6000E-S13.

Context

Before you power on the USG, ensure that:

- The power cable and PGND cable are properly connected.
- The power switch in the equipment room is easy to locate so that you can power off devices in the case of accidents.

Procedure

- Power on the USG.

  Turn on the switch of the power supply device. The USG starts.

  You can identify the USG status based on indicators on the front and rear panels. Indicators shown in **Figure 3-32** indicate that the USG runs normally.

  Figure 3-32 Indicators when the USG6000E-S13 runs normally

- Power off the USG.

  > **NOTICE**
  >
  > Before powering off the USG, ensure that configuration data is saved. Otherwise, the configuration data may be lost.

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

  ----End

Follow-up Procedure

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

4 Maintaining the Hardware

The power modules, and fan modules of the are replaceable. You can replace them as instructed.

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

Replacing a Power Module
This section describes how to replace a faulty power module.

Replacing a Fan Module
If the only fan of the USG fails, replace the fan module immediately. Otherwise, heat dissipation of the device is affected. If the USG 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. This section is irrelevant to other models that do not have independent fan modules.

Replacing a Micro SD Card (USG6000E-S03)
This section describes how to replace the micro SD card and the precautions.

Replacing a Device

4.1 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 USG interrupts services. Install or replace the hard disks during off-peak hours.
- Wear the ESD wrist strap while working on the USG to avoid possible damages to the USG and hard disks.
- While holding a hard disk, do not touch the PCB board or squeeze the disk. Carry only one hard disk at a time. Do not vibrate, crash, or pile multiple hard disks up.

- Put the hard disks inside ESD bags when they are not used.
- For mapping relationships between the USG and hard disks, see Hardware Overview.

Tools

ESD bag

Replacing the Hard Disk (USG6000E-S13)

If a hard disk is faulty (for example, a hard disk failure log is generated on the USG), you can replace the hard disk. The hard disk can be replaced no matter when the USG is powered on or off. If the USG is powered off, skip **Step 1** and do not run the **disk offline** command. The following procedure guides you through hard disk replacement while the USG is powered on:

Step 1 Ensure that all configurations are saved.

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

> **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 4-1 Removing the hard disk (USG6000E-S13)

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

Step 4 Run the **disk online** command in the system view and then the **display disk information** command. If **Filesystem Status** is **Mounted**, the hard disk works properly.

----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.

4.2 Replacing a Power Module

This section describes how to replace a faulty power module.

Context

When two power modules are installed on the USG, one of them is hot swappable. Pay attention to the following items during hot swapping:

- Power off the power module to be replaced.

- Do not power off the other power module during the replacement.
- Do not touch the other power module either by body or by tools, preventing human injury or device short circuit.

Tools

ESD wrist strap

Replacing the Power Module

Step 1 Determine the location of the power module to be replaced and attack a replacement label on the panel to identify the power module.

Step 2 Disconnect the power supply device from the power module to be replaced.

Step 3 Wear an ESD wrist strap.

Step 4 Remove the power cable connected to the power module.

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.
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 .

Figure 4-2 Replace the power module

6. Switch on the power supply device. If the STATUS indicator on the new power module of the USG6000E 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.

4.3 Replacing a Fan Module

If the only fan of the USG fails, replace the fan module immediately. Otherwise, heat dissipation of the device is affected. If the USG 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. This section is irrelevant to other models that do not have independent fan modules.

Context

☐ **NOTE**

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

> **NOTICE**
>
> To prevent USG overheating, replace the fan module within 1 minute.

Tools

ESD wrist strap

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 4-3 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.

4.4 Replacing a Micro SD Card (USG6000E-S03)

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 USG generates the micro SD card damage alarm: ENTEXT_1.3.6.1.4.1.2011.5.25.31.2.0.16 hwEntityExtDiskDamaged.
- The micro SD card is full. That is, the USG generates the micro SD card full alarm: ENTEXT_1.3.6.1.4.1.2011.5.25.31.2.0.17 hwEntityExtDiskFull.

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 model is SDSDQAE-064G, the capacity is 64 GB, and dimensions (H x W x D) are 1 mm x 15 mm x 11 mm (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 USG is powered on or off. If the USG is powered off, skip the **sd-card offline** command. The following procedure guides you through micro SD card replacement while the USG is powered on.

Tools

- Phillips screwdriver
- ESD wrist strap

Procedure

Step 1 Ensure that all configurations are saved.

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

☐ **NOTE**

- Before replacing a micro SD card, run the **sd-card 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 4-4 Removing a micro SD card

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

☐ **NOTE**

- Note that the micro SD card must be installed with the face with words upwards.
- Do not use too much force; otherwise the micro SD or micro SD card slot might be damaged.

1. Insert the micro SD along the guide rail to the micro SD card slot.
2. When you hear a click, the micro SD card is in position.
3. Hook the locating hook on the anti-theft board to the locating hole of the rear panel and tighten the captive screw on the anti-theft board.

Figure 4-5 Installing the new micro SD card and anti-theft board

Step 4 In any view, run the **display sd-card information** command to check the micro SD card installation and file system mounting status. In the command output, **SD Card Physical State** should be **Present**, and **SD Card File System State** should be **Mounted**.

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

- If **SD Card File System State** is **Unmounted**, the micro SD card format might not be **ext4.** You need to run the **reset sd-card** command in the system view to format the micro SD card.

----End

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.

4.5 Replacing a Device

Context

When a fault occurs on the USG device, such as a memory fault, CPLD fault, or startup failure, you can replace the USG device to rectify the fault.

Precautions

Pay attention to the following during device replacement:

- If a device can still be started, save and back up the configuration data before powering off the device. Otherwise, the configuration will be lost.
- To prevent a USG device from falling down, hold the device tightly with both hands while removing or installing it.
- Be careful of the heat when replacing the USG device.

Preparing Tools

- ESD wrist strap or ESD gloves
- Phillips screwdriver

Replacing a device

Step 1 Determine the installation position of the USG device to be replaced and attach a replacement label on the panel of the device to avoid misoperations.

Step 2 Wear an ESD wrist strap or ESD gloves.

Step 3 Disconnect the power supply device from the USG device to be replaced. When the PWR indicator on the USG device is off, you can proceed with subsequent operations.

Step 4 Remove the cables from the USG device to be replaced and attach labels that specify interface numbers to the cables.

> 📖 **NOTE**
>
> Remove the power cables, service cables, and ground cables from the USG device to be replaced in sequence.

Step 5 Remove the USG device to be replaced.

For a device installed in a cabinet, perform the following steps to remove it:

1. Use a Phillips screwdriver to loosen the M6 screws on the mounting ears at both ends of the USG device.
2. Hold the USG device with both hands. Place the removed USG device in an ESD bag or on an ESD pad.

Figure 4-6 Removing a device from the cabinet

Step 6 Install the new USG device, connect the cables according to the labels, and then power on the USG device. For details, see Hardware Installation.

----End

Follow-up Procedure

After replacing the device, pack up all the tools. If the old USG device is faulty, fill in the **Repair Transmission Sheet** and send the faulty device with the Repair Transmission Sheet to the equipment supplier or the specified repair service provider.

A Appendix

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

A.1 Quick Reference Tables of Power Cables

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

Table A-1 AC power cables for the power adapters directly connected to the socket

Part Number	Description	Image
0404 3491	External Power Cable, Power Cable 250V2.5A,2m,2X0.75mm^2,Black,PASM,227IEC53-0.75^2(2C)-I,C7SF	
0404 4216	Power cord,Europe AC Power 250V2,2.0m,PCSM, (H03VVH2F-0.5^2(2C)),C7SF,black	

Part Number	Description	Image
0404 4496	Power Cords Cable,Japan AC Power 125V7A,2.0m,PASM,VCTFK-0.75^2(2C),C7SF,Black	
0404 4497	Power Cable,America AC Power Cable 125V7A,2.0m,PASM,18NISPT-1(2C),C7SF,Black	
0404 5094	Power Cords Cable,India AC Power 250V2.5A,2.0m,PC-IISM,IS 694-0.75^2(2C),C7S,250V,2.5A, Black	
0405 0956	Power Cord Cable,Brazil AC Power Cable,250V2.5A,2m,PC-IIISM,H05VVH2-F 2*0.75^2(2C),C7SF,250V,2.5A,Black	

Part Number	Description	Image
0405 1081	Power cord,BS546 250V2.5A,2m,PD-IAM,H03VVH2-F-0.75mm^2(2C),C7SF,250V,2.5A,Black	
0405 1997	Power cord,2m,IRAM2063 Straight Male,H05VVH2-F 2*0.75^2(2C),C7 Straight Female,250V,2.5A,BLACK	
0405 G025	Power Cords Cable,South Africa AC Power 250V2.5A,2m,PDAM,H03VVH2-F-0.75^2(2C),C7SF	

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

Table A-2 AC power cables for the power modules directly connected to the socket

Part Number	Description	Image
0402 0728	Power Cable,America AC Power Cable,125V10A,3.0m,PBSM,18 SJT(3C),C13SF,Black	
0404 0887	Power Cable,Japan AC Power Cable 125V12A,3.0m,PBSM,HVCTF-1. 25mm^2(3C),C13SF,Black	
0404 0888	Power Cords Cable,Australia AC Power Cable,250V 10A,3.0m,PISM,H05VV- F-1.0mm^2(3C),C13SF,Black	

Part Number	Description	Image
0404 0889	Power cord,BS546 250V10A,3.0m,PM-IAM,H05VV-F-1.5mm^2(3C),C13SF,250V,10A,Black	
0404 0890	Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM ,H05VV-F-1.0mm^2(3C),C13SF,Black	
0404 1056	Power cord,Europe AC Power Cable,250V10A,3.0m,PFSM, (H05VVF 1.0^2(3C)),C13SF,250V,10A,BLack	

Part Number	Description	Image
0404 1117	Power Cable,Britain AC Power Cable 250V10A,3.0m,PGAM ,H05VV-F-1.0mm^2(3C),C13AF-L,Black	
0404 1120	Power Cable,Italy AC Power Cable 250V10A,3.0m,PLSM,H05VV-F-1.0mm^2(3C),C13SF,Black	
0404 2697	Power Cords Cable,China AC Power 250V10A,10.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	

Part Number	Description	Image
0404 2699	Power Cords Cable,China AC Power 250V10A,20.0m,PISM,227IEC53-1.0^2(3C),C13SF,Black	
0404 7785	Power Cords Cable,Argentina AC Power 250V10A,3.0m,PISM,H05VV-F-1.0mm^2(3C),C13SF,Black	
0405 0139	Power Cords Cable,China AC Power Cable,250V10A,3m,PISM,227IEC53-1.0^2(3C),C13SF,Black	
0405 0206	Power Cable,China AC Power Cable 250V10A,1.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	
0405 0517	Power Cable,China AC Power Cable 250V10A,2.0m,PISM,227IEC53(RVV)1.0mm^2(3C),C13SF,Black	

Part Number	Description	Image
0405 0955	Power Cords Cable,China AC Power,250V10A,1.5m,PISM,227 IEC53(RVV)1.0mm^2(3C),C13S F,250V,10A,Black	
0405 1035	Power cord,India AC Power 250V6A,3m,PM-IIAM,IS 694-1.0^2(3C),C13 SF,250V,6A,Black	
0405 1080	Power cord,South Africa AC Power 250V10A,3m,PMAM,H05VV-F-1.0mm^2(3C),C13SF,250V,10A,Black	

Part Number	Description	Image
0405 G028	Power Cords Cable,Korea AC Power 250V10A,3m,PFSM,H05VV-F 3*1.0^2(3C),C13SF,Black	
0405 G02K	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 A-3 AC power cables for the power modules directly connected to the PDU

Part Number	Description	Image
0405 0188	Power Cords Cable,China AC Power 250V10A,1.5m,C14SM,227IEC53(RVV)1.0mm^2(3C),C13SF,PDU Cable	
0405 0846	Power cord,China AC Power Cable,250V10A,3.0m,C14SM,(227IEC53-1.0^2(3C)),C13SF,250V,10A,Black,PDU Cable	
0405 0847	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
0405 G019	Power Cords Cable,Europe AC 250V10A,1.8m,C14SM,H05VV-F- 3*1.00^2,C13SF,PDU Cable	
0405 G029	Power Cords Cable,North America AC Power 250V10A,1.8m,C14SM,SJT 18AWG(3C),C13SF,PDU Cable	
0405 G02D	Power Cords Cable,Japan AC Power 250V12A,1.8m,C14SM,HVCTF 1.25^2(3C),C13SF,PDU Cable	

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

A.2 Requirements for Installation Environment

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

A.2.1 Device Position

This section describes the USG position requirements to ensure its security.

Table A-4 lists the requirements for the device position.

Table A-4 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.

Item	Requirement
Stability	The cabinet or mounting table must be firm enough to support the weight of the device and its accessories.
Grounding	Ensure that the chassis or mounting table is properly grounded.

A.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 USG and its components, check that the equipment room meets the requirements.

Ensure that there is no explosive, conductive, magnetic, or corrosive dust or debris in the equipment room. Dust that settle on the device may cause electrostatic adsorption, resulting in poor contact of the metal socket connectors and metal contacts. This shortens the life cycle of the device and causes faults.

In addition to dust and debris, toxic gases, such as SO_2, H_2S, and NH_3 must be cleaned out of the equipment room.

Table A-5 Requirements for humidity, temperature, and cleanness in the equipment room

Item		Description							
Cleanne ss	Dust particl e	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	
	Noxio us gas densit y	Gas	SO_2	H_2S	Cl_2	HCl	HF	NH_3	O 3	NO 2
		Average (mg/m³)	0.3	0.1	0.1	0.1	0.0 1	1.0	0. 05	0.5
		Maximum (mg/m³)	1.0	0.5	0.3	0.5	0.0 3	3.0	0. 1	1.0
Humidit y and tempera ture	Temp eratur e	Long-term operating temperatu re							

Item	Description	
	Short-term operating temperature	
	Operating humidity	
	Storage humidity	

To meet the requirements listed in **Table A-5**, take the following measures in the equipment room:

- Install a permanent temperature controller regardless of the climate conditions.

- In dry regions, use humidifiers or regularly mop the floor to ensure proper humidity in the equipment room.

- In regions with high humidity, use dehumidifiers.

- Use dust-free materials for the floor, walls, and ceilings.

- Screen exterior doors and windows. The external windows of the equipment room should be sealed for anti-dust purposes.

- Clean the equipment room and air filters on the devices once every three months.

- Wear the ESD uniform, ESD gloves, and ESD shoes before entering the equipment room.

- Locate the equipment room far away from areas with dense corrosive gases, such as chemical plants.

- The air intake vent of the equipment room must not face any pollution source.

- Place batteries in a different room from the devices.

- Invite professionals to measure the temperature, humidity, and other factors periodically.

A.2.3 ESD Requirements

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

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

- Provide operators with ESD protection training.

- Adjust the humidity to reduce the impact of static electricity.

- Install an ESD floor in the equipment room.

- Wear an antistatic suit, ESD gloves, and antistatic shoes before entering the equipment room.

- Use ESD tools, such as ESD wrist straps, ESD tweezers, and extractors.
- All the conductors in the equipment room, including computer terminals, must be properly grounded. Set up an antistatic workbench.
- Electrostatic sources, such as non-ESD plastic bags, non-ESD foam, and rubber objects must be kept at least 30 cm away from ESD-sensitive components and boards.

To protect the USG boards from damage caused by static electricity discharge, take the following measures:

- Ensure that the USG is properly grounded according to the grounding requirements.
- Wear an ESD wrist strap before performing any operations on the USG.
- Ensure proper contact between the metal buckle of the ESD wrist strap and the operator's skin. Ensure that the other end of the ESD wrist strap is already connected to the ESD jack on the USG, as shown in **Figure A-1**. In addition, wearing ESD gloves is recommended.

Figure A-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.

A.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 USG.

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

Table A-6 Lightning protection and grounding requirements

Item	Requirement
Civil construction of the equipment room	The equipment room should be built of reinforced concrete. The equipment room should be equipped with lightning protection devices, such as a lightning arrester. The lightning protection ground for the equipment room (the grounding of the lightning arrester) should share the same grounding conductor with the protection ground of the equipment room.
AC power system (TN-S power supply recommended)	A dedicated transformer should be used at a communications station. Power cables that are connected to the communications station should be buried with metal jackets or insulated jackets passing through steel pipes. Both sides of the metal jackets or steel pipes are connected to the nearest ground bar. The length of the buried power cables should be no less than 15 meters. The three phase lines at the low-voltage side of the AC transformer at the communications station should each be installed with a closed zinc-oxide lightning arrester for grounding. The enclosure of the transformer, AC zero wire of the low-voltage side of the transformer, and the metal outer protector of the power cable connected to the transformer enclosure must be connected to the nearest grounding post.

Item	Requirement
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.
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.

Item	Requirement
Grounding resistance	Less than 1 Ohm
	The upper end of the ground body must be no less than 0.7 m from the ground. In cold regions, the ground body should be buried under the frozen soil layer.
	Measure the grounding resistance periodically to ensure that the grounding works properly.
Signal cable layout	No overhead signal cable should exist in the communications station. Signal cables should be led into the station from underground.
	The communications cables led into or out of the communication station should be protected with metal sheaths or laid out in metal pipes.
	The ground cable of a lightning arrester should be as short as possible. The unused wire pairs in the cables should be grounded in the equipment room.
Collective ground cable	The main earthing conductor can be a cable grounding ring or busbar.
	Do not use aluminum materials as ground cables. Avoid electrochemical corrosion when different types of metals are interconnected.
	Generally, a copper busbar with a cross-sectional area of no less than 120 mm^2 or galvanized steel with the same resistance is used as the main earthing conductor. The main earthing conductor must be insulated from the reinforcing steel bar in the building.
Grounding lead-in cable	The grounding lead-in cable must be no longer than 30 m. The grounding lead-in cable should use galvanized steel with a cross-sectional area of 40 mm x 4 mm or 50 mm x 5 mm.

A.2.5 Power Supply

Normal power supply is the prerequisite for proper running of the USG. This section describes the requirements for power supply.

Basic AC Power Supply

The AC power supply system that consists of mains, uninterruptible power supply (UPS), and self-provided generators should supply power in centralized mode. The power supply system should meet the needs of the communications station, and its cabling should be as simple as possible to facilitate operation and maintenance. The low-voltage AC power supply system should use 3-phase 5-wire or 1-phase 3-wire for power supply. **Table A-7** lists the low-voltage AC nominal voltage and frequency.

Table A-7 AC voltage and frequency

Nominal Voltage	Rated Frequency
110/127/220 (V)	50Hz/60Hz

In common cases, the UPS serves as the backup power supply for network products. The backup power supply must be the same as the mains in phases, and the duration for the switchover between the UPS and the mains should be less than 10 ms. Otherwise, the device might restart or be reset. Each device must have an independent AC surge protector. The capacity of the surge protector for the power distribution room must be greater than the sum of the operating current and fault current on the devices to be powered. The DC power supply system must be able to safely withstand the maximum load of the device, regardless of whether the device is in working or standby state. The wire type and gauge of each outlet of the power distribution panel must be able to withstand the maximum power load of the devices. The specifications for the AC power supply voltage of all communications and power supply devices are as follows:

- Communications devices must be equipped with AC power supply with the rated voltage ranging from +5% to -10%.

- Communications power supply devices and key constructions must be equipped with AC power supply with the rated voltage ranging from +10% to -15%.

- The frequency of the AC power current ranges from +4% to -4%, and the sinusoidal distortion rate of voltage waveform must be 5% or less.

The self-provided generator sets in the communications station must be automatic in activation, deactivation, and replenishment, be equipped with remote signaling, remote measurement, and remote control, and provide standard interfaces and communications protocols.

The power cables used for AC and DC power distribution should comply with the following specifications:

- The AC neutral for communications purposes must be a conductive wire that has the same cross section as the phase cable.

- The selection of the DC power feeder depends on the long-term load. If the cross-sectional area is greater than 95 mm^2, use the rigid busbar. If the short-term load differs greatly from long-term load, lay out the cables by stages.

- The DC and AC conducting wires must be fire resistant and the wiring must comply with the *Class A Fire Resistance Design Norm for High-Rise Civil Buildings* (GB50045-95). The low-voltage power distribution facilities must comply with the *Low-Voltage Power Distribution Facilities and Wiring Design Norm* (GB50054-95)

In addition, the basic AC power supply system should meet the following requirements:

- Use voltage regulating or stabilization facilities to restrict the voltage fluctuation within a reasonable scale if:

  – The communications devices are powered by mains, and the voltage exceeds the rated voltage by +5% to -10% or the allowed voltage range.

- – The communications devices are not powered directly by the mains and the voltage of the mains exceeds the rated voltage by +10% to -15% or the AC voltage range allowed by the DC power supply device.
- Use the UPS or inverter power supply system if the communication load requires non-interruptible and non-transient AC power supply.
- Equip the site with the electric generator set to ensure normal communication in case of mains failure. The capacity of the generator set is greater than or equal to 1.5 to 2 times the capacity of the UPS.
- A UPS usually has only one batter set. Connect two or more UPSs in parallel or series for redundancy. If the inverter or UPS is used, configure the inverter or UPS that provides the maximum amount of power as the active one, and configure another inverter or UPS as the standby.

Basic DC Power Supply

Ensure the reliability of the DC power supply system at the communications site. Deploy the power supply device as close as possible to the communications devices so as to shorten the power feeder and lower the circuit voltage drop between the battery port and device port to less than 3.2 V, thereby reducing installation costs and power consumption.

Use two or more independent power supply systems if the communication volume is large or if more than two switching systems are deployed at the site.

For large communications hubs, deploy an independent power supply system on each floor, each providing power for the communications equipment room on this floor. Medium-sized communications stations can be centrally powered by a power room or storage battery room, or powered in a decentralized manner. For small-sized communications stations, the power supply system can be deployed in the same equipment room as the communications devices, but you must take appropriate measures to ensure that the corrosive gases discharged by the batteries in the equipment room do not corrode the circuit boards of communications devices.

Table A-8 lists the DC power supply specifications.

Table A-8 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.

Item	Specifications
On/Off overshoot magnitude	Within the 95% to 105% range of the DC rated voltage value
Peak-to-peak noise voltage	Less than or equal to 200 mV
Dynamic response	The recovery time should be less than 200 ms, and the overshoot must be within the 95% to 105% range of the DC voltage set value.

The following are suggestions for the basic DC power supply system:

- Decentralized power supply is recommended. Use multiple DC power supply systems and multiple power sources.

- Use a standard-compliant DC power supply. The output voltage of the communications power supply must be in the voltage range of the device to be powered.

- Improve the reliability of the AC power supply system to properly reduce the battery capacity. When it is difficult to improve the reliability of the AC power supply system at a small communications station, properly increase the battery capacity.

- The total capacity configuration of the high-frequency switch rectifier should match the communications load power and battery charging power. Rectifier modules should use a redundancy configuration. If the number of active modules is less than or equal to 10, one standby module should be deployed. If the number of active modules is greater than 10, one standby module should be deployed for every 10 active modules.

- Storage batteries should be installed in two or multiple sets. The total capacity depends on the duration in which the storage battery sets independently supply power to the load. For most communications stations, storage battery sets should supply power for at least one hour.

A.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 USG.

Possible interference sources are as follows:
- Capacitive coupling
- Inductance coupling
- Electromagnetic radiation
- Common impedance (including the PGND system) coupling

To reduce as much interference as possible, complete the following steps:
- Take effective measures to avoid possible power grid interference to the power supply system.

- Do not use the power line ground or lightning protection ground as the working ground of the device, and leave as much space as possible between the working ground of the device and the power line ground or lightning protection ground.
- Ensure that no high-power radio transmitter, radar transmitter, or high-frequency high-current device is deployed nearby.
- Take electromagnetic protection measures if necessary.

A.3 Fault Tag

*Customer name:										
Address:										
Contact person:										
Tel.:			Fax:							
Category*: □ Replacement □ Repair □ Analysis										
RMA code/SR*	Bom Code*	SN	Goods Description	Whether the Data in the Parts Removed	Fault Occurring Date*	Description of the Fault Phenomena*	Category No.*	Software Version	Customer Name	Property Owner*
				□ Yes □ No						
				□ Yes □ No						
				□ Yes □ No						
				□ Yes □ No						
Please help confirm the information below:										
1. If the above returned BOM Code has the function of saving data, please delete the data saved in this BOM Code before returning to Huawei or removing the storage medium, like HD or CF Card. □ Yes □ No										
2. Record any data that should be remained as follows:										
Definition of Huawei Category No.: F001–Wear out Damaged, F003–Dead on arrival of spare parts, F005–Active Batch replacement by R&D request, F006–Faulty parts from Customer's R&R request, F009–Damaged by irresistible natural force (such as Earthquake, Lightning strike, Ground sea, Rainstorm, Flood), F056–Internal Return, F060–Good parts Return for testing										

Note:

1. **Items marked with asterisks (*) are mandatory.**

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