Ruijie Cybrey RG-CS65 Series Switches

Installation Guide

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Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- Ruijie Networks website: https://www.ruijie.com/
- Online support center: https://www.ruijie.com/support
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Conventions

1. GUI Symbols

GUI Symbol	Description	Example
Boldface	1. Button names 2. Window names, tab name, field name and menu items 3. Link	1. Click **OK**. 2. Select **Config Wizard**. 3. Click the **Download File** link.
>	Multi-level menu items	Choose System > Time.

2. Signs

The signs used in this document are described as follows:

Danger

An alert that calls attention to safety operation instructions that if not understood or followed when operating the device can result in physical injury.

Warning

An alert that calls attention to important rules and information that if not understood or followed can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information that if not understood or followed can result in function failure or performance degradation.

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

An alert that contains a description of product or version support.

3. Note

This document provides the installation steps, troubleshooting, technical specifications, as well as the specifications and use guidelines of cables and connectors. It is intended for users who want to understand the above contents, and are familiar with the installation and maintenance of networking hardware. Users are assumed to have reasonable knowledge of relevant terms and concepts.

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1 Overview

1.1 About the RG-CS65

Ruijie Cybrey RG-CS65 series switches are next-generation Layer 3 switches that deliver high performance, unified security, and multiple services. These switches are mainly applied to the aggregation layer to provide line-rate switching and comprehensive QoS policies for traffic prioritization, ensuring that critical data is transmitted without delay. The switches also support various Ethernet interfaces and provide flexible media options for various network deployment scenarios.

Three models are available currently.

Model	10/100/1000Base-T Port	1GE SFP Port	10GE SFP+ Port	25GE SFP28 Ports	40GE QSFP+ Ports	RPS	Fan	Heat Dissipation
RG-CS65-24SFP/8GT4XS-D	8 (8 x combo ports)	24 (8 x combo ports)	4	N/A	N/A	1+1	3 x hot-swappable fan module	Left-to-rear and front-to-rear airflow
RG-CS65-12XS4VS2QXS-D	N/A	N/A	12	4	2	1+1	4 x hot-swappable fan module	Left-to-rear and front-to-rear airflow
RG-CS65-24XS8VS2QXS-D	N/A	N/A	24	8	2	1+1	4 x hot-swappable fan module	Left-to-rear and front-to-rear airflow

Note

The product images shown below are for reference only. The actual product may differ.

1.2 RG-CS65-24SFP/8GT4XS-D

1.2.1 Equipment Appearance

1. Front Panel

Figure1-1 Front Panel

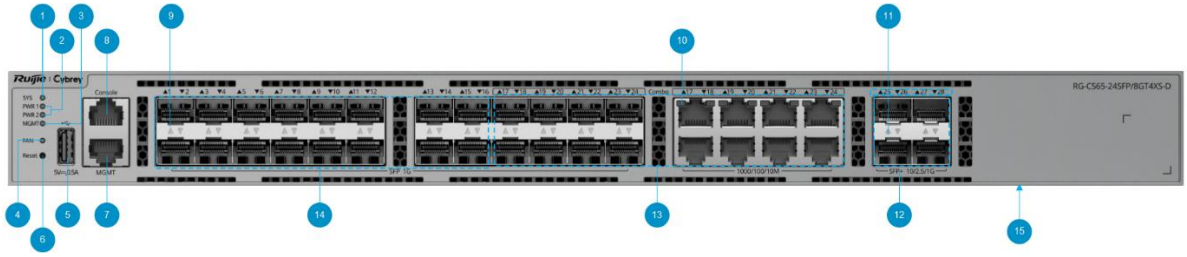


Table1-1 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table1-3 LED Description.
2	PWR1/ PWR2	PWR LED	Used for indicating the power status. For details, see Table1-3 LED Description.
3	MGMT	MGMT LED	Used for indicating the MGMT port status. For details, see Table1-3 LED Description.
4	FAN	FAN LED	Used for indicating the fan status. For details, see Table1-3 LED Description.
5	/	USB Port	Used for connecting a USB flash drive.
6	Reset	Reset Button	● If you hold the button for less than 2 seconds, the system reboots. ● If you hold the button for more than 5 seconds until the system status LED starts blinking, the system restores factory settings and reboots. **Note:** o If a device is in stack mode, pressing and holding the **Reset** button for more than 5 seconds restores the factory defaults and reboots the device. After the reboot, the device remains in stack mode. o To convert the device from stack mode to standalone mode, log in to the CLI of the device, run the **switch convert mode standalone** command, and enter **Y** when prompted. The device switches to standalone mode only after it restarts.
7	MGMT	MGMT Port	Management port
8	Console	Console Port	Used for connecting to the device serial console.
9	1–24	SFP optical port	Used for indicating the SFP optical port status. For

No.	Silkscreen	Component	Description
		LED	details, see Table1-3 LED Description.
10	17–24	Combo port LED	Used for indicating the combo port status. For details, see Table1-3 LED Description.
11	25–28	SFP+ optical port LED	Used for indicating the SFP+ optical port status. For details, see Table1-3 LED Description.
12	25–28	Fixed 10GE SFP+ port	Supports 1GE/2.5GE/10GE SFP transceivers
13	17–24	1GE combo port	Supports switching between 1GE optical port and 1GE Ethernet port on the combo port. The Ethernet port supports 1000M/100M/10M.
14	1–16	Fixed 1GE SFP port	Supports 1GE SFP transceivers
15	-	Product nameplate	Located at the bottom of the device

2. Rear Panel

Figure1-2 Rear Panel



Table1-2 Components on the Rear Panel

No.	Component	Description
1	Grounding screw	Used for securing the grounding lug to ensure a reliable connection between the chassis and the ground.
2	Hot-swappable fan module slot	Used for installing fan modules.
3	Hot-swappable power module slot	Used for installing hot-swappable power modules.

3. Status LEDs

Table1-3 LED Description

Silkscreen	Component	Description
SYS	SYS LED	● Off: The switch is not powered on. ● Solid green: The switch is powered on and operating normally. ● Fast blinking green: The system is upgrading or starting up and cannot operate normally. ● Blinking red: A system fault has occurred, the redundant power module is faulty, the fan module is faulty, or a switch loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold, or the fan module is not present.
PWR1/PWR2	PWR LED	● Off: All power modules are not present. ● Solid green: The power modules are present and supplying power normally. ● Solid red: The redundant power module is faulty.
MGMT	MGMT LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.
FAN	FAN LED	● Solid green: All fan modules are properly installed and operating normally. ● Solid yellow: One or more fan modules are not properly seated. ● Solid red: Fan modules are present, but one or more fan modules are faulty, or an unsupported fan module is installed.
1–24	SFP optical port LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.
17–24	Combo port LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.
25–28	SFP+ optical port LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.

1.2.2 Technical Specifications

Table1-4 Technical Specifications

System Specifications	CPU	Quad Core ARMv8 Cortex-A72 CPU frequency up to 2000 MHz
	BootROM	16 MB

	Flash memory	1 GB
	SDRAM	4 GB + 8 bit ECC
	Switch buffer	32 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	● 24 x 1GE SFP ports Ports 17 to 24 are 10/100/1000BASE-T combo ports ● 4 x 1GE/2.5GE/10GE SFP+ ports
	Module slot	3 x hot-swappable fan module slots 2 x hot-swappable power module slots
	Console port	1
	MGMT port	1
	USB port	1
	Status LED	● 1 x MGMT LED ● 1 x system status LED ● 2 x PWR LEDs ● 1 x FAN LED ● 24 x 1GE SFP port LEDs ● 8 x 10/100/1000BASE-T port LEDs ● 4 x 1GE/2.5GE/10GE SFP+ port LEDs
Power Supply and Consumption	Power supply	2 x hot-swappable power modules (no pre-installed modules)
	Power module	RG-PA150IB-FC
	Power Input	AC input ● Rated input voltage: 100 V AC to 240 V AC, 50 Hz to 60 Hz ● Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz ● Maximum input current: 3 A
	Maximum power consumption	99 W (when the input power is 220 V) 100 W (when the input power is 110 V)
	PoE	Not supported
Dimensions and Weight	Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm (17.40 in. x 16.54 in. x 1.72 in.)
	Weight	5.40 kg (11.90 lbs)
	Shipping dimensions (W x D x H)	570 mm × 565 mm × 225 mm (22.44 in. × 22.24 in. × 8.86 in.)
	Shipping weight	8.01 kg (17.66 lbs)

	Rack height	1 RU
Environment and Reliability	Operating temperature	0°C to 50°C (32°F to 122°F)
	Operating humidity	10% to 90% RH (non-condensing)
	Storage temperature	–40°C to +70°C (–40°F to +158°F)
	Storage humidity	5% to 95% RH (non-condensing)
	Altitude	0 m to 5,000 m (0 ft. to 16,404.2 ft.)
	Mean Time Between Failures (MTBF)	> 400,000 hours
	Fan	3 x hot-swappable fan modules (3 pre-installed modules)
	Heat dissipation	Air cooling, front-to-rear and left-to-rear airflow
	Energy saving	Supported
	Acoustic noise	< 40 dB at 27°C (80.6°F)
	Hot swapping of cables	Supported
	Hot swapping of power modules	Supported
Certification and Regulatory Compliance	Safety regulations	IEC 62368-1, EN 62368-1
	EMC certifications	EN 300386, EN 55032 Class A, EN 55035, EN IEC 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN IEC 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN IEC 61000-4-11
	Related standard compliance	CE CB

Warning

- Operation of this equipment in a residential environment could cause radio interference.
- This equipment has a built-in CR2032 lithium battery. There is a risk of explosion if the battery is replaced by an incorrect type. If the battery is damaged, replace the battery only with the same or equivalent type. Dispose used batteries according to the local laws and regulations regarding safe disposal of lithium batteries.

1.3 RG-CS65-12XS4VS2QXS-D

1.3.1 Equipment Appearance

1. Front Panel

Figure1-3 Front Panel

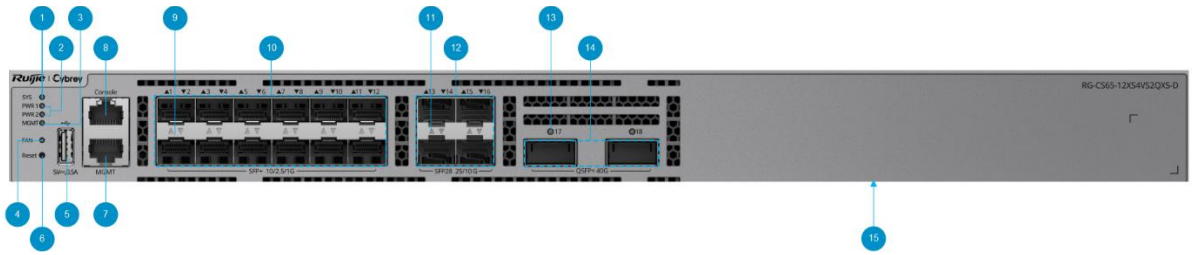


Table1-5 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table1-7 LED Description.
2	PWR1/ PWR2	PWR LED	Used for indicating the power status. For details, see Table1-7 LED Description.
3	MGMT	MGMT LED	Used for indicating the MGMT port status. For details, see Table1-7 LED Description.
4	FAN	FAN LED	Used for indicating the fan status. For details, see Table1-7 LED Description.
5	/	USB Port	Used for connecting a USB flash drive.
6	Reset	Reset Button	● If you hold the button for less than 2 seconds, the system reboots. ● If you hold the button for more than 5 seconds until the system status LED starts blinking, the system restores factory settings and reboots. **Note:** ○ If a device is in stack mode, pressing and holding the **Reset** button for more than 5 seconds restores the factory defaults and reboots the device. After the reboot, the device remains in stack mode. ○ To convert the device from stack mode to standalone mode, log in to the CLI of the device, run the **switch convert mode standalone** command, and enter **Y** when prompted. The device switches to standalone mode only after it restarts.
7	MGMT	MGMT Port	Management port
8	Console	Console Port	Used for connecting to the device serial console.

No.	Silkscreen	Component	Description
9	1–12	SFP+ optical port LED	Used for indicating the optical port status. For details, see Table1-7 LED Description.
10	1–12	10GE SFP+ port	Supports 1GE/2.5GE/10GE SFP+ transceivers
11	13–16	25GE SFP28 optical port LED	Used for indicating the optical port status. For details, see Table1-7 LED Description.
12	13–16	25GE SFP28 port	Supports 10GE/25GE SFP28 transceivers Note: The four 10GE/25GE SFP28 ports cannot operate in mixed 10GE and 25GE rate modes at the same time.
13	17–18	40GE QSFP+ optical port LED	Used for indicating the optical module port status. For details, see Table1-7 LED Description.
14	17–18	40GE QSFP+ port	Supports 40GE QSFP+ transceivers or 4 x 10GE SFP+ transceivers
15	-	Product nameplate	Located at the bottom of the device

2. Rear Panel

Figure1-4 Rear Panel

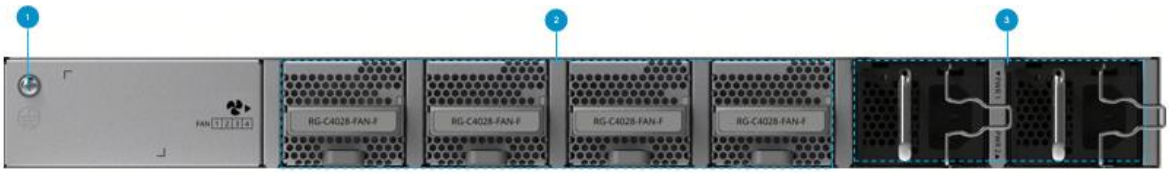


Table1-6 Components on the Rear Panel

No.	Component	Description
1	Grounding screw	Used for securing the grounding lug to ensure a reliable connection between the chassis and the ground.
2	Hot-swappable fan module slot	Used for installing fan modules.
3	Hot-swappable power module slot	Used for installing hot-swappable power modules.

3. Status LEDs

Table1-7 LED Description

Silkscreen	Component	Description
SYS	SYS LED	● Off: The switch is not powered on. ● Solid green: The switch is powered on and operating normally. ● Fast blinking green: The system is upgrading or starting up and cannot operate normally. ● Blinking red: A system fault has occurred, the redundant power module is faulty, the fan module is faulty, or a switch loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold, or the fan module is not present.
PWR1/PWR2	PWR LED	● Off: All power modules are not present. ● Solid green: The power modules are present and supplying power normally. ● Solid red: The redundant power module is faulty.
MGMT	MGMT LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.
FAN	FAN LED	● Solid green: All fan modules are properly installed and operating normally. ● Solid yellow: One or more fan modules are not properly seated. ● Solid red: Fan modules are present, but one or more fan modules are faulty, or an unsupported fan module is installed.
1–18	Optical port LED	● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.

1.3.2 Technical Specifications

Table1-8 Technical Specifications

System Specifications	CPU	Quad Core ARMv8 Cortex-A72 CPU frequency up to 2000 MHz
	BootROM	16 MB
	Flash memory	1 GB
	SDRAM	4 GB + 8 bit ECC
	Switch buffer	32 Mbit

	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	● 12 x 1GE/2.5GE/10GE SFP+ ports ● 4 x 10GE/25GE SFP28 ports ● 2 x 40GE QSFP+ ports Note: The four 10GE/25GE SFP28 ports cannot operate in mixed 10GE and 25GE rate modes at the same time.
	Module slot	4 x hot-swappable fan module slots 2 x hot-swappable power module slots
	Console port	1
	MGMT port	1
	USB port	1
	Status LED	● 1 x system status LED ● 2 x PWR LEDs ● 1 x FAN LED ● 12 x 1GE/2.5GE/10GE SFP+ port LEDs ● 4 x 10GE/25GE SFP28 port LEDs ● 2 x 40GE QSFP+ port LEDs
Power Supply and Consumption	Power supply	2 x hot-swappable power modules (no pre-installed modules)
	Power module	RG-PA150IB-FC
	Power Input	AC input ● Rated input voltage: 100 V AC to 240 V AC, 50 Hz to 60 Hz ● Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz ● Maximum input current: 3 A
	Maximum power consumption	104 W (when the input power is 220 V) 105 W (when the input power is 110 V)
	PoE	Not supported
Dimensions and Weight	Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm (17.40 in. x 16.54 in. x 1.72 in.)
	Weight	5.81 kg (12.81 lbs)
	Shipping dimensions (W x D x H)	570 mm × 565 mm × 225 mm (22.44 in. × 22.24 in. × 8.86 in.)
	Shipping weight	8.45 kg (18.63 lbs)
	Rack height	1 RU

Environment and Reliability	Operating temperature	0°C to 50°C (32°F to 122°F)
	Storage temperature	–40°C to +70°C (–40°F to +158°F)
	Operating humidity	10% to 90% RH (non-condensing)
	Storage humidity	5% to 95% RH (non-condensing)
	Altitude	0 m to 5,000 m (0 ft. to 16,404.2 ft.)
	MTBF	> 400,000 hours
	Fan	4 x hot-swappable fan modules (4 pre-installed modules)
	Heat dissipation	Air cooling, front-to-rear and left-to-rear airflow
	Energy saving	N/A
	Acoustic noise	< 40 dB at 27°C (80.6°F)
	Hot swapping of cables	Supported
	Hot swapping of power modules	Supported
Certification and Regulatory Compliance	Safety regulations	IEC 62368-1, EN 62368-1
	EMC certifications	EN 300386, EN 55032 Class A, EN 55035, EN IEC 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN IEC 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN IEC 61000-4-11
	Related standard compliance	CE CB

Warning

- Operation of this equipment in a residential environment could cause radio interference.
- This equipment has a built-in CR2032 lithium battery. There is a risk of explosion if the battery is replaced by an incorrect type. If the battery is damaged, replace the battery only with the same or equivalent type. Dispose used batteries according to the local laws and regulations regarding safe disposal of lithium batteries.

1.4 RG-CS65-24XS8VS2QXS-D

1.4.1 Equipment Appearance

1. Front Panel

Figure1-5 Front Panel

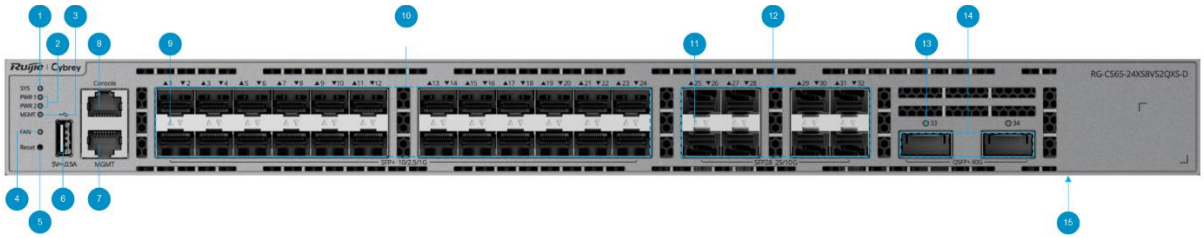


Table1-9 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table1-11 LED Description.
2	PWR1/ PWR2	PWR LED	Used for indicating the power status. For details, see Table1-11 LED Description.
3	MGMT	MGMT LED	Used for indicating the MGMT port status. For details, see Table1-11 LED Description.
4	FAN	FAN LED	Used for indicating the fan status. For details, see Table1-11 LED Description.
5	Reset	Reset Button	● If you hold the button for less than 2 seconds, the system reboots. ● If you hold the button for more than 5 seconds until the system status LED starts blinking, the system restores factory settings and reboots. **Note:** o If a device is in stack mode, pressing and holding the **Reset** button for more than 5 seconds restores the factory defaults and reboots the device. After the reboot, the device remains in stack mode. o To convert the device from stack mode to standalone mode, log in to the CLI of the device, run the **switch convert mode standalone** command, and enter **Y** when prompted. The device switches to standalone mode only after it restarts.
6	/	USB Port	Used for connecting a USB flash drive.
7	MGMT	MGMT Port	Management port
8	Console	Console Port	Used for connecting to the device serial console.

No.	Silkscreen	Component	Description
9	1–24	SFP+ optical port LED	Used for indicating the optical port status. For details, see Table1-11 LED Description.
10	1–24 (SFP+ 10GE/2.5GE/1GE)	SFP+ port	Supports 1GE/2.5GE/10GE SFP+ transceivers Note: Twenty-four SFP+ ports (1GE/2.5GE/10GE) are divided into six groups: ports 1–4, ports 5–8, ports 9–12, ports 13–16, ports 17–20, and ports 21–24. The four ports in each group must operate at the same rate. Mixed operation of 1GE, 2.5GE, and 10GE ports within the same group is not supported. Different rates can be configured independently for each group.
11	25–32	SFP28 optical port LED	Used for indicating the optical port status. For details, see Table1-11 LED Description.
12	25–32 (SFP28 25GE/10GE)	SFP28 optical port	Supports 10GE/25GE SFP28 transceivers Note: Eight SFP28 ports (10GE/25GE) are divided into two groups: ports 25–28 and ports 29–32. The four ports in each group must operate at the same rate. Mixed operation of 10GE and 25GE ports within the same group is not supported. Different rates can be configured independently for each group.
13	33–34	QSFP28 optical port LED	Used for indicating the optical module port status. For details, see Table1-11 LED Description.
14	33–34 (QSFP+40)	QSFP28 optical port	Supports 40GE QSFP28 transceivers
15	-	Product nameplate	Located at the bottom of the device

2. Rear Panel

Figure1-6 Rear Panel



Table1-10 Components on the Rear Panel

No.	Component	Description
1	Grounding screw	Used for securing the grounding lug to ensure a reliable connection between the chassis and the ground.
2	Hot-swappable fan module slot	Used for installing fan modules.
3	Hot-swappable power module slot	Used for installing hot-swappable power modules.

3. Status LEDs

Table1-11 LED Description

Silkscreen	Component	Description
SYS	SYS LED	Off: The switch is not powered on. Solid green: The switch is powered on and operating normally. Fast blinking green: The system is upgrading or starting up and cannot operate normally. Blinking red: A system fault has occurred, the redundant power module is faulty, the fan module is faulty, or a switch loop is detected. Blinking yellow: The operating temperature exceeds the preset threshold, or the fan module is not present.
PWR1/PWR2	PWR LED	Off: All power modules are not present. Solid green: The power modules are present and supplying power normally. Solid red: The redundant power module is faulty.
MGMT	MGMT LED	Off: The port link is down. Solid green: The port link is up. Blinking green: The port is receiving or sending data.
FAN	FAN LED	Solid green: All fan modules are properly installed and operating normally. Solid yellow: One or more fan modules are not properly seated. Solid red: Fan modules are present, but one or more fan modules are faulty, or an unsupported fan module is installed.
1–34	Optical port LED	Off: The port link is down.

Silkscreen	Component	Description
		Solid green: The port link is up. Blinking green: The port is receiving or sending data.

1.4.2 Technical Specifications

Table1-12 Technical Specifications

System Specifications	CPU	Quad Core ARMv8 Cortex-A72 CPU frequency up to 2000 MHz
	BootROM	16 MB
	Flash memory	1 GB
	SDRAM	4 GB + 8 bit ECC
	Switch buffer	64 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Module Slot	4 x fan module slots 2 x system power module slots
	Fixed service port	24x 1GE/2.5GE/10GE SFP+ ports 8 x 10GE/25GE SFP28 ports 2 x 40GE QSFP+ ports Note: ● Twenty-four SFP+ ports (1GE/2.5GE/10GE) are divided into six groups: ports 1–4, ports 5–8, ports 9–12, ports 13–16, ports 17–20, and ports 21–24. The four ports in each group must operate at the same rate. Mixed operation of 1GE, 2.5GE, and 10GE ports within the same group is not supported. Different rates can be configured independently for each group. ● Eight SFP28 ports (10GE/25GE) are divided into two groups: ports 25–28 and ports 29–32. The four ports in each group must operate at the same rate. Mixed operation of 10GE and 25GE ports within the same group is not supported. Different rates can be configured independently for each group.
	Power module	RG-PA550I-FC
	Console port	1
	MGMT port	1
	USB port	1

	Status LED	● 1 x System Status LED ● 2 x PWR LEDs ● 1 x FAN LED ● 1 x MGMT LED ● 24 x 10GE SFP port LEDs ● 8 x 10GE/25GE SFP port LEDs ● 2 x 10GE SFP port LEDs
Power Supply and Consumption	Power supply	2 x hot-swappable power modules (no pre-installed modules)
	Power input	RG-PA550I-FC (AC input): Rated input voltage: 100 V AC to 240 V AC, 50/60 Hz Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz Rated input current: 3.5 A to 7.2 A Maximum input current: 7.2 A
	Maximum power consumption	189 W (when the input power is 110 V) 186 W (when the input power is 220 V)
Dimensions and Weight	Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm (17.40 in. x 16.54 in. x 1.72 in.)
	Weight	5.90 kg (13.01 lbs)
	Shipping dimensions (W x D x H)	570 mm × 565 mm × 225 mm (22.44 in. × 22.24 in. × 8.86 in.)
	Shipping weight	8.10 kg (17.86 lbs)
	Rack height	1 RU
Environment and Reliability	Operating temperature	0°C to 50°C (32°F to 122°F)
	Storage temperature	–40°C to +70°C (–40°F to +158°F)
	Operating humidity	10% to 90% RH (non-condensing)
	Storage humidity	5% to 95% RH (non-condensing)
	MTBF	> 400,000 hours
	Fan	4 x hot-swappable fan modules (4 pre-installed modules)
	Energy saving	N/A
	Heat dissipation	Air cooling, front-to-rear and left-to-rear airflow
	Altitude	0 m to 5,000 m (0 ft. to 16,404.2 ft.)
	Acoustic noise	< 52 dB at 27°C (80.6°F)

	Cable hot swapping	Supported
Regulatory Compliance and Certifications	Safety regulation	IEC 62368-1 EN 62368-1
	EMC regulation	EN 300386, EN 55032 Class A, EN 55035, EN IEC 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
	Related standard compliance	CE CB

Warning

- Operation of this equipment in a residential environment could cause radio interference.
- This equipment has a built-in CR2032 lithium battery. There is a risk of explosion if the battery is replaced by an incorrect type. If the battery is damaged, replace the battery only with the same or equivalent type. Dispose used batteries according to the local laws and regulations regarding safe disposal of lithium batteries.

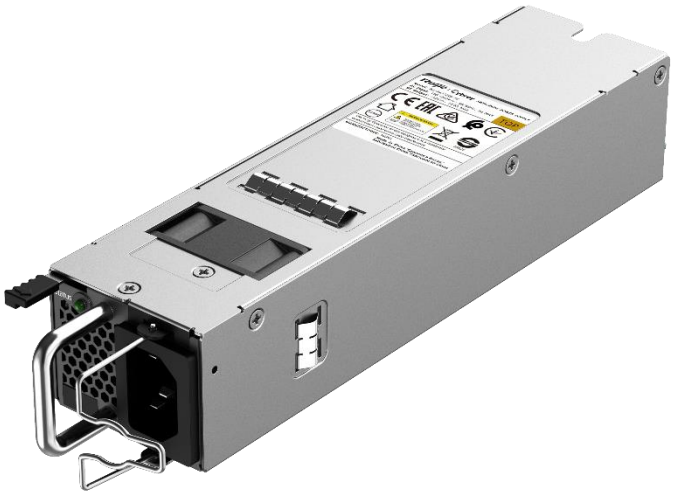
1.5 Power module

1.5.1 RG-PA150IB-FC

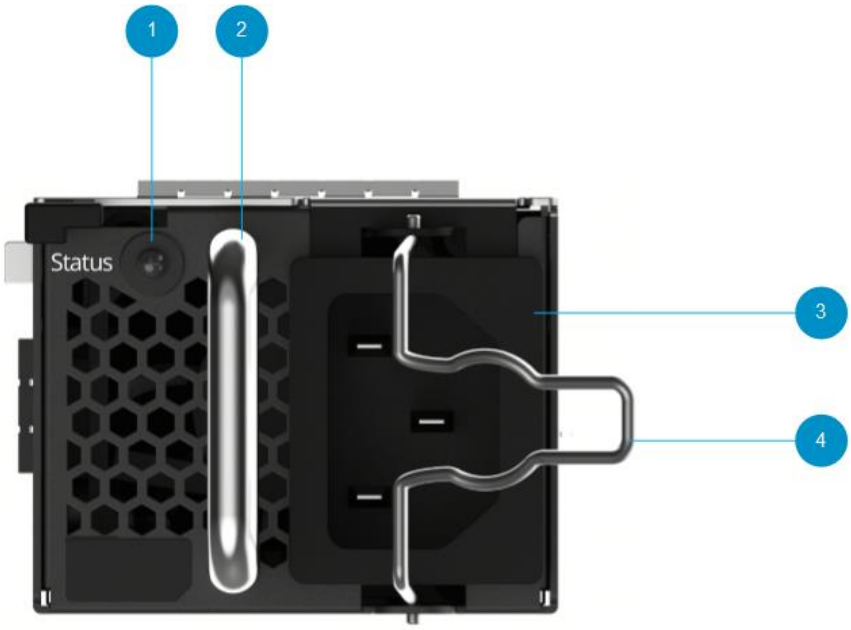
The RG-CS65-24SFP/8GT4XS-D and RG-CS65-12XS4VS2QXS-D switches support the RG-PA150IB-FC hot-swappable power module. The RG-PA150IB-FC is an AC module (AC input, DC output) that provides an output voltage of 12 V and an output power of up to 150 W.

At least one power module is required. If any slot is unoccupied, install a filler panel to ensure normal ventilation and avoid dust in the chassis.

1. Equipment Appearance



2. Front Panel



No.	Silkscreen	Component	Description
1	Status	Power status LED	Used for indicating the power module status.
2	/	Handle	Power module pull handle
3	/	AC input socket	100 V to 240 V power input

No.	Silkscreen	Component	Description
4	/	Power cord retention clip	Prevents accidental pulling of the power cord.

3. Status LEDs

Table1-13 LED Description

Silkscreen	Component	Description
Status	Power status LED	• Solid green: The power output is normal. • Off: The power module is not outputting power or the power output is abnormal.

4. Technical Specifications

Table1-14 Technical Specifications

Product Model	**RG-PA150IB-FC**
Rated Voltage Range	100 V to 240 V AC
Maximum Voltage Range	90 V to 264V AC
Maximum Output Power	150 W
Input Current	3 A
Leakage Current	3.5 mA
Status LEDs	1 x status LED
Dimensions (W x D x H)	196 mm x 50.5 mm x 40.0 mm (7.72 in. x 1.99 in. x 1.57 in.)
Weight	0.50 kg (1.10 lbs)
Operating Temperature	–10°C to +55°C (14°F to 131°F)
Storage Temperature	–40°C to +70°C (–40°F to +158°F)
Operating Humidity	10% RH to 90% RH (non-condensing)
Storage Humidity	5% RH to 95% RH (non-condensing)

Shipping weight	0.66 kg (1.46 lbs)

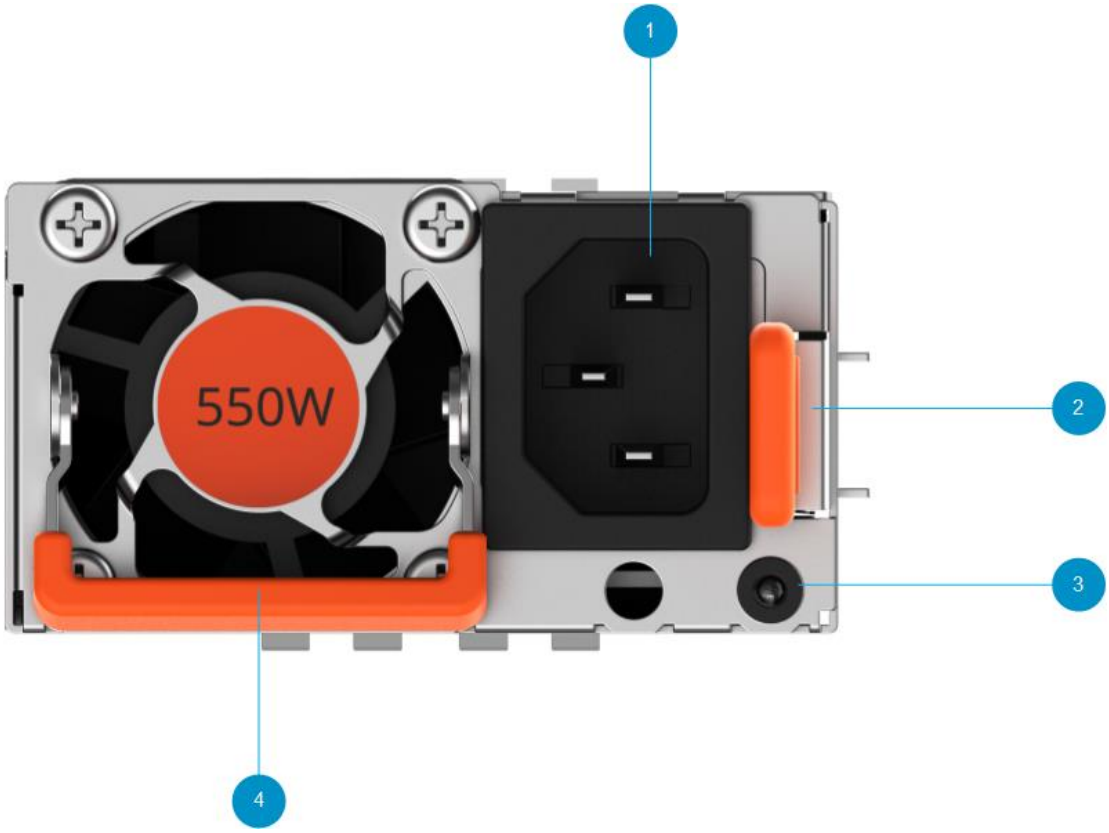
1.5.2 RG-PA550I-FC

The RG-CS65-24XS8VS2QXS-D switch supports the RG-PA550I-FC hot-swappable power module. The RG-PA550I-FC is an AC module (AC input, DC output) that provides an output voltage of 12 V and an output power of up to 550 W.

1. Equipment Appearance



2. Front Panel



No.	Silkscreen	Component	Description
1	/	AC input socket	100 V to 240 V power input
2	/	Latch	Used to secure and remove the power module.
3	Status	Power status LED	Used for indicating the power module status.
4	/	Handle	Power module pull handle

3. Status LEDs

Table1-15 LED Description

Silkscreen	Component	Description
Status	Power status LED	● Solid green: The power output is normal. ● Off: The power module is not outputting power or the power output is abnormal.

4. Technical Specifications

Table1-16 Technical Specifications

Product Model	**RG-PA550I-FC**
Rated Voltage Range	100 V to 240 V AC
Maximum Voltage Range	90 V to 264 V AC
Maximum Output Power	550 W
Input Current	7.2-3.5 A
Leakage Current	3.5 mA
Status LEDs	1 x status LED
Dimensions (W x D x H)	185 mm x 73.5 mm x 39 mm (7.28 in. x 2.89 in. x 1.54 in.)
Weight	0.80 kg (1.76 lbs)
Operating Temperature	–10°C to +55°C (14°F to 131°F)
Storage Temperature	–40°C to +70°C (–40°F to +158°F)
Operating Humidity	10% RH to 90% RH (non-condensing)
Storage Humidity	5% RH to 95% RH (non-condensing)

2 Preparing for Installation

2.1 Package Contents

Table2-1 Package Contents

No.	Name	Quantity
1	Device	1
2	Mounting brackets	2
3	M4 x 8 mm cross recessed countersunk head screws	10
4	Rubber pads	4
5	Rack-mount guide	2
6	Rack-mount guide rail	2
7	Warranty Card	1
8	User Manual	1
9	Grounding wire	1

Note

The package contents are subject to the purchase contract, and actual delivery may vary. The purchase contract prevails. Check the items carefully against the package contents or purchase contract. If you have any questions, contact your distributor.

2.2 Safety Guidelines

Note

- To avoid personal injury or equipment damage, review the safety guidelines in this chapter before you begin the installation.
- The following safety guidelines may not include all the potentially hazardous situations.

2.2.1 General Precautions

- Install the equipment in a standard 19-inch rack.
- Never operate the equipment in a wet environment, and avoid any liquids inside it. Keep the chassis clean and dust-free.
- Keep the equipment away from heat sources.

- Ensure that the rack and power distribution system are properly grounded.
- Keep the equipment away from walk areas.
- During the installation and maintenance, do not wear loose clothing, jewelry, or other items that may get caught on the chassis.
- Keep tools and accessories away from walk areas.

2.2.2 Chassis-Lifting Guidelines

- Avoid moving the equipment frequently.
- Turn off all power supplies and disconnect all cables before lifting or moving the equipment.
- Two or more people are required to lift the chassis. Keep balance and prevent personal injuries when lifting or moving the equipment.

2.2.3 Electricity Safety

Warning

- Any deviation from standard or improper electrical operations can cause accidents such as fires or electric shocks, resulting in serious or fatal injuries to personnel and severe damage to equipment.
- Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.

- Always observe the local regulations and standards. Only qualified personnel should be allowed to operate the equipment.
- Carefully check the work area for potential hazards, including ungrounded power system, absent safety grounds, and damp floors.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Never assume that power is disconnected from a circuit. Always check.
- Select the correct leakage protector (also called leakage current switch or leakage current breaker) for the power supply system so that it can automatically disconnect the power supply in the event of leakage current or electric shock hazards. A leakage protector should meet the following requirements:
  - The rated leakage action current of each leakage protector must be at least twice the total maximum leakage current of all connected power supplies.

    Example:
    If a system has 16 identical power supplies, each with a maximum leakage current of 3.5 mA:
    Total leakage current = 16 x 3.5 mA = 56 mA
    For a 30-mA leakage protector:
    Maximum number of power supplies per protector = 30 mA/2/3.5 mA ≈ 4.28
    Therefore, only four power supplies can be connected to one 30 mA leakage protector.
    To support 16 power supplies, at least four 30 mA leakage protectors are required.

    Always ensure:
    Rated leakage operating current/2 > Total maximum leakage current of connected power supplies
  - The rated leakage non-action current of a leakage protector should be 50% of the leakage action current. If the non-action current value is too small, the high sensitivity level can cause the circuit to break, leading

to power cutoff and service interruption, even if the leakage current value is normal.

For example, if a leakage protector has a rated leakage action current of 30 mA, the rated leakage non-action current should be 15 mA. The leakage protector will not activate unless the leakage current exceeds 15 mA.

Caution

- To ensure personal safety, each leakage protector in the system must have a rated leakage action current equal to or below 30 mA, which is the recognized safety threshold for human body current. If the total leakage current of the system exceeds twice the 30-mA limit, the system must be equipped with two or more leakage protectors to maintain safety.
- The leakage current of power supplies varies depending on the product model.

In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.”

In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"

In **Norway**: “Apparatet må tilkoples jordet stikkontakt”

In **Sweden**: “Apparaten skall anslutas till jordat uttag”

2.2.4 Preventing ESD Damage

- Ensure that the chassis is connected to earth ground.
- Keep the site as dust-free as possible.
- Maintain appropriate humidity conditions.
- Before installing any pluggable modules, wear an anti-ESD wrist strap and make sure that it is properly grounded.
- Do not touch the printed circuit boards (PCBs) or component boards with bare hands.
- Store the module not in use in a static-shielding container.
- Avoid contact between the PCBs and clothing. The anti-ESD wrist strap only protects the printed circuit boards from ESD voltages on the body. ESD voltages on clothing can still cause damage.

Note

The connectors for anti-ESD wrist straps are located at the upper right and lower right corners on the front panel of the device.

2.2.5 Laser Safety

The equipment supports various types of optical transceivers, which are Class I laser products.

Pay attention to the following:

- When an optical transceiver is working, ensure that its port is connected to an optical cable or covered by a dust cap to keep out dust and prevent it from burning your eyes.
- Do not look directly into an optical port.

Figure2-1 Laser Product Warning



Warning

Do not approach or look directly into any optical port under any circumstances. This may cause permanent damage to your eyes.

2.3 Site Requirements

The equipment must be installed indoors for normal operation and prolonged service life.

The installation site must meet the following requirements.

2.3.1 Floor Loading

Assess the combined weight of the equipment and its accessories, such as rack, chassis, and power modules, and verify that the floor under the rack can bear the weight.

2.3.2 Airflow

Maintain sufficient space around air vents to ensure adequate airflow through the chassis. Manage the Ethernet cables and power cords using cable ties or cable management brackets to avoid blocking air intakes.

2.3.3 Space

You are advised to have a pathway of at least 0.8 meters (2.62 ft.) wide in the equipment room. This space ensures that you can move the chassis and swap the modules easily.

Do not install the equipment against a wall. Instead, maintain a minimum clearance of 0.4 m (1.31 ft.) around the equipment for heat dissipation and equipment maintenance.

2.3.4 Temperature and Humidity

To ensure normal operation and prolonged service life of the equipment, maintain appropriate temperature and humidity conditions in the equipment room.

Prolonged exposure to inappropriate temperature and humidity conditions can cause damage to the equipment.

- In an environment with high relative humidity, insulating materials are prone to poor insulation or even electricity leakage.
- In an environment with low relative humidity, insulating gaskets may shrink, resulting in screw loosening
- In a dry environment, static electricity is more likely to occur, posing a risk to the internal circuits of equipment.
- A high temperature can accelerate the aging process of insulation materials, greatly reducing the availability of the equipment and severely affecting its service life.

Note

The ambient temperature and humidity of the device are measured at the point that is 1.5 m (59.06 in.) above the floor and 0.4 m (15.75 in.) in front of the rack when there is no protective plate on the front or rear of the rack.

2.3.5 Cleanliness

Dust poses a significant hazard to the equipment. Dust on the enclosure causes electrostatic adhesion, leading to poor contact of the metallic joints. Electrostatic adhesion is more likely to occur in an indoor environment with relatively low humidity, not only affecting the service life of the equipment, but also causing communication faults. The following table lists the requirements for dust concentration and particle size in the equipment room.

Table2-2 Requirements for Dust

Particle Diameter	Unit	Concentration
Dust particles (diameter ≥ 0.5 μm)	Particles/m^3	≤ 3.5 x 10^6
Dust particles (diameter ≥ 5 μm)	Particles/m^3	≤ 3.5 x 10^4

Apart from dust, there are also requirements on the salt, acid, and sulfide in the air of the equipment room. These harmful substances will accelerate metal corrosion and component aging. Therefore, the equipment room should be properly protected against harmful gases, such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and chlorine gas. The following table lists the limits on harmful gases.

Table2-3 Requirements for Gases

Gas	Average (mg/m^3)	Maximum (mg/m^3)
Sulfur dioxide (SO_2)	0.3	1.0
Hydrogen sulfide (H_2S)	0.1	0.5
Nitrogen dioxide (NO_2)	0.5	1.0
Chlorine gas (Cl_2)	0.1	0.3

Note

Average refers to the average value of harmful gases measured in a week. **Maximum** refers to the upper limit of harmful gases measured in a week for up to 30 minutes every day.

2.3.6 Grounding

A proper grounding system is crucial for ensuring stable and reliable operation, as well as preventing lightning strikes and interference. Carefully check the grounding conditions at the installation site according to the grounding requirements, and complete grounding properly based on the site situation.

- **Safety Grounding**

  Ensure that the rack and power distribution system are securely grounded if the equipment uses the AC power supply. Otherwise, electric shocks may occur when the insulation resistance between the power module and the chassis decreases.

Caution

- The building should provide a protective ground connection to ensure that the equipment is connected to a protective ground.
- Verify that the AC socket is reliably connected to the protective grounding system of the building. If not, a protective grounding wire should be used to connect the protective grounding lug of the AC socket to the protective grounding system of the building.
- The cross-sectional area of the protective grounding wire should be at least 0.75 mm^2 (18 AWG)

- **Lightning Grounding**

  The lightning protection system is an independent system composed of a lightning rod, a downlead conductor, and a connector connected to the grounding system. The grounding system is typically used for power reference grounding and safety grounding of the rack. Lightning grounding is required only for facilities, and is not required for the equipment.

- EMC Grounding

  Electromagnetic compatibility (EMC) grounding includes shielded grounding, filter grounding, noise and interference suppression, and level reference.

  These items constitute the overall grounding requirements. The grounding resistance should be smaller than 1 ohm. Connect the grounding terminal to the ground before operating the equipment.

2.3.7 Preventing Electromagnetic Interference

- Take interference prevention measures for the power supply system.
- Keep the equipment away from the grounding system or lightning protection grounding system of the power facility.
- Keep the equipment far away from high-frequency current equipment, such as high-power radio transmitters and radar transmitters.
- Take electromagnetic shielding measures when necessary.

2.3.8 Surge Protection

- Although the equipment can guard against lightning strikes, strong lightning strikes may still damage the equipment. Take the following surge protection measures: Ensure that the grounding wire of the rack is in good contact with the ground.
- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- Install a surge protector upstream of the power input end to enhance surge protection for the power supply.

2.3.9 Installation Site

Regardless of whether the equipment is installed in a rack or on a workbench, ensure that the following conditions are met:

- Maintain a proper clearance around the air inlets and outlets for heat dissipation.
- The equipment is equipped with fans to draw in cold air from sides and dissipate heat through the rear of the chassis. Maintain a minimum clearance of 150 mm (5.91 in.) around the air outlets for heat dissipation. You are advised to install the equipment in a standard 19-inch rack or place it on a clean workbench. In hot areas, air-conditioning is recommended.
- The installation site has a good cooling and ventilation system.
- The installation site is sturdy enough to support the weight of the chassis and its components.

  The installation site is properly grounded.

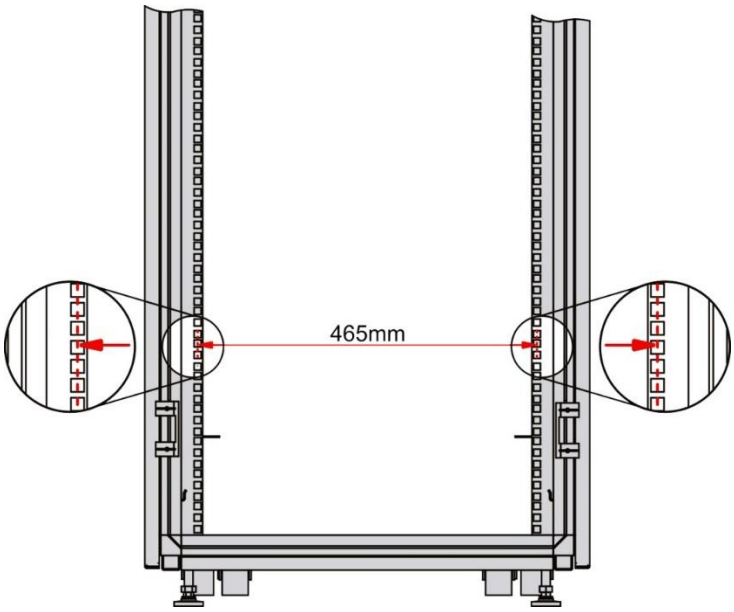
2.4 Rack Requirement

If you plan to install the equipment on a rack, ensure that the rack meets the following conditions.

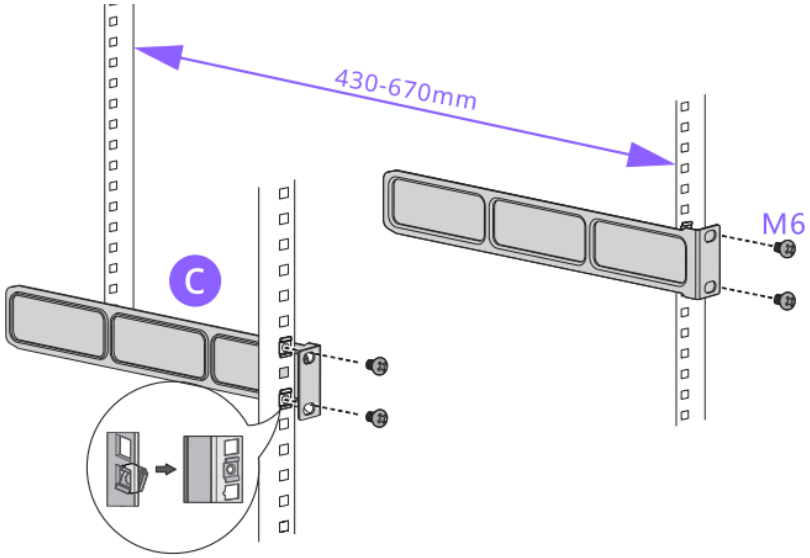
(1) Use a four-post 19-inch rack.

(2) The left and right square hole rack posts are 465 mm (18.31 in.) apart.

Figure2-2 19-Inch Rack



(3) The distance between the front and rear square-hole rack posts must range from 430 mm (16.93 in.) to 670 mm (26.38 in.).



(4) The guide rails or tray can bear the weight of the equipment and its accessories.

(5) The rack has a reliable grounding lug for the chassis to connect to an earth ground.

(6) The rack has a reliable ventilation system. The open area of front and rear doors is greater than 50%.

2.5 Tools

Table2-4 Tools

Common Tool	Phillips screwdriver, power cords, Ethernet cables, rack-mounting bolts, diagonal pliers, and cable ties
Dedicated Tool	ESD-preventive glove, wire stripper, crimping plier, RJ45 crimping plier, and punch down tool
Meter	Multimeter
Relevant Equipment	PC, display, and keyboard

Note

The equipment is delivered without a toolkit. Prepare the preceding tools by yourself.

3 Installing the Switch

Caution

Before installing the equipment, ensure that you have carefully read Chapter 2 and that all requirements described in Chapter 2 have been met.

3.1 Before You Begin

- The installation site provides sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements.
- The power supply is available at the installation site, and its current meets the requirements.
- The Ethernet cables have been deployed at the installation site.
- The power supply meets the requirements.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.

3.2 Installing the Switch

3.2.1 Precautions

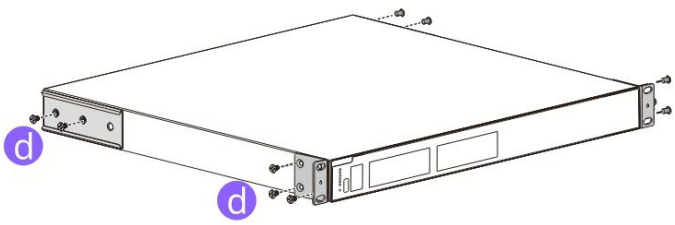
Pay attention to the following:

- Connect the grounding wire to the grounding lug.
- Ensure that the connector of the power cord is properly seated in the power port of the equipment. After plugging the power cord into the equipment, secure the power cord with power cord retention clip.
- Do not place anything on the top of the equipment.
- Maintain a minimum clearance of 10 cm (3.94 in.) around the equipment to ensure proper airflow. Do not stack equipment.
- Keep the equipment away from high-power radio transmitters, radar transmitters, and high-frequency high-current equipment. If necessary, take electromagnetic shielding measures, such as using shielded interface cables, to minimize interference.
- Route 100-meter Ethernet cables indoors. Outdoor routing is not recommended. Take surge protection measures if you need to route cables outdoors.

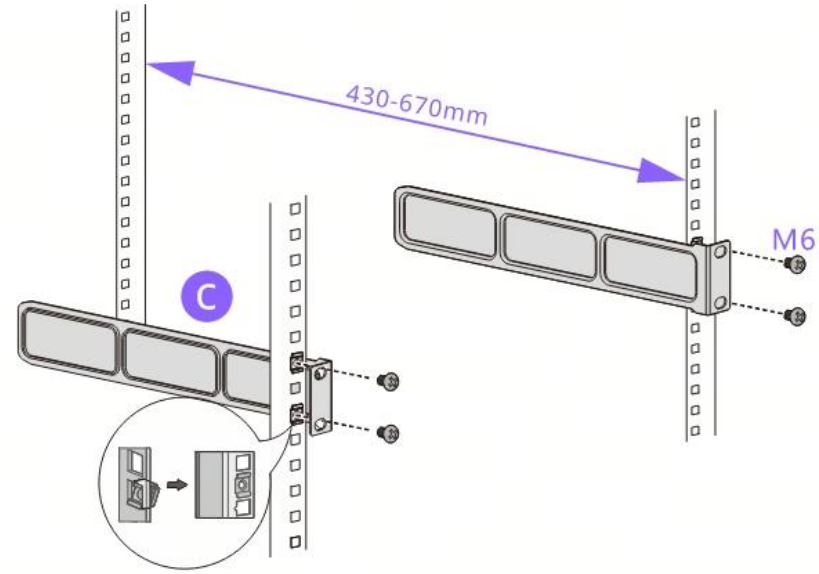
3.2.2 Installing the Switch in a Rack

The switch meets the standard defined by the Electronic Industries Alliance (EIA), and can be installed onto a 19-inch rack. The installation steps are as follows:

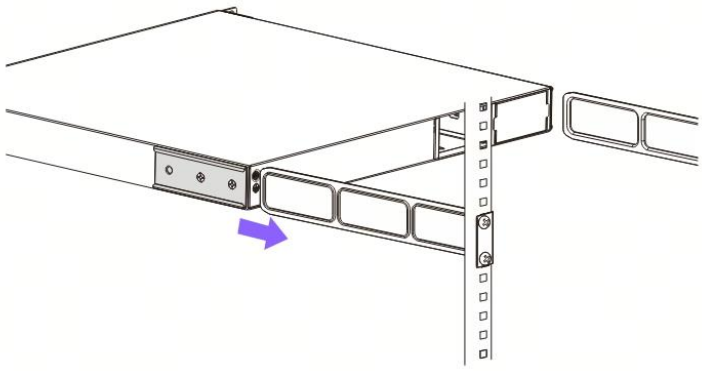
(1) Take the M4 x 8 mm cross recessed countersunk head screws, rack-mount brackets, and rack-mount guide rails from the package. Align the rack-mount brackets and guide rails with screw holes on both sides of the switch, and secure them using the M4 x 8 mm screws.



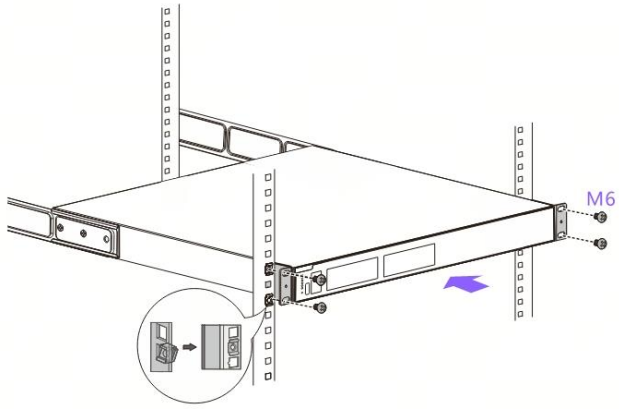
(2) Take the rack-mount guides from the package, align them with both sides of the rack and secure them using cage nuts and M6 screws.



(3) Align the rack-mount guide rails with the rack-mount guides, and then slide the device horizontally into the rack.

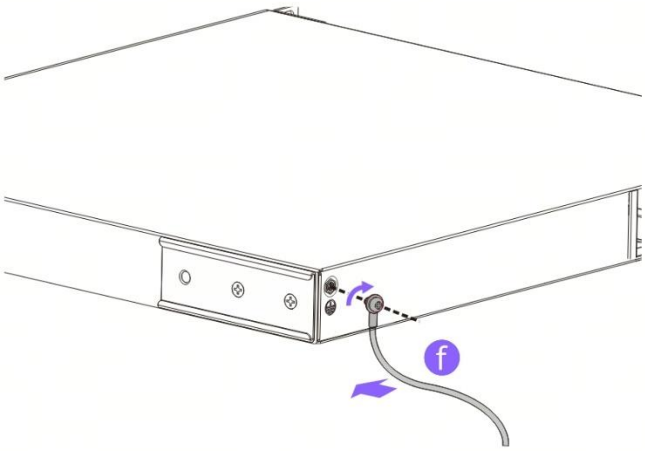


(4) After placing the switch into the rack, align the rack-mount brackets with both sides of the rack and secure them using cage nuts and M6 screws (user-supplied).



3.3 Grounding the Switch

Connect the protective ground (PGND) to the grounding lug of the rack and then connect the grounding lug to the grounding bar of the equipment room.



Precautions

- The cross-sectional area of a grounding wire should be determined based on the maximum current load that may pass through it. Grounding cables with good conductors should be used.
- Do not use bare wires.
- The grounding resistance for combined grounding should be less than 1 ohm.

Caution

- To avoid personal injury and device damage, connect the switch to the ground properly. The grounding resistance between the chassis and the ground should be less than 1 ohm.
- The O&M personnel should check whether the AC socket is reliably connected to the PGND of the building. If not, the O&M personnel should use a protective earthing (PE) conductor from the grounding lug of the AC socket to the PGND of the building.
- The power socket should be installed near the device and easily accessible.
- During installation, the ground connection must always be connected first and disconnected last.

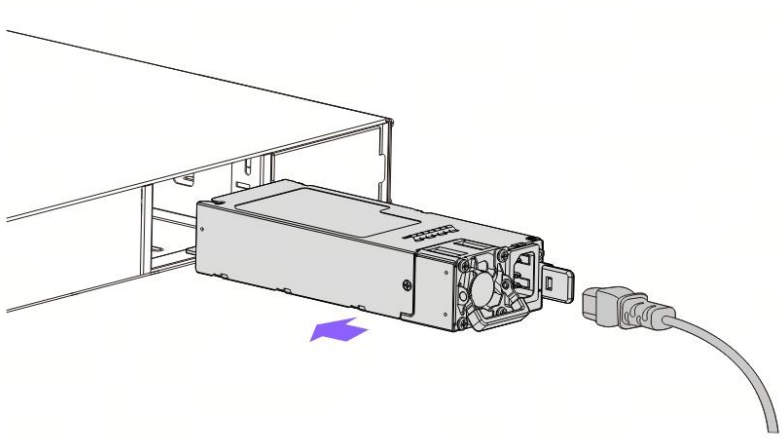
3.4 Installing or Removing Power Modules

Wear ESD-preventive gloves before performing the following operations.

3.4.1 Installing an AC Power Module

1. Unpack the power module, and ensure that the input type and input specifications of the power module meet the requirements.

2. Remove the filler panel from the empty slot. Keep the module nameplate face upward. Grasp the handle with one hand and place your other hand under the module to support its weight. Slide the module all the way into the slot along the guide rail until you feel the connector snap into place.



Caution

- Slide the power module into the slot gently. Verify that the power module is inserted in the correct orientation.
- If the power module cannot be inserted or is difficult to insert, pull it back out and check whether the power module is properly aligned with the guide rails before inserting it again.

3.4.2 Removing an AC Power Module

(1) Press the latch on the module and grasp the handle with one hand. Place your other hand under the module to support its weight. Gently pull the module fully out of the slot.

(2) Install a filler panel in the power module slot and put the removed power module into its package.

Caution

- Pull the power module out of the slot gently.
- Install a filler panel in the slot where the power module is removed to ensure normal ventilation and avoid dust in the chassis.

3.5 Connecting Cables

Warning

Use the power cord that comes with the equipment to prevent any potential accidents.

Take the following steps to connect the power cord and Ethernet cable:

(1) Connect one end of a power cord to the power connector of the equipment.

(2) Connect the other end of the power cord to the power socket of the external power system. Make sure the power switch is OFF before connecting the power cord.

(3) Connect the RJ45 connector of an Ethernet cable to the management Ethernet port on the device, and the other end to a network management device or control terminal.

(4) Insert the SMF and MMF optical fibers into the corresponding ports according to the silkscreen, and distinguish the transmitting and receiving ends of the optical fibers.

(5) Insert the twisted pair cable with RJ45 connector into the corresponding ports according to the silkscreen, and distinguish the crossover cable and the straight-through cable.

3.6 Bundling Cables

Precautions

- Bundle the power cords and other cables in a visually pleasing way.
- When you bind optical cables, make sure that the optical cables at the connectors have natural bends or bends of large radius.
- Do not bind optical cables and twisted pair cables too tightly, as excessive pressure on the cables can impact their lifespan and transmission performance.

Cable Bundling Steps

(1) Bundle the drooping part of the optical cables and twisted pair cables, and lead them to both sides of the chassis as appropriate.

(2) On both sides of the chassis, fasten the optical cables and twisted pair cables to the cable management ring or cable trunking.

(3) For the power cords, bind them securely along the bottom of the chassis, keeping them as straight as possible.

3.7 Verifying Installation

- If the equipment is installed in a rack, check whether the equipment is securely installed in the rack. If the equipment is installed on a workbench, check whether the workbench is sturdy enough to support the combined weight of the equipment and its components. For both installation modes, check whether there is sufficient space for heat dissipation.
- The power cord meets the standard specifications of the switch.
- The rack is properly grounded.
- The equipment is correctly connected to the terminal or other equipment.

- The power cord is long enough to avoid over-extension.

4 Commissioning

4.1 Setting Up the Configuration Environment

Connect the PC to the Ethernet port of the switch with an Ethernet cable.

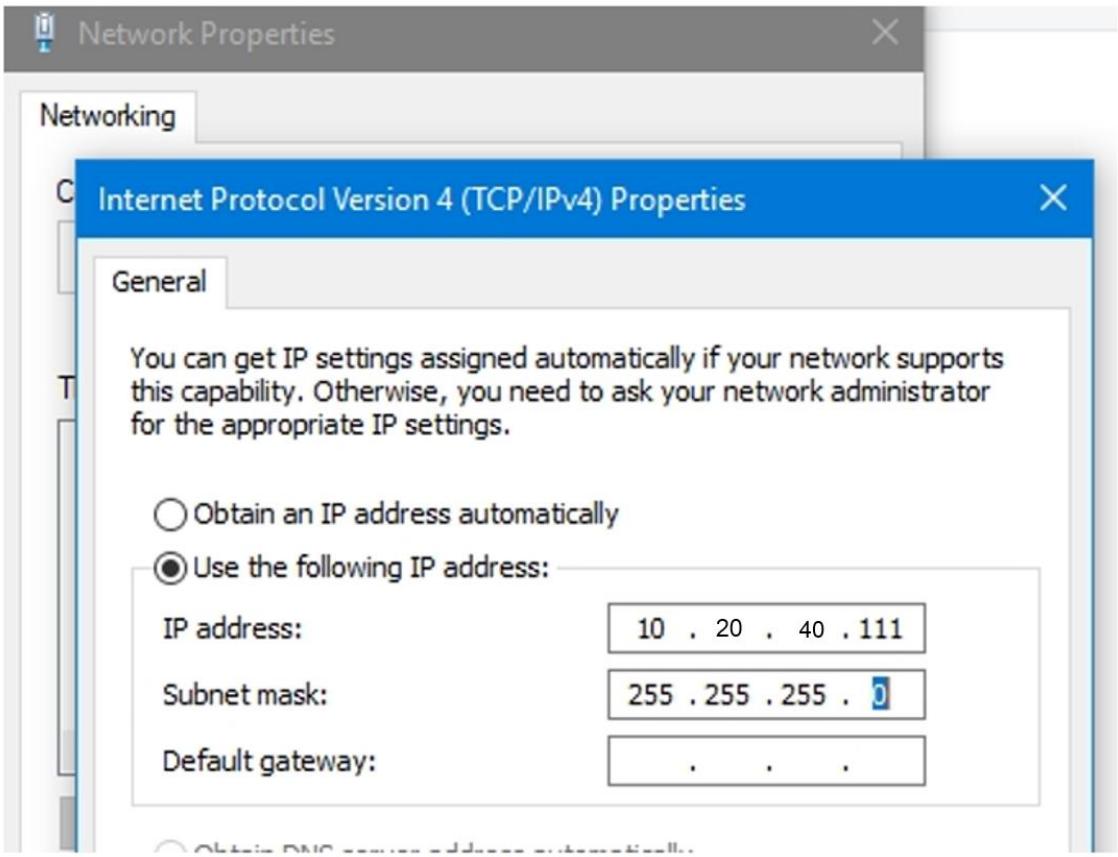
Connecting an Ethernet Cable

(1) Plug the RJ45 connector of the Ethernet cable into the Ethernet port of the PC.

(2) Connect the other RJ45 connector to the MGMT port of the switch.

eWeb-based Login

(1) Turn on the PC. Configure the local connection properties on the PC and assign a static IP address in the range of 10.20.40.XXX (1 to 254, excluding 42). An example configuration is shown below.



(1) Open a browser on the PC and enter 10.20.40.42 in the address bar to access the system configuration page. The default password is **admin**.

4.2 Power-on

(1) Checklist Before Power-on

- The power cord is properly connected.
- The supply voltage meets the requirement.

(2) Checklist After Power-on

The LED status is normal.

5 Appendix

5.1 Connectors and Media

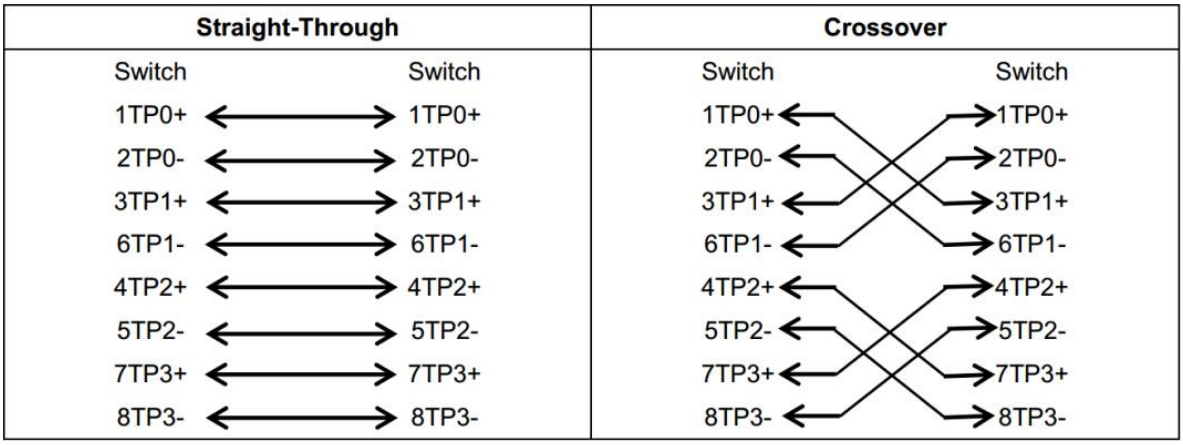
5.1.1 10/100/1000BASE-T Ports

The 10/100/1000BASE-T port supports auto-negotiation for 10 Mbps, 100 Mbps, and 1000 Mbps connections and also supports auto MDI/MDIX Crossover.

Compliant with IEEE 802.3ab, 1000BASE-T requires Category 5e 100-ohm UTP or STP (STP is recommended) with a maximum distance of 100 m (328.08 ft.).

The 1000BASE-T port requires that all four pairs of wires be connected for data transmission. The following figure shows twisted pair connections for the 1000BASE-T port.

Figure5-1 Twisted Pair Connections for 1000BASE-T Ports



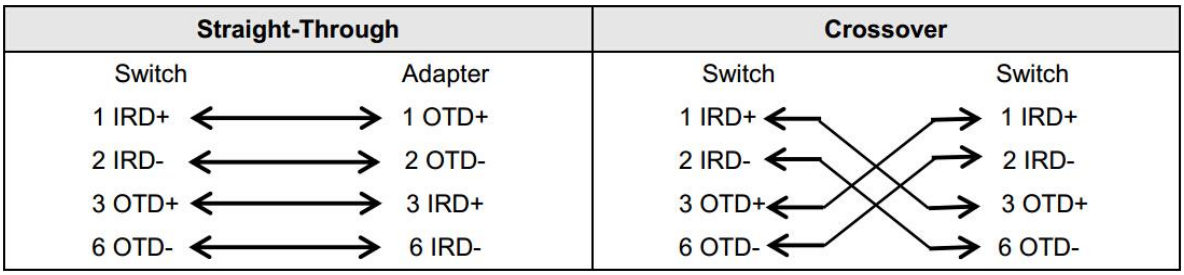
In addition to cables with the above-mentioned specifications, the 10/100BASE-T port can also be connected using 100-ohm CAT3, CAT4, and CAT5 cables at 10 Mbps or using 100-ohm CAT5 cables with a maximum distance of 100 m (328.08 ft.). The following table shows pin assignments for a 10/100BASE-T port.

Table5-1 10/100BASE-T Pin Assignment

Pin	Socket	Plug
1	Input Receive Data+	Output Transmit Data+
2	Input Receive Data-	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data+
6	Output Transmit Data-	Input Receive Data-
4, 5, 7, and 8	Not used	Not used

The following table shows wiring of straight-through and crossover cables for the 100BASE-TX or 10BASE-T ports.

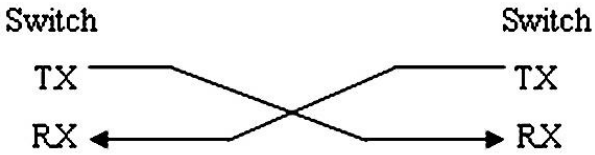
Figure5-2 Twisted Pair Connections for the 10/100BASE-T Port



5.1.2 Optical Cable Connection

Select an SMF or MMF based on the type of the optical transceiver connected to an optical port. The following figure shows the connection diagram.

Figure5-3 Connecting an Optical Cable



5.2 SFP and SFP+ Transceivers

Ruijie provides supporting SFP transceivers and SFP+ transceivers based on the port types of switch modules. You can select a transceiver to suit your specific needs. In addition to the transceivers listed below, the 1GE SFP port also supports the 1GE copper SFP transceiver, Mini-GBIC-GT. This document provides models and technical specifications of some 1GE SFP transceivers and 10GE SFP+ transceivers for reference. For details about the technical specifications, see *Ruijie Transceiver Installation and Reference Guide*.

Table5-2 Models and Specifications of 1GE SFP Transceivers

Model	Wavelength (nm)	Fiber Type	DDM Support (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
				min	max	min	max
CO-GE-SFP-SX-MM850	850	MMF	Yes	–9.5	0	–17	0
CO-GE-SFP-LX-SM1310	1310	SMF	Yes	–11	–3	–19	0
GE-SFP-LH40-SM1310-BIDI	1310TX/1550RX	SMF	Yes	–3	3	–25	0
GE-SFP-LH40-SM1550-BIDI	1550TX/1310RX	SMF	Yes	–3	3	–25	0

Model	Wavelength (nm)	Fiber Type	DDM Support (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
				min	max	min	max
GE-SFP-LX20-SM1310-BIDI	1310TX/1550RX	SMF	Yes	–8	–3	–23	–3
GE-SFP-LX20-SM1550-BIDI	1550TX/1310RX	SMF	Yes	–8	–3	–23	–3
MINI-GBIC-LH40-SM1310	1310	SMF	Yes	–5	0	–25	–3
MINI-GBIC-ZX80-SM1550	1550	SMF	Yes	–3	3	–26	–3

Table5-3 1000BASE-T SFP Copper Transceivers

Standard	1000BASE-T SFP Module	DDM Support (Yes/No)
1000BASE-T	Mini-GBIC-GT	No

Table5-4 SFP Transceiver Cabling Specifications

SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
CO-GE-SFP-SX-MM850	Duplex LC	MMF	50/125	550 m (1804.46 ft.)
CO-GE-SFP-LX-SM1310	Duplex LC	SMF	9/125	10 km (6.21 mile)
GE-SFP-LH40-SM1310-BIDI	LC	SMF	9/125	40 km (24.85 mile)
GE-SFP-LH40-SM1550-BIDI	LC	SMF	9/125	40 km (24.85 mile)
MINI-GBIC-LH40-SM1310	LC	SMF	9/125	40 km (24.85 mile)
MINI-GBIC-ZX80-SM1550	LC	SMF	9/125	80 km (49.71 mile)
GE-SFP-LX20-SM1310-BIDI	LC	SMF	9/125	20 km (12.43 mile)
GE-SFP-LX20-SM1550-BIDI	LC	SMF	9/125	20 km (12.43 mile)

SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
Mini-GBIC-GT	RJ45 cable	Category 5 or higher unshielded twisted pair (UTP) or shielded twisted pair (STP) cables		100 m (328.08 ft.)

Caution

- For the optical transceiver with the transmission distance of 40 km (24.85 miles) or longer, add an inline optical attenuator on the link to avoid overloading the optical receiver when shorter distances of Single-Mode Fiber (SMF) are used.
- An optical transceiver is a laser transmitter. Do not look directly into the light source to prevent it from burning your eyes.
- To keep an optical transceiver clean, make sure that its idle ports remain capped.

Table5-5 2.5GE SFP Transceiver Models and Technical Specifications

Model	Wavelength (nm)	DDM (Yes/No)	Fiber Type	Transmit Power (dBm)		Receive Power (dBm)	
				min	max	min	max
2.5G-SFP-LX03-SM1310-BIDI-I	1310	Yes	SMF	–9	–3	–18	0
2.5G-SFP-LX03-SM1550-BIDI-I	1550	Yes	SMF	–9	–3	–16	–2

Table5-6 2.5G SFP Transceiver Cabling Specifications

SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
2.5G-SFP-LX03-SM1310-BIDI-I	LC	SMF	9/125	3 km (1.86 mile)
2.5G-SFP-LX03-SM1550-BIDI-I	LC	SMF	9/125	3 km (1.86 mile)

Table5-7 10GE SFP+ Transceiver Models and Technical Specifications

Model	Wavelength (nm)	DDM (Yes/No)	Fiber Type	Transmit Power (dBm)		Receive Power (dBm)	
				Min.	Max.	Min.	Max.
XG-SFP-ER-SM1550	1550	Yes	SMF	–4.7	4	–15.8	–1
CO-XG-SFP-SR-MM850	850	Yes	MMF	-7.3	-1	–11.1	-1
CO-XG-SFP-LR-SM1310	1330	Yes	SMF	-8.2	0.5	-12.6	-0.5
CO-XG-SFP-T	N/A	No	Cat 6A/7	N/A	N/A	N/A	N/A

Table5-8 Cabling Specifications of SFP+ Transceivers

Model	Interface Type	Fiber Type	Core Size (um)	Modal Bandwidth (MHz·km)	Max. Cabling Distance
XG-SFP-ER-SM1550	LC	SMF	9/125	N/A	40 km (24.85 mile)
CO-XG-SFP-SR-MM850	Duplex LC	MMF	50/125	MMF OM3: 2000 MMF OM4: 4700	300 m (984.25 ft.) for OM3 400 m (1312.34 ft.) for OM4
CO-XG-SFP-LR-SM1310	Duplex LC	SMF	50/125	/	10 km (6.21 mile)
CO-XG-SFP-T	RJ45	Cat 6A/7	N/A	N/A	30 m (98.43 ft.)

Table5-9 10GE SFP+ Active Cable Models

Model	Module Type	Connector Type	Copper Cable Length (M)	Conductor Diameter (AWG)	Data Speed (Gb/s)	DDM Support (Yes/No)

XG-SFP-AOC1M	Active	SFP+	1	\	10.3125	Yes
XG-SFP-AOC3M	Active	SFP+	3	\	10.3125	Yes
XG-SFP-AOC5M	Active	SFP+	5	\	10.3125	Yes

Note

- The types and models of the SFP+ optical transceivers are subject to change without prior notice. For the latest and most accurate models, contact Ruijie marketing or technical support personnel.
- The DDM function of AOC cables does not report transmit power. Therefore, TX power may be displayed as N/A.

Table5-10 25GE SFP Transceiver Models and Technical Specifications

Model	Wavelength (nm)	DDM (Yes/No)	Fiber Type	Transmit Power (dBm)		Receive Power (dBm)	
				min	max	min	max
VG-SFP-SR-MM850	850	Yes	MMF	–8.4	2.4	–10.3	2.4
VG-SFP-AOC7M(M)	850	Yes	MMF	N/A	N/A	N/A	N/A

Table5-11 25GE SFP Transceiver Cabling Specifications

SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
VG-SFP-SR-MM850	LC	MMF	50/125	70 m (229.66 ft.) (OM3) 100 m (328.08 ft.) (OM4)
VG-SFP-AOC7M(M)	N/A	MMF	50/125	7 m (22.97 ft.)

Table5-12 40GE SFP Transceiver Models and Technical Specifications

Model	Wavelength (nm)	DDM (Yes/No)	Fiber Type	Transmit Power (dBm)		Receive Power (dBm)	
				min	max	min	max
40G-QSFP-SR-MM850	850	Yes	MMF	–7.6	2.4	–9.5	2.4
40G-QSFP-LSR-MM850	850	Yes	MMF	–7.6	2.4	–9.5	2.4
40G-QSFP-LR4-SM1310	1310	Yes	SMF	–7	–2.3	–11.5	2.3
40G-QSFP-iLR4-SM1310	1310	Yes	SMF	–6.5	2.5	–10.5	2.5
40G-QSFP-LX4-SM1310	1310	Yes	MMF/SMF	MMF 10.5 SMF1 1.5	MMF 3.5 SMF2. 5	MMF 10.5 SMF 11.5	MMF 3.5 SMF 2.5
40G-AOC-5M	850	Yes	MMF	N/A	N/A	N/A	N/A
40G-AOC-10M	850	Yes	MMF	N/A	N/A	N/A	N/A
40G-AOC-30M	850	Yes	MMF	N/A	N/A	N/A	N/A

Table5-13 40GE SFP Transceiver Cabling Specifications

SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
40G-QSFP-SR-MM850	MPO-8	MMF	50/125	100 m (328.08 ft.) (OM3) 50 m (164.04 ft.) (OM4)
40G-QSFP-LSR-MM850	MPO-8	MMF	50/125	150 m (492.13 ft.) (OM3) 300 m (984.25 ft.) (OM4)
40G-QSFP-LR4-SM1310	LC	SMF	9/125	2 km (1.24 mile)
40G-QSFP-iLR4-SM1310	LC	SMF	9/125	2 km (1.24 mile)
40G-QSFP-LX4-SM1310	LC	Single-mode/multi-mode	9/125	MMF150 m (492.13 ft.) SMF 2 km

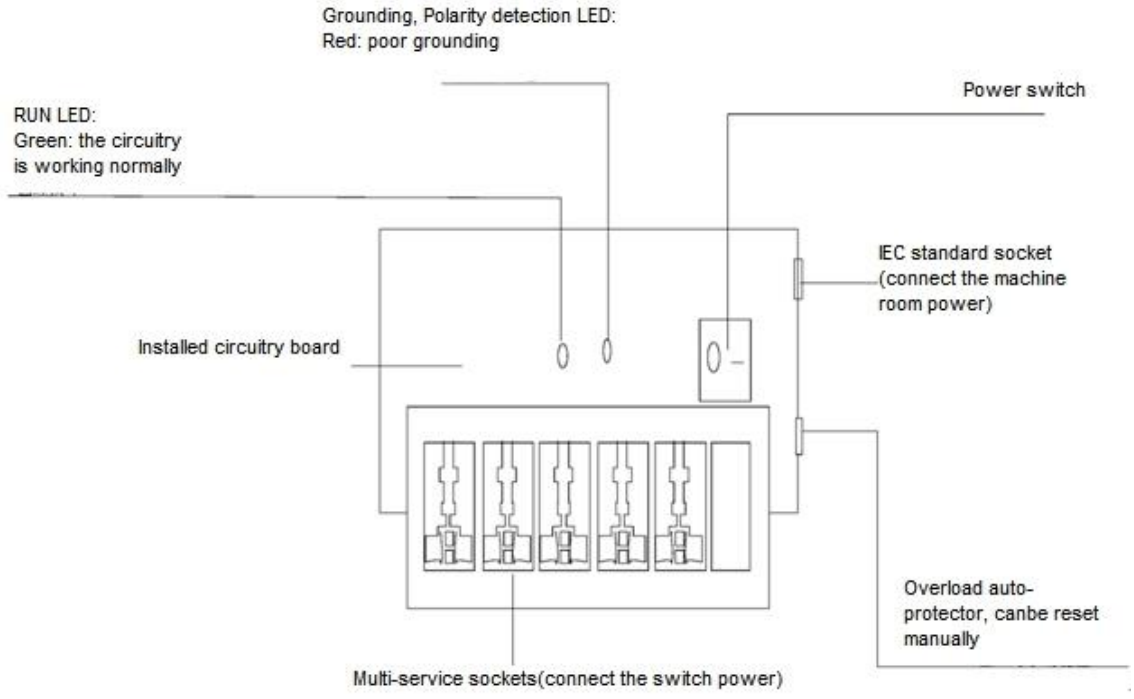
SFP Model	Interface Type	Fiber Type	Core Specifications (μm)	Max. Cabling Distance
				(1.24 mile)
40G-AOC-5M	N/A	MMF	50/125	5 m (16.40 ft.)
40G-AOC-10M	N/A	MMF	50/125	10 m (32.81 ft.)
40G-AOC-30M	N/A	MMF	50/125	30 m (98.43 ft.)

5.3 Lightning Protection

5.3.1 Installing the AC Surge Protector (Power Strip with Surge Protection)

When an alternating current (AC) power cord is introduced from outdoors and directly connected to the AC power connector of the switch, the power connector must be connected to an external surge protector to safeguard the switch against lightning strikes. The surge protector can be fixed on the rack, workbench, or wall in the equipment room by using cable ties and screws. AC power enters the surge protector before entering the switch.

Figure5-4 Surge Protector



Note

The surge protector is not delivered with the equipment. Please purchase it based on actual requirements.

Precautions during the installation:

- Make sure that the PE terminal of the surge protector is well grounded.
- After the AC power plug of the switch is connected to the socket of the surge protector, the lightning protection function is implemented only if the running status LED is green and the alarm LED is off.
- If the alarm LED on the surge protector is red, check whether it is caused by a poor grounding connection or by the reversed connection of the neutral and live wires. The detection method is as follows: Use a multimeter to measure the polarity of the surge protector when the alarm LED is red. If the neutral wire is on the left and the live wire is on the right (facing the socket), the PE terminal of the surge protector is not grounded. If not, the polarity of the surge protector should be reversed. In this case, open the surge protector and reverse its polarity. If the alarm LED is still red, the PE terminal of the surge protector is not grounded.

5.3.2 Installing the Ethernet Port Arrester

Please connect an Ethernet port arrester to the switch to prevent the damage by lightning strikes before connecting an outdoor Ethernet cable to the switch.

Tools: Phillips screwdriver or flat-blade screwdriver, multimeter, and diagonal pliers

Installation steps:

(1) Tear one side of the protective paper for the double-sided adhesive tape and paste the tape to the enclosure of the Ethernet port arrester. Tear the other side of the protective paper for the double-sided adhesive tape and paste the Ethernet port arrester to the switch enclosure. The paste position for the Ethernet port arrester should be as close to the grounding lug of the switch as possible.

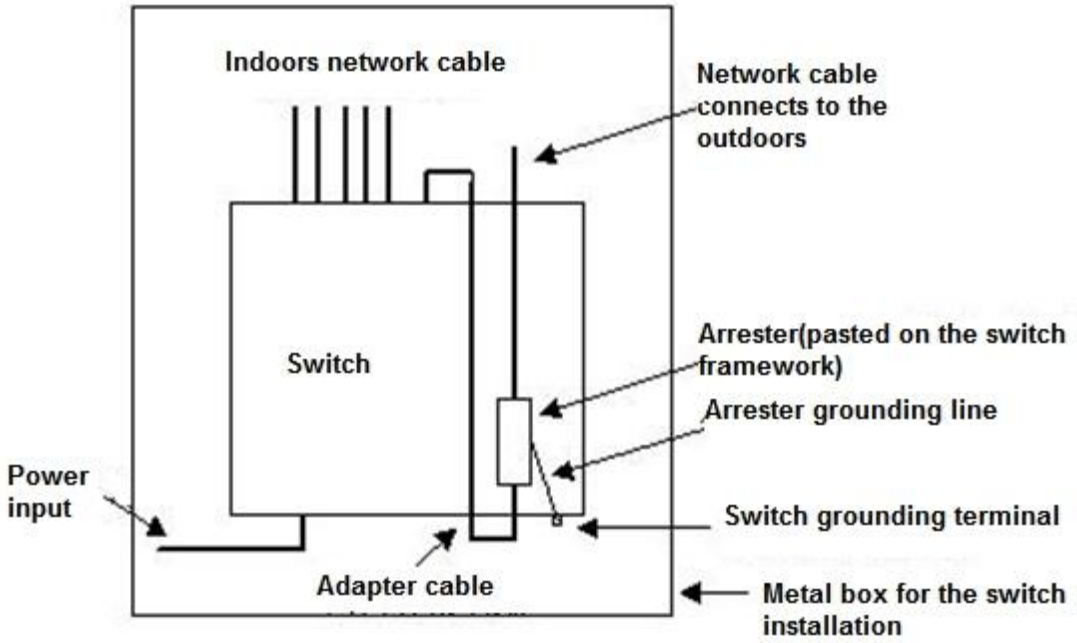
(2) Based on the distance between the grounding lug of the switch and the Ethernet port arrester, cut the grounding cable of the Ethernet port arrester and firmly tighten the grounding cable to the grounding lug of the switch.

(3) Use a multimeter to check whether the grounding cable for the arrester is in good contact with the grounding lug and the enclosure of the switch.

(4) Connect the arrester by using an adapter cable (note that the external network cable is connected to the IN end, while the adapter cable connected to the switch is connected to the OUT end) and check whether the service module LED is normal.

(5) Use a nylon cable tie to bind the cables.

Figure5-5 Installing an Ethernet Port Arrester



Note

- The Ethernet port arrester is only for a 10 Mbps or 100 Mbps RJ45 port.
- The Ethernet port arrester is not delivered with the equipment. Please purchase it based on actual requirements. The user manual for Ethernet port arresters contains technical parameters and maintenance and installation instructions. Carefully read this manual during installation.

Pay attention to the following situations during the actual installation to avoid influencing the performance of an Ethernet port arrester:

- The arrester is incorrectly connected to the cables. Connect the external Ethernet cable to the IN end and connect the Ethernet port of the switch to the OUT end.
- The Ethernet port arrester is incorrectly grounded. The grounding cable of the arrester should be as short as possible to ensure that it is in good contact with the grounding lug of the switch. Use a multimeter to confirm the contact condition after grounding.
- Not all Ethernet ports are installed with Ethernet port arresters. If outdoor Ethernet cables connect the switch ports to the peer equipment, Ethernet port arresters need to be installed on all the ports for the purpose of lightning protection.

5.4 Cabling Recommendations

When the switch is installed in a standard 19-inch rack, secure the cables around the cable management brackets. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room. All adapted connectors should be placed at the bottom of the rack in an orderly manner instead of outside the rack that is easy to touch. Power cords are routed beside the rack. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the positions of the DC power distribution box, AC socket, or lightning protection box.

5.4.1 Requirement for the Minimum Bend Radius of Cables

- The bend radius of a fixed power cord, Ethernet cable, and flat cable should be over five times greater than their respective external diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than their respective external diameters.
- The bend radius of a fixed common coaxial cable should be over seven times greater than its external diameter. The bend radius of these cables that are often bent or plugged should be over 10 times greater than their respective external diameters.
- The minimum bend radius of a high-speed cable, such as an SFP+ cable, should be 5 times the overall diameter of the cable. If the cable is constantly bent, plugged or unplugged, the bend radius should be 10 times the overall diameter.

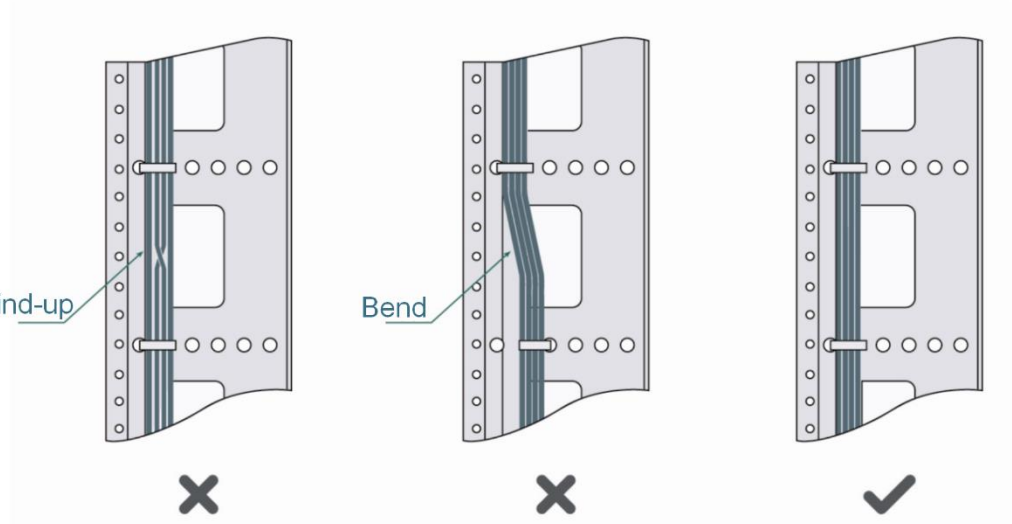
5.4.2 Requirement for the Minimum Bend Radius of Optical Cables

- The diameter of the optical cable tray should be no less than 25 times greater than that of the optical cable.
- When an optical cable is moved, its bend radius should be no less than 20 times greater than its diameter.
- During cabling of an optical cable, its bend radius should be no less than 10 times greater than its diameter.

5.4.3 Precautions for Cable Bundling

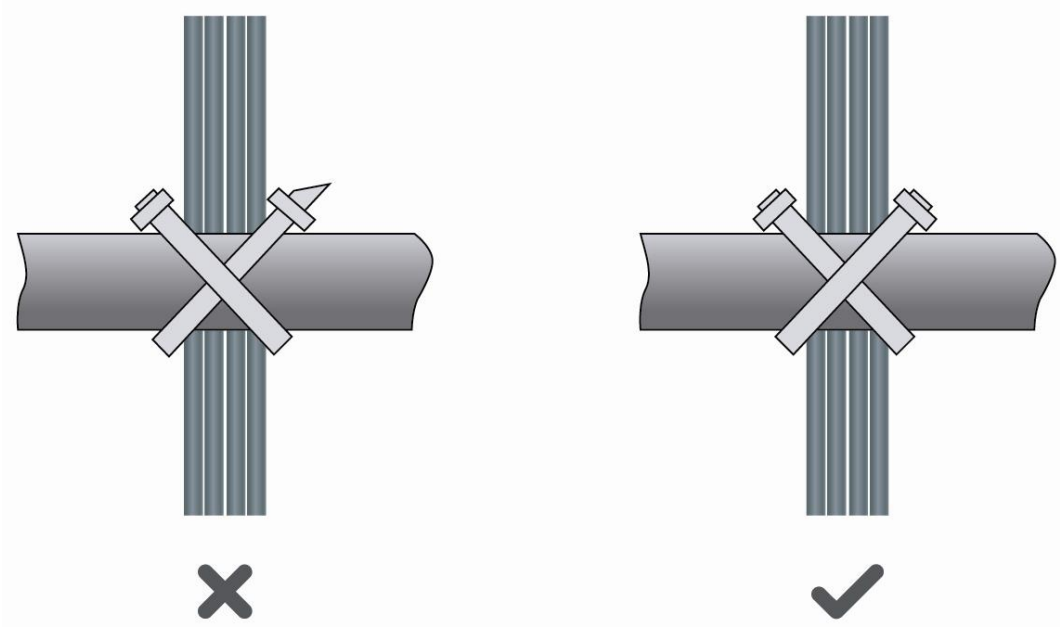
- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or improper bending.

Figure5-6 Bundling Cables (1)



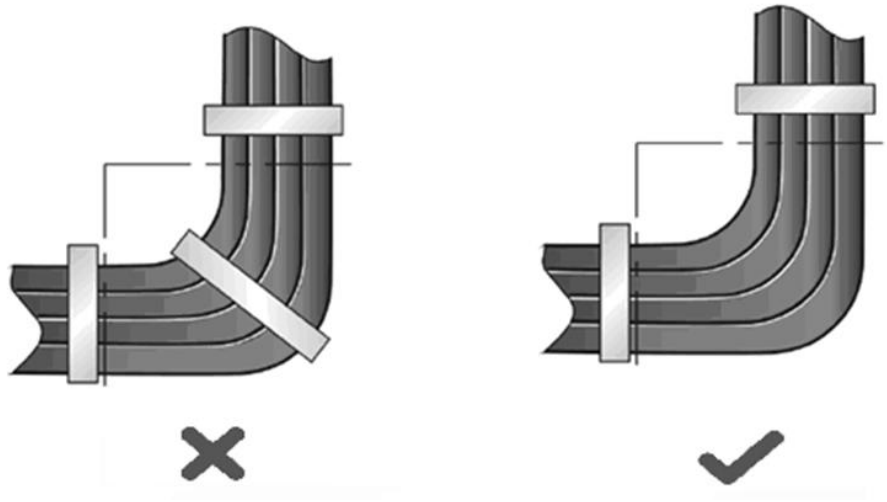
- Cables of different types (such as power cords, signal cables, and grounding wires) should be separated in cabling and bundling. Mixed bundling is not allowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the rack should be smooth without sharp corners.
- The metal holes traversed by cables should have a smooth and fully rounded surface or an insulated lining.
- Use cable ties to bundle cables properly. Please do not connect two or more cable ties to bundle cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim without sharp corners.

Figure5-7 Bundling Cables (2)



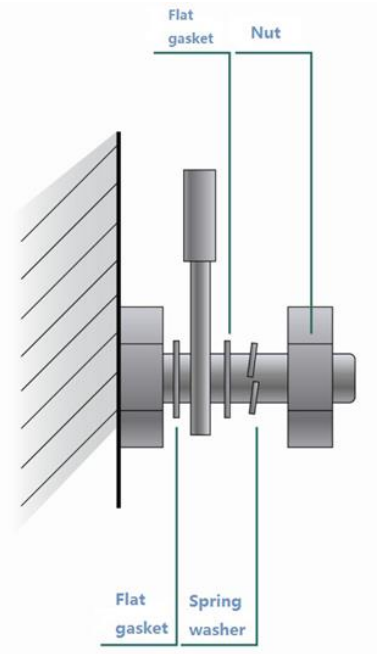
- When cables need to be bent, bundle them first but do not tie cables within the bend. Otherwise, stress may be generated on the cables and cause the wires inside to break.

Figure5-8 Bundling Cables (3)



- Cables not to be assembled or the remaining parts of cables should be folded and placed in a proper position of the rack or cable management trough. The proper position refers to a position that does not affect the equipment running or damage the equipment or cables.
- Power cords must not be bundled on the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding wires should be reserved with some excess after being assembled to avoid suffering tension or stress. When a moving part reaches the installation position, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources must be touched, high-temperature cables should be used.
- When using screw threads to secure a cable lug, ensure that the bolt or screw is properly tightened and take measures to prevent it from loosening.

Figure5-9 Fastening Cables



- Hard power cords should be secured near the cable termination area to prevent stress on the cable termination area and cables.
- Do not use tapping screws to secure cable lugs.
- Power cords of the same type and in the same cabling direction should be bundled up into cable bunches, with cables in cable bunches clean and straight.
- Bundle cables by using cable ties according to the following table.

Cable Bunch Diameter	Bundling Spacing
10 mm (0.39 in.)	80–150 mm (3.15–5.91 in.)
10–30 mm (0.39–1.18 in.)	150–200 mm (5.91–7.87 in.)
30 mm (1.18 in.)	200–300 mm (7.87–11.81 in.)

- Do not tie cables or bundles in a knot.
- For wiring terminal blocks (such as circuit breakers) with cord end terminals, the metal part of the cord end terminal should not be exposed outside the terminal block when assembled.

5.5 Equipment Room Site Selection

- The equipment room should be at least 5 km (3.11 miles) away from heavy pollution sources, such as smelters, coal mines, and thermal power plants. The equipment room should be at least 3.7 km (2.30 miles) away from medium pollution sources, such as the chemical factory, rubber factory, and electroplating factory. The equipment room should be at least 2 km (1.24 miles) away from light pollution sources, such as the food factory and leather plant. If the pollution source is unavoidable, the equipment room should be located on the windward side of the pollution source perennially with advanced protection.
- The equipment room should be at least 3.7 km (2.30 miles) away from the sea or salt lake. Otherwise, the equipment room must be sealed, with an air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select equipment with advanced protection against severe environments.
- Do not build the equipment room in the proximity of livestock farms. Otherwise, the equipment room should be located on the windward side of the pollution source perennially. The previous livestock house or fertilizer warehouse cannot be used as the equipment room.
- The equipment room should be firm enough to withstand severe weather conditions such as windstorms, heavy rain, and dense dust. If the dust is unavoidable, keep the door and window away from the pollution source.
- The equipment room should be located away from the residential area. Otherwise, the equipment room should meet construction specifications to avoid noise interference.
- Make sure the air vent of the equipment room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the equipment room under positive pressure to prevent corrosive gas from entering the equipment room to corrode components and circuit boards.
- Keep the equipment room away from industrial boilers and heating boilers.
- The equipment room should be on the second floor or higher. Otherwise, the equipment room floor should be 600 mm (23.62 in.) higher than the highest flood level ever recorded.
- Make sure no cracks or holes exist in the wall and floor. If there are cable entries in the wall or window, take proper sealing measures. Ensure that the wall is flat, wear-resistant, and dust-free, meeting standards for flame resistance, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.
- Keep the door and the window closed to make the equipment room sealed.
- You are advised to use the steel door for soundproofing.
- Do not use sulfur-containing materials.
- Keep the air conditioner from blowing wind straight toward the equipment or blowing water drops from the window or air vent toward the equipment.