Ruijie Cybrey RG-CS61 Series Switches

Installation Guide

Document Version: V1.0
Date: 2026-09-30
Copyright © 2026 Ruijie Networks

Copyright

Copyright © 2026 Ruijie Networks

All rights are reserved in this document and this statement.

Without the prior written consent of Ruijie Networks, no organization or individual is permitted to reproduce, extract, back up, modify, or distribute the content of this document in any manner or form. It is also prohibited to translate the document into other languages or use any or all parts of it for commercial purposes.




and other Ruijie trademarks are owned by Ruijie Networks.

All other trademarks or registered trademarks mentioned in this document are owned by their respective owners.

Disclaimer

The products, services, or features that you purchase are subject to commercial contracts and terms. It is possible that some or all of the products, services, or features described in this document may not be available for purchase or use. Unless agreed upon otherwise in the contract, Ruijie Networks does not provide any explicit or implicit statements or warranties regarding the content of this document.

The names, links, descriptions, screenshots, and any other information regarding third-party software mentioned in this document are provided for your reference only. Ruijie Networks does not explicitly or implicitly endorse or recommend the use of any third-party software and does not make any assurances or guarantees concerning the applicability, security, or legality of such software. You should choose and use third-party software based on your business requirements and obtain proper authorization. Ruijie Networks assumes no liability for any risks or damages arising from your use of third-party software.

The content of this document is subject to constant change due to product version upgrades or other reasons. Thus, Ruijie Networks reserves the right to modify the content of the document without prior notice or prompt.

This manual serves solely as a user guide. While Ruijie Networks endeavors to ensure the accuracy and reliability of the content when compiling this manual, it does not guarantee that the content of the manual is free of errors or omissions. All information contained in this manual does not constitute any explicit or implicit warranties.

Personal Data Statement

During the operation or troubleshooting of the products, services, or features you have purchased, certain personal data of users may be collected or used. Therefore, it is essential for you to establish and implement appropriate privacy policies, in compliance with the relevant laws and regulations of the applicable countries or regions, to ensure the complete protection of users' personal data.

If Ruijie Networks is involved in this process, we will strictly adhere to the relevant laws and regulations of the applicable countries or regions and take all necessary actions to safeguard users' personal data.

When discarding, reclaiming, or reusing a device, please ensure to back up or clear any stored data to avoid data leakage. For assistance, please contact our after-sales technical support.

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
- Case portal: https://caseportal.ruijie.com
- Community: https://community.ruijie.com/
- Email support: service_rj@ruijie.com
- Live chat: https://www.ruijie.com/rita
- Documentation feedback: doc@ruijie.com.cn

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.

Contents

Preface.....I

1 Overview.....1

1.1 About the RG-CS61.....1

1.2 RG-CS61-10GT2MS-P.....2

1.2.1 Equipment Appearance.....2

1.2.2 Technical Specifications.....4

1.3 RG-CS61-24GT4MS.....7

1.3.1 Equipment Appearance.....7

1.1.2 Technical Specifications.....9

1.4 RG-CS61-24GT4MS-P.....10

1.4.1 Equipment Appearance.....10

1.4.2 Technical Specifications.....13

1.5 RG-CS61-48GT4MS-P.....15

1.5.1 Equipment Appearance.....15

1.5.2 Technical Specifications.....17

2 Preparing for Installation.....21

2.1 Package Contents.....21

2.2 Safety Guidelines.....21

2.2.1 General Precautions.....22

2.2.2 Chassis-Lifting Guidelines.....22

2.2.3 Electricity Safety.....22

2.2.4 Preventing ESD Damage.....23

2.2.5 Laser Safety.....23

2.3 Site Requirements....24
2.3.1 Floor Loading....24
2.3.2 Airflow....24
2.3.3 Space....24
2.3.4 Temperature and Humidity....24
2.3.5 Cleanliness....25
2.3.6 Grounding....26
2.3.7 Preventing Electromagnetic Interference....26
2.3.8 Surge Protection....26
2.3.9 Installation Site....27
2.4 Rack Requirement....27
3 Installing the Switch....28
3.1 Before You Begin....28
3.2 Installing the Chassis....28
3.2.1 Installing the Switch in a Rack....28
3.2.2 Installing the Switch on a Workbench....29
3.3 Grounding the Switch....30
3.4 Connecting the External Port Cables....31
3.5 Bundling Cables....31
3.6 Verifying Installation....31
4 Commissioning....32
4.1 Connecting the Power Supply....32
4.2 Setting Up the Configuration Environment....32
4.3 Power-on....33

4.3.1 Checklist Before Power-on....33
4.3.2 Checklist After Power-on....33
5 Appendix....34
5.1 Connectors and Media....34
5.1.1 10/100/1000BASE-T Ports....34
5.1.2 Optical Cable Connection....35
5.2 SFP and SFP+ Transceivers....35
5.3 Lightning Protection....37
5.3.1 Installing the AC Surge Protector (Power Strip with Surge Protection)....37
5.3.2 Installing the Ethernet Port Arrester....38
5.4 Cabling Recommendations....40
5.4.1 Requirement for the Minimum Bend Radius of Cables....40
5.4.2 Requirement for the Minimum Bend Radius of Optical Cables....40
5.4.3 Precautions for Cable Bundling....40
5.5 Equipment Room Site Selection....43

1 Overview

1.1 About the RG-CS61

The RG-CS61 series switches are next-generation Layer 3 switches that deliver high performance, unified security, and multiple services. These switches are mainly used at the access 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.

Currently, four models are available.

Model	10/100/1000Base-T Port	1GE/2.5GE SFP Port	Console Port	USB Port	Power Supply	Fan	Heat Dissipation
RG-CS61-10GT2MS-P	10 (The first 8 ports support PoE+.)	2	1	1	Fixed Power Supply	N/A	Natural heat dissipation
RG-CS61-24GT4MS	24	4	1	1	Fixed Power Supply	N/A	Natural heat dissipation
RG-CS61-24GT4MS-P	24 (PoE+ Capable)	4	1	1	Fixed Power Supply	Fixed fan modules	Left-to-right and front-to-right airflow
RG-CS61-48GT4MS-P	48 (PoE+ Capable)	4	1	1	Fixed Power Supply	Fixed 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-CS61-10GT2MS-P

1.2.1 Equipment Appearance

1. Front Panel

Figure 1-1 Front Panel

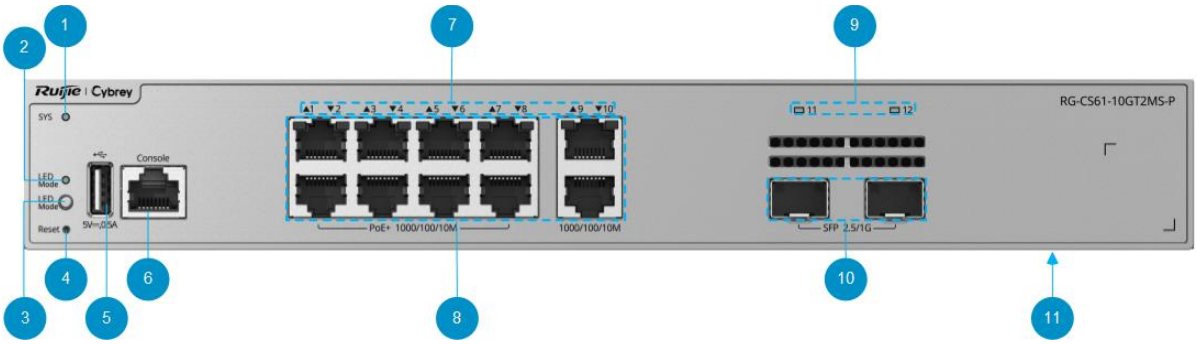


Table 1-1 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table 1-3 LED Description.
2	LED Mode	LED Mode LED	● Off: The Ethernet port LED indicates the Link/Active status. ● Solid green: The Ethernet port LED indicates the PoE status.
3	LED Mode	LED Mode Button	Used for switching the display mode of the Ethernet port LEDs.
4	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.
5	/	USB Port	Used for connecting a USB flash drive.
6	Console	Console Port	Used for connecting to the device serial console.
7	1–10	Ethernet port LED	Used for indicating the status of the Ethernet port. For details, see Table 1-3 LED Description.

No.	Silkscreen	Component	Description
8	1–10 (1000/100/10M)	Ethernet port	10/100/1000BASE-T Ethernet ports, with the first eight ports supporting PoE compliant with IEEE 802.3af and IEEE 802.3at standards.
9	11–12	Optical port LED	Used for indicating the optical port status. For details, see Table 1-3 LED Description.
10	11–12 (SFP 2.5GE/1GE)	Optical port	1GE/2.5GE optical transceiver
11	-	Product nameplate	Located at the bottom of the device

2. Rear Panel

Figure 1-2 Rear Panel



Table 1-2 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	Mounting hole for power cord retainer	Used for installing the power cord retainer.
3	AC input socket	Used for connecting the AC power cord.

3. Status LEDs

Table 1-3 LED Description

Silkscreen	Component	Description
SYS	SYS LED	• Off: The switch is not powered on. • Solid green: The switch is powered on. • Fast blinking green: The system is upgrading or starting up and

Silkscreen	Component	Description
		cannot operate normally. ● Blinking red: A system fault or switching loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold.
1–10	Ethernet port LED	● Link/ACT mode (The mode can be switched by pressing the LED Mode button): ● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data. ● LED mode (The mode can be switched by pressing the LED Mode button): ● Off: The PoE power supply is disabled. ● Solid green: The PoE power supply is normal. ● Blinking green: The PoE power limit is exceeded.
11–12	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

Table 1-4 Technical Specifications

System Specifications	CPU	Dual-core ARM A55 CPU frequency up to 1.0 GHz
	BootROM	16 MB
	Flash memory	512 MB
	SDRAM	2 GB
	Switch buffer	12 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	● 10 x 10/100/1000BASE-T ports, port 1 to 8 supporting PoE/PoE+ ● 2 x 1GE/2.5GE SFP ports
	Console port	1
	USB port	1
	Status LED	1 x system status LED 1 x LED Mode LED 10 x 10/100/1000BASE-T port LEDs 2 x 1GE/2.5GE SFP port LEDs
	Power supply	1 x fixed power supply

Power Supply and Consumption	Power module	N/A
	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: 3.5 A
	Maximum power consumption	144.88 W (full-load power when the input power is 110 V) 142.3 W (full-load power when the input power is 220 V) 14.2 W (with no PoE load when the input power is 110 V) 14.2 W (with no PoE load when the input power is 220 V)
	PoE	Supported
	Number of PoE ports	Ports 1 to 8 supporting PoE/PoE+ (IEEE802.3af/at) power supply
	PoE power pairs	Mode A (1-2, 3-6 pairs)
	Maximum PoE output power per port	30 W
	Maximum PoE output power of the device	125 W
Dimensions and Weight	Dimensions (W x D x H)	300 mm x 225.8 mm x 43.6 mm (11.81 in. x 8.890 in. x 1.72 in.)
	Weight	2.10 kg (4.63 lbs)
	Shipping dimensions (W x D x H)	480 mm x 385 mm x 375 mm (18.90 in. x 15.16 in. x 14.76 in.)
	Shipping weight	15.5 kg (34.17 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.)
	Mean time between failures (MTBF)	> 400,000 hours
	Fan	Fanless design
	Heat dissipation	Natural heat dissipation
	Energy saving	Supported
	Acoustic noise	N/A
	Cable hot swapping	Supported
	Hot swapping of power modules	N/A
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-CS61-24GT4MS

1.3.1 Equipment Appearance

1. Front Panel

Figure 1-3 Front Panel

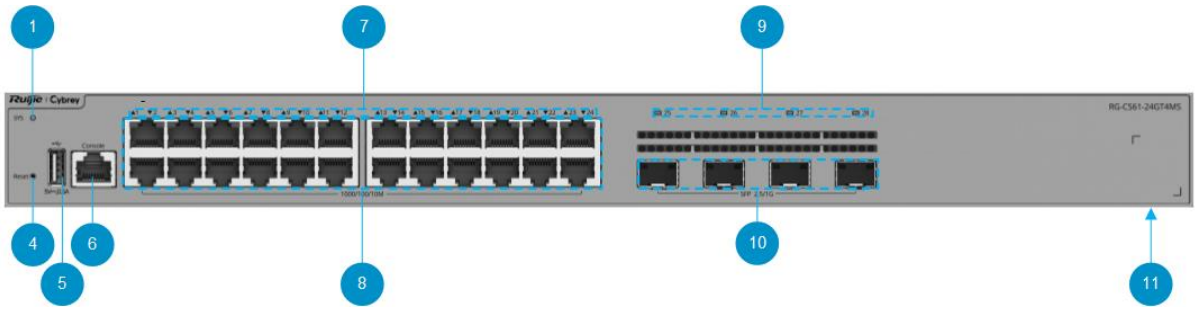


Table 1-5 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table 1-7 Status LED Description.
2	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.
3	/	USB Port	Used for connecting a USB flash drive.
4	Console	Console Port	Used for connecting to the device serial console.
5	1–24	Ethernet port LED	Used for indicating the status of the Ethernet port. For details, see Table 1-7 Status LED Description.
6	1–24 (1000/100/10M)	Ethernet port	10/100/1000BASE-T
7	25–28	Optical port LED	Used for indicating the optical port status. For details, see Table 1-7 Status LED Description.
8	25–28 (SFP 2.5GE/1GE)	Optical port	1GE/2.5GE optical transceiver

No.	Silkscreen	Component	Description
9	/	**Product nameplate**	Located at the bottom of the device.

2. Rear Panel

Figure 1-4 Rear Panel

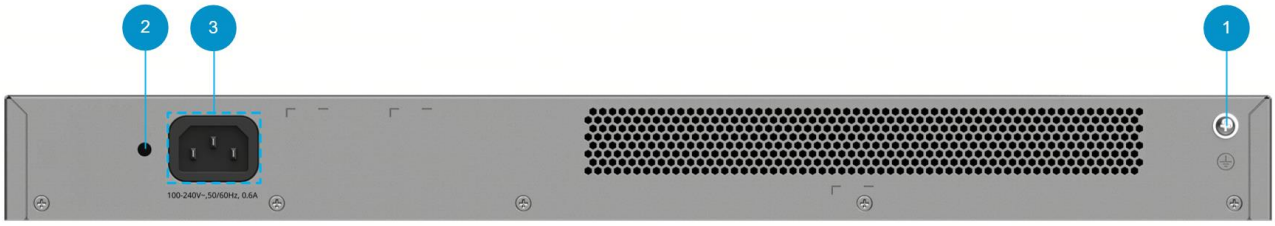


Table 1-6 Components on the Rear Panel

No.	Component	Description
1	Grounding screw	Used for securing the grounding lug to ensure a reliable connection between the chassis and the ground.
2	Mounting hole for power cord retainer	Used for installing the power cord retainer.
3	AC input socket	Used for connecting the AC power cord.

3. Status LEDs

Table 1-7 Status LED Description

Silkscreen	Component	Description
SYS	SYS LED	● Off: The switch is not powered on. ● Solid green: The switch is powered on. ● Fast blinking green: The system is upgrading or starting up and cannot operate normally. ● Blinking red: A system fault or switching loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold.
1–24	Ethernet port LED	● Link/ACT mode (The mode can be switched by pressing the LED Mode button): ● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data.
25–28	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.

1.1.2 Technical Specifications

Table 1-8 Technical Specifications

System Specifications	CPU	Dual-core ARM A55 CPU frequency up to 1.0 GHz
	BootROM	16 MB
	Flash memory	512 MB
	SDRAM	2 GB
	Switch buffer	12 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	24 x 10/100/1000BASE-T ports 4 x 1GE/2.5GE SFP ports
	Console port	1
	USB port	1
	Status LED	1 x system status LED 24 x 10/100/1000BASE-T port LEDs 4 x 1GE/2.5GE SFP port LEDs
Power Supply and Consumption	Power supply	1 x fixed power supply
	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: 0.6 A
	Maximum power consumption	22.407 W (when the input power is 110 V) 22.163 W (when the input power is 220 V)
Dimensions and Weight	Dimensions (W x D x H)	442 mm x 222.8 mm x 43.6 mm (17.40 in. x 8.77 in. x 1.72 in.)
	Weight	2.60 kg (5.73 lbs)

	Shipping dimensions (W x D x H)	540 mm x 340 mm x 153 mm (21.26 in. x 13.39 in. x 6.02 in.)
	Shipping weight	3.60 kg (7.94 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.)
	Fan	Fanless design
	Heat dissipation	Natural heat dissipation
	Energy saving	Supported
	MTBF	> 400,000 hours
	Acoustic noise	N/A
	Cable hot swapping	Supported

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-CS61-24GT4MS-P

1.4.1 Equipment Appearance

1. Front Panel

Figure 1-5 Front Panel

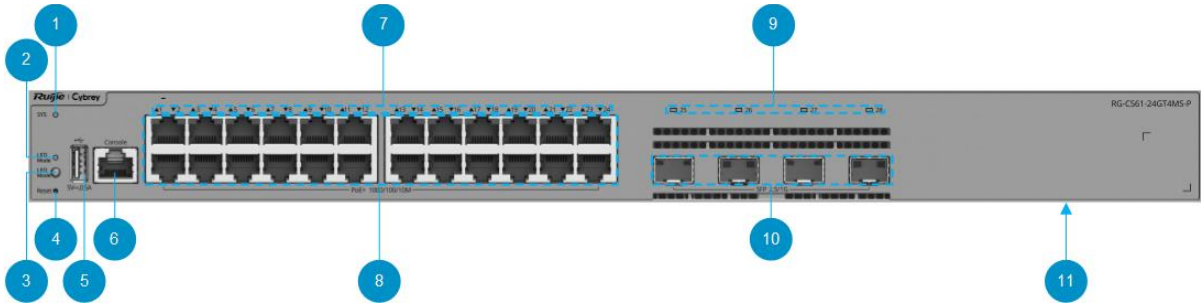


Table 1-9 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table 1-11 Status LED Description.
2	LED Mode	LED Mode LED	Off: The Ethernet port LED indicates the Link/Active status. Solid green: The Ethernet port LED indicates the PoE status.
3	LED Mode	LED Mode Button	Used for switching the display mode of the Ethernet port LEDs.
4	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.
5	/	USB Port	Used for connecting a USB flash drive.
6	Console	Console Port	Used for connecting to the device serial console.
7	1–24	Ethernet port LED	Used for indicating the status of the Ethernet port. For details, see Table 1-11 Status LED Description.
8	1–24 (1000/100/10M)	Ethernet port	10/100/1000BASE-T Ethernet ports, with all ports supporting PoE compliant with IEEE 802.3af and IEEE 802.3at standards.
9	25–28	Optical port LED	Used for indicating the optical port status. For details, see Table 1-11 Status LED Description.
10	25–28 (2.5GE/1GE	Optical port	1GE/2.5GE optical transceiver

No.	Silkscreen	Component	Description
	SFP)		
11	/	Product nameplate	Located at the bottom of the device.

2. Rear Panel

Figure 1-6 Rear Panel



Table 1-10 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	Mounting hole for power cord retainer	Used for installing the power cord retainer.
3	AC input socket	Used for connecting the AC power cord.

3. Status LEDs

Table 1-11 Status LED Description

Silkscreen	Component	Description
SYS	SYS LED	● Off: The switch is not powered on. ● Solid green: The switch is powered on. ● Fast blinking green: The system is upgrading or starting up and cannot operate normally. ● Blinking red: A system fault or switching loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold.
1–24	Ethernet port LED	Link/ACT mode (The mode can be switched by pressing the LED Mode button): ● Off: The port link is down. ● Solid green: The port link is up.

Silkscreen	Component	Description
		● Blinking green: The port is receiving or sending data. LED mode (The mode can be switched by pressing the LED Mode button): ● Off: The PoE power supply is disabled. ● Solid green: The PoE power supply is normal. ● Blinking green: The PoE power limit is exceeded.
25–28	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.

1.4.2 Technical Specifications

Table 1-12 Technical Specifications

System Specifications	CPU	Dual-core ARM A55 CPU frequency up to 1.0 GHz
	BootROM	16 MB
	Flash memory	512 MB
	SDRAM	2 GB
	Switch buffer	12 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	24 x 10/100/1000BASE-T ports, supporting PoE/PoE+ 4 x 1GE/2.5GE SFP ports
	Console port	1
	USB port	1
	Status LED	1 x system status LED 1 x PoE mode LED 24 x 10/100/1000BASE-T port LEDs 4 x 1GE/2.5GE SFP port LEDs
Power Supply and Consumption	Power supply	1 x fixed power supply
	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: 6 A

	Maximum power consumption	439.65 W (full-load power when the input power is 110 V) 428.56 W (full-load power when the input power is 220 V) 34.179 W (with no PoE load when the input power is 110 V) 33.511 W (with no PoE load when the input power is 220 V)
	PoE	Supported
	Number of PoE ports	All RJ45 ports support PoE/PoE+ (IEEE802.3af/at) power supply
	PoE power pairs	Mode A (1-2, 3-6 pairs)
	Maximum PoE output power per port	30 W
	Maximum PoE output power of the device	370 W
Dimensions and Weight	Dimensions (W x D x H)	442 mm x 222.8 mm x 43.6 mm (17.40 in. x 8.77 in. x 1.72 in.)
	Weight	2.90 kg (6.39 lbs)
	Shipping dimensions (W x D x H)	540 mm x 340 mm x 153 mm (21.26 in. x 13.39 in. x 6.02 in.)
	Shipping weight	4.03 kg (8.88 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.)
	Fan	1 x fixed fan module
	Heat dissipation	Air cooling, left-side intake and right-side exhaust
	Energy saving	Supported

	MTBF	> 400,000 hours
	Acoustic noise	< 40 dB at 27°C (80.6°F)
	Cable hot swapping	Supported
Certification and Regulatory Compliance	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 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.

1.5 RG-CS61-48GT4MS-P

1.5.1 Equipment Appearance

1. Front Panel

Figure 1-7 Front Panel

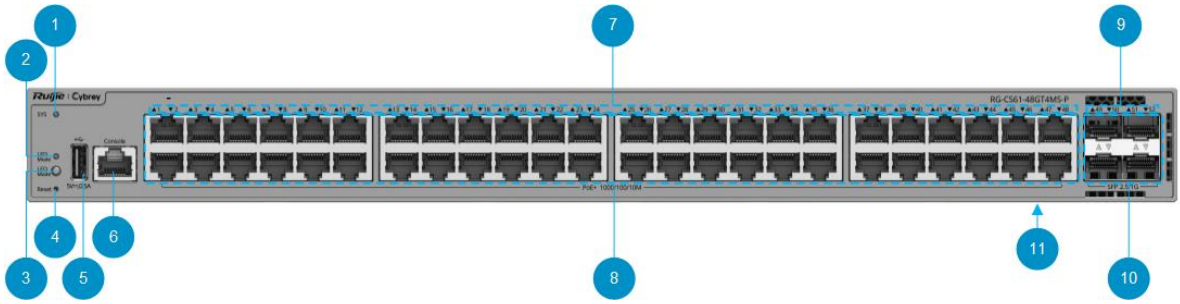


Table 1-13 Components on the Front Panel

No.	Silkscreen	Component	Description
1	SYS	SYS LED	Used for indicating the system status. For details, see Table 1-15 LED Description.
2	LED Mode	LED Mode LED	Off: The Ethernet port LED indicates the Link/Active status. Solid green: The Ethernet port LED indicates the PoE status.

No.	Silkscreen	Component	Description
3	LED Mode	LED Mode Button	Used for switching the displaymode of the Ethernet port LEDs.
4	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.
5	/	USB Port	Used for connecting a USB flash drive.
6	Console	Console Port	Used for connecting to the device serial console.
7	1–48	Ethernet port LED	Used for indicating the status of the Ethernet port. For details, see Table 1-15 LED Description.
8	1–48 (1000/100/10M)	Ethernet port	10/100/1000BASE-T Ethernet ports, with all ports supporting PoE compliant with IEEE 802.3af and IEEE 802.3at standards.
9	49–52	Optical port LED	Used for indicating the optical port status. For details, see Table 1-15 LED Description.
10	49–52 (SFP 2.5GE/1GE)	Optical port	1GE/2.5GE optical transceiver
11	/	Product nameplate	Located at the bottom of the equipment.

2. Rear Panel

Figure 1-8 Rear Panel

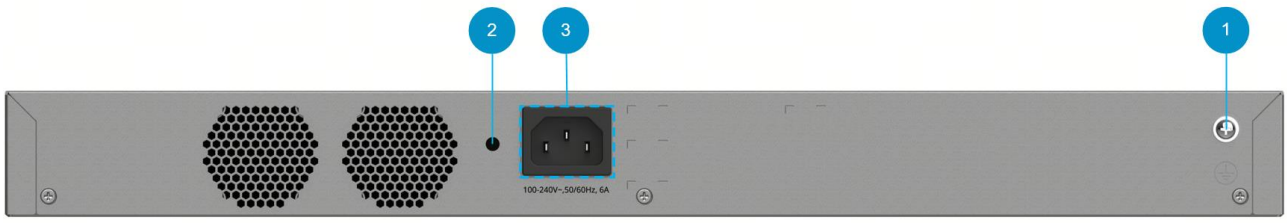


Table 1-14 Components on the Rear Panel

No.	Component	Description
1	Grounding screw	Used for securing the grounding lug to ensure a reliable connection between the chassis and the ground.
2	Mounting hole for power cord retainer	Used for installing the power cord retainer.
3	AC input socket	Used for connecting the AC power cord.

3. Status LEDs

Table 1-15 LED Description

Silkscreen	Component	Description
SYS	SYS LED	● Off: The switch is not powered on. ● Solid green: The switch is powered on. ● Fast blinking green: The system is upgrading or starting up and cannot operate normally. ● Blinking red: A system fault or switching loop is detected. ● Blinking yellow: The operating temperature exceeds the preset threshold.
1–48	Ethernet port LED	Link/ACT mode (The mode can be switched by pressing the LED Mode button): ● Off: The port link is down. ● Solid green: The port link is up. ● Blinking green: The port is receiving or sending data. LED mode (The mode can be switched by pressing the LED Mode button): ● Off: The PoE power supply is disabled. ● Solid green: The PoE power supply is normal. ● Blinking green: The PoE power limit is exceeded.
49–52	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.

1.5.2 Technical Specifications

Table 1-16 Technical Specifications

System Specifications	CPU	Dual-core ARM A55 CPU frequency up to 1.0 GHz
	BootROM	16 MB

	Flash memory	512 MB
	SDRAM	2 GB
	Switch buffer	12 Mbit
	Real-time clock (RTC)	Supported
Port Specifications	Fixed service port	48 x 10/100/1000BASE-T ports, supporting PoE/PoE+ 4 x 1GE/2.5GE SFP ports
	Console port	1
	USB port	1
	Status LED	1 x system status LED 1 x PoE mode LED 48 x 10/100/1000BASE-T port LEDs 4 x 1GE/2.5GE SFP port LEDs
Power Supply and Consumption	Power supply	1 x fixed power supply
	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: 6 A
	Maximum power consumption	56.064 W (with no PoE load when the input power is 110 V) 55.438 W (with no PoE load when the input power is 220 V) 456.65 W (full-load power when the input power is 110 V) 446.79 W (full-load power when the input power is 220 V)
	PoE	Supported
	Number of PoE ports	All RJ45 ports support PoE/PoE+ (IEEE802.3af/at) power supply
	PoE power pairs	Mode A (1-2, 3-6 pairs)
	Maximum PoE output power per port	30 W
	Maximum PoE output power of the device	370 W

Dimensions and Weight	Dimensions (W x D x H)	440 mm x 262.8 mm x 43.6 mm (17.32 in. x 10.34 in. x 1.72 in.)
	Weight	4.3 kg (9.48 lbs)
	Shipping dimensions (W x D x H)	560 mm x 377 mm x 150 mm (22.05 in. x 14.8 in. x 5.9 in.)
	Shipping weight	5.57 kg (12.28 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	2 x fixed fan modules
	Heat dissipation	Air cooling, left-side intake and rear-side exhaust
	Energy saving	Supported
	Acoustic noise	< 40 dB at 27°C (80.6°F)
	Cable hot swapping	Supported
Certification and Regulatory Compliance	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 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.

2 Preparing for Installation

2.1 Package Contents

Table 2-1 Package Contents

No.	Name	Quantity
1	Device	1
2	Rack-mount brackets	2
3	Rack-mount bracket screws **Note:** The supplied screws vary with equipment models. M3 x 6 mm screws are provided for the RG-CS61-10GT2MS-P, and M4 x 8 mm screws are provided for other equipment.	6
4	Rubber pads	4
5	Power cord retainer	1
6	Power cord	1
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 action 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.

Figure 2-1 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.

Table 2-2 Requirements for Dust

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

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.

Table 2-3 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.

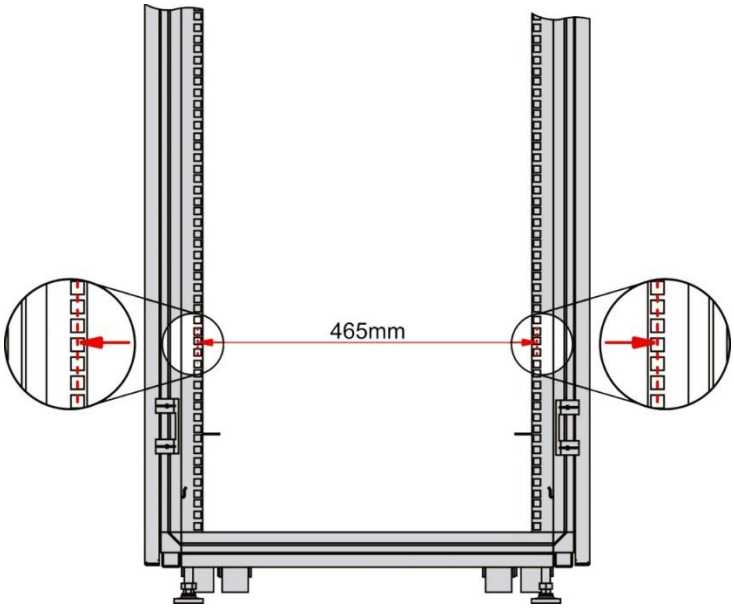
2.4 Rack Requirement

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.

Figure 2-2 19-Inch Rack



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

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

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

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 Chassis

Note

The installation methods for the RG-CS61 series switches are the same. The following installation procedure uses the RG-CS61-10GT2MS-P as an example.

Pay attention to the following:

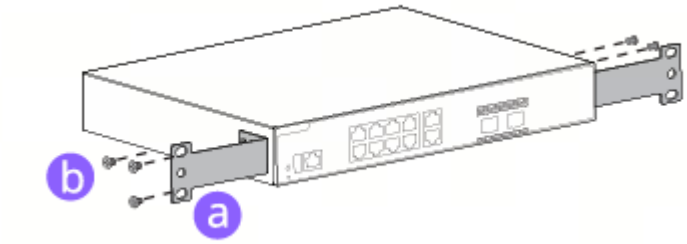
- Connect the grounding wire to the grounding lug.
- Ensure that the connector of the power cord is properly seated in the power port of the equipment. After plugging the power cord into the equipment, secure the power cord with power cord retention clip.
- Do not place anything on the top of the equipment.
- 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.

3.2.1 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:

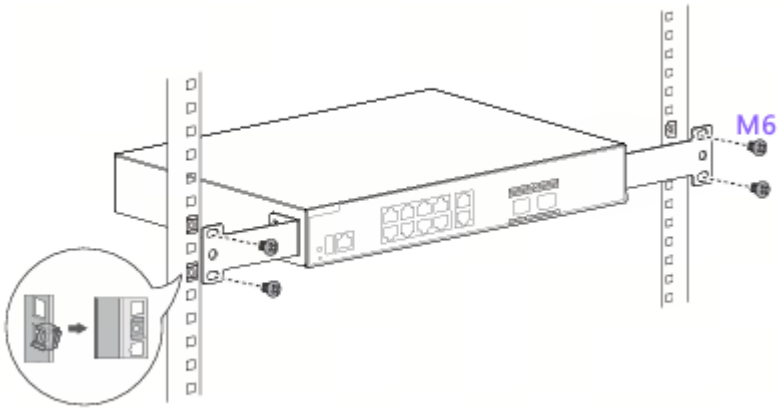
(1) Take the M3 x 6 mm cross recessed countersunk head screws and rack-mount brackets from the package. Align the rack-mount brackets with screw holes on both sides of the switch, and secure them using the M3 x 6 mm screws.

Figure 3-1 Tightening Screws



(2) Place the switch horizontally to an appropriate position in the rack. Use 4 x M6 screws and matching cage nuts (both screws and nuts are to be provided by the user) to secure the other end of the mounting brackets to the square hole rack posts.

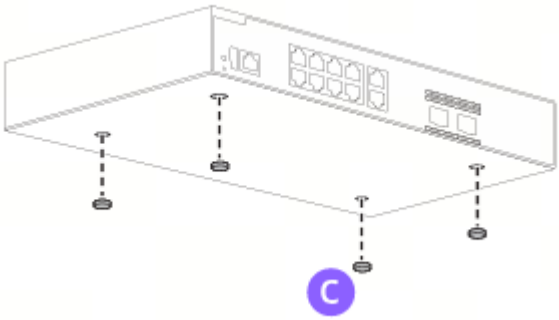
Figure 3-2 Mounting the Switch onto a Rack



3.2.2 Installing the Switch on a Workbench

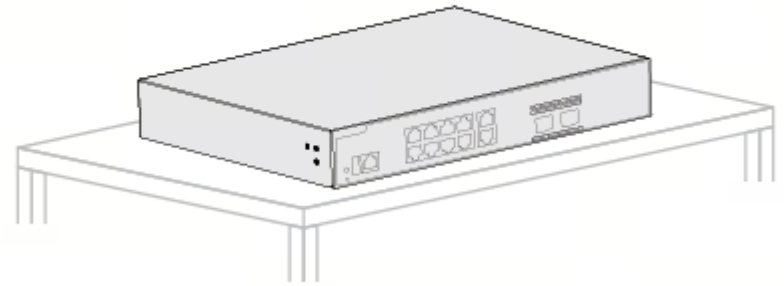
(1) Attach the four rubber pads to the four corners on the bottom of the switch.

Figure 3-3 Attaching the Rubber Pads



(2) Place the switch on the workbench and ensure adequate airflow.

Figure 3-4 Mounting the Switch on a Workbench

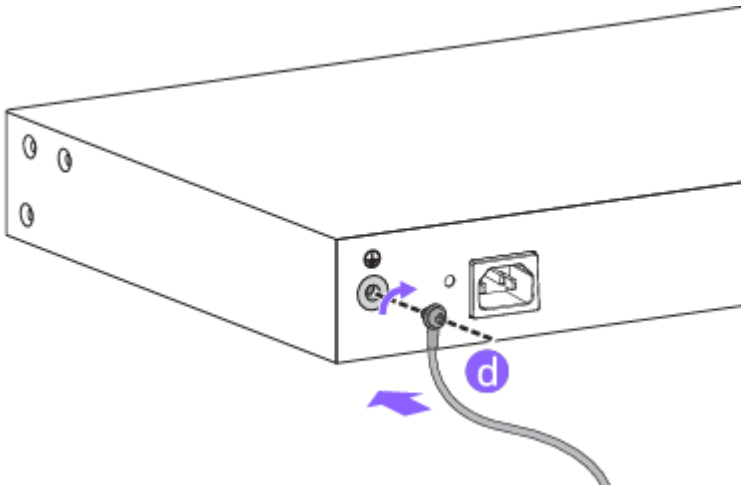


Note

The switch must be installed in a location where movement is restricted.

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 Protective Ground (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 Connecting the External Port Cables

Precautions

- Distinguish single-mode fiber (SMF) and multimode fiber (MMF) and ports.
- Avoid a small bend radius at the connector.

Steps

(1) 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.

(2) 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.

(3) 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.

3.5 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 fibers 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.

3.6 Verifying Installation

Caution

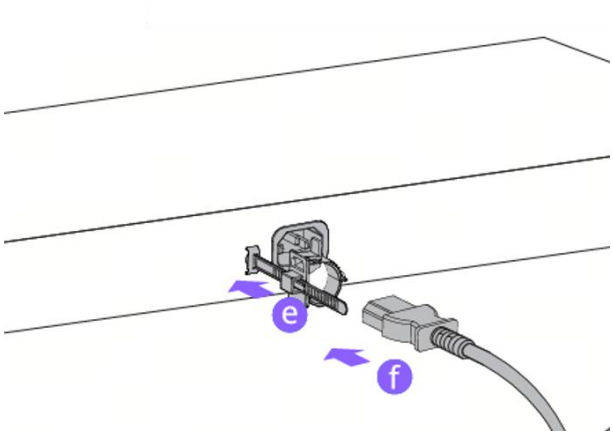
Turn off the power to avoid personal injury and damage to components caused by incorrect connection.

- 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 Connecting the Power Supply

Connect one end of the power cord delivered with the equipment to the AC power socket on the rear panel of the equipment, and the other end to the power supply device.



4.2 Setting Up the Configuration Environment

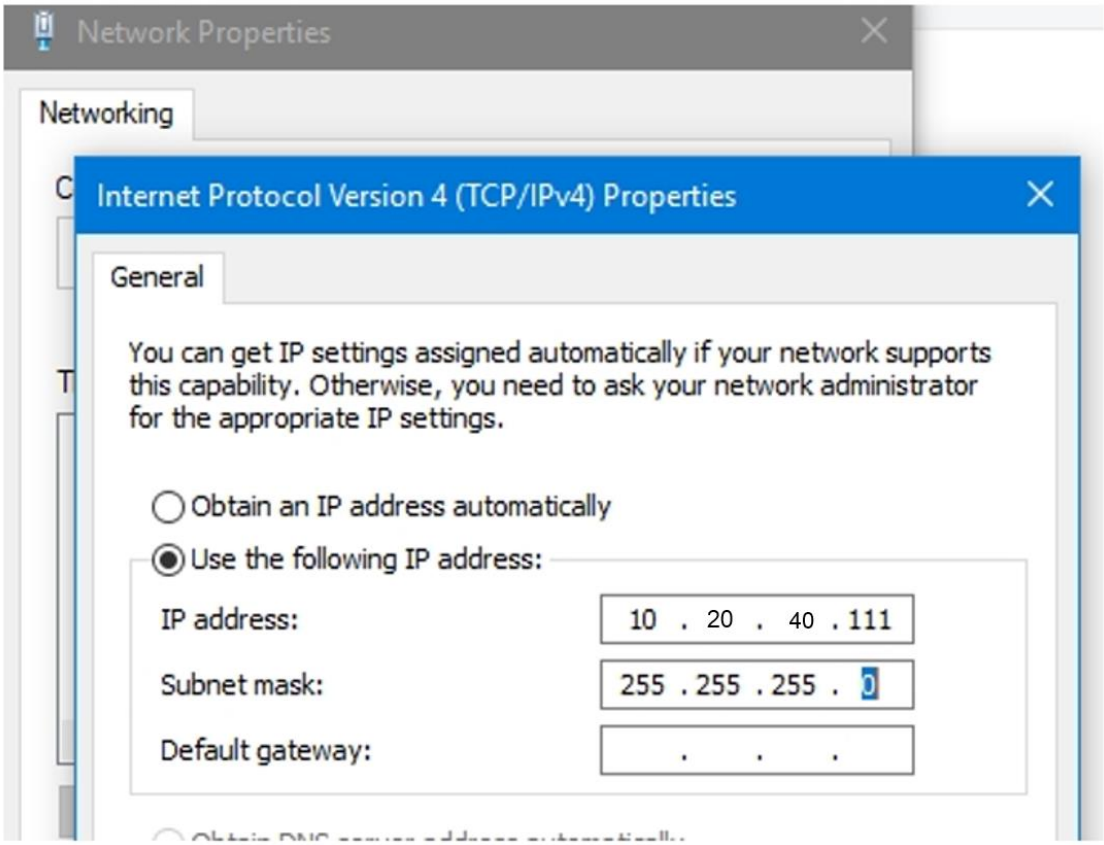
Connect the PC to the Ethernet port of the switch with an Ethernet cable.

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 Ethernet 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.



(2) 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**.

4.3 Power-on

4.3.1 Checklist Before Power-on

- The switch is properly grounded.
- The power cord is reliably connected.
- The supply voltage meets the requirement.
- The Ethernet port of the PC is properly connected to the Ethernet port of the switch. Parameters are set correctly.

4.3.2 Checklist After Power-on

- The LED status is normal.
- The main program is loaded properly.
- Service ports can forward data properly.

5 Appendix

5.1 Connectors and Media

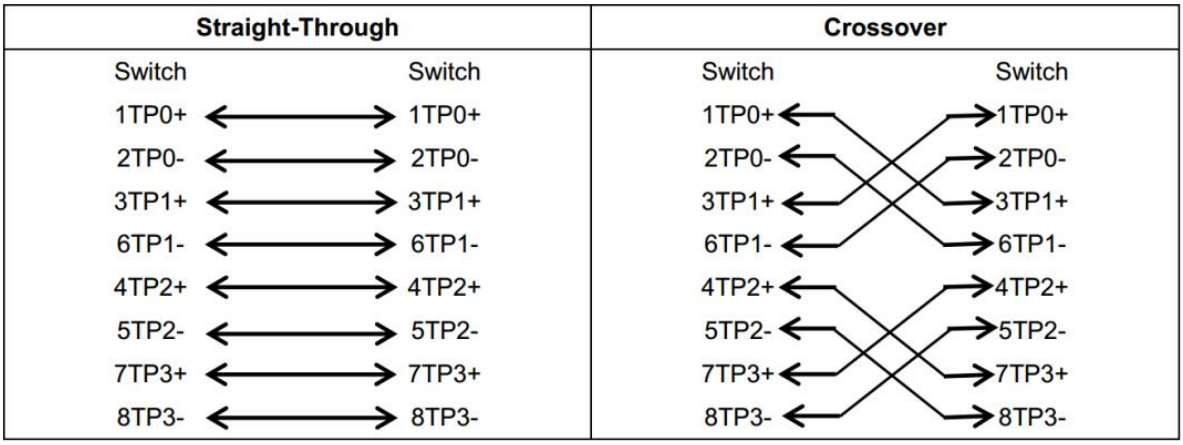
5.1.1 10/100/1000BASE-T Ports

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.

Figure 5-1 Twisted Pair Connections for 1000BASE-T Ports



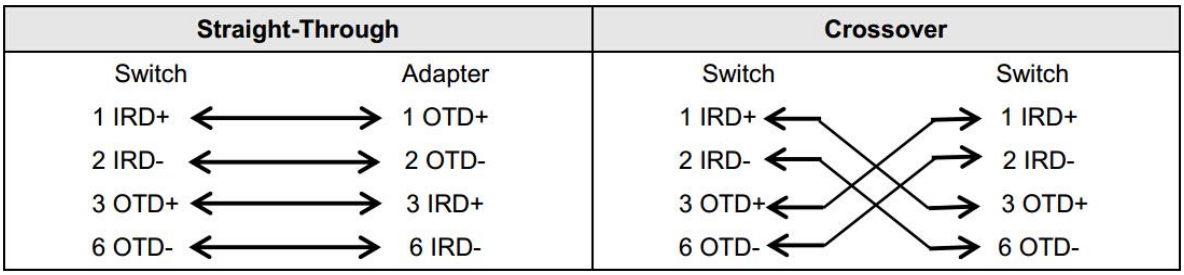
In addition to cables with the above-mentioned specifications, the 10/100BASE-T port can also be connected using 100-ohm CAT3, CAT4, and CAT5 cables at 10 Mbps or using 100-ohm CAT5 cables with a maximum distance of 100 m (328.08 ft.). The following table shows pin assignments for a 10/100BASE-T port.

Table 5-1 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.

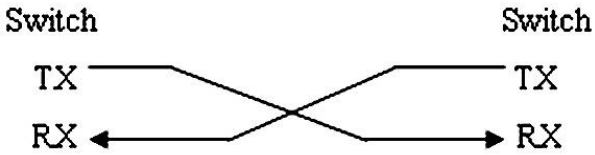
Figure 5-2 Twisted Pair Connections for the 10/100BASE-T Port



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.

Figure 5-3 Connecting an Optical Cable



5.2 SFP and SFP+ Transceivers

Ruijie provides supporting SFP transceivers and 10GE 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*.

Table 5-2 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-SM1550-BIDI	1550TX/1310RX	SMF	Yes	–5	0	–23	–3
GE-SFP-LH40-SM1310-BIDI	1310TX/1550RX	SMF	Yes	–5	0	–23	–3

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	–9	–3	–20	–3
GE-SFP-LX20-SM1550-BIDI	1550TX/1310RX	SMF	Yes	–9	–3	–20	–3
MINI-GBIC-LH40-SM1310	1310	SMF	Yes	–5	0	–23	–3
MINI-GBIC-ZX80-SM1550	1550	SMF	Yes	–2	5	–23	–1

Table 5-3 1GE SFP Copper Transceivers

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

Table 5-4 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)
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)
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)

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 the overload of the optical receiver when shorter distances of 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.

Table 5-5 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	1310TX/1550 RX	SMF	Yes	–9	–3	–16	0
2.5G-SFP-LX03-SM1550-BIDI-I	1550TX/1310 RX	SMF	Yes	–9	–3	–16	0

Table 5-6 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)

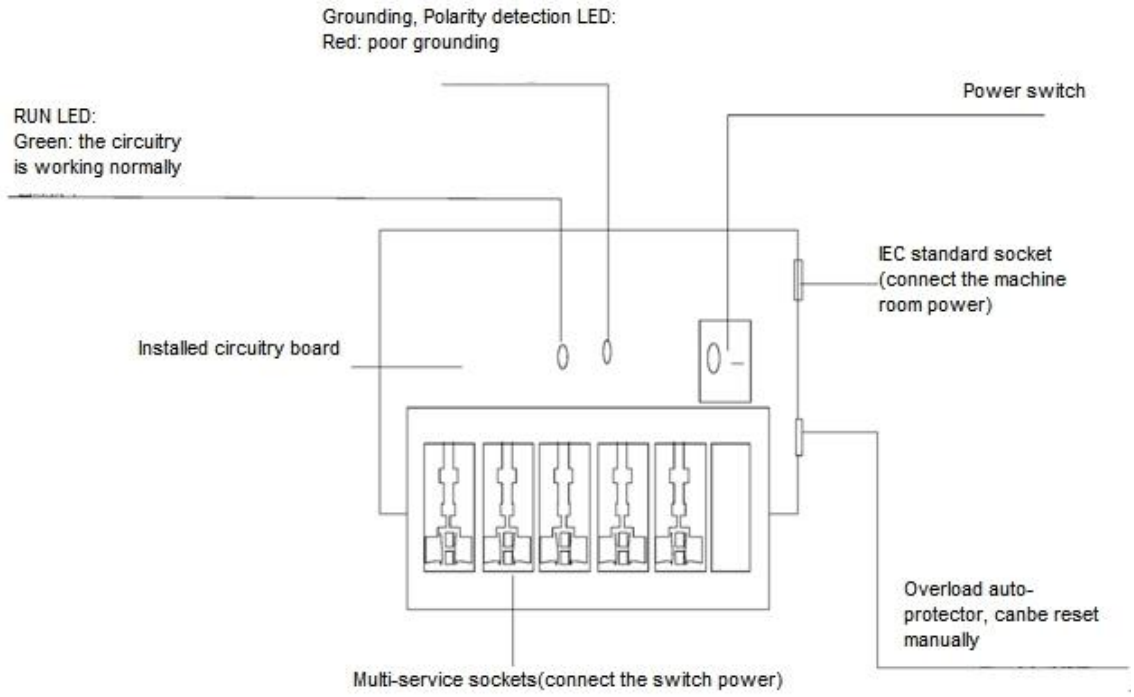
5.3 Lightning Protection

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.

Figure 5-4 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.

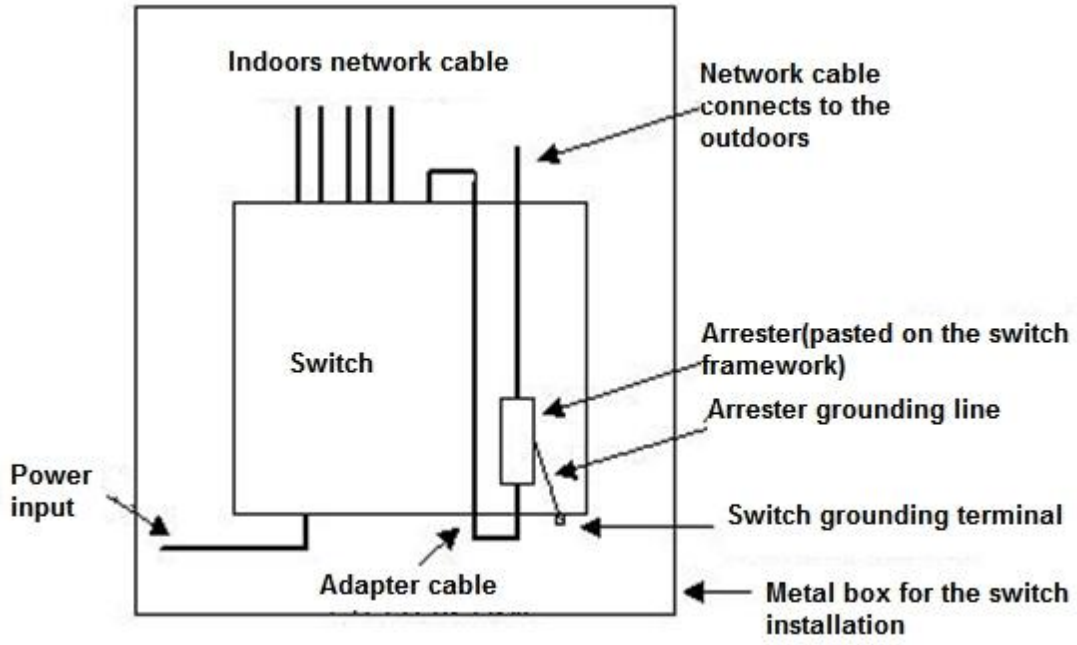
(2) Based on the distance between the grounding lug of the switch and the Ethernet port arrester, cut the grounding cable of the Ethernet port arrester and firmly tighten the grounding cable to the grounding lug of the switch.

(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.

Figure 5-5 Installing an Ethernet Port Arrester



Note

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.

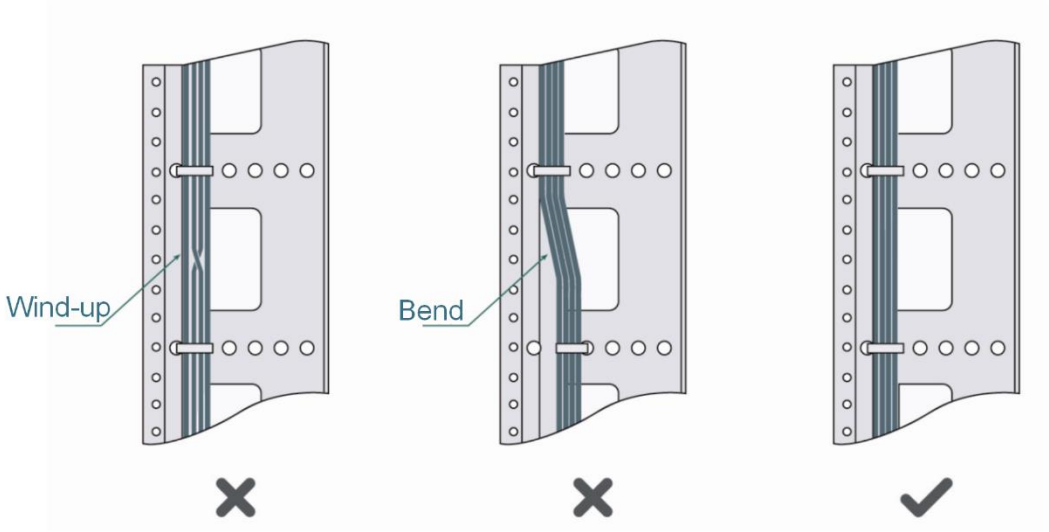
5.4.2 Requirement for the Minimum Bend Radius of Optical Cables

- 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

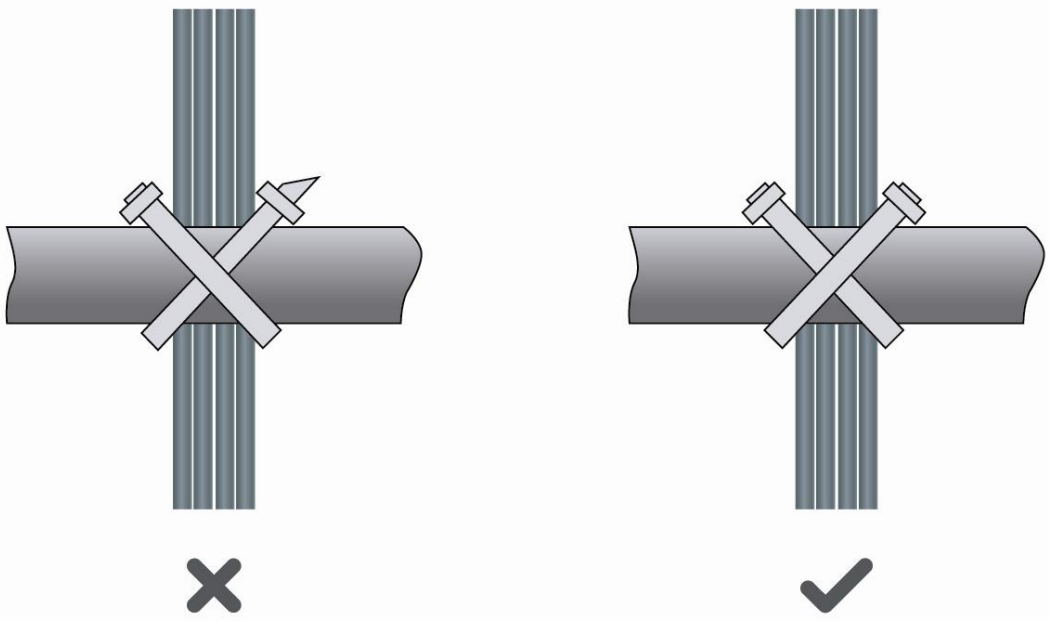
- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or improper bending.

Figure 5-6 Bundling Cables (1)



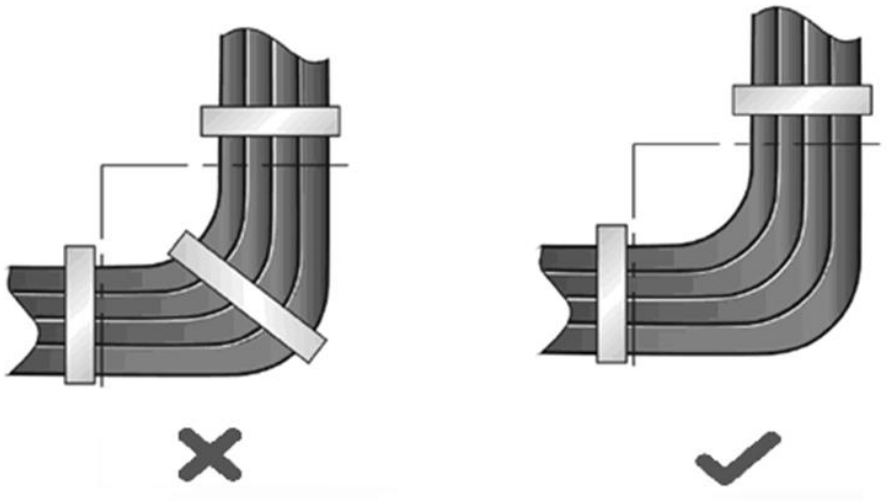
- Cables of different types (such as power cords, signal cables, and grounding wires) should be separated in cabling and bundling. Mixed bundling is not allowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance 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.

Figure 5-7 Bundling Cables (2)



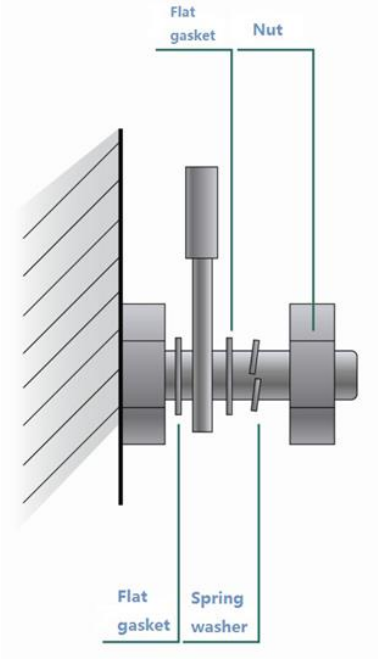
- When cables need to be bent, bundle them first but do not tie cables within the bend. Otherwise, stress may be generated on the cables and cause the wires inside to break.

Figure 5-8 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.

Figure 5-9 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.