Ruijie RG-NBS5500-12XS Switch

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
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Conventions

1. Signs

The signs used in this document are described as follows:

Danger

An alert that contains important safety instructions. Before you work on any equipment, be aware of the hazards involved and be familiar with standard practices in case of accidents.

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.

2. Note

The manual provides configuration information, including models, port types, and command line interfaces, for reference purposes only. In the event of any discrepancy or inconsistency between the manual and the actual version, the actual version shall take precedence.

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1 Introduction

1.1 Overview

The RG-NBS5500-12XS switch is a high-speed all-optical multi-port core switch launched by Ruijie Networks. It is easy to use, and can be managed by Ruijie Cloud. Its powerful Layer 3 performance and cost-effective 10G optical ports fully meet the service requirements of high-bandwidth data exchange. This switch supports virtual cloud stacking (VCS) and backup. In video surveillance and small- and medium-sized enterprise (SME) office scenarios, it provides reliable hot standby guarantee for key services. The front panel of the RG-NBS5500-12XS provides a management port, which can be connected to a PC using a common Ethernet cable for configuration, making after-sales operation and maintenance more convenient. This switch also supports hybrid cables, providing more stable high bandwidth guarantee for long-distance transmission.

Model	Number of 10 Gbps Optical Ports	MGMT Port	Console Port	Number of Fan Modules	Number of Power Supply Modules
RG-NBS5500-12XS	12	1	N/A	2	1 x fixed power supply module

Note

The SFP+ port is backward compatible with a 1G SFP transceiver.

1.2 Package Contents

Table 1-1 Package Contents

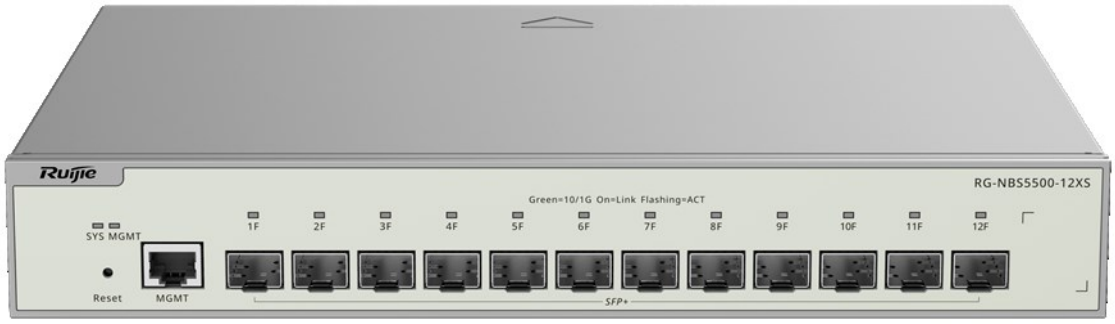
No.	Item	Quantity
1	RG-NBS5500-12XS switch	1
2	Rack-mount Brackets	2
3	M3 x 6 mm Philips countersunk screws	8
4	User Manual	1
5	Rubber pad	4
6	Warranty Card	1
7	Power cord	1 x 1 m (3.28 ft.)
8	Grounding cable	1
9	Power cord retention clip	1

Note

The package contents above are intended to provide a general overview, and are subject to the terms of the order contract. Check your goods carefully against the order contract. If you have any questions, please contact the distributor.

1.3 Product Appearance

The RG-NBS5500-12XS switch provides 12 x SFP+ ports, one 10/100BASE-T RJ45 MGMT port, and one reset button on the front panel. The rear panel provides an AC power connector. The following figures show the product appearance.



1.3.1 Front Panel

Figure 1-1 Front Panel

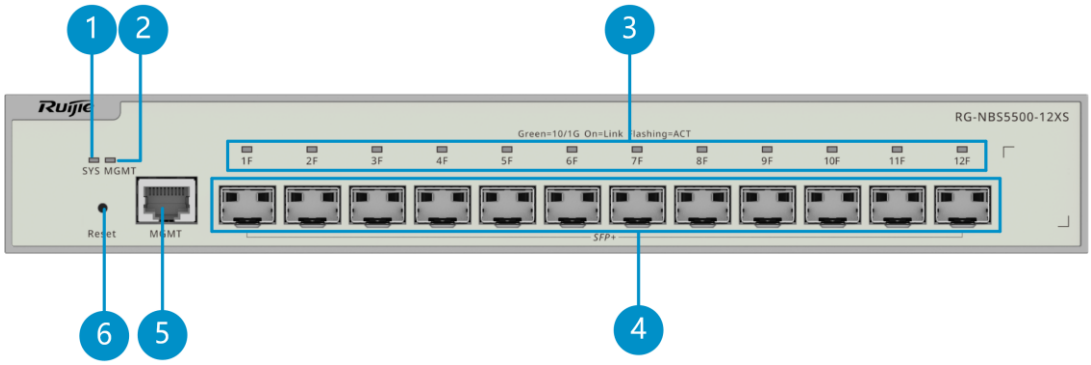


Table 1-2 Components on the Front Panel

No.	Component	Description
1	System status LED	● Off: The switch is not powered on. ● Fast blinking green: The switch is starting up or upgrading. ● Slow blinking green: The switch has started, and is working properly, but is not connected to Ruijie Cloud. ● Solid green: The switch is operating normally, and is connected to Ruijie Cloud. ● Blinking red: The switch is not operating normally, and a loop has

		occurred.
2	MGMT port LED	● Off: No link is established on the port. ● Solid green: The port is connected, but no data is being transmitted. ● Blinking green: The port is connected, and data is being transmitted.
3	Optical port status LED	● Off: No link is established on the port. ● Solid green: The port is working properly at 1/10 Gbps, but no data is being transmitted. ● Blinking green: The port is working properly at 1/10 Gbps, and data is being transmitted.
4	SFP+ port	Can be connected to an SFP+ transceiver or SFP transceiver, and supports hot swapping.
5	MGMT port	1 x 10/100BASE-T Ethernet port with a standard RJ45 connector, which can be used to connect to the PC for configuration and management.
6	Reset button	● Press and hold the button for less than 2 seconds: The system restarts. ● Press and hold the button for more than 5 seconds, and then release when the system LED starts flashing: The web password is restored to the default value, and the system restores to factory defaults and restarts after the configuration file is saved. ● Press and hold the button for 2 to 5 seconds: No action is triggered.

1.3.2 Rear Panel

Figure 1-2 Rear Panel

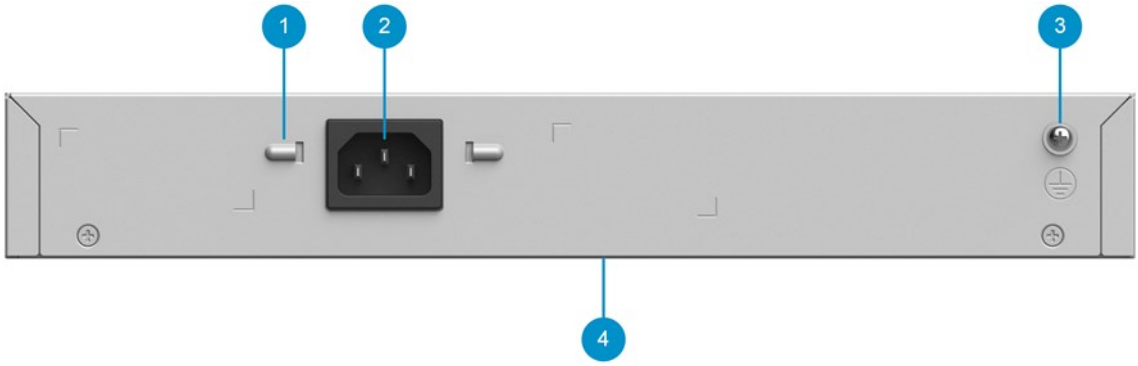


Table 1-3 Components on the Rear Panel

No.	Component	Description
1	Power cord retention clip holes	Holds the power cord retainer clip.
2	Power Connector	Connects to an external AC power supply.
3	Grounding stud	Secures the grounding lug to connect the chassis to an earth ground.
4	Label	Located at the bottom of the switch.

1.4 Technical Specifications

Table 1-4 Technical Specifications

Product Model	Parameter Name	RG-NBS5500-12XS
Product Information	Warranty	5 years
System Specifications	RAM	1 GB
	Flash memory	256 MB
Port Specifications	Total number of optical ports	12
	Number of 10GE SFP+ ports	12
	MGMT port	1
	Ethernet cable type	CAT5e
	LEDs	1 x system status LED 12 x SFP+ port LEDs
Power Supply and Consumption	Power supply	Fixed power supply
	Power input	220 V AC power supply: ● 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 ● Maximum input current: 2 A
	Maximum power consumption	44 W
Dimensions and Weight	Casing	Metal
	Product dimensions (W x D x H)	300 mm x 232 mm x 44 mm (11.81 in. x 9.13 in. x 1.73 in.)
	Weight	2.26 kg (4.98 lbs) (without packaging materials)
	Shipping weight	3.04 kg (6.7 lbs)
	Rack space	Rack requirement: 19-inch rack
Environment and Reliability	Fan	2 x fixed fans
	Cooling	Air cooling, left-to-right airflow
	Mounting options	Rack
	MTBF	400,000 hours

Product Model	Parameter Name	RG-NBS5500-12XS
	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% RH to 90% RH (non-condensing)
	Storage humidity	5% RH to 95% RH (non-condensing)
	Altitude	Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)
	Surge protection	Service port: ±6 kV for common mode Power connector: ±6 kV for both common mode and differential mode
Certification and Regulatory Compliance	Certification	CE, FCC, IC, cTUVus

Caution

- This product belongs to Class A.
- This equipment is not suitable for use in locations where children are likely to be present.
- The switch has a built-in lithium battery to keep the real-time clock running when external power source is unavailable. To replace the lithium battery, please contact Ruijie Networks Customer Service Technical Support to have it replaced with a lithium battery of the same specifications.
- Replacement of a battery with an incorrect type may cause fire and explosion, or compromise the safety features of the device. Replace the battery only with the same or equivalent type.
- A battery subjected to extremely high temperature and/or low air pressure may result in an explosion or the leakage of flammable liquid or gas.
- Disposal of a battery into a fire or by crushing or puncturing it can result in an explosion.

Warning

Operation of this equipment in a residential environment could cause radio interference.

2 Preparing for Installation

2.1 Safety Precautions

Note

To avoid bodily injury and device damage, carefully read the safety precautions before you install the device.

The following safety precautions may not cover all possible dangers.

2.1.1 General Safety Precautions

- Install the device in a standard 19-inch rack, and ensure that the rack and power distribution system are properly grounded.
- Do not place the device in a wet area, and keep it away from any liquid. Keep the chassis clean and dust-free.
- Keep the device away from heat sources.
- Do not place the device in walking areas.
- During installation and maintenance, do not wear loose clothes, jewelry, or any other objects that may be hooked by the chassis.
- Do not place tools and accessories in walking areas.

2.1.2 Handling Safety

- Avoid handling the device frequently after the device is installed.
- Turn off all power supplies and disconnect all power cords and cables before moving or handling the device.

2.1.3 Electrical Safety

Warning

- Any non-standard or improper electrical operation can lead to accidents such as fires or electric shocks, causing severe, or even fatal damage to the human body and the device.
- Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.

- Observe local regulations and specifications when performing electrical operations. Only qualified personnel should handle these tasks.
- Carefully check the work area for potential hazards, including ungrounded power system, insufficient grounding, and damp or wet ground.
- Locate the emergency power supply switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Carefully inspect the device and the environment before powering on or off the device.
- Select the right leakage protector (also called “leakage current switch” or “leakage current breaker”) for the power supply system. This device automatically disconnects the power supply in the event of leakage and

the risk of electric shock. A leakage protector should meet the following requirements:

- The rated leakage action current of each leakage protector is greater than twice of the theoretical maximum leakage current of all the power supplies in the system. For example, if a system is equipped with 16 identical power supplies, and the leakage current of each power supply is equal to or less than 3.5 mA, then the leakage current of the system totals 56 mA. A leakage protector with a rated leakage action current of 30 mA supports no more than four power supplies (that is, action current of the leakage protector/2/Maximum leakage current of each power supply = 30/2/3.5 ≈ 4.28). In this case, 16 power supplies in the system require at least four leakage protectors with a rated action current of 30 mA, with each leakage protector supporting four power supplies. Although the number of power supplies in a system differs in models, the rated leakage action current of each leakage protector divided by two must be greater than the sum of the maximum leakage current of all the 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 values vary with products. For the leakage current value of each product model, see the technical specifications in 1.4 Technical Specifications.

2.1.4 ESD Safety

- Properly ground both the device and the floor.
- Keep the indoor installation environment clean and dust-free.
- Maintain appropriate humidity conditions.
- Before installing any pluggable modules, wear an ESD wrist strap and make sure that it is well grounded.
- Avoid touching the printed circuit board with clothing or any other objects. ESD wrist straps only offer protection against static electricity on the body and not on clothing.

2.1.5 Laser Safety

The device supports various types of optical transceivers available on the market, and these optical transceivers 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 any 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.

2.2 Installation Environment Requirements

Install the device indoors to ensure its normal operation and prolonged service life. The installation site must meet the following requirements.

2.2.1 Bearing Requirements

Assess the combined weight of the device and its accessories, including the cabinet, chassis, and power supply modules, and verify that the installation site's ground meets the necessary specifications.

2.2.2 Ventilation Requirements

Reserve sufficient space in front of the air vents to ensure normal heat dissipation. After cables are connected, bundle the cables or place them in the cable management brackets to avoid blocking air inlets.

2.2.3 Space Requirements

Maintain an indoor pathway of at least 0.8 m (31.50 in.) wide to ensure sufficient room for chassis handling and module swapping.

Do not install the device directly against a wall. Instead, maintain a minimum clearance of 0.4 m (15.75 in.) around the device for heat dissipation and device maintenance.

2.2.4 Temperature and Humidity Requirements

To ensure normal operation and prolonged service life of the device, it is essential to maintain suitable temperature and humidity conditions in the equipment room. Prolonged exposure to excessively high or low temperature and humidity can potentially cause damage to the device.

- If the relative humidity is too high, insulating materials may exhibit poor insulation, increasing the risk of electrical leakage. Furthermore, high humidity can cause mechanical changes in materials and corrosion of metallic components.
- If the relative humidity is too low, insulating gaskets may shrink, increasing the risk of static electricity generation. This static electricity can pose a danger to the circuits inside the device.
- In a dry environment, static electricity is prone to occur and damage the internal circuits of the device.
- High temperature environments can be detrimental to the device, leading to reduced performance and a shorter service life. Prolonged exposure to high temperatures can expedite the device's aging process.

Note

The operating temperature and humidity of the device are measured 1.5 m (59.06 in.) above the floor and 0.4 m (15.75 in.) before the rack when there is no protective plate in front or at the back of the rack.

2.2.5 Cleanliness Requirements

Dust poses a major threat to the operational safety of the device. The buildup of dust on the device can result in static electricity, causing poor contact between the metallic joints. Dust buildup is more likely to occur in environments with low relative humidity, which not only impacts the service life of the device but also increases the likelihood of communication failure. The following table shows the specifications for dust concentration and particle size in the equipment room.

Table 2-1 Requirements for Dust

Particle Size	Unit	Concentration
≥ 0.5 μm	Particles/m^3	≤ 3.5 x 10^6
≥ 5 μm	Particles/m^3	≤ 3.5 x 10^4

Apart from dust, the salt, acid, and sulfide in the air of the equipment room must meet strict requirements. These harmful substances will accelerate metal corrosion and component aging. Therefore, the equipment room should be properly protected against the intrusion of harmful gases, such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and chlorine gas. The following table lists limit values for harmful gases.

Table 2-2 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 one week. **Maximum** refers to the upper limit of harmful gases measured in one week for up to 30 minutes every day.

2.2.6 Grounding Requirements

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

- **Secure Grounding**

Ensure that the rack and power distribution device are securely grounded if the device uses the AC power supply. Failure to do so may result in an increased risk of electric shock, particularly when the insulation resistance between the power supply inside the device and the chassis decreases.

Caution

- The building should provide a protective ground connection to ensure that the device 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 of facilities is standalone, and is composed of a lightning rod, a down conductor, and a connector connected to the grounding system. The grounding system is usually used for power reference grounding and safety grounding of the rack. Lightning grounding is required only for facilities, and is not required for the device.

- **EMC Grounding**

Grounding for electromagnetic compatibility (EMC) includes shielded grounding, filter grounding, noise and interference suppression, and level reference. The grounding resistance should be less than 1 ohm. The grounding terminals on the rack should be grounded before device running.

2.2.7 Anti-interference Requirements

- Take interference prevention measures for the power supply system.
- Keep the device far away from the grounding facility or lightning and grounding facility of the power device as much as possible.
- Keep the device away from high-frequency current devices such as high-power radio transmitting stations and radar launchers.
- Take electromagnetic shielding measures when necessary.

2.2.8 Surge Protection Requirements

- Although the device provides a certain level of protection against lightning strikes, it remains vulnerable to exceptionally strong strikes. The following lightning protection measures should be taken: Ensure that the grounding cable 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 power lightning arrester in front of the power input end to enhance surge protection for the power supply.

2.2.9 Installation Site Requirements

Regardless of whether the device is installed in a rack or on a workbench, the following conditions must be met:

- Maintain a proper clearance around the air inlets and outlets for heat dissipation.
- The switch is equipped with fans and adopts a left-to-right airflow design. Maintain a minimum clearance of

150 mm (5.91 in.) around the air outlets for heat dissipation. You are advised to install the device 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 device and its accessories.
- The installation site is properly grounded.

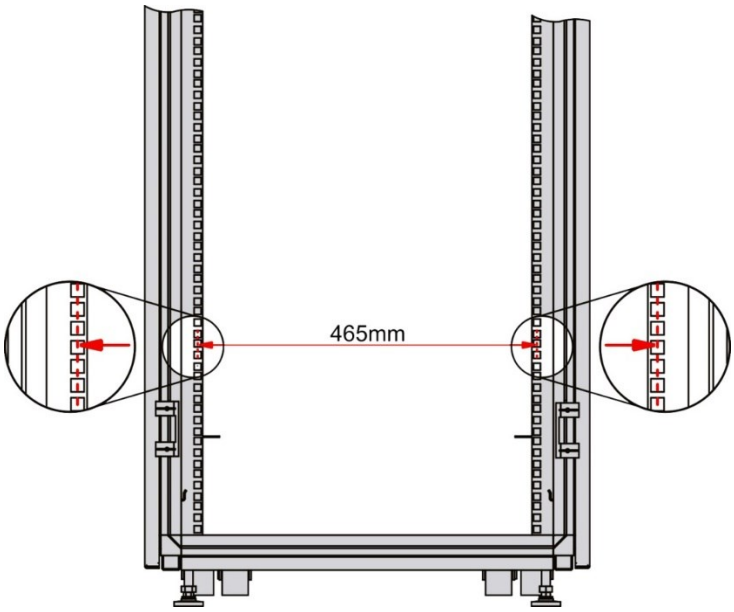
2.3 Rack Requirements

If you plan to install the device 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 square-hole rack post is at least 180 mm (7.09 in.) from the front door, and the front door is at most 25 mm (0.98 in.) thick. This ensures an available clearance of at least 155 mm (6.10 in.). The rack depth (distance between front and rear doors) is at least 1000 mm (39.37 in.).

(4) The guide rails can bear the weight of the device 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 good ventilation system. The open area of front and rear doors is greater than 50%.

2.4 Tools

Table 2-3 Tools

Common Tools	Phillips screwdriver, power cords, Ethernet cables, cage nuts, diagonal pliers, and cable ties
Special Tools	ESD gloves, wire strippers, crimpers, RJ45 connector crimping pliers, and wire cutters
Meters	Multimeter
Relevant Devices	PC, display, and keyboard

Note

The device is delivered without a toolkit. You need to prepare the preceding tools by yourself.

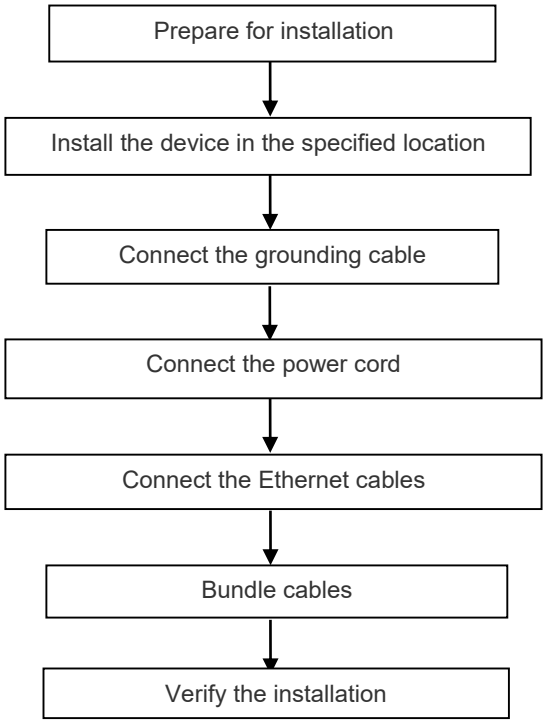
3 Installing the Switch

Caution

Before installing the device, ensure that all the requirements described in Chapter 2 are met.

3.1 Installation Procedure

Figure 3-1 Installation Flowchart



3.2 Before You Begin

- The installation site provides sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements of the device.
- The power supply is available at the installation site, and its current meets the requirement.
- The Ethernet cables have been deployed at the installation site.
- The selected power supply meets the requirement on the system power.
- The position of the indoor emergency power switch is located before installation, so that the power switch can be cut off in case of an accident.

3.3 Install the Device in the Specified Location

3.3.1 Precautions

Pay attention to the following during installation:

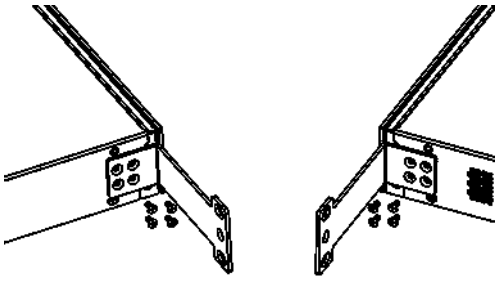
- Connect the power wires of different colors to the corresponding cable terminals.
- Ensure that the connector of the power cord is properly seated in the power connector of the device. After plugging the power cord into the device, secure the power cord with the power cord retention clip.
- Do not place any object on top of the device.
- Maintain a minimum clearance of 100 mm (3.94 in.) around the device to ensure proper airflow. Do not stack switches.
- Keep the device away from high-power radio stations, radar launch pads, and high-frequency large-current devices. Take electromagnetic shielding measures to minimize interference when necessary, for example, use shielded cables.
- Use Ethernet cables of 100 meters (328.08 feet) indoors. Take lightning protection measures if they need to be routed outdoors.

3.3.2 Installing the Switch in a Rack

The switch meets the EIA standard, and can be installed in a 19-inch rack. The installation process is as follows:

Step 1: Take out the eight M3 x 6 mm screws from the supplied rack mounting bracket package, and install one end of the mounting bracket to the switch, as shown in Figure 3-2.

Figure 3-2 Install the Switch Using Rack Mounting Brackets



Step 2: Place the switch horizontally in the rack. Use the supplied M6 screws and matching cage nuts to secure the other end of the mounting bracket to the front mounting rail of the rack, as shown in Figure 3-3 and Figure 3-4.

Figure 3-3 Mounting the Switch to the Rack

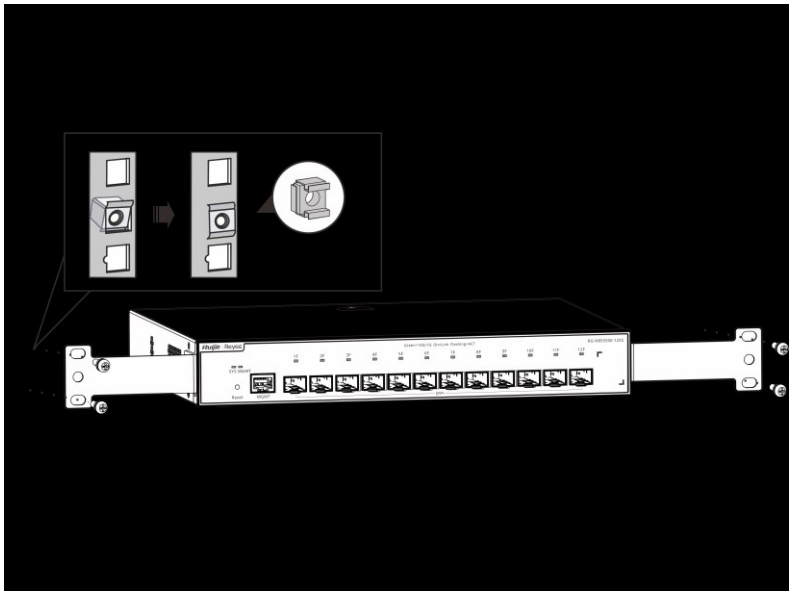
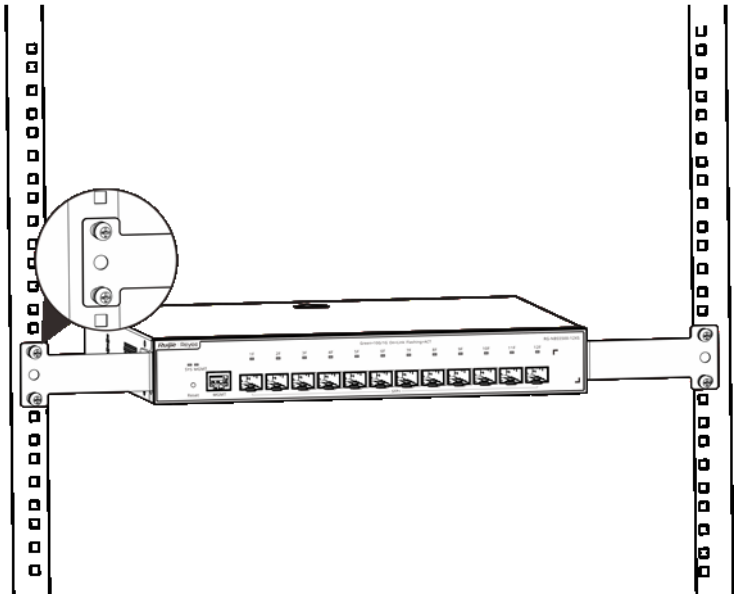


Figure 3-4 Switch Mounted in the Rack



3.4 Connecting the Grounding Cable

The grounding stud on the rear of the switch should be connected to the grounding lug of the rack, which should be connected to the ground bar in the equipment room.

Caution

- To ensure personal and device safety, it is necessary to provide a proper grounding for the device.
- The O&M personnel should verify if the AC outlet is properly connected to the protective ground of the building. If not, they should connect the protective earth conductor of the AC outlet's protective earth lug to the building's protective earth.
- The power socket should be near the device and easily accessible.

- During device installation, connect the grounding cable first and disconnect it last.
- The cross-sectional area of a protective grounding cable should be at least 2.5 mm^2 (12 AWG).
- The sectional area of a grounding cable should be determined by the possible maximum current. Grounding cables with good conductors should be used.
- Do not use bare wire.
- The resistance between the chassis and the ground should be less than 1 ohm.

3.5 Connecting Cables

This chapter describes how to connect the power cord, Ethernet cables, and optical cables.

3.5.1 Precautions

- Use the delivered power cord. Otherwise, security accidents may occur.
- Use Ethernet cables of 100 meters (328.08 feet) indoors. Take lightning protection measures if they need to be routed outdoors.
- Correctly distinguish between single-mode and multi-mode optical cables and connectors, and avoid excessive small-radius bending at the joints.
- When connecting optical cables, ensure that the transmitting end of this device is connected to the receiving end of the peer device, and that the receiving end of this device is connected to the transmitting end of the peer device.

3.5.2 Steps

After the switch is successfully installed, proceed to connect cables to external devices by following these steps:

(1) Before connecting the power cord, ensure that the mains power supply is cut off.

(2) Connect the supplied power cord to the power connector on the device, and then plug the other end of the power cord into a power socket.

(3) Properly insert the optical transceiver into the designated optical port on the front panel as indicated by the labeling. Next, connect the single-mode or multi-mode optical cable to the corresponding port on the optical transceiver, ensuring correct identification of the receiving and sending ends of the cable.

(4) Insert the twisted pair cable with RJ45 connector into the corresponding port as indicated by the labeling, and distinguish the crossover cable and the straight-through cable.

3.6 Bundling Cables

3.6.1 Precautions

- Bundle the power cord and other cables in a visually pleasing way.
- Ensure that the fibers at joints have natural bends or bends with a large radius.
- Do not bind fibers and twisted pair cables too tightly, as this could exert excessive pressure on the fibers, potentially affecting their lifespan and transmission performance.

3.6.2 Steps

(1) Bind the drooping part of the optical cables and twisted-pair cables, and route them to both sides of the chassis for convenience.

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

(3) Bind the power cord closely along the bottom of the chassis in a straight line wherever possible.

3.7 Verifying the Installation

Caution

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

- Verify that the grounding cable is securely connected.
- Verify that the Ethernet cables and power cord are properly connected.
- Verify that the cables with a length of 100 meters (328.08 feet) are deployed indoors. If not, check whether the power supply and interfaces are protected from lightning strikes.
- Verify that there is a minimum clearance of 100 mm (3.94 in.) around the switch.

4 Verifying the Operating Status

4.1 Setting Up the Configuration Environment

4.1.1 Connecting the PC to the Switch

- Connect one RJ45 connector of the Ethernet cable to the Ethernet port of the PC.
- Connect the other RJ45 connect of the Ethernet cable to the MGMT port of the switch.

4.1.2 Logging In to the Web Interface

(1) Configure your PC with an IP address in the subnet 10.44.77.XXX (1-255, excluding 200).

(2) Open a browser on the PC, then enter 10.44.77.200 to go to the web interface of the switch. You can use the default password “admin” for login for the first time. To ensure security, you are advised to change the password after login, and update the password regularly.

4.2 Powering On

4.2.1 Checklist Before Power-on

- The switch is properly grounded.
- The power cord is properly connected.
- The input voltage meets the requirement.
- The Ethernet cable is properly connected. The terminal (it can be a PC) used for configuration is already started, and the parameters are configured correctly.

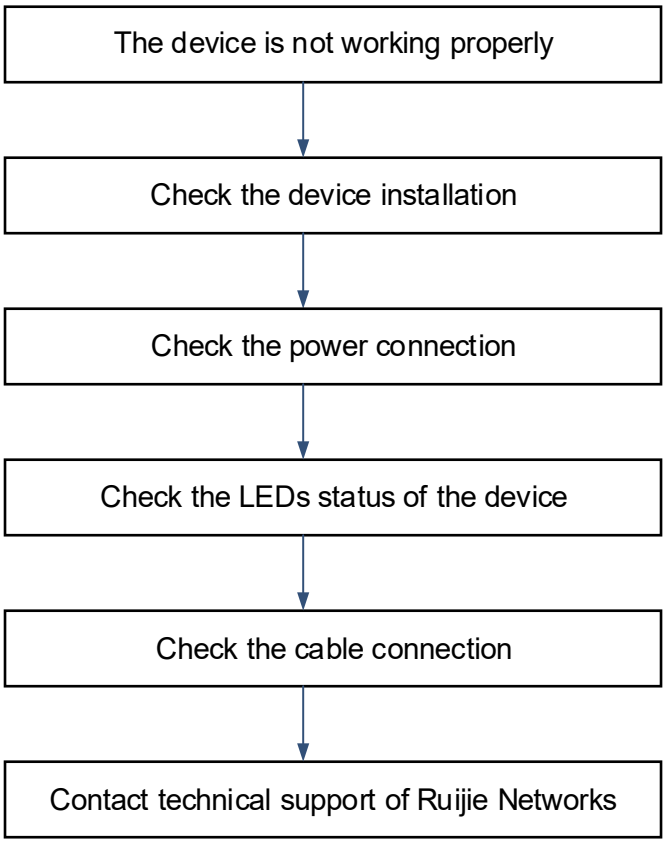
4.2.2 Checklist After Power-on

After the switch is powered on, check the following to ensure normal configuration:

- LEDs of the switch are in the normal state.
- The main program is loaded properly.
- Service ports can forward data properly.

5 Common Troubleshooting

5.1 Troubleshooting Flowchart



5.2 Troubleshooting

Fault Symptom	Possible Cause	Solution
The login password cannot be retrieved.	The login password is forgotten after being configured.	Press and hold the reset button to restore the device to factory settings.
The system status LED is off after the switch is powered on.	No power is supplied to the switch or the power cord is loose.	Check whether the power socket in the equipment room is normal and whether the power cord connected to the switch is loose.
An optical port cannot be connected.	The receiving and transmitting ends are connected incorrectly.	Exchange the transmitting and receiving ends of the optical cable.
	The types of interconnected optical transceivers do not match.	Replace the optical transceiver with another one of the same type.

	The optical cable type does not meet requirements.	Replace the optical cable with a qualified one.
	The length of the optical cable is beyond the allowed length marked on the optical transceiver.	Use an optical cable of required length.
	The fiber or connector is contaminated.	Clean the end face with a dust-free cloth or a cleaning pen.

6 Appendix

6.1 Appendix A: Ports, Connectors, and Media

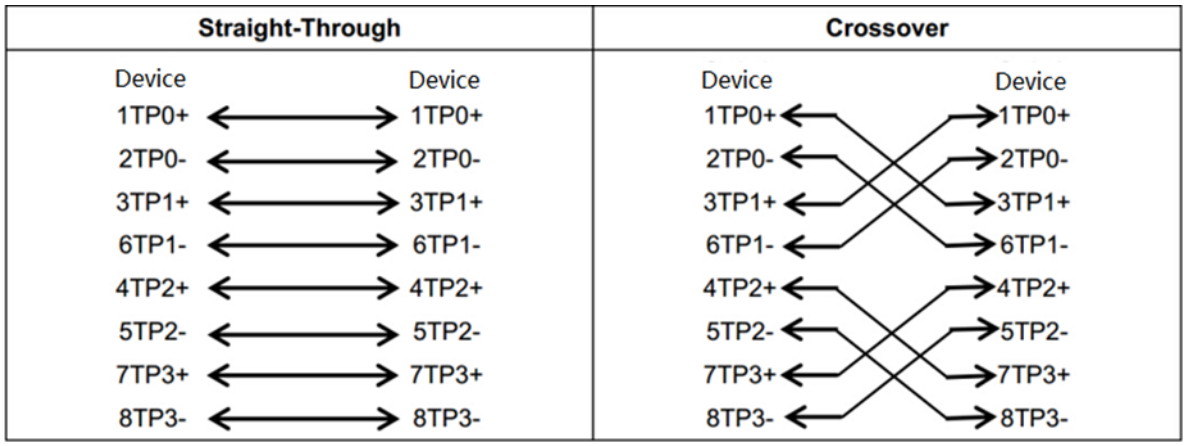
6.1.1 1000BASE-T/100BASE-TX/10BASE-T Ports

The 1000BASE-T/100BASE-TX/10BASE-T port is a 10/100/1000 Mbps auto-negotiation port that supports auto medium-dependent interface/MDI crossover (MDI/MDIX). RJ45 connectors are supported.

Compliant with IEEE 802.3ab, the 1000BASE-T port requires 100-ohm Category 5 or Category 5e unshielded twisted pair (UTP) or shielded twisted pair (STP) (recommended) with a maximum distance of 100 meters (328 feet).

The 1000BASE-T port requires all four pairs of wires to be connected for data transmission. Figure 6-1 shows the four twisted pairs for the 1000BASE-T port.

Figure 6-1 1000BASE-T Twisted Pair Connections



The 100BASE-TX/10BASE-T ports can be connected using cables of the preceding specifications. The 10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables with a maximum distance of 100 meters (328 feet). The 100BASE-TX port can be connected using 100-ohm Category 5 cables with a maximum distance of 100 meters (328 feet). Table 6-1 shows 100BASE-TX/10BASE-T pin assignments.

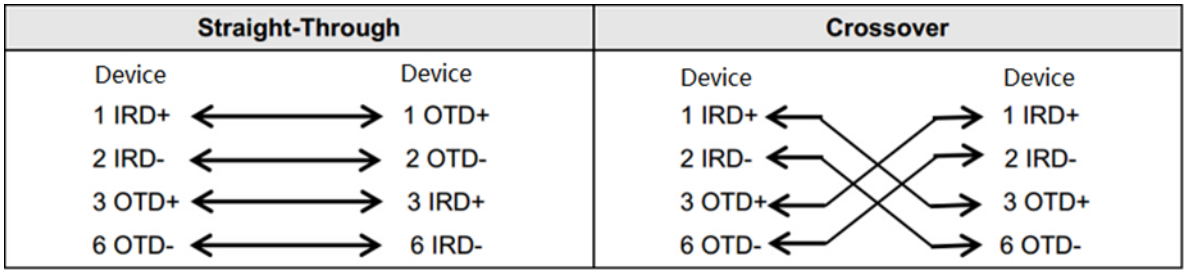
Table 6-1 100BASE-TX/10BASE-T Pin Assignments

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, 8	Not Used	Not Used

Figure 6-2 shows wiring of straight-through and crossover cables for the 100BASE-TX/10BASE-T port.

Figure 6-2 100BASE-TX/10BASE-T Twisted Pair Connections



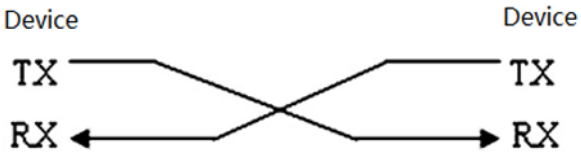
6.1.2 SFP and SFP+ Ports

SFP and SFP+ ports are also called optical ports, which require optical transceivers or copper SFP transceivers.

- The optical transceiver of an SFP or SFP+ port is connected to the peer port using LC connectors and optical cables.
- The copper SFP transceiver is connected to the peer port using RJ45 connectors and Ethernet cables.

Use a single-mode fiber (SMF) or multimode fiber (MMF) for connection based on the type of the optical transceiver. Figure 6-3 shows the connection of optic cables. Note that the TX end of the local device is connected to the RX end of the peer device, and the RX end of the local device is connected to the TX end of the peer device.

Figure 6-3 Optic Cable Connection



6.2 Appendix B: SFP and SFP+ Modules

We provide optical transceivers according to the port types. You can select the optical transceiver to suit your specific needs.

The SFP transceivers are 1G transceivers and SFP+ transceivers are 10G transceivers. Besides, copper SFP transceivers (Mini-GBIC-GT transceivers) are supported. The following models and technical specifications of some SFP and SFP+ transceivers are provided for your reference. For details about the technical specifications, see *Ruijie Optical Module Hardware Installation and Reference Guide* .

6.2.1 SFP Modules

Table 6-2 Models and Specifications of SFP Modules

Model	Wavelength (nm)	Optical Cable type	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
MINI-GBIC-SX-MM850	850	MMF	No	–9.5	–3	–17	0
MINI-GBIC-LX-SM1310	1310	SMF	No	–9.5	–3	–20	–3
GE-eSFP-SX-MM850	850	MMF	Yes	–9.5	–3	–17	0
GE-eSFP-LX-SM1310	1310	SMF	Yes	–9.5	–3	–20	–3
GE-SFP-LX-SM1310	1310	SMF	No	–9.5	–3	–20	–3
MINI-GBIC-LH40-SM1310	1310	SMF	Yes	–2	3	–22	–3
GE-SFP-SX-SM1310-BIDI	1310	MMF	No	–10	–5	–17	–3
GE-SFP-SX-SM1550-BIDI	1550	MMF	No	–10	–5	–17	–3
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
GE-SFP-LH40-SM1310-BIDI	1310TX/1550RX	SMF	Yes	–5	0	–24	–1
GE-SFP-LH40-SM1550-BIDI	1550TX/1310RX	SMF	Yes	–5	0	–24	–1
MINI-GBIC-ZX50-SM1550	1550	SMF	Yes	–5	0	–22	–3
MINI-GBIC-ZX80-SM1550	1550	SMF	Yes	0	4.7	–22	–3
MINI-GBIC-ZX100-SM1550	1550	SMF	Yes	0	5	–30	–9

Model	Wavelength (nm)	Optical Cable type	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
GE-SFP-SX	850	MMF	No	–9.5	–3	–17	0
GE-SFP-LX	1310	SMF	No	–9.5	–3	–20	–3
SFP-MM850	850	MMF	No	–9.5	–3	–17	0
SFP-SM1310	1310	SMF	No	–9.5	–3	–20	–3

Table 6-3 Copper SFP Module Models

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

Table 6-4 SFP Module Cabling Specifications

SFP Model	Connector Type	Optical Cable Type	Core Specifications (μm)	Max. Cabling Distance
MINI-GBIC-SX-MM850	LC	MMF	62.5/125	275 m (902.23 ft)
			50/125	550 m (1804.46 ft)
MINI-GBIC-LX-SM1310	LC	SMF	9/125	10 km (32808.40 ft)
GE-eSFP-SX-MM850	LC	MMF	62.5/125	275 m (902.23 ft)
			50/125	550 m (1804.46 ft)
GE-eSFP-LX-SM1310	LC	SMF	9/125	10 km (32808.40 ft)
GE-SFP-LX-SM1310	LC	SMF	9/125	10 km (32808.40 ft)
MINI-GBIC-LH40-SM1310	LC	SMF	9/125	40 km (131233.60 ft)
GE-SFP-SX-SM1310-BIDI	LC	MMF	50/125	500 m (1640.42 ft)
GE-SFP-SX-SM1550-BIDI	LC	MMF	50/125	500 m (1640.42 ft)
GE-SFP-LX20-SM1310-BIDI	LC	SMF	9/125	20 km (65616.80 ft)
GE-SFP-LX20-SM1550-BIDI	LC	SMF	9/125	20 km (65616.80 ft)
GE-SFP-LH40-SM1310-BIDI	LC	SMF	9/125	40 km (131233.60 ft)

SFP Model	Connector Type	Optical Cable Type	Core Specifications (μm)	Max. Cabling Distance
GE-SFP-LH40-SM1550-BIDI	LC	SMF	9/125	40 km (131233.60 ft)
MINI-GBIC-ZX50-SM1550	LC	SMF	9/125	50 km (164042 ft)
MINI-GBIC-ZX80-SM1550	LC	SMF	9/125	80 km (262467.19 ft)
MINI-GBIC-ZX100-SM1550	LC	SMF	9/125	100 km (328083.99 ft)
GE-SFP-SX	LC	MMF	62.5/125	275 m (902.23 ft)
			50/125	550 m (1804.46 ft)
GE-SFP-LX	LC	SMF	9/125	10 km (32808.40 ft)
Mini-GBIC-GT	RJ45 Ethernet cable	Cat 5 (or higher) UTP or STP		100 m (328.08 ft)

Caution

- For optical transceivers with a cabling distance of over 40 km (24.85 miles) (including 40 km) (including 24.85 miles), install an optical attenuator to avoid overload on the optical receiver when using short-distance SMFs.
- An optical transceiver is a laser transmitter. Do not look directly into the optical transceiver to prevent it from burning your eyes.
- To keep the optical transceiver clean, ensure that the unused ports remain capped.

Table 6-5 Pairing Description of the BIDI Optical Module

Rate/Distance	Pairing Model
1000 Mbps/500 m (1640.42 ft)	GE-SFP-SX-SM1310-BIDI GE-SFP-SX-SM1550-BIDI
GE/20 km (65616.80 ft)	GE-SFP-LX20-SM1310-BIDI GE-SFP-LX20-SM1550-BIDI
GE/40 km (131233.60 ft)	GE-SFP-LH40-SM1310-BIDI GE-SFP-LH40-SM1550-BIDI

Caution

The BIDI transceivers must be used in pairs. For example, if you install the GE-SFP-LX20-SM1310-BIDI in the local port, you must install the GE-SFP-LX20-SM1550-BIDI in the peer port.

6.2.2 SFP+ Modules

Table 6-6 Models and Specifications of SFP+ Modules

Model	Wavelength (nm)	Optical Cable Type	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
XG-SFP-SR-MM850	850	MMF	Yes	–7.3	–1	–9.9	–1
XG-SFP-ZRV1	850	MMF	Yes	–7.3	–1	–9.9	–1
XG-SR-MM850	850	MMF	Yes	–7.3	–1	–9.9	–1
SFP+MM850	850	MMF	Yes	–7.3	–1	–9.9	–1
XG-SFP-SR-SM1270-BIDI	1270	MMF	No	–3	4	–9	0.5
XG-SFP-SR-SM1330-BIDI	1270	MMF	No	–3	4	–9	0.5
XG-SFP-LR-SM1270-BIDI	1270	SMF	No	–6.5	0.5	–14.4	0.5
XG-SFP-LR-SM1330-BIDI	1330	SMF	No	–6.5	0.5	–14.4	0.5
XG-LR-SM1310	1310	SMF	Yes	–8.2	0.5	–14.4	0.5
XG-SFP-LR-SM1310	1310	SMF	Yes	–8.2	0.5	–14.4	0.5
XG-eSFP-LR-SM1310	1310	SMF	Yes	–8.2	0.5	–14.4	0.5
XG-SFP-ER-SM1550	1550	SMF	Yes	-4.7	4	–11.3	–1
XG-SFP-ZR-SM1550	1550	SMF	Yes	0	4	-24	–7
XS-SFP-SR	850	MMF	Yes	–7.3	–1	–9.9	–1
XS-SFP-LR	1310	SMF	Yes	–8.2	0.5	–10.3	0.5

Table 6-7 Models of SFP+ Active Optical Cable Modules

Model	Module Type	Connector Type	Copper Cable Length	Conductor Diameter (AWG)	Rate (Gb/s)	DDM (Yes/No)
XG-SFP-AOC1M	Active	SFP+	1 m (3.28 ft)	N/A	10.3125	Yes
XG-SFP-AOC3M	Active	SFP+	3 m (9.84 ft)	N/A	10.3125	Yes
XG-SFP-AOC5M	Active	SFP+	5 m (16.40 ft)	N/A	10.3125	Yes
XG-SFP-AOC10M	Active	SFP+	10 m (32.81 ft)	N/A	10.3125	Yes

Note

- SFP+ transceiver types are subject to change without prior notice. For more accurate information about the optical transceivers, contact Ruijie marketing or technical support personnel.
- The DDM function of AOC cables does not report the transmit power. The TX power is displayed as N/A.

Table 6-8 SFP+ Module Cabling Specifications

Model	Connector Type	Optical Cable Type	Core Specifications (μm)	Modal Bandwidth (MHz•km)	Max. Cabling Distance
XG-SFP-SR-MM850	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
XG-SFP-ZRV1	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
XG-SR-MM850	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
SFP+MM850	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
XG-SFP-SR-SM1270-BIDI	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
XG-SFP-SR-SM1330-BIDI	LC	MMF	50/125	2000 (OM3)	300 m (984.25 ft)
XG-SFP-LR-SM1270-BIDI	LC	SMF	9/125	N/A	10 km (32,808.40 ft)

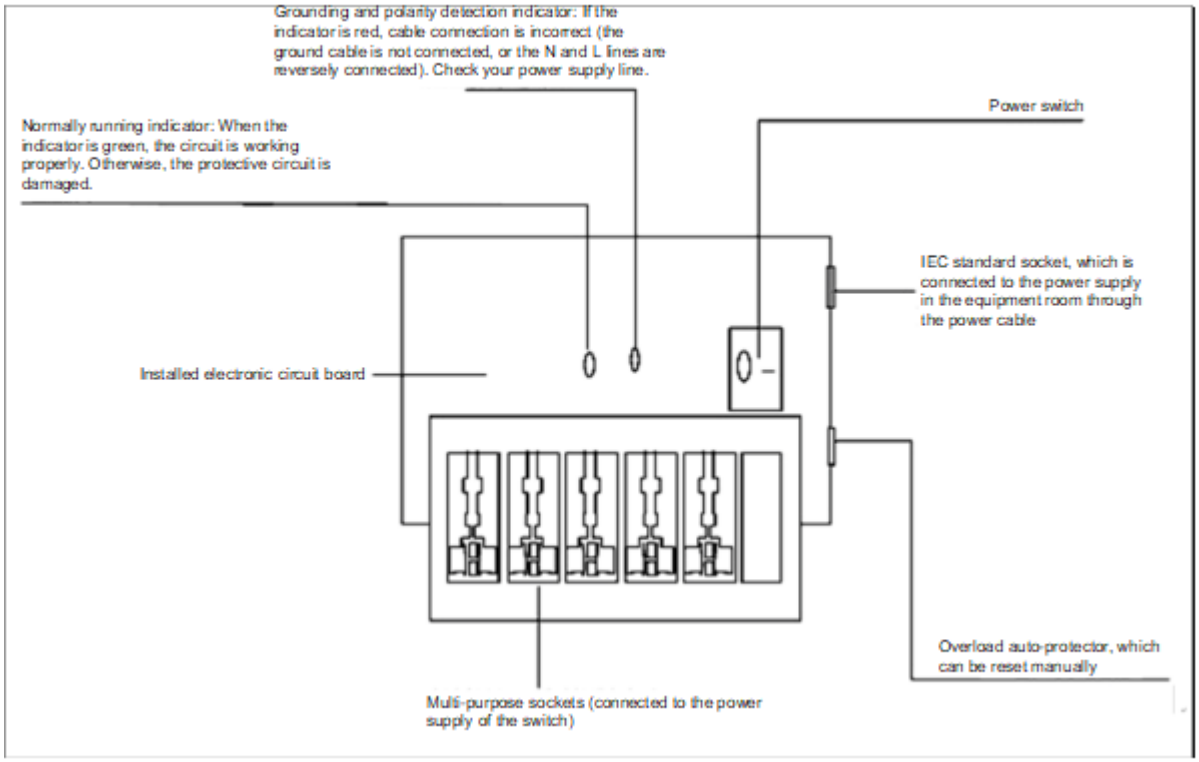
Model	Connector Type	Optical Cable Type	Core Specifications (μm)	Modal Bandwidth (MHz•km)	Max. Cabling Distance
XG-SFP-LR-SM1330-BIDI	LC	SMF	9/125	N/A	10 km (32,808.40 ft)
XG-SFP-LR-SM1310	LC	SMF	9/125	N/A	10 km (32,808.40 ft)
XG-SFP-ER-SM1550	LC	SMF	9/125	N/A	40 km (131,233.60 ft)
XG-SFP-ZR-SM1550	LC	SMF	9/125	N/A	80 km (262,467.19 ft)
XS-SFP-SR	LC	MMF	62.5/125	200 (OM1) 160	33 m (108.27 ft) 26 m (85.30 ft)
			50/125	2000 (OM3) 500 (OM2) 400 (OM1)	300 m (984.25 ft) 82 m (269.03 ft) 66 m (216.54 ft)
XS-SFP-LR	LC	SMF	9/125	N/A	10 km (32,808.40 ft)

6.3 Appendix C: Lightning Protection

6.3.1 Installing an AC Power Arrester (Lightning Resistance Socket)

When an AC power cord is introduced from outdoors and directly connected to the power port of the device, the AC power port must be connected to an external lightning protection power strip to protect the device against lightning strokes. The lightning resistance socket can be fixed on the rack, workbench, or wall in the equipment room by using cable ties and screws. AC power enters the lightning protection power strip and then enters the device.

Figure 6-4 Power Arrester



Note

The power arrester is not delivered with the device. Please purchase it based on actual requirements.

Precautions:

- Make sure that the PE terminal of the power arrester is well grounded.
- After the AC power plug of the device is connected to the socket of the power arrester (lightning resistance socket), the lightning protection function is implemented only if the RUN indicator is green and the ALARM indicator is OFF.
- If the ALARM indicator on the power arrester is red, check whether it is caused by poor grounding connection or by the reversed connection of the Null and Live lines. The detection method is as follows: Use a multimeter to measure the polarity of the power socket for the arrester when the indicator is red. If the N line is on the

left and the L line is on the right (facing the socket), the arrester's PE terminal is not grounded. If not, the polarity of the arrester power cord should be reversed. In this case, you should open the power arrester and rectify the polarity of the connection. If the indicator is still red, the arrester's PE terminal is not grounded.

6.3.2 Installing the Ethernet Port Arrester

Connect an Ethernet port arrester to the device to prevent the damage by lightning before connecting an outdoor network cable to the device.

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

Procedure:

(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 device enclosure. The paste position for the Ethernet port arrester should be as close to the grounding terminal of the device as possible.

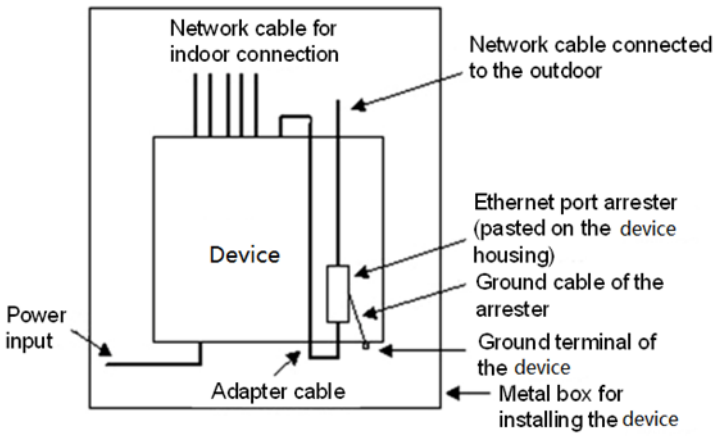
(2) According to the distance between the device grounding terminal and the Ethernet port arrester, cut the grounding cable for the Ethernet port arrester and firmly crimp the grounding cable to the grounding terminal of the device.

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

(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 device is connected to the OUT end) and check whether the service transceiver LED is normal.

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

Figure 6-5 Installation of the Ethernet Port Arrester



Caution

The Ethernet port arrester is only for the electrical Ethernet ports with an RJ-45 connector.

The Ethernet port arrester is not delivered with the device. Please purchase it based on actual requirements. The Ethernet port arrester user manual contains technical parameters and maintenance and installation instructions for the Ethernet port arrester. Carefully read this manual before installation.

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

- Reversed installation direction of the arrester. Connect the external network cable to the "IN" end and connect the Ethernet port of the device to the "OUT" end.
- Poor grounding of the arrester. The grounding cable of the arrester should be as short as possible to ensure that it is in good contact with the grounding terminal of the device. Use a multimeter to confirm the contact condition after grounding.
- Incomplete arrester installation. If there is more than one port connected to the peer device on the device, arresters need to be installed on all connection ports for the purpose of lightning protection.

6.4 Appendix D: Cabling Recommendations

When the device is installed in a standard 19-inch rack, secure the cables around the cable management brackets. Adopt top cabling or bottom cabling according to the actual situation in the equipment room. All cable connectors used for transit should be placed at the bottom of the cabinet rather than be exposed outside of the cabinet. Power cords are routed beside the cabinet, and 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.

6.4.1 Requirements for Cable Bend Radius

- The bend radius of a fixed power cord, network cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than their respective diameters.
- The bend radius of a fixed common coaxial cable should be over seven times greater than its diameter. The bend radius of the common coaxial cable that is often bent or plugged should be over 10 times greater than its diameter.
- The bend radius of a fixed high-speed cable (such as SFP+ cable) should be over five times greater than its diameter. The bend radius of the fixed high-speed cable that is often bent or plugged should be over 10 times greater than its diameter.

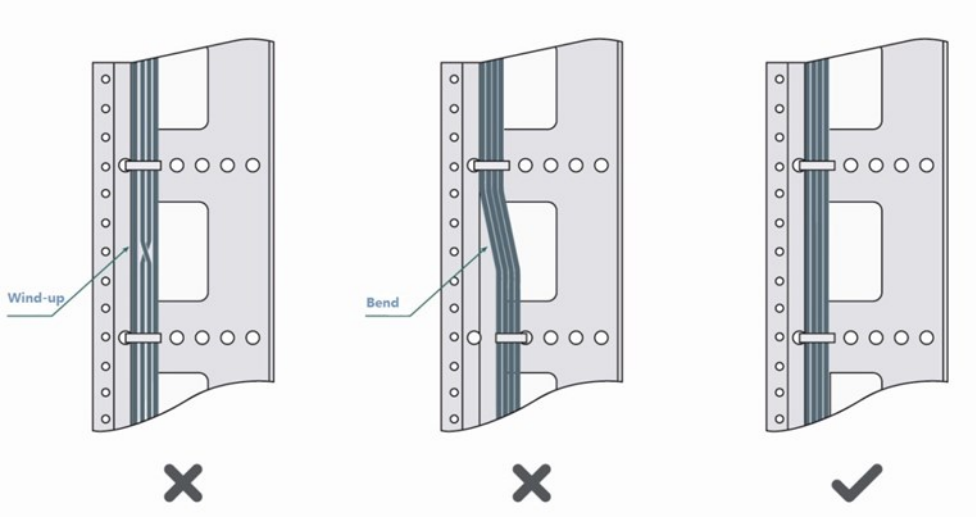
6.4.2 Requirement for the Minimum Bend Radius of an Optical Fiber

- The diameter of a fiber tray to hold fibers should be over 25 times greater than the diameter of the fiber.
- When an optical fiber is moved, the bend radius of the fiber should be over 20 times greater than the diameter of the fiber.
- During cabling of an optical fiber, the bend radius of the fiber should be over 10 times greater than the diameter of the fiber.

6.4.3 Precautions for Bundling up Cables

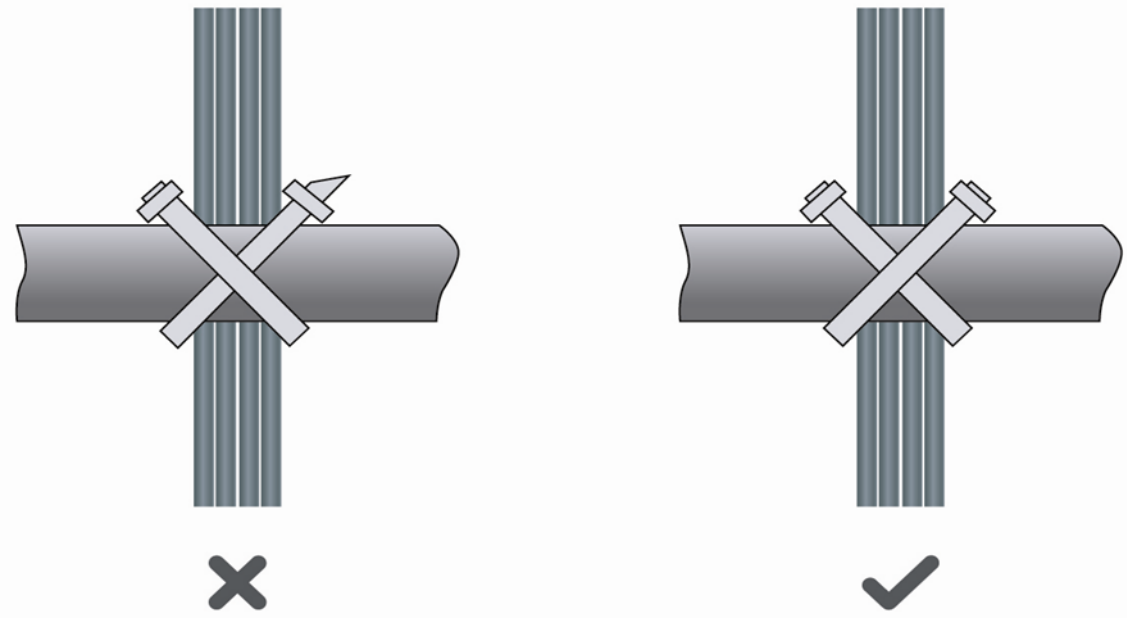
- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or bending, as shown in Figure 6-6.

Figure 6-6 Binding Cables (I)



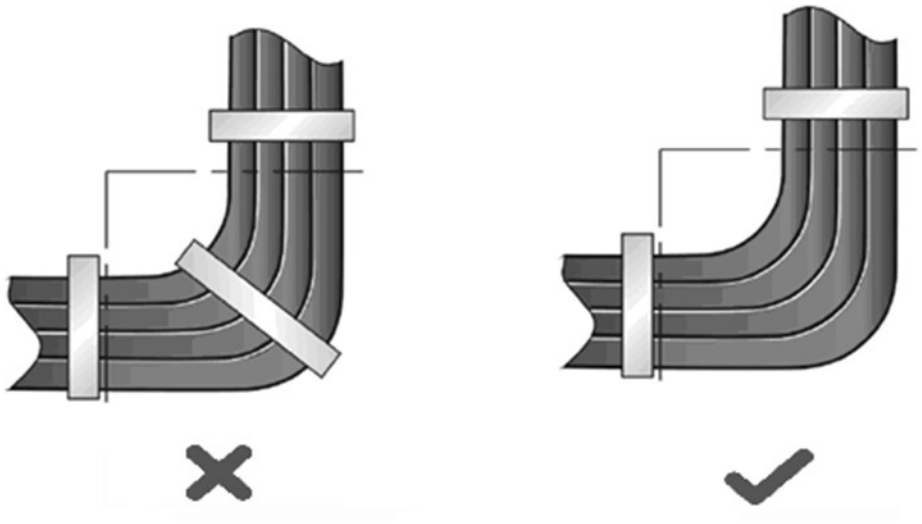
- Cables of different types (such as power cords, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 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 hole traversed by cables should have a smooth and fully rounding surface or an insulated lining.
- Use cable ties to bundle up cables properly. Please do not connect two or more cable ties to bundle up cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure 6-7.

Figure 6-7 Binding Cables (II)



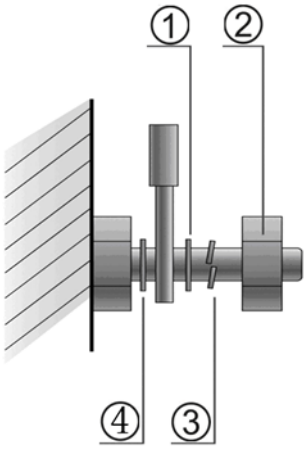
- When cables need to be bent, please bundle them up but do not tie them where the cables will be bent, as shown in Figure 6-8.

Figure 6-8 Binding Cables (III)



- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the rack or cable trough. The proper position refers to a position that does not affect device running or damage the device or cable.
- Do not bind power cords to the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding cables should be reserved with some excess after being assembled to avoid suffering tension or stress. After the moving part is installed, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be used.
- When screw threads are used to fasten cable terminals, the anchor or screw must be tightly fastened, as shown in Figure 6-9.

Figure 6-9 Cable Fastening



① Flat washer ③ Spring washer

② Nut ④ Flat washer

- Hard power cords should be fastened in the terminal connection area to prevent stress on terminal connection and cable.
- Do not use self-tapping screws to fasten terminals.
- 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 up cables by using cable ties.

Cable Bunch Diameter	Binding 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 sockets (such as circuit breakers) with cord end terminals, the metal part of the cord end terminal should not be exposed outside the terminal socket when assembled.

6.5 Appendix E: Equipment Room Site Selection

- The equipment room should be at least 5 km (3.11 miles) away from heavy pollution sources, such as the smelter works, coal mine, and thermal power plant. 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 air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select devices with advanced protection against severe environment.
- 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 windstorm and heavy rain as well as away from dust. If the dust is unavoidable, keep the door and window away from the pollution source.
- The equipment room should be away from the residential area. Otherwise, the equipment room should meet the construction standard in terms of noise.
- 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 boiler and heating boiler.
- The equipment room should be on the second floor. Otherwise, the equipment room floor should be 600 mm (23.62 in.) higher than the highest flood level ever recorded.
- Make sure there are no cracks or holes 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, which should be up to the standard for flame retarding, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.
- Keep the door and the window closed to make the equipment room sealed.
- The steel door is recommended for soundproofing.
- Sulfur-containing materials are forbidden.
- Keep the air conditioner from blowing wind straight toward the device or blowing water drops from the window or air vent toward the device.