Ruijie Reyee RG-NBS5200-48GT4XS-UP 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 Reyee website: https://reyee.ruijie.com
- Online support center: https://reyee.ruijie.com/en-global/support
- Case portal: https://www.ruijie.com/support/caseportal
- Community: https://community.ruijie.com
- Email support: service_rj@ruijie.com
- Live chat: https://reyee.ruijie.com/en-global/rita

Conventions

1. Signs

The signs used in this document are described as below:

Danger

An alert that calls attention to safety instruction that if not understood or followed can result in personal 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.

2. Note

This manual provides installation steps, troubleshooting, technical specifications, and usage guidelines for cables and connectors. It is intended for users who want to understand the above and have extensive experience in network deployment and management, and assume that users are familiar with related terms and concepts.

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1 Product Overview

RG-NBS5200-48GT4XS-UP is a new generation Layer 3 Ethernet switch developed by Ruijie Networks. The switch provides 1GE Ethernet ports and 10GE SFP+ ports and features high performance, high reliability and mutli-service integration. It adopts an efficient hardware architecture design for larger MAC address table capacity, higher hardware performance and more convenient experience.

A RG-NBS5200-48GT4XS-UP switch provides 48 10/100/1000Base-T ports. The first eight ports are PoE/PoE+/PoE++ compliant and the last 40 ports are PoE/PoE+ compliant. The maximum PoE power consumption of the switch is 740 W. The switch also offers four 1G/10G SFP+ ports. It supports App and cloud-based management.

Model	10/100/1000Base-T Ethernet port	10GE SFP+ port	Power supply
RG-NBS5200-48GT4XS-UP	48	4	Fixed single power supply

1.1 RG-NBS5200-48GT4XS-UP

The RG-NBS5200-48GT4XS-UP switch provides 48 10/100/1000Base-T RJ45 Ethernet ports and four 10GE SFP+ ports on the front panel, and an AC connector on the rear panel. The switch supports routing, Rapid Spanning Tree Protocol (RSTP) and link aggregation. It can be managed through eWeb, Ruijie Cloud and App.



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1.2 Package Contents

Table 1-1 Package Contents

Item	Quantity
RG-NBS5200-48GT4XS-UP Switch	1
Rack-mount bracket	2
Rubber Pad	4

Item	Quantity
M4 x 8 mm cross recessed countersunk head screws	8
M6 Cage Nut	4
Grounding Cable	1 x 1 m (3.28 ft.)
Power Cord	1 x 1.5 m (4.92 ft.) 1 x 1.8 m (5.91 ft.)
Power Cord Retention Clip	1
User Manual	1
Warranty Card	1

Note

- The power cord is 1.5 m (4.92 ft.) or 1.8 m (5.91 ft.) long, depending on the actual delivery.
- The above is the general Packet Contents. The actual delivery is subject to the order contract. And please check your goods carefully against the order contract. If you have any questions, please contact the distributor.

1.3 Appearance

1.3.1 Front Panel

Figure 1-1 Front Panel

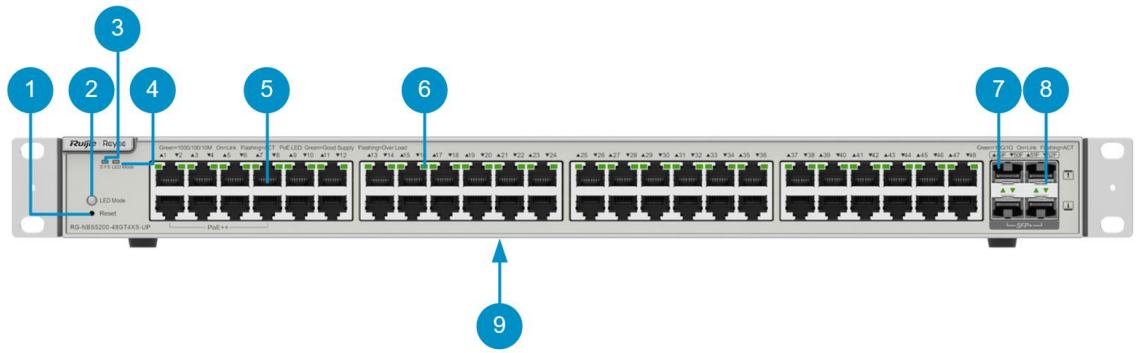


Table 1-2 Ports and Buttons on the Front Panel

ID	Item	Description
1	Reset Button	Press and hold for no more than two seconds: Restart the switch Press and hold for two to five seconds: No action Press and hold for over five seconds: Fetch logs, reset username and password, and restart the device. After the device restarts, select whether to restore factory settings on Eweb or App.
2	LED Mode Switchover Button	Switch over the LED mode
3	System Status LED	Off: The switch is not powered on. Fast blinking (0.5 Hz): The switch is operating properly but not connected to Ruijie Cloud, Fast blinking (10 Hz): The switch is upgrading or restarting. Solid green: The switch is operating properly and connected to Ruijie Cloud.
4	LED Mode LED	Off: The LED indicates the Link/ACK status. Solid green: The LED indicates the PoE status.
5	Ethernet Port	10/100/1000Base-T Ethernet Port
6	Ethernet Port Status LED	Off: The port is not connected. Solid green: The port has made a successful 10/100/1000 Mbps link. Blinking green: The port is receiving or sending data at 10/100/1000 Mbps.
7	SFP+ Port Status LED	Blinking green: The port is receiving or sending data. Solid green: The port is connected but not receiving or sending data. Off: The port is not connected.
8	SFP+ port	1/10GE SFP+ Port
9	Nameplate	Nameplate on the bottom of the device.

1.3.2 Rear Panel

Figure 1-2 Rear Panel

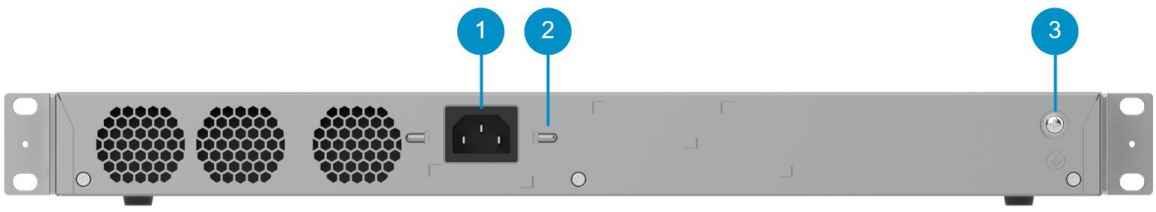


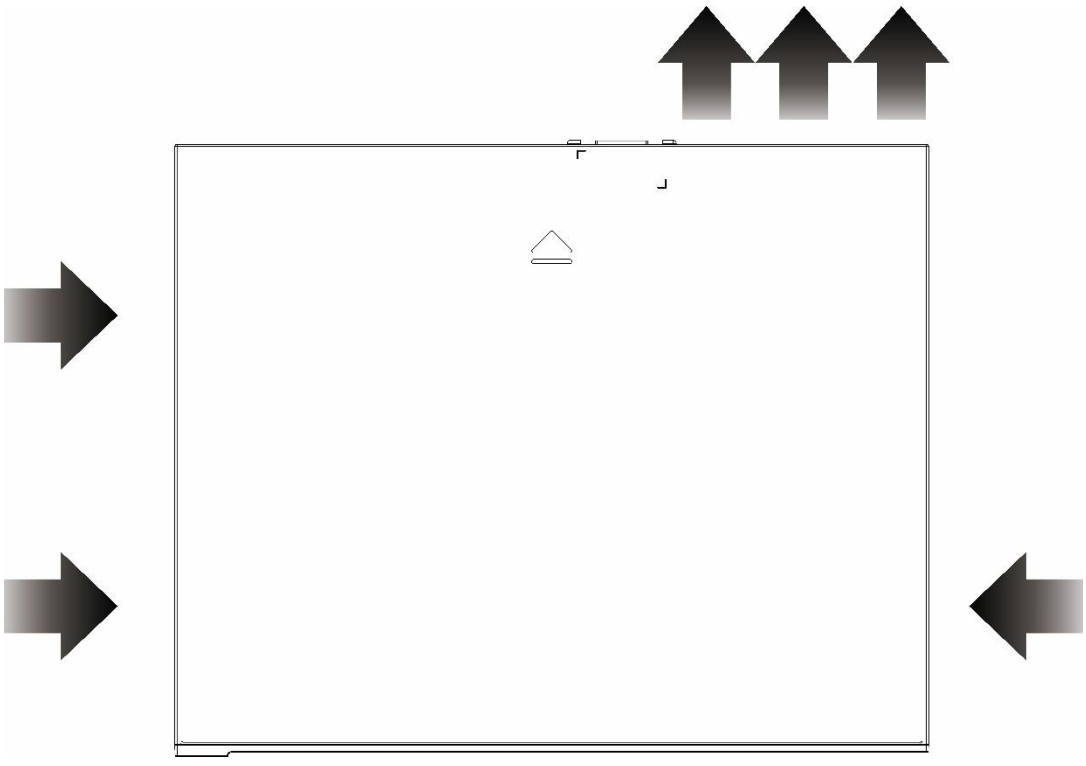
Table 1-3 Ports and Buttons on the Rear panel

ID	Item	Description
1	AC Connector	Connect to an external AC power supply.
2	Power Cord Retention Clip	Secure the power cord.
3	Grounding Screw	Secure the grounding lug to ensure connection between the chassis and earth ground.

1.3.3 Ventilation

The RG-NBS5200-48GT4XS-UP switch adopts the side-to-rear airflow design to ensure that the switch works properly in the specified environment. Maintain a minimum clearance of 100 mm (3.94 in.) around the switch to ensure proper ventilation. You are advised to dust the switch at an interval of three months to avoid blocking the ventilation openings.

Figure 1-3 Airflow Direction



Note

Maintain a minimum clearance of 1 RU (44.45 mm) between the switch and its neighboring device to ensure proper ventilation.

1.4 Technical Specifications

Table 1-4 Specifications

Parameter Type	**Parameter Name**	**RG-NBS5200-48GT4XS-UP**
Product Information	Warranty	5 years
System Specifications	RAM	512 MB
	Flash memory	256 MB
Port Specifications	Total number of RJ45 ports	48
	Total number of optical ports	4
	Number of 10GE SFP+ ports	4
	Number of 10/100/1000BASE-T ports	48
	Ethernet cable type	CAT5e
	LEDs	1 x system status LED 48 x Ethernet port LEDs 4 x SFP+ port LEDs 1 x LED mode LED
Power Supply and Consumption	PoE Out standard	Ports 1–8: PoE/PoE+/PoE++ (IEEE 802.3af/at/bt) Ports 9–48: PoE/PoE+ (IEEE 802.3af/at)
	Number of PoE Out ports	48
	Number of PoE/PoE+ Out ports	48
	Number of PoE/PoE+/PoE++ Out ports	8
	PoE power pins	Ports 1–8: 1–2(-), 3– 6(+), 4–5(+), 7–8(-) Ports 9–48: 1–2 (+), 3–6 (-)
	PoE budget per port	Ports 1–8: 90 W

		Ports 9–48: 30 W
	PoE budget	740 W
	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: 10 A
	Power supply to external devices	The Ethernet interface provides PoE output of 54 V/90 W.
	Maximum power consumption	75.6 W (with no PoE load) 815.6 W (with full PoE load)
	EEE	Yes
	Leakage Current to Ground	≤ 3.5 mA
Dimensions and Weight	Casing	Metal
	Product dimensions (W x D x H)	440 mm x 357.6 mm x 43.6 mm (17.32 in. x 14.08 in. x 1.72 in.)
	Weight	5.64 kg (12.43 lbs) (without packaging materials)
	Shipping weight	7.15 kg (15.76 lbs)
	Rack space	Rack requirement: 19-inch rack
Environment and Reliability	Fan	3 x fixed fans
	Cooling	Air cooling, side-to-rear airflow
	Mounting options	Rack
	MTBF	400,000 hours
	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

Warning

- Operation of this equipment in a residential environment could cause radio interference.
- This equipment is not suitable for use in locations where children are likely to be present.

Caution

- 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.

2 Preparing for Installation

2.1 Safety Precautions

Note

- To avoid personal injury and device damage, carefully read the safety precautions before you install the switch.
- The following safety precautions may not cover all possible dangers.

2.1.1 General Safety Precautions

- Install the switch in a standard 19-inch rack.
- Cut off all power supplies and unplug all power cords before mounting the switch in a rack or removing the switch from a rack.
- Do not place the switch in a wet position, and keep the switch away from liquid. Keep the chassis clean and dust-free.
- Install the switch in a position far away from heat sources.
- Ensure that the rack and power distribution system are properly grounded.
- Do not place the switch in walking areas.
- During installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the chassis.
- Keep tools and components away from walking areas.

2.1.2 Handling Safety

- Prevent the switch from being frequently handled.
- Cut off all power supplies and unplug all power cords before moving or handling the device.
- Keep balance and prevent personal injuries when handling the switch.

2.1.3 Electric Safety

Warning

- Any nonstandard and inaccurate operation can cause an accident such as fire or electrical attack, thus causing severe damages to human bodies and the switch.
- Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.

- Observe local regulations and specifications during electric operations. Only personnel with qualifications can perform such operations.
- Check whether there are potential risks in the work area. For example, check whether the power supply is grounded, whether the grounding is reliable, and whether the ground is wet.
- Find out the position of the indoor emergency power switch before installation. Cut off the power switch in

the case of accidents.

- Make sure that the switch is powered off when you cut off the power supply.
- Equip the power supply system with a leakage protector (also referred to as “leakage current switch” or “leakage current breaker”) to automate the power cut-off in the case of power leakage or shock. When selecting the leakage protector, observe the following rule:
  - 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, the leakage current of each power supply is at most 3.5 mA, and the leakage current of the system totals 56 mA (maximum theoretical value). A leakage protector with 30 mA rated action current supports less than nine 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 other words, the leakage protector with a rated action current of 30 mA supports up to four power supplies. In this case, the 16 power supplies in the system require at least four leakage protectors with a rated action current of 30 mA and each leakage protector supports four power supplies.

    If power supplies in a system differ in models, the rated leakage action current of each leakage protector divided by two is greater than the sum of maximum leakage currents of all the power supplies.
  - The rated leakage non-action current of a leakage protector shall be 50% of the leakage action current. If the non-action current value is too small, the high sensitivity level may cause the circuit to break, causing power cut-off and service interruption even if the leakage current value is normal.

    Take a leakage protector with a rated action current of 30 mA as an example. The rated leakage non-action current shall be 15 mA. When the leakage current is less than 15mA, the protector shall not act.

Caution

- To guarantee personal safety, the rated leakage action current of each leakage protector in the system must be equal to or less than 30 mA (human body safety current is 30 mA). When twice of the total leakage current of the system is greater than 30 mA, the system must be equipped with two or more leakage protectors.
- The leakage current values vary with products. For the leakage current value of each product model, see the technical specifications in Section 1.4 Technical Specifications.

2.1.4 Static Electricity

- Ensure that the grounding screw on the rear panel of the device is tightened. Ensure that the AC power socket is a single-phase three-core power socket with protective earthing conductors (PE).
- Keep the indoor installation environment clean and free of dust.
- Maintain appropriate humidity conditions.

Before installing the various pluggable modules, please wear an anti-static wrist strap and make sure that it is well grounded.

2.1.5 Laser Safety

A device with an optical port usually supports multiple types of optical transceivers, all of which are Class I laser products. Pay attention to the following during the use of optical transceivers:

- When an optical transceiver is in operation, ensure that its port is connected to an optical fiber or covered by

a dust cap to keep out dust and prevent it from burning your eyes.

- When an optical transceiver is in operation, do not look into its port after removing the optical fiber. Doing so may result in eye injury.

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

2.2.1 Bearing Requirements

Evaluate the weight of the switch and its accessories (such as the rack and cables) and ensure that the ground of the installation site observes the requirements.

2.2.2 Ventilation Requirements

Maintain a minimum clearance of 100 mm (3.94 in.) around the switch for air circulation and ventilation. After various cables are connected, bind the cables or place them in the cable management bracket to avoid blocking air inlets. You are advised to dust the switch at an interval of three months to avoid blocking the ventilation openings.

2.2.3 Space Requirements

To have sufficient room for chassis handling and module swapping, you are advised to maintain an indoor pathway of at least 800 mm (31.50 in.) wide.

Do not install the device against the wall. Instead, maintain a minimum clearance of 400 mm (15.75 in.) around the switch for proper ventilation.

2.2.4 Temperature and Humidity Requirements

To ensure the normal operation and prolonged service life of the switch, maintain an appropriate temperature and humidity in the machine room. Working in an environment with too high or too low temperature and humidity for a long period may damage the switch.

- In an environment with high relative humidity, the insulating material may have poor insulation or even leak electricity.
- In an environment with low relative humidity, the insulating strip may dry and shrink, loosening screws.

- In a dry environment, the internal circuits are prone to static electricity.
- A high temperature can accelerate the aging process of insulation materials, greatly reducing the reliability of the switch and severely affecting its service life.

Note

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

2.2.5 Cleanliness Requirements

Dust poses a major threat to the switch. The indoor dust takes on a positive or negative static electric charge when falling on the switch, causing poor contact of the metallic joint. Such electrostatic adhesion may occur more easily when the relative humidity is low, not only affecting the service life of the switch, but also causing communication faults. The following table describes the requirements for the dust content and granularity in the machine room.

Table 2-1 Requirements for Dust

Dust	Unit	Maximum Quantity
Dust particles (diameter≥ 0.5 μm)	Particles/m^3	3.5×10^6
Dust particles (diameter ≥ 5 μm)	Particles/m^3	3×10^4

Apart from dust, the salt, acid, and sulfide in the air in the machine room must meet strict requirements. These harmful substances will accelerate metal corrosion and component aging. Therefore, the machine 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, and the maximum value cannot last for more than 30 minutes every day.

2.2.6 Grounding Requirements

A proper grounding system is the basis for stable and reliable running. It is indispensable for 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 switch is securely grounded using a yellow/green grounding cable when the switch uses the AC power supply. Otherwise, electric shock may occur when the insulation resistance between the power supply inside the switch and the chassis becomes small.

Caution

- The building should provide a protective ground connection to ensure that the device is connected to a protective earth.
- The O&M personnel should check whether the AC socket is reliably connected to the protective ground of the building. If not, the O&M personnel should use a protective earth conductor from the AC outlet protective earth terminal to the building protective earth.
- The power socket should be installed near the device and easily accessible.
- During the device installation, the ground connection must always be made first and disconnected last.
- The cross-sectional area of the protective grounding cable should be at least 0.75 mm^2 (18 AWG).
- Install the switch by using 3-core power cords, with a minimum cross-sectional area of 0.75 mm^2 or 18 AWG per pin.

- **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 switch.

Note

For lightning protection, please see Section 6.3 Lightning Protection.

- **EMC Grounding**

Grounding required for electromagnetic compatibility includes shielded grounding, filter grounding, noise and interference suppression, and level reference. The resistance of the grounding cable should be smaller than 1 ohm.

2.2.7 Lightning Protection Requirements

- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- You are advised to install a power lightning arrester in front of the power input end to enhance the lightning prevention for the power supply.
- When an AC power cord is introduced from outdoors and directly connected to the power port of the switch, the AC power port must be connected to an external lightning resistance socket to protect the switch against lightning strokes. The lightning resistance socket is used as follows: Connect the mains AC power cord to the lightning resistance socket and then connect the switch to the lightning resistance socket. This prevents

the current of high-voltage lightning from directly passing through the switch along the mains cable.

Note

- Lightning resistance sockets are customer-supplied.

2.2.8 EMI Requirements

All interference sources, either from outside or inside of the device or application system, affect the device by capacitive coupling, inductive coupling, or electromagnetic waves. Electromagnetic interference (EMI) occurs due to electromagnetic radiation or conduction, depending on the transmission path. When the energy, often RF energy, from a component arrives at a sensitive component through the space, the energy is known as radiated interference. The interference source can be both a part of the interfered system and a completely electrically isolated unit. Conduction interference occurs when interference is transferred from one unit to another unit through cables, which are usually electromagnetic wires or signal cables connected between the source and the sensor. Conducted interference often affects the power supply of the equipment, but can be controlled by a filter. Radiated interference may affect any signal path in the devices, and is difficult to shield.

- Take interference prevention measures for the power supply system.
- Keep the switch far away from the lightening protection and grounding system of the power device.
- Keep the switch far away from high-frequency current devices such as high-power radio transmitting station and radar launcher.
- Take electromagnetic shielding measures when necessary.

2.2.9 Installation Site Requirements

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

- Maintain a proper clearance around the air intakes and outlets for heat dissipation.
- The switch is equipped with fans to draw air from side to rear. Maintain a minimum clearance of 150 mm (5.91 in.) around the ventilation openings for heat dissipation. You are advised to install the switch in a standard 19-inch rack. Or, place the device on a clean workbench. In hot areas, air-conditioning is recommended.
- The installation site has good cooling and ventilation.
- The installation site is sturdy enough to support the weight of the switch and its accessories.

  The installation site is properly grounded.

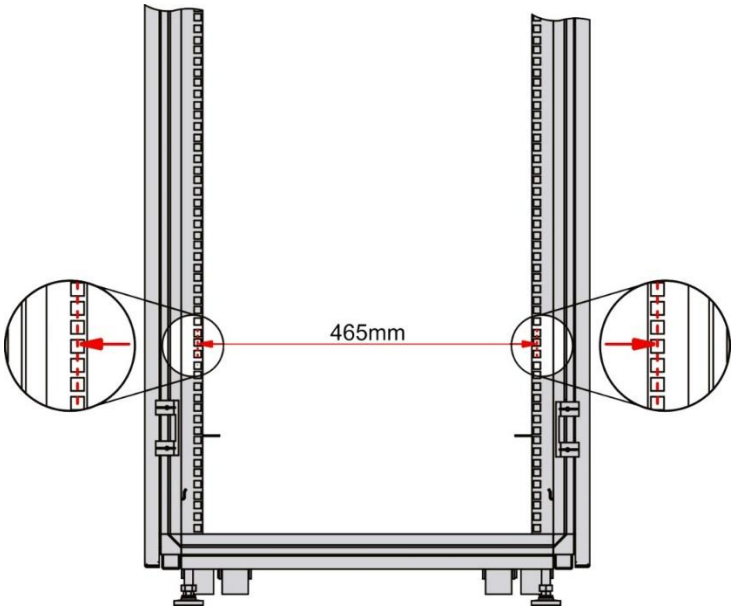
2.3 Rack Requirements

The RG-NBS5200 switch meets the EIA standard and can be installed in a 19-inch rack. If you want to install the switch in a rack, make sure that the rack observes the following requirements:

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

(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, the distance between front and rear doors, is at least 1000 mm (39.37 in.).

(4) The guide rails can bear the weight of the switch and its accessories.

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

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, fastening bolts, diagonal plier and cable ties
Special Tools	Anti-static wrist strap, wire stripper, crimping plier, crystal connector crimping plier, and wire cutter
Meters	Multimeter
Relevant Devices	PC, display, and keyboard

Note

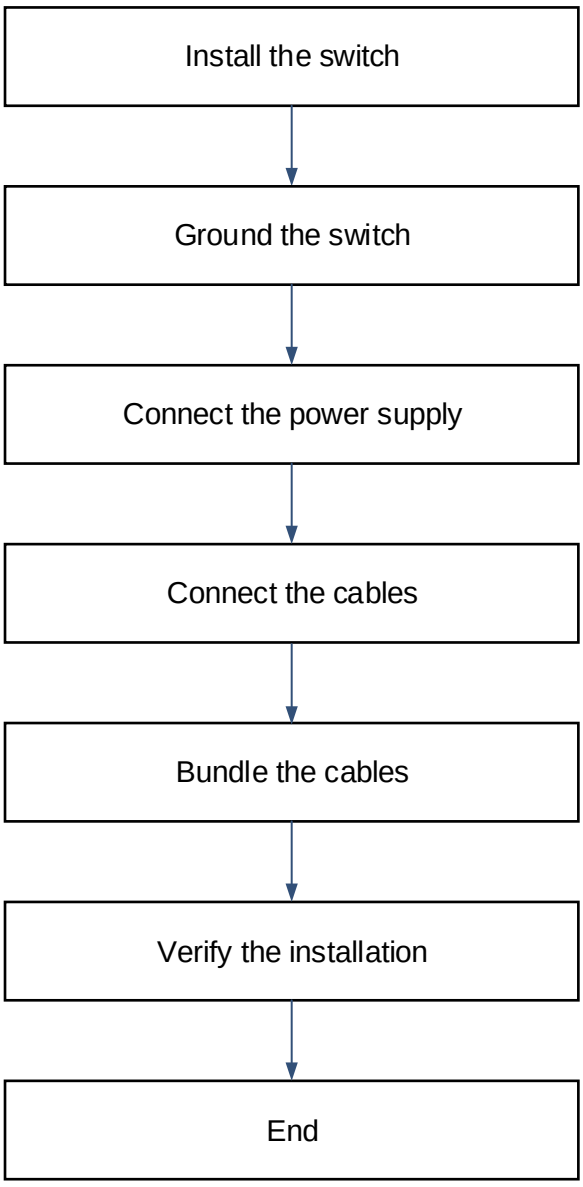
The RG-NBS5200 switch is delivered without a tool kit. The tool kit is customer-supplied.

3 Installing the Switch

Caution

Before installing the switch, make sure that you have carefully read and met the requirements specified in Chapter 2.

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 switch.
- The power supply is available in the installation site and meets requirement for current.
- The Ethernet cables have been deployed in the installation site.
- The selected power supply meets requirement for the system power.
- Find out the position of the emergency power switch before installation, so that the power switch can be cut off in case of accidents.

3.3 Installing the Switch

Pay attention to the following:

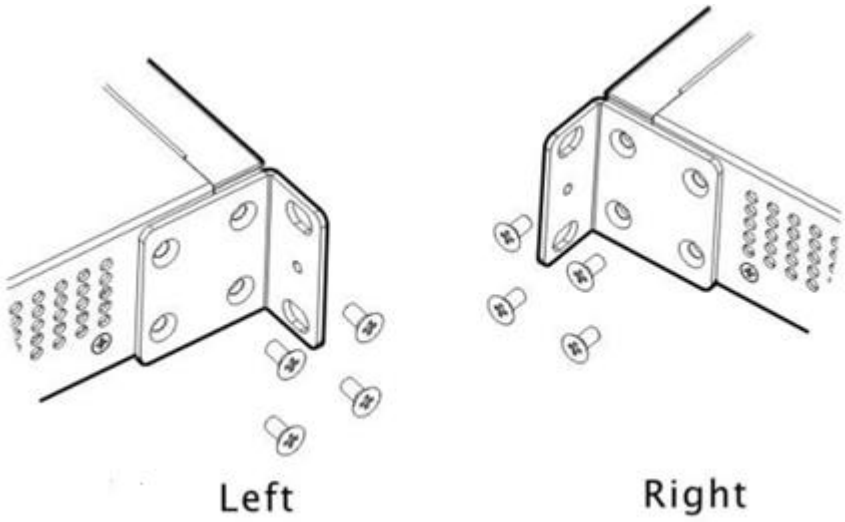
- Connect the power cords of different colors to the corresponding cable terminals.
- Ensure that the connector of the power cord is properly seated in the power port of the switch. After plugging the power cord into the switch, secure the power cord with power cord retention clip.
- Do not place anything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

3.3.1 Installing the Switch in a Rack

The RG-NBS5200 switch meets the EIA standard and can be installed in a 19-inch rack. Take the following installation steps:

Step 1: Take screws out of the package. Attach one end of the mounting brackets to the switch by using screws.

Figure 3-1 Securing Mounting Brackets



Step 2: Use M6 screws and cage nuts to secure the other end of the mounting brackets to square hole rack posts.

Figure 3-2 Installing Cage Nuts and Screws

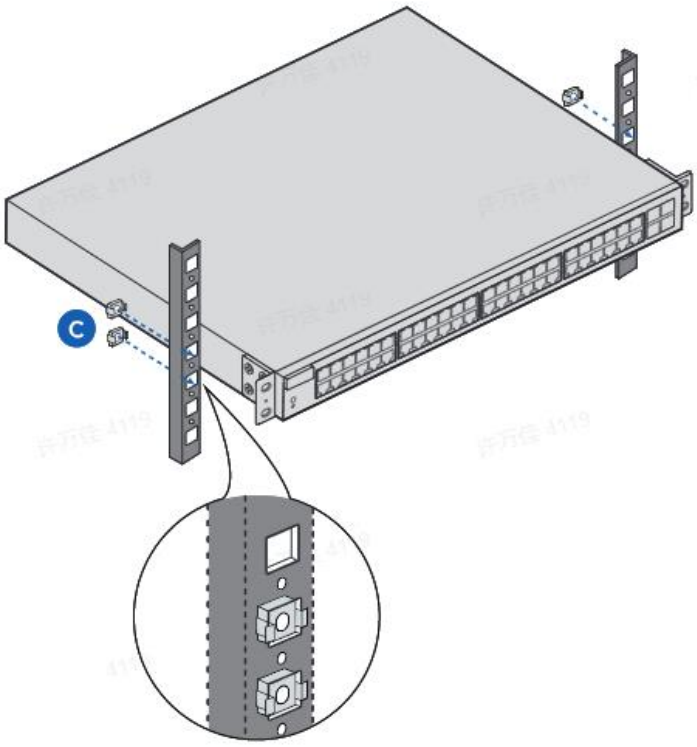
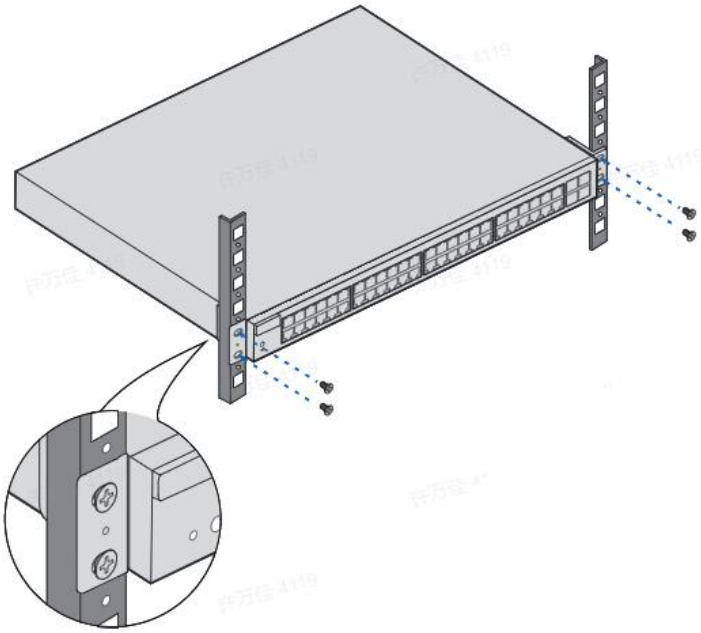


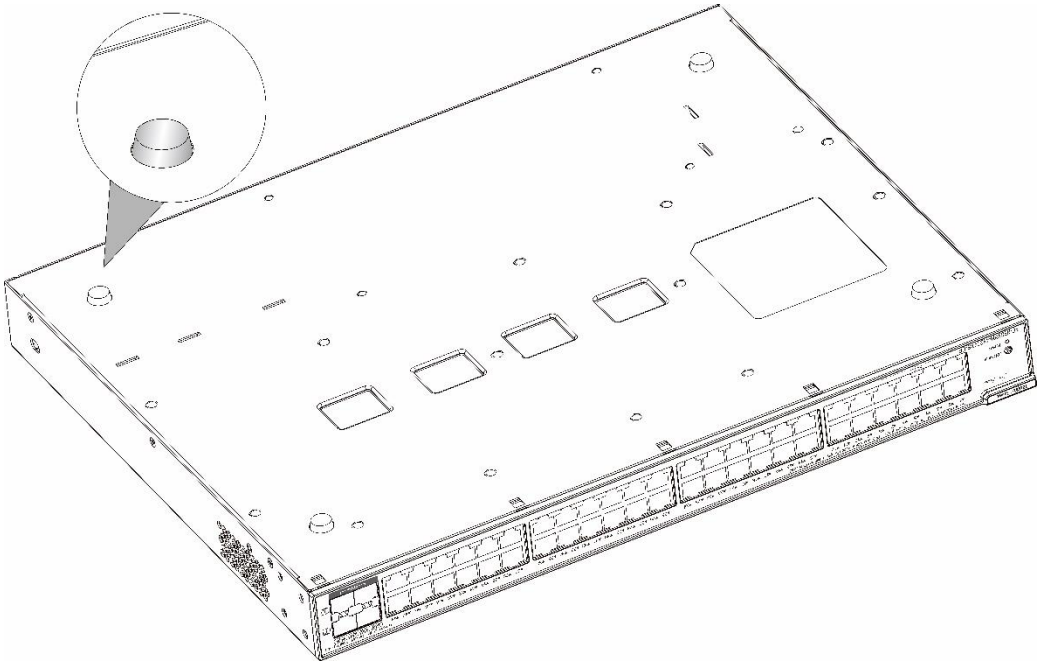
Figure 3-3 Tightening Screws



3.3.2 Installing the Switch on a Workbench

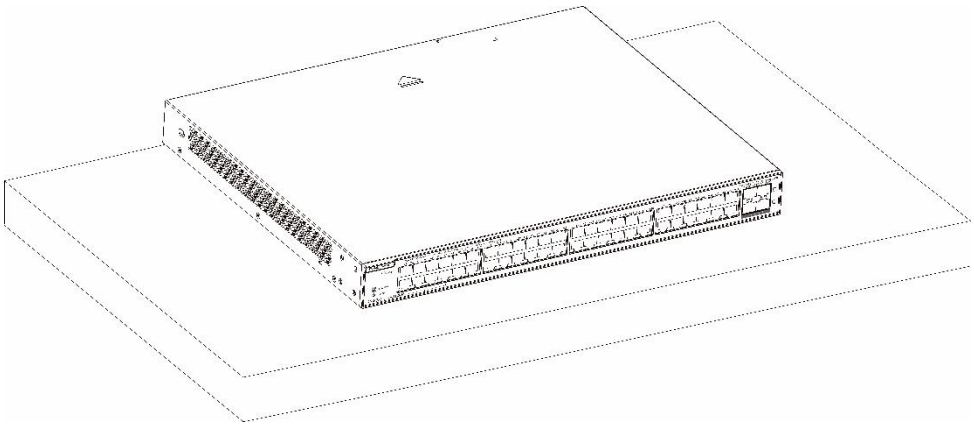
Step 1: Attach the four rubber feet to the four corners at the bottom of the switch.

Figure 3-4 Attaching Rubber Feet to the Bottom of the Switch



Step 2: Place the switch on a workbench and ensure adequate airflow around the switch.

Figure 3-5 Installing the Switch on a Workbench



Note

The location where the switch is installed must be subject to movement restrictions.

3.4 Connecting the Switch to Earth Ground

The switch has a grounding stud on the rear panel. Connect the grounding stud to the grounding lug of the rack and then connect the grounding lug of the rack to the ground buss bar of the machine room.

Caution

- The sectional area of a grounding cable should be determined according to the possible maximum current. Grounding cables with good conductors should be used.
- Do not have bare wires exposed.
- The resistance between the chassis and ground should be less than 1 ohm.

Warning

- To avoid personal injury and device damage, connect the switch to earth 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 of the building. If not, the O&M personnel should use a protective earth conductor from the AC outlet protective earth terminal to the building protective earth.
- The power socket should be installed near the device and easily accessible.
- During the device installation, the ground connection must always be made first and disconnected last.
- The cross-sectional area of a protective grounding cable should be at least 2.5 mm^2 (12 AWG).

3.5 Connecting Cables

Warning

Use the delivered power cords. Otherwise, security accidents may occur.

Precautions

- Make sure that the models of optical transceivers and optical cables match with SFP ports. The transmitting port on the local device should be connected to the receiving port on the peer device and vice versa.
- Avoid a small bend radius at the connector.

Steps

(1) Connect the RJ45 connector of a twisted-pair cable to the Ethernet port on the switch, and the other end to a managed device or PC.

(2) Plug the SMF and MMF optical fibers into the corresponding ports according to the panel identification, and distinguish the transmitting and receiving ends of the optical fibers.

3.6 Bundling Cables

Precautions

- Bundle the power cords and other cables in a visually pleasing way.
- Make sure that the fibers at the connectors have natural bends or bends of large radius.
- Do not bind fibers and twisted pair cables too tightly, as this may press the fibers and affect their service life and transmission performance.

Bundling Steps

(1) Bind the drooping part of the optical cables and twisted pairs, and lead 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 cabling chute.

(3) For the power cords, you should bind them closely along the bottom of the chassis, in a straight line wherever possible.

3.7 Verifying Installation

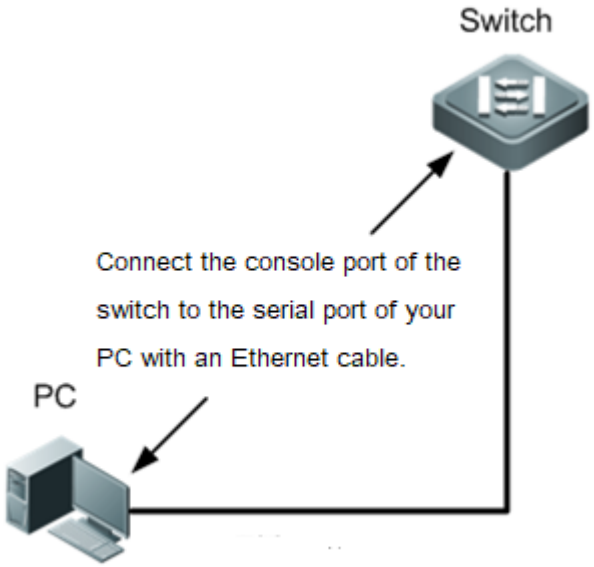
- Verify that the grounding cable is properly connected.
- Verify that the Ethernet cables and power cords are properly connected.
- Verify that the cables with a distance of 100 meters (328.08 feet) are managed indoors. If not, check whether the power supply and interfaces are protected from lightning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

4 Verifying Operating Status

4.1 Setting up Configuration Environment

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

Figure 4-1 Configuring Environment



Connecting an Ethernet Cable

Plug the crystal head of the Ethernet cable into the network port of the PC.

Connect the RJ-45 end to any port of the switch.

Eweb-based Login

Step 1: Configure your PC with an IP address in the network of 10.44.77.XXX (Range: 1-254, excluding 200).

Step 2: Open a browser, enter 10.44.77.200 into the address bar of the browser and press Enter.

4.2 Powering on the Switch

4.2.1 Checklist Before Power-On

- The switch is connected to earth ground.
- The power cord is properly connected.
- The power voltage follows the requirement.
- The network port of the PC is properly connected to the console port of the switch. Parameters are set correctly.

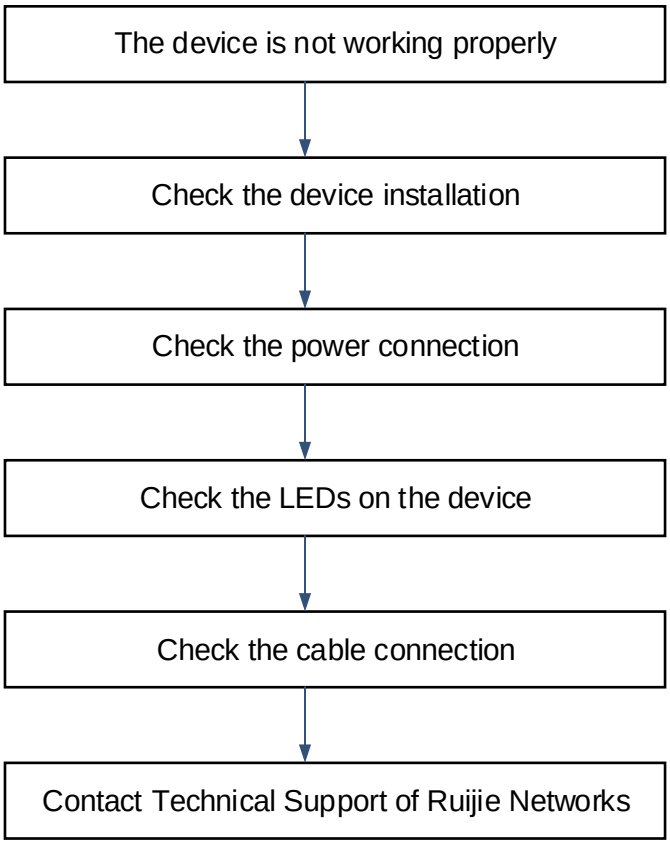
4.2.2 Checklist After Power-On

- The LED statuses are normal.

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

5 Common Troubleshooting

5.1 Troubleshooting Flowchart



5.2 Common Faults

Symptom	Possible Cause	Suggested Action
The login password cannot be retrieved.	The login password is forgotten after being configured.	Press and hold the Reset button for over five seconds to reset your username and password.
The SYS indicator 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 machine room is normal and whether the power cord connected to the switch is loose.
An RJ45 port is disconnected or a frame sending/receiving error occurs.	The twisted pair cable is not connected properly. The cable length exceeds 100 m (328.08 feet). The port is specially configured	Replace the twisted pair cable. Use optical cables or connect to an intermediate switch for relay. Make sure that the port works in the same

Symptom	Possible Cause	Suggested Action
	and does not use the same work mode as the interconnected switch.	mode as the interconnected switch.
An optical port cannot be connected.	The receiving and transmitting ends are connected incorrectly. The types of the interconnected optical transceivers do not match. The optical fiber type does not observe requirements. The length of the optical fiber length is beyond the allowed length marked on the optical transceiver.	Exchange the transmission and receiving ends of the optical fiber. Replace the optical transceiver with another one of the same type. Replace the optical fiber with a qualified one. Use an optical fiber with the required length.

6 Appendix

6.1 Connectors and Connection Media

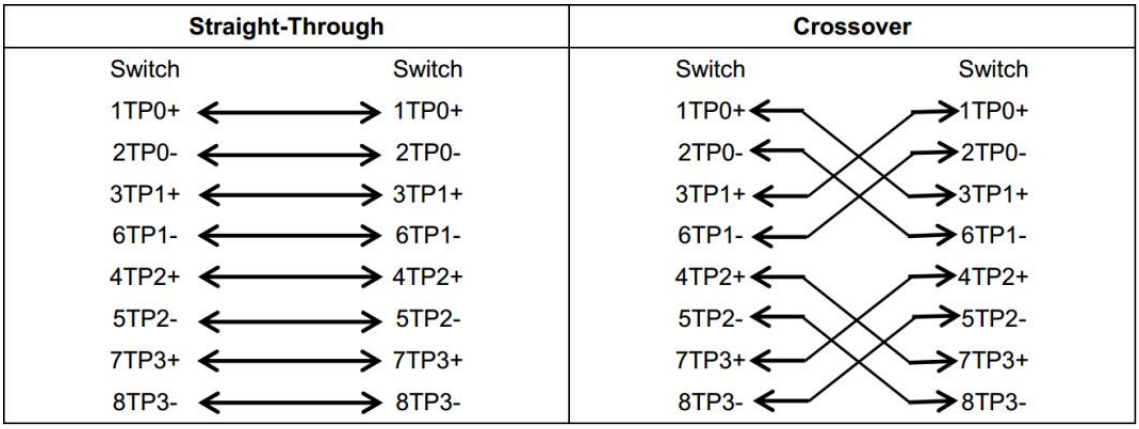
1000BASE-T/100BASE-TX/10BASE-T Ports

The 1000BASE-T/100BASE-TX/10BASE-T supports adaptation of three rates and automatic MDI/MDIX crossover at these three rates.

The 1000BASE-T complies with IEEE 802.3ab, and uses the cable of 100-ohm Category-5 or Supper Category-5 UTP or STP, which can be up to 100 m.

The 1000BASE-T port uses four pairs of wires for transmission, all of which must be connected.

Figure 6-1 Schematic Diagram for the Four Twisted Pairs of the 1000BASE-T



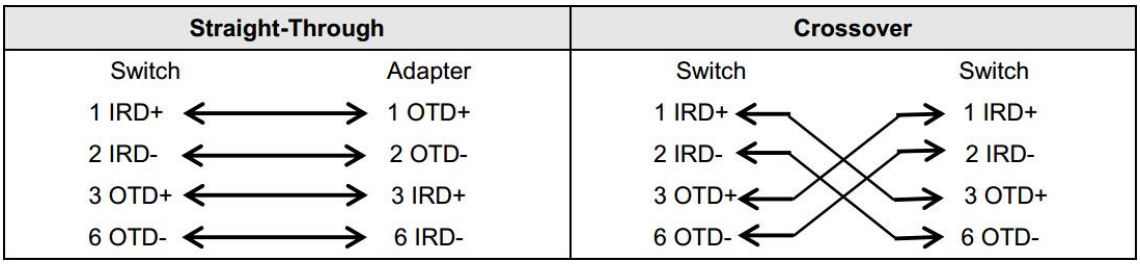
In addition to the preceding cables, the 100BASE-TX/10BASE-T can also use 100-ohm Category-3, Category-4, and Category-5 cables for 10 Mbps, and 100-ohm Category-5 cables for 100 Mbps, both of which can be up to 100 m. 0 shows the pinouts of the 100BASE-TX/10BASE-T.

Figure 6-2 Pinouts of the 100BASE-TX/10BASE-T

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

Table 6-3 shows the straight-through and crossover cable connections for the 100BASE-TX/10BASE-T.

Figure 6-3 Connections of the Twisted Pairs of the 100BASE-TX/10BASE-T



Optical Fiber Connection

For the optical fiber ports, select single-mode or multimode optical fibers for connection according to the fiber module connected. Table 6-4 shows the connection schematic diagram.

Figure 6-4 Figure A-4 Optical Fiber Connections



6.2 Mini-GBIC and SPF+ Module

SFP modules (mini-GBIC module) and 10G SFP+ modules are available to cope with interface types of switch modules. You can select the mini-GBIC module to suit your specific needs. The models and technical specifications of some mini-GBIC and 10G SFP+ modules are listed below. For details, see *Ruijie Transceiver Installation and Reference Guide.*

Table 6-1 Models and Technical Specifications of the 1000M Mini-GBIC Module

Model	Wave Length (nm)	Media 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

Model	Wave Length (nm)	Media Type	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
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
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 6-2 Models and Technical Specifications of the Mini-GBIC-GT Module

Standard	1000Base-T SFP Type	DDM (Yes/No)
1000Base-T	Mini-GBIC-GT	No

Table 6-3 Cabling Specifications of SFP Modules

Model	Optical Fiber Type	Media Type	Core Size (μm)	Maximum Cabling Distance
MINI-GBIC-SX-MM850	LC	MMF	62.5/125	275 m
			50/125	550 m
MINI-GBIC-LX-SM1310	LC	SMF	9/125	10 km
GE-eSFP-SX-MM850	LC	MMF	62.5/125	275 m
			50/125	550 m
GE-eSFP-LX-SM1310	LC	SMF	9/125	10 km
GE-SFP-LX-SM1310	LC	SMF	9/125	10 km
MINI-GBIC-LH40-SM1310	LC	SMF	9/125	40 km
GE-SFP-SX-SM1310-BIDI	LC	MMF	50/125	500 m
GE-SFP-SX-SM1550-BIDI	LC	MMF	50/125	500 m
GE-SFP-LX20-SM1310-BIDI	LC	SMF	9/125	20 km
GE-SFP-LX20-SM1550-BIDI	LC	SMF	9/125	20 km
GE-SFP-LH40-SM1310-BIDI	LC	SMF	9/125	40 km
GE-SFP-LH40-SM1550-BIDI	LC	SMF	9/125	40 km
MINI-GBIC-ZX50-SM1550	LC	SMF	9/125	50 km
MINI-GBIC-ZX80-SM1550	LC	SMF	9/125	80 km

Model	Optical Fiber Type	Media Type	Core Size (μm)	Maximum Cabling Distance
MINI-GBIC-ZX100-SM1550	LC	SMF	9/125	100 km
GE-SFP-SX	LC	MMF	62.5/125	275 m
			50/125	550 m
GE-SFP-LX	LC	SMF	9/125	10 km
Mini-GBIC-GT	RJ45 cable	Category 5 (or above) UTP/STP		100 m

Note

- For the optical module with the transmission distance exceeding 40 km or above, add one online optical attenuator on the link to avoid the overload of the optical receiver when short single-mode optical fibers are used.
- Optical modules generate laser. Do not look directly into the optical module.
- To keep optical modules clean, use dust caps when the modules are not connected to fibers.

Table 6-4 Specifications of SFP BIDI Optical Module Pairs

Rate/Distance	Module Pairs
1000 Mbps/500 m	GE-SFP-SX-SM1310-BIDI GE-SFP-SX-SM1550-BIDI
1000 Mbps/20 km	GE-SFP-LX20-SM1310-BIDI GE-SFP-LX20-SM1550-BIDI
1000 Mbps/40 km	GE-SFP-LH40-SM1310-BIDI GE-SFP-LH40-SM1550-BIDI
10 Gbps/300 m	XG-SFP-SR-SM1270-BIDI XG-SFP-SR-SM1330-BIDI
10 Gbps/10 km	XG-SFP-LR-SM1270-BIDI XG-SFP-LR-SM1330-BIDI

Caution

The BIDI modules must be used in pairs, for example, FE-SFP-LX20-SM1310-BIDI and FE-SFP-LX20-SM1550-BIDI are used together.

Table 6-5 Models and Technical Specifications of the 10G SFP+ Module

Model	Wavelength (nm)	DDM (Yes/No)	Optical Fiber Type	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
XG-SFP-SR-MM850	850	Yes	MMF	-7.3	-1	-9.9	-1
XG-SFP-ZR V1	850	Yes	MMF	-7.3	-1	-9.9	-1
XG-SR-MM850	850	Yes	MMF	-7.3	-1	-9.9	-1
SFP+MM850	850	Yes	MMF	-7.3	-1	-9.9	-1
XG-SFP-SR-SM1270-BIDI	1270	No	MMF	-3	4	-9	0.5
XG-SFP-SR-SM1330-BIDI	1270	No	MMF	-3	4	-9	0.5
XG-SFP-LR-SM1270-BIDI	1270	No	SMF	-6.5	0.5	-14.4	0.5
XG-SFP-LR-SM1330-BIDI	1330	No	SMF	-6.5	0.5	-14.4	0.5
XG-LR-SM1310	1310	Yes	SMF	-8.2	0.5	-14.4	0.5
SFP+SM1310	1310	Yes	SMF	-8.2	0.5	-14.4	0.5
XG-SFP-LR-SM1310	1310	Yes	SMF	-8.2	0.5	-14.4	0.5
XG-eSFP-LR-SM1310	1310	Yes	SMF	-8.2	0.5	-14.4	0.5
XG-SFP-ER-SM1550	1550	Yes	SMF	-4.7	4	-11.3	-1
XG-SFP-ZR-SM1550	1550	Yes	SMF	0	4	-24	-7
XS-SFP-SR	850	Yes	MMF	-7.3	-1	-9.9	-1
XS-SFP-LR	1310	Yes	SMF	-8.2	0.5	-10.3	0.5

Table 6-6 Models and Technical Specifications of the 10G SFP+ Cables

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

Note

- Supported SFP+ models may change at any time. Contact Ruijie Networks after-sales personnel for the latest information.
- If the DDM function of the AOC cable does not report transmit power, the TX power is allowed to be displayed as N/A.

Table 6-7 abling Specifications of SFP+ Modules

Model	Optical Fiber Type	Media Type	Core Size (um)	Modular Bandwidth (MHz·km)	Maximum Cabling Distance
XG-SFP-SR-MM850	LC	MMF	50/125	2000 (OM3)	300 m
XG-SFP-ZR V1	LC	MMF	50/125	2000 (OM3)	300 m
XG-SR-MM850	LC	MMF	50/125	2000 (OM3)	300 m
SFP+MM850	LC	MMF	50/125	2000 (OM3)	300 m
XG-SFP-SR-SM1270-BIDI	LC	MMF	50/125	2000 (OM3)	300 m
XG-SFP-SR-SM1330-BIDI	LC	MMF	50/125	2000 (OM3)	300 m
XG-SFP-LR-SM1270-BIDI	LC	SMF	9/125	N/A	10 km
XG-SFP-LR-SM1330-BIDI	LC	SMF	9/125	N/A	10 km
XG-SFP-LR-SM1310	LC	SMF	9/125	N/A	10 km
SFP+SM1310	LC	SMF	9/125	N/A	10 km
XG-SFP-ER-SM1550	LC	SMF	9/125	N/A	40 km

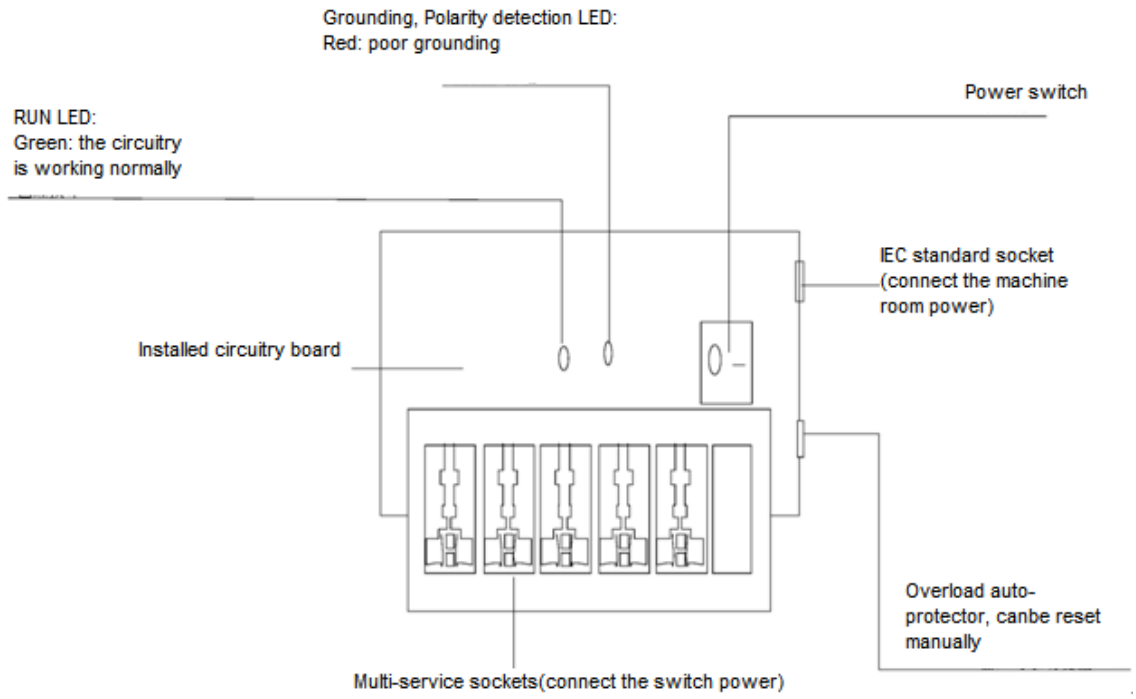
Model	Optical Fiber Type	Media Type	Core Size (um)	Modular Bandwidth (MHz·km)	Maximum Cabling Distance
XG-SFP-ZR-SM1550	LC	SMF	9/125	N/A	80 km
XS-SFP-SR	LC	MMF	62.5 /125	200 (OM1) 160	33 m 26 m
			50/125	2000 (OM3) 500 (OM2) 400 (OM1)	300 m 82 m 66 m
XS-SFP-LR	LC	SMF	9/125	N/A	10 km

6.3 Surge Protection

Installing the AC Power Arrester (Surge Protection Cable Row)

The external surge protection cable row must be used on the AC power port to prevent the switch from being struck by lightning when the AC power cable is introduced from the outdoor and directly connected to the power port of the switch. The surge protection cable row is fixed on the cabinet, operating table, or the wall in the equipment room using the line buttons and screws.

Figure 6-5 Schematic Diagram for the Power Arrester



Caution

The power arrester is not provided and customers have to purchase it.

Precautions for installation:

- Ensure that the PE terminal of the power arrester is properly grounded.
- After connecting the switch AC power plug to the socket of the power arrester (surge protection cable row), surge protection function implements if the RUN LED is Green and the ALARM LED is OFF.
- If the alarm LED on the power arrester is red, check whether there is the poor grounding connection or reversed connection of null and live lines. You can use the multimeter to check the polarity of the power socket for the arrester when the LED is red. If the N line is on the left and the L line is on the right, the arrester PE terminal is not grounded. If the L line is on the left and the N line is on the right, the polarity of the arrester power cable is reversed. If the LED is still red, the arrester PE terminal is not grounded.

Installing the Ethernet Port Arrester

During the switch usage, the Ethernet port arrester must be connected to the switch to prevent the switch damage by lightning before the outdoor network cable connects to the switch.

Tools: cross or straight screwdriver, multimeter, and diagonal pliers

Installation steps:

(1) Tear one side of the protection paper for the double-sided adhesive tape and paste the tape to the framework of the Ethernet port arrester. Tear the other side of the protection paper for the double-sided adhesive tape and paste the Ethernet port arrester to the switch framework. The paste location for the Ethernet port arrester must be as close to the grounding terminal of the switch.

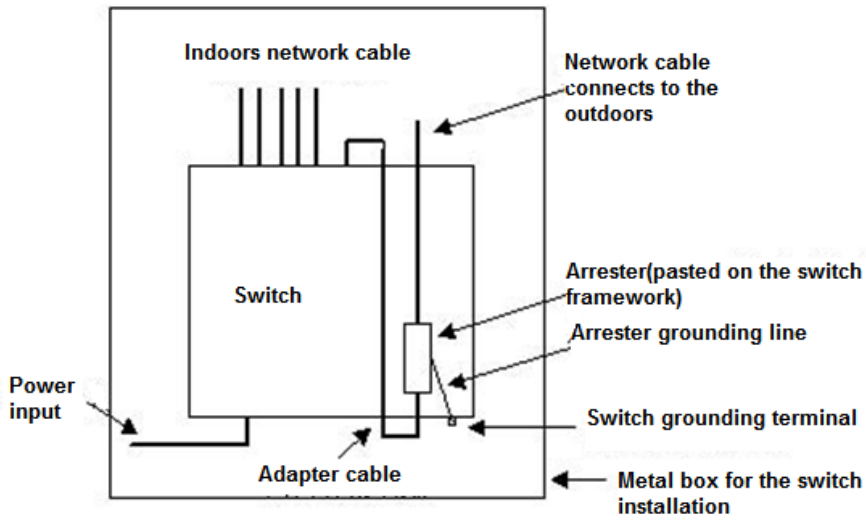
(2) Based on the distance of the switch grounding terminal, cut the grounding line for the Ethernet port arrester and firmly tighten the grounding line to the grounding terminal of the switch.

(3) Use the multimeter to check whether the grounding line for the arrester is in good contact with the switch grounding terminal and the framework.

(4) According to the *Ethernet Port Arrester Hardware Installation Guide*, connect the arrester using the adapter cable (note that the external network cable is connected to the end of IN, while the adapter cable connected to the switch is connected to the end of OUT) and check whether the LED on the board is normal.

(5) Use the nylon button to bundle the power cables.

Figure 6-6 Schematic Diagram for the Ethernet port Arrester Installation



Caution

- The Ethernet port arrester applies to only the 10M/100M electrical Ethernet ports with the RJ45 connector.
- The Ethernet port arrester is provided by customers. For more information about arrester installation, refer to Ethernet Port Arrester Hardware Installation Guide.

To prevent the performance of the Ethernet port arrester from being affected, note the following points:

- Reversed direction of the arrester installation: Connect the external network cable to the IN end and connect the switch Ethernet port to the OUT end.
- Poor arrester grounding: The grounding line must be as short as possible to ensure that it is in good contact with the switch grounding terminal. Use the multimeter to confirm the contact after grounding.
- Incomplete arrester installation: If more than one port is connected to the peer device on the switch, install the arresters on all connection ports for surge protection.

6.4 Cabling Recommendations

When the switches are installed in standard 19-inch cabinets, cables are tied in the binding rack on the cabinet by the cabling rack, and top or bottom cabling is adopted according to the actual situation in the equipment room. All cable connectors should be placed at the bottom of the cabinet in an orderly manner but not outside the cabinet. Power cables are routed beside the cabinet, and top or bottom cabling is adopted according to the actual situation in the equipment room, such as the position of the DC power distribution box, AC socket, or surge protection box.

Requirement for the Minimum Cable Bending Radius

- The bending radius of a power cord, communication cable, and flat cable should be five times greater than their respective diameters. The bending radius of these cables that often bend or is removed or installed should be seven times greater than their respective diameters.
- The bending radius of a common coaxial cable should be seven times greater than its diameter. The bending radius of this type of cables that often bend or is removed or installed should be 10 times greater than its diameter.
- The bending radius of a high-speed cable (for example, SFP cable) should be five times greater than its diameter. The bending radius of this type of cables that often bend or is removed or installed should be 10 times greater than its diameter.

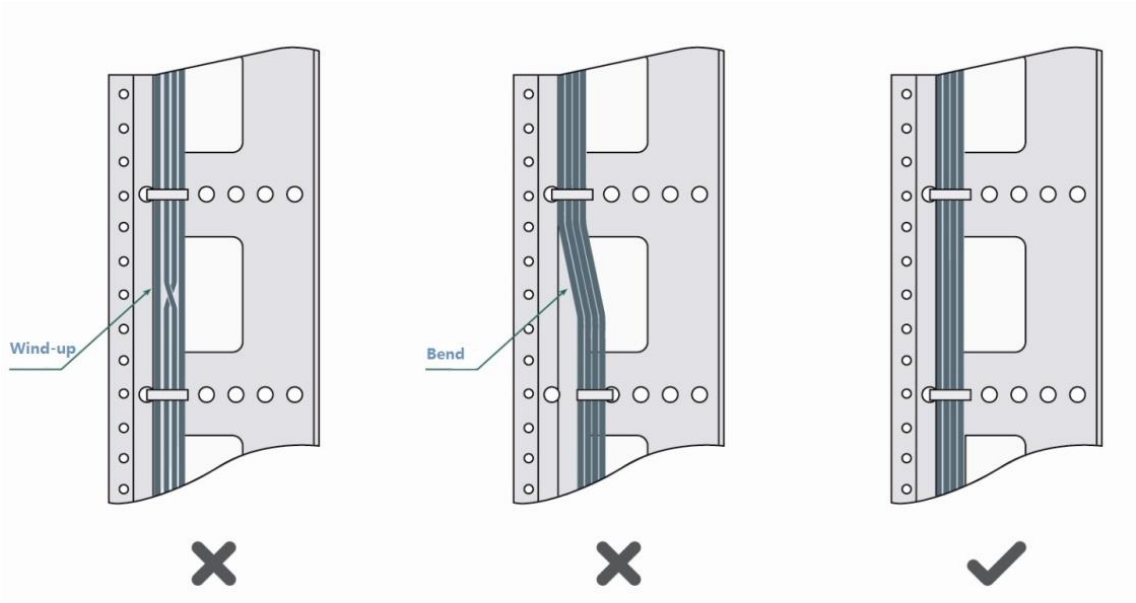
Requirement for the Minimum Fiber Bending Radius

- The diameter of a fiber tray to hold fibers cannot be 25 times less than the diameter of the fiber.
- When moving an optical fiber, the bending radius of the fiber should be equal to or 20 times greater than the diameter of the fiber.
- During cabling of an optical fiber, the bending radius of the fiber should be equal to or 10 times greater than the diameter of the fiber.

Precautions for Bundling Up Cables

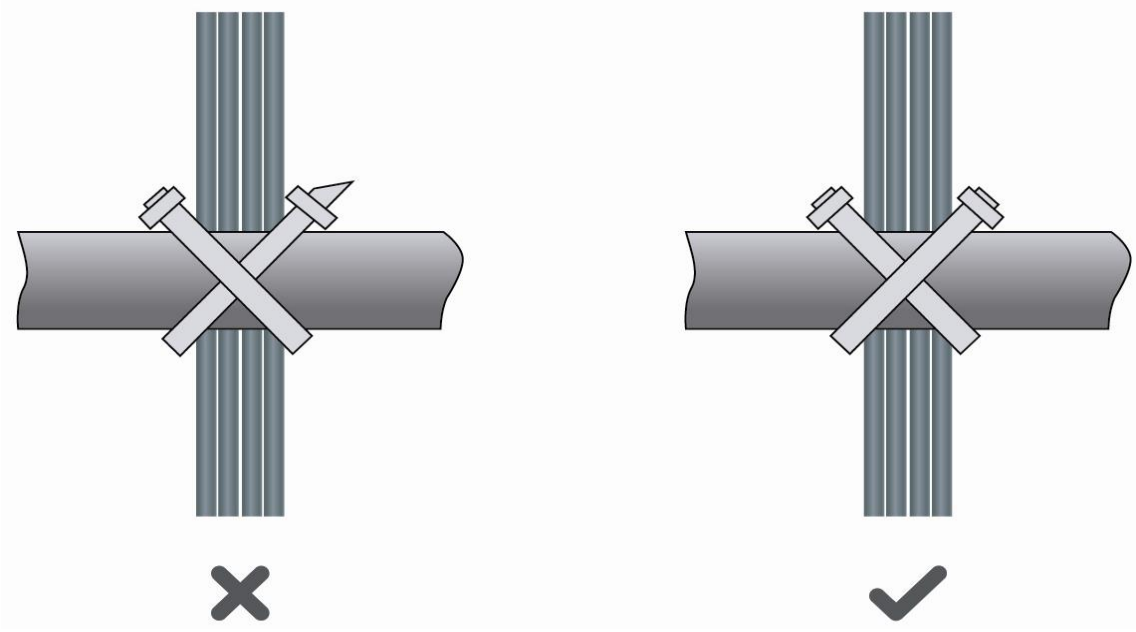
- Before bundling up cables, correctly mark labels and stick the labels to cables.
- Cables should be neatly and properly bundled, as shown in Figure 6-7.

Figure 6-7 Bundling Cables



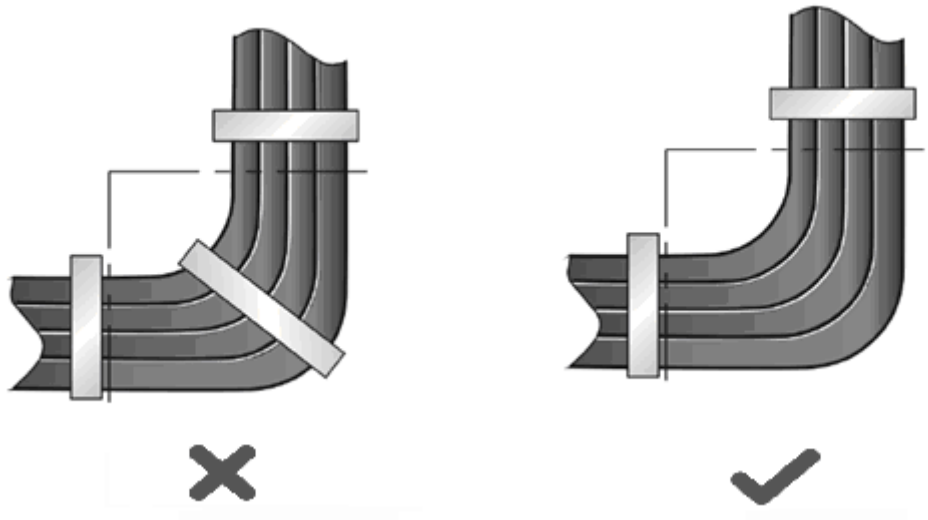
- Route and bundle power, signal, ground cables separately. When the cables are close to each other, cross them. When power cables are parallel to signal cables, the distance between them must be 30 mm (1.18 in.).
- All cable trays and their accessories must be smooth and free from sharp edges.
- Holes in metal, through which cables pass must have smooth or well-rounded surfaces, and be protected with insulating bushings.
- Use proper cable ties to bind cables together. Do not tie two or more cable ties to bind cables.
- Cut off excess cable tie cleanly with no sharp edges after bundling cables, as shown in Figure 6-8.

Figure 6-8 Cutting Off Excess Cable Tie



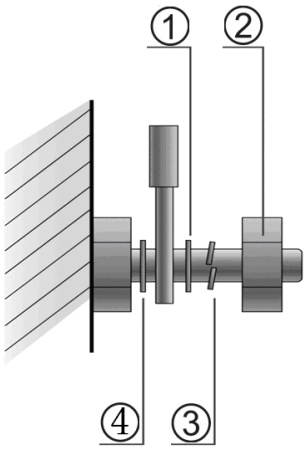
- If cables are to be bent, bind them first but do not tie cable ties within the bend to avoid stress on the cables, which may cause the wires inside to break, as shown in Figure 6-9.

Figure 6-9 Preventing Cable Ties from Being Tied within the Bend



- Wrap up unnecessary or excess cables and bind them to the appropriate rack position, where device operation is not affected and no damages occur to the device and cables during commissioning.
- Do not bind power cords to the rails for moving parts.
- Leave a specified length of the cable connecting moving parts, such as the ground wire of the cabinet door, to avoid stress on the cable. When moving parts are in place, ensure that the excess cable length does not contact heat sources, sharp corners, or edges. If heat sources are unavoidable, use high-temperature cables instead.
- When using screws to fasten cable lugs, the bolts or nuts should be tightened and prevented from loosening, as shown in Figure 6-10.

Figure 6-10 Fastening Cable Lugs



Note	Flat washer Nut	Spring washer Flat washer

- When using a stiff cable, fix it near the cable lug to avoid stress on the lug and cable.
- Do not use self-tapping screws to fasten terminals.

- Bundle cables of the same type and running in the same direction into groups. Keep cables clean and straight.
- Cables should be tied according to the following table.

Diameter of Cable Bundle (mm)	Space Between Bundles (mm)
10	80 to 150
10 to 30	150 to 200
30	200 to 300

- No knot is allowed in cabling or bundling.
- The metal parts of the cold-pressed terminal blocks, such as air circuit breakers, should not be exposed outside of the blocks.

6.5 Site Selection

- The equipment room should be at least 5 km away from the heavy pollution source such as the smelter, coal mine, and thermal power plant, 3.7 km away from the medium pollution source such as the chemical industry, rubber industry, and electroplating industry, and 2 km away from the light pollution source such as the food manufacturer 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 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 that 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 had better be on the second floor or above. Otherwise, the equipment room floor should be 600 mm higher than the highest flood level ever recorded.
- Make sure that 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 must meet requirements of 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.
- Pay attention to the location of the air conditioner. Keep the air conditioner from blowing wind straight toward the device or blowing water drops from the window or air vent toward the device.