Ruijie Reyee RG-ES118GS-P-L Switch

Installation Guide

Document Version: V1.5

Date: May 9, 2026

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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
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Conventions

1. Signs

The signs used in this document are described as below:

Danger

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

Warning

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

Caution

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

Note

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

Specification

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

2. Note

This manual provides the device installation steps, hardware troubleshooting, module technical specifications, and specifications and usage guidelines for cables and connectors. It is intended for the users who have some experience in installing and maintaining network hardware. At the same time, it is assumed that the users are already familiar with the related terms and concepts.

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1 Product Introduction

1.1 Overview

Model	10/100/1000Base-T Ethernet Port with Auto-Negotiation	1000Base-X SFP Port	Console Port	Fan	Power Supply
RG-ES118GS-P-L	16	2	N/A	1	2 x fixed fan

Note

The 16 Ethernet ports are PoE-capable, and comply with the IEEE 802.3af and 802.3at standards. These ports support the Alternative A PoE power supply mode, which deliver power through pins 1/2 (+) and pins 3/6 (-).

1.2 Package Contents

Table 1-1 Package Contents

No.	Item	Quantity
1	RG-ES118GS-P-L Switch	1
2	Rubber pad	4
3	Rack-mount bracket	2
4	User Manual	1
5	M4 x 8 mm Phillips Countersunk Screws	6
6	Warranty Card	1
7	Power Cord	1
8	Power Cord Retainer Clip	1

Note

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

1.3 Appearance

The RG-ES118GS-P-L switch provides sixteen 10/100/1000Base-T Ethernet ports with auto-negotiation, two 1000Base-X SFP ports, two DIP switches, and a number of LEDs on the front panel. It provides one AC power connector and one grounding stud on the rear panel. The following figure shows the product appearance.



1.3.1 Front Panel

Figure 1-1 Front Panel

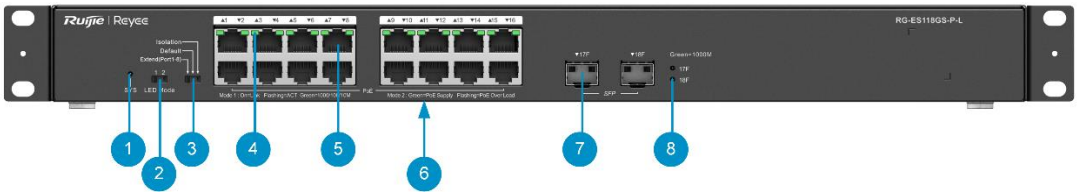


Table 1-2 Front Panel Components

No.	Component	Description
1	System LED (SYS)	● Off: The switch is not powered on. ● Slow blinking green (flash every two seconds): The switch is operating properly, but has insufficient power for PoE. ● Fast blinking green (10 flashes per second): The switch is upgrading or restarting. ● Solid green: The switch is operating normally.
2	Port LED Mode switch	● LED Mode switch toggled to left (Mode 1): The port LED status indicates the status of traffic transmission. Solid green means that the port is connected, but is not sending and receiving data, while blinking green means that the port is connected, and is sending and receiving data. ● LED Mode switch toggled to right (Mode 2): The port LED status indicates the PoE status. Solid green means that the port is supplying power, while blinking green means that the port is in power overload state.

No.	Component	Description
3	Work Mode Switch	● Toggle to the far left position (Extend mode): The rate of ports 1 to 16 is reduced to 10 Mbps. Typically, the transmission distance is 200 m (656.17 ft), which is up to 250 m (820.21 ft) in the laboratory environment with Cat5e cables or higher. In addition, factors such as cable quality, powered device performance, and ambient temperature may cause the transmission distance to be less than 250 m (820.21 ft). ● Toggle to the middle position (Default mode): All ports can communicate with each other, and flow control is enabled on all ports. ● Toggle to the far right position (Port isolation mode): Ports 1 to 16 cannot communicate with each other and can only communicate with ports 17 and 18. Ports 17 and 18 can communicate with each other, and flow control is enabled on all ports.
4	Ethernet port status LED	● PoE status: ○ Off: PoE is disabled. ○ Solid green: PoE is enabled. ○ Blinking green: PoE overload has occurred. ● Port status: ○ Off: No link is established on the port. ○ Solid green: The port is operating at 10/100/1000 Mbps, but is not receiving or sending data. ○ Blinking green: The port is operating at 10/100/1000 Mbps, and is receiving or sending data.
5	10/100/1000Base-T Ethernet port	10/100/1000Base-T ports with auto-negotiation, connected to Cat5e or above cables.
6	Label	Located at the bottom of the switch.
7	SFP port	1000Base-X SFP port, backward compatible with 100Base-FX.
8	SFP port status LED	● Off: No link is established on the port. ● Solid green: The port is operating at 100/1000Mbps, but is not receiving or sending data. ● Blinking green: The port is operating at 100/1000Mbps, and is receiving or sending data.

1.3.2 Rear Panel

Figure 1-2 Rear Panel



Table 1-3 Rear Panel Components

No.	Component	Description
1	Power cord retention clip holder	Secures the power cord.
2	Power connector	Connects to an external AC power supply.
3	Grounding stud	Secures the grounding lug to connect the chassis to earth ground.

1.4 Technical Specifications

Table 1-4 Technical Specifications

System Specifications	Flash memory	4 MB
	Forwarding rate	26.8 Mpps
	Switching capacity	36 Gbps(bit/s)
Port Specifications	Total number of RJ45 ports	16
	Total number of optical ports	2
	Number of 1GE SFP ports	2
	Number of 10/100/1000BASE-T ports	18
	Long-distance transmission	Yes **Notes:** ● Support a stable transmission distance of up to 200 m (656.17 ft.). In a lab environment, with CAT5e or better Ethernet cables, the transmission distance can reach up to 250 m (820.21 ft.). ● Refer to the note below the specifications table for other restrictions on the long-distance transmission feature.
	DIP switch	● Extend mode: The rate of Ports 1 to 8 is reduced to 10 Mbps, but the maximum transmission distance can be up to 200 meters (Cat5e cables required). Flow control on. ● Default mode: All ports can communicate with each other. Flow control on. ● Isolation mode: Ports 1 to 16 cannot communicate with each other, but they can communicate with ports 17 and 18. Flow control on.
	PoE Out standard	PoE/PoE+ (IEEE 802.3af/at)

Power Supply and Consumption	Number of PoE/PoE+ Out ports	16
	PoE budget per port	30 W
	PoE budget	247 W
	PoE power pins	1–2 (+), 3–6 (-)
	Power input	220 V AC power supply: ● Rated input voltage: 100 V AC to 240 V AC, 50 Hz to 60 Hz ● Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz ● Rated input current: 4.5 A
	Maximum power consumption	● 20 W (with no PoE load) ● 267 W (with PoE full load)
	Power supply	Fixed power supply
Dimensions and Weight	Casing	Metal
	Product dimensions (W x D x H)	440 mm x 214.9 mm x 44 mm (17.32 in. x 8.46 in. x 1.73 in.)
	Weight	● 2.57 kg (5.67 lbs) (without packaging materials) ● 3.78 kg (8.33 lbs) (with packaging materials)
Environment and Reliability	Fan	2 x fixed fan
	Cooling	Air cooling, front-to-rear airflow
	Acoustic noise	< 45 dB: 25℃ (77°F)
	Mounting options	Desk/Rack
	Hot swapping of cables	Hot swapping supported by the service port and power connector
	MTBF	200,000 hours
	Operating temperature	0°C to 45°C (32°F to 113°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	–500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)

	ESD protection	● Air discharge: 8 kV ● Contact discharge: 6 kV
	Surge protection	● Service port: ±4 kV for common mode ● Power connector: ±6 kV for common mode and ±6 kV for differential mode
Certification and Regulatory Compliance	EMC	EN 55032 EN IEC 61000-3-2 EN 61000-3-3 EN 55035 EN 300 386
	Safety compliance	EN 62368-1 IEC 62368-1
	Certification	CE, CB

CAUTION：DOUBLE POLE/NEUTRAL FUSING

Electric shock hazard！The fuse may be in the neutral, and that the mains shall be disconnected to de-energize the phase conductors.

Warning

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

Notes

Before using long-distance transmission, the following requirements must be met.

1. A CAT5e or better Ethernet cable must be used, with an impedance of less than 25 ohms over a 100-meter (328.08-foot) length.

2. The connected device also supports long-distance transmission.

3. The supply voltage should be 54 V.

4. After long-distance transmission is enabled on a port with PoE Out supported, its rate will decrease to 10 Mbps. In addition, the cable material, powered device performance, ambient temperature, and other factors will affect the actual transmission distance.

1.5 Cooling

The RG-ES118GS-P-L switch adopts fan cooling design. To ensure the normal operation of the device, maintain a minimum clearance of 10 cm (3.94 in.) around the device. Dust the device every three months to avoid blocking the ventilation openings.

2 Preparing for Installation

2.1 Safety Precautions

Note

- To avoid bodily injury and device damage, please 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 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 clothing, jewelry, or any other objects that may hook onto 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.
- Prior to installation or dismantling, turn off all power supplies and disconnect all power cords and cables.
- Moving the device requires a team of at least two people. Operating alone is strictly prohibited. Pay attention to maintaining balance to prevent injuries.

2.1.3 Electrical Safety

Warning

- Any 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 free of dust.
- Maintain appropriate humidity conditions.
- Before installing any pluggable module, 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

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

To ensure the normal operation and prolonged service life of the device, it is essential to install it indoors in a location that meets 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, and verify that the installation site's ground meets the necessary specifications.

2.2.2 Ventilation Requirements

Maintain adequate clearance around the device for air circulation and heat dissipation. After connecting various cables, bundle them or place them in cable management brackets to prevent them from blocking air vents.

2.2.3 Space Requirements

Ensure that indoor pathways are at least 800 mm (31.50 in.) wide to allow for proper 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

For optimal device performance and extended service life, 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.

- When exposed to high relative humidity, insulating materials may exhibit poor insulation capabilities, increasing the risk of electrical leakage. Furthermore, high humidity can cause mechanical changes in materials and corrosion of metallic components.
- When exposed to low relative humidity, the insulating strip may dry out and 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 elevated temperatures can expedite the device's aging process.

Note

The ambient 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 switch 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 running 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/m3	≤ 3.5×10^6
≥ 5 μm	Particles/m3	≤ 3.5×10^4

Apart from dust, the salt, acid, and sulfide in the air of the machine room must also 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 limits 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" indicates the typical level of exposure over a one-week period. "Maximum" refers to the highest allowable exposure level within a week, with this level being sustainable for no more than 30 minutes per 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. To ensure proper grounding, carefully check the grounding

conditions at the installation site according to the grounding specifications, and complete grounding properly based on the actual situation.

- **Safety Grounding**

Ensure that the cabinet 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

- Adopt grounding protection connections in buildings so that the device can be connected to the protective grounding system.
- 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 required for electromagnetic compatibility includes shielded grounding, filter grounding, noise and interference suppression, and level reference, which contribute to the overall grounding requirements. The grounding resistance should be smaller than 1 ohm, and the grounding terminals of the rack should be grounded before the running of the device.

2.2.7 Anti-interference Requirements

- Take effective measures to prevent interference from power grid to 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 far 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 cabinet is in good contact with the ground.
- Ensure that the neutral point of the AP 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 air vents for heat dissipation.
- The device is equipped with fans to draw air from front and left and right sides to rear. Maintain a minimum clearance of 150 mm (5.91 in.) around the ventilation openings for heat dissipation. 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 good cooling and ventilation.
- The installation site is sturdy enough to support the weight of the device and its accessories.
- The installation site is properly grounded.

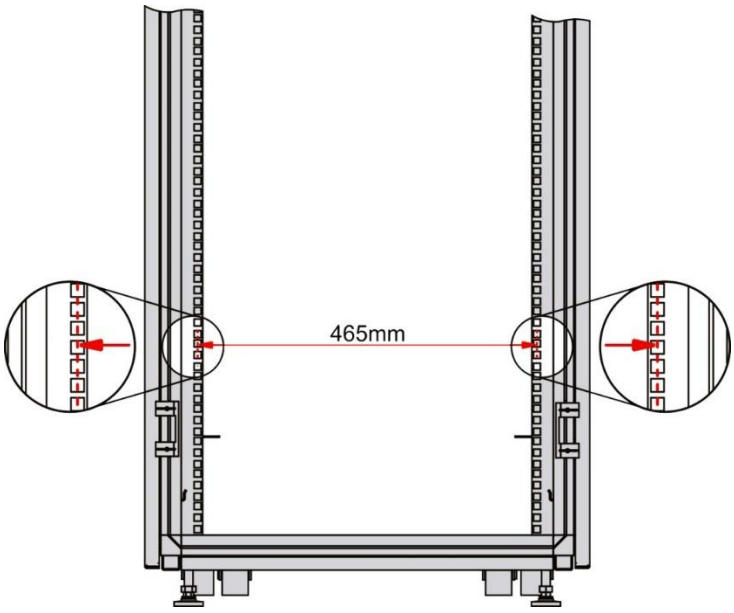
2.3 Rack Requirements

If you plan to install the device in a rack, ensure that the rack meets the following conditions.

(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 (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 cabinet has a reliable grounding terminal for the chassis to connect to earth ground.

(6) The cabinet 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 plier, and cable ties
Special Tools	Anti-ESD glove, wire stripper, crimping plier, RJ45 crimping plier, and wire cutter
Meters	Multimeter

Note

The device is not shipped with a tool kit. You need to prepare these tools by yourself.

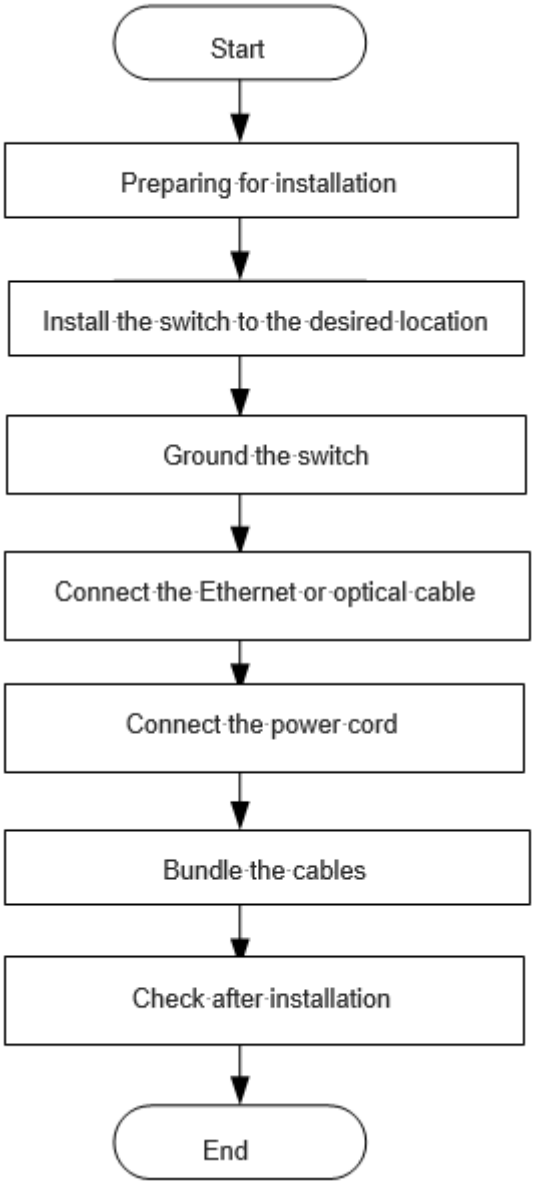
3 Installing the Switch

Caution

Before installing the device, make sure that you have carefully read the requirements described in Chapter 2.

3.1 Installation Flowchart

Figure 3-1 Installation Flowchart



3.2 Preparing for Installation

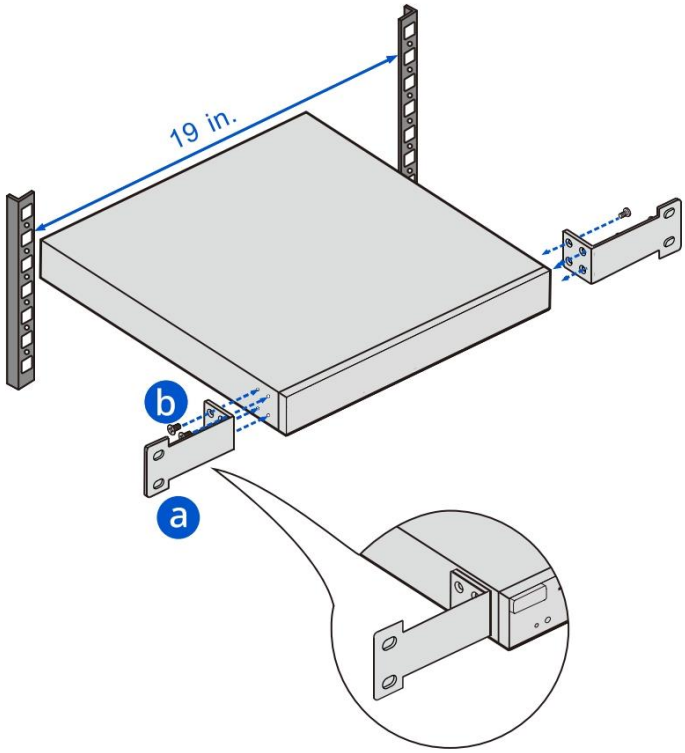
- The installation site provides sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements of the device.
- The power supply is available in the installation site and meets current requirements.
- Ethernet cables have been deployed at the installation 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

3.3.1 Installing the Switch in A Standard 19-inch Rack

Before installing the switch in a rack, attach the mounting brackets to the switch using the supplied screws, as shown in Figure 3-2.

Figure 3-2 Securing Mounting Brackets



Follow the steps below to mount the switch in a 19-inch rack:

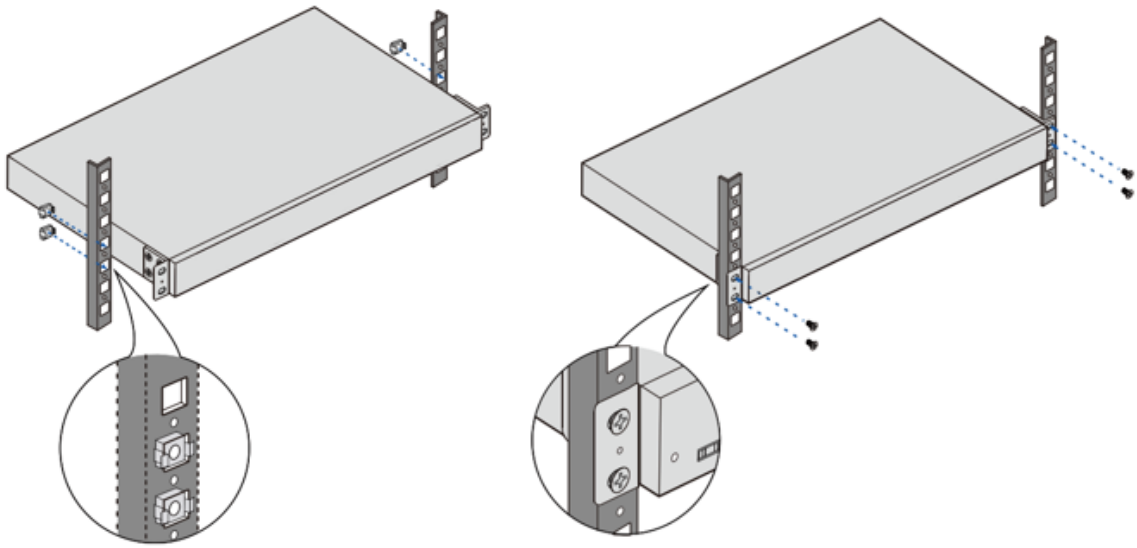
(1) Verify that the mounting brackets are securely attached to both sides of the switch.

(2) Install the cage nuts into the square holes of the rack posts.

(3) Have one person support the bottom of the switch while moving it along the rack to find the desired position.

(4) Another person secures the switch to the rack by attaching the mounting brackets to the rack using M6 screws and cage nuts (both screws and nuts are to be provided by the user). Ensure that the switch is level and firmly mounted in place.

Figure 3-3 Mounting the Switch in a Rack

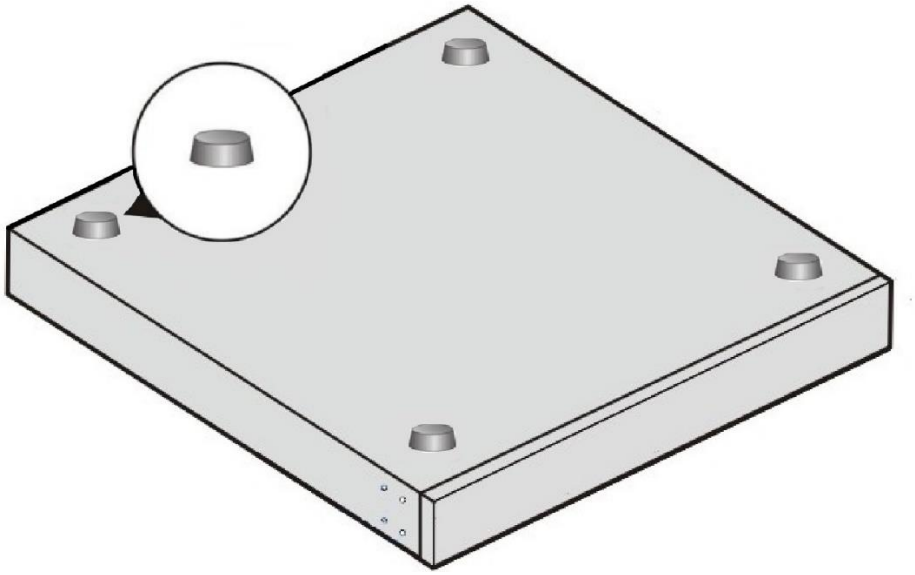


3.3.2 Installing the Switch on a Workbench

When a standard rack is unavailable, a common approach is to place the switch on a clean workbench. The installation steps are as follows:

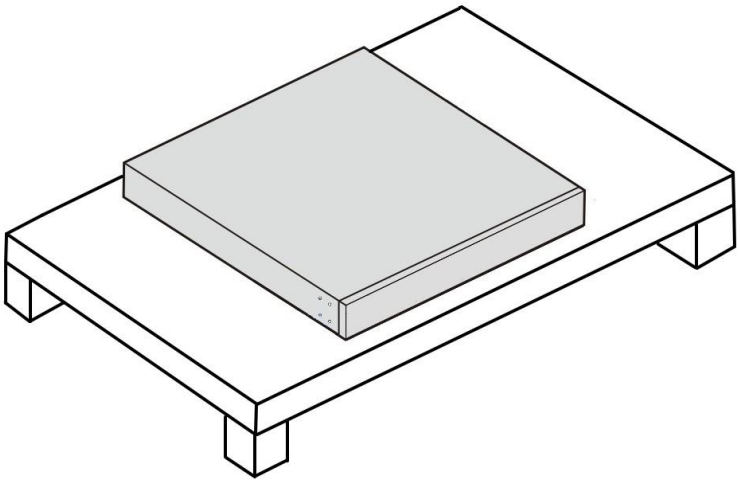
(1) As shown in Figure 3-4, attach the four rubber feet to the four corners at the bottom of the switch.

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



(2) As shown in Figure 3-5, place the switch on a workbench and ensure adequate airflow around the switch.

Figure 3-5 Installing the Switch on a Workbench



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

- 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 outlet is reliably connected to the protective ground of the building. If not, the O&M personnel should use a protective grounding wire to connect the AC outlet protective earth terminal to the building protective ground.
- The power outlet should be installed near the device and easily accessible.
- During device installation, connect the grounding wire first and disconnect it last.
- The cross-sectional area of the protective grounding cable must be at least 2.5 square millimeters (12 AWG).
- 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 use bare wire.
- The resistance between the chassis and ground should be less than 1 ohm.

3.5 Connecting Cables

Caution

- Use the delivered power cords. Otherwise, security accidents may occur.
- Manage Ethernet cables with a distance 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 sharp small-radius bending at the joints.

- When connecting optical cables, ensure that the sending 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 sending end of the peer device.

After successfully installing the switch in a rack, proceed to connect cables to external devices by following these steps:

(1) Before connecting the power cables, ensure that the main power supply is off.

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

(3) Properly insert the optical transceiver module into the designated optical port on the front panel, following the provided labeling. Next, connect the single-mode or multi-mode optical cable to the corresponding port on the transceiver module, ensuring you correctly identify the receiving and sending ends of the cable.

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

3.6 Bundling Cables

3.6.1 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 hard the fibers and affect their useful life and transmission performance.

3.6.2 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 the Installation

Caution

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

- Verify that the ground wire is 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 Debugging

4.1 Powering on the Switch

4.1.1 Checklist Before Power-On

- The switch is connected to earth ground.
- The power cord is properly connected.
- The power voltage meets the requirement.

4.1.2 Checklist After Power-on

After the device is powered on, check the following items:

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

4.2 Adding Unmanaged Device to Topology

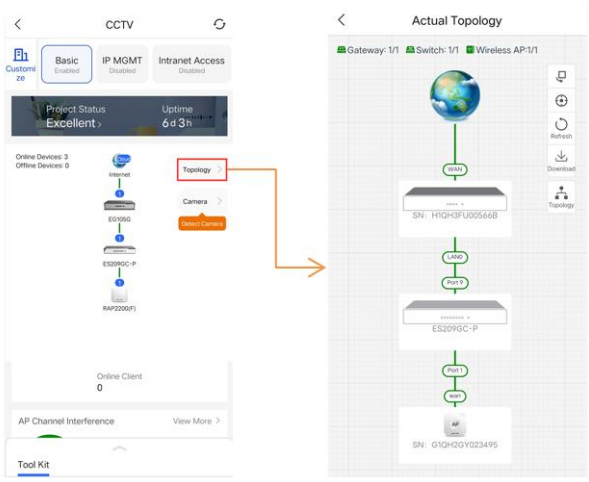
> Caution
>
> There must be devices that can be managed in the network, including Reyee EG or ES2/NBS switches.

Scenarios:

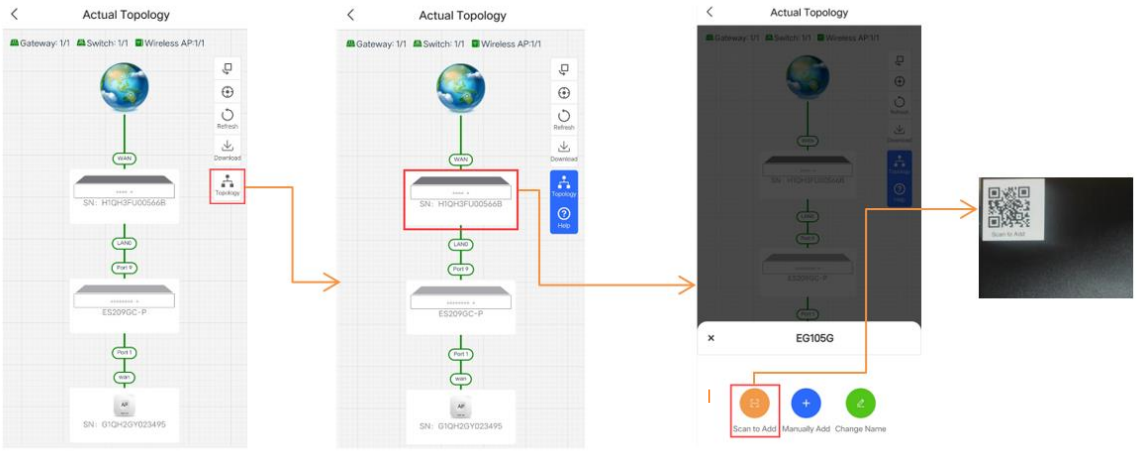
- Add a new unmanaged switch: Select its uplink device, and scan the QR-code on the switch or manually add it to the topology.
- If the unmanaged switch is already added to the topology and displayed as a virtual device: Select the virtual device, and scan its QR-code or manually enter its information to the topology.

4.2.1 Scanning QR-code of Unmanaged Device

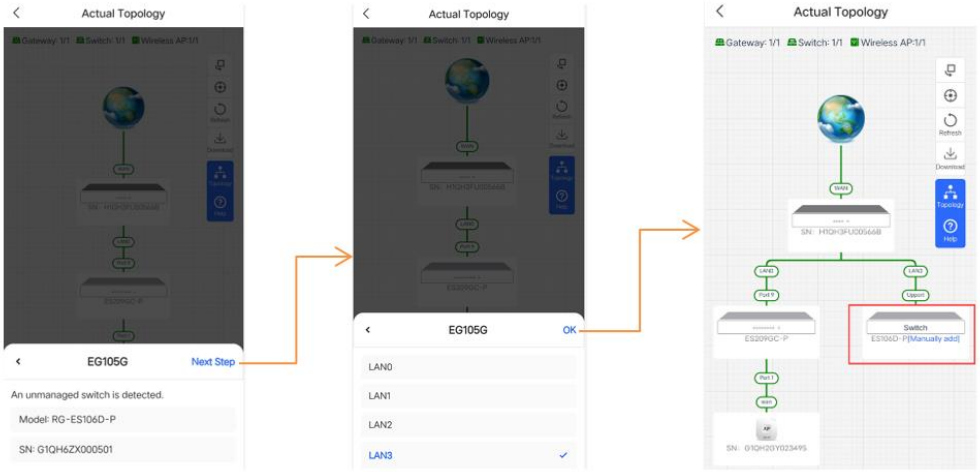
(1) Tap **Topology** to open the topology page.



(2) Tap the **Topology** button, and select the existing managed device. To add an unmanaged downlink switch by scanning its QR-code, select **Scan to Add**.

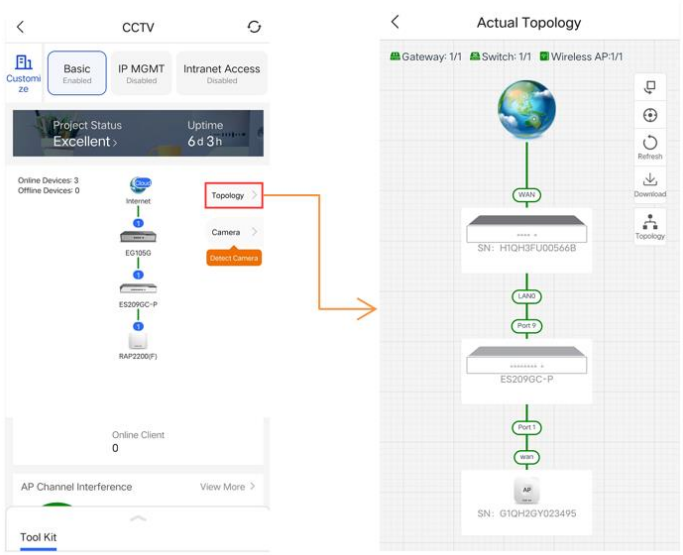


(3) After the device is detected, select its uplink port. And the device is added successfully.

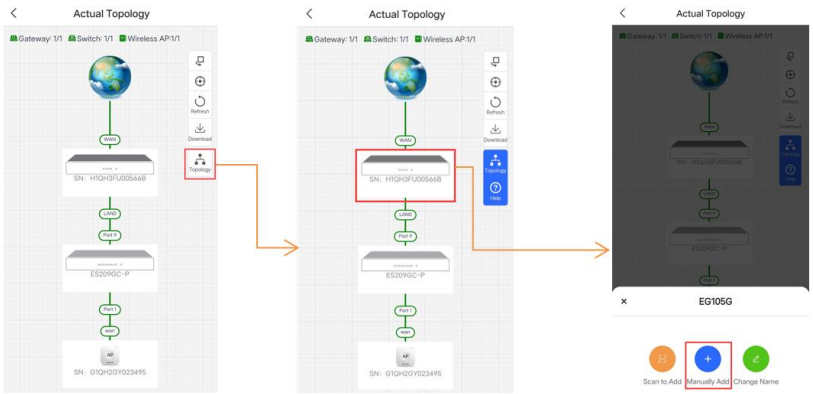


4.2.2 Adding Unmanaged Device Manually

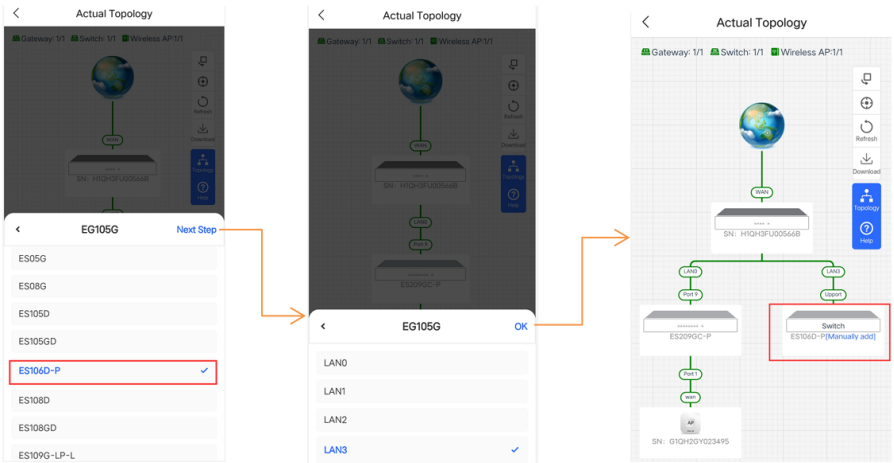
(1) Tap **Topology** to enter the topology page.



(2) Tap the **Topology** button, and select the existing managed device. To add an unmanaged downlink switch manually, select **Manually Add**.

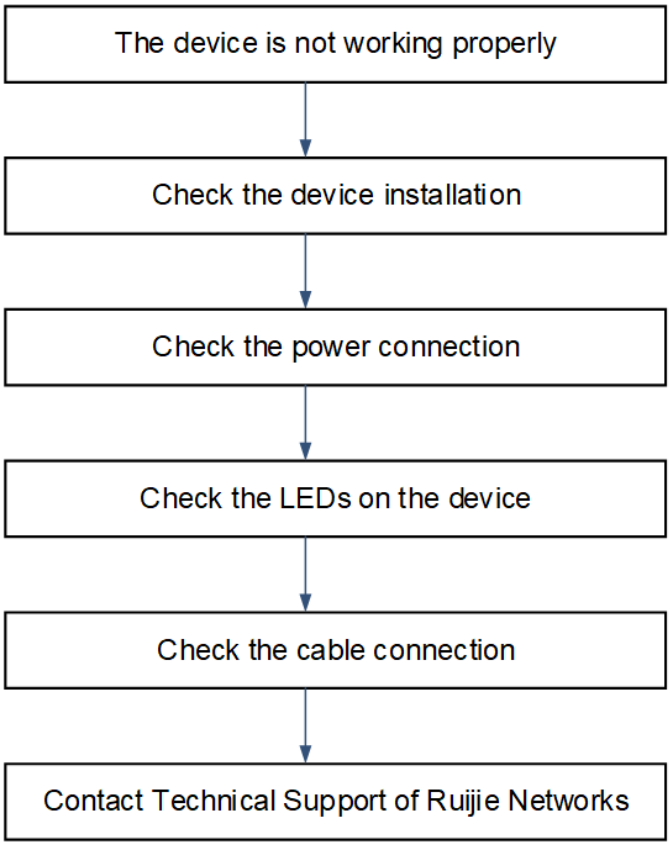


(3) Select the device model and its uplink port, and the device is added successfully.



5 Troubleshooting

5.1 Troubleshooting Flowchart



5.2 Common Faults

Symptom	Possible Cause	Suggested Action
The SYS 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 machine room is normal and whether the power cord connected to the switch is loose.

Symptom	Possible Cause	Suggested Action
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 and does not use the same work mode as the interconnected switch.	Replace the twisted pair cable. Use optical cables or connect to a cascaded switch. Make sure that the port works in the same 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. The optical fiber or end face is contaminated.	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. Clean the end face with a lint-free cloth or cleaning pen.
RJ45 port is receiving and sending data but the port status is off.	RJ45 port LED status error: The port LED indicates the PoE status, and the port is not supplying PoE power.	Toggle the LED Mode switch to the left, so that the port LED indicates the working status of the switch.

6 Appendixes

6.1 Connectors and Media

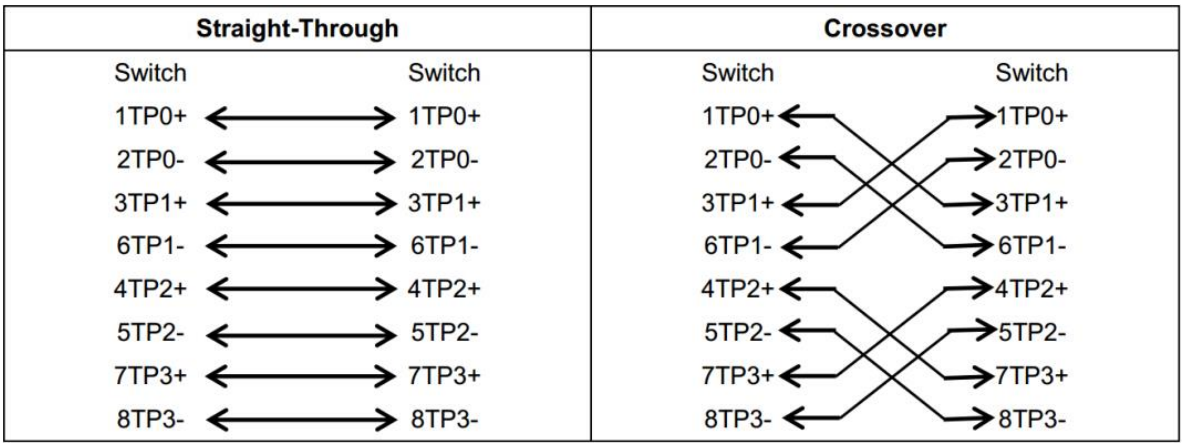
6.1.1 1000BASE-T/100BASE-TX/10BASE-T Port

The 1000BASE-T/100BASE-TX/10BASE-T is a 10/100/1000 Mbps auto-negotiation port that supports auto MDI/MDIX Crossover.

Compliant with IEEE 802.3ab, 1000BASE-T requires Category 5e 100-ohm UTP or 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 pairs of wires for the 1000BASE-T port.

Figure 6-1 1000BASE-T Twisted Pair Connections



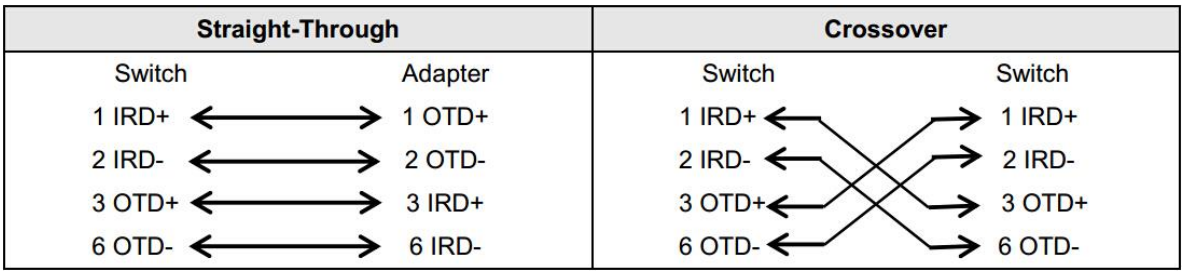
100BASE-TX/10BASE-T can be interconnected using cables of the preceding specifications. For 10 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables; for 100 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 5 cables with a maximum connection distance of 100 meters. The following table 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

The following figure shows wiring of straight-through and crossover cables for the 100BASE-TX/10BASE-T port.

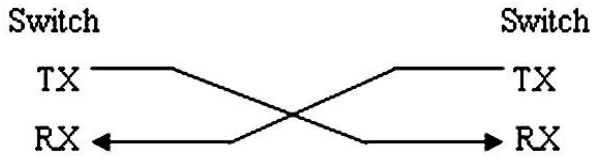
Figure 6-2 100BASE-TX/10BASE-T Twisted Pair Connections



- **Optical Fiber Connection**

You can choose single-mode or multimode fibers according to the module types. Figure 6-3 shows the connection of fiber-optic cable.

Figure 6-3 Fiber-Optic Cable Connection



6.2 Mini-GBIC and SFP Modules

We provide appropriate SFP modules (Mini-GBIC modules) according to the port types. You can select the module to suit your specific needs. Besides, the Mini-GBIC-GT modules are also supported. The following models and technical specifications of some SFP modules are listed for your reference. For details about the technical specifications, see *Ruijie Hybrid Cable Installation and Reference Guide*.

Table 6-2 Models and Specifications of 1000M Mini-GBIC (SFP) Optical Modules

Model	Wavelength (nm)	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

Model	Wavelength (nm)	Cable type	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
				Min	Max	Min	Max
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 6-3 1000Base-T SFP Copper Module

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

Table 6-4 SFP Module Cabling Specifications

SFP Model	Connector Type	Cable type	Core Specifications (μm)	Max. Cabling Distance
MINI-GBIC-SX-MM850	L/C	MMF	62.5/125	275 m
			50/125	550 m

SFP Model	Connector Type	Cable type	Core Specifications (μm)	Max. Cabling Distance
MINI-GBIC-LX-SM1310	L/C	SMF	9/125	10 km
GE-eSFP-SX-MM850	L/C	MMF	62.5/125	275 m
			50/125	550 m
GE-eSFP-LX-SM1310	L/C	SMF	9/125	10 km
GE-SFP-LX-SM1310	L/C	SMF	9/125	10 km
MINI-GBIC-LH40-SM1310	L/C	SMF	9/125	40 km
GE-SFP-SX-SM1310-BIDI	L/C	MMF	50/125	500 m
GE-SFP-SX-SM1550-BIDI	L/C	MMF	50/125	500 m
GE-SFP-LX20-SM1310-BIDI	L/C	SMF	9/125	20 km
GE-SFP-LX20-SM1550-BIDI	L/C	SMF	9/125	20 km
GE-SFP-LH40-SM1310-BIDI	L/C	SMF	9/125	40 km
GE-SFP-LH40-SM1550-BIDI	L/C	SMF	9/125	40 km
MINI-GBIC-ZX50-SM1550	L/C	SMF	9/125	50 km
MINI-GBIC-ZX80-SM1550	L/C	SMF	9/125	80 km
MINI-GBIC-ZX100-SM1550	L/C	SMF	9/125	100 km
GE-SFP-SX	L/C	MMF	62.5/125	275 m
			50/125	550 m
GE-SFP-LX	L/C	SMF	9/125	10 km
Mini-GBIC-GT	RJ45 Ethernet cable	Cat 5 (or higher) twisted-pair cable		100 m

Caution

- For optical modules 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 single-mode fibers (SMFs).
- An optical module is a laser transmitter. Do not look directly into the optical module to prevent it from burning your eyes.
- To keep the optical module 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	GE-SFP-SX-SM1310-BIDI GE-SFP-SX-SM1550-BIDI
GE/20 km	GE-SFP-LX20-SM1310-BIDI GE-SFP-LX20-SM1550-BIDI
GE/40 km	GE-SFP-LH40-SM1310-BIDI GE-SFP-LH40-SM1550-BIDI

Caution

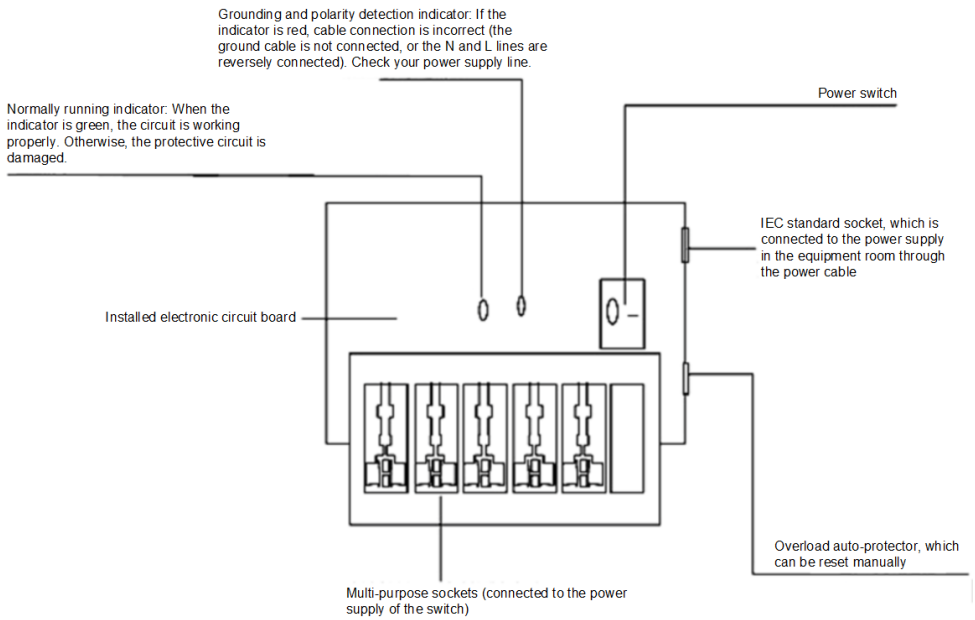
The BIDI modules must be used in pairs. For example, if you install the GE-SFP-LX20-SM1310-BIDI in the local port, you must install the GE-SFP-LX20-SM1550-BIDI in the peer port.

6.3 Lightning Protection

- **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 switch, the AC power port must be connected to an external lightning protection power strip to protect the switch against lightning strokes. The lightning resistance socket can be fixed on the rack, workbench, or wall in the machine room by using cable ties and screws. AC power enters the lightning protection power strip and then enters the switch.

Figure 6-4 Power Arrester



Note

The power arrester is not delivered with the switch. 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 switch 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.

6.3.1 Installing the Ethernet Port Arrester

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

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

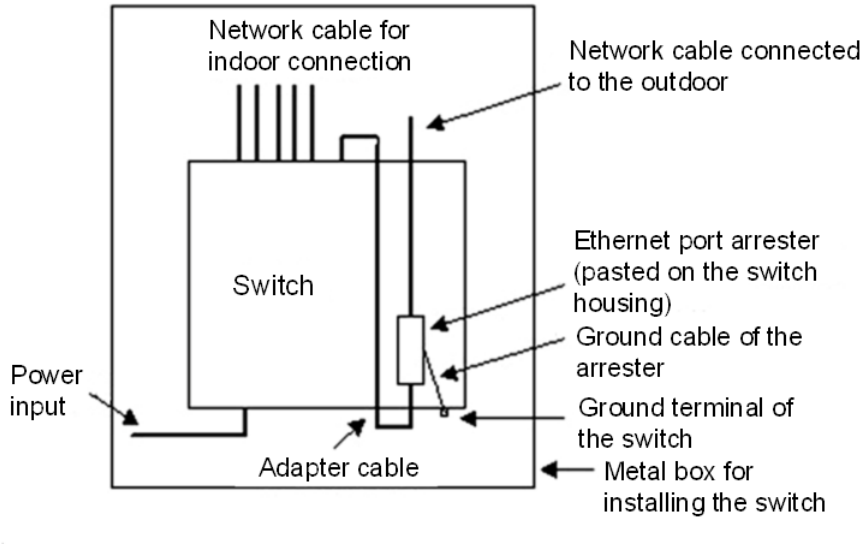
(2) According to the distance between the switch grounding terminal and the Ethernet port arrester, cut the grounding cable for the Ethernet port arrester and firmly crimp the grounding cable to the grounding terminal of the switch.

(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 switch.

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

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

Figure 6-5 Installation of the Ethernet Port Arrester



Note

- The Ethernet port arrester is only for the 10/100 Mbps copper ports with an RJ-45 connector.
- The Ethernet port arrester is not delivered with the switch. 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 switch 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 switch. 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 switch, arresters need to be installed on all connection ports for the purpose of lightning protection.

6.4 Cabling Recommendations

When the switch 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 machine 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.

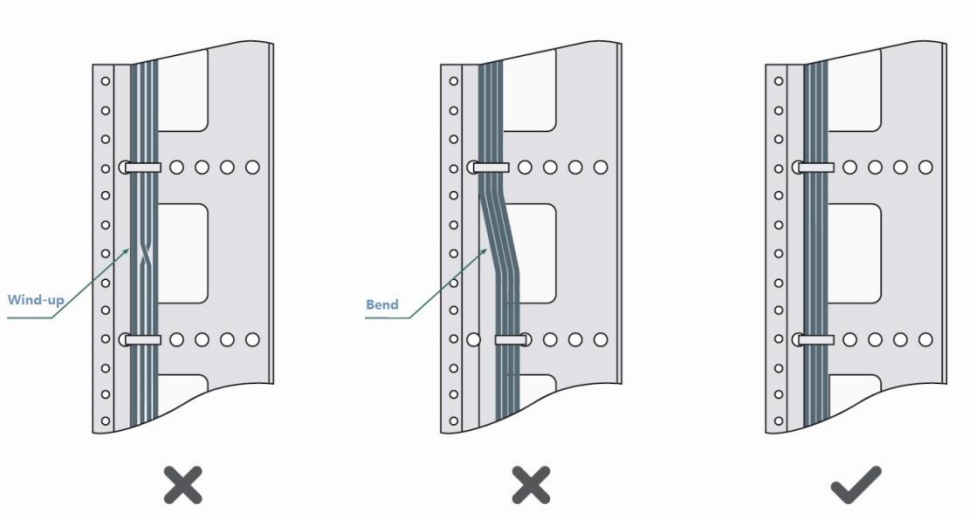
6.4.2 Requirement for the Minimum Bend Radius of an Optical Fiber

- 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.

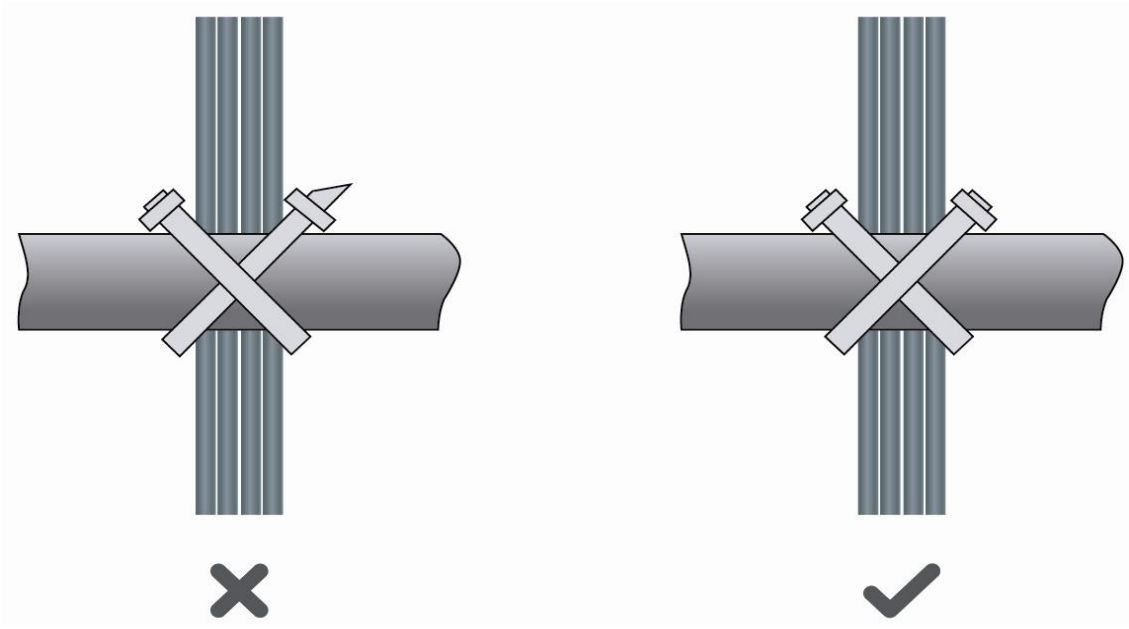
Figure 6-6 Binding Cables (I)



- 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.

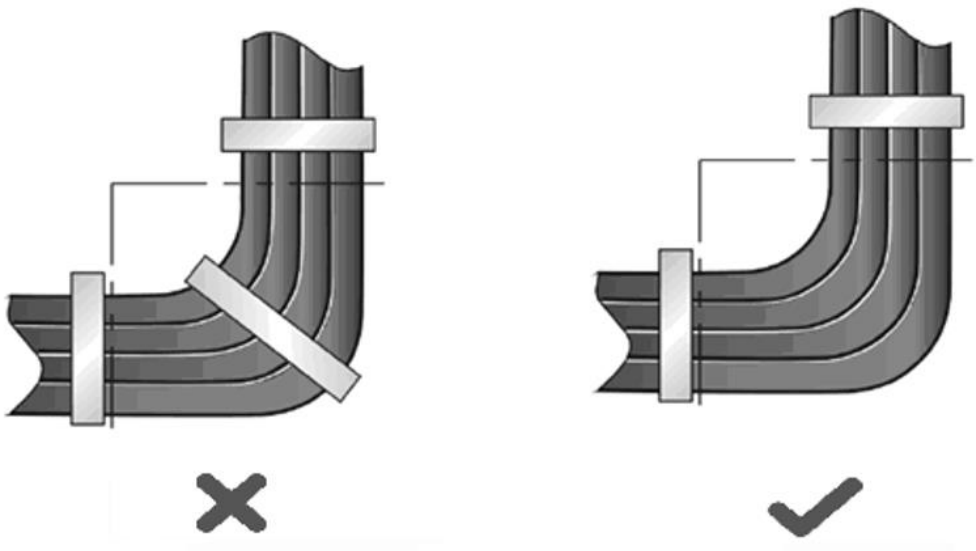
- Use cable ties to bundle up cables properly. Please do not connect two or more cable ties to bundle up cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure 6-7.

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.

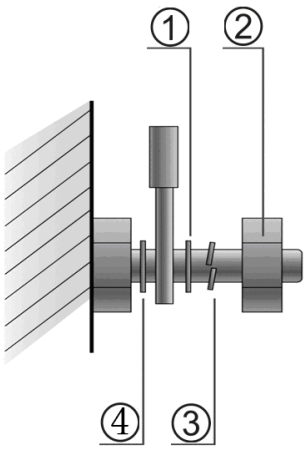
Figure 6-8 Binding Cables (III)



- 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 switch 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



①Flat washer ③Spring washer

②Nut ④Flat 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 (mm)	Binding Spacing (mm)
10	80–150 mm (3.15–5.91 in.)
10–30 mm (0.394–1.18 in.)	150–200 mm (5.91–7.87 in.)
30	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 Machine Room Site Selection

- The machine 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 machine 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 machine 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 machine room should be located on the windward side of the pollution source perennially with advanced protection.
- The machine room should be at least 3.7 km (2.30 miles) away from the sea or salt lake. Otherwise, the machine 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 machine room in the proximity of livestock farms. Otherwise, the machine 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 machine room.
- The machine 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 machine room should be away from the residential area. Otherwise, the machine room should meet the construction standard in terms of noise.
- Make sure the air vent of the machine room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the machine room under positive pressure to prevent corrosive gas from entering the machine room to corrode components and circuit boards.
- Keep the machine room away from industrial boiler and heating boiler.
- The machine room should be on the second floor. Otherwise, the machine 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 machine 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.