Ruijie Reyee RG-ES209GC-P 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 follows:

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. Notes

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

1.1 Technical Specifications

Parameter Type	Parameter Name	RG-ES209GC-P
System Specifications	Forwarding rate	13.4 Mpps
	Switching capacity	18 Gbps(bit/s)
	Flash memory	4 MB
Port Specifications	Total number of RJ45 ports	9
	Number of 10/100/1000BASE-T ports	9
	Reset button	1
	LEDs	1 x system status LED 9 x Ethernet port LEDs
	DIP 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 link up, while blinking green means that the port is transmitting 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.
Power Supply and Consumption	Power supply	DC power adapter
	Power input	DC adapter: ● 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: 2.5 A

Parameter Type	Parameter Name	RG-ES209GC-P
		Output: ● Rated output voltage: 54 V DC ● Maximum output current: 2.4 A
	Maximum power consumption	10 W (with no PoE load) 120 W (with PoE full load)
	Number of PoE Out ports	8
	Number of PoE/PoE+ Out ports	8
	PoE Out standard	PoE/PoE+ (IEEE 802.3af/at)
	PoE power pins	1–2 (+), 3–6 (-)
	PoE budget per port	30 W
	PoE budget	120 W
Dimensions and Weight	Product dimensions (W x D x H)	202 mm x 108 mm x 28 mm (7.95 in. x 4.25 in. x 1.10 in.)
	Weight	0.53 kg (1.17 lbs) (without packaging materials) 1.60 kg (3.53 lbs) (with packaging materials)
	Shipping weight	1.60 kg (3.53 lbs)
	Casing	Metal
Interface	EEE	Yes
Environment and Reliability	Mounting options	Wall/Desk
	Hot swapping of cables	Hot swapping supported by the service port and power connector
	Fan	Fanless design
	Cooling	Natural cooling
	MTBF	200,000 hours
	ESD protection	Air discharge: 6 kV Contact discharge: 4 kV
	Surge protection	Service port: ±4 kV for common mode Power connector: ±4 kV for common

Parameter Type	Parameter Name	RG-ES209GC-P
		mode and ±2 kV for differential mode
	Operating temperature	0°C to 40°C (32°F to 104°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.)
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

Warning

The power can not be repaired, do not disassemble it to avoid the risk of an electric shock.

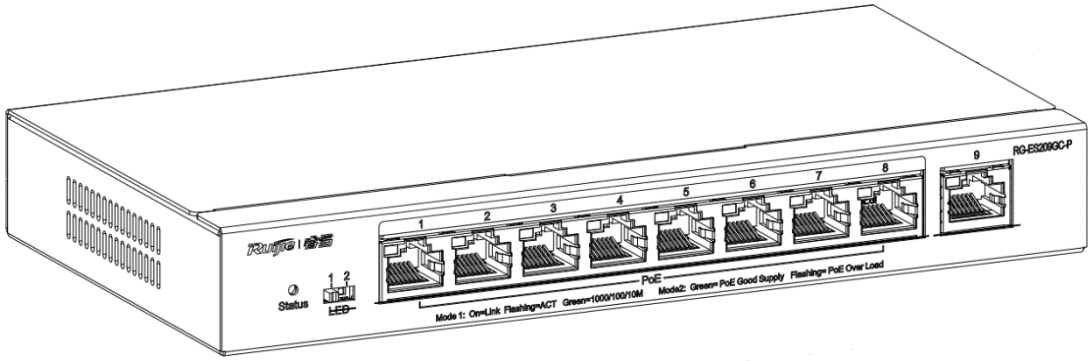
Caution

Device operation in a residential environment may cause radio interference.

1.2 Product Appearance

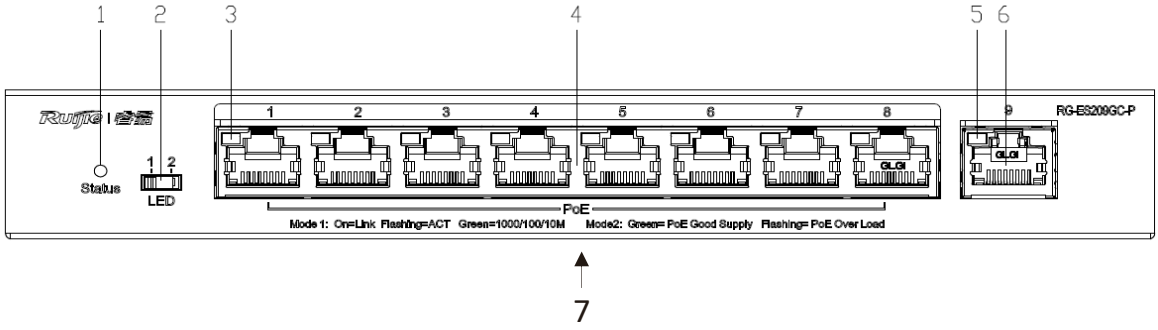
On the front panel, the RG-ES209GC-P Ethernet switch provides nine 10/100/1000Base-T Ethernet ports. On the back panel, it provides a DC power port.

Figure 1-1 Appearance of the RG-ES209GC-P



1.2.2 Front Panel

Figure 1-2 Front Panel of the RG-ES209GC-P



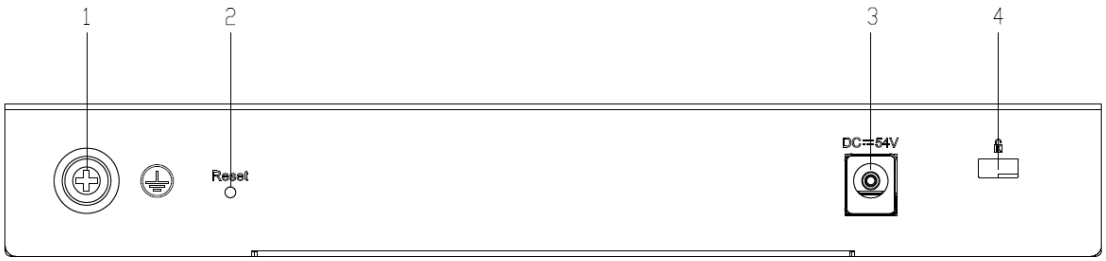
Note:	1. System status LED 2. Port mode switchover button 3. Copper port status LED 4. 10/100/1000Base-T auto-sensing Ethernet port	5. Electrical port status LED 6. 10/100/1000Base-T auto-sensing Ethernet port 7. Nameplate on the bottom of the device

Note

- When the button is turned to the left position (Mode 1), the LED indicates the switching status of the port. When the LED is solid green, the link is Up. When the LED blinks green, data is being transmitted or received.
- When the button is turned to the right position (Mode 2), the LED indicates the PoE status of ports. When the LED is solid green, the PoE-supported ports are supplying power. When the LED blinks green, the power of the ports is overloaded.

1.2.3 Back Panel

Figure 1-3 Back Panel of the RG-ES209GC-P



Note:	1. Grounding pole 2. System reset button	3. DC power port 4. Hole for anti-theft lock

Note

- The switch restarts after the reset button is pressed for less than 2 seconds.
- The switch restores the default factory settings after the reset button is pressed for more than 5 seconds (until the status LED blinks).

1.3 Heat Dissipation

The RG-ES209GC-P adopts natural heat dissipation, thereby ensuring normal operation. You must reserve 10 cm distance space at both sides and the back plane of the cabinet to allow airflow. It is recommended that you clean the device once every three months to avoid dust from blocking vents.

1.4 LEDs

LED	Panel Identification	State	Meaning
System status LED	Status	Off	The switch is not receiving power.
		Blinking green	The PoE power exceeds the power of the entire device (120 W). The newly connected PD cannot be powered up due to insufficient power. The switching function is operational.
		Solid green	The switch is operational.
RJ45 port PoE status LED	1–8	Off	PoE is not enabled.
		Solid green	PoE is enabled. The port is operational.

LED	Panel Identification	State	Meaning
		Blinking green	PoE overload.
1000 Mbps RJ45 port status LED	1–9	Off	The port is not connected.
		Solid green	The port is connected at a rate of 10/100/1000 Mbps.
		Blinking green	The port is receiving or transmitting traffic at a rate of 10/100/1000 Mbps.

2 Preparation Before Installation

2.1 Safety Suggestions

Caution

- To avoid personal injury and device damage, carefully read the safety suggestions before you install the RG-ES209GC-P switch.
- The following safety suggestions do not cover all possible dangers.

2.1.1 Installation

- Keep the chassis clean and free from any dust.
- Do not place the equipment in a walking area.
- Do not wear loose clothes or accessories that may be hooked or caught by the device during installation and maintenance.
- Turn off all power supplies and remove power sockets and cables before installing or uninstalling the device.

2.1.2 Movement

- Do not frequently move the device.
- When moving the device, note the balance and avoid hurting legs and feet or straining the back.
- Before moving the device, turn off all power supplies and dismantle all power modules.

2.1.3 Electricity

- Observe local regulations and specifications when performing electric operations. Relevant operators must be qualified.
- Before installing the device, carefully check any potential danger in the surroundings, such as ungrounded power supply, and damp or wet ground or floor.
- Before installing the device, find out the location of the emergency power supply switch in the room. First cut off the power supply in the case of an accident.
- Try to avoid maintaining the switch that is powered on alone.
- Be sure to make a careful check before you shut down the power supply.
- Do not place the device in a damp location. Do not let any liquid enter the chassis.

Caution

- Any nonstandard and inaccurate electric operation may cause an accident such as fire or electrical shock, thus causing severe even fatal damages to human bodies and the device.
- Direct or indirect touch through a wet object on high-voltage and mains supply may bring a fatal danger.
- If a power supply system is equipped with a leakage protector (leakage current switch or breaker), the rated leakage action current of each leakage protector is twice greater than the maximum leakage current of all the power supplies in the system. For example, if a system is equipped with twenty identical

power supplies, the leakage current of each power supply is equal to or less than 1.5 mA, and the total leakage current of the system is 30 mA. A leakage protector with 30 mA rated action current supports less than ten power supplies (that is, action current of the leakage protector/2/maximum leakage current of each power supply = 30/2/1.5 = 10). In other words, the leakage protector with 30 mA rated action current supports no more than ten power supplies. In this case, the twenty power supplies in the system require at least two leakage protectors with 30 mA rated action current and each leakage protector supports ten 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 current of all the power supplies. The rated leakage non-action current of a leakage protector must be 50% of the leakage action current. The leakage protector with 30 mA rated leakage action current is used as an example. The rated leakage non-action current must be 15 mA. When the leakage current falls below 15 mA, the protector should not act. Otherwise, misoperation may easily occur due to high sensitivity and thus the leakage protector trips, devices are powered off, and services are interrupted.

- 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.
- For details of the leakage current value of each power supply model, see Chapter 1 Product Overview.

2.1.4 Static Discharge Damage Prevention

To prevent damage from static electricity, pay attention to the following points:

- Proper grounding of grounding screws on the back panel of the device
- Indoor dust prevention
- Proper humidity conditions

2.2 Installation Site Requirements

The installation site must meet the following requirement to ensure normal working and a prolonged durable life of the switch.

2.2.1 Ventilation

For the RG-ES209GC-P, you must reserve at least 10 cm distances from both sides and the back plane of the cabinets at the ventilation openings to ensure normal ventilation. After various cables have been connected, they should be arranged into bundles or placed on the cabling rack to avoid air inlet blocking. It is recommended that the device be cleaned at regular intervals. In particular, avoid dusts from blocking the screen mesh on the back of the cabinet.

2.2.2 Temperature and Humidity

To ensure the normal operation and prolong the service life of RG-ES200 series switch, keep proper temperature and humidity in the equipment room.

If the temperature and humidity in the equipment room do not meet requirements for a long period of time, the device may be damaged.

- In an environment with a high humidity, insulating materials may have bad insulation or even leaking electricity. Sometimes the materials may suffer from mechanical performance change and metallic parts may get rusted.

- In an environment with a low humidity, insulating strips may dry and shrink. Static electricity may occur easily and endanger circuits on the device.
- In an environment with a high temperature, the router is subject to more serious harm. Its performance may degrade significantly and various hardware faults may occur.

The ambient temperature and humidity of the RG-ES200 series switch must meet the requirements listed in Table 2-1.

Table 2-1 Temperature and Humidity Requirements of the RG-ES200 Series Switch

Temperature	Relative Humidity
0°C to 40°C (32°F to 104°F)	10% to 90%

The requirements for the sampling site of the temperature and humidity in the operating environment of the device are as follows:

Caution

The requirements for the sampling site of the temperature and humidity in the operating environment of the device are as follows:

- There is no protective plate at the front or back of the rack.
- The vertical height is 1.5 m above the floor.
- The distance from the front panel of the device is 0.4 m.

2.2.3 Cleanness

Dust poses a severe threat to the running of the device. The indoor dust falling on the device may be absorbed by the static electricity, causing bad contact of the metallic joint. Such electrostatic absorption may occur more easily when the relative humidity is low. This affects the device lifecycle and causes communication faults. Table 2-2 lists the requirements for the dust content and granularity in the equipment room.

Table 2-2 Requirements for the Dust Content and Granularity in the Equipment Room

Dust	Unit	Density
Diameter ≥ 0.5 μm	Particles/ m^3	≤ 3.5×10^6
Diameter ≥ 5 μm	Particles/ m^3	≤ 3×10^4

Apart from dust, the salt, acid, and sulfide in the air in the equipment room must also meet strict requirements. This is because such poisonous substances may accelerate the corrosion of the metal and the aging of some parts. The equipment room should be protected from the intrusion of harmful gases such as sulfur dioxide, sulfured hydrogen, nitrogen dioxide, and chlorine. Table 2-3 lists the requirements.

Table 2-3 Requirements for Harmful Gases in the Equipment Room

Gas	Average (mg/m^3)	Maximum (mg/m^3)

SO_2	0.3	1.0
H_2S	0.1	0.5
NO_2	0.5	1.0
Cl_2	0.1	0.3

Note

The average and maximum values are measured for a week. The switch cannot be placed in the environment with the maximum density for over 30 minutes every day.

2.2.4 Interference Resistance

The switch is vulnerable to external interface caused by capacity coupling, inductance coupling, electromagnetic wave radiation, common impedance (including grounding system) coupling, and conducting wires (including power cords, signal and output wires). Therefore, note the following points:

- The AC power supplying system is the TN system. The single-phase three-wire socket with protecting grounding must be used as the socket for the power supply to enable the device's upper filter circuit to effective filter the power interface.
- The switch should be far from high-power radio transmitting stations, radar stations and high-frequency and large-current devices.
- Electromagnetic shielding methods should be applied when necessary, such as using the shielded cable as the interface cable.
- Cables must be connected to interfaces inside the room to prevent damage to the device's signal ports caused by over-voltage and over-current generated by thunder and lightning.

2.2.5 Grounding

A good grounding system is the basis for stable and reliable operation of the device, preventing lightning strokes and resisting interference. Carefully check the grounding conditions at the installation site according to the grounding requirements, and perform grounding operations properly as required.

Caution

- Effective grounding of the switch guarantees surge protection and interference resistance. Therefore, connect the grounding line of the switch properly.
- The grounding cable is prepared by customers.

1. Safety Grounding

The device using AC power supply must be grounded by using the yellow/green safety grounding cable. Otherwise, when the insulating resistance decreases the power supply and the enclosure in the equipment, electric shock may occur.

Caution

- The building must provide the protective grounding connection to ensure that the device is connected to the protection location.
- The installation and maintenance personnel must check whether the A.C. socket is well connected to the protection location of the building. If not, use a protective grounding wire to connect the grounding end of the A.C. socket to the building's protection location.
- The power supply socket must be installed in a place that is near to the device and where users can operate the device easily.
- Before device installation, ensure that the ground is connected at first and disconnected finally.
- The sectional area of the protective grounding wire should be at least 0.75 mm2 (18 AWG).
- Use the 3-core power supply line. The sectional area of each pin should be at least 0.75 mm2 or 18 AWG.

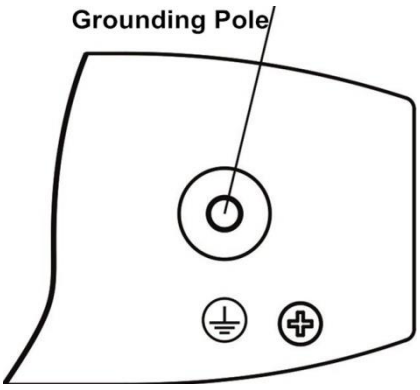
2. Lightning Grounding

The surge protection system of a facility is an independent system that consists of the lightning rod, down conductor, and connector to the grounding system, which usually shares the power reference ground and ground cable. The lightning discharge ground is targeted for the facility.

3. EMC Grounding

The grounding required for EMC design includes the shielding ground, filter ground, noise and interference suppression, and level reference. All the above constitute the comprehensive grounding requirements. The resistance of earth wires should be less than 1 Ω. The RG-ES200 series switch back plane is reserved with one grounding pole, as shown in Figure 2-1.

Figure 2-1 Grounding of the RG-ES200



2.2.6 Lightning Resistance

When the AC power cable is imported outdoors and directly connected to the power port of the RG-ES200 series switch, use the lightning line bank to prevent the switch from being hit by lightning shocks. In this case, connect the mains supply AC cable to the lightning line bank, and connect the switch to the lightning line bank. This helps prevent the current of high-voltage lightning from passing the switch directly through the mains supply cable to a certain extent.

Note

The lightning line banks are not provided and should be purchased by customers as required.

2.2.7 EMI

Electro-Magnetic Interference (EMI), from either outside or inside the device or application system, affects the system in the conductive ways such as capacitive coupling, inductive coupling, and electromagnetic radiation.

There are two types of electromagnetic interference: radiated interference and conducted interference, depending on the type of 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 either a part of the interfered system or a completely electrically isolated unit. Conducted interference results from an electromagnetic wire or signal cable connection between the source and the sensitive component, along which cable the interference conducts from one unit to another. Conducted interference often affects the power supply of the device, but can be controlled by a filter. Radiated interference may affect any signal path in the device and is difficult to shield.

- For the TN AC power supply system, the single-phase three-core power socket with protective earthing conductors (PE) should be adopted to effectively filter out interference from the power grid through filtering circuits.
- Do not use the grounding device for an electrical device or anti-lightning grounding device. In addition, the grounding device of the device must be deployed far away from the grounding device of the electrical device and anti-lightning grounding device.
- Keep the device away from the high-power radio transmitter, radar transmitting station, and high-frequency large-current device.
- Take measures to shield static electricity.
- Lay interface cables inside the equipment room. Outdoor cabling is prohibited, avoiding damages to device signal interfaces caused by over-voltage or over-current of lightning.

2.3 Installation Tools

Table 2-4 List of Installation Tools

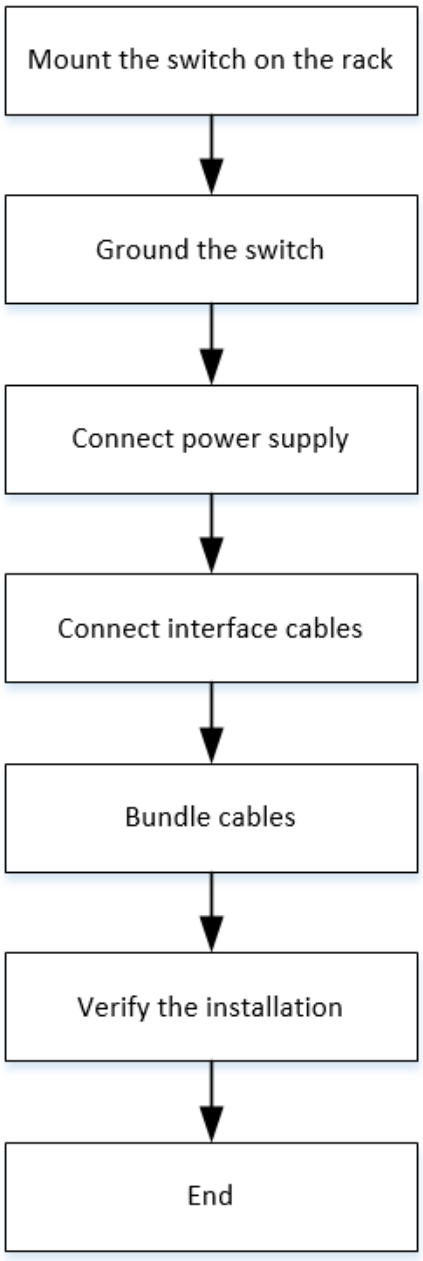
Common Tools	Phillips screwdriver, flathead screwdriver, related electric cables and optical cables, bolts, diagonal pliers, and straps
Special Tools	Anti-static tools
Meters	Multimeter

Note

The tool kit is customer-supplied.

3 Product Installation

3.1 Installation Flowchart



3.2 Precautions Before Installation

Before installation, confirm the following points:

- Check whether ventilation requirements are met for the switch.

- Check whether the requirements of temperature and humidity are met for the switch.
- Check whether power cables are already laid out and whether the requirements of electrical current are met.
- Check whether related network adaption lines are already laid out.

3.3 Installing the RG-ES209GC-P

During installation, note the following points:

- Connect the power cables of different colors to the corresponding grounding posts.
- Ensure that the interface of the power supply cable is properly connected to the power interface of the device. The power cables must be protected using power cable retention clips after they are connected to the device.
- Do not place any articles on the RG-ES200 series switch.
- Reserve a spacing of at least 10 cm around the chassis for good ventilation. Do not stack the devices.
- The switch should be located at places free from the large power radio launch pad, radar launch pad, and high-frequency large-current devices. If necessary, use electromagnetic shielding. For example, use interface cables to shield cables.
- 100-meter network cables should be laid inside the equipment room and outdoor cabling of such cables is prohibited. If outdoor cabling is necessary, take relevant measures for surge protection.

3.3.1 Mounting the Switch Against a Wall

RG-ES209GC-P can be mounted against the wall. Mounting screws and wall anchors are customer-supplied.

You need to determine the size and depth of the two mounting holes on the wall based on the sizes of wall anchors and screws. Ensure that the wall anchors can be inserted into the holes. The outer edges of the wall anchors are left outside the wall, so screws can be tightly fastened to the wall.

The steps of mounting the switch on the wall are as follows:

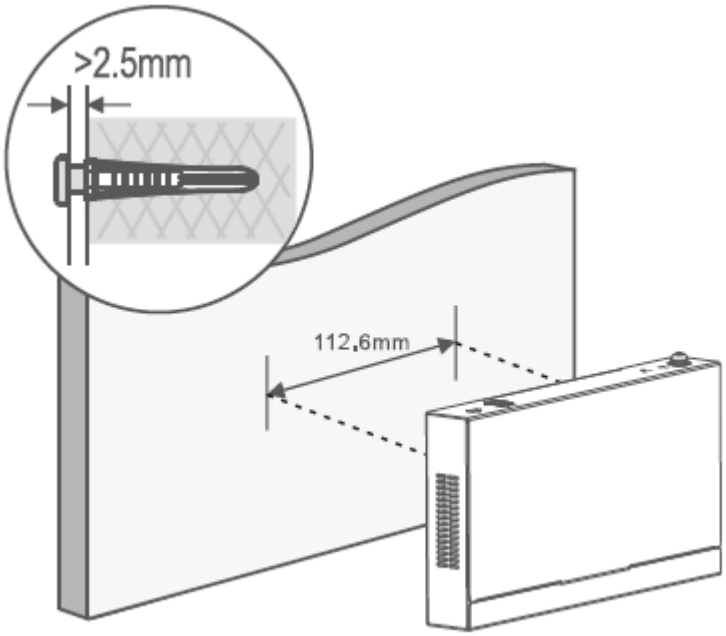
Step 1: As shown in Figure 3-1, drill two holes with the diameter of about 5 mm on the wall, and ensure that the spacing of the two holes is 112 mm and the line of connecting the two holes is horizontal.

Step 2: Insert wall anchors into the holes and ensure that the outer edges of the wall anchors are aligned with the wall.

Step 3: Put two M4 screws into the wall anchors. Ensure that the distance between the inner side of the screw head and the outer edge of the wall anchors not be smaller than 2.5 mm so that the device can be securely mounted on the screws.

Step 4: Align the two mounting holes on the bottom of the chassis of the device with the screws, and then fasten the device on the screws.

Figure 3-1 Mounting the Switch Against the Wall



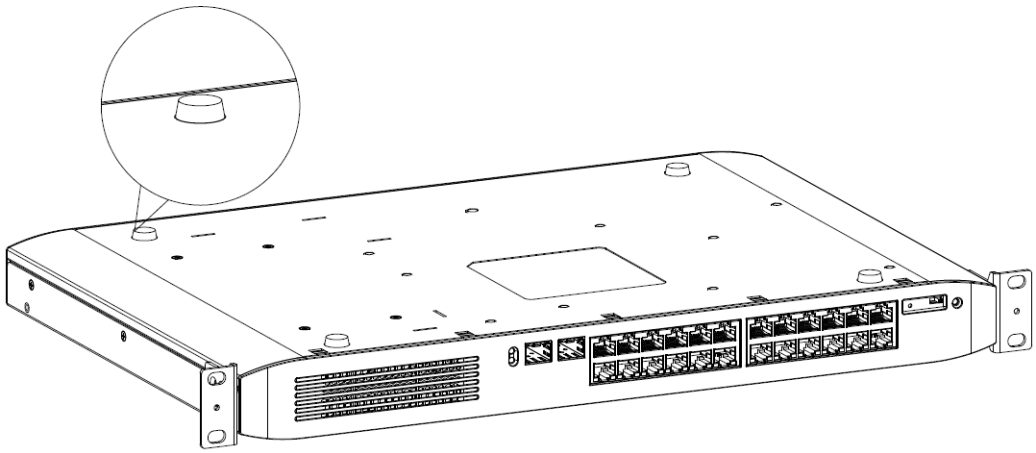
Caution

It is suitable for mounting on the concrete or non-combustible surface only.

3.3.2 Mounting the Switch on a Table

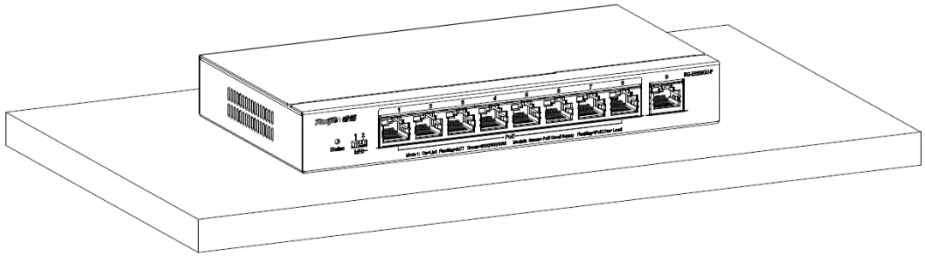
Attach the four rubber pads to the recessed areas on the bottom of the switch, as shown in Figure 3-2.

Figure 3-2 Attaching the Rubber Pads to the Recessed Areas



Place the switch on the table, as shown in Figure 3-3.

Figure 3-3 Mounting the Switch on the Table



Caution

The device must be installed and operated in the place that can restrict its movement.

3.4 Checking After Installation

Caution

Before checking the installation, switch off the power supply so as to avoid any personal injury or damage to the component due to connection errors.

- Check that the ground line is connected.
- Check that the cables and power input cables are correctly connected.
- Check that all interface cables are laid out inside the equipment room. In the case of external cabling, check that the lightning resistance socket or network interface lightning protector is connected.
- Check that sufficient airflow is available around the device (over 10 cm).

4 System Check

4.1 Startup Check

4.1.1 Checking Before the Device Is Powered On

- The switch is well grounded.
- The power cable is correctly connected.
- The power supply voltage complies with the requirement of the switch.

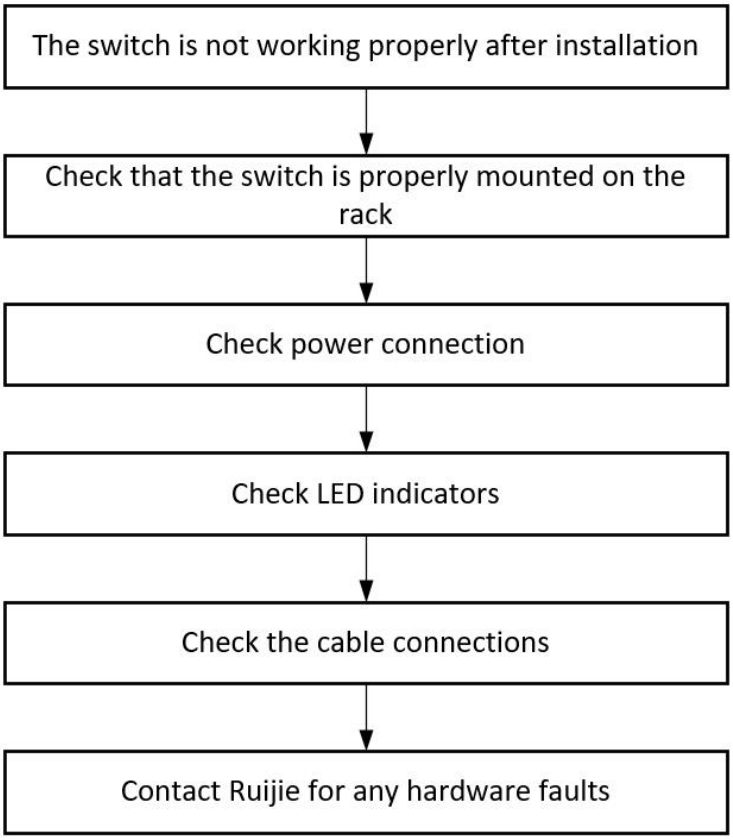
4.1.2 Checking After Program Startup (Recommended)

After power-on, you are advised to perform the following checks to ensure the normal operation of follow-up configurations.

- Check whether the status of the switch indicator is normal.
- Check whether the service interface forwards data normally.

5 Maintenance and Troubleshooting

5.1 Troubleshooting Procedure



5.2 Troubleshooting Common Faults

Symptom	Possible Causes	Solution
The management interface login password is forgotten.	A password is manually configured but it is forgotten.	Contact Ruijie Networks Customer Service Department for technical support.
The RJ45 port is not connected or an error occurs when the port is receiving or transmitting	The connected twisted pair cable is faulty. The length of the cable exceeds 100 m. The port has special configuration, which does not	Replace the twisted pair cable. Check that the working mode of the port must adapt to that of the connected switch.

Symptom	Possible Causes	Solution
frames.	adapt to the working mode of the connected switch.	
The optical port cannot be connected.	The Rx and Tx ends are connected reversely. The interconnected optical module type does not match. The fiber type is incorrect. The length of the optical module exceeds the rated value.	Switch the Rx and Tx ends of the optical module. Replace the optical module with one of the matched type. Replace the optical module with one of the appropriate type. Replace the optical module with one of the appropriate length.

6 Appendix

6.1 Connectors and Media

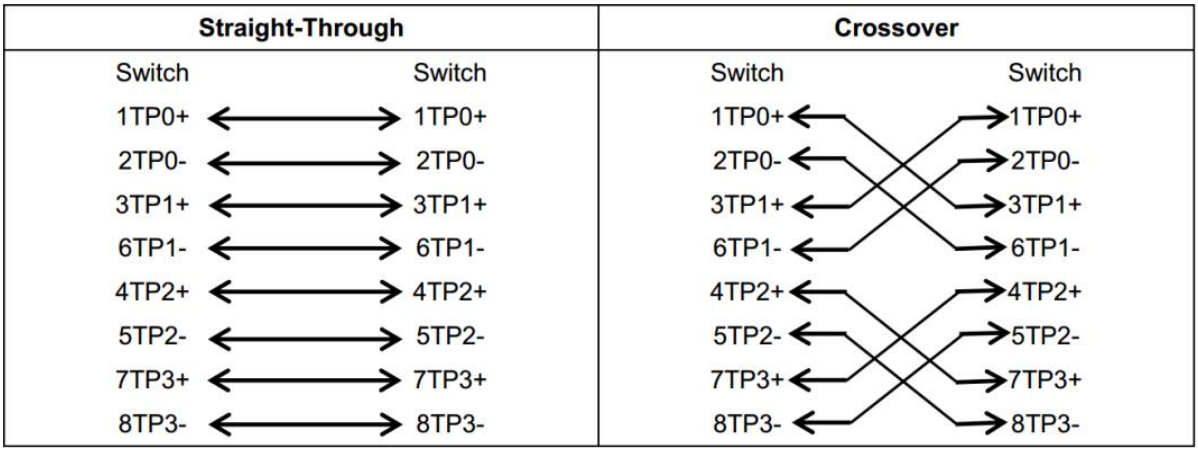
6.1.1 10/100/1000BASE-T Port

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

Compliant with IEEE 802.3ab, a 1000BASE-T port connects to a 100-ohm Category 5 (CAT5) or Category 5 Enhanced (CAT5e) Unshielded Twisted Pair (UTP), or recommended Shielded Twisted Pair (STP) cable with a maximum distance of 100 m (328.08 ft.).

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

Figure 6-1 Twisted Pair Connections for a 1000BASE-T Port



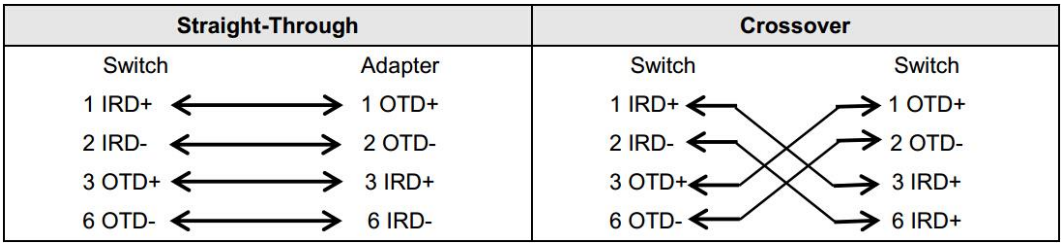
In addition to cables with the above-mentioned specifications, the 10/100BASE-T port can also be connected using 100-ohm CAT3, CAT4, and CAT5 cables at 10 Mbps or using 100-ohm CAT5 cables with a maximum distance of 100 m (328.08 ft.). The following table shows pin assignments for a 10/100BASE-T port.

Table 6-1 10/100BASE-T Pin Assignment

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

The following table shows wiring of straight-through and crossover cables for a 10/100BASE-T port.

Figure 6-2 Twisted Pair Connections for a 10/100BASE-T Port

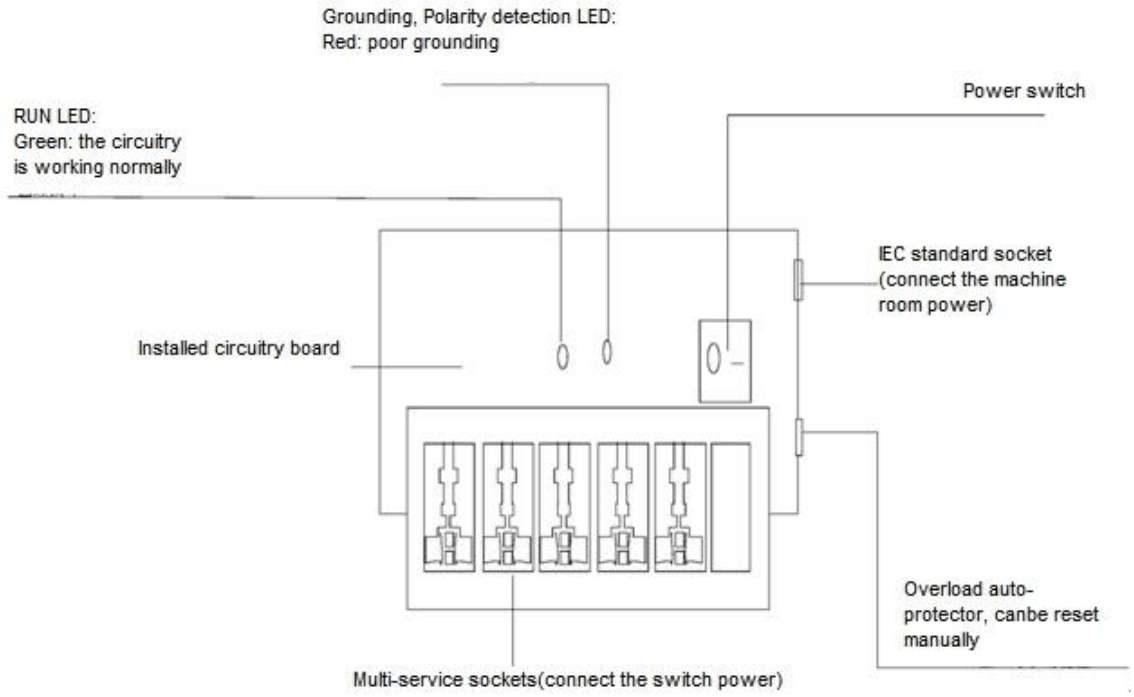


6.2 Lightning Protection

6.2.1 Installing the AC Power Arrester (Power Strip with Surge Protection)

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

Figure 6-3 Power Arrester



Caution

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

Precautions during the installation:

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

6.2.2 Installing the Ethernet Port Arrester

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

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

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

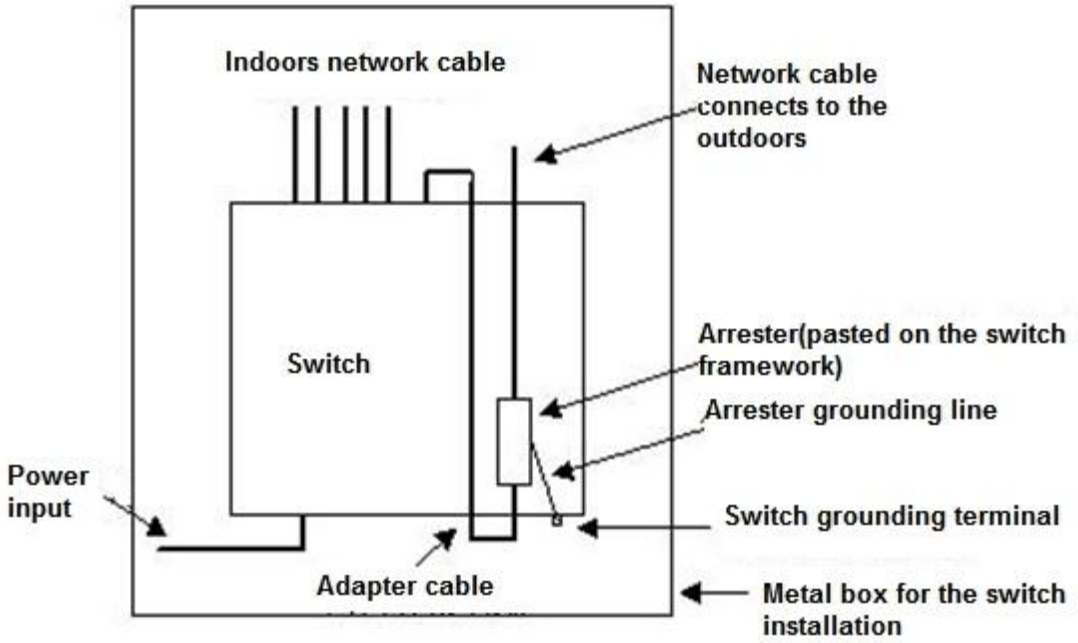
  b Based on the distance between the grounding lug of the switch and the Ethernet port arrester, cut the grounding cable of the Ethernet port arrester and firmly tighten the grounding cable to the grounding lug of the switch.

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

  d Connect the Ethernet port arrester by using an adapter cable (note that the external Ethernet 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 module LED is normal.

  e Use a nylon cable tie to bind the cables.

Figure 6-4 Installing an Ethernet Port Arrester



Caution

- The Ethernet port arrester is only for a 10 Mbps, 100 Mbps, or 1000 Mbps RJ45 port.
- The Ethernet port arrester is not delivered with the equipment. Please purchase it based on actual requirements. The user manual for Ethernet port arresters contains technical parameters and maintenance and installation instructions. Carefully read this manual during installation.

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

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

6.3 Recommended Cabling

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

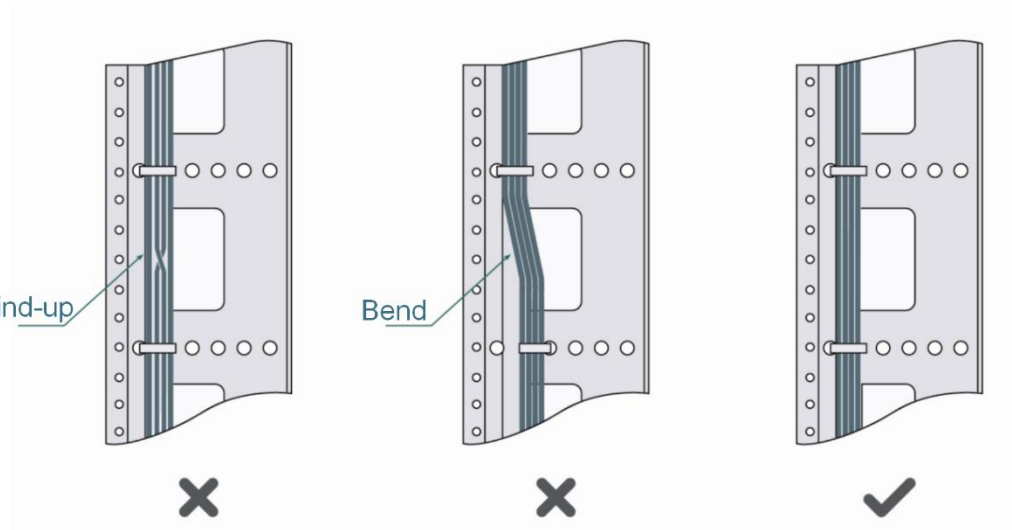
6.3.1 Requirement for the Minimum Bend Radius of Cables

- The bend radius of a fixed power cord, Ethernet cable, and flat cable should be over five times greater than their respective external diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than their respective external diameters.
- The bend radius of a fixed common coaxial cable should be over seven times greater than its external diameter. The bend radius of these cables that are often bent or plugged should be over 10 times greater than their respective external diameters.
- The minimum bend radius of a high-speed cable, such as an SFP+ cable, should be 5 times the overall diameter of the cable. If the cable is constantly bent, plugged or unplugged, the bend radius should be 10 times the overall diameter.
- The minimum bend radius of optical cables should meet the following requirements.
  - The diameter of the optical cable tray should be no less than 25 times greater than that of the optical cable.
  - When an optical cable is moved, its bend radius should be no less than 20 times greater than its diameter.
  - During cabling of an optical cable, its bend radius should be no less than 10 times greater than its diameter.

6.3.2 Precautions for Cable Bundling

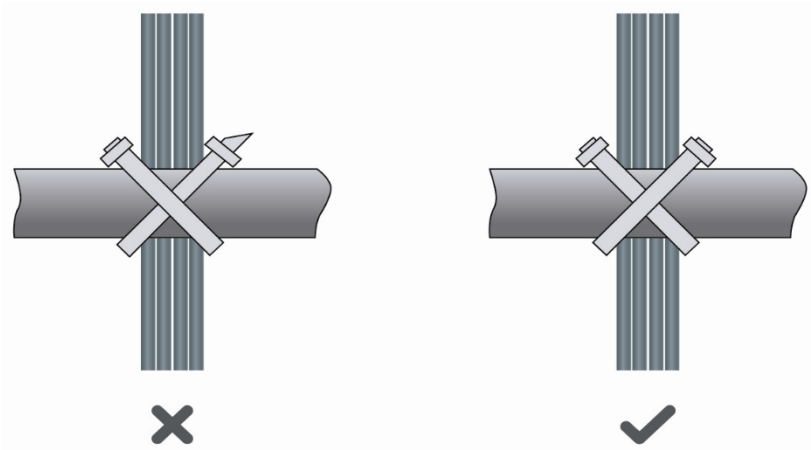
- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or bending, as shown in Figure 6-5.

Figure 6-5 Bundling Cables (1)



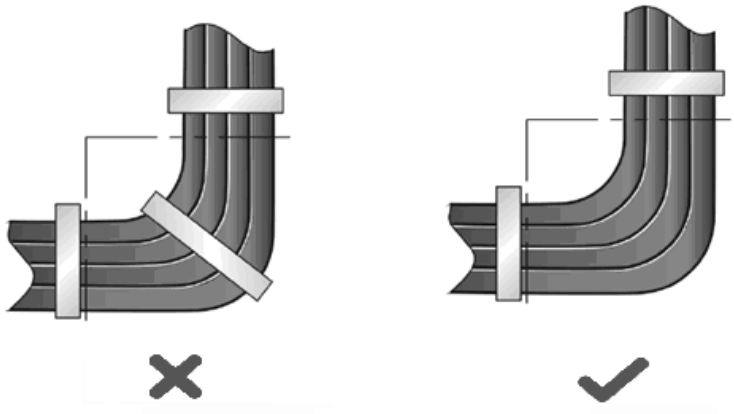
- Cables of different types (such as power cords, signal cables, and grounding wires) should be separated in cabling and bundling. Mixed bundling is not allowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the rack should be smooth without sharp corners.
- The metal holes traversed by cables should have a smooth and fully rounded surface or an insulated lining.
- Use cable ties to bundle cables properly. Please do not connect two or more cable ties to bundle cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim without sharp corners, as shown in Figure 6-6.

Figure 6-6 Bundling Cables (2)



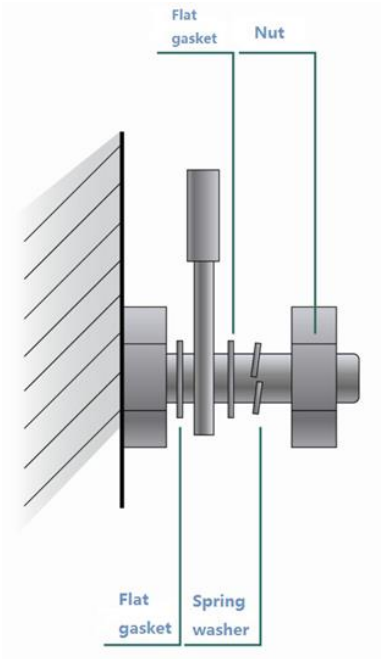
- When cables need to be bent, bundle them first but do not tie cables within the bend. Otherwise, stress may be generated on the cables and cause the wires inside to break, as shown in Figure 6-7.

Figure 6-7 Bundling Cables (3)



- Cables not to be assembled or the remaining parts of cables should be folded and placed in a proper position of the rack or cable management trough. The proper position refers to a position that does not affect the equipment running or damage the equipment or cables.
- Power cords must not be bundled on the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding wires should be reserved with some excess after being assembled to avoid suffering tension or stress. When a moving part reaches the installation position, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources must be touched, high-temperature cables should be used.
- When using screw threads to secure a cable lug, ensure that the bolt or screw is properly tightened and take measures to prevent it from loosening, as shown in Figure 6-8.

Figure 6-8 Fastening Cables



- Hard power cords should be secured near the cable termination area to prevent stress on the cable

termination area and cables.

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

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

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

6.4 Site Selection

- The equipment room should be at least 5 km (3.11 miles) away from heavy pollution sources, such as smelters, coal mines, and thermal power plants. The equipment room should be at least 3.7 km (2.30 miles) away from medium pollution sources, such as the chemical factory, rubber factory, and electroplating factory. The equipment room should be at least 2 km (1.24 miles) away from light pollution sources, such as the food factory and leather plant. If the pollution source is unavoidable, the equipment room should be located on the windward side of the pollution source perennially with advanced protection.
- The equipment room should be at least 3.7 km (2.30 miles) away from the sea or salt lake. Otherwise, the equipment room must be sealed, with an air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select equipment with advanced protection against severe environments.
- Do not build the equipment room in the proximity of livestock farms. Otherwise, the equipment room should be located on the windward side of the pollution source perennially. The previous livestock house or fertilizer warehouse cannot be used as the equipment room.
- The equipment room should be firm enough to withstand severe weather conditions such as windstorms, heavy rain, and dense dust. If the dust is unavoidable, keep the door and window away from the pollution source.
- The equipment falls into Class A. Therefore, the equipment room should be located away from the residential area. Otherwise, the equipment room should meet construction specifications to avoid noise and radio interference.
- Make sure the air vent of the equipment room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the equipment room under positive pressure to prevent corrosive gas from entering the equipment room to corrode components and circuit boards.
- Keep the equipment room away from industrial boilers and heating boilers.
- The equipment room should be on the second floor or higher. Otherwise, the equipment room floor should

be 600 mm (23.62 in.) higher than the highest flood level ever recorded.

- Make sure no cracks or holes exist in the wall and floor. If there are cable entries in the wall or window, take proper sealing measures. Ensure that the wall is flat, wear-resistant, and dust-free, meeting standards for flame resistance, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.
- Keep the door and the window closed to make the equipment room sealed.
- You are advised to use the steel door for soundproofing.
- Do not use sulfur-containing materials.
- Keep the air conditioner from blowing wind straight toward the equipment or blowing water drops from the window or air vent toward the equipment.