Ruijie Reyee RG-ES103F-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
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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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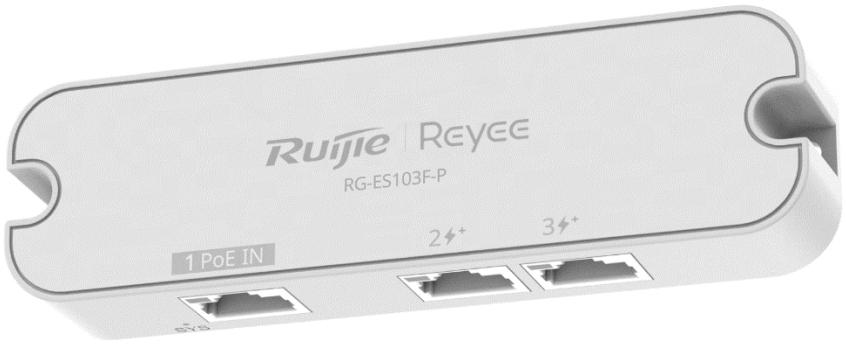
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1 Overview

1.1 About the RG-ES103F-P

The RG-ES103F-P is a 100 Mbps Ethernet PoE switch, which provides three 10/100BASE-T ports and supports line-rate forwarding on all ports. Two of the ports support Power over Ethernet (PoE), allowing the switch to serve as the Power Sourcing Equipment (PSE). The switch can automatically detect and identify powered devices (PDs) that comply with the IEEE 802.3at or IEEE 802.3af standard, and supply power to them through Ethernet cables.

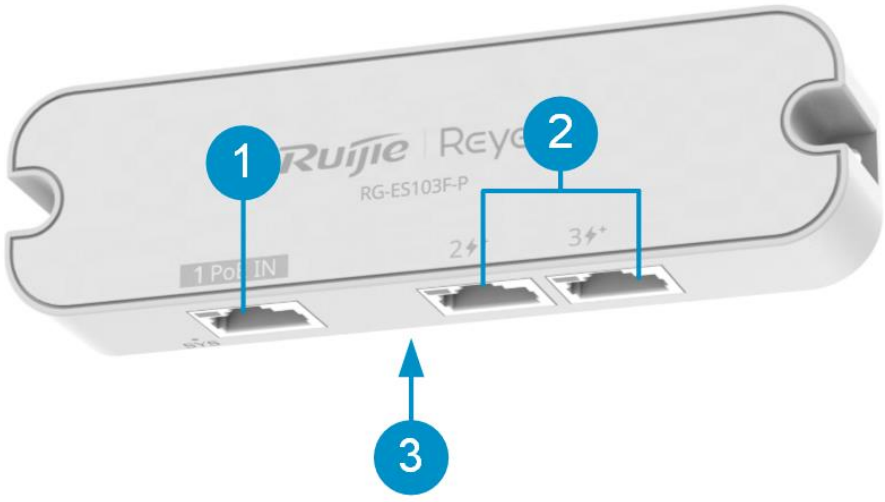
Figure 1-1 RG-ES103F-P Appearance



1.2 Equipment Appearance

1.1.1 Front Panel

Figure 1-2 Front Panel of the RG-ES103F-P



Note

indicates the PoE+ ports, which are compliant with IEEE 802.3at, and backward compatible with IEEE 802.3af.

Table 1-1 Components on the Front Panel

No.	Component	**Silkscreen**	Description
1	RJ45 port	1 PoE IN	10/100BASE-T PoE In port, compliant with IEEE 802.3at (PoE+) and IEEE 802.3af (PoE).
2	RJ45 port	2 3	Two 10/100BASE-T ports, supplying power to PDs through PoE.
3	Nameplate	-	It is located at the bottom of the switch.

1.2.2 LEDs

Figure 1-3 RG-ES103F-P LEDs

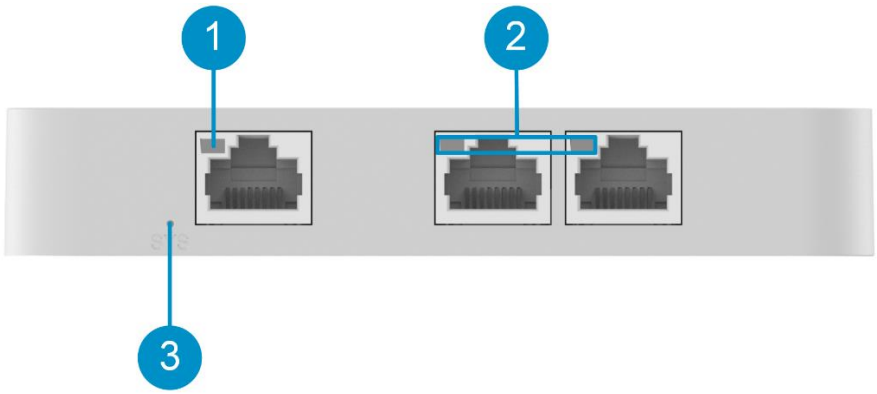


Table 1-2 LEDs

No.	Component	Silkscreen	Description
1	RJ45 port LED	1 PoE IN	● Off: The port is not connected. ● Solid green: The port is operating at 10 Mbps or 100 Mbps, but is not receiving or sending data. ● Blinking green: The port is operating at 10 Mbps or 100 Mbps, and is receiving or sending data.
2	RJ45 port LED	2 3	● Off: The port is not connected. ● Solid green: The port is operating at 10 Mbps or 100 Mbps, but is not receiving or sending data. ● Blinking green: The port is operating at 10 Mbps or 100 Mbps, and is receiving or sending data.

No.	Component	Silkscreen	Description
3	System status LED	SYS	● Off: The switch is not powered on. ● Solid on: The switch is powered on.

1.3 Cooling

The RG-ES103F-P adopts fanless design and uses natural cooling. To ensure that the equipment works properly in the specified environment, a minimum clearance of 10 cm (3.94 in.) must be maintained around the equipment for air circulation and ventilation.

1.4 Technical Specifications

Warning

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

Table 1-3 Technical Specifications

Parameter Type	Parameter Name	RG-ES103F-P
System Specifications	Forwarding rate	0.45 Mpps
	Switching capacity	0.6 Gbps(Gbit/s)
Port Specifications	Total number of RJ45 ports	3
	Number of 10/100BASE-T ports	3
	LEDs	1 x System indicator light 3 x Network port indicator lights
Power Supply and Consumption	Power supply	PoE Ethernet Power Supply
	Power input	PoE/HPoE Ethernet Power Supply: Compliant with 802.3af/at Ethernet Power Supply Standards
	Maximum power consumption	32.5 W (with full PoE load) 2.5 W (without PoE load)
	Number of PoE Out ports	2

Parameter Type	Parameter Name	RG-ES103F-P
	Number of PoE/PoE+ Out ports	2
	PoE Out standard	IEEE 802.3af/at (PoE/PoE+)
	PoE power pins	1-2(+), 3-6(-)
	PoE budget per port	30 W
	PoE budget	30 W
Dimensions and Weight	Product dimensions (W x D x H)	120mm x 34mm x 20.5mm
	Weight	0.05 kg (0.11 lbs)
	Shipping weight	0.114 kg (0.25 lbs)
	Casing	plastic
Environment and Reliability	Mounting options	Wall/Desk
	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
	Operating temperature	0℃~40°C
	Storage temperature	-40℃~70°C
	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

Parameter Type	Parameter Name	RG-ES103F-P
		IEC 62368-1
	Certification	CE, CB

2 Preparing for Installation

2.1 Package Contents

Table 2-1 Package Contents

No.	Item	Quantity
1	RG-ES103F-P switch	1
2	User Manual	1
3	Warranty Card	1

2.2 Safety Guidelines

Note

- To avoid personal injury or equipment damage, review the safety guidelines in this chapter before you begin the installation.
- The following safety guidelines may not include all the potentially hazardous situations.

2.2.1 General Precautions

- Never operate the equipment in a wet environment, and avoid any liquids inside it. Keep the chassis clean and dust-free.
- Keep the equipment away from heat sources.
- Keep the equipment away from walk areas.
- During installation and maintenance, do not wear loose clothing or ornament that may get caught in the chassis.
- Keep tools and accessories away from walk areas.

2.2.2 Chassis-Lifting Guidelines

- Avoid moving the equipment frequently.
- Turn off all power supplies and disconnect all cables before lifting or moving the equipment.

2.2.3 Electricity Safety

Warning

- Any deviation from standard or improper electrical operations can result in accidents such as fires or electric shocks, potentially causing severe or even fatal harm to both individuals and equipment.
- Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.

- Always observe the local regulations and standards. Only qualified personnel should be allowed to operate the equipment.
- Carefully check the work area for potential hazards, including ungrounded power system, absent safety grounds, and damp floors.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Never assume that power is connected to or disconnected from a circuit. Always check.
- Select the right leakage protector (also called "leakage current switch" or "leakage current breaker") for the power supply system. This equipment 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 must be at least twice the total maximum leakage current of all connected power supplies.

    Example:

    If a system has 16 identical power supplies, each with a maximum leakage current of 3.5 mA:

    Total leakage current = 16 x 3.5 mA = 56 mA

    For a 30 mA leakage protector:

    Maximum number of power supplies per protector = 30 mA/2/3.5 mA ≈ 4

    Therefore, only four power supplies can be connected to one 30 mA leakage protector.

    To support 16 power supplies, at least four 30 mA leakage protectors are required.

    Always ensure:

    Rated leakage operating current/2 > Total maximum leakage current of connected power supplies
  - The rated leakage non-action current of a leakage protector should be 50% of the leakage action current. If the non-action current value is too small, the high sensitivity level can cause the circuit to break, leading to power cutoff and service interruption, even if the leakage current value is normal.

    For example, if a leakage protector has a rated leakage action current of 30 mA, the rated leakage non-action current should be 15 mA. The leakage protector will not activate unless the leakage current exceeds 15 mA.

Caution

- To ensure personal safety, each leakage protector in the system must have a rated leakage action current equal to or below 30 mA, which is the recognized safety threshold for human body current. If the total leakage current of the system exceeds twice the 30 mA limit, the system must be equipped with two or more leakage protectors to maintain safety.
- The leakage current values vary with equipment. For the leakage current value of each equipment model, see "Technical Specifications."

2.2.4 Preventing ESD Damage

- Ensure that the chassis is connected to earth ground.
- Keep the site as dust free as possible.
- Maintain appropriate humidity conditions.

- Before installing any pluggable modules, wear an anti-ESD wrist strap and make sure that it is properly grounded.
- Avoid contact between the printed circuit boards and clothing. The anti-ESD wrist strap only protects the printed circuit boards from ESD voltages on the body. ESD voltages on clothing can still cause damage.

2.3 Site Requirements

The equipment must be installed indoors for normal operation and prolonged service life.

The installation site must meet the following requirements.

2.3.1 Floor Loading

Assess the combined weight of the equipment and its accessories, such as chassis and power modules, and verify that the floor under the rack can bear the weight.

2.3.2 Airflow

The equipment adopts natural cooling. Reserve a sufficient clearance around the equipment to ensure proper ventilation.

2.3.3 Space

Do not install the equipment against a wall. Instead, maintain a minimum clearance of 10 cm (3.94 in.) around the equipment for heat dissipation and equipment maintenance.

2.3.4 Temperature and Humidity

To ensure the normal operation and a prolonged service life of the equipment, maintain an appropriate temperature and humidity in the installation environment.

Prolonged exposure to inappropriate temperature and humidity conditions can cause damage to the equipment.

- In an environment with high relative humidity, insulating materials are prone to poor insulation or even electricity leakage.
- In an environment with low relative humidity, insulating gaskets may shrink, resulting in screw loosening.
- In a dry environment, static electricity is more likely to occur, posing a risk to the internal circuits of equipment.
- A high temperature can accelerate the aging process of insulation materials, greatly reducing the availability of the equipment and severely affecting its service life.

2.3.5 Cleanliness

Dust poses a significant hazard to the equipment. Dust on the enclosure causes electrostatic adhesion, leading to poor contact of the metallic joints. Electrostatic adhesion is more likely to occur in an indoor environment with relatively low humidity, not only affecting the service life of the equipment, but also causing communication faults. The following table lists the requirements for dust concentration and particle size in the equipment room.

Table 2-2 Requirements for Dust

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

≥ 5 μm	Particles/m^3	≤ 3.5 x 10^6

Apart from dust, there are also requirements on the salt, acid, and sulfide in the air of the equipment room. These harmful substances will accelerate metal corrosion and component aging. Therefore, the equipment room should be properly protected against harmful gases, such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and chlorine gas. The following table lists the limits on harmful gases.

Table 2-3 Requirements for Gases

Gas	Average (mg/m^3)	Maximum (mg/m^3)
Sulfur dioxide (SO_2)	0.3	1.0
Hydrogen sulfide (H_2S)	0.1	0.5
Nitrogen dioxide (NO_2)	0.5	1.0
Chlorine gas (Cl_2)	0.1	0.3

Note

Average refers to the average value of harmful gases measured in a week. **Maximum** refers to the upper limit of harmful gases measured in a week for up to 30 minutes every day.

2.3.6 Grounding

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

- Safety Grounding

  Ensure that the power distribution system is securely grounded if the equipment uses the AC power supply. Otherwise, electric shocks may occur when the insulation resistance between the power module and the chassis decreases.

Caution

- The building should provide a protective ground connection to ensure that the equipment is connected to a protective ground.
- Verify that the AC socket is reliably connected to the protective grounding system of the building. If not, a protective grounding wire should be used to connect the protective grounding lug of the AC socket to the protective grounding system of the building.

- Lightning Grounding

  The lightning protection system is an independent system composed of a lightning rod, a downlead conductor, and a connector connected to the grounding system. The grounding system is typically used for power reference grounding and safety grounding. Lightning grounding is required only for facilities, and is not required for the equipment.

- EMC Grounding

  Electromagnetic compatibility (EMC) grounding includes shielded grounding, filter grounding, noise and interference suppression, and level reference.

2.3.7 Preventing Electromagnetic Interference

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

2.3.8 Surge Protection

Although the equipment can guard against lightning strikes, strong lightning strikes may still damage the equipment. Take the following surge protection measures:

- Ensure that the grounding wire is in good contact with the ground.
- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- Install a power arrester in front of the power input end to enhance surge protection for the power supply.

2.3.9 Installation Site

Regardless of whether the equipment is installed on a wall or a workbench, ensure that the following conditions are met:

- Maintain a proper clearance around the equipment for heat dissipation.
- Alternatively, place the equipment on a clean workbench. The installation of air conditioners is recommended in hot areas.

2.4 Tools

Table 2-4 Tools

Common Tools	Phillips screwdriver, cables, cage nuts, diagonal pliers, cable ties, and grounding wires
Dedicated Tools	Anti-ESD gloves, wire stripper, crimping pliers, RJ45 crimping pliers, and wire cutter
Meter	Multimeter

Note

The equipment is delivered without a toolkit. Prepare the preceding tools by yourself.

3 Installing the Switch

Caution

Before installing the equipment, ensure that guidelines and requirements in Chapter 2 have been met.

3.1 Before You Begin

- The installation site provides sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements.
- The power supply is available at the installation site, and its current meets the requirements.
- The Ethernet cables have been deployed at the installation site.
- Locate the emergency power-off switch in the room before installation. In the case of an accident, cut off the power supply immediately.

3.2 Installing the Equipment

3.2.1 Wall Mount

Note

- You need to prepare two screws (M3 x 6 mm Phillips pan head combination machine screws) and two plastic expansion anchors for wall mounting.
- For wall mounting, install the equipment only on concrete or other non-flammable surfaces.

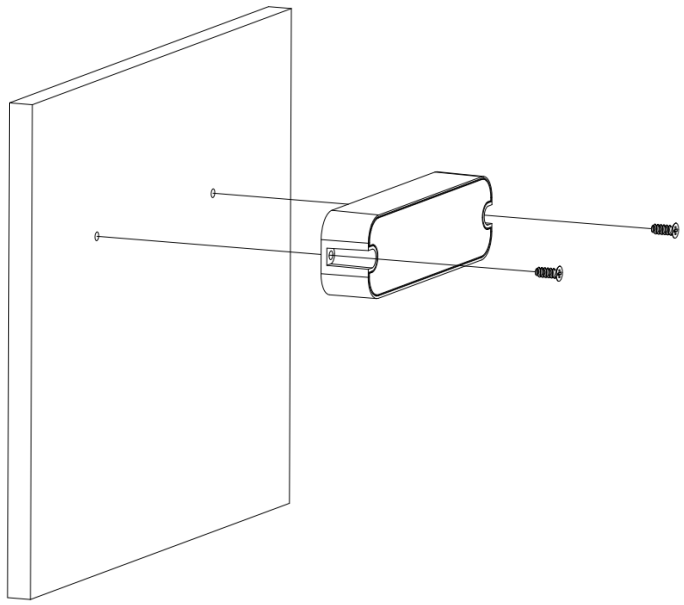
The steps for wall mounting a switch are as follows:

(1) Drill two holes at suitable positions on the wall with a spacing of 112 mm (4.41 in.). The hole diameter and depth depend on the specifications of the purchased plastic expansion anchors.

(2) Insert two plastic expansion anchors into the drilled holes.

(3) Align the mounting holes on the switch with the holes on the wall, and tighten the screws, as shown in the following figure.

Figure 3-1 Mounting the Switch on a Wall



3.2.2 Workbench Mount

If wall mounting is not feasible, place the switch on a clean workbench and choose a location where it is unlikely to be touched, to ensure the safety and stability of the switch.

3.3 Verifying Installation

Caution

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

- Verify that the cables including power cords are properly connected.
- Verify that cables connected to ports are routed indoors.
- Verify that the surge protection socket and Ethernet port arrester are installed, if outdoor cabling exists.
- Verify that there is a minimum clearance of 10 cm (3.94 in.) around the switch.

4 Commissioning

4.1 Startup Check

4.1.1 Checking before the Device is Powered on

- 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)

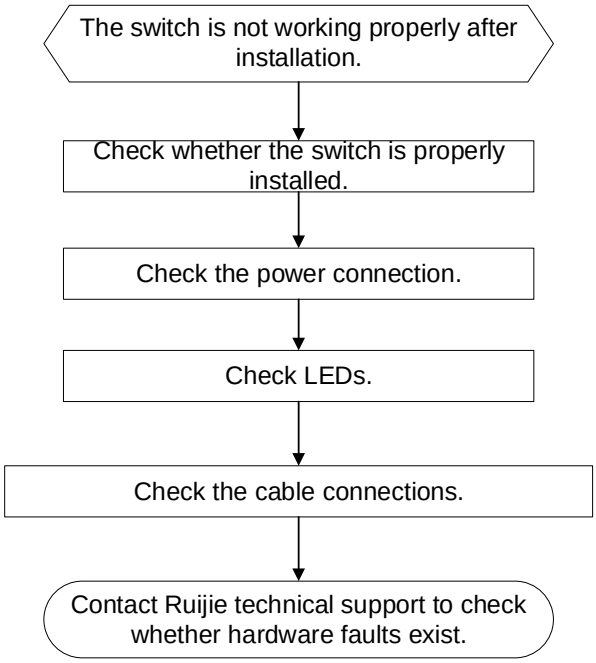
After power-on, you are recommended to perform the following checks to ensure the normal operation of follow-up configurations.

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

5 Common Troubleshooting

5.1 General Troubleshooting Flowchart

Figure 5-1 General Troubleshooting Flowchart



5.2 Common Faults

Table 5-1 Common Faults and Troubleshooting

Symptom	Possible Cause	Suggested Action
The system status LED is off after the switch is powered on.	The switch is not powered on. The Ethernet cable is loosely connected to the uplink port.	Check whether the Ethernet cable connected to the PoE In port is functioning properly and securely connected.

6 Appendix

6.1 Connectors and Media

10/100BASE-T Port

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

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 the 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.

Table 6-2 Twisted Pair Connections for the 10/100BASE-T Port

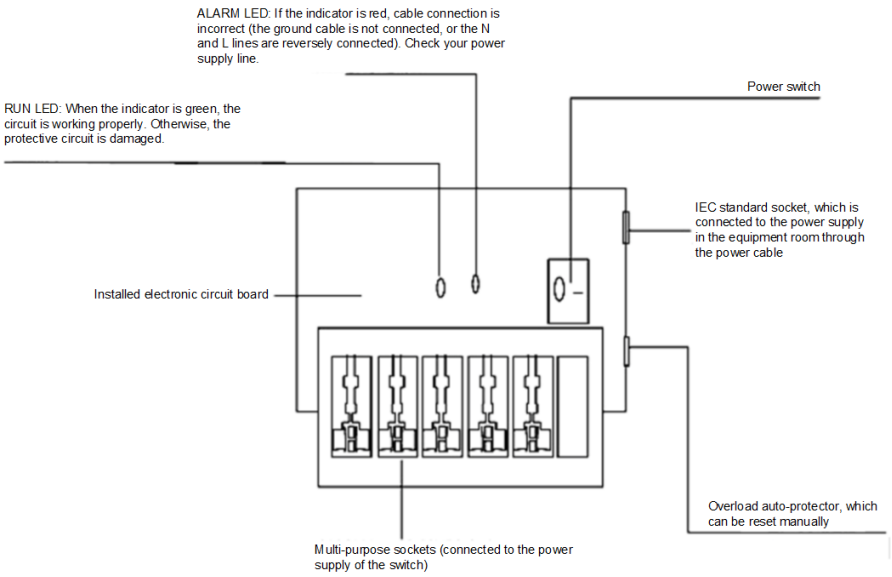
Straight-Through		Crossover	
Switch	Adapter	Switch	Switch
1 IRD+ ⟷	1 OTD+	1 IRD+ ⟷	1 IRD+
2 IRD- ⟷	2 OTD-	2 IRD- ⟷	2 IRD-
3 OTD+ ⟷	3 IRD+	3 OTD+ ⟷	3 OTD+
6 OTD- ⟷	6 IRD-	6 OTD- ⟷	6 OTD-

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 6-1 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.

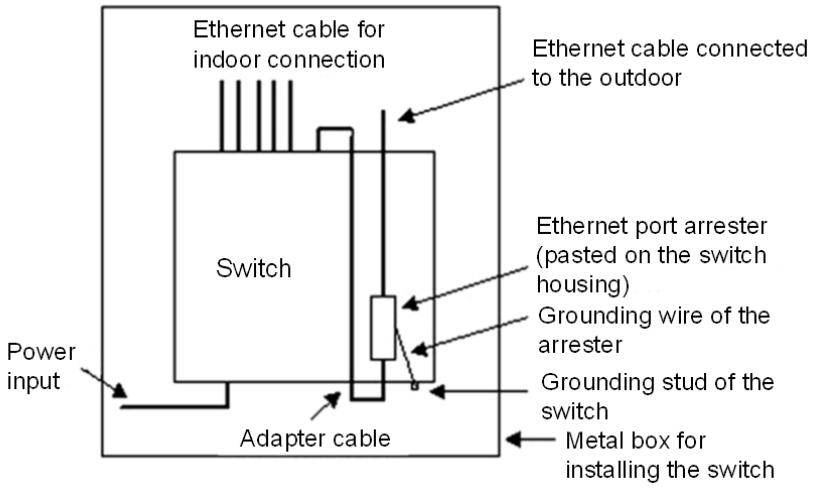
b Based on the distance between the grounding lug of the switch and the Ethernet port arrester, cut the grounding cable of the Ethernet port arrester and firmly tighten the grounding cable to the grounding lug of the switch.

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 6-2 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.