Ruijie Reyee RG-NIS2100 Series Switches

Implementation Cookbook

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.ruijienetworks.com
- Email support: service_rj@ruijie.com
- Live chat: https://reyee.ruijie.com/en-global/rita

Conventions

1. GUI Symbols

Interface symbol	Description	Example
Boldface	1. Button names 2. Window names, tab name, field name and menu items 3. Link	1. Click **OK**. 2. Select **Config Wizard**. 3. Click the **Download File** link.
>	Multi-level menus items	Select **System** > **Time**.

2. Signs

The signs used in this document are described as follows:

> 🛑 **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.

> **ℹ 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.

3. Note

This manual serves as a guide for users to understand, install, and configure the product.

- The examples of port types provided may differ from the actual situation. Please proceed with configuration according to the supported port types.

- The display information examples may include content from other product series, such as models and descriptions. For accurate display information, please refer to the relevant documentation.

Overview

This cookbook consists of multiple independent volumes, introducing the installation, web-based configuration of the RG-NIS2100 series switches and related power modules, including:

01- Installation Guide

02- ESW_1.0(1)B1P48 Configuration Guide

03- Power Modules

Contents

1 Product Overview

1.1 Introduction to RG-NIS2100

The RG-NIS2100 series Layer 2 industrial switches boast a unique industrial design. With Ruijie's unique self-organizing network (SON) technology and Ruijie Cloud, they have an industrial-grade operating temperature range, professional capability in outdoor lightning protection, and enterprise-class dustproof rating. They provide user-friendly features for ease of use and O&M and can withstand various harsh and complex environments.

Table 1-1 Interface Specifications of the RG-NIS2100 Series Switches

Model	10/100/1000BASE-T Ethernet Ports with Auto-Negotiation	1000BASE-X SFP Port	Console Port	PoE Port	Power Supply
RG-NIS2100-8GT2SFP-HP	8	2	/	8	1+1 redundancy
RG-NIS2100-4GT2SFP-HP	4	2	/	4	1+1 redundancy

> **Note**
> ● 1000BASE-T ports are downward compatible with 100BASE-T and 10BASE-T ports.
> ● Only one power supply is used at a time, and the other power supply is used as a backup.

1.2 Package Contents

Table 1-2 Package Contents

Number	Item	Quantity	Remarks
1	Switch	1	-
2	Mounting bracket (for wall mounting)	2	-
3	Installation guide	1	-

Number	Item	Quantity	Remarks
4	Warranty card	1	-
5	M3 x 5 mm cross recessed countersunk head screw	4	-
6	Access device management software of Ruijie Networks	1	Pre-installed on the device

🛈 Note

The preceding package contents are intended to provide a general overview. The actual delivery is subject to the order contract. Please check your goods carefully against the order contract. If you have any questions, please contact the distributor.

1.3 RG-NIS2100-8GT2SFP-HP

1.3.1 Product Appearance

The RG-NIS2100-8GT2SFP-HP full Gigabit Ethernet switch provides eight RJ45 ports supporting 10/100/1000BASE-T auto-negotiation, and two 1000Base-X SFP ports on the front panel. On the top panel, there are one dual-output DC power connector, one DIP switch, one reset button, and one grounding screw.

The product appearance is as follows.

Figure 1-1   Appearance of the RG-NIS2100-8GT2SFP-HP

1. Front Panel

Figure 1-2   Front Panel of the RG-NIS2100-8GT2SFP-HP
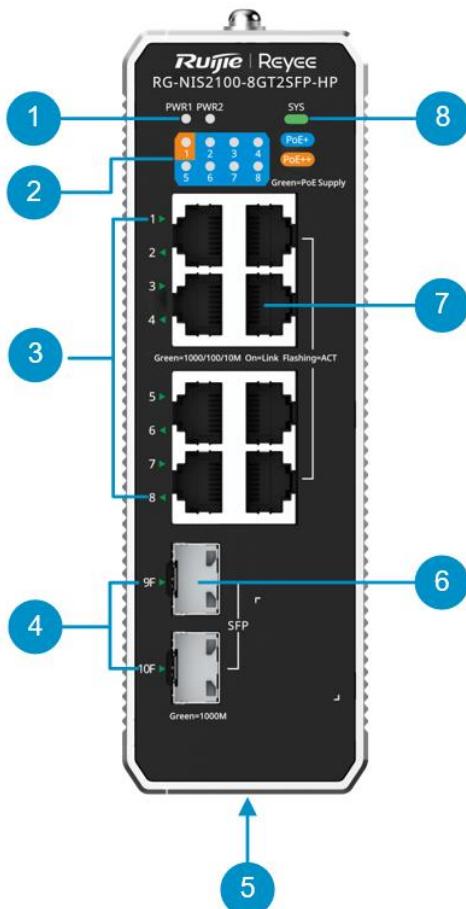
Table 1-3 Front Panel

Number	Item	Description
1	PWR LED	● Off: The power supply is disabled. ● On: The power supply is enabled.
2	PoE status LED	● Off: Power over Ethernet (PoE) is disabled. ● Solid green: PoE is enabled.

Number	Item	Description
3	Electrical port status LED	● Off: The port is not connected. ● Solid green: The port operates at 1000/100/10 Mbps and no data is transmitted. ● Blinking green: The port operates at 1000/100/10 Mbps and is transmitting data. (Note: Port 1 is IEEE 802.3bt-compliant.)
4	Optical port status LED	● Off: The port is not connected. ● Solid green: The port operates at 1000 Mbps and no data is transmitted. ● Blinking green: The port operates at 1000 Mbps and is transmitting data.
5	Nameplate	Nameplate on the bottom of the device
6	1000BASE-X SFP ports	SFP port for SFP module expansion
7	10/100/1000BASE-T Ethernet port with auto-negotiation	RJ45 electrical port that connects to a CAT5e network cable
8	System status LED	● Off: The switch is not powered on. ● Fast blinking green (8 to 10 Hz): The switch is starting up. ● Solid green: The switch is operating normally after startup. ● Slow blinking green (0.5 Hz): The switch is operating normally after startup but does not connect to Ruijie Cloud. ● Blinking green (2 Hz): The system is restoring factory settings or upgrading.

2. Top Panel

Figure 1-3   Top Panel of the RG-NIS2100-8GT2SFP-HP
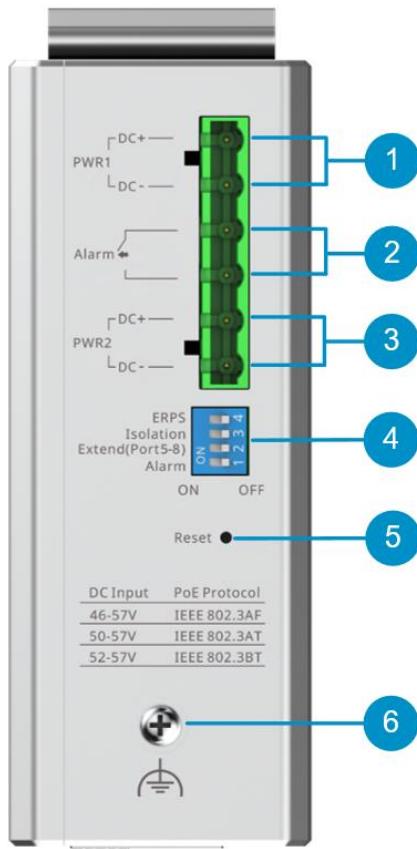
Table 1-4 Top Panel

Number	Item	Description
1	PWR1 DC power connector	Connects to a DC power supply.
2	Alarm port	- In normal cases, the contact of an alarm port is closed. - When an alarm is triggered (by power failure of a power supply), the contact is opened.
3	PWR2 DC power connector	Connects to a DC power supply.
4	DIP switch	- ERPS: - On: Ethernet Ring Protection Switching (ERPS) is enabled.

Number	Item	Description
		○ Off: ERPS is disabled. ● Isolation: 　○ On: Ports 1–8 cannot communicate with each other, but can communicate with ports 9 and 10. Ports 9 and 10 can communicate with each other. 　○ Off: Port isolation is disabled. ● Extend(Port5–8): Sets the rate of ports 5–8 to 10 Mbps. ● Alarm: Generates an alarm when the power module is not detected. When the switch is turned off, the alarm function is disabled.
5	Reset button	● Press and hold the button for shorter than two seconds to restart the system. ● Press and hold the button for longer than five seconds until the system status LED starts blinking to restore the factory setting and restart the device. ● If the button is pressed and held for two to five seconds, no operation is triggered.
6	Grounding screw	Connects to the ground.

🛈 Note

ERPS, port isolation, and extension mode can be configured through the DIP switch on the device panel or on Eweb. The new configuration will overwrite the old configuration.

3. Rear Panel

Figure 1-4   Rear Panel of the RG-NIS2100-8GT2SFP-HP
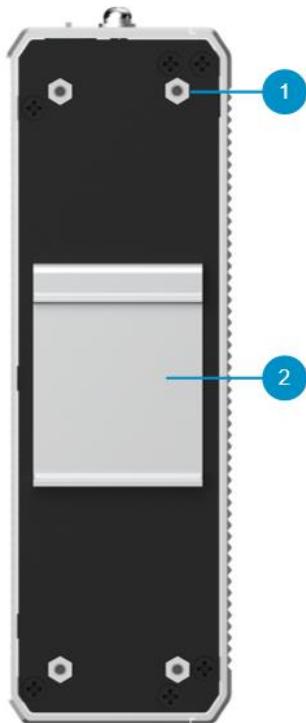
Table 1-5 Rear Panel

Number	Item	Description
1	Mounting bracket screw hole	Used to install mounting brackets
2	DIN rail clamp	Used to secure the switch to the guide rail.

🛈 Note

When mounting the switch on a wall, secure the two screws removed from the DIN rail clamp back into their original holes to guarantee the IP40 protection level of the switch.

4. Bottom Panel

Figure 1-5   Bottom Panel of the RG-NIS2100-8GT2SFP-HP
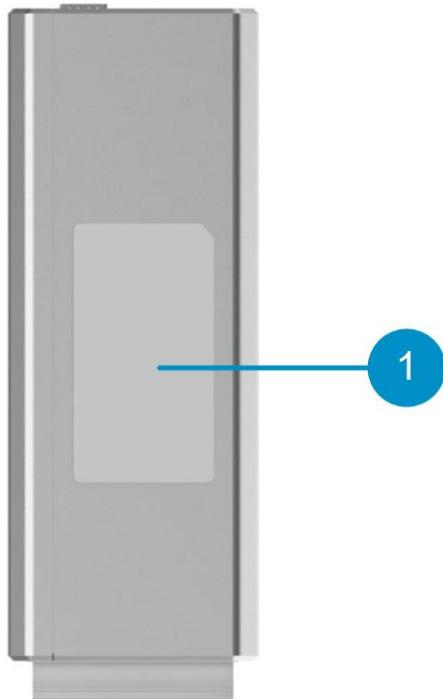
Table 1-6 Bottom Panel

Number	Item	Description
1	Nameplate	Nameplate on the bottom of the device

1.3.2 Technical Specifications

Table 1-7 Technical Specifications of the RG-NIS2100-8GT2SFP-HP

Model	RG-NIS2100-8GT2SFP-HP
Ports	● 8 x 10/100/1000BASE-T Ethernet ports with auto-negotiation (port 1 supports PoE/PoE+/PoE++ and ports 2–8 support PoE/PoE+) ● 2 x 1000BASE-X SFP ports
Flash Memory	8 MB
Supported Optical	For details, see 6.2 SFP Module. Copper cables are not supported.

Model	RG-NIS2100-8GT2SFP-HP
Module Models	Note: The supported module models may be updated at any time. For details about the latest supported models, visit https://reyee.ruijie.com/en-global/rita.
Power Supply	DC input: ● Rated voltage range: 46–57 V DC ● Rated current: 7 A
Ground Leakage Current	≤ 3.5 mA
PoE	● Maximum PoE output power on port 1: 90 W ● Maximum PoE output power on ports 2–8: 30 W ● The maximum number of powered devices (PDs) supported by the switch is determined by the input voltage, PoE output power of the switch, and the actual power of the PDs. ● 46–57 V input voltage: IEEE 802.3af-compliant ● 50–57 V input voltage: IEEE 802.3af/at-compliant ● 52–57 V input voltage: IEEE 802.3af/at/bt-compliant (Caution: When the switch uses the RG-NIS-PA240-48 or RG-NIS-PA120-48 power module and should be IEEE 802.3at/bt-compliant, turn the ADJ knob on the power module fully clockwise.)
Max. PoE Power Budget	300 W (The default PoE output power is 228 W. You can modify the PoE output power on the Eweb based on the power consumption of PDs.)
PoE Power Pins	● Port 1: 1/2 (−), 3/6 (+), 4/5 (+), 7/8 (−) ● Ports 2–8: 1/2 (+) and 3/6 (−)
Power Consumption	● Less than 12W with no PoE load ● Less than 312W with PoE full load
Operating Temperature	–40°C to +75°C (–40°F to +167°F)
Storage Temperature	–40°C to +85°C (–40°F to +185°F)

Model	RG-NIS2100-8GT2SFP-HP
Operating Humidity	10% RH to 90% RH (non-condensing)
Storage Humidity	5% RH to 95% RH (non-condensing)
Cooling	Natural cooling
Number of Fans	Fanless
Temperature Alarm	Not supported
Certification	CE
Dimensions (W x D x H)	50 mm x 155 mm x 130 mm (1.97 in. x 6.10 in. x 5.12 in.)
Net Weight	0.79 kg (1.74 lbs)

⚠ Warning

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

1.4 RG-NIS2100-4GT2SFP-HP

1.4.1 Product Appearance

The RG-NIS2100-4GT2SFP-HP full Gigabit Ethernet switch provides four RJ45 ports supporting 10/100/1000BASE-T auto-negotiation, and two 1000Base-X SFP ports on the front panel. On the top panel, there are one dual-output DC power connector, one DIP switch, one reset button, and one grounding screw.

The product appearance is as follows.

Figure 1-6   Appearance of the RG-NIS2100-4GT2SFP-HP

1. **Front Panel**

Figure 1-7   Front Panel of the RG-NIS2100-4GT2SFP-HP
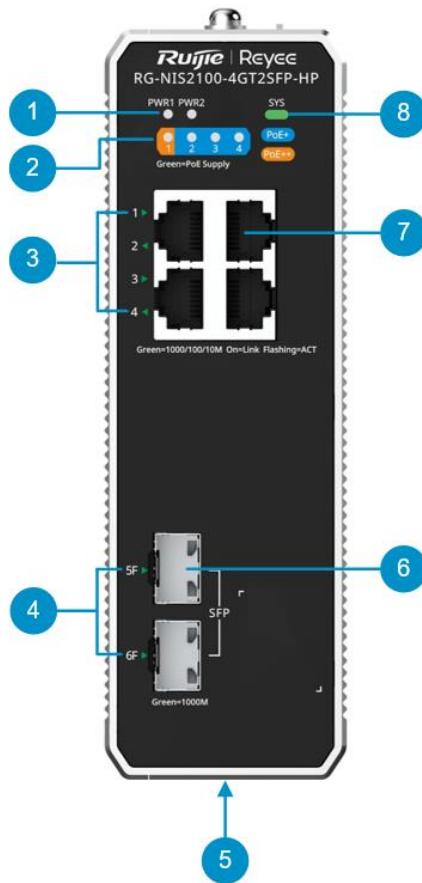
Table 1-8 Front Panel

Number	Item	Description
1	PWR LED	● Off: The power supply is disabled. ● On: The power supply is enabled.
2	PoE status LED	● Off: PoE is disabled. ● Solid green: PoE is enabled.

Number	Item	Description
3	Electrical port status LED	● Off: The port is not connected. ● Solid green: The port operates at 1000/100/10 Mbps and no data is transmitted. ● Blinking green: The port operates at 1000/100/10 Mbps and is transmitting data. (Note: Port 1 is IEEE 802.3bt-compliant.)
4	Optical port status LED	● Off: The port is not connected. ● Solid green: The port operates at 1000 Mbps and no data is transmitted. ● Blinking green: The port operates at 1000 Mbps and is transmitting data.
5	Nameplate	Nameplate on the bottom of the device
6	1000BASE-X SFP ports	SFP port for SFP module expansion
7	10/100/1000BASE-T Ethernet port with auto-negotiation	RJ45 electrical port that connects to a CAT5e network cable
8	System status LED	● Off: The switch is not powered on. ● Fast blinking green (8 to 10 Hz): The switch is starting up. ● Solid green: The switch is operating normally after startup. ● Slow blinking green (0.5 Hz): The switch is operating normally after startup but does not connect to Ruijie Cloud. ● Blinking green (2 Hz): The system is restoring factory settings or upgrading.

2. Top Panel

Figure 1-8   Top Panel of the RG-NIS2100-4GT2SFP-HP
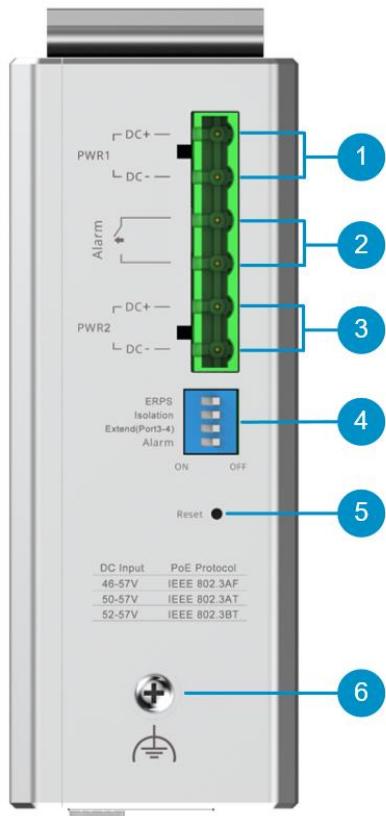
Table 1-9 Top Panel

Number	Item	Description
1	PWR1 DC power connector	Connects to a DC power supply
2	Alarm port	● In normal cases, the contact of an alarm port is closed. ● When an alarm is triggered (by power failure of a power supply), the contact is opened.
3	PWR2 DC power connector	Connects to a DC power supply

Number	Item	Description
4	DIP switch	● ERPS: o On: Ethernet Ring Protection Switching (ERPS) is enabled. o Off: ERPS is disabled. ● Isolation: o On: Ports 1–4 cannot communicate with each other, but can communicate with ports 5 and 6. Ports 5 and 6 can communicate with each other. o Off: Port isolation is disabled. ● Extend(Port3–4): Sets the rate of ports 3–4 to 10 Mbps. ● Alarm: Generates an alarm when the power module is not detected. When the switch is turned off, the alarm function is disabled.
5	Reset button	● Press and hold the button for shorter than two seconds to restart the system. ● Press and hold the button for longer than five seconds until the system status LED starts blinking to restore the web password to the default setting. After saving user configurations, the system restores the factory setting and restarts. ● If the button is pressed and held for two to five seconds, no operation is triggered.
6	Grounding screw	Connects to the ground.

ℹ Note

ERPS, port isolation, and extension mode can be configured through the DIP switch on the device panel or on Eweb. The new configuration will overwrite the old configuration.

3. Rear Panel

Figure 1-9   Rear Panel of the RG-NIS2100-4GT2SFP-HP
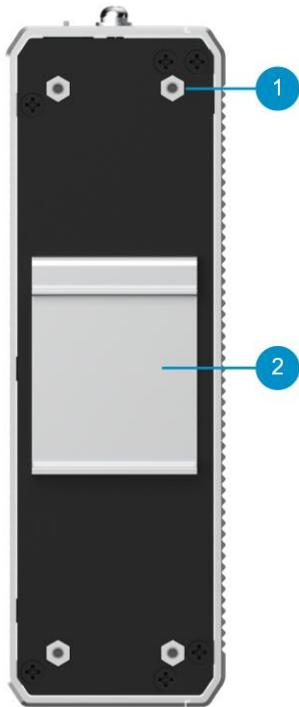
Table 1-10   Rear Panel

Number	Item	Description
1	Mounting bracket screw hole	Used to install mounting brackets
2	DIN rail clamp	Used to secure the switch to the guide rail.

🛈 **Note**

When mounting the switch on a wall, secure the two screws removed from the DIN rail clamp back into their original holes to guarantee the IP40 protection level of the switch.

4. Bottom Panel

Figure 1-10   Bottom Panel of the RG-NIS2100-4GT2SFP-HP
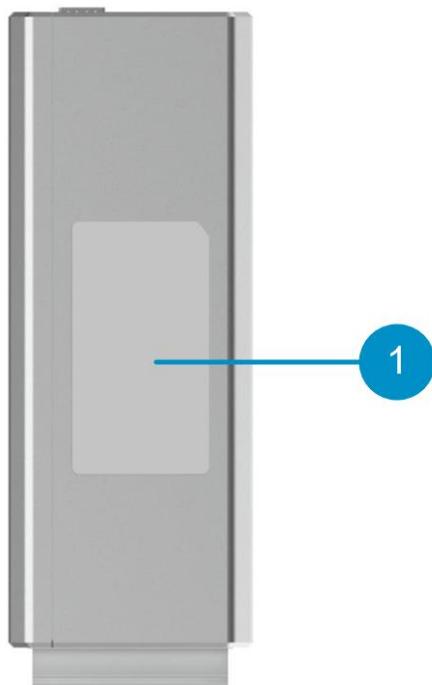
Table 1-11   Bottom Panel

Number	Item	Description
1	Nameplate	Nameplate on the bottom of the device

1.4.2 Technical Specifications

Table 1-12   Technical Specifications of the RG-NIS2100-4GT2SFP-HP

Model	RG-NIS2100-4GT2SFP-HP
Ports	● 4 x 10/100/1000BASE-T Ethernet ports with auto-negotiation (port 1 supports PoE/PoE+/PoE++ and ports 2–4 support PoE/PoE+) ● 2 x 1000BASE-X SFP ports
Flash Memory	8 MB
Supported Optical Module Models	For details, see 6.2 SFP Module. Copper cables are not supported.

Model	RG-NIS2100-4GT2SFP-HP
	Note: The supported module models may be updated at any time. For details about the latest supported models, visit https://reyee.ruijie.com/en-global/rita.
Power Supply	DC input: ● Rated voltage range: 46–57 V DC ● Rated current: 4.2 A
Ground Leakage Current	≤ 3.5 mA
PoE	● Maximum PoE output power on port 1: 90 W ● Maximum PoE output power on ports 2–4: 30 W ● The maximum number of PDs supported by the switch is determined by the input voltage, PoE output power of the switch, and the actual power of the PDs. ● 46–57 V input voltage: IEEE 802.3af-compliant ● 50–57 V input voltage: IEEE 802.3af/at-compliant ● 52–57 V input voltage: IEEE 802.3af/at/bt-compliant (Caution: When the switch uses the RG-NIS-PA240-48 or RG-NIS-PA120-48 power module and should be IEEE 802.3at/bt-compliant, turn the ADJ knob on the power module fully clockwise.)
Max. PoE Power Budget	180 W (The default PoE output power is 108 W. You can modify the PoE output power on the Eweb based on the power consumption of PDs.)
PoE Power Pins	● Port 1: 1/2 (−), 3/6 (+), 4/5 (+), 7/8 (−) ● Ports 2–4: 1/2 (+) and 3/6 (−)
Power Consumption	● Less than 12W with no PoE load ● Less than 192W with PoE full load
Operating Temperature	–40°C to +75°C (–40°F to +167°F)
Storage Temperature	–40°C to +85°C (–40°F to +185°F)

Model	RG-NIS2100-4GT2SFP-HP
Operating Humidity	10% RH to 90% RH (non-condensing)
Storage Humidity	5% RH to 95% RH (non-condensing)
Cooling	Natural cooling
Number of Fans	Fanless
Temperature Alarm	Not supported
Certification	CE
Dimensions (W x D x H)	50 mm x 155 mm x 130 mm (1.97 in. x 6.10 in. x 5.12 in.)
Net Weight	0.77 kg (1.70 lbs)

ⓘ Warning

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

2 Preparing for Installation

2.1 Safety Precautions

⚠ Caution

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

2.1.1 General Safety

- Keep the chassis clean and dust-free.
- Do not place the device in walking areas.
- During installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the chassis.
- Cut off all the power supplies and unplug all power cords before mounting the device in a rack or removing the device from a rack.

2.1.2 Handling Safety

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

2.1.3 Electric Safety

❗ Warning

- Improper or incorrect electric operations may cause a fire, electric shock, and other accidents, and lead to severe and fatal personal injury and device damage.
- Direct or indirect touch through a wet object on high-voltage or mains power supply may be fatal.

- Observe local regulations and specifications during electric operations. Only personnel with relevant qualifications can perform such operations.
- Do not maintain the device by yourself when the device is powered on.
- Make sure that the switch is powered off when you cut off the power supply.

● Before installing the device, check potential risks in the work area, such as ungrounded power socket and wet floor.

● Find out the position of the indoor emergency power switch before installation. Cut off the power supply in case of accidents.

● Do not place the switch in a wet position, and keep the switch away from liquid.

● Equip the power supply system with a leakage protector (also referred to as leakage current switch or leakage current breaker) to automatically cut off the power in case of power leakage or shock. When selecting the leakage protector, observe the following rules:

○ The rated leakage action current of each leakage protector must be larger than twice 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 smaller than 3.5 mA, the leakage current of the system totals 56 mA. A leakage protector with 30 mA rated action current supports a maximum of four power supplies (that is, Rated action current of the leakage protector/2/Maximum leakage current of each power supply = 30/2/3.5 ≈ 4.28). In this case, the 16 power supplies in the system require at least four leakage protectors with 30 mA rated action current and each leakage protector supports four power supplies.

If power supplies in a system differ in models, the rated leakage action current of each leakage protector divided by two must be larger than the sum of maximum leakage currents of all the power supplies.

○ The rated leakage non-action current of a leakage protector shall be 50% of the rated leakage action current. If the rated leakage non-action current is too small, the leakage protector may be highly sensitive and trip unnecessarily on a normal leakage current, causing device power-off and service interruption.

For instance, the rated leakage non-action current of a leakage protector with 30 mA rated action current of shall be 15 mA. In this case, the leakage protector will not trip when the leakage current is smaller than 15 mA.

⚠ Caution

● To guarantee personal safety, the rated leakage action current of each leakage protector in the system must be equal to or smaller than 30 mA, the amount of current that a person can tolerate. When twice of the total leakage current of the system is larger than 30 mA, the system must be equipped with two or more leakage protectors.

● For the leakage current value of each power supply model, see the technical specifications in 1 Product Overview.

2.1.4 Electrostatic Discharge Safety

● Ensure that the grounding screw on the side panel of the device is grounded.

● Keep the indoor installation environment clean and free of dust.

● Keep the indoor humidity within the required range.

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

CLASS 1 LASER PRODUCT

⚠ **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 running and prolonged service life of the device, the installation site must meet the following requirements.

2.2.1 Bearing

Evaluate the weight of the device and its accessories, including the cabinet, chassis, and power module, and ensure that the installation site can bear the weight.

2.2.2 Clearance

● To have sufficient room for chassis handling and module swapping, you are advised to maintain an indoor pathway of at least 0.8 m (31.50 in.) wide.

● Maintain a minimum clearance of 0.4 m (15.75 in.) around the device for heat dissipation

and device maintenance.

2.2.3 Temperature and Humidity

To ensure the normal operation and prolonged service life of the device, maintain an appropriate temperature and humidity in the equipment room.

Working in an environment with too high or too low temperature and humidity for a long period may damage the device.

- In an environment with high relative humidity, the insulating material may have poor insulation or even leak electricity.

- In an environment with low relative humidity, the insulating strip may dry and shrink, resulting in screw loosening.

- In a dry environment, the internal circuits are prone to static electricity.

- A high temperature can accelerate the aging process of insulating materials, greatly reducing the reliability of the device and severely affecting its service life.

The following table describes the temperature and humidity requirements for the RG-NIS2100 series switches.

Table 2-1 Requirements for Temperature and Humidity

Temperature	Relative Humidity
−40°C to +75°C (−40°F to +167°F)	5% to 95%

🛈 Note

The operating temperature and humidity of the device are measured at the point that is 1.5 m (4.92 ft.) above the floor and 0.4 m (1.31 ft.) before the device when there is no protective plate in front or at the back of the device.

2.2.4 Cleanliness

Dust poses a serious threat to device operation. Dust that falls onto the surface of the device can be absorbed onto metal contact points by static electricity, resulting in poor contact. Electrostatic absorption of dust occurs more easily when the relative humidity is low, which may shorten the service life of the device and cause communication failures. Table 2-2 shows the maximum concentration and diameter of dust allowed in the equipment room.

Table 2-2 Requirements for Dust

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

Besides, the contents of salts, acids and sulfides in the air are also strictly limited for the equipment room. These substances can accelerate metal corrosion and the aging of some parts. These substances can accelerate metal corrosion and the aging of some parts. Table 2-3 describes the limit of some hazardous gases such as SO_2, H_2S, NO_2 and Cl_2 in the equipment room.

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

ℹ️ Note

Average refers to the average value of harmful gases measured in one week.

Maximum refers to the upper limit of the harmful gas measured in one week for up to 30 minutes every day.

2.2.5 Anti-Interference

The device is susceptible to external interference such as capacitive coupling, inductive coupling, electromagnetic waves, common impedance (grounding) coupling, or conduction over conducting wires including power cords, signal cables, and output cables.

- In a TN earthing system, use a 3-wire single-phase outlet that has a protective earth (PE) contact to allow the filter circuit in the device to eliminate interference from the power grid.
- Keep the device away from high-power radio transmitters, radar transmitters, and high-frequency high-current devices.
- Use electromagnetic interference (EMI) shielding such as shielded interface cables to

minimize interference when necessary.

● Route interface cables only indoors to prevent signal ports from getting damaged by overvoltage or overcurrent caused by lightning strikes.

2.2.6 Grounding

A proper grounding system is the basis for stable and reliable running. It is indispensable for lightning protection and interference prevention. Carefully check the grounding conditions at the installation site according to the grounding specifications, and complete grounding properly based on the actual situation.

● Secure Grounding

Ensure that the rack and power distribution device are securely grounded when the device uses the AC power supply. Otherwise, electric shock may occur when the insulation resistance between the power supply inside the device and the chassis becomes small.

⚠ Caution

● The building should provide a protective ground connection to ensure that the device is connected to a protective ground.
● 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 PE 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 wire should be at least 0.75 mm^2 (18 AWG).
● Install the device by using three-core power cords, with a minimum cross-sectional area of 0.75 mm^2 or 18 AWG per pin.

● Lightning Grounding

The lightning protection system of facilities is standalone, and is composed of a lightning rod, a down conductor, and a connector connected to the grounding system. The grounding system is usually used for both power reference grounding and safe 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 resistance of the grounding wire should be smaller than 1 Ohm.

2.2.7 Surge Protection

The device can guard against lightning strikes. As an electrical device, too strong lightning strikes may still damage the device. Take the following surge protection measures:

- Ensure that the grounding wire of the cabinet is in good contact with the ground.
- Ensure that the neutral point of the power socket is in good contact with the ground.
- You are advised to install a power lightning arrester in front of the power input end to enhance surge protection for the power supply.

ⓘ Note

- Surge protection sockets are customer-supplied.
- For details about surge protection sockets, see the related user guide.

2.2.8 EMI

All EMI sources, either from outside or inside of the device or application system, affect the device by capacitive coupling, inductive coupling, or electromagnetic waves.

EMI occurs due to radiation or conduction, depending on the transmission path.

When the energy, often RF energy, from a component arrives at a sensitive component through the space, the energy is known as radiated interference. The interference source can be either a part of the interfered system or a completely electrically isolated unit. Conducted interference occurs when interference is transferred from one unit to another through cables which are usually electromagnetic wires or signal cables connecting the source and the sensor. Conducted interference often affects the power supply of the device, but this can be controlled by a filter. Radiated interference may affect any signal path in the device, and is difficult to shield.

To mitigate electromagnetic interference and safeguard the device, the following measures should be taken.

- Interference prevention measures should be taken for the power supply system.
- Keep the grounding device of the device far away from the grounding device and lightning grounding device of the power equipment.
- Keep the device far away from the high-power radio transmitter, radar transmitter, and high-frequency large-current devices.
- Take electromagnetic shielding measures when necessary.

2.3 Tools

Table 2-4 Tools

Common Tools	Phillips screwdriver, slotted screwdriver, related copper and optical cables, cage nuts, diagonal pliers, and cable ties
Special Tools	ESD tools
Meters	Multimeter
Other Devices	PC, display, and keyboard

ℹ Note

The RG-NIS2100 series switches are delivered without a tool kit. You need to prepare the tools listed in the tool table.

3 Installing the Switch

> ⚠ **Caution**
>
> Before installing the device, make sure that you have carefully read the requirements described in 2 Preparing for Installation.

3.1 Installation Procedure

Figure 3-1   Installation Procedure

```
┌─────────────────────────────────────┐
│       Prepare for installation       │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│          Install the switch          │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│          Ground the switch           │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│  Install and connect the power module│
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│      Connect and Bundle Cables       │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│         Verify installation          │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│                 End                  │
└─────────────────────────────────────┘
```
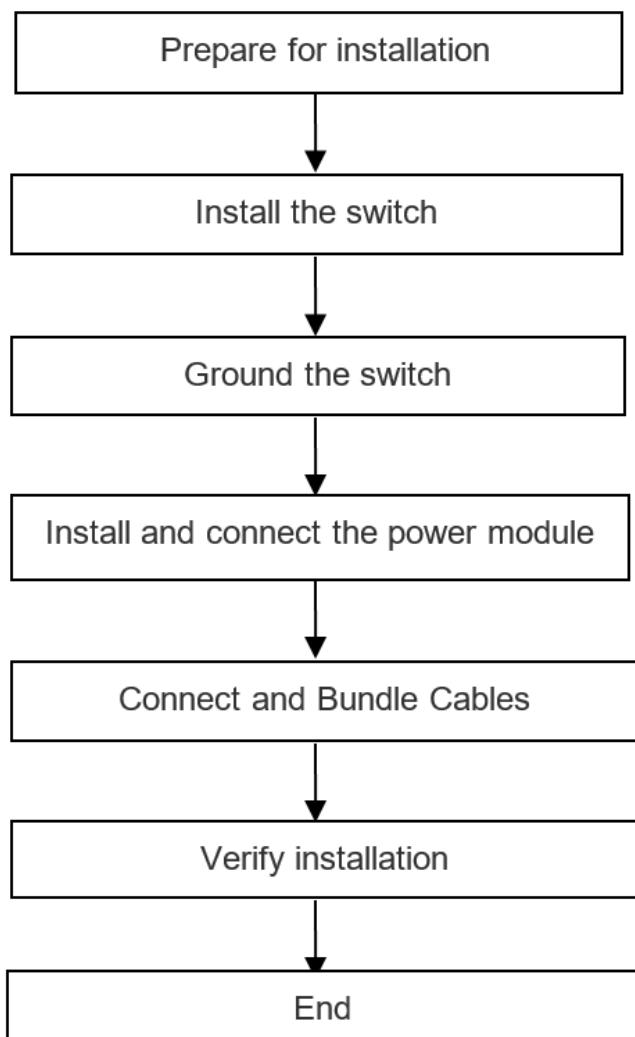
3.2 Before You Begin

Confirm the following requirements before installation:

- The installation environment meets heat dissipation requirements.
- The installation environment meets the temperature and humidity requirements.
- The installation site has a power supply that meets the current requirements.
- The relevant network cables have been arranged at the installation site.

3.3 Precautions

Pay attention to the following:

- Connect the power cords of different colors to the corresponding cable terminals.
- Ensure that the connector of the power cord is properly seated in the power port of the switch. After plugging the power cord into the switch, secure the power cord with power cord retention clip.
- Do not place anything on the top of the switch.
- Maintain a minimum clearance of 0.4 m (15.75 in.) around the device to ensure proper airflow. Do not stack switches.
- Keep the switch away from high-power radio transmitters, radar transmitters, and high-frequency large-current devices. Use EMI shielding such as shielded interface cables to minimize interference when necessary.
- Manage Ethernet cables with a distance of 100 m (328.08 ft.) indoors. Take lightning protection measures if they need to be routed outdoors.

3.4 Installing the Switch

3.4.1 Mounting the Switch on the DIN Rail

The RG-NIS2100 series switches can be mounted on the DIN rail. The installation steps are as follows:

(1) Position the switch with the DIN rail bracket on the rear facing the DIN rail.

Figure 3-2   Mounting Procedure
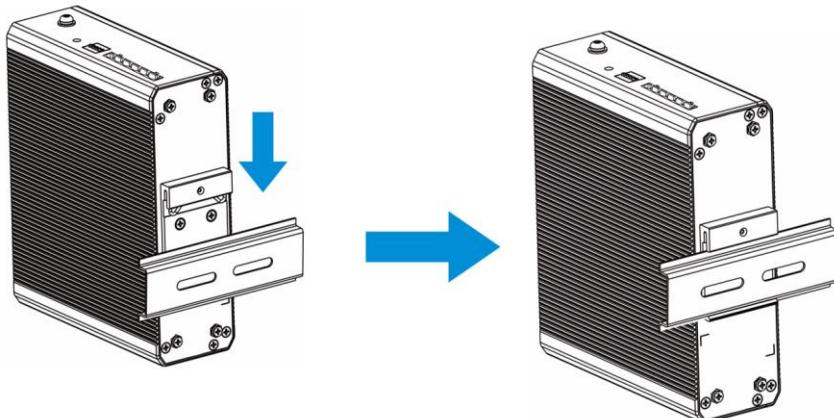
(2) Engage the DIN rail bracket with the top section of the DIN rail, and then rotate the device so that the bottom hook of the DIN clip clamps to the bottom section of the DIN rail.

Figure 3-3   Mounting Details
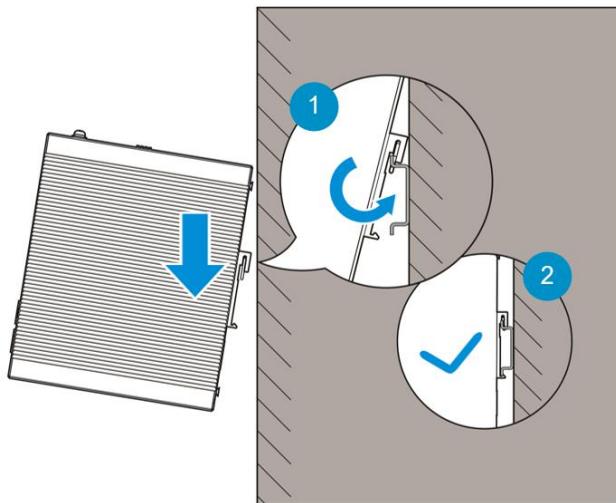
3.4.2 Mounting the Switch on the Wall

⚠ Caution

- Mount the device on a concrete or non-flammable wall.
- You need to prepare four screws and four expansion tubes of appropriate sizes to secure the device.

The RG-NIS2100 series switches can be mounted on a wall using the mounting brackets delivered with the device. The installation steps are as follows:

(1) Remove the two screws securing the DIN slot, and then remove the DIN slot.

(2) Secure the two removed screws back into place.

(3) Use the four M3 x 8 mm screws in the accessory package to secure the mounting brackets to the back of the switch.

Figure 3-4   Removing the DIN Rail Bracket and Securing the Mounting Brackets
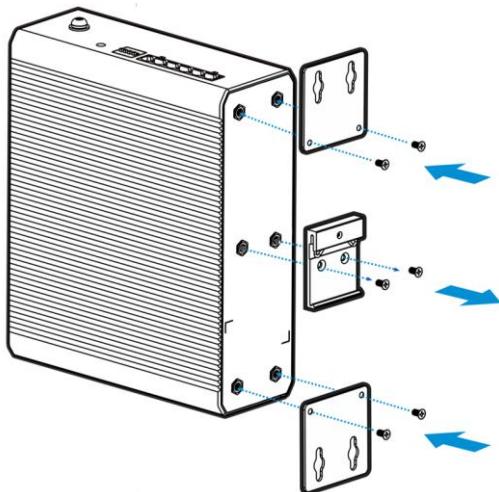
(4) Use a hammer drill to drill four holes (two on the top and two on the bottom) on the wall, and secure the switch to the wall using four expansion screws.

> 🛈 **Note**
>
> The distances between holes are shown in the following figure. The hole diameter and depth depend on the screws and expansion tubes you prepare.

Figure 3-5   Securing the Switch
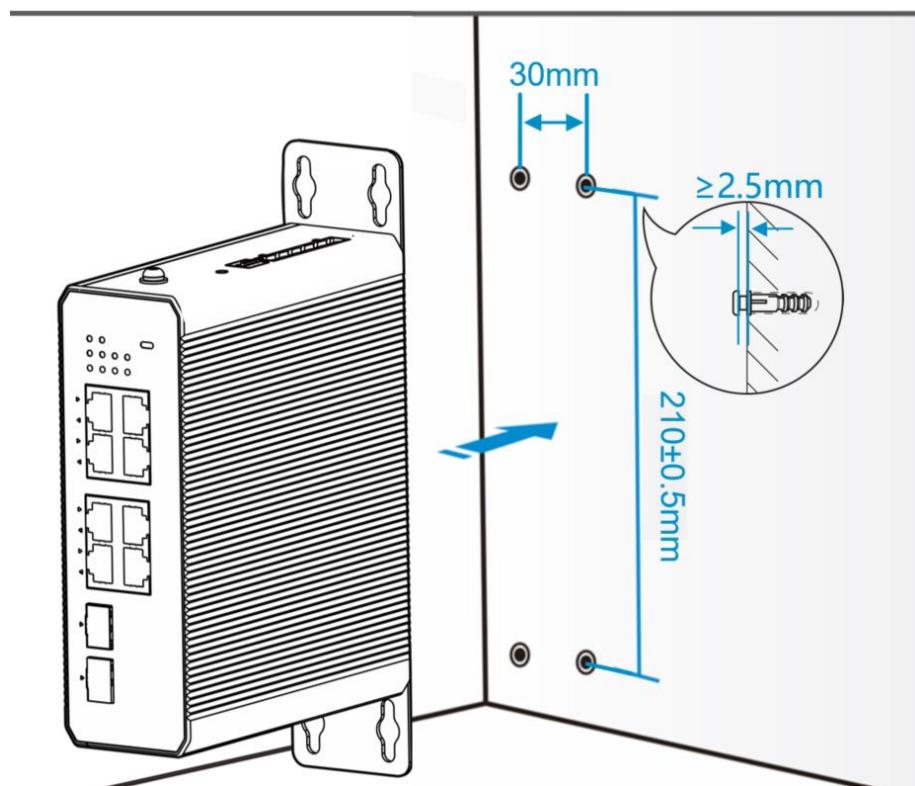
3.5 Grounding the Switch

> **ⓘ Note**
>
> ● If the device is mounted on a wall, connect the grounding stud on the back of the device to the grounding bar in the equipment room.
> ● The grounding wire of the RG-NIS2100 series switches is not delivered with the device and should be purchased separately.

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

Precautions:

● The cross-sectional area of a grounding wire should be determined according to the maximum current.

● The grounding wires should be good conductors.

● Do not use bare conductors.

● The resistance between the chassis and ground should be less than 1 ohm.

> **⚠ Caution**
>
> ● To avoid personal injury and device damage, connect the switch to earth ground properly.
> ● 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 PE 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 wire must be at least 0.75 mm^2 (18 AWG).

3.6   Installing the Power Module

> **ℹ Note**
>
> ● This section takes the RG-NIS-PA series power modules as an example. If you purchase a power module of another model, install and connect it to the switch according to the power module description specific to the model.
> ● Purchase power cords according to the specifications of the switch and power modules. The length of the power cord should be determined based on the actual installation requirements.
> ● The RG-NIS-PA series power modules can be installed only on DIN rails.

(1) Install the power module.

    a   Engage the DIN rail bracket of the power module with the top section of the DIN rail.

    b   Pull down the spring and rotate the device so that the bottom hook of the DIN clip clamps to the bottom section of the DIN rail.

Figure 3-6   Installing the Power Module
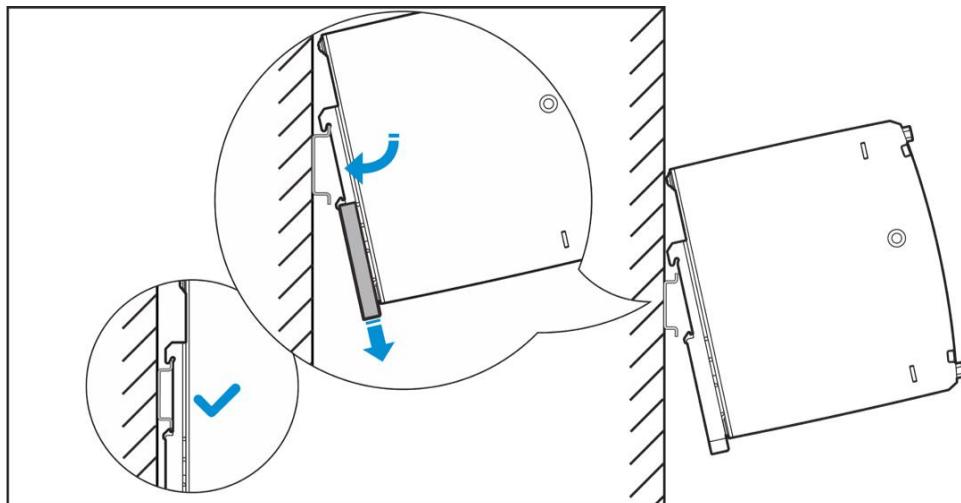
(2) Connect the power module to the switch according to the following figure:

    a   Connect the power output connector of the power module to the DC power input connector of the switch. (Ensure that the positions of positive and negative electrodes are correct.)

    b   Connect the power input connector of the power module to the AC grid.

Figure 3-7   Connecting the Power Module to the Switch
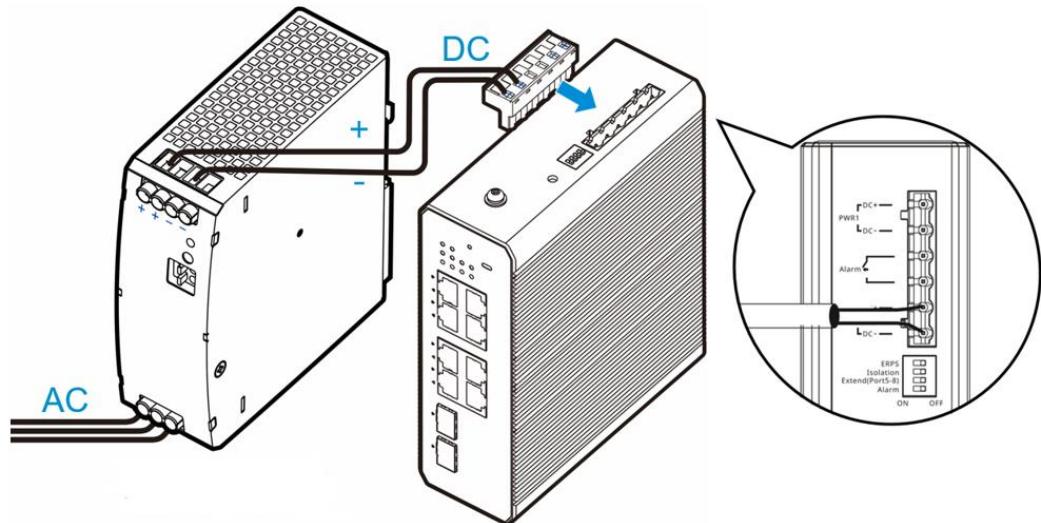
⚠ Caution

When the switch uses the RG-NIS-PA240-48 or RG-NIS-PA120-48 power module and should be IEEE 802.3at/bt-compliant, turn the **ADJ** knob on the power module fully clockwise.

Figure 3-8   ADJ Knob on the Power Module

3.7 Connecting Cables

⚠ Note

- Distinguish single-mode and multi-mode optical cables and interfaces.
- Avoid a small bend radius at the connector.

Connection Procedure

(1) Connect the RJ45 connector of the Ethernet cable to any electrical port on the front panel of the device, and connect the other end to the network management terminal or control terminal unit.

(2) Identify the transmit and receive ends of the optical cables, and insert the single-mode or multi-mode optical cables into the corresponding interfaces according to the silkscreen labels.

(3) Distinguish crossover and straight-through cables, and insert the twisted pair cables with RJ45 connectors into the corresponding interfaces according to the silkscreen labels.

3.8 Bundling the Cables

⚠ Note

- Bundle the power cords and other cables neatly.
- When bundling optical cables, ensure that they have natural bends or large bend radius at the connectors.
- Do not bundle optical cables and twisted pairs too tightly, as this may press the cables and affect their service life and transmission performance.

Bundling Steps

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

(2) On both sides of the chassis, fasten the optical cables and twisted pairs to the cable management bracket or trough.

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

3.9   Verifying Installation

> **⚠ Warning**
>
> 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 m (328.08 ft.) 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 0.4 m (15.75 in.) around the switch.

4 Debugging

4.1 Powering On the Switch

(1) Checklist Before Power-On

- The switch is properly grounded.

- The power cord is properly connected.

- The input voltage follows the requirement.

- The Ethernet port on the PC is properly connected to the Ethernet port on the switch. Parameters are set correctly.

(2) Checklist After Power-on

After power-on, you are advised to check the following list to ensure the normal operation of the switch:

- Indicators of the switch are in the normal state.

- Service ports can forward data properly.

4.2 Log In to the Web Interface

(1) Start up the PC and configure the local connection attribute on the PC. Change the static IP address of the PC to 10.44.77.XXX (1–255, excluding 200).

Figure 4-1   Change the IP Address of the PC
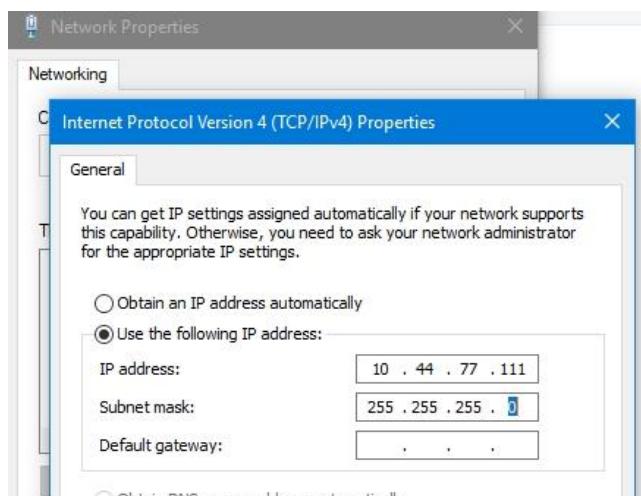
(2) Open a browser on the PC and enter 10.44.77.200 to log in to the web interface. The default password is "admin" for the first login.

⚠ **Caution**

To ensure security, you are advised to change the password after login, and update the password regularly.

5 Common Troubleshooting

5.1 Troubleshooting Flowchart

Figure 5-1   Troubleshooting Flowchart
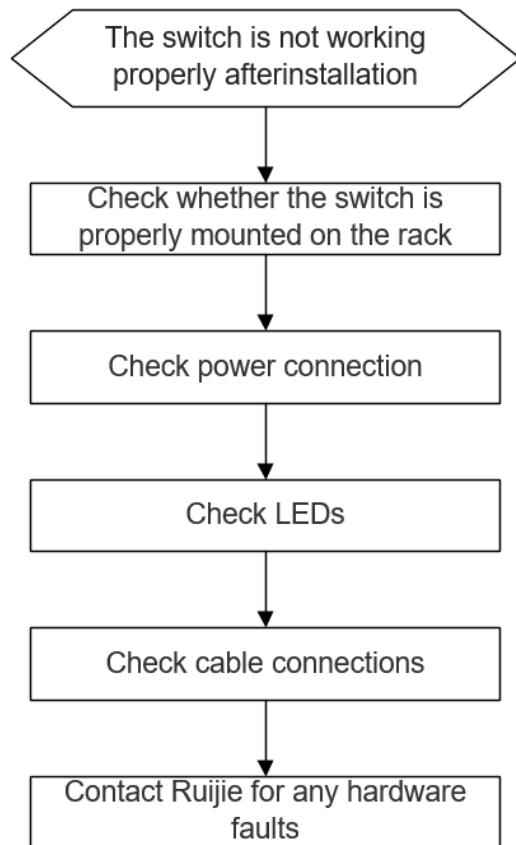
5.2 Common Faults

Table 5-1 Common Faults

Symptom	Possible Cause	Suggested Action
The login password of the web management system is forgotten.	The login password is forgotten after being manually configured.	Press and hold the **Reset** button to restore the switch to factory settings.

Symptom	Possible Cause	Suggested Action
The SYS LED is off after power on.	No power is supplied to the switch or the power cord is loose.	Check whether the power socket in the equipment room functions normally and whether the power cord connected to the switch is loose.
An RJ45 port is unreachable or a frame sending or receiving error occurs.	● The twisted pair cable is not connected properly. ● The cable length exceeds 100 m (328. 08 ft.). ● The port is specially configured and not in the same working mode as the connected switch.	● Replace the twisted pair cable. ● Make sure that the port works in the same mode as the connected switch.
An optical port is unreachable.	● The receiving and transmitting ends are connected incorrectly. ● The type of the connected optical module does not match. ● The optical cable does not meet requirements. ● The length of the optical cable is beyond the allowed length marked on the optical module.	● Exchange the transmitting and receiving ends of the optical cable. ● Replace the optical module with another one of the same type. ● Replace the optical cable with a qualified one. ● Use an optical cable with the required length.

6 Appendix

6.1 Connectors and Media

6.1.1 1000BASE-TOr100BASE-TXOr10BASE-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 Cat5e 100-ohm UTP or STP (recommended) with a maximum distance of 100 m (328 ft.).

The 1000BASE-T port requires all four pairs of wires to be connected for data transmission. The following Figure shows the connection of twisted pairs used by a 1000BASE-T port.

Figure 6-1   Connections of Four Twisted Pairs for the 1000BASE-T Port
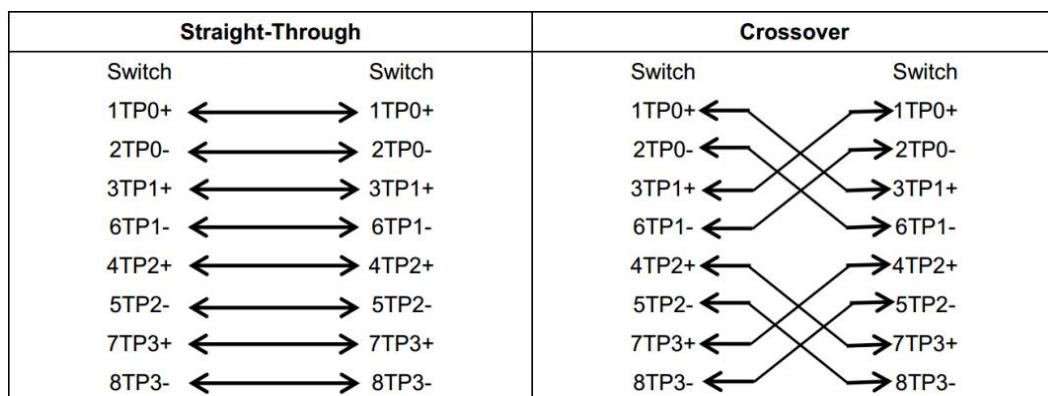
100BASE-TX/10BASE-T can be interconnected using cables of the preceding specifications. For 10 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables; for 100 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 5 cables with a maximum connection distance of 100 m (328 ft.). The following table shows 100BASE-TX/10BASE-T pin assignments.
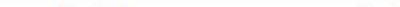
Table 6-1 Pin Assignments for the 100BASE-TX/10BASE-T Port

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–

Pin	Socket	Plug
4, 5, 7, 8	Not Used	Not Used

The following figure shows feasible connections of the straight-through and crossover twisted pairs for a 100BASE-TX/10BASE-T port.

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

6.1.2 Optical Cable Connection

Choose single mode or multi-mode fiber (MMFs) according to the module types.

Figure 6-3   Optical Cable Connection
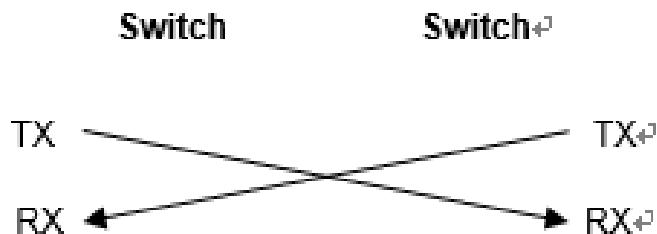
6.2   SFP Modules

We provide appropriate SFP modules according to the port types. You can select a module as required. 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 Transceiver Installation and Reference Guide*.

Table 6-2 SFP Optical Modules and Technical Specifications (Commercial)

Model	Wavelength (nm)	Fiber Type	Operating Temperature	DDM (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
					Min.	Max.	Min.	Max.
MINI-GBIC-SX-MM850	850	MMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–17	0
MINI-GBIC-LX-SM1310	1310	SMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–20	–3
GE-eSFP-SX-MM850	850	MMF	0°C to 70°C (32°F to 158°F)	Yes	–9.5	–3	–17	0
GE-eSFP-LX-SM1310	1310	SMF	0°C to 70°C (32°F to 158°F)	Yes	–9.5	–3	–20	–3
GE-SFP-LX-SM1310	1310	SMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–20	–3
MINI-GBIC-LH40-SM1310	1310	SMF	0°C to 70°C (32°F to 158°F)	Yes	–2	3	–22	–3
GE-SFP-SX-SM1310-BIDI	1310	MMF	0°C to 70°C (32°F to 158°F)	No	–10	–5	–17	–3
GE-SFP-SX-SM1550-BIDI	1550	MMF	0°C to 70°C (32°F to 158°F)	No	–10	–5	–17	–3
GE-SFP-LX20-SM1310-BIDI	1310TX/1550RX	SMF	0°C to 70°C (32°F to 158°F)	Yes	–9	–3	–20	–3
GE-SFP-LX20-	1550TX/1310RX	SMF	0°C to 70°C (32°F to 158°F)	Yes	–9	–3	–20	–3

Model	Wavelength (nm)	Fiber Type	Operating Temperature	DDM (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
					Min.	Max.	Min.	Max.
SM1550-BIDI								
GE-SFP-LH40-SM1310-BIDI	1310TX/1550RX	SMF	0°C to 70°C (32°F to 158°F)	Yes	–5	0	–24	–1
GE-SFP-LH40-SM1550-BIDI	1550TX/1310RX	SMF	0°C to 70°C (32°F to 158°F)	Yes	–5	0	–24	–1
MINI-GBIC-ZX50-SM1550	1550	SMF	0°C to 70°C (32°F to 158°F)	Yes	–5	0	–22	–3
MINI-GBIC-ZX80-SM1550	1550	SMF	0°C to 70°C (32°F to 158°F)	Yes	0	4.7	–22	–3
MINI-GBIC-ZX100-SM1550	1550	SMF	0°C to 70°C (32°F to 158°F)	Yes	0	5	–30	–9
GE-SFP-SX	850	MMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–17	0
GE-SFP-LX	1310	SMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–20	–3
SFP-MM850	850	MMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–17	0
SFP-SM1310	1310	SMF	0°C to 70°C (32°F to 158°F)	No	–9.5	–3	–20	–3

Table 6-3 SFP Optical Modules and Technical Specifications (Industrial)

Model	Wavelength (nm)	Fiber Type	Operating Temperature	DDM (Yes/No)	Transmit Power (dBm)		Receive Power (dBm)	
					Min.	Max.	Min.	Max.
NIS-GE-SFP-10KM-SM1310	1310	SMF	–40°C to 85°C (–40°F to +185°F)	Yes	–9.5	–3	–20	–3
NIS-GE-SFP-20KM-SM1310-BIDI	1310TX/1550RX	SMF	–40°C to 85°C (–40°F to +185°F)	Yes	–9	–3	–22	–3
NIS-GE-SFP-20KM-SM1550-BIDI	1550TX/1310RX	SMF	–40°C to 85°C (–40°F to +185°F)	Yes	–9	–3	–22	–3
NIS-GE-SFP-550M-MM850	850	MMF	–40°C to 85°C (–40°F to +185°F)	Yes	–9.5	–3	–17	0

Table 6-4 1000BASE-T SFP Copper Module

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

Table 6-5 Cabling Specifications of SFP Modules

SFP Model	Connector Type	Fiber type	Core Size (µm)	Max. Cabling Distance
MINI-GBIC-SX-MM850	LC	MMF	62.5/125	275 m (902.23 ft.)
			50/125	550 m (1804.46 ft.)

SFP Model	Connector Type	Fiber type	Core Size (μm)	Max. Cabling Distance
MINI-GBIC-LX-SM1310	LC	SMF	9/125	10 km (6.21 mi.)
GE-eSFP-SX-MM850	LC	MMF	62.5/125	275 m (902.23 ft.)
			50/125	550 m (1804.46 ft.)
GE-eSFP-LX-SM1310	LC	SMF	9/125	10 km (6.21 mi.)
GE-SFP-LX-SM1310	LC	SMF	9/125	10 km (6.21 mi.)
MINI-GBIC-LH40-SM1310	LC	SMF	9/125	40 km (24.85 mi.)
GE-SFP-SX-SM1310-BIDI	LC	MMF	50/125	500 m (1640.42 fi.)
GE-SFP-SX-SM1550-BIDI	LC	MMF	50/125	500 m (1640.42 fi.)
GE-SFP-LX20-SM1310-BIDI	LC	SMF	9/125	20 km (12.43 mi.)
GE-SFP-LX20-SM1550-BIDI	LC	SMF	9/125	20 km (12.43 mi.)
GE-SFP-LH40-SM1310-BIDI	LC	SMF	9/125	40 km (24.85 mi.)
GE-SFP-LH40-SM1550-BIDI	LC	SMF	9/125	40 km (24.85 mi.)
MINI-GBIC-ZX50-SM1550	LC	SMF	9/125	50 km (31.07 mi.)
MINI-GBIC-ZX80-SM1550	LC	SMF	9/125	80 km (49.71 mi.)
MINI-GBIC-ZX100-SM1550	LC	SMF	9/125	100 km (62.14 mi.)
GE-SFP-SX	LC	MMF	62.5/125	275 m (902.23 ft.)
			50/125	550 m (1804.46 ft.)

SFP Model	Connector Type	Fiber type	Core Size (μm)	Max. Cabling Distance
GE-SFP-LX	LC	SMF	9/125	10 km (6.21 mi.)
Mini-GBIC-GT	RJ45 Ethernet cable	Cat 5 (or higher) twisted pair		100 m (302.08 ft.)

⚠ **Caution**

● For optical modules with a cabling distance of over 40 km (24.85 mi.) (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 6-6 Pairing Models of the BIDI Optical Modules

| Speed/Distance	Pairing Model
1GE/500 m	● GE-SFP-SX-SM1310-BIDI ● GE-SFP-SX-SM1550-BIDI
1GE/20 km	● GE-SFP-LX20-SM1310-BIDI ● GE-SFP-LX20-SM1550-BIDI
1GE/40 km	● GE-SFP-LH40-SM1310-BIDI ● GE-SFP-LH40-SM1550-BIDI
10GE/300 m	● XG-SFP-SR-SM1270-BIDI ● XG-SFP-SR-SM1330-BIDI
10GE/10 km	● XG-SFP-LR-SM1270-BIDI ● XG-SFP-LR-SM1330-BIDI

ℹ **Note**

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 Surge Protection

6.3.1 Installing an AC Power Arrester (Lightning Resistance Socket)

When an AC power cord is introduced from outdoors and directly connected to the power port of the switch, the AC power port must be connected to an external surge 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 equipment room by using cable ties and screws. AC power enters the surge protection power strip and then enters the switch.

Figure 6-4   Power Arrester
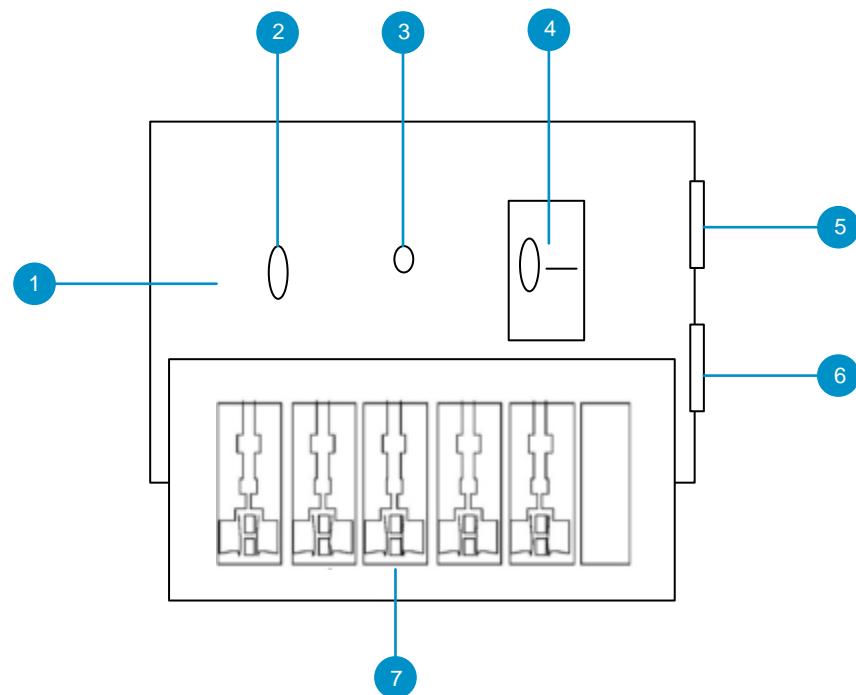
No.	Description
1	Installed electronic circuit board
2	Normally running indicator: When the indicator is green, the circuit is working properly. Otherwise, the protective circuit is damaged.

No.	Description
3	Grounding and polarity detection indicator: If the indicator is red, cable connection is incorrect (the ground cable is not connected, or the N and L lines are reversely connected). Check your power supply line.
4	Power switch
5	IEC standard socket, which is connected to the power supply in the equipment room through the power cable
6	Overload auto-protector, which can be reset manually
7	Multi-purpose sockets (connected to the power supply of the switch)

🛈 Note

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

Important points:

- 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 surge protection function is implemented only if the RUN 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 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 LED is red. If the N line is on the left and the L line is on the right (facing the socket), the arrester's PE terminal is not grounded. If not, the polarity of the arrester power cord should be reversed. In this case, you should open the power arrester and rectify the polarity of the connection. If the indicator is still red, the arrester's PE terminal is not grounded.

6.3.2 Installing the Ethernet Port Arrester

Connect an Ethernet port arrester to the 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

Installation Steps:

(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. over any of its shares arising under its Articles of Association;

(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
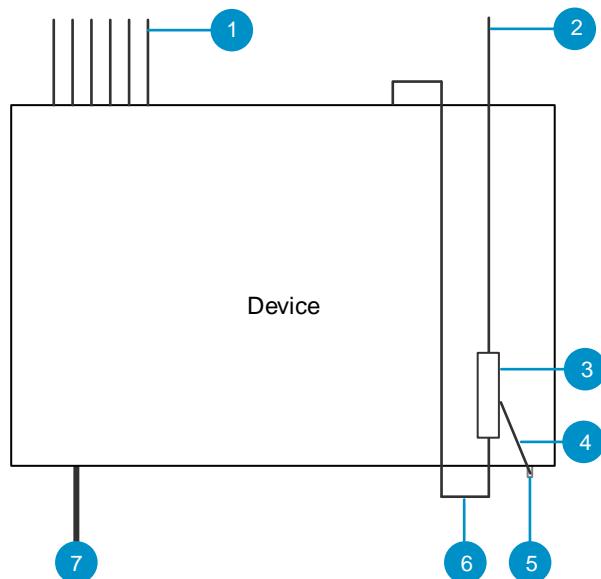
No.	Description
1	Ethernet cable for indoor connection
2	Ethernet cable connected to the outdoor
3	RJ45 port arrester (pasted on the enclosure)
4	Ground cable of the arrester
5	Grounding lug of the equipment
6	RJ45 port adapter cable

No.	Description
7	Power input

⚠ Caution

- The Ethernet port arrester is only for the 10/100 Mbps electrical ports with an RJ45 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 surge protection.

6.4 Cabling Recommendations

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 Cable

- The diameter of a cable tray to hold cables should be over 25 times greater than the diameter of the cable.

- When an optical cable is moved, the bend radius of the cable should be over 20 times greater than the diameter of the fiber.

- During cabling of an optical cable, the bend radius of the cable 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.
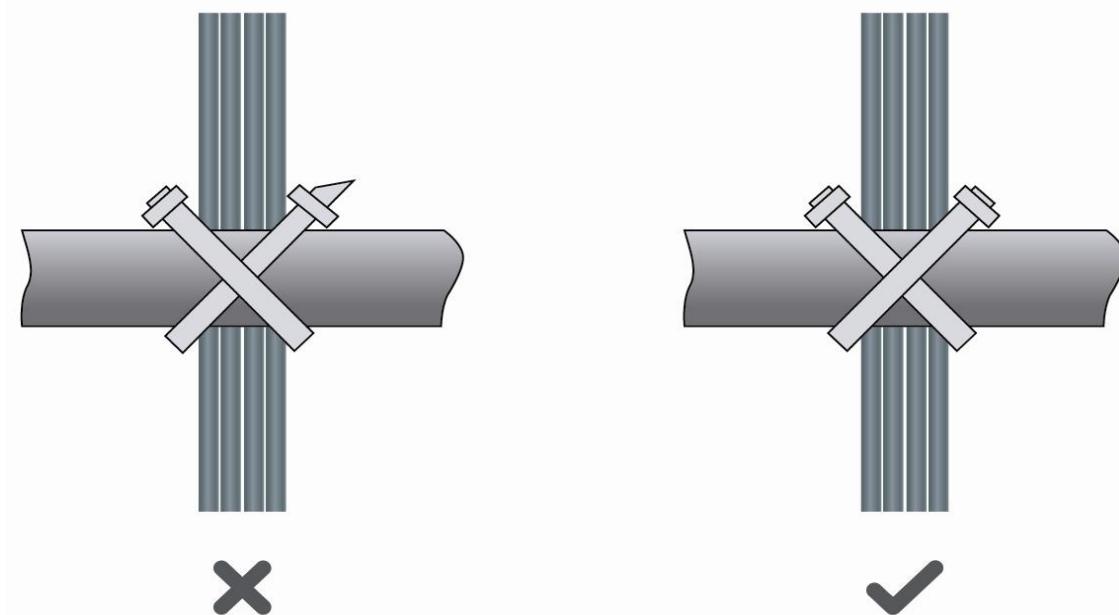
Figure 6-6   Binding Cables (1)
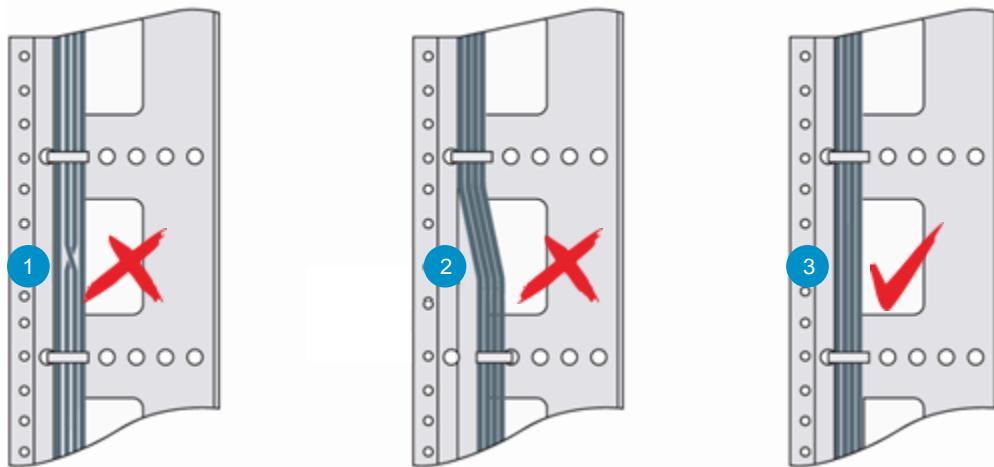
No.	Description
1	In the rack, cables should not be wound up after being bundled.
2	In the rack, cables should not bend after being bundled.
3	In the rack, cables should be neatly and straightly bundled.

- 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.

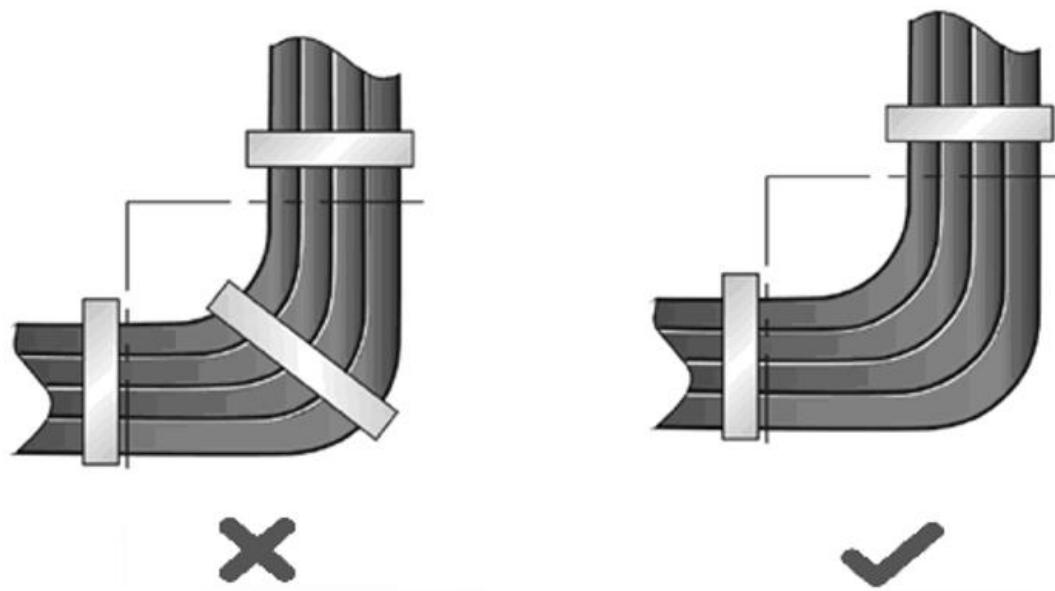● After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim without sharp corners.

Figure 6-7   Binding Cables (2)

● When cables need to be bent, please bundle them up but do not tie them where the cables will be bent. Otherwise, stress may be generated on the cables, causing the cable cores inside to break.

Figure 6-8   Binding Cables (3)

- 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 access 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 secure a cable terminal, the bolt or screw must be tightened, and measures should be taken to retain the terminal.

Figure 6-9   Securing Cables
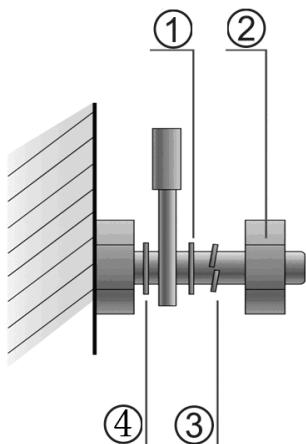
No.	Description
1	Flat washer
2	Screw nut
3	Spring washer
4	Flat washer

- Hard power cords should be fastened in the terminal connection area to prevent stress on terminal connection and cable.

- Do not use self-tapping screws to fasten terminals.

- Power cords of the same type and in the same cabling direction should be bundled up into cable bunches, with cables in cable bunches clean and straight.

- Bundle up cables by using cable ties.

Table 6-7 Requirements for Binding Cables with Cable Ties

Cable Bunch Diameter	Distance Between Every Binding Point
10 mm (0.39 in.)	80 mm to 150 mm (3.15 in. to 5.91 in.)
10 mm to 30 mm (0.39 in. to 1.18 in.)	150 mm to 200 mm (5.91 in. to 7.87 in.)
30 mm (1.18 in.)	200 mm to 300 mm (7.87 in. to 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 Equipment Room Site Selection

- The equipment room should be at least 5 km (3.11 mi.) away from heavy pollution sources, such as the smelter works, coal mine, and thermal power plant. The equipment room should be at least 3.7 km (2.30 mi.) 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 mi.) 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 mi.) away from the sea or salt lake. Otherwise, the equipment room must be sealed, with air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select devices with advanced protection against severe environment.

- Do not build the equipment room in the proximity of livestock farms. Otherwise, the equipment room should be located on the windward side of the pollution source perennially. The previous livestock house or fertilizer warehouse cannot be used as the equipment room.

- The equipment room should be firm enough to withstand severe weather conditions such as windstorm and heavy rain as well as away from dust. If the dust is unavoidable, keep the door and window away from the pollution source.

- The equipment room should be away from the residential area. Otherwise, the equipment room should meet the construction standard in terms of noise.

- Make sure the air vent of the equipment room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the equipment room under positive pressure to prevent corrosive gas from entering the equipment room to corrode components and circuit boards.

- Keep the equipment room away from industrial boiler and heating boiler.

- The equipment room should be on the second floor. Otherwise, the equipment room floor should be 600 mm (23.62 in.) higher than the highest flood level ever recorded.

- Make sure there are no cracks or holes in the wall and floor. If there are cable entries in the wall or window, take proper sealing measures. Ensure that the wall is flat, wear-resistant, and dust-free, which should be up to the standard for flame retarding, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.

- Keep the door and the window closed to make the equipment room sealed.

- The steel door is recommended for soundproofing.

- Sulfur-containing materials are forbidden.

- Keep the air conditioner from blowing wind straight toward the device or blowing water drops from the window or air vent toward the device.

Contents

1 Release Note

This section describes the hardware support and new software features in the ESW_1.0(1)B1P48 version. For details about the software version, see the release note published with the software version.

1.1 Hardware Support

The following table lists the hardware models supported by this version.

Table 1-1   Supported Hardware Models

Hardware Type	Model	Hardware Version Number
Switch	RG-ES205GC-P	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 1.5x, 1.6x, 2.0x, 2.1x, 2.2x, 2.3x, 2.4x, 2.5x, 2.6x, 2.7x
Switch	RG-ES209GC-P	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 1.5x, 1.6x, 1.7x, 1.8x, 1.9x, 1.Ax, 1.Bx, 1.Cx, 1.Dx, 1.Ex
Switch	RG-ES205GC	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 1.5x, 1.6x
Switch	RG-ES206GC-P	1.0x, 1.1x, 1.2x
Switch	RG-ES208GC	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 1.5x
Switch	RG-ES210GC-LP	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-ES210GS-P	1.0x, 1.1x, 1.2x, 1.3x, 1.4x
Switch	RG-ES206GS-P	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-ES216GC	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 2.0x, 2.1x, 2.2x, 3.0x, 3.1x, 3.2x, 3.3x
Switch	RG-ES224GC	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 2.0x, 2.1x, 2.2x, 3.0x, 3.1x, 3.2x
Switch	RG-ES220GS-P	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-ES228GS-P	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-ES226GC-P	1.0x, 1.1x, 1.2x, 1.3x, 2.0x, 2.1x, 2.2x, 2.3x, 3.0x, 3.1x
Switch	RG-ES218GC-P	1.0x, 1.1x, 1.2x, 1.3x, 1.4x, 2.0x, 2.1x, 2.2x, 3.0x, 3.1x, 3.2x
Switch	RG-ES224GC-V2	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-ES216GC-V2	1.0x, 1.1x, 1.2x, 1.3x
Switch	RG-NIS2100-8GT2SFP-HP	1.0x, 1.1x, 1.2x
Switch	RG-NIS2100-4GT2SFP-HP	1.0x, 1.1x, 1.2x

1.2   New Software Features

The ESW_1.0(1)B1P48 version introduces no new features but includes optimizations to some existing features.

2 Login

2.1   Configuration Environment Requirements

- Google Chrome, Internet Explorer 9.0, 10.0, and 11.0, and some Chromium/Internet Explorer kernel-based browsers (such as 360 Extreme Explorer) are supported. Exceptions such as garbled characters or format errors may occur when other browsers are used.

- 1024 x 768 or a higher resolution is recommended. Exceptions such as font alignment errors and format errors may occur when other resolutions are used.

2.2   Connecting the Device

Connect the switch port with the network port of the PC through an Ethernet cable. Configure the PC with an IP address in the same network segment as the default IP address of the switch so that the PC can ping the switch. For example, set the IP address of the PC to 10.44.77.100.

Table 2-1   Default Configuration

Feature	Default Setting
Device IP Address	10.44.77.200
Password	admin

2.3   Login to eWeb

(1) Enter the IP address (10.44.77.200 by default) of the device in the address bar of the browser to access the login page.

ⓘ **Note**

If the static IP address of the device is changed, or the device dynamically obtains a new IP address, the new IP address can be used to access the device's eWeb as long as the PC and the device are on the same LAN, and their IP addresses are on the same network segment.

(2) (Optional) When logging in for the first time, set the login password and click **Save**.

Figure 1-1   Login to eWeb Upon the First Time
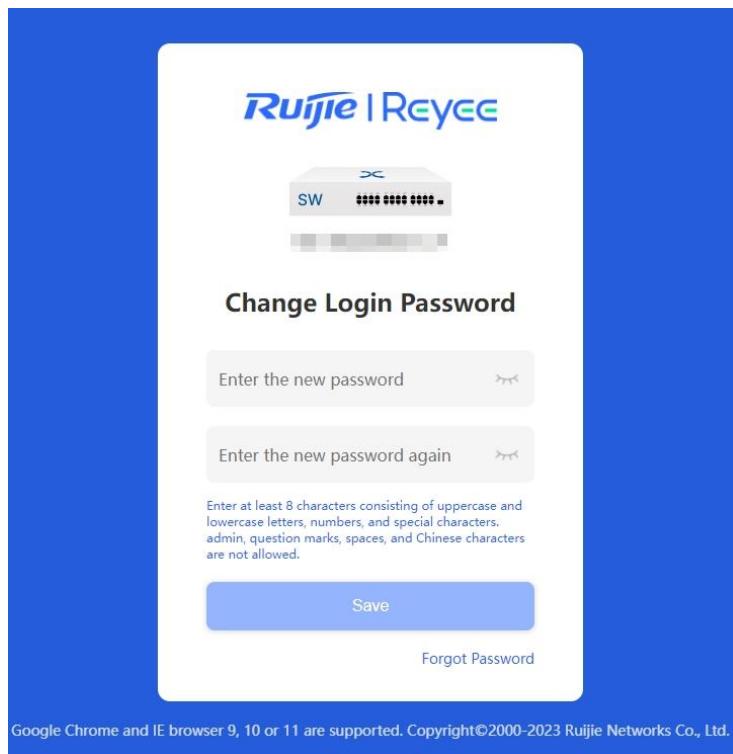
(3) On the login page, enter the password and click **Log In** to enter the homepage of eWeb.

> **ⓘ Note**
>
> To change the login password, see 9.2   Login Password Settings.

Figure 1-2   eWeb Login Page
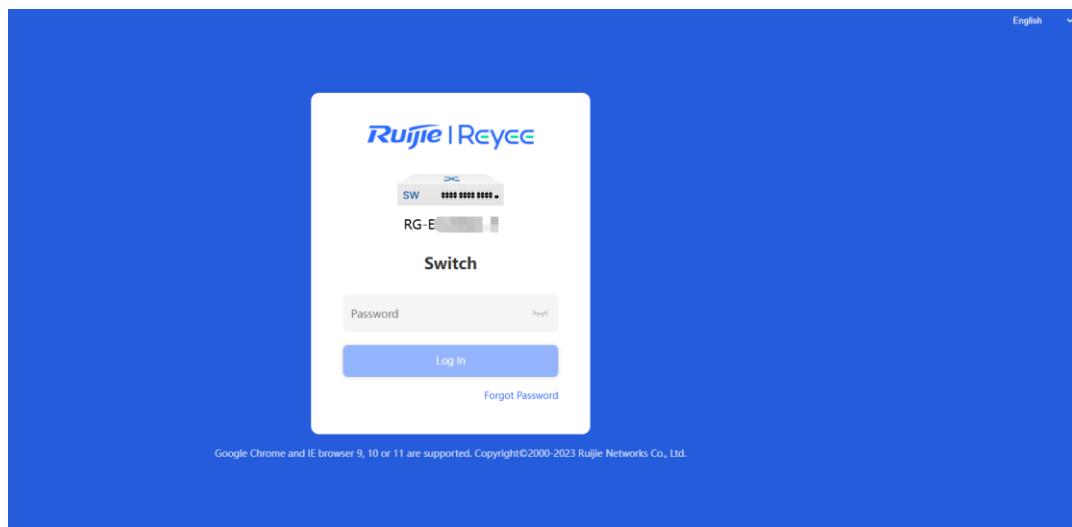
If you forget the device's IP address or password, hold down the **Reset** button on the device panel for more than 5 seconds to restore factory settings when the device is connected to the power supply. After restoration, you can use the default IP address to log in to the device and then change the login password.

> ⚠️ **Caution**
>
> Restoring factory settings will clear all configurations on the device. Exercise caution when performing this operation.

3 Port Management

3.1 Managing Port Information

3.1.1 Port Status Bar

The port status bar is at the top of eWeb, showing the port ID, port attribute (uplink/downlink), connection status, and other information.
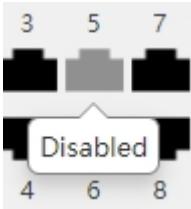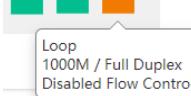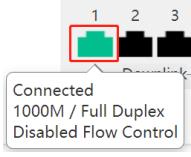
Figure 1-3   Port Status Bar

Different colors and shapes of the port icons represent different port statuses. See Table 3-1 for details. Move the cursor over a port icon and the port status will be displayed, including the connection status, port rate, duplex mode, and flow control status.

Table 3-1   Port Icons

Port Icon	Description
	The port icon is in the shape of a square, showing the port is a fiber port.
	The port icon is in the shape of an RJ-45 connector, showing the port is a copper port.
	The color of the port icon is black, showing the port is disconnected.

Port Icon	Description
	The color of the port icon is gray, showing the port is disabled and cannot receive or transmit packets.
	The color of the port icon is yellow, showing there is a loop.
	The color of the port icon is green, showing the port is working normally.
	The number above the port icon is the port ID used to identify the device port. With the port ID, you can specify the target port.
	● The device port is classified into the uplink port and the downlink port. The uplink port is used to connect network devices in the upper layer and access the core network. The downlink port is used to connect the endpoints. ● When port isolation is enabled, the downlink ports of the device are isolated from each another, and they can only communicate with the uplink ports. For details, see 3.4 Port Isolation

3.1.2 Port Info Overview

Choose **Home** from the navigation page.

The **Home** page displays the global port information, including the port status, port VLAN settings, packet receiving/transmission rate (Rx/Tx rate), port isolation status, loop status, and port PoE settings. In addition, you can query and view information about downlink devices.

Click a port feature to go to the feature configuration page.

● Click **Port Status** to configure the basic port attributes. For details, see 3.2 Port Settings.

● Click **VLAN** to set the VLAN of the port. For details, see 4.2 VLAN Settings.

> 🛈 **Note**
>
> Port VLAN settings can only be configured and viewed in the **Port Info** pane after the **VLAN Settings** switch is toggled on.

● Click **Isolation Status** to configure port isolation so that the downlink ports of the device are isolated from each other. For details, see 3.4 Port Isolation.

● Click **Loop Status** to enable loop guard function. After a loop occurs, the port causing the loop will be shut down automatically. For details, see 5.3 Loop Guard.

- Click **PoE** to view and set PoE parameters of the port. For details, see 6 PoE Settings.

- Click **Search** in the **Downlink Device** column to search for the downlink device of the selected port. After the search is done, click **View** to view the MAC address of the downlink device.

- Click **Refresh List** to fetch the latest port information.

Figure 1-4   Viewing or Configuring Port Settings

3.1.3 Port Packet Statistics

Choose **Monitoring** > **Port Statistics**.

The **Port Statistics** page displays the port status, the connection status, Rx/Tx rate (kbps), Rx/Tx packets (KB), Rx/Tx success, and Rx/Tx failure.

Click **Clear** to clear current packet statistics of all ports and reset the statistics.

Figure 1-5   Port Packet Statistics
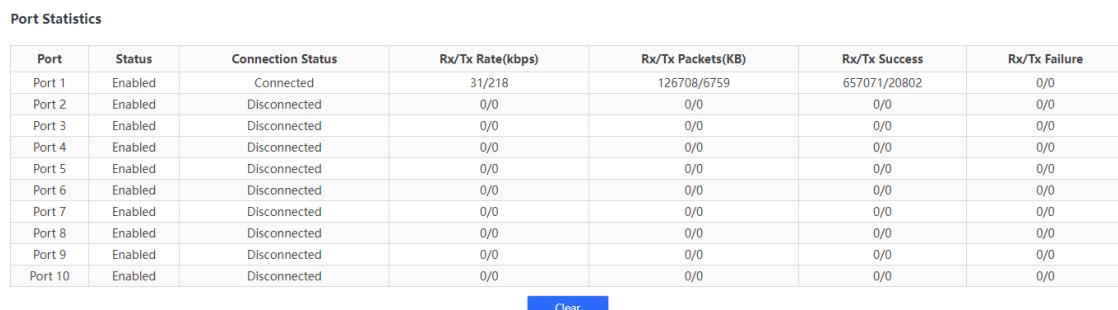
Port Statistics

Port	Status	Connection Status	Rx/Tx Rate(kbps)	Rx/Tx Packets(KB)	Rx/Tx Success	Rx/Tx Failure
Port 1	Enabled	Connected	31/218	126708/6759	657071/20802	0/0
Port 2	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 3	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 4	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 5	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 6	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 7	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 8	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 9	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 10	Enabled	Disconnected	0/0	0/0	0/0	0/0

Clear

3.2 Port Settings

ⓘ **Note**

- The EEE feature can be configured on RJ45 ports that operate at 100 or 1000 Mbps with **Duplex** set to **Auto**.

- For the RG-NIS2100 series, set the port speed to 10 Mbps through the DIP switch on the device's front panel or through the web interface. On the web interface, set **Speed** to **10M**, **Duplex** to **Auto**, and **Flow Control** to **Enabled**. The latest configuration takes effect.

Choose **Configuration** > **Port Settings**.

You can set the basic attributes of the Ethernet ports in batches.

(1) Click **Select** in the **Port** column to display options of all device ports. Select the ports you want to configure.

(2) Set the feature parameters for the ports.

(3) Click **Save**.

The port list below provides the basic attributes of all ports and can also be used to verify whether the configuration of a specified port takes effect.

⚠️ **Caution**

Shutting down all ports will make the switch unmanageable. Exercise caution when performing this operation.

Figure 1-6   Port Configuration and Status

Table 3-2   Basic Port Configuration Parameters

Parameter	Description	Default
Port	Select the ports you want to configure.	No default value
Status	● **Enabled**: When the port is enabled, it can receive or transmit packets. ● **Disabled**: When the port is disabled, it cannot receive or transmit packets (The PoE feature of the ports will not be affected).	Enabled
Speed	Configure the operating speed of the Ethernet physical port. When the speed is set to **Auto**, it is determined by the auto-negotiation between the local port and the peer port. The negotiated speed can be any speed within port capability.	Auto

Parameter	Description	Default
Duplex	● **Full Duplex**: The port can receive packets while sending packets. ● **Half Duplex**: The port can receive or send packets at a time. ● **Auto**: The duplex mode of the port is determined by the auto-negotiation between the local port and the peer port.	Auto
Flow Control	● **Enabled**: The port will process the received flow control frames and send them when flow congestion occurs. ● **Disabled**: The flow control is disabled.	Disabled
EEE	When Energy Efficient Ethernet (EEE) based on the IEEE 802.3az standard is enabled on an Ethernet port and the port is in idle state, it enters the Low Power Idle (LPI) mode, thereby achieving energy saving.	Disabled

3.3 Port Mirroring

3.3.1 Overview

In network monitoring and troubleshooting scenarios, users need to analyze data traffic on suspicious network nodes or device ports. When port mirroring is enabled, packets received and transmitted on the source port will be mirrored to the mirror port (destination port). You can monitor and analyze the packets on the mirror port through network analyzer without affecting the normal data forwarding of the monitored device.

As Figure 1-7 shows, by configuring port mirroring on Device A, the packets on Port 1 are mirrored to Port 10. Though the network analyzer is not directly connected to Port 1, it can receive all packets on Port 1 and is able to monitor the data traffic on Port 1.

Figure 1-7   Operating Principle of Port Mirroring
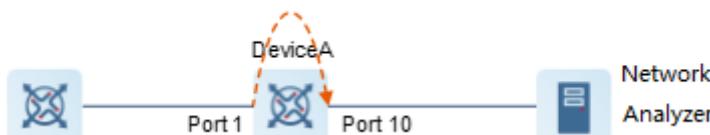
3.3.2 Configuration Steps

Choose **Configuration** > **Port Mirroring**.

Select the source port, the monitoring direction, and the mirror port, and click **Save**. The device supports configuring one port mirroring rule.

If you want to delete port mirroring configuration, click **Delete**.

⚠️ **Caution**

● You can select multiple source ports but only one mirror port. The source ports cannot contain the mirror port.

● Only one port mirroring rule can be configured. If multiple rules are configured, the latest configuration takes effect.

Figure 1-8   Configuring Port Mirroring

Port Mirroring

Source Port Member	Direction	Mirror Port
--Select--	Input ▾	Port 1 ▾

Save

Source Port Member	Direction	Mirror Port
1	Input	2

Delete

Table 3-3   Port Mirroring Parameters

Parameter	Description
Source Port Member	The source port is also called the monitored port. Packets on the source port will be mirrored to the mirror port for network analysis or troubleshooting. You can select multiple source ports. Packets on these ports will be mirrored to one mirror port.
Direction	Direction of the data traffic monitored on the source port: ● Bi-directions (input & output): All packets on the source port, including the received packets and the transmitted packets, will be mirrored to the mirror port. ● Input: The packets received by the source port will be mirrored to the mirror port. ● Output: The packets transmitted from the sourced port will be mirrored to the mirror port.
Mirror Port	The mirror port is also called the monitoring port. The mirror port is connected with a monitoring device, and it transmits packets on the source port to the monitoring device.

3.4 Port Isolation

Choose **Configuration** > **Port Isolation**.

Port isolation is used for isolating layer-2 packets. When port isolation is enabled, the downlink ports are isolated from each other but can communicate with uplink ports.

Port isolation is disabled by default. Toggle the switch to **On** to enable port isolation.

Figure 1-9   Port Isolation

Port Isolation

Downlink ports (1-8) will be isolated. The last 2 ports (9-10) are uplink ports and will not be isolated. (Packets will be forwarded between the uplink port and the downlink port. Downlink ports are not allowed to forward packets to each other).

Status	
	🔵

> **ℹ Note**
> ● The number of the uplink/downlink ports and port IDs of different devices vary. Please refer to the specific device's documentation for accurate information.
> ● Port isolation can be enabled on devices featuring DIP switches on the panel. The last configuration applied takes effect.

3.5 Port-based Rate Limiting

Choose **QoS** > **Rate Limiting**.

You can configure rate limiting rules for packets in the input direction and the output direction of ports. There is no rate limiting on ports by default.

Select the port you want to configure, then select the rate limiting type and status, and enter the rate limit. Click **Save** to save the configuration. The configuration will be displayed accordingly in the **Port Rate** table right below the **Save** button.

Figure 1-10 Port Rate Limiting

Rate Limiting

Port	Type	Status	Rate(Mbit/sec)
--Select--	Input ⌄	Disabled ⌄	No Limit (1-1000M)

Save

Port	Input Rate(Mbit/sec)	Output Rate(Mbit/sec)
Port 1	No Limit	No Limit
Port 2	No Limit	No Limit
Port 3	No Limit	No Limit
Port 4	No Limit	No Limit
Port 5	No Limit	No Limit
Port 6	No Limit	No Limit
Port 7	No Limit	No Limit
Port 8	No Limit	No Limit
Port 9	No Limit	No Limit
Port 10	No Limit	No Limit

Table 3-4   Rate Limiting Parameters

Parameter	Description	Default
Port	You can select multiple ports for rate limiting configuration in batches.	No default value

Parameter	Description	Default
Type	The direction of the rate-limited data traffic: ● Input & output: Rate limiting for all packets forwarded over the port, including the received packets and the transmitted packets. ● Input: Rate limiting for packets received by the port. ● Output: Rate limiting for packets transmitted from the port.	No default value
Status	You can decide whether to enable or disable rate limiting.	Disabled
Rate (Mbit/sec)	The maximum rate at which packets are forwarded over the port.	No Limit

Note

The port rate limit range varies with the switch model.

3.6 Management IP Address

Choose **Configuration** > **IP Settings**.

You can configure the management IP address of the device. By accessing the management IP address, you can configure and manage the device.

There are two Internet types available:

● Dynamic IP address: Enable **Auto Obtain IP** feature to use the IP address assigned dynamically by the uplink DHCP server.

● Static IP address: Disable **Auto Obtain IP** feature to use the fixed IP address configured manually by the user.

Enable **Auto Obtain IP** feature, and the device will automatically obtain various parameters from the DHCP server. You can select whether to obtain a DNS address automatically from the DHCP server. If **Auto Obtain DNS** feature is disabled, you need to configure a DNS address manually.

After disabling **Auto Obtain IP** feature, you need to manually configure the IP address, subnet mask, gateway IP address, and DNS address. Click **Save** to enforce the configuration.

VLAN is used for managing VLAN tag of the management packets. Disable VLAN settings, and the management packets will be untagged, and management VLAN configuration is not supported. The management VLAN of the device is VLAN 1 by default.

Figure 1-11 IP Settings

IP Settings		
VLAN	VLAN 1	
Auto Obtain IP	Enabled	
	If you disable this feature, multi-DHCP alarming will fail.	
IP Address	192.168.110.61	
Submask	255.255.255.0	
Gateway	192.168.110.1	
Auto Obtain DNS	Enabled	
DNS	192.168.110.1	

Save

> **ⓘ Note**
>
> ● Disable VLAN settings, and the management packets will be untagged. If you want to tag packets, please enable VLAN settings. For details, see 4.2.1 Global VLAN Settings.
> ● The management VLAN must be selected from the existing VLANs. To create a static VLAN, refer to 4.2.2 Static VLANs Settings.
> ● You are advised to bind a configured management VLAN to an uplink port. Otherwise, you may fail to access the web interface. For details, see 4.2.3 Port VLAN Settings.
> ● If you disable **Auto Obtain IP** feature, multi-DHCP alarming will fail. For details about multi-DHCP alarming, see 10.2 Multi-DHCP Alarming.

3.7 Setting the Port Media Type

> **✓ Specification**
>
> This function is only supported on the RG-ES206GS-P and the RG-ES210GS-P switches.

Choose **Configuration** > **Port Media Type**.

(1) Select a combo port. Only combo ports are displayed in the drop-down list.

(2) Select the port type. You can select **combo(optical preferred)**, **electrical**, or **optical** from the drop-down list.

   ○ **combo(optical preferred)**: The port type is automatically selected based on the access status of the combo port. The optical port is selected by default.

   ○ **Electrical**: Indicates the RJ45 port type.

   ○ **Optical**: Indicates the optical port type.

(3) Click **Save**. The configured combo port type is displayed in the lower list.

Figure 1-12 Setting the Port Media Type

Port Media Type

| Port 6 × | 1 | | combo(optical preferred) ▾ | 2 |

Save 3

Port	Port Media Type
Port 6	optical

4 Switch Settings

4.1 Managing MAC Address

4.1.1 Overview

The MAC address table records mappings of MAC addresses and ports to VLANs.

The device queries the MAC address table based on the destination MAC address in a received packet. If the device finds an entry that is consistent with the destination MAC address in the packet, the device forwards the packet through the port specified by the entry in unicast mode. If the device does not find such an entry, it forwards the packet through all ports other than the receiving port in broadcast mode.

MAC address entries are classified into the following types:

- Static MAC address entries: Static MAC address entries are manually configured by the users. Packets whose destination MAC address matches the one in such an entry are forwarded through the corresponding port.

- Dynamic MAC address entries: Dynamic MAC address entries are learned dynamically by the device. They are generated automatically by the device.

4.1.2 Viewing MAC Address Table

Choose **Configuration** > **MAC List**.

This page displays the MAC address of the device, including the static MAC address configured manually by the users and the dynamic MAC address learned automatically by the device.

Click **Clear Dynamic MAC** to clear the dynamic MAC address learned by the device. The device will re-learn the MAC address and generate a MAC address table.

Figure 1-13 MAC Address Table

MAC List

Up to **8k** MAC addresses can be learned by the device, with **2** MAC addresses already learned.
The **MAC List** displays up to **100** learned MAC addresses. Other learned MAC addresses are not shown but can be searched in **MAC Search**.

No.	MAC Address	VLAN ID	Type	Port
1	28:D0:F5:E2:DD:AF	1	Dynamic	1
2	70:42:D3:9A:3B:A0	1	Dynamic	1

Clear Dynamic MAC

> **ⓘ Note**
> ● If you disable VLAN, the device will forward packets according to only the destination MAC address. VLAN ID is not displayed in the MAC address table.
> ● Up to 100 MAC addresses are displayed.

4.1.3 Searching for MAC Address

Choose **Configuration** > **MAC Search**.

You can search for MAC address entries according to MAC address and VLAN ID.

> **⚠ Caution**
> If you disable VLAN, the VLAN ID will not be recorded in the MAC address table.MAC address entries can only be found through MAC address.

Enter MAC address and VLAN ID, and then click **Search**. The MAC address entries that meet the search criteria will be displayed in table right below the **Search** button. Moreover, you can enter partial characters of the MAC address for fuzzy search.

Figure 1-14 Searching for MAC Addresses (with VLAN Enabled)

MAC Search

MAC Address	VLAN ID
00:00:00:00:00:00	VLAN ID (1-4094)

Search

MAC Address	VLAN ID	Type	Port
00:D0:F8:94:11:23	1	Dynamic	Port 1

Figure 1-15 Searching for MAC Addresses (with VLAN Disabled)

MAC Search

MAC Address
00:00:00:00:00:00

Search

MAC Address	Type	Port
00:D0:F8:94:11:23	Dynamic	Port 1

4.1.4 Configuring Static MAC Address

Choose **Configuration** > **Static MAC**.

By configuring a static MAC address, you can manually bind the MAC address of a downlink network device with a port of the switch. After you add a static MAC address, when the device receives a packet destined to this address from VLAN, it forwards the packet to the specified port.

> **⚠ Caution**
> If you disable VLAN, the VLAN ID will not be recorded in the MAC address table. It is not allowed to configure a VLAN to which the static MAC address belongs.

Enter a MAC address, specify a VLAN ID and select the outbound port. Then click **Add** to add a static MAC address. The MAC address entries will be updated accordingly in the MAC address table.

Figure 1-16 Configuring Static MAC Address

Static MAC

Up to **16** MAC addresses can be configured.

MAC Address	VLAN ID	Port
00:00:00:00:00:00	VLAN ID (1-4094)	Port 1 ⌄

Add

	No.	MAC Address	VLAN ID	Port
☐	1	00:74:9C:71:74:FF	2	Port 4

Delete

If you want to delete a static MAC address, select the MAC address entry you want to delete in the table and click **Delete**.

4.2 VLAN Settings

4.2.1 Global VLAN Settings

Choose **Home** from the navigation page.

This page displays the status of VLAN settings. You can toggle on or off **VLAN Settings**.

● When VLAN is disabled, the device operates like an un-managed switch. The device forwards packets according to the destination MAC address, and the VLAN information of the forwarding packets remains unchanged during the forwarding process.

● When VLAN is enabled, the device operates like a managed switch. The device forwards packets according to the destination MAC address and VLAN ID. You can configure the port mode (access or trunk) based on whether a VLAN tag is carried in packets. Besides, all device ports will be initialized to access ports.

Figure 1-17 VLAN Settings

Device Info

Model:	RG-
MAC Address:	10:8
IP Address:	192.168.110.24
Cloud Status:	Connected Download App

Port Info   VLAN Settings 🔵 ⑦

Port	Status	Config Status		Actual Status	Flow Control(Config)	Flow Control(Actual)
		Speed	Duplex	Port Status		
Port 1	Enabled ⌄	Auto ⌄	Auto ⌄	1000M/Full Duplex	Disabled ⌄	Disabled
Port 2	Disabled ⌄	Auto ⌄	Auto ⌄	Disconnected	Disabled ⌄	Disabled
Port 3	Disabled ⌄	Auto ⌄	Auto ⌄	Disconnected	Disabled ⌄	Disabled
Port 4	Disabled ⌄	Auto ⌄	Auto ⌄	Disconnected	Disabled ⌄	Disabled

> **Note**
>
> Apart from choosing **Home** from the navigation page, you can also choose **VLAN** > **VLAN List** or **VLAN** > **VLAN Settings** to toggle on or off **VLAN Settings**. Configuration through three paths has the same effects and takes effect instantly for all the paths.

4.2.2 Static VLANs Settings

Choose **VLAN** > **VLAN List**.

Enter VLAN ID and click **Add** to create a static VLAN.

> **Note**
> - You can create static VLANs only when **VLAN Settings** is toggled on.
> - The VLAN ID ranges from 1 to 4094. VLAN 1 is the default VLAN.
> - A maximum of 16 VLANs can be created.
> - The Management VLAN (VLAN 1), Native VLAN, Permit VLAN, and Access VLAN cannot be deleted.

The VLAN table contains the existing VLANs. Select the VLANs and click **Delete**, and the corresponding VLANs will be deleted. VLAN 1 cannot be deleted.

Figure 1-18 Static VLANs Settings

4.2.3 Port VLAN Settings

> ⚠ **Caution**
>
> Improper configuration of VLANs on a port (especially uplink port) may cause the failure to log in to eWeb. Therefore, exercise caution when configuring VLANs.

Choose **VLAN** > **VLAN Settings**.

Configure the port mode and VLAN members of a port, and you will know the allowed VLANs of the port and whether the packets forwarded by the port carry tags.

> **ℹ Note**
> ● You are advised to create VLAN members (refer to 4.2.2   Static VLANs Settings) before configuring the
>   port based on VLANs. Click **VLAN List** to access the **VLAN List** page where you can add VLAN
>   members.
> ● You can configure VLANs on ports only when **VLAN Settings** is toggled on.
> ● On the **VLAN Settings** page, VLAN settings are the same as those on the **Home** page. The settings are
>   globally applied and the latest configuration takes effect.

(1) Select the target ports. Multiple ports can be selected.

(2) Configure the port type.

  ○   Access: If the port is an access port, select **Access** for the port.

  ○   Trunk: If the port is a trunk port, select a native VLAN for the port, and enter the VLAN ID range of permit
      VLANs.

(3) Click **Save**.

The configured port information is synchronized to the table on the **VLAN Settings** page.

Figure 1-19 Configuring Port VLANs

VLAN Settings

VLAN Settings 🔵 ⑦

You can go to VLAN List to add a VLAN ID.
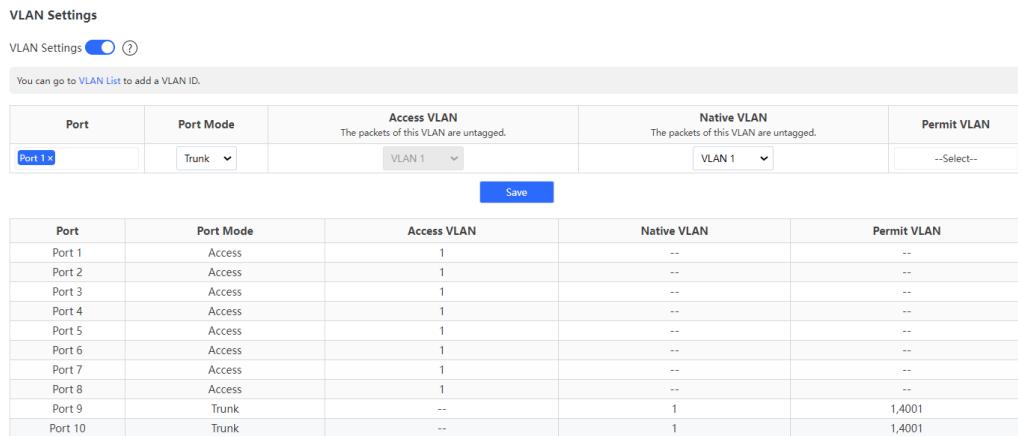
Port	Port Mode	Access VLAN The packets of this VLAN are untagged.	Native VLAN The packets of this VLAN are untagged.	Permit VLAN
Port 1 ×	Trunk ▾	VLAN 1 ▾	VLAN 1 ▾	--Select--

<div align="center">Save</div>

Port	Port Mode	Access VLAN	Native VLAN	Permit VLAN
Port 1	Access	1	--	--
Port 2	Access	1	--	--
Port 3	Access	1	--	--
Port 4	Access	1	--	--
Port 5	Access	1	--	--
Port 6	Access	1	--	--
Port 7	Access	1	--	--
Port 8	Access	1	--	--
Port 9	Trunk	--	1	1,4001
Port 10	Trunk	--	1	1,4001

Table 4-1   Port Modes

Port Mode	Description
Access	● One access port can belong to only one VLAN and allow frames from this VLAN only to pass through. This VLAN is called an access VLAN. ● The frames from the access port do not carry VLAN tag. When the access port receives an untagged frame from a peer device, the local device determines that the frame comes from the access VLAN and adds the access VLAN ID to the frame. ● Access port is connected to the endpoints.

Trunk	● One trunk port supports one Native VLAN and several Permit VLANs. Native VLAN frames forwarded by a trunk port do not carry tags while Permit VLAN frames forwarded by the trunk port carry tags. Trunk port is connected to switches.
	● You can set the Permit VLAN range to limit VLAN frames that can be forwarded.
	● Make sure the trunk ports at the two ends of the link are configured with the same Native VLAN.

5 Security

5.1 DHCP Snooping

5.1.1 Overview

The Dynamic Host Configuration Protocol (DHCP) snooping function allows a device to snoop DHCP packets exchanged between clients and a server to record and monitor the IP address usage and filter out invalid DHCP packets, including request packets from the clients and response packets from the server.

5.1.2 Configuration Steps

Choose **Configuration** > **DHCP Snooping**.

Toggle the switch to **On** to enable DHCP snooping, select the trusted ports, and then click **Save**.

When DHCP snooping is enabled, response packets are forwarded from only trusted ports of the DHCP servers.

> ⚠️ **Caution**
>
> The uplink port connected to the DHCP server is configured as the trusted port generally.

Figure 1-20 DHCP Snooping
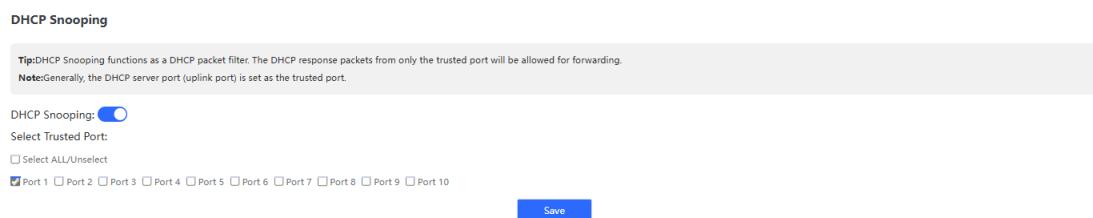
5.2 Storm Control

5.2.1 Overview

When a local area network (LAN) has excess broadcast, multicast, or unknown unicast data flows, the network speed will slow down and packet transmission will have an increased timeout probability. This situation is called a LAN storm, which may be caused by topology protocol execution errors or incorrect network configuration.

You can perform storm control separately for the broadcast, unknown multicast, and unknown unicast data flows. When the rate of broadcast, unknown multicast, or unknown unicast data flows received over a device port exceeds the specified range, the device transmits only packets in the specified range and discards packets beyond the range until the packet rate falls within the range. This prevents flooded data from entering the LAN and causing a storm.

5.2.2 Configuration Steps

Choose **QoS** > **Storm Control**.

Select the storm control type, port, status, and enter the rate limit, and then click **Save**.

The storm control type and corresponding rate are displayed in the table right below the **Save** button. When storm control is disabled, the rate of broadcast, unknown multicast, and unknown unicast data flows is not limited. The corresponding status is displayed **Disabled**. When storm control is enabled, the corresponding rate limits will be displayed.

Figure 1-21 Storm Control

Storm Control

Type	Port	Status	Rate(Mbit/sec)
Broadcast ⌄	--Select--	Disable ⌄	No Limit (1-1000M)

Save

Type	Broadcast(Mbit/sec)	Unknown Unicast(Mbit/sec)	Unknown Multicast(Mbit/sec)
Port 1	Disabled	Disabled	Disabled
Port 2	Disabled	Disabled	Disabled
Port 3	Disabled	Disabled	Disabled
Port 4	Disabled	Disabled	Disabled
Port 5	Disabled	Disabled	Disabled
Port 6	Disabled	Disabled	Disabled
Port 7	Disabled	Disabled	Disabled
Port 8	Disabled	Disabled	Disabled
Port 9	Disabled	Disabled	Disabled
Port 10	Disabled	Disabled	Disabled

5.3 Loop Guard

Choose **Monitoring** > **Loop Prevention**.

When loop guard feature is enabled, the port causing the loop will be shut down automatically. After the loop is removed, the port will be up automatically. Loop guard function is disabled by default.

Figure 1-22 Loop Prevention

Loop Prevention

The port causing the loop will be shut down. After the loop is removed, the port will be up automatically.

Enabled	
	⬤

6 PoE Settings

> ✅ **Specification**

This function is supported by switch models suffixed with -P, -LP, -HP, or -UP in the [Supported Hardware Models](), such as the RG-ES220GS-P.

Choose **PoE** from the navigation pane.

The device supplies power to PoE powered devices through ports. You can view the power supply status of the current system and ports and configure whether to enable the power supply feature on a specified port.

- **PoE Info**: The total power, used power, remaining power, and current work status of the PoE system are displayed.

- **PoE watchdog**: This feature is mainly applicable to Closed-Circuit Television (CCTV) scenarios for security purposes. After this feature is enabled, when a PoE port of the device suddenly stops receiving packets during the ping interval, the powered device (PD) will be restarted after the ping interval expires to restore normal operation.

> ℹ️ **Note**

If a non-PD, such as a PC, is connected to a PoE port of this device, the PoE watchdog will not initiate any action on the non-PD even if the trigger condition is met.

Table 6-1   PoE Watchdog Application Description

Packet Receiving Status of the PoE Port	Whether PoE Watchdog is Enabled	Action Taken on the PD
During the ping interval, a PoE port of the device suddenly stops receiving packets.	Yes	Restart the PD to restore normal operation and reset the ping interval.
	No	No action is initiated on the PD.
During the ping interval, a PoE port of the device stops receiving packets all the time.	Yes	No action is initiated on the PD.
	No	No action is initiated on the PD.
During the ping interval, a PoE port of the device starts to receive packets.	Yes	Reset the ping interval.
	No	No action is initiated on the PD.

- Port status

  ○ The voltage, current, output power, and current power status of the device ports are displayed.

  ○ You can toggle on or off PoE Status to enable or disable the PoE feature. When PoE is disabled, the port will not supply power to PDs.

○ When the switch needs to supply power to a PD that does not comply with IEEE 802.3af/at, you can toggle on Non-Standard.

Figure 1-23 PoE Information and Configuration

PoE Info

Total Power	Used	Remaining	Work Status
130w	0w	130w	Normal

PoE Settings

PoE watchdog

Click Save for the new interval to take effect.

| Ping Interval | 300 | Range:90-1800 |

Save

PoE Status When off, PoE will not work on this port	Port	Power(W)	Current(mA)	Voltage(V)	Non-Standard PoE Non-standard PoE: When enabled, the device can supply power to a PD that may not conform to IEEE802.3af/at standards.	Power Status	Action
	Port 1	0	0	0		Off	--
	Port 2	0	0	0		Off	--
	Port 3	0	0	0		Off	--
	Port 4	0	0	0		Off	--
	Port 5	0	0	0		Off	--
	Port 6	0	0	0		Off	--
	Port 7	0	0	0		Off	--
	Port 8	0	0	0		Off	--
	Port 9	0	0	0		Off	--

7 ERPS

✅ **Specification**

This feature is only supported on the RG-NIS2100 series.

7.1 Overview

Ethernet Ring Protection Switching (ERPS), also known as G.8032, is a ring protection protocol developed by the International Telecommunication Union (ITU). It is a data link layer protocol specially designed for Ethernet rings. ERPS prevents broadcast storms caused by data loops when an Ethernet ring network is intact, and can rapidly perform link switching and recover the communication between nodes when a link is disconnected in the Ethernet ring, so as to implement data link redundancy.

Currently, the Spanning Tree Protocol (STP) is another solution to the Layer 2 network loop problem. STP is at mature application stage but requires a relatively long (within seconds) convergence time. Compared with STP, ERPS provides faster convergence, with the Layer 2 convergence time less than 50 ms.

7.2 Control VLAN and Data VLAN

ERPS supports two types of virtual local area networks (VLANs): control VLANs and data VLANs.

● Control VLAN: Also known as the Ring Auto Protection Switching VLAN (R-APS VLAN) for transmitting ERPS protocol packets. On a device, the ports connecting to an ERPS ring belong to a control VLAN, and only such ports can be added to a control VLAN.

● Data VLAN: A data VLAN is used to transmit data packets. Both ERPS ports and non-ERPS ports can be assigned to a data VLAN. A data VLAN is also known as a protected VLAN.

7.3 Basic Model of an Ethernet Ring

A group of interconnected devices in the same control VLAN (R-APS VLAN) constitute an Ethernet ring (ERPS ring), in which each device is called a node. ERPS rings can be classified into major rings and subrings based on whether a ring is closed.

7.3.1 Major Ring and Subring

● Major ring and major ring link: A major ring is a topology of a closed network connected in a ring, such as the blue rings shown in Figure 1-24. In an ERPS ring, links that belong to and are controlled by a major ring are called major ring links.

● Subring and subring link: A subring is a topology of a non-closed network attached to a major ring, such as the green ring shown in Figure 1-24. In an ERPS ring, links that belong to and are controlled by a subring are called subring links.

● R-APS virtual channel of a subring: As shown in Figure 1-24, all the links on the major ring can be regarded as R-APS virtual channels of subrings, which are used to forward subring protocol packets. They belong to the major ring instead of the subring. The major ring must associate with the control VLAN of the subring and allow packets from this VLAN to pass through.

Figure 1-24 Basic Topologies of Ethernet Rings
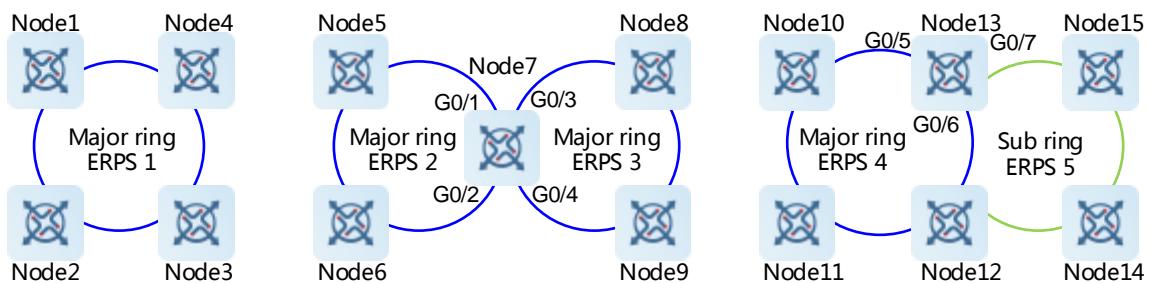
7.3.2 Basic Topologies

Major rings, subrings, and nodes can form basic topologies with different characteristics, depending on the connection modes, as shown in Figure 1-24.

● Single ring: Major ring ERPS 1 (node 1-2-3-4) constitutes a single-ring topology.

● Tangent rings: A topology in which two ERPS rings share one device is called tangent rings. Major ring ERPS 2 (node 5-6-7) and major ring ERPS 3 (node 7-8-9) constitute a tangent-ring topology, and are tangent to each other on one node, namely, node 7.

● Intersecting rings: A topology in which two ERPS rings share two devices is called intersecting rings. Major ring ERPS 4 (node 13-10-11-12) and subring ERPS 5 (node 13-15-14-12) constitute an intersecting-ring topology, and intersect on two directly connected intersecting nodes, namely, node 13 and node 12.

In practice, a network is a combination of multiple basic topologies, with multiple major rings and multiple subrings.

7.3.3 Node

According to the different topological relationships between nodes and Ethernet rings, nodes are classified into single-ring nodes, tangent nodes, and intersecting nodes by role.

- Single-ring node: In an Ethernet ring, the nodes that belong to only one Ethernet ring (either major ring or subring) are called single-ring nodes. Two interfaces need to be provided on a single-ring node so that the node can be added to one ERPS ring. As shown in Figure 1-24, nodes 1-4 in the single-ring topology, nodes 5, 6, 8, and 9 in the tangent-ring topology, and nodes 10, 11, 14, and 15 in the intersecting-ring topology are all single-ring nodes.

- Tangent node: A device shared in tangent rings is called a tangent node. Four interfaces need to be provided on each tangent node, with two added to a major ring and the other two added to another major ring. As shown in Figure 1-24, node 7 in the tangent-ring topology is a tangent node.

- Intersecting node: The nodes in intersecting rings that belong to multiple rings are called intersecting nodes. Three interfaces need to be provided on a tangent node, with two added to a major ring and the other added to a subring. As shown in Figure 1-24, nodes 12 and 13 in the intersecting-ring topology are intersecting nodes. ERPS rings can intersect with other multiple ERPS rings and share links to implement data link redundancy. Services can be quickly switched from a failed link in one ERPS ring to a normal link.

7.3.4 Ring Member Port

An Ethernet ring has two ring member ports on each node that it passes through: the **west** and **east** ports. As shown in Figure 1-24:

- If an ERPS ring is a closed major ring, each node that the ring passes through has two interfaces used as the **west** and **east** ports for adding the node to the ERPS ring. For example, on node 7, GigabitEthernet 0/1 and 0/2 are added to the major ring ERPS 2, and GigabitEthernet 0/3 and 0/4 are added to the major ring ERPS 3. On node 13, GigabitEthernet 0/5 and 0/6 are added to the major ring ERPS 4.

- If an ERPS ring is a non-closed subring (in an intersecting-ring topology), a non-intersecting node has two interfaces used as the **west** and **east** ports for adding the node to the ERPS subring, such as node 15. On an intersecting node, only one physical port is added to the ERPS subring as a ring member port, and the other ring member port is a virtual channel (indicated by **virtual-channel**). For example, on node 13, only GigabitEthernet 0/7 is added to the subring ERPS 5.

- There are two states for a port running the ERPS protocol: forwarding and block. Their functions are listed in Table 7-1.

Table 7-1   ERPS Protocol Port States

Port State	Receiving Protocol Packets	Sending Protocol Packets	Address Learning	Receiving Data Packets	Sending Data Packets
Block	Yes	Yes	No	No	No
Forwarding	Yes	Yes	Yes	Yes	Yes

7.4 RPL and Nodes

An Ethernet ring can be in either of the following two states regardless of whether it is a major ring or subring:

- **Idle** state: The physical links in the entire ring network are connected.

- **Protection** state: A physical link in the ring network is disconnected.

Ring protection link (RPL): When the physical links in a ring network are connected, the ERPS ring is in the idle state, and the links in the logic blocking state are RPLs. Each Ethernet ring has only one RPL. For example, the links indicated by the orange lines shown in Figure 1-25 are RPLs, the link between node 3 and node 4 is the RPL of the Ethernet ring ERPS 1 (node 1-2-3-4), and the link between node 5 and node 6 is the RPL of the Ethernet ring ERPS 2 (node 3-5-6).

A node that is adjacent to an RPL and is used to block the RPL to prevent loops when the Ethernet ring is free of faults is called an RPL **owner** node. As shown in Figure 1-25, node 4 is the RPL owner node of the Ethernet ring ERPS 1 (node 1-2-3-4) and node 6 is the RPL owner node of the ERPS 2 (node 3-5-6).

Any nodes other than the RPL owner node in an Ethernet ring are non-RPL owner nodes. As shown in Figure 1-25, nodes except node 4 and node 6 are non-RPL owner nodes of the rings.

Blocked ports on RPLs are RPL ports, and RPL ports do not forward data packets to prevent loops. RPL ports are on RPL owner nodes, and the RPL owner nodes block the RPL ports. Each Ethernet ring has only one RPL owner node.

Figure 1-25 Typical Topology of Tangent Rings
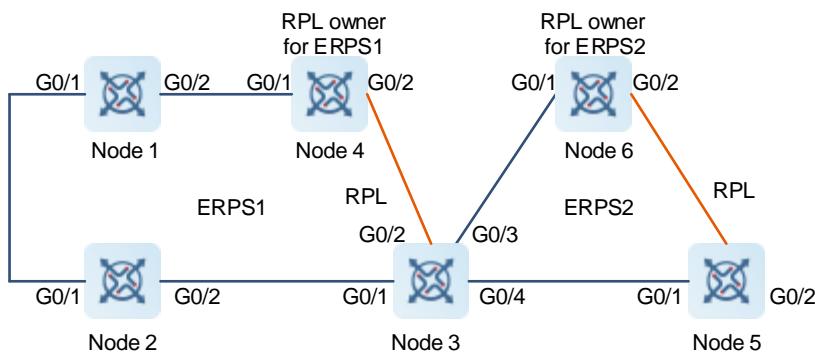
As shown in Figure 1-25, the link between node 3 and node 4 is the RPL of the Ethernet ring ERPS 1. As the RPL owner node of ERPS 1, node 4 blocks the RPL port. The link between node 5 and node 6 is the RPL of the Ethernet ring ERPS 2. As the RPL owner node of ERPS 2, node 6 blocks the RPL port. ERPS 1 (node 1-2-3-4) and ERPS 2 (node 3-5-6) share node 3, forming a tangent-ring topology. Node 3 is the tangent node.

Figure 1-26 Typical Topology of Intersecting Rings
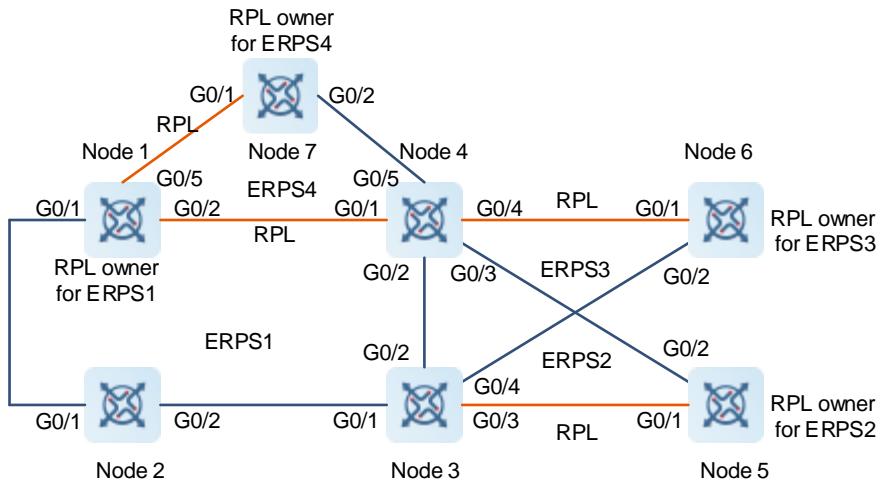
As shown in [Figure 1-26](#), ERPS 1 (node 1-2-3-4) is a major ring, and ERPS 2 (node 3-4-5) is a subring. ERPS 1 and ERPS 2 share node 3 and node 4, forming an intersecting-ring topology. The links between node 4 and node 5, and between node 3 and node 5 are links of the subring ERPS 2 and are controlled by ERPS 2. The link between node 3 and node 4 belongs to the major ring not the subring, and is not controlled by the subring. However, the protocol packets of the subring are transmitted through the direct link between node 3 and node 4. This direct link is the R-APS virtual channel of the subring ERPS 2. Node 2 only belongs to the major ring ERPS 1, and is called a single-ring node. Node 6 only belongs to the subring ERPS 3, and is also called a single-ring node. Node 3 and node 4 are tangent nodes.

7.5 ERPS Packet

ERPS packets (also called R-APS packets) are classified into Signal Fail (SF) packets, No Request (NR) packets, No Requests-RPL Blocked (NR-RB) packets, and Flush packets.

- SF packet: When the link of a node is down, the node sends an SF packet to notify other nodes of its link failure.

- NR packet: When the failed link is restored, the node sends an NR packet to notify the RPL owner node of its link recovery.

- NR-RB packet: When all nodes in an ERPS ring function properly, the RPL owner node sends NR-RB packets periodically.

- Flush packet: In intersecting rings, when a topology change occurs in a subring, the intersecting nodes send flush packets to notify other devices in the Ethernet ring to which the subring is connected.

7.6 ERPS Timer

ERPS supports three timers: Holdoff timer, Guard timer, and **Wait-To-Restore** (WTR) timer.

- **Holdoff** timer: The timer is used to minimize frequent ERPS topology switching due to intermittent link failures. After you configure the Holdoff timer, ERPS performs topology switching only if the link failure still persists after the timer times out.

- **Guard** timer: The timer is used to prevent a device from receiving expired R-APS PMDU packets. When a

device detects that a link failure is cleared, it sends link recovery packets and starts the **Guard** timer. Before the timer expires, all packets except Flush packets indicating a subring topology change will be discarded.

- **WTR** timer: The timer is effective only for RPL owner nodes. It is used to avoid ring status misjudgment by the RPL owner node. When an RPL owner node detects that a failure is cleared, it will not perform topology switching immediately but only if the Ethernet ring is recovered after the WTR timer times out. If a ring failure is detected again before the timer expires, the RPL owner node cancels the timer and does not perform topology switching.

7.7 Ring Protection

The ring protection function prevents broadcast storms caused by data loops and can rapidly recover the communication between nodes when a link is disconnected in the Ethernet ring.

- Normal state
  - All nodes in the physical topology are connected in ring mode.
  - ERPS blocks the RPL to prevent loops.
  - ERPS detects failures on each link between adjacent nodes.
- Link fault
  - A node adjacent to a failed node detects the fault.
  - The node adjacent to the failed link blocks the failed link and sends SF packets to notify other nodes in the same ring.
  - An SF packet triggers the RPL owner node to enable the RPL port, and also triggers all nodes to update their MAC address entries and ARP/ND entries and enter the protection state.
- Link recovery
  - When a failed link is restored, an adjacent node still blocks the link and sends NR packets indicating that no local fault exists.
  - When the RPL owner node receives the first NR packet, it starts the WTR timer.
  - When the WTR timer times out, the RPL owner node blocks the RPL and sends an NR-RB packet.
  - After receiving this NR-RB packet, other nodes update their MAC address entries and ARP/ND entries, and the node that sends the NR packet stops sending the NR packet and enables the blocked ports.
  - The ring network is restored to the normal state.

7.8 Protocols and Standards

ITU-T G.8032/Y.1344: Ethernet ring protection switching

7.9 Configuring ERPS

> ✅ **Specification**
>
> A maximum of one ERPS ring can be configured in this ERPS version.

7.9.1 Adding an ERPS Ring

Choose **ERPS** from the navigation pane.

As shown in Figure 1-27, after configuring the ERPS ring parameters, click **Add** to add the ERPS ring.

Once the ERPS ring is successfully added, it will appear in the ERPS instances below.

Table 7-2   Parameter Description

Parameter	Description	Default Value
ID	Specifies the ID of an ERPS instance.	No default value
Control VLAN	It is used to forward ERPS protocol packets.	No default value
West Port/Role	Specifies the west port in the ERPS ring and its role. The values of a port role include: ● **NORMAL**: Indicates a normal node. ● **RPL OWNER**: Indicates an RPL owner node. ● **RPL NEIGHBOR**: Indicates an RPL neighbor node.	No default value
East Port/Role	Specifies the east port in the ERPS ring and its role. The values of a port role include: ● **NORMAL**: Indicates a normal node. ● **RPL OWNER**: Indicates an RPL owner node. ● **RPL NEIGHBOR**: Indicates an RPL neighbor node.	No default value
WTR Timer	Specifies the interval of the WTR timer.	5 min
Guard Timer	Specifies the interval of the Guard timer.	500 ms
Hold-off Timer	Specifies the interval of the Hold-off timer.	0 ms, indicating a topology switch is performed immediately after a link failure is detected.
MEL Level	Indicates the maintenance entity group (MEG) level. The MEL level of devices in the same ERPS ring must be consistent.	7
Revertive Mode	When it is toggled on, once the condition causing a link failure has been cleared, traffic is blocked on the RPL.	Enabled.

Figure 1-27 Adding an ERPS Ring

Ring Configuration

After changing the port role, unplug and plug back in the cable connected to the port for the changes to take effect.
Only 1 ERPS ring can be configured.

ID		(1-255)
Control VLAN	VLAN 1 ▾	
West Port/Role	Port 9 ▾ NORMAL ▾	
East Port/Role	Port 9 ▾ NORMAL ▾	
WTR Timer(min)	5	(1-12)
Guard Timer(ms)	500	(10-2000)
Hold(ms)	0	(0-10000)
MEL Level	7(High) ▾	
Revertive Mode	Enabled ▾	

Add

ERPS Instance

Refresh List

Invalid configuration. The ERPS ring port does not allow tagged traffic from the control VLAN to pass through.

☐	ID	Status	Control VLAN	West Port			East Port			WTR Timer(min)	Guard Timer(ms)	Hold(ms)	MEL Level	Revertive Mode	Action
				Port	Role	Status	Port	Role	Status						
☐	1	PROTECTION	4001	9	NORMAL ▾	BLOCK	10	NORMAL ▾	BLOCK	5	500	0	7(High) ▾	Enabled ▾	Save

Delete

> **ⓘ Note**
> - The west port and the east port must be trunk ports. For details on how to configure trunk ports, see 4.2.3 Port VLAN Settings.
> - You can select a control VLAN when it is a permit VLAN rather than a native VLAN, and the west or east port is a trunk port.
> - ERPS can be enabled or disabled through the DIP switch on the device's front panel or through the web interface. The latest configuration takes effect.
> - If ERPS is enabled through the DIP switch on the device's front panel but not the web interface, the device will automatically create an ERPS ring with the following default settings: Ring ID 1, Control VLAN 4001, west port 9 in NORMAL state, east port 10 in NORMAL state, WTR timer set to 5 minutes, Guard timer set to 500 milliseconds, Hold timer set to 0 milliseconds, MEL level 7, and revertive mode enabled.
> - When ERPS is enabled on the web interface, it is disabled through the DIP switch on the device's front panel, and then it is enabled, the configuration on the web interface takes effect.

7.9.2 Checking, Modifying, or Deleting an ERPS Ring

Choose **ERPS**.
- Check an ERPS ring. Once a ring is created, you can check its status and configuration details in the ERPS instances.

Figure 1-28 ERPS Ring Status

Status	Description
IDLE	When the ring network is operating stably, one port of the device on the ring network will be in blocked state.
PENDING	The protocol negotiation is in progress within the ring network which has already been formed, and after the negotiation is completed, the ring network will enter the **IDLE** state.
PROTECTION	A device in the ring network is faulty, and the ring network cannot be formed.
Forced switch	The configuration in **Link Switch** is being delivered to the devices on the ring network.

- Modify an ERPS ring. After an ERPS ring is created, you can modify parameters such as the roles of the

west and east ports, **WTR Timer**, and **Guard Timer**. When the modifications are complete, click **Save**.

● Delete an ERPS ring. To delete a created ERPS ring, select it and click **Delete** to remove it.

Figure 1-29 Checking, Modifying, or Deleting an ERPS Ring

7.9.3 Link Switchover

Choose **ERPS**.

When a ring network is operating normally, one of the west or east ports will be used for data transmission, while the other will be in the blocked state. Through link switchover, you can specify which port on the current device is used for data transmission and which port is in blocked state.

Set **ID**, **Port**, and **Link State** based on service requirements. Then click **OK** to complete the link switchover for the ERPS ring.

Figure 1-30 Link Switchover

Figure 1-31 Parameter Description

Parameter	Description	Default Value
ID	Specifies the ID of an ERPS instance.	No default value
Port	Specifies the port in the ERPS ring. The values include **West Port** and **East Port**.	No default value
Link State	Specifies the link state of the selected port. ● **Clear**: Clears the forced switch state of the port, and allows the protocol to elect the port to be blocked. ● **Block**: Indicates that the port is blocked by a forced switch operation.	No default value

7.10 Typical ERPS Configuration Examples

✅ **Specification**

ERPS ring network-wide configuration is supported only on ReyeeOS version 2.280 or later. Thus, the primary device on the network where the ERPS ring will be established must run ReyeeOS 2.280 or later.

Requirements: There are three devices on the user's network that need to form an ERPS ring. The specific topology is shown below.

Figure 1-32 Network Diagram

ℹ️ **Note**

● To prevent loops, configure ERPS before performing cable connections.
● For an ERPS ring, only one interface can be the RPL Owner, and its peer interface must be the RPL Neighbor.

---

(1) Log in to the web interface of the primary device.

(2) Choose **Network-Wide** > **Workspace** > **Wired** > **ERPS Ring** to access the **ERPS Ring** configuration page.

(3) Click **+Add** on the page to add an ERPS ring.

Figure 1-33 ERPS Ring List

---
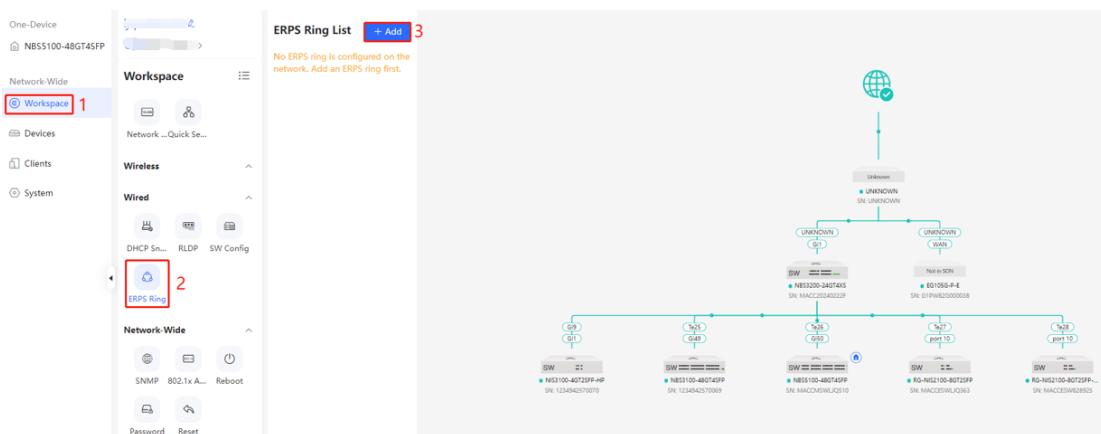
(4) Set the ERPS ring parameters (only **ID** and **Control VLAN** are mandatory, and should be configured according to the user's network setup. Other parameters can remain at their default values). Then, click **Next**.

Figure 1-34 Ring Parameter Settings
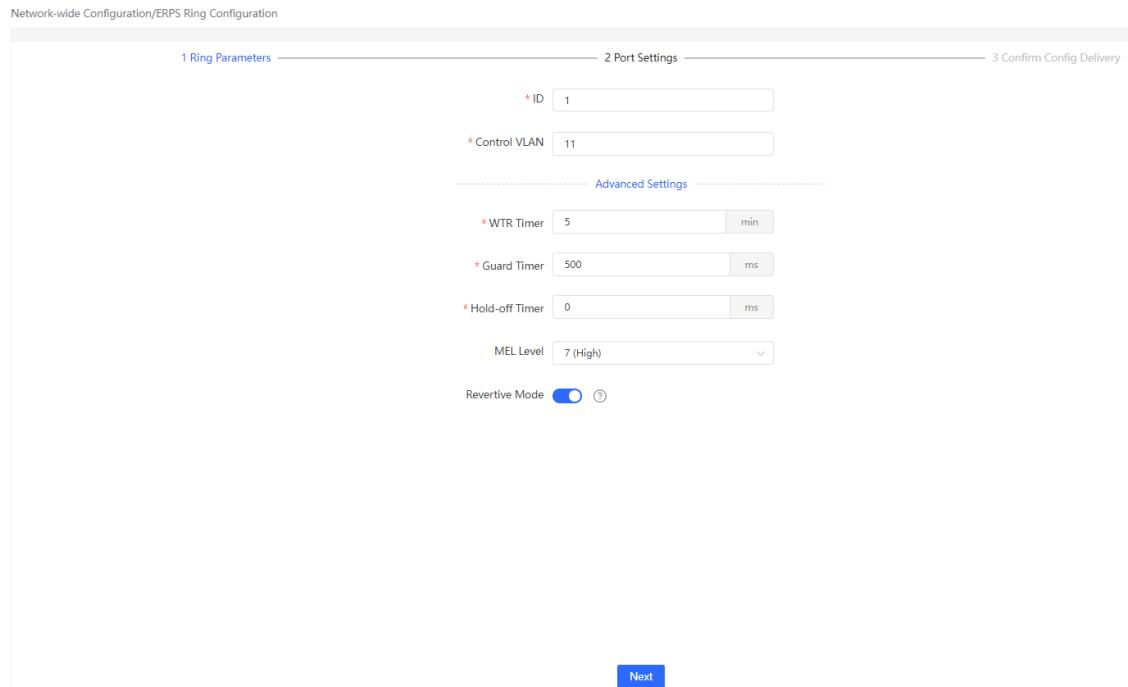
(5) Select a device for the ERPS ring, set **Gi9** to **RPL OWNER**, and **Gi10** to **NORMAL**. Click **Next**.

Figure 1-35 Port Settings
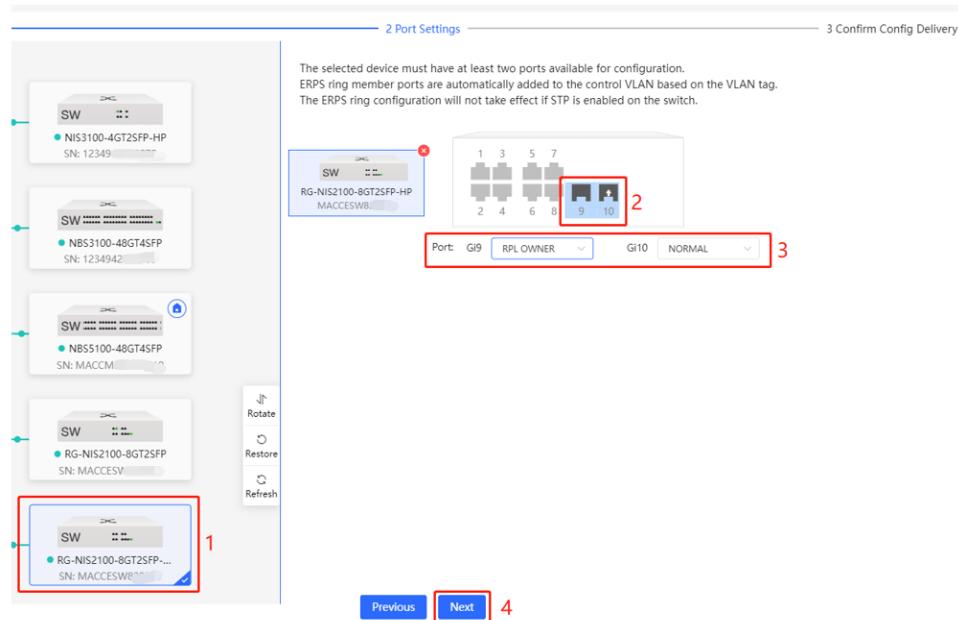
(6) Click **Save**.

Figure 1-36 Configuration Delivery Confirmation
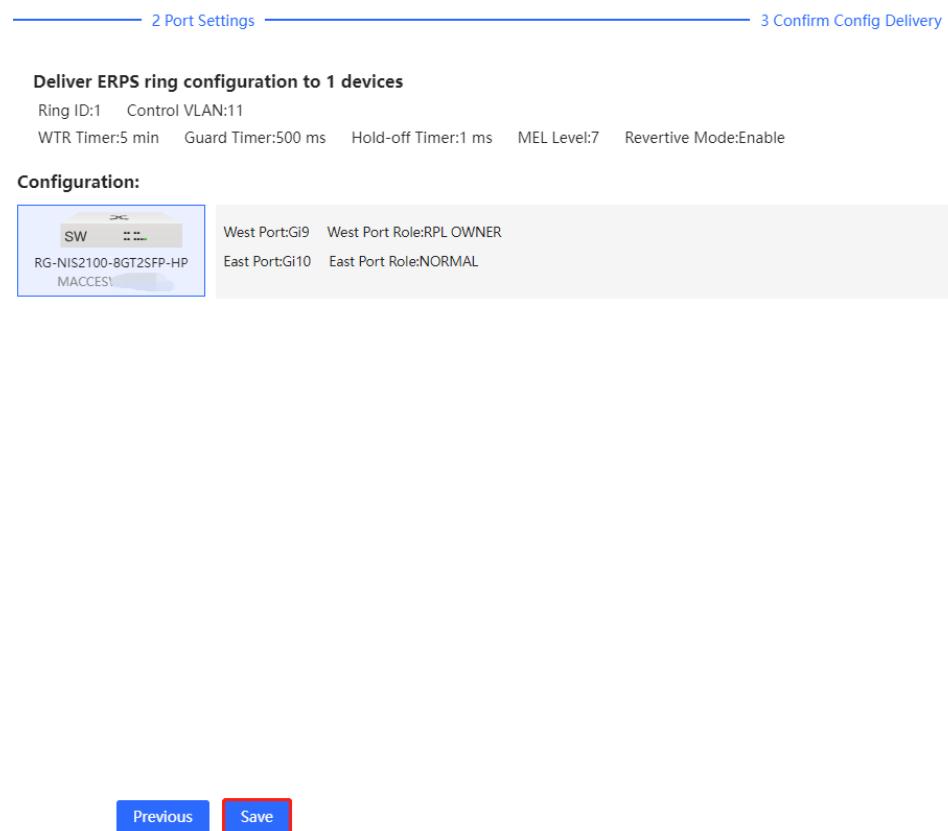
(7) Choose **Network-Wide** > **Workspace** > **Wired** > **ERPS Ring**. On the page that opens, click **Edit**.

Figure 1-37 Editing the Created Ring
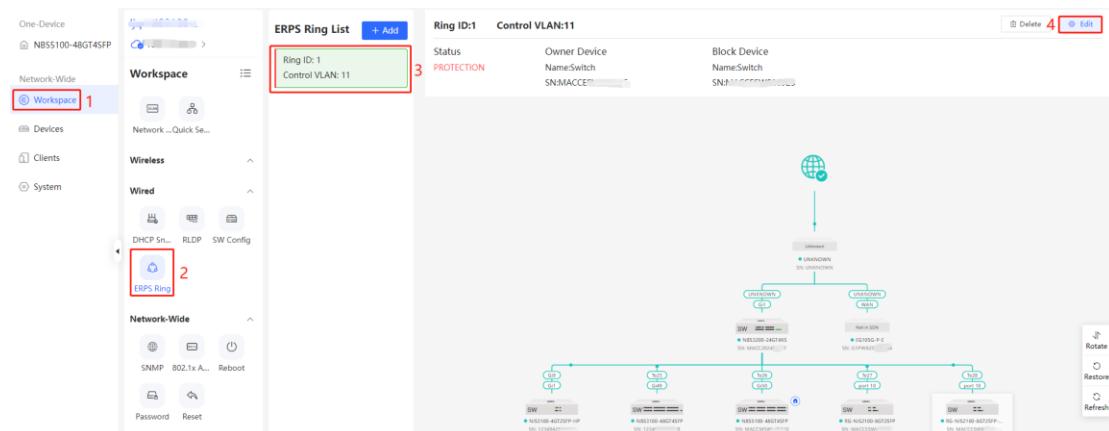
(8) Click **Next** to access the **ERPS Ring Configuration** page.

Figure 1-38 Confirming the Ring Information
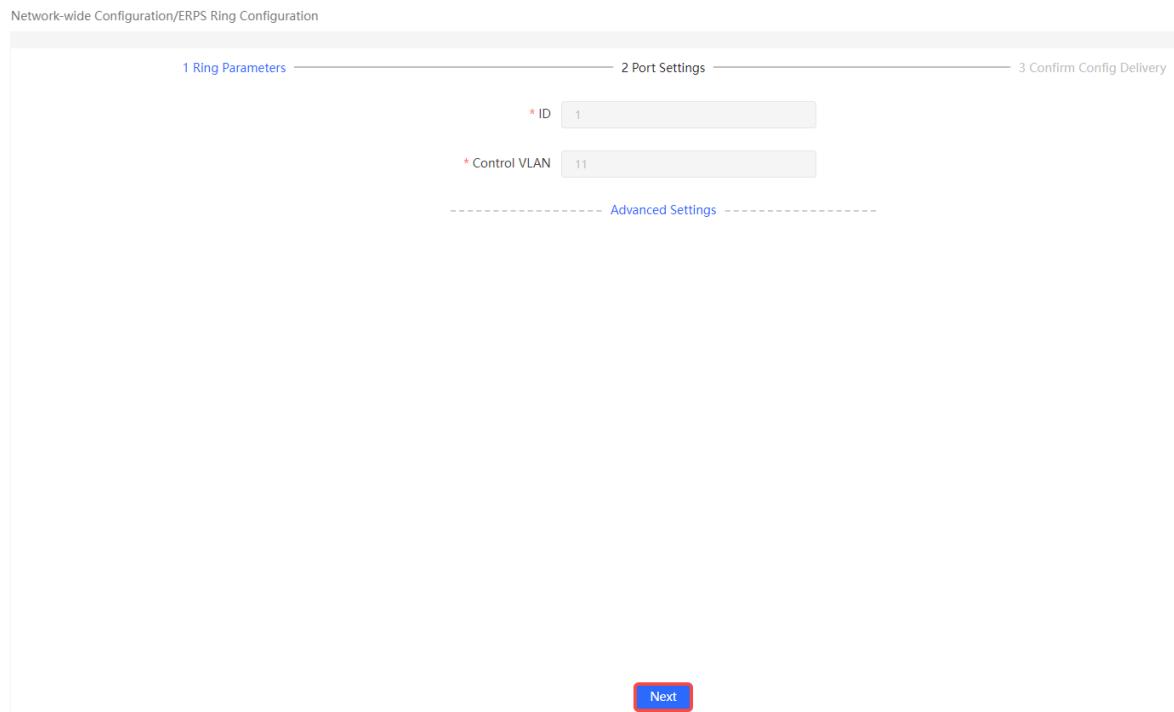
(9) Add the remaining devices on the **ERPS Ring Configuration** page. Select the optical ports on the devices and configure the interfaces connected to the RPL OWNER as RPL NEIGHBOR, following the example of Gi9 in the figure below. Configure other interfaces as NORMAL. After completing the configuration, click **Next**.

Figure 1-39 Adding Remaining Ring Devices
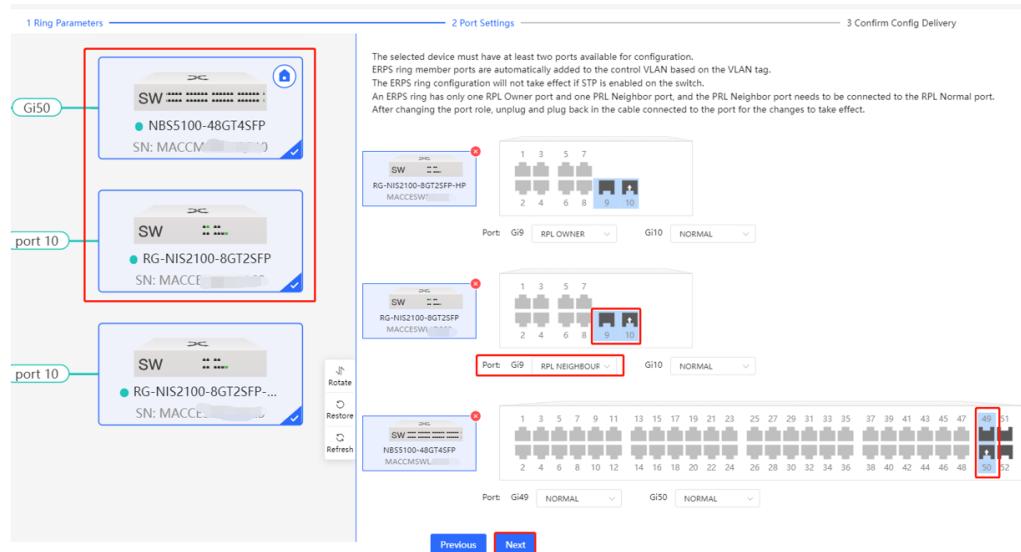
(10)   Click **Save** to apply all configurations.

Figure 1-40 Delivering the Configuration
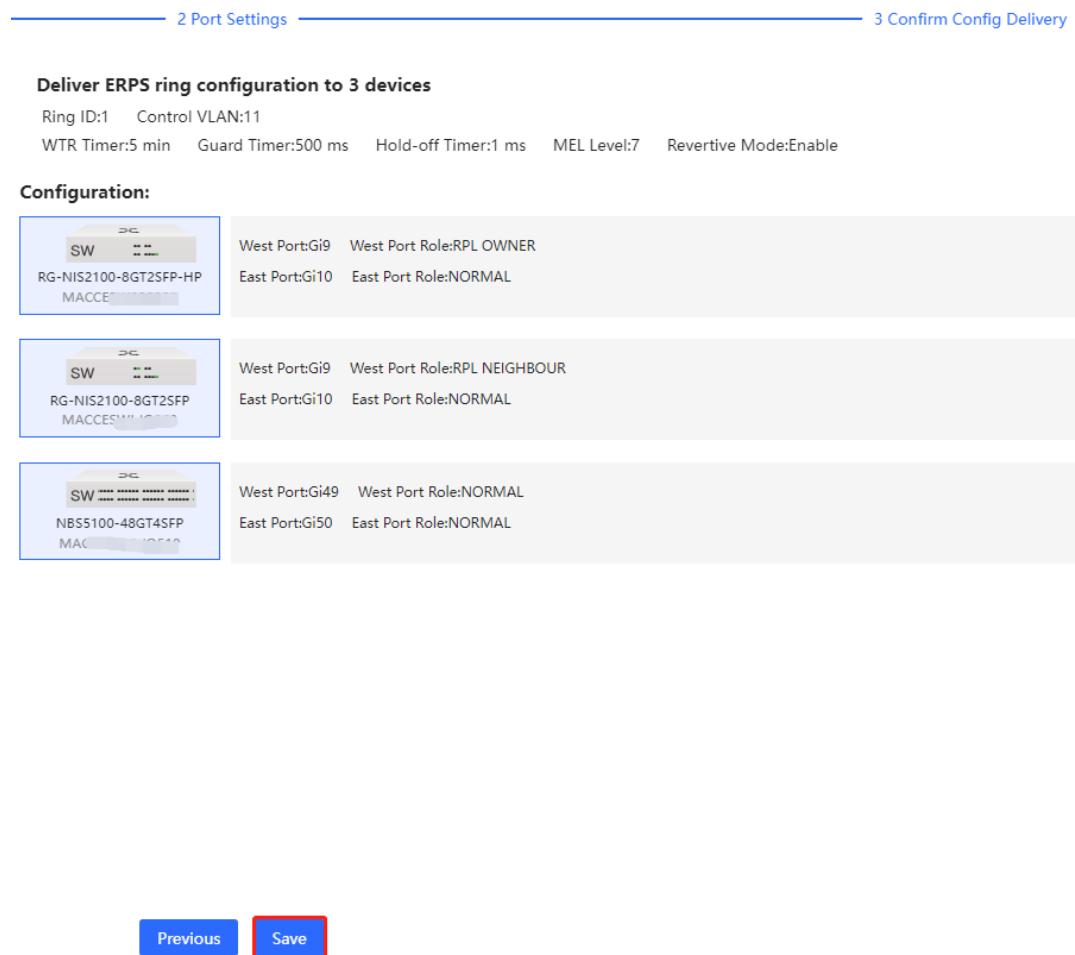
After all cables are connected according to the topology, the devices will automatically form an ERPS ring.

Figure 1-41 Ring Connection
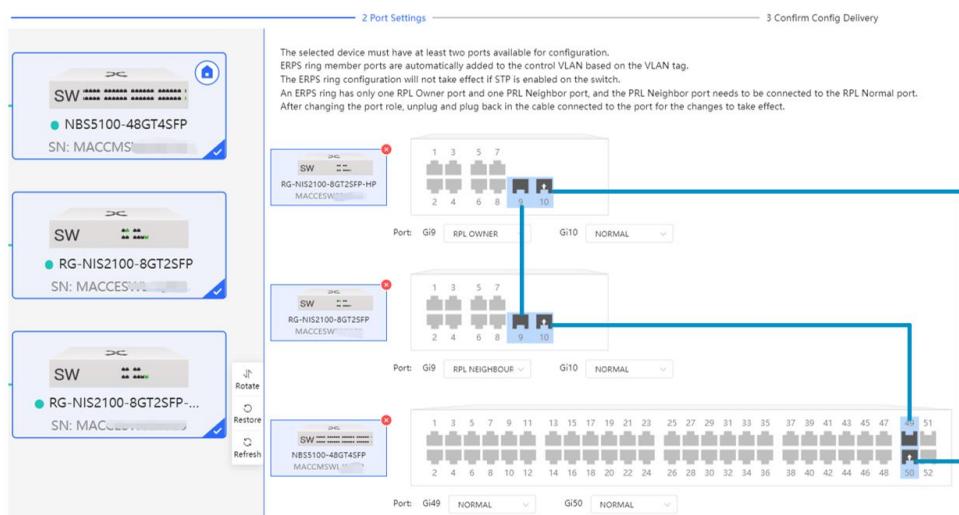
8 Toolkit

8.1 Cloud Settings

Choose **Toolkit** > **Cloud Settings**.

On Ruijie Cloud, you can check the status of your device, including its cloud connectivity status, reason for failure to connect, and the domain name and IP address of the cloud server.

- To change the domain name of the device, enter the new domain name in the **Domain** field, and then click **Save**.

- To restore the default domain name, click **Restore Default**, and then click **OK** on the pop-up window.

Figure 1-42 Cloud Settings

Cloud Settings	
Cloud Status	Connected
Domain	iotsvra.rj.link:5683
IP	47.105.78.202

Save   Restore Default

Table 8-1   Cloud Settings Parameters

Parameter	Description
Cloud Status	Indicates the connectivity status of the device on the cloud, including **Connected**, **Unconnected** and **Connectable**.
Reason	Indicates the reason for connection failure. Reasons for different cloud statuses: ● **Connected**: No reason is displayed. ● **Unconnected**: 　○ No Internet connection or DNS resolution failure. 　○ This device failed to connect to Ruijie Cloud. ● **Connectable**: This device is not registered to Ruijie Cloud.
Domain	Domain name of the cloud server ⚠️ **Caution** ● The coap:// prefix is not required in the domain name field as it is added by default. ● After the domain name is changed, the page is refreshed after 5 seconds by default.
IP	IP address of the cloud server resolved based on the cloud address.

8.2   System Logs

Choose **Toolkit** > **Logs**.

System logs record device operations, operation time, and operation modules. System logs are used by administrators to monitor the running status of the device, analyze network status, and locate faults.

Figure 1-43 System Logs

Logs

Number	Time(UTC)	Type	Module	Details
1	1970/01/01 00:00:07	info	port	Port1 link up.

| 1 |

Clear

⚠ Caution

If the issue persists despite following the troubleshooting methods provided in this section, you may require remote support from a technician who will enable developer mode to resolve the issue. We will ensure your data is protected during this process.

9 System Settings

9.1   Managing Device Information

9.1.1   Viewing Device Information

Choose **Home** from the navigation page.

The **Device Info** pane on the **Home** page displays basic information about the device, including hostname, device model, serial number, firmware version, IP address, MAC address, cloud status, and uptime. You can view more information about the device by choosing **Monitoring** > **Device Info**.

Figure 1-44 Device Info

Device Info

Model:	RG-ES210GC-LP	Firmware Version:	ESW_1.0(1)B1P48,Release(12151700)
MAC Address:	10:82:3D:F▇▇▇	SN:	ZARA27N▇▇▇
IP Address:	192.168.110.24	Uptime:	36d 16h 14min 44s
Cloud Status:	Connected Download App	Hostname:	▇ Edit

Figure 1-45 Viewing Device Information

Device Info

Hostname	
Model	RG-ES210GC-LP
MAC Address	10:82:
IP Address	192.168.110.24
Submask	255.255.255.0
Gateway	192.168.110.1
DNS	192.168.110.1
SN	ZARA
Firmware Version	ESW_1.0(1)B1P48,Release(12151700)
Firmware Date	Jun 05 2024
Hardware Version	1.02

✅ **Specification**

Only the **Home** page of the RG-NIS2100 series displays the DIP switch effective state and the power supply status.

- **DIP Switch Effective State**: You can view the configuration status of ERPS, port isolation, forced 10 Mbps, and power alarm (If the configured function conflicts with the DIP switch settings, the ⓘ icon will appear next to the function. Hovering over the icon will display a prompt showing the current effective state of the DIP switch.).

- **Power Supply Status**: You can view the status and the voltage of the power supply.

Figure 1-46 Decoding/Power Status

DIP Switch Effective State

ERPS:	Disabled	Port Isolation:	Enabled ⓘ
10 Mbps (Ports 5-8):	Disabled	Alarm:	Disabled

Power Supply Status(Normal voltage range: 46.0V~57.0V)

Power1:	Normal	Voltage:	53.4V
Power2:	Normal	Voltage:	52.9V

9.1.2 Editing the Hostname

Choose **Home** from the navigation page.

Enter the hostname and click **Edit** to edit the hostname in order to distinguish different devices.

Figure 1-47 Editing the Hostname

Device Info

Model:	RG-NIS2100-8GT2SFP-HP	Firmware Version:	ESW_1.0(1)B
MAC Address:	00:D0:F	SN:	MAC
IP Address:	192.168.110.61	Uptime:	6d 02h 17min 27s
Cloud Status:	Connected Download App	Hostname:	ruijie Edit

9.1.3 Cloud Management

Choose **Home** from the navigation page.

Cloud status displays whether the device is connected to the cloud. After the device is bound to a cloud management account, the Cloud Status will display **Connected**, and you can manage the device remotely

through Ruijie Cloud webpage or APP. Click **Connected** to access the homepage of Ruijie Cloud (https://cloud-as.ruijienetworks.com). Click **Download APP** to download Ruijie Cloud APP.

Figure 1-48 Cloud Management

9.2 Login Password Settings

- Set the login password on the login page.

  When logging in to the device for the first time or after resetting it to factory settings, you need to set a new login password on the login page. Click **Save** to apply changes and log in to the device with your new password.

Figure 1-49 Setting the Login Password on the Login Page
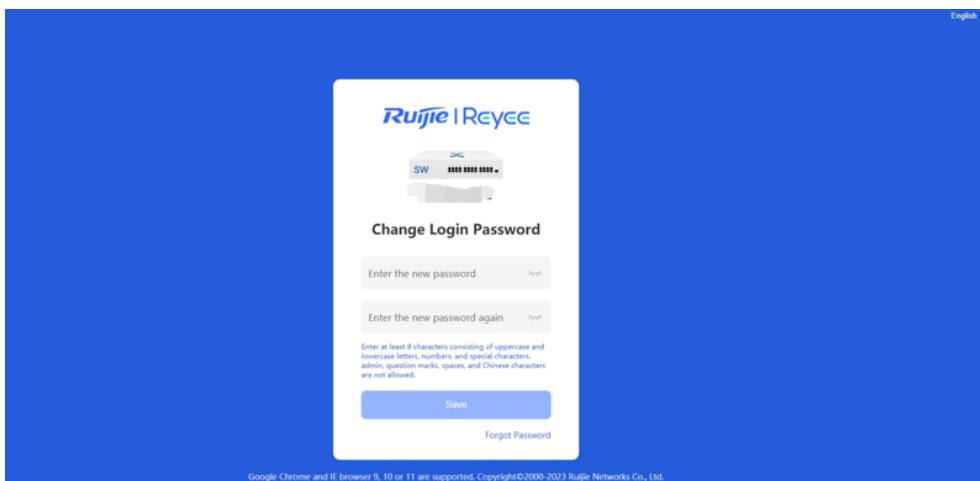
- Change the login password after login.

  After logging in to the device, choose **System** > **Account Settings**. On the **Account Settings** page, set a new password and click **Save**. The system will automatically redirect you to the login page, where you can log in using the new password.

Figure 1-50 Setting the Login Password

⚠ **Caution**

A new management password cannot be set on the **Account Settings** page in the following scenarios:

● This device, when in network-management mode, cannot be configured with an individual management password. You can log in to the primary device to modify the network-wide management password.

● If this device is managed by Ruijie Cloud or Ruijie Reyee App, you can modify the network-wide management password through Ruijie Cloud or Ruijie Reyee App. Changing the management password on the device will not synchronize the changes on Ruijie Cloud or Ruijie Reyee App with the device.

Figure 1-51 Network-Management Mode

Account Settings

Tip: This device is in network-management mode, and cannot be configured with an individual management password. Log in to 192.168.110.1 to modify the network-wide management password.

Account	admin

Figure 1-52 Management Through Ruijie Cloud or Ruijie Reyee App

Account Settings

Tip:If this device is managed by Ruijie Cloud or Ruijie Reyee App, you can modify the network-wide management password through Ruijie Cloud or Ruijie Reyee. Changing the management password on the device will not synchronize the changes with Ruijie Cloud or Ruijie Reyee App.Collapse

Account	admin	
Password	Password	Please enter 8 to 16 letters or numbers or special characters.
Confirm Password	Confirm Password	

Save

9.3 Device Reboot

Choose **System** > **Reboot**.

Click **Reboot** to reboot the switch.

Figure 1-53 Device Reboot

Reboot

Please click **Reboot** to reboot the switch.

Reboot

9.4   Setting the Maximum Power of the Power Supply

Choose **Configuration** > **Power Settings**.

If the power of the actual power supply differs significantly from the default power of the switch, adjust the power settings on the **Power Settings** page in a timely manner to avoid misoperation or unnecessary power consumption.

✅ **Specification**

● The power value should approximate the actual output power of the power supply.

● This feature is only supported on the RG-NIS2100 series.

Figure 1-54 Setting the Maximum Power

Power Settings

You are advised to use the recommended 120 W to 240 W power supply. Alternatively, you can install other compatible power supplies to support the device's operation.

Power Settings ⓘ	240	W
PoE Total Power ⓘ	228 W	

Save
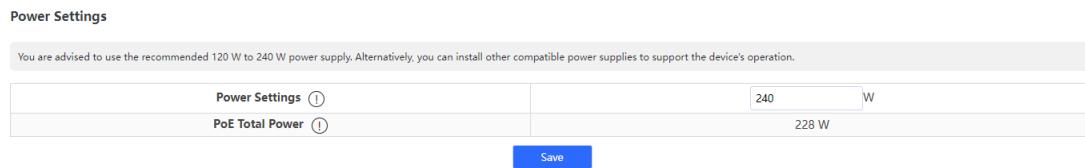
9.5   System Upgrade

9.5.1 Local Upgrade

Choose **System** > **Upgrade**.

Click **Select File** to select the upgrade package from the local files (the upgrade package is a bin file. If it is a tar.gz file, you need to decompress the package and select the bin file for upgrade).

Keep Old Config is selected by default. That means the current configuration will be saved after device upgrade. If there is a huge difference between the current version and the upgrade version, you are advised not to select **Keep Old Config**.

Figure 1-55 Local Upgrade

Local Upgrade

Select File ☑ Keep Old Config

Decompress the package and select the .bin file for upgrade.
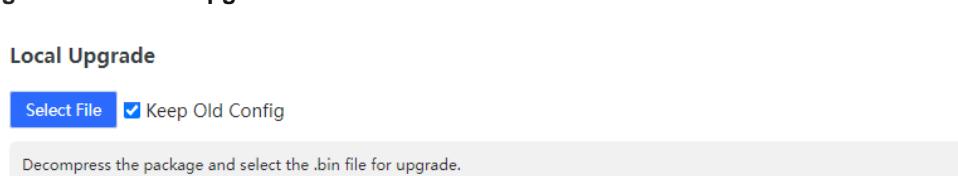
9.5.2 Online Upgrade

Choose **System** > **Upgrade**.

When there is a new version in the cloud, the version number of the latest version will be displayed on this page, and the **Upgrade** button will become available. The device will download the installation package of the recommended version from the cloud and it will be updated to the latest version. Online upgrade will keep the old configuration by default.

Figure 1-56 Online Upgrade

Note

The time that online upgrade takes depends on the current network speed. It may take some time. Please be patient.

9.6 Restoring Factory Configuration

Choose **System** > **Reset**.

Click **Reset** to restore factory configuration and reboot the device.

Figure 1-57 Restoring Factory Configuration
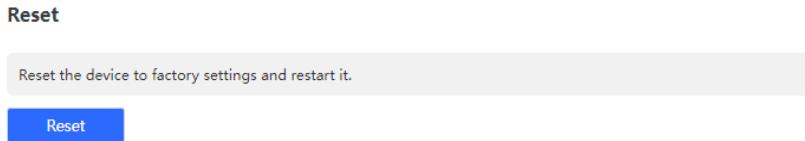
10 Monitoring

10.1 Cable Test

Note

This feature is not supported on an SFP port.

Choose **Monitoring** > **Cable Test.**

Cable Test allows you to check the status of Ethernet cables. For example, you can check whether the cables are short-circuited or disconnected.

Select the ports you want to detect, and then click **Start** to start cable diagnostics. The test result will be displayed accordingly. Click **Start All** to perform one-click cable diagnostics on all ports.

Figure 1-58 Cable Test

Cable Test

	Port	Test Result	Details
☐	Port 1	Normal	The cable works well.
☐	Port 2	Disconnected	Please check cable connection or replace the cable.
☐	Port 3	Disconnected	Please check cable connection or replace the cable.
☐	Port 4	Disconnected	Please check cable connection or replace the cable.
☐	Port 5	Disconnected	Please check cable connection or replace the cable.
☐	Port 6	Disconnected	Please check cable connection or replace the cable.
☐	Port 7	Disconnected	Please check cable connection or replace the cable.
☐	Port 8	Disconnected	Please check cable connection or replace the cable.
☐	Port 9	Unsupported	The port does not support cable diagnostics.
☐	Port 10	Unsupported	The port does not support cable diagnostics.

Start   Start All

⚠ **Caution**

If you select an uplink port for diagnostics, the network may be intermittently disconnected. Exercise caution when performing this operation.

10.2 Multi-DHCP Alarming

⚠ **Caution**

Multi-DHCP alarming will fail when the device IP address is not obtained dynamically. For relevant IP address configuration, see 3.6   Management IP Address.

Choose **Home** from the navigation page.

When there are multiple DHCP servers in a LAN, the system will send a conflicting alarm. An alarming message will be displayed in the **Device Info** column.

Figure 1-59 Multi-DHCP Alarming

Device Info   Multiple DHCP servers exist ⓘ

Model: RG-	Firmware Version: ESW_1.0(
MAC Address: 30:0D:9F	SN: G1PH62V0
IP Address: 192.168.110.66	Uptime: 00h 00min 46s
Cloud Status: Connected Download App	Hostname: ruijie Edit

Move the cursor to ⓘ to view the alarm details, including the VLAN where the conflicts occur, port, IP address of DHCP server, and MAC address.

10.3 Viewing Switches on the Network

Choose **Monitoring** > **Device List**.

● Primary device for global management

If the switch is under uniform management, some features cannot be configured independently (such as password settings). To facilitate configuration, information of the primary device in the VLAN will be

displayed on this page. Click the IP address of the primary device to access the **Primary Device** page for global configuration.

● Devices in the same management VLAN

The device is able to automatically discover other switches in the same management VLAN. Information of these switches will be displayed in **Switch List**.

The first row of **Switch List** displays information of the current device, and the following rows display information of other devices. Click the **IP address** of a device to access eWeb of the device (login required).

Figure 1-60 Viewing Switches on the Network

Primary Device

The current device has been managed by the master device. Please click the IP address to manage the master device.

IP Address	SN	Model
192.168.110.1	H1RP7	

Switch List

Up to **32** switches of the same management VLAN can be discovered.

No.	IP Address	SN	Hostname
1	192.168.110.83(Local)	MACCESW	ruijie
2	192.168.110.22	ZAS50FX0	ruijie
3	192.168.110.32	G1SK9JR0	ruijie
4	192.168.110.35	G1S080K0	ruijie

🛈 **Note**

The number of switches that can be discovered varies with product models.

11 FAQs

11.1 I failed to log in to eWeb. What can I do#

(1) Verify that an Ethernet cable is properly connected to the LAN port of the device and the LED blinks or is steady on.

(2) Before accessing eWeb, you are advised to configure a static IP address for a PC on the same network segment as the device IP address (default device IP address: 10.44.77.200 and subnet mask: 255.255.255.0). For example, set the IP address of the PC to 10.44.77.100 and the subnet mask to 255.255.255.0.

(3) Run the **ping** command to test the connectivity between the PC and the device.

(4) If the login failure persists, restore the device to factory settings.

11.2 What can I do if I forget my password# How can I restore the factory settings#

⚠ **Caution**

Press and hold the **Reset** button on the device panel for more than 5 seconds. This action will restore the device to factory settings, clearing all configurations. Exercise caution when performing this operation.

If you forget the password and cannot log in to the device, follow these steps:

(1) With the device powered on, press and hold the **Reset** button on the device panel for more than 5 seconds. Release the button when the system LED blinks to restore the device to factory settings.

(2) Once the device restarts, log in to eWeb using the default management IP address (10.44.77.200).

(3) On the login page, set a new password and use it to log in to the device.

Contents

1 Product Introduction

> ℹ️ **Note**
>
> When using this power module with an RG-NIS series switch, select the proper environmental temperature and power consumption specifications based on the specifications of both the power module and the switch.

> ⚠️ **Warning**
> - Operation of this equipment in a residential environment could cause radio interference.
> - The power supply is not user-serviceable. To prevent electric shock, do not open the device.
> - The power can not be repaired, do not disassemble it to avoid the risk of an electric shock.

> ⚡ **Danger**
> - When the power module is powered on, its surface temperature is high. Do not touch the surface to avoid injury.
> - Do not place any flammable or combustible items on top of or beneath the power module.

1.1 RG-NIS-PA240-54

1.1.1 Package Contents

Table 1-1   Package Contents

Number	Item	Quantity
1	RG-NIS-PA240-54	1
2	Warranty card	1

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

1.1.2 Appearance

1.1.3 External Ports

- The RG-NIS-PA240-54 is a DC power module designed to supply power to switches, delivering of a rated voltage of 54 V at 4.4 A to the system.

- Connect a three-pin power cord (recommended rating: 10 A) to the three-pin power connector located under the front panel.

1.1.4 LEDs

LED	Silkscreen Label	Status	Description
Power supply status LED	DC OK	Off	The power supply is off
		Solid green	The power supply is on

1.1.5 Technical Specifications

Product Name	AC-DC Converter
Model	RG-NIS-PA240-54
Power Supply	● Nameplate Input Voltage Range: 100 V AC-240 V AC ● Input Voltage Range: 90 V AC-264 V AC ● Input Frequency Range: 50/60 Hz ● Input Current: 3.5 A ● Output Voltage Range: 52.38 V DC-55.62 V DC ● Output Current: 4.4 A
Power Consumption	≤240 W
Power Supply Surge Protection	● Common mode: 4 kV ● Differential mode: 2 kV
Ground-Leakage Current	≤ 3.5 mA
Number of Fans	Fanless
Operating Temperature	−40ºC to +70ºC (−40°F to +158°F)
Storage Temperature	−40ºC to +85ºC (−40°F to +185°F)
Storage Humidity	5% to 95% RH (non-condensing)
Operating Humidity	5% to 95% RH (non-condensing)
Dimensions (W x D x H)	52 mm x 110 mm x 125 mm
Net Weight	0.75 kg (1.65 lbs)

Item	Working Conditions		Value
Output power derating	Operating temperature derating	−40ºC to −30ºC (−40°F to −22°F)	115 V AC input	4.0%/ºC
		45ºC to 70ºC (113°F to 158°F)	115 V AC input	2.0%/ºC
		50ºC to 70ºC (122°F to 158°F)	230 V AC input	2.0%/ºC
	Input voltage derating	90 V AC to 100 V AC	1.0%/V AC

Item	Working Conditions		Value
Short circuit protection	After the short circuit is eliminated, the power supply is restored within 10s		Hiccup mode: Power off for 3s to provide long-term short circuit protection and self-recovery
Over-current protection	230 V AC, rated load		110%–170% Io, self-recovery
Over-voltage protection	54 V		≤ 60 V (hiccup, self-recovery after an exception is eliminated)
Over-temperature protection	100 V AC, 100% load	Start of over-temperature protection (typical)	60ºC (140°F)
	240 V AC, 100% load		70ºC (158°F)
	100 V AC, 50% load		76ºC (168.8°F)
	240 V AC, 50% load		80ºC (176°F)

1.2   RG-NIS-PA120-54

1.2.1 Package Contents

Table 1-2   Package Contents

Number	Item	Quantity
1	RG-NIS-PA120-54	1
2	Warranty card	1

🛈 Note

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

1.2.2 Appearance

1.2.3 External Ports

- The RG-NIS-PA120-54 is a DC power module designed to supply power to switches, delivering of a rated voltage of 54 V at 2.2 A to the system.
- Connect a three-pin power cord (recommended rating: 10 A) to the three-pin power connector located under the front panel.

1.2.4 LEDs

LED	Silkscreen Label	Status	Description
Output status LED	DC OK	Off	The power supply is off
		Solid green	The power supply is on

1.2.5 Technical Specifications

Product Name	AC-DC Converter
Model	RG-NIS-PA120-54
Power Supply	● Nameplate Input Voltage Range: 100 V AC-240 V AC ● Input Voltage Range: 90 V AC-264 V AC ● Input Frequency Range: 50/60 Hz ● Input Current: 4 A ● Output Voltage Range: 52.38 V DC-55.62 V DC ● Output Current: 2.2 A
Power Consumption	≤120 W
Power Supply Surge Protection	● Common mode: 4 kV ● Differential mode: 2 kV
Ground-Leakage Current	≤ 3.5 mA
Number of Fans	Fanless
Operating Temperature	−40ºC to +70ºC (−40°F to +158°F)
Storage Temperature	−40ºC to +85ºC (−40°F to +185°F)
Storage Humidity	5% to 95% RH(non-condensing)
Operating Humidity	5% to 95% RH(non-condensing)
Dimensions (W x D x H)	35 mm x 110 mm x 125 mm
Net Weight	0.48 kg (1.06 lbs)

Item	Working Conditions		Value
Output power derating	Operating temperature derating	−40ºC to −20ºC (−40°F to +68°F)	115 V AC input	2.0%/ºC
		45ºC to 70ºC (113°F to 158°F)	115 V AC input	2.0%/ºC
		50ºC to 70ºC (140°F to 158°F)	230 V AC input	2.0 %/ºC
	Input voltage derating	90 V AC to 100 V AC	1.0%/V AC
Short circuit protection	After the short circuit is eliminated, the power supply is restored within 10s		Hiccup mode: Power off for 1.5s to provide long-term short circuit protection and self-recovery

Item	Working Conditions		Value
Over-current protection	230 V AC, rated load		110%–180% Io, self-recovery
Over-voltage protection	54 V		≤ 60 V (hiccup, self-recovery after an exception is eliminated)
Over-temperature protection	100 V AC, 100% load	Start of over-temperature protection（typical）	57ºC (134.6°F)
	240 V AC, 100% load		75ºC (167°F)
	100 V AC, 50% load		85ºC (185°F)

1.3 RG-NIS-PA240-48

1.3.1 Package Contents

Table 1-3   Package Contents

Number	Item	Quantity
1	RG-NIS-PA240-48	1
2	Warranty card	1

ℹ️ Note

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

1.3.2 Appearance

1.3.3 External Ports

- RG-NIS-PA240-48 is a DC power module that provides DC power input to switch and supplies 48 V/5 A rated voltage to the system.

- Connect a three-pin power cord (recommended rating: 10 A) to the three-pin power connector located under the front panel.

- ADJ port: outputs adjustable voltage from 48 V to 53 V based on adjustable resistance.

- DC OK Relay Contact: Rated: 30 V at 1 A, resistive load. The relay contacts are normally "ON" (closed) when the output (Vout) is greater than 90% of its rated value.

1.3.4 LEDs

LED	Silkscreen Label	Status	Description
Power supply status LED	DC ON	Off	The power supply is off
		Solid green	The power supply is on

1.3.5 **Technical Specifications**

Product Name	AC-DC Converter
Model	RG-NIS-PA240-48
Rated Voltage Range	100–240 V, 50/60 Hz
Max. Voltage Range	85–264 V, 47–63 Hz
Max. Output Power	240 W
Ground-Leakage Current	≤ 0.5 mA
Operating Temperature	–40ºC to +70ºC (–40°F to +158°F)
Storage Temperature	–40ºC to +85ºC (–40°F to +185°F)
Storage Humidity	Maximum: 95% RH (non-condensing)
Operating Humidity	Maximum: 90% RH (non-condensing)
Weight	0.65 kg (1.43 lbs.)

Item	Working Conditions			Value
Output power derating	Operating temperature derating	–40ºC to –25ºC (–40°F to –13°F)		3.34%/ºC
		45ºC to 70ºC (113°F to 158°F)	115 V AC input	2.0%/ºC
		60ºC to 70ºC (140°F to 158°F)	230 V AC input	2.5%/ºC
	Input voltage derating	85 V AC to 100 V AC		0.67%/V AC
Short circuit protection	After the short circuit is eliminated, the power supply is restored within 10s			Hiccup mode: Maintain constant current for 1s and power off for 10s to provide long-term short circuit protection and self-recovery
Over-current protection	230 V AC, rated load	Ordinary temperature, high temperature		110%–200% Io, self-recovery
		Low temperature		≥ 105% Io, self-recovery
Over-voltage protection	48 V			≤ 60 V (hiccup, self-recovery after an exception is eliminated)

Item	Working Conditions	Value
Over-temperature protection	230 V AC, rated load	80ºC (176°F)

1.4 RG-NIS-PA120-48

1.4.1 Package Contents

Table 1-4   Package Contents

Number	Item	Quantity
1	RG-NIS-PA120-48	1
2	Warranty card	1

ℹ️ Note

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

1.4.2 Appearance

1.4.3 External Ports

- RG-NIS-PA120-48 is a DC power module that provides DC power input to switch and supplies 48 V/2.5 A rated voltage to the system.

- Connect a three-pin power cord (recommended rating: 10 A) to the three-pin power connector located under the front panel.

- ADJ port: outputs adjustable voltage from 47 V to 53 V based on adjustable resistance.

- DC OK Relay Contact: Rated: 30 V at 1 A, resistive load. The relay contacts are normally "ON" (closed) when the output (Vout) is greater than 90% of its rated value.

1.4.4 LEDs

LED	Silkscreen Label	Status	Description
Power supply status LED	DC ON	Off	The power supply is off
		Solid green	The power supply is on

1.4.5 Technical Specifications

Product Name	AC-DC Converter
Model	RG-NIS-PA120-48
Rated Voltage Range	100–240 V, 50/60 Hz
Max. Voltage Range	85–264 V, 47–63 Hz
Max. Output Power	120 W
Ground-Leakage Current	≤ 1 mA
Operating Temperature	–40ºC to +70ºC (–40°F to +158°F)
Storage Temperature	–40ºC to +85ºC (–40°F to +185°F)
Storage Humidity	20% to 95% RH (non-condensing)
Operating Humidity	Maximum: 90% RH (non-condensing)
Weight	0.49 kg (1.08 lbs.)

Item	Working Conditions		Value
Output power derating	Operating temperature derating	–40ºC to –25ºC (–40°F to –13°F)	3.34%/ºC
		55ºC to 70ºC (131°F to 158°F)	85 V AC to 164 V AC input	2.0%/ºC

Item	Working Conditions		Value
	60ºC to 70ºC (140°F to 158°F)	165 V AC to 264 V AC input	2.5%/ºC
	Input voltage derating	85 V AC to 100 V AC	0.67%/V AC
Short circuit protection	After the short circuit is eliminated, the power supply is restored within 10s		Hiccup mode: Maintain constant current for 1s and power off for 10s to provide long-term short circuit protection and self-recovery.
Over-current protection	230 V AC, rated load	Ordinary temperature, high temperature	105%–200% Io, self-recovery
		Low temperature	≥ 105%, full load after derating, self-recovery
Over-voltage protection	48 V		≤ 60 V (hiccup, self-recovery after an exception is eliminated)
Over-temperature protection	230 V AC, 70% load	Start of over-temperature protection	90ºC (194°F)
		End of over-temperature protection	Lowest: 60ºC (140°F)

2 Preparation before Installation

2.1 Safety Suggestions

To avoid personal injury and device damage, carefully read the safety suggestions before you install the RG-NIS-PA series.

⚠ Caution

The following safety suggestions may not cover all possible dangers.

2.1.1 General Safety Precautions

● Take security measures (such as wearing an anti-static wrist strap) to ensure safety.

● Keep the chassis clean and dust-free. Do not place the switch at a damp place and keep the switch away from moisture.

● Make sure the installation site is dry and flat. Take skid-proof measures.

- Do not place the switch in a walking area.

- Do not wear loose clothes or any other things that may be caught by the chassis during installation and maintenance.

- Moving or lifting the switch and its components requires team work. Be careful not to get hurt.

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.

> ⚡ Danger
> 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.

> ⚠ Caution
> - 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 16 identical power supplies, the leakage current of each power supply is equal to or less than 3.5 mA, and the total leakage current of the system is 56 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 = $30/2/3.5 ≈ 4.28$). In other words, the leakage protector with 30 mA rated action current supports no more than 4 power supplies. In this case, the 16 power supplies in the system require at least 4 leakage protectors with 30 mA rated action current and each leakage protector supports 4 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 0.

2.1.4 ESD

To prevent Electronic Static Discharge (ESD), pay attention to the following points:

● Proper grounding of grounding screws on the back panel of the device, and three-wire single-phase socket with protective earth wire (PE) used as the AC power socket.

● Indoor dust prevention

● Proper humidity conditions

2.2 Installation Site Requirements

To ensure the normal running and prolonged service life of the device, the installation site must meet the following requirements.

2.2.1 Load Bearing Requirements

Evaluate the load bearing requirements for the ground according to the weight of the switch and its accessories (such as the cabinet, chassis, line cards and power supply modules). Make sure the installation site meet the requirements.

2.2.2 Space Requirements

● The width of the machine room corridor should be greater than 0.8 m (31.50 in.) to ensure enough space to move the chassis, and to plug and remove modules.

● Do not install the switch against the wall. Maintain proper clearance around the switch for heat dissipation and switch maintenance.

2.2.3 Anti-interference Requirements

● The switch is susceptible to external interference by capacitive coupling, inductive coupling, electromagnetic waves, common impedance (grounding) coupling, or conduction over conducting wires including power cords, signal cables, and output cables. Note that:

● In a TN grounding system, use a three-wire single-phase outlet that has a protective earth (PE) contact to allow the filter circuit in the device to eliminate interference from the power grid.

● Keep the switch away from high-power radio transmitters, radar transmitters, and high-frequency high-current devices.

● Take electromagnetic shielding measures to minimize interference when necessary, for example, use shielded interface cables.

● Route interface cables only indoors to prevent signal ports from getting damaged by overvoltage or overcurrent caused by lightning strikes.

2.2.4 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 2-1 lists the requirements for the dust content and granularity in the equipment room.

Table 2-1   Requirements for the Dust Content and Granularity in the Equipment Room

Dust	Unit	Density
Diameter ≥ 0.5 µm	Particles/m^3	≤ 3.5 x 10^6
Diameter ≥ 5 µm	Particles/m^3	≤ 3 x 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 2-2 lists the requirements.

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

Gas	Average (mg/m3)	Maximum (mg/m3)
SO_2	0.3	1.0
H_2S	0.1	0.5
NO_2	0.5	1.0
Cl_2	0.1	0.3

ℹ️ **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.

2.2.5 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 lightning protection and interference resistance. Therefore, connect the grounding line of the switch properly.

● 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 mm^2 (18 AWG).
- Use the 3-core power supply line. The sectional area of each pin should be at least 0.75 mm^2 or 18 AWG.

- 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.

- 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.

2.2.6 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.

2.2.7 Lightning Resistance

When the AC power cable is imported outdoors and directly connected to the power port of the RG-NIS-PA 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.

2.3 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

⚠ Caution
- Ensure that you have read chapter 2 carefully.
- Verify that the requirements described in chapter 2 have been met.

3.1 Confirmations Before Installation

Before installation, confirm the following points at the installation site:

- Cooling requirements are met.

- Temperature and humidity requirements are met.

- The power supply and required current are available.

- Network cables have been deployed.

3.2 Grounding the Power

The Power Module has a grounding stud on the rear panel. Connect the grounding stud to the grounding point of the rack and then connect the grounding point of the rack to the ground bar of the equipment room.

Precautions

- The cross-sectional area of a grounding wire should be determined according to the maximum current. The grounding wires should be good conductors.
- Do not use bare conductors.

> **Note**
> - To avoid personal injury and device damage, connect the switch to earth ground properly. The resistance between the chassis and 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 wire must be at least 2.5 mm^2 (12 AWG).
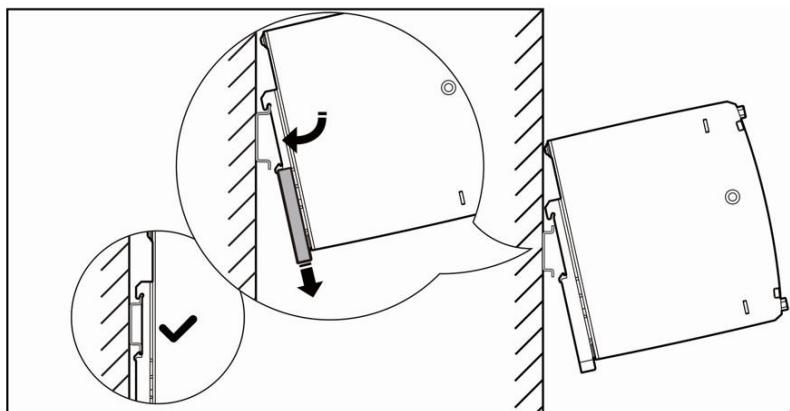
3.3 Installing the Power Module

> **Note**
> - The RG-NIS-PA series power supplies follow a consistent installation method.
> - Please note that the appearance of the power module in the installation diagram may not exactly match the actual product.

The power module only supports DIN rail mounting. The installation procedure is as follows:

(1) Snap the top part of the DIN rail clamp on the DIN rail, pull the blade spring down, and then push the module inward until it is completely seated on the rail.

Figure 3-1   Installing the Power Module

(2) Connect the power module to the switch, as shown in the following figure.

Figure 3-2   Connecting the Power Module to the Switch

Power module
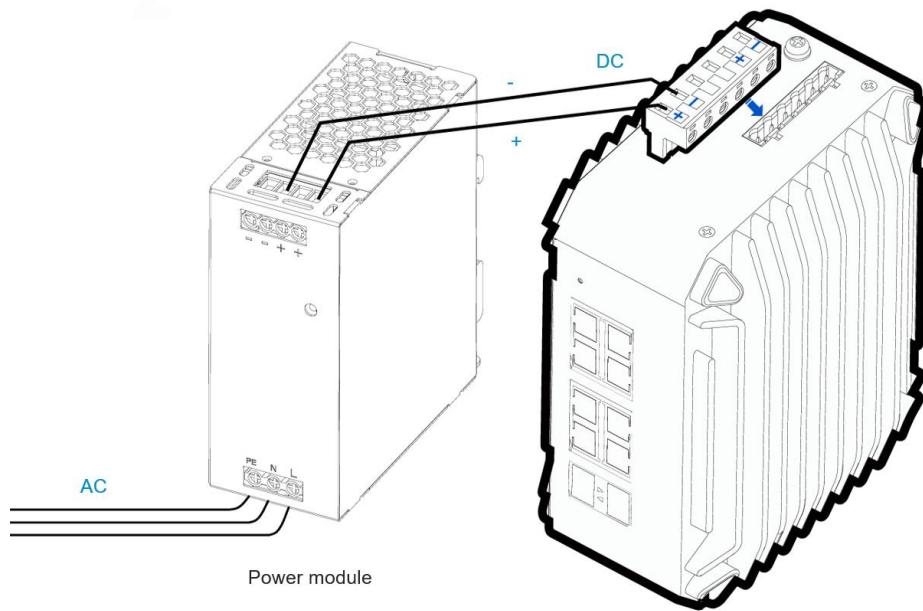
3.4 Bundling the Cables

- Precautions

  Bundle the power cords and other cables neatly.

  When bundling fiber-optic cables, ensure that they have natural bends or large bend radius at the connectors.

  Do not bundle fiber-optic cables and twisted pair cables too tightly, as this may press the cables and affect their service life and transmission performance.

- Bundling Steps

  a   Bundle the drooping part of the fiber-optic cables and twisted pair cables, and route them to both sides of the chassis for convenience.

  b   On both sides of the chassis, fasten the fiber-optic cables and twisted pair cables to the cable management bracket or trough.

  c   For the power cords, bundle them closely along the bottom of the chassis, in a straight line wherever possible.

3.5 Verifying Installation

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

- Verify that the grounding wire is properly connected.

- Verify that the cables and power cords are properly connected.

- Verify that there is a minimum clearance of 100 mm (3.94 in.) around the device.