Ruijie Reyee

RG-NBF2100S Series e-Lighten Access Switches

Installation Guide

Document Version: V1.2
Date: November 6, 2025
Copyright © 2025 Ruijie Networks

Copyright

Copyright © 2025 Ruijie Networks

All rights are reserved in this document and this statement.

Without the prior written consent of Ruijie Networks, any organization or individual shall not reproduce, extract, back up, modify, or propagate the content of this document in any manner or in any form, or translate it into other languages or use some or all parts of the document for commercial purposes.

 and other Ruijie networks logos are trademarks of Ruijie Networks.

All other trademarks or registered trademarks mentioned in this document are owned by their respective owners.

Disclaimer

The products, services, or features you purchase are subject to commercial contracts and terms, and some or all of the products, services, or features described in this document may not be available for you to purchase or use. Except for the agreement in the contract, Ruijie Networks makes no explicit or implicit statements or warranties with respect to the content of this document.

The names, links, descriptions, screenshots, and any other information regarding third-party software mentioned in this document are provided for your reference only. Ruijie Networks does not explicitly or implicitly endorse or recommend the use of any third-party software and does not make any assurances or guarantees concerning the applicability, security, or legality of such software. You should choose and use third-party software based on your business requirements and obtain proper authorization. Ruijie Networks assumes no liability for any risks or damages arising from your use of third-party software.

The content of this document will be updated from time to time due to product version upgrades or other reasons, Ruijie Networks reserves the right to modify the content of the document without any notice or prompt.

This manual is designed merely as a user guide. Ruijie Networks has tried its best to ensure the accuracy and reliability of the content when compiling this manual, but it does not guarantee that the content of the manual is completely free of errors or omissions, and all the information in this manual does not constitute any explicit or implicit warranties.

Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

STechnical Support

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

Conventions

1. Signs

The signs used in this document are described as below:

Danger

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

Warning

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

Caution

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

Note

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

Specification

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

2. Note

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

Contents

Preface I

1 Overview 1

1.1 About the RG-NBF2100S Series Switches 1

1.2 Package Contents 2

1.2.1 Package Contents of the RG-NBF2100S-8GT1SC-P 2

1.2.2 Package Contents of the RG-NBF2100S-8GT1SC 2

1.2.3 Package Contents of the RG-NBF2100S-16GT1SC-P 3

1.3 Product Appearance 4

1.3.1 Appearance of the RG-NBF2100S-8GT1SC-P 4

1.3.2 Appearance of the RG-NBF2100S-8GT1SC 5

1.3.3 Appearance of the RG-NBF2100S-16GT1SC-P 7

1.4 Hardware Specifications 8

1.4.1 Hardware Specifications of the RG-NBF2100S-8GT1SC-P 8

1.4.2 Hardware Specifications of the RG-NBF2100S-8GT1SC 10

1.4.3 Hardware Specifications of the RG-NBF2100S-16GT1SC-P 11

2 Preparing for Installation 14

2.1 Safety Guidelines 14

2.1.1 General Precautions 14

2.1.2 Chassis-Lifting Guidelines 14

2.1.3 Electricity Safety 14

2.1.4 Preventing ESD Damage 15

2.1.5 Laser Safety 15

2.2 Site Requirements 16

2.2.1 Floor Loading 16
2.2.2 Airflow 16
2.2.3 Space 16
2.2.4 Temperature and Humidity 16
2.2.5 Cleanliness 17
2.2.6 Grounding 18
2.2.7 Anti-Electromagnetic Interference 18
2.2.8 Surge Protection 18
2.2.9 EMI 19
2.2.10 Installation Site 19
2.3 Rack Requirements 19
2.4 Tools 20
3 Installing the Switch 21
3.1 Precautions for Installation 21
3.2 Installation Procedure 21
3.2.1 Installing a Switch in a Rack 21
3.2.2 Mounting a Switch on the Wall 22
3.2.3 Mounting a Switch on the Ceiling 23
3.2.4 Installing a Switch on a Desktop 24
3.3 Connecting the Grounding Wire 25
3.4 Connecting the Power Cord 26
3.4.1 Connecting the Power Cord of the Power Adapter 26
3.4.2 Connecting the AC Power Cord 26
3.5 Verifying Installation 26

4 Log in to the Web UI 27

5 Troubleshooting 28

5.1 Troubleshooting Flowchart 28

5.2 Common Faults 28

5.2.1 Forgot or Lost the System Login Password 28

5.2.2 System Status LED Is Off for a Long Time 28

5.2.3 Only Partial PoE Ports Can Supply Power 28

6 Appendix 30

6.1 Ports, Connectors, and Media 30

6.1.1 1000BASE-T/100BASE-TX/10BASE-T Ports 30

6.1.2 PON Ports and SC Ports 31

6.2 Surge Protection 31

6.2.1 Installing an AC Power Lightning Arrester 31

6.2.2 Installing an Ethernet Port Lightning Arrester 33

6.3 Recommended Cabling 35

6.3.1 Requirements for the Minimum Bend Radius of an Ethernet Cable 35

6.3.2 Requirement for the Minimum Bend Radius of an Optical Cable 35

6.3.3 Precautions for Bundling up Cables 35

6.4 Site Selection 38

6.5 Cleaning the Connectors and End Faces of Optical Cables 39

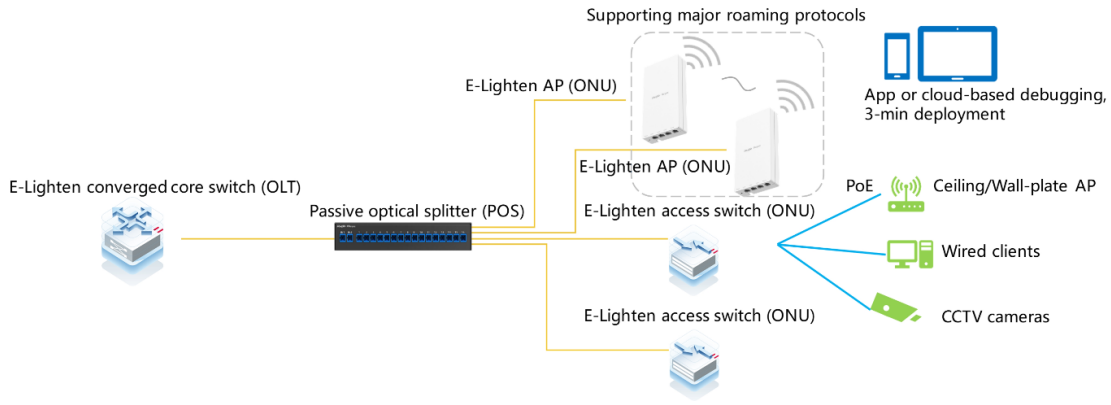
1 Overview

1.1 About the RG-NBF2100S Series Switches

The Reyee e-Lighten Solution is a network product solution based on existing Ethernet technology integrating PON technology and passive optical splitting features. The components include:

- e-Lighten core switch (OLT): As a core switch, it has the Layer 3 data forwarding capability. It provides PON ports that can be connected to e-Lighten access switches and e-Lighten access points (APs) to achieve data interconnection.
- e-Lighten access switch (ONU): As an access device, the e-Lighten access switch is connected to the PON port in the uplink direction. It can send data to the core switch through the passive optical splitter.
- e-Lighten AP (ONU): An e-Lighten AP is connected to the PON port in the uplink direction, and can send wireless users' Internet access data to the core switch through the passive optical splitter.
- Passive optical distribution network (ODN): The ODN, consisting of passive optical splitters, is connected to the core switch in the uplink direction and to e-Lighten access switches or APs in the downlink direction.

Figure 1-1 Topology Diagram of Reyee e-Lighten Solution



The RG-NBF2100S series switches serve as gigabit optical access switches (ONUs) in the Reyee e-Lighten Solution. They apply to diverse small and medium-sized business environments, and can effectively cater to the needs of ELV campus networks, office spaces, hotels, residences, and small to medium-sized enterprises.

Table 1-1 RG-NBF2100S Series Switches

Model	10/100/1000BASE-T Ethernet Ports with Auto-negotiation	SC PON Ports	PoE Ports	Power Module
RG-NBF2100S-8GT1SC-P	8	1	8	DC input
RG-NBF2100S-8GT1SC	8	1	-	DC input

Model	10/100/1000BASE-T Ethernet Ports with Auto-negotiation	SC PON Ports	PoE Ports	Power Module
RG-NBF2100S-16GT1SC-P	16	1	16	AC input

1.2 Package Contents

Note

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

1.2.1 Package Contents of the RG-NBF2100S-8GT1SC-P

Table 1-2 Package Contents of the RG-NBF2100S-8GT1SC-P

Item	Quantity
RG-NBF2100S-8GT1SC-P	1
Rubber pad	4
Rack-mount bracket	2
DC power adapter	1
M3 x 6 mm cross recessed countersunk head screws	8
User Manual	1
Warranty card	1

1.2.2 Package Contents of the RG-NBF2100S-8GT1SC

Table 1-3 Package Contents of the RG-NBF2100S-8GT1SC

Item	Quantity
RG-NBF2100S-8GT1SC	1
Rubber pad	2
Rack-mount bracket	2

Item	Quantity
DC power adapter	1
M3 x 6 mm cross recessed countersunk head screws	8
User Manual	1
Warranty card	1

1.2.3 Package Contents of the RG-NBF2100S-16GT1SC-P

Table 1-4 Package Contents of the RG-NBF2100S-16GT1SC-P

Item	Quantity
RG-NBF2100S-16GT1SC-P	1
Rubber pad	4
Rack-mount bracket	2
AC power cord	1
M3 x 6 mm cross recessed countersunk head screws	8
User Manual	1
Warranty card	1

1.3 Product Appearance

1.3.1 Appearance of the RG-NBF2100S-8GT1SC-P

Figure 1-2 Front Panel of the RG-NBF2100S-8GT1SC-P

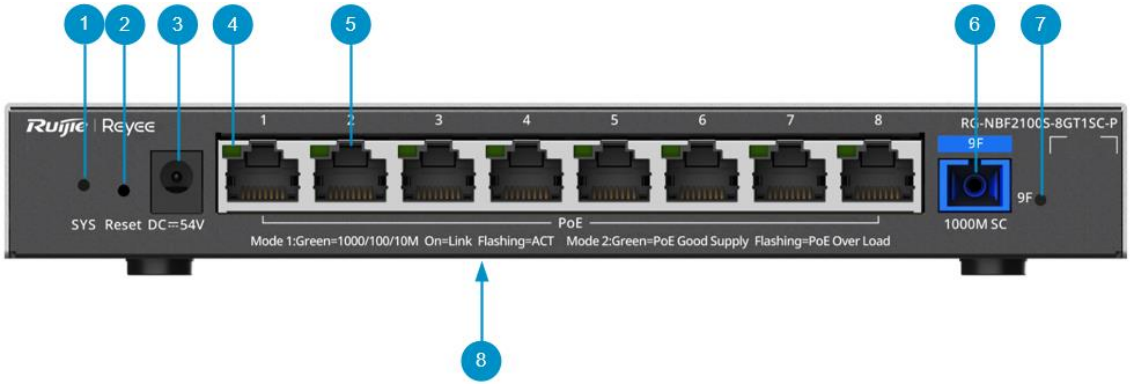


Table 1-5 Components on the Front Panel of the RG-NBF2100S-8GT1SC-P

No.	Item	Description
1	System status LED	Indicates the working status of the system. ● Fast blinking green: 1. The device is starting up. 2. The device is restoring factory settings. 3. The device version is being upgraded. ● Solid green: The device is working properly. ● Slow blinking green: The device is not connected to Ruijie Cloud or a loop occurs.
2	Reset button	Used to restart the device or restore factory settings. ● Press and hold the button for less than 2 seconds to restart the system. ● Press and hold the button for more than 5 seconds until the system status LED blinks. The system will restore to factory settings and restart. After factory settings are restored, the default management IP address is http://10.44.77.200 (default password: admin).
3	DC power connector	Connected to the DC power adapter to supply power to the device.
4	Link/ACT status LED of Ethernet port	Indicates the working status of the port. ● Mode 1 o Solid green: A link is set up on the port. o Blinking green: The port is transmitting and receiving data. ● Mode 2 o Solid green: The PoE output is normal. o Blinking green: The PoE is overloaded.
5	Ethernet port	RJ45 10/100/1000BASE-T Ethernet port with auto-negotiation. The port is used to connect to the Ethernet port of a computer, switch, or AP, and supports IEEE 802.3af/at-compliant PoE.

No.	Item	Description
6	SC PON port	GE SC PON uplink port.
7	SC port status LED	● Slow blinking green: The device is registered successfully. ● Slow blinking red: No optical input or the optical cable is not inserted. ● Slow blinking yellow: The device is registering.
8	Nameplate	Located at the bottom of the front panel.

Figure 1-3 Rear Panel of the RG-NBF2100S-8GT1SC-P

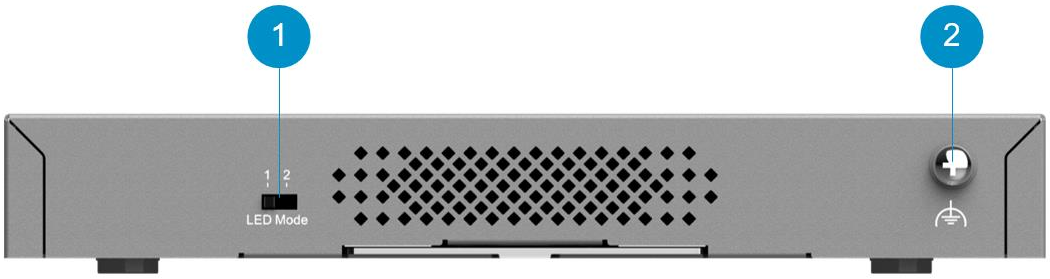


Table 1-6 Components on the Rear Panel of the RG-NBF2100S-8GT1SC-P

No.	Item	Description
1	Switch	Used to change the status LED mode of the ports on the front panel.
2	Grounding stud	Used to secure the grounding lug to connect the chassis to an earth ground.

1.3.2 Appearance of the RG-NBF2100S-8GT1SC

Figure 1-4 Front Panel of the RG-NBF2100S-8GT1SC

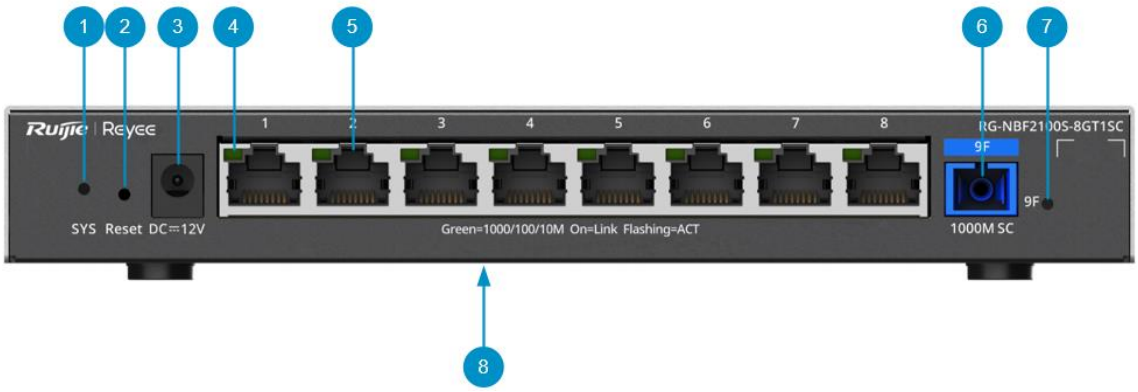


Table 1-7 Components on the Front Panel of the RG-NBF2100S-8GT1SC

No.	Item	Description
1	System status LED	Indicates the working status of the system. ● Fast blinking green: 1. The device is starting up. 2. The device is restoring factory settings. 3. The device version is being upgraded. ● Solid green: The device is working properly. ● Slow blinking green: The device is not connected to Ruijie Cloud or a loop occurs.
2	Reset button	Used to restart the device or restore factory settings. ● Press and hold the button for less than 2 seconds to restart the system. ● Press and hold the button for more than 5 seconds until the system status LED blinks. The system will restore to factory settings and restart. After factory settings are restored, the default management IP address is http://10.44.77.200 (default password: admin).
3	DC power connector	Connected to the DC power adapter to supply power to the device.
4	Link/ACT status LED of Ethernet port	Indicates the working status of the port. ● Solid green: A link is set up on the port. ● Blinking green: The port is transmitting and receiving data.
5	RJ45 Ethernet port	RJ45 10/100/1000BASE-T Ethernet port with auto-negotiation. The port is used to connect to the Ethernet port of a computer, switch, or AP.
6	SC PON port	GE SC PON uplink port.
7	SC port status LED	● Slow blinking green: The device is registered successfully. ● Slow blinking red: No optical input or the optical cable is not inserted. ● Slow blinking yellow: The device is registering.
8	Nameplate	Located at the bottom of the front panel.

Figure 1-5 Rear Panel of the RG-NBF2100S-8GT1SC

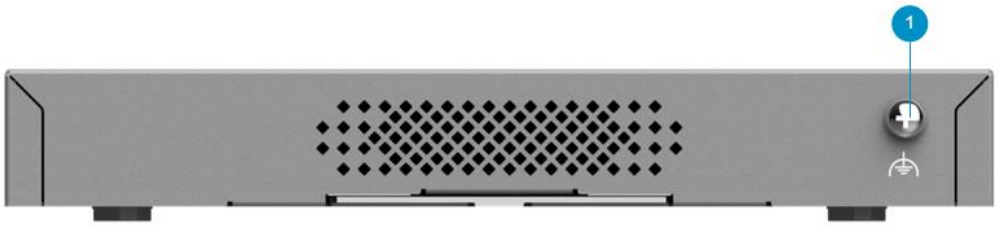


Table 1-8 Components on the Rear Panel of the RG-NBF2100S-8GT1SC

No.	Item	Description
1	Grounding stud	Used to secure the grounding lug to connect the chassis to an earth ground.

1.3.3 Appearance of the RG-NBF2100S-16GT1SC-P

Figure 1-6 Front Panel of the RG-NBF2100S-16GT1SC-P

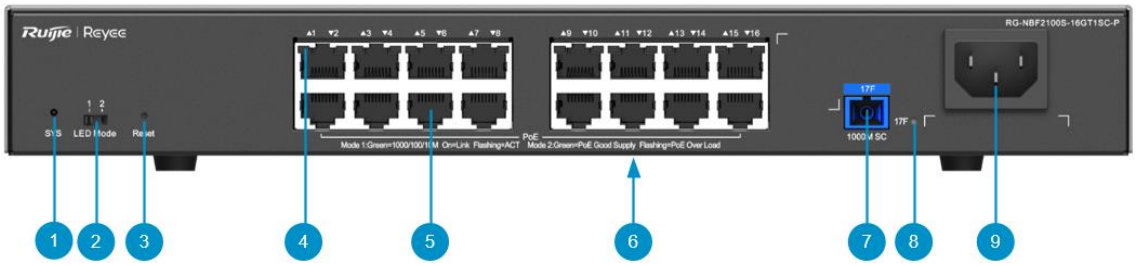


Table 1-9 Components on the Front Panel of the RG-NBF2100S-16GT1SC-P

No.	Item	Description
1	System status LED	Indicates the working status of the system. ● Fast blinking green: 1. The device is starting up. 2. The device is restoring factory settings. 3. The device version is being upgraded. ● Solid green: The device is working properly. ● Slow blinking green: The device is not connected to Ruijie Cloud or a loop occurs. ● Off: The switch is not connected to a power supply.
2	Switch	Used to change the status LED mode of the ports on the front panel.
3	Reset button	Used to restart the device or restore factory settings. ● Press and hold the button for less than 2 seconds to restart the system. ● Press and hold the button for more than 5 seconds until the system status LED blinks. The system will restore to factory settings and restart. After factory settings are restored, the default management IP address is http://10.44.77.200 (default password: admin).
4	Link/ACT status LED of Ethernet port	Indicates the working status of the port: ● Mode 1 ○ Solid green: A link is set up on the port. ○ Blinking green: The port is transmitting and receiving data. ○ Off: No link is set up on the port. ● Mode 2 ○ Solid green: The PoE output is normal.

No.	Item	Description
		○ Blinking green: The PoE is overloaded. ○ Off: PoE power supply is off.
5	Ethernet port	RJ45 10/100/1000BASE-T Ethernet port with auto-negotiation. The port is used to connect to the Ethernet port of a computer, switch, or AP, and supports IEEE 802.3af/at-compliant PoE.
6	Nameplate	Located at the bottom of the device.
7	SC PON port	GE SC PON uplink port.
8	SC port status LED	● Off: No link is set up on the port. ● Slow blinking green: The device is registered successfully. ● Slow blinking yellow: The device is registering. ● Slow blinking red: No optical input or the optical cable is not inserted.
9	Power connector	Connected to an external AC power supply.

Figure 1-7 Rear Panel of the RG-NBF2100S-16GT1SC-P

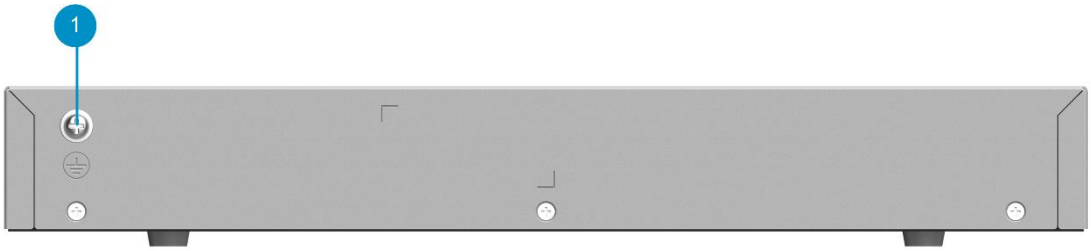


Table 1-10 Components on the Rear Panel of the RG-NBF2100S-16GT1SC-P

No.	Item	Description
1	Grounding stud	Used to secure the grounding lug to connect the chassis to an earth ground.

1.4 Hardware Specifications

1.4.1 Hardware Specifications of the RG-NBF2100S-8GT1SC-P

Table 1-11 Hardware Specifications of the RG-NBF2100S-8GT1SC-P

Parameter Type	Parameter Name	RG-NBF2100S-8GT1SC-P
System Specifications	Flash Memory	8 MB
	SDRAM	N/A

Port Specifications	Fixed Service Port	8 x RJ45 10/100/1000BASE-T Ethernet ports with auto-negotiation, 1 x gigabit SC uplink optical port, and 8 x ports supporting IEEE 802.3af/at-compliant PoE
Power Supply and Consumption	Power Range of the ONU's SC Port	The optical power of the ONU's SC port should be within the range of −28 dBm to −8 dBm. If the power is out of this range, the device may have an exception or be damaged. **Caution** The SC port of the ONU should not be directly connected to the PON port of the OLT. According to the optical power indicator, when short-distance single-mode fibers are used, an online optical attenuator or splitter should be added on the link to prevent device damage.
	Power Module	Adapter AC input: Rated voltage range: 186 V AC to 240 V AC Maximum voltage range: 186 V AC to 240 V AC Frequency: 50 Hz/60 Hz Rated current: 1.5 A Power cord requirement: 10 A power cord
	Adapter DC Power Connector	Inner diameter: 2.1 mm (0.08 in.) Outer diameter: 5.5 mm (0.22 in.) Insertion depth: 10 mm ± 0.3 mm (0.39 in. ± 0.01 in.) Polarity: center positive
	PoE	IEEE 802.3af/at-compliant PoE, with a maximum output power of 120 W
	Overall Power Consumption	< 130 W
	EEE	Yes
	Ground-Leakage Current	≤ 3.5 mA
Dimensions and Weight	Dimensions (W x D x H)	202 mm x 108 mm x 28 mm (7.95 in. x 4.25 in. x 1.10 in.)
	Weight	0.50 kg (1.10 lbs.)
Environment and Reliability	Operating Temperature	0ºC to 40ºC (32°F to 104°F)
	Storage Temperature	−40ºC to +70ºC (−40°F to +158°F)

	Operating Humidity	10% RH to 90% RH (non-condensing)
	Storage Humidity	5% RH to 95% RH (non-condensing)
	Fan	Fanless design
Certification and Regulatory Compliance	Certification	CE

Warning

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

1.4.2 Hardware Specifications of the RG-NBF2100S-8GT1SC

Table 1-12 Hardware Specifications of the RG-NBF2100S-8GT1SC

Parameter Type	Parameter Name	RG-NBF2100S-8GT1SC
System Specifications	Flash Memory	8 MB
	SDRAM	N/A
Port Specifications	Fixed Service Port	8 x RJ45 10/100/1000BASE-T Ethernet ports with auto-negotiation and 1 x gigabit SC uplink optical port
Power Supply and Consumption	Power Range of the ONU's SC Port	The optical power of the ONU's SC port should be within the range of −28 dBm to −8 dBm. If the power is out of this range, the device may have an exception or be damaged. **Caution** The SC port of the ONU should not be directly connected to the PON port of the OLT. According to the optical power indicator, when short-distance single-mode fibers are used, an online optical attenuator or splitter should be added on the link to prevent device damage.
	Power Module	Adapter AC input: Rated voltage range: 100 V AC to 240 V AC Maximum voltage range: 90 V AC to 264 V AC Frequency: 50 Hz/60 Hz Rated current: 1 A

	Adapter DC Power Connector	Inner diameter: 2.1 mm (0.08 in.) Outer diameter: 5.5 mm (0.22 in.) Insertion depth: 10 mm ± 0.3 mm (0.39 in. ± 0.01 in.) Polarity: center positive
	Ground-Leakage Current	≤ 3.5 mA
	EEE	Yes
	PoE	N/A
	Overall Power Consumption	< 12 W
Dimensions and Weight	Dimensions (W x D x H)	202 mm x 108 mm x 28 mm (7.95 in. x 4.25 in. x 1.10 in.)
	Weight	0.80 kg (1.76 lbs.)
Environment and Reliability	Operating Temperature	0ºC to 45ºC (32°F to 113°F)
	Storage Temperature	–40ºC to +70ºC (–40°F to +158°F)
	Operating Humidity	10% RH to 90% RH (non-condensing)
	Storage Humidity	5% RH to 95% RH (non-condensing)
	Fan	Fanless design
	Temperature Alarm	No
Certification and Regulatory Compliance	Certification	CE

Warning

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

1.4.3 Hardware Specifications of the RG-NBF2100S-16GT1SC-P

Table 1-13 Hardware Specifications of the RG-NBF2100S-16GT1SC-P

Parameter Type	Parameter Name	RG-NBF2100S-16GT1SC-P
System Specifications	Flash Memory	8 MB
	SDRAM	N/A

Port Specifications	Fixed Service Port	16 x RJ45 10/100/1000BASE-T Ethernet ports with auto-negotiation, 1 x gigabit SC uplink optical port, and 16 x ports supporting IEEE 802.3af/at-compliant PoE
Power Supply and Consumption	Power Range of the ONU's SC Port	The optical power of the ONU's SC port should be within the range of –28 dBm to –8 dBm. If the power is out of this range, the device may have an exception or be damaged. **Caution** The SC port of the ONU should not be directly connected to the PON port of the OLT. According to the optical power indicator, when short-distance single-mode fibers are used, an online optical attenuator or splitter should be added on the link to prevent device damage.
	Power Module	Adapter AC input: Rated voltage range: 100 V AC to 240 V AC Maximum voltage range: 90 V AC to 264 V AC Frequency: 50 Hz/60 Hz Rated current: Vout = 54 V (4.7 A), Vout = 12 V (3 A)
	Ground-Leakage Current	≤ 3.5 mA
	EEE	Yes
	PoE	IEEE 802.3af/at-compliant PoE, with a maximum output power of 240 W
	Overall Power Consumption	< 290 W
Dimensions and Weight	Dimensions (W x D x H)	330 mm x 229 mm x 44 mm (12.99 in. x 9.02 in. x 1.73 in.)
	Weight	3.7 kg (8.16 lbs., including the package)
Environment and Reliability	Operating Temperature	0ºC to 45ºC (32°F to 113°F)
	Storage Temperature	–40ºC to +70ºC (–40°F to +158°F)
	Operating Humidity	10% RH to 90% RH (non-condensing)
	Storage Humidity	5% RH to 95% RH (non-condensing)

	Fan	1 x fixed fan
	Temperature Alarm	No
Certification and Regulatory Compliance	Certification	CE

Warning

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

2 Preparing for Installation

2.1 Safety Guidelines

Note

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

2.1.1 General Precautions

- Do not place the equipment in a wet area, and keep it away from liquid. Keep the chassis clean and dust-free.
- Keep the equipment away from heat sources.
- For the equipment that is installed in a cabinet, ensure that the cabinet and power distribution system are properly grounded.
- Do not place the equipment in walking areas.
- During installation and maintenance, do not wear loose clothing, jewelry, or any other objects that may hook onto the chassis.
- Do not place tools and accessories in walking areas.

2.1.2 Chassis-Lifting Guidelines

- Avoid moving the equipment frequently.
- Turn off all power supplies and disconnect all power cords before lifting or moving the equipment.
- Two or more people are required to lift the chassis. Keep balance and prevent personal injuries when lifting or moving the equipment.

2.1.3 Electricity Safety

CAUTION：DOUBLE POLE/NEUTRAL FUSING

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

- Observe local regulations and specifications when performing electrical operations. Only qualified personnel should handle these tasks.
- Any improper electrical operation can lead to accidents such as fires or electric shocks, causing severe, or even fatal damage to the human body and the equipment.
- Carefully check the work area for potential hazards, including ungrounded power system, insufficient grounding, and damp or wet ground.
- Direct or indirect touch through a wet object on high-voltage and mains supply can bring a fatal danger.

- Locate the emergency power supply switch in the room before installation. In the case of an accident, cut off the power supply immediately.
- Carefully inspect the equipment and the environment before powering on or off the equipment.
- Select the right leakage protector (also called “leakage current switch” or “leakage current breaker”) for the power supply system. This equipment automatically disconnects the power supply in the event of leakage and the risk of electric shock. A leakage protector should meet the following requirements:
  - The rated leakage action current of each leakage protector is greater than twice of the theoretical maximum leakage current of all the power supplies in the system. For example, if a system is equipped with 16 identical power supplies, and the leakage current of each power supply is equal to or less than 3.5 mA, then the leakage current of the system totals 56 mA. A leakage protector with a rated leakage action current of 30 mA supports no more than four power supplies (that is, action current of the leakage protector/2/Maximum leakage current of each power supply = 30/2/3.5 ≈ 4.28). In this case, 16 power supplies in the system require at least four leakage protectors with a rated action current of 30 mA, with each leakage protector supporting four power supplies. Although the number of power supplies in a system differs in models, the rated leakage action current of each leakage protector divided by two must be greater than the sum of the maximum leakage current of all the power supplies.
  - The rated leakage non-action current of a leakage protector should be 50% of the leakage action current. If the non-action current value is too small, the high sensitivity level can cause the circuit to break, leading to power cutoff and service interruption, even if the leakage current value is normal. For example, if a leakage protector has a rated leakage action current of 30 mA, the rated leakage non-action current should be 15 mA. The leakage protector will not activate unless the leakage current exceeds 15 mA.

Caution

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

2.1.4 Preventing ESD Damage

- Properly ground both the equipment and the installation site.
- Keep the site as dust free as possible.
- Maintain appropriate humidity conditions.
- Before installing or maintaining the equipment, wear an anti-ESD wrist strap and make sure that it is properly grounded.
- Avoid contact between the printed circuit boards and clothing. The anti-ESD wrist strap only protects the printed circuit boards from ESD voltages on the body. ESD voltages on clothing can still cause damage.

2.1.5 Laser Safety

An equipment 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.

Caution

Do not approach or look directly into any optical port under any circumstances. This may cause permanent damage to your eyes.

Figure 2-1 Laser Product Warning



2.2 Site Requirements

To ensure the normal operation and prolonged service life of the equipment, it is essential to install it indoors in a location that meets the following requirements.

2.2.1 Floor Loading

Assess the combined weight of the equipment and its accessories, including the cabinet, chassis, and power supply, and verify that the installation site meets the necessary specifications.

2.2.2 Airflow

To ensure that the equipment works properly in the specified environment, a minimum clearance of 100 mm (3.94 in.) must be maintained around the equipment to ensure proper ventilation. Manage the Ethernet cables and power cords using cable ties or cable management brackets to avoid blocking air intakes. You are advised to dust the equipment at an interval of three months to avoid blocking the ventilation openings.

2.2.3 Space

Ensure that indoor pathways are at least 0.8m (31.50 in.) wide to allow for proper chassis handling and module swapping.

Maintain a minimum clearance of 0.4m (15.75 in.) around the equipment for heat dissipation and equipment maintenance.

2.2.4 Temperature and Humidity

For optimal equipment performance and extended service life, it is essential to maintain ambient temperature and humidity conditions. Prolonged exposure to excessively high or low temperature and humidity can potentially cause damage to the equipment.

- When exposed to high relative humidity, insulating materials may exhibit poor insulation capabilities, increasing the risk of electrical leakage. Furthermore, high humidity can cause mechanical changes in materials and corrosion of metallic components.
- When exposed to low relative humidity, the insulating strip may dry out and shrink, increasing the risk of static

electricity generation. This static electricity can pose a danger to the circuits inside the equipment.

- In a dry environment, static electricity is prone to occur and damage the internal circuits of the equipment.
- High temperature environments can be detrimental to the equipment, leading to reduced performance and a shorter service life. Prolonged exposure to elevated temperatures can expedite the equipment's aging process.

Note

The ambient temperature and humidity of the equipment are measured 1.5 m (59.06 in.) above the floor and 0.4 m (15.75 in.) before the equipment rack when there is no protective plate in front or at the back of the rack.

2.2.5 Cleanliness

Dust poses a major threat to the running of the equipment. The buildup of dust on the equipment can result in static electricity, causing poor contact between the metallic joints. Dust buildup is more likely to occur in environments with low relative humidity, which not only impacts the service life of the equipment but also increases the likelihood of communication failure. The following table shows the specifications for dust concentration and particle size in the equipment room.

Table 2-1 Requirements for Dust

Particle Size	Unit	Concentration
≥ 0.5 μm	Particles/m^3	≤ 3.5×10^6
≥ 5 μm	Particles/m^3	≤ 3.5×10^4

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

Table 2-2 Requirements for Gases

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

Note

"Average" indicates the typical level of exposure over a one-week period. "Maximum" refers to the highest allowable exposure level within a week, with this level being sustainable for no more than 30 minutes per day.

2.2.6 Grounding

A proper grounding system is crucial for ensuring stable and reliable operation of the equipment, as well as preventing lightning strikes and interference. To ensure proper grounding, carefully check the grounding conditions at the installation site according to the grounding specifications, and complete grounding properly based on the actual situation.

- Safety Grounding

Ensure that the installation site and power distribution system are securely grounded if the equipment uses the AC power supply. Failure to do so may result in an increased risk of electric shock, particularly when the insulation resistance between the power module and the chassis decreases.

⚠ Caution

- Adopt grounding protection connections in buildings so that the equipment can be connected to the protective grounding system.
- Verify that the AC socket is reliably connected to the protective grounding system of the building. If not, a protective grounding wire should be used to connect the protective grounding lug of the AC socket to the protective grounding system of the building.
- The cross-sectional area of the protective grounding wire should be at least 0.75 mm^2 (18 AWG).

- Lightning Grounding

The lightning protection system of facilities is standalone, and is composed of a lightning rod, a down conductor, and a connector connected to the grounding system. The grounding system is usually used for power reference grounding and safety grounding of the installation site. Lightning grounding is required only for facilities and is not required for the equipment.

- EMC Grounding

Grounding required for electromagnetic compatibility includes shielded grounding, filter grounding, noise and interference suppression, and level reference, which contribute to the overall grounding requirements. The grounding resistance should be smaller than 1 ohm, and the grounding terminals of the rack should be grounded before the running of the equipment.

2.2.7 Anti-Electromagnetic Interference

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

2.2.8 Surge Protection

- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- Install a power arrester in front of the power input end to enhance surge protection for the power supply.
- When an AC power cord is introduced from outdoors and directly connected to the power port of the equipment, the AC power port must be connected to an external lightning protection power strip to protect the equipment against lightning strokes. Connect the mains supply AC power cord to the lightning protection

power strip, and then connect the equipment to the lightning protection power strip. This prevents high-voltage lightning from directly passing through the equipment over the mains supply AC power cord.

Note

- The lightning protection power strip is not delivered with the equipment. Purchase it as required.
- For details on how to use the lightning protection power strip, see the related user guide.

2.2.9 EMI

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

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

2.2.10 Installation Site

Regardless of whether the equipment is installed in a rack, on a workbench or on a wall, the following conditions must be met:

- Maintain a proper clearance around air vents for heat dissipation.
- The equipment is equipped with fans to draw air from front and left and right sides to rear. Maintain a minimum clearance of 150 mm (5.91 in.) around the ventilation openings for heat dissipation. Install the equipment in a standard 19-inch rack, or place it on a clean workbench. In hot areas, air-conditioning is recommended.
- The installation site has good cooling and ventilation.
- The installation site is sturdy enough to support the weight of the equipment and its accessories.
- The installation site is properly grounded.

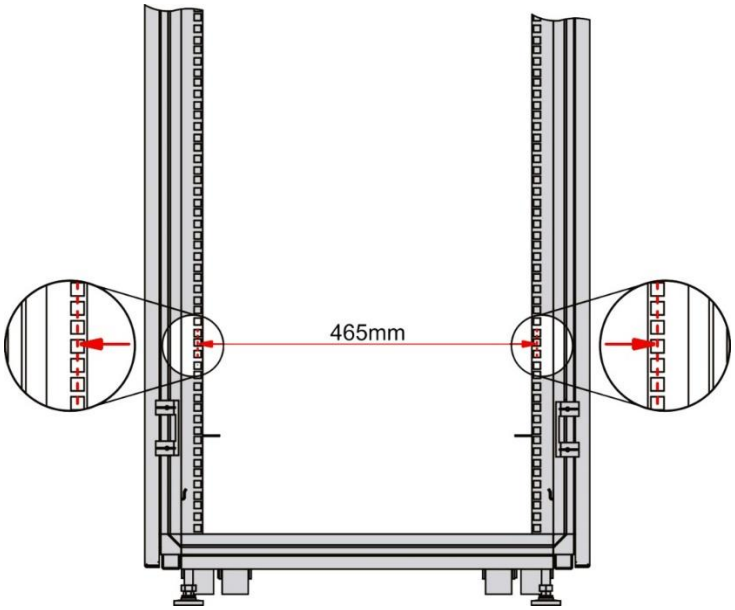
2.3 Rack Requirements

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

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

(2) The left and right square-hole rack posts are 465 mm (18.31 in.) apart.

Figure 2-2 19-Inch Rack



(3) The square-hole rack post is at least 180 mm (7.09 in.) from the front door, and the front door is at most 25 mm (0.98 in.) thick. This ensures an available clearance of at least 155 mm (6.10 in.). The rack depth (distance between front and rear doors) is at least 1000 mm (39.37 in.).

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

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

(6) The cabinet has a good ventilation system. The open area of front and rear doors is greater than 50%.

2.4 Tools

Table 2-3 Tools

Common Tools	Phillips screwdriver, power cords, Ethernet cables, cage nuts, diagonal pliers, and cable ties
Special Tools	Anti-ESD gloves, wire stripper, crimping plier, RJ45 crimping plier, and wire cutter
Meters	Multimeter

Note

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

3 Installing the Switch

Caution

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

3.1 Precautions for Installation

Pay attention to the following points during installation:

- 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 connector of the switch.
- Do not place any objects above the switch.
- Maintain a minimum clearance of 100 mm (3.94 in.) around the switch to ensure proper airflow. Do not stack switches.
- Keep the switch far away from high-frequency current equipment such as high-power radio transmitting stations and radar launchers. Take electromagnetic shielding measures when necessary, such as electromagnetic shielding for port cables.
- Keep Ethernet cables with a distance of 100 m (328.08 feet) indoors. Take surge protection measures if they need to be routed outdoors.

3.2 Installation Procedure

3.2.1 Installing a Switch in a Rack

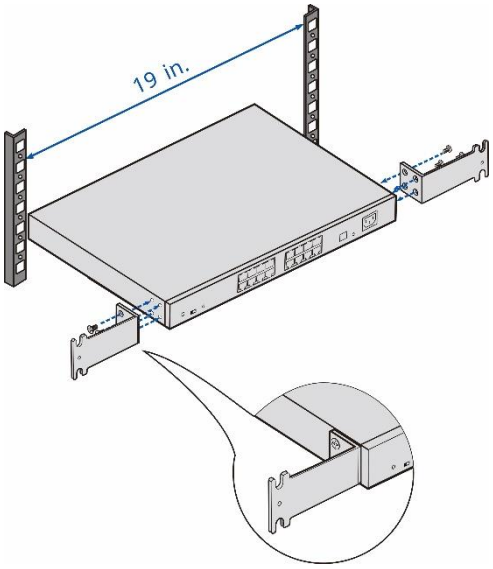
Caution

Only the RG-NBF2100S-16GT1SC-P can be installed in a rack.

The size of the RG-NBF2100S-16GT1SC-P complies with the EIA standard and can be installed in a standard 19-inch rack.

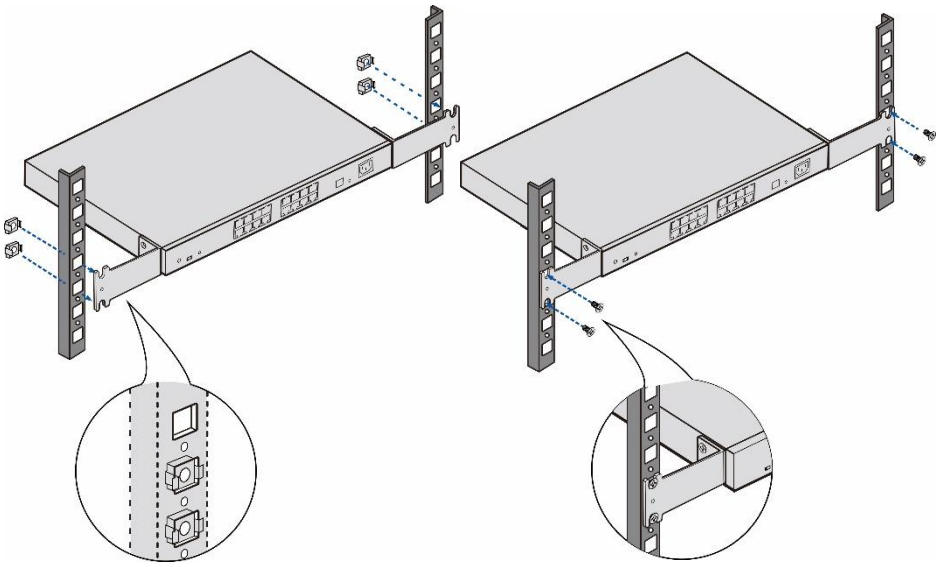
(1) Use eight M3 x 6 mm screws to fix the mounting brackets to the left and right sides of the switch.

Figure 3-1 Installing Mounting Brackets on the RG-NBF2100S-16GT1SC-P



(2) Place the switch horizontally in the rack and secure it to the rack using the M6 screws and matching cage nuts, which need to be prepared by yourself.

Figure 3-2 Securing the RG-NBF2100S-16GT1SC-P to the Square Holes of the Rack



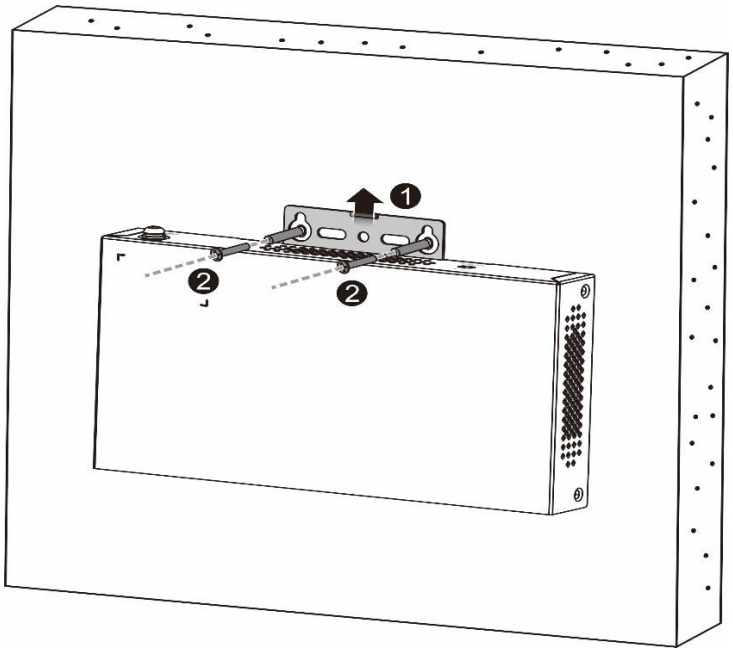
3.2.2 Mounting a Switch on the Wall

Caution

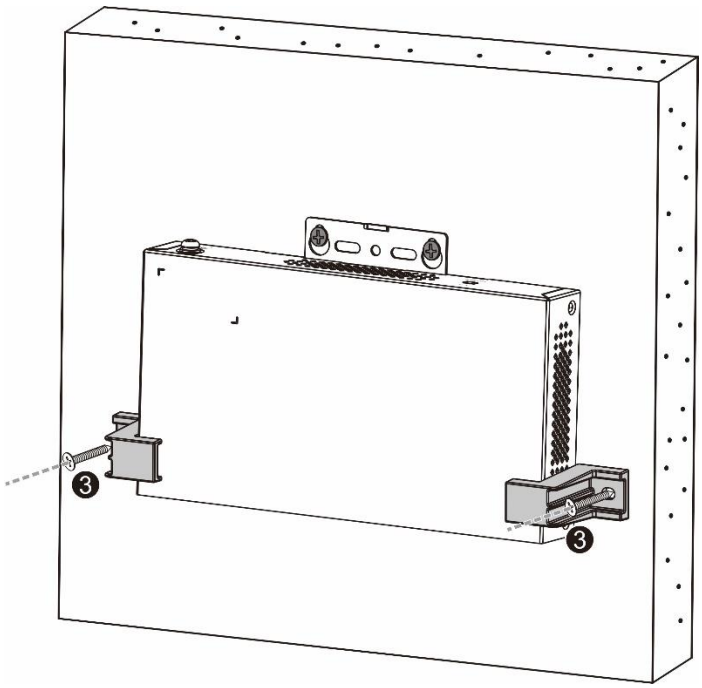
- Only RG-NBF2100S series 8-port switches support the wall-mounting mode.
- Ensure that the length of the M4 screws prepared by yourself is longer than 10 mm (0.39 in.).
- If a switch is mounted on a wall, it must be installed in a position that restricts mobility.

- **Mounting an RG-NBF2100S Series 8-Port Switch on the Wall**

(1) Pull out the mounting plate of the switch, and use two M4 screws (which need to be prepared by yourself) to secure the switch to the wall.



(2) Use the mounting brackets and two M4 screws (which need to be prepared by yourself) to secure the switch to the wall.



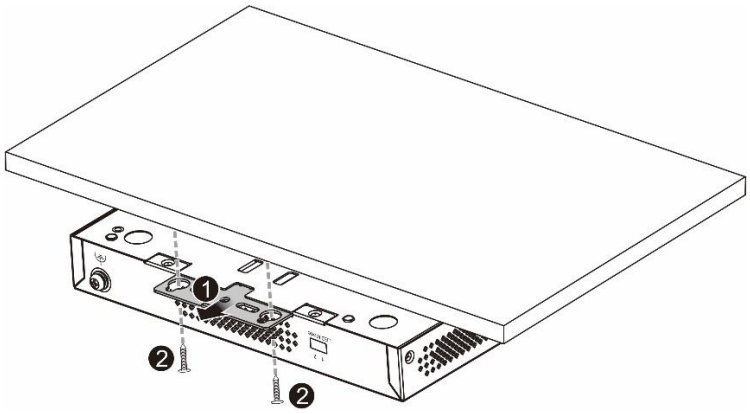
3.2.3 Mounting a Switch on the Ceiling

Caution

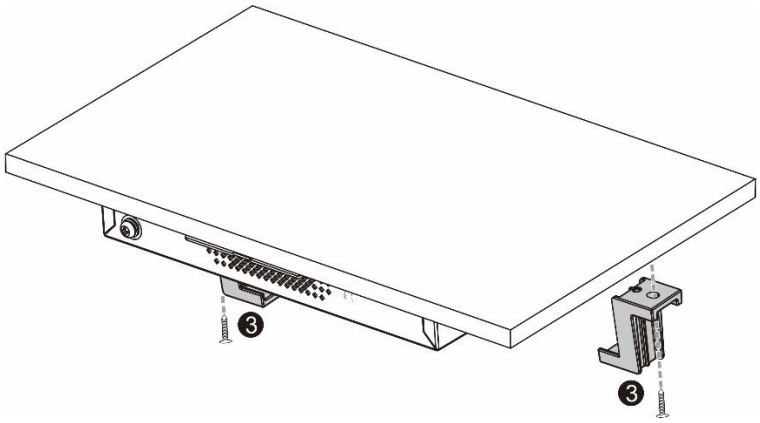
- Only RG-NBF2100S series 8-port switches support the ceiling-mounting mode.
- If a switch is installed on a ceiling, it must be installed in a position that restricts mobility.

- Before mounting a switch on a ceiling, ensure that the ceiling can support the weight of the switch.
- Ensure that the length of the M4 screws prepared by yourself is longer than 10 mm (0.39 in.).

(1) Pull out the mounting plate of the switch, and use two M4 screws (which need to be prepared by yourself) to secure the switch to the ceiling.



(2) Use the mounting brackets and two M4 screws (which need to be prepared by yourself) to secure the switch to the ceiling.



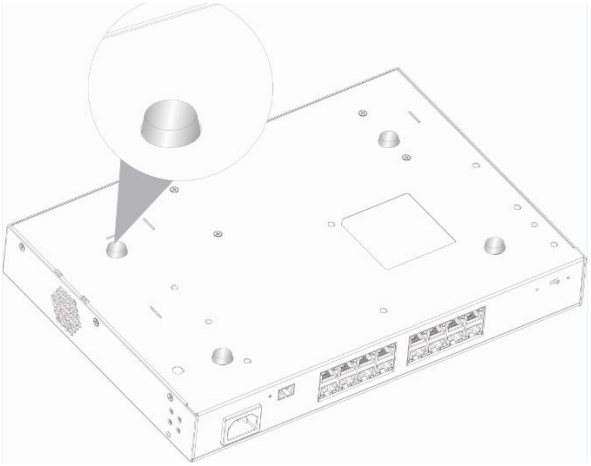
3.2.4 Installing a Switch on a Desktop

Note

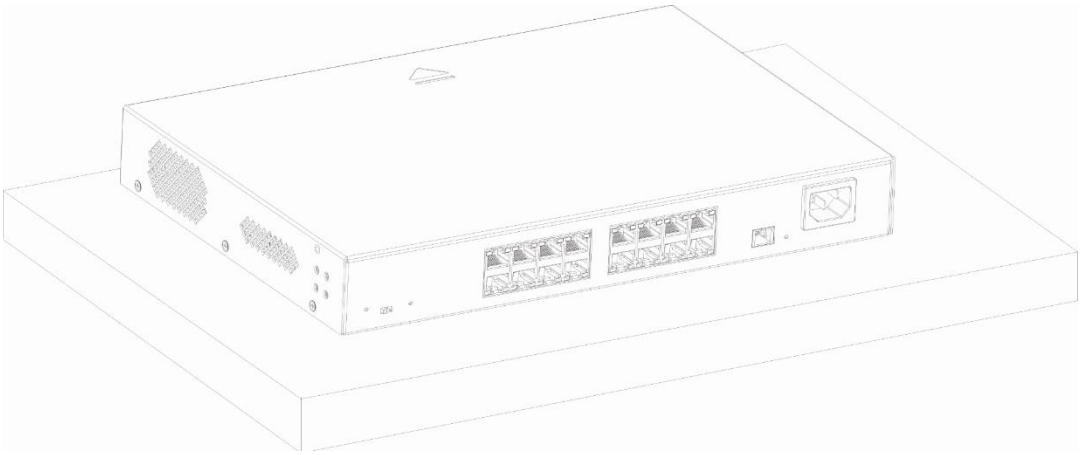
If a switch is installed on a desktop, it must be installed in a location where mobility is restricted.

In most cases, users do not have the conditions for installing a switch in a rack, on a wall, or on a ceiling. In this case, the switch can be placed on a clean workbench. The desktop installation steps of the RG-NBF2100S series switches are the same. The following uses RG-NBF2100S-16GT1SC-P as an example to describe the desktop installation procedure.

(1) Paste the four rubber pads provided in the package to the four corners of the bottom of the device.



(2) Place the switch on the workbench and ensure adequate airflow around the switch.



3.3 Connecting the Grounding Wire

Warning

- To avoid personal injury and device damage, connect the switch to an earth ground properly.
- The resistance between the switch chassis and the ground must be less than 1 Ω.
- The O&M personnel should check whether the AC outlet is properly connected to the protective ground of the building. If not, the O&M personnel should use a protective earth conductor from the AC outlet protective earth terminal to the building protective earth.
- The power socket should be installed near the switch and easily accessible.
- During device installation, connect the grounding wire first and disconnect it last.
- The cross-sectional area of a protective grounding wire should be at least 2.5 mm^2 (12 AWG).

A proper grounding system is crucial for ensuring stable and reliable operation, as well as preventing lightning strikes and interference.

- The grounding wire must be a good conductor with a cross-sectional area determined by the maximum current load.
- Do not use bare wire.
- To guarantee personal and device safety, properly ground the switch. The resistance between the switch

chassis and the ground must be less than 1 Ω.

Procedure:

(1) Remove the ground screw on the rear panel of the device.

(2) Use the removed ground screw to secure one end of the grounding wire to the chassis. Similarly, connect the other end of the grounding wire to the rack grounding cable or the equipment room grounding bar.

3.4 Connecting the Power Cord

Caution

- Use the power adapter and power cord delivered with the device to avoid accidents.
- The O&M personnel should check whether the AC outlet is properly connected to the protective ground of the building. If not, the O&M personnel should use a protective earth conductor from the AC outlet protective earth terminal to the building protective earth.
- During device installation, connect the grounding wire first and disconnect it last.
- The power socket should be installed near the switch and easily accessible.

3.4.1 Connecting the Power Cord of the Power Adapter

All RG-NBF2100S series models use the power cord of the power adapter except for the RG-NBF2100S-16GT1SC-P.

Connect the power cord as follows:

(1) Insert the round end of the power adapter into the DC power connector of the device, and then plug the other end into the AC power socket.

(2) Check whether the system status LED on the front panel is on. If so, the power supply is connected correctly. Otherwise, check the power supply connection.

3.4.2 Connecting the AC Power Cord

Only the RG-NBF2100S-16GT1SC-P uses the AC power cord.

Connect the power cord as follows:

(1) Connect the AC power cord to the power connector of the device, and then plug the other end into the AC power socket.

(2) Check whether the system status LED on the front panel is on. If so, the power supply is connected correctly. Otherwise, check the power supply connection.

3.5 Verifying Installation

- Check whether the device is securely installed.
- The power cord meets the requirements.
- The rack is properly grounded.
- The switch is correctly connected to the terminal or other equipment.
- The power cord is long enough to avoid over-extension.

4 Log in to the Web UI

(1) Connect the PC to the Ethernet port of the device using a cable.

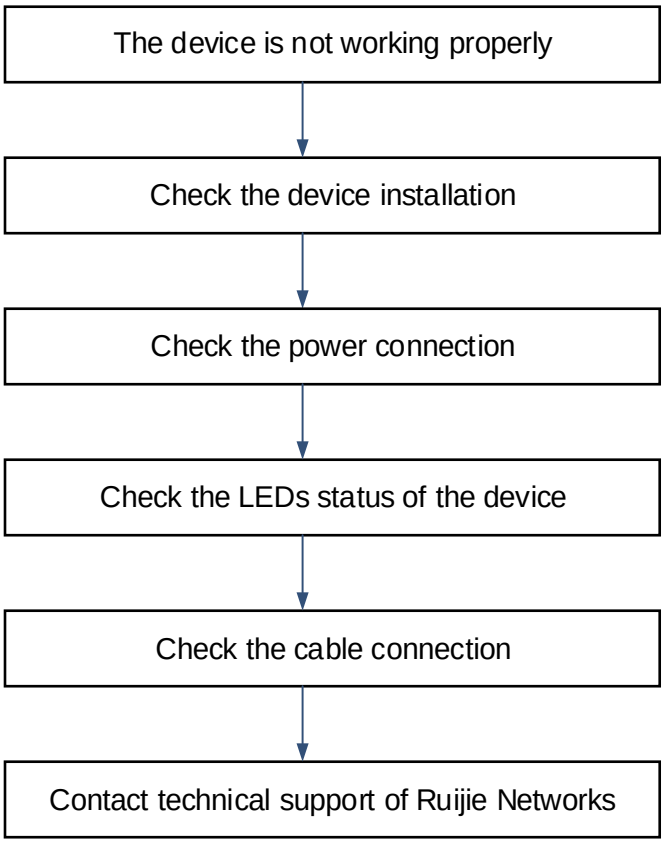
(2) Configure your PC with an IP address on the network of 10.44.77.*XXX* (Range of *XXX*: 1 to 254, excluding 200).

(3) Open a browser, enter 10.44.77.200 in the address bar of the browser, and press **Enter**. (The default password is **admin** when you log in to the device for the first time. To ensure security, you are advised to change the password after login, and update the password regularly.)

(4) Perform device commissioning based on service requirements.

5 Troubleshooting

5.1 Troubleshooting Flowchart



5.2 Common Faults

5.2.1 Forgot or Lost the System Login Password

Press and hold the reset button for more than 5 seconds to restore factory settings and reset the system login password.

5.2.2 System Status LED Is Off for a Long Time

Power off all power supplies. Check whether the cables of the rack are correctly connected, whether the power socket of the rack is normal, whether the connection between the power socket of the rack and the power cord is loose, and whether the connection of the power cord of the device is loose.

5.2.3 Only Partial PoE Ports Can Supply Power

PoE ports can be connected to PoE-powered devices. If some ports supply power and some ports do not, check whether the faulty ports are manually disabled by software and whether the power provided by the PoE power supply is insufficient. If the power is insufficient, only the ports with higher default priorities are powered on.

Fault Symptom	Possible Cause	Solution
The login password cannot be retrieved.	The login password is forgotten after being configured.	Press and hold the reset button for more than 5 seconds to reset your username and password.
The system status LED is off after the switch is powered on.	No power is supplied to the switch or the power cord is loose.	Check whether the power socket in the equipment room is normal and whether the power cord connected to the switch is loose.
An RJ45 port is disconnected or a frame sending/receiving error occurs.	● The twisted pair is not connected properly. ● The cable length exceeds 100 m (328.08 feet). ● The port has special configuration and does not use the same working mode as the connected switch.	● Replace the twisted pair. ● Use optical cables or connect to an intermediate switch for relay. ● Check port configuration and ensure that the port works in the same mode as the connected switch.
Only partial PoE ports can supply power.	The PoE port is manually disabled or the output power of the PoE power supply is limited.	Enable the PoE port or remove the output power limit of the PoE power supply

6 Appendix

6.1 Ports, Connectors, and Media

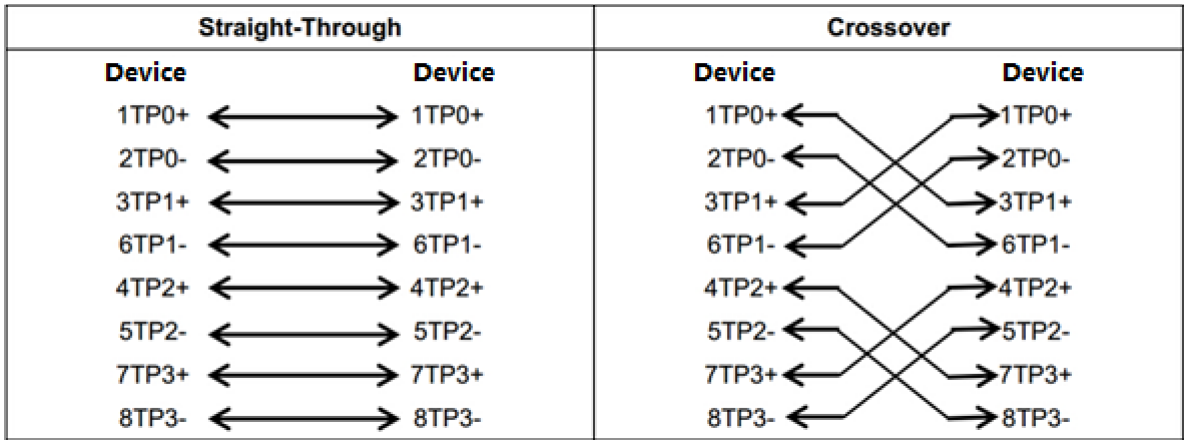
6.1.1 1000BASE-T/100BASE-TX/10BASE-T Ports

1000BASE-T/100BASE-TX/10BASE-T ports are Ethernet ports with auto-negotiation of three speeds: 10 Mbps, 100 Mbps, and 1000 Mbps. They support auto MDI/MDIX Crossover, and use RJ45 connectors.

Compliant with the IEEE 802.3ab standard, a 1000BASE-T port requires 100-ohm Category 5 or 5e unshielded twisted pair (UTP) or shielded twisted pair (STP) (recommended) cables, and supports a maximum distance of 100 meters (328 feet).

A 1000BASE-T port requires all four pairs of wires to be connected for data transmission. Figure 6-1 shows the four pairs of wires for the 1000BASE-T port.

Figure 6-1 1000BASE-T Twisted Pair Connections



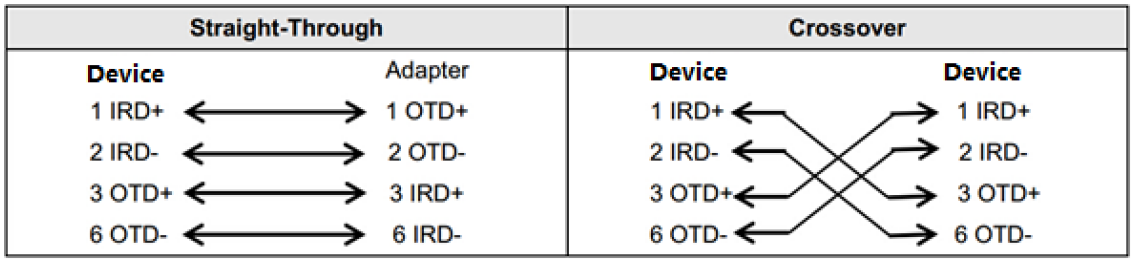
100BASE-TX/10BASE-T ports can be interconnected using cables of the preceding specifications. In addition, a 10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables, while a 100BASE-TX port can be connected using 100-ohm Category 5 cables, and supports a maximum distance of 100 meters (328 feet). Table 6-1 shows 100BASE-TX/10BASE-T pin assignments.

Table 6-1 100BASE-TX/10BASE-T Pin Assignments

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

Figure 6-2 shows the connection of straight-through and crossover cables for 100BASE-TX/10BASE-T ports.

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

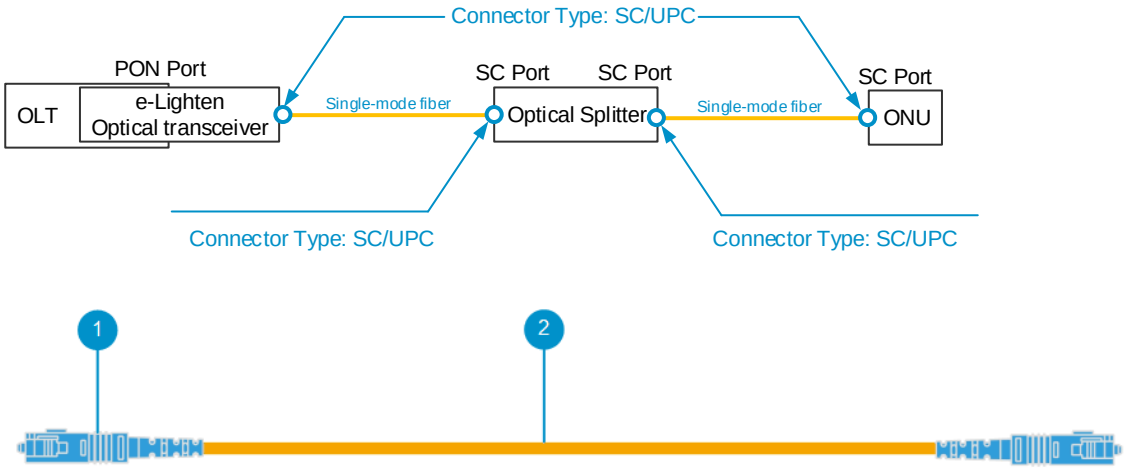


6.1.2 PON Ports and SC Ports

Figure 6-3 shows the PON ports and SC ports on equipment in Ruijie Reyee e-Lighten Optical Solution.

- PON ports on the OLT require e-Lighten optical transceivers with SC/UPC connectors, which are connected to an optical splitter using single-mode fiber.
- SC ports on optical splitters and ONUs use SC/UPC connectors, and are interconnected using single-mode fiber.

Figure 6-3 PON Port and SC Port Connections



No	Description
1	SC/UPC connector
2	Single-mode fiber

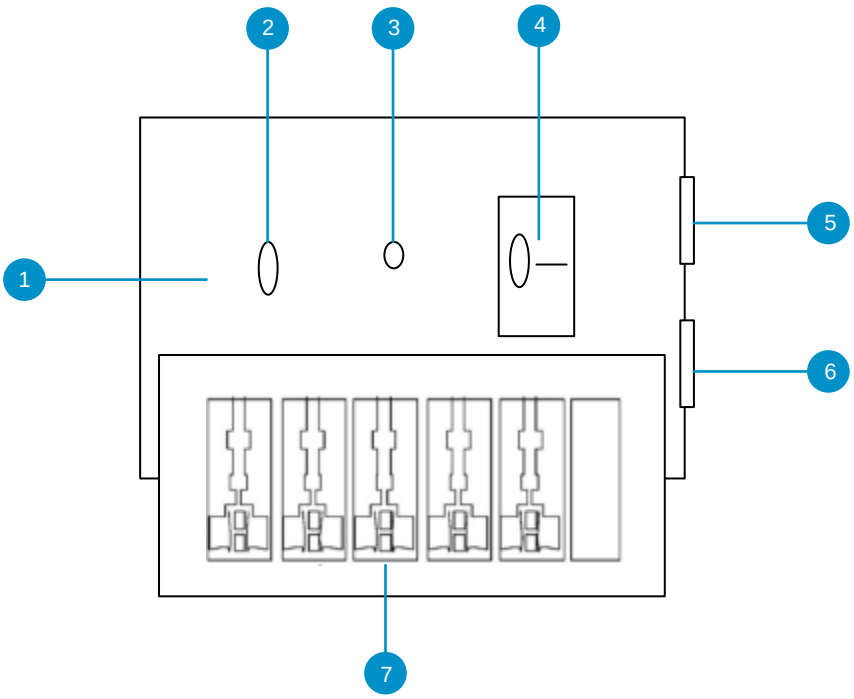
6.2 Surge Protection

6.2.1 Installing an AC Power Lightning Arrester

When an AC power cord from outdoors is directly plugged into the power port of the equipment, the AC power connector must be connected to an external surge protector power strip to protect the equipment against

lightning strikes. The surge protector power strip can be fixed on the rack, workbench, or wall in the equipment room by using cable ties and screws. AC power enters the equipment through the surge protector power strip.

Figure 6-4 Installing an AC Power Lightning 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.
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 lightning arrester is not delivered with the equipment. Please purchase it based on actual requirements.

Precautions:

- Make sure that the PE terminal of the power arrester is well grounded.
- After the AC power plug of the equipment is connected to the socket of the power arrester (lightning resistance socket), the surge protection function is implemented only if the RUN indicator is green and the ALARM indicator is OFF.
- If the indicator on the power arrester is red, check whether it is caused by poor grounding connection or by the reversed connection of the Null and Live lines. The detection method is as follows: Use a multimeter to measure the polarity of the power socket for the arrester when the indicator is red. If the N line is on the left and the L line is on the right (facing the socket), the arrester's PE terminal is not grounded. If not, the polarity of the arrester power cord should be reversed. In this case, you should open the power arrester and rectify the polarity of the connection. If the indicator is still red, the arrester's PE terminal is not grounded.

6.2.2 Installing an Ethernet Port Lightning Arrester

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

Tools: Phillips screwdrivers or flat-head screwdriver, multimeter, and diagonal pliers

Procedure:

(1) Tear one side of the protective paper for the double-sided adhesive tape and paste the tape to the enclosure of the Ethernet port arrester.

(2) Tear the other side of the protective paper for the double-sided adhesive tape and paste the Ethernet port arrester to the enclosure. The paste position for the Ethernet port arrester should be as close to the grounding terminal of the equipment as possible.

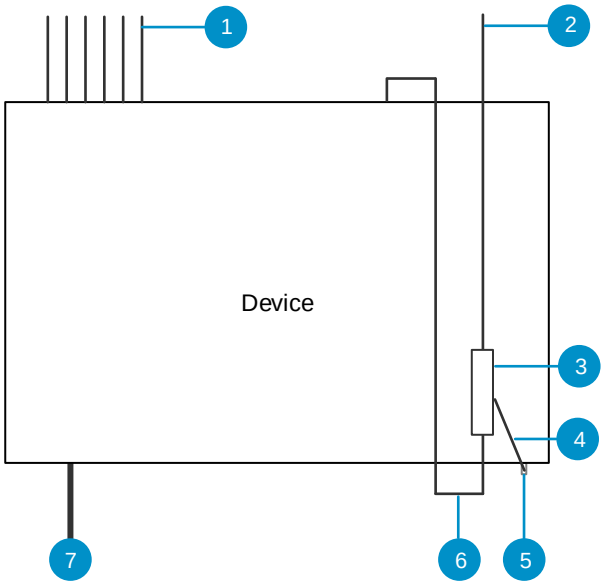
(3) According to the distance between the equipment grounding terminal and the Ethernet port arrester, cut the grounding cable for the Ethernet port arrester and firmly crimp the grounding cable to the grounding terminal of the equipment.

(4) 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 equipment.

(5) 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 equipment is connected to the OUT end) and check whether the service module LED is normal.

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

Figure 6-5 Installing an Ethernet Port Lightning 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
7	Power input

Note

- The Ethernet port arrester is only for Ethernet ports with an RJ45 connector.
- The Ethernet port arrester is not delivered with the equipment. 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 equipment 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 equipment. Use a multimeter to confirm the contact condition after grounding.
- Incomplete arrester installation. If there is more than one port connected to external power cords, arresters

need to be installed on all connection ports for the purpose of surge protection.

6.3 Recommended Cabling

When the device is installed in a standard 19-inch rack, route the cables through the cable management brackets. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room. All conversion connectors should be placed at the bottom of the rack instead of outside the rack that is easily accessible. Power cords are routed beside the cabinet, and top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the locations of the DC power distribution box, AC power socket, or surge protection box.

6.3.1 Requirements for the Minimum Bend Radius of an Ethernet Cable

- The bend radius of a fixed power cord, Ethernet 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.

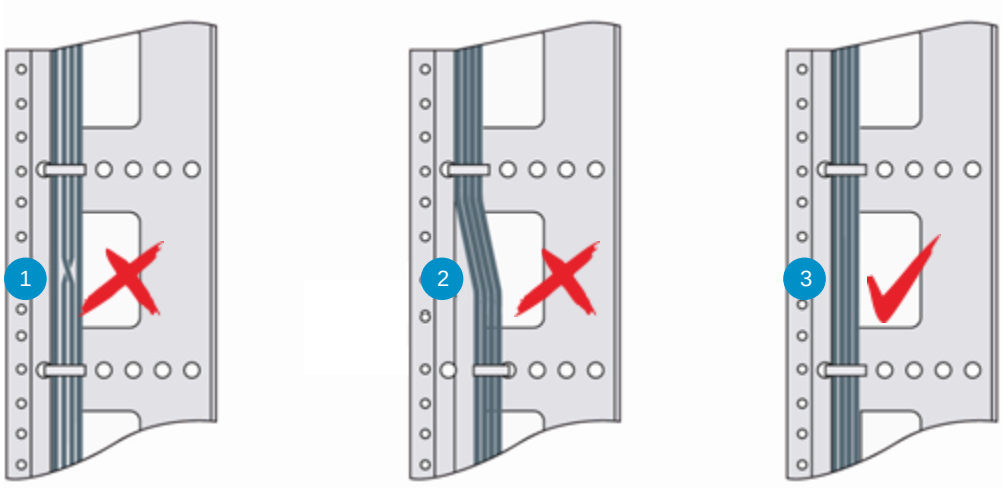
6.3.2 Requirement for the Minimum Bend Radius of an Optical Cable

- When an optical cable is coiled, the diameter of a fiber tray should be over 25 times greater than the diameter of the optical cable.
- When an optical cable is moved, the bend radius of the optical cable should be over 20 times greater than the diameter of the optical cable.
- When an optical cable is laid, the bend radius of the optical cable should be over 10 times greater than the diameter of the optical cable.

6.3.3 Precautions for Bundling up Cables

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

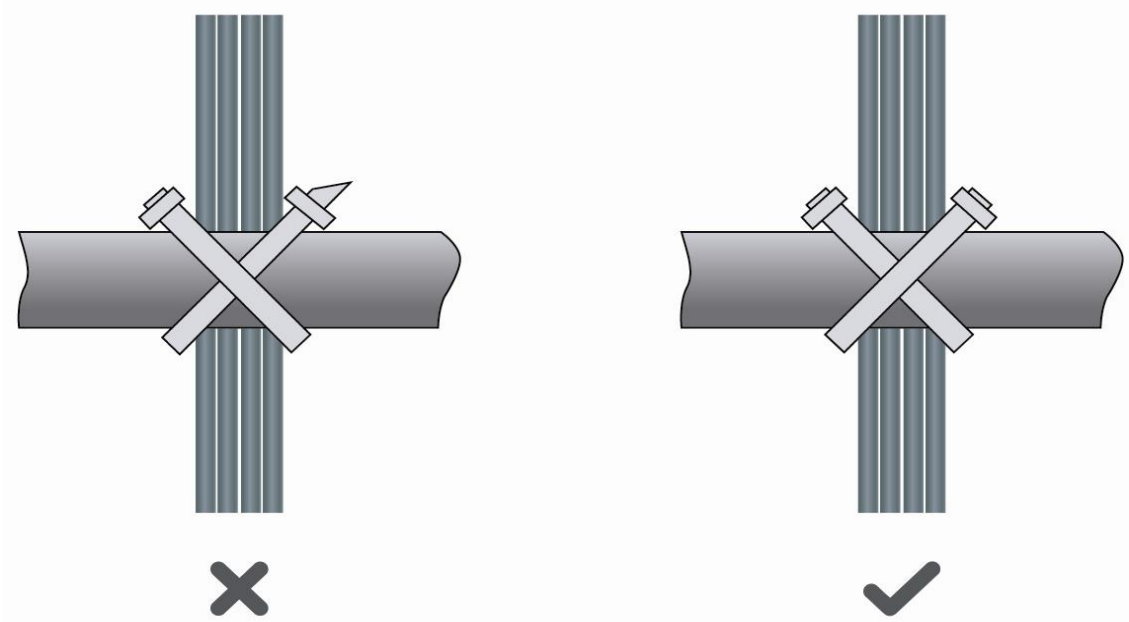
Figure 6-6 Binding Cables (I)



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.

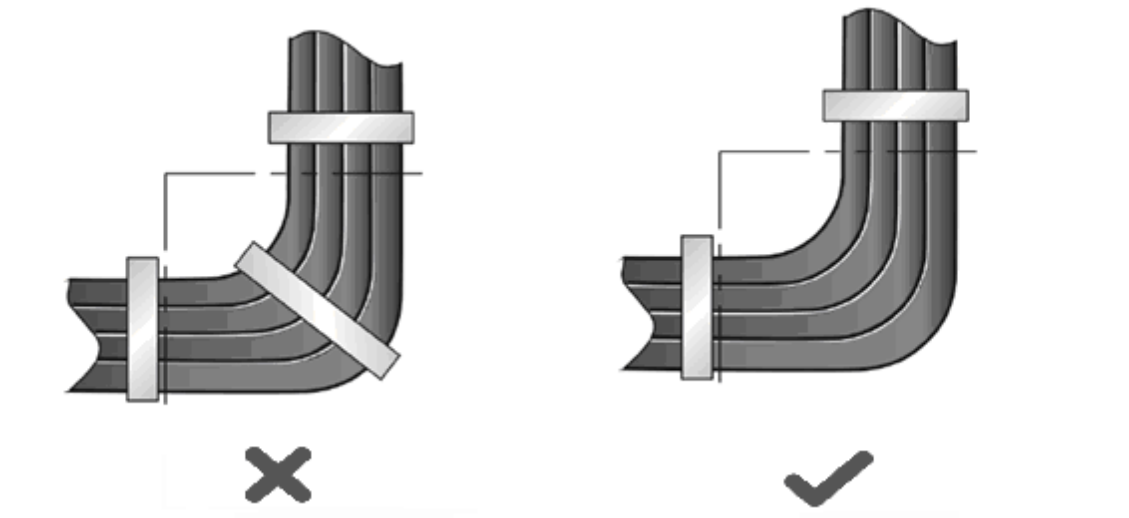
- Cables of different types (such as power cords, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 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, as shown in Figure 6-7.

Figure 6-7 Binding Cables (II)



- When cables need to be bent, please bundle them up but do not tie them where the cables will be bent, as shown in Figure 6-8.

Figure 6-8 Binding Cables (III)

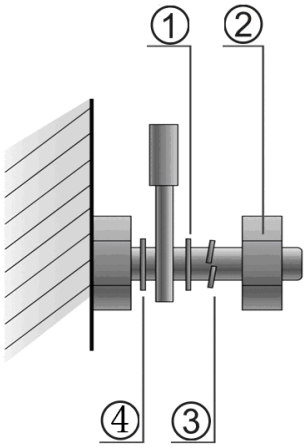


- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the rack or cable trough. The proper position refers to a position that does not affect device running or damage the device or cable.
- Do not bind power cords to the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding cables should be reserved with a margin after being assembled to avoid suffering tension or stress. When the moving part is installed, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided,

high-temperature cables should be used.

- When screw threads are used to fasten cable terminals, the anchor or screw must be tightly fastened, as shown in Figure 6-9.

Figure 6-9 Cable Fastening



① Flat washer ③ Spring washer

② Screw nut 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.

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.

6.4 Site Selection

- The equipment room should be at least 5 km (3.11 miles) away from heavy pollution sources, such as the smelter works, coal mine, and thermal power plant. The equipment room should be at least 3.7 km (2.30 miles) away from medium pollution sources, such as the chemical factory, rubber factory, and electroplating

factory. The equipment room should be at least 2 km (1.24 miles) away from light pollution sources, such as the food factory and leather plant. If the pollution source is unavoidable, the equipment room should be located on the windward side of the pollution source perennially with advanced protection.

- The equipment room should be at least 3.7 km (2.30 miles) away from the sea or salt lake. Otherwise, the equipment room must be sealed, with 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.

6.5 Cleaning the Connectors and End Faces of Optical Cables

To ensure a good connection between a patch cable and an optical cable coupler, the cleanliness of the end face is a quite important factor, as it directly affects the communication quality of the optical network. In the daily construction of optical networks, however, improper operations or other reasons can easily contaminate the end face. When the end face accumulates dust, oil stains, and other dirt, if it is not detected and cleaned before connection, it will cause increased optical attenuation, leading to optical network failures. What's worse, it may even result in the collapse of the entire optical signal system. The following are common methods for cleaning connectors and end faces:

- Using fiber-optic cleaning pens

Fiber-optic cleaning pens, also known as one-click fiber-optic cleaners, typically use anti-static resin materials, lint-free cleaning tip, and cleaning solution to ensure the product remains free from dust contamination. Available in 1.25 mm and 2.5 mm sizes, these pens are suitable for cleaning SC, FC, LC connectors, and more. Select an appropriate cleaning pen for the connector to be cleaned, and gently insert the pen into the connector. To prevent ferrule damage, avoid excessive pressure when you insert the cleaning pen. Press inward gently until you hear a "click", indicating the end face has been cleaned. If necessary, repeat the process 2 to 3 times for thorough cleaning. Finally, remove the pen to complete the cleaning process.

- Using fiber-optic cleaning boxes or lint-free cloths
  - Made from high-density textile fibers, fiber-optic cleaning boxes do not need alcohol, do not produce static electricity, and are lint-free. In addition, fiber-optic cleaning boxes offer a convenient way for cleaning various optical cable connectors, including SC, FC, LC, and ST connectors.
  - To use the cleaning box, grip it with one hand and press it to reveal the clean cleaning belt core. Gently swipe the optical cable ferrule to be cleaned across the cleaning belt several times to remove dirt from the end face. To prevent ferrule damage, avoid excessive pressure when you swipe the optical cable ferrule.