# Ruijie Reyee RG-NBS6002 Switch

## Installation Guide

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# Preface

## Intended Audience

This document is intended for:

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

## Technical Support

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

## Conventions

The signs used in this document are described as follows:

### 1. Signs

**Danger**

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

**Warning**

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

**Caution**

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

**Note**

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

**Specification**

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

### 2. Notes

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

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# 1 Product Overview

RG-NBS6002 switch is 1U swappable box-type network switch independently developed by Ruijie Networks. It provides two line card slots for four types of line cards and two power supply module slots for 1+1 power redundancy. The following table describes components of an RG-NBS6002 switch.

| Item | Model | Remarks |
|---|---|---|
| Chassis (independently purchased and delivered) | RG-NBS6002 | The chassis contains the backplane. |
| Service module (independently purchased and delivered) | M6000-24GT2XS | One or two service modules can be configured. |
| | M6000-24SFP2XS | |
| | M6000-16GT8SFP2XS | |
| | M6000-16SFP8GT2XS | |
| Power supply module (independently purchased and delivered) | RG-PA150I-FS | 1+1 redundancy is supported. |

## 1.1 RG-NBS6002 Switch

### 1.1.1 Package Contents

**Table 1-1 Package Contents**

| Item | Quantity |
|---|---|
| Chassis | 1 |
| Power supply module filler panel | 1 |
| Service module filler panel | 1 |
| M4 x 10 mm cross recessed countersunk head screw | 1 |
| M4 x 8 mm cross recessed countersunk head screws | 8 |
| Rubber pad | 4 |
| Rack-mount bracket | 2 |
| Grounding cable | 1 x 2 m (6.56 ft.) |
| Warranty Card | 1 |
| User Manual | 1 |

**Note**

- The preceding table lists items delivered in normal cases. The actually delivered items may vary with the contract. Carefully check your goods against the package contents or contract. Contact the seller if you have any questions or find any errors.

## 1.1.2 Product Appearance

The hardware of an RG-NBS6002 switch consists of the chassis, power supply system, system modules, and heat dissipation system.

Power supply system: Provides two power supply module slots and supports 1+1 power redundancy. It is recommended to configure power redundancy.

System modules: Provides two service module slots. All service modules can be configured in either of the two slots. You can select different service modules based on actual application requirements.

**Figure 1-1 RG-NBS6002 Switch Appearance (Service Module Combination of M6000-24GT2XS and M6000-24SFP2XS)**

**Front View**



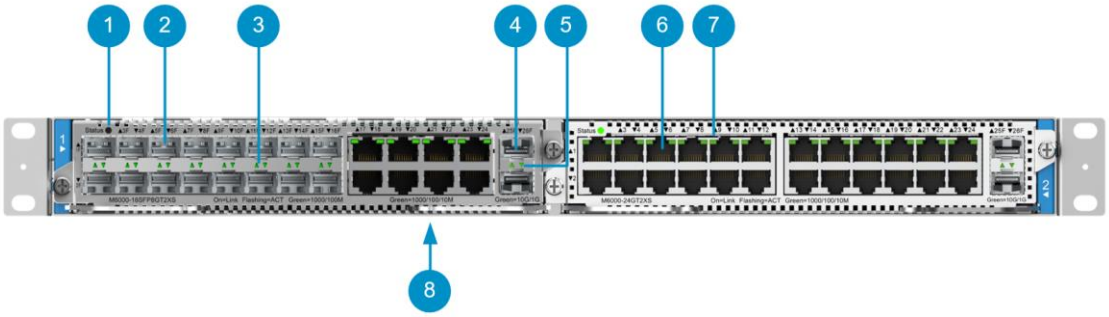
**Rear View**



## 1.1.3 Ports - Front Panel

Figure 1-2 shows the front panel of an RG-NBS6002 switch. For the detailed meanings of numbers 1 to 7, see the following table.

**Figure 1-2 Front Panel of an RG-NBS6002 Series Switch (Service Module Combination of M6000-16GT8SFP2XS and M6000-16SFP8GT2XS)**




| Item | Description |
|---|---|
| Line card status indicator | Line card status indicator. The statuses are as follows:<br>● Solid green: The service module works properly.<br>● Blinking green: The service module is starting up.<br>● Blinking yellow: Hot swapping or configuration conflict occurs.<br>Off: The system is not powered on or the system is receiving power but is not functioning properly. |
| RJ-45 copper port | 10/100/1000Base-T adaptive Ethernet port that supports auto-negotiation. The copper port uses an RJ45 connector. |
| RJ-45 copper port indicator | Status indicator of a 10/100/1000Base-T adaptive Ethernet port. The statuses are as follows:<br>● Solid green: The port has made a successful 1000 Mbps link.<br>● Blinking green: The port is sending or receiving traffic at 1000 Mpbs.<br>Off: No link is detected for the port. |
| SFP port | SFP port. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP port indicator | SFP port indicator. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |
| SFP+ port | SFP+ port. For details about applicable transceiver modules, see Transceiver Modules |
| SFP+ port indicator | SFP+ port indicator. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |
| Nameplate | Nameplate on the bottom of the device |

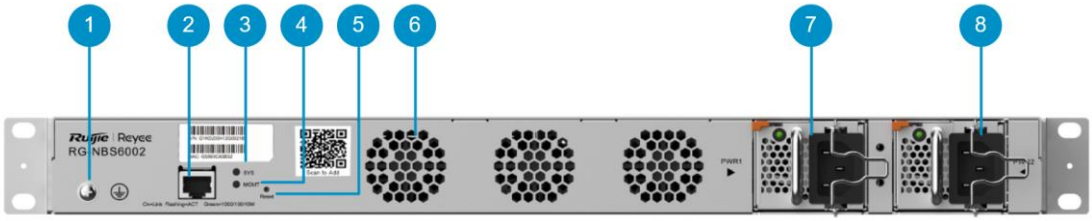
**Warning**

Before handling or transporting the chassis of a RG-NBS6002 switch, remove the service modules and power supply modules from the chassis. Please do not handle or transport the chassis of an RG-NBS6002 switch with the service modules or power supply modules installed.

### 1.1.4 Ports - Rear Panel

Figure 1-3 shows the rear panel of an RG-NBS6002 switch. For detailed meanings of numbers 1 to 7, see the following table.

**Figure 1-3 Rear Panel of an RG-NBS6002 Switch**




| Item | Description |
|---|---|
| Grounding post | Used to fasten the ground cable. |
| MGMT port | 10/100/1000Base-T adaptive Ethernet port. The port uses an RJ-45 connector. The management port is used for configuration and software upgrade. |
| System indicator (SYS) | ● Solid green: The system is initialized.<br>● Blinking green (rapidly): The system is starting up.<br>● Blinking yellow: The temperature reaches the warning value or you are unable to read the temperature. A service module is inserted in hot swapping mode.<br>● Blinking red: A device fault occurs, which causes system or module failure or causes device damage if the system continues to run. The power supply module is faulty or inserted without a cable.<br>Off: The switch is not powered on. |
| Management port indicator | 10/100/1000Base-T adaptive Ethernet port status indicator. The statuses are as follows:<br>● Solid green: The port has made a successful 1000 Mbps link.<br>● Blinking green: The port is sending or receiving traffic at 1000 Mpbs.<br>Off: No link is detected for the port. |
| Reset button | After the reset button is pressed, the system is reset and restarts based on the original software version(Note). |
| Fan module | Three fan modules are used for heat dissipation. |

| Item | Description |
| --- | --- |
| Power supply module | Two power supply module slots PWR1 and PWR2 are available.<br>Insert power supply modules and then connect AC power cords.<br>1+1 power redundancy is supported. |
| Power supply module indicator | Power supply module status indicator (PWR1 and PWR2). The statuses are as follows:<br>● Solid green: Power supply is normal.<br>● Solid red: Power supply is abnormal.<br>Off: The system is not powered on. |

**Caution**

Reset button: When you press and hold the reset button for less than 2 seconds, all modules are reset. When you press and hold the reset button for more than 5 seconds, all modules are reset, the initial password is restored, the supervisor module is restored to factory settings, and the configuration backup file is saved. If you log in to the web-based management system after a restart, you can select **Delete Backup** or **Restore Backup** (the password is the default password). If you do not log in, factory settings are used for the supervisor module. When you press and hold the reset button for 2s to 5s, no operation is performed. The preceding events are executed after you release the reset button.

### 1.1.5 Technical Specifications

**Table 1-2 Technical Specifications of an RG-NBS6002 Switch**

| Parameter Type | Parameter Name | RG-NBS6002 |
| --- | --- | --- |
| **Product Information** | Warranty | 5 years |
| **System Specifications** | RAM | 1 GB |
| | Flash memory | 256 MB |
| **Port Specifications** | Total number of RJ45 ports | Determine the quantity based on the type and number of line cards. |
| | Number of 10GE SFP+ ports | Determine the quantity based on the type and number of line cards. |
| | Number of 10/100/1000BASE-T ports | Determine the quantity based on the type and number of line cards. |
| | Ethernet cable type | CAT5e |
| | LEDs | 1 x system status LED<br>1 x MGMT port LED |
| | Module slots | 2 line card slots |

| | | |
|---|---|---|
| | | 2 system power module slots |
| | Service module | M6000-24GT2XS<br>M6000-24SFP2XS<br>M6000-16GT8SFP2XS<br>M6000-16SFP8GT2XS |
| **Power Supply and Consumption** | Power supply | Power module |
| | Power input | RG-PA150I-FS (AC input):<br>● Rated input voltage: 100 V AC to 240 V AC, 50/60 Hz<br>● Maximum input voltage: 90 V AC to 264 V AC, 47 Hz to 63 Hz<br>● Maximum input current: 3 A |
| | Power output | RG-PA150I-FS：<br>90 V AC to 264 V AC: 12 V DC (output voltage), 12.5 A (maximum output current) |
| | Maximum power consumption | 126 W |
| **Dimensions and Weight** | Casing | Metal |
| | Product dimensions (W x D x H) | 442 mm x 460 mm x 44 mm (17.4 in. x 18.11 in. x 1.73 in.) |
| | Weight | 5.4 kg (11.9 lbs) (including the empty chassis, without packaging materials) |
| | Shipping weight | 6.82 kg (15.04 lbs) (including packaging materials and empty chassis) |
| | Rack space | Rack requirement: 19-inch rack |
| **Environment and Reliability** | Fan | 3 x fixed fans |
| | Cooling | Device: Air cooling, front-to-rear airflow<br>Line card: Air cooling, front-to-rear airflow + left-to-rear airflow + right-to-rear airflow<br>Power module: Air cooling, front-to-rear airflow + left-to-rear airflow + right-to-rear airflow |
| | Mounting options | Rack |
| | MTBF | 400,000 hours |
| | Operating temperature | 0°C to +50°C (32°F to 122°F) |

| | | |
|---|---|---|
| | Storage temperature | –40°C to +70°C (–40°F to +158°F) |
| | Operating humidity | 10% RH to 90% RH (non-condensing) |
| | Storage humidity | 5% RH to 95% RH (non-condensing) |
| | Altitude | Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)<br>Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) |
| | Surge protection | Service port: ±6 kV for common mode<br>Power connector: ±6 kV for both common mode and differential mode |
| | Hot swapping of power modules | Yes |
| | Acoustic noise | 25°C (77°F): 68 dB |
| **Certification and Regulatory Compliance** | Certification | CE |

**Note**

The weight in the preceding table indicates only the weight of the empty chassis. The entire device weight is calculated based on different service modules.

Caution

- Operation of this equipment in a residential environment could cause radio interference.
- This equipment is not suitable for use in locations where children are likely to be present.
- The switch has a built-in lithium battery to keep the real-time clock running when external power source is unavailable. To replace the lithium battery, please contact Ruijie Networks Customer Service Technical Support to have it replaced with a lithium battery of the same specifications.
- Replacement of a battery with an incorrect type may cause fire and explosion, or compromise the safety features of the device. Replace the battery only with the same or equivalent type.
- A battery subjected to extremely high temperature and/or low air pressure may result in an explosion or the leakage of flammable liquid or gas.
- Disposal of a battery into a fire or by crushing or puncturing it can result in an explosion.

## 1.2 RG-PA150I-FS Power Supply Module

Power supply for an RG-NBS6002 switch:

AC input: The RG-PA150I-FS power supply module is supported.

**Caution**

RG-NBS6002 switch supports 1+1 redundancy of the power supply modules. To improve the stability and reliability of the entire system, it is recommended to configure power redundancy.

### 1.2.1 Power Supply Appearance

**Figure 1-4 Appearance of an RG-PA150I-FS Power Supply Module**




RG-PA150I-FS is an AC power module with AC power input and provides 12 V voltage to the entire RG-NBS6002 system. The front panel of the power supply provides a three-pin power socket, which is connected with a standard 10 A power cord.

### 1.2.2 Technical Specifications

**Table 1-3 RG-PA150I-FS Technical Specifications**

| | |
|---|---|
| **Module Model** | RG-PA150I-FS |
| **Rated Voltage Range** | 100 V to 240 V; 50/60 Hz |
| **Maximum Voltage Range** | 90 V to 264 V; 47 to 63 Hz |
| **Maximum Output Power** | 100 V to 240 V; Power: 150 W |
| **Input Current Parameter** | < 3 A @ 90 to 264 V AC @ full load |
| **Leakage Current Parameter** | < 3.5 mA @ 110 V AC and 220 V AC/50 Hz and 60 Hz |

| | |
|---|---|
| **Net Weight** | 0.55 kg |
| **Power Cord Requirements** | 10 A power cord |

**Caution**

- When connecting a power cord, push up on the cable-retention clip that secures the input power cord to the power supply.
- Connect the power cords to a grounded output socket.
- The maximum operating and storage altitudes of the power supply module are 5000 m (3.11 miles).

# 1.3 Service Module

## 1.3.1 Package Contents

**Table 1-4 Service Module Package Contents**

| Item | Quantity |
|---|---|
| Service module | 1 |
| Warranty Card | 1 |

**Note**

- The package contents table applies to all service modules.
- The preceding table lists items delivered in normal cases. The actually delivered items may vary with the contract. Carefully check your goods against the packing list or contract. Contact the seller if you have any questions or find any errors.

## 1.3.2 M6000-24GT2XS Service Module

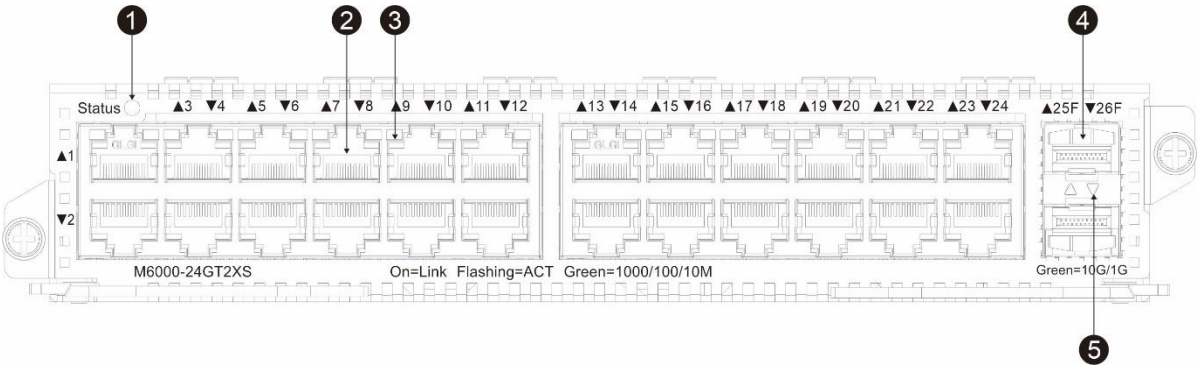
### 1. Product Appearance

**Figure 1-5 Appearance of M6000-24GT2XS**



## 2. Front Panel

**Figure 1-6 Front Panel of M6000-24GT2XS**




| Item | Description |
|---|---|
| Line card status indicator | Line card status indicator. The statuses are as follows:<br>● Solid green: The service module works properly.<br>● Blinking green: The service module is starting up.<br>● Blinking yellow: Hot swapping or configuration conflict occurs.<br>Off: The system is not powered on or the system is receiving power but is not functioning properly. |
| RJ-45 copper port | 24 10/100/1000Base-T adaptive Ethernet ports that support auto-negotiation. The copper port uses an RJ45 connector. |
| RJ-45 copper port indicator | 24 10/100/1000Base-T adaptive Ethernet port status indicator. The statuses are as follows:<br>● Solid green: The port has made a successful 1000 Mbps link.<br>● Blinking green: The port is sending or receiving traffic at 1000 Mpbs.<br>Off: No link is detected for the port. |
| SFP+ port | Two SFP+ ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP+ port indicator | Two SFP+ port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |

### 3. Technical Specifications

**Table 1-5 M6000-24GT2XS Technical Specifications**

| | |
|---|---|
| **Product Model** | M6000-24GT2XS |
| **Port Type** | 24 10/100/1000BASE-T RJ-45 copper ports and two SFP+ ports |
| **Supported Transceiver Modules and Cable Types** | For details, see<br>Transceiver Modules. Copper cables are not supported.<br>Supported models may be updated anytime. For details, consult Ruijie Networks Co., Ltd. |
| **Indicator** | Status and Link/ACT indicators |
| **Hot Swapping** | Unsupported |
| **Power Consumption** | < 20.6 W |
| Certification | CE |
| **Operating Temperature** | 0°C to 50°C (32°F to 122°F) |
| **Storage Temperature** | –40°C to 70°C (-40°F to 158°F) |
| **Operating Humidity** | 10% to 90% RH (non-condensing) |
| **MTBF** | > 200,000 hours |
| Net Weight | 0.9 kg (1.98 lbs.) |
| **Dimensions (H x W x D)** | 40.3 mm x 227 mm x 210 mm (1.59 in. x 8.94 in. x 8.27 in.) |

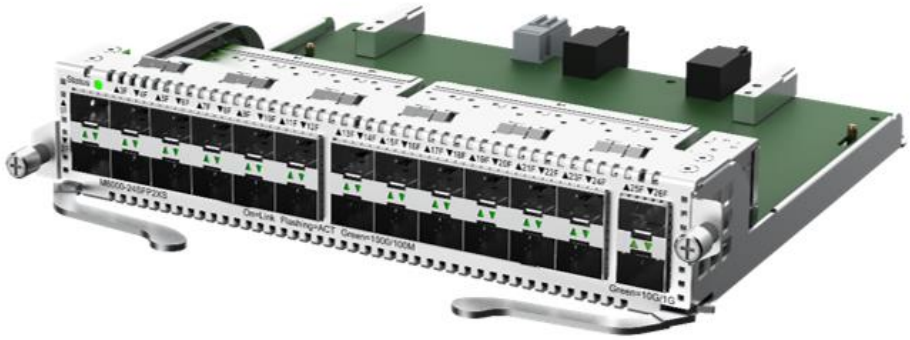
| **Parameter Type** | **Parameter Name** | **M6000-24GT2XS** |
|---|---|---|
| **Product Information** | Warranty | 5 years |
| **Port Specifications** | Total number of RJ45 ports | 24 |
| | Total number of optical ports | 2 |
| | Number of 10GE SFP+ ports | 2 |
| | Number of 10/100/1000BASE-T ports | 24 |

| | | |
|---|---|---|
| | Ethernet cable type | CAT5e |
| | LEDs | 1 x line card status LED<br>24 x Ethernet port LEDs<br>2 x SFP+ port LEDs |
| **Power Supply and Consumption** | Module power consumption | 20.544 W |
| | Maximum power consumption | 20.544 W |
| **Dimensions and Weight** | Casing | Metal |
| | Product dimensions (W x D x H) | 224 mm x 172.7 mm x 40.9 mm (8.82 in. x 6.8 in. x 1.61 in.) |
| | Weight | 0.9 kg (1.98 lbs) (without packaging materials) |
| | Shipping weight | 1.31 kg (2.89 lbs) |
| **Environment and Reliability** | Fan | Fanless design |
| | Cooling | See the RG-NBS6002. |
| | Mounting options | Rack |
| | MTBF | 400,000 hours |
| | Operating temperature | 0°C to +50°C (32°F to 122°F) |
| | Storage temperature | –40°C to +70°C (–40°F to +158°F) |
| | Operating humidity | 10% RH to 90% RH (non-condensing) |
| | Storage humidity | 5% RH to 95% RH (non-condensing) |
| | Altitude | Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)<br>Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) |
| | Surge protection | Service port: ±6 kV for common mode |
| **Certification and Regulatory Compliance** | Certification | CE |

## 1.3.3 M6000-24SFP2XS Service Module

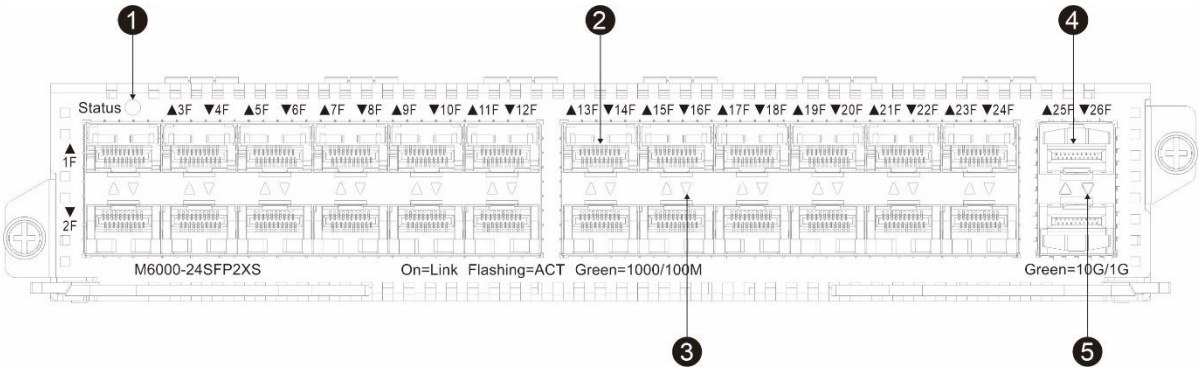
### 1. Product Appearance

**Figure 1-7 Appearance of M6000-24SFP2XS**



### 2. Front Panel

**Figure 1-8 Front Panel of M6000-24SFP2XS**




| Item | Description |
|---|---|
| Line card status indicator | Line card status indicator. The statuses are as follows:<br>● Solid green: The service module works properly.<br>● Blinking green: The service module is starting up.<br>● Blinking yellow: Hot swapping or configuration conflict occurs.<br>Off: The system is not powered on or the system is receiving power but is not functioning properly. |
| SFP port | 24 SFP ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP port indicator | 24 SFP port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link. |

| | |
|---|---|
| | ● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |
| SFP+ port | Two SFP+ ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP+ port indicator | Two SFP+ port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |

### 3. Technical Specifications

**Table 1-6 M6000-24SFP2XS Technical Specifications**

| | |
|---|---|
| **Product Model** | M6000-24SFP2XS |
| **Port Type** | 24 SFP ports and two SFP+ ports |
| **Supported Transceiver Modules and Cable Types** | For details, see Transceiver Modules. Copper cables are not supported.<br>Supported models may be updated anytime. For details, consult Ruijie Networks Co., Ltd. |
| **Indicator** | Status and Link/ACT indicators |
| **Hot Swapping** | Unsupported |
| **Power Consumption** | < 44.4 W |
| **Certification** | CE |
| **Operating Temperature** | 0°C to 50°C (32°F to 122°F) |
| **Storage Temperature** | –40°C to 70°C (-40°F to 158°F) |
| **Operating Humidity** | 10% to 90% RH (non-condensing) |
| **MTBF** | > 200,000 hours |
| **Weight** | Net weight: about 0.95 kg (2.09 lbs.) |
| **Dimensions (H x W x D)** | 40.3 mm x 227 mm x 210 mm (1.59 in. x 8.94 in. x 8.27 in.) |

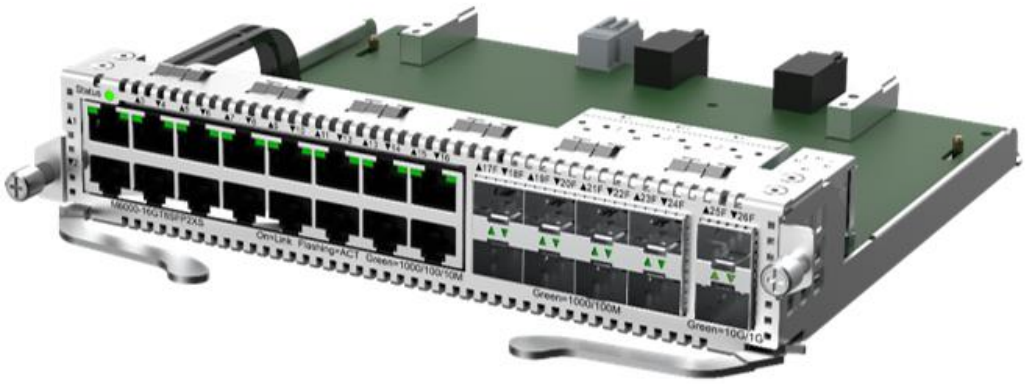
| **Parameter Type** | **Parameter Name** | M6000-24SFP2XS |
|---|---|---|

| | | |
|---|---|---|
| **Product Information** | Warranty | 5 years |
| **Port Specifications** | Total number of optical ports | 26 |
| | Number of 1GE SFP ports | 24 |
| | Number of 10GE SFP+ ports | 2 |
| | Ethernet cable type | CAT5e |
| | LEDs | 1 x line card status LED<br>24 x SFP port LEDs<br>2 x SFP+ port LEDs |
| **Power Supply and Consumption** | Module power consumption | 44.37 W |
| | Maximum power consumption | 44.37 W |
| **Dimensions and Weight** | Casing | Metal |
| | Product dimensions (W x D x H) | 224 mm x 172.7 mm x 40.9 mm (8.82 in. x 6.8 in. x 1.61 in.) |
| | Weight | 0.95 kg (2.09 lbs) (without packaging materials) |
| | Shipping weight | 1.39 kg (3.06 lbs) |
| **Environment and Reliability** | Fan | Fanless design |
| | Cooling | See the RG-NBS6002. |
| | Mounting options | Rack |
| | MTBF | 400,000 hours |
| | Operating temperature | 0°C to +50°C (32°F to 122°F) |
| | Storage temperature | –40°C to +70°C (–40°F to +158°F) |
| | Operating humidity | 10% RH to 90% RH (non-condensing) |
| | Storage humidity | 5% RH to 95% RH (non-condensing) |
| | Altitude | Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)<br>Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) |
| **Certification and Regulatory Compliance** | Certification | CE |

## 1.3.4 M6000-16GT8SFP2XS Service Module

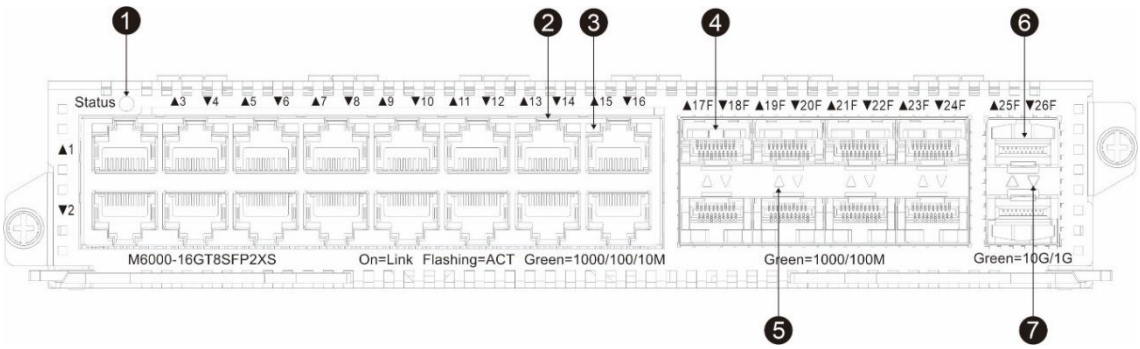
### 1. Product Appearance

**Figure 1-9 Appearance of M6000-16GT8SFP2XS**



### 2. Front Panel

**Figure 1-10 Front Panel of M6000-16GT8SFP2XS**




| Item | Description |
|---|---|
| Line card status indicator | Line card status indicator. The statuses are as follows:<br>● Solid green: The service module works properly.<br>● Blinking green: The service module is starting up.<br>● Blinking yellow: Hot swapping or configuration conflict occurs.<br>Off: The system is not powered on or the system is receiving power but is not functioning properly. |
| RJ-45 copper port | 16 10/100/1000Base-T adaptive Ethernet ports that support auto-negotiation. The copper port uses an RJ45 connector. |

| Item | Description |
| --- | --- |
| RJ-45 copper port indicator | 16 10/100/1000Base-T adaptive Ethernet port status indicators. The statuses are as follows:<br>● Solid green: The port has made a successful 1000 Mbps link.<br>● Blinking green: The port is sending or receiving traffic at 1000 Mpbs.<br>Off: No link is detected for the port. |
| SFP port | Eight SFP ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP port indicator | Eight SFP port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |
| SFP+ port | Two SFP+ ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP+ port indicator | Two SFP+ port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>● Off: No link is detected for the port. |

### 3. Technical Specifications

**Table 1-7 M6000-16GT8SFP2XS Technical Specifications**

| | |
|---|---|
| **Product Model** | M6000-16GT8SFP2XS |
| **Port Type** | 16 10/100/1000BASE-T RJ-45 copper ports, eight SFP ports, and two SFP+ ports |
| **Supported Transceiver Modules and Cable Types** | For details, see<br>Transceiver Modules. Copper cables are not supported.<br>Supported models may be updated anytime. For details, consult Ruijie Networks Co., Ltd. |
| **Indicator** | Status and Link/ACT indicators |
| **Hot Swapping** | Unsupported |
| **Power Consumption** | < 28.5 W |
| **Certification** | CE |
| **Operating Temperature** | 0°C to 50°C (32°F to 122°F) |
| **Storage Temperature** | –40°C to 70°C (-40°F to 158°F) |
| **Operating Humidity** | 10% to 90% RH (non-condensing) |
| **MTBF** | > 200,000 hours |
| **Net Weight** | 0.9 kg (1.98 lbs.) |
| **Dimensions (H x W x D)** | 40.3 mm x 227 mm x 210 mm (1.59 in. x 8.94 in. x 8.27 in.) |

| **Parameter Type** | Parameter Name | M6000-16GT8SFP2XS |
|---|---|---|
| **Product Information** | Warranty | 5 years |
| **Port Specifications** | Total number of RJ45 ports | 16 |
| | Total number of optical ports | 10 |
| | Number of 1GE SFP ports | 8 |
| | Number of 10GE SFP+ ports | 2 |

| | | |
|---|---|---|
| | Number of 10/100/1000BASE-T ports | 16 |
| | Ethernet cable type | CAT5e |
| | LEDs | 1 x line card status LED<br>16 x Ethernet port LEDs<br>8 x SFP port LEDs<br>2 x SFP+ port LEDs |
| **Power Supply and Consumption** | Module power consumption | 28.42 W |
| | Maximum power consumption | 28.42 W |
| **Dimensions and Weight** | Casing | Metal |
| | Product dimensions (W x D x H) | 224 mm x 172.7 mm x 40.9 mm (8.82 in. x 6.8 in. x 1.61 in.) |
| | Weight | 0.9 kg (1.98 lbs) (without packaging materials) |
| | Shipping weight | 1.33 kg (2.93 lbs) |
| **Environment and Reliability** | Fan | Fanless design |
| | Cooling | See the RG-NBS6002. |
| | Mounting options | Rack |
| | MTBF | 400,000 hours |
| | Operating temperature | 0°C to +50°C (32°F to 122°F) |
| | Storage temperature | –40°C to +70°C (–40°F to +158°F) |
| | Operating humidity | 10% RH to 90% RH (non-condensing) |
| | Storage humidity | 5% RH to 95% RH (non-condensing) |
| | Altitude | Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)<br>Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) |
| | Surge protection | Service port: ±6 kV for common mode |
| **Certification and Regulatory Compliance** | Certification | CE |

## 1.3.5 M6000-16SFP8GT2XS Service Module

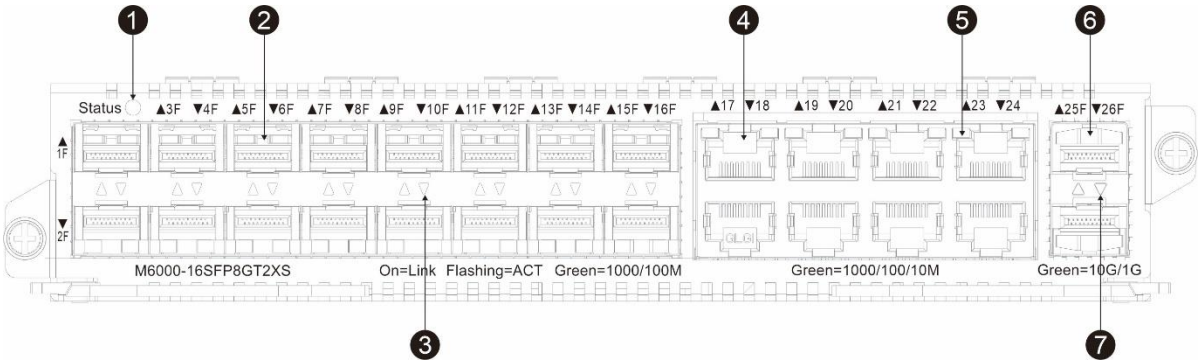
### 1. Product Appearance

**Figure 1-11 Appearance of M6000-16SFP8GT2XS**



### 2. Front Panel

**Figure 1-12 Front Panel of M6000-16SFP8GT2XS**




| Item | Description |
|---|---|
| Line card status indicator | Line card status indicator. The statuses are as follows:<br>● Solid green: The service module works properly.<br>● Blinking green: The service module is starting up.<br>● Blinking yellow: Hot swapping or configuration conflict occurs.<br>● Off: The system is not powered on or the system is receiving power but is not functioning properly. |
| SFP port | 16 SFP ports. For details about applicable transceiver modules, see Transceiver Modules. |

| | |
|---|---|
| SFP port indicator | 16 SFP port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>Off: No link is detected for the port. |
| RJ-45 copper port | Eight 10/100/1000Base-T adaptive Ethernet ports that support auto-negotiation. The copper port uses an RJ45 connector. |
| RJ-45 copper port indicator | Eight 10/100/1000Base-T adaptive Ethernet port status indicators. The statuses are as follows:<br>● Solid green: The port has made a successful 1000 Mbps link.<br>● Blinking green: The port is sending or receiving traffic at 1000 Mpbs.<br>● Off: No link is detected for the port. |
| SFP+ port | Two SFP+ ports. For details about applicable transceiver modules, see Transceiver Modules. |
| SFP+ port indicator | Two SFP+ port indicators. The statuses are as follows:<br>● Solid green: The port has made a successful link.<br>● Blinking green: The port is sending or receiving traffic.<br>● Off: No link is detected for the port. |

### 3. Technical Specifications

**Table 1-8 M6000-16SFP8GT2XS Technical Specifications**

| | |
|---|---|
| **Product Model** | M6000-16SFP8GT2XS |
| **Port Type** | 16 SFP ports, eight 10/100/1000BASE-T RJ-45 copper ports, and two SFP+ ports |
| **Supported Transceiver Modules and Cable Types** | For details, see<br>Transceiver Modules. Copper cables are not supported.<br>Supported models may be updated anytime. For details, consult Ruijie Networks Co., Ltd. |
| **Indicator** | Status and Link/ACT indicators |
| **Hot Swapping** | Unsupported |
| **Power Consumption** | < 36.4 W |
| **Certification** | CE |
| **Operating Temperature** | 0°C to 50°C (32°F to 122°F) |
| **Storage Temperature** | –40°C to 70°C (-40°F to 158°F) |
| **Operating Humidity** | 10% to 90% RH (non-condensing) |
| **MTBF** | > 200,000 hours |
| **Net Weight** | 0.95 kg (2.09 lbs.) |
| **Dimensions (H x W x D)** | 40.3 mm x 227 mm x 210 mm (1.59 in. x 8.94 in. x 8.27 in.) |

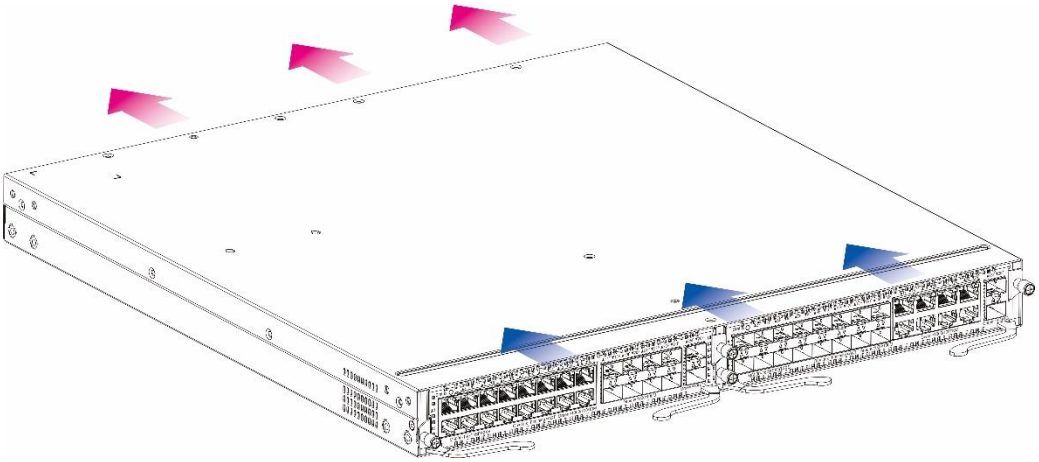
| | | |
|---|---|---|
| **Product Information** | Warranty | 5 years |
| **Port Specifications** | Total number of RJ45 ports | 8 |
| | Total number of optical ports | 18 |
| | Number of 1GE SFP ports | 16 |
| | Number of 10GE SFP+ ports | 2 |
| | Number of 10/100/1000BASE-T ports | 8 |

| | | |
|---|---|---|
| | Ethernet cable type | CAT5e |
| | LEDs | 1 x line card status LED<br>8 x Ethernet port LEDs<br>16 x SFP port LEDs<br>2 x SFP+ port LEDs |
| **Power Supply and Consumption** | Module power consumption | 36.42 W |
| | Maximum power consumption | 36.42 W |
| **Dimensions and Weight** | Casing | Metal |
| | Product dimensions (W x D x H) | 224 mm x 172.7 mm x 40.9 mm (8.82 in. x 6.8 in. x 1.61 in.) |
| | Weight | 0.95 kg (2.09 lbs) (without packaging materials) |
| | Shipping weight | 1.37 kg (3.02 lbs) |
| **Environment and Reliability** | Fan | Fanless design |
| | Cooling | See the RG-NBS6002. |
| | Mounting options | Rack |
| | MTBF | 400,000 hours |
| | Operating temperature | 0°C to +50°C (32°F to 122°F) |
| | Storage temperature | –40°C to +70°C (–40°F to +158°F) |
| | Operating humidity | 10% RH to 90% RH (non-condensing) |
| | Storage humidity | 5% RH to 95% RH (non-condensing) |
| | Altitude | Operating altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.)<br>Storage altitude: –500 m to +5,000 m (–1,640.42 ft. to +16,404.20 ft.) |
| | Surge protection | Service port: ±6 kV for common mode |
| **Certification and Regulatory Compliance** | Certification | CE |

## 1.4 Heat Dissipation Solution

RG-NBS6002 switch works at an ambient temperature ranging from 0°C to 50°C (32°F to 122°F) . The heat design must ensure the reliability, safety, and maintainability of the device under this environment. The RG-NBS6002 switch uses fans for forced convection so that the switch can work properly under specified environment.

**Figure 1-13 Air Inlet and Outlet Schemes for an RG-NBS6002 Switch**



**Note**

- Blue arrow: air inlet direction for heat dissipation of the service modules and power supply modules
- Red arrow: air outlet direction for heat dissipation of the service modules and power supply modules

Service modules/power supply modules adopt the design of left-to-rear, right-to-rear and front-to-rear cooling. Fans blow air to the outside for convection and heat dissipation.

**Caution**

- Maintain a minimum clearance of 10 cm (3.94 in.) around the chassis.
- Install a corresponding filler panel in a vacant slot properly to allow cooling air to flow effectively within it.

## 1.5 Transceiver Modules

Based on the port types, Ruijie provides corresponding SFP modules (Mini-GBIC modules) and 10G SFP+ modules. You can select modules based on usage requirements. In addition to the following modules, the O/E conversion 1000M SFP module (Mini-GBIC-GT) is supported. This document provides models and technical parameters of some 1000M SFP modules and 10G SFP+ modules for reference. For details about the technical specifications, see the *Ruijie Transceiver Installation and Reference Guide*.

### 1.5.1 1000M SFP Transceiver Modules

**Table 1-9 1000M SFP Transceiver Module Technical Specifications**

| Model | Wavelength (nm) | Fiber Type | Support Digital Diagnostic Monitoring (DDM) (Yes/No) | TX Power (dBm) | | RX Power (dBm) | |
|---|---|---|---|---|---|---|---|
| | | | | Min | Max | Min | Max |
| MINI-GBIC-SX-MM850 | 850 | Multi-mode | No | –9.5 | –3 | –17 | 0 |
| MINI-GBIC-LX-SM1310 | 1310 | Single-mode | No | –9.5 | –3 | –20 | –3 |
| MINI-GBIC-LH40-SM1310 | 1310 | Single-mode | Yes | –2 | 3 | –22 | –3 |
| GE-SFP-LX20-SM1310-BIDI | 1310 TX/1550 RX | Single-mode | Yes | –9 | –3 | –20 | –3 |
| GE-SFP-LX20-SM1550-BIDI | 1550 TX/1310 RX | Single-mode | Yes | –9 | –3 | –20 | –3 |
| GE-SFP-LH40-SM1310-BIDI | 1310 TX/1550 RX | Single-mode | Yes | –5 | 0 | –24 | –1 |
| GE-SFP-LH40-SM1550-BIDI | 1550 TX/1310 RX | Single-mode | Yes | –5 | 0 | –24 | –1 |
| MINI-GBIC-ZX80-SM1550 | 1550 | Single-mode | Yes | 0 | 4.7 | –22 | –3 |
| MINI-GBIC-ZX100-SM1550 | 1550 | Single-mode | Yes | 0 | 5 | –30 | –9 |
| SFP-MM850 | 850 | Multi-mode | No | –9.5 | –3 | –17 | 0 |
| SFP-SM1310 | 1310 | Single-mode | No | –9.5 | –3 | –20 | –3 |
| GE-SFP-ZX | 850 | Multi-mode | Yes | –9.5 | –3 | –17 | 0 |
| GE-SX-MM850 | 850 | Multi-mode | Yes | –9.5 | –3 | –17 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GE-LX-SM1310 | 1310 | Single-mode | Yes | –9 | –3 | –20 | –3 |
| SFP-S4-R1000P1 v1 | 1310 | Single-mode | Yes | –9 | –3 | –20 | –3 |

**Table 1-10 1000M SFP Transceiver Module Technical Specifications**

| Standard | 1000Base-T SFP Product Model | Support DDM (Yes/No) |
|---|---|---|
| 1000Base-T | Mini-GBIC-GT | No |

**Table 1-11 SFP Transceiver Module Cabling Specifications**

| SFP Model | Port Type | Fiber Type | Core Specifications (μm) | Maximum Cabling Distance |
|---|---|---|---|---|
| MINI-GBIC-SX-MM850 | LC | Multi-mode | 62.5/125 | 275 m |
| | | | 50/125 | 550 m |
| MINI-GBIC-LX-SM1310 | LC | Single-mode | 9/125 | 10 km |
| MINI-GBIC-LH40-SM1310 | LC | Single-mode | 9/125 | 40 km |
| GE-SFP-SX-SM1310-BIDI | LC | Multi-mode | 50/125 | 500 m |
| GE-SFP-SX-SM1550-BIDI | LC | Multi-mode | 50/125 | 500 m |
| GE-SFP-LX20-SM1310-BIDI | LC | Single-mode | 9/125 | 20 km |
| GE-SFP-LX20-SM1550-BIDI | LC | Single-mode | 9/125 | 20 km |
| GE-SFP-LH40-SM1310-BIDI | LC | Single-mode | 9/125 | 40 km |
| GE-SFP-LH40-SM1550-BIDI | LC | Single-mode | 9/125 | 40 km |
| MINI-GBIC-ZX80-SM1550 | LC | Single-mode | 9/125 | 80 km |
| MINI-GBIC-ZX100-SM1550 | LC | Single-mode | 9/125 | 100 km |
| SFP-MM850 | LC | Multi-mode | 50/125 | 500 m |
| SFP-SM1310 | LC | Single-mode | 9/125 | 10 km |
| GE-SFP-ZX | LC | Multi-mode | 50/125 | 550 m |
| GE-SX-MM850 | LC | Multi-mode | 50/125 | 550 m |
| GE-LX-SM1310 | LC | Single-mode | 9/125 | 10 km |

| SFP Model | Port Type | Fiber Type | Core Specifications (μm) | Maximum Cabling Distance |
|---|---|---|---|---|
| SFP-S4-R1000P1 v1 | LC | Single-mode | 9/125 | 10 km |
| Mini-GBIC-GT | RJ-45 network cable | Unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cables of CAT5 or higher | | 100 m |
| GE-SFP-GT | RJ-45 network cable | UTP or STP cables of CAT5 or higher | | 100 m |
| SFP-GT | RJ-45 network cable | UTP or STP cables of CAT5 or higher | | 100 m |

**Note**

- When a transceiver module supporting a deployment distance of 40 km or longer is connected with a single-mode optical fiber for short-range transmission, an online light attenuator must be installed to prevent the optical receiver from being overloaded.
- To ensure that the transceiver module is clean, put on a dust cap when you do not connect an optical fiber to the transceiver module.

**Caution**

A transceiver module is a laser transmitter. Do not stare at any light source to prevent it from burning your eyes.

**Table 1-12 Pairing Description of BIDI Transceiver Module**

| Rate/Distance | Pairing Model |
|---|---|
| 1000M/500 m | GE-SFP-SX-SM1310-BIDI<br>GE-SFP-SX-SM1550-BIDI |
| 1000M/20 km | GE-SFP-LX20-SM1310-BIDI<br>GE-SFP-LX20-SM1550-BIDI |
| 1000M/40 km | GE-SFP-LH40-SM1310-BIDI<br>GE-SFP-LH40-SM1550-BIDI |
| 10G/10 km | XG-SFP-LR-SM1270-BIDI<br>XG-SFP-LR-SM1330-BIDI |

**Note**

The BIDI transceiver modules at both ends must be paired for use. For example, if GE-SFP-LX20-SM1310-BIDI is used at one end, GE-SFP-LX20-SM1550-BIDI must be used at the other end.

### 1.5.2 10G SFP+ Transceiver Modules

**Table 1-13 10G SFP+ Transceiver Module Technical Specifications**

| Model | Wavelength (nm) | Support DDM (Yes/No) | Fiber Type | TX Power (dBm) | | RX Power (dBm) | |
|---|---|---|---|---|---|---|---|
| | | | | Min | Max | Min | Max |
| XG-SFP-SR-MM850 | 850 | Yes | Multi-mode | –7.3 | –1 | –9.9 | –1 |
| XG-SR-MM850 | 850 | Yes | Multi-mode | –7.3 | –1 | –9.9 | –1 |
| SFP+MM850 | 850 | Yes | Multi-mode | –7.3 | –1 | –9.9 | –1 |
| XG-SFP-LR-SM1270-BIDI | 1270 | No | Single-mode | –6.5 | 0.5 | –14.4 | 0.5 |
| XG-SFP-LR-SM1330-BIDI | 1330 | No | Single-mode | –6.5 | 0.5 | –14.4 | 0.5 |
| XG-LR-SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| SFP+SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| XG-SFP-LR-SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| XG-eSFP-LR-SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| XG-SFP-ER-SM1550 | 1550 | Yes | Single-mode | –4.7 | 4 | –11.3 | –1 |
| XG-SFP-ZR-SM1550 | 1550 | Yes | Single-mode | 0 | 4 | –24 | –7 |
| SFP-S4-R1000P1 v2 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| SFP-S1-R1000P1 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| SFP+1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| SFP-M3-R1000P1 | 850 | Yes | Multi-mode | –7.3 | –1 | –11.1 | –1 |
| XG-LR-SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| HSFP-XG-SFP-LR-SM1310 | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |
| XG-SFP-SR-MM850-I | 850 | Yes | Multi-mode | –7.3 | –1 | –9.9 | –1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| XG-SFP-LR-SM1310-I | 1310 | Yes | Single-mode | –8.2 | 0.5 | –14.4 | 0.5 |

**Table 1-14 10G Active SFP+ Transceiver Module Technical Specifications**

| Model | Module Type | Connector Type | Copper Cable Length (m) | Conductor Wire Diameter (AWG) | Data Rate (Gb/s) | Support DDM (Yes/No) |
|---|---|---|---|---|---|---|
| XG-SFP-AOC1M | Active | SFP+ | 1 | N/A | 10.3125 | Yes |
| XG-SFP-AOC3M | Active | SFP+ | 3 | N/A | 10.3125 | Yes |
| XG-SFP-AOC5M | Active | SFP+ | 5 | N/A | 10.3125 | Yes |
| XG-SFP-AOC10M | Active | SFP+ | 10 | N/A | 10.3125 | Yes |

**Note**

- Types/models of SFP+ series modules are being updated. To obtain more accurate module models, contact Ruijie's marketing personnel or technical support personnel.
- The DDM function of the active optical cables (AOCs) does not have TX power report. The TX power can be displayed as N/A.
- To ensure that the transceiver module is clean, put on a dust cap when you do not connect an optical fiber to the transceiver module.

**Caution**

A transceiver module is a laser transmitter. Do not stare at any light source to prevent it from burning your eyes.

**Table 1-15 SFP+ Module Cabling Specifications**

| Model | Port Type | Fiber Type | Core Specifications (μm) | Modal Bandwidth (MHz km) | Maximum Cabling Distance |
|---|---|---|---|---|---|
| XG-SFP-SR-MM850 | LC | Multi-mode | 50/125 | 2000 (OM3) | 300 m |
| XG-SR-MM850 | LC | Multi-mode | 50/125 | 2000 (OM3) | 300 m |
| SFP+MM850 | LC | Multi-mode | 50/125 | 2000 (OM3) | 300 m |
| XG-SFP-LR-SM1270-BIDI | LC | Single-mode | 9/125 | N/A | 10 km |
| XG-SFP-LR-SM1330-BIDI | LC | Single-mode | 9/125 | N/A | 10 km |
| XG-SFP-LR-SM1310 | LC | Single-mode | 9/125 | N/A | 10 km |
| SFP+SM1310 | LC | Single-mode | 9/125 | N/A | 10 km |
| XG-SFP-ER-SM1550 | LC | Single-mode | 9/125 | N/A | 40 km |

| Model | Port Type | Fiber Type | Core Specifications (μm) | Modal Bandwidth (MHz km) | Maximum Cabling Distance |
|---|---|---|---|---|---|
| XG-SFP-ZR-SM1550 | LC | Single-mode | 9/125 | N/A | 80 km |
| SFP-S4-R1000P1 v2 | LC | Single-mode | 9/125 | N/A | 10 km |
| SFP-S1-R1000P1 | LC | Single-mode | 9/125 | N/A | 10 km |
| SFP+1310 | LC | Single-mode | 9/125 | N/A | 10 km |
| SFP-M3-R1000P1 | LC | Multi-mode | 50/125 | 2000 (OM3) | 300 m |
| XG-LR-SM1310 | LC | Single-mode | 9/125 | N/A | 10 km |
| HSFP-XG-SFP-LR-SM1310 | LC | Single-mode | 9/125 | N/A | 10 km |
| XG-SFP-SR-MM850-I | LC | Multi-mode | 50/125 | 2000 (OM3) | 300 m |
| XG-SFP-LR-SM1310-I | LC | Single-mode | 9/125 | N/A | 10 km |

# 1.6 Cable

## 1.6.1 Ethernet Cables

- 1000BASE-T: Use 100-ohm CAT5E UTP or STP cables with the maximum transmission distance of 100 m.
- 100BASE-TX: Use 100-ohm CAT5 or CAT5E UTP or STP cables with the maximum transmission distance of 100 m.
- 10BASE-T: Use 100-ohm CAT3, CAT4, CAT5, or CAT5E UTP or STP cables with the maximum transmission distance of 100 m.
- When device ports support MDI/MDI-X adaption, both straight-through and crossover network cables are supported. RG-NBS6002 switch supports MDI/MDI-X.

**Note**

For details about the connection methods and signals of twisted-pair cables, see Connection Modes of Cables Prepared by Users.

## 1.6.2 Optical Fibers

**Table 1-16 Features of Optional Transmission Media**

| Model | Description |
|---|---|
| 1000BASE-SX | Wavelength: 850 nm<br>The maximum transmission distance of a 62.5/125 μm multi-mode optical fiber is |

| | |
|---|---|
| | 220 m.<br>The maximum transmission distance of a 50/125 μm multi-mode optical fiber is 500 m. |
| 1000BASE-LX | Wavelength: 1310 nm<br>The maximum transmission distance of a 62.5/125 μm multi-mode optical fiber is 550 m.<br>The maximum transmission distance of a 50/125 μm multi-mode optical fiber is 550 m.<br>The maximum transmission distance of a 9/125 μm single-mode optical fiber is 10 km. |
| 1000BASE-LH | Wavelength: 1310 nm<br>The maximum transmission distance of a 9/125 μm single-mode optical fiber is 40 km. |
| 1000BASE-ZX | Wavelength: 1550 nm<br>The maximum transmission distance of a 9/125 μm single-mode optical fiber is 50 km or 80 km. |
| FE-SFP-LX-MM1310 | Wavelength: 1310 nm<br>The maximum transmission distance of a 50/125 μm multi-mode optical fiber is 2 km. |
| FE-SFP-LH15-SM1310 | Wavelength: 1310 nm<br>The maximum transmission distance of a 9/125 μm single-mode optical fiber is 15 km. |

**Table 1-17 SFP+ Transmission Media and Distance**

| **Specifications** | **XG-SFP-SR-MM850** | | **XG-SFP-LR-SM1310** | **XG-SFP-ER-SM1550** | **XG-SFP-ZR-SM1550** |
|---|---|---|---|---|---|
| **Wavelength (nm)** | 850 | | 1310 | 1550 | 1550 |
| **Fiber Type** | Multi-mode optical fiber-LC connector | | Single-mode optical fiber-LC connector | Single-mode optical fiber-LC connector | Single-mode optical fiber-LC connector |
| **Core Specifications (μm)** | 62.5/125 | 50/125 | 9/125 | 9/125 | 9/125 |
| **Modal Bandwidth (MHz, km)** | 200<br>160 | 2000<br>500<br>400 | N/A | N/A | N/A |
| **Maximum Cabling Distance** | 33 m<br>26 m | 300 m<br>82 m<br>66 m | 10 km | 40 km | 80 km |
| **TX Power (dBm)** | –5 to –1 | | –4.8 to +0.5 | –1 to +2 | 0 to 4 |

| | | | | |
|---|---|---|---|---|
| **RX Power (dBm)** | –7.5 to +0.5 | –10.3 to +0.5 | –11.3 to –1 | –24 to –7 |

# 2 Preparing for Installation

## 2.1 Safety Precautions

**Note**

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

### 2.1.1 General Safety Precautions

- Install the switch inside a standard 19-inch cabinet.
- Do not place the switch in a wet position, and keep the switch away from liquid. Keep the chassis clean and dust-free.
- Install the switch in a position far away from heat sources.
- Ensure that the cabinet and power distribution system are properly grounded.
- Do not place the device in walking areas.
- During the installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the chassis.
- Keep tools and components away from walking areas.

### 2.1.2 Handling Safety

- Prevent the switch from being frequently handled.
- Cut off all the power supplies and unplug all power cords before moving or handling the switch.
- Keep balance and prevent personal injuries when 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 contact with high voltage or mains power supply via wet objects may cause fatal dangers.

- Observe local regulations and specifications during electric operations. Only personnel with relevant qualifications can perform such operations.
- Check whether there are potential risks in the work area. For example, check whether the power supply is grounded, whether the grounding is reliable, and whether the ground is wet.
- Learn about the position of the indoor emergency power switch before installation. Cut off the power switch in case of accidents.

- Check the switch carefully before shutting down the power supply.

### 2.1.4 Electrostatic Discharge Safety

- Properly ground the device and floor.
- Keep the indoor installation environment clean and free of dust.
- Maintain appropriate humidity conditions.
- When installing different types of transceiver modules, wear an antistatic wrist strap and ensure that it is reliably grounded.
- Do not use bare hands to touch the components and the printed circuit boards (PCBs).
- Use an ESD shielding bag to properly store the boards.
- Do not let any clothes touch PCBs. An antistatic wrist strap can only prevent human static electricity from damaging the PCBs but cannot prevent static electricity on clothes.

### 2.1.5 Laser Safety

A device with an optical port usually supports multiple types of optical transceivers, all of which are Class I laser products. Pay attention to the following during the use of optical transceivers:

- When an optical transceiver is in operation, ensure that its port is connected to an optical fiber or covered by a dust cap to keep out dust and prevent it from burning your eyes.
- When an optical transceiver is in operation, do not look into its port after removing the optical fiber. Doing so may result in eye injury.

**Figure 2-1 Laser Product Warning**




**Warning**

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

## 2.2 Installation Environment Requirements

Install the switch indoors to ensure its normal operation and prolonged service life.

The installation site must meet the following requirements.

### 2.2.1 Bearing Requirements

Evaluate the weight of the switch and its accessories (for example, the cabinet, chassis, and power supply modules), and ensure that the ground of the installation site meets the requirements.

### 2.2.2 Ventilation Requirements

Reserve sufficient space in front of the air vents to ensure normal heat dissipation. After various cables are connected, bundle the cables or place them in the cable management bracket to avoid blocking air inlets.

### 2.2.3 Space Requirements

To dissipate heat and maintain the switch, do not install it against walls. Maintain a minimum clearance of 10 cm (3.94 in.) around the chassis to facilitate heat dissipation.

### 2.2.4 Temperature/Humidity Requirements

To ensure the normal operation and prolonged service life of the RG-NBS6002 switch, maintain an appropriate temperature and humidity in the equipment room.

The equipment room with too high or too low temperature and humidity for a long period may damage the switch.

- 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, loosening screws.
- In a dry environment, static electricity is prone to occur and damage the internal circuits of the switch.
- Too high temperatures can accelerate the aging of insulation materials, greatly reducing the reliability of the switch and severely affecting its service life.

For details about the operating temperature and humidity requirements of the switch, see section 1.2.5 Technical Specifications.

**Note**

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

### 2.2.5 Cleanliness Requirements

Dust poses a major threat to the switch. The indoor dust takes on a positive or negative static electric charge when falling on the switch, causing poor contact of the metallic joint. Such electrostatic adhesion may occur more easily when the relative humidity is low, not only affecting the service life of the switch, but also causing communication faults. Table 2-1 describes the requirements for the dust content and granularity in the equipment room.

**Table 2-1 Requirements for Dust**

| Dust | Unit | Content |
|---|---|---|
| Dust particles (diameter ≥ 0.5 μm) | Particles/$m^3$ | ≤ 3.5 x $10^6$ |
| Dust particles (diameter ≥ 5 μm) | Particles/$m^3$ | ≤ 3.5 x $10^4$ |

Apart from dust, the salt, acid, and sulfide in the air in the equipment room must meet strict requirements. These harmful substances will accelerate metal corrosion and component aging. Therefore, the equipment room should

be properly protected against the intrusion of harmful gases, such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, and chlorine gas. Table 2-2 lists limit values for harmful gases.

**Table 2-2 Requirements for Gases**

| Gas | Average ($mg/m^3$) | Maximum ($mg/m^3$) |
|---|---|---|
| Sulfur dioxide ($SO_2$) | 0.2 | 1.5 |
| Hydrogen sulfide (HS) | 0.006 | 0.03 |
| Nitrogen dioxide ($NO_2$) | 0.04 | 0.15 |
| Ammonia gas ($NH_3$) | 0.05 | 0.15 |
| Chlorine gas ($Cl_2$) | 0.01 | 0.3 |

**Note**

**Average** refers to the average value of harmful gases measured in one week. **Maximum** refers to the upper limit of harmful gases measured in one week, and the maximum value lasts up to 30 minutes every day.

### 2.2.6 Grounding Requirements

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

- Safe Grounding

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

**Caution**

Please adopt protection grounding connections in buildings so that the switch can be connected to the protection ground.

- Lightning Grounding

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

- 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 ground terminals of the cabinet should be grounded before the running of the switch.

### 2.2.7 Anti-interference Requirements

- Take interference prevention measures for the power supply system.
- Keep the switch away from the grounding equipment or lightning and grounding equipment of the power device as much as possible.
- Keep the switch far away from high-frequency current devices such as high-power radio transmitting station and radar launcher.
- Take electromagnetic shielding measures when necessary.

### 2.2.8 Lightning Protection Requirements

The RG-NBS6002 switch can guard against lightning strikes. As an electric device, it may still be damaged by strong lightning strikes. Take the following lightning protection measures:

- Ensure that the ground cable of the cabinet is in good contact with the ground.
- Ensure that the neutral point of the AC power socket is in good contact with the ground.
- It is recommended to install a power lightning arrester in front of the power input end to enhance the lightning prevention for the power supply.

### 2.2.9 Inspection of the Installation Unit

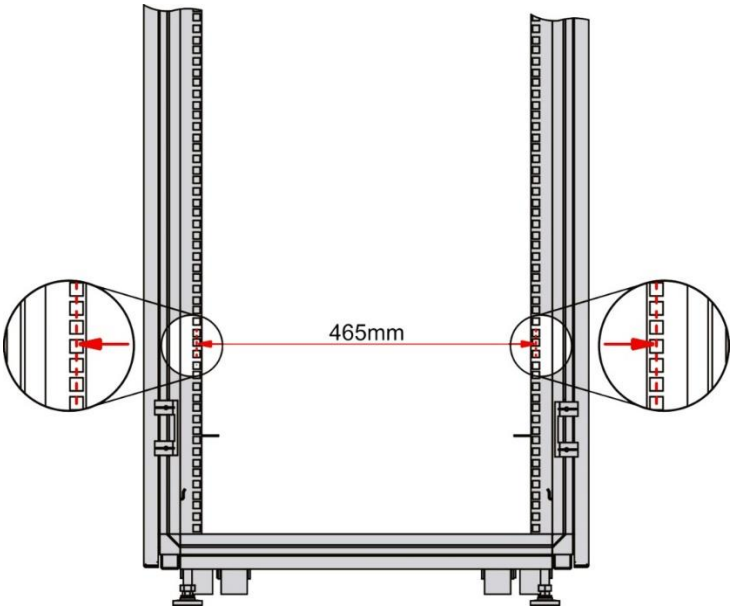
Regardless of whether the switch is installed inside a cabinet or on a workbench, the following conditions must be met:

- The switch is equipped with fans. Therefore, maintain a minimum clearance of 15 cm (5.91 in.) around the air vents for heat dissipation. It is recommended to install the switch inside a standard 19-inch cabinet. The switch can be horizontally placed on a clean plane if conditions are not met. It is recommended to install air conditioners if you want to use the switch in hot areas.
- The cabinet and workbench has proper ventilation and heat dissipation.
- The cabinet and workbench are strong enough to support the weight of the switch and its accessories.
- The cabinet and workbench are properly grounded.

## 2.3 Cabinet Installation Requirements

If you want to install the switch inside a cabinet, confirm that the cabinet meets the following conditions:

**Figure 2-2 Standard 19-inch Cabinet**




(1) A 19-inch standard cabinet is used.

(2) The distance between square hole strips on the left and right sides of the 19-inch standard cabinet is 465 mm.

(3) The distance between the square hole strip on the rack column and the outer side of the front cabinet door is greater than 180 mm and the thickness of the front cabinet door is smaller than 25 mm. Therefore, the available space is greater than 155 mm. The cabinet depth (distance between the front and rear doors) is greater than 1000 mm.

(4) The slide rails (or trays) of the cabinet meets the requirements of the switch and support its weight.

(5) A ground terminal is installed reliably on the cabinet to ensure that the switch is fully grounded.

(6) The cabinet is well ventilated and the porosity of the front and rear panels is greater than 50%.

## 2.4 Tools

**Table 2-3 Tools**

| | |
|---|---|
| **Common Tools** | Phillips screwdrivers, wires, network cables, fastening bolts, diagonal pliers, and binding straps |
| **Special Tools** | Antistatic gloves, wire stripper, crimping pliers, crystal connector crimping pliers, and wire cutter |
| **Meter** | Multimeter |
| **Relevant Devices** | PC, display, and keyboard |

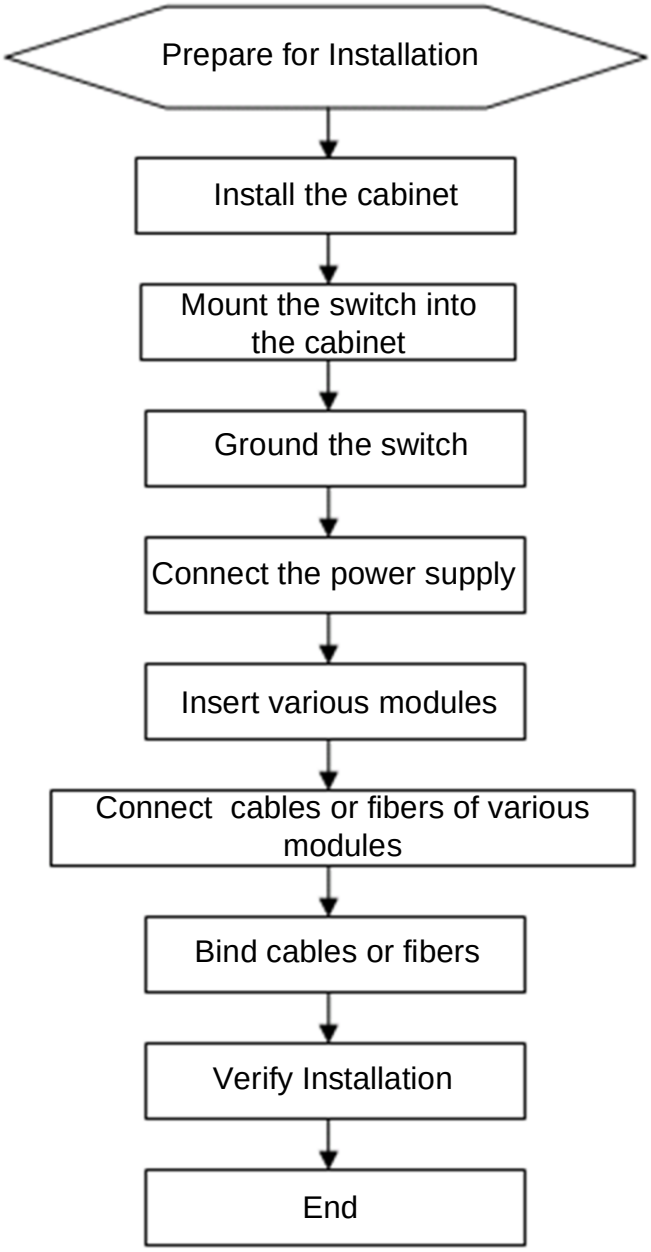
**Note**

The RG-NBS6002 switch is delivered without a tool kit. Please prepare a tool kit yourself.

# 3 Installing the Switch

Ensure that requirements in Chapter 2 are all met.

## 3.1 Installation Procedure




(1) Preparing

(2) Mounting the Switch

(3) Installing and Removing the Power Supply Module

(4) Installing and Removing the Service Module

(5) Verifying Installation

## 3.2 Preparing

The RG-NBS6002 switch is a complex device. Carefully plan and arrange the installation position, networking mode, power supply, and cabling before installation. Confirm the following requirements before installation:

- The installation position provides sufficient space for heat dissipation.
- The installation position meets the temperature and humidity requirements of the switch.
- The power supply and required current are available in the installation position.
- The network cables have been deployed in the installation position.
- The selected power supply modules meet the system power requirements.
- The position of the indoor emergency power switch is learned before installation. The power switch is cut off in case of accidents.

## 3.3 Mounting the Switch

Typically, the switch is mounted to the following places:

- Cabinet
- Workbench

### 3.3.1 Mounting the Switch into a Cabinet

The switch is designed based on the size of a 19-inch standard cabinet. Use fixing accessories delivered with the switch to install the switch into the cabinet based on the cabinet situation.

**Notes**

When mounting the switch inside a cabinet, note the following:

- All expansion bolts for fastening the cabinet base to the ground should be installed and tightened in sequence from bottom to up (large flat washer, spring washer, and nut), and the installation holes on the base and the expansion bolts are properly aligned.
- The installed cabinet should be stable and still.
- The installed cabinet should be vertical to the ground.
- When multiple cabinets are placed side by side in the equipment room, they should be aligned with each other, leaving an error less than 5 mm.
- The front/rear doors of the cabinet should be installed to allow you open and close them smoothly. The locks should work normally, and all keys should be complete.
- There should be no unnecessary and informal labels inside the cabinet and on service modules.
- Filler panels are installed on vacant slots.
- Fastening screws of the switch in the cabinet should be ready, tightened, and of the same model.
- Service modules of the switch are securely installed, and the fastening screws on the panel are tightened.

- All wiring outlets at the top and bottom of the cabinet should be installed with rodent-resistant nets with seams no more than 1.5 cm (0.59 in.) in diameter to prevent rodents and other small animals from entering the cabinet.
- Antistatic wrist straps should be provided in the cabinet.

### Simple Installation Steps

(1) Plan the available space before installing the cabinet. Reserve sufficient space for the front and rear doors for maintenance.

(2) Install and fasten the cabinet in the designed position as planned.

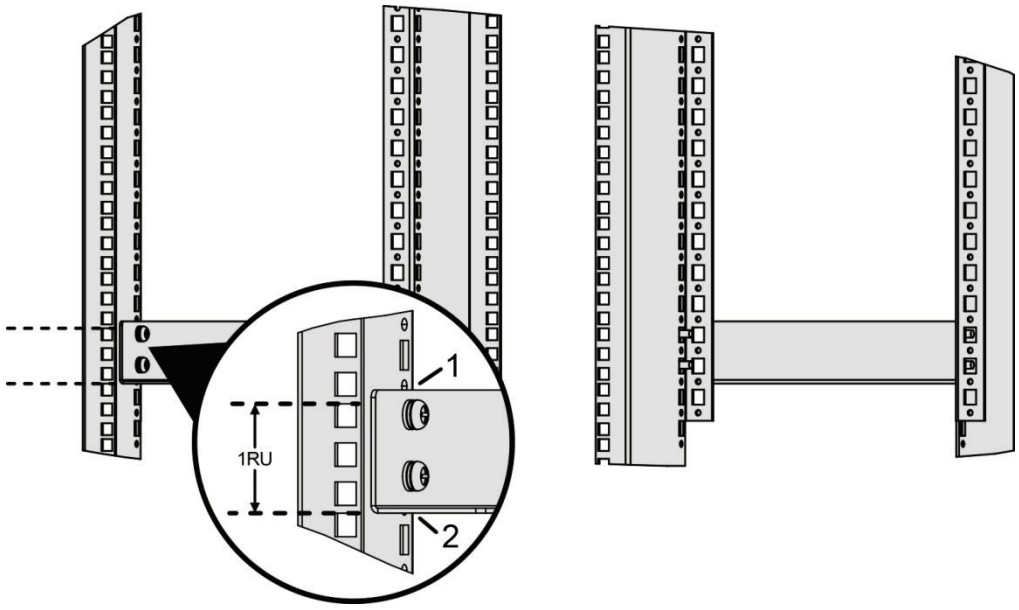
(3) Install the appropriate cable troughs and cables.

(4) Install the tray and cable management brackets on the rack according to the number of switches installed inside the cabinet.

### Description of Slide Rail Installation

Before installing slide rails, understand a 19-inch standard cabinet of IEC60297. The panel height of a standard cabinet is calculated using Rack Unit (RU). 1RU is equal to 44.45 mm (1.75 inch). 1RU is equal to the height of three holes, as shown in Figure 3-1. The intermediate role is the auxiliary installation role, and the upper and lower holes are standard installation holes. Note that the distance between two adjacent standard installation roles is slightly shorter than the distance between the auxiliary installation role and its adjacent standard installation hole. When installing the slide rails used by an NBS6002 switch, ensure that the switch is installed on the plane indicated by 1RU as shown in Figure 3-1.

**Figure 3-1 Slide Rails**




**Note**

The plane between 1 and 2 is a standard RU.

**Caution**

- Before installing slide rails, ensure that the slide rails meet the bearing requirements.
- Slide rail types are diversified. The appearance and installation methods of each slide rail vary with the actual situation.
- RG-NBS6002 switch is heavy. To ensure the cabinet stability, if only one RG-NBS6002 switch is installed in the cabinet, install it in the cabinet as low as possible. If multiple switches are installed in the cabinet, install the heavier switch at the bottom of the cabinet.
- Before installing the power strip of the cabinet, properly arrange the space to prevent the power strip from affecting the cabinet space of the RG-NBS6002 switch or avoid inconvenient operations if the two are too close to each other.

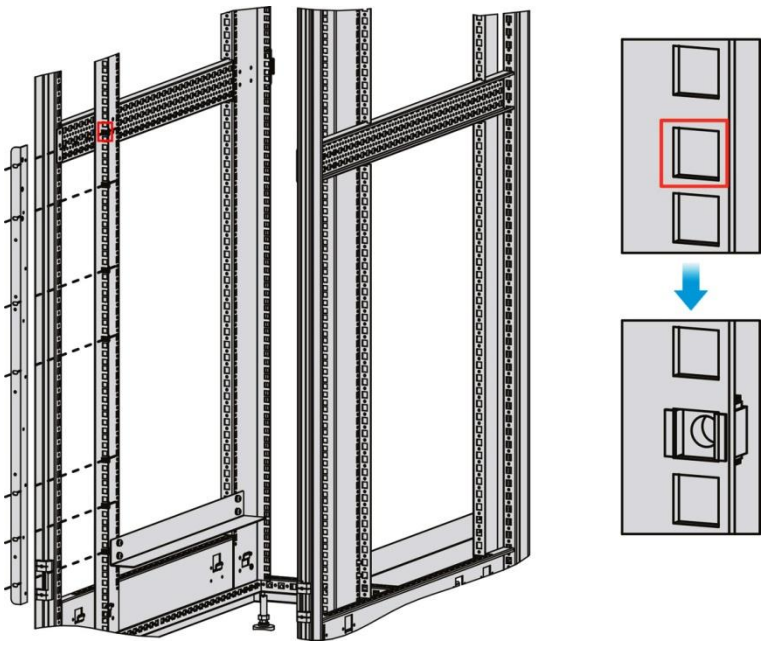
Before mounting an RG-NBS6002 switch into a cabinet, verify that the front and rear brackets of the cabinet are in the right positions. If the brackets are too far forward, the front door of the switch may be too close to the front door of the cabinet. As a result, the front door of the cabinet cannot be closed when the switch is connected with network cables and fibers. Maintain a minimum clearance of 10 cm (3.94 in.) between the front panel of the switch and the front door of the cabinet. Before mounting the switch into a cabinet, ensure that the following conditions are met:

- The cabinet is fixed.
- All the internal units have been installed properly in the cabinet.
- No obstacles to installation exist inside or around the cabinet.
- The switch is prepared and moved to a place near the cabinet where you can handle it easily.

### Installation Steps

(1) Measure the installation height and positions of the mounting brackets. Then, measure the installation height and positions of the mounting brackets, and use a marker to mark them. Install floating nuts into the corresponding positions, as shown in Figure 3-2.

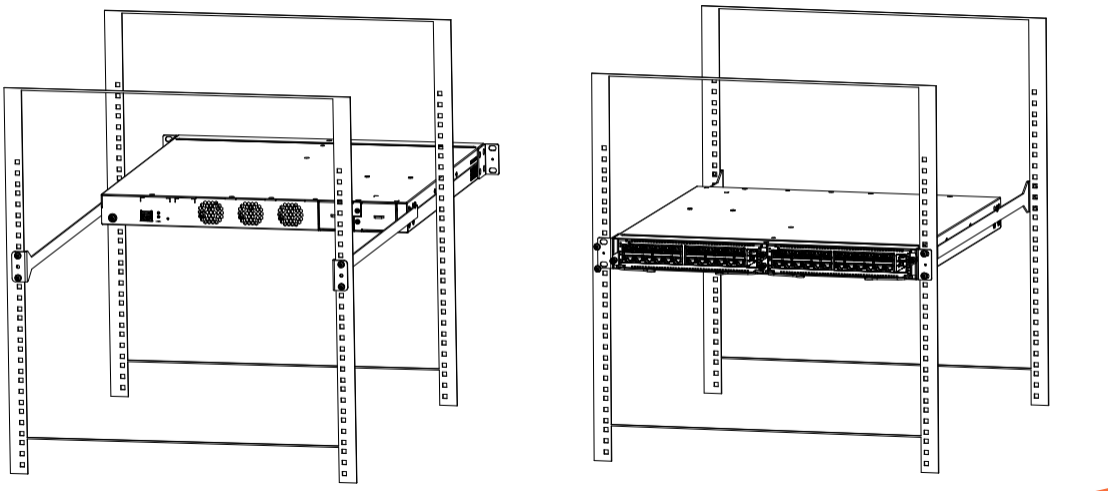
**Figure 3-2 Measuring Installation Height and Positions of the Mounting Brackets**



(2) Raise the switch from two sides by multiple persons and place it on the slide rail or tray of the cabinet. Stably push it into the cabinet until the mounting brackets of the switch fit the square hole strips of the cabinet.

(3) Use screws to fasten the mounting brackets to the floating nuts on the square hole strips of the cabinet.

**Figure 3-3 Mounting an RG-NBS6002 Switch into a 19-inch Standard Cabinet**



## 3.3.2 Mounting the Switch on a Workbench

When mounting the switch onto a workbench, note the following:

- Ensure that the workbench is stable and properly grounded.
- Attach the foot pads delivered with the switch to small holes at the bottom of the switch and maintain a minimum clearance of 10 cm (3.94 in.) around the chassis for heat dissipation.
- Do not place heavy objects on the switch.

## 3.4 Installing and Removing the Power Supply Module

**Figure 3-4 Installing a Power Supply Module**

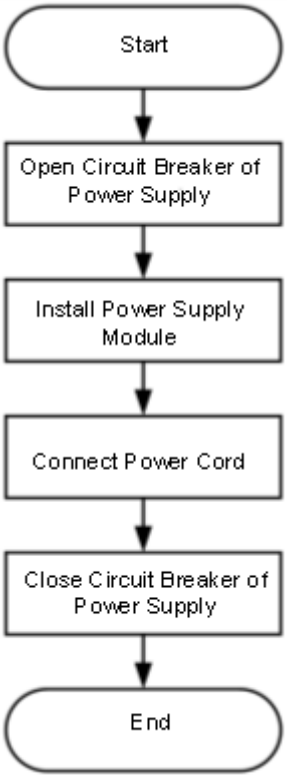
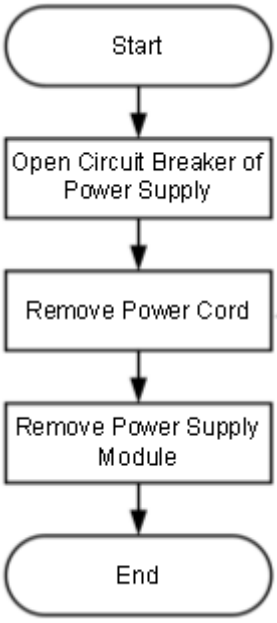



**Figure 3-5 Removing a Power Supply Module**



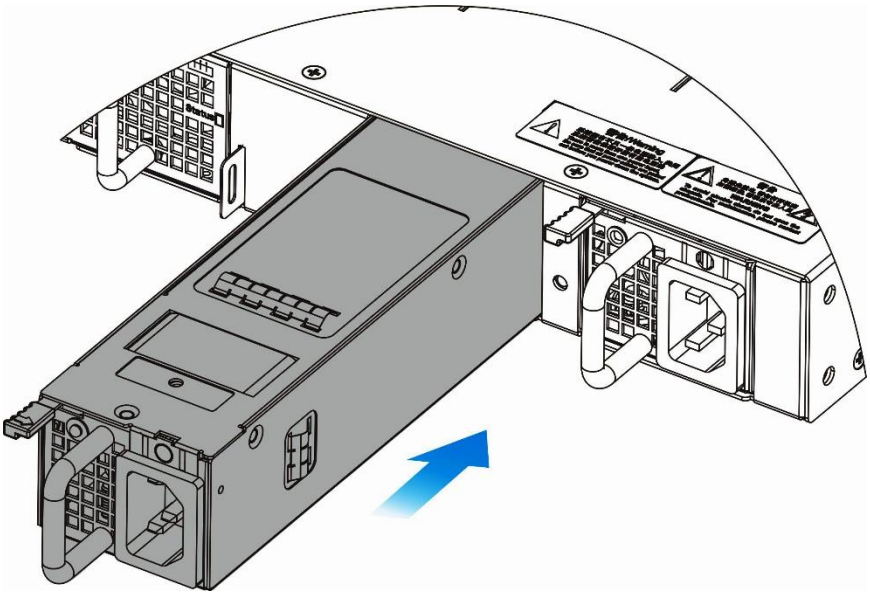
## 3.4.1 Installing the Power Supply Module

### Installing RG-PA150I-FS Power Supply Modules

(1) Take out a new power supply module and ensure that the input mode and input indicators of the power supply module meet requirements.

(2) Remove the filler panel. With the panel printed with the power nameplate information as the upper panel, grab the power supply module handle with one hand and hold the bottom of the power supply module with the other hand. Straightly and slowly insert the power supply module into the chassis along the guide rail until it clicks into place.

**Figure 3-6 Installing a RG-PA150I-FS Power Supply Module**



**Warning**

- Before installing a power supply module, unplug the power cord. Otherwise, personal injury or device damage may occur.
- Insert the power supply module into the chassis gently. If it is difficult to push it, pull the power supply module out and check whether it is aligned with the power supply module slot. If yes, proceed with the operation.

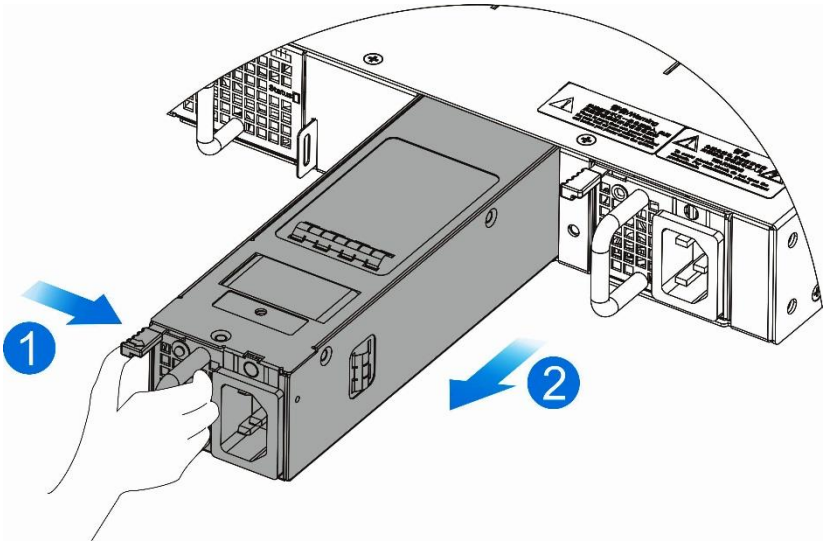
## 3.4.2 Removing the Power Supply Module

### Removing RG-PA150I-FS Power Supply Modules

(1) Press the latch to pull out the power supply module with one hand. Hold the power supply module with another hand.

(2) Install a filler panel in the vacant slot and store the removed power supply module in the package.

**Figure 3-7 Removing a RG-PA150I-FS Power Supply Module**




**Warning**

- Before removing a power supply module, unplug the power cord. Otherwise, personal injury or device damage may occur.
- Insert the power supply module into the chassis gently. If it is difficult to push it, pull the power supply module out and check whether it is aligned with the power supply module slot. If yes, proceed with the operation.
- Install a filler panel in a vacant slot.

### 3.4.3 Connecting the Power Cord and Ground Cable

Ensure that the power supply, power cord and ground cable meet specification requirement.

- For details about the requirements for AC power supply modules, see Technical Specifications of Power Supply Modules.
- The switch uses three-wire power cords. It is recommended to use a single-phase three-wire power socket with a neutral-point connector. The neutral point must be securely grounded in buildings. Ensure that power supplies in this building are properly grounded.

(1) Open the circuit breaker of the power supply. Insert one end of the power cord delivered with the switch into the power socket on the rear panel of the chassis and the other end into an AC power socket.

(2) Close the circuit breaker of the power supply.

(3) Check whether the power supply indicator on the front panel is on. If yes, it means that the power supply is properly connected.

**Warning**

- Please use the power cord delivered with the switch.

#### Connecting the Ground Cable of the Switch

A proper grounding system is the basis for stable and reliable running and is indispensable for preventing lightning strikes and interference.

- The cross-sectional area of the ground cable should be determined according to the possible maximum current. Cables with good conductor should be used.
- Do not use bare wire.
- To ensure human safety and device security, the switch must be properly grounded. The resistance between the chassis and ground should be less than 1 ohm.

**Simple Grounding Steps**

(1) Remove ground screws on the back of the chassis.

(2) Use the removed ground screws to fix one end of the ground cable to the chassis. Use the same method to connect the other end of the ground cable to the cabinet ground cable or ground bar in the equipment room.

**Warning**

- To ensure human safety and device security, the switch must be properly grounded. The resistance between the switch chassis and ground should be less than 1 ohm.
- Please check whether the AC socket of the switch is reliably connected to the protection ground of the building. If not, please use a protection ground wire to connect the protection ground terminal of the AC socket to the protection ground of the building.
- The power socket should be installed in an easily operable position near the switch.
- During the device installation, always make the ground cable connected first and disconnected last.
- The cross-sectional area of the protection ground cable should be at least 2.5 $mm^2$ (12 AWG).

### 3.4.4 Removing the Power Cord and Ground Cable

(1) Open the circuit breaker of the power supply.

(2) Unplug the power cord.

(3) Check whether the power indicator on the front panel is off. If yes, the power cord is removed.

(4) Use a screwdriver to remove the ground cable of the chassis.

**Warning**

- Before unplugging a power cord, ensure that the circuit breaker of the power supply is open.
- Before maintenance, ensure that all power cords are disconnected.

## 3.5 Installing and Removing the Service Module

For details about the service modules supported by the switch, see Service Modules.

**Note**

Service modules in this section are installed with the power cut off.

### 3.5.1 Installing the Service Module

Wear an antistatic wrist strap and ensure that its metal part fully touches the skin surface. To ensure safety, do not touch any component on the service module.

**Caution**

- Do not hold the PCB edges or crash components on the PCB.

- When inserting or removing a service module, use the handles on both sides of the module panel. Do not operate it forcibly.

### Selecting a Service Module Slot

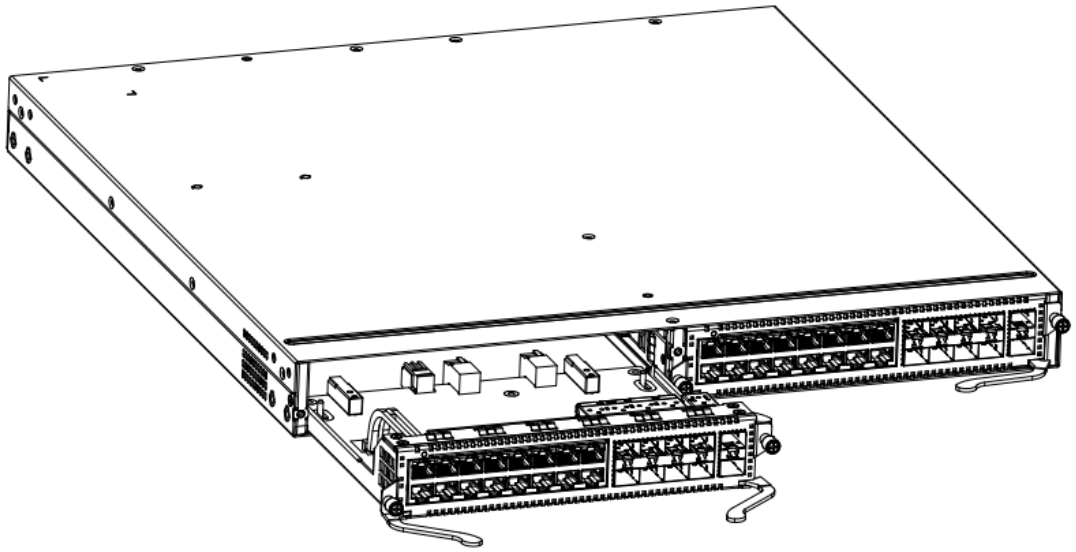
Service modules can be inserted into either service module slots.

To change a slot for a service module or replace a service module, restore the RG-NBS6002 series switch to factory settings.

Restore factory settings: Press and hold the reset button for more than 5 seconds to reset all modules, restore the initial password, restore factory settings, and save the configuration backup file. If you log in to the web-based management system after a restart, you can select **Delete Backup** or **Restore Backup** (the password is the default password). If you do not log in, factory settings are used.

Before installing a service module, remove the filler panel in the corresponding slot.

**Figure 3-8 Module Slots of the RG-NBS6002 Switch Chassis**



### Installing Service Modules

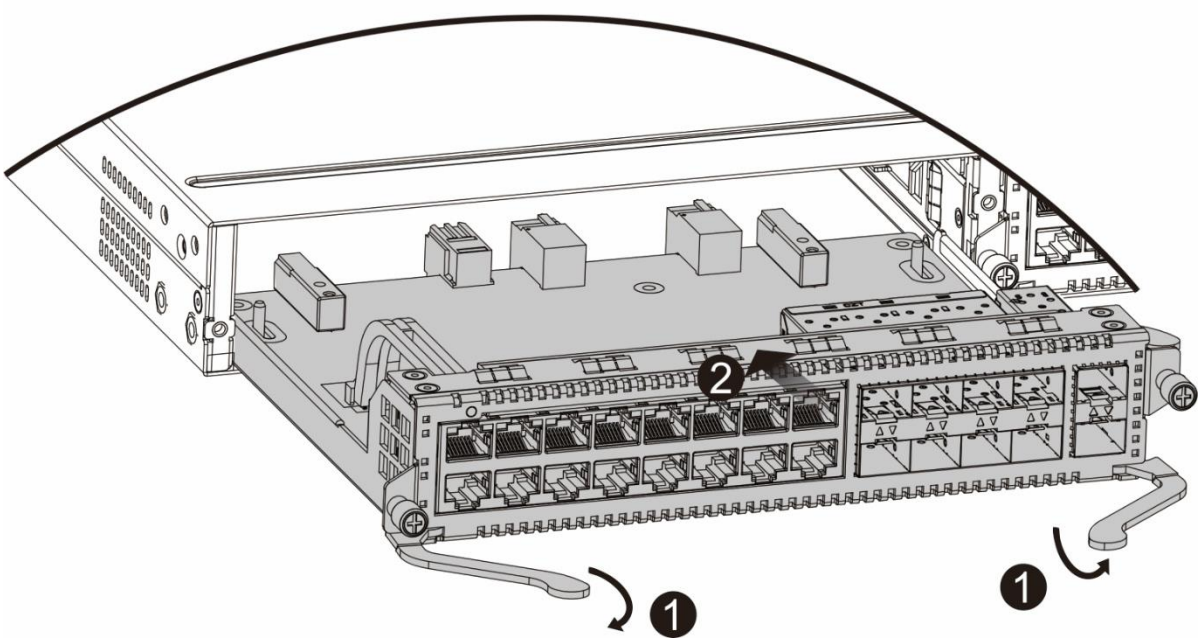
Figure 3-9 and Figure 3-10 show the installation method of service modules.

(1) Confirm the service module slot.

(2) Pull the ejector levers outwards, as marked by 1 in Figure 3-9.

(3) Align the service module with the guide rail in the corresponding slot and insert the module into the slot, as marked by 2 in Figure 3-9.

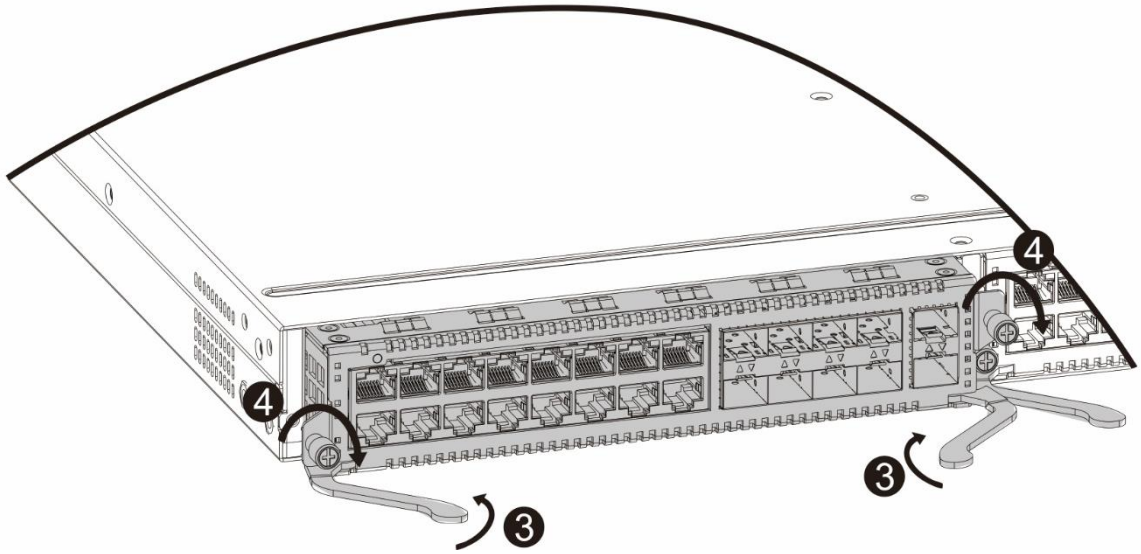
**Figure 3-9 Installing a Service Module- (1)**




(4) Push the ejector levers inwards, as marked by 3 in Figure 3-10.

(5) Fasten captive screws on both sides of the panel, as marked by 4 in Figure 3-10.

**Figure 3-10 Installing a Service Module- (2)**




**Warning**

Insert the service module into the chassis gently. If it is difficult to push it, pull the service module out and check whether it is aligned with the service module slot. If yes, proceed with the operation.

## 3.5.2 Removing the Service Module

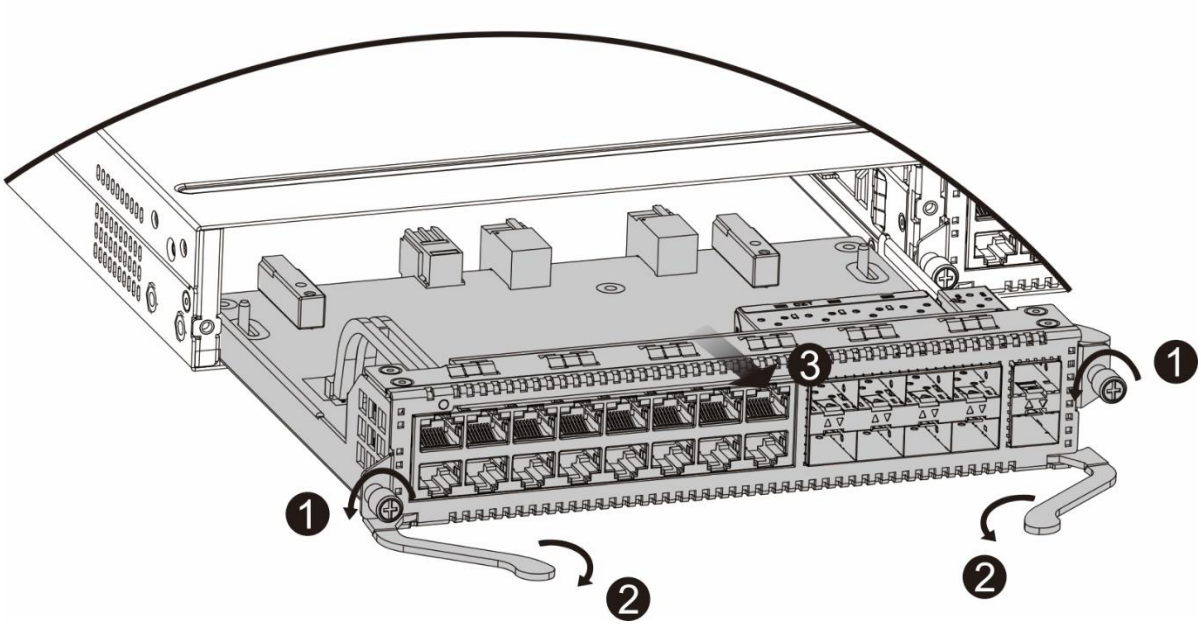
(1) Ensure that the switch panel faces you.

(2) Use a screwdriver to loosen the captive screws of the service module, as marked by 1 in Figure 3-11.

(3) Pull the ejector levers outwards, as marked by 2 in Figure 3-11.

(4) Pull out the service module, as marked by 3 in Figure 3-11, and store the removed service module in the package.

**Figure 3-11 Removing a Service Module**




**Caution**

- Service modules do not support hot swapping. Before removing them, cut off the power supply.
- After removing service modules, install filler panels in vacant slots to avoid dusting.

**Warning**

Keep the switch away from the walking area to avoid accidents due to collision.

### 3.5.3 Troubleshooting the Service Module

If the switch does not work properly, take the following steps:

- Check whether the cables are properly selected.
- Check whether the indicator is normal.
- Check whether the service module works properly as configured.

## 3.6 Verifying Installation

- If the switch is installed inside a cabinet, verify that the cabinet and mounting brackets are secured. If the switch is placed on a workbench, maintain sufficient space around the device for heat dissipation.
- Verify that the power cord meets the specification requirement.

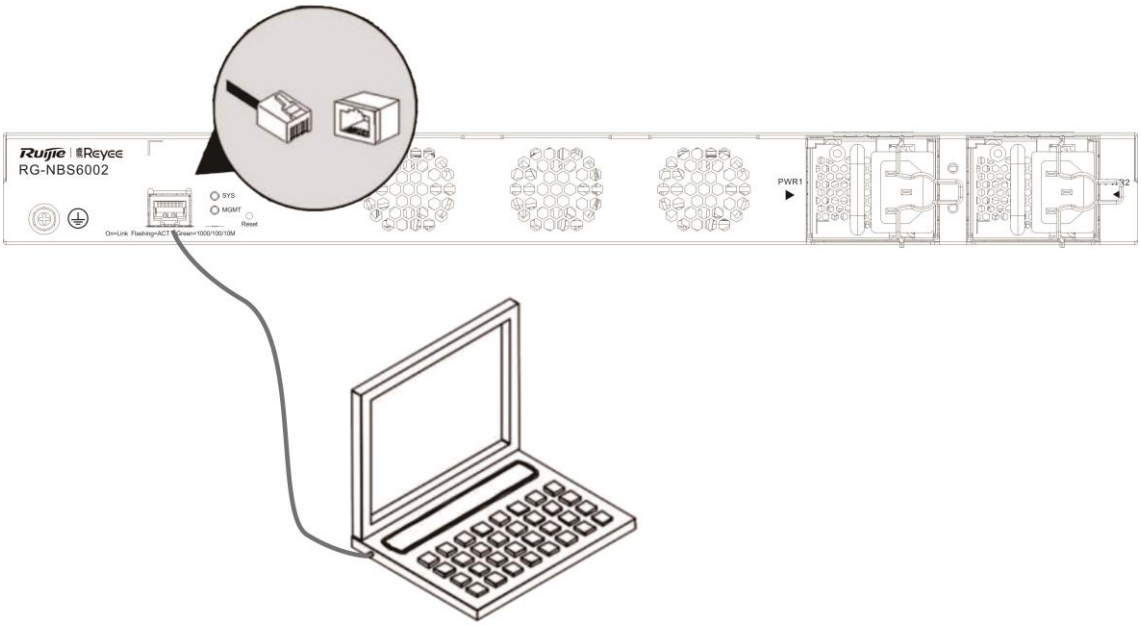
- Verify that the cabinet is securely grounded.
- Verify that the switch is properly connected to other devices, such as the configuration terminal.
- Verify that the power cord is long enough to avoid overstretching.

# 4 Verifying Operating Status

## 4.1 Setting up Configuration Environment

Connect the PC to the management port of the switch through a network cable, as shown in Figure 4-1.

**Figure 4-1 Configuration Environment**




**Connecting Cable**

(1) Plug the crystal head of the network cable into the network port of the PC.

(2) Plug the RJ-45 connector of the network cable to the management port of the switch.

**Setting Web-based Login**

(1) Start the PC and configure local connection attributes. Change the IP address of the PC to 10.44.77.*XXX* (1 to 254, excluding 200).

(2) Open the browser and enter 10.44.77.200 into the address bar to log in to the system. Power on the switch.

### 4.1.2 Checking Environment Before Power-on

(1) Check whether the switch is properly grounded.

(2) Check whether power supply modules are properly installed.

(3) Check whether the power cord is properly connected.

(4) Check whether the power supply voltage meets the requirement.

(5) Check whether the network cable is properly connected, whether the terminal (may be PC) is started, and whether configuration parameters are configured.

### 4.1.3 Checking Environment After Power-on (Recommended)

After power-on, check the following item:

- Check the switch indicator status.

# 5 Monitoring and Maintenance

## 5.1 Monitoring

### Indicator

When the RG-NBS6002 switch is running, you can monitor the module status by observing the module indicator.

- If the SYS indicator of the chassis is red, it indicates that the power supply module is faulty or not in place or the service module is faulty. Log in to the web-based management system to confirm and troubleshoot the fault.
- If the SYS indicator of the chassis is yellow, it indicates that the system temperature reaches the warning value or the service module is abnormal. This case may affect the system performance, but the system can continue working. Log in to the web-based management system to confirm and troubleshoot the fault.
- If the SYS indicator of the chassis or the status indicators of service modules are off or blink quickly after the modules run for a period, it indicates that the module is faulty. Check the cause of the fault. Cut off the power supply if necessary.

## 5.2 Maintenance

### Supervisor Module and Service Module Maintenance

When a fault occurs and a service module needs to be replaced, replace the service module based on the installation and removal guide of service modules.

### Power Supply Module Maintenance

When a power supply module is faulty, unplug the power cord, press the latch, grab the handle, pull it out, replace it with a qualified one, and then plug the power cord.

### Replacing Fuses

To replace fuses, contact technical support personnel. The technical support personnel will select fuses of the same specifications for replacement. The following table describes specifications of fuses for different modules.

| Model | Fuse Position No. | Fuse Specifications |
|---|---|---|
| M6000-24GT2XS | F1 | F 10 A/125 V |
| M6000-24SFP2XS | F1s | F 10 A/125 V |
| M6000-16GT8SFP2XS | F1 | F 10 A/125 V |
| M6000-16SFP8GT2XS | F1 | F 10 A/125 V |

# 6 Troubleshooting

## 6.1 Troubleshooting Power Supplies

You can judge whether the power supply system is faulty according to the SYS indicator on the rear panel and the status indicators on the power supply modules. For normal indicator statuses, see Chapter 1. If an exception occurs, check the following items:

- Check whether the power supply is the same as that required by the switch.
- Check whether the power cord of the switch is properly connected.
- When a power supply fault occurs, unplug the power cord, loosen two screws on the power supply module to remove the power supply module, replace it with a qualified one, fasten screws, and then plug the power cord.

**Caution**

If no exception is found but the SYS indicator is still off, contact the local distributor or technical support personnel of Ruijie networks.

## 6.2 Troubleshooting Configuration System

If the configuration system is faulty after the switch is powered on, garbled characters or no information will appear on the configuration terminal. In this case, check the following items:

- Check whether the power system is normal.
- Check whether the cable is properly plugged into the management port.
- If no exception is found but no information appears on the configuration terminal, a network cable or terminal parameter error occurs. In this case, change the terminal parameters.

**Note**

If you change the switch's console port parameters, there may be no information displayed on the configuration terminal.

# 7 Appendix

## 7.1 Connection Modes of Cables Prepared by Users

The following describes the connection modes and signals of cables prepared by users. When you hold the RJ-45 connector facing yourself, the signal wires from left to right are numbered 1 to 8.

**Figure 7-1 Cable Connection and Signals**

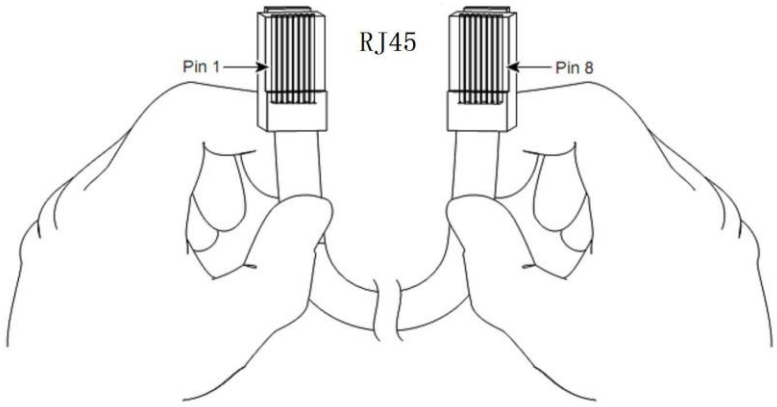



**Table 7-1 Definition of Pin Signal Concerning the 1000BASE-T Port**

| Pin | MDI Mode | MDI-X Mode |
|---|---|---|
| 1 | Media Dependent Interface A+ | Media Dependent Interface B+ |
| 2 | Media Dependent Interface A- | Media Dependent Interface B- |
| 3 | Media Dependent Interface B+ | Media Dependent Interface A+ |
| 4 | Media Dependent Interface C+ | Media Dependent Interface D+ |
| 5 | Media Dependent Interface C- | Media Dependent Interface D- |
| 6 | Media Dependent Interface B- | Media Dependent Interface A- |
| 7 | Media Dependent Interface D+ | Media Dependent Interface C+ |
| 8 | Media Dependent Interface D- | Media Dependent Interface C- |

The preceding table describes the definition of pin signal concerning the 1000BASE-T port. A 1000BASE-T port uses four pairs of wires for data transmission, and all of the four pairs of wires must be connected. Figure 7-2 shows the connection of twisted-pair cables used by a 1000BASE-T port.

**Figure 7-2 Four Pairs of Twisted-pair Cables Used by a 1000BASE-T Port**

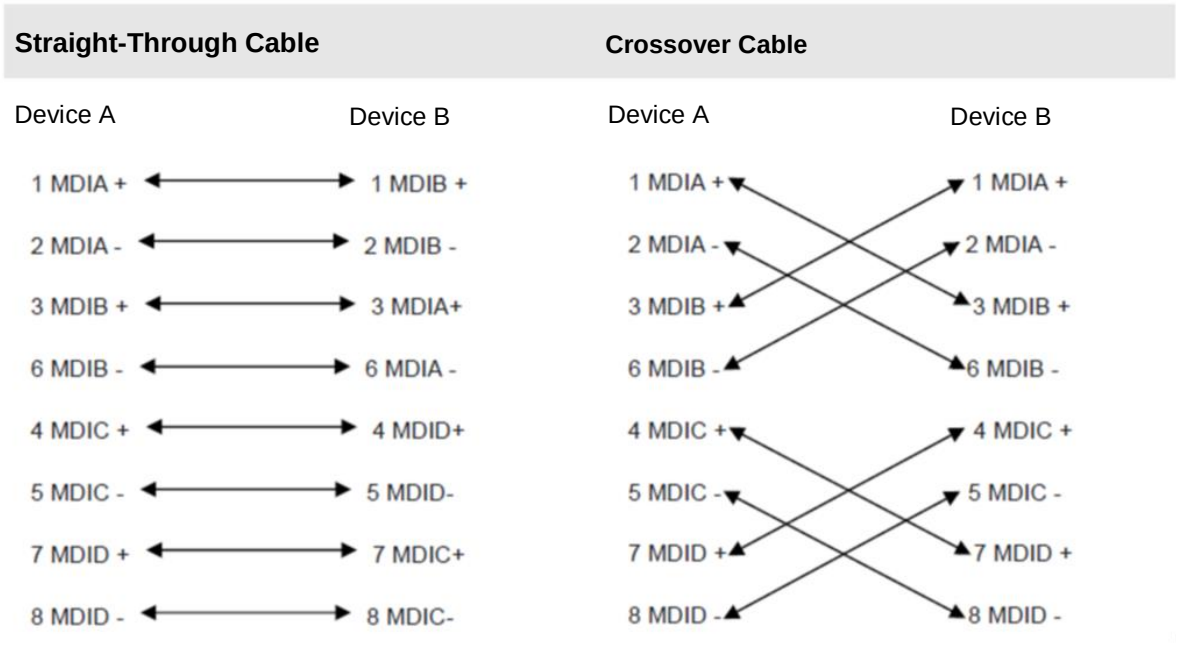
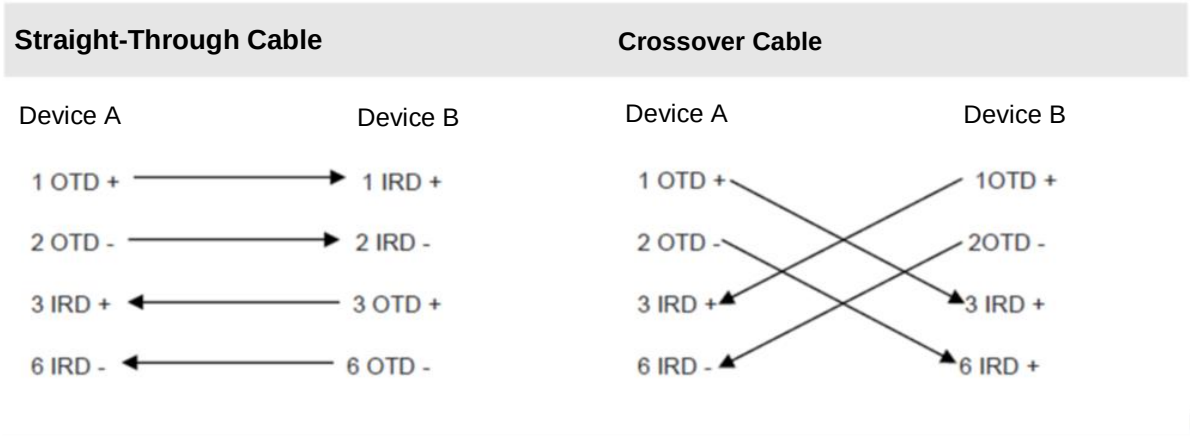



**Table 7-2 Definition of Pin Signal Concerning the 100BASE-TX/10BASE-T Port**

| Pin | MDI Mode | MDI-X Mode |
|---|---|---|
| 1 | Output Transmit Data+ | Input Receive Data+ |
| 2 | Output Transmit Data- | Input Receive Data- |
| 3 | Input Receive Data+ | Output Transmit Data+ |
| 6 | Input Receive Data- | Output Transmit Data- |
| 4, 5, 7, 8 | Not used | Not used |

Figure 7-3 shows feasible connections of the straight-through and crossover twisted pairs of a 100BASE-TX/10BASE-T port.

**Figure 7-3 Connection Modes of 100BASE-TX/10BASE-T Twisted-pair Cables**

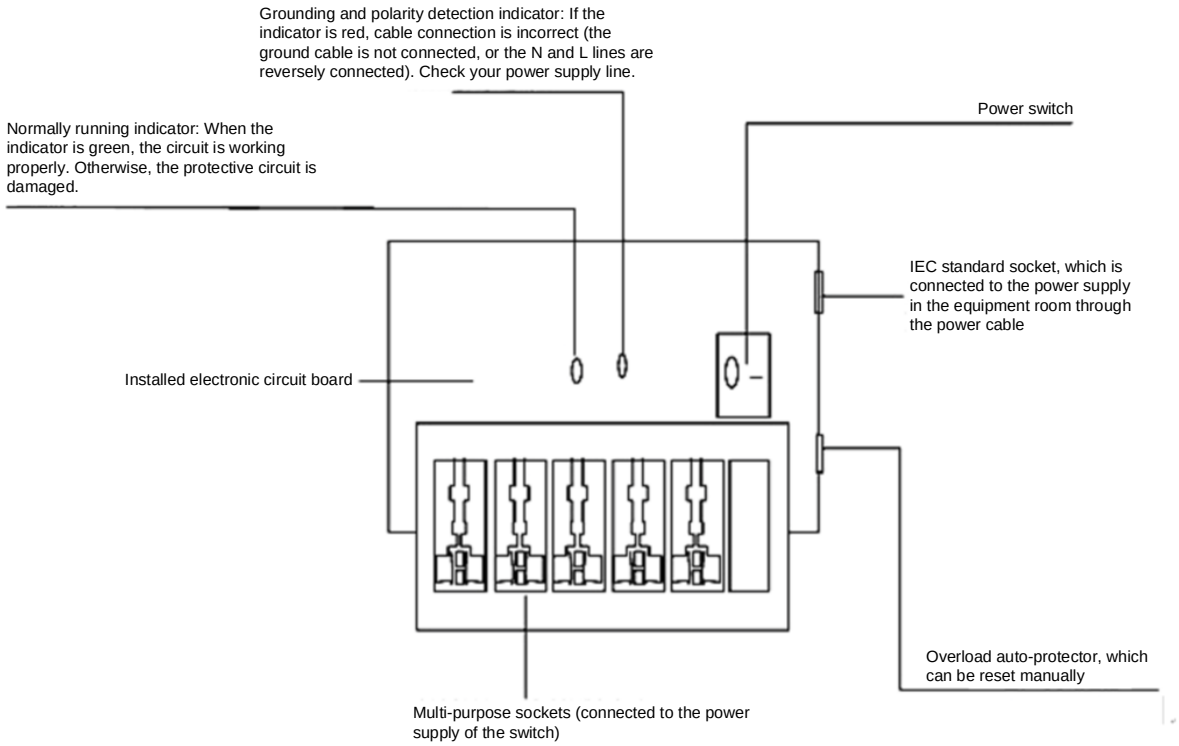



## 7.2 Lightning Protection

**Installing AC Power Arrester (Lightning Protection Power Strip)**

The AC power port must be connected to an external lightning protection power strip to prevent the switch from being struck by lightning when the AC power cord is introduced from the outdoor and directly connected to the power port of the switch. The lightning protection power strip can be fixed on the cabinet, workbench, or wall in the equipment room by using cable ties and screws. AC power enters the lightening protection power strip and then gets to the switch.

**Figure 7-4 Power Arrester**




**Caution**

- The power arrester is not delivered with the switch. Please purchase it based on actual requirements.
- 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 protection power strip), the lightning protection function is implemented only if the RUN indicator is green and the ALARM indicator is OFF.
- If the ALARM indicator on the power arrester is red, check whether it is caused by poor grounding connection or by the reversed connection of the Null and Live lines. The detection method is as follows: Use a multimeter to measure the polarity of the power socket for the arrester when the indicator is red. If the N line is on the left and the L line is on the right (facing the socket), the arrester's PE terminal is not grounded. If not, the polarity of the arrester power cord should be reversed. In this case, you should open the power arrester and rectify the polarity of the connection. If the indicator is still red, the arrester's PE terminal has not been grounded.

### Installing the Ethernet Port Arrester

Please 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 housing 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 housing. The paste position for the Ethernet port arrester should be as close to the ground terminal of the switch as possible.

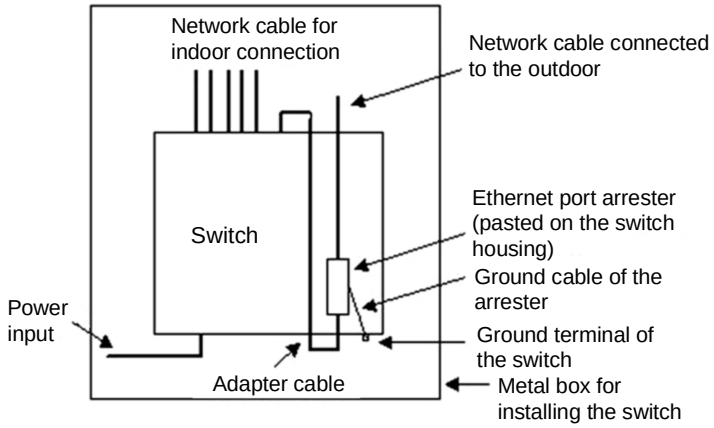
(2) Based on the distance between the switch ground terminal and the Ethernet port arrester, cut the ground cable for the Ethernet port arrester and firmly tighten the ground cable to the ground terminal of the switch.

(3) Use a multimeter to check whether the ground cable for the arrester is in good contact with the ground terminal and the housing 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 indicator is normal.

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

**Figure 7-5 Ethernet Port Arrester Installation**




**Caution**

- The Ethernet port arrester is only for the 10M/100M copper ports with an RJ-45 connector.
- The Ethernet port arrester is not delivered with the switch. Please purchase it based on actual requirements.

Pay attention to the following conditions during the actual installation to avoid affecting the performance of the Ethernet port arrester:

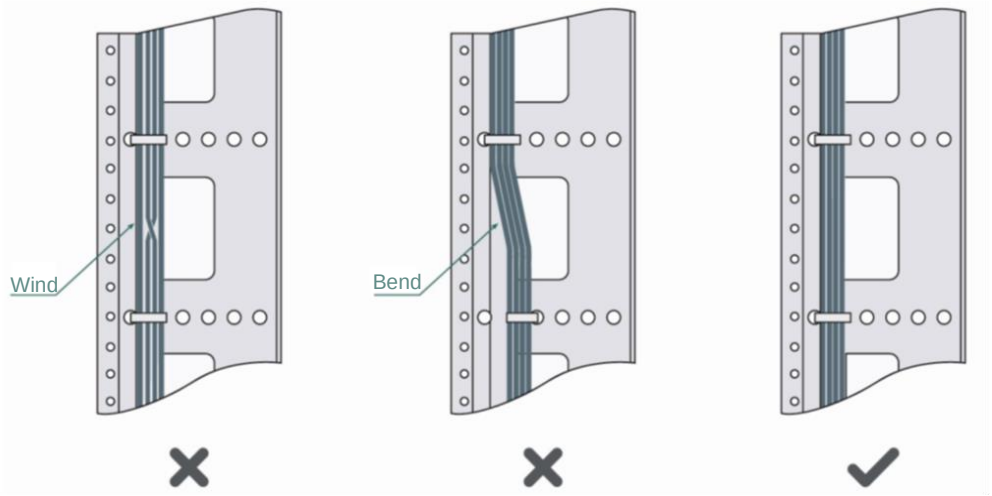
- Reversed installation direction of the arrester. Connect the external network cable to the "IN" end and connect the Ethernet port of the switch to the "OUT" end.
- Poor grounding of the arrester. The ground cable of the arrester should be as short as possible to ensure that it is in good contact with the ground terminal of the switch. Use a multimeter to confirm the contact condition after the grounding.
- Incomplete arrester installation. If there is more than one port connected to the peer device on the switch, arresters need to be installed on all connection ports for the purpose of lightning protection.

## 7.3 Cabling

When the RG-NBS6002 switch is installed in a standard 19-inch cabinet, secure the cables around the cable management brackets. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room. All transferred cable connectors should be placed at the bottom of the cabinet in an orderly manner instead of outside the cabinet that is easy to touch. Power cables are routed beside the cabinet, and top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the positions of the DC power distribution box, AC socket, or lightning protection box.

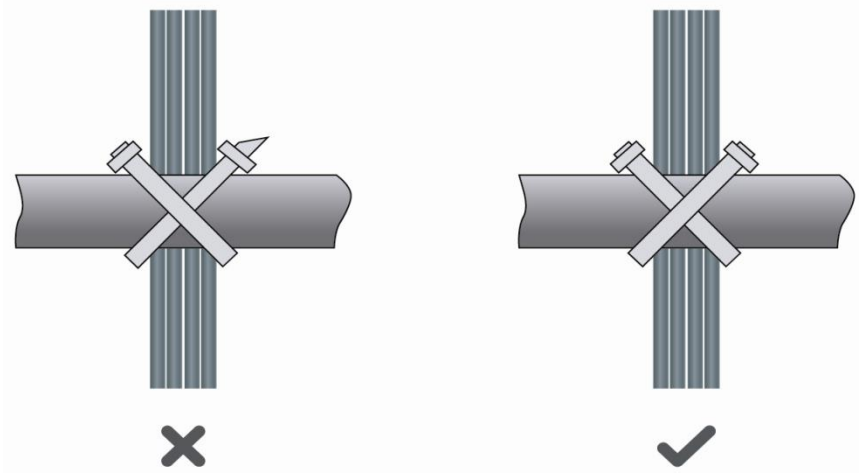
- Requirement for the Minimum Cable Bend Radius
  - The bend radius of a fixed power cord, network cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than their respective 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.
- Requirement for the Minimum Fiber Bend Radius
  - The diameter of a fiber tray to hold fibers should be over 25 times greater than the diameter of the fiber.
  - When an optical fiber is moved, the bend radius of the fiber should be over 20 times greater than the diameter of the fiber.
  - During cabling of an optical fiber, the bend radius of the fiber should be over 10 times greater than the diameter of the fiber.
- 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 cabinet without twisting or bending, as shown in Figure 7-6.

**Figure 7-6 Binding Cables (1)**



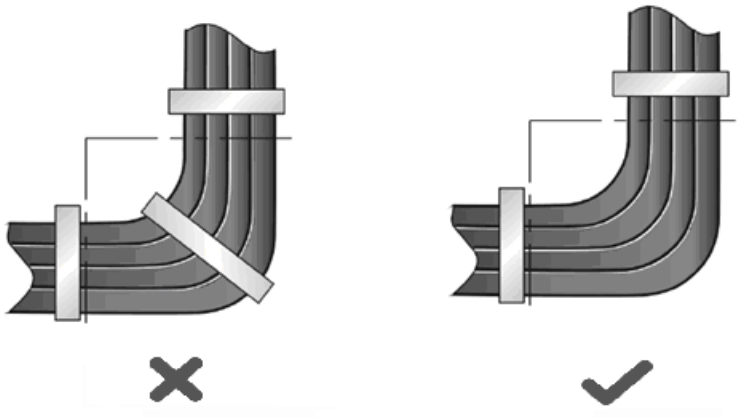

- Cables of different types (such as power cords, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, it is recommended to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the cabinet 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 7-7.

**Figure 7-7 Binding Cables (2)**



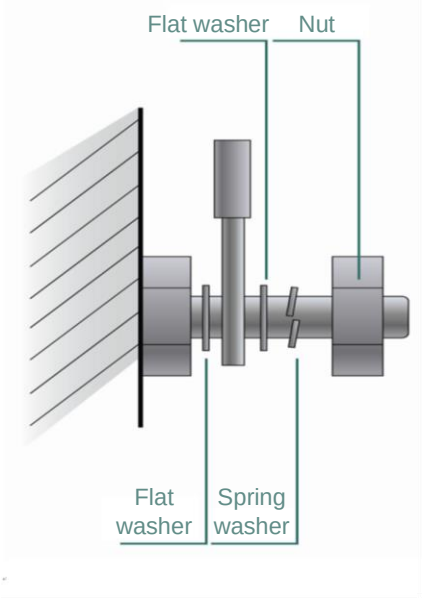
- When cables need to be bent, please bundle them up but do not tie them where the cables will be bent. Otherwise, considerable stress may be generated in cables, breaking cable cores, as shown in Figure 7-8.

**Figure 7-8 Binding Cables (3)**



- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the cabinet or cable trough. The proper position refers to a position that does not affect device running or damage the switch or cable.
- 220 V and –48 V power cords must not be bundled on the guide rails of moving parts.
- The power cords connecting moving parts such as door grounding wires should be reserved with some 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 fasten cable terminals, the bolt or screw must be tightly fastened, and anti-loosening measures should be taken, as shown in Figure 7-9.

**Figure 7-9 Cable Fastening**




- 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 cables 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 based on Table 7-3.

**Table 7-3 Bundle up Cables Using Cable Ties**

| Cable Bunch Diameter | Distance between Every Binding Spot |
|---|---|
| 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.) |

- No knot is allowed in cabling or bundling.
- For wiring terminal blocks (such as circuit breakers) with cord end terminals, the metal part of the cord end terminal should not be exposed outside the terminal block when assembled.

## 7.4 Site Selection

- The equipment room should be at least 5 km 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 away from medium pollution sources, such as the chemical factory, rubber factory, and electroplating factory. The equipment room should be at least 2 km away from light pollution sources, such as the food factory and leather plant. If these pollution sources are unavoidable, the equipment room should be located on the windward side of the pollution sources perennially with advanced protection.
- The equipment room should be at least 3.7 km 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 environments.
- Do not build the equipment room in the proximity of livestock farms. Otherwise, the equipment room should be located on the windward side of the pollution source perennially. The previous livestock house or fertilizer warehouse cannot be used as the equipment room.
- The equipment room should be firm enough to withstand severe weather conditions such as windstorm and heavy rain. The equipment room should be away from the dusty road or quarry. 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 that the air vents of the equipment room are 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 PCBs.
- Keep the equipment room away from industrial boilers and heating boilers.
- The equipment room had better be on the second floor or above. Otherwise, the equipment room floor should be 600 mm higher than the highest flood level ever recorded.
- Make sure there are no cracks or holes on the wall and floor. If there are cable entries on 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 switch.