# Ruijie RG-WALL 1600-Z5100-S

# Cloud-Managed Firewall

## Hardware Installation and Reference Guide

Document version: 1.1
Date: October 16, 2024

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# Preface

## Intended Audience

This document is intended for:

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

## Technical Support

- Ruijie Networks website: https://www.ruijienetworks.com/
- Online support center: https://ruijienetworks.com/support
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- Live chat: https://www.ruijienetworks.com/rita
- Documentation feedback: doc@ruijie.com.cn

## Conventions

### 1. Conventions

| Convention | Description |
| --- | --- |
| **Boldface** | The keywords of a command line are in **boldface**. |
| *Italic* | Command arguments are in *italics*. |
| [ ] | Items in square brackets are optional. |
| [ x \| y ] | Optional items are grouped in braces and separated by vertical bars. One item is selected or no item is selected. |
| { x \| y } | Optional items are grouped in brackets and separated by vertical bars. One item is selected. |
| [ x \| y \| ... ] * | Optional items are grouped in braces and separated by vertical bars. Several items or no item can be selected. |
| { x \| y \| ... } * | Optional items are grouped in brackets and separated by vertical bars. A minimum of one item or a maximum of all items can be selected. |
| &<1-n> | The parameter before the & sign can be repeated for consecutive 1-n times. |
| // | A line starting with double slashes is comments. |

## 2. Signs

The signs used in this document are described as follows:

**Warning**

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

**Caution**

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

**Note**

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

**Specification**

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

## 3. Notes

This manual introduces the version information, revision history, features, resolved issues, known issues, supported platforms, software upgrading, and related documentation.

# Contents

# 1 Overview

## 1.1 Introduction

The RG-WALL 1600-Z5100-S firewall (Z5100-S firewall or Z5100-S for short) is a next-generation Z series firewall of Ruijie Networks for all industries. With cloud-network linkage, the firewall continuously improves its security detection capabilities and evolves from passive defense to proactive defense based on quick detection and proactive handling.

## 1.2 Package Contents

**Table 1-1 Package Contents**

| No. | Item | Quantity |
|---|---|---|
| 1 | RG-WALL 1600-Z5100-S (Nameplate at the Bottom) | 1 |
| 2 | Power Cord | 1 |
| 3 | Console Cable | 1 |
| 4 | Ethernet Cable | 1 |
| 5 | Yellow/Green Grounding Cable | 1 |
| 6 | L-shaped Mounting Bracket | 2 |
| 7 | M4 x 6 mm Cross Recessed Countersunk Head Screw | 8 |
| 8 | Rubber Pad | 4 |
| 9 | Warranty Card | 1 |
| 10 | User Manual | 1 |

# 1.3 Appearance

## 1.3.1 Front Panel

**Figure 1-1 Front Panel**

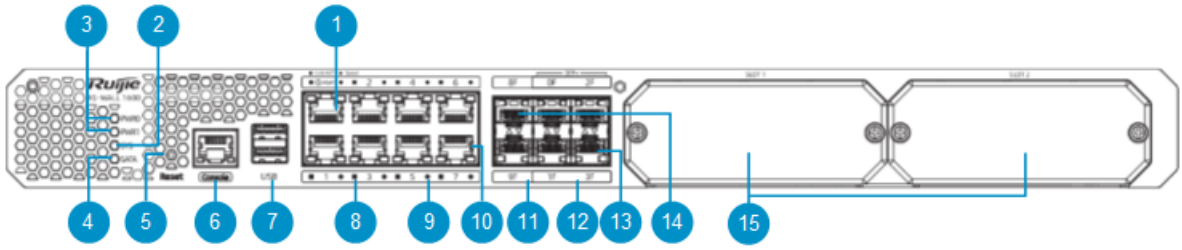



**Table 1-2 Components on the Front Panel**

| No. | Component | Description |
|---|---|---|
| 1 | MGMT port | It is used to access the device management page upon first login. |
| 2 | System status LED (SYS) | ● Blinking green: The device is powered on and being initialized, or the system is restoring factory settings.<br>● Solid green: Initialization is complete.<br>● Solid red: An alarm is generated. |
| 3 | Power module status LEDs (PWR0 and PWR1) | ● Solid green: The power module is operating normally.<br>● Solid red: The power module is not functioning properly, or the power module is installed but no power cord is connected.<br>● Off: No power supply is connected. |
| 4 | SATA hard disk status LED (SATA) | ● Solid green: A hard disk is connected.<br>● Blinking green: Data is being read or written. |
| 5 | Reset button | ● Restarting the device: Press the button for less than 5 seconds.<br>● Restoring factory settings: Press the button for more than 5 seconds.<br>When you perform either of the preceding operations, device status information is collected. After the device starts, you can log in to the web UI of the firewall, choose **System** > **One-Click Collection**, and download device status information. |
| 6 | Console port | It is used to connect to the console for maintenance and diagnosis.<br>Note:<br>● When the console port is used, set the baud rate to 115,200 bps, data bit to 8, and stop bit to 1, and disable parity check and data flow control.<br>● The console port is used only in special scenarios. For details, contact technical support personnel. |
| 7 | USB port | Two USB 2.0 ports can be used to connect USB flash drives. |

| No. | Component | Description |
|---|---|---|
| 8 | Link/ACT status LEDs (square) of 10/100/1000BASE-T ports | ● Solid green: The link on the port is Up.<br>● Blinking green: The port is receiving or sending data.<br>● Off: No link is established on the port. |
| 9 | Speed LEDs (round) of 10/100/1000BASE-T ports | ● Solid orange: Gbps port speed<br>● Off: 100/10 Mbps port speed |
| 10 | 10/100/1000BASE-T ports | Ports 1 to 7, which are used to connect Ethernet cables. |
| 11 | 1GE SFP port LEDs | ● Solid green: The port is connected.<br>● Blinking green: The port is receiving or sending data. |
| 12 | 10GE SFP + port LEDs | ● Solid green: The port is connected.<br>● Blinking green: The port is receiving or sending data. |
| 13 | 10GE SFP+ ports | Ports 0F to 3F |
| 14 | 1GE SFP ports | Ports 8F and 9F |
| 15 | Module slots | Expansion module slots |

## 1.3.2 Rear Panel

**Figure 1-2 Rear Panel**

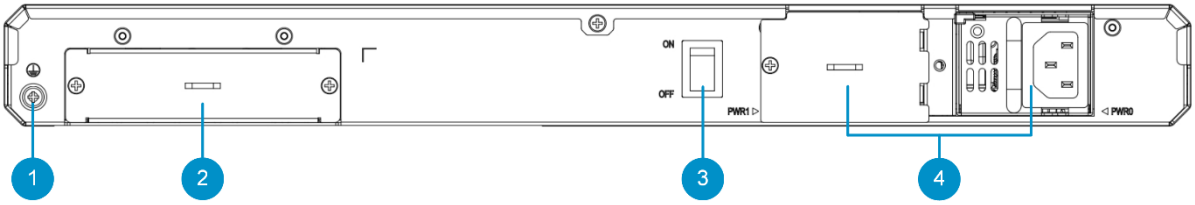



**Table 1-3 Components on the Rear Panel**

| No. | Item | Description |
|---|---|---|
| 1 | Grounding terminal | Used to ground the device to ensure electrical safety. |
| 2 | Hard disk slot | Used to install a hard disk. For details about the hard disk, see 1.6 Hard Disk. |
| 3 | Power switch | Used to power on or power off the device. |
| 4 | Power module | Used to connect an AC power cord. Two power modules can be installed. For details about the power modules, see 1.5 Power Module. |

## 1.4 Specifications

**Table 1-4 Specifications**

| | |
|---|---|
| **Model** | RG-WALL 1600-Z5100-S |
| **Memory** | 4 GB DDR4 memory (ECC supported) |
| **eMMC** | 8 GB |
| **Hard Disk** | No hard disk for factory delivery. A 1 TB hard disk drive (HDD) can be added. |
| **Hot Swapping of Hard Disk** | Not supported. |
| **Fixed Service Port** | ● 8 x 10/100/1000BASE-T ports (10BASE-T/100BASE-TX/1000BASE-TX): support 10/100/1000 Mbps auto-negotiation and auto MDI/MDIX. Port 0 is the default MGMT port.<br>● 2 x 1GE SFP ports (1000BASE-SX/LX/ZX): For details about supported optical transceivers, see 7 Appendix B: Gigabit SFP Transceivers.<br>● 4 x 10GE SFP+ ports (1000BASE-X/10GBASE-R). For details about supported optical transceivers, see 6 Appendix A: 10 Gigabit SFP+ Transceivers. |
| **Fixed Management Port** | ● 1 x RJ45 MGMT port (reusing Ge0/0)<br>● 1 x RJ45 console port (RS-232) |
| **USB Port** | 2 x USB 2.0 ports |
| **Bypass Port** | Not supported |
| **Module Slot** | 2 x expansion module slots (expansion modules not supported)<br>2 x power module slots.<br>1 x hard disk slot. |
| **Power Module** | 2 x pluggable power modules (RG-NSEC-PA70I/RG-PA70I), one power module for factory delivery. |
| **Hot Swapping of Power Module** | The two power modules support hot swapping. |
| **Dimensions (W x D x H)** | 440 mm x 300 mm x 43.6 mm (17.32 in. x 11.81 in. x 1.72 in.) |
| **Rated Input Voltage** | 100 V AC to 240 V AC, 50 Hz to 60 Hz |
| **Rated Input Current** | 2 A (maximum) |
| **Power Consumption** | < 60 W |
| **Temperature** | ● Operating temperature: 0°C to 45°C (32°F to 113°F)<br>● Storage temperature: –40°C to +70 °C (–40°F to +158°F) |

| | |
|---|---|
| **Humidity** | ● Operating humidity: 40% to 65% RH (non-condensing)<br>● Storage humidity: 10% to 90% RH (non-condensing) |

Warning

- In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.
- During the transfer and use of the product, avoid vibration and shock.
- The original package of the product must be used for transportation.
- Before installing a hard disk, format the hard disk to third extended filesystem (ext3) first to ensure normal running.

Warning

This product contains a button battery. If the button battery is swallowed, it may cause severe internal burns and possibly death within 2 hours.

- Keep new and used batteries away from children.
- If the battery compartment is not closed securely, stop using the product and keep it away from children.
- Seek medical help immediately if you believe a battery may have been swallowed or retained in any part of your body.

Warning

The device contains a lithium button battery.

- If the battery is damaged, contact technical support personnel to replace it with the same type of battery and properly dispose of the used battery. Do not replace the battery by yourself. Replacing the battery with the incorrect type may cause explosion or void safety protection.
- If the battery is exposed to extremely high temperatures and/or extremely low air pressure, the battery may explode or leak flammable liquids or gases.
- If the battery is thrown into a fire or oven, or mechanically crushed or cut, it may explode.

Caution

As USB flash drive models are diversified, the system may not support specific models. You are advised to use a Kingston USB flash drive that applies the FAT32 file system.

## 1.5 Power Module

The Z5100-S firewall supports the RG-NSEC-PA70I/RG-PA70I power module. One power module is delivered with the device, and a maximum of two power modules can be installed for Redundant Power Supply (RPS).

**Figure 1-3 Appearance of RG-NSEC-PA70I/RG-PA70I**

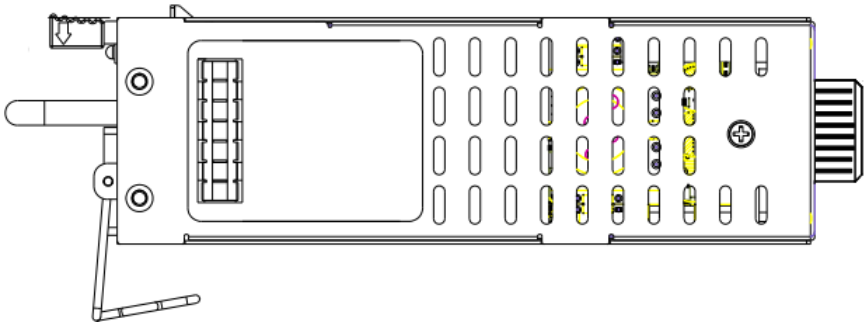


Table 1-5 describes LED status of RG-NSEC-PA70I/ RG- PA70I.

**Table 1-5 Power Module LED**

| Item | Silkscreen Label | Status | Description |
|---|---|---|---|
| Output status LED | DC OK | Off | The power module is not outputting power or an output fault occurs. |
| | | On | The power module is outputting power normally. |

**Table 1-6 Power Module Specifications**

| | |
|---|---|
| **Model** | RG-NSEC-PA70I/RG-PA70I |
| **Firewall Model** | RG-WALL 1600-Z5100-S |
| **Dimensions (W x D x H)** | 50.5 mm x 156 mm x 38 mm (1.99 in. x 6.14 in. x 1.50 in.) |
| **Weight** | About 0.395 kg (0.871 lbs.) |
| **Rated Input Voltage Range** | AC input: 100 V AC to 240 V AC, 50 Hz/60 Hz |
| **Maximum Input Voltage Range** | AC input: 90 V AC to 264 V AC, 47 Hz/63 Hz |
| **Maximum Input Current** | 2 A |
| **Output Voltage** | 12 V |
| **Maximum Output Current** | 5.83 A |
| **Maximum Output Power** | 70 W |
| **Overall Leakage Current** | ≤ 1.75 mA |
| **Temperature** | ● Operating temperature: –10°C to +50°C (14°F to 122°F)<br>● Storage temperature: –40°C to +70°C (–40°F to +158°F) |
| **Humidity** | ● Operating humidity: 10% to 90% RH (non-condensing)<br>● Storage humidity: 5% to 95% RH (non-condensing) |
| **Hot Swapping** | Hot swapping is supported. If two power modules are installed in RPS mode, one power module can be disconnected from the external power supply system and then removed when the device is powered on. |

## 1.6 Hard Disk

The Z5100-S firewall can be equipped with a hard disk to store logs and report data. The hard disk model RG-NSEC-HDD-1T is supported. No hard disk is delivered with the device. Please purchase one if necessary.

**Note**

- The hard disk has built-in software that uses ext3. It supports plug-and-play.

Caution

- During the transfer and use of the product, avoid vibration and shock.
- The original package of the product must be used for transportation.
- At an altitude above 3,000 m (9842.52 ft.), the hard disk may not function properly.
- When operating the hard disk, do not drop it, press the surface, or cover the air vent.

Figure 1-4 shows the appearance of RG-NSEC-HDD-1T.

**Figure 1-4 Appearance of RG-NSEC-HDD-1T**

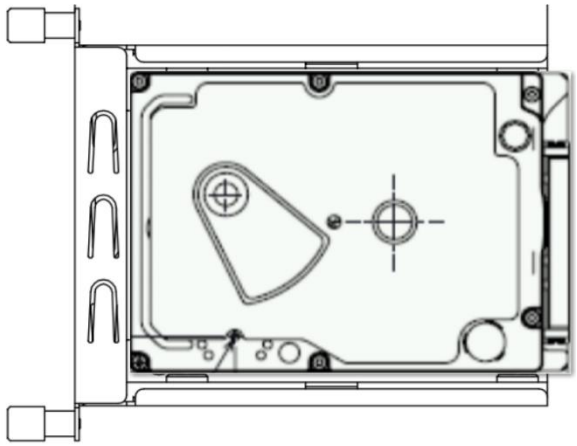


**Table 1-7 Hard Disk Specifications**

| | |
|---|---|
| **Model** | **RG-NSEC-HDD-1T** |
| **Firewall Model** | RG-WALL 1600-Z3200-S, RG-WALL 1600-Z5100-S |
| **Dimensions (W x D x H)** | 130 mm x 102 mm x 27 mm (5.12 in. x 4.02 in. x 1.06 in.) |
| **Weight** | 0.300 kg (0.661 lbs.) |
| **Connector Type** | SATA |
| **Memory Capacity** | 1 TB |
| **Hard Disk Type** | Hard disk drive |
| **Maximum Power Consumption** | 14 W |
| **Temperature** | ● Operating temperature: 0°C to 60°C (32°F to 140°F)<br>● Storage temperature: –40°C to +65 °C (–40°F to +149°F) |
| **Humidity** | ● Operating humidity: 5% to 95% RH (non-condensing)<br>● Storage humidity: 8% to 90% RH (non-condensing) |
| **Altitude** | Operating altitude: 0 m to 3,000 m (0 ft. to 9,843 ft.) |
| **Hot Swapping of Hard Disk** | Not supported |

# 2 Preparing for Installation

## 2.1 Safety Precautions

**Note**

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

### 2.1.1 General Safety

- To install the device in a cabinet, use a standard 19-inch cabinet.
- Do not place the device in a wet position, and keep the device away from liquid. Keep the chassis clean and dust-free.
- Install the device 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 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 Transfer Safety

- Do not frequently move devices.
- Cut off all power supplies and unplug all power cords before moving or transferring the device.
- The device should be moved by at least two persons. Keep balance and prevent personal injuries when moving the device.

### 2.1.3 Electrical Safety

Warning

- Any non-standard and inaccurate operation can cause an accident such as fire or electric shock, thus causing severe damage to human bodies and the device.
- Direct or indirect touch on high-voltage and mains supply through a wet object can bring a fatal danger.

- Observe local regulations and specifications when performing electrical operations. The operators must be qualified.
- Carefully check any potential danger in the work area, such as ungrounded power supply, unreliable power grounding, and wet floor.
- Before installing the device, find out the location of the emergency power switch in the room. First cut off the power supply in the case of an accident.
- Make a careful check before you cut off the power supply.

- You are advised to use an uninterrupted power supply (UPS) to avoid interference caused by power failures.

### 2.1.4 ESD Safety

- Properly ground the device and floor.
- Keep the indoor installation environment clean and dust-free.
- Maintain appropriate humidity conditions.
- Before installing various pluggable modules, wear an ESD wrist strap and make sure that it is well grounded.
- Do not directly touch the components and PCB of a board with your hands.
- Use an ESD bag to store a board, or place the board upwards on an ESD workbench.
- Avoid touching the circuit board with items such as clothing. The ESD wrist strap can only prevent damage to the circuit board caused by static electricity on the body. Static electricity on clothing cannot be prevented.

### 2.1.5 Laser Safety

Among the modules supported by the device, many optical modules are Class I laser products.


**Precautions:**

- When an optical transceiver is working, 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
- Do not stare at any fiber port.

Warning

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

## 2.2 Installation Environment Requirements

Install the Z5100-S firewall indoors to ensure its normal operation and prolonged service life.
The installation site must meet the following requirements.

### 2.2.1 Ventilation Requirements

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

### 2.2.2 Space Requirements

- To have sufficient room for chassis handling and module swapping, you are advised to maintain an indoor pathway of at least 0.8 m (31.50 in.) wide.
- Do not install the device against the wall. Instead, maintain a minimum space of 0.4 m (15.75 in.) wide around the device for proper ventilation.

### 2.2.3 Temperature and Humidity Requirements

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

If the device works in an environment with too high or too low temperature and humidity for a long period, it may be damaged.

- If the relative humidity is too high, insulating materials may have poor insulation or even leak electricity.
- If the relative humidity is too low, insulating gaskets may shrink, which makes fastening screws loose.
- In a dry environment, internal circuits are prone to static electricity.
- A high temperature can accelerate the aging process of insulating materials, greatly reducing the reliability of the device and severely affecting its service life.

**Table 2-1 Temperature and Humidity Requirements**

| Item | Requirements |
|---|---|
| Temperature | ● Long-term operating temperature: 15°C to 30°C (59°F to 86°F)<br>● Short-term operating temperature: 0°C to 45°C (32°F to 113°F) |
| Humidity | ● Long-term operating humidity: 40% to 65% RH (non-condensing)<br>● Short-term operating humidity: 10% to 90% RH (non-condensing) |

**Note**

- The operating temperature and humidity of the device 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 device when there is no protective plate in front or on the rear of the device.
- Short-term operating: The continuous operating period is no more than 48 hours or the total operating period per year is no more than 15 days.

### 2.2.4 Cleanliness Requirements

Dust poses a major threat to device operating. In an indoor environment, dust may fall on the device and be attached on the surface due to static electricity, causing poor contact of metallic joints. Such electrostatic adhesion may occur more easily when the relative humidity is low, not only affecting the service life of the device, but also causing communication faults. The following table describes the requirements on the dust content and granularity in the equipment room.

**Table 2-2 Requirements on Dust**

| Dust | Content (Particles/$m^3$) |
|---|---|
| Dust particles (diameter ≥ 0.5 μm) | ≤ $1.4 \times 10^7$ |
| Dust particles (diameter ≥ 1 μm) | ≤ $7 \times 10^5$ |
| Dust particles (diameter ≥ 3 μm) | ≤ $2.4 \times 10^5$ |
| Dust particles (diameter ≥ 5 μm) | ≤ $1.3 \times 10^5$ |

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. The following table lists limit values for harmful gases.

**Table 2-3 Requirements on Gases**

| Gas | Average ($mg/m^3$) | Maximum ($mg/m^3$) |
|---|---|---|
| Sulfur dioxide ($SO_2$) | 0.2 | 1.5 |
| Hydrogen sulfide ($H_2S$) | 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 for up to 30 minutes every day.

## 2.2.5 Grounding Requirements

A proper grounding system is the basis for stable and reliable running and is indispensable for protection against lightning 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 device uses an AC power supply. Otherwise, electric shock may occur when the insulation resistance between the power supply inside the device and the chassis becomes small.

Caution

The building should provide a protective ground connection to ensure that the device is connected to a protective ground.

- **Lightning Grounding**

The lightning protection system of facilities is standalone, and is composed of a lightning rod, a down conductor, and a connector connected to the grounding system. The grounding system is typically used as the reference point for power supply and for safe grounding of the cabinet. Lightning grounding is required only for facilities and is not required for the device.

- **EMC Grounding**

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

The grounding resistance should be less than 1 ohm. The grounding terminal on the cabinet should be properly grounded before device running.

### 2.2.6 Anti-interference Requirements

- Take interference prevention measures for the power supply system.
- Keep the firewall away from the lightning protection and grounding system of power devices.
- Keep the firewall away from high-frequency current devices such as a high-power radio transmitting station and radar launcher.
- Take electromagnetic shielding measures when necessary.

### 2.2.7 Lightning Protection Requirements

- The device provides lightning protection. However, as an electrical device, it may still be damaged by strong lightning strikes. Take the following lightning protection measures: Ensure that the grounding 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.
- You are advised to install a power lightning arrester in front of the power input end to enhance lightning protection for the power supply.

### 2.2.8 Installation Site Requirements

Regardless of whether the device is installed in a cabinet or on a workbench, observe the following conditions:

- Maintain a proper clearance around the air intakes and outlets for heat dissipation.
- The device is equipped with fans to draw in cold air from sides and dissipate heat through the rear of the chassis. Maintain a minimum clearance of 15 cm (5.91 in.) around the ventilation openings for heat dissipation. You are advised to install the device in a standard 19-inch cabinet. Or, place the device on a clean workbench. In hot areas, air-conditioning is recommended.
- The installation site has good cooling and ventilation.
- The installation site is sturdy enough to support the weight of the device and its accessories.
- The installation site is properly grounded.

## 2.3 Tools

Table 2-4 lists the tools required for installing the Z5100-S firewall, which need to be prepared in advance.

**Table 2-4 Tools**

| Tool Type | Tools |
|---|---|
| Common tool | Phillips screwdrivers, fastening bolts, and cable ties |
| Special tool | ESD gloves, wire stripper, crimping plier, and crystal connector crimping plier |
| Meter | Multimeter and optical power meter |
| Relevant device | Management PC, display, and keyboard |

**Note**

The Z5100-S firewall is delivered without a tool kit. You need to prepare the preceding tools in advance.

## 2.4 Unpacking the Device

Before installing the Z5100-S firewall, open the accessories box delivered with the product and check whether the accessories are complete. The accessories of the product depend on the product model. For details, see the package contents.

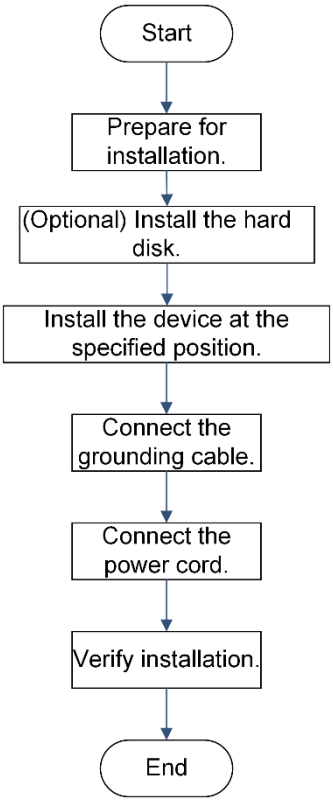
# 3 Installing the Device

Caution

Before installing the device, ensure that all the requirements specified in Chapter 2 are met.

## 3.1 Installation Procedure

Install the device according to the following procedure to prevent damage.




## 3.2 Preparing for Installation

Prepare for installation according to 2 Preparing for Installation and check whether the following conditions are met:

- The installation site provides sufficient space for heat dissipation.
- The installation site meets the temperature and humidity requirements of the device.
- The power supply is available at the installation site and its current meets the requirement.
- Ethernet cables have been deployed at the installation site.
- The selected power supply meets the requirement on the system power.
- Find out the location of the emergency power switch in the room. First cut off the power supply in the case of

an accident.

## 3.3 (Optional) Installing the Hard Disk

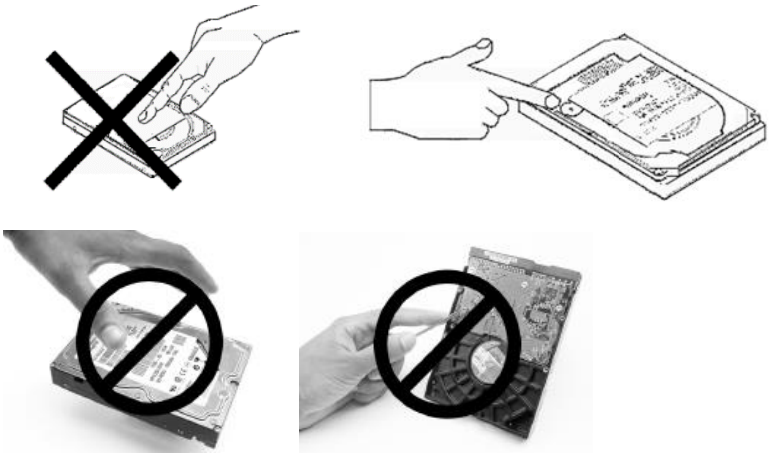
**Application Scenario**

If you have purchased a hard disk, follow the instruction described in this section to install the hard disk so as to prevent damage to the hard disk.

**Precautions**

The hard disk does not support hot swapping. Verify that the power is off before installing or removing the hard disk. During the hard disk installation, pay attention to the following:

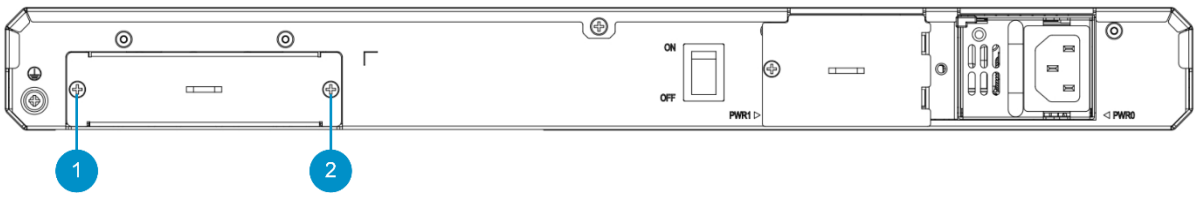
- Do not cover the hole on top of the hard disk.
- Do not press down on the hard disk.
- Do not drop, shake, or vibrate the hard disk. When handling the hard disk, hold it by its sides.
- Do not touch PCB components with hands or tools.



**Procedure**

(1) On the rear panel of the device, unscrew the two fixing screws on the hard disk panel counterclockwise.

**Figure 3-1 Positions of the Fixing Screws of the Hard Disk**




(2) Remove the hard disk panel and keep it properly.

(3) Slowly push the hard disk horizontally into the slot until it is fully seated.

(4) Tighten the fixing screws on the hard disk clockwise.

# 3.4 Installing the Device at the Specific Position

The Z5100-S firewall can be installed in a standard cabinet. If no cabinet is available, the device can be installed on a workbench.

## 3.4.1 Installing in a Cabinet

**Application Scenario**

When a standard cabinet is configured, the fixed accessories delivered with the device can be used.

The Z5100-S firewall is designed based on a standard cabinet. You can use the fixed accessories as required.

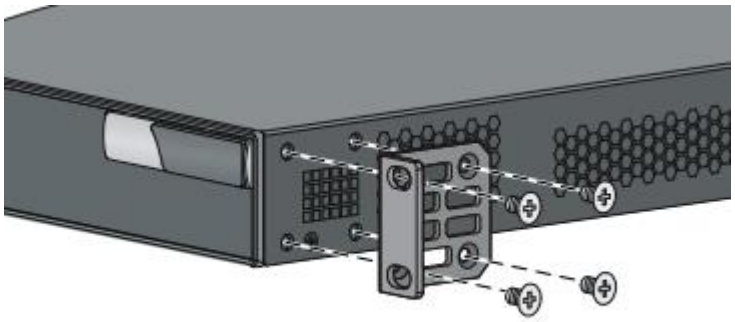
**Prerequisites**

Before installation, check the following items:

- The cabinet has been properly secured.
- The device installation position in the cabinet has been planned.

**Procedure**

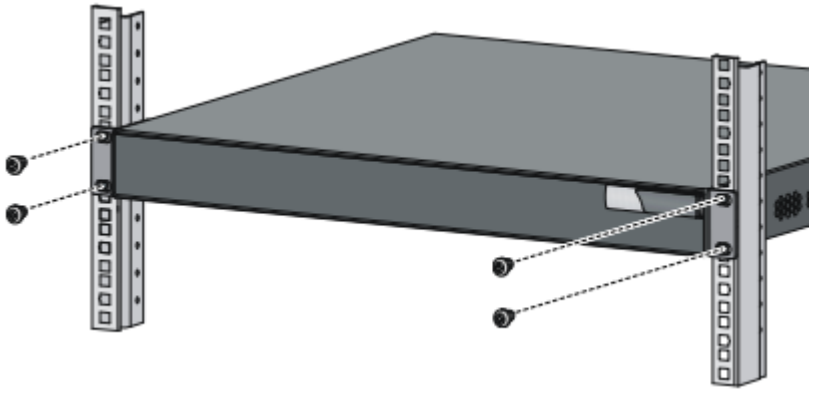
(1) Install the mounting brackets on both sides of the device according to the *User Manual* in the package contents.



(2) Install the cage nuts on both sides of the device.

(3) Lift the device by both sides and push it horizontally into the cabinet.

(4) Secure the left and right mounting brackets of the device to the front of the cabinet to fix the device in the cabinet.



**Follow-up Procedure**

After installation, check the following items:

- The device is securely installed in the cabinet.
- About 1 U space is reserved above and below the device to facilitate heat dissipation.
- No objects around the device hinder heat dissipation.

### 3.4.2 Installing on a Workbench

**Application Scenario**

In many cases, a standard cabinet is unavailable. In such cases, you can simply place the device on a clean workbench.

**Prerequisites**

Before installation, check the following items:

- The workbench has been properly grounded.
- The workbench is clean, sturdy, and stable.

**Procedure**

(1) Paste the four rubber pads delivered with the device on the holes at the four corners of the bottom of the device.

(2) Place the device on the workbench.

**Follow-up Procedure**

After installation, check the following items:

- The device is securely placed on the workbench.
- A 10 cm (3.94 in.) space has been reserved around the device for heat dissipation, and no objects that hinder heat dissipation exist.
- No heavy objects are placed on top of the device.

## 3.5 Connecting the Grounding Cable

**Application Scenario**

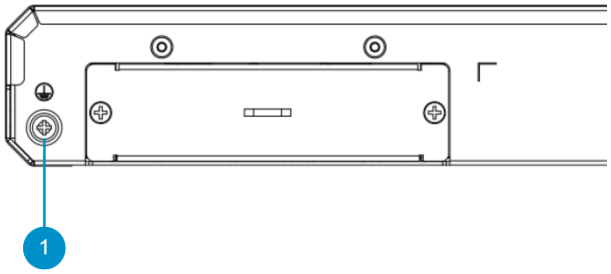
You must correctly connect the grounding cable to ensure lightning protection and anti-interference of the firewall.

**Procedure**

(1) Remove the screw from the grounding terminal of the device.

Icon 1 in Figure 3-2 shows the grounding terminal of the firewall.

**Figure 3-2 Grounding Terminal of the Z5100-S Firewall**



(2) Align the M4 end of the grounding cable with the screw hole on the grounding terminal, and fasten the screw.

(3) Connect the M6 end of the grounding cable to the grounding terminal of the cabinet or workbench.

**Follow-up Procedure**

After connecting the grounding cable, check the following items:

- The grounding cable is securely connected to the grounding terminal.
- Use the ohm mode of a multimeter to measure the resistance between the grounding terminal and the grounding point. The grounding resistance is less than 1 ohm.

## 3.6 Connecting the Power Cord

**Application Scenario**

A power cord is used to connect a power module and a power supply. If dual power supplies are configured, the power cords need to be connected for both power modules.

**Prerequisites**

- The power supply meets power requirements of the Z5100-S firewall.

AC power supported by the Z5100-S firewall: 100–240 V/50–60 Hz.

The power cord of the firewall has three cores. It is recommended that a single-phase three-core power socket with a neutral point connector or a multi-function microcomputer power socket be used. The neutral point of the power supply has been securely grounded in the building. Typically, the neutral point of the power supply system of a building has been buried during construction and cabling. Ensure that the power supply of the building has been properly grounded and the grounding resistance is less than 1 ohm.

- The device has been properly grounded.
- The power switch is off.

**Procedure**

Warning

Use the delivered power cords. Otherwise, security accidents may occur.

(1) Plug one end of a power cord into the power module on the rear panel of the firewall.

(2) Use a cable tie to secure the AC power cord to the handle of the power module to prevent the power cord from loosening.

(3) Plug the other end of the power cord into an external AC power socket.

**Follow-up Procedure**

After connecting the power cord, verify that the power cord is securely connected to the power socket.

## 3.7 Verifying Installation

After installing the device, check the following items before powering on the device to ensure normal device running:

- If the device is installed in a cabinet, check whether the device is securely installed in the cabinet. If the

device is installed on a workbench, check whether the workbench is sturdy enough to support the combined weight of the device and its accessories. For both installation modes, check whether there is sufficient space for heat dissipation.

- The specifications of the external power supply meet the device requirement.
- The grounding cable is securely connected.
- The power cord is securely connected and is in good contact. The power cord is long enough to avoid cord tension and reduced service life.
- The device is correctly connected to other devices such as configuration terminals.

# 4 Commissioning

## 4.1 Setting Up the Configuration Environment

**Prerequisites**

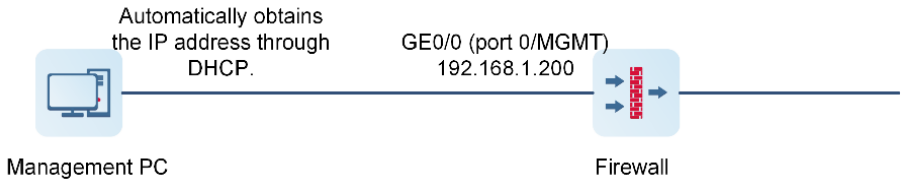
The Z5100-S firewall provides the default configuration, as described in Table 4-1.

**Table 4-1 Factory Settings of the Device**

| | |
|---|---|
| **DHCP** | By default, the DHCP service is enabled. |
| **Login Address** | Default address: **https://192.168.1.200** |
| **Account and Password** | Default account: **admin**<br>Default password: **firewall** |
| **Management Port** | Port 0/MGMT |

**Procedure**

Use an Ethernet cable to connect port 0/MGMT on the firewall to the management PC.




By default, the DHCP server function is enabled on port 0/MGMT. In this case, the local NIC of the management PC can automatically obtain an IP address from the firewall to communicate with the firewall. Therefore, you do not need to manually configure the IP address.

## 4.2 Powering on and Starting the Device

### 4.2.1 Checklist Before Power-On

- The device is properly grounded. (The three-core power supply and grounding terminal are properly grounded.)
- The power module is properly installed.
- The power cord is properly connected.
- The external power voltage meets the device requirement.
- The Ethernet cable is properly connected.

### 4.2.2 Powering on and Starting the Device

(1) Turn on the switch of the external power supply.

(2) Turn on the power switch of the firewall.

### 4.2.3 Checklist After Power-On

Check whether the statuses of LEDs are normal.

**Table 4-2 LED Statuses After Power-On**

| LED | Normal Status |
| --- | --- |
| SYS LED | Solid green |
| PWR1/PWR0 LED | Solid green |

## 4.3 Configuring the Product

**Follow-up Procedure**

Open a browser on the management PC, enter **https://192.168.1.200** in the search box, and press **Enter**. Then, log in to the web UI of the firewall to configure services.

Caution

By default, the prefix **https** must be used. If **http://192.168.1.200** is used, you may fail to log in.

For details about device configuration, see *User Manual* of the required version.

# 5 Troubleshooting

## 5.1 AC Power Module Does Not Work

### 5.1.1 Symptom

- All LEDs on the front panel are off, and the fan does not rotate.
- The PWR0/PWR1 LED is off.

### 5.1.2 Solution

Perform the following steps for troubleshooting:

(1) Turn off the power switch of the device.

(2) Check whether the external power supply meets the device requirement.

(3) Check whether cables in the cabinet are correctly connected, and whether the power cord is securely connected to the power socket.

(4) Check whether the power cord is securely connected to the power module. If necessary, remove the power module and check its connector.

If the problem persists, please contact Ruijie technical support.

## 5.2 Optical Port Fails

### 5.2.1 Symptom

After an optical transceiver is inserted into an optical port and the optical cable is properly connected, the optical port fails to work properly.

### 5.2.2 Solution

Perform the following steps for troubleshooting:

(1) Check whether the receive end and transmit end of the fiber connection are reverse. In normal cases, the transmit end on a local optical port must be connected to the receive end on the peer port. You can change the connection sequence of the two fibers on the optical transceivers.

(2) Check whether the wavelengths of the optical transceivers on both ends are the same. For example, an optical transceiver with a wavelength of 1,310 nm cannot be connected to an optical transceiver of 1,550 nm.

(3) Check whether the distance between the two ends exceeds the maximum length marked on the optical transceivers.

(4) Check whether the fiber type meets the requirement.

(5) Optical ports of some devices can work at different rates. In this case, you need to check whether the rates of the two ends are the same.

If the problem persists, please contact Ruijie technical support.

# 6 Appendix A: 10 Gigabit SFP+ Transceivers

Ruijie Networks provides 10 gigabit SFP+ transceivers according to the port types required for the firewall. You can select a transceiver as required. This document provides models and technical specifications of some 10 gigabit SFP+ transceivers for reference. For details about the technical specifications, see *[Product Description] Ruijie RG 10GBASE Series Optical Transceivers Datasheet*.

**Table 6-1 Models and Technical Specifications of 10 Gigabit SFP+ Transceivers**

| Model | Wavelength (nm) | DDM Support (Yes/No) | Fiber Type | Transmitted Intensity (dBm) | | Received Intensity (dBm) | |
|---|---|---|---|---|---|---|---|
| | | | | Min | Max | Min | Max |
| XG-SFP-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 |

**Table 6-2 Cabling Specifications of SFP+ Transceivers**

| Model | Connector Type | Fiber Type | Core Size (μm) | Modal Bandwidth (MHz·km) | Max. Cabling Distance |
|---|---|---|---|---|---|
| XG-SFP-LR-SM1310 | LC | Single-mode | 9/125 | N/A | 10 km (6.21 miles) |
| XG-SFP-ER-SM1550 | LC | Single-mode | 9/125 | N/A | 40 km (24.85 miles) |

⚠ Caution

- For the XG-SFP-ER-SM1550 module, do not use short-distance optical cables for connection to avoid overload on the optical transceiver. If the optical power at the receive end of the transceiver is greater than or equal to –1 dBm, an optical attenuator should be added at the receive end of the transceiver to reduce the optical power at the receive end to less than –1 dBm.
- An optical transceiver is a laser transmitter. Do not look into the laser source to prevent it from burning your eyes.
- To keep the optical transceiver clean, ensure that unused ports remain capped.

**Table 6-3 Models of 10 Gigabit SFP+ Cable Modules**

| Model | Module Type | Connector Type | Cable Length (m) | Conductor Diameter (AWG) | Data Rate (Gbit/s) | DDM Support (Yes/No) |
|---|---|---|---|---|---|---|
| XG-SFP-AOC1M | Active optical cable | SFP+ | 1 | / | 10.3125 | No |

| Model | Module Type | Connector Type | Cable Length (m) | Conductor Diameter (AWG) | Data Rate (Gbit/s) | DDM Support (Yes/No) |
|---|---|---|---|---|---|---|
| XG-SFP-AOC3M | Active optical cable | SFP+ | 3 | / | 10.3125 | No |
| XG-SFP-AOC5M | Active optical cable | SFP+ | 5 | / | 10.3125 | No |

**Note**

You just need to plug both ends of the SFP+ cable module into the corresponding ports of the device separately. No extra cable is required.

# 7 Appendix B: Gigabit SFP Transceivers

Ruijie Networks provides SFP transceivers (Mini-GBIC transceivers) according to the port types required for the firewall. You can select a transceiver as required. In addition to the following models, the gigabit SFP transceiver Mini-GBIC-GT is also supported. This document provides models and technical specifications of some gigabit SFP transceivers for your reference. For details about the technical specifications, see *[Product Description] Ruijie RG 1000BASE Series Optical Transceivers Datasheet*.

**Table 7-1 Models and Technical Specifications of Gigabit Mini-GBIC (SFP) Transceivers**

| Model | Wavelength (nm) | Fiber Type | DDM Support (Yes/No) | Transmitted Intensity (dBm) | | Received Intensity (dBm) | |
|---|---|---|---|---|---|---|---|
| | | | | Min | Max | Min | Max |
| MINI-GBIC-SX-MM850 | 850 | Multi-mode | Yes | –9.5 | 0 | –17 | 0 |
| MINI-GBIC-LX-SM1310 | 1310 | Single-mode | Yes | –9 | –3 | –19 | –3 |
| MINI-GBIC-LH40-SM1310 | 1310 | Single-mode | Yes | –5 | 0 | –23 | –3 |

**Table 7-2 Cabling Specifications of SFP Transceivers**

| Model | Connector Type | Fiber Type | Core Size (μm) | Max. Cabling Distance |
|---|---|---|---|---|
| MINI-GBIC-SX-MM850 | LC | Multi-mode | 50/125 | 500 m (1640.42 ft.) |
| MINI-GBIC-LX-SM1310 | LC | Single-mode | 9/125 | 10 km (6.21 miles) |
| MINI-GBIC-LH40-SM1310 | LC | Single-mode | 9/125 | 40 km (24.85 miles) |

⚠ Caution

- When the maximum cabling distance of an optical transceiver is 40 km (24.85 miles) or longer but short-distance single-mode fibers (SMFs) are used, deploy an optical attenuator on the path to avoid overload on the optical transceiver.
- An optical transceiver is a laser transmitter. Do not look into the laser source to prevent it from burning your eyes.
- To keep the optical transceiver clean, ensure that unused ports remain capped.