RG-WS6024 Series Wireless controller

Hardware Installation and Reference Guide V1.00

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Preface

Thank you for using our products. This manual will guide you through the installation of the wireless controller.

Scope

It is intended for the users who have some experience in installing and maintaining network hardware. At the same time, it is assumed that the users are already familiar with the related terms and concepts.

Obtaining Technical Assistance

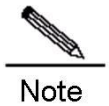
Ruijie Networks website: http://www.ruijienetworks.com
Ruijie service portal: http://case.ruijienetworks.com

Related Documents

Documents	Description
Configuration Guide	Describes network protocols and related mechanisms that supported by the product, with configuration examples.
Command Reference	Describes the related configuration commands, including command modes, parameter descriptions, usage guides, and related examples.

Documentation Conventions

The symbols used in this document are described as below:



This symbol brings your attention to some helpful suggestions and references.

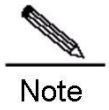
This symbol means that you must be extremely careful not to do some things that may damage the device or cause data loss.

Product Overview

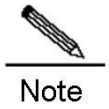
Ruijie WS6024, the next-generation intelligent wireless controller, features high performance, high security, multiple services and ease of use to meet the needs of the current networks. The RG-WS6024 series wireless controller provides the integrated PoE/PoE+ service, various WLAN access control and unified wired and wireless network management. It is greatly ideal for small and medium sized enterprises and general education industry, providing high-speed, high-efficiency, secure and intelligent access solutions.

Table 1-1 RG-WS6024

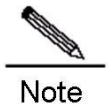
Model	10/100/1000 Base-T Auto-sensing Ethernet Port	SFP+ Port	1000Base-X SFP Port	Console Port	USB Port	Expansion Module Slot	Pluggable Power Slot
RG-WS6024	24 (PoE+)	2	2 (Combo)	1	1	1	Dual



The SFP+ ports support both 10Gbase-R and 1000base-X modules.



The SFP ports support both 1000 base-X and 100base-X modules.



1000Base-T is downward compatible with 100Base-TX and 10Base-T.

RG-WS6024

Technical Specifications

Model	RG-WS6024
Optical Module	See Appendix B.  The supported module type may change at any time. Contact Ruijie Networks for details.
SFP Port	100Base-X 1000Base-X

SFP+ Port	10GBase-R 1000Base-X
RPS Type	Dual power supplies
EEE	Supported
Power Supply	RG-M5000E-AC500P 1) AC Rated voltage range: 100V to 240V Rated current range: 3.5A to 7A Frequency range: 50/60 Hz 2) HVDC Rated voltage range: 192V to 290V Rated current range: 2.5A to 3.5A RG-PA1150P-F 1) AC Rated voltage range: 100V to 240V Frequency range: 50/60 Hz Rated current: 10A 2) HVDC Rated voltage range: 192V to 290V Rated current: 10A M5000E-DC500P (DC) Rated voltage range: -72V to -36V Rated current:16.5A
PoE	All the RJ45 ports are PoE-capable with the maximum power input of 30W. The maximum output power is subject to the configured power supplies.  Note The available number of PoEs is determined by PoE output power and PoE input power in practice.
Power Consumption	24-port PoE+: < 850 W

Temperature	Operating temperature: 0ºC to 50ºC Storage temperature: -40ºC to 70ºC
Humidity	Operating humidity: 10% to 90% Storage humidity: 5% to 90%
Fan	Speed adjustment and fault alarm
Temperature Warning	Supported
EMC Standards	GB9254-2008
Safety Standards	GB4943-2011
Dimensions (W x D x H)	440 mm x 320 mm x 44 mm (with RG-PA1150P-F power module installed, the depth is 410 mm)
Weight	5.8 kg (with package)

Caution The RG-WS6024 wireless controller is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

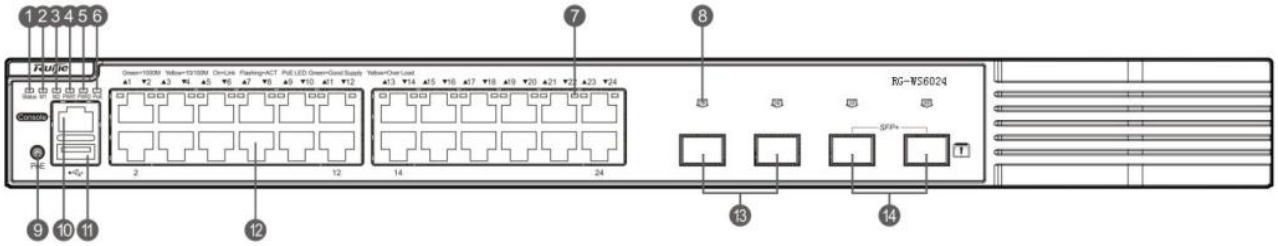
Product Appearance

On the front panel, the RG-WS6024 wireless controller provides 24 10/100/1000Base-T Ethernet ports, 2 GE SFP fiber/copper combo ports, 2 10G SFP+ ports and 1 Console port. On the back panel, it provides 2 power module slots and 2 expansion module slots.

Figure 1-1 Appearance of RG-WS6024

Front Panel

Figure 1-2 Front Panel of RG-WS6024



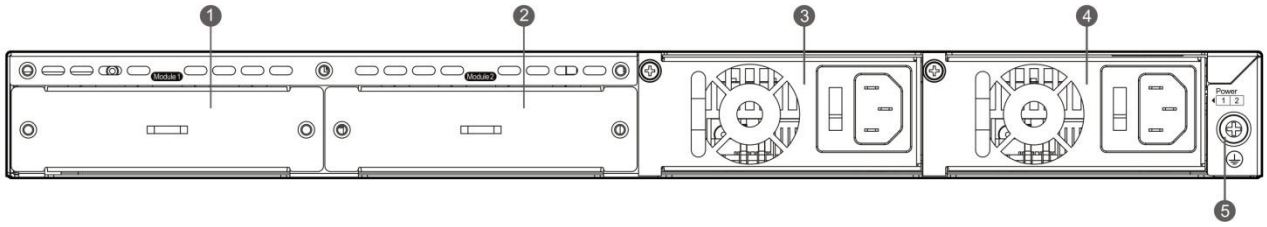
Note:		
	1. System status LED	8. Fiber port status LED
	2. Expansion module 1 status LED	9. Mode button
	3. Expansion module 2 status LED	10. Console port
	4. Power module 1 status LED	11. USB port
	5. Power module 2 status LED	12. 10/100/1000Base-T auto-sensing Ethernet port
	6. PoE status LED	13. 100/1000Base-X SFP port
	7. Copper port status LED	14. SFP+ port

Caution

Long press Mode Button for above 2 seconds to switch the display mode between PoE mode and port rate mode.

Back Panel

Figure 1-3 Back Panel of RG-WS6024



Note:		
	1. Expansion module 1 slot	4. Power module 2 slot
	2. Expansion module 2 slot	5. Grounding connector
	3. Power module 1 slot	

Power Supply

The RG-WS6024supports two power modules with AC or DC input. For the detailed power specification, see the following tables.

Model	RG-M5000E-AC500P	RG-M5000E-AC500P(HVDC)
Platform	RG-WS6024	RG-WS6024
Rated Voltage Range	100V to 240V, 50/60Hz	240V
Maximum AC Input Voltage Range	90V to 264V, 50/60Hz	192V to 290V
PoE Power	Single power supply: 370W Dual power supplies: 740W	
Hot Swapping	Supported	
Redundant Power Supplies	1+1	
Over-Voltage Protection	54V: -57V to -60V 12V: 13.4V to 16V	
Over-Current Protection	54V: 8A to 10A 12V: 12A to 16A	
Over-Temperature Protection	Supported	
Current Sharing	Supported	
Mixed Insertion	Mixed insertion with RG-M5000E-DC500P	
Power Cord	10A	
Dimensions (W x D x H)	195.4 mm x 90 mm x 40 mm(connecting finger and handle excluded) 224.5 mm x 90 mm x 40mm (connecting finger and handle included)	
Weight	1.6 kg	

Model	RG-M5000E-DC500P
Platform	RG-WS6024
Maximum DC Input Voltage Range	-72V to -36V
PoE Power	Single power supply: 370W Dual power supplies: 740W
Hot Swapping	Supported
Redundant Power Supplies	1+1
Over-Voltage Protection	54V: -58V to -66V 12V: 13.2Vto 15.6V
Over-Current Protection	54V: 7.8A to 10A 12V: 11A to 14A

Over-Temperature Protection	Supported
Current Sharing	Supported
Mixed Insertion	Mixed Insertion with RG-M5000E-AC500P
Power Cord	PD650I DC
Dimensions (W x D x H)	195.4 mm x 90 mm x 43.2 mm(connecting finger and handle excluded) 224.5 mm x 90 mm x 43.2 mm(connecting finger and handle included)
Weight	1.6 kg

Model	RG-PA1150P-F	RG-PA1150P-F(HVDC input)
Platform	RG-WS6024	RG-WS6024
Rated AC Voltage Range	100V to240V, 50/60Hz	240V
Maximum AC Input Voltage Range	90V to 264V, 50/60Hz	192V to 290V
PoE Power	Single power supply: 740 W Dual power supplies: 1480 W	
Hot Swapping	Supported	
Redundant Power Supplies	1+1	
Over-Voltage Protection	54V: -57V to -60V 12V: 14V to 16V	
Over-Current Protection	54V: 16.5A to 20A 12V: 32A to 40A	
Over-Temperature Protection	Supported	
Current Sharing	Supported	
Mixed Insertion	Unsupported	
Power Cord	10A	
Dimensions (W x D x H)	281 mm x 90 mm x40 mm(connecting finger and handle excluded) 301 mm x 90 mm x 40 mm(connecting finger and handle included)	
Weight	1.6 kg	

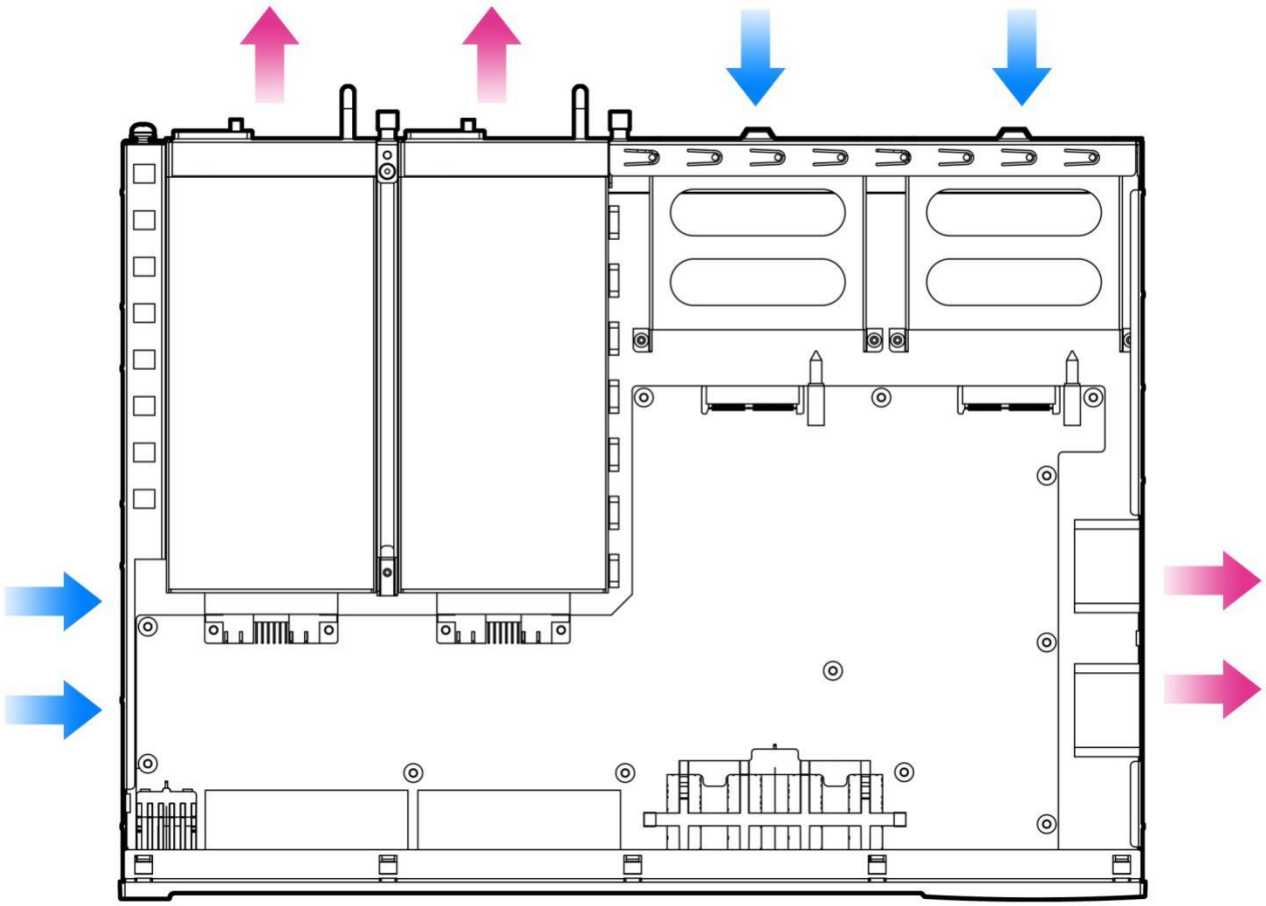
Dual-power input: The wireless controller can be powered by one power module, or by two power modules. When both two modules are available, the wireless controller is powered in the current sharing mode.

Caution When the wireless controller is powered by the dual-power modules, if the system working power is greater than the capacity of single power module, the power redundancy cannot work.

Heat Dissipation

The RG-WS6024 adopts turbine fans for heat dissipation, thereby ensuring normal function of the device in the specified environment. 10 cm distance space should be reserved at both sides and the back panel of the device to allow air circulation. It is recommended to clean the device once every 3 months to prevent dust from blocking vents. Figure 1-4 shows the flow scheme of heat dissipation.

Figure 1-4 Flow Scheme of Heat Dissipation



LEDs

LED	Panel Identification	State	Meaning
System status LED	Status	Off	The wireless controller is not receiving power.
		Blinking green	The system is being initialized. Continuous blinking indicates errors.

		Solid green	The wireless controller is operational.
		Solid yellow	Temperature warning Check the working environment of the wireless controller immediately.
		Solid red	The wireless controller is faulty.
Expansion module status LED	M1/M2	Off	There is no expansion module or the expansion module is not correctly installed.
		Solid green	The expansion module is correctly installed.
Power module status LED	PWR1/PWR2	Off	The power module is not in place.
		Solid red	The power module is in place but the AC power chord or wireless controller is abnormal.
		Solid green	The power supply is operational.
PoE status LED	PoE	Solid green	Indicates the switching state.
		Solid yellow	Indicates the PoE state.
GE port status LED	1-24	Off	The port is not connected.
		Solid green	The port is connected at 1000 Mbps.
		Blinking green	The port is receiving or transmitting traffic at 1000 Mbps.
		Solid yellow	The port is connected at 10/100 Mbps.
		Blinking yellow	The port is receiving or transmitting traffic at 10/100 Mbps.
Port PoE status LED	1-24	Off	PoE is not enabled.
		Solid green	PoE is enabled. The port is operational.
		Solid yellow	The port has a PoE fault of overload.

GE SFP port status LED	23F-24F	Off	The port is not connected.
		Solid green	The port is connected at 1000 Mbps.
		Blinking green	The port is receiving or transmitting traffic at 1000 Mbps.
		Solid yellow	The port is connected at 100 Mbps.
		Blinking yellow	The port is receiving or transmitting traffic at 100 Mbps.
SFP+ port status LED	25F-26F	Off	The port is not connected.
		Solid green	The port is connected
		Blinking green	The port is receiving or transmitting traffic at 1000 Mbps.

Safety Suggestions

Note

To avoid personal injury and equipment damage, please carefully read the safety suggestions before you install the RG-WS6024 series wireless controller.

The following safety suggestions do not cover all possible dangers.

Installation

- Keep the chassis clean and free from any dust.
- Do not place the equipment in a walking area.
- Do not wear loose clothes or accessories that may be hooked or caught by the device during installation and maintenance.
- Turn off all power supplies and remove the power sockets and cables before installing or uninstalling the device.

Movement

- Do not frequently move the device.
- When moving the device, note the balance and avoid hurting legs and feet or straining the back.
- Before moving the device, turn off all power supplies and dismantle all power modules.

Electricity

- Observe local regulations and specifications when performing electric operations. Relevant operators must be qualified.
- Before installing the device, carefully check any potential danger in the surroundings, such as ungrounded power supply, and damp/wet ground or floor.
- Before installing the device, find out the location of the emergency power supply switch in the room. First cut off the power supply in the case of an accident.
- Try to avoid maintaining the wireless controller that is powered-on alone.
- Be sure to make a careful check before you shut down the power supply.
- Do not place the equipment in a damp location. Do not let any liquid enter the chassis.

Any nonstandard and inaccurate electric operation may cause an accident such as fire or electrical shock, thus causing severe even fatal damages to human bodies and equipment.

Direct or indirect touch through a wet object on high-voltage and mains supply may bring a fatal danger.

RG-WS6024 wireless controller has more than one power cords, make sure to cut off all before shut down the system.

Static Discharge Damage Prevention

To prevent damage from static electricity, pay attention to the following:

- Proper grounding of grounding screws on the back panel of the device. Use of a three-wire single-phase socket with protective earth wire (PE) as the AC power socket.
- Indoor dust prevention
- Proper humidity conditions

Laser

The RG-WS6024 series wireless controller supports varying models of optical modules sold on the market which are Class I laser products. Improper use of optical modules may cause damage. Therefore, pay attention to the following when you use them:

- When a fiber transceiver works, ensure that the port has been connected with an optical fiber or is covered with a dust cap, to keep out dust and avoid burning your eyes.
- When the optical module is working, do not pull out the fiber cable and stare into the transceiver interface or you may hurt your eyes.

Caution Do not stare into any optical port under any circumstances, as this may cause permanent damage to your eyes.

Installation Site Requirements

To ensure the normal working and a prolonged durable life of the equipment, the installation site must meet the following requirements.

Ventilation

For the RG-WS6024,a sufficient space (at least 10 cm distances from both sides and the back plane of the cabinet)should be reserved at the ventilation openings to ensure the normal ventilation. After various cables have been connected, they should be arranged into bundles or placed on the cabling rack to avoid blocking the air inlets. It is recommended to clean the wireless controller at regular intervals (like once every 3 months). Especially, avoid dust from blocking the screen mesh on the back of the cabinet.

Temperature and Humidity

To ensure the normal operation and prolong the service life of RG-WS6024 series wireless controller, you should keep proper temperature and humidity in the equipment room.

If the equipment room has temperature and humidity that do not meet the requirements for a long time, the equipment may be damaged.

- In an environment with high relative humidity, the insulating material may have bad insulation or even leak electricity. Sometimes the materials may suffer from mechanical performance change and metallic parts may get rusted.
- In an environment with low relative humidity, however, the insulating strip may dry and shrink. Static electricity may occur easily and endanger the circuit on the equipment.
- In an environment with high temperature, the equipment is subject to even greater harm, as its performance may degrade significantly and various hardware faults may occur.

Therefore, the ambient temperature and humidity of the RG-WS6024 series must meet the requirements listed in Table 2-1:

Table 2-1 Temperature and Humidity Requirements of the RG-WS6024 Series Wireless controller

Temperature	Relative Humidity
0 ºC to 50ºC	10% to 90%

Note The requirements for the sampling site of the temperature and humidity in the operating environment of the device are as follows:
There is no protective plate at the front or back of the equipment rack.

The vertical height is 1.5 m above the floor.

The distance from the front panel of the equipment is 0.4 m.

Cleanness

Dust poses a severe threat to the running of the equipment. The indoor dust falling on the equipment may be adhered by the static electricity, causing bad contact of the metallic joint. Such electrostatic adherence may occur more easily when the relative humidity is low, not only affecting the useful life of the equipment, but also causing communication faults. Table 2-2 shows the requirements for the dust content and granularity in the equipment room.

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

Dust	Unit	Density
Diameter≥0.5μm	Particles/m^3	≤3.5×10^6
Diameter≥5μm	Particles/m^3	≤3×10^4

Apart from dust, the salt, acid and sulfide in the air in the equipment room must also meet strict requirements, as such poisonous substances may accelerate the corrosion of the metal and the aging of some parts. The equipment room should be protected from the intrusion of harmful gases such as sulfur dioxide, sulfured hydrogen, nitrogen dioxide, and chlorine), whose requirements are listed in Table 2-3.

Table 2-3 Requirements for Harmful Gases in the Equipment Room

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

Note

Both average and maximum value are measured for a week. The wireless controller cannot be placed in the environment with the maximum density for over 30 minutes every day.

Grounding

A good grounding system is the basis for the stable and reliable operation of the RG-WS6024 series wireless controller. It is the chief condition to prevent lightning stroke and resist interference. Please carefully check the grounding conditions on the installation site according to the grounding requirements, and perform grounding operations properly as required.

Note

Effective grounding of the wireless controller is an important guarantee for lightning protection and interference resistance. Therefore, connect the grounding line of the wireless controller properly.

Safety Grounding

The equipment using AC power supply must be grounded by using the yellow/green safety grounding cable. Otherwise, when the insulating resistance decreases the power supply and the enclosure in the equipment, electric shock may occur.

Caution The building must provide protective grounding connection to ensure that the device is connected to the protection location.

Caution The installation and maintenance personnel must check whether the A.C. socket is well connected to the protection location of the building, if not, they should use a protective grounding wire to connect the grounding end of the A.C. socket to the building's protection location.

Caution The power supply socket must be installed in a place that is near to the device and where users can operate the device easily.

Caution Before the installation of the device, make sure that ground connection is connected at first and disconnected finally.

Caution The sectional area of the protective grounding wire should be at least 0.75 mm^2 (18 AWG).

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

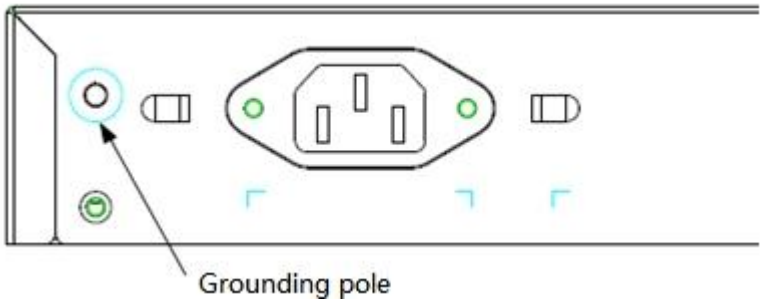
Lightning Grounding

The lightning protection system of a facility is an independent system that consists of the lightning rod, download conductor and the connector to the grounding system, which usually shares the power reference ground and yellow/green safety cable ground. The lightning discharge ground is for the facility only, irrelevant to the equipment.

EMC Grounding

The grounding required for EMC design includes shielding ground, filter ground, noise and interference suppression, and level reference. All the above constitute the comprehensive grounding requirements. The resistance of earth wires should be less than 1 ohm. The back plane of RG-WS6024 series wireless controller is reserved with one grounding pole, as shown in Figure 1-5.

Figure 1-5 Grounding of RG-WS6024



Lightning Resistance

When the AC power cable is imported outdoors and directly connected to the power port of the RG-WS6024 series wireless controller, lightning line bank should be adopted to prevent the wireless controller from being hit by lightning shocks. Usage of the lightning line bank: Connect the mains supply AC cable to the lightning line bank. Then, connect the wireless controller to the lightning line bank. This can help to prevent the current of high-voltage lightning from passing the wireless controller directly through the mains supply cable to a certain extent.


Note

The lightning line banks are not provided and should be purchased by users as required.
For the usage of lightning line banks, refer to their related manuals.

EMI

Electro-Magnetic Interference (EMI), from either outside or inside the equipment or application system, affects the system in the conductive ways such as capacitive coupling, inductive coupling, and electromagnetic radiation.

There are two types of electromagnetic interference: radiated interference and conducted interference, depending on the type of the transmission path.

When the energy, often RF energy, from a component arrives at a sensitive component via the space, the energy is known as radiated interference. The interference source can be either a part of the interfered system or a completely electrically isolated unit. Conducted interference results from the electromagnetic wire or signal cable connection between the source and the sensitive component, along which cable the interference conducts from one unit to another. Conducted interference often affects the power supply of the equipment, but can be controlled by a filter. Radiated interference may affect any signal path in the equipment and is difficult to shield.

- For the AC power supply system TN, single-phase three-core power socket with protective earthing conductors (PE) should be adopted to effectively filter out interference from the power grid through the filtering circuit.
- The grounding device of the wireless controller must not be used as the grounding device of the electrical equipment or anti-lightning grounding device. In addition, the grounding device of the wireless controller must be deployed far away from the grounding device of the electrical equipment and anti-lightning grounding device.
- Keep the equipment away from high-power radio transmitter, radar transmitting station, and high-frequency large-current device.
- Measures must be taken to shield static electricity.

Requirements of Installation Tools

Table 2-4 List of Installation Tools

Common Tools	Phillips screwdriver, flathead screwdriver, related electric cables and optical cables, bolts, diagonal pliers, straps
Special Tools	Anti-static tools
Meters	Multimeter

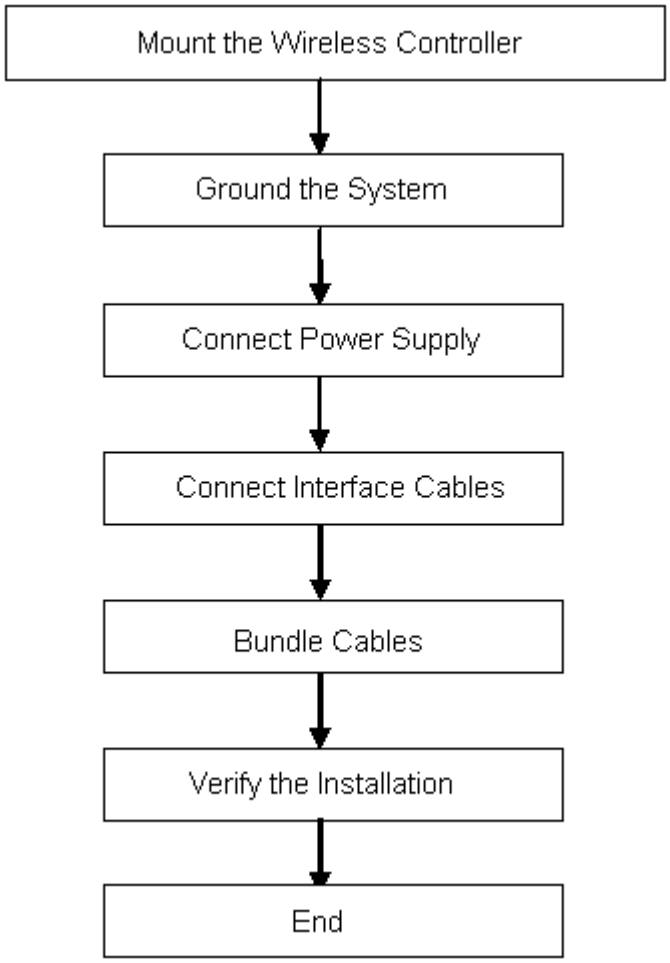
Note The tool kit is customer-supplied.

Product Installation

Note

Please ensure that you have carefully read Chapter 2.
Make sure that the requirements set forth in Chapter 2 have been met.

Installation Flowchart



Confirmations before Installation

Before installation, please confirm the following points:

- Whether ventilation requirements are met for the wireless controller
- Whether the requirements of temperature and humidity are met for the wireless controller

- Whether power cables are already laid out and whether the requirements of electrical current are met
- Whether related network adaption lines are already laid out

Installing the RG-WS6024

Notes

During installation, note the following points:

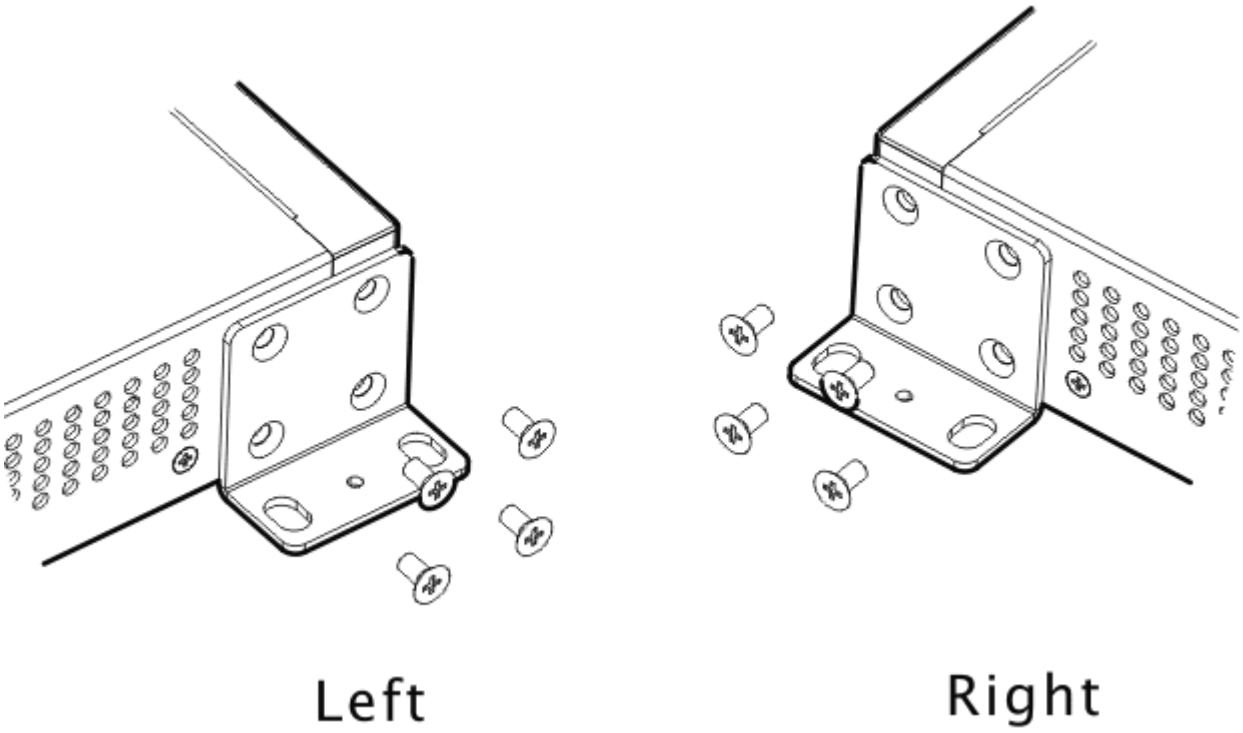
- Connect the power cables of different colors to the corresponding grounding posts.
- Ensure that the interface of the power supply cable is well connected to the power interface of the device. The power cables must be protected using power cable retention clips after they are connected to the device.
- Do not place any articles on the RG-WS6024 series wireless controller.
- Reserve a spacing of at least 10 cm around the chassis for good ventilation. Do not stack the devices.
- The wireless controller should be located at places free from the large power radio launch pad, radar launch pad, and high-frequency large-current devices. If necessary, electromagnetic shielding should be adopted. For example, use interface cables to shield cables.
- 100-meter network cables should be laid inside the equipment room and outdoor cabling of such cables is prohibited. If outdoor cabling is necessary, take relevant measures for lightning protection.

Mounting the Wireless controller to a Standard 19-inch Rack

The RG-WS6024series wireless controller follows the EIA standard dimensions and can be installed in 19-inch distribution cabinets.

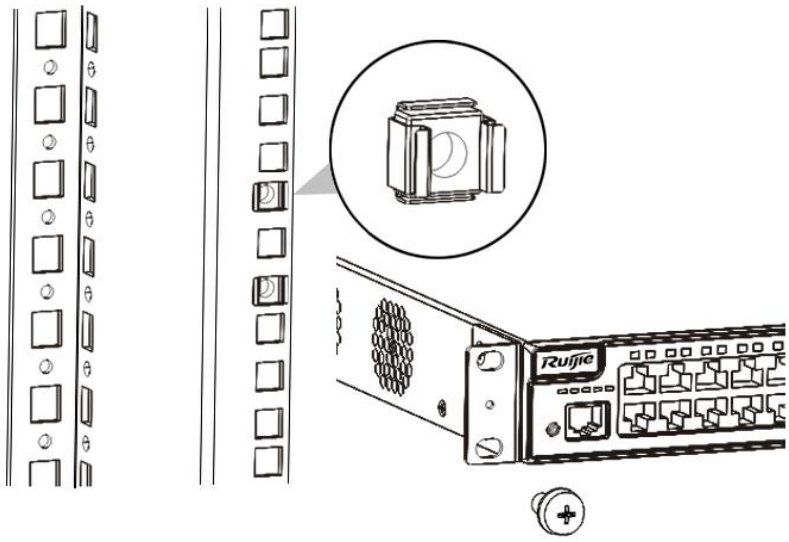
Attach the mounting brackets to the wireless controller with the supplied screws, as shown in Figure 2-1.

Figure 2-1 Attaching the Mounting Bracket to the Wireless Controller



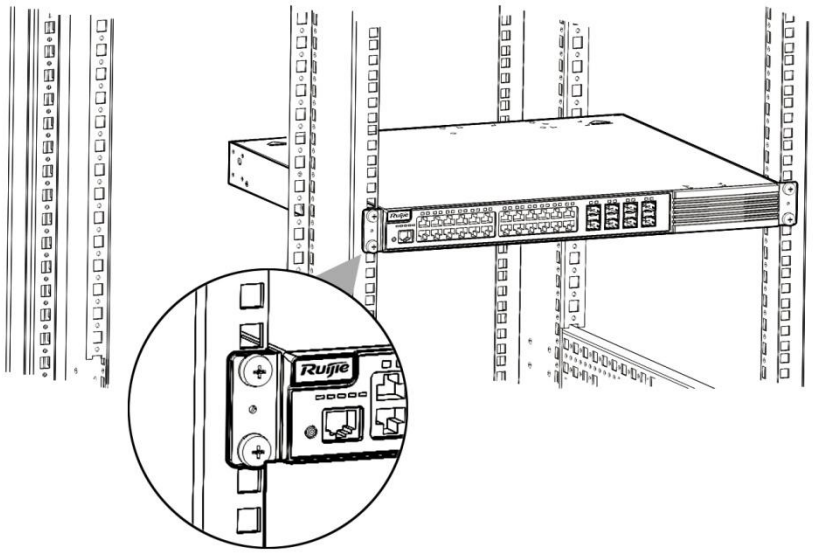
Align the mounting holes in the mounting bracket with the mounting holes in the rack, as shown in Figure 2-2.

Figure 2-2



Use the supplied M6 screws and cage nuts to securely attach the mounting brackets to the rack, as shown in Figure 2-3.

Figure 2-3

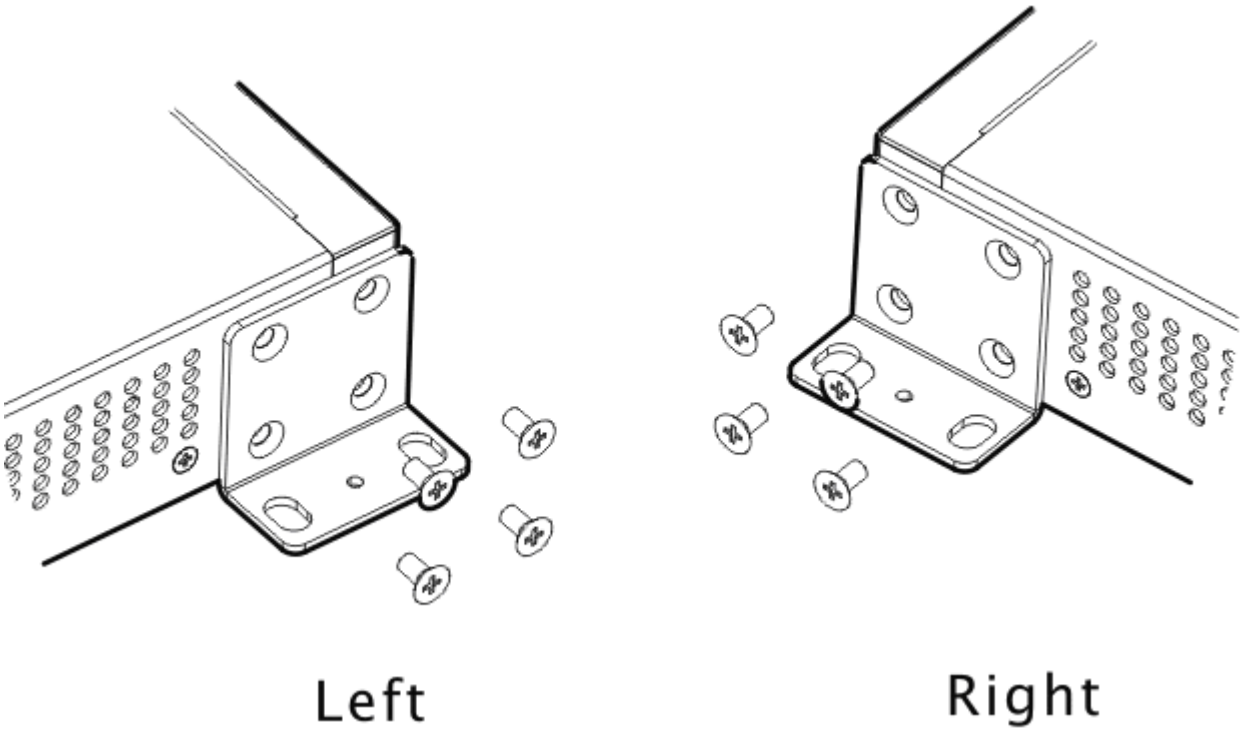


Mounting the Wireless controller on the Wall

The RG-WS6024series wireless controller can be mounted on the wall, as shown in the following figure.

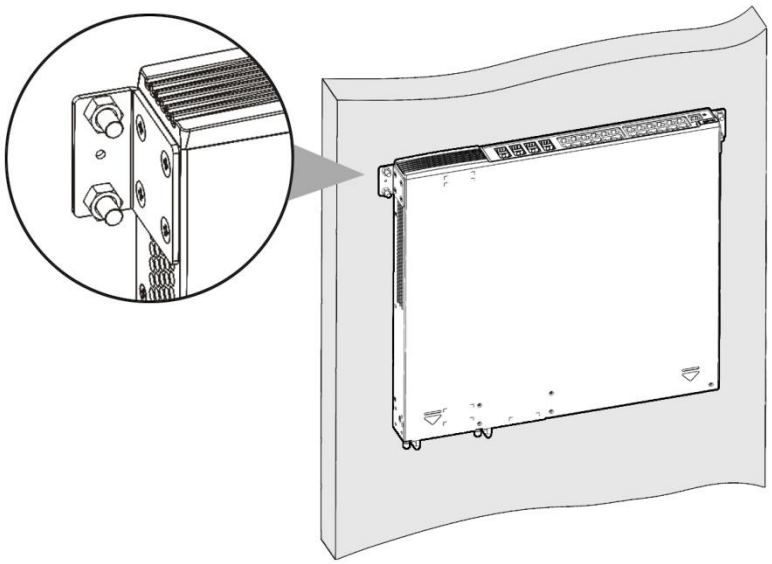
Attach the mounting brackets to the wireless controller with the supplied screws, as shown in Figure 2-4.

Figure 2-4 Attaching the Mounting Brackets to the Wireless Controller for Wall-Mounting



Use the expansion screws to securely attach the mounting brackets on the wall, as shown in Figure 2-5.

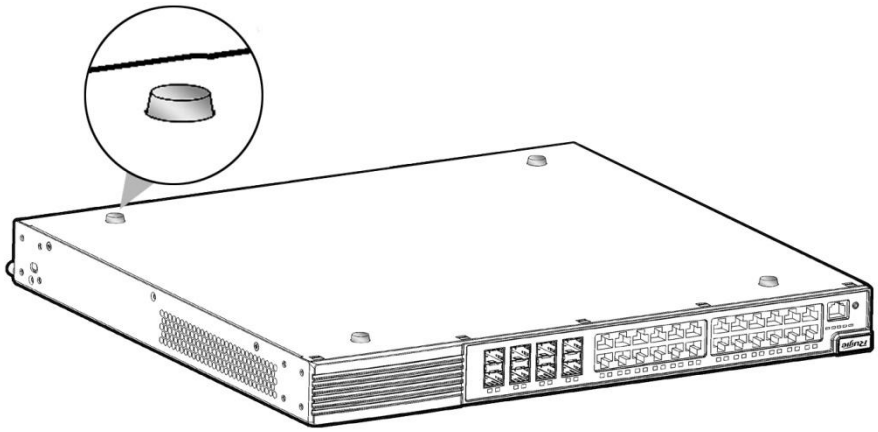
Figure 2-4 Attaching the Wireless Controller on the Wall



Mounting the Wireless controller on a Table

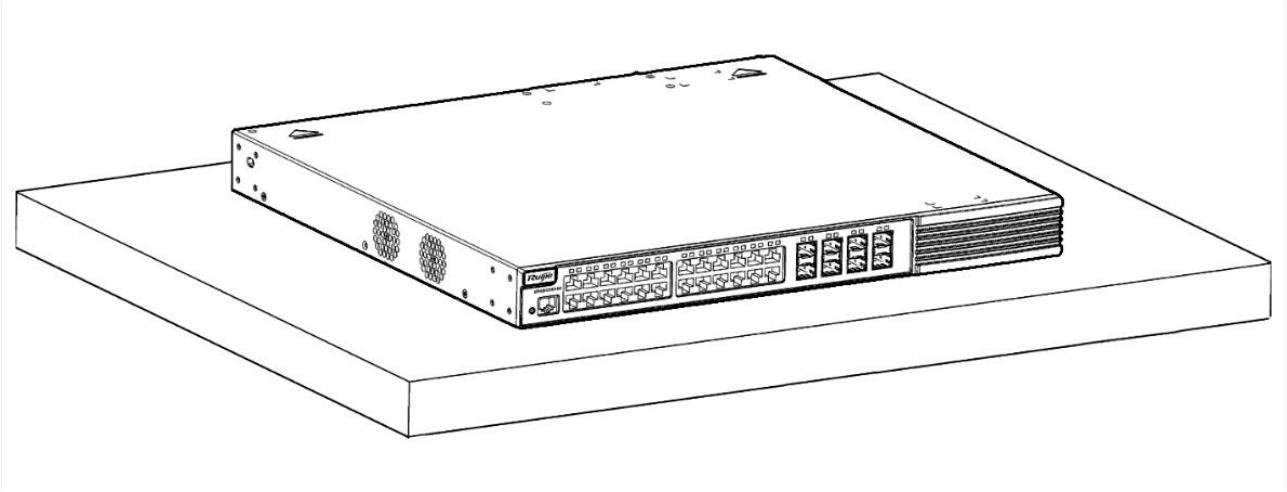
Attach the four rubber feet to the recessed areas on the bottom of the wireless controller, as shown in Figure 2-6.

Figure 2-6 Attaching the Rubber Feet to the Recessed Areas



Place the wireless controller on the table, as shown in Figure 2-7.

Figure 2-7 Mounting the Wireless Controller on the Table



Caution The device must be installed and operated in the place that can restrict its movement.

Checking after Installation

Caution Before checking the installation, switch off the power supply so as to avoid any personal injury or damage to the component due to connection errors.

- Check that the ground line is connected.
- Check that the cables and power input cables are correctly connected.
- Check that all interface cables are laid out inside the equipment room. In the case of external cabling, check that the lightning resistance socket or network interface lightning protector is connected.
- Check that sufficient airflow is available around the device (over 10 cm).

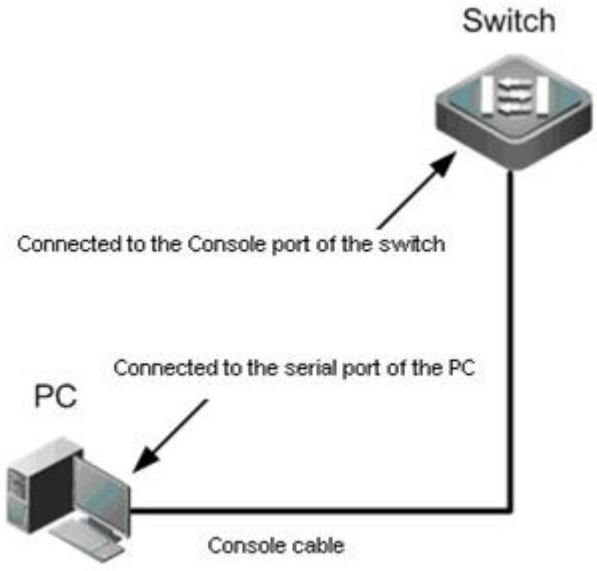
System Debugging

Establishing the Debugging Environment

Establishing the Debugging Environment

Connect the PC to the console port of the wireless controller through the console cable, as shown in Figure 3-1.

Figure 3-1 Schematic Diagram of the Configuration Environment



Connecting the Console Cable

- Step 1: Connect the end of the console cable with DB-9 jack to the serial port of the PC.
- Step 2: Connect the end of the console cable with RJ45 to the console port of the wireless controller.

Setting Heper Terminal Parameters

- Step 1: Start the PC and run the terminal simulation program on the PC, such as Terminal on Windows 3.1 or HyperTerminal on Windows 95/98/NT/2000/XP.
- Step 2: Set terminal parameters. The parameters are as follows: baud rate 9600, data bit 8, parity check none, stop bit 1, and flow control as none.

1) Choose Setup>Program>Attachment >Communication> Hyper Terminal.
2) Choose Cancel, the interface as shown in figure 3-2 is displayed.

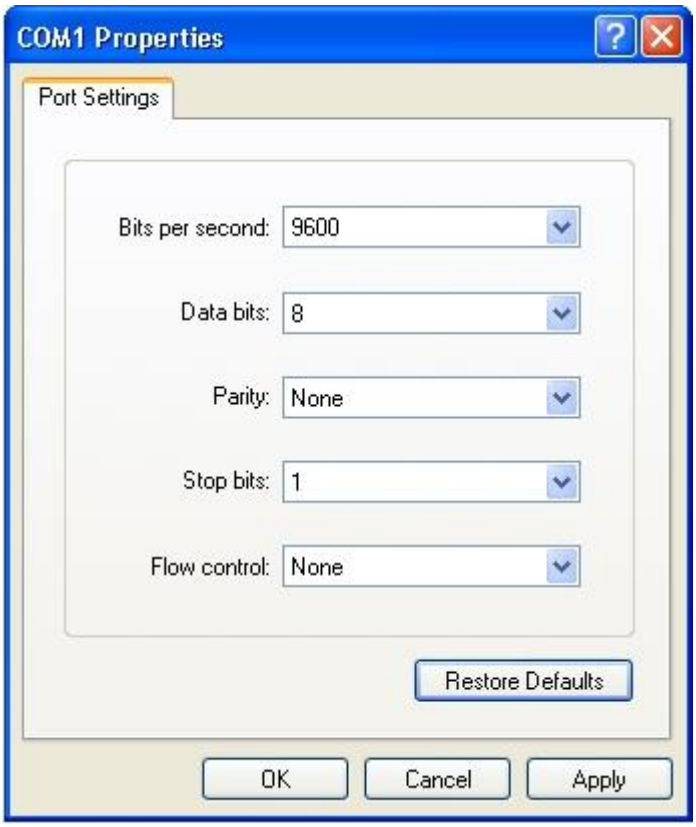
Figure 3-2

3) Enter the name of the new connection and click **OK**, the interface as shown in figure 3-3 is displayed. Choose the serial port used currently in the column [use when connecting].

Figure 3-3

4) After choosing the serial port, click **OK** to display the serial port parameter setting interface, set the baud rate to 9600, data bit to 8, parity check to none, stop bit to 1 and flow control to none.

Figure 3-4



5) After setting the parameters, click **OK** to enter the hyper terminal interface.

Startup Check

Checking before the Device is Powered on

- The wireless controller is fully grounded.
- The power cable is correctly connected.
- The power supply voltage complies with the requirement of the wireless controller.
- The control cable of the PC is properly connected to the console port of the wireless controller. The HyperTerminal is started and the parameter settings are correct.

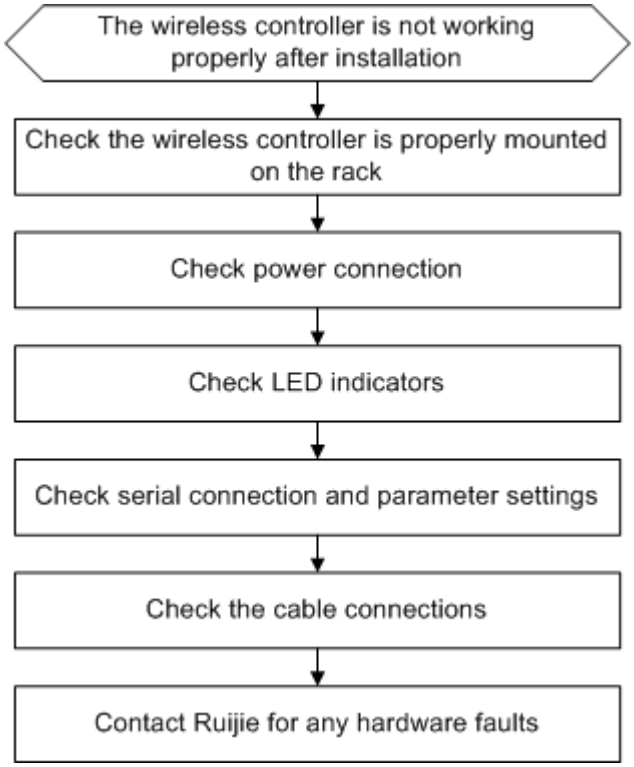
Checking after Program Startup (Recommended)

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

- Check whether information is displayed on the terminal interface.
- Check whether the status of the wireless controller indicator is normal.
- Check whether the main program of the device is normally loaded.
- Check whether the time on the device is consistent with the current Beijing time.
- Check whether the service interface forwards data normally.

Maintenance and Troubleshooting

General Troubleshooting Procedure



Troubleshooting Common Faults

Symptom	Possible Causes	Solution
Forgetting the management interface login password	A password is manually configured but it is forgotten.	Please contact Ruijie Networks Customer Service Department for technical support.
The status indicator is not on after the wireless controller is started.	The power supply module does not supply power. The power cable is in loose contact.	Check whether the power socket at the equipment room is normal and whether the power cable of the wireless controller is in good contact.
The status indicator is red.	Fan alarm Temperature alarm Power alarm	Check whether the fan stops working or is damaged. Temperature alarm: the wireless controller already stops the normal service exchanges. Check in time the working environment of the wireless controller, clean the dust on the cabinet and reinforce the refrigeration effect.

		Power alarm: the power module problem may be: 1) The power module is in place but no power cord is connected. Please power on the module or remove the unused power module. 2) The power module is faulty. Please replace a power module.
The serial port console has no output or outputs illegible characters.	The serial port connected to the wireless controller does not match that opened by the configuration software. The serial port is not configured correctly.	Change the serial port opened by the configuration software to be the one connected to the wireless controller. Check that the parameter configuration of the serial port matches that specified in the instructions.
The RJ45 port is not in connectivity or it is erroneous in receiving/transmitting frames.	The connected twisted pair cable is faulty. The length of the cable exceeds 100 m. The port has special configuration that has no common working mode with the connected wireless controller.	Replace the twisted pair cable. Check that the port configuration has the common working mode with the connected wireless controller.
The fiber port cannot be connected.	The Rx and Tx ends are connected reversely. The interconnected optical module type does not match. The fiber type is not correct. The length of the optical fiber exceeds that rated of the optical module.	Switch the Rx and Tx ends of the optical fiber. Replace the optical module with one of the matched type. Replace the optical fiber with one of the appropriate type. Replace the optical fiber with one of the appropriate length.
The expansion module is not identified by the host.	The module is not properly installed or is in loose contact. The module is installed after the host is powered on.	Power off, install the module, and then power on the host. Power off, remove and install the module again.

AppendixA Connectors and Connection Media

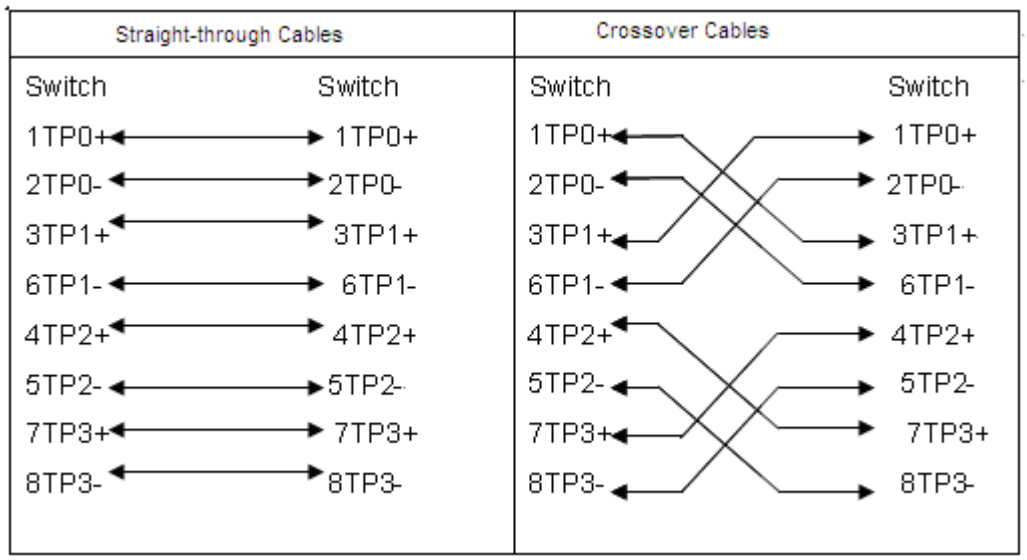
1000BASE-T/100BASE-TX/10BASE-T Ports

The 1000BASE-T/100BASE-TX/10BASE-T is a port that supports adaptation of three rates, and automatic MDI/MDIX Crossover at these three rates.

The 1000BASE-T complies with IEEE 802.3ab, and uses the cable of 100-ohm Category-5 or Supper Category-5 UTP or STP, which can be up to 100 m.

The 1000BASE-T port uses four pairs of wires for transmission, all of which must be connected. Figure A-1 shows the connections of the twisted pairs used by the 1000BASE-T port.

Figure A-1 Four Twisted Pairs of the 1000BASE-T



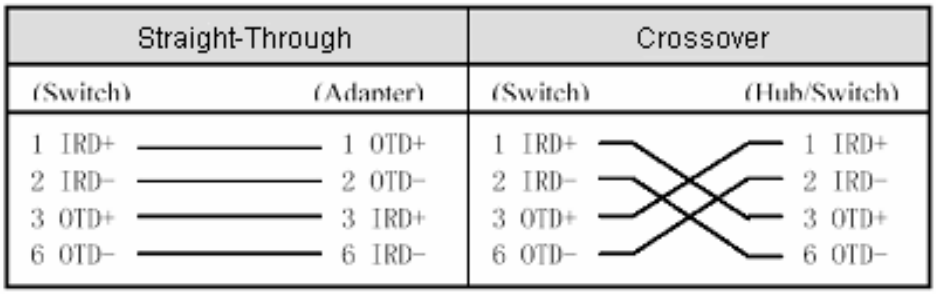
In addition to the above cables, the 100BASE-TX/10BASE-T can also use 100-ohm Category-3, 4, 5 cables for 10 Mbps, and 100-ohm Category-5 cables for 100 Mbps, both of which can be up to 100 m. Figure A-2 shows the pinouts of the 100BASE-TX/10BASE-T.

Figure A-2 Pinouts of the 100BASE-TX/10BASE-T

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

Figure A-3 shows the straight-through and crossover cable connections for the 100BASE-TX/10BASE-T.

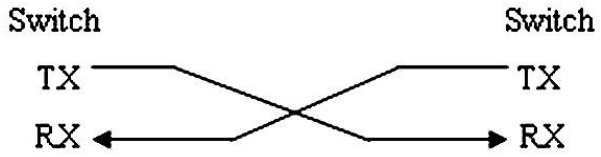
Figure A-3 Connections of the Twisted Pairs of the 100BASE-TX/10BASE-T



Optical Fiber Connection

For the optical fiber ports, select single-mode or multiple-mode optical fibers for connection according to the fiber module connected. The connection schematic diagram is shown in Figure A-4:

Figure A-4 Optical Fiber Connections



AppendixB Mini-GBIC and SPF+ Module

SFP module (Mini-GBIC module) and 10G SFP+ module are available to address the requirements of interface types of wireless controller modules. You can select the Mini-GBIC or SFP+ module to suit your specific needs. Besides the following modules, the 10G SFP+ module also supports the Mini-GBIC-GT module. The models and technical specifications of some Mini-GBIC and 10G SFP+ modules are listed below for your reference. For details, see *Instructions on Mini-GBIC and SFP Series Module* and *Instructions on 10G SFP+ Series Module*.

Table B-1 Models and Technical Specifications of the 100M Mini-GBIC Module

Model	Wave Length (nm)	Media Type	Core Size (um)	Maximum Cabling Distance	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
						Min	Max	Min	Max
FE-SFP-LX-MM1310	1310	MMF	62.5/125	2km	Yes	-22	-14	-30	-14
FE-SFP-LH15-SM1310	1310	SMF	9/125	15km	Yes	-15	-8	-28	-8

Table B-2 Models and Technical Specifications of the 1000M Mini-GBIC Module

Model	Wave Length (nm)	Media Type	Core Size (um)	Maximum Cabling Distance	DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
						Min	Max	Min	Max
Mini-GBIC-SX	850	MMF	62.5/125	275m	No	-9.5	-3	-17	0
			50/125	550m					
Mini-GBIC-LX	1310	SMF	9/125	10km	No	-9.5	-3	-20	-3
GE-eSFP-SX-MM850	850	MMF	62.5/125	275m	Yes	-9.5	-3	-17	0
			50/125						
GE-eSFP-LX-SM1310	1310		9/125	10km	Yes	-9.5	-3	-20	-3
Mini-GBIC-LH40	1310		9/125	40km	Yes	-2	3	-22	-3
Mini-GBIC-ZX50	1550	SMF	9/125	50km	Yes	-5	0	-22	-3
Mini-GBIC-ZX80	1550	SMF	9/125	80km	Yes	0	4.7	-22	-3
Mini-GBIC-ZX100	1550	SMF	9/125	100km	Yes	0	5	-30	-9

Note

For the optical module with transmission distance exceeding 40 km and more, one on-line optical attenuator should be added on the link to avoid the overload of the optical receiver when short single-mode optical fibers are used.

Table B-3 Specifications of SFP BIDI Optical Module Pairs

Rate/Distance	Module Pairs
100M/20km	FE-SFP-LX20-SM1310-BIDI FE-SFP-LX20-SM1550-BIDI
100M /40km	FE-SFP-LH40-SM1310-BIDI FE-SFP-LH40-SM1550-BIDI
1000M /20km	GE-SFP-LX20-SM1310-BIDI GE-SFP-LX20-SM1550-BIDI
1000M /40km	GE-SFP-LH40-SM1310-BIDI GE-SFP-LH40-SM1550-BIDI


Caution The BIDI modules must be used in pairs (e.g., FE-SFP-LX20-SM1310-BIDI and FE-SFP-LX20-SM1550-BIDI).

Table B-4 Models and Technical Specifications of the Mini-GBIC-GT Module

The existing SFP copper module:

Standard	1000Base-T SFP Type
1000Base-T	Mini-GBIC-GT

The existing 1000Base-T module:

1000baseT	Copper Type	Cabling Distance	DDM (Yes/No)
Mini-GBIC-GT	Category 5 (or above) UTP/STP	100m	No

Table B-5 Models and Technical Specifications of the 10G SFP+ Module

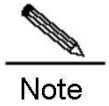
The existing 10G SFP+ optical modules:

Model	Wavelength (nm)	Optical Fiber Type	Core Size (μm)	Modular Bandwidth (MHz·km)	Maximum Cabling distance	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
						Min	Max	Min	Max
XG-SFP-SR-MM850	850	MMF (LC interface)	62.5	200	33m	-5	-1	-7.5	0.5
				160	26m				
			50	2000	300m				
				500	82m				
				400	66m				
XG-SFP-LR-SM1310	1310	SMF (LC interface)	9	N/A	10km	-8.2	0.5	-10.3	0.5
XG-SFP-ER-SM1550	1550	SMF (LC	9	N/A	40km	-4.7	4	-11.3	-1

		interface)							
XG-SFP-ZR-SM1550	1550	SMF (LC interface)	9	N/A	80km	0	4	-24	-7

The existing 10G SFP+ copper modules:

Model	Module Type	Connector Type	Copper Cable Length(m)	Conductor Wire Diameter (AWG)	Data Rate(Gb/s)	DDM (Yes/No)
XG-SFP-CU1M	Passive	SFP+	1	28	10.3125	No
XG-SFP-CU3M	Passive	SFP+	3	28	10.3125	No
XG-SFP-CU5M	Passive	SFP+	5	26	10.3125	No



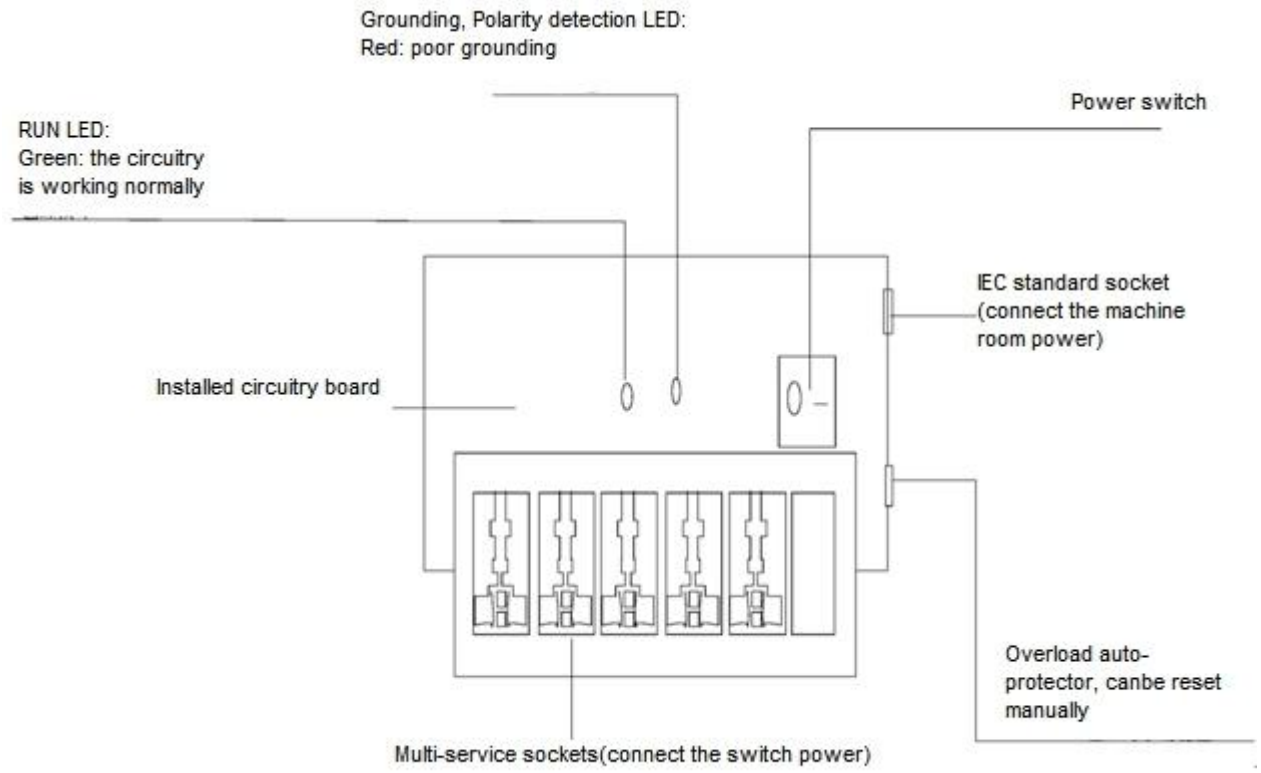
For the optical module with transmission distance exceeding 40 km and more, one on-line optical attenuator should be added on the link to avoid the overload of the optical receiver when short single-mode optical fibers are used.

AppendixC Lightning Protection

Installing AC Power Arrester (lightning protection cable row)

The external lightning protection cable row shall be used on the AC power port to prevent the wireless controller from being struck by lightning when the AC power cable is introduced from the outdoor and directly connected to the power port of the wireless controller. The lightning protection cable row is fixed on the cabinet, operating table or the wall in the machine room using the line buttons and screws.

Figure C-1 Schematic Diagram for the Power Arrester



Note The power arrester is not provided and the user shall purchase it to address the practical requirement.

Notes for installation:

- Make sure that the PE terminal of the power arrester has been well-grounded;
- After connecting the wireless controller AC power plug to the socket of the power arrester (lightning protection cable row), lightning protection function implements if the RUN LED is Green and the ALARM LED is OFF.
- If the ALARM LED on the power arrester is Red, you shall check what the reason is, poor grounding connection or the reversed connection of the Null and Live lines: Use the multimeter to check the polarity of the power socket for the arrester when the LED is Red, if the N line is on the left and the L line is on the right, the arrester PE terminal is

not grounded; if the L line is on the left and the N line is on the right, the polarity of the arrester power cable shall be reversed; if the LED is still Red, it is confirmed that the arrester PE terminal has not been grounded.

Installing the Ethernet Port Arrester

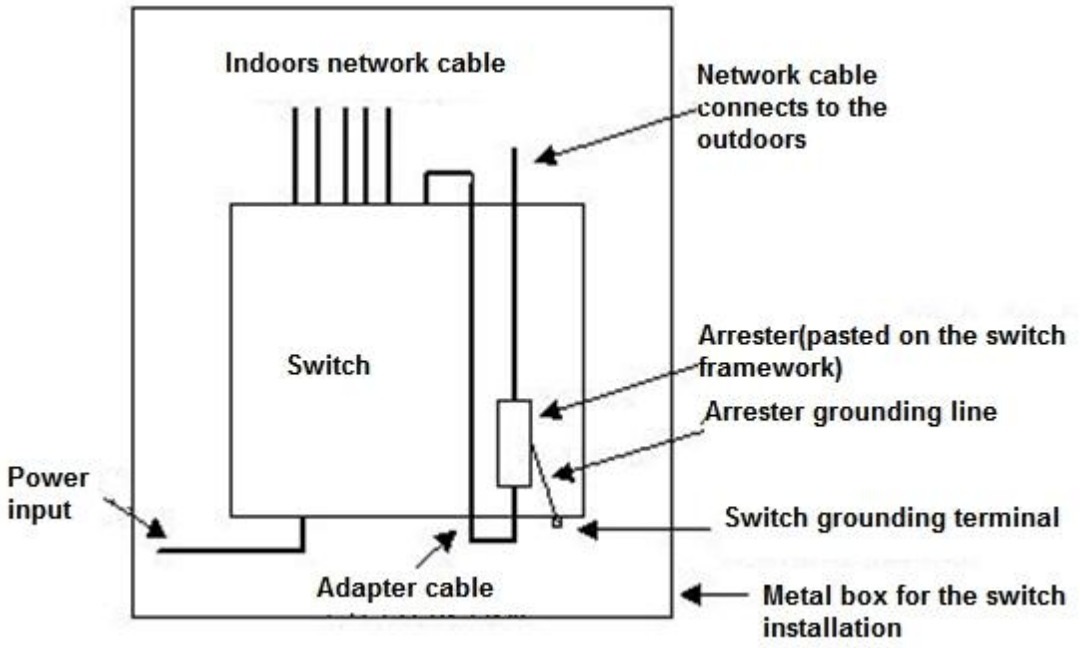
During the wireless controller usage, the Ethernet port arrester shall be connected to the wireless controller to prevent the wireless controller damage by lightning before the outdoor network cable connects to the wireless controller.

Tools: Cross or straight screwdriver, Multimeter, Diagonal pliers

Installation Steps:

1) Tear one side of the protection paper for the double-sided adhesive tape and paste the tape to the framework of the Ethernet port arrester. Tear the other side of the protection paper for the double-sided adhesive tape and paste the Ethernet port arrester to the wireless controller framework. The paste location for the Ethernet port arrester shall be as close to the grounding terminal of the wireless controller.
2) Based on the distance of the wireless controller grounding terminal, cut the grounding line for the Ethernet port arrester and firmly tighten the grounding line to the grounding terminal of the wireless controller.
3) Use the multimeter to check whether the grounding line for the arrester is in good contact with the wireless controller grounding terminal and the framework.
4) According to the description on the Ethernet Port Arrester Hardware Installation Guide, connect the arrester using the adapter cable(note that the external network cable is connected to the end of IN, while the adapter cable connected to the wireless controller is connected to the end of OUT) and observe whether the LED on the board is normal or not.
5) Use the nylon button to bundle the power cables.

Figure C-2 Schematic Diagram for the Ethernet port Arrester Installation



Note

The Ethernet port arrester is only for the 10M/100M copper Ethernet ports with the RJ-45 connector;

Note

The Ethernet port arrester is not provided, the user can purchase them to address their own practical requirements. For the detailed information during the arrester installation, please refer to Ethernet Port Arrester Hardware Installation Guide, which contains the technical specification and the maintenance and installation of the arrester.

You may pay attention to the following conditions during the actual installation to avoid influencing the performance of the Ethernet port arrester:

- Reversed direction of the arrester installation. You shall connect the external network cable to the “IN” end and connect the wireless controller Ethernet port to the “OUT” end.
- Poor arrester grounding. The length of the grounding line should be as short as possible to ensure that it is in good contact with the wireless controller grounding terminal. Use the 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 wireless controller, it needs to install the arresters on all connection ports for the purpose of the lightning protection.

AppendixD Cabling Recommendations in Installation

When RG-WS6024 series wireless controller is installed in standard 19-inch cabinets, the cables are tied in the binding rack on the cabinet by the cabling rack, and top cabling or bottom cabling is adopted according to the actual situation in the equipment room. All cable connectors should be placed at the bottom of the cabinet in an orderly manner instead of outside the cabinet 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 position of the DC power distribution box, AC socket, or lightning protection box.

Requirement for the minimum cable bend radius

- The bend radius of a power cord, communication cable, and flat cable should be greater than five times their respective diameters. The bend radius of these cables that often bend or suffer removal/insertion should be greater than seven times their respective diameters.
- The bend radius of a common coaxial cable should be greater than seven times its diameter. The bend radius of this type of cables that often bend or suffer removal/insertion should be greater than 10 times its diameter.
- The bend radius of a high-speed cable (SFP+ cable, for example) should be greater than five times its diameter. The bend radius of this type of cables that often bend or suffer removal/insertion should be greater than 10 times its diameter.

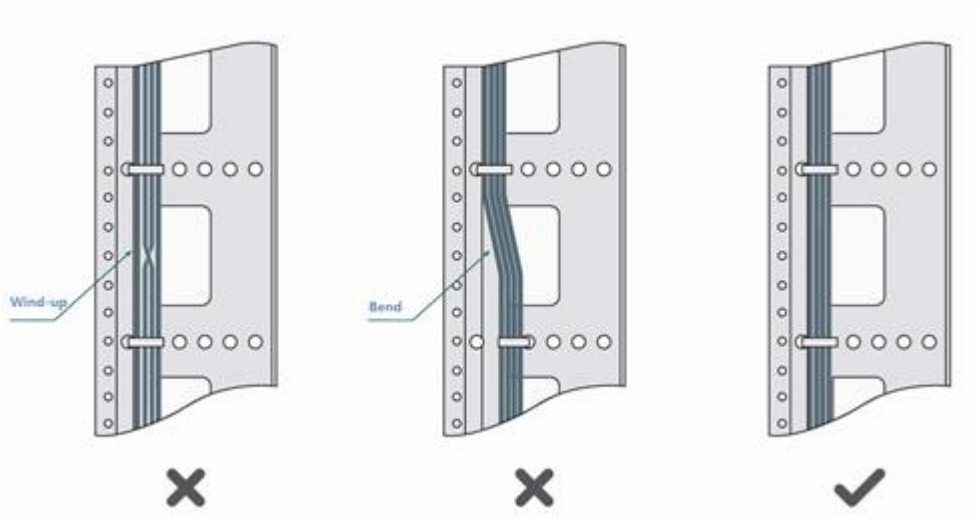
Requirement for the minimum fiber bend radius

- The diameter of a fiber tray to hold fibers cannot be less than 25 times the diameter of the fiber.
- When moving an optical fiber, the bend radius of the fiber should be equal to or greater than 20 times the diameter of the fiber.
- During cabling of an optical fiber, the bend radius of the fiber should be equal to or greater than 10 times the diameter of the fiber.

Notes for Bundling up Cables

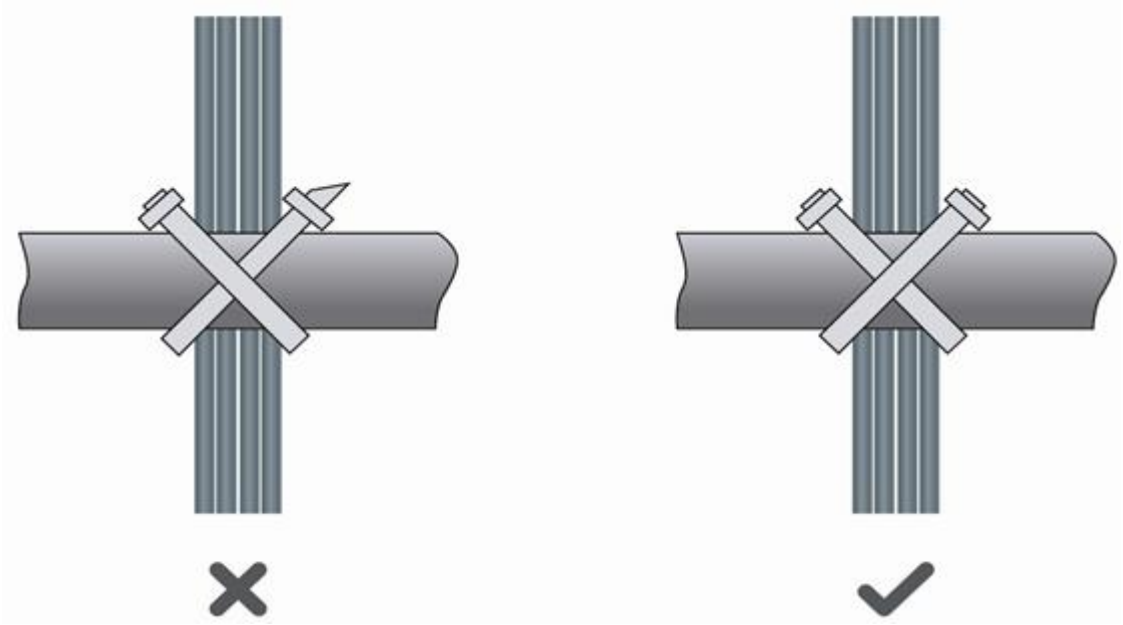
- Before bundling cables, correctly mark labels and stick the labels to cables where appropriate.
- Cables should be neatly and properly bundled, as shown in Figure D-1.

Figure D-1 Bundling Up Cables (1)



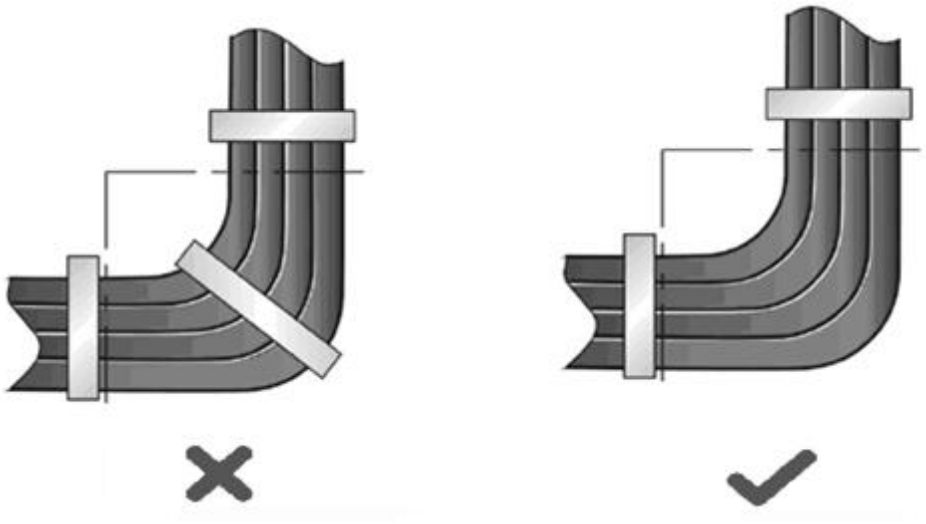
- Cables of different types (such as power cords, signal cables, and grounding cables) should be separated in cabling and bundling. When they are close, crossover cabling can be adopted. In the case of parallel cabling, power cords and signal cables should maintain a space equal to or greater than 30 mm.
- The binding rack and cabling slot 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.
- Proper buckles should be selected to bundle up cables. It is forbidden to connect two or more buckles to bundle up cables.
- After bundling up cables with buckles, you should cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure D-2.

Figure D-2 Bundling Up Cables (2)



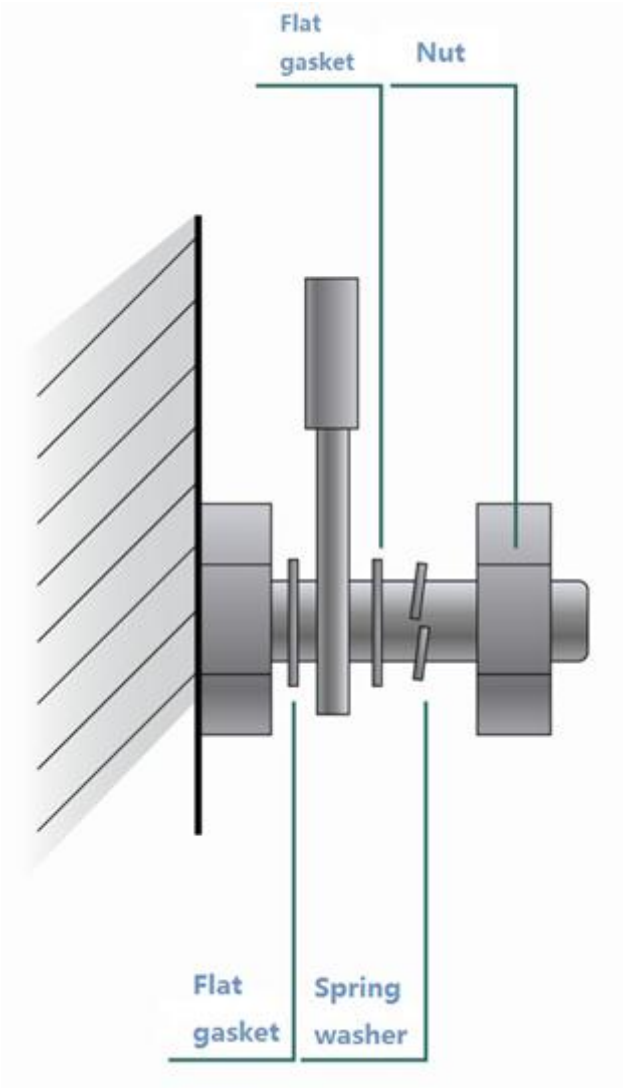
- When cables need to bend, you should first bundle them up. However, the buckle cannot be bundled within the bend area. Otherwise, significant stress may be generated in cables, breaking cable cores. As shown in Figure D-3.

Figure D-3 Bundling Up 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 cabling slot. The proper position indicates a position that will not affect device running or cause device damage or cable damage during commissioning.
- The power cords cannot be bundled on the guide rails of moving parts.
- The power cables connecting moving parts such as door grounding wires should be reserved with some access after assembled. When the moving part reaches the installation position, the remaining part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be used.
- When using screw threads to fasten cable terminals, the bolt or screw must be tightly fastened, and anti-loosening measures should be taken, as shown in Figure D-4.

Figure D-4 Cable Fastening



- The hard power cable should be fastened by the terminal connection area to prevent stress.
- 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.
- Binding by using buckles should be performed according to Table D-1.

Cable Bunch Diameter (mm)	Binding Space (mm)
10	80-150
10-30	150-200
30	200-300

- No knot is allowed in cabling or bundling.
- For solder-less terminal blocks (such as air switches) of the cold pressing terminal type, the metal part of the cold pressing terminal should not be exposed outside the terminal block when assembled

AppendixE Site Selection

- The machine room should be at least 5km away from the heavy pollution source such as the smelter, coal mine and thermal power plant, 3.7km away from the medium pollution source such as the chemical industry, rubber industry and electroplating industry, and 2km away from the light pollution source such as the food manufacturer and leather plant. If the pollution source is unavoidable, the machine room should be located on the windward side of the pollution source perennially with advanced protection.
- The machine room should be at least 3.7km away from the sea or salt lake. Otherwise, the machine room must be sealed, with air conditioner installed for temperature control. Saline soil cannot be used for construction. Otherwise, you should select devices with advanced protection against severe environment.
- Do not build the machine room in the proximity of livestock farms. Otherwise, the machine 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 machine room.
- The machine room should be firm enough to withstand severe weather conditions such as windstorm and heavy rain as well as away from dust. If the dust is unavoidable, keep the door and window away from the pollution source.
- The machine room should be away from the residential area. Otherwise, the machine room should meet the construction standard in terms of noise.
- Make sure the air vent of the machine room is away from the sewage pipe, septic tank, and sewage treatment tank. Keep the machine room under positive pressure to prevent corrosive gas from entering the machine room to corrode components and circuit boards. Keep the machine room away from industrial boiler and heating boiler.
- The machine room had better be on the second floor or above. Otherwise, the machine room floor should be 600mm higher than the highest flood level ever recorded.
- Make sure there are no cracks or holes in the wall and floor. If there are cable entries in the wall or window, take proper sealing measures. Ensure that the wall is flat, wear-resistant, and dust-free, which should be up to the standard for flame retarding, soundproofing, heat absorption, dust reduction, and electromagnetic shielding.
- Keep the door and the window closed to make the machine room sealed.
- The steel door is recommended for soundproofing.
- Sulfur-containing materials are forbidden.
- Pay attention to the location of the air conditioner. Keep the air conditioner from blowing wind straight toward the device or blowing water drops from the window or air vent toward the device.