Ruijie RG-AP820-L(V3) Access Point

Hardware Installation and Reference Guide

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Preface

Intended Audience

This document is intended for:

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

Technical Support

- Ruijie Networks Website: https://www.ruijienetworks.com/
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Conventions

1. Signs

The symbols used in this document are described as follows:

Danger

An alert that calls attention to safety operation instructions that if not understood or followed when operating the device can result in physical injury.

Warning

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

Caution

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

Note

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

Specification

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

2. Note

This manual provides the device installation steps, hardware troubleshooting, module technical specifications, and specifications and usage guidelines for cables and connectors. 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.

Contents

1 Product Overview

The RG-AP820-L(V3) AP is a dual-radio access point compliant with the IEEE 802.11ax standard. The RG-AP820-L(V3) AP provides a combined data rate of 2.976 Gbps, with up to 574 Mbps in the 2.4 GHz band and 2.402 Gbps in the 5 GHz band. Designed for flexible deployments in the field of education, government, finance and business, the RG-AP820-L(V3) AP offers one combo port.

1.1 Appearance

The RG-AP820-L(V3) provides two radio frequency (RF) connectors, one 10/100/1000 BASE-T Ethernet port, one 2.5G SFP port, one Console port and one DC power plug. The AP supports PoE or DC power supply.

Figure 1-1 Appearance

Figure 1-2 Front Panel

Table 1-1 Front Panel

No.	Item	Description
1	LED	Indicate the operation status of device.

Figure 1-3 Side View

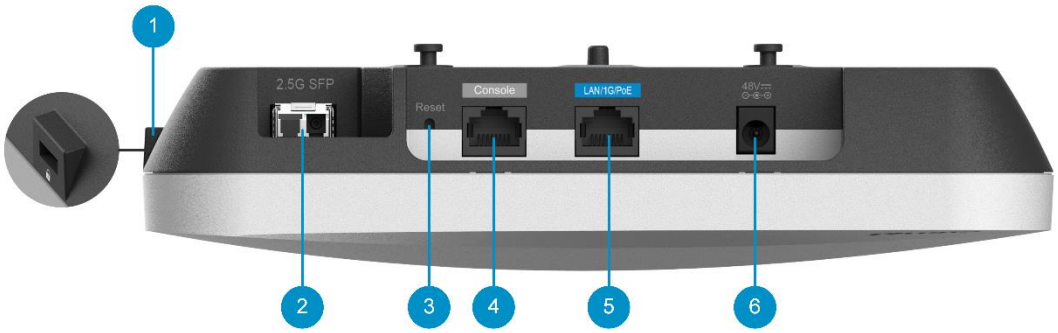


Table 1-2 Side View

No.	Button and Port	Description

1	Anti-theft lock hole	Connect to the anti-theft lock.
2	2.5G SFP port	The uplink SFP port for service data transmission.
3	Reset button	Reboot the device or restore the device to factory settings.
4	Console port	Connect to the device that is managed with the serial cable.
5	1000 BASE-T Ethernet port	The uplink adaptive Ethernet port for service data transmission. Support IEEE 802.3af standard PoE power supply.
6	DC power plug	Connect to the DC power adapter to supply power to the AP.

Note

The nameplate is at the bottom of the access point.

1.2 Package Contents

Table 1-3 Package Contents

Item	Quantity
RG-AP820-L(V3) Access Point	1
Mounting Bracket	1
Wall Anchor	4
Phillips Pan Head Screws M4 x 20	4
Warranty Card	1
Installation Guide	1

1.3 Technical Specifications

1.3.1 Dimensions and Weight

Table 1-4 Dimensions and Weight

Dimensions and Weight	RG-AP820-L(V3)
Unit dimensions (W x D x H)	220 mm x 220 mm x 49 mm (8.66 in. x 8.66 in. x 1.93 in.)
Shipping dimensions (W x D x H)	514 mm x 326 mm x 292 mm (20.24 in. x 12.83 in. x 11.50 in.)
Unit weight	Main unit: 0.6 kg (1.32 lbs)

Dimensions and Weight	RG-AP820-L(V3)
	Mounting bracket: 0.2 kg (0.44 lbs)
Shipping weight	8.46 kg (18.65 lbs)
Mounting	Wall/Ceiling-mount (a mounting bracket is delivered with the main unit)
Lock option	Kensington lock and securing latch
Bracket dimensions (W x D x H)	120 mm×120 mm×8 mm (4.72 in. x 4.72 in. x 0.31 in.)
Mounting hole pattern	53 mm (2.09 in.) x 53 mm (2.09 in.)
Mounting hole diameter	6.5 mm (0.26 in.)

1.3.2 Wi-Fi Radio

Table 1-5 Wi-Fi Radio

Wi-Fi Radio	RG-AP820-L(V3)
Radio design	Dual-radio and up to four spatial streams: ● Radio 1: 2.4 GHz, two spatial streams, 2x2 MU-MIMO ● Radio 2: 5 GHz, two spatial streams, 2x2 MU-MIMO
Operating frequencies	Radio 1, 802.11b/g/n/ax: ● 2.400 GHz to 2.4835 GHz, ISM Radio 2, 802.11a/n/ac/ax: ● 5.150 GHz to 5.250 GHz, U-NII-1 ● 5.250 GHz to 5.350 GHz, U-NII-2A ● 5.470 GHz to 5.725 GHz, U-NII-2C ● 5.725 GHz to 5.850 GHz, U-NII-3/ISM Note: Available frequency bands may vary with countries or regions. To use the above-mentioned frequency bands, ensure that they are supported in your country or region. For details, see *WLAN Country or Region Codes and Channel Compliance*.
Data rates	Combined peak data rate: 2.976 Gbps 2.4 GHz radio ● Two spatial stream Single User (SU) MIMO for up to 574 Mbps wireless data rate to individual 2SS HE40 802.11ax client devices (maximum) ● Two spatial stream Single User (SU) MIMO for up to 287 Mbps wireless data rate to individual 2SS HE20 802.11ax client devices (typical) 5 GHz radio ● Two spatial stream Single User (SU) MIMO for up to 2.402 Gbps wireless data rate to individual 2SS HE160 802.11ax client devices (maximum)

Wi-Fi Radio	RG-AP820-L(V3)
	● Two spatial stream Single User (SU) MIMO for up to 1.201 Gbps wireless data rate to individual 2SS HE80 802.11ax client devices (typical)
Data rate set	The following 802.11-compliant data rates in Mbps are supported: 2.4 GHz radio ● 802.11b: 1, 2, 5.5, 11 ● 802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 ● 802.11n: 6.5 to 300 (MCS0 to MCS15, HT20 to HT40) ● 802.11ax: 8.6 to 574 (MCS0 to MCS11, NSS = 1 to 2, HE20 to HE40) 5 GHz radio ● 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 ● 802.11n: 6.5 to 300 (MCS0 to MCS15, HT20 to HT40) ● 802.11ac: 6.5 to 1,733 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160) ● 802.11ax: 8.6 to 2,402 (MCS0 to MCS11, NSS = 1 to 2, HE20 to HE160)
Packet aggregation	802.11n/ac/ax: A-MPDU and A-MSDU
Antenna type	Built-in omnidirectional antennas (two 2.4 GHz antennas and two 5 GHz antennas)
Antenna gain	2.4 GHz: 5 dBi 5 GHz: 5 dBi
Maximum transmit power	2.4 GHz radio: 26 dBm (23 dBm per chain) 5 GHz radio: 26 dBm (23 dBm per chain) Note: The transmit power is limited by local regulatory requirements. For details, see *WLAN Country or Region Codes and Channel Compliance*. Thailand 2.400 GHz to 2.4835 GHz, EIRP ≤ 20 dBm 5.150 GHz to 5.350 GHz, EIRP ≤ 23 dBm 5.470 GHz to 5.725 GHz, EIRP ≤ 30 dBm 5.725 GHz to 5.825 GHz, EIRP ≤ 30 dBm
Power increment	Configurable in increments of 1 dBm
Radio technologies	802.11b: Direct-Sequence Spread-Spectrum (DSSS) 802.11a/g/n/ac: Orthogonal Frequency-Division Multiplexing (OFDM) 802.11ax: Orthogonal Frequency Division Multiple Access (OFDMA)
Modulation types	802.11b: BPSK, QPSK, CCK 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM

Wi-Fi Radio	RG-AP820-L(V3)
	802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM 802.11ax: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM

The following table lists the radio frequency performance of Wi-Fi including different frequency bands, protocols, and date rates. It is country-specific, and Ruijie Networks reserves the right of interpretation.

Table 1-6 Wi-Fi Radio Frequency Performance

Wi-Fi Radio Frequency Performance	RG-AP820-L(V3)		
Frequency Band and Protocol	**Data Rate**	**Maximum Transmit Power per Transmit Chain**	**Maximum Receive Sensitivity per Receive Chain**
2.4 GHz 802.11b	1 Mbps	23 dBm	-91 dBm
	2 Mbps	23 dBm	-91 dBm
	5.5 Mbps	23 dBm	-90 dBm
	11 Mbps	23 dBm	-87 dBm
2.4 GHz 802.11g	6 Mbps	23 dBm	-89 dBm
	24 Mbps	22 dBm	-82 dBm
	36 Mbps	22 dBm	-78 dBm
	54 Mbps	20 dBm	-72 dBm
2.4 GHz 802.11n (HT20)	MCS0	23 dBm	-85dBm
	MCS7	19 dBm	-67 dBm
2.4 GHz 802.11n (HT40)	MCS0	23 dBm	-82 dBm
	MCS7	19 dBm	-64 dBm
2.4 GHz 802.11ax (HE20)	MCS0	23 dBm	-85 dBm
	MCS11	15 dBm	-58 dBm
2.4 GHz 802.11ax (HE40)	MCS0	23 dBm	-82 dBm
	MCS11	15 dBm	-54 dBm
5 GHz 802.11a	6 Mbps	23 dBm	-89 dBm
	24 Mbps	22 dBm	-82 dBm
	36 Mbps	22 dBm	-78 dBm

Wi-Fi Radio Frequency Performance	RG-AP820-L(V3)		
Frequency Band and Protocol	**Data Rate**	**Maximum Transmit Power per Transmit Chain**	**Maximum Receive Sensitivity per Receive Chain**
	54 Mbps	20 dBm	-72 dBm
5 GHz 802.11n (HT20)	MCS0	23 dBm	-85 dBm
	MCS7	19 dBm	-67 dBm
5 GHz 802.11n (HT40)	MCS0	23 dBm	-82 dBm
	MCS7	19 dBm	-64 dBm
5 GHz 802.11ac (VHT20)	MCS0	23 dBm	-85 dBm
	MCS9	18 dBm	-60 dBm
5 GHz 802.11ac (VHT40)	MCS0	23 dBm	-82 dBm
	MCS9	18 dBm	-57 dBm
5 GHz 802.11ac (VHT80)	MCS0	23 dBm	-79 dBm
	MCS9	18 dBm	-53 dBm
5 GHz 802.11ax (HE20)	MCS0	23 dBm	-85 dBm
	MCS11	16 dBm	-58 dBm
5 GHz 802.11ax (HE40)	MCS0	23 dBm	-82 dBm
	MCS11	16 dBm	-54 dBm
5 GHz 802.11ax (HE80)	MCS0	23 dBm	-79 dBm
	MCS11	16 dBm	-52 dBm
5 GHz 802.11ax (HE160)	MCS0	23 dBm	-77 dBm
	MCS11	16 dBm	-50 dBm

1.3.3 Bluetooth Radio

Table 1-7 Bluetooth Radio

Bluetooth Radio	RG-AP820-L(V3)
Bluetooth	Bluetooth 5.1
Antenna type	Onboard omnidirectional antenna

Maximum antenna gain	2.4 dBi, with a downtilt angle of roughly 30 degrees
Maximum transmit power	17 dBm (GFSK) 14 dBm (π/4-DQPSK, 8-DPSK)
Receive sensitivity	–95.5 dBm (DH5) –95 dBm (π/4-DQPSK) –87.5 dBm (8-DPSK)

1.3.4 Ports Specifications

Table 1-8 Ports Specifications

Ports Specifications	RG-AP820-L(V3)
Fixed service port	1 x 10/100/1000BASE-T port ● In compliance with IEEE 802.3af standard (PoE) ● Auto MDI/MDIX crossover ● PoE-PD: 54 V DC (nominal) 802.3af/at/bt (Class 3 or higher) ● 802.3az EEE 1 x 2.5GE SFP/RJ45 combo port, compatibility with 1GE module, shared with one 10/100/1000BASE-T port
Fixed management port	1 x RJ45 console port (serial console port)
Status LED	1 x multi-color system status LED
Button	1 x Reset button ● Press the button for shorter than 2 seconds. Then the device restarts. ● Press the button for longer than 5 seconds. Then the device restores to factory settings.

Note

A combo port consists of an optical Ethernet port and an electrical Ethernet port on the panel and can be used as the optical or electrical port at one time. When either of the Ethernet ports is working, the other port is automatically shut down. You can select a port type as required.

1.3.5 Power Supply and Consumption

Table 1-9 Power Supply and Consumption

Power Supply and Consumption	RG-AP820-L(V3)
Input power supply	The AP supports the following two power supply modes:

Power Supply and Consumption	RG-AP820-L(V3)
	● 48 V DC/0.6 A power input over DC connector: The DC connector accepts 2.1 mm/5.5 mm center-positive circular plug. A DC power adapter needs to be purchased separately. ● PoE input over LAN 1: The power source equipment (PSE) complies with IEEE 802.3af standard (PoE). Note: ● If both DC power and PoE are available, DC power is preferred.
Overall power consumption	Maximum power consumption: 12.95 W ● DC powered: 12.95 W ● PoE powered (802.3af): 12.95 W ● PoE+ powered (802.3at): 12.95 W ● PoE++ powered (802.3bt): 12.95 W ● Idle mode: 6 W

Note

When the 2.5GE SFP port of the RG-AP820-L(V3) is used as an uplink port, the port supports PoE or DC power supply. When PoE is adopted, the auto-negotiation Ethernet port (LAN/1G/PoE) serves as a PoE-in port only.

Caution

- DC power supply is optional. If DC power supply is required for the AP, please purchase a DC power adapter that meets the safety requirements.
- When the AP is powered by 802.3af (PoE), the power sourcing equipment (PSE) should be 802.3af-capable.
- The AP adopts a fanless design. Maintain sufficient clearance around the AP for air circulation.

1.3.6 Environment and Reliability

Table 1-10 Environment and Reliability

Environment and Reliability	RG-AP820-L(V3)
Temperature	Operating temperature: –10°C to +50°C (14°F to +122°F) Storage temperature: –40°C to +70°C (–40°F to +158°F) Note: At an altitude in the range of 3,000–5,000 m (9,842.52–16,404.20 ft.), every time the altitude increases by 220 m (722 ft.), the maximum temperature decreases by 1°C (1.8°F).
IP rating	IP41
Humidity	Operating humidity: 0% RH to 95% RH (non-condensing)

Environment and Reliability	RG-AP820-L(V3)
	Storage humidity: 0% RH to 95% RH (non-condensing)
Environment standard	Storage and operating environment: NEBS GR-63-CORE_Issue3_2006 GB/T 2423.6-1995
Mean Time Between Failure (MTBF)	200,000 hours (22 years) at the operating temperature of 25°C (77°F)
Security regulations	GB 4943.1, IEC 62368-1
EMC regulations	EN 300386, GB/T 19286, GB/T 17618 FCC Part 15
Radio frequency regulations	FCC Part 15E: 15.407

1.3.7 Regulatory Compliance

Regulatory Compliance	RG-AP820-L(V3)
Regulatory compliance	EN 55032, EN 55035, EN 61000-3-3, EN IEC 61000-3-2, EN 301 489-1, EN 301 489-3, EN 301 489-17, EN 300 328, EN 301 893, EN 300 440, FCC Part 15, EN IEC 62311, IEC 62368-1, EN 62368-1

Note

For more country-specific regulatory information and approvals, contact your local sales agency.

1.4 LED

Note

The LED description applies to both Fit and Fat modes, unless otherwise specified.

Table 1-1 LED Status

Status	Frequency	Description
Off	N/A	The AP is not powered on. The AP is powered on, but the LED is manually turned off.
Steady green	N/A	The software system of the AP is being initialized.

Status	Frequency	Description
Steady red	N/A	The system is running properly, but the uplink service port is in link-down state.
Blinking red at an interval of 1s	On for 3s Off for 1s	In Fit mode, the setup of a CAPWAP tunnel between the AP and AC expires.
Blinking blue at an interval of 0.2s	On for 0.2s Off for 0.2s	In Fit or MACC mode, the software system of the AP is being updated.
Steady blue	N/A	The system is running properly, but no STA is online.
Blinking blue at an interval of 1s	On for 1s Off for 1s	The system is running properly and one or more STAs are online.
Blinking red at an interval of 0.2s	On for 0.2s Off for 0.2s	In Fit mode, the AP is being located.

1.5 SFP Modules

The 2.5G SFP port of the AP supports both copper and fiber links. The negotiation speed may vary with the SFP module type and the speeds on both sides of the link.

Table 1-2 Negotiation Speed When Connected with SFP Port on Peer Device

AP SFP Port Speed	SFP Fiber Module Speed	Negotiation Speed		
		1 Gbps	1 Gbps/10 Gbps/Auto	1 Gbps/2.5 Gbps/10 Gbps/Auto
1 Gbps	3 Gbps	1 Gbps	1 Gbps	1 Gbps
1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps
2.5 Gbps	3 Gbps	Not supported	Not supported	2.5 Gbps
2.5 Gbps	1 Gbps	Not supported	Not supported	2.5 Gbps

Table 1-3 Negotiation Speed When Connected with Copper Port on Peer Device

AP SFP Port Speed	SFP Copper Module Speed	Negotiation Speed		
		1 Gbps	1 Gbps/10 Gbps/Auto	1 Gbps/2.5 Gbps/10 Gbps/Auto
1 Gbps	2.5 Gbps	Not supported	Not supported	Not supported
1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps

2.5 Gbps	2.5 Gbps	Not supported	Not supported	2.5 Gbps
2.5 Gbps	1 Gbps	Not supported	Not supported	Not supported

Caution

- The 2.5G SFP port of the AP does not support speed negotiation. When you use the transceiver module, the speed of the AP, the module, and the port of peer device must be the same.
- The SFP port and copper port can be multiplexed as a combo port. If two ports are connected with cables at the same time, AP will preferentially select the SFP port for data transmission (the copper port is automatically disabled). When the cable of SFP port is unplugged, the copper port is automatically enabled.

2 Preparing for Installation

2.1 Safety Precautions

Note

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

2.1.1 General Safety Precautions

- Do not expose the AP to high temperature, dusts, or harmful gases.
- Do not install the AP in an inflammable or explosive environment.
- Keep the AP away from EMI sources such as large radar stations, radio stations, and substations.
- Do not subject the AP to unstable voltage, vibration, and noises.
- The installation site should be free from water flooding, seepage, dripping, or condensation. The installation site should be selected according to network planning and communications equipment features, and considerations such as climate, hydrology, geology, earthquake, electrical power, and transportation.
- Keep the AP at least 500 meters away from the ocean and do not face it towards the sea breeze.
- Do not place the device in walking areas.
- During the installation and maintenance, do not wear loose clothes, ornaments, or any other things that may be hooked by the chassis.
- Keep tools and components away from walking areas.

2.1.2 Handling Safety

- Prevent the device from being frequently handled.
- Cut off all the power supplies and unplug all power cords before moving or handling the device.

2.1.3 Electric Safety

Warning

- Improper or incorrect electric operations may cause a fire, electric shock, and other accidents, and lead to severe and fatal personal injury and device damage.
- Direct or indirect contact with high voltage or mains power supply via wet objects may cause fatal dangers.

- Observe local regulations and specifications during electric operations. Only personnel with relevant qualifications can perform such operations.
- Check whether there are potential risks in the work area. For example, check whether the power supply is grounded, whether the grounding is reliable, and whether the ground is wet.

- Learn about the position of the indoor emergency power switch before installation. Cut off the power switch in case of accidents.
- Check the device carefully before shutting down the power supply.
- Do not place the device in a damp/wet location. Do not let any liquid enter the chassis.
- Keep the device far away from grounding or lightning protection devices for power equipment.
- Keep the device away from radio stations, radar stations, high-frequency high-current devices, and microwave ovens.

2.1.4 Storage Safety

For proper working of the AP, the AP must be stored in an environment based on the storage temperature/humidity requirements in Specifications.

⚠ Caution

If the AP is stored for more than 18 months, power on the AP and run it for consecutive 24 hours to activate the AP.

2.2 Installation Environment Requirements

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

The installation site must meet the following requirements.

2.2.1 Bearing Requirements

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

2.2.2 Ventilation Requirements

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

2.2.3 Space Requirement

Maintain a minimum clearance of 0.4 m (39.37 in.) around the device to ensure proper cooling and ventilation.

2.2.4 Temperature/Humidity Requirements

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

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

- In an environment with high humidity, the insulating material may have poor insulation or even leak electricity.
- In an environment with low humidity, the insulating strip may dry and shrink, loosening screws.
- In a dry environment, static electricity is prone to occur and damage the internal circuits of the device.
- Too high temperatures can accelerate the aging of insulation materials, greatly reducing the reliability of the

device and severely affecting its service life.

Note

The ambient 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 at the back of the device.

2.2.5 Cleanliness Requirements

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

Table 2-1 Requirements for Dust

Dust	Unit	Content
Dust particles (diameter ≤ 0.5 μm)	Particles/m^3	≤1.4×10^7
Dust particles (0.5 μm ≤ diameter ≤ 1 μm)	Particles/m^3	≤7×10^5
Dust particles (1 μm ≤ diameter ≤ 3 μm)	Particles/m^3	≤2.4×10^5
Dust particles (3 μm ≤ diameter ≤ 1 μm)	Particles/m^3	≤1.3×10^5

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. Table 2-2 lists limit values for harmful gases.

Table 2-2 Requirements for Gases

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

Note

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

2.2.6 Anti-interference Requirements

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

2.2.7 Lightning Protection Requirements

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

- Ensure that the 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 the lightning prevention for the power supply.

2.2.8 Installation Site Requirements

Regardless of whether the device is installed on the wall or ceiling, the following conditions must be met:

- Maintain a minimum clearance of 0.4 cm (15.75 in.) around the device to ensure proper cooling and ventilation.
- The installation site allows for proper cooling and ventilation. You are advised to install an air conditioner if you want to install the device in a hot area.
- The installation side is sturdy enough to support the weight of the device and its accessories.

2.3 Tools

Table 2-3 Tools

Common Tools	Phillips screwdrivers, wires, Ethernet cable, fastening bolts, diagonal pliers, and binding straps
Special Tools	Antistatic gloves, wire stripper, crimping pliers, crystal connector crimping pliers, and wire cutter
Meter	Multimeter, and bit error rate tester (BERT)
Relevant Devices	PC, display, and keyboard

Note

The device is delivered without a tool kit. The tool kit and cables are customer-supplied.

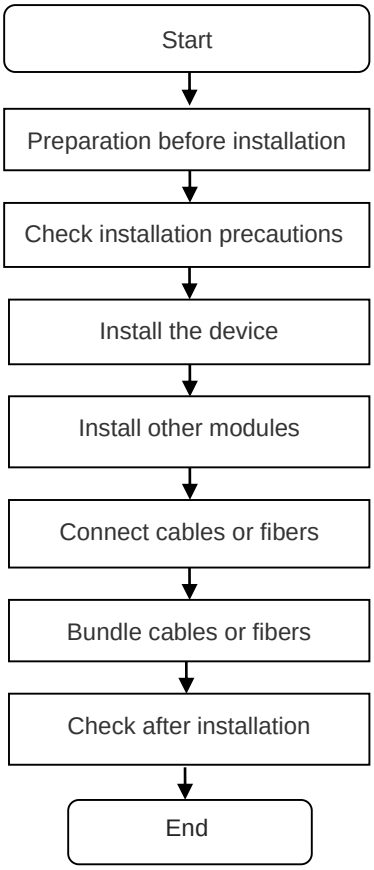
3 Installing the Access Point

The RG-AP820-L(V3) AP must be fixed and installed indoors.

Caution

Before installing the device, make sure you have carefully read the requirements described in Chapter 2.

3.1 Installation Flowchart



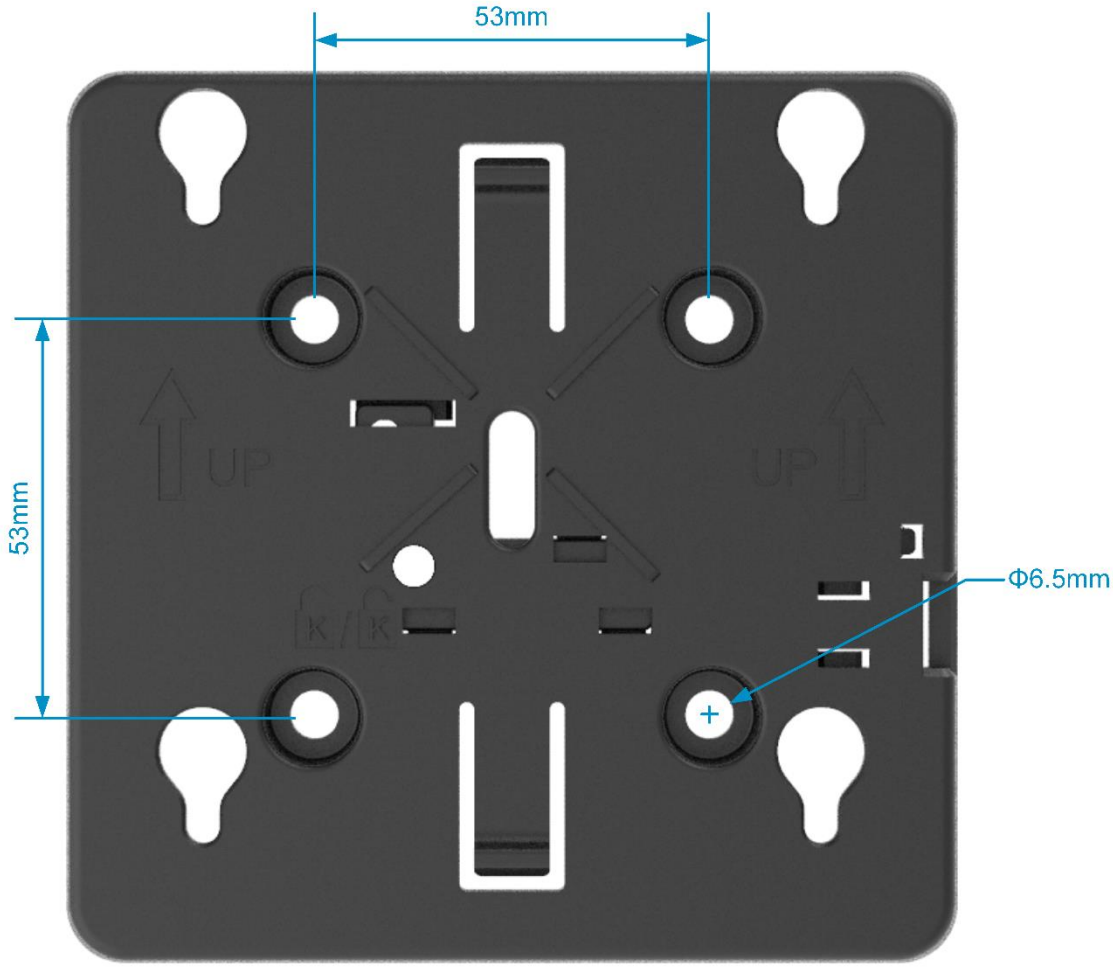
3.2 Before You Begin

Before you install the device, verify that all the parts in the package contents are there and make sure that:

- The installation position provides sufficient space for heat dissipation.
- The installation position meets the temperature and humidity requirements of the device.
- The power supply and required current are available in the installation position.
- The Ethernet cable have been deployed in the installation position.
- The selected power supply modules meet the system power requirements.

- The position of the indoor emergency power switch is learned before installation. The power switch is cut off in case of accidents.
- For ceiling-mounted or wall-mounted AP, the mounting bracket size, mounting hole pattern and diameter should meet the requirements in Table 1-4.

Figure 3-1 Mounting Bracket



3.3 Precautions

To avoid damage to the AP, observe the following safety precautions:

- Do not power on the device during installation.
- Install the device in a well-ventilated location.
- Do not subject the device to high temperatures.
- Keep away from high voltage cables.
- Install the device indoors.
- Do not expose the device in a thunderstorm or strong electric field.
- Keep the device clean and dust-free.
- Disconnect the device before cleaning it.

- Do not wipe the device with a damp cloth.
- Do not wash the device with liquid.
- Do not open the enclosure when the device is working.
- Fasten the device tightly.

3.4 Installing the Access Point

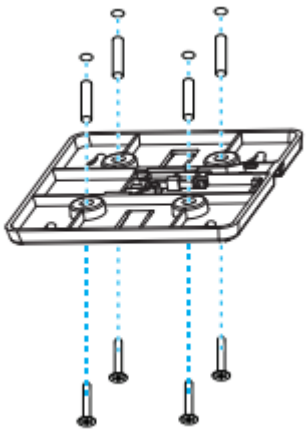
Note

- You are advised to install the device where you can get the optimal coverage.
- In the indoor area, the signal coverage of the ceiling-mounted device is larger than that of the wall-mounted device. Please choose the ceiling-mounting method first.

3.4.1 Ceiling Mounting

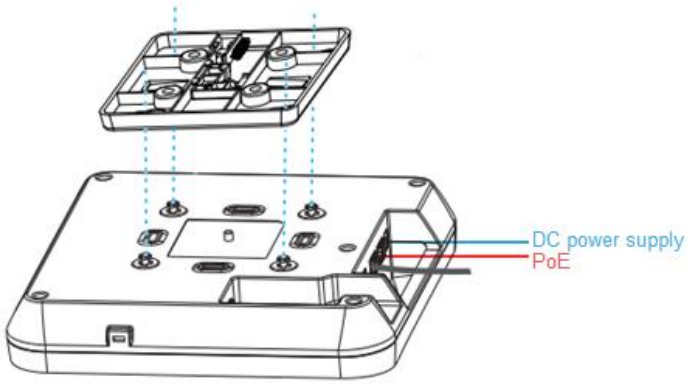
(1) Drill four 6.5 mm (0.26 in.) diameter holes in the ceiling, 53 mm (2.09 in.) apart. Tap wall anchors into the holes, and drive screws through the mounting bracket into the anchors to secure the bracket.

Figure 3-2 Attaching the Mounting Bracket to the Ceiling



(2) Align the square feet on the rear of the AP with the mounting holes on the bracket.

Figure 3-3 Aligning the Square Feet with the Mounting Holes

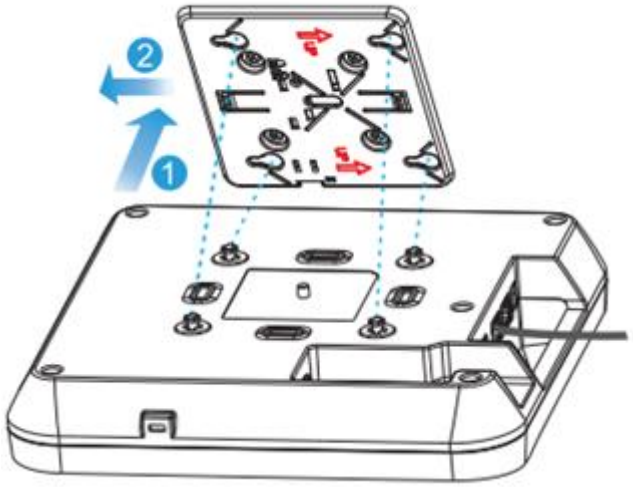


Caution

Install the Ethernet cables before mounting the AP on the bracket.

(3) Slide the AP onto the bracket in the opposite direction of the arrow on the mounting bracket until it clicks into place.

Figure 3-4 Mounting the AP on the Bracket



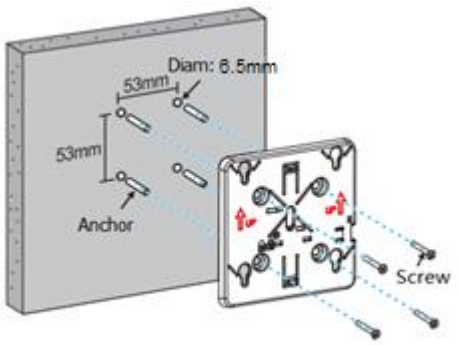
Caution

- The AP can be installed in any of four directions on the mounting bracket depending on how you route the Ethernet cable.
- The square feet should fit easily into the mounting slots. Do not forcibly push the AP into the slots.
- After installation, verify that the AP is securely fastened.

3.4.2 Wall Mounting

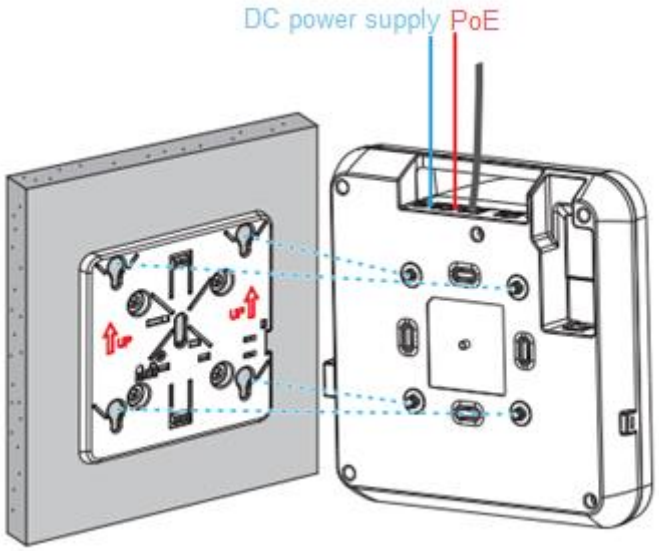
(1) Drill four 6.5 mm (0.26 in.) diameter holes in the wall and 53 mm (2.09 in.) apart, with the arrow on the mounting bracket facing up. Tap wall anchors into the holes, and drive screws through the mounting bracket into the anchors to secure the bracket.

Figure 3-5 Attaching the Mounting Bracket to the Wall



(2) Align the square feet on the rear of the AP with the mounting holes on the bracket.

Figure 3-6 Aligning the Square Feet with the Mounting Holes

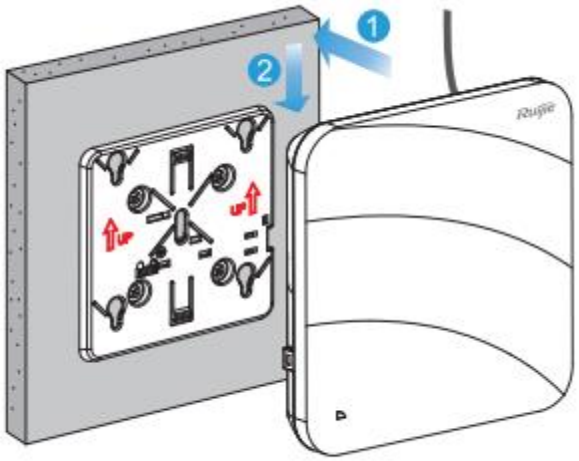


Caution

Install the Ethernet cables before mounting the AP on the bracket.

(3) Slide the AP into the holes in the opposite direction of the arrows on the mounting bracket until it clicks into place.

Figure 3-7 Mounting the AP on the Bracket



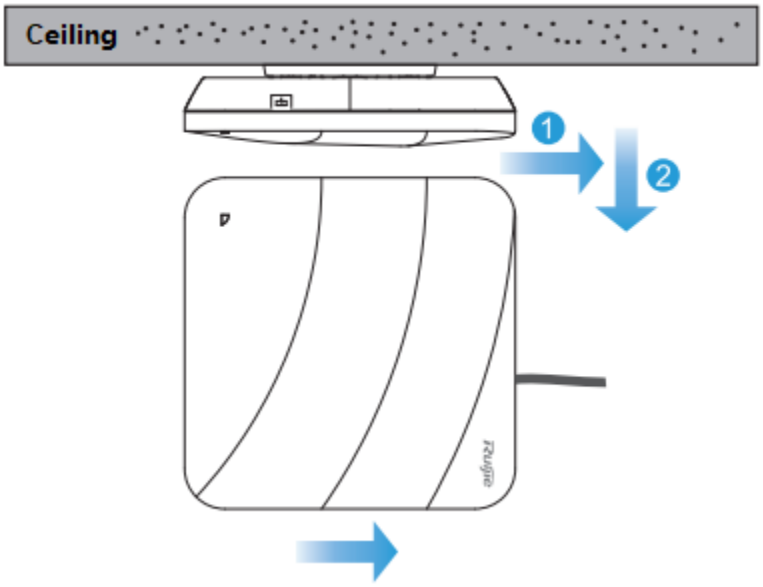
Caution

- When mounting the AP on the wall, keep the Ruijie logo pointed upwards.
- The square feet should fit easily into the mounting slots. Do not forcibly push the AP into the slots.
- After installation, verify that the AP is securely fastened.

3.4.3 Removing the Access Point

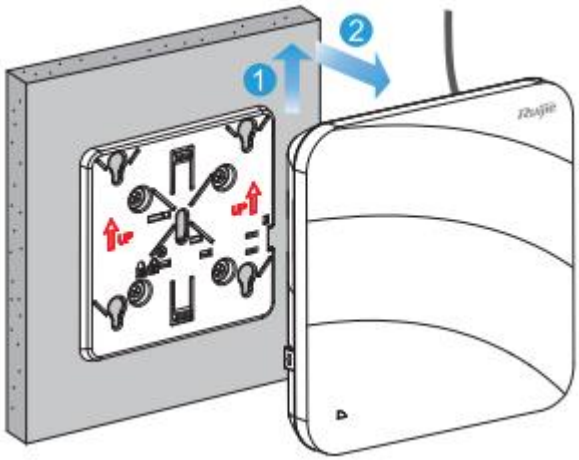
(1) If the AP is installed on the ceiling, hold the AP with your hands and slide it sideways and away from the bracket in the LAN port direction.

Figure 3-8 Removing the Ceiling-mounted AP



(2) If the AP is installed on the wall, hold the AP with your hands and push it upward and away from the bracket in the LAN port direction.

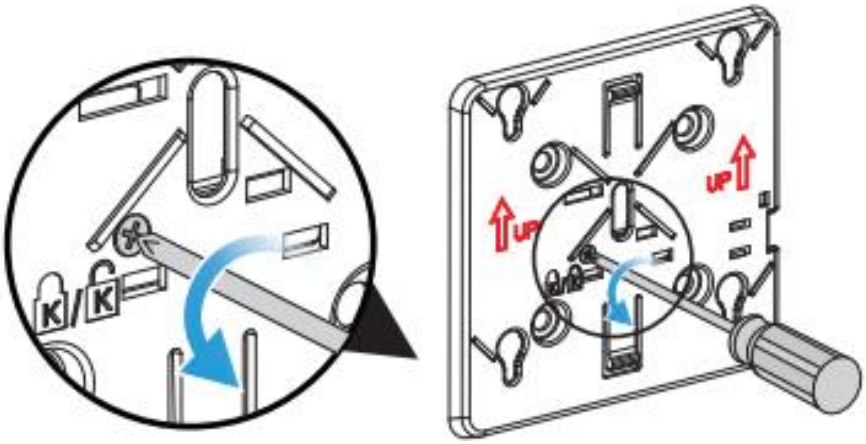
Figure 3-9 Removing the Wall-mounted AP



3.5 Securing the Access Point

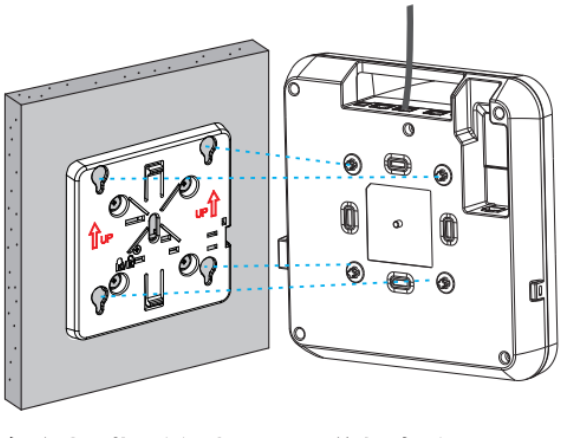
(1) Loosen the screw on the mounting bracket and engage the security screw.

Figure 3-8 Engaging the Security Screw



(2) Align the square feet on the rear of the AP over the mounting holes on the bracket, slide the AP in the opposite direction of the arrows on the mounting bracket until it clicks into place.

Figure 3-9 Mounting the AP on the Bracket



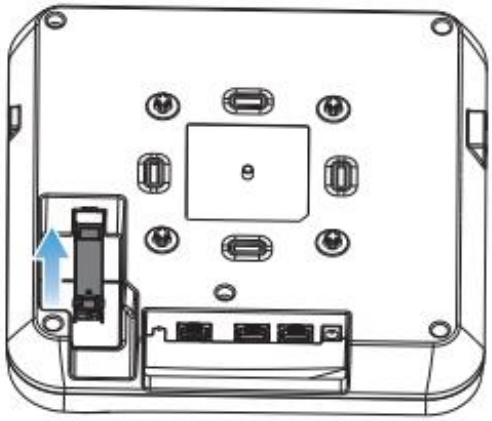
Caution

Install the Ethernet cables before mounting the AP on the bracket.

3.6 Installing the SFP Module

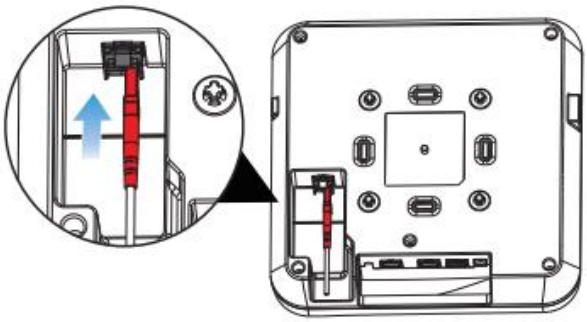
(1) Insert the SFP module.

Figure 3-10 Inserting the SFP Module



(2) Connect the fiber.

Figure 3-11 Connecting the Fiber



3.7 Connecting Cables

Connect UTP/STP to the LAN/PoE port on the AP. See Appendix A for supported wiring of twisted pairs.

Caution

By default, baud rate is set to 9600, data bit 8, parity none, stop bits 1 and flow control none on the Console port of the AP. The console port is used only when you want to configure the AP manually.

3.8 Bundling Cables

3.8.1 Precautions

- Make sure the cable bundles are neat and orderly.
- Bend twisted pairs naturally or to a large radius close to the connector.
- Do not over tighten cable bundle as it may reduce the cable life and performance.

3.8.2 Bundling Steps

- Bundle the drop UTP/STP cables and route them to the LAN/PoE port.
- Attach the cables in the cable tray of the rack.
- Extend the cables under the AP and run in straight line.

3.9 Checking after Installation

3.9.1 Checking Cable Connection

- Make sure the UTP/STP cable matches the interface type.
- Make sure cables are properly bundled.

3.9.2 Checking Power Supply

- Make sure all power ports are properly connected and compliant with safety requirement.

- Make sure the AP is operational after power-on.

4 Verifying Operating Status

4.1 Configuring the Environment

Use a power adapter or PoE to power the AP.

Setting up the Environment

- Verify that the AP is properly connected to the power source.
- Connect the AP to an AC through a twisted pair cable.
- When the AP is connected to a PC, verify that the PC and PoE switch are properly grounded.

4.2 Powering up the AP

4.2.1 Checking Environment before Power-on

- Verify that the power supply is properly connected.
- Verify that the input voltage matches the specification of the AP.

4.2.2 Checking Environment after Power-on

After power-on, you are advised to check the following to ensure normal operation of the AP.

- Check if any message is printed on the Web-based configuration interface of the device.
- Check if the LED works normally.

5 Monitoring and Maintenance

5.1 Monitoring

5.1.1 LED

You can observe the LED to monitor the AP in operation.

5.1.2 CLI Commands

You can run related commands on the command line interface (CLI) of the device to remotely monitor the configurations and status of the AP.

Note

- You can log in to the AP via Telnet and use monitoring related commands to maintain the AP.

5.2 Remote Maintenance

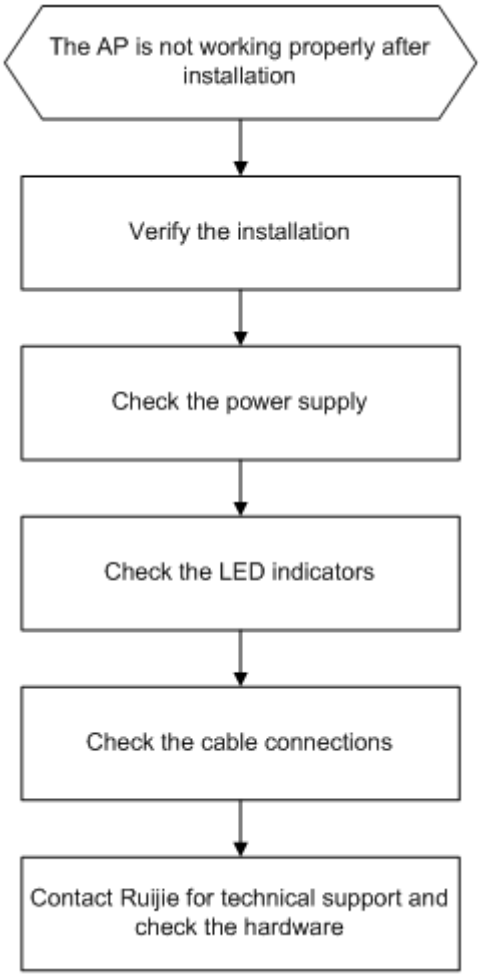
- If the AP operates as a Fat AP, you can log in to the AP remotely for maintenance.
- If the AP operates as a Fit AP, you can use AC to centrally manage and maintain the AP.

5.3 Hardware Maintenance

If the hardware is faulty, please contact our Technical Assistance Center (TAC) for help.

6 Troubleshooting

6.1 Troubleshooting Flowchart



6.2 Troubleshooting

6.2.1 Ethernet Port Is Not Working After the Ethernet Cable Is Plugged In

Verify that the device at the other end of the Ethernet cable is working properly. And then verify that the Ethernet cable is capable of providing the required data rate and is properly connected.

6.2.2 LED Is Off for a Long Time

- If you use a PoE power supply, verify that the power source is IEEE 802.11af-compliant, and then verify that the cable is connected properly.
- If you use a DC power source, verify that the mains input is abnormal, and then verify that the power supply

device works properly.

6.2.3 LED Keeps Steady Red

The LED keeps steady red for a long time, indicating that the Ethernet port is not connected. Verify the Ethernet connection.

6.2.4 LED Keeps Steady Green

The device performs initialization after power-on. During this period, the LED keeps steady green and does not turn normal blue until the initialization is completed. Note: If the steady green persists for an hour, it indicates that the device initialization fails and the device is faulty.

6.2.5 LED Keeps Blinking Blue at an Interval of 0.2s (in Fit Mode)

Sometimes the AP performs software upgrade after power-on. During this period, the LED keeps blinking blue at an interval of 0.2s and does not turn steady blue until the upgrade is completed. Do not plug or unplug the power cord when the LED is blinking as software upgrade takes time. If the blinking persists for 10 minutes, the device fails to complete software upgrade and is faulty.

6.2.6 LED Does Not Turn Steady Blue or Blinking Blue

If the LED does not turn steady blue or blinking blue after the system starts, the AP probably has not established a proper CAPWAP connection with the AC. Verify that the AC is operational and configured properly.

6.2.7 Radio Signal of the AP Cannot Be Found

(1) Verify that the device is properly powered.

(2) Verify that the Ethernet port is correctly connected.

(3) Verify that the AP is correctly configured.

(4) Move the client device to adjust the distance between the client and the AP.

7 Appendix

7.1 Connectors and Media

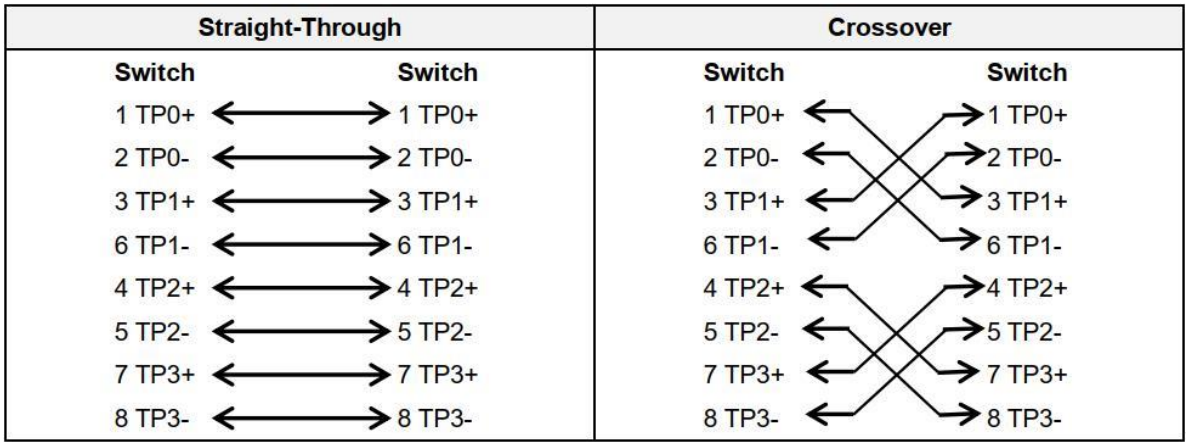
1000BASE-T/100BASE-TX/10BASE-T

The 1000BASE-T/100BASE-TX/10BASE-T is a 10/100/1000 Mbps auto-negotiation port that supports auto MDI/MDIX.

Compliant with IEEE 802.3ab, 1000BASE-T requires Category 5e 100-ohm UTP or STP (STP is recommended) with a maximum distance of 100 meters (328 feet).

1000BASE-T requires all four pairs of wires be connected for data transmission, as shown in **Figure 7-1**.

Figure 7-1 1000BASE-T Connection



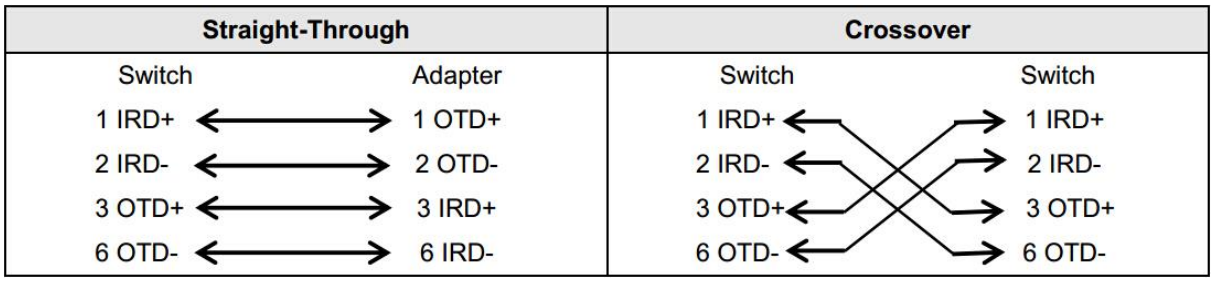
10BASE-T uses Category 3, 4, 5 100-ohm UTP/STP and 1000BASE-T uses Category 5 100-ohm UTP/STP for connections. Both support a maximum length of 100 meters. **Figure 7-2** shows 100BASE-TX/10BASE-T pin assignments.

Figure 7-2 100BASE-TX/10BASE-T Pin Assignments

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

Figure 7-3 shows wiring of straight-through and crossover cables for 100BASE-TX/10BASE-T.

Figure 7-3 100BASE-TX/10BASE-T Connection



7.2 Mini-GBIC Modules

We provide appropriate SFP modules (Mini-GBIC) modules according to the port types. You can select the module to suit your specific needs. The following models and technical specifications of some SFP modules are listed for your reference.

Table 7-1 Models and Technical Specifications of the SFP Module

Wavelength (nm)	Media Type	Support DDM (Yes/No)	Intensity of Transmitted Light (dBm)		Intensity of Received Light (dBm)	
			min	max	min	max
1310Tx/1550Rx	Single-mode fiber	No	-9	-3	-	-18

Table 7-2 Cabling Specifications of the SFP Module

Port	Media Type	Core Size (μm)	Cabling Distance
LC	Single-mode fiber	9/125	0.3 km

Caution

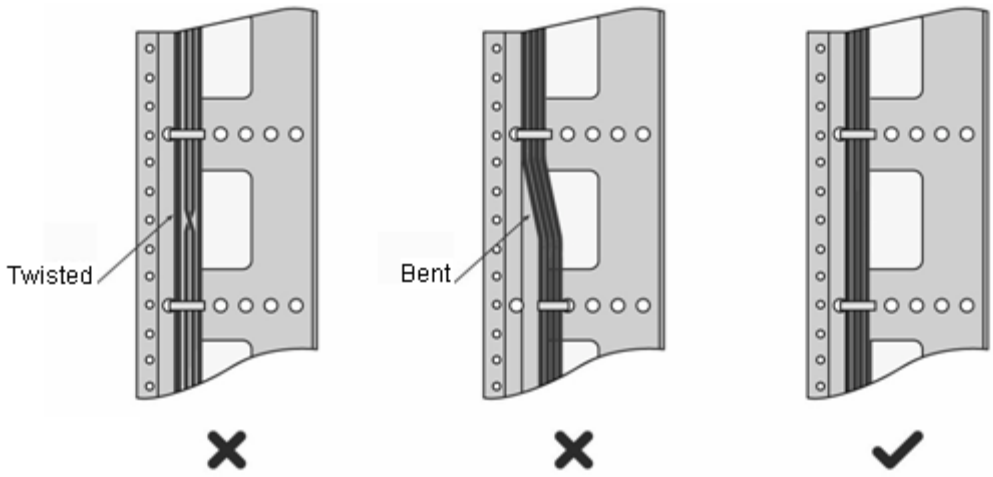
- For the fiber module with transmission distance exceeding 40 km and more, one on-line optical attenuator should be added on the link to avoid the overload of the optical receiver when short single-mode optical fibers are used.
- Fiber modules generate laser. Do not stare at light source.
- To keep fiber modules clean, please use dust caps when the modules are not connected with fibers.

7.3 Cabling Recommendations

During installation, route cable bundles upward or downward along the sides of the rack depending on the actual situation in the equipment room. All cable connectors should be placed at the bottom of the cabinet rather than be exposed outside of the cabinet. Power cords should be routed upward or downward beside the cabinet close to the location of the DC power distribution cabinet, AC power outlet, or lightning protection box.

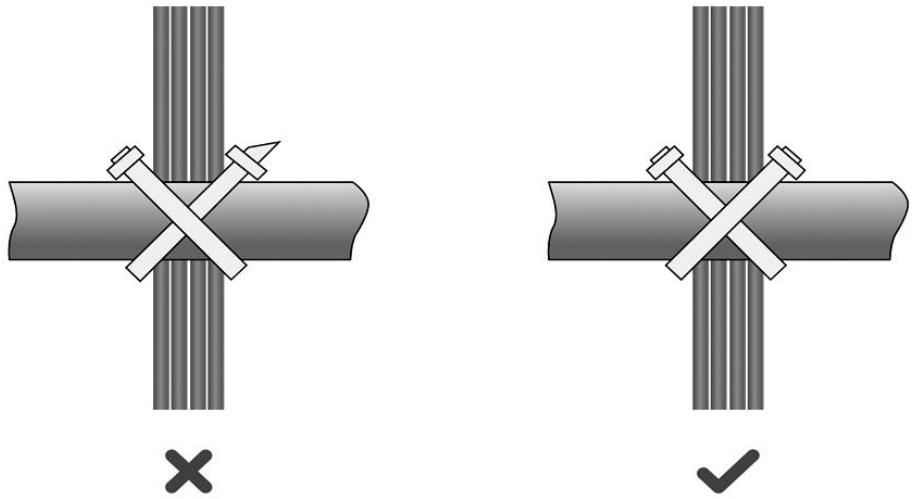
- Required Minimum Cable Bend Radius
  - The minimum bend radius of a power, communication or flat cable should be 5 times the overall diameter of the cable. If the cable is constantly bent, plugged or unplugged, the bend radius should be 7 times the overall diameter.
  - The minimum bend radius of a coaxial cable should be 7 times the overall diameter of the cable. If the cable is constantly bent, plugged or unplugged, the bend radius should be 10 times the overall diameter.
  - The minimum bend radius of a high-speed cable, such as an SFP+ cable should be 5 times the overall diameter of the cable. If the cable is constantly bent, plugged or unplugged, the bend radius should be 10 times the overall diameter.
- Precautions for Cable Bundling
  - 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 7-4**.

Figure 7-4 Bundling Cables



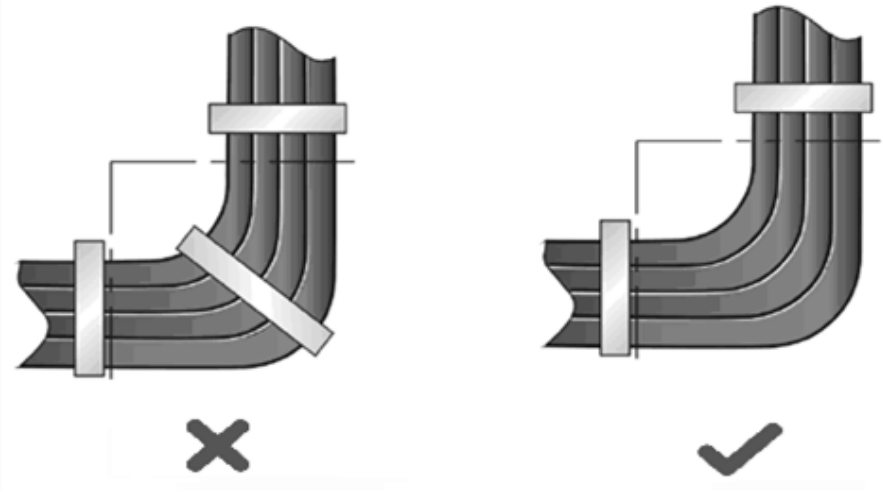
  - Route and bundle power, signal, ground cables separately. When the cables are close to each other, cross them. When power cords run parallel to signal cables, the distance between them must be greater than 30 mm.
  - All cable trays and their accessories shall be smooth and free from sharp edges.
  - Holes in metal, through which cables pass shall have smooth, well-rounded surfaces or be protected with insulating bushings.
  - Use proper cable ties to bind cables together. Do not tie two or more cable ties to bind cables.
  - Cut off excess cable tie cleanly with no sharp edges after bundling cables, as shown in Figure B-2.

Figure 7-5 Cutting off Excess Cable Tie



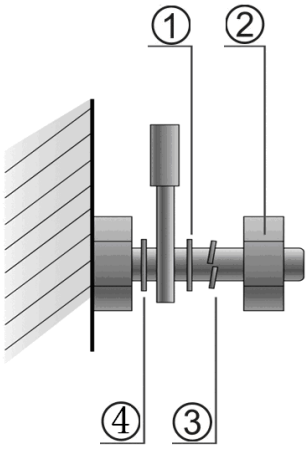
- If cables are to be bent, bind them first but do not tie cable ties within the bend to avoid stress on the cables, which may otherwise cause the wires inside to break, as shown in **Figure 7-6**.

Figure 7-6 Do Not Tie Cable Ties within the Bend



- Wrap up unnecessary or excess cables and bind them to the appropriate rack position, where device operation is not affected and no damages occur to the device and cables during debugging.
- Do not bind power cords to the rails for moving parts.
- Leave a certain length of the cable connecting moving parts, such as the ground wire of the cabinet door, to avoid stress on the cable; when moving parts are in place, ensure the excess cable length shall not contact heat sources, sharp corners or edges. If heat sources are unavoidable, use high-temperature cables instead.
- When using screws to fasten cable lugs, the bolts or nuts shall be tightened and prevented from loosening, as shown in **Figure 7-7**.

Figure 7-7 Fastening Cable Lugs



Note	1. Flat washer	3. Spring washer
	2. Nut	4. Flat washer

- When using a stiff cable, fix it near the cable lug to avoid stress on the lug and cable.
- Do not use self-tapping screws to fasten terminals.
- Bundle cables of the same type and running in the same direction into groups. Keep cables clean and straight.
- Cables shall be tied according to the following table.

Diameter of Cable Bundle (mm)	Space between Bundles (mm)
10	80 to 150
10 to 30	150 to 200
30	200 to 300

- Do not tie knots for cables or cable bundles.
- The metal parts of the cold-pressed terminal blocks, such as air circuit breakers, shall not be exposed outside of the blocks.

7.4 Power Supply

- DC power adapter:

Input voltage: 48 V

Rated current: 0.6 A

- Technical Specifications of the DC Power Connector

Inner Diameter	Outer Diameter	Depth	Polarity
2.1 mm (0.08 in.)	5.5 mm (0.22 in.)	10 mm (0.40 in.)	Inner pole: positive Outer pole: negative

Figure 7-8 DC Power Connector Dimensions