Ruijie RG-AP180P-L 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/
- Online support center: https://ruijienetworks.com/support
- Case portal: https://caseportal.ruijienetworks.com
- Community: https://community.ruijienetworks.com
- Email support: service_rj@ruijienetworks.com
- Live chat: https://www.ruijienetworks.com/rita
- Documentation feedback: doc@ruijie.com.cn

Conventions

1. Signs

The signs used in this document are described as follows:

Warning

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

Caution

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

Note

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

Specification

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

2. Note

The manual offers configuration information (including model, port type and command line interface) for indicative purpose only. In case of any discrepancy or inconsistency between the manual and the actual version, the actual version prevails.

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1 Product Introduction

1.1 Overview

RG-AP180P-L is a generic 802.11ax-compliant wall-mounted wireless access point (AP) launched by Ruijie Networks for small- and medium-sized networks in indoor scenarios such as furnished apartments or houses, stores, KTVs, hotels, VIP offices, and real estates.

RG-AP180P-L supports the 802.11ax, 802.11ac Wave2, 802.11ac Wave1, and 802.11n protocols. With hardware-independent dual-radio design, the AP can provide a data rate of up to 2.976 Gbps. The ultra-fast wireless negotiation rate makes wireless performance no longer a bottleneck.

The AP can be installed on an 86-mm junction box, and has the following two features:

- The personalized appearance and structural design makes the product simple and beautiful.
- The product is cost-effective, and can carry IP phones when working, saving network deployment costs.

RG-AP180P-L provides Ethernet ports, and gives sufficient consideration to wireless network security, radio control, mobile access, Quality of Service (QoS), seamless roaming, and other important factors. In cooperation with Ruijie access controllers (ACs) and RG-WIS, this product implements user data forwarding, security, and access control. It is an optimal choice for wireless network construction in dormitories, VIP offices, hotels, stores, KTVs, and real estates.

1.2 Product Appearance

Figure 1-1 Front View



Figure 1-2 Side View

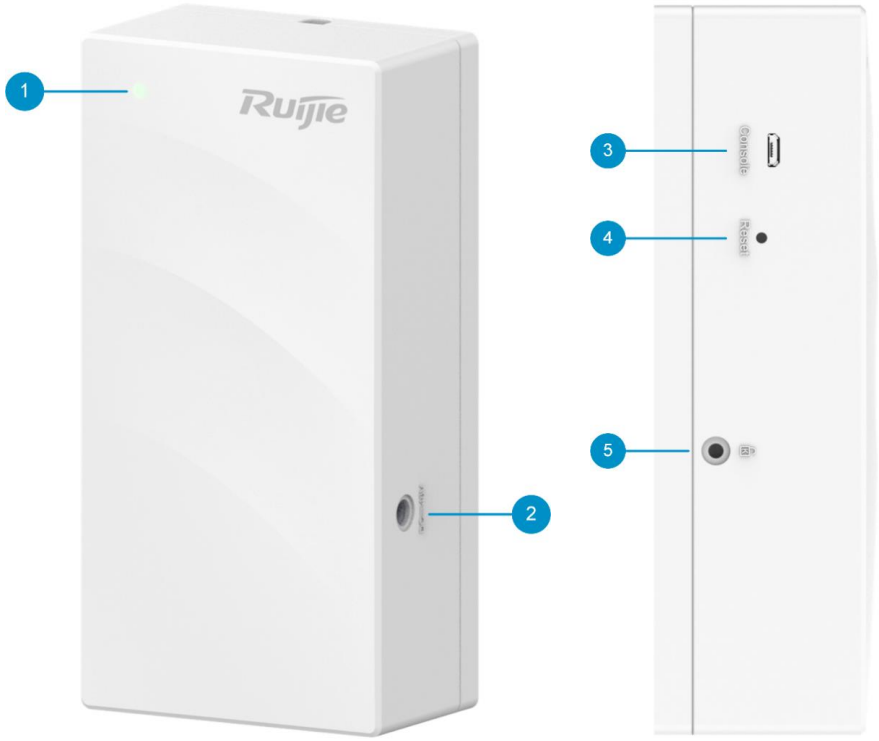


Figure 1-3 Bottom View

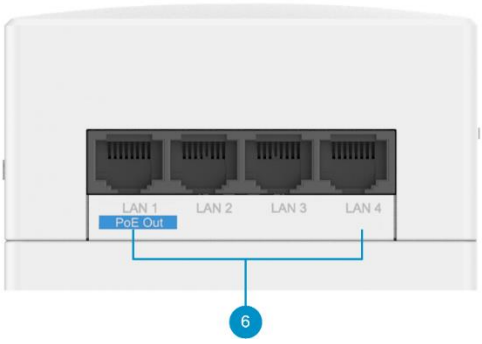


Figure 1-4 Rear View

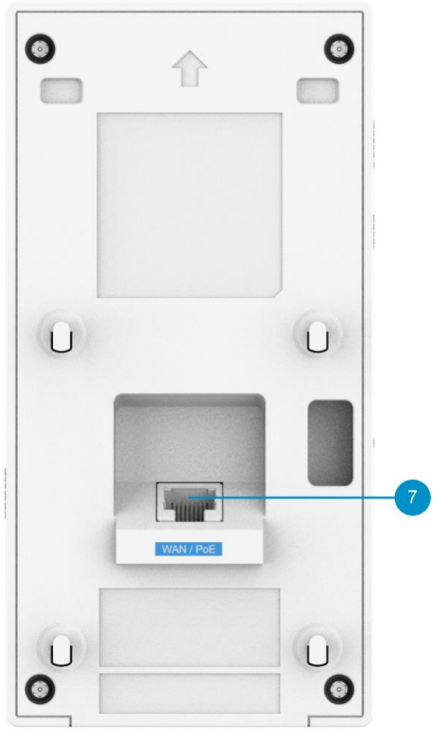


Table 1-1 LEDs, Buttons and Ports

No.	Item	Description
1	LED	Used to show the running status of the system
2	DC connector	Connected to a DC power source
3	Console port	Micro USB-type management port, used to connect to a USB cable to manage the AP
4	Reset button	Used to reboot the device or restore the device to factory settings
5	Lock slot	Used to install the security screw
6	LAN port	Connected to the downlink service ports for data transmission. The LAN1 port can provide 48 V/10 W PoE output to external devices.
7	WAN port	Connected to the uplink service ports for wired Ethernet connection and service data transmission, supporting IEEE 802.3af/at-compliant PoE

Note

The nameplate is located at the bottom of the product.

1.3 Package Contents

Table 1-2 Package Contents

No.	Item	Quantity
1	Access point	1
2	Mounting bracket	1
3	T8 Torx screw	1
4	Phillips pan head screws M4 × 40 mm	2
5	Warranty card	1
6	User manual	1

1.4 Technical Specifications

1.4.1 Dimensions and Weight

Table 1-3 Dimensions and Weight

Dimensions and Weight	RG-AP180P-L
Unit dimensions (W x H x D)	86 mm x 170 mm x 43 mm (3.39 in. × 6.69 in. × 1.69 in.)
Shipping dimensions (W x D x H)	399 mm x 367 mm x 245 mm (15.71 in. × 14.45 in. × 9.65 in.)
Unit weight	Main unit: 0.3 kg (0.66 lbs) Mounting bracket: 0.1 kg (0.22 lbs)
Shipping weight	0.54 kg (1.19 lbs)
Mounting	Wall-mount (a mounting bracket is delivered with the main unit) Junction box-mount (86 mm/European-standard/American-standard junction box)
Color	Elegant white
Lock option	Kensington lock
Mounting Bracket Dimensions (W × H × D)	86 mm × 170 mm × 9 mm (3.39 in. × 6.69 in. × 0.35 in.)
Mounting Hole Pattern	60 mm (2.36 in.) or 83.5 mm (3.29 in.)

Mounting Hole Diameter	4.3 mm × 6.6 mm (0.17 in. x 0.26 in., oval)

1.4.2 Wi-Fi Radio

Table 1-4 Wi-Fi Radio

Wi-Fi Radio	RG-AP180P-L
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 (HE20/HE40), ISM, channels 1 to 13 Radio 2, 802.11a/n/ac/ax: ● 5.150 GHz to 5.250 GHz, U-NII-1, channels 36, 40, 44, and 48 ● 5.250 GHz to 5.350 GHz, U-NII-2A, channels 52, 56, 60, and 64 ● 5.470 GHz to 5.725 GHz, U-NII-2C, channels 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, and 140 ● 5.725 GHz to 5.850 GHz (HE80), U-NII-3/ISM, channels 149, 153, 157, 161, and 165 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 Radio 1: 2.4 GHz, 574 Mbps ● 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) Radio 2: 5 GHz, 2.402 Gbps ● 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) ● 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)

Wi-Fi Radio	RG-AP180P-L
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 1,732 (MCS0 to MCS9, NSS = 1 to 2, 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: 20 dBm (17 dBm per chain) 5 GHz radio: 20 dBm (17 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 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 1-1 Wi-Fi Radio Frequency Performance

Wi-Fi Radio Frequency Performance	**RG-AP180P-L**		
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	20 dBm	–96 dBm
	2 Mbps	-10 dBm	–94 dBm
	5.5 Mbps	-10 dBm	–93 dBm
	11 Mbps	-10 dBm	–89 dBm
2.4 GHz, 802.11g	6 Mbps	19 dBm	–91 dBm
	24 Mbps	17 dBm	–85 dBm
	36 Mbps	17 dBm	–80 dBm
	54 Mbps	16 dBm	–74 dBm
2.4 GHz, 802.11n (HT20)	MCS0	19 dBm	–85 dBm
	MCS7	16 dBm	–67 dBm
2.4 GHz, 802.11n (HT40)	MCS0	19 dBm	–82 dBm
	MCS7	16 dBm	–64 dBm
2.4 GHz, 802.11ax (HE20)	MCS0	18 dBm	–85 dBm
	MCS11	12 dBm	–58 dBm
2.4 GHz, 802.11ax (HE40)	MCS0	17 dBm	–82 dBm
	MCS11	12 dBm	–54 dBm
5 GHz, 802.11a	6 Mbps	18 dBm	–89 dBm
	24 Mbps	17 dBm	–82 dBm
	36 Mbps	17 dBm	–78 dBm
	54 Mbps	15 dBm	–72 dBm
5 GHz, 802.11n (HT20)	MCS0	18 dBm	–85 dBm
	MCS7	14 dBm	–67 dBm
5 GHz, 802.11n (HT40)	MCS0	17 dBm	–82 dBm

Wi-Fi Radio Frequency Performance	RG-AP180P-L		
Frequency Band and Protocol	**Data Rate**	**Maximum Transmit Power per Transmit Chain**	**Maximum Receive Sensitivity per Receive Chain**
	MCS7	14 dBm	–64 dBm
5 GHz, 802.11ac (VHT20)	MCS0	18 dBm	–85 dBm
	MCS9	13 dBm	–60 dBm
5 GHz, 802.11ac (VHT40)	MCS0	17 dBm	–82 dBm
	MCS9	13 dBm	–57 dBm
5 GHz, 802.11ac (VHT80)	MCS0	16 dBm	–82 dBm
	MCS9	13 dBm	–56 dBm
5 GHz, 802.11ax (HE20)	MCS0	18 dBm	–85 dBm
	MCS11	12 dBm	–58 dBm
5 GHz, 802.11ax (HE40)	MCS0	17 dBm	–82 dBm
	MCS11	12 dBm	–54 dBm
5 GHz, 802.11ax (HE80)	MCS0	16 dBm	–82 dBm
	MCS11	12 dBm	–52 dBm
5 GHz, 802.11ax (HE160)	MCS0	15 dBm	–79 dBm
	MCS11	12 dBm	–50 dBm

1.4.3 Bluetooth Radio

Table 1-2 Bluetooth Radio

Bluetooth Radio	RG-AP180P-L
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	10 dBm
Receive sensitivity	–88 dBm (@BLE)

1.4.4 Ports Specifications

Table 1-5 Ports Specifications

Ports Specifications	RG-AP180P-L
Fixed service port	Uplink: 1 x 100/1000/2.5GBASE-T port, in compliance with IEEE 802.3af/802.3at standard (PoE/PoE+) When powered by 802.3af PoE, LAN 1 cannot supply power to an attached device. Downlink: 4 x 10/100/1000BASE-T ports LAN 1 supports 48 V/10 W power supply to an attached device.
Fixed management port	1 x Micro USB 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.

1.4.5 Power Supply and Consumption

Table 1-6 Power Supply and Consumption

Power Supply and Consumption	RG-AP180P-L
Input power supply	The AP supports the following two power supply modes: ● 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 PoE-in port: The power source equipment (PSE) complies with IEEE 802.3af/at standard (PoE/PoE+). Note: ● When powered by 802.3at (PoE+), the AP operates with the optimal performance. ● If both DC power and PoE are available, DC power is preferred.
PoE port	LAN 1 supports 48 V/10 W PoE output to an attached device.
Overall power consumption	Maximum power consumption: 25 W ● DC powered: 25 W ● PoE powered (802.3af): 15 W ● PoE+ powered (802.3at): 25 W ● Idle mode: 8 W

Caution

- To power the AP by using PoE, ensure that the device at the other end of the Ethernet cable supports IEEE 802.3af/at power supply.
- In the case of 802.3af-compliant power supply, PoE power output through LAN1 port is disabled.
- The AP adopts a fanless design. Therefore, sufficient clearance should be maintained around the AP for cooling.

1.4.6 Environment and Reliability

Table 1-7 Environment and Reliability

Environment and Reliability	RG-AP180P-L
Temperature	Operating temperature: 0°C to 40°C (–32°F to +104°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).
Humidity	Operating humidity: 5% RH to 95% RH (non-condensing) Storage humidity: 5% 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)

1.4.7 Regulatory Compliance

Table 1-3 Regulatory Compliance

Regulatory Compliance	RG-AP180P-L
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.

1.5 LED

Note

The LED description applies to both fit and fat modes, unless otherwise specified.

Table 1-8 LED Status

LED Color	Frequency	Description
Off	N/A	Possible cases:1. The AP is not powered on. 2. 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.
Steady red	N/A	The system is running properly, but the uplink service port is down.
Blinking red	On for 3s Off for 1s	In fit mode, the CAPWAP tunnel between the AP and AC timed out.
Blinking green	On for 0.2s Off for 0.2s	In fit or MACC mode, the software system of the AP is being upgraded and the AP cannot be powered off.
Blinking green	On for 3s Off for 1s	The software system runs properly, and the CAPWAP tunnel status is normal.
Blinking red	On for 0.2s Off for 0.2s	In fit mode, the AP is being located.

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, communications equipment features, and considerations such as climate, hydrology, geology, earthquake, electrical power, and transportation.
- The installation site should be dry. It is not recommended that the AP be installed in a place near the sea. Keep the device 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 AP 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 ground is wet.

- Find the position of the indoor emergency power switch before installation. Cut off the power switch in case of accidents.
- Check the AP carefully for confirmation 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 AP far away from grounding or lightning protection devices for power equipment.
- Keep the AP away from radio stations, radar stations, high-frequency high-current devices, and microwave ovens.

2.1.4 Storage Security

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 (such as the bracket), and ensure that the ground of the installation site meets the requirements.

2.2.2 Ventilation Requirements

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

2.2.3 Space Requirements

Do not install the AP against walls for ease of heat dissipation and maintenance. Reserve certain space (no less than 0.1 m) when installing the upper, lower, left, and right panels, to facilitate heat dissipation.

2.2.4 Temperature/Humidity Requirements

To ensure the normal operation and a prolonged service life of the AP, 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 relative humidity, the insulating material may have bad insulation or even leak electricity.
- In an environment with low relative humidity, the insulating strip may dry and shrink, loosening screws.
- In a dry environment, static electricity is prone to occur and damage the internal circuits of the AP.
- Too high temperatures can accelerate the aging of insulation materials, greatly reducing the reliability of the

AP 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 above the floor and 0.4 m 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 the top threat to the running of the device. The indoor dust falling on the AP may be adhered by static electricity, causing poor contact of the metallic joint. Such electrostatic adherence may occur more easily when the relative humidity is low, not only affecting the service life of the AP, but also causing communication faults. The following table describes the requirements for the dust content and granularity in the equipment room.

Table 1-1 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 ≤ 5 μm)	Particles/m^3	≤ 1.3×10^5

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

Table 1-2 Requirements for Gases

Gas	Average (mg/m^3)	Maximum (mg/m^3)
Sulfur dioxide (SO_2)	0.2	1.5
Hydrogen sulfide (H_2S)	0.006	0.03
Nitrogen dioxide (NO_2)	0.04	0.15
Ammonia gas (NH_3)	0.05	0.15
Chlorine gas (Cl_2)	0.01	0.3

Note

Average refers to the average value of harmful gases measured in one week. Maximum refers to the upper limit of harmful gases measured in one week, and the maximum value cannot last for more than 30 minutes every day.

2.2.6 Anti-Interference Requirements

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

2.2.7 Lightning Protection Requirements

The RG-AP180P-L can guard against lightning strikes. As an electric device, too strong lightning strikes may still damage the device. Take the following lightning protection measures:

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

2.2.8 Other Requirements

When the device is installed on the wall, the following conditions must be met:

- The installation site allows for proper cooling and ventilation. Install air conditioners in hot areas.
- The mounting location must be sturdy enough to support the weight of the device and its accessories.

2.3 Tools

Table 1-3 Tools

Common Tools	Phillips screwdriver, wires, Ethernet cables, cage nuts, diagonal pliers, and binding straps
Special Tools	Anti-static wrist strap, wire stripper, RJ45 crimping plier, and wire cutter
Meter	Multimeter and bit error rate tester (BERT)
Relevant Devices	PC, display, and keyboard

Note

RG-AP180P-L is not shipped with a tool kit. You need to prepare a tool kit by yourself.

3 Installing the Access Point

It is required that RG-AP180P-L be fixed indoors.

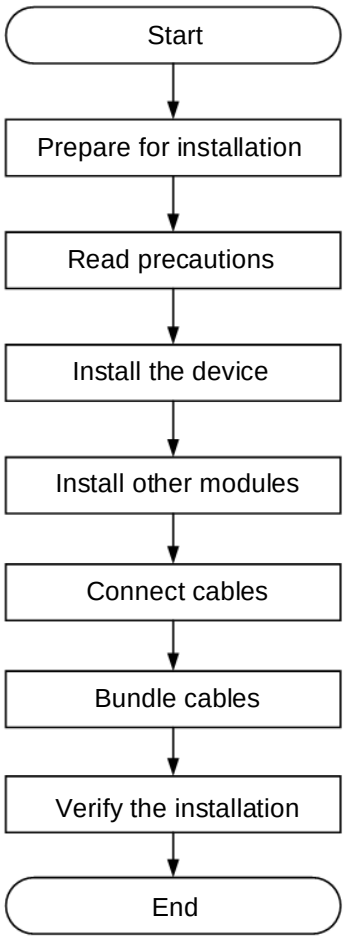
Caution

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

3.1 Installation Flowchart

The following figure shows the process for installing an AP.

Figure 1-2 Installation Flowchart



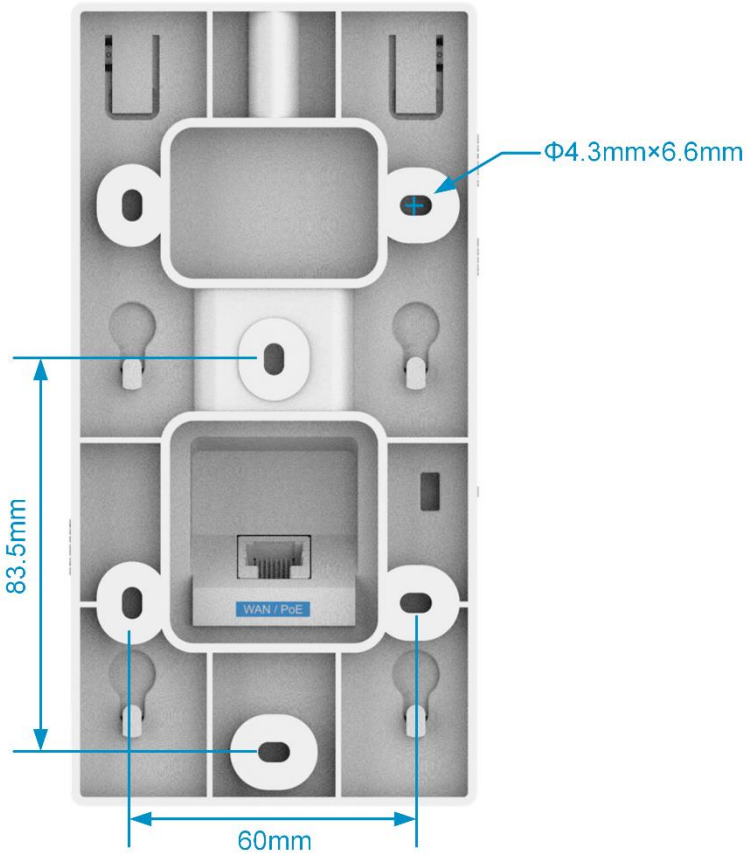
3.2 Before You Begin

Carefully plan and arrange the installation location, networking mode, power supply, and cabling before installing the device.

Confirm the following requirements before installation:

- The installation location provides sufficient space for heat dissipation.
- The installation location meets the temperature and humidity requirements of the device.
- The power supply and required current are available in the installation location.
- The Ethernet cables have been deployed in the installation location.
- The selected power supply meets the system power requirements.
- The position of the indoor emergency power switch is found before installation, so that the power switch can be cut off in case of accidents.
- The mounting bracket dimensions and mounting hole pattern should meet the dimensions requirements in the technical specifications. The following figure shows the mounting bracket dimensions.

Figure 1-3 Bracket Dimensions



3.3 Precautions

To ensure the normal operation and prolonged service life of the AP, observe the following safety precautions:

- Do not power on the device during installation.
- Place the device in a well-ventilated environment.
- Do not subject the device to high temperatures.

- Keep the device away from high-voltage power cables.
- Install the device indoors.
- Do not expose the device in a thunderstorm or strong electric field.
- Keep the device clean and dust-free.
- Cut off the power switch before cleaning the device.
- 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 AP

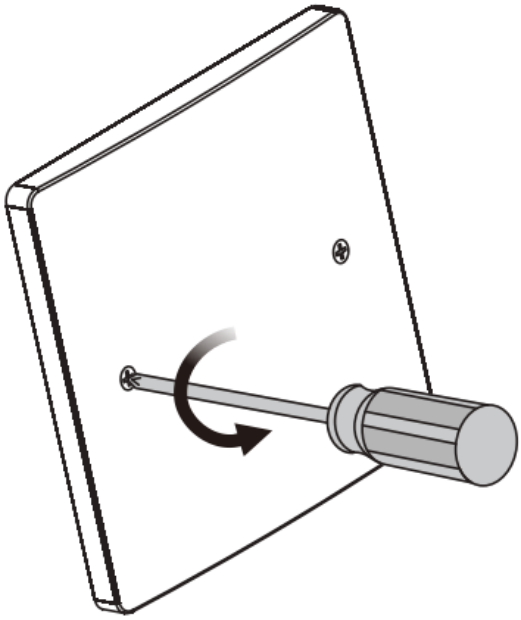
3.4.1 Installing the AP on an 86-mm Junction Box

Note

Take the same steps to install the AP on a 118-mm junction box as on an 86-mm junction box. For details, see Installing the AP on an 86-mm Junction Box.

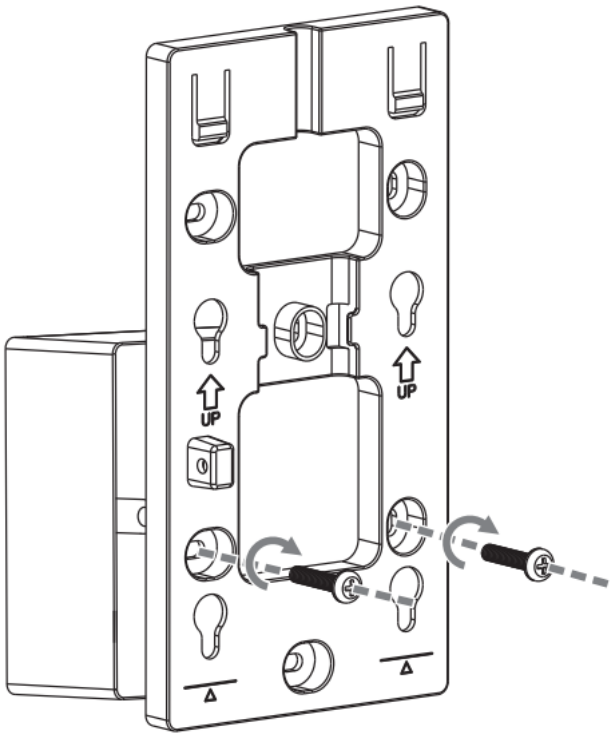
(2) Use a screwdriver to remove the 86-mm junction box on the wall. (If there is no 86-type junction box, skip this step.)

Figure 1-4 Removing the 86 mm Junction Box



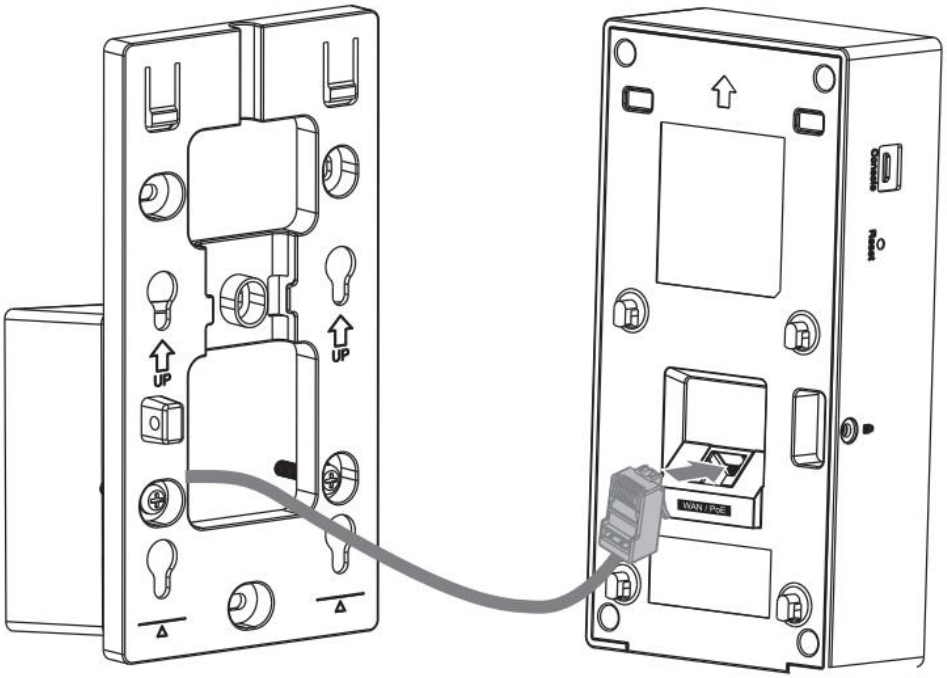
(3) Align two round holes on the mounting bracket with the two screw holes on the 86 mm junction box, and secure the mounting bracket to the 86 mm junction box with two supplied Philips pan head screws.

Figure 1-5 Installing the Mounting Bracket



(4) Thread the uplink cable through the opening on the mounting bracket and connect it to the WAN/PoE port on the back of the AP.

Figure 1-6 Connecting the Uplink Cable



(5) Secure the cabled AP to the mounting bracket by using the supplied hooks. During installation, align the hooks with round holes on the mounting bracket and gently slide the access point onto the mounting bracket until it clicks into place.

Figure 1-7 Securing the AP

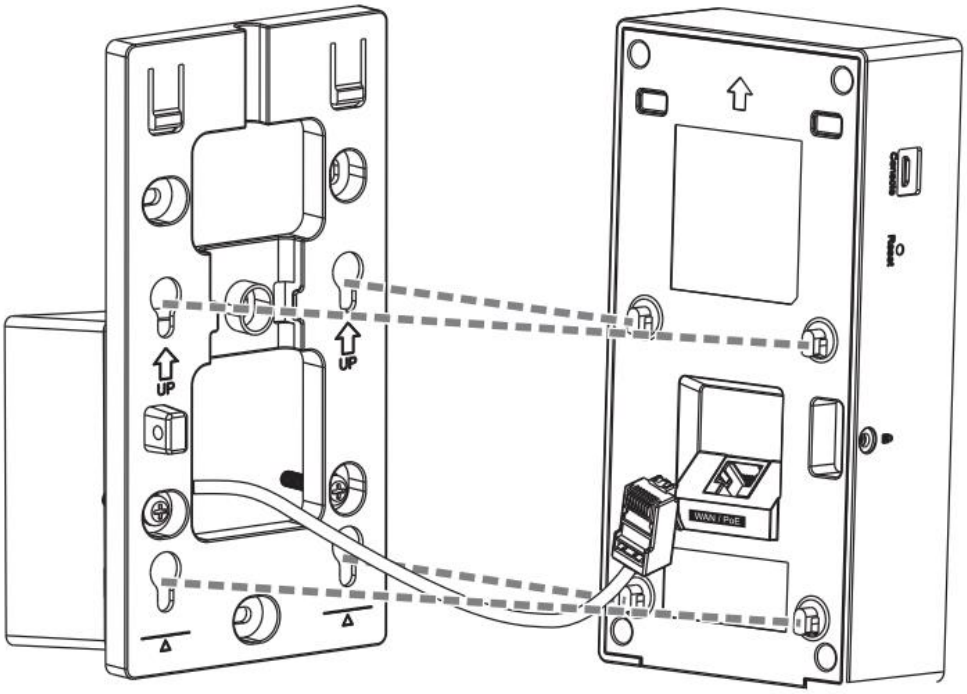
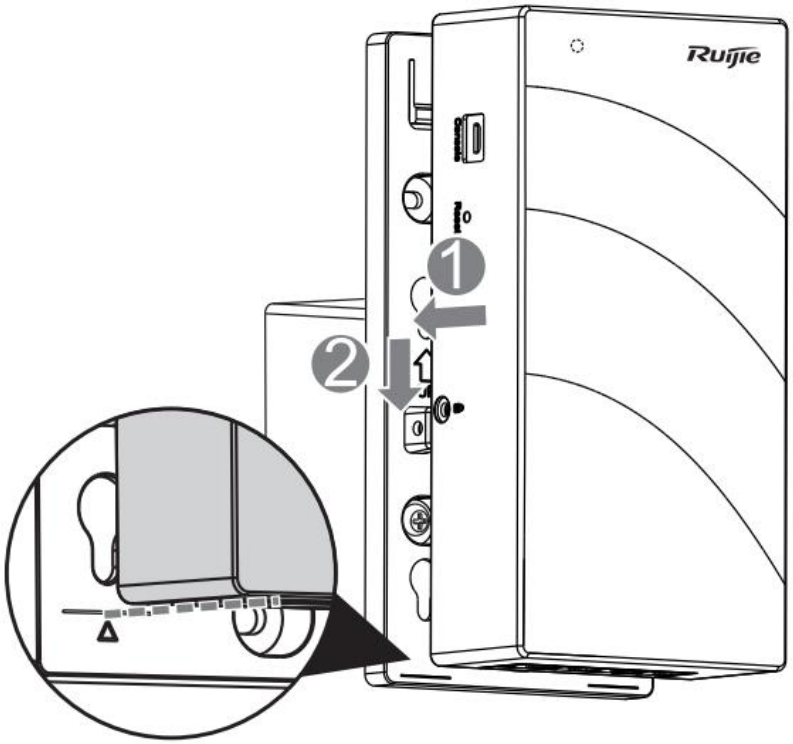
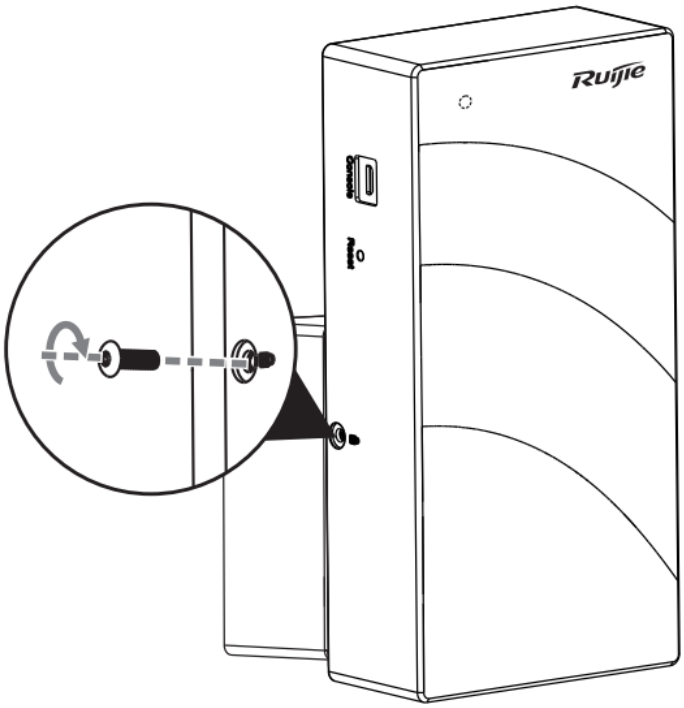


Figure 1-8 Installing the AP



(6) Use a torx screwdriver to lock the torx screw to the security lock on the side of the AP.

Figure 1-9 Installing the Security Screw



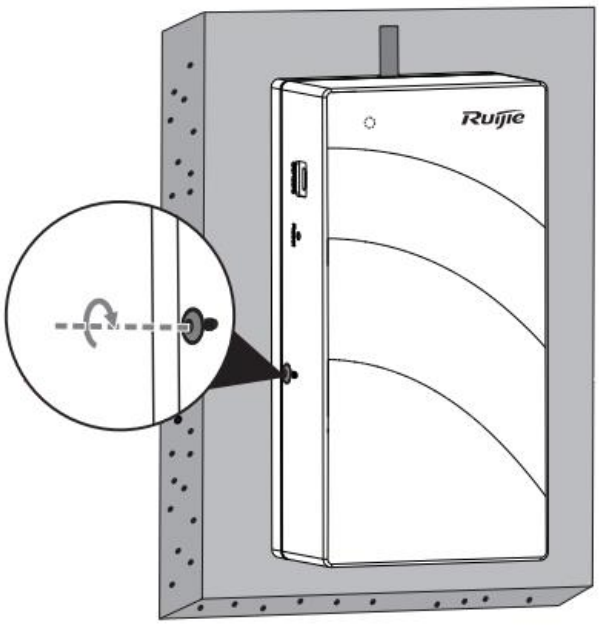
Caution

- When installing or moving the AP, ensure that the power supply is cut off.
- Ensure that the screws are tightened.
- Ensure that the AP is installed in a place where the system LED is easily visible.
- Ensure that the AP is at least 10 cm away from other objects in the upper, lower, left, and right directions, and no obstacle is under the device that blocks cables out from the network port.

3.4.2 Removing the AP

Use a torx screwdriver to remove the security screw on the side of the AP and push the AP upwards to remove it.

Figure 1-10 Removing the Security Screw



3.5 Connecting Cables

Connect twisted pairs with the WAN/PoE port on the AP. See 7.1 Connectors and Media for supported wiring of twisted pairs.

⚠ Caution

By default, the baud rate is set to **9600**, data bit to **8**, stop bit to **1**, with no parity check and no flow control on the console port of the AP. The console port is used only when you want to configure the AP manually.

3.6 Bundling Cables

3.6.1 Precautions

- Bundle cables neatly to ensure aesthetics.
- Bend twisted pairs naturally or to a large radius close to the connector.
- Do not over tighten twisted pair bundle as it may reduce the cable life and performance.

3.6.2 Bundling Steps

(1) Bundle the hanging part of the twisted pairs using cable ties and lead them to the WAN/PoE port end of the AP by convenience.

(2) Fasten the twisted pair cables to the cable trough of the mounting bracket.

(3) When bundling the twisted pair cables, extend them under the AP and maintain a straight line.

3.7 Installation Verification

3.7.1 Checking the AP

- Verify that the external power supply matches with the AP.
- Verify that the cabinet is securely fastened and will not move or fall.

3.7.2 Checking Cable Connections

- Verify that the twisted pair cable matches the port.
- Verify that cables are properly bundled.

3.7.3 Checking the Power Supply

- Verify that the power cord is properly connected and compliant with safety requirements.
- Turn on the power supply to supply power to the AP. Verify that the AP works properly.

4 Verifying Operating Status

4.1 Establishing the Configuration Environment

Power on the AP by DC power or PoE.

When setting up the environment, pay attention to the following:

- 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 with a PC, verify that the PC and PoE switch are properly grounded.

4.2 Powering on the AP

4.2.1 Checklist Before Power-on

- Check whether the power cord is properly connected.
- Check whether the power supply voltage is the same as that required by the AP.

4.2.2 Checklist After Power-on

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

- Check if any message is printed on the configuration interface of the device.
- Check whether the LEDs are normal.

5 Monitoring and Maintenance

5.1 Monitoring

5.1.1 LED

You can observe the LEDs to monitor the device in operation.

5.1.2 CLI Commands

You can run related commands on the CLI of the device to remotely monitor the device, including:

- Port configuration and status
- System logs

Note

- For details about the commands, see the corresponding configuration guide.
- The AP supports remote maintenance.

5.2 Remote Maintenance

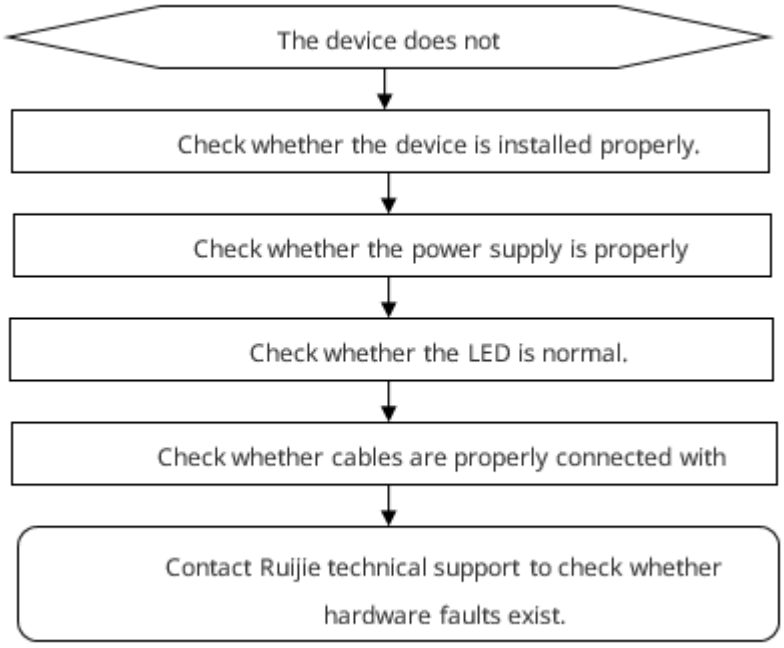
- If the AP works in fat mode, you can log in to the AP remotely for maintenance.
- If the AP works in fit mode, you can use an AC to centrally manage and maintain the AP.

5.3 Hardware Maintenance

If the hardware is faulty, please contact Ruijie technical support.

6 Troubleshooting

6.1 General Troubleshooting Flowchart



6.2 Common Troubleshooting Procedures

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

- DC power supply: Check whether there is power supply, and whether the power supply unit works normally.
- PoE: Check whether the other end of the PoE cable supports 802.11af-compliant power supply, and check whether the Ethernet cable is connected properly.

6.2.3 LED Is 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 Is 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, the device initialization fails and the device is faulty.

6.2.5 LED Blinks Green at an Interval of 0.2s for a Long Time

Sometimes the AP performs software upgrade after power-on. During this period, the LED keeps blinking green at an interval of 0.2s and enters the normal state of quick off after blinking green until the upgrade is completed. Note: 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 Blinks Red at an Interval of 1s for a Long Time

If the LED blinks red at an interval of 1s 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 No Wireless Signal Searched

(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 STA to adjust the distance between the STA and the AP.

7 Appendix

7.1 Connectors and Media

- 2500BASE-T/1000BASE-T/100BASE-TX/10BASE-T port

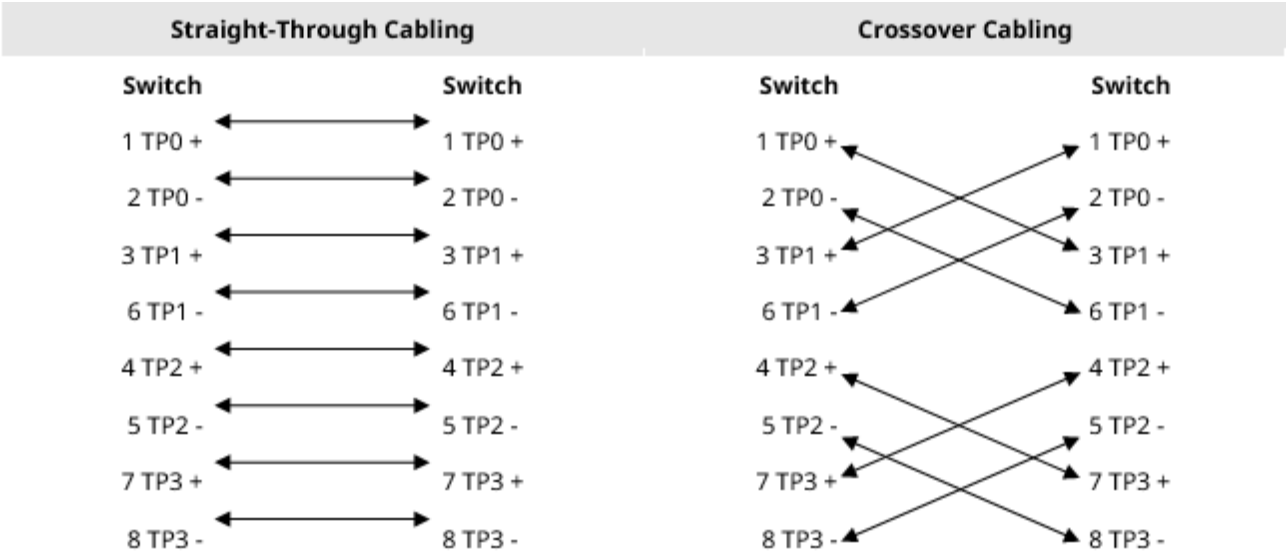
The 2500BASE-T/1000BASE-T/100BASE-TX/10BASE-T port is a 10/100/1000 Mbps port that supports auto-negotiation and auto MDI/MDIX Crossover.

Compliant with IEEE 802.3bz, the 2500BASE-T port requires at least Category 6 STP with a maximum distance of 100 meters.

Compliant with IEEE 802.3ab, the 1000BASE-T port requires 100-ohm Category 5/5e UTP or STP with a maximum distance of 100 meters.

The 1000BASE-T port requires all four pairs of wires be connected for data transmission. The following figure shows the four pairs of wires for the 1000BASE-T port.

Table 7-1 1000BASE-T Twisted Pair Connections



In addition to cables with the above-mentioned specifications, the 100BASE-TX/10BASE-T port can be connected using 100-ohm CAT-3, CAT-4, and CAT-5 cables for at 10 Mbps data speed or using to 100-ohm CAT-5 cables for at 100 Mbps data speed with a maximum connection distance of 100 meters. The following table shows 100BASE-TX/10BASE-T pin assignments.

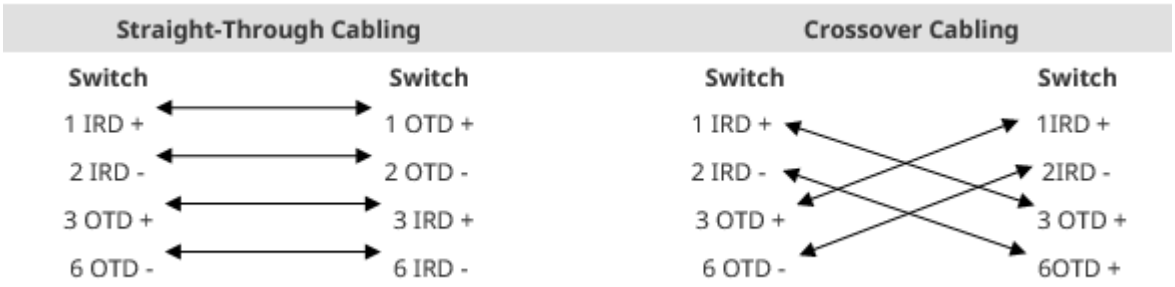
Table 7-2 100BASE-TX/10BASE-T Pin Assignments

Pin	Socket	Plug
1	Input Receive Data+	Output Transmit Data+
2	Input Receive Data-	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data+

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

The following figure shows wiring of straight-through and crossover cables for 100BASE-TX/10BASE-T.

Table 7-3 100BASE-TX/10BASE-T Twisted Pair Connections

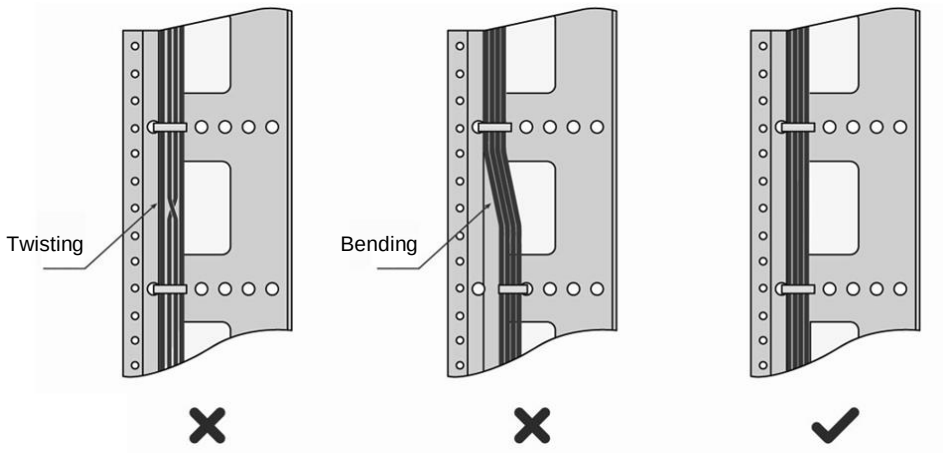


7.2 Cabling Recommendations

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 are routed beside the cabinet, and top cabling or bottom cabling is adopted according to the actual situation in the equipment room, such as the positions of the DC power distribution box, AC socket, or lightning protection box.

- Requirement for the Minimum Cable Bend Radius
  - The bend radius of a power cable, communication cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that is often bent or plugged or unplugged should be over seven times greater than their respective diameters.
  - The bend radius of a fixed common coaxial cable should be over seven times greater than its diameter. The bend radius of the common coaxial cable that is often bent or plugged should be over 10 times greater than its diameter.
  - The minimum bend radius of a high-speed cable, such as an SFP+ cable should be over five times the overall diameter of the cable. If the cable is frequently bent, plugged or unplugged, the bend radius should be over 10 times the overall diameter.
- Precautions for Cable Bundling
  - Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
  - Cables should be neatly and properly bundled in the cabinet without twisting or bending, as shown in Figure 1-11.

Figure 1-11 Bundling Cables

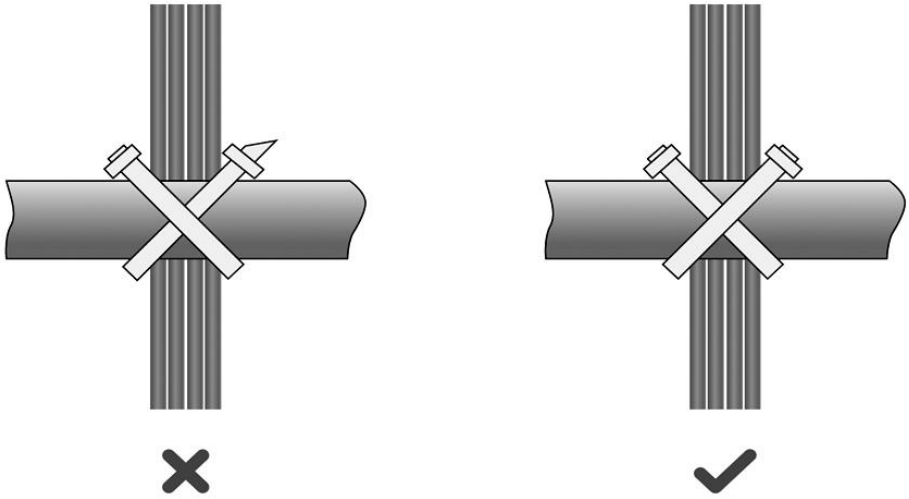


  - Cables of different types (such as power cables, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is not allowed. When they are close to each other, it is recommended that crossover cabling be adopted. In the case of parallel cabling, maintain a minimum distance of 30 mm between power cords and signal cables.
  - The cable management brackets and cabling troughs inside and outside the cabinet should be smooth without sharp corners.
  - The metal hole traversed by cables should have a smooth and fully rounding surface or an insulated lining.
  - Proper cable ties should be selected to bundle up cables. It is forbidden to connect two or more cable ties

to bundle up cables.

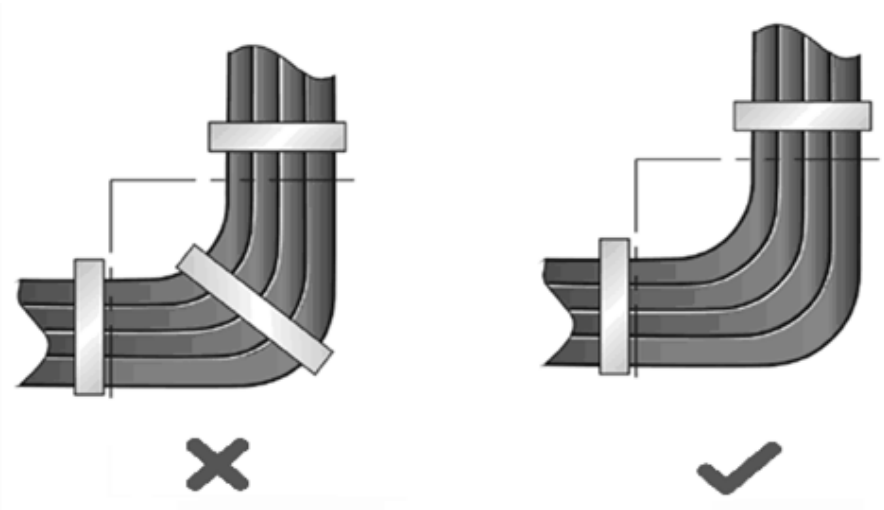
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure 1-12.

Figure 1-12 Cutting off Excess Cable Tie



- When cables need to be bent, bind them first but do not tie cable ties within the bend. Otherwise, considerable stress may be generated in cables, breaking cable cores, as shown in Figure 1-13.

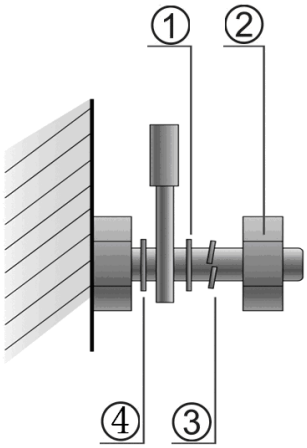
Figure 1-13 Binding Cables



- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the cabinet or cable trough. The proper position indicates a position that will not affect device running or cause device damage or cable damage during debugging.
- 220 V and –48 V power cables must not 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 being assembled to avoid suffering tension or stress. When a moving part reaches the installation position, the remaining cable part should not touch heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be used.
- When screw threads are used to fasten cable terminals, the bolt or screw must be tightly fastened, and

anti-loosening measures should be taken, as shown in Figure 1-14.

Figure 1-14 Fastening Cable Lugs



Description	① Flat washer	③ Spring washer
	② Nut	④ Flat washer

- Hard power cords should be fastened in the terminal connection area to prevent stress on terminal connection and cable.
- Do not use self-tapping screws to fasten terminals.
- Power cables of the same type and in the same cabling direction should be bundled up into cable bunches, with cables in cable bunches clean and straight.
- Bundle up cables using cable ties based on the following table.

Cable Bunch Diameter (mm)	Distance Between Every Binding Point (mm)
10	80–150
10–30	150–200
30	200–300

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

7.3 DC Power Specifications

- Input voltage: 48 V DC
- Rated current: 0.6 A

Table 1-4 Technical Specifications of the DC Power Connector

Inner Diameter	Outer Diameter	Depth	Polarity
2.1 mm	5.5 mm	10 mm	Center positive

Figure 1-15 DC Connector Dimensions

