# Ruijie RG-AP180 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/
- Technical Support Website: https://ruijienetworks.com/support
- Case Portal: https://caseportal.ruijienetworks.com
- Community: https://community.ruijienetworks.com
- Technical Support Email: service_rj@ruijienetworks.com
- Live Chat: https://www.ruijienetworks.com/rita

**Conventions**

1. **Conversions**

| Convention | Description |
| --- | --- |
| **Bold** font | Commands, command options, and keywords are in **bold** font. |
| *Italic* font | Arguments for which you supply values are in *italic* font. |
| [ ] | Elements in square brackets are optional. |
| { x \| y \| z } | Alternative keywords are grouped in braces and separated by vertical bars. |
| [ x \| y \| z ] | Optional alternative keywords are grouped in brackets and separated by vertical bars. |
| &<1-n> | The argument before the sign (&) can be input for consecutive 1- n times. |
| // | Double slashes at the beginning of a line of code indicate a comment line. |

## 2. Signs

The signs used in this document are described as follows:

Warning

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

Caution

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

Note

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

Specification

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

## 3. 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.

# Contents

# 1 Product Overview

## 1.1 About the RG-AP180 Access Point

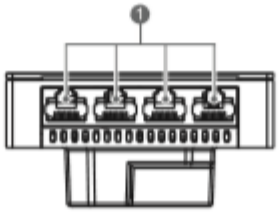
The RG-AP180 is a dual-radio Wi-Fi 6 access point (AP) provided by Ruijie Networks for general education, higher education, hotel, office, dormitory, and other indoor scenarios. With simple and pleasant appearance design, the RG-AP180 is easy to deploy without damaging the wall decoration. It is ideal for wireless network deployment in hotels, dormitories, and other environments.

Compliant with the latest IEEE 802.11ax standard, the RG-AP180 can work in both 2.4 GHz and 5 GHz frequency bands. The AP delivers a combined data rate of 1.775 Gbps, with up to 574 Mbps in the 2.4 GHz band and 1.201 Gbps in the 5 GHz band. This eliminates the performance bottleneck. The AP provides five wired ports, including four GE LAN ports and one GE uplink port, for wired user access. The RG-AP180 provides wireless network security, radio control, mobile access, Quality of Service (QoS), seamless roaming, and other key features. Working with Ruijie wireless access controllers (AC), the AP implements wireless user data forwarding, security, and access control.

The RG-AP180 supports local power supply and power over Ethernet (PoE). Customers can flexibly select the power supply mode based on the actual site.

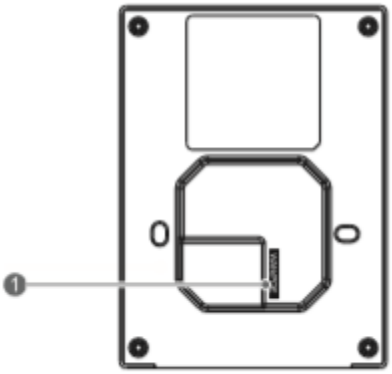
## 1.2 Product Appearance

The RG-AP180 provides two radio connectors and five Ethernet ports. The ports on the rear panel support 802.3af/at-compliant PoE. The AP also provides one console port, one direct current (DC) power connector, and one reset hole. The following figures show the product appearance.



| No. | Description |
|---|---|
| 1 | Four GE Ethernet ports |

| No. | Description |
|---|---|
| 1 | Micro USB console port |
| 2 | Reset hole with a diameter of 1.2 mm (0.05 in.) |
| 3 | DC power connector (used for local power supply) |




| No. | Description |
|---|---|
| 1 | GE PoE uplink port |

**Note**

The nameplate is at the bottom of the access point.

## 1.3 Technical Specifications

### 1.3.1 Dimensions and Weight

| Dimensions and Weight | RG-AP180 |
|---|---|
| Unit dimensions (W x D x H) | 86 mm x 116 mm x 24.1 mm (3.39 in. x 4.57 in. x 0.95 in., part outside the wall) + 18.9 mm (0.74 in., part inside the wall) |
| Weight | Main unit: 0.3 kg (0.66 lbs) |
| Mounting | Mounted on a junction box |
| Color | Elegant white |
| Lock option | Not supported |

### 1.3.2 Radio Specifications

| Radio Specifications | RG-AP180 |
|---|---|
| Radio design | Dual-radio<br>Four spatial streams<br>Radio 1: 2.4 GHz, two spatial streams: 2x2, MU-MIMO<br>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<br>Radio 2: 802.11a/n/ac/ax, 5.150 GHz to 5.350 GHz, 5.470 GHz to 5.725 GHz, 5.725 GHz to 5.850 GHz<br>Note: Country-specific restrictions apply. |
| Data rate | Radio 1: 2.4 GHz, 574 Mbps<br>Radio 2: 5 GHz, 1.201 Gbps<br>Combined peak data rate:<br>2.4 GHz + 5 GHz, 1.775 Gbps |
| Antenna type | Built-in smart antenna |
| Antenna gain | 2.4 GHz: 2 dBi<br>5 GHz: 2 dBi |
| Max. transmit power | 2.4 GHz radio: 20 dBm (17 dBm per chain)<br>5 GHz radio: 20 dBm (17 dBm per chain)<br>Note: The transmit power is limited by local regulatory requirements.<br><br>Thailand<br>2.400 GHz to 2.4835 GHz, EIRP ≤ 20 dBm<br>5.150 GHz to 5.350 GHz, EIRP ≤ 23 dBm<br>5.470 GHz to 5.725 GHz. EIRP ≤ 30 dBm<br>5.725 GHz to 5.825 GHz, EIRP ≤ 30 dBm |
| Power increment | 1dBm |

| Radio Specifications | RG-AP180 |
|---|---|
| Modulation | DSSS: DBPSK @ 1 Mbps, DQPSK @ 2 Mbps, and CCK @ 5.5/11 Mbps<br>OFDM: BPSK @ 6/9 Mbps, QPSK @ 12/18 Mbps, 16-QAM @ 24 Mbps, and 64-QAM @ 48/54 Mbps<br>MIMO-OFDM: QPSK, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM |
| Receive sensitivity | 11a: –91 dBm (1 Mbps), –90 dBm (5 Mbps), –87 dBm (11 Mbps)<br>11b/g: –89 dBm (6 Mbps), –82 dBm (24 Mbps), –78 dBm (36 Mbps), –72 dBm (54 Mbps)<br>11an: –85 dBm @ MCS0, –67 dBm @ MCS7, –67 dBm @ MCS7<br>11ac: VHT20: –85 dBm (MCS0), –62 dBm (MCS8)<br>11ac: VHT40: –82 dBm (MCS0), –57 dBm (MCS9)<br>11ac: VHT80: –79 dBm (MCS0), –53 dBm (MCS9)<br>11ax: HE80: –79 dBm (MCS0), –53 dBm (MCS9), –52 dBm (MCS11) |

### 1.3.3 Port Specifications

| Port Specifications | RG-AP180 |
|---|---|
| Bluetooth | Bluetooth 5.0 |
| Fixed service port | Uplink: One 10/100/1000Base-T Ethernet port with auto-negotiation, supporting IEEE 802.3af/at-compliant PoE input<br>Downlink: Four 10/100/1000Base-T Ethernet ports with auto-negotiation |
| Fixed management port | One micro USB console port (concealed) |
| Status LED | One system status LED |
| Button | One Reset button |

### 1.3.4 Power Supply and Consumption

| Power Supply and Consumption | RG-AP180 |
|---|---|
| Input power supply | 1. 12 V DC/1 A<br>2. PoE/PoE+ power supply, in compliance with the 802.3af/at standard |
| External power supply | Not supported |
| Max. power consumption | 10 W |
| Power redundancy | Not supported |

⚠ Caution

Before using PoE power supply, make sure that the PSE device is 802.3af/802.3af-compliant.

### 1.3.5 Environment and Reliability

| Environment and Reliability | RG-AP180 |
|---|---|
| Temperature | Operating temperature: –10°C to +50°C (14°F to 122°F)<br>Storage temperature: –40°C to +70°C (–40°F to +158°F)<br>Note: At a height between 3,000 m (9,842.52 ft.) and 5,000 m (16,404.20 ft.), every time the altitude increases by 220 m (721.78 ft.), the maximum temperature decreases by 1°C (1.8°F). |
| Humidity | Operating humidity: 5% RH to 95% RH (non-condensing)<br>Storage humidity: 5% RH to 95% RH (non-condensing) |
| Regulatory compliance | EN 55032<br>EN 55035<br>EN 61000-3-3<br>EN IEC 61000-3-2<br>EN 301 489-1<br>EN 301 489-3<br>EN 301 489-17<br>EN 300 328 |

| Environment and Reliability | RG-AP180 |
| --- | --- |
| | EN 301 893<br>EN 300 440<br>FCC Part 15<br>EN IEC 62311<br>IEC 62368-1<br>EN 62368-1 |

## 1.4 LED and Button

Fat Mode

| Status | LED Blinking Frequency | Meaning |
| --- | --- | --- |
| N/A | Off | The AP is not powered on or is silent (which can be disabled via software). |
| Startup | Fast blinking green (at 2.5 Hz)/Solid green | 1. Fast blinking green<br>Indicates the system is loading U-Boot.<br>2. Solid green<br>Indicates the main program is completely loaded. |
| Warning | Fast blinking red (at 2.5 Hz) | The AP is updating program, and cannot be powered off. |
| Operation | Blinking orange (at 1 Hz) | The AP is operating normally. |

Fit Mode

| Status | LED Blinking Frequency | Meaning |
| --- | --- | --- |
| N/A | Off | The AP is not powered on or is in silent mode (which can be disabled via software). |
| Startup | Fast blinking green (at 2.5 Hz)/Solid green | 1. Fast blinking green<br>Indicates the system is loading U-Boot.<br>2. Solid green<br>Indicates the main program is completely loaded. |

| | | |
|---|---|---|
| Warning | Fast blinking red (at 2.5 Hz) | The AP is updating program, and cannot be powered off. |
| The AP is operating normally. | Blinking orange (at 1 Hz) | The AP is operating normally but the WAN port is in link-down state. |
| Operation | Blinking green (at 1 Hz) | The AP is operating normally and the WAN port is in link-up state, but the CAPWAP tunnel is not established. |
| The AP is operating normally. | Slow blinking green (at 0.4 Hz) | The AP is operating normally and the CAPWAP tunnel is established. |

Reset Function

(1) Press the button and hold for no more than two seconds to restart the device.

(2) Press the button and hold for more than three seconds to restore the device to factory settings.

## 1.5 Heat Dissipation System

The RG-AP180 adopts a fanless design.

Note

Maintain sufficient clearance around the AP for air circulation.

# 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 RG-AP180.

The following safety precautions do not cover all possible dangers.

## 2.2 Installation Safety

- 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 Electro-Magnetic Interference (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 dry. You are not advised to install the AP in a place near the sea.
- Keep the device at least 500 meters (1,640.41 ft.) away from the ocean and do not face it towards the sea breeze.
- The installation site should be free from water flooding, seepage, dripping, or condensation.
- The installation site should be selected according to communication network planning and technical requirements for communication equipment, and considerations such as climate, hydrology, geology, earthquake, electrical power, and transportation.

Caution

Please install and remove the AP according to the installation instructions.

## 2.3 Handling Safety

- After the AP is installed, avoid handling it frequently.
- Cut off all power supplies and unplug all power cords and cables before handling the AP.

## 2.4 Electric Safety

- 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 out the position of the indoor emergency power switch before installation. Cut off the power supply in case of accidents.
- Make sure that the AP is powered off when you cut off the power supply.
- Do not place the AP in a wet position, and keep the AP away from liquid.
- Keep the AP away from the grounding facility or lightning and grounding facility of the power device as much as possible.
- Keep the AP away from radio stations, radar stations, high-frequency and high-current devices, microwave ovens, and other high-power wireless devices.

⚠ Caution

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 through wet objects with high voltage or mains power supply may be fatal.

## 2.5 Installation Environment Requirements

The RG-AP180 must be used indoors. To ensure the normal operation and prolonged service life of the AP, the installation site must meet the following requirements.

### 2.5.1 Installation Requirements

- The AP should be installed in an open environment if possible. If the AP is to be installed in an enclosed environment, ensure that a good ventilation and heat dissipation system is available.
- Ensure that the installation position is strong enough to support the weight of the RG-AP180 and its accessories.
- Ensure that the dimensions of the installation position are suitable for installing the RG-AP180. Reserve a sufficient clearance around the AP for heat dissipation. In addition, the AP needs to be installed at least 2 m (78.74 in.) away from ISP's base station antennas to prevent mutual interference.

### 2.5.2 Ventilation Requirements

The RG-AP180 adopts natural cooling. Reserve a sufficient clearance around the AP to ensure proper ventilation.

### 2.5.3 Temperature and Humidity Requirements

To ensure the normal operation and service life of the RG-AP180, maintain appropriate temperature and humidity in the environment where the AP is used. The operating environment with too high or too low temperature and humidity for a long period of time will damage the AP.

- In an environment with too high relative humidity, the insulating material may have poor

insulation or even leak electricity. Sometimes high humidity also causes changes of mechanical properties and rusting of metal parts.

- In an environment with too low relative humidity, the insulating strips will shrink, and static electricity is prone to occur and damage the internal circuits of the AP.
- In an environment with high temperature, the aging process of insulation materials will accelerate, greatly reducing the reliability of the AP and severely affecting its service life.

The following table lists the temperature and humidity requirements of RG-AP180 operating environment.

| Operating Environment Temperature Requirements | Operating Environment Relative Humidity Requirements |
|---|---|
| –10°C to +45°C (14°F to 113°F) | 5% RH to 95% RH (non-condensing) |

## 2.5.4 Cleanliness Requirements

Dust poses a major threat to the AP. The indoor dust can cause electrostatic adhesion when falling on the AP, causing poor contact of the metallic joint. Such electrostatic adhesion occurs more easily when the indoor relative humidity is low, not only affecting the service life of the AP, but also causing communication failure easily. The following table lists the requirements for the dust content and diameter in the machine room.

| **Maximum Diameter (μm)** | 0.5 | 1 | 3 | 5 |
|---|---|---|---|---|
| **Maximum Concentration (Particles/$m^3$)** | 1.4 x $10^7$ | 7 x $10^7$ | 2.4 x $10^7$ | 1.3 x $10^7$ |

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

### 2.5.5 Power Supply Requirements

- Power input voltage/current: 12 V DC /1.0 A
- PoE power supply: 802.3af/at-capable power source equipment (PSE)

Note

The DC input power should be greater than the actual power consumption of the AP. The DC input power of the RG-AP180 should not be less than 10 W.

Caution

In a DC power supply scenario, use a 12 V DC /1.0 A power adapter. (For the required inner and external diameters of DC power plug, see Appendix B.)

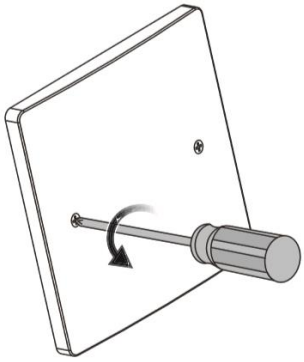
In a PoE power supply scenario, a Rujie-certificated PoE adapter is recommended.

## 2.6 EMI Requirements

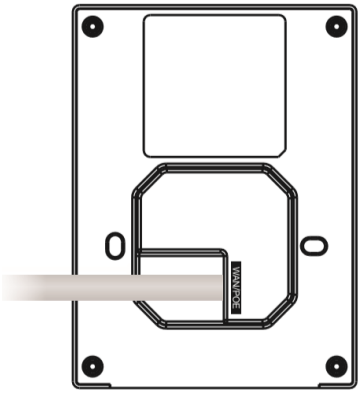
- All interference sources, either from outside or inside of the device application system, affect the AP by capacitive coupling, inductive coupling, electromagnetic waves, or other conduction modes.
- EMI occurs due to radiation or conduction, depending on the transmission path. When the energy, often radio energy, from a component arrives at a sensitive component through space, the energy is known as radiated interference. The interference source can be both a part of the interfered system and a completely electrically isolated unit. Conducted interference occurs when interference is transferred from one unit to another through cables which are usually electromagnetic wires or signal cables connecting the source and the sensor. Conducted interference often affects the power supply of the AP, but this can be controlled by a filter. Radiated interference may affect any signal path in the AP, and is difficult to shield.
- Interference prevention measures should be taken for the power supply system.
- Keep the AP away from the grounding facility or lightning and grounding facility of the power device as much as possible.
- Keep the AP far away from the high-power radio transmitter, radar launch pad, and high-frequency large-current devices.

## 2.7 Installation Tools and Steps

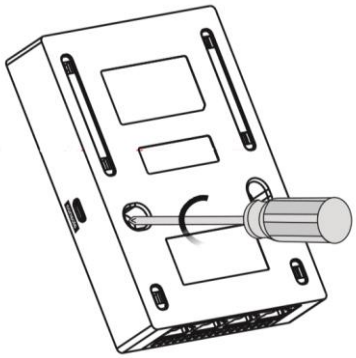
(1) Use a screwdriver to remove the panel of the 86-mm junction box from the wall. (If there is no panel, ignore this step.)



(2) Connect the uplink data cable to the uplink port.



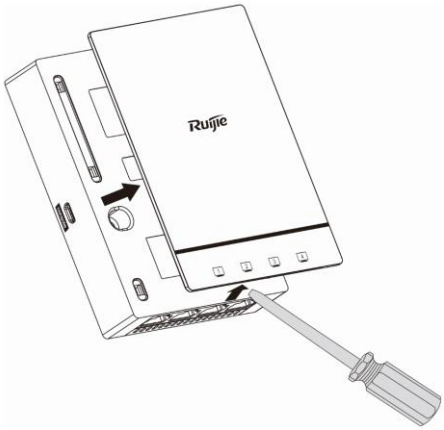

(3) Align the screw holes on the left and right sides of the RG-AP180 with the screw holes on the 86-mm junction box and tighten the screws using the screwdriver.



(4) Install the decorative cover on the AP as shown in the following figure.

(5) Complete the installation.

(6) Use a flat-blade screwdriver to remove the decorative cover from the AP. As shown in the following figure, slightly pry up the decorative cover from the bottom.



| | |
|---|---|
| **Common Tools** | Phillips screwdriver, cables, cage nuts, diagonal pliers, and flat-blade screwdriver (for removing the decorative cover) |
| **Special Tools** | Wire stripper, crimping plier, wire cutter, and ESD tools |
| **Meters** | Multimeter and bit error rate tester (BERT) |

Note

Cage nuts are delivered with the RG-AP180 and later versions. Other tools is customer-supplied.

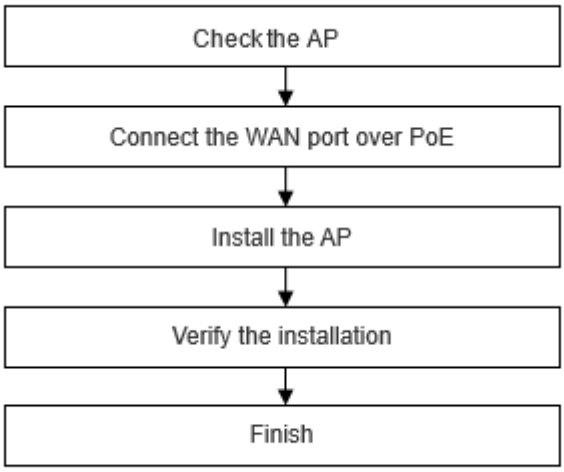
# 3 Installing the AP

The RG-AP180 is required to be fixed indoors.

Note

Before installing the AP, make sure that you have carefully read and met the requirements specified in Chapter 2.

## 3.1 Installation Procedures




## 3.2 Before You Begin

Carefully plan and arrange the installation location, networking mode, power supply, and cabling of the RG-AP180 before installation. Confirm the following requirements before installation:

- The installation location should provide sufficient space for heat dissipation.
- The installation location should meet the temperature and humidity requirements of the AP.
- The installation location should meet the power supply and current requirements of the AP.
- The selected power supply should meet the system power requirements.
- The installation location should meet the network cable requirements of the AP.
- The installation location should meet the site selection requirements of the AP.
- Before proceeding with the installation, ensure that all the specific requirements of the intended users are met if this AP is designed for special purpose.

## 3.3 Safety Precautions

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

- Do not power on the AP during installation.
- Place the AP in a well-ventilated environment.
- Do not subject the AP to high temperature.
- Keep the AP away from high-voltage power cables.
- Install the AP indoors.
- Do not expose the AP to a thunderstorm or strong electric field.
- Keep the AP clean and dust-free.
- Cut off the power supply before cleaning the AP.
- Do not wipe the AP with a damp cloth.
- Do not clean the AP with liquid.
- Do not open the enclosure when the AP is working.
- Fasten the AP tightly.

## 3.4 Installing the AP

Note

When installing or handling the wireless AP, ensure that the power supply is cut off.

Ensure that the screws are tightened.

Ensure that the wireless AP installation position facilitates indicator status observation.

When the AP is installed in an 86 mm junction box, the junction box must meet the JB/T 8593-2013 standard, and M4-type screws must be used.

If an electric screwdriver is used, the recommended twisting force is 10±1 kgf·cm (0.79 to 0.97 inch-pounds).

# 4 Verifying Operating Status

## 4.1 Setting Up the Configuration Environment

The AP can be powered by PoE or DC power adapter.

**Setting up Environment**

(1) When the AP is powered through DC or PoE, ensure that the power cord is properly connected and meets safety requirements.

(2) Use a twisted pair cable to connect the AP that is powered properly to the AC.

(3) When the AP is connected with a PC, verify that the PC and PoE switch are properly grounded.

## 4.2 Powering on the AP

**Checklist before Power-on**

- The power cord is properly connected.
- The power voltage follows the requirement.

**Checklist after Power-on (Recommended)**

After the AP is powered on, check the following items to ensure the normal configuration:

- Check whether any message is printed on the configuration interface of AC after the AP is powered on.
- The LED status is normal.

## 4.3 Resetting the System/Restoring to Factory Settings

The AP adopts a concealed Reset hole design for after-sales and O&M personnel to perform system of factory reset. Non-O&M personnel and users should proceed with caution to avoid device errors caused by improper operation.

### 4.3.1 Resetting the System

To reset the system, insert an iron rod with a diameter of less than 1 mm into the concealed hole, press and hold the button for more than three seconds, and release it until you hear a click.

### 4.3.2 Restoring to Factory Settings

To restore the AP to factory settings, insert an iron rod with a diameter of less than 1 mm into the concealed hole, press it slightly, and release it after hearing a click and holding it for more than three seconds.

# 5 Monitoring and Maintenance

## 5.1 Monitoring

**LED**

You can monitor the AP in operation by observing the LED. Examples:

- Solid green after fast blinking: The AP is being initialized and is operating normally.
- Blinking red: The AP is updating program, and cannot be powered off.
- Blinking orange: The AP is operating normally, but the Ethernet port is in link-down state.
- Blinking green (at 1 Hz): The AP is operating normally and the Ethernet port is in link-up state, but the CAPWAP tunnel is faulty.
- Blinking green (at 0.4 Hz): The AP is operating normally and the CAPWAP tunnel is established with clients connected to the AP.
- Blinking green (at 0.25 Hz): The AP is operating normally. No client is connected to the AP and the system is in low-power mode.

## 5.2 Remote Maintenance

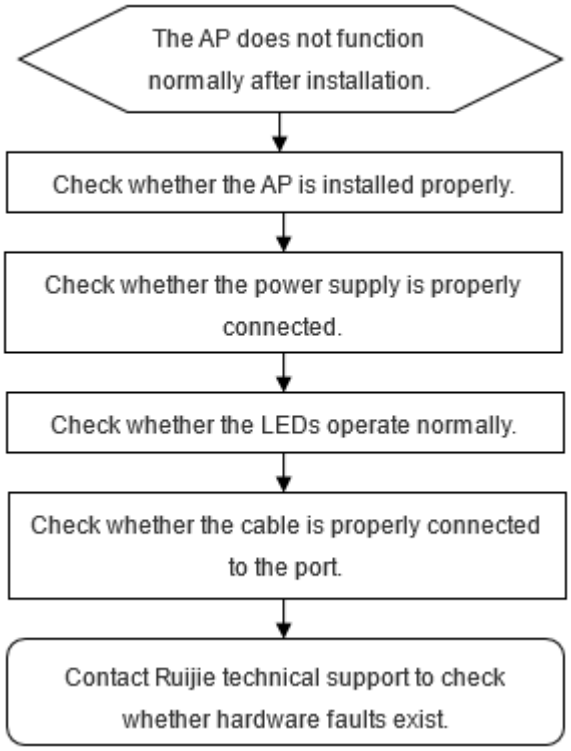
- If the AP works in fat mode, you can log in to the AP directly for remote maintenance.
- If the AP works in fit mode, you can use the AC to remotely manage and maintain the AP.

## 5.3 Hardware Maintenance

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

# 6 Common Troubleshooting

## 6.1 Troubleshooting Flowchart




## 6.2 Common Troubleshooting

**The status LED is still off after the access point is powered on.**

(1) If you use a PoE power supply, check whether the PSE is at least 802.3at-capable, and then check whether the Ethernet cable is connected properly.

(2) If you use a DC power supply, check whether the power supply has mains input and whether the PSE works properly.

**The Ethernet port does not work after the Ethernet cable is plugged in.**

Check whether the peer device of the Ethernet cable is working properly, and check whether the Ethernet cable is capable of providing the required data rate and is properly connected.

**The client cannot find the access point.**

(3) Check whether the AP is properly powered.

(4) Check whether the Ethernet port is correctly connected.

(5) Check whether the AP is correctly configured.

(6) Move the client closer to the AP.

# 7 Appendix

## 7.1 Connectors and Media

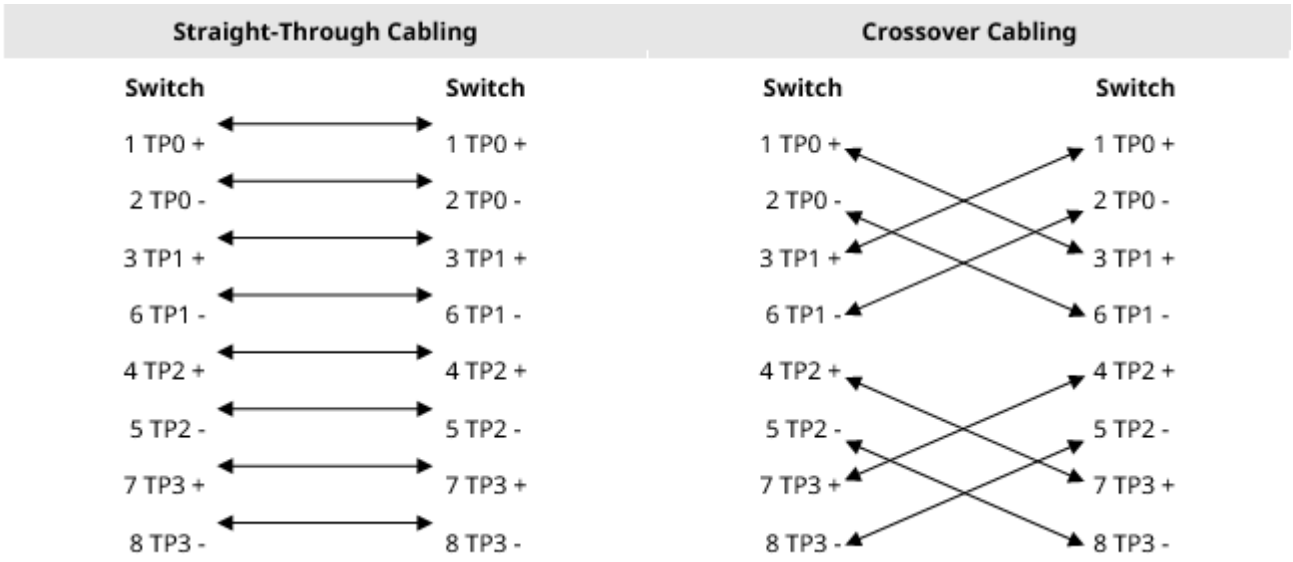
**1000BASE-T/100BASE-TX/10BASE-T Port**

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

Compliant with IEEE 802.3ab, the 1000BASE-T port requires 100-ohm Category 5/5e Unshielded Twisted Paired (UTP) or Shielded Twisted Pair (STP) with a maximum distance of 100 meters (328.08 ft.).

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

**Figure 7-1 Connections of Four Twisted Pairs for the 1000BASE-T Port**




In addition to cables with the above-mentioned specifications, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 3, 4, and 5 cables for 10 Mbps data transmission speed and using 100-ohm Category 5 cables for 100 Mbps data transmission speed with a maximum connection distance of 100 meters (328.08 ft.). The following table shows 100BASE-TX/10BASE-T pin assignments.

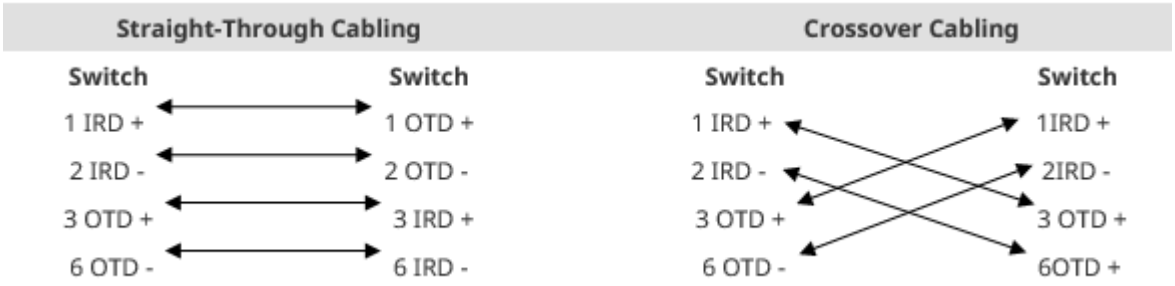
**Table 7-1 Pin Assignments for the 100BASE-TX/10BASE-T Port**

| 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 |

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

**Figure 7-2 Twisted Pair Connections for the 100BASE-TX/10BASE-T Port**



## 7.2 Cabling Recommendations

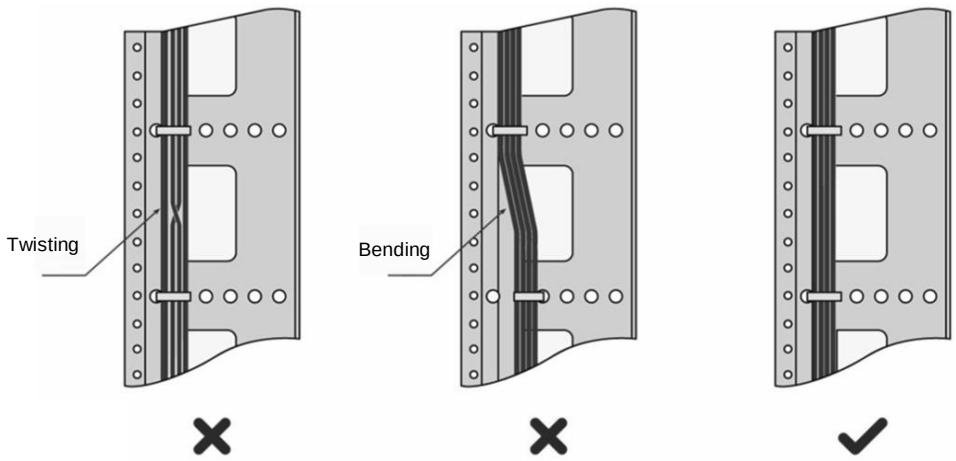
During installation, route cable bundles upward or downward along the sides of the rack depending on the actual situation in the equipment room. All cable connectors should be placed at the bottom of the cabinet rather than be exposed outside of the cabinet. Power cords are routed beside the cabinet, 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 fixed power cord, network cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than their respective diameters.
- The bend radius of a fixed common coaxial cable should be over seven times greater than its diameter. The bend radius of the common coaxial cable that is often bent or plugged should be over 10 times greater than its diameter.
- The 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 7-3.

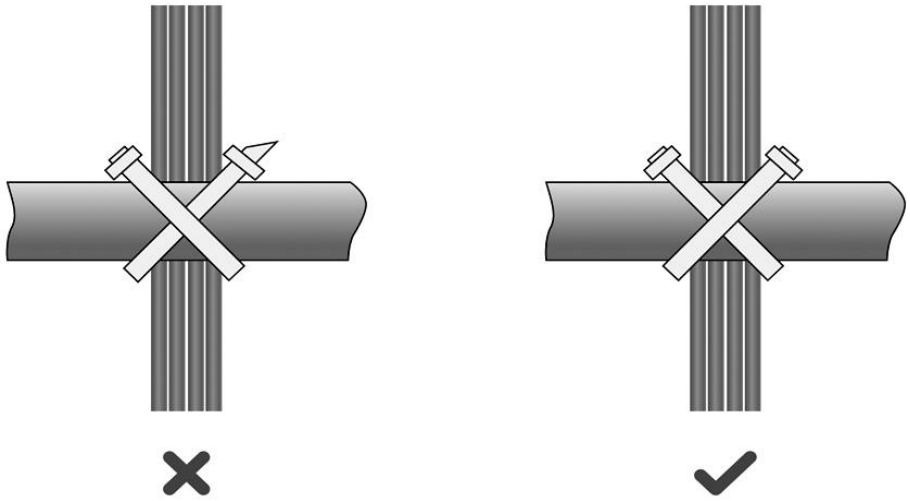
**Figure 7-3 Bundling Cables**




  - 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 to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.

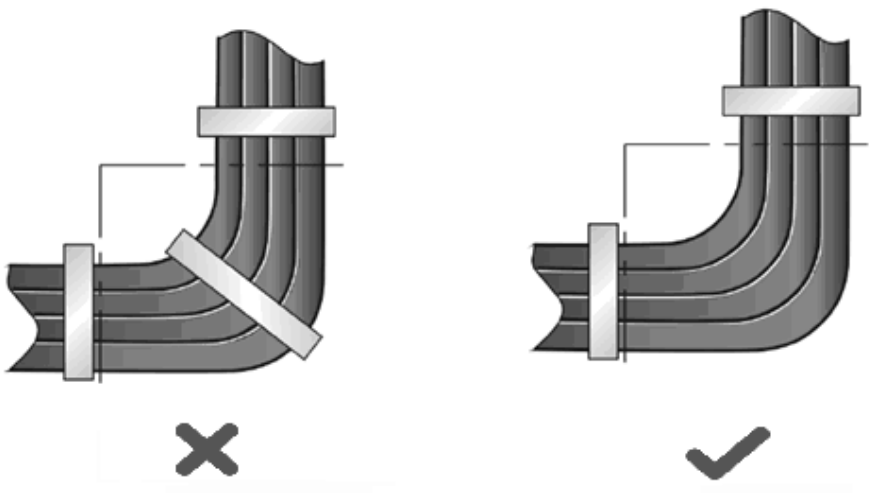
- The cable management brackets and cabling troughs inside and outside the cabinet should be smooth without sharp corners.
- The metal hole traversed by cables should have a smooth and fully rounding surface or an insulated lining.
- Use cable ties to bundle up cables properly. Please do not connect two or more cable ties to bundle up cables.
- After bundling up cables with cable ties, cut off the remaining part. The cut should be smooth and trim, without sharp corners, as shown in Figure 7-4.

**Figure 7-4 Cutting off Excess Cable Tie**



- When cables need to be bent, bind them first but do not tie cable ties within the bend. Otherwise, stress may be generated on the cables and cause the wires inside to break, as shown in Figure 7-5.

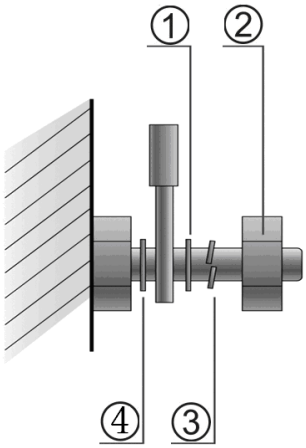
**Figure 7-5 Do Not Tie Cable Ties within the Bend**



- 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. A proper position does not affect device running or damage the device or cable.

- 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 assembled to avoid suffering tension or stress. When the moving part reaches the installation position, the remaining cable part should not be in contact with heat sources, sharp corners, or sharp edges. If heat sources cannot be avoided, high-temperature cables should be used.
- When screw threads are used to fasten cable terminals, the bolt or screw must be tightly fastened, and anti-loosening measures should be taken, as shown in Figure 7-6.

**Figure 7-6 Fastening Cable Lugs**




Note:
① Flat washer
② Nut
③ Spring washer
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 cords 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.
- Cables need to be tied according to the following table.

| Cable Bunch Diameter (mm) | Distance Between Every Binding Point (mm) |
|---|---|
| 10 mm (0.39 in.) | 80 mm to 150 mm (3.15 in. to 5.91 in.) |
| 10 mm to 30 mm (0.39 in. to 1.18 in.) | 150 mm to 200 mm (5.91 in. to 7.87 in.) |
| 30 mm (1.18 in.) | 200 mm to 300 mm (7.87 in. to 11.81 in.) |

- No knot is allowed in cabling or bundling.
- For wiring terminal blocks (such as circuit breakers) with cord end terminals, the metal

part of the cord end terminal should not be exposed outside the terminal block when assembled.

## 7.3 DC Connector Specifications

Input voltage: 12 V DC, rated current: 1 A

**Table 7-2 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 (0.39 in.) | Center positive |

**Figure 7-7 DC Connector Dimensions**