Ruijie Reyee RG-RAP73HD Access Point

Hardware Installation and Reference Guide

Copyright

Disclaimer

Preface

Audience

This document is intended for:

- Network engineers

- Technical support and servicing engineers

- Network administrators

Technical Support

- Official Website of Ruijie Reyee: https://www.ruijienetworks.com/products/reyee

- Technical Support Website: https://www.ruijienetworks.com/support

- Case Portal: https://caseportal.ruijienetworks.com

- Community: https://community.ruijienetworks.com

- Technical Support Email: service_rj@ruijienetworks.com

Conventions

1. GUI Symbols

Interface symbol	Description	Example
Boldface	1. Button names 2. Window names, tab name, field name and menu items 3. Link	1. Click **OK**. 2. Select **Config Wizard**. 3. Click the **Download File** link.
>	Multi-level menus items	Select **System** > **Time**.

2. Signs

The signs used in this document are described as follows:

> ⚡ **Danger**
> An alert that calls attention to safety instruction that if not understood or followed can result in personal 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.

3. Note

This manual provides installation steps, troubleshooting, technical specifications, and usage guidelines for cables and connectors. It is intended for users who want to understand the above and have extensive experience in network deployment and management, and assume that users are familiar with related terms and concepts.

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1 Product Overview

1.1 Package Contents

Table 1-1   Package Contents

Item	Quantity
RG-RAP73HD Access Point	1
PoE Adapter	1
Power Cord (Region-Specific)	1
Mounting Bracket	1
Security Screw	1
Phillips Pan Washer Head Self-Tapping Screw	3
Wall Anchor	3
User Manual	1
Warranty Card	1

> 🛈 **Note**

The package contents generally contain the preceding items. The actual delivery is subject to the order contract. Please check your goods carefully against the order contract. If you have any questions, please contact the distributor.

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1.2 Product Appearance

1.2.1 Top Panel

Figure 1-1 Top Panel

Table 1-2 LED

Status	Description
Solid Blue	The AP is operating normally with no alarms.
Off	The AP is not powered on.
Fast Flashing	The AP is starting up.
Slow Flashing (at 0.5 Hz)	The network is unconnected.
Flashing Twice in Succession	Possible cases: ● The AP is restoring factory settings. ● The AP is recovering automatically by upgrading the firmware. Note: Do not power off the AP in this case.
One Long Flash Followed by Three Short Flashes	Other fault occurs.

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1.2.2 Bottom Panel

Figure 1-2　Bottom Panel
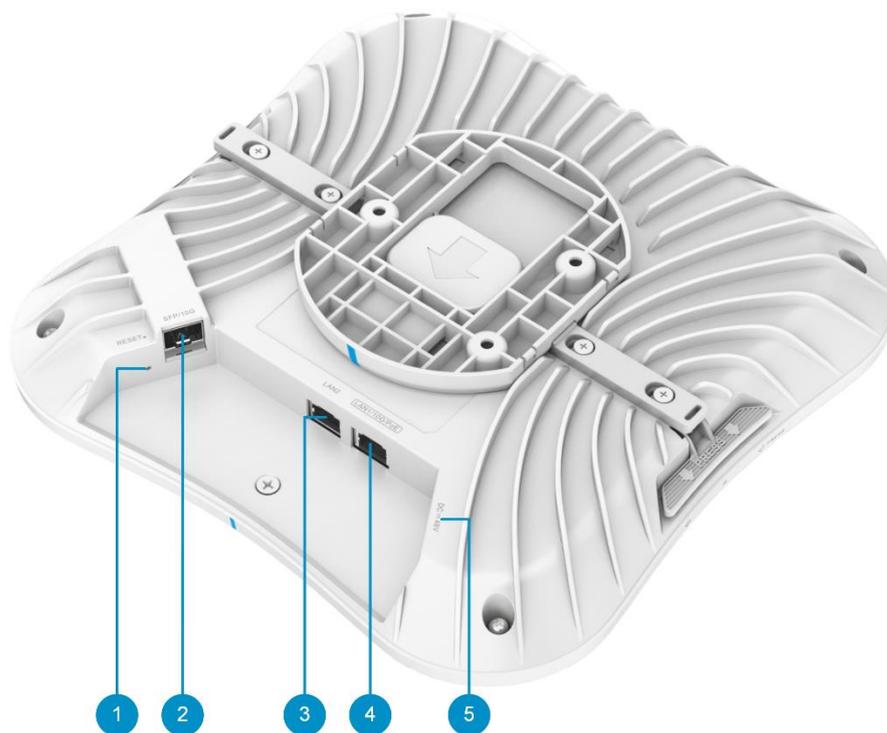
Table 1-3　Ports and Reset Hole

No.	Item	Description
1	Reset Hole	● Stick the pin into the Reset hole: Restart the AP. ● Press and hold the pin to the Reset hole for more than 5 seconds: Restore the AP to factory settings.
2	SFP/10G Port	10GBase-X SFP port (The optical module needs to be purchased separately) The 10GBase-X SFP port and the LAN1/10G/PoE port can connect to the uplink device simultaneously to provide a combined data rate.
3	LAN2 Port	10/100/1000Base-T Ethernet port
4	LAN1/10G/PoE Port	100M/1000M/2.5G/5G/10GBase-T Ethernet port, PoE-capable
5	DC Connector	Supplying power to the device and supporting a DC adapter

1.3 Technical Specifications

Table 1-4   Technical Specifications

Radio Design	Tri-radio, four spatial streams
Standard & Protocol	802.11be, 802.11ax, 802.11ac wave2/wave1 and 802.11a/b/g/n
Operating Frequencies	802.11b/g/n/ax/be: 2.4 GHz to 2.4835 GHz 802.11a/n/ac/ax/be: 5.150 GHz to 5.350 GHz, 5.470 GHz to 5.725 GHz, and 5.725 GHz to 5.850 GHz 802.11ax/be: 5.925 GHz to 6.425 GHz
Antenna Type	Planar inverted-F (PIFA) antennas Antenna gain: 2.4 GHz: 6.72dBi 5 GHz: 8.46dBi 6 GHz: 6.49dBi
Spatial Streams	2.4 GHz: four spatial streams, 4x4 MU-MIMO 5 GHz: four spatial streams, 4x4 MU-MIMO 6 GHz: four spatial streams, 4x4 MU-MIMO
Max. Data Rate	2.4 GHz: 1.376 Gbps 5 GHz: 5.765 Gbps 6 GHz: 11.530 Gbps Combined: 18.671 Gbps
Modulation	OFDM: BPSK @ 6/9 Mbps, QPSK @ 12/18 Mbps, 16-QAM @ 24 Mbps, and 64-QAM @ 48/54 Mbps DSSS: DBPSK @ 1 Mbps, DQPSK @ 2 Mbps, and CCK @ 5.5/11 Mbps MIMO-OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, and 4096-QAM OFDMA
Receive Sensitivity	11b: –91 dBm (1 Mbps), –90 dBm (5.5 Mbps), –87 dBm (11 Mbps) 11a/g: –89 dBm (6 Mbps), –82 dBm(24 Mbps), –78 dBm (36 Mbps), –72 dBm (54 Mbps) 11n: –85 dBm (MCS0), –67 dBm (MCS7), –62 dBm (MCS8) 11ac: 20 MHz: –85 dBm (MCS0), –62 dBm (MCS8) 11ac: 40 MHz: –82 dBm (MCS0), –59 dBm (MCS8) 11ac: 80 MHz: –79 dBm (MCS0), –53 dBm (MCS9) 11ac: 160 MHz: –76 dBm (MCS0), –50 dBm (MCS9)

	11ax: 20 MHz: –85 dBm (MCS0), –62 dBm (MCS8), –58 dBm (MCS11)
	11ax: 40 MHz: –82 dBm (MCS0), –59 dBm (MCS8), –54 dBm (MCS11)
	11ax: 80 MHz: –79 dBm (MCS0), –53 dBm (MCS9), –52 dBm (MCS11)
	11ax: 160 MHz: –76 dBm (MCS0), –49 dBm (MCS11)
	11be: 20 MHz: –85 dBm (MCS0), –52 dBm (MCS13)
	11be: 40 MHz: –82 dBm (MCS0), –49 dBm (MCS13)
	11be: 80 MHz: –82 dBm (MCS0), –46 dBm (MCS13)
	11be: 160 MHz: –79 dBm (MCS0), –44 dBm (MCS13)
	11be: 320 MHz: –76 dBm (MCS0), –41 dBm (MCS13)
Max. Transmit Power	CE EIRP: 2.4 GHz to 2.4835 GHz: 20 dBm 5.150 GHz to 5.350 GHz: 23 dBm 5.470 GHz to 5.725 GHz: 30 dBm 5.925 GHz to 6.425 GHz: 23 dBm Note: The transmit power is country-specific.
Power Increment	1 dBm
Dimensions (W x D x H)	258 mm × 258 mm × 59.5mm (10.16 in. x 10.16 in. x 2.20 in., without the mounting bracket)
Weight	≤ 2.0 kg (4.41 lbs., without the mounting bracket)
Service Port	1 x 100/1000/2.5G/5G/10GBase-T Ethernet port, PoE-capable 1 x 10/100/1000Base-T Ethernet port 1 x 10GBase-X SFP port (The optical module needs to be purchased separately.) Note: The access point itself does not transmit optical signals. An optical module must be installed on the access point to convert optical signals into electrical signals.
Management Port	N/A
Status LED	One LED (Blue)
Power Supply	There are two power supply modes available: ● Local power supply using adapters: 48 V DC ● PoE++ power supply: IEEE 802.3bt-compliant
Max. Power Consumption	60 W

Temperature	Working temperature: 0°C to 40°C (32°F to 104°F)
	Storage temperature: –40°C to +70°C (–40°F to +158°F)
Humidity	Working humidity: 5% RH to 95% RH (non-condensing)
	Storage humidity: 5% RH to 95% RH (non-condensing)
Certification	CE and FCC
MTBF	> 400,000 hours

⊘ **Warning**

● Operation of this equipment in a residential environment could cause radio interference.

● This equipment is not suitable for use in locations where children are likely to be present.

● ⚠: CAUTION! Hot surface. Do not touch.

1.4 Power Supply Specifications

The AP can be powered by either DC power supply using a customer-supplied adapter or PoE.

● If the AP adopts DC power supply, a 48 V DC adapter provided by Ruijie is required. The technical specifications of the adapter are as follows:

Inner Diameter	Outer Diameter	Depth	Conductor Resistance	Voltage Resistance	Voltage for Insulator and Conductor	Polarity Symbol
2.10 ± 0.05 mm (0.083 in. ± 0.002 in.)	5.50 ± 0.05 mm (0.22 in. ± 0.002 in.)	10 mm (0.39 in.)	5 Ω	100 MΩ	1000 V	Center (tip) of the output plug: Positive (+) Barrel (ring) of the output plug: Negative (–) Reverse polarity symbol is not allowed.

⚠ **Caution**

The DC input power should be greater than the power actually consumed by the AP.

● If the AP adopts PoE power supply, make sure that the power sourcing equipment (PSE) is 802.3bt-compliant. Connect the LAN1/10G/PoE port of the AP to a PoE-capable port of a switch or PSE using an Ethernet cable. If you use a PoE injector to power the AP, you are advised to use a Ruijie-certified 802.3bt-compliant PoE

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injector.

1.5 Cooling Solution

The AP adopts a fanless design.

⚠️ **Caution**

Maintain a sufficient clearance around the AP for air circulation.

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2 Preparing for Installation

2.1 Safety Precautions

> ℹ️ **Note**
> - To prevent device damage and physical injury, please read the safety recommendations carefully as described in this chapter.
> - The following safety precautions do not cover all possible hazardous situations.

2.1.1 Installation Safety

- Do not expose the AP to high temperature, dust, or harmful gases.

- Do not install the AP in an area prone to fire or explosions.

- 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 dry. Keep the AP at least 500 m (1640.42 ft) away from the ocean and do not face it towards the sea breeze.

- The installation site should be free from water including possible 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.

> ⚠️ **Caution**

Follow the installation instructions described in the guide correctly to install or remove the AP.

2.1.2 Handling Safety

- Do not move the installed AP frequently.

- Turn off all power supplies and unplug all power cables before you remove the AP.

2.1.3 Electric Safety

> ❗ **Warning**
> - Any nonstandard and inaccurate electrical operation can cause an accident such as fire or electric shock, thus causing severe even fatal damages to humans and devices.
> - Direct or indirect contact with a wet object (or your finger) on the high voltage and power line can be fatal.

- Please observe local regulations and specifications when performing electrical operations. Relevant operators must be qualified.

- Carefully check for any potential hazards in the working area such as damp/wet ground or floors.

- Find the location of the emergency power supply switch in the room before installation. Cut off the power supply first in case of an accident.

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- Be sure to make a careful check 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 Laser Safety

The optical modules supported by the AP are Class I laser products.

Precautions:

- When a fiber transceiver works, ensure that the port has been connected with a fiber or has been covered by a dust cap so as to keep out dust and prevent it from burning your eyes.

- Do not look into any fiber port.

⚠️ **Caution**

Do not look into any fiber port under any circumstances, as this may cause permanent damage to your eyes.

2.2 Installation Environment Requirements

The AP must be installed indoors. To ensure the normal operation and lengthen the service life of the AP, the installation site must meet the following requirements.

2.2.1 Load Bearing Requirements

Make sure the site is sturdy enough to support the RG-RAP73HD and its accessories.

2.2.2 Space Requirements

- Install the AP in a well-ventilated environment. If it is installed in a closed room, make sure there is a good cooling system.

- Make sure the site has enough space for installing the RG-RAP73HD and leave sufficient room around the AP for ventilation.

2.2.3 Ventilation Requirements

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

2.2.4 Temperature/Humidity Requirements

To ensure the normal operation and service life of the AP, maintain appropriate temperature and humidity in the equipment room. Improper room temperature and humidity can cause damage to the device.

- High relative humidity may affect insulation materials, resulting in poor insulation and even electrical leakage. Sometimes it may lead to changes in the mechanical properties of materials and corrosion of metal parts.

- Low relative humidity can dry and shrink insulation sheets and cause static electricity that can damage the circuitry.

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- High temperatures greatly reduce device reliability and shorten service life.

2.2.5 Cleanliness Requirements

Dust poses a serious threat to device operation. Dust on the surface of the device can be absorbed onto metal contact points by static electricity causing poor contact. Electrostatic absorption of dust occurs more easily when the relative humidity is low, and might shorten the equipment service life and cause communication failures. The following table shows the maximum concentration and diameter of dust allowed in the equipment room.

Table 2-1   Requirements for Dust Diameters and Concentration

Minimum Diameter (μm)	0.5	1	3	5
Maximum Concentration (Particles/m³)	1.4×10^7	7×10^5	2.4×10^5	1.3×10^5

The amount of salt, acids and sulfides in the air are also strictly limited for the equipment room. These substances can accelerate metal corrosion and aging of some parts. The following table describes the limits of some hazardous gases such as sulfur dioxide, hydrogen sulfide, nitrogen dioxide, ammonia gas and chlorine gas in the equipment room.

Table 2-2   Requirements for Gases

Gas	Average (mg/m3)	Maximum (mg/m3)
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** indicates the upper limit of the harmful gas measured in one week for up to 30 minutes every day.

2.2.6 EMI Requirements

- Keep the AP as far away from the grounding equipment of the power device and the lightning prevention equipment as possible.
- Keep the AP away from radio stations, radar stations, high-frequency high-current devices, and microwave ovens.

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2.3 Tools

Table 2-3   Tools

Common Tools	Phillips screwdrivers, power cords, Ethernet cables, cage nuts, diagonal plier, and cable tie
Special Tools	Antistatic gloves, wire stripper, crimping plier, RJ45 connector crimping plier, wire cutter, and waterproof tape
Meter	Multimeter and bit error rate tester (BERT)

🛈 **Note**

The RG-RAP73HD is delivered without a tool kit. The tool kit is customer-supplied.

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3 Installing the AP

The RG-RAP73HD is required to be installed and work indoors.

> ⚠️ **Caution**
>
> Before installing the AP, make sure you have carefully read the requirements described in Chapter 2 and the
> requirements are all met.

3.1 Before You Begin

Carefully plan and arrange the installation position, networking mode, power supply, and cabling before installation. Confirm the following requirements before installation:

- The installation site provides sufficient space for proper ventilation.
- The installation site meets the temperature and humidity requirements of the AP.
- The power supply and required current are available in the installation site.
- The selected power supply modules meet the system power requirements.
- The installation site meets the cabling requirements of the AP.
- The installation site meets the site requirements of the AP.
- The customized AP meets the client-specific requirements.

3.2 Precautions for Installation

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

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

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3.3 Installing the AP

> ℹ️ **Note**
>
> - In an indoor scenario, the Wi-Fi coverage of a ceiling-mount AP is larger than that of a wall-moun AP. You are advised to install the AP on the ceiling.
> - The images are for indicative purpose only and may not represent exact equipment.
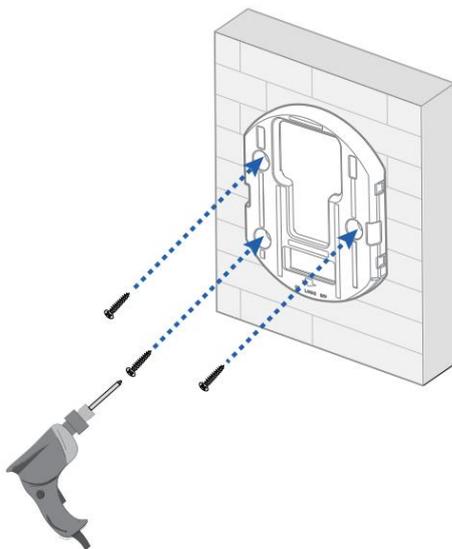
(1) Drill three holes on the wall or ceiling. Figure 3-1 shows the hole spacing.

Figure 3-1   Drilling Three Holes on the Wall or Ceiling
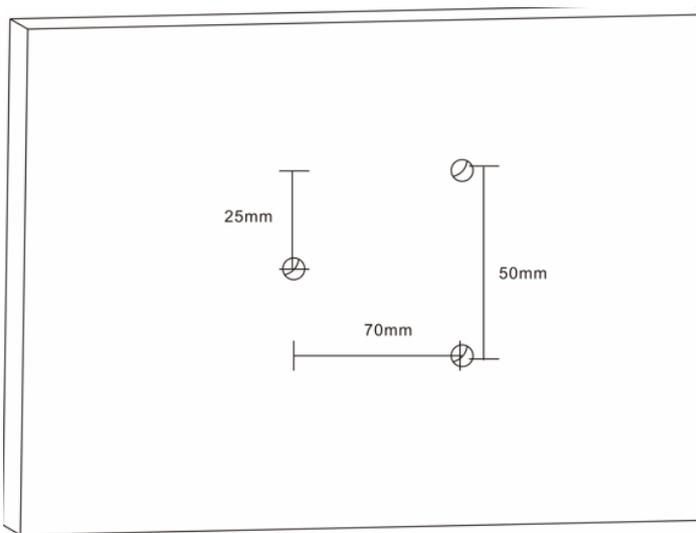
(2) Secure the assembly of the mounting bracket and fiber splice tray to the ceiling or wall by using self-tapping screws and wall anchors.

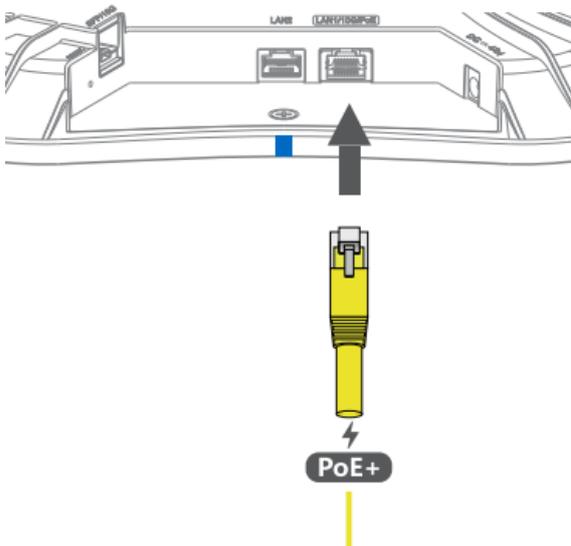**Figure 3-2   Securing the Assembly of the Mounting Bracket and Fiber Splice Tray to the Wall or Ceiling**

(3) Connect the Ethernet cable as required. The following describes the cable connections of the AP.

● Ethernet cable connection: Connect one end of the Ethernet cable to one of the LAN ports on the bottom panel of the AP. The LAN1/10G/PoE port is PoE-capable.

● Optical cable connection: Connect one end of the optical cable to the SFP/10G port on the bottom panel of the AP.

● DC power cord connection: If the AP adopts DC power supply, connect one end of the power cord to the DC connector on the bottom panel of the AP.

⚠ **Caution**

● Avoid a small bend radius at the connector of the cable.
● You are advised not to use an Ethernet cable with an RJ45 boot, which is inconvenient for cable connection.
● If you use an optical cable for data transmission, plug or unplug it gently. Otherwise, the fiber stub will be moved, affecting optical data transmission. Do not over-bend or twist the optical cable. Otherwise, optical attenuation during transmission will increase.

Figure 3-3   Connecting the Ethernet Cable

(4) Align the round feet at the bottom of the AP with the mounting holes on the bracket. Slide the AP into the mounting bracket.

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Figure 3-4 Securing the Access Point to the Mounting Bracket
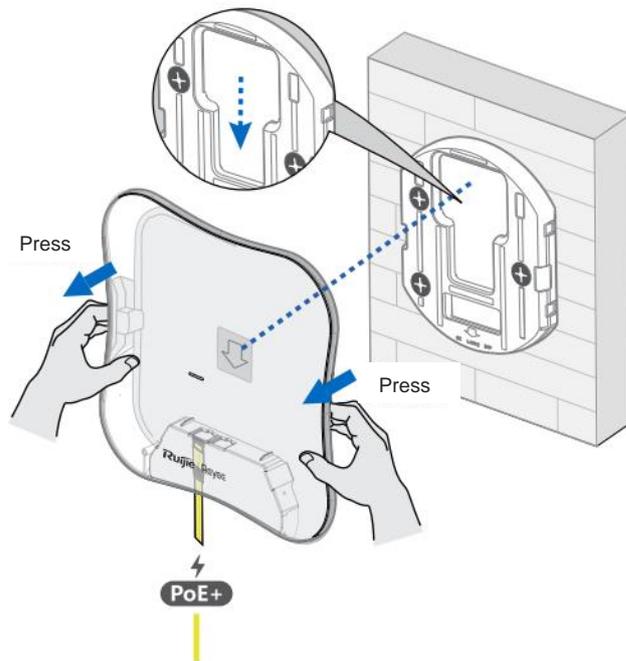
> ⚠️ **Caution**
> - Install the cables properly before securing the AP to the mounting bracket.
> - The AP can be installed in any of four directions on the mounting bracket depending on how you route the Ethernet cable.
> - The round feet should fit easily into the mounting holes. Do not force the round feet into the mounting holes.
> - After installation, verify that the AP is secured properly in case that the AP falls down.

3.4 Removing the AP

Press the spring latches on both sides of the AP to release it. Push the AP outward in the direction marked in Figure 3-5 to remove the AP.

Figure 3-5 Removing the AP

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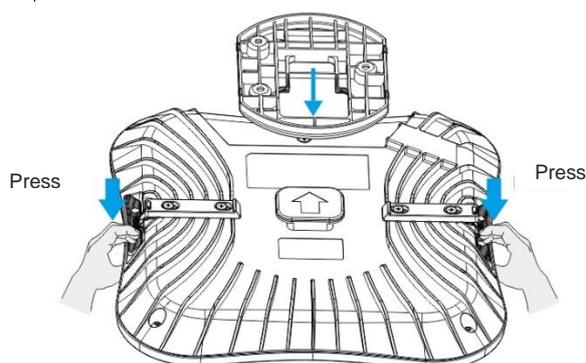
3.5 Bundling Cables

⚠️ **Caution**

- The power cords and other cables should be bound in a visually pleasing way.
- Make sure that the twisted pair cables at the connectors have natural bends or bends of large radius.
- Do not over tighten cable bundle as it may reduce the cable life and performance.

The steps for cable bundling are as follows:

(1) Bundle the drooping part of the cables and place the bundle as near the ports as possible.

(2) Route the cables under the AP and run them in straight line.

3.6 Checklist After Installation

(1) Checking the AP

- Verify that the external power supply matches with the requirement of the AP.

- Verify that the AP is securely fastened.

(2) Checking Cable Connections

- Verify that the UTP/STP cable matches with the port type.

- Verify that cables are properly bundled.

(3) Checking Power Supply

- Verify that the power cord is properly connected and compliant with safety requirements.

- Verify that the AP works properly when powered by the power supply.

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4 Verifying Operating Status

4.1 Setting up Configuration Environment

If the AP is powered by a DC power adapter or PoE, verify that the power cord is properly connected and compliant with safety requirements.

4.2 Powering on the AP

4.2.1 Checklist Before Power-on

● Verify that the power cord is properly connected.

● Verify that the input voltage meets with the requirement of the AP.

4.2.2 Checklist After Power-on

● Verify that the LED status is normal.

● Verify that the mobile phone or other wireless device can discover the SSID broadcast by the AP. If multiple devices exist on the network, use SSID @Ruijie-m*XXXX*. If only one device exists on the network, use SSID @Ruijie-s*XXXX*.

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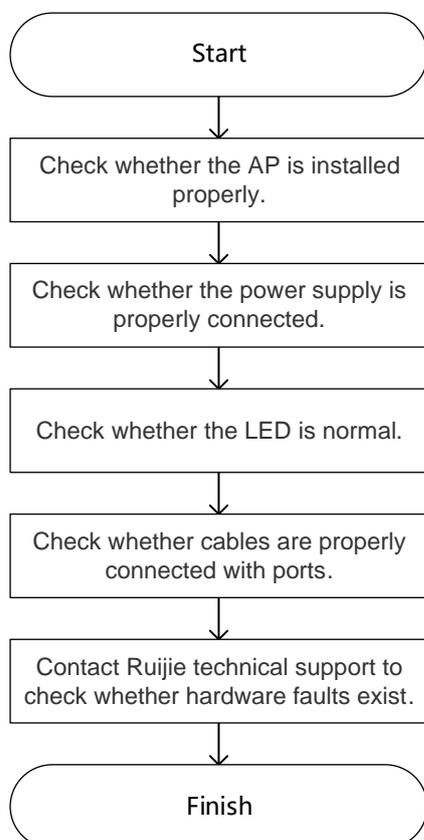# 5 Monitoring and Maintenance

5.1 Monitoring

When RG-RAP73HD is operating, you can monitor its status by observing the LEDs.

5.2 Maintenance

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

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6 Troubleshooting

6.1 General Troubleshooting Flowchart

```
┌──────────────────────────────┐
│            Start             │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│  Check whether the AP is     │
│  installed properly.         │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│  Check whether the power     │
│  supply is properly          │
│  connected.                  │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│  Check whether the LED is    │
│  normal.                     │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│  Check whether cables are    │
│  properly connected with     │
│  ports.                      │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│  Contact Ruijie technical    │
│  support to check whether    │
│  hardware faults exist.      │
└──────────────────────────────┘
              │
              ▼
┌──────────────────────────────┐
│            Finish            │
└──────────────────────────────┘
```

6.2 Common Faults

● The status LED is off after the AP is powered on.

  ○ If the AP is powered by PoE, verify that the PSE is 802.3bt-compliant and the Ethernet cable is connected properly.

  ○ If the AP is powered by a DC adapter, verify that the adapter has mains input and works properly and the adapter supports 48 V DC output.

● The Ethernet port or the optical port does not work after the Ethernet cable or the optical cable is plugged in.

  Check whether the peer device is working properly. Then verify that the cable is capable of providing the required data rate and is properly connected.

● The client cannot find the AP.

  ○ Verify that the AP is properly powered.

  ○ Verify that the Ethernet port or the optical port is correctly connected.

  ○ Verify that the AP is correctly configured.

 ○ Move the client device to adjust the distance between the client and the AP.

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7 Appendix

7.1 Connectors and Media

7.1.1 10GBase-X SFP Port

For the optical ports, select single-mode or multimode optical cables for connections according to the optical module connected. Figure 7-1 shows the connection schematic diagram.

Figure 7-1 Optical Cable Connections
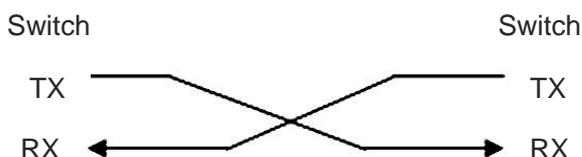
7.1.2 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX Port

The 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX port is a 100/1000/2500/5000/10000 Mbps port with auto-negotiation, which supports auto MDI/MDIX Crossover at these five rates.
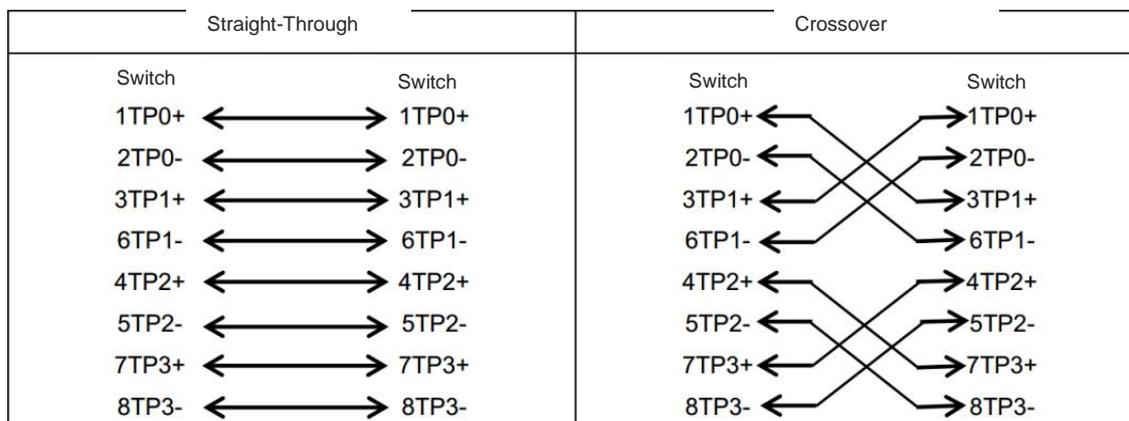
The 10GBASE-T complies with the IEEE 802.3an standard, and uses up to 100 m (328.08 ft) of 100-ohm CAT6a shield twisted pairs (STP), or twisted pairs with higher standard.

The 5GBASE-T/2.5GBASE-T complies with the IEEE 802.3bz standard, and uses up to 100 m (328.08 ft) of 100-ohm CAT6 or CAT5e twisted pairs. STP is recommended. CAT6 STP is recommended for PoE power supply. Take shielding measures for both ports and cables.

The 1000BASE-T complies with the IEEE 802.3ab standard, and uses up to 100 m (328.08 ft) of 100-ohm CAT5, CAT5e, or higher standard twisted cables.

The 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T port uses four pairs of wires for transmission, all of which must be connected. Figure 7-4 shows the connection of the twisted pairs used by the 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T port.

Figure 7-2 Four Twisted Pairs of the 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T

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In addition to the preceding cables, the 100BASE-TX can also use 100-ohm CAT3, CAT4, and CAT5 cables for 10 Mbps, and 100-ohm CAT5 cables for 100 Mbps, both of which support a link length of up to 100 m (328.10 ft). Table 7-1 shows the pinouts of the 100BASE-TX.

Table 7-1   Pinouts of the 100BASE-TX

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 the straight-through and crossover cable connections for the 100BASE-TX.

Figure 7-3   Connections of the Twisted Pairs of the 100BASE-TX
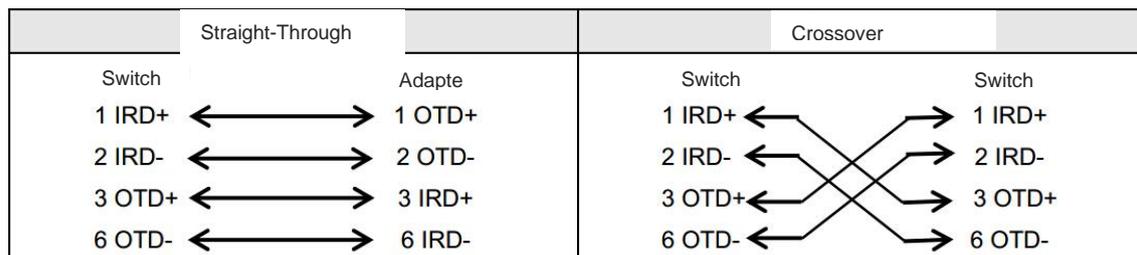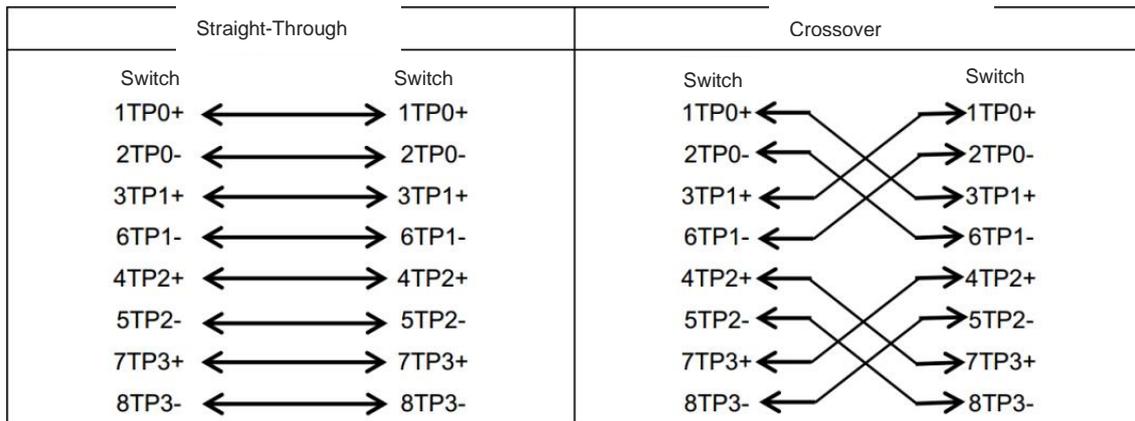

7.1.3 1000BASE-T/100BASE-TX/10BASE-T Port

The 1000BASE-T/100BASE-TX/10BASE-T is a 10/100/1000 Mbps port with auto-negotiation, which supports auto MDI/MDIX Crossover at these three rates.

The 1000BASE-T complies with IEEE 802.3ab standard, and uses up to 100 m (328.08 ft) of 100-ohm CAT5, CAT5e or twisted pairs with higher standard. The 1000BASE-T port uses four pairs of wires for transmission, all of which must be connected. Figure 7-4 shows the connection of the twisted pairs used by the 1000BASE-T port.

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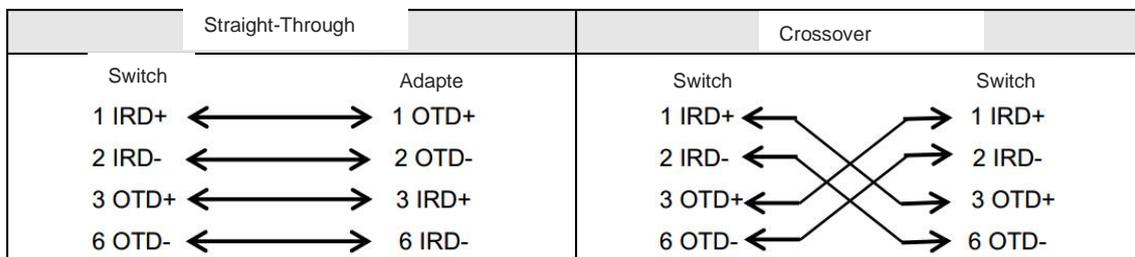
Figure 7-4   Four Twisted Pairs of the 1000BASE-T

In addition to the preceding cables, the 100BASE-TX/10BASE-T can also use 100-ohm CAT3, CAT4, and CAT5 cables for 10 Mbps, and 100-ohm CAT5 cables for 100 Mbps, both of which support a link length of up to 100 m (328.10 ft). Table 7-2 shows the pinouts of the 100BASE-TX/10BASE-T.

Table 7-2   Pinouts of the 100BASE-TX/10BASE-T

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

Figure 7-5 shows the straight-through and crossover cable connections for the 100BASE-TX/10BASE-T.

Figure 7-5   Connections of the Twisted Pairs of the 100BASE-TX/10BASE-T

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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 used for transit 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.

7.2.1 Requirements for 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 bend radius of a fixed high-speed cable (such as an SFP+ cable) should be over five times greater than its diameter. The bend radius of the fixed high-speed cable that is often bent or plugged should be over 10 times greater than its diameter.

7.2.2 Precautions for Bundling up Cables

- Before cables are bundled, mark labels and stick the labels to cables wherever appropriate.
- Cables should be neatly and properly bundled in the rack without twisting or bending.
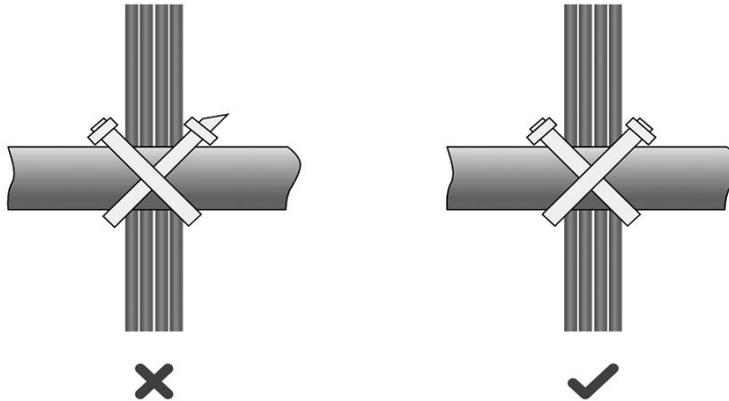
Figure 7-6   Bundling up Cables (1)
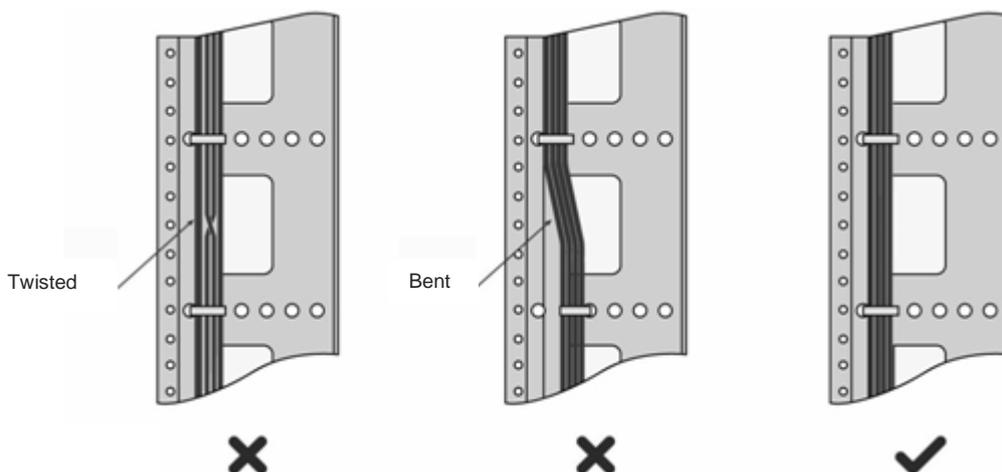
- Cables of different types (such as power cords, signal cables, and grounding cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance 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.

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- 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.

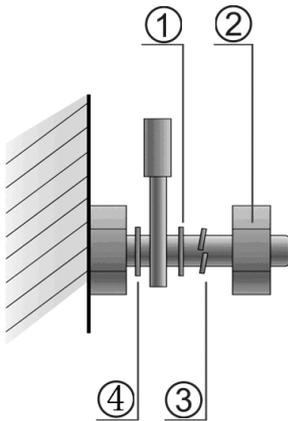**Figure 7-7   Bundling up Cables (2)**

- When cables need to be bent, you should first bundle them up. However, the buckle cannot be bundled within the bend area. Otherwise, considerable stress may be generated in cables, breaking cable cores.

Figure 7-8   Bundling up Cables (3)
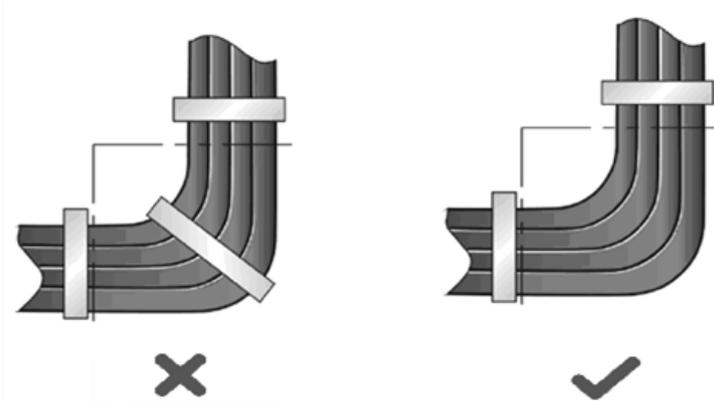
- Cables not to be assembled or remaining parts of cables should be folded and placed in a proper position of the rack or cable trough. The proper position refers to a position that does not affect device running or damage the device or cable.

- 220 V and 48 V power cords must not be bundled on the guide rails of moving parts.

- The power cords connecting moving parts such as grounding cables should be reserved with some access after being assembled to avoid suffering tension or stress. After the moving part is installed, 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. If heat sources cannot be avoided, high-temperature cables should be used.

- When screw threads are used to fasten cable terminals, the anchor or screw must be tightly fastened, as shown in Figure 7-9.

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Figure 7-9   Cable Fastening

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 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.

- Binding by using buckles should be performed according to Table 7-3.

Table 7-3   Cable Bunch

Cable Bunch Diameter	Distance between Every Binding Point
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 air switches) of the cold pressing terminal type, the metal part of the cord end terminal should not be exposed outside the terminal block when assembled.