



Ruijie RG-AP9861-R 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>


Conventions


1. Signs


The signs used in this document are described as follows:

 **Danger**
An alert that contains important safety instructions. Before you work on any equipment, be aware of the hazards involved and be familiar with standard practices in case of accidents.

 **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. Notes

The manual provides configuration information, including models, port types, and command line interfaces, for reference purposes only. In the event of any discrepancy or inconsistency between the manual and the actual version, the actual version shall take precedence.

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1 Product Overview

1.1 About the RG-AP9861-R

The RG-AP9861-R is a Wi-Fi 7 five-radio flagship access point (AP) launched by Ruijie Networks for high-density indoor scenarios in the sectors covering higher education, government, general education, finance, and business.

In compliance with IEEE 802.11be, IEEE 802.11ax, IEEE 802.11ac Wave2, IEEE 802.11ac Wave1, and IEEE 802.11n standards, the RG-AP9861-R adopts a hardware-independent five-radio design and delivers a combined peak data rate of 24.436 Gbps, eliminating the performance bottleneck.

The RG-AP9861-R integrates Ruijie AI radio design. The additional intelligent radio enables real-time full-band scanning, ensuring high security and superior user experience in the Wi-Fi environment

The RG-AP9861-R is designed considering factors such as wireless network security, radio control, mobile access, QoS, seamless roaming, and Internet of Things (IoT) module expansion. The IoT radio frequency (RF) connector supports Bluetooth 5.3, Zigbee module, and Power over Ethernet (PoE) output. The RG-AP9861-R can be used together with Ruijie access controllers (ACs), RG-INC, and RG-WIS to implement wireless user data forwarding, security, access control, and IoT application expansion.

The RG-AP9861-R supports local power supply and PoE, which can be selected based on power supply conditions. In addition, the RG-AP9861-R can be mounted on a wall or ceiling, making it ideal for high-density scenarios including large campuses, conference centers, plazas, enterprise offices, and operation hotspots.

1.2 Hardware Features

The RG-AP9861-R provides five radio frequency (RF) connectors, one 10GE SFP+ combo port, one 100M/1000M/2.5GE/5GE/10GE auto-negotiation Ethernet port that is shared with the SFP+ port, one 100M/1000M/2.5GE/5GE/10GE auto-negotiation Ethernet port, one 10/100/1000Base-T downlink auto-negotiation Ethernet port that can supply power to an IoT unit, one console port, and one DC power connector.

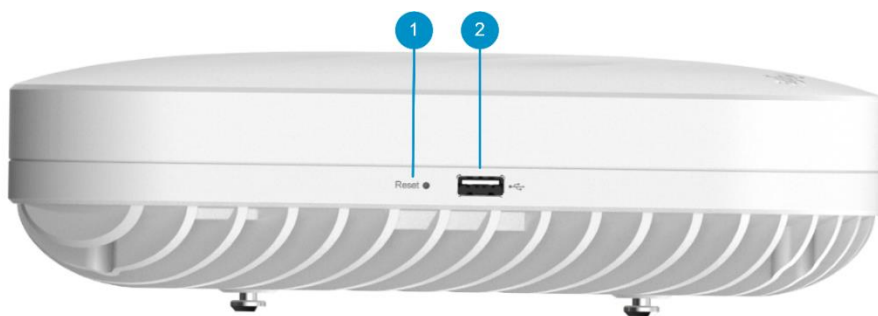
Figure 1-1 Front View of the RG-AP9861-R



Table 1-1 LED

No.	LED	Description
1	System status LED	Used to indicate the operating status of the system.

Figure 1-2 Side View of the RG-AP9861-R



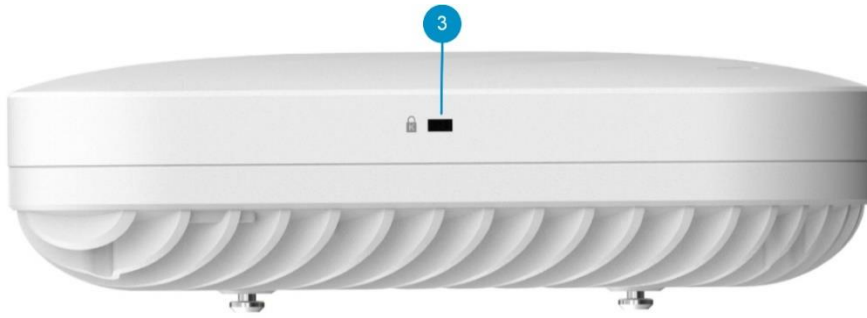


Table 1-2 Button and Port

No.	Button and Port	Description
1	Reset button	Used to restart the AP or restore the AP to factory settings.
2	USB port	Connected to a USB device.
3	Lock slot	Connected to a Kensington lock.

Figure 1-3 Bottom View of the RG-AP9861-R



Table 1-3 Button and Ports

No.	Button and Ports	Description
1	DC power connector	Connected to a 54 V DC power supply to source power to the AP.
2	SFP+	Uplink service port for data transmission, shared with one 10GE electrical port (WAN 2/10G noted by 4), called a combo port.
3	WAN 1/10G/PoE	Uplink service port for wired connection and service data transmission, supporting 802.3at/bt-compliant PoE input.
4	WAN 2/10G	Uplink service port for data transmission, shared with one SFP+ port (noted by 2), called a combo port.
5	LAN 1/IoT	Downlink service port for wired connection and service data transmission, supplying power to an IoT unit.
6	Console port	Connected to a serial port for device management.

 **Note**

The nameplate is located at the bottom of the device.

1.3 Package Contents

Table 1-4 Package Contents

No.	Item	Quantity
1	RG-AP9861-R access point	1
2	Mounting bracket	1
3	<i>Quick Start Guide</i>	1
4	<i>Hazardous Substance Table</i>	1
5	<i>Warranty Card</i>	1
6	<i>Package Contents</i>	1
7	M3 x 20 mm security screw	1
8	M6 x 50 mm expansion anchor	2

1.4 Technical Specifications

1.4.1 Dimensions and Weight

Table 1-5 Dimensions and Weight

Dimensions and Weight	RG-AP9861-R
Dimensions (W x D x H)	Main unit: 245 mm x 245 mm x 67 mm (9.65 in. x 9.65 in. x 2.64 in.) Shipping: 485 mm x 346 mm x 340 mm (19.09 in. x 13.62 in. x 13.39 in.)
Weight	Main unit: 2.0 kg (4.41 lbs) Mounting bracket: 0.2 kg (0.44 lbs) Shipping weight: 2.76 kg (6.08 lbs)
Mounting	Wall/Ceiling-mount (a mounting bracket is delivered with the main unit)
Color	White
Lock option	Securing latch and Kensington lock
Mounting bracket dimensions (W x D x H)	145 mm x 131 mm x 14 mm (5.71 in. x 5.16 in. x 0.55 in.)
Mounting hole pattern	75 mm (2.95 in.)
Mounting hole diameter	9 mm (0.35 in.)

1.4.2 System Specifications

Table 1-6 System Specifications

System Specifications	RG-AP9861-R
Memory	8 GB SDRAM
Flash memory	2GB NAND 32MB SPI

1.4.3 Wi-Fi Radio

Table 1-7 Wi-Fi Radio

Wi-Fi Radio	RG-AP9861-R
Radio design	Five-radio, 18 spatial streams per device: <ul style="list-style-type: none"> ● Radio1 – 2.4 GHz: 4x4, MU-MIMO, 4 spatial streams ● Radio2 – 5 GHz: 4x4, MU-MIMO, 4 spatial streams ● Radio3 – 5 GHz: 4x4, MU-MIMO, 4 spatial streams

Wi-Fi Radio	RG-AP9861-R
	<ul style="list-style-type: none"> ● Radio4 – 6 GHz: 4x4, MU-MIMO, 4 spatial streams ● Radio5 – AI Radio, 2.4 GHz/5 GHz: 2x2, MIMO, 2 spatial streams
<p>Operating frequencies</p>	<p>Radio 1, 802.11b/g/n/ax/be:</p> <ul style="list-style-type: none"> ● 2.400 GHz to 2.4835 GHz ISM , channels 1 to 13 <p>Radio 2, 802.11a/n/ac/ax/be:</p> <ul style="list-style-type: none"> ● 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, U-NII-3/ISM, channels 149, 153, 157, 161, and 165 <p>Radio 3, 802.11a/n/ac/ax/be:</p> <ul style="list-style-type: none"> ● 5.150 GHz to 5.350 GHz, U-NII-1, channels 36, 40, 44, and 48; U-NII-2A, channels 52, 56, 60, 64 <p>Radio 4, 802.11a/n/ac/ax/be:</p> <ul style="list-style-type: none"> ● 5.925 GHz to 7.125 GHz U-NII-4 channels 1~233 <p>Radio 5:</p> <p>802.11b/g/n:</p> <ul style="list-style-type: none"> ● 2.400 GHz to 2.4835 GHz ISM, channels 1~13 <p>802.11a/n/ac:</p> <ul style="list-style-type: none"> ● 5.150 GHz to 5.250 GHz U-NII-1, channels 36, 40, 44, 48 ● 5.250 GHz to 5.350 GHz U-NII-2A, channels 52, 56, 60, 64 ● 5.470 GHz to 5.725 GHz U-NII-2C, channels 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140 ● 5.725 GHz to 5.850 GHz U-NII-3/ISM, channels 149, 153, 157, 161, 165 <p>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.</p>
<p>Packet aggregation</p>	<p>A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)</p>
<p>802.11n</p>	<p>16 spatial streams</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 4x4 MIMO, four spatial streams ● Radio 2 – 5 GHz: 4x4 MIMO, four spatial streams ● Radio 3 – 5 GHz: 4x4 MIMO, four spatial streams ● Radio 4 – 6 GHz: 4x4 MIMO, four spatial streams <p>Channel:</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 20 MHz and 40 MHz ● Radio 2 – 5 GHz: 20 MHz and 40 MHz ● Radio 3 – 5 GHz: 20 MHz and 40 MHz ● Radio 4 – 6 GHz: 20 MHz and 40 MHz ● Radio 5 – 2.4 GHz/5 GHz: 20 MHz and 40 MHz <p>Combined peak data rate: 2.400 Gbps</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 6.5 Mbps to 600 Mbps (MCS0 to MCS31) ● Radio 2 – 5 GHz: 6.5 Mbps to 600 Mbps (MCS0 to MCS31) ● Radio 3 – 5 GHz: 6.5 Mbps to 600 Mbps (MCS0 to MCS31)

Wi-Fi Radio	RG-AP9861-R
	<ul style="list-style-type: none"> ● Radio 4 – 6 GHz: 6.5 Mbps to 600 Mbps (MCS0 to MCS31) ● Radio 5 – 2.4 GHz/5 GHz: Scanning <p>Radio technologies: Orthogonal Frequency-Division Multiplexing (OFDM)</p> <p>Modulation types: BPSK, QPSK, 16-QAM, and 64-QAM</p> <p>Packet aggregation:</p> <ul style="list-style-type: none"> ● Aggregate MAC Protocol Data Unit (A-MPDU) ● Aggregate MAC Service Data Unit (A-MSDU) <p>Dynamic Frequency Selection (DFS)</p> <p>Cyclic Delay/Shift Diversity (CDD/CSD)</p> <p>Maximum Ratio Combining (MRC)</p> <p>Space-Time Block Coding (STBC)</p> <p>Low-Density Parity Check (LDPC)</p> <p>Transmit beam-forming (TxBF)</p>
<p>802.11ac</p>	<p>12 spatial streams</p> <ul style="list-style-type: none"> ● Radio 2 – 5 GHz: 4x4 MIMO, four spatial streams ● Radio 3 – 5 GHz: 4x4 MIMO, four spatial streams ● Radio 4 – 6 GHz: 4x4 MIMO, four spatial streams <p>Channel:</p> <ul style="list-style-type: none"> ● Radio 2 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 3 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 4 – 6 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 5 – 5GHz: 20 MHz, 40 MHz, and 80 MHz <p>Combined peak data rate: 10.401 Gbps</p> <ul style="list-style-type: none"> ● Radio 2 – 5 GHz: 6.5 Mbps to 3.467 Gbps (MCS0 to MCS9) ● Radio 3 – 5 GHz: 6.5 Mbps to 3.467 Gbps (MCS0 to MCS9) ● Radio 4 – 6 GHz: 6.5 Mbps to 3.467 Gbps (MCS0 to MCS9) ● Radio 5 – 5 GHz: Scanning <p>Radio technologies: Orthogonal Frequency-Division Multiplexing (OFDM)</p> <p>Modulation types: BPSK, QPSK, 16-QAM, 64-QAM, and 256-QAM</p> <p>Packet aggregation:</p> <ul style="list-style-type: none"> ● Aggregate MAC Protocol Data Unit (A-MPDU) ● Aggregate MAC Service Data Unit (A-MSDU) <p>Dynamic Frequency Selection (DFS)</p> <p>Cyclic Delay/Shift Diversity (CDD/CSD)</p> <p>Maximum Ratio Combining (MRC)</p> <p>Space-Time Block Coding (STBC)</p> <p>Low-Density Parity Check (LDPC)</p> <p>Transmit beam-forming (TxBF)</p>
<p>802.11ax</p>	<p>16 spatial streams</p>

Wi-Fi Radio	RG-AP9861-R
	<ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 2 – 5 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 3 – 5 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 4 – 6 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams <p>Channel:</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 20 MHz and 40 MHz ● Radio 2 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 3 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 4 – 6 GHz: 20 MHz, 40 MHz, 80 MHz, 160 MHz, and 320 MHz <p>Combined peak data rate: 20.363 Gbps</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 7.3 Mbps to 1.147 Gbps (MCS0 to MCS11) ● Radio 2 – 5 GHz: 7.3 Mbps to 4.804 Gbps (MCS0 to MCS11) ● Radio 3 – 5 GHz: 7.3 Mbps to 4.804 Gbps (MCS0 to MCS11) ● Radio 4 – 6 GHz: 7.3 Mbps to 9.608 Gbps (MCS0 to MCS11) <p>Radio technologies: uplink/downlink Orthogonal Frequency-Division Multiple Access (OFDMA)</p> <p>Modulation types: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM</p> <p>Packet aggregation:</p> <ul style="list-style-type: none"> ● Aggregate MAC Protocol Data Unit (A-MPDU) ● Aggregate MAC Service Data Unit (A-MSDU) <p>Dynamic Frequency Selection (DFS)</p> <p>Cyclic Delay/Shift Diversity (CDD/CSD)</p> <p>Maximum Ratio Combining (MRC)</p> <p>Space-Time Block Coding (STBC)</p> <p>Low-Density Parity Check (LDPC)</p> <p>Transmit beam-forming (TxBF)</p> <p>WPA3</p>
802.11be	<p>16 spatial streams</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 2 – 5 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 3 – 5 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams ● Radio 4 – 6 GHz: 4x4 uplink/downlink MU-MIMO, four spatial streams <p>Channel:</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 20 MHz and 40 MHz ● Radio 2 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 3 – 5 GHz: 20 MHz, 40 MHz, 80 MHz, and 160 MHz ● Radio 4 – 6 GHz: 20 MHz, 40 MHz, 80 MHz, 160 MHz, and 320 MHz <p>Combined peak data rate: 24.436 Gbps</p> <ul style="list-style-type: none"> ● Radio 1 – 2.4 GHz: 7.3 Mbps to 1.377 Gbps (MCS0 to MCS13) ● Radio 2 – 5 GHz: 7.3 Mbps to 5.765 Gbps (MCS0 to MCS13) ● Radio 3 – 5 GHz: 7.3 Mbps to 5.765 Gbps (MCS0 to MCS13) ● Radio 4 – 6 GHz: 7.3 Mbps to 11.529 Gbps (MCS0 to MCS13)

Wi-Fi Radio	RG-AP9861-R
	<p>Radio technologies: uplink/downlink Orthogonal Frequency-Division Multiple Access (OFDMA)</p> <p>Modulation types: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, and 4096-QAM</p> <p>Packet aggregation:</p> <ul style="list-style-type: none"> ● Aggregate MAC Protocol Data Unit (A-MPDU) ● Aggregate MAC Service Data Unit (A-MSDU) <p>Dynamic Frequency Selection (DFS)</p> <p>Cyclic Delay/Shift Diversity (CDD/CSD)</p> <p>Maximum Ratio Combining (MRC)</p> <p>Space-Time Block Coding (STBC)</p> <p>Low-Density Parity Check (LDPC)</p> <p>Transmit beam-forming (TxBF)</p> <p>WPA3</p>
<p>Antenna</p>	<p>Wi-Fi</p> <ul style="list-style-type: none"> ● 2.4 GHz: four built-in omnidirectional smart antennas, with peak antenna gain of 3 dBi ● 5 GHz: eight built-in omnidirectional smart antennas, with peak antenna gain of 3 dBi ● 6 GHz: four built-in omnidirectional smart antennas, with peak antenna gain of 3 dBi <p>Bluetooth</p> <ul style="list-style-type: none"> ● One built-in omnidirectional antenna, with peak antenna gain of 3 dBi
<p>Transmit power</p>	<p>2.4 GHz</p> <ul style="list-style-type: none"> ● Maximum transmit power: 30 dBm (1000 mw) ● Minimum transmit power: 10 dBm (10 mw) <p>5 GHz</p> <ul style="list-style-type: none"> ● Maximum transmit power: 30 dBm (1000 mw) ● Minimum transmit power: 10 dBm (10 mw) <p>6 GHz</p> <ul style="list-style-type: none"> ● Maximum transmit power : 30 dBm (1000 mw) ● Minimum transmit power : 10 dBm (10 mw) <p>Note: The transmit power adjusted in percentage. The transmit power is limited by local regulatory requirements. For details, see WLAN Country or Region Codes and Channel Compliance.</p>
<p>Radio technologies</p>	<p>802.11b: Direct-Sequence Spread-Spectrum (DSSS)</p> <p>802.11a/g/n/ac: Orthogonal Frequency-Division Multiplexing (OFDM)</p> <p>802.11ax: Orthogonal Frequency Division Multiple Access (OFDMA)</p> <p>802.11be: Orthogonal Frequency Division Multiple Access (OFDMA)</p>

Wi-Fi Radio	RG-AP9861-R
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 802.11be: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM

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

Radio Frequency Performance	RG-AP9861-R		
Frequency Band and Protocol	Data Rate	Maximum Transmit power per Transmit Chain	Maximum Receive Sensitivity per Receive Chain
2.4 GHz, 802.11g	6 Mbps	24 dBm	-91 dBm
	24 Mbps	23 dBm	-85 dBm
	36 Mbps	23 dBm	-80 dBm
	54 Mbps	21 dBm	-74 dBm
2.4 GHz, 802.11n (HT20)	MCS0	24 dBm	-85 dBm
	MCS7	20 dBm	-67 dBm
2.4 GHz, 802.11n (HT40)	MCS0	24 dBm	-82 dBm
	MCS7	20 dBm	-64 dBm
2.4 GHz, 802.11ax (HE20)	MCS0	24 dBm	-85 dBm
	MCS11	17 dBm	-58 dBm
2.4 GHz, 802.11ax (HE40)	MCS0	24dBm	-82 dBm
	MCS11	17dBm	-54 dBm
5 GHz, 802.11a	6 Mbps	24 dBm	-91 dBm
	24 Mbps	23 dBm	-85 dBm
	36 Mbps	23 dBm	-80 dBm
	54 Mbps	21 dBm	-74 dBm
5 GHz, 802.11n (HT20)	MCS0	24 dBm	-85 dBm
	MCS7	20 dBm	-67 dBm
5 GHz, 802.11n (HT40)	MCS0	24 dBm	-82 dBm

Radio Frequency Performance	RG-AP9861-R		
Frequency Band and Protocol	Data Rate	Maximum Transmit power per Transmit Chain	Maximum Receive Sensitivity per Receive Chain
	MCS7	20 dBm	-64 dBm
5 GHz, 802.11ac (HT20)	MCS0	24 dBm	-85 dBm
	MCS9	18 dBm	-60 dBm
5 GHz, 802.11ac (HT40)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-57 dBm
5 GHz, 802.11ac (HT80)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-56 dBm
5 GHz, 802.11ax (HE20)	MCS0	24 dBm	-85 dBm
	MCS11	17 dBm	-58dBm
5 GHz, 802.11ax (HE40)	MCS0	24 dBm	-82dBm
	MCS11	17 dBm	-54dBm
5 GHz, 802.11ax (HE80)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-56 dBm
	MCS11	17 dBm	-52dBm
5 GHz, 802.11ax (HE160)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-53 dBm
	MCS11	17 dBm	-50 dBm
5 GHz, 802.11be (EHT80)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-56 dBm
	MCS11	17 dBm	-52 dBm
	MCS13	15 dBm	-46 dBm
5 GHz, 802.11be (EHT160)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-53 dBm
	MCS11	17 dBm	-50 dBm
	MCS13	15 dBm	-44 dBm
6 GHz, 802.11ax (HE20)	MCS0	24 dBm	-85 dBm

Radio Frequency Performance	RG-AP9861-R		
Frequency Band and Protocol	Data Rate	Maximum Transmit power per Transmit Chain	Maximum Receive Sensitivity per Receive Chain
	MCS11	17 dBm	-58dBm
6 GHz, 802.11ax (HE40)	MCS0	24 dBm	-82dBm
	MCS11	17 dBm	-54dBm
6 GHz, 802.11ax (HE80)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-56 dBm
	MCS11	17 dBm	-52 dBm
	MCS13	15 dBm	-46 dBm
6 GHz, 802.11ax (HE160)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-53 dBm
	MCS11	17 dBm	-50 dBm
	MCS13	15 dBm	-44 dBm
6 GHz, 802.11ax (HE320)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-51 dBm
	MCS11	17 dBm	-50 dBm
	MCS13	15 dBm	-44 dBm
6 GHz, 802.11be (EHT20)	MCS0	24 dBm	-85 dBm
	MCS11	17 dBm	-58dBm
6 GHz, 802.11be (EHT40)	MCS0	24 dBm	-82dBm
	MCS11	17 dBm	-54dBm
6 GHz, 802.11be (EHT80)	MCS0	24 dBm	-82 dBm
	MCS9	18 dBm	-56 dBm
	MCS11	17 dBm	-52 dBm
	MCS13	15 dBm	-46 dBm
6 GHz, 802.11be (EHT160)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-53 dBm
	MCS11	17 dBm	-50 dBm

Radio Frequency Performance	RG-AP9861-R		
Frequency Band and Protocol	Data Rate	Maximum Transmit power per Transmit Chain	Maximum Receive Sensitivity per Receive Chain
	MCS13	15 dBm	-44 dBm
6 GHz, 802.11be (EHT320)	MCS0	24 dBm	-79 dBm
	MCS9	18 dBm	-51 dBm
	MCS11	17 dBm	-50 dBm
	MCS13	15 dBm	-44 dBm

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](#).

1.4.4 Bluetooth Radio

Table 1-8 Bluetooth Radio


Bluetooth Radio	RG-AP9861-R
Bluetooth	Bluetooth 5.3
Antenna type	Built-in omnidirectional antenna
Maximum antenna gain	3 dBi
Maximum transmit power	10 dBm
Receive sensitivity	-92 dBm

1.4.5 Port Specifications

Table 1-9 Port Specifications

Port Specifications	RG-AP9861-R
USB	USB 3.0 (Type-A connector) Supporting power output and connection to a storage or IoT module
GPS	Supported
Fixed service port	1 x 100/1000/2.5G/5G/10GBASE-T port (10G/PoE IN port on the AP) <ul style="list-style-type: none"> ● Auto MDI/MDIX crossover ● Compliant with IEEE 802.3at/bt standard (PoE+/PoE++) 1 x 1000/2.5G/5G/10GBASE-T port (10G/WAN2 port on the AP), shared with one

Port Specifications	RG-AP9861-R
	10GE SFP+ port 1 x 10GE SFP+ port, compatibility with 10GE/2.5GE/1GE modules, shared with one 10GE RJ45 port (10G/WAN2 port on the AP) 1 x 10/100/1000BASE-T port <ul style="list-style-type: none"> ● Supplying 48 V/12.95 W power to an IoT unit
Fixed management port	1 x RJ45 console port (serial console port)
Status LED	1 x multi-color system status LED <ul style="list-style-type: none"> ● AP power-on status ● Software initialization status and upgrade status ● Uplink service interface status ● Wireless user online status ● CAPWAP tunnel timeout ● Specific AP locating
Button	1 x Reset button <ul style="list-style-type: none"> ● 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.

 **Caution**

When USB 3.0 is used, interference with the 2.4 GHz signal may occur. You are advised to connect a USB 2.0 device to the USB port (USB 2.0 does not affect the 2.4 GHz signal), or use a USB 3.0 extension cable to keep the USB device away from the AP, thereby preventing interference.

1.4.6 Power Supply and Consumption

Table 1-10 Power Supply and Consumption

Power Supply and Consumption	RG-AP9861-R
Input power supply	The AP supports the following power supply modes: <ul style="list-style-type: none"> ● 54 V DC/1.25 A power input over DC connector ● PoE+/PoE++ input, in compliance with IEEE 802.3at/bt standard Note: If both DC power and PoE are available, DC power is preferred.
External power supply	Supported. <ul style="list-style-type: none"> ● The LAN 1 port can source 48 V/12.95 W power to an IoT unit. ● The USB port can source 5 V/1 A power to a storage or IoT module.
Maximum power consumption	60 W

⚠ Caution

- When the AP is powered by 802.3at (PoE+), the power sourcing equipment (PSE) should be 802.3at-capable.
- The AP adopts a fanless design. Maintain sufficient clearance around the AP for air circulation.

The following table lists the power consumption and working status of the AP in different power supply modes.

Power Supply Modes	PoE Input (802.3af-Compliant)	PoE+ Input (802.3at-Compliant)	PoE++ Input (802.3bt-Compliant)	DC Power Input
Input power consumption	Not supported	30 W	60 W	60 W
Output power consumption		25 W	60 W	60 W
Radio 1 (2.4 GHz)		Supported 2x2 MU-MIMO	Supported 4x4 MU-MIMO	Supported 4x4 MU-MIMO
Radio 2 (5 GHz)		Supported 2x2 MU-MIMO	Supported 4x4 MU-MIMO	Supported 4x4 MU-MIMO
Radio 3 (5 GHz)		Supported 2x2 MU-MIMO	Supported 4x4 MU-MIMO	Supported 4x4 MU-MIMO
Radio 4 (6 GHz)		Not supported	Supported 4x4 MU-MIMO	Supported 4x4 MU-MIMO
Radio 5 (AI Radio)		Not supported	Not supported	Supported 2x2 MIMO
PSE		<ul style="list-style-type: none"> ● Data transmission: Supported ● External power supply: Not supported 	Supported, supplying 48 V/12.95 W power to an external device	Supported, supplying 48 V/12.95 W power to an external device
USB		Not supported	Supported, supplying 5 V/5 W power to an external device	Supported, supplying 5 V/5 W power to an external device
BLE		Supported	Supported	Supported
SFP+	Supported	Supported	Supported	

1.4.7 Environment and Reliability

Table 1-11 Environmental and Reliability Specifications

Environment and Reliability	RG-AP9861-R
Temperature	Operating temperature: -10°C to +50°C (14°F to 122°F) Storage temperature: -40°C to +70°C (-40°F to +158°F) 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 166 m (544.62 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)

1.4.8 Regulatory Compliance

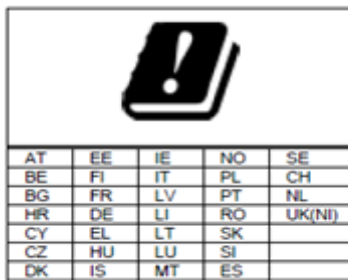
Table 1-12 Regulatory Compliance

Regulatory Compliance	RG-AP9861-R
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 301 489-19
	EN 300 328
	EN 301 893
	EN 300 440
	EN 303 413
	EN 303 687
	FCC Part 15
	EN IEC 62311
	IEC 62368-1
	EN 62368-1

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

Note:

- EU simplified DoC: Hereby, [Ruijie Networks Co., Ltd.] declares that the radio equipment type [RG-AP9861-R] is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://www.ruijienetworks.com/>.
- UK simplified DoC: Hereby, [Ruijie Networks Co., Ltd.] declares that the radio equipment type [RG-AP9861-R] is in compliance with UK Radio Equipment Regulation 2017. The full text of the UK declaration of conformity is available at the following internet address: <https://www.ruijienetworks.com/>.
- The functions of Wireless Access Systems including Radio Local Area Networks(WAS/RLANs) within the band 5150-5350 MHz for this device are restricted to indoor use only within all European Union countries (BE/BG/CZ/DK/DE/EE/IE/EL/ES/FR/HR/ IT/CY/LV/LT/LU/HU/MT/NL/AT/PL/PT/RO/SI/SK/FI/SE/TR/NO/CH/IS/LI/UK(NI))



1.5 LED and Button

Note

LED status descriptions are applicable to both fit and fat APs, unless otherwise specified.

Table 1-13 System LED

Color	Frequency	Description
Off	N/A	The AP is not powered on. Alternatively, the AP is powered on, but the LED is turned off through the software function.
Solid green	N/A	The software system is being initialized.
Solid red	N/A	The software system is operating normally but the uplink port of the AP is down.
Slow blinking red	On for 3s Off for 1s	In fit mode, CAPWAP tunnel establishment between the AP and the AC has timed out.
Fast blinking blue	On for 0.2s Off for 0.2s	In fit or cloud mode, the software system is being upgraded.
Solid blue	N/A	The software system is operating normally but there is no client online.

Color	Frequency	Description
Blinking blue	On for 1s Off for 1s	The software system is operating and there is at least one client online.
Fast blinking red	On for 0.2s Off for 0.2s	In fit mode, the LED locating function is enabled on the AP to discover a specific AP.

Table 1-14 Reset Button

Button	Action	Description
Reset button	Press the Reset button for less than 2 seconds.	Restart the AP.
	Press the Reset button for more than 5 seconds.	Restore the AP to factory settings.

1.6 Optical Transceivers

The peer device directly connected to the AP's optical port supports optical ports. However, the negotiation rates are different when the devices at both ends use different port rates or use different optical transceivers. For details, see [Table 1-15](#).

Table 1-15 Rate Negotiation for an Optical Port on the Peer Device (Unit: bps)

Optical Port Rate of the AP	Optical Transceiver Rate	Negotiated Rate Supported by the Port on the Peer Device		
		1 G	1 G/10 G/auto	1 G/2.5 G/5 G/10 G/auto
1 G/2.5 G/10 G	1 G	1 G	1 G	1 G
1 G/2.5 G/10 G	2.5 G	Not supported	Not supported	2.5 G
1 G/2.5 G/10 G	10 G	Not supported	10 G	10 G

Caution

The AP provides an uplink combo port. If Ethernet cables are connected to both uplink optical port and uplink electrical port, the optical port is preferentially selected for data transmission (the electrical port is automatically disabled). When the cable is removed from the optical port, the electrical port is automatically enabled.

2 Preparing for Installation

Note

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

2.1.1 Safety Guidelines

- 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 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.
- 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 m (1640.42 ft.) away from the ocean. You are advised not to orient the device toward the direction of sea breeze.
- Do not place the device in walking areas.
- During 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 the walking area.

2.1.2 Chassis-Lifting Guidelines

- The chassis is not intended to be moved frequently.
- Cut off all power supplies and unplug all power cords and cables before handling the AP.

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 touch through a wet object on high-voltage and mains supply can bring a fatal danger.
-
- Always observe the local regulations and standards. Only trained and qualified personnel should be allowed to operate the device.
 - Carefully check your work area for possible hazards, such as ungrounded power extension cables, missing safety grounds, and moist floors.
 - Locate the emergency power-off switch in the room. In the case of an electrical accident, you will be able to

quickly turn off the power.

- Never assume that power is disconnected from a circuit. Instead, always check.
- Do not place the device in a wet position. Avoid liquid inside the device.
- Keep the device far away from grounding or surge protection facility for power equipment.
- Keep the device away from radio stations, radar stations, high-frequency and high-current devices, microwave ovens, and other high-power wireless devices.

2.1.4 Storage Guidelines

To ensure normal operation, plan for your installation site according to the temperature and humidity requirement.

 **Caution**

If the device has been powered off for more than 18 months, power on the device and run it for consecutive 24 hours to activate the device.

2.2 Site Requirements

The device must be installed and used indoors. For normal operation and prolonged service life of the device, the installation site must meet the following requirements.

2.2.1 Floor Loading

Ensure that the floor under the rack supporting the chassis is capable of supporting the combined weight of the rack and all the other components.

2.2.2 Airflow

To ensure adequate airflow through the chassis, maintain a proper clearance around air vents. Route the cables and power cords through the cable management brackets to avoid blocking air intake vents.

2.2.3 Space

Do not install the device against the wall. Instead, maintain a minimum clearance of 0.4 m (1.31 ft.) around the device for ventilation and maintenance.

2.2.4 Temperature and Humidity

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

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

- In an environment with high relative humidity, the insulating material may have poor insulation or even leak electricity.
- In an environment with low relative humidity, the insulating strip may dry and shrink, resulting in screw loosening.
- In a dry environment, internal circuits are prone to static electricity.
- A high temperature can accelerate the aging process of insulation materials, greatly reducing the reliability of the device and severely affecting its service life.

Note

The operating temperature and humidity of the device are measured at the point that is 1.5 m (4.92 ft.) above the floor and 0.4 m (1.31 ft.) before the device with no protective plate in front or at the back of the device.

2.2.5 Cleanliness

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

Table 2-1 Requirements for Dust

Dust	Unit	Maximum Quantity
Dust particles (diameter $\geq 0.5 \mu\text{m}$)	Particles/m ³	1.4×10^7
Dust particles ($0.5 \mu\text{m} < \text{diameter} \leq 1 \mu\text{m}$)	Particles/m ³	7×10^5
Dust particles ($1 \mu\text{m} < \text{diameter} \leq 3 \mu\text{m}$)	Particles/m ³	2.4×10^5
Dust particles ($3 \mu\text{m} < \text{diameter} \leq 5 \mu\text{m}$)	Particles/m ³	1.3×10^5

Apart from dust, the salt, acid, and sulfide in the air of the equipment room must meet strict requirement. 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 2-2 Requirements for Gases

Gas	Average (mg/m ³)	Maximum (mg/m ³)
Sulfur dioxide (SO ₂)	0.2	1.5
Hydrogen sulfide (H ₂ S)	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

The average value is measured over one week. The maximum value is the upper limit of the harmful gas measured in one week for up to 30 minutes every day.

2.2.6 Preventing Electromagnetic Interference

- Interference prevention measures should be taken for the power supply system.
- Keep the device far away from the grounding facility or lightning and grounding facility of the power device.
- Keep the device 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 Surge Protection

Although the device can guard against lightning strikes, strong lightning strikes may still damage the device.

Take the following surge protection measures:

- Ensure that the grounding cable of the rack is in good close contact with the ground.
- You are advised to install a power arrester in front of the power input end to enhance surge protection for the power supply.

2.2.8 Installation Site

Regardless of whether the device is installed on a wall or ceiling, ensure that the following requirements are met:

- Maintain a proper clearance around air intake and exhaust vents for heat dissipation.
- Ensure that the installation site allows for proper cooling and ventilation.
- Ensure that the installation site is sturdy enough to support the weight of the device and its accessories.

2.3 Tools

Table 2-3 Tools

Common Tools	Phillips screwdriver, power cables, Ethernet cables, cage nuts, diagonal pliers, cable ties, screw nuts, spring washers, flat washers, wrench, and socket
Dedicated Tools	ESD-preventive gloves, wire strippers, crimping pliers, and wire cutters
Meters	Multimeter and bit error rate tester (BERT)
Relevant Devices	PC, display, and keyboard

Note

The RG-AP9861-R is delivered without a tool kit. The tool kit is customer-supplied.

3 Installing the Access Point

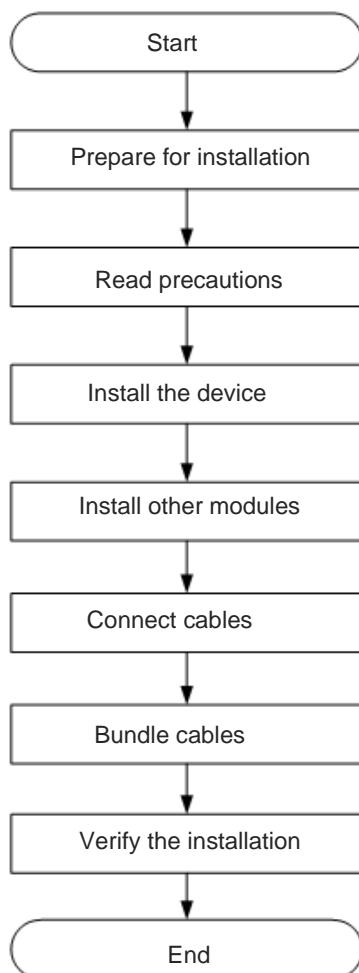
The RG-AP9861-R must be fixed and used indoors.

⚠ Caution

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

3.1 Installation Flowchart

The installation flowchart is as follows.



3.2 Before You Begin

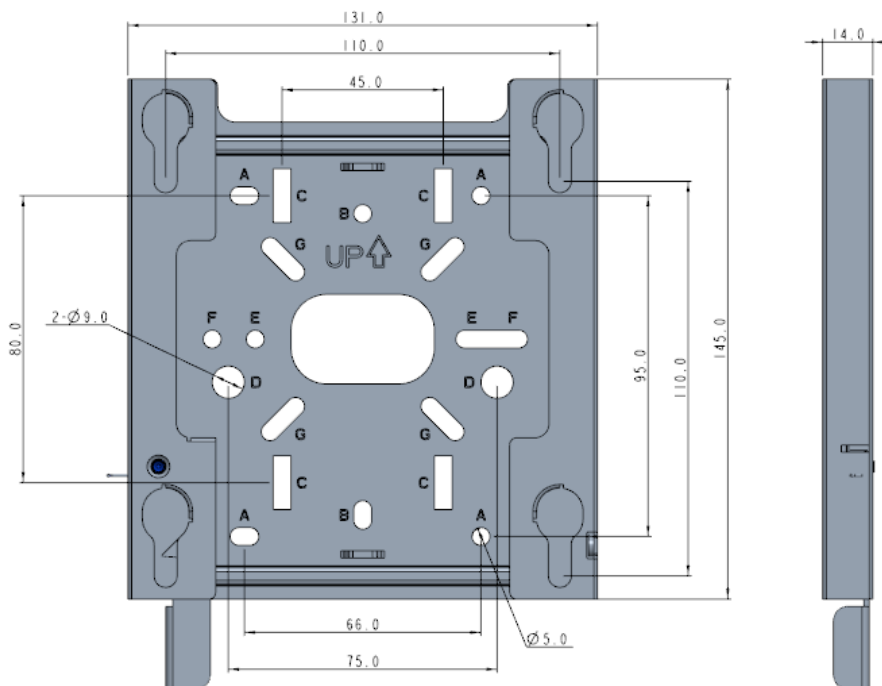
Carefully plan and arrange the installation location, networking, power supply, and cabling before installing the device.

Confirm the following requirements before installation:

- The installation site should provide sufficient space for heat dissipation.

- The installation site meets the temperature and humidity requirements of the device.
- The power supply and required current are available in the installation site.
- The Ethernet cables are deployed in the installation site.
- The selected power supply meets the system power requirements.
- Learn about the position of the indoor emergency power switch before installation. Turn off the power switch in case of accidents.
- To install the AP on a wall or ceiling, ensure that the mounting bracket dimensions, mounting hole pattern, and mounting hole diameter should meet the requirements described in [Table 1-5 Dimensions and Weight](#). [Figure 3-1](#) shows the mounting hole pattern.

Figure 3-1 Mounting 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 AP during installation.
- Place the AP in a well-ventilated environment.
- Do not expose 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 wash the AP with liquid.
- Do not open the enclosure when the AP is working.
- Secure the AP properly.

3.4 Installing the Access Point

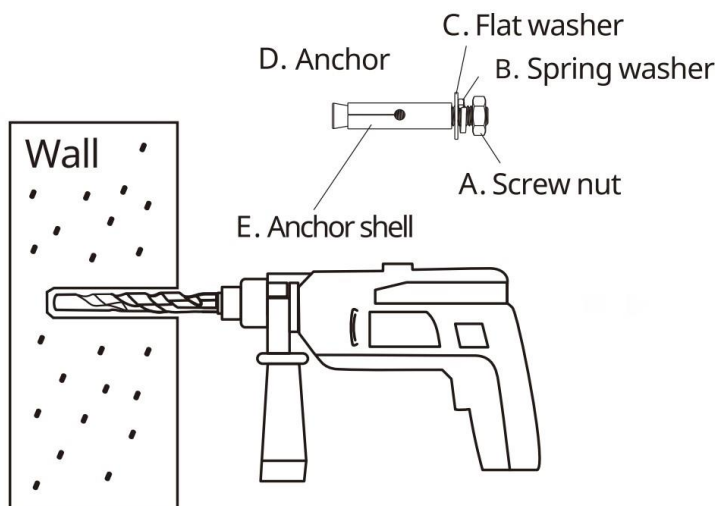
i Note

- You are advised to install the access point where you can get the optimal Wi-Fi coverage.
- In indoor scenarios, the Wi-Fi coverage of a ceiling-mount AP is larger than that of a wall-mount AP. You are advised to install the AP on a ceiling.

3.4.1 Installing the Expansion Screw

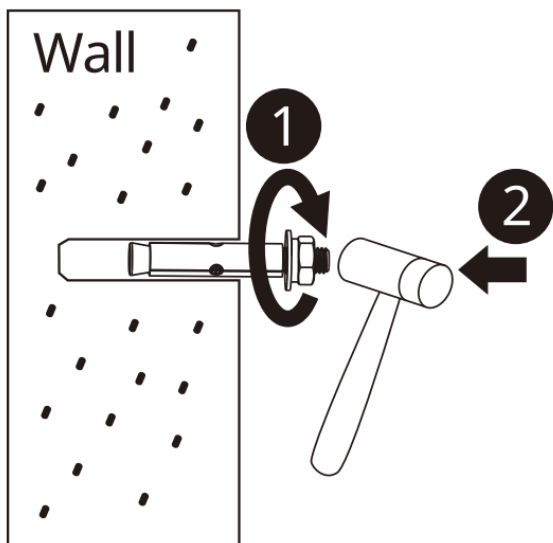
- (1) Drill a hole with a diameter of 8 mm (0.31 in.) on a wall.

Figure 3-2 Drilling a Hole



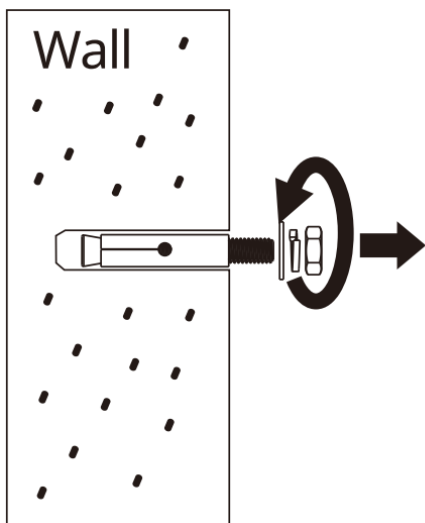
- (2) Tighten the anchor. Tap the expansion anchor into the hole with a rubber hammer until it is properly seated.

Figure 3-3 Installing the Anchor and Anchor Shell

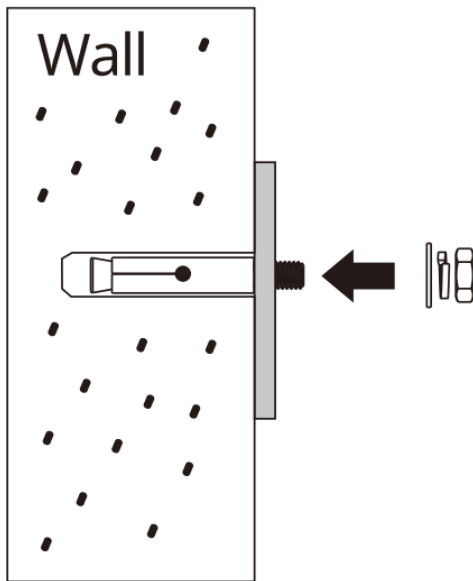


(3) Remove the screw nut, spring washer, and flat washer in sequence.

Figure 3-4 Remove the Screw Nut and Washers

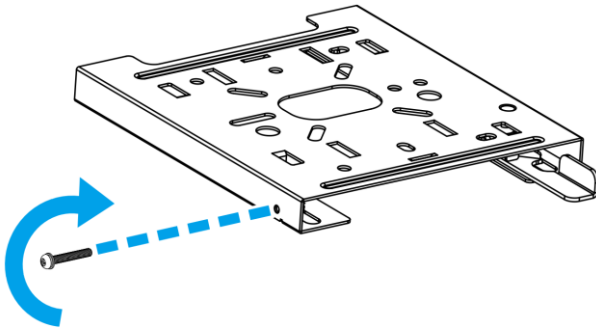


(4) Secure the mounting bracket to the wall and tighten the flat washer, spring washer, and screw nut in sequence.

Figure 3-5 Installing the Mounting Bracket

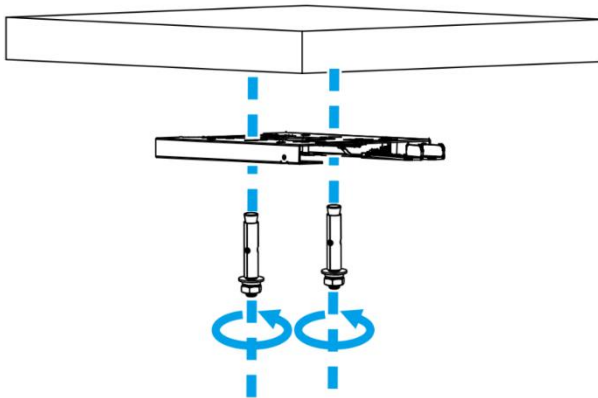
3.4.2 Ceiling Mount

- (1) Install the security screw on the mounting bracket. Leave no gap between the bracket surface and the base of the screw's head.

Figure 3-6 Installing the Security Screw on the Mounting Bracket

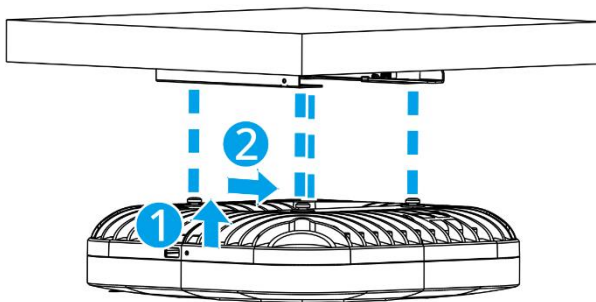
- (2) Drill two holes with a diameter of 8 mm (0.31 in.) at 75 mm (2.95 in.) spacing on the ceiling. Drive the provided expansion anchors into the holes and secure the mounting bracket (round holes indicated by letter D in [Figure 3-1 Mounting Bracket Dimensions](#)) to the ceiling.

Figure 3-7 Installing the Mounting Bracket



- (3) Align the mounting posts on the bottom of the AP with the mounting holes on the mounting bracket. Slide the AP in the orientation indicated by the arrow onto the mounting bracket until it clicks in place.

Figure 3-8 Sliding the AP onto the Mounting Bracket

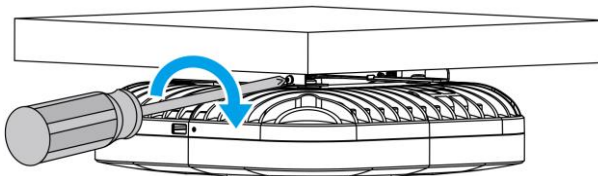


⚠ Caution

Connect the Ethernet cables properly before sliding the AP onto the mounting bracket.

- (4) Tightening the security screw to secure the AP on the bracket.

Figure 3-9 Tightening the Security Screw



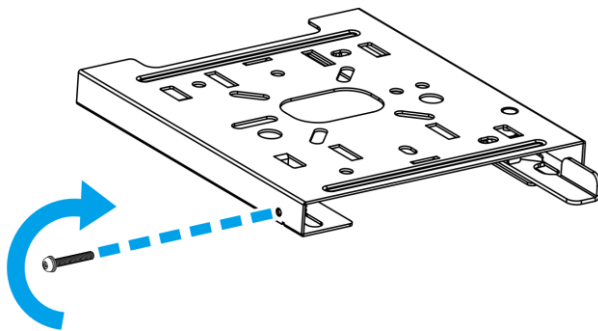
⚠ Caution

- The mounting bracket can be installed in four orientations. Install the AP in one orientation based on the cable routing.
- The mounting posts on the bottom of the AP must be aligned with and slid into the mounting holes on the mounting bracket during installation. Do not press the mounting posts into the mounting holes by force.
- After installation, check whether the AP is secured properly in case it falls down.

3.4.3 Wall Mount

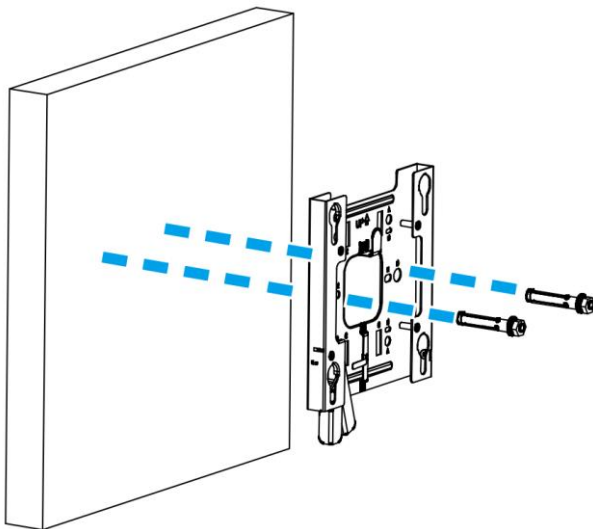
- (1) Install the security screw on the mounting bracket. Leave no gap between the bracket surface and the base of the screw's head.

Figure 3-10 Installing the Security Screw on the Mounting Bracket

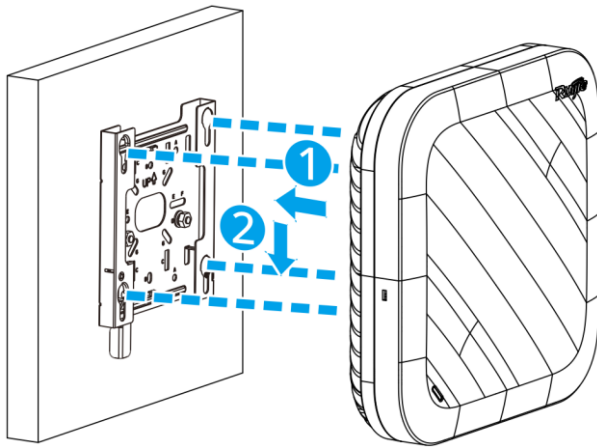


- (2) Drill two holes with a diameter of 8 mm (0.31 in.) at 75 mm (2.95 in.) spacing on the wall. Drive the provided expansion anchors into the holes and secure the mounting bracket (round holes indicated by letter D in [Figure 3-1 Mounting Bracket Dimensions](#)) to the wall.

Figure 3-11 Installing the Mounting Bracket



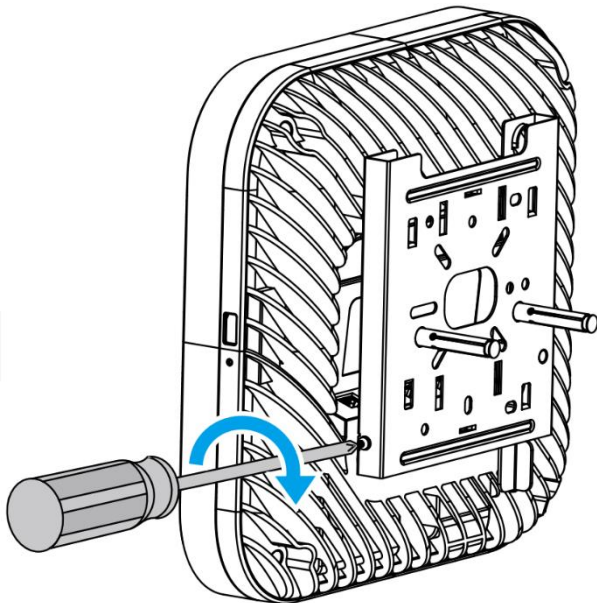
- (3) Align the mounting posts on the bottom of the AP with the mounting holes on the mounting bracket. Slide the AP in the orientation indicated by the arrow onto the mounting bracket until it clicks in place.

Figure 3-12 Installing the AP

⚠ Caution

Connect the Ethernet cables properly before sliding the AP onto the mounting bracket.

- (4) Tighten the security screw to secure the AP on the bracket.

Figure 3-13 Tightening the Security Screw

⚠ Caution

- Keep the **Ruijie** logo in the right orientation when mounting the AP on the wall.
 - The mounting posts on the bottom of the AP must be aligned with and slid into the mounting holes on the mounting bracket during installation. Do not press the mounting posts into the mounting holes by force.
 - After installation, check whether the AP is secured properly in case it falls down.
-

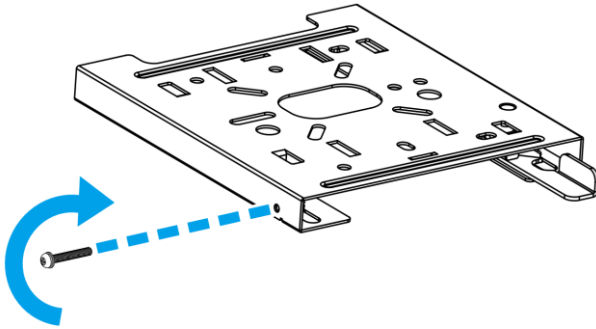
3.4.4 Pole Mount (Optional)

Note

Hose clamps and other accessories used for pole mount are customer-supplied.

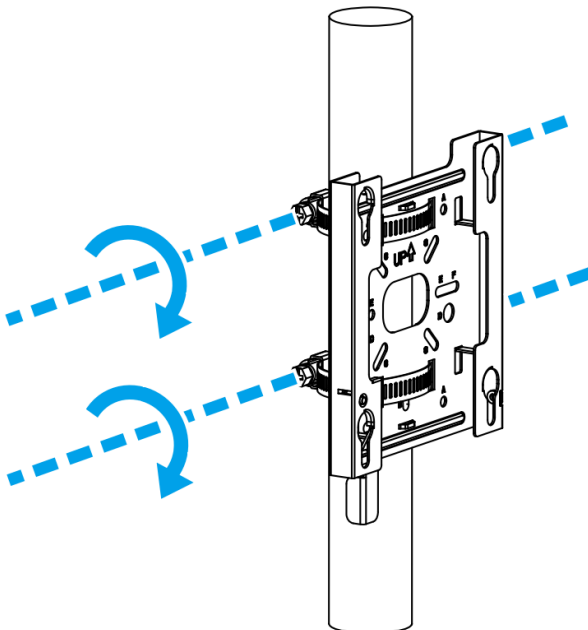
- (1) Install the security screw on the mounting bracket. Leave no gap between the bracket surface and the base of the screw's head.

Figure 3-14 Installing the Security Screw on the Mounting Bracket



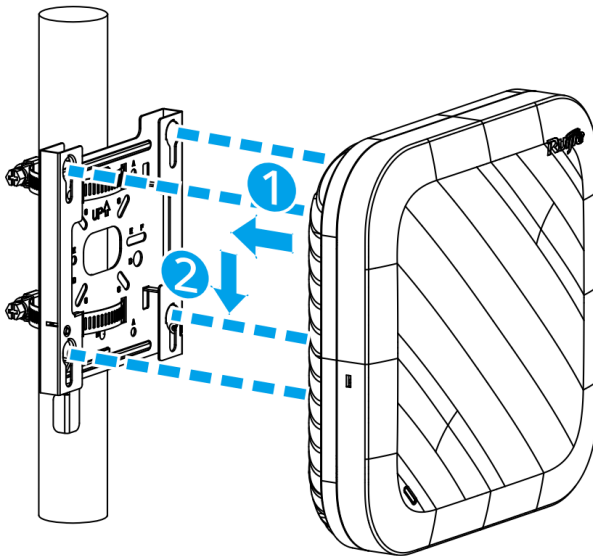
- (2) Secure the mounting bracket by threading two hose clamps through the square holes (indicated by letter C in [Figure 3-1 Mounting Bracket Dimensions](#)) on the mounting bracket. Tighten the screws on the clamps.

Figure 3-15 Installing the Mounting Bracket



- (3) Align the mounting posts on the bottom of the AP with the mounting holes on the mounting bracket. Slide the AP in the orientation indicated by the arrow onto the mounting bracket until it clicks in place.

Figure 3-16 Installing the AP

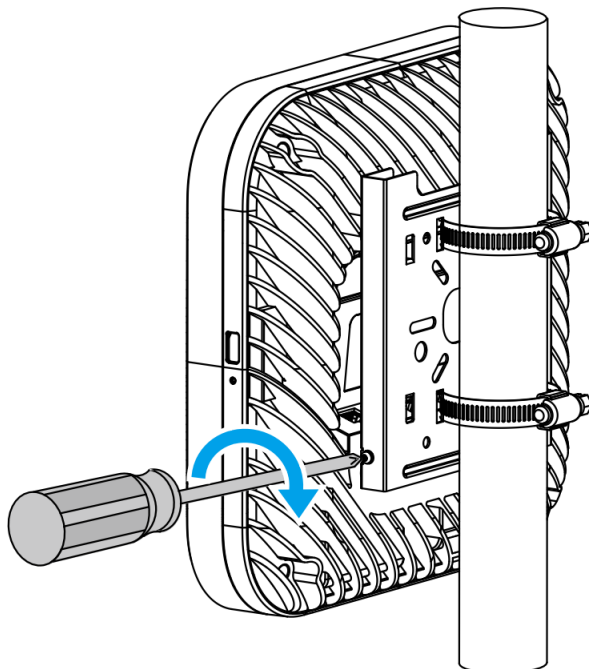


⚠ Caution

Connect the Ethernet cables properly before sliding the AP onto the mounting bracket.

(4) Tighten the security screw to secure the AP on the bracket.

Figure 3-17 Tightening the Security Screw



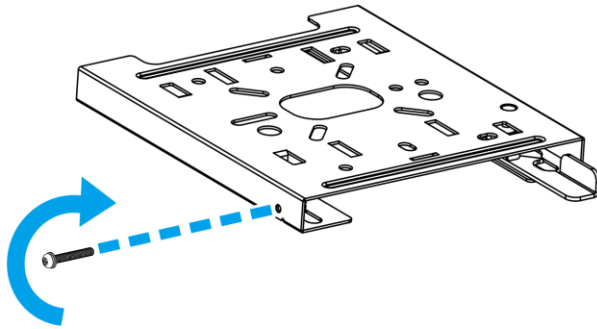
⚠ Caution

- Keep the **Ruijie** logo in the right orientation when mounting the AP on the wall.
- The mounting posts on the bottom of the AP must be aligned with and slid into the mounting holes on the mounting bracket during installation. Do not press the mounting posts into the mounting holes by force.
- After installation, check whether the AP is secured properly in case it falls down.

3.4.5 Rod Mount (Optional)

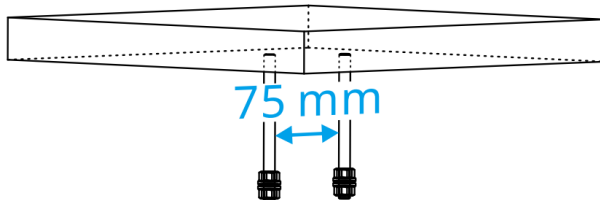
- (1) Install the security screw on the mounting bracket. Leave no gap between the bracket surface and the base of the screw's head.

Figure 3-18 Installing the Security Screw on the Mounting Bracket



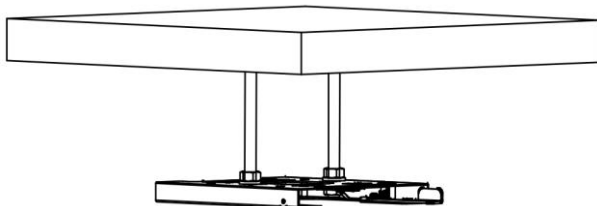
- (2) Install two rods at 75 mm (2.95 in.) spacing on a concrete ceiling.

Figure 3-19 Installing the Rods



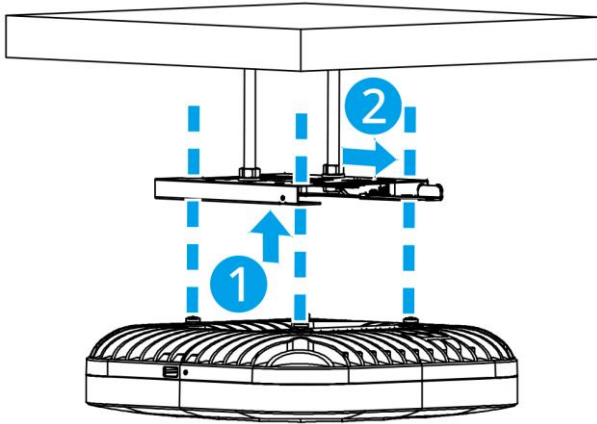
- (3) Align the rods with the round holes (indicated by letter D in [Figure 3-1 Mounting Bracket Dimensions](#)) on the mounting bracket. Tighten the flat washer, spring washer, and screw nut in sequence to secure the mounting bracket to the rod.

Figure 3-20 Installing the Mounting Bracket



- (4) Align the mounting posts on the bottom of the AP with the mounting holes on the mounting bracket. Slide the AP in the orientation indicated by the arrow onto the mounting bracket until it clicks in place.

Figure 3-21 Installing the AP

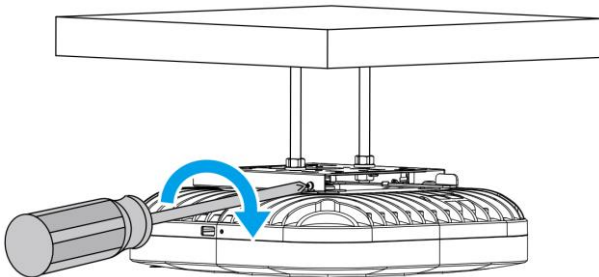


⚠ Caution

Connect the Ethernet cables properly before sliding the AP onto the mounting bracket.

- (5) Tighten the security screw to secure the AP on the bracket.

Figure 3-22 Tightening the Security Screw



⚠ Caution

- The mounting bracket can be installed in four orientations. Install the AP in one orientation based on the cable routing.
 - The mounting posts on the bottom of the AP must be aligned with and slid into the mounting holes on the mounting bracket during installation. Do not press the mounting posts into the mounting holes by force.
 - After installation, check whether the AP is secured properly in case it falls down.
-

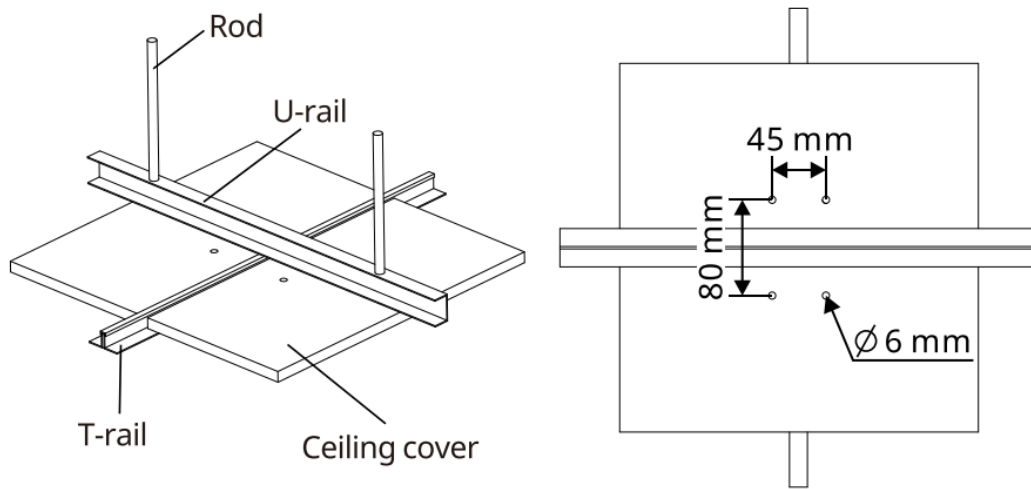
3.4.6 Rail Mount (Optional)

⚠ Caution

The AP must be mounted on the U-rail. Other rails are not sturdy enough to bear the weight.

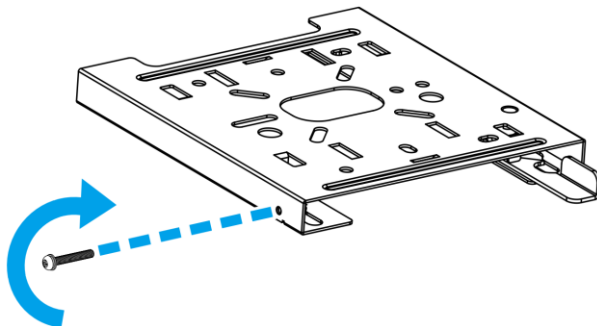
- (1) Locate the intersection of the U-rail and the T-rail. Drill four holes on the ceiling cover, distributing them in the four quadrants created by the intersection.

Figure 3-23 Installing the Ceiling Cover



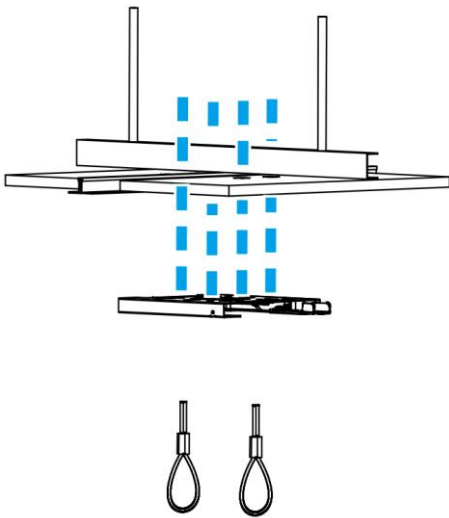
- (2) Install the security screw on the mounting bracket. Leave no gap between the bracket surface and the base of the screw's head.

Figure 3-24 Installing the Security Screw on the Mounting Bracket



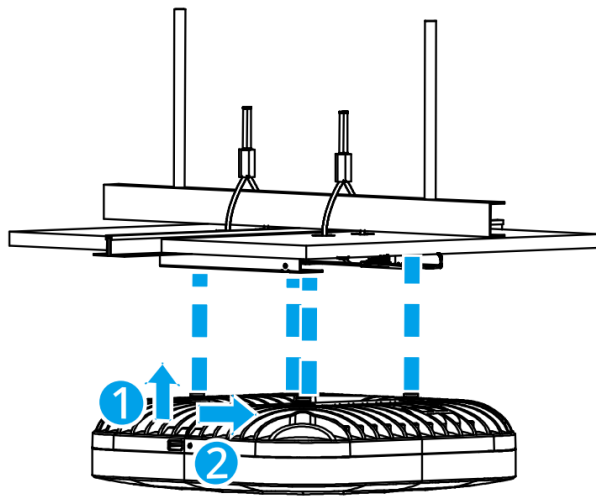
- (3) Secure the mounting bracket by threading two steel ropes through the mounting holes (indicated by letter B in [Figure 3-1 Mounting Bracket Dimensions](#)) on the mounting bracket and the holes on the ceiling cover.

Figure 3-25 Installing the Mounting Bracket



- (4) Align the mounting posts on the bottom of the AP with the mounting holes on the mounting bracket. Slide the AP in the orientation indicated by the arrow onto the mounting bracket until it clicks in place.

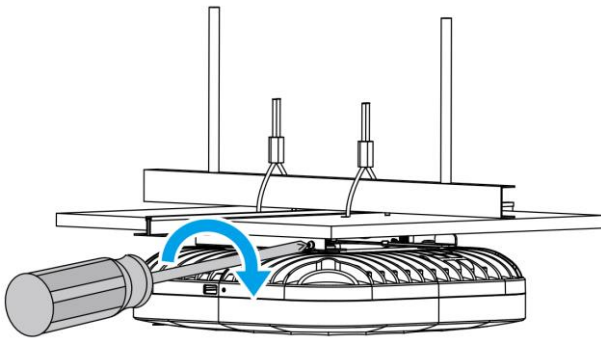
Figure 3-26 Installing the AP



⚠ Caution

Connect the Ethernet cables properly before sliding the AP onto the mounting bracket.

- (5) Tightening the security screw to secure the AP on the bracket.

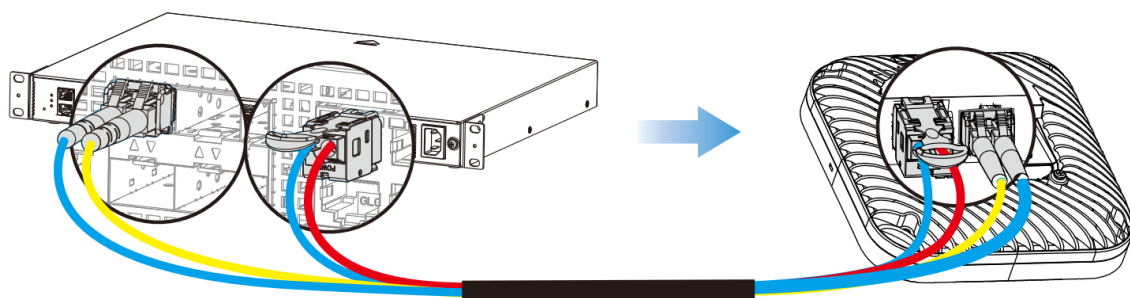
Figure 3-27 Tightening the Security Screw**⚠ Caution**

- Because the AP is heavy, install the AP on a rail by using hose clamps or steel ropes instead of plastic straps.
- Slide the AP against the direction indicated by the arrow on the mounting bracket. Do not press the mounting posts into the mounting holes by force.
- After installation, check whether the AP is secured properly in case it falls down.
- Make sure that the rail is sturdy enough to bear four times the total weight of the AP and its accessories.

3.5 Connecting the Hybrid Cable

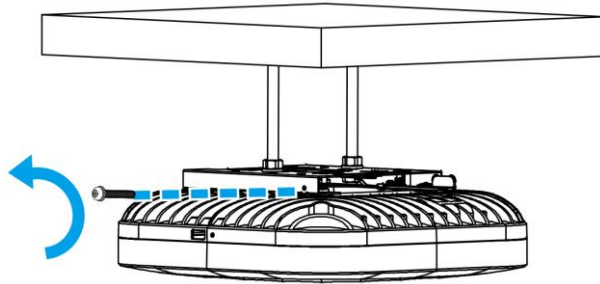
If a hybrid cable is used, perform the following steps:

- (1) Insert two LC connectors and two RJ45 connectors at one end of the hybrid cable to the optical transceiver and the Ethernet ports on the switch respectively, as shown in the figure.
- (2) Connect the LC connectors and RJ45 connectors at the other end of the hybrid cable to the optical ports and the electrical ports on the AP respectively.

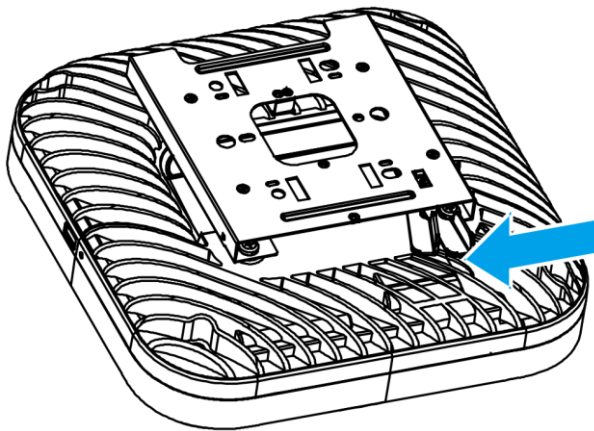
Figure 3-28 Connecting the Hybrid Cable

3.6 Removing the Access Point

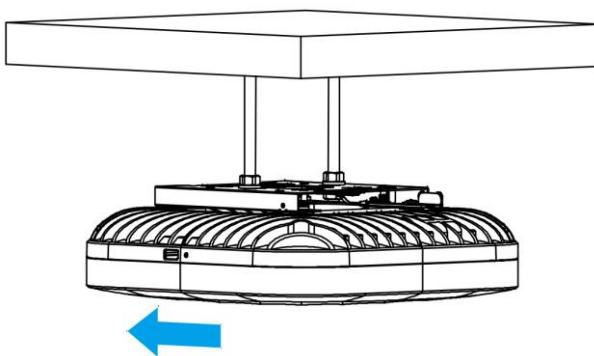
- (1) Loosen the secure screw on the mounting bracket.

Figure 3-29 Loosening the Security Screw

(2) Unlatch the clip on the mounting bracket.

Figure 3-30 Unlatching the Clip

(3) Slide AP away from the mounting bracket in the orientation indicated by the arrow.

Figure 3-31 Removing the AP

3.7 Connecting Cables

Connect a twisted pair cable to the LAN2/PoE OUT port of the AP. For details about the twisted pairs supported by the AP, see [7.1 Connectors and Media](#).

⚠ Caution

By default, the baud rate is set to 9,600, 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 need to configure the AP manually.

3.8 Bundling Cables

3.8.1 Precautions

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

3.8.2 Steps

- (1) Bind the dropping parts of the twisted pair cables and place the bundle the LAN2/PoE OUT port of the AP.
- (2) Fasten the twisted pair cables to the cable management trough.
- (3) Extend the twisted pair cables under the AP and route them in a straight line.

3.9 Checklist After Installation

3.9.1 Checking the Access Point

- Verify that the external power supply matches the distribution board of the cabinet.
- Verify that the AP is properly secured.

3.9.2 Checking Cable Connection

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

3.9.3 Checking Power Supply

- Verify that the power cord is properly connected and meets safety requirements.
- Verify that the AP works properly after power-on.

4 Commissioning

4.1 Setting Up the Configuration Environment

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

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

- When the AP is powered by PoE or DC power supply, verify that the power supply functions properly and meets safety requirements.
- Connect the AP to an AC through a twisted pair cable.
- When the AP is commissioned through a PC, verify that the PC and PoE switch are properly grounded.

4.2 Powering on the Access Point

4.2.1 Checklist Before Power-on

- The power cord is properly connected.
- The input voltage meets the requirement.

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:

- There is information output on the terminal interface.
- The LED status is normal.

5 Monitoring and Maintenance

5.1 Monitoring

5.1.1 LED

When the AP is operating, monitor the system status by observing the LED.

5.1.2 CLI Commands

Run related commands on the CLI to monitor the AP, including:

- Port configuration and status
- System logs

 **Note**

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

5.2 Remote Maintenance

- When the AP works in fat mode, log in to the AP for remote maintenance.
- When the AP works in fit mode, use an AC to manage and maintain the AP uniformly.

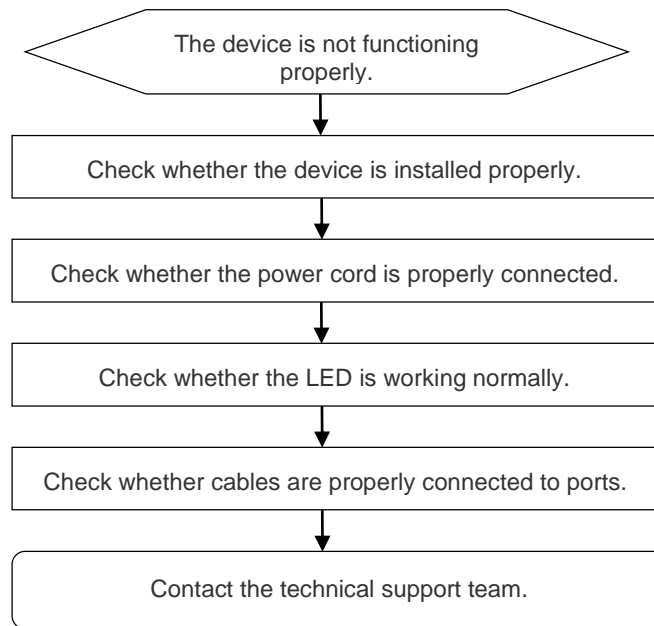
5.3 Hardware Maintenance

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

6 Troubleshooting

6.1 Flowchart

Figure 6-1 Flowchart



6.2 Common Faults

6.2.1 The Ethernet Port Does Not Work After the Ethernet Cable Is Plugged In

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

6.2.2 LED Is Still Off After the Access Point Is Powered On

- If the AP is powered by PoE, check whether the PSE is at least 802.3at-capable, and then check whether the Ethernet cable is connected properly.
- If the AP is powered by DC power supply, check whether the power supply has mains input and works properly.

6.2.3 LED Is Solid Red

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

6.2.4 LED Is Solid Green

The AP needs to be initialized after power-on. During this period, the LED keeps solid green and does not turn blue until the initialization is completed. If the LED is still solid green after an hour, the initialization fails and the AP is faulty.

6.2.5 LED Is Fast Blinking Blue for a Long Time (in Fit Mode)

The software is being upgraded after the AP is powered on. During this period, the LED is fast blinking blue and does not turn solid blue until the upgrade is completed. Do not plug or unplug the power cord when the LED is blinking as software upgrade takes time. If the blinking persists for 10 minutes, software upgrade is not completed and the AP is faulty.

6.2.6 LED Does Not Turn Solid Blue or Blinking Blue

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

6.2.7 A Client Cannot Discover the AP

- (1) Check whether the device is properly powered.
- (2) Check whether the Ethernet port is correctly connected.
- (3) Check whether the AP is correctly configured.
- (4) Move the client closer to the AP.

7 Appendix

7.1 Connectors and Media

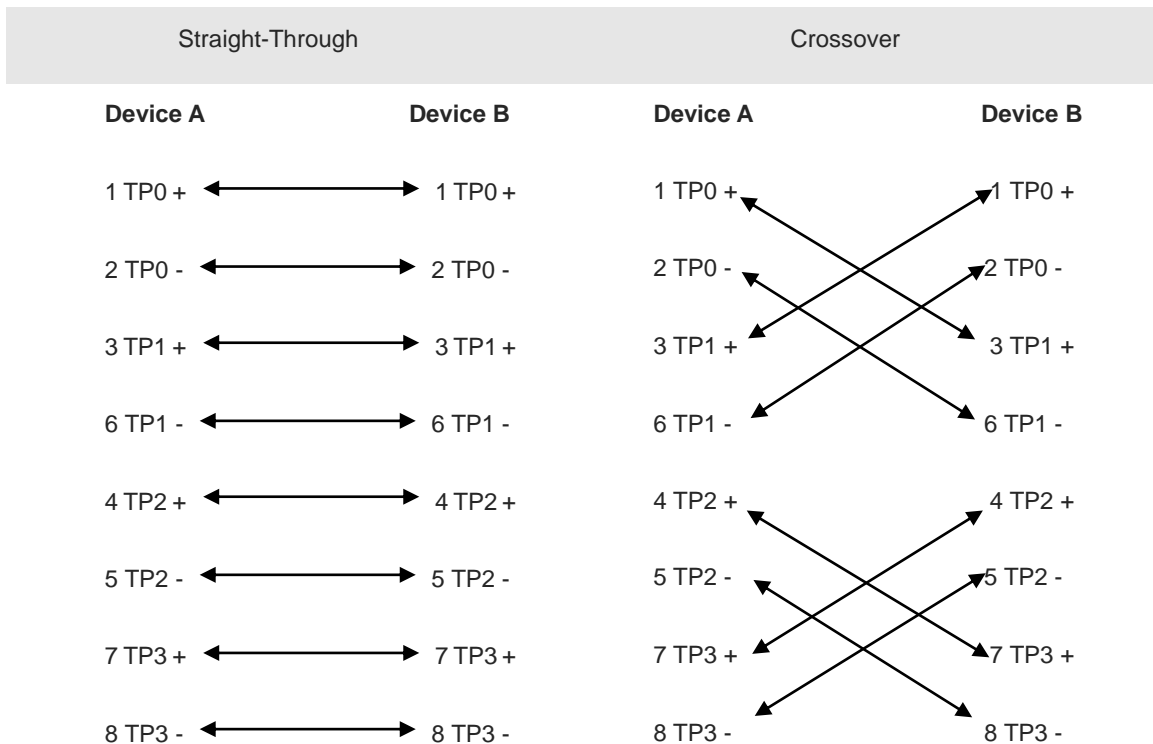
- 1000BASE-T/100BASE-TX/10BASE-T Port

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 (CAT) 5/5e Unshielded Twisted Pair (UTP) or Shielded Twisted Pair (STP) with a maximum distance of 100 meters (328.08 feet).

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 1000BASE-T Twisted Pair Connections



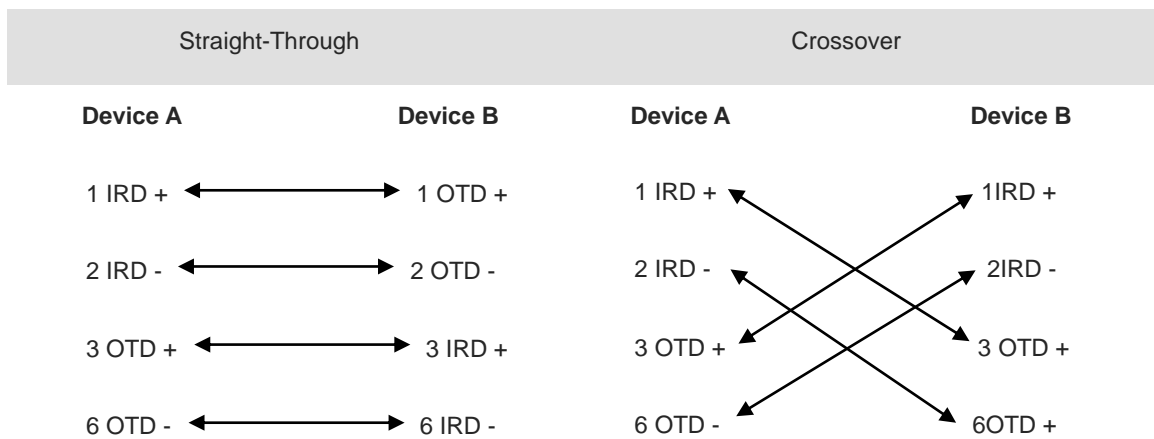
100BASE-TX/10BASE-T port can also be connected by cables of the preceding specifications. Besides, the 10BASE-T port can be connected by 100-ohm Category 3, Category 4, and Category 5 cables with a maximum distance of 100 meters (328.08 feet). 100BASE-TX port can be connected by 100-ohm Category 5 cables with a maximum distance of 100 meters (328.08 feet). The following figure lists definitions of pin signals for the 100BASE-TX/10BASE-T port.

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

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

The following figure shows feasible connections of the straight-through and crossover twisted pairs for a 100BASE-TX/10BASE-T port.

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



7.2 Optical Transceivers

We provide appropriate optical transceivers according to the port types. You can select a transceiver as required. The following model and technical specifications of SFP transceivers are provided for your reference.

Table 7-1 Models and Technical Specifications of SFP Transceivers

Model	Wavelength (nm)	Fiber Type	DDM	Transmit Power (dBm)		Receive Power (dBm)	
				Minimum	Maximum	Minimum	Maximum
GE-SFP-LX20-SM1550-BIDI	1550TX/1310RX	SMF	Supported	-9	-3	-20	-3

2.5G-SFP-LX03-SM1550-BIDI	1550TX/1310RX	SMF	Supported	-9	-3	-16	-3
XG-SFP-ILR-SM1310-I	1310	SMF	Supported	-8.2	0.5	-12.6	0.5

Table 7-2 Cabling Specifications of SFP Transceivers


Model	Connector Type	Fiber Type	Core Size (μm)	Maximum Cabling Distance
GE-SFP-LX20-SM1550-BIDI	LC	SMF	9/125	20 km
2.5G-SFP-LX03-SM1550-BIDI	LC	SMF	9/125	3 km
XG-SFP-ILR-SM1310-I	LC	SMF	9/125	1.4 km

 **Caution**

- For optical transceivers with a cabling distance of over 40 km/24.85 miles (including 40 km), install an optical attenuator to avoid overload on the optical receiver when using short-distance single-mode fibers (SMFs).
- An optical transceiver is a laser transceiver. Do not look into the laser beam to avoid burning your eyes.
- To keep an optical transceiver clean and dust-free, make sure that the unused ports remain capped.

Table 7-3 Pairing of BIDI Optical Transceivers

Rate/Distance	Pairing Models
1000 Mbps/10 km	GE-SFP-LX20-SM1550-BIDI GE-SFP-LX20-SM1310-BIDI
1000 Mbps/3 km	2.5G-SFP-LX03-SM1550-BIDI 2.5G-SFP-LX03-SM1310-BIDI
10 Gbps/1 km	XG-SFP-ILR-SM1310-I

 **Caution**

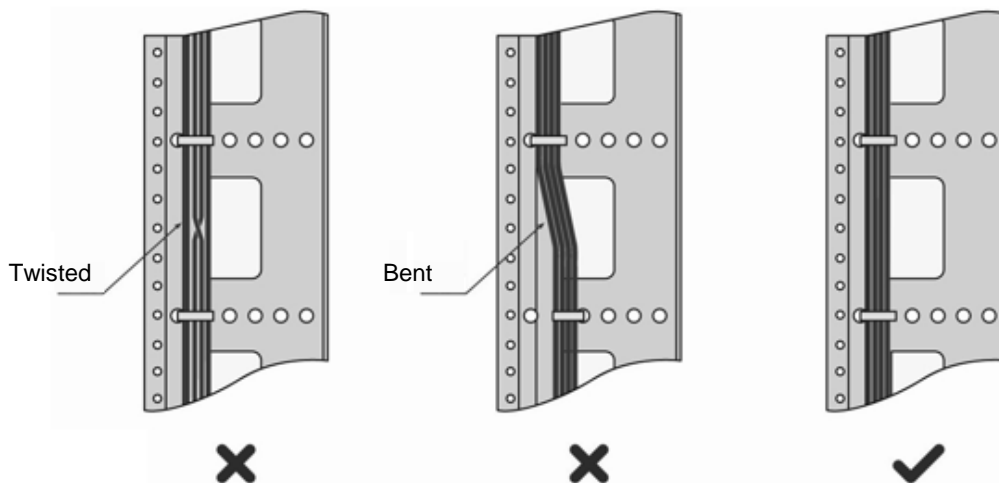
BIDI optical transceivers must be used in pairs. For example, if GE-SFP-LX20-SM1550-BIDI is used at one end, GE-SFP-LX20-SM1310-BIDI must be used at the other end.

7.3 Recommended Cabling

When the device is installed in a standard 19-inch rack, route the cables through the cable management brackets. Top cabling or bottom cabling is adopted according to the actual situation in the equipment room. All conversion connectors should be placed at the bottom of the rack instead of outside the rack that is easily accessible. Power cords are routed beside the rack, and top cabling or bottom cabling is adopted according to the locations of the DC power distribution box, AC power socket, or surge protection box in the equipment room.

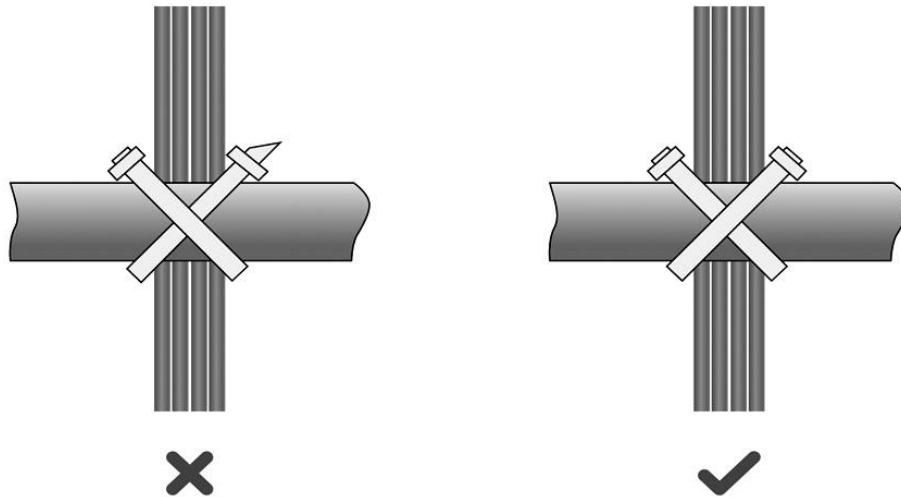
- Requirement for the Minimum Bend Radius of an Ethernet Cable
 - The bend radius of a fixed power cord, Ethernet cable, or flat cable should be over five times greater than their respective diameters. The bend radius of these cables that are often bent or plugged should be over seven times greater than 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 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.
- 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 7-4 Binding Cables

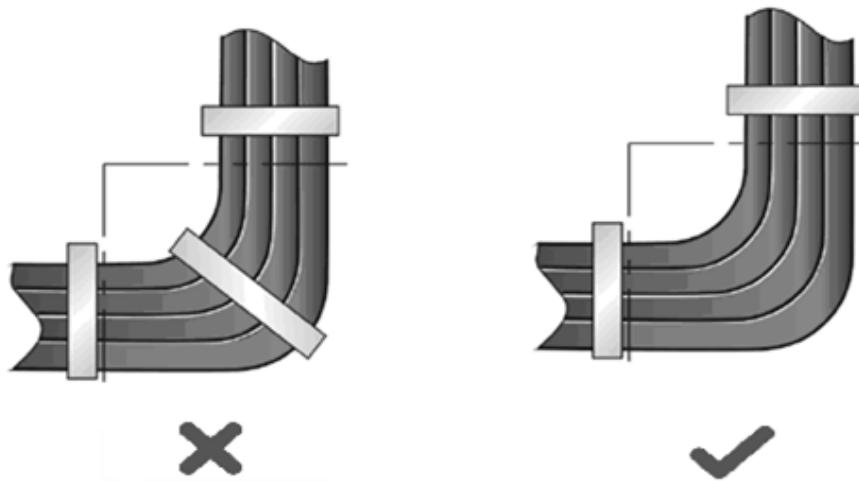


- Cables of different types (such as power cords, signal cables, and ground cables) should be separated in cabling and bundling. Mixed bundling is disallowed. When they are close to each other, you are advised to adopt crossover cabling. In the case of parallel cabling, maintain a minimum distance of 30 mm (1.18 in.) between power cords and signal cables.
- The cable management brackets and cabling troughs inside and outside the rack 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.

Figure 7-5 Binding Cables

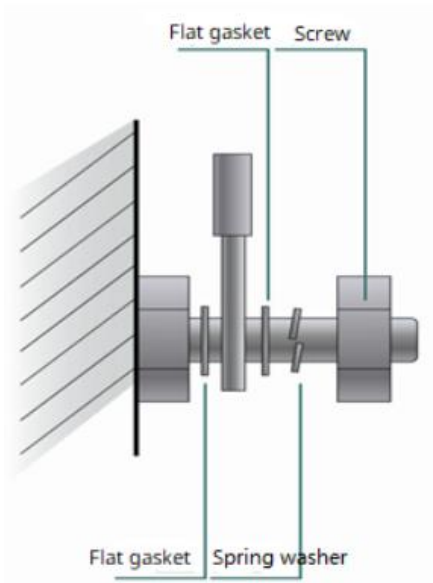
- When cables need to be bent, please bundle them up but do not tie them where the cables will be bent, as this may create stress on the cables and lead to potential wire breakage.

Figure 7-6 Binding Cables

- 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 location that does not affect the device performance or damage the device or cable.
- 220 V and -48 V power cables must not be bundled on the guide rails of moving parts.
- Leave a margin for the power cords connecting moving parts such as door grounding wires after they are connected to avoid suffering tension or stress. When the moving part is installed, the remaining cable part should not touch heat sources or sharp corners. If heat sources cannot be avoided, high-temperature cables should be adopted.

- For the cable terminals fastened by screw threads, tighten the bolt or screw and take cable retention measures.

Figure 7-7 Cable Fastening



- 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 orientation should be bundled up into one cable bundle. The power cords in the bundle should be clean and straight.
- Bundle up cables using cable ties.

Table 7-4 Cable Bundling

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 sockets (such as circuit breakers) with insulated terminals, the metal part of the insulated terminal should not be exposed outside the terminal block during assembling.

7.4 DC Connector Specifications

- Input voltage: 54 V DC
- Rated current: 1.25 A

Table 7-5 DC Connector Specifications

Inner Diameter	Outer Diameter	Depth	Polarity Symbol
2.4–2.6 mm (0.09–0.10 in.)	5.4–5.6 mm (0.21–0.22 in.)	9.2–9.8 mm (0.36–0.39 in.)	Center (tip) of the output plug: Positive (+) Barrel (ring) of the output plug: Negative (-)

Figure 7-8 DC Connector Dimensions

