Ruijie Reyee RG-EST450G Wireless Bridge

Installation Guide

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Preface

Audience

This document is intended for:

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

Technical Support

- Official Website of Ruijie Reyee: https://reyee.ruijie.com
- Technical Support Website: https://reyee.ruijie.com/en-global/support
- Case Portal: https://www.ruijienetworks.com/support/caseportal
- Community: https://community.ruijienetworks.com
- Technical Support Email: service_rj@ruijienetworks.com
- Online Robot/Live Chat: https://reyee.ruijie.com/en-global/rita

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:

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 document provides the installation steps, troubleshooting, technical specifications, as well as the specifications and use guidelines of cables and connectors. It is intended for users who want to understand the above contents, and are familiar with the installation and maintenance of networking hardware.

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1 Product Introduction

1.1 Overview

The RG-EST450G wireless bridge is launched by Ruijie Reyee. It utilizes the IEEE 802.11ac standard for efficient and reliable communication. Operating in the 5 GHz band and supporting 2x2 MIMO technology, this product delivers a maximum wireless rate of 867 Mbps for bridging services, ensuring more than sufficient bandwidth for delivering point to point (PTP) and point to multi-point (PTMP) services. The RG-EST450G utilizes the 2.4 GHz band in single-stream mode for bridge management, while the 5 GHz band is used for data transmission.

1.2 Package Contents

Table 1-1 Package Contents

No.	Item	Quantity
1	RG-EST450G Wireless Bridge	1
2	24 V DC/0.6 A Power Adapter	1
3	1000 Mbps Passive PoE Injector	1
4	Universal Joint	1
5	Universal Joint Nut	1
6	Hose Clamp	1
7	Mounting Bracket	1
8	Product Manual	1
9	Warranty Card	1
10	Wall Anchor	3
11	Phillips Pan Head Screw (ST4.2x19)	4

Note

The package contents above are intended to provide a general overview, and are subject to the terms of the order contract. Please check your goods carefully against the package contents or order contract. If you have any questions, please contact the distributor.

1.3 Appearance

1.3.1 Appearance

Figure 1-1 Appearance of the RG-EST450G Wireless Bridge

Front view

Back view

Note

The label is located on the back of the device.

1.3.2 Ports, Buttons and LEDs

Figure 1-2 Ports, Buttons and LEDs of the RG-EST450G Wireless Bridge

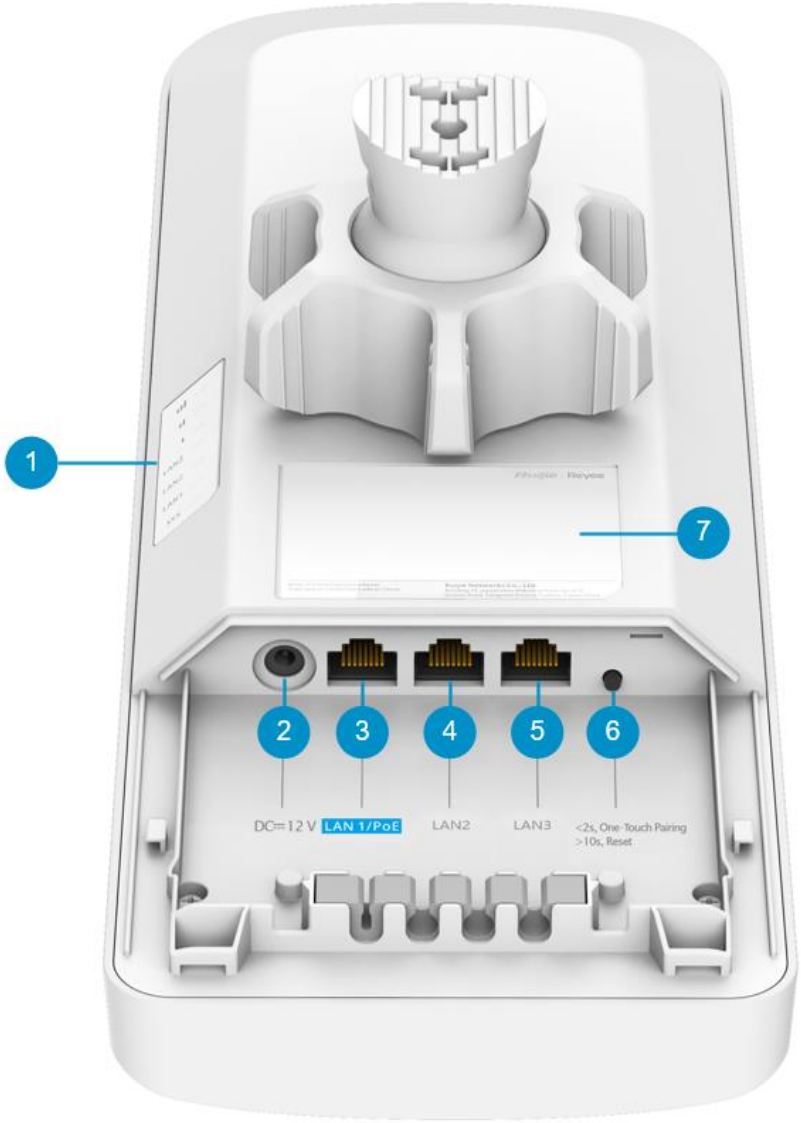


Table 1-2 Ports, Buttons and LEDs of the RG-EST450G Wireless Bridge

Mark	Item	Description
1	Status LEDs	7 status LEDs, including 1 x system LED, 3 x port LEDs and 3 x signal LEDs
2	12 V DC connector	Support 12 V/1.2 A DC power supply
3	LAN1/PoE Port	10/100/1000BASE-T Ethernet port, support 802.3af/at PoE or 24V⎓0.6A passive PoE
4	LAN2 Port	10/100/1000BASE-T Ethernet port
5	LAN3 Port	10/100/1000BASE-T Ethernet port

Mark	Item	Description
6	Reset/One-Touch Pairing button	● Press and hold the button for less than 2s: The wireless bridge pairs with another wireless bridge (the LED blinks during pairing). ● Press and hold the button for 2s to 10s: No action is triggered. ● Press and hold the button for more than 10s: Restores the wireless bridge to factory settings.
7	Label	Contains the product name, model, I/O parameters, default IP address, and other information.

Note

- After the One-Touch Pairing button is pressed, the wireless bridge is switched to the BaseStation mode regardless of whether it was in BaseStation or CPE mode.
- During one-touch pairing, the signal LEDs on the wireless bridge in BaseStation mode blink for 1 minute (it will stop blinking after 1 minute if no bridge connection is established). The signal LEDs on the bridge in CPE mode also blink until the pairing is complete.
- Only a bridge that has been reset to factory settings and has not been bridged before can be switched to the CPE mode through one-touch pairing.
- The one-touch pairing feature is enabled by default and can be disabled through eWeb.
- One-touch pairing is disabled during interference scanning.

Table 1-3 LEDs

LED	Status	Description
System LED	Solid green	The device is operating normally.
	Blinking	● Fast blinking (8 to 10 times/second): The device is starting up. ● Fast blinking (2 times/second): The device is initializing. ● Fast blinking (2 times/second): The device is upgrading.
	Off	The device is NOT receiving power.
LAN1/LAN2/LAN3 port LED	Solid green	A valid link is established, but the port is not receiving or sending data.
	Blinking green	A valid link is established, and the port is receiving or sending data.
	Off	No link is established.
Signal LEDs	Off	The device is not bridged.
	LED 1 on/blinking	The device is bridged and the RSSI is below –75 dBm.

LED	Status	Description
	LED 1 on	The RSSI is above –75 dBm.
	LED 1 on, LED 2 blinking	The RSSI is above –73 dBm.
	LEDs 1 and 2 on	The RSSI is above –71 dBm.
	LEDs 1 and 2 on, LED 3 blinking	The RSSI is above –68 dBm.
	LEDs 1, 2, and 3 on	The RSSI is above –64 dBm.
	LEDs 1, 2, and 3 blinking	The mesh pairing is in progress.

1.4 Technical Specifications

Table 1-4 Specifications

Model	RG-EST450G
Radio Design	● 2.4 GHz: single-stream ● 5 GHz: dual-stream 2x2 MIMO
Protocol and Standard	● 5 GHz: 802.11ac/n/a ● 2.4 GHz: 802.11b/g/n
Operating Frequency Bands	● 2.4 GHz: 802.11 b/g/n: 2.4000 GHz to 2.483 GHz ● 5 GHz: 802.11a/n/ac: 5.150 GHz to 5.350 GHz, 5.470 GHz to 5.725 GHz, 5.725 GHz to 5.850 GHz **Note** Country-specific restrictions apply. ● European Union & United Kingdom: 2400 MHz to 2483.5 MHz, EIRP ≤ 20 dBm; 5470 MHz to 5725 MHz, EIRP ≤ 30 dBm ● Myanmar: 2400 MHz to 2483.5 MHz, EIRP ≤ 23 dBm; 5725 MHz to 5825 MHz, EIRP ≤ 30 dBm ● Thailand: 2400 MHz to 2483.5 MHz, EIRP ≤ 20 dBm; 5470 MHz to 5725 MHz, EIRP ≤ 30 dBm; 5725 MHz to 5825 MHz, EIRP ≤ 30 dBm ● Indonesia: 2400 MHz to 2483.5 MHz, EIRP ≤ 27 dBm; 5725 MHz to 5825 MHz, EIRP ≤ 23 dBm ● Egypt: 2400 MHz to 2483.5 MHz, EIRP ≤ 20 dBm; 5150 MHz to 5350 MHz, EIRP ≤ 23 dBm
Antenna Type	Built-in antenna (horizontal/vertical): 120°/13°
Antena Gain	● 2.4 GHz: 2 dBi ● 5 GHz: 15 dBi
Working Distance	5 km (3.11 mi)

Model	RG-EST450G
Data Rate	● 2.4 GHz: 150 Mbps ● 5 GHz: 867 Mbps
Modulation Technology	● OFDM: BPSK@6/9 Mbps, QPSK@12/18 Mbps, 16-QAM@24/36 Mbps, 64-QAM@48/54 Mbps ● MIMO-OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Receive Sensitivity	● 11a: -89 dBm (6 Mbps), –80 dBm (24 Mbps), –76 dBm (36 Mbps), –71dBm (54 Mbps) ● 11n: –83 dBm@MCS0, –65 dBm@MCS7, –83 dBm@MCS8, –65dBm@MCS15 ● 11ac: –86 dBm (MCS0), –63 dBm (MCS9)
Max. Transmit Power	● 2.4 GHz: 100 mW ● 5 GHz: 400 mW (26 dBm) (single stream)
Power Step	1 dBm
Dimensions (W x D x H)	355 mm x 124 mm x 48 mm (13.98 in. x 4.88 in. x 1.89 in.) (excluding the mounting bracket)
Weight	0.83 kg (1.83 lbs.) (excluding packaging materials) 1.61 kg (3.55 lbs.) (including packaging materials)
Service Ports	3 x 10/100/1000BASE-T auto-negotiation ports, where LAN1/PoE port supports 24 V PoE input
Buttons	1 x Reset/One-Touch Pairing button
LED	1 x system LED, 3 x port LEDs, and 3 x signal LEDs
Power Supply	● 24 V passive PoE power supply (A passive PoE injector is delivered with the wireless bridge.) ● 12 V DC (solar panel)
Max. Power Consumption	< 12 W
Environment	Operating temperature: –30°C to +65°C (–22°F to +149°F)
	Storage temperature: –40°C to +85°C (–40°F to +185°F)
	Operating humidity: 5% RH to 95% RH (non-condensing)
	Storage humidity: 5% RH to 95% RH (non-condensing)
Mounting	● Wall-mount ● Pole-mount
IP Rating	IP55
Certification	CE
MTBF	> 400000 hours

Warning

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

Note

The weight refers to the weight of the main unit.

1.5 Power Supply Technical Specifications

The RG-EST450G can be powered by 12 V/1.2 A DC power supply, 24 V passive PoE power supply, and IEEE 802.3at/af-compliant PoE power supply. It is supplied with a 24 V/0.6 A DC power adapter and a 1000 Mbps passive PoE injector.

- Technical specifications of the DC adapter:

Inner Diameter	Outer Diameter	Depth
2.10 mm ± 0.05 mm (0.083 in. ± 0.002 in.)	5.50 mm ± 0.05 mm (0.22 in. ± 0.002 in.)	10 mm (0.35 in.)

Warning

- For DC power supply, the DC adapter required for this wireless bridge is not included in the package. You can purchase the DC adapter separately from us.
- For PoE power supply, use the provided PoE injector in the package. Do not use other models of PoE injectors or switches for power supply as it may lead to irreparable damage to the device.
- When using a DC power supply to power the device, ensure that the power output of the DC power supply is less than 100 W.

2 Preparing for Installation

2.1 Safety Precautions

Note

- To prevent device damage and physical injury, please read carefully the safety precautions described in this chapter.
- The following safety precautions do not cover all possible dangers.

2.1.1 General Safety Precautions

- Do not expose the device to high temperature, dusts, or harmful gases. Do not install the device in an inflammable or explosive environment. Keep the device away from EMI sources such as large radar stations, radio stations, and substations. Do not subject the device to unstable voltage, vibration, and noises.
- The installation site should be far away from the sea. Keep the device at least 500 meters (1640 ft.) away from the seaside and do not face it toward the wind from the sea.
- The installation site should be free from water flooding, seepage, dripping, or condensation. The installation site shall be selected according to network planning and features of communications device, and considerations such as climate, hydrology, geology, earthquake, electric power, and transportation.

Caution

Please follow the correct procedures described in this installation guide to install and remove the device.

2.1.2 Handling Safety

- Avoid frequently handling the device.
- Cut off all the power supplies and unplug all power cords before moving or handling the device.

2.1.3 Electrical Safety

Warning

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

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

2.2 Installation Environment Requirements

To ensure normal operation and a prolonged service life of the device, the installation site must meet the following requirements.

2.2.1 Environment

- Install the device 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 is sturdy enough to support the device and its accessories.
- Make sure the site has enough space for installing the device and leave sufficient space around the device for ventilation.

Bridge Type	Distance Between Base Station and Customer Premises Equipment (CPE)	Recommended Installation Height (Above the Obstacle)
5 GHz bridge	500 m (0.13 mi.)	2.6 m (8.53 ft.)
	1 km (0.62 mi.)	3.5 m (11.48 ft.)
	2 km (1.24 mi.)	5.2 m (17.06 ft.)
	3 km (1.86 mi.)	6.3 m (20.67 ft.)
	4 km (2.49 mi.)	7.3 m (23.95 ft.)
	5 km (3.11 mi.)	8.2 m (26.9 ft.)
	6 km (3.73 mi.)	9 m (29.53 ft.)
	7 km (4.35 mi.)	9.7 m (31.82 ft.)
	8 km (4.97 mi.)	10.5 m (34.45 ft.)
	9 km (5.59 mi.)	11 m (36.09 ft.)
	10 km (6.21 mi.)	11.6 m (38.06 ft.)
	11 km (6.84 mi.)	12 m (39.37 ft.)
	12 km (7.46 mi.)	12.8 m (41.99 ft.)
	13 km (8.08 mi.)	13.3 m (43.64 ft.)
	14 km (8.70 mi.)	13.8 m (45.28 ft.)
	15 km (9.32 mi.)	14.3 m (46.92 ft.)
2.4 GHz bridge	50 m (164.04 ft.)	1.2 m (3.94 ft.)
	100 m (328.08 ft.)	1.7 m (5.58 ft.)
	300 m (984.25 ft.)	3 m (9.84 ft.)

Bridge Type	Distance Between Base Station and Customer Premises Equipment (CPE)	Recommended Installation Height (Above the Obstacle)
	500 m (1640.42 ft.)	4 m (13.12 ft.)

2.2.2 Surge Protection

- When the connection cable between the main grounding conductor and local equipotential earthing terminal board (LEB) on each floor is short, use a stranded copper wire with a sectional area not less than 1.318 mm2 (16 AWG) for the connection cable.
- Use a shielded network cable if possible. Ensure that devices connected to both ends of the shielded network cable are reliably grounded, and that the sheath of the shielded network cable is also grounded if possible. If no shielded network cable is available, wire the network cable through a steel pipe and bury the steel pipe for lead-in, and properly ground both ends of the steel pipe.
- The device has a built-in high-grade surge arrester with a 6KV surge protection capability. Generally, additional surge arrester is not required. If a higher surge protection level is required, a surge arrester can be installed and must be grounded.

2.2.3 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 device.

- In an environment with high humidity, the insulating material may have bad insulation or even leak electricity and sometimes the materials may suffer from mechanical performance change and metallic parts may get rusted.
- In an environment with low humidity, the insulating strip may dry and shrink, and static electricity is prone to occur and damage the internal circuits of the device.
- In an environment with high temperature, the device is subjected to even greater harm, as its performance may degrade significantly and its useful life may be shortened in the case of long-term exposure that expedites the aging process.

Table 2-1 Temperature and Humidity Requirements

Operating Temperature	Operating Humidity
–30°C to 65°C (–22°F to +149°F)	5% RH to 95% RH (non-condensing)

2.2.4 Anti-Interference

- Take interference prevention measures for the power supply system.
- Keep the device away from the grounding facility or lightning and grounding facility of the power device as much as possible.
- Keep the device away from high-power radio stations, radar stations, and high-frequency high-current

devices.

2.3 Tools

Table 2-2 Tools

Common Tools	Marker, Phillips screwdriver, hammer drill, power cords, Ethernet cables, and diagonal plier
Special Tools	Anti-ESD gloves, wire stripper, crimping plier, RJ45 crimping plier, wire cutter, and waterproof adhesive tape
Meters	Multimeter
Relevant Devices	PC, display, and keyboard

Note

The RG-EST450G wireless bridge is not shipped with a tool kit. You need to prepare a tool kit by yourself.

2.4 Checking Before Installation

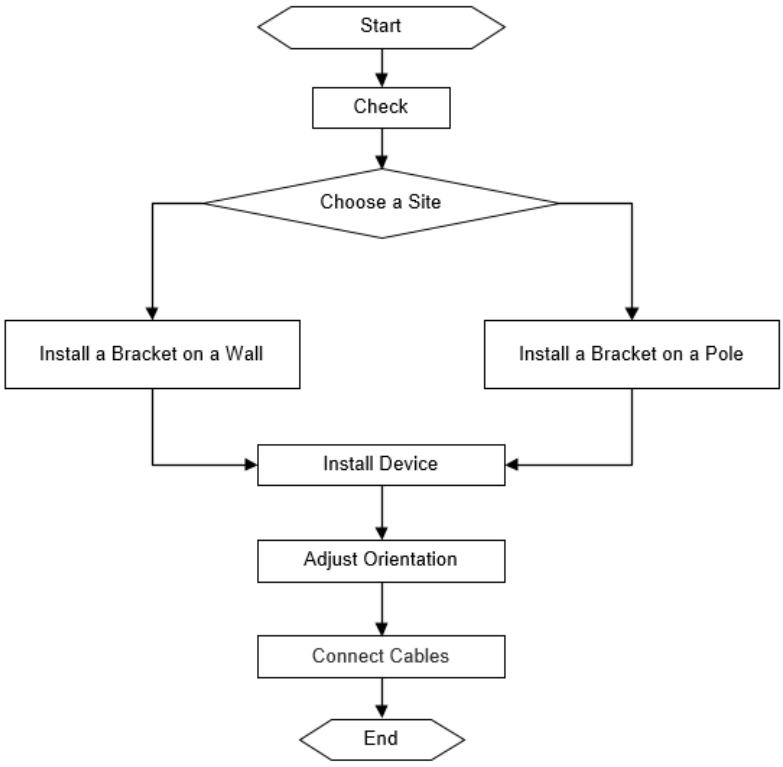
After unpacking the product, carefully inspect each item in accordance with the provided package contents. If any inconsistencies are found, please contact our local distributor.

3 Installation

Caution

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

3.1 Installation Procedure



3.2 Before You Begin

Carefully plan and arrange the installation location, networking mode, power supply, and cabling of the device before installation. Confirm the following points before installation:

- The installation site provides 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 selected power supply modules meet the system power requirement.
- The network cables have been deployed in the installation site.
- The installation site meets all requirements described in this guide.
- The device meets the customers' requirements.

3.3 Safety Precautions During Installation

To ensure minimal interference when installing multiple wireless bridges in close proximity, maintain a horizontal installation distance of at least 2 meters (6.56 ft), or a vertical installation distance of at least 0.5 meters (1.64 ft) between each wireless bridge. Ensure that the horizontal angle formed by the two wireless bridges is greater than 120 degrees. The specific installation location of the wireless bridge should be determined by professionals after conducting a thorough site survey.

Before installation, ensure that the installation location meets the requirements in 2.2 Installation Environment Requirements, and pay attention to the following:

- Use the supplied 24 V/0.6 A DC power adapter or an equivalent power source with the same specifications to power the equipment. Do not use adapters with different specifications.
- When the equipment is powered by 24 V passive PoE and is operating under full load (with simultaneous 2.4 GHz, 5 GHz, and wired connectivity), the maximum recommended cable length for the Cat5e cable is 80 m (262.47 ft.).
- Ensure that the Ethernet cable and power cord are securely connected.

3.4 Mounting the Device

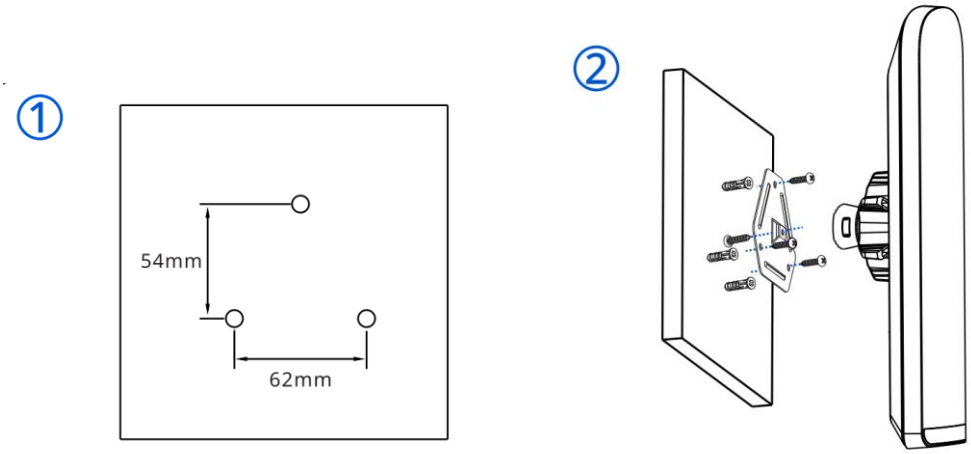
Caution

- Install the device in a manner that maximizes the coverage area of the antenna.
- The schematic diagram provided is for reference purposes only. The actual product should be installed based on its physical specifications and design.

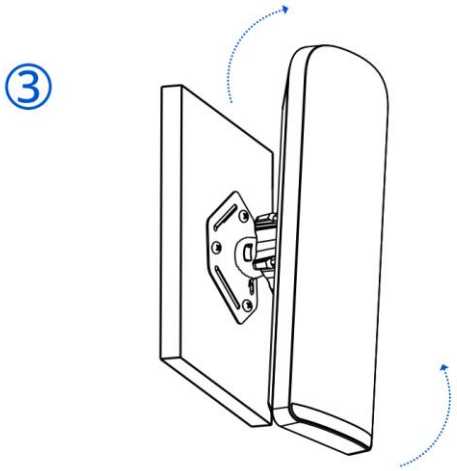
3.4.1 Wall Mounting

(1) Secure the mounting bracket on the wall.

(2) Install the device to the mounting bracket.

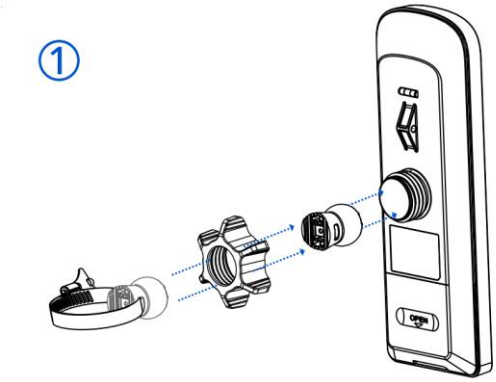


(3) Adjust the orientation.

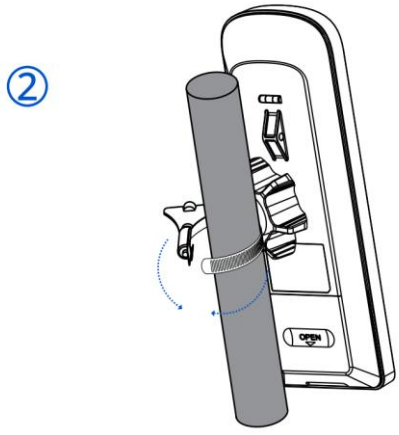


3.4.2 Pole Mounting

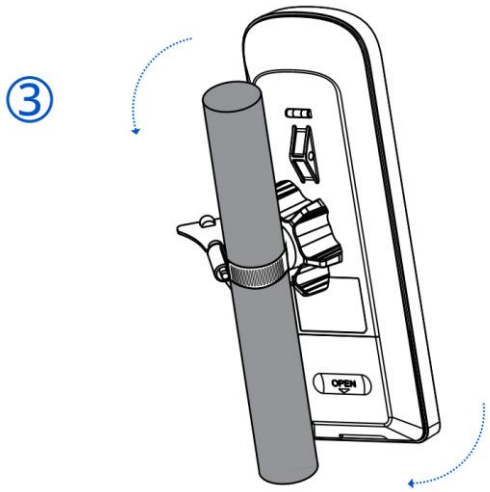
(1) Install the device to the mounting bracket.



(2) Secure the mounting bracket to the pole by threading a clamp through the mounting bracket.



(3) Adjust the orientation.



3.5 Connecting Cables

(1) Select or make an Ethernet cable suitable for the distance between the bridge and the power source equipment. (The bridge supports Cat5e or higher cables up to 100 meters (328.08 ft) for PoE power supply.)

(2) Connect one end of the Ethernet cable to the PoE port of the 1000 Mbps passive PoE injector, and the other end to the LAN1/PoE port on the bridge. Connect the LAN port of the 1000 Mbps passive PoE injector to a server or IP camera using another Ethernet cable. Connect the 24 V/0.6 A DC power adapter to the DC power connector of the PoE injector for power supply. Alternatively, connect a 12 V DC solar panel to the DC connector of the bridge for power supply. Then, connect a LAN port on the bridge to a server or IP camera using an Ethernet cable.

Figure 3-1 Connecting the Ethernet Cable to the Passive PoE Injector

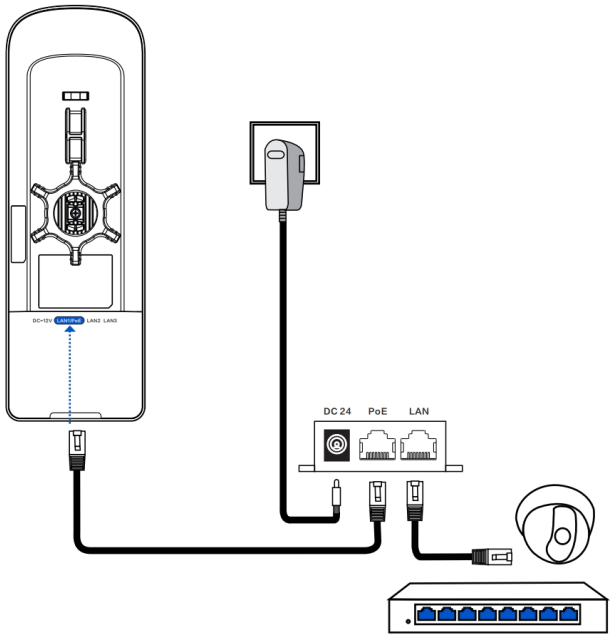
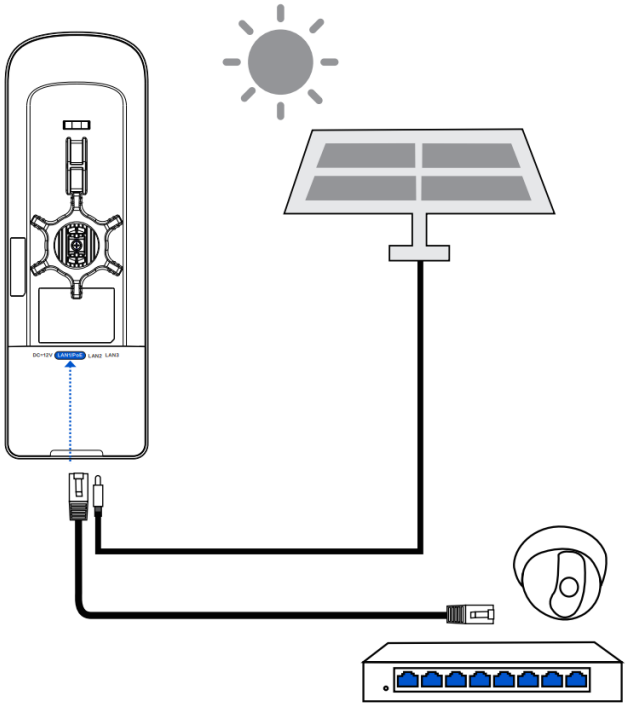


Figure 3-2 Connect the Ethernet cable to a solar panel



Solar Panel

Solar panels convert light energy from sunlight into electrical energy. The EST350G requires a solar power panel with an output specification of 12V/1.2A DC.

Notes for Installing the Solar Panel

Because the sun's position differs between the Northern and Southern Hemispheres, the solar panel should face south in the Northern Hemisphere and north in the Southern Hemisphere to achieve optimal power output. Additionally, the tilt angle of the solar panel affects the efficiency of solar energy conversion. The optimal tilt angle varies with latitude. The following table shows the optimal tilt angles for different latitude ranges.

Latitude Range	Optimum Tilt
0°–10°	10°–20°
10°–20°	20°–30°
20°–30°	30°–40°
30°–40°	40°–50°
40°–50°	50°–60°
50°–60°	Approximately 60°

Warning

- After the Ethernet cable is securely connected to the device, cover the device with a waterproof cover to shield it from potential water and dust damage.

- Do not use other models of PoE injectors or switches for power supply as it may lead to irreparable damage to the device.

3.6 Verifying the Installation

(1) Check the device

- Verify that the external power supply matches the specification.
- Verify that the device is firmly and reliably secured.

(2) Check the power supply

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

4 Debugging

4.1 Power-On

(1) Checklist Before Power-On

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

(2) Recommended: After the bridge is powered on, check whether the LED status is normal.

4.2 Configuring the Bridge

- Method 1: Configure the bridge through Ruijie Reyee App

(1) The power cord is properly connected.

(2) Scan the QR code on this page or on the device to download and install Ruijie Reyee App.

(3) Log in to Ruijie Reyee App.

- Method 2: Log in to eWeb for configuration

(1) Connect the LAN port of the bridge to a PC using an Ethernet cable for wired connection, or connect your smartphone or PC to the device's SSID (default SSID: @Ruijie-bxxxx) for wireless connection.

(2) Enter **https://10.44.77.254** in a browser to access the device's eWeb.

(3) Enter the device password (default password: admin) and click **Login** to log in to eWeb for configuration.

Caution

- Enter the initial password **admin** to log in and begin configuration.
- To ensure device security, set a password after login and change the password regularly.

5 Monitoring and Maintenance

5.1 Monitoring

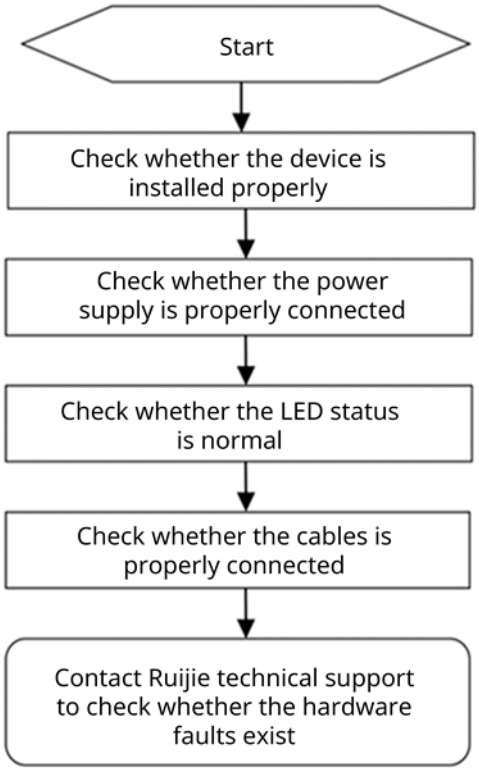
You can observe the LED status to monitor the device in operation.

5.2 Hardware Maintenance

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

6 Common Troubleshooting

6.1 Troubleshooting Flowchart



7 Appendix

7.1 Connectors and Media

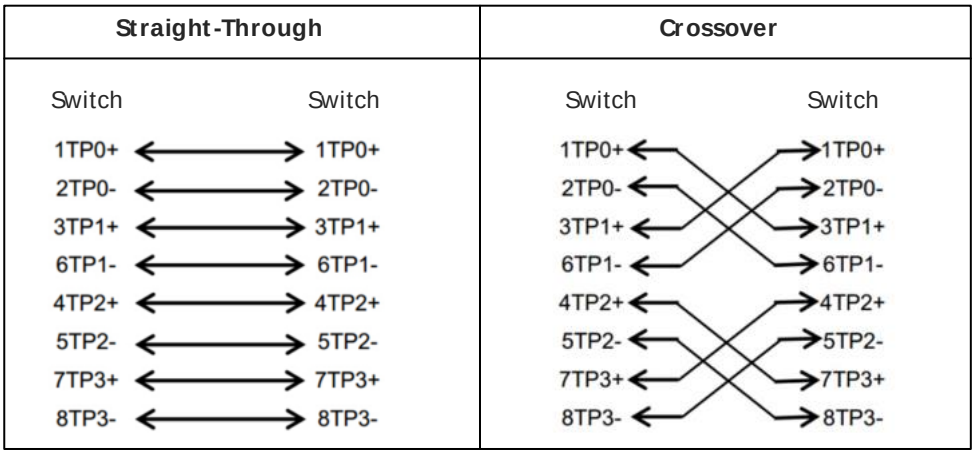
1000BASE-T/100BASE-TX/10BASE-T Port

The 1000BASE-T/100BASE-TX/10BASE-T port 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 Category 5e 100-ohm UTP or STP (recommended) with a maximum distance of 100 meters (328 feet).

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

Figure 7-1 1000BASE-T Twisted Pair Connections



100BASE-TX/10BASE-T can be interconnected using cables of the preceding specifications. For 10 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 3, Category 4, and Category 5 cables; for 100 Mbps, the 100BASE-TX/10BASE-T port can be connected using 100-ohm Category 5 cables with a maximum connection distance of 100 meters. The following table shows 100BASE-TX/10BASE-T pin assignments.

Table 7-1 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 pair cables for a 100BASE-TX/10BASE-T port.

Figure 7-2 100BASE-TX/10BASE-T Twisted Pair Connections