AP Series Outdoor Wireless LAN Access Points

Quick Start Guide

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base

　　　　　 Bantian, Longgang

　　　　　 Shenzhen 518129

　　　　　 People's Republic of China

Website: http://enterprise.huawei.com

Preface

This document describes the hardware configuration, installation preparation, installation method, installation procedure, cable connection, and procedure for logging in to the outdoor APs.

The preface is organized as follows:

- Intended Audience
- Symbol Conventions
- Documentation Obtaining
- Technical Support

Intended Audience

This document is intended for:

- Hardware installation engineers
- Onsite maintenance engineers
- Network administrators configuring and maintaining the network

Symbol Conventions

The symbols that may be found in this document are defined as follows:

Symbol	Description
⚠ DANGER	Indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.
⚠ WARNING	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
⌐ TIP	Provides a tip that may help you solve a problem or save time.
📖 NOTE	Provides additional information to emphasize or supplement important points of the main text.

Documentation Obtaining

You can visit http://enterprise.huawei.com to obtain the latest product documentations. Choose **Support > Product Support > Enterprise Networking > WLAN > AP**, and then select the document of a specified product.

> 📖 **NOTE**
>
> You can select the document as required. For example, if you want to obtain AP6610DN-AGN documents, select **AP6610DN-AGN**.

Technical Support

If you have trouble in locating or rectifying faults during maintenance or troubleshooting by following instructions in this document, contact the Huawei customer service center (CSC) for help.

You can also visit http://enterprise.huawei.com, click **Contact Us** in the lower area of the page, and select the country to obtain contact information about Huawei local office.

Change History

Changes between document issues are cumulative. Therefore, the latest document issue contains all the changes in previous issues.

Changes in Issue 02 (2013-01-30)

This version has the following updates:
The following information is added:
●FCC compliance and sales regions of AP products

Change in Issue 01 (2012-10-31)

Initial commercial release.

Device Introduction

The Huawei AP series outdoor wireless LAN access point provides two models: AP6510DN-AGN, AP6610DN-AGN. The outdoor AP supports 2.4GHz and 5 GHz frequency bands, and has enhanced coverage performance and protection capabilities. It supports wireless bridging, complies with IEEE 802.11a/b/g/n, connects a large number of users, and works as a Fit AP. The outdoor AP features high reliability, high security, simple network deployment, automatic AC discovery and configuration, and real-time management and maintenance.

The APs are recommended for use in residential or commercial properties without wired resources. The APs can be deployed at both ends of a commercial street or in the building opposite to a commercial property. The APs must be equipped with external antennas to implement wireless signal coverage. Different outdoor AP models are sold in different regions depending on whether the APs have passed the FCC certification.

Table 1   FCC compliance and sales regions of AP products

Passed FCC Certification	Product Model		Sales Region
No	AP6510DN-AGN		All regions except Japan and regions that require FCC certification
	AP6610DN-AGN		
Yes	AP6510DN-AGN-US	AP6510DN-AGN-US	Regions that require FCC certification (except the U.S)
		AP6510DN-AGN-USA	U.S
	AP6610DN-AGN-US	AP6610DN-AGN-US	Regions that require FCC certification (except the U.S)
		AP6610DN-AGN-USA	U.S

📖 NOTE

● The AP products sold in the U.S have a fixed country code US, and the country code change function is disabled.

● The AP6510DN-AGN, AP6510DN-AGN-US, and AP6510DN-AGN-USA have the same specifications and are installed in the same way. This document collectively calls the three models AP6510DN-AGN.

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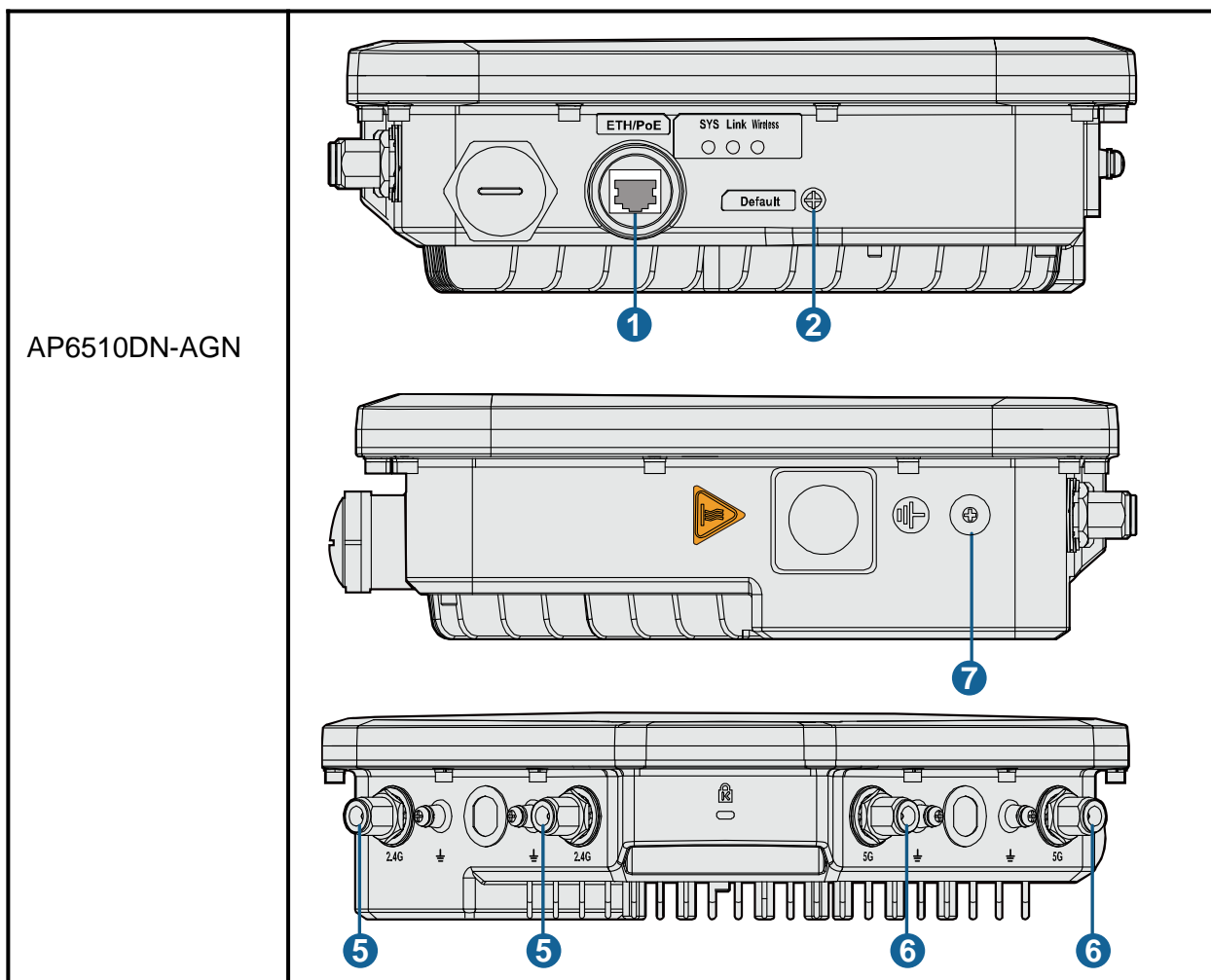
Device Introduction

Table 2 lists the dimensions and weights of outdoor APs.

Table 2 Dimensions and weight

Model	Dimensions	Weight
AP6510DN-AGN	255mm×255mm×83mm（W×D×H）	2.2kg
AP6610DN-AGN	255mm×255mm×83mm（W×D×H）	2.65kg

Table 3 Interfaces on outdoor APs

AP6510DN-AGN	

Device Introduction

Table 3 Interfaces on outdoor APs

AP6610DN-AGN

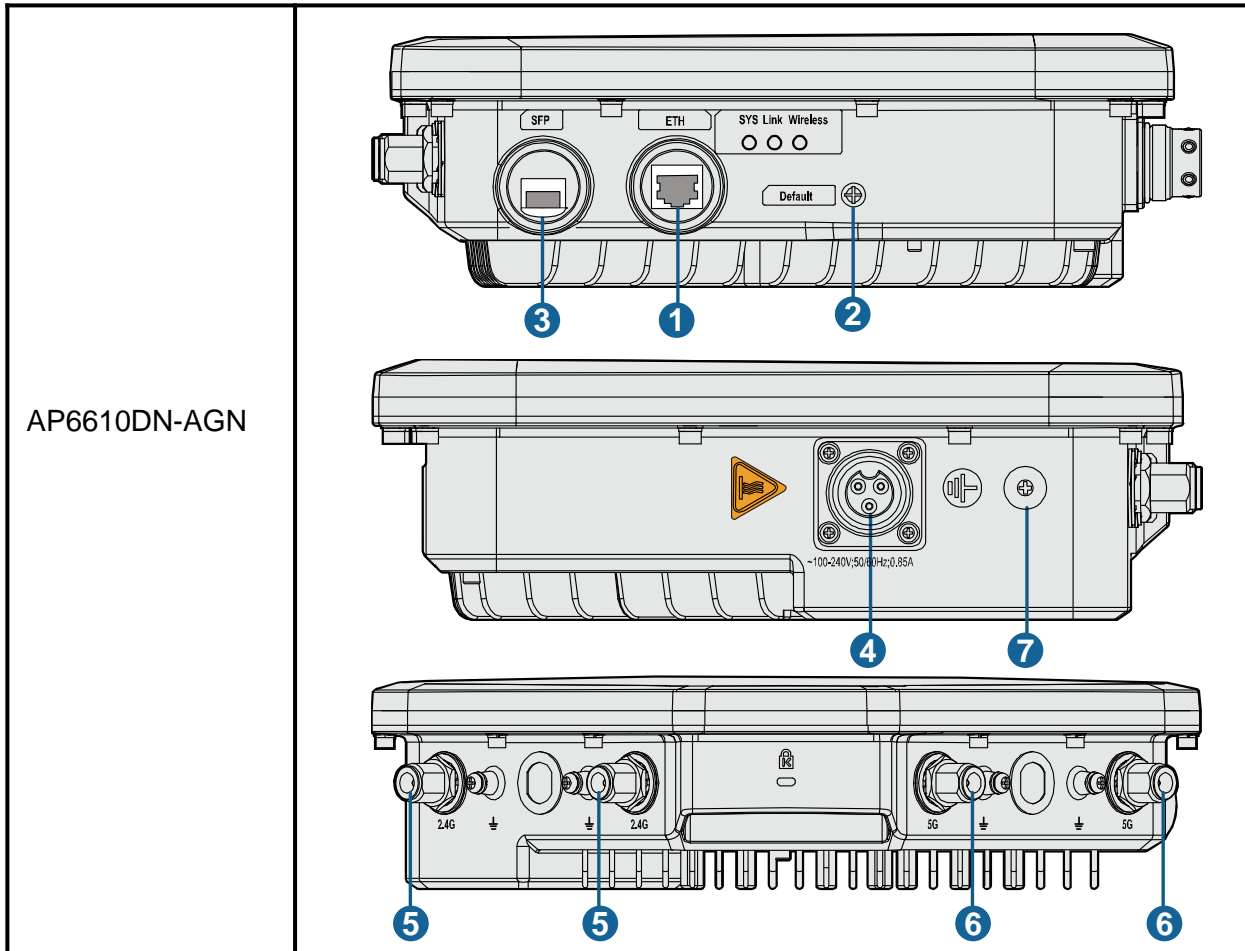**Table 4 Interfaces on outdoor APs**

No.	Name	Description
1	ETH port (ETH/PoE port)	Connected to a switch or PD.
2	Default	Press and hold down the Reset button for 3 seconds to restore the factory settings and restart the AP.
3	SFP port	Connected to fiber. An optical module is required.
4	AC power port	Connected to an AC power module.
5	2.4 GHz antenna port	A port connected to the 2.4 GHz antenna.
6	5 GHz antenna port	A port connected to the 5 GHz antenna.
7	Ground screw	Connect the ground cable to the AP with a ground screw.

Installation Preparations

1. Safety Precautions

⚠️ **WARNING**

Only the qualified personnel are permitted to install and remove the device and its accessories. Before installation and operation, read the safety precautions carefully.

- Take proper measures to prevent injuries and device damage.
- Place the device in a dry and flat position away from any liquid and prevent the device from slipping.
- Keep the device clean.
- Do not put the device and tools in the aisles.

2. Installation Environment Check

Before installation, verify that the device runs in a favorable environment.

The table lists requirements on the environment that a device works in, including the temperature, humidity, altitude, and pressure.

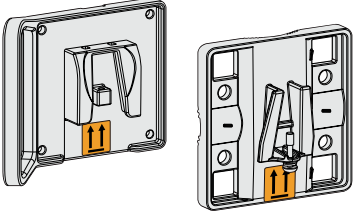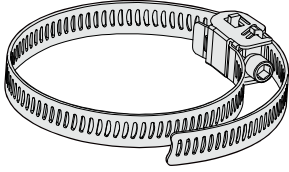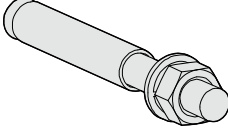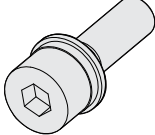**Table 5 Requirements on the environment**

Item	Range
Operating temperature	AP6510DN-AGN: -40℃～60℃
	AP6610DN-AGN: -40℃～60℃
Storage temperature	AP6510DN-AGN: -40℃～70℃
	AP6610DN-AGN: -40℃～70℃
Relative humidity	0% to 100%
Altitude	-60 m to +4000 m
Pressure	70 kPa to 106 kPa

Installation Preparations

3. Device Accessories

The following accessories are delivered together with outdoor APs:

Installation suite	Hose clamp	Expansion bolt	M4x12 hexagon socket head cap screw

4. Installation Tools

To install outdoor APs, prepare the following tools:

Maker	Phillips screwdriver	Flat-head screwdriver
Hammer drill	Utility knife	COAX crimping tool
Diagonal pliers	RJ45 crimping tool	Wire stripper
Network cable tester	Multimeter	Hex key
Ladder	Adjustable wrench	Hammer
ESD gloves	Level	8mm drill bit

Installing the AP

1. Installation Flowchart

Figure 1   Flowchart for installing an AP

2. Checking Before Installation

Unpack the package. Ensure that all the items listed in the packing list are included in the carton. If any item is missing, contact the supplier.

Table 6 Packing list
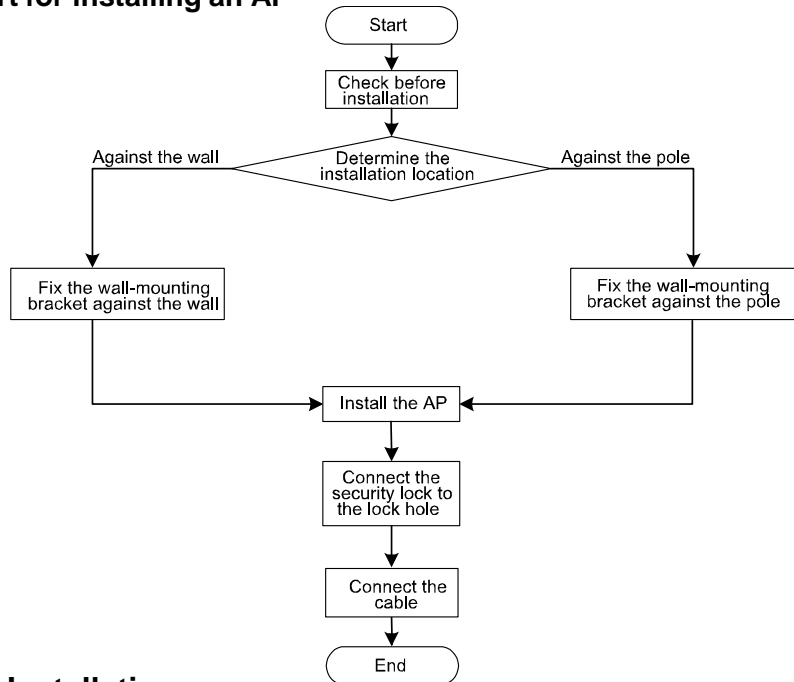
No.	Item	Quantity	Unit
1	AP device	1	PCS
2	Installation suite	1	PCS
3	Network port connector	1	PCS
4	M4x12 hexagon socket head cap screw	4	PCS
5	Expansion bolt	2	PCS
6	Hose clamp	2	PCS
7	Fiber wrench	1	PCS
8	OT terminals	2	PCS
9	Quick Start	1	PCS

📖 NOTE

- Before unpacking the carton, ensure that the packing carton is intact and that the carton is not severely damaged or soaked. Stop unpacking if the packing carton is rusted or socked. Then, investigate causes and give a feedback to the vendor.
- Optical fiber tubes are only contained in the AP6610DN-AGN packing carton.

Installing the AP

3. Determining the Installation Position

When determining the AP installation position, comply with the following rules:

- Install the AP free from high temperature, dust, toxic gases, flammable or explosive materials, unstable voltage, or electromagnetic interferences, such as radar stations, launch pads, or transformer substations. The AP should also be away from great vibrations and strong noises.
- Install the AP away from water, drippings, and dews.
- Install the AP in a hidden position in order not to disturb people.
- Consider the communication network planning and the technical requirements of the equipment in the project design. In addition, hydrographic, geological, seismic, power supply, and transportation factors must be considered.

Outdoor APs can be installed on poles or wall. The pole diameter is 48 mm to 114 mm and the thickness must be at least 2.5 mm. The AP must be installed by the installation personnel in the position determined by site survey. The recommended AP installation space is as follows:

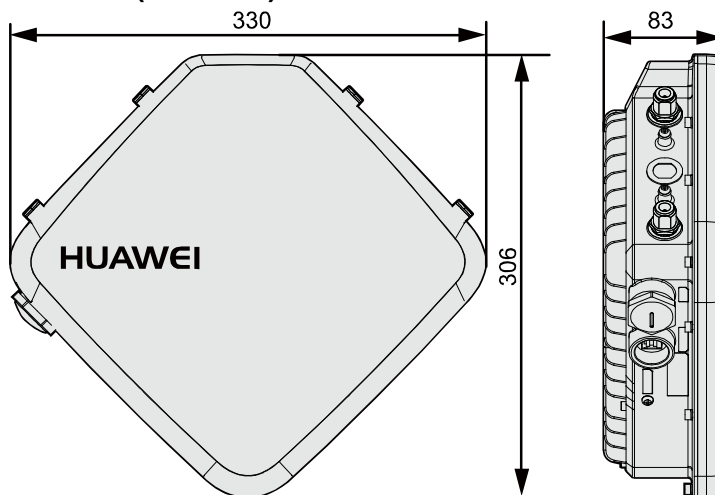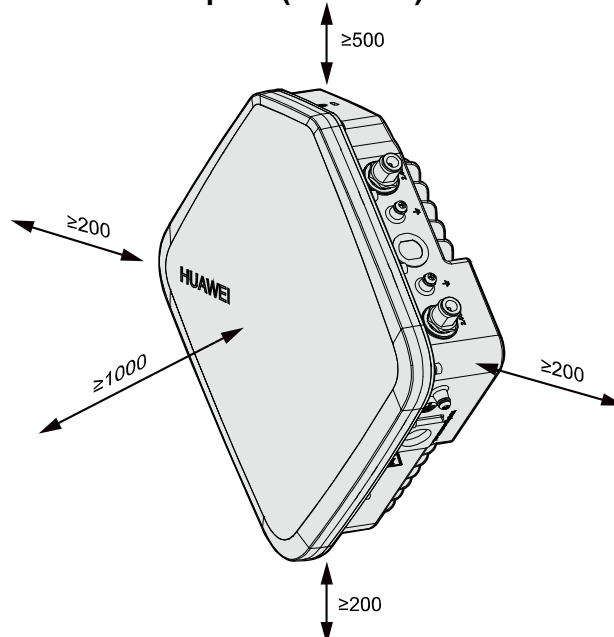**Figure 2 AP dimensions (unit: mm)**

Figure 3 Recommended AP installation space (unit: mm)

Installing the AP

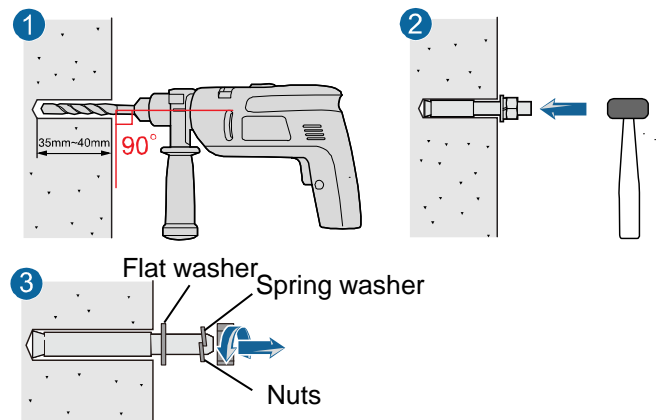## 4. Installing the AP

📖 **NOTE**

The procedures for installing all models of outdoor APs are the same unless otherwise stated. The following figures use the AP6610DN-AGN as an example.

● **Against the Wall**

You need the sheet metal wall-mounting bracket and expansion bolt to install the outdoor AP against the wall. The procedures are as follows:

(1) Fix the wall-mounting bracket to the wall, adjust the installation position, and use the marker to mark the drilling positions where expansion bolts are installed. (Mark the two holes on either diagonal line on the wall-mounting bracket.)

(2) Use 8 mm drill bit to drill 35 mm to 40 mm deep holes in the drilling positions and install expansion bolts. Screw the nut into the expansion tube, hammer the expansion bolt into a hole until the flat washer is flattened against the wall, and remove the nuts, spring washer, and flat washer in order.
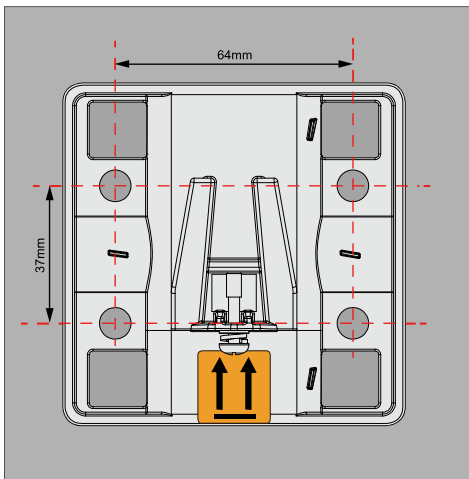
(3) Use four M4x12 hexagon socket head cap screws to fasten the wall-mounting bracket to the AP.

Hexagon socket head cap screw
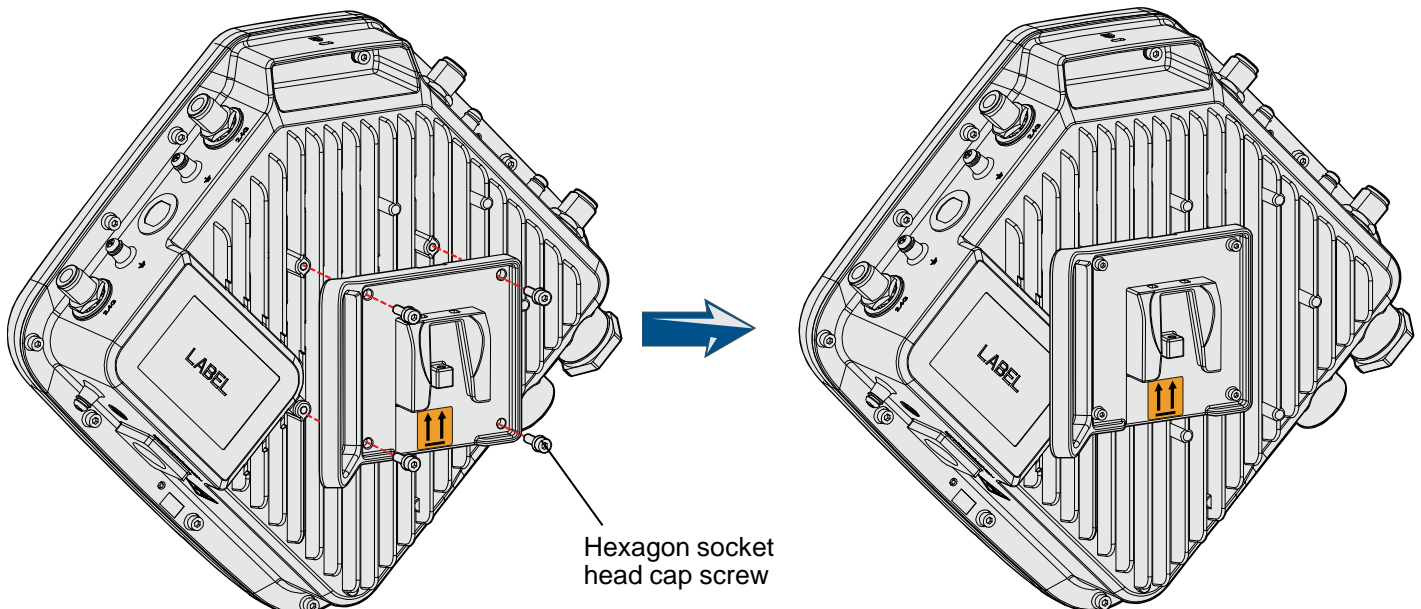
Installing the AP

(4) Pinch the wall-mounting bracket on the expansion bolts, and fasten the flat washer, spring washer, and nuts in order.
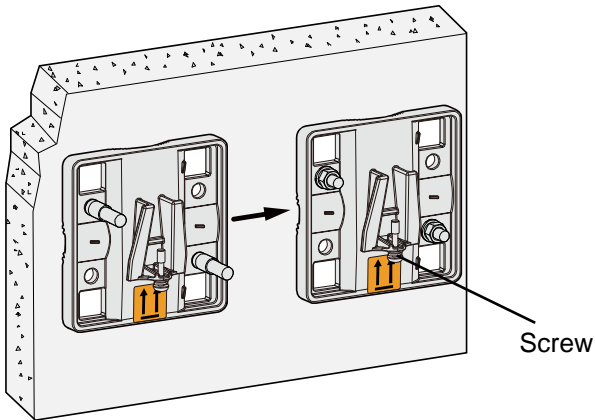
Screw

(5) Slide the AP into the wall-mounting bracket and fasten the screw on the wall-mounting bracket.

- **Against the vertical pole**

(1) Determine the AP installation position, slide the hose clamp through the hole of the wall-mounting bracket and attach it to the pole, and use the hex key to secure screws on the hose clamp.

(2) Slide the AP into the wall-mounting bracket and fasten the screw on the wall-mounting bracket.
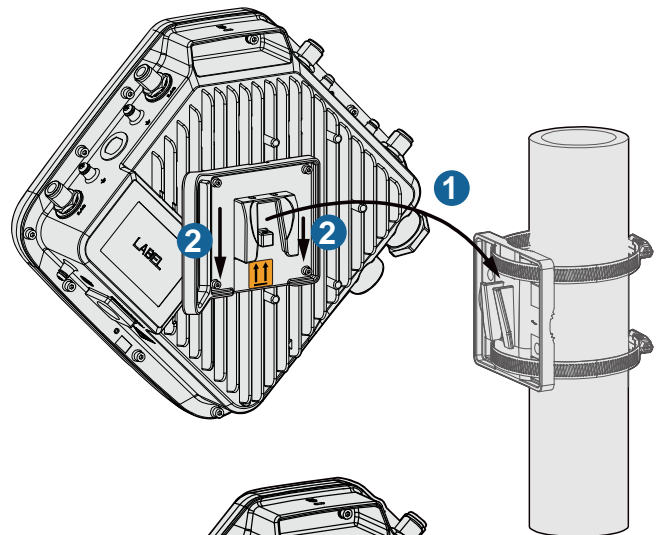
- **Against the horizontal pole**
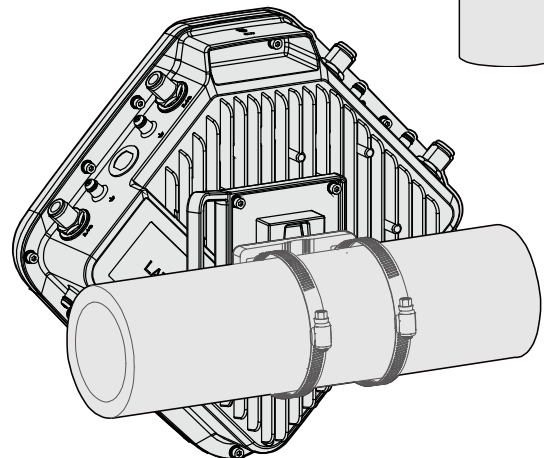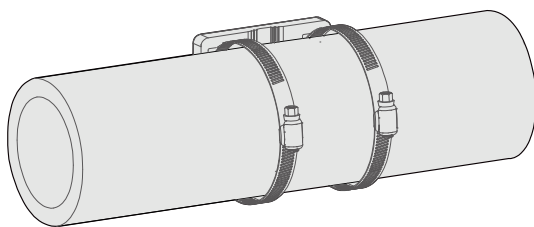
📖 NOTE

The procedure for installing the AP6610DN-AGN against a horizontal pole is similar to the procedure for installing the AP6610DN-AGN against a vertical pole.

Installing the AP

5. Installing the Security Lock

📖 **NOTE**

You need to purchase the security lock.

The device provides a lock hole. You can lock the device to an immovable object to ensure security.
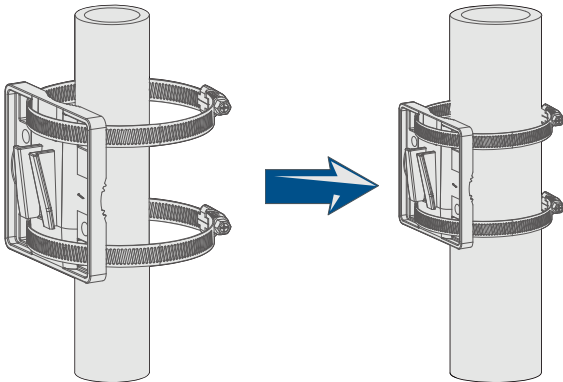The detailed procedures are as follows:

(1) Fix the cable of the security lock to a fixed object around.

(2) Plug the locking piece into the security keyhole on the device and lock it.
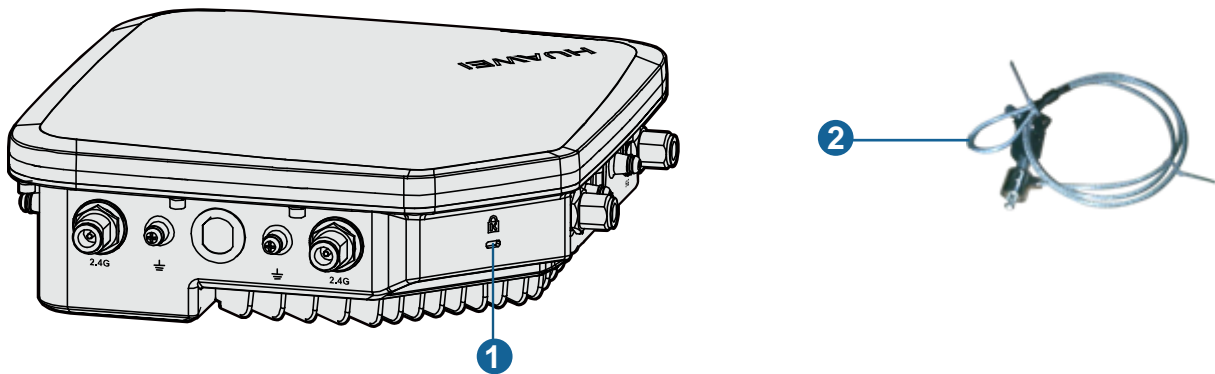
1. Lock hole	2. Security lock

6. Connecting Cables

- **AP6610DN-AGN external cable arrangement drawing**
- **AP6510DN-AGN external cable arrangement drawing**
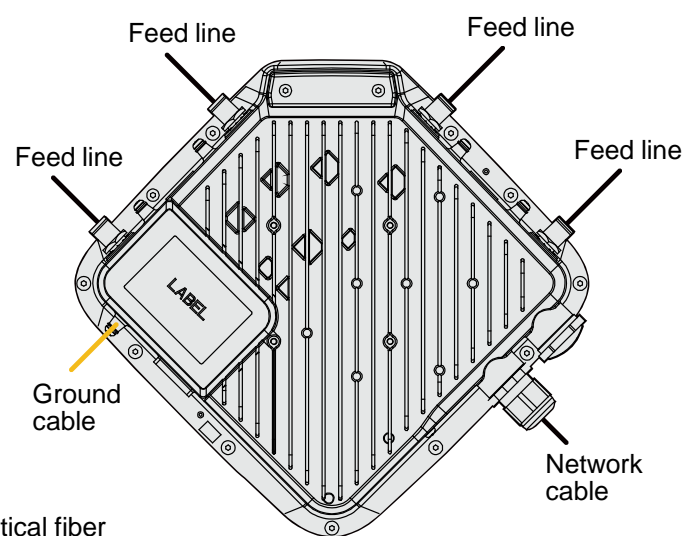
Installing the AP

- **Connecting the feed line**

(1) The outdoor AP's antenna ports already have 5 KA surge protection capability. Generally, no surge protection devices need to be installed; therefore, the antenna cables are directly connected to the AP's antenna ports.

Feed line

Waterproof adhesive tape

(2) If higher surge protection capability is required, the customer can purchase a surge protection device. When installing the surge protection device, ensure that it is connected to a ground cable.

a **b** **c**

Surge protection device

Feed line

Ground cable

Waterproof adhesive tape
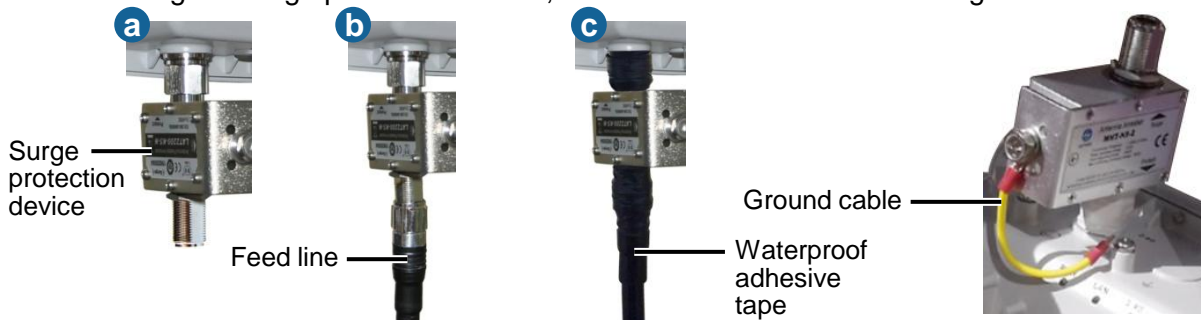
📖 **NOTE**

- When no antenna is installed on the 5G antenna interface, cover the interface with a dustproof cap and wrap the dustproof cap with insulating tape and waterproof tape.
- Wrap the feed line using one-layer PVC black insulation tape, three-layer waterproof adhesive tape, and then three-layer PVC black insulation tape.
- Stretch the waterproof adhesive tape evenly and ensure that the upper layer of the tap overlaps 1/2 of the lower layer. Each layer should be attached tightly.
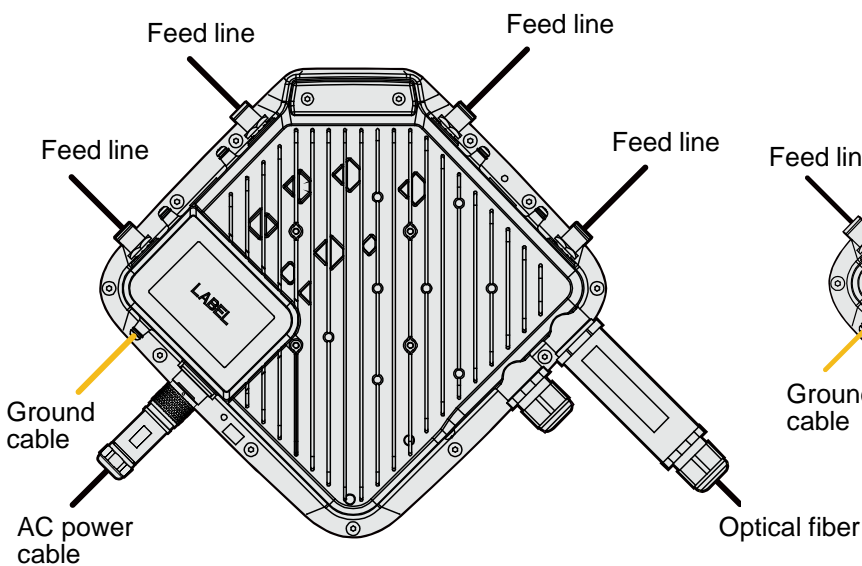- Wrap the three-layer waterproof adhesive tape from bottom to up, from up to bottom, and from bottom to up in order.

- **Connecting optical fibers**

(1) The right figure shows the appearance of the optical fiber：

(2) The optical fiber connection of AP6610DN-AGN is similar to that of WA653SN. Here, WA653SN is used as an example. Connect the optical fiber to the AP and ensure that the waterproof connector is fastened.

b **c** **d** **e** **f**

📖 **NOTE**

Install an optical module as shown in step a before connecting the fiber.

a **b** **c** **d** **e** **f**

Installing the AP

● **Connecting optical fibers**

(1) Make an AC power cable onsite, cut the cable of proper length. Make a cable according to figure 4. L/N/PE pin arrangement must be correct.

(2) When connecting the AC power cable to the AP, align the socket to the red point of the connector, and insert the waterproof connector. When a crack sound is heard, the AC power cable is installed properly. When removing the AC power cable, press the component with the red point. You do not need loosen the screw. (figure 5)

Figure 4
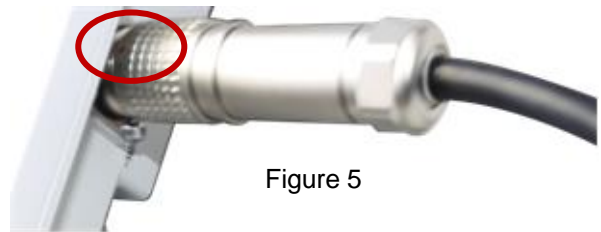
Figure 5

● **Making AC Power Cables Onsite**

a Preparation

(1) The required tools are as follows: open-end wrench (22mmX24mm), open-end wrench (22mmX24mm), Phillips screwdriver (0#X50mm), diagonal pliers, and utility knife.

(2) The following table shows the connector components.

Shell Screw   Socket   Nut
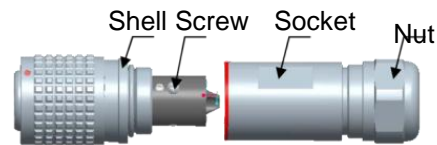
b Connection

(1) Use cable ties to fasten the cable, remove the socket and nut together, and then lead the cable through the socket and nut.
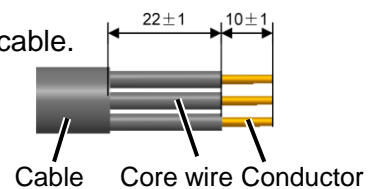
Wiring terminal

Cable tie

(2) Strip the cable.

22±1   10±1

Cable   Core wire   Conductor

(3) Install the core wires in the L, N and PE holes.
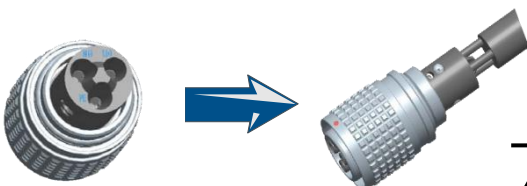
(4) Tighten the screws in the three holes using a Phillips screwdriver.
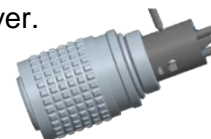
(5) Tighten the Socket and Shell using hand until you can't see the red color band.

Red color band   Nut
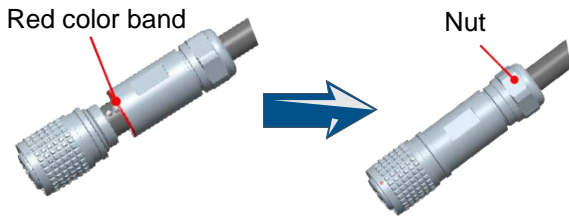
⚠ CAUTION

Before tightened the socket and shell, the cable can't be tightened by the nut.

c Verification

Use a multimeter to test the reliability of the cable components.

(6) Pre-tighten the nut and socket, and then further tighten the nut using a wrench with a torque of more than 1.2N·m.

Wrench specifications:22
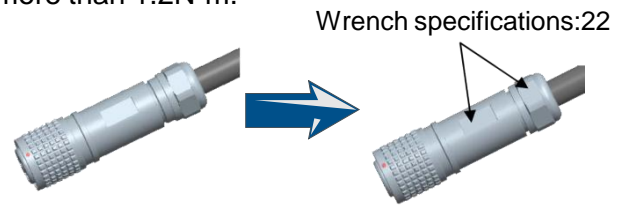
⚠ CAUTION

Please be careful not to damage the surface coating of parts when tightening the nut and socket.

⚠ CAUTION

● Connector jacks can't be short-circuited.
● Connections between the metal shell and the connector jacks can't be short-circuited.
● Cable core wires are connected properly to the corresponding connector jacks.

d Protection

The device is placed outdoors, warp up the connector using three layers of PVC insulation tapes to prevent it from being damaged, as shown in the following figure.

📖 NOTE

● Each radio connector must be wrapped by three layers of waterproof tape and three layers of insulating tape.
● Wrap the tape from bottom to top, from top to bottom, and then from bottom to top. Cut the tape after wrapping three layers of tape on the connector.
● Wrap each layer of tape tightly and ensure that each layer covers more than 50% of the layer below it.
● Before wrapping the waterproof tape, stretch the tape evenly until the tape turns 1/2 as wide as before.
● After wrapping the tape, bundle cable ties at both ends of the insulating tape to prevent aging of the tape.

● **Connecting the ground cable**

Cut the cable of proper length, and select 6-M4 OT terminal for the AP and 6-M6 OT terminal for the ground bar.

M6
⊕
4.8N·m

Connecting the ground bar
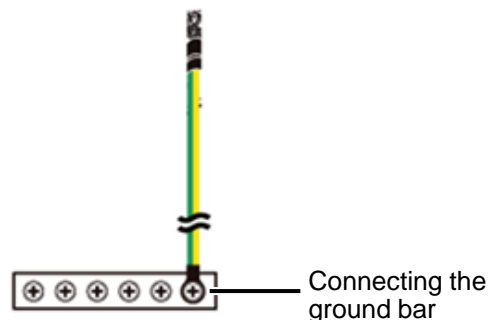
Installing the AP

● **Connecting network cable**

(1) Use a shield straight-through cable. Cut the cable of proper length based on the distance between the AP and the PSE device, peel the insulation on both ends of the network cable, and crimp the wires to RJ45 connectors.

(2) Make a network cable onsite according to the following pin assignment. Otherwise, the communication quality is affected even if devices can be connected.

Table 7 Pin assignment

X1 Pin	Wire Color	X2 Pin
1	White and orange	1
2	Orange	2
3	White and green	3
4	Blue	4
5	White and blue	5
6	Green	6
7	White and brown	7
8	Brown	8

(3) Put the network cable through the hole on the waterproof PG connector.
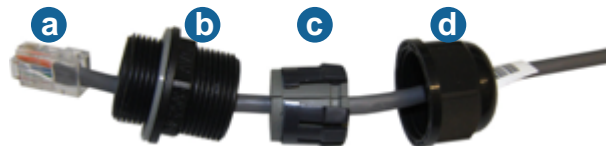
(4) Connect the RJ45 connector to the AP and secure the waterproof PG connector, as shown in figures b, c, and d.
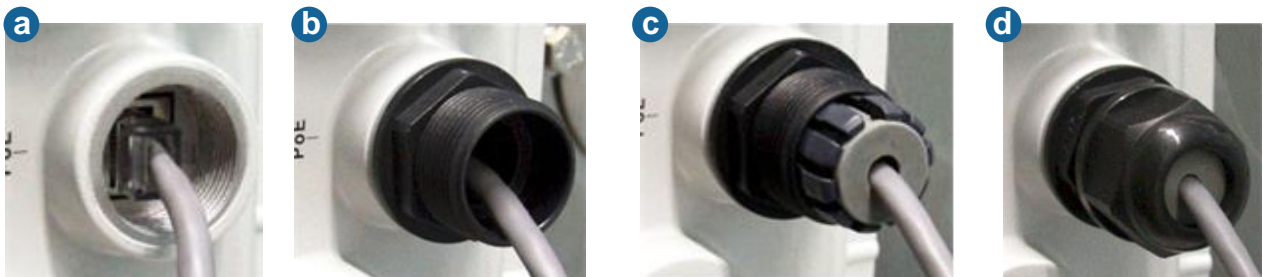
⚠ **CAUTION**

● The network cables used are shield straight-through cables.

● Ensure that the RJ45 connector is correctly connected to the AP. Otherwise, the network cable may be damaged. Before removing the network cable, remove the waterproof PG connector, and then remove the RJ45 connector from the AP.

Installing the AP

● **Installing outdoor antennas**

Two types of outdoor antennas are available: directional outdoor antenna and omnidirectional outdoor antenna. Omnidirectional antennas can be directly installed on APs. The following are the procedures for installing directional and omnidirectional outdoor antennas.

1. Perform the following steps to install a directional outdoor antenna:

(1) Weld the lightning rod on the top of the antenna pole.

(2) Install the antenna pole on a parapet or concrete bed on the roof of the building.

(3) Use a 40 mm x 4 mm flat steel to connect the antenna pole to an earth mat.

(4) Secure the directional outdoor antenna on the pole with an antenna support.

Keep the pole vertical with the ground during the installation. (See the figure below for how a directional outdoor antenna is installed on a pole.)

● If roof of the building is surrounded by parapets of no less than 1.2 m high, fix the pole on a parapet with expansion screws, and then fix the directional outdoor antenna on the pole with an antenna support.

● If roof of the building is surrounded by parapets of less than 1.2 m high, fix the pole on a parapet and on the ground with expansion screws, and then fix the directional outdoor antenna on the pole with an antenna support.

●If there is no parapets around the roof, fix the pole on the ground or a concrete bed with expansion screws and steel wires, and then fix the directional outdoor antenna on the pole with an antenna support.
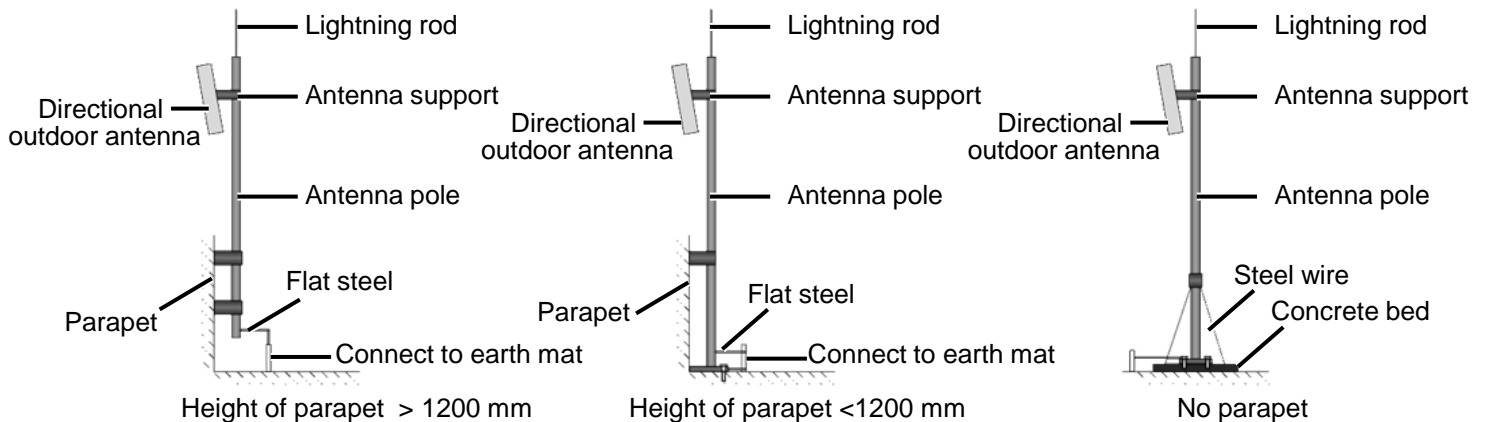

| Height of parapet > 1200 mm | Height of parapet <1200 mm | No parapet |

2. Perform the following steps to install a omnidirectional outdoor antenna:

Pay attention to the following points when installing an omnidirectional antenna:

(1) An omnidirectional outdoor must be installed on a pole with a diameter of 30 mm to 50 mm and the thickness must be at least 2.5 mm. A 50 mm diameter pole made of round steel is usually used.

(2) The top of pole must be aligned with the hose clamp at the bottom of the antenna, as show in the figure 6.

(3) After the installation is complete, the antenna must high enough to provide sufficient signal coverage, and the top of the antenna must be within the 45° protection angle of the lighting rod.

(4) Do no weld a lightning rod directly on the antenna pole (because there should not be metal subjects within 1 m around an omnidirectional antenna). Instead, install an independent lightning rod between two omnidirectional antenna poles. Adjust the height of the lightning rod to ensure that the omnidirectional antennas are covered in the protection angle.

Installing the AP

Figure 6
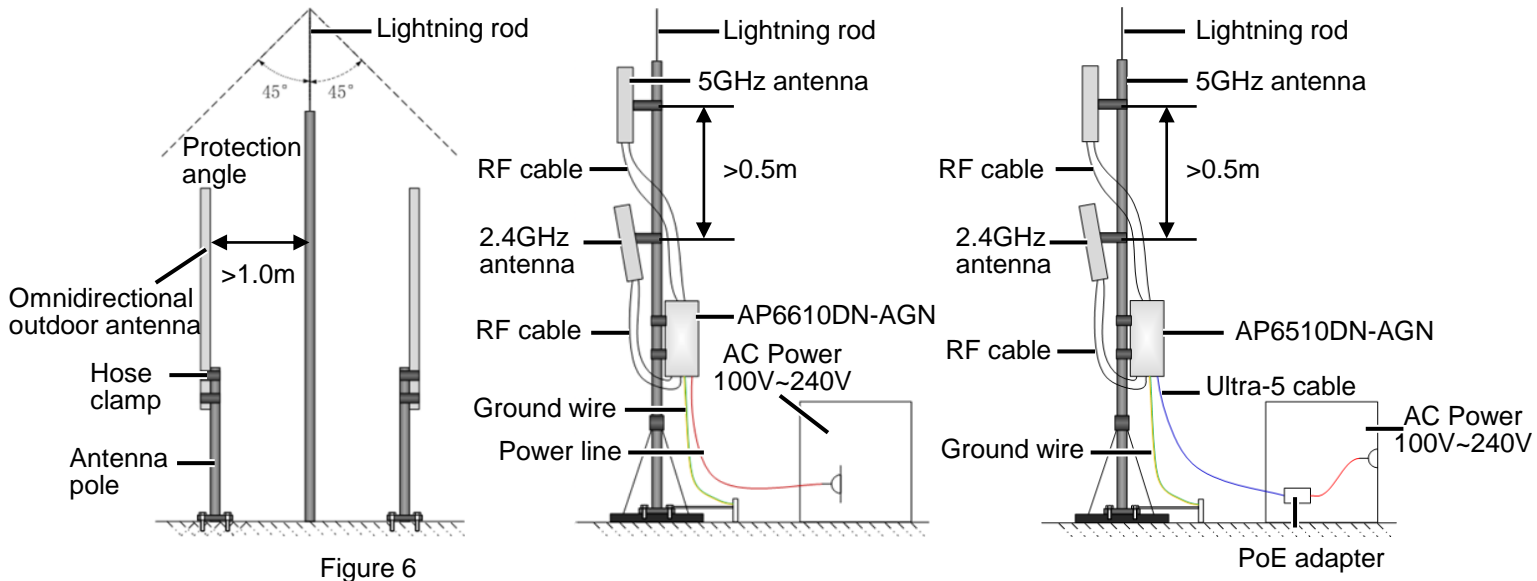
- **Pressing the Reset Button**

The Reset button on an outdoor AP is protected by a waterproof screw. Before pressing the Reset button, remove the waterproof screw.

⚠ **CAUTION**

Keep the screw properly and install it again after pressing the Reset button.

- **Requirements for laying Out Cables**

Requirements for laying out ground cables

(1) All ground cables must be connected to a ground bar.

(2) The ground cable cannot be led in aerially, but buried in the earth or arranged indoor.

(3) Both ends of the external conductor of the coaxial cable and those of the insulation of the shielded cable should have good electric contact with the metal shell of the equipment they connect to.

(4) Ground cables must be separated from signal cables to reduce interference between them.

(5) Do not add any switch or fuse on the ground cable.

(6) Do not use another device for an electrical connection with the ground cable.

(7) All metal components in the shell must be securely connected to the ground cable.

Power-on

Power on the AP and check the indicator status to determine the system running status.

📖 **NOTE**

The AP6510DN-AGN supports the PoE function that complies with 802.3at.

Table 8 Indicator status of the AP6510DN-AGN and AP6610DN-AGN

Information Type	SYS	Link	Wireless	Description
Startup status	Steady green	NA	NA	The device is being started.
	Blinking green	NA	NA	The system is working properly.
	Steady red	NA	NA	The system fails to load the DRAM or system software.
Running and connection	0.5Hz	Off	Off	The system is working properly. However, the Ethernet is not connected. Radios are disabled and no user is connected to the AP.
			Blinking green	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 2.4 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking yellow	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 5 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking green and yellow alternately	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 2.4 GHz and 5 GHz bands and is transmitting data.
	0.5Hz	Steady or Blinking green	Off	The system is working properly, the Ethernet is connected, and radios are disabled. The indicator blinks more quickly when more data is being transmitted.
			Blinking green	The system is working properly, and the Ethernet is connected. The AP has wireless users connected to the 2.4 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking yellow	The system is working properly, and the Ethernet is connected. The AP has wireless users connected to the 5 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking green and yellow alternately	The AP has wireless users connected to the 2.4 GHz and 5 GHz bands and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.

Power-on

If an AP is deployed on a WDS network, you can check the Wireless indicator on the AP to determine whether the AP transmits and receives wireless data normally when it is establishing a WDS link with another AP. The Wireless indicator has four possible states, as described in the following table.

Table 9   Wireless indicator status

State	Blinking Frequency	Meaning
Blinking very fast	10 Hz	The AP is transmitting or receiving data normally, and the receive signal strength is high.
Blinking fast	2 Hz	The AP is transmitting or receiving data normally, and the receive signal strength is medium.
Blinking slowly	0.5 Hz	The AP is transmitting or receiving data normally, and the receive signal strength is low.
Off	0 Hz	The AP is not transmitting or receiving data.

⚠ CAUTION

When the WDS function is enabled on an AP, the blinking frequency of its Wireless indicator indicates the receive signal strength by default. You can run the **wifi-light** { **signal-strength | traffic** } command on the A to make the blinking frequency of its Wireless indicator indicate receive signal strength or service traffic rate.

Logging In to the AP

After an AP is powered on, you can log in to the AP using the following methods.
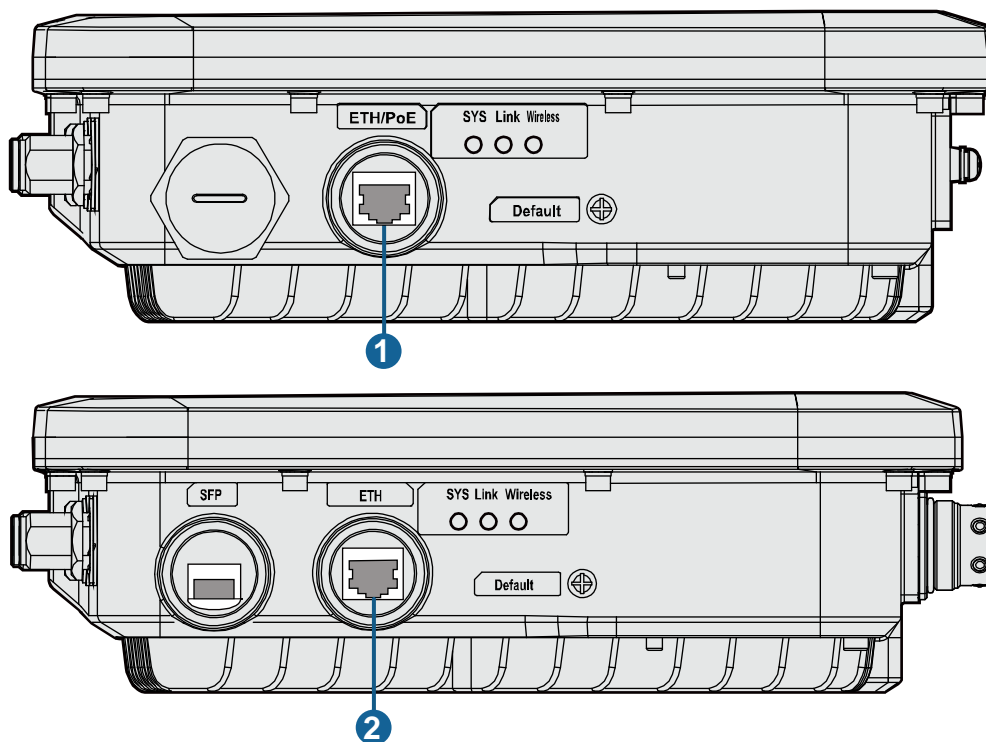1. Logging In to the AP Using Telnet

1. Logging In to the AP Using Telnet

This section describes how to log in to the AP using Telnet. After logging in to the AP, you can configure the AP using commands.

Procedure

Step 1 Connect a PC to the uplink port of the AP with a network cable. Figure 7 shows the location of the AP's uplink port.

Figure 7   Location of the AP's uplink port

No.	Port
1	ETH/PoE
2	ETH

Step 2   Configure a static IP address for the PC. The IP address must be on the network segment 192.168.0.1/24 (The IP address should not be same as the AP's default IP address 192.168.0.1.) and the subnet mask is 255.255.255.0.
After the configuration is complete, run the **ping 192.168.0.1** command on the PC to check whether the PC can be pinged. If the ping operation succeeds, the connection is set up successfully. If the ping operation fails, the connection fails to be set up. Check whether the network cable works properly.

Step 3   Access the command line window on the PC. For example, if the PC runs Windows XP, choose **Start > Run** and enter **cmd** in the displayed dialog box.

Logging In to the AP

Step 4   Run the **telnet 192.168.0.1** command to log in to the AP.

Step 5   Enter the default user name and password **admin.** If the user view is displayed, you have logged in successfully.

📖 NOTE

Run the exit command to exit from the Telnet window. When the system fails to exit from the Telnet window:

- If you logged in to the AP from an AC or a switch, press **Ctrl+T** to return to the AC or switch view. This operation does not affect the AP operation.
- If you logged in to the AP from a PC, directly close the Telnet window. This operation does not affect the AP operation.
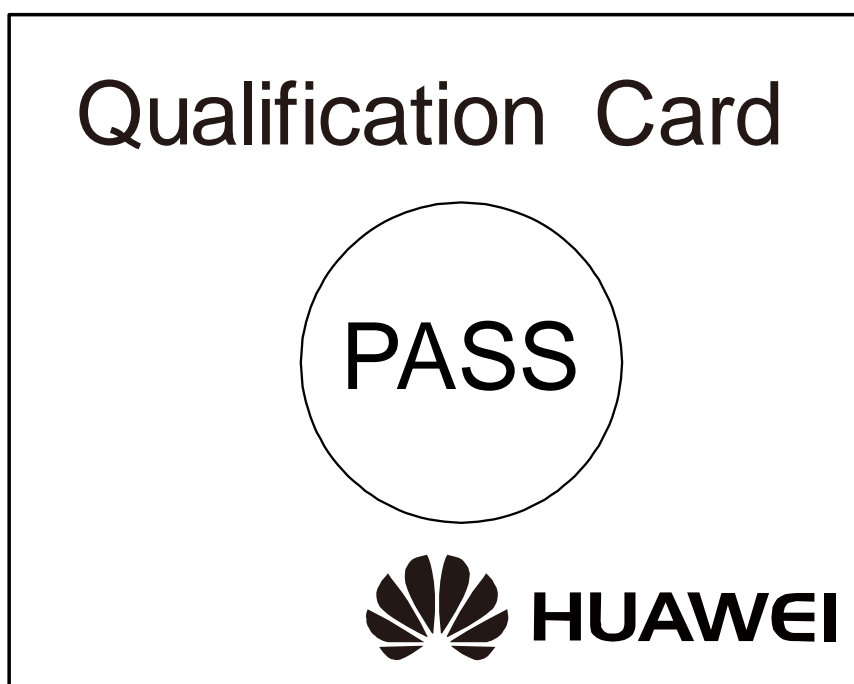
Appendix

1. **Declaration on Hazardous Substances in Electronic Information Products**

Parts	Hazardous Substances					
	Pb	Hg	Cd	Cr6+	PBB	PBDE
Mechanical part	O	O	O	O	O	O
Board/circuit module	O	O	O	O	O	O
Signal cable	O	O	O	O	O	O
Cable connector	O	O	O	O	O	O
Power adapter	O	O	O	O	O	O
Auxiliary equipment	O	O	O	O	O	O

O: Indicates that the concentration of the hazardous substance contained in all the homogeneous materials of this part is below the limit requirement of the SJ/T 11363-2006 standard.
X: Indicates that the Concentration of the hazardous substance contained in all the homogeneous materials of this part is above the limit requirement.

2. **Qualification Card**

Qualification Card

PASS

HUAWEI

Appendix

3. Warranty Card

Warranty Card

Thank you for choosing HUAWEI Technologies Co., Ltd-a leading telecom solution provider. To get better services, please read this warranty card carefully, fill in the required information and preserve this card in good condition.

Your Name	
Address/Postal Code	
Telephone	
Product Type	
Product Serial Number.	
Purchase Date.	
Invoice Number.	
Dealer's Name	
Dealer's Address/Telephone	

Preserve well. No reissue

Dealer's Seal:

Limited Warranty

Subject to the exclusions contained below, Huawei Technologies Co., Ltd. (hereinafter referred to as Huawei) warrants its access terminals ("Products") to be free from defects in materials and workmanship under normal consumer usage for one year from the date of purchase of the product ("Warranty period"). During the warranty period, a Huawei authorized service partner shall remedy defects in materials and workmanship free of charge.

Special Notice:

1. The warranty card shall be applicable only after being stamped by the dealer.
2. The warranty card must be preserved in good condition and free of any scratch or alteration.
3. To claim such service for defects that are not included in the following exclusion terms, the warranty card and the invoice that records the product serial number shall be presented to a Huawei authorized service partner.

Exclusions:

In any of the following cases, the warranty card becomes unenforceable or inapplicable without prior notice:

1. The defects are caused by improper handling in transportation and assembly.
2. The defects are caused by the fact that the product is dismantled or altered by anyone that is not from a Huawei authorized service partner.
3. The defects are caused by the fact that the product is used in a harsh environment that is not suitable for the operation of the product.
4. The defects are caused by any force majeure including but not limited to fire, earthquake, lightning and tsunami.
5. The defects are caused by the fact that the product is used or handled improperly, roughly or not as instructed in the applicable User Guide.
6. The normal wear and tear, including but not limited to the normal wear and tear of the shell and the power module, shall not be covered by the limited warranty.
7. The warranty card is altered or illegible, or the product serial number recorded on the warranty card is inconsistent with the actual one imprinted or labeled on the product.

In any case that is not covered by this limited warranty or should the warranty expire, Huawei shall charge for the service(s) claimed for the products if the product is still remediable.

Huawei preserves the right for interpretation of this limited warranty.

Huawei Technologies Co., Ltd.
Huawei Industrial Base, Bantian, Longgang,
Shenzhen 518129, People's Republic of China
http://enterprise.huawei.com