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Product Overview

Sundray S900 plus is an outdoor high-speed wireless access point supporting 802.11a/b/g/n, support 3x3 MIMO, maximum throughput 1750Mbps adopts the Gigabit port for uplink, ensuring high-speed wireless transmission. It supports one Gigabyte Ethernet port, and build-in with one SFP port, which make deployment of S900 plus much easier.

S900 plus is designed with the shell of the IP 67 protection level and supports waterproof, dampproof, dustproof, fireproof, and sun protection features. The shell can protect S900 plus against harsh weather and outdoor environment. This ensures that S900 plus can work in both damp and cold areas. Additionally, S900 plus supports point-to-point and point-to-multipoint bridge functions, which boosts the feasibility of outdoor network construction. By working with Sundray network access controller(NAC), S900 plus makes access experience faster and more secure.

S900 plus is designed for outdoor environment, such as scenic spots, schools and parks, etc. It provides six N-type external antenna interfaces. External antenna can be selected based on the actual environment.

Product Appearance

S900 plus has one 10/100/1000Mbps PoE in port, and one 10/100/1000Mbps PoE OUT port; also with one SFP port, S900 plus build-in with directional antenna, support external N type interface antenna.



Figure1-1 Front Panel



Specifications

Model	S900 plus
Hardware specifications	
Weight	2.5Kg
Dimensions (Exclusive of antenna interfaces and accessories)	242mm*242mm*68mm
Interfaces	1*10/100/1000Mbps ETH0/PoE IN 1*SFP 1*10/100/1000Mbps ETH2/PoE OUT
PoE	802.3at
PSE	Optional, work with 60wPOE injector
Power consumption	< 25W
Antenna	External antenna, three 2.4 GHz N-type connectors and three 5 GHz N-type connectors
Reset/Restore factory settings	Required
Status indicator	Required
Protection level	IP 67
MTBF	> 250000H
RF specifications	
Tx Power	$\leq 27\text{dBm}$
Tx Power Range	1dBm~the maximum allowed by local regulations
Maximum transmission speed(single frequency)	2.4 G:450 Mbps 5 G:1300 Mbps
Operating frequency band	802.11ac/n/a: 5.725GHz-5.850GHz, 5.15~5.35GHz (China) 802.11b/g/n:2.4GHz-2.483GHz (China)

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Preparing for Installation

2.1 Safety Precautions

S900 plus series products should be installed in an outdoor environment. To ensure that AP is operational and extend its lifetime, it must be installed in a qualified environment.



Caution: To avoid damage to access point and bodily injury, please read and follow the safety precautions before installation of the S900 plus series products.

Install the S900 plus series products under the instructions of technical support representative.

2.1.1 Installation Site Selection

- ✓ Keep the AP away from places that are susceptible to high temperature, harmful gases, inflammable, explosive, electromagnetic interference (from radar station, transmitter station or substation), unstable voltage, violent shake, or loud noise, or places that are near source of pollutions.
- ✓ In engineering design, the site should be selected according to telecommunication network plan and technical requirements for telecommunication devices and the following factors should be taken into account: hydrology, geology, occurrence odds of earthquake, electric power and transportation, etc.

2.1.2 Temperature and Humidity Requirements

The requirements for temperature and humidity are listed as follows:

Item	Description
Operating temperature	-40 ℃～65 ℃
Storage temperature	-40 ℃～65 ℃
Operating humidity	0%～100% (non-condensing)
Storage humidity	0%～100% (non-condensing)

2.2 Grounding and Lightning Protection

In outdoor deployment, the following must be grounded separately: outdoor S900 plus, feeder lightning protector, lightning protector with Ethernet port and lightning rod. Ensure the grounding points are well grounded and take anti-oxidation measures against the grounding points. (Grounding cable should be prepared by customers in advance)

Table Grounding and lightning protection requirements

Item:	Requirements
Lightning rod	<p>In plain areas, the protection angle of the lightning rod should be less than 45 degrees. In mountainous areas or areas lightning occurs frequently, the protection angle should be less than 30 degrees.</p> <p>The lightning rod should be high enough so that the access point and antenna can be protected from lightning strikes.</p> <p>The protection grounding of the lightning rod should be connected to the earthing conductor of the server room.</p>
Access point	<p>If a grounding strip is available, connect the yellow and green ground cable of the AP to the grounding strip. The cross-section area of the ground cable should be equal to or greater than 6mm^2 and its length should not exceed 3 meters.</p> <p>If no grounding strip is available, bury a piece of angle steel or steel tube at least 0.5 meter long in the earth to function as the earthing conductor. For a piece of angle steel, the size should be at least $50\text{ mm} \times 50\text{ mm} \times 5\text{ mm}$; for a piece of steel tube, it must be zinc-plated and have a wall thickness of at least 3.5 mm. Weld the yellow and green ground cable of the AP onto the angle steel and take anti-erosion measures against the welding joint. The cross-sectional area of the ground cable should be equal to or greater than 6mm^2. The grounding cable should be as short as possible and must not be coiled.</p>
Outdoor antenna	The antenna support should be grounded.
Grounding lead-in	<p>A grounding lead-in is a metal conductor connecting a grounding net and a grounding strip. The grounding cable of the AP should be connected to the grounding strip.</p> <p>The grounding lead-in must be 30 meters or shorter. A piece of zinc-coated flat steel with a cross-section area of $40 \times 4\text{ mm}$ or $50 \times 5\text{ mm}$ is recommended.</p> <p>Connect the grounding strip and the grounding lead-in of the AP through</p>

	the yellow and green ground cable with an area of 35 mm ² , or weld them directly. Take anti-erosion measures against the welding joint.
Grounding resistance	<p>Earth resistance should be less than 5 ohms. In an area with a higher earth resistance, reduce the earth resistance by using resistance reducing agent around the earthing conductor.</p> <p>The top of the earthing conductor should be at least 0.7 m away from the ground surface. In cold areas, the earthing conductor should be buried below the frozen soil layer.</p>
Network cable	<p>Use a shielded twisted pair cables for an AP deployed outdoors. Ensure that the devices at the two ends of the cable are well grounded.</p> <p>If a metal tube is used, the two ends of the tube should be grounded.</p>

2.3 Installation Tools

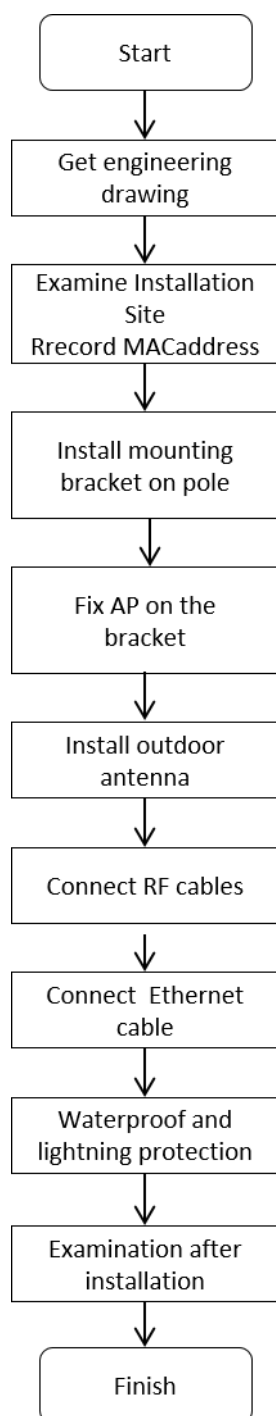
Several tools are required for installation of the S900 plus series products and debugging. The following tools should be provided by customers. (Sundray does not provide the following tools)

Type of Tools	Tools
General tool	Torque Hex Driver Screwdriver, sleeves, cutting plier, steel measuring tape, marker pen, hammer drill
Special tool	Cable stripper, crimping plier, electrical tape, network cable tester, waterproof cement, waterproof glue
Additional tool	PC for troubleshooting

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Installation Guideline

3.1 Installation Procedure

**Precautions:**

- ✓ You need to get the corresponding engineering drawing before beginning installation.

- ✓ AP-S500 series product should be installed at the specified site according to the engineering drawing.
- ✓ Before installation, you need to check whether the installation site is suitable. If it is not suitable, you can change the installation site but the distance between the new and the specified sites on the engineering drawing cannot be greater than 1 meter.
- ✓ Record the MAC address and installation site of the access point(MAC address is on the side panel of the AP), for example, MAC: 10-0D-0E-20-CD-E1, location: on the top of the building XXX.

3.2 Examining Installation Site

- ✓ Outdoor access point must be installed on a pole or a bracket. The pole and bracket must be vertical. If the pole or bracket is made of iron, it should be protected from oxidation. The installation site of the access point and its height must meet the design requirements.
- ✓ If an outdoor S900 plus is installed on a pole on the top of a building, it cannot be suspended outwards in the air.
- ✓ On the top of a building, outdoor S900 plus should not be installed in the sun, otherwise, the temperature of the device is easier to become high. If necessary, the corresponding sunproof protection can be applied to the device.
- ✓ If the access point has an Ethernet port supporting PoE, it should be installed outdoors with that port facing down.

3.3 Installing Access Point

Access point is fixed on a pole through the pole mount kit. The outer diameter of the pole should not be greater than 90mm, if wall mount, install follow below instructions.

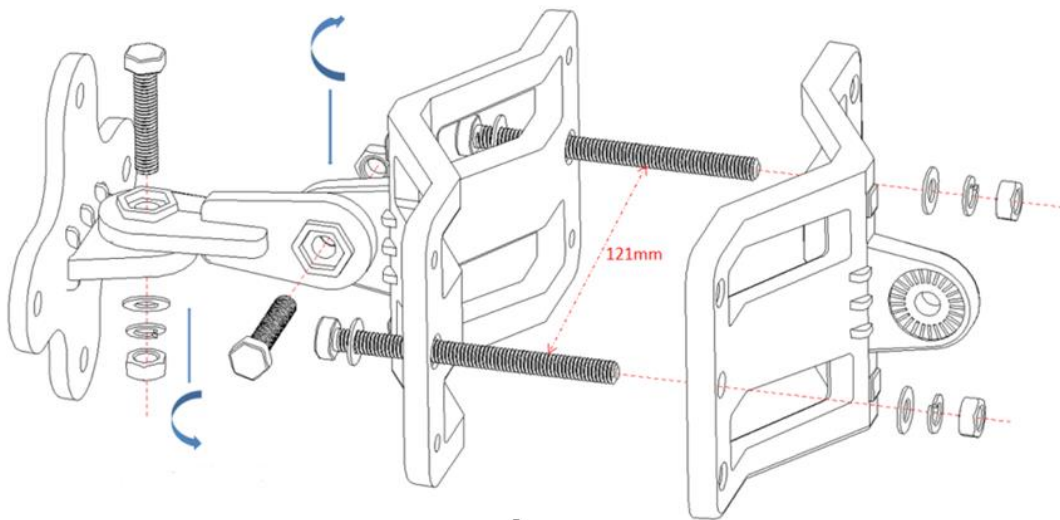
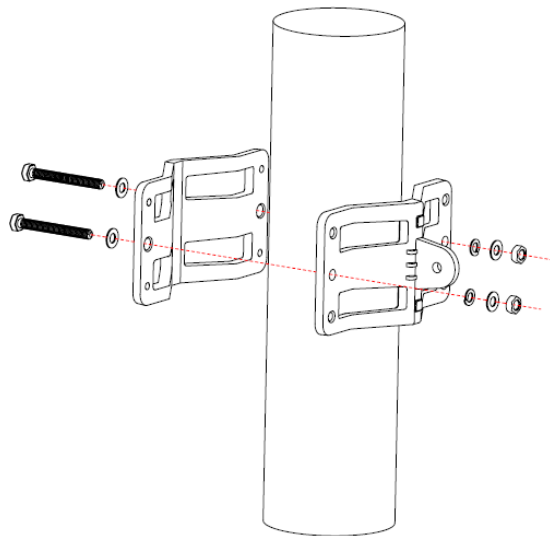


Figure3-1 Pole Mounting Kit

- a. Install the pole holder.



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- b. Install the holder on the AP.

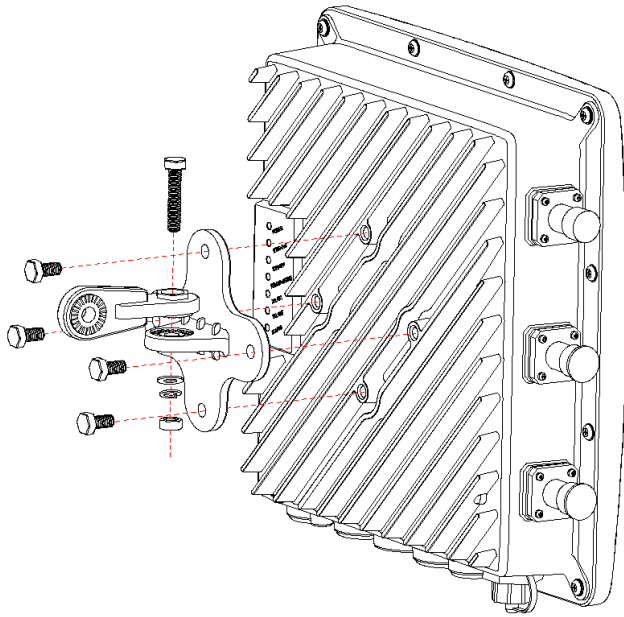


Figure3-3 Insert Hex Head Bolts

c. Connecting the AP and pole.

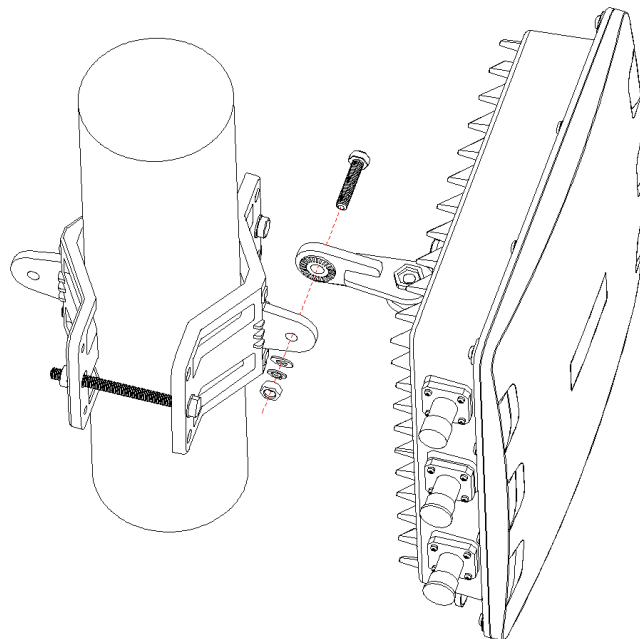


Figure3-4 Install AP on the Mounting Bracket

3.4 Grounding Access Point

Connect access point to protection grounding using a yellow and green ground cable(provided by customers). For details, refer to **Grounding and Lightning Protection** section.

3.6 Installing Outdoor Antenna

S900 plus has built in with directional antenna, if need to install external antenna, please continue this guide.

Outdoor antennas are classified as directional and omnidirectional antennas. The following introduces how to install the two types of outdoor antennas.

Installation precautions:

- ✓ Outdoor antenna should be installed away from high-power electronic devices and no large obstruction or metal object is allowed in the coverage direction.
- ✓ The antenna height should meet the requirements of signal coverage and the tip of the antenna should fall within the 45 °protection angle of the lightning rod.
- ✓ Outdoor antenna support should be solid. The pole on which the antenna is installed should be vertical. If the pole is made of iron, anti-oxidation measures should be taken against the pole.

3.5.1 Installing Omnidirectional Outdoor Antenna

- ✓ The omni antenna pole should be 40 to 50 mm in diameter.
- ✓ The omnidirectional outdoor antenna should be vertical to the top surface of the building.
- ✓ Generally, no lightning rod is directly soldered onto an omni antenna pole (no metal object is allowed within one meter in the horizontal direction of the omni antenna). Instead, a lightning rod is set on a separate pole between two omni antenna poles and the lightning rod is high enough to keep the tip of omni antennas within the protection angle.

- 1) Install a lightning rod.
- 2) Install the antenna pole onto a cement pier.
- 3) Use the pole-mounting bracket to install the omni outdoor antenna on the pole.

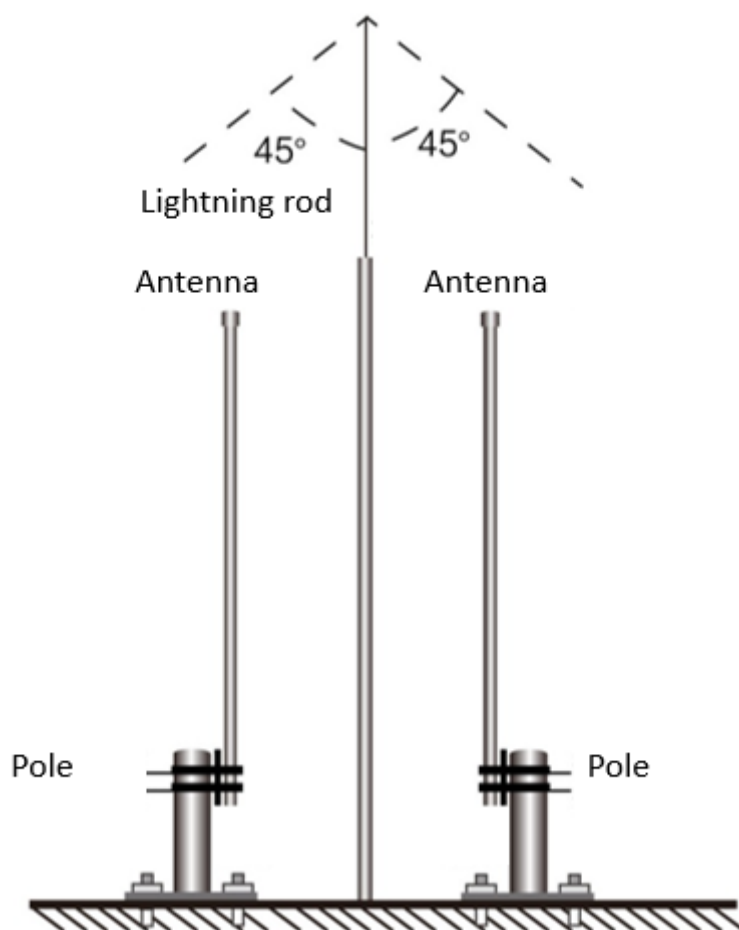


Figure3-5 Installation of Omni Outdoor Antenna

3.5.2 Installing Directional Outdoor Antenna

Install directional antenna.

- ✓ The dual-band antenna pole should be **40mm to 50mm** in diameter.
 - ✓ You should select such an installation location for the pole that the antenna direction and tilt could be adjusted freely according to targets.
- 1) Weld the lightning rod onto the tip of the pole.
 - 2) Install the antenna pole onto a cement pier.
 - 3) Use a 40mm × 4 mm flat steel to connect the pole to the ground grid.
 - 4) Use the pole-mounting bracket to install the directional outdoor antenna on the pole.

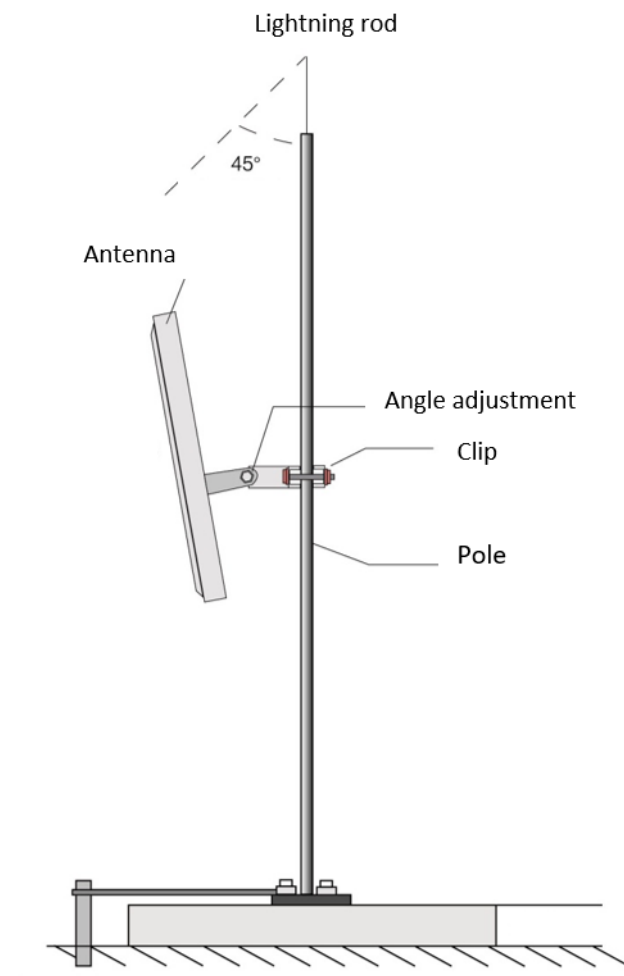


Figure3-6 Installation of Directional Outdoor Antenna



Notes: Directional outdoor antennas cannot be installed at the same height on a same pole. If two directional outdoor antennas are installed on a same pole, the vertical distance between those antennas should be more than 2 meters.

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- ✓ The directional antenna pole should be 40 to 100mm in diameter.
- ✓ You should select such an installation location for the pole that the antenna direction and tilt could be adjusted freely according to targets.

- 1) Weld the lightning rod onto the tip of the pole.
- 2) Install the antenna pole onto a cement pier.

- 3) Use a 40mm × 4 mm flat steel to connect the pole to the ground grid.
- 4) Use the pole-mounting bracket to install the directional outdoor antenna on the pole.

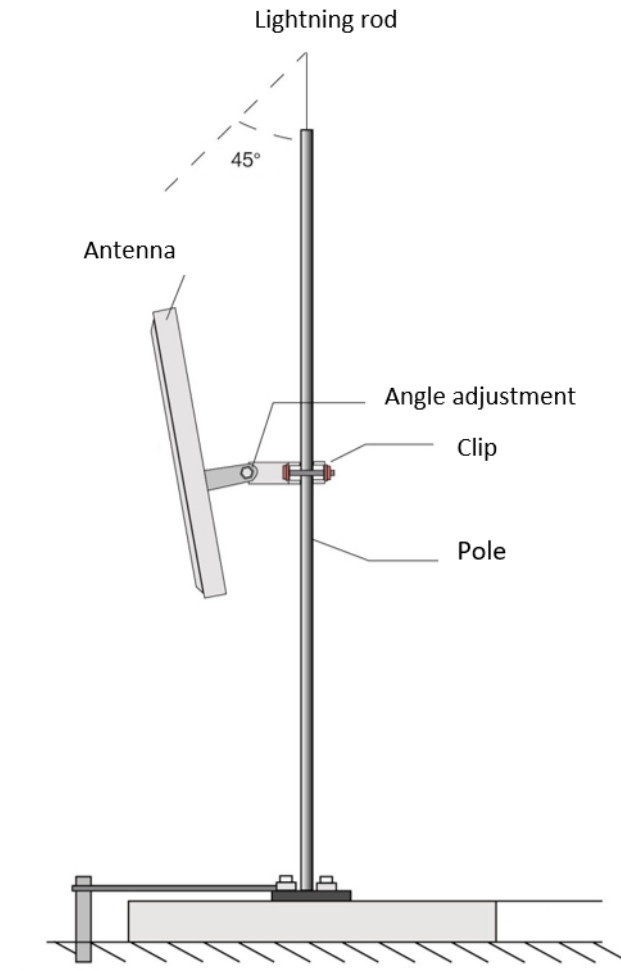


Figure3-7 Installation of Directional Outdoor Antenna

3.6 Connecting Cables

RF cable and Ethernet cable need to be connected to S900 plus after the access point and outdoor antenna are installed.

Precautions:

- ✓ Cables should be placed according to design requirements.

- ✓ Cables should not be placed near high-voltage pipe, fire pipe or lightning protection cable to avoid electromagnetic interference.
- ✓ It is recommended to use PVC pipe, steel pipe, Plica pipe, or cable trunking to run cables. If metal pipe is used, the two ends of the pipe should be grounded.
- ✓ For outdoors PVC pipe placed horizontally, drill a small hole on the pipe so that the water can drain out.
- ✓ For the holes in the wall, through which cables go, they should be blocked with waterproof and fireproof materials.

3.6.1 Connecting RF Cable (optional)

Follow the following steps to RF cable to RF interface(2.4GHz and 5GHz):

- (1) Connect one end of the RF cable to the feeder lightning arrester and the other end to the outdoor antenna.
- (2) Wrap the water proof tape on the interface.

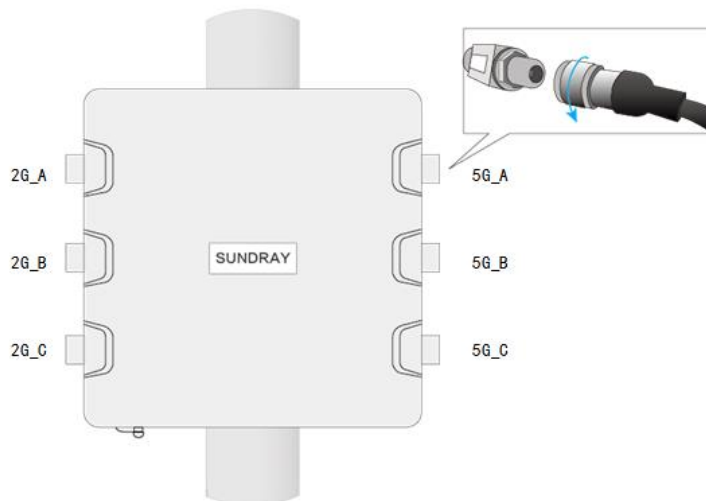


Figure3-8 Connect RF Cable to Feeder Lightning Arrester

3.6.2 Connecting Ethernet Cable

Follow the following steps to connect an Ethernet cable:

- (1) An Ethernet cable needs to pass through a waterproof cover for waterproof purpose (an Ethernet cable with a RJ-45 connector is unable to pass through), you need to make an Ethernet cable connector on site.
- (2) Connect the Ethernet cable to the Ethernet port ETH0 on the access point.

- (3) Tighten the waterproof cover.
- (4) Use waterproof tape to wrap the joint between the waterproof cover and the cable.

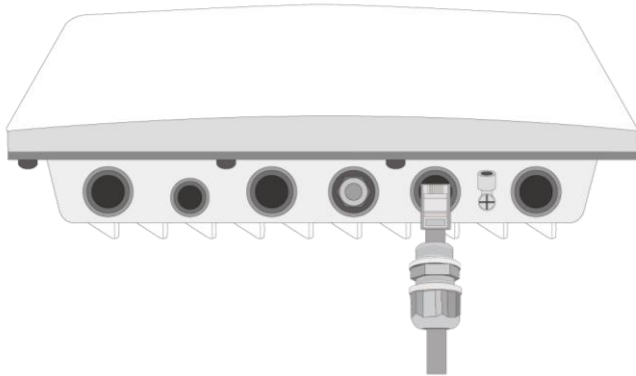


Figure3-9 Connect Ethernet Cable

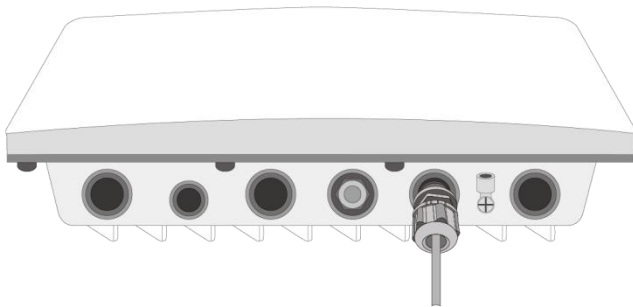


Figure3-10 Connect Ethernet Cable



Notes: In outdoor environment, Ethernet cable must have waterproof cover. It is recommended to use shielded Cat5 or enhanced Cat5 cable, and the length of the Ethernet cable used to connect AP to switch cannot exceed 100 meters.

3.6.3 Connect the fiber cable.

- (1) Connect the LC cable into the SFP port.
- (2) Connect the SFP module into ETF1.

(3) Tighten the packing nut

Use waterproof tape to wrap the joint between the cover and the fiber.

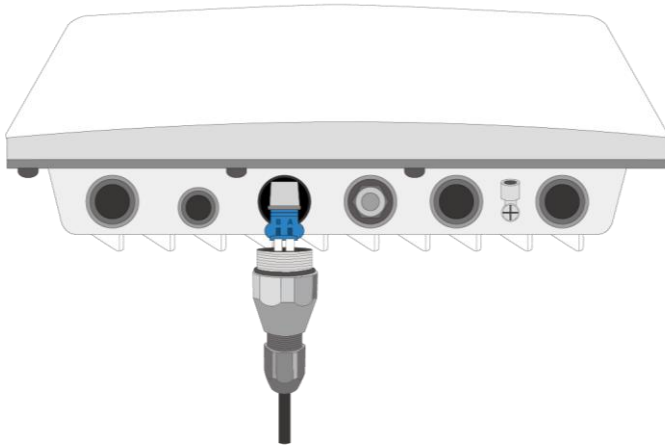


Figure3-11 Connect Ethernet Cable

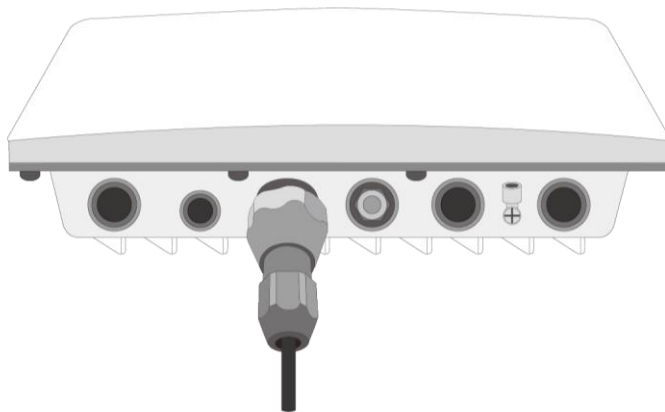


Figure3-12 Connect Ethernet Cable

3.7 Powering Access Point

S900 plus POE power supply and 220V AC power supply.

3.7.1 220V AC power supply.

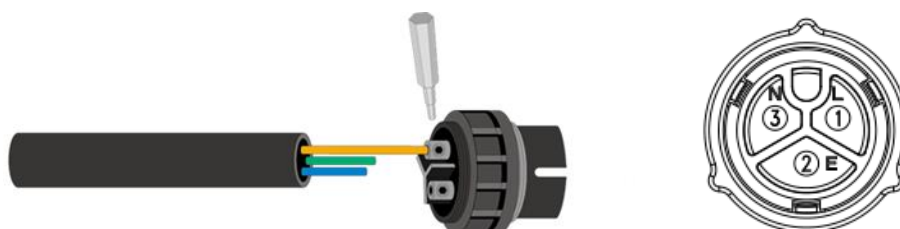


Notes: Please connect under no power.

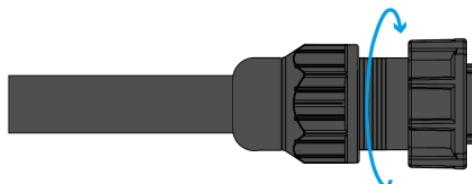
Use waterproof tape to wrap the joint between the cover and the cable.



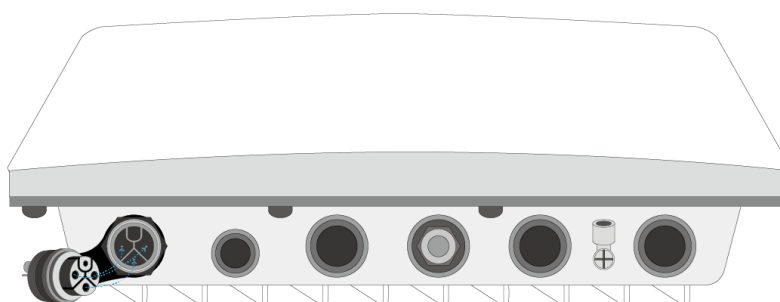
3-13 Waterproof



3-14 Wire connection



3-15 Sealing



3-16 Connect to AP

3.7.2 Powered by POE

When powered POE, connect AP to ETH0, support 802.3at standard POE switch and injector.

3.7.3 Enable PSE POE OUT.

Power the AP with 802.3at+ 60W PoE, and the output port is ETH2.

3.8 Waterproof and Lightning Protection

To ensure that access point and lightning arrester are grounded, refer to **Grounding and Lightning Protection** section.

3.9 Examination After Installation

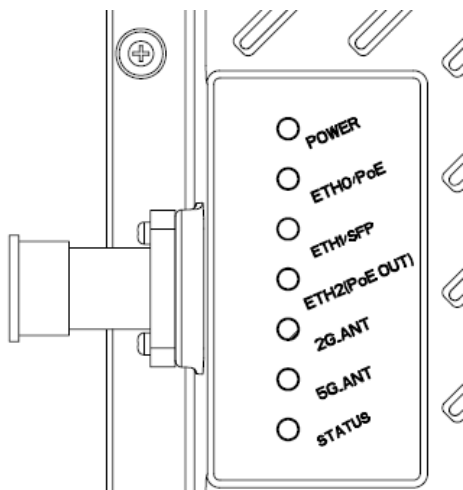
After the installation and cabling, check the following items before supplying access point power.

- ✓ Access point and antenna are installed firmly.
- ✓ Check whether the AP is powered;
- ✓ Power supply meets the power specifications of the AP.
- ✓ The access point is well grounded.
- ✓ Waterproof measures are taken against the each joint of access point.
- ✓ Unconnected ports on the AP are connected with RSMA-50KR load and then blocked waterproof plugs.

Appendix Figure 1 How to use waterproof tape



The LED indicator notification:



Symbol	Status
Power	Green Glowing: Powered on off: Not powered or abnormal
ETH0/PoE	Green Glowing: connected, 1000Mbps Green Blinking: connected, 1000Mbps, data transmission Orange Glowing: connected, 10/100Mbps Orange Blinking: connected, 10/100Mbps, data transmission off: ETH0 not connected
ETH1/SFP	Green Glowing: connected, 1000Mbps Green Blinking: connected, 1000Mbps, data transmission Orange Glowing: connected, 10/100Mbps Orange Blinking: connected, 10/100Mbps, data transmission off: ETH1 not connected
ETH2(PoE OUT)	Green Glowing: connected, 1000Mbps Green Blinking: connected, 1000Mbps, data transmission Orange Glowing: connected, 10/100Mbps Orange Blinking: connected, 10/100Mbps, data transmission off: ETH2 not connected
2G_ANT	Green Glowing: Output to internal antenna Orange Glowing: Output to external antenna off: No signal output
5G_ANT	Green Glowing: Output to internal antenna Orange Glowing: Output to external antenna off: No signal output
STATUS	Green Glowing: Connected to controller Green Blinking: Not connected to controller

Official Site: <http://www.sundray.com>

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