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Outdoor Micro Gateway Installation Guide

Revision History

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Chapter 1 Basic Equipment

1.1 Gateway Installation Diagram

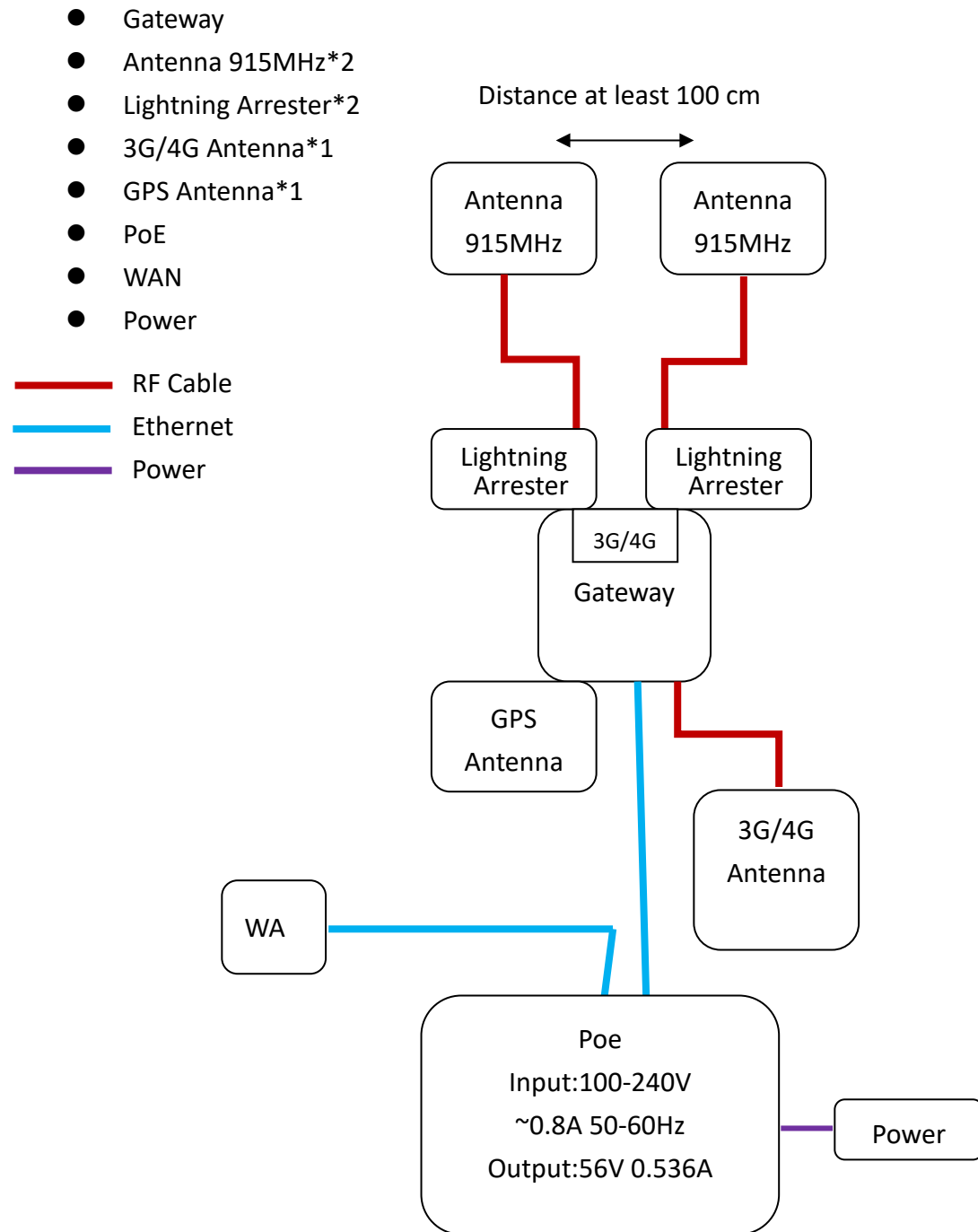
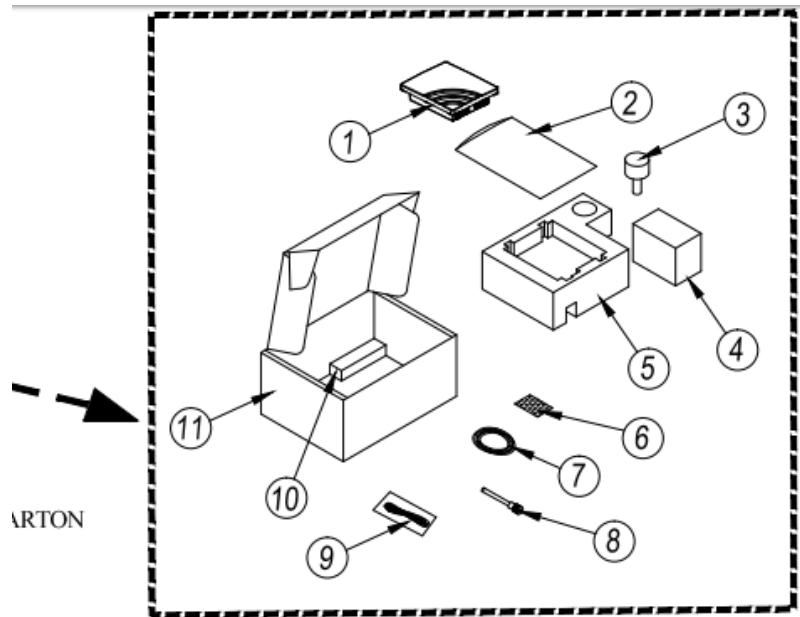


Figure 1 System Architecture Diagram

1.2 Diagram of Standard Product Equipment



No	TITLE	Q'TY	No	TITLE	Q'TY
1	WAPS-232N324	1	8	DIPOLE ANT. 110MM	1
2	PE BAG	1	9	POWER CORD	1
3	GPS ANT.	1	10	POE ADAP.	1
4	MOUNT KIT ASS'Y	1	11	BOX	1
5	HOLD-EPE	1	12	CARTON(455*375*548mm)	1/6
6	RJ45 CONNECTOR	1	13	PALLET(120*100cm)	1/72
7	RF CABLE	1			

Figure 2 Diagram of Standard Product Equipment



Figure 3 Actual View of Standard Equipment

Table 1 Device Specifications

List of Specification Items			
No.	Name	Quantity	Remark
Gateway			
1	Gateway (WAPS-232N_LW)	1	<ul style="list-style-type: none"> ● Wireless Frequency Band 902 ~ 928MHz ISM (SKU-US) 862 ~ 870MHz ISM (SKU-EU) 470 ~ 510MHz ISM (SKU-CN) ● Operating Voltage: 48V ± 10% (POE adapter) ● Transmit Power 0.5W (up to 27 dBm) ● Receive Sensitivity -142 dBm ● Antenna Type N-Type connected antenna ● Operating Temperature -20°C ~ 60°C
2	Gateway Protective Pouch	1	
3.	GPS Antenna(1.5GHz)	1	<ul style="list-style-type: none"> ● Frequency Range :1575.42 ± 1.023 MHz. ● Gain: 90°: 5.0 dBi Min. 20°: -2.0 dBi Min. <p>Mounted on the 60mm*60mm ground plane.</p> <ul style="list-style-type: none"> ● Polarization: RHCP ● Axial Ratio: 90° : Max 3.0dB <p>Mounted on the 60mm*60mm ground plane.</p>
4.	Mount kit	1	Gateway mount kit (accessories included)
5	Gateway Protection Foam		
6.	Waterproof Connector	1.	RJ45 CABLE CONNECTOR ASS'Y (R) WAPA-216N29WW OUTDOOR ODS
7.	GPS RF cable	1	3 Meter RF cable (Return loss < -20dB)
8.	3G/4G Antenna	1	<ul style="list-style-type: none"> ● Frequency Range 698~960MHz/1710~2700MHz ● Average Gain:0~1dBi ● Polarization: Vertical Linear ● Connector type: N-type
9.	Power code	1	According to country standards
10.	Power over Ethernet (PoE)	1	<ul style="list-style-type: none"> ● Power over Ethernet Output: Pin Assignment and Polarity:4/5 (+), 7/8 (-)



			<p>Output Power Voltage: 55Vdc User Port Power: 30Watts (Guaranteed)</p> <ul style="list-style-type: none"> ● Input Power Requirements: AC Input Voltage: 100 to 240 Vac AC Input Current: 0.8A @100-240Vac AC Frequency: 50 to 60 Hz ● Environmental Conditions Operating Ambient Temperature: -4° to 104°F (-20 to 40°C) @ 30W -4° to 131°F (-20 to 55°C) @ 22.5W Operating Humidity: Maximum 90%, Non-condensing Storage Temperature: -4° to 158°F (-20° to 70°C) Storage Humidity: Maximum 95%, Non-condensing ● Regulatory Compliance IEEE 802.3at (PoE,) RoHS Compliant, WEEE Compliant, CE ● Power cord: connect to PoE Input/Output:220V 												
11	Ethernet Cable (not included)	2	<p>1 connected to PoE 1 connected to WAN Cat5e FTP</p>												
12	Antenna(915MHz)	2	<ul style="list-style-type: none"> ● 6, 7.2 or 10 dBi Antenna for Lora <table border="1"> <tr> <td>Gain(dBi)</td> <td>6</td> <td>7.2</td> <td>10</td> </tr> <tr> <td>Length(cm)</td> <td>130</td> <td>155</td> <td>170</td> </tr> <tr> <td>VSWR</td> <td><1.5</td> <td><1.5</td> <td><1.5</td> </tr> </table> <ul style="list-style-type: none"> ● Distance between the two antennas must be at least 100cm 	Gain(dBi)	6	7.2	10	Length(cm)	130	155	170	VSWR	<1.5	<1.5	<1.5
Gain(dBi)	6	7.2	10												
Length(cm)	130	155	170												
VSWR	<1.5	<1.5	<1.5												
13	Lighting arrester	2	<ul style="list-style-type: none"> ● VSWR < 1.5 												
Node															
1.	Node Antenna((915MHz))	1	902MHz~928MHz / ≥ 0 dBi/ SMA plug												
2.	Browan GPS node	1													

Note: Items listed in red are optional accessories which are not included within the product package. Please contact Browan personnel for additional purchases.

Chapter 2 Micro Outdoor Gateway System Installation Instructions

2.1 Exterior Appearance of the Gateway Device:

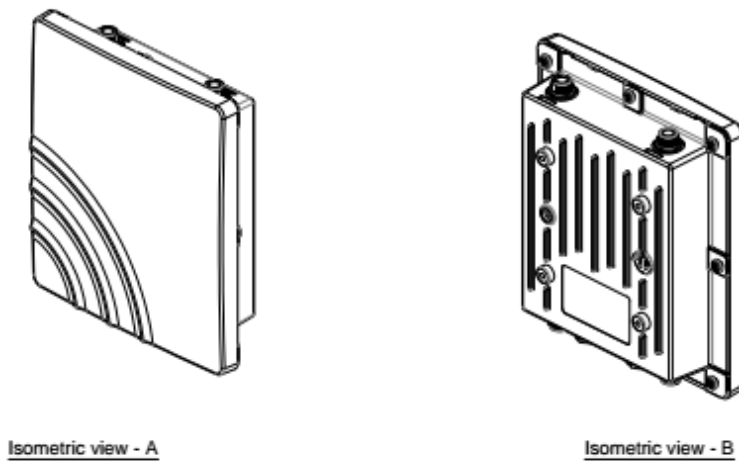


Figure 4 Gateway Front and Rear View



Figure 5 Gateway Installation Instructions

2.2 Equipment Installation

Device installation can be physically supported by either post mount or wall mount. Installation instructions are stated in the following sections and diagrams.

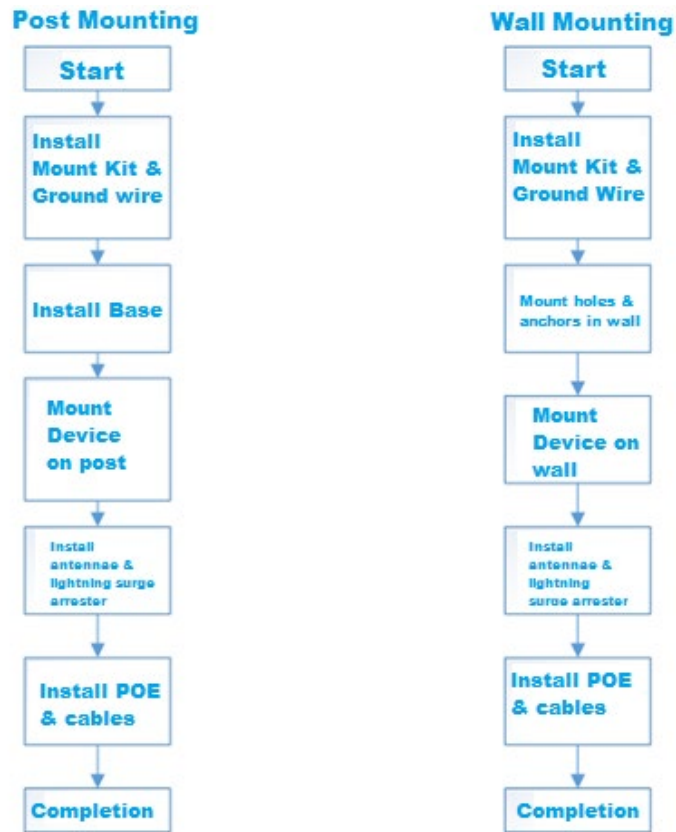


Figure 6 Diagram of Equipment Installation Procedures

2.2.1 Post Mounting

Pre-installation preparations

Please make sure that all required tools and components are available prior to installation.

- Tools: Allen wrenches (M5 and M8) or an adjustable wrench, Philips screwdriver

➤ List of components:

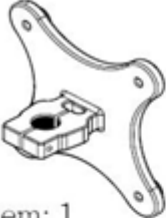
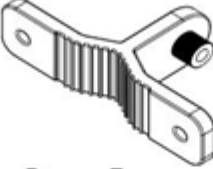
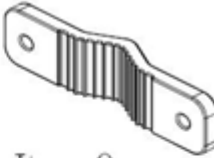










Table 2 List of Gateway Mounting Kit Components

CODE	Name of Component	QTY
1	Outdoor Gateway	1
2	Mounting Base Frame	1
3	Adjustable Plate	1
4	Fixing Plate	1
5	Pack of Screws (includes the necessary types of screws)	1

➤ Component details as described in the following:

Table 3 Description of Gateway Mounting Kit Components

Mounting Kit Component Description

 Item: 1 Qty : 1 Base	 Item: 5 Qty : 1 Adjustable Plate	 Item: 9 Qty : 1 Fixing Plate
 Item: 2 Qty : 4 Screw M5*20mm	 Item: 6 Qty : 1 Screw M8*50mm	 Item: 10 Qty : 5 Washer M8
 Item: 3 Qty : 5 Spring Washer M5	 Item: 7 Qty : 1 Screw M5*35mm	 Item: 11 Qty : 6 Spring Washer M8
 Item: 4 Qty : 4 Washer M5	 Item: 8 Qty : 1 Washer M8	 Item: 12 Qty : 3 Nut M8
		 Item: 13 Qty : 2 Screw M8*100mm



Mount kits, frames, screws, and anchors are not included in the standard product and must be purchased separately.

Step 1

Secure the base frame of the mount kit to the Gateway device, as shown in the figure below:

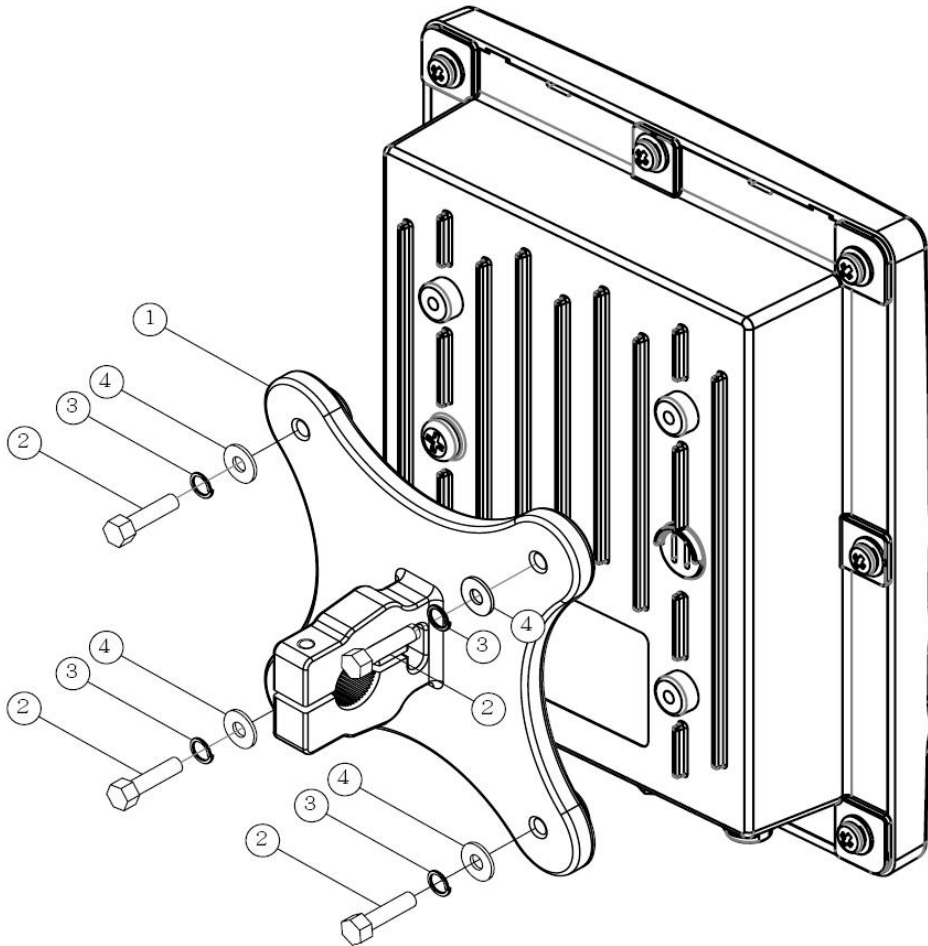


Figure 7 Assembling the Base Frame - Diagram I

Step 2

Secure the adjustable plate to the base frame. Please take note NOT to fasten the locking screws and adjustment screws in a tight manner at this point of installation.

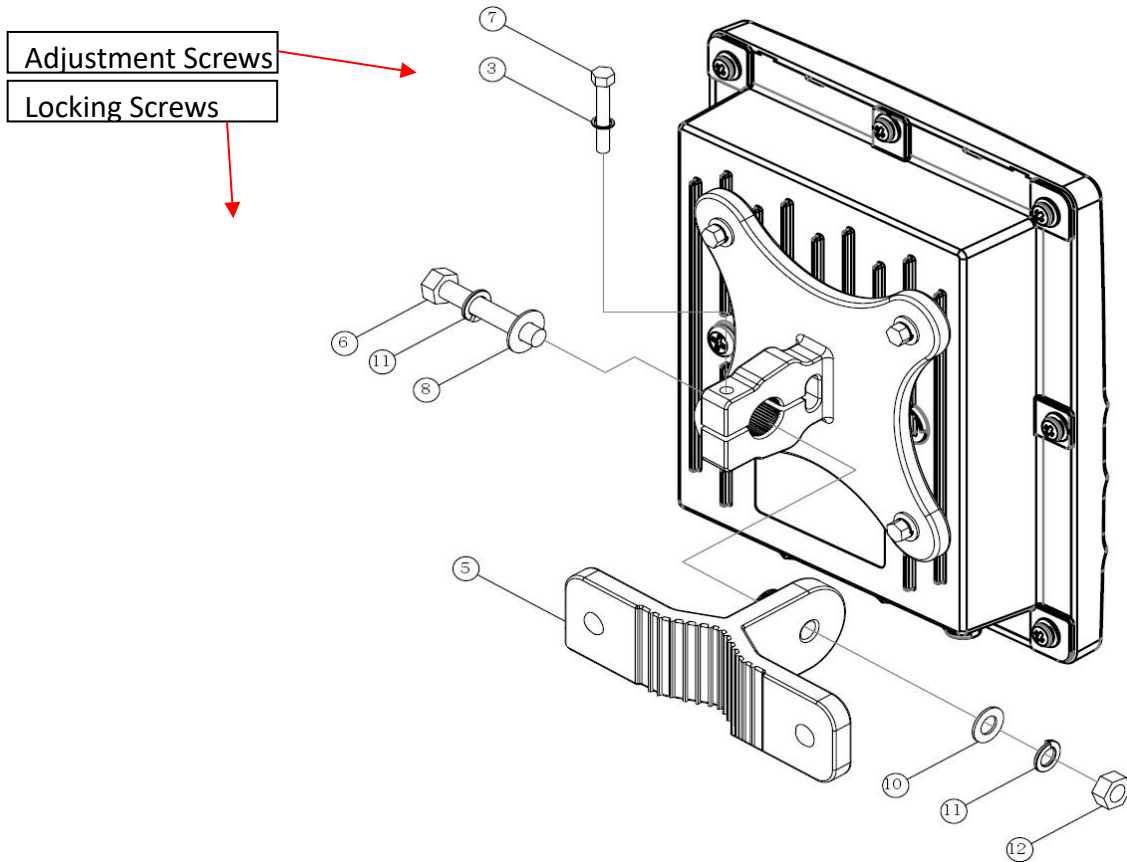


Figure 8 Assembling the Base Frame - Diagram II

Step 3

Install the base frame of the Gateway device against the pole by tightly fastening the fixing plate to the adjustable plate by using locking screws and adjustable screws. (It is recommended to install the Ethernet portal downwards.)

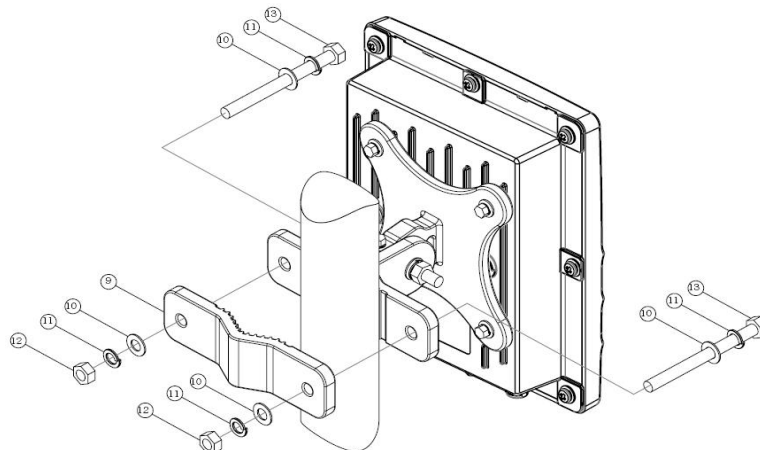



Figure 9 Diagram I of Pole Installation

Step 4

The ground wire portal is situated at the corner of the Gateway with a  icon. When the ground wire resistance is less than 5 ohm, the recommended diameter of the ground wire would be less than 6 mm².

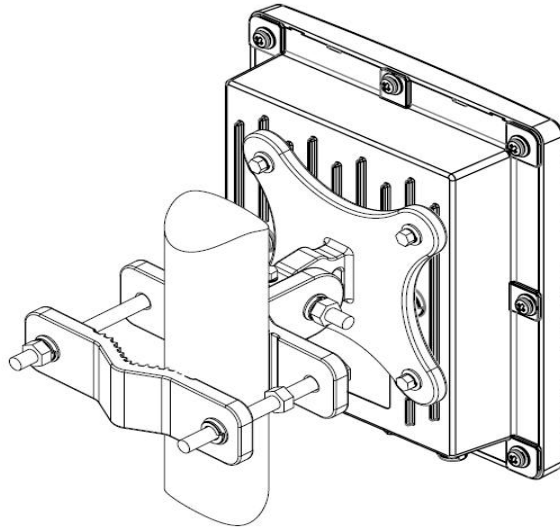


Figure 10 Diagram II of Pole Installation

2.2.2 Wall Mounting

Pre-installation preparations

Please make sure that all required tools and components are available prior to installation.

➤ Tools: Allen wrenches (M5 and M8) or an adjustable wrench, Philips screw, impact drill and drill bits (the diameter of the drill bit has to be $\Phi 12.7\text{mm}$), measuring tape 120mm or longer, iron hammer

➤ List of components:

Table 4 List of Gateway Mounting Kit Components

CODE	Name of Component	QTY
1	Outdoor Gateway	1
2	Mounting Base Frame	1
3	Adjustable Plate	1
4	Pack of Screws (includes the necessary types of screws)	1
5	Expansion anchors (stainless steel)	2

Step 1: Positioning the wall mounting holes

Mark and drill suitable spots on the wall based on the measurements taken from the mounting kit. The width between the two mounting holes ought to be 114mm apart and 38.1mm deep by using a $\Phi 12.7\text{mm}$ drill bit. As shown in the following figure below.

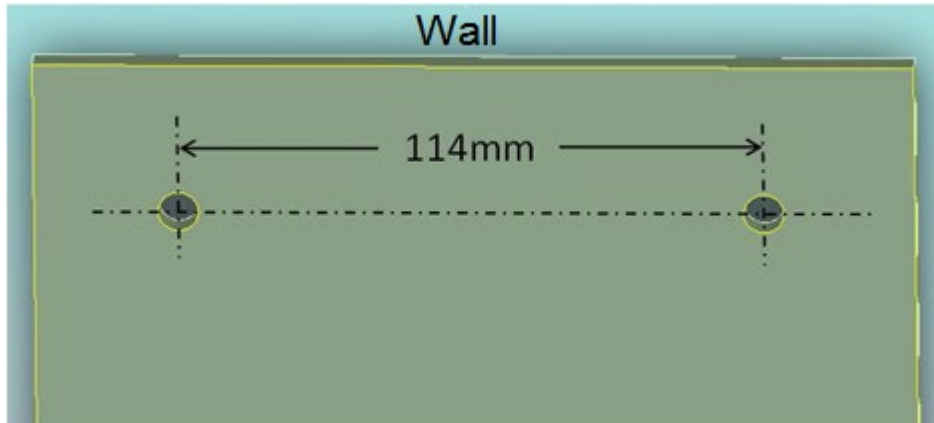


Figure 11 Width between the wall mounting holes

Step 2: Inserting stainless steel anchors

After drilling holes in the wall, insert and drive stainless steel anchors into the holes with a hammer until they are fully fixed inside the wall.

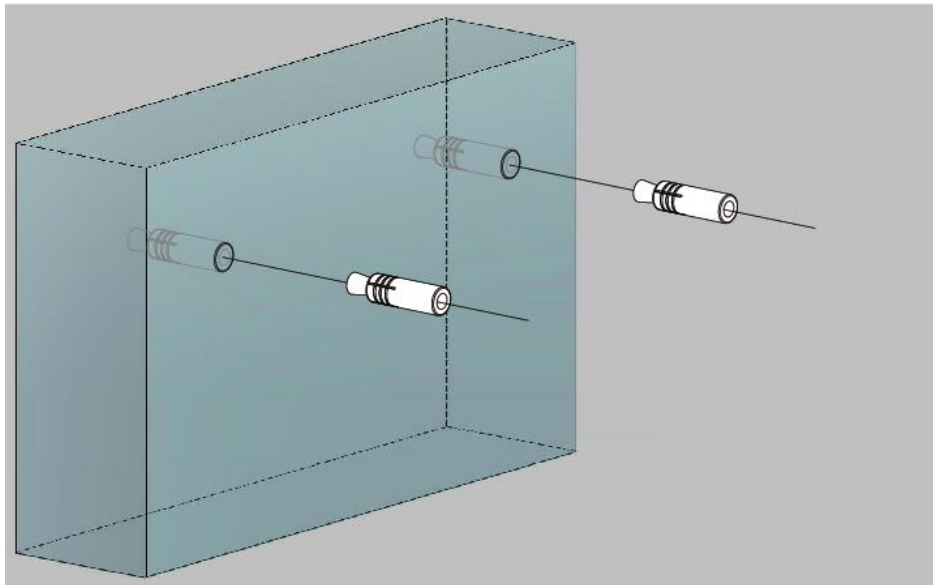


Figure 12 Installation Diagram of Wall Mount Anchors (Stainless Steel)

Step 3: Installing the Adjustable Plate

Fasten the adjustable plate against the wall by securing it with hexagon screws. Figure as illustrated in the following.

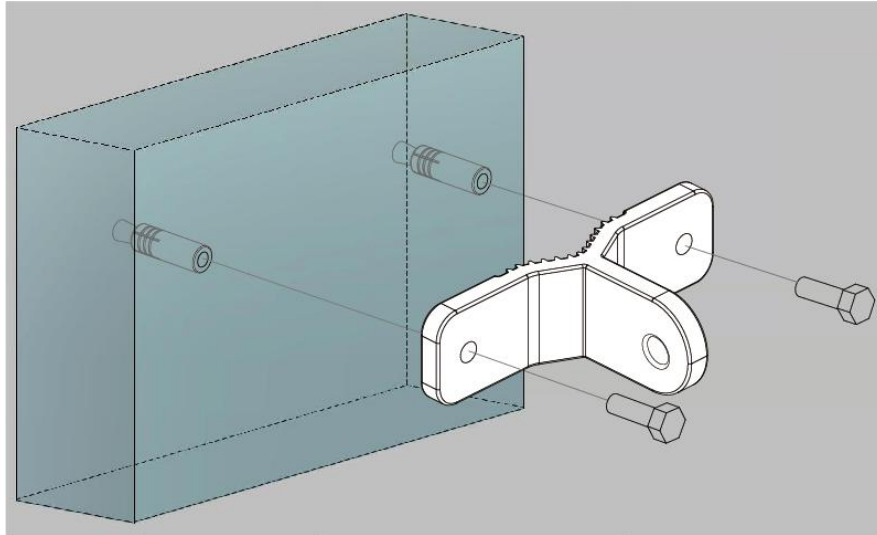



Figure 13 Installation Diagram of Adjustable Plate

Step 4: Assembling the Base Frame and Ground Wire

Secure the base frame of the mount kit to the Gateway with M5x8mm screws and connect the ground wire. The ground wire portal is situated at the corner of the Gateway with a  icon.

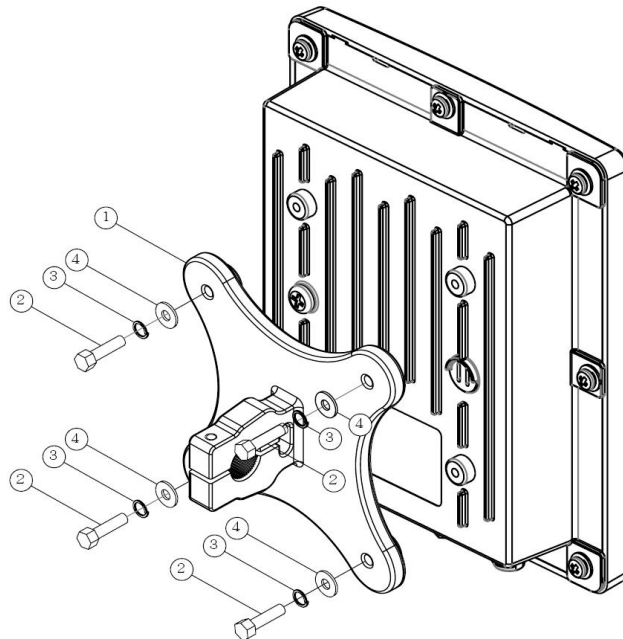


Figure 14 Assembling Diagram of Base Frame

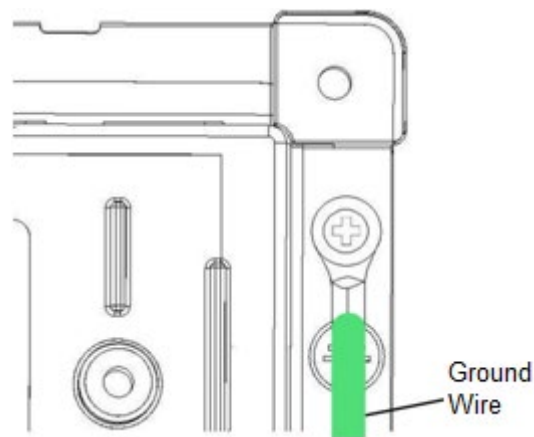


Figure 15 Depiction of Ground Wire

Step 5: Fastening the Gateway to complete the installation

Match and secure the Gateway base frame against the adjustable plate by inserting M8x50mm locking screws through the conjoining ends and fasten the screw with nuts. Adjust the Gateway to the appropriate angle and fasten with M5x35mm adjustable screws to secure the device in place. Please see the following diagram:

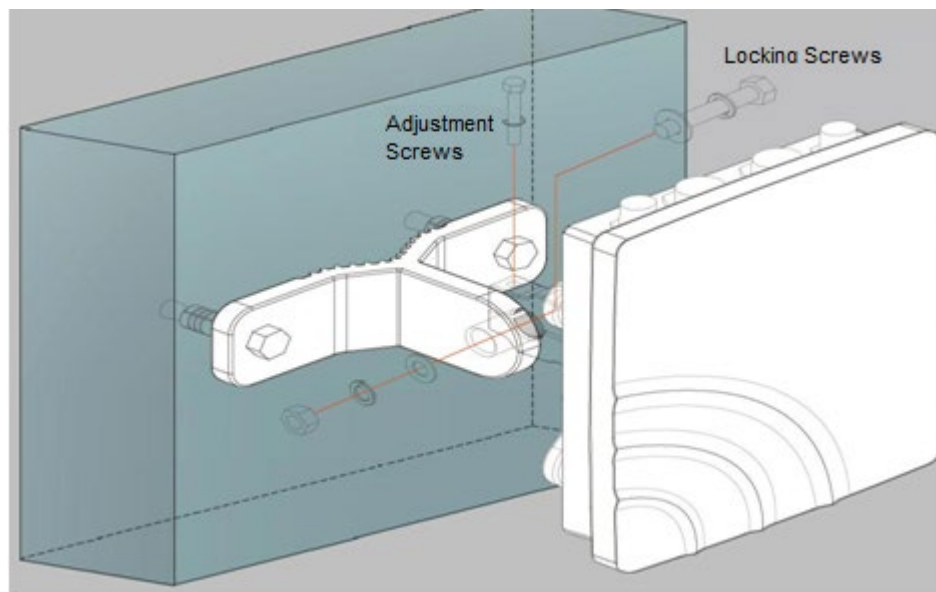




Figure 16 Installation Completion

Step 6: Connecting the RF cable

The RF (*Radio Frequency*) cable is used to connect the antenna and the gateway with a lightning arrester nested in between.

	<p>Note: Install the lightning arrester between the antenna and the gateway device.</p>
	<p>Note: The device could be damaged if no-load power occurs when the high-power antenna is connected. This type of damage is not warranted.</p>

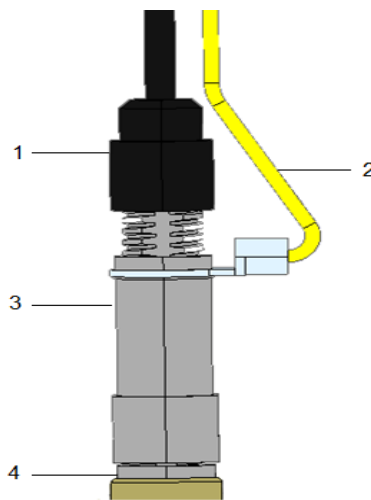


Figure 17 Connecting the RF Cable

Table 5 Connecting the RF Cable

1	RF cable type N connector	3	Lightning arrester
2	Lightning arrester ground wire	4	Antenna connector

●Steps for installation:

1. Connect one end of the lightning arrester to the antenna connector.
2. Connect the type N connector of the RF cable to the lightning arrester.

Step 7: Connecting the power and data cables



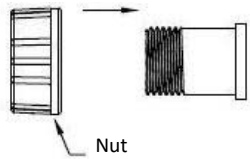
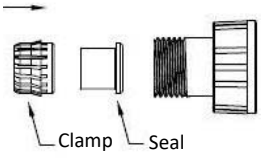
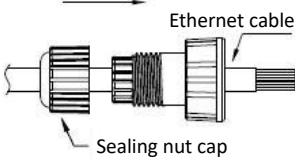
Note: Power and data cables are not included in this product and must be purchased separately.

- Please use network cables that comply with the 802.3at cable specification
- Please use a POE+ switch that complies with the 802.3at power standard

2.2.3 Assembling and Securing the Waterproof Connector

The outdoor gateway device requires specialized waterproof Ethernet connectors. The product device comes with one set of waterproof connector components [Waterproof connector - Included in the waterproof packet].

Prior to installation, a RJ-45 Ethernet connector, cable and the waterproof connector must be conjoined. Make sure that the Ethernet cable used should be a FTP (*Foiled Twisted Pair*) outdoor cable and that the gateway device is properly grounded. Please follow the steps below to assemble the waterproof connector. While installing, please ensure that the nut is securely fastened to prevent water or air from entering the gateway device.

<p>① Insert the main body of the waterproof connector into the metal nut</p>  <p>Nut</p>	<p>② Place the clamp and the sealing sleeve into the narrow end of the main body</p>  <p>Clamp Seal</p>	<p>③ Insert the Ethernet cable through the waterproof components and sealing nut cap</p>  <p>Ethernet cable Sealing nut cap</p>
<p>④ Press down the clip and push the RJ-45 into the waterproof contraption.</p>	<p>⑤ Tighten the sealing nut once the RJ-45 is stationed in the main body.</p>	<p>⑥ Place the waterproof liner through the RJ-45 and secure it to the main body</p>

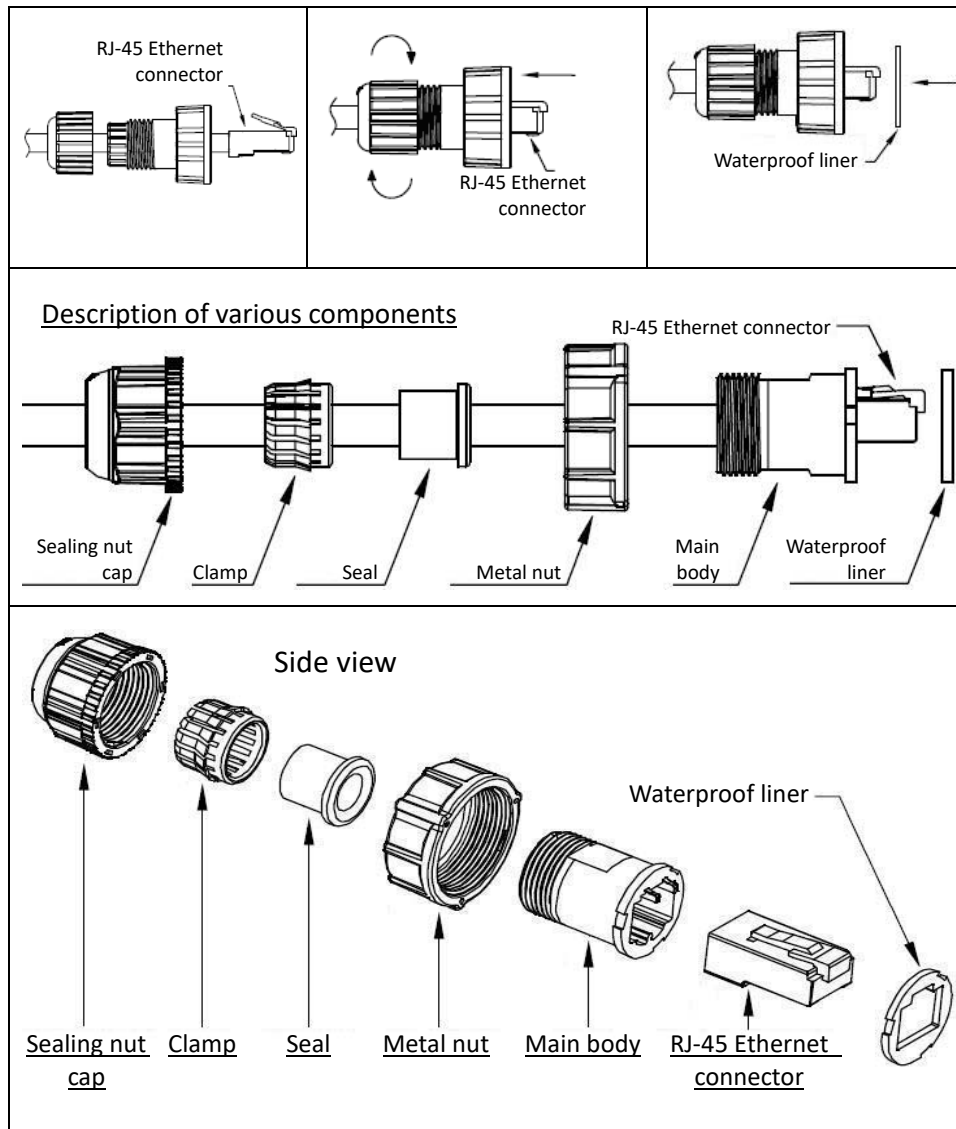


Figure 18 Steps for Installation



Note: Cable assembly and installation must be handled by a professional.



1. The device complies with the IP-67 waterproof standard.
2. After the installation is completed, we recommend the use of waterproof tape to seal the adjoining parts of the RJ-45 Ethernet connector and the antenna connector to enhance the level of waterproof protection.

2.3 Power

Power is supplied to the gateway device via PoE (*Power over Ethernet*). Users can verify whether the PoE device is working correctly by viewing the indicator light.

- Power over Ethernet (PoE):
 - Output: connects to the gateway device
 - Input: connects to WAN
 - Power Supply Specification:
 - AC Input Voltage: 100 to 240 Vac
 - AC Input Current: 0.8A @100-240Vac
 - AC Frequency: 50 to 60 Hz



Figure 19 PoE Installation Instructions

2.4 WAN

The gateway device is to transmit data to the Server. Means of transmission can be divided into two types: Ethernet (wired network) and 3G / 4G (mobile network). The Ethernet PoE In port (WAN) needs to be connected to a physical network device. As for 3G / 4G wireless network connections, a mini Sim card is inserted in the gateway device (Figure 20) to acquire access to mobile networks. PoE Out port (LAN) is to be connected to the Gateway Ethernet connector regardless of the transmission type.

Note: The length of the network cable has to be less than 100m.



Figure 20 Sim card installation

Chapter 3 Gateway Installation Reference

Subject to different environments, the Gateway should be installed in specialized manners. Installation can be roughly divided into two types: wall-mount installation and base-mount installation. In general, wall-mount installation is the preferable choice since wall-mount installations are less likely to result in a water leak in the roof (you need to make sure there are no water pipes inside the wall and that there are no water towers above the wall) and this type of installation is relatively less expensive. However, in order to make the right choice, the physical presence of a construction professional and the owner of the building are required in order to evaluate and draw the final decision.

In addition, please note

1. Network cables should not be longer than 100(m). The location of the Gateway will affect the length of the network cable.
2. The height of the antenna must not exceed the 45 degrees cone of protection from the lightning rod.
3. A certain level of attenuation will exist on the RF Cable
4. Waterproof measures must be applied to the installation site.
5. Please ensure that there are no obstacles blocking the antenna and that the antenna is in a vertical state.
6. The way the gateway is installed should make it easy to maintain
7. The gateway, lightning surge arresters, and other relative equipments must be properly grounded.

3.1 Wall-mount Installation



Figure 21 Actual View of a Wall-mount Installation

Step 1. Please avoid walls that are connected to the water tower (an assessment made by a professional is required).

Step 2. Use anchors to help secure the mount kit on the wall. Attach the Gateway device to the mount kit.



Figure 22 Wall-mount Installation – Image 1



Figure 23 Wall-mount Installation – Image 2

Step 3. The GPS and antenna are secured onto the wall by using a customized metal bracket.

1. The antenna is secured onto the bracket by using the mounting kit or a customized U ring.

Note: Use a level to make sure that the antenna is completely vertical.



Figure 24 The Level

2. Insert the GPS antenna into a 1 inch PVC pipe. Then, use two 1 inch U rings to secure the pipe to the rod.



Figure 25 Customized Metal Bracket – Image 1



Figure 26 Customized Metal Bracket – Image 2



Figure 27 Customized Metal Bracket – Image 3

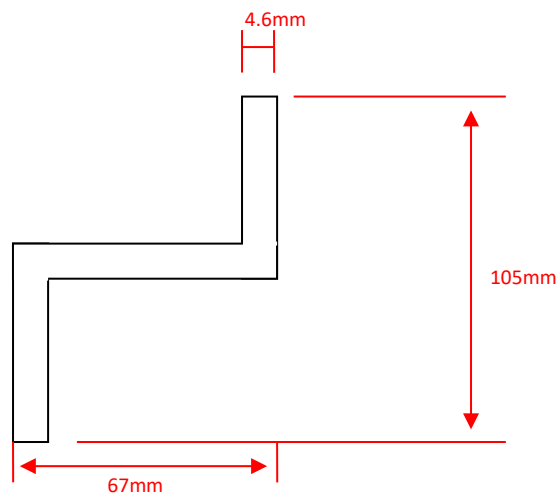


Figure 28 Specifications for Customized Metal Bracket – Image 1

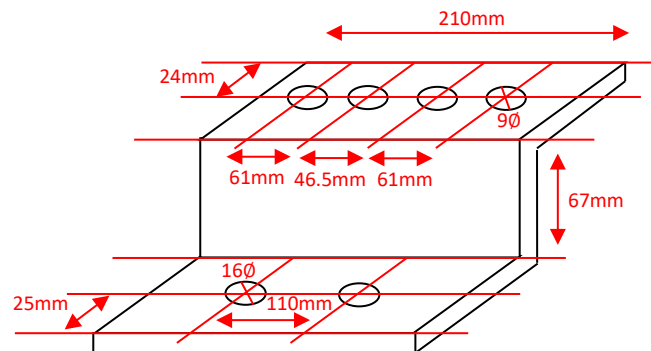


Figure 29 Specifications for Customized Metal Bracket – Image 2



Step 4. The grounding wire that connects the lightning arrester to the gateway device should be 5.5mm² in diameter. The ground wire should be secured to ground copper bars or an equipment grounding conductor. If grounding apparatus are not available, please fasten the ground wire to the mount kit to deliver a similar grounding effect.



Figure 30 Lightning Protections and Grounding Equipment – Image 1



Figure 31 Lightning Protections and Grounding Equipment – Image 2

Step 5. The antenna and RF cable connectors should be wrapped with electrical tape or



covered with waterproof materials to resist water penetration.

Step 6. Waterproof connectors should be used for connecting network cables. Network cables near the machine room should be wrapped with conduits, e.g. size 6 PVC cable protection hose. Network cables and RF cables should be secured to avoid wind-induced vibrations.



Figure 32 6 PVC cable protection hose

3.2 Base-mount Installation



Figure 33 Actual View of a Base-mount Installation

Step 1. Please make sure that the installation will not cause a leak in the roof (an assessment made by a professional is required)

Step 2. Establish a cement base (with a thickness of at least 6cm). The amount of time required for the cement to harden may vary based on different cement compositions. Make sure that there is sufficient thickness to support the base-mount.

Step 3. Secure the base of the galvanized pipe. Please see image as shown below.

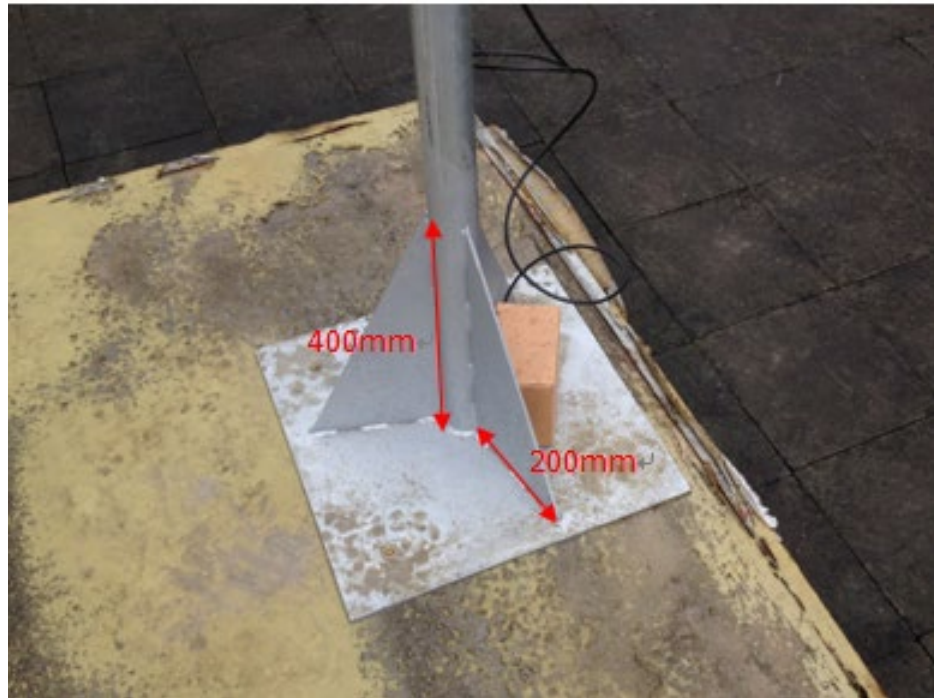


Figure 34 Establishing the Base -1

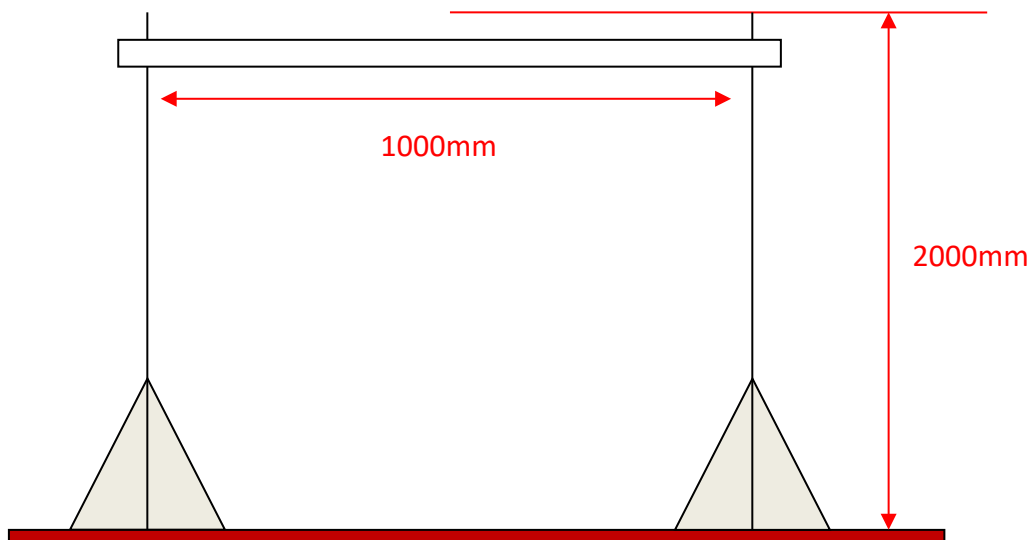


Figure 35 Establishing the Base -2

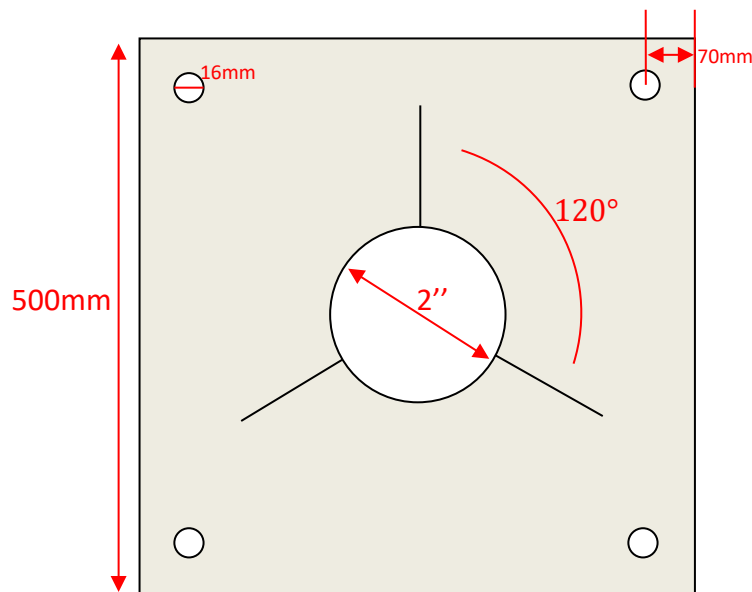


Figure 36 Establishing the Base -3

Step 4. Attach the metal bracket (5mm thick) to the galvanized pipe with a U-ring.

Step 5. Secure the Gateway mount kit to the galvanized pipe.

Step 6. Secure the antenna to the galvanized pipe by using the mount kit or the customized U-ring.

Note: Please use a level to verify whether the antenna is vertically erected.

Step 7. Insert the GPS antenna into a 1 inch PVC pipe. Then, use 1 inch U screws *2 to secure the pipe to the pole.

Step 8. The antenna and RF cable connectors should be wrapped with electrical tape or covered with waterproof materials to resist water penetration.

Step 9. Waterproof connectors should be used for connecting network cables. Network cables near the machine room should be wrapped with conduits, e.g. size 6 PVC cable protection hose. Network cables and RF cables should be secured to avoid wind-induced vibrations.

Step 10. The grounding wire that connects the lightning arrester to the gateway device should be 5.5mm² in diameter.