BROWAN

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|---|---|

# WAPS-232N_LW

# IOT Access Point

# Outdoor Micro Gateway

# Installation Guide

# Revision History

| Revision | Date | Description |
|---|---|---|
| .001 | May. 12, 2020 | Browan first release. |
| .002 | Aug. 7, 2020 | Modified Company Address.<br>Modified Copy Right 2020. |
| .003 | Nov. 20, 2020 | Modified specification on page 8, 9(Table 1).<br>Modified ethernet waterproof connector assembly steps. |
| .004 | Apr. 1, 2022 | Modified cover page, add model name for regulatory.<br>Modification pictures and drawings on page 7.<br>Updated the mount kit description on page12. |

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## 1.1 Gateway Installation Diagram

- Gateway
- Antenna 915MHz*2
- Lightning Arrester*2
- 3G/4G Antenna*1
- GPS Antenna*1
- PoE
- WAN
- Power

———— RF Cable

———— Ethernet

———— Power

Distance at least 100 cm

Antenna　　Antenna

Lightning Arrester　　Lightning Arrester

3G/4G

Gateway

GPS Antenna

3G/4G Antenna

WA

Poe
Input:100-240V
~0.8A 50-60Hz
Output:56V 0.536A
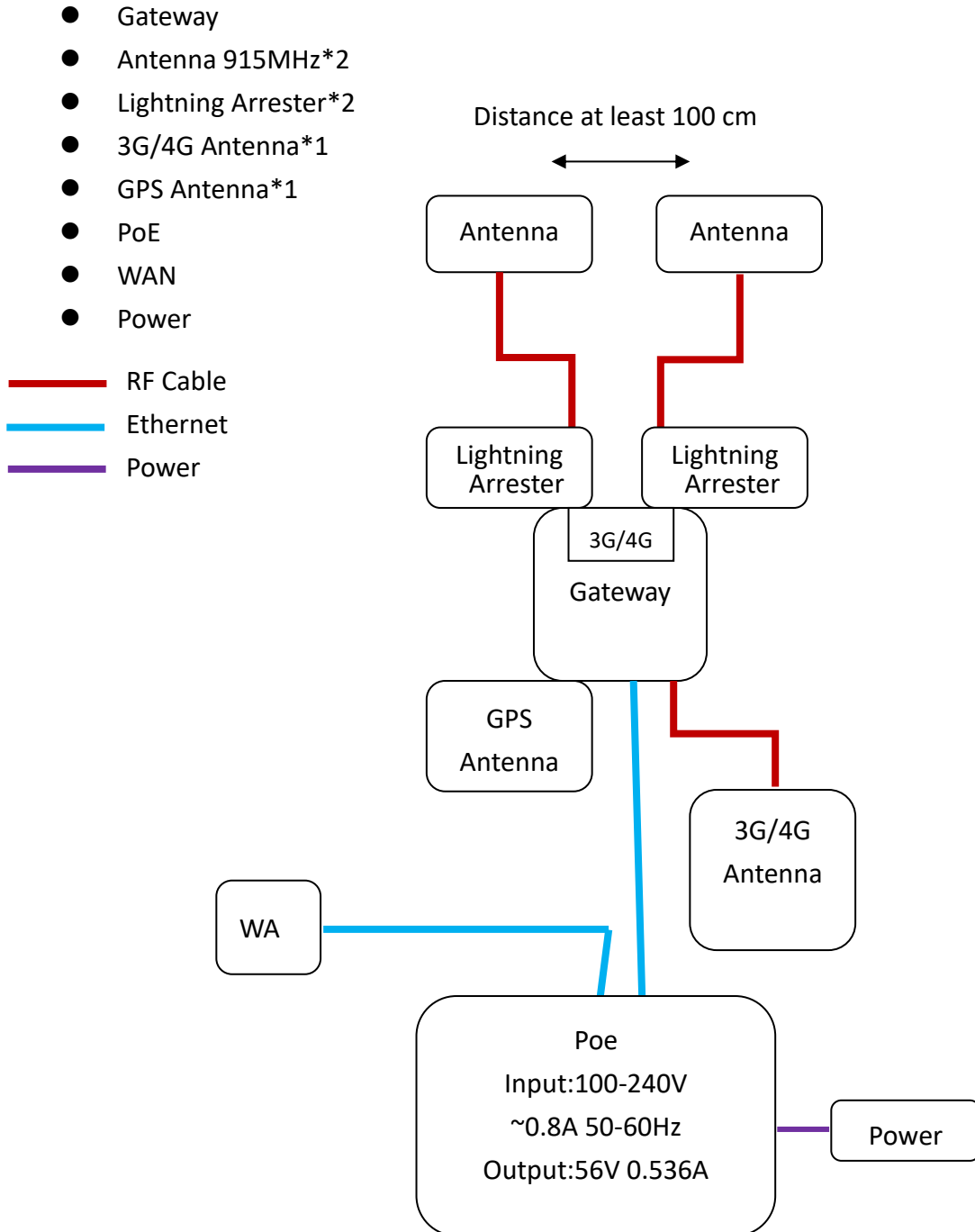
Power

Figure 1　System Architecture Diagram

## 1.2 Diagram of Standard Product Equipment



Figure 2    Diagram of Standard Product Equipment
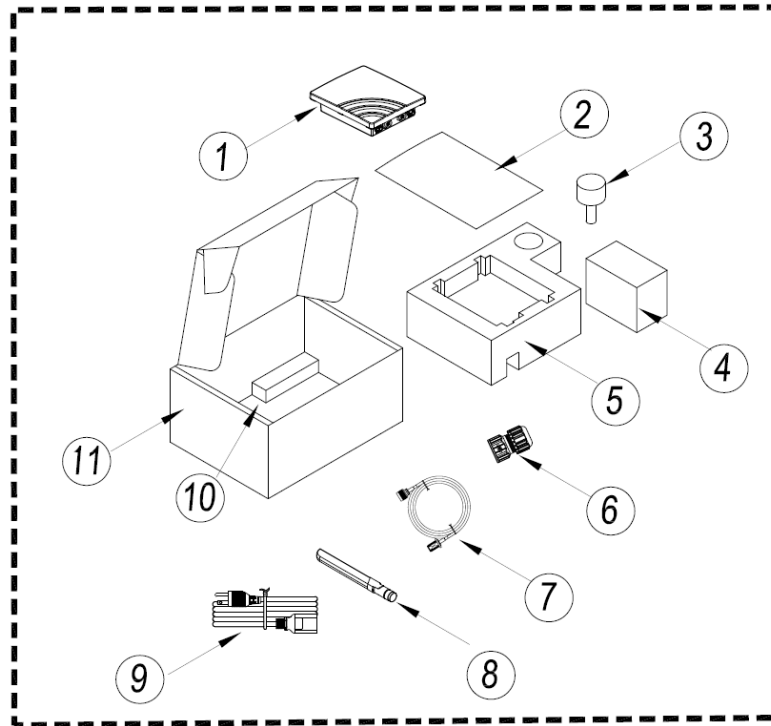
| NO | TITLE | Q'TY | NO | TITLE | Q'TY |
|----|-------|------|----|-------|------|
| 1 | WAPS-232N_LW | 1 | 7 | RF CABLE (3000 mm) | 1 |
| 2 | PE BAG | 1 | 8 | DIPOLE ANT | 1 |
| 3 | GPS ANTENNA | 1 | 9 | POWER CORD | 1 |
| 4 | MOUNT KIT ASS'Y | 1 | 10 | POE ADAPTER | 1 |
| 5 | EPE HOLDER | 1 | 11 | BOX | 1 |
| 6 | RJ45 CONNECTOR | 1 | 12 | CARTON (455*375*548 mm) | 1/6 |



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 | ● Wireless Frequency Band<br>902 ~ 928MHz ISM (SKU-US)<br>862 ~ 870MHz ISM (SKU-EU)<br>470 ~ 510MHz ISM (SKU-CN)<br>● Power input: support 802.3at Power-over-Ethernet<br>● Transmit Power 0.5W (up to 27 dBm)<br>● Receive Sensitivity -142 dBm<br>● Antenna Type N-Type connected antenna<br>● Operating Temperature -20ºC ~ 60ºC |
| 2 | Gateway Protective Pouch | 1 | |
| 3. | GPS Antenna(1.5GHz) | 1 | ● Frequency Range :1575.42 ± 1.023 MHz.<br>● Gain:    90°: 5.0 dBi Min.<br>           20°: -2.0 dBi Min.<br>Mounted on the 60mm*60mm ground plane.<br>● Polarization: RHCP<br>● Axial Ratio: 90° : Max 3.0dB<br>Mounted on the 60mm*60mm ground plane. |
| 4. | Mount kit | 1 | Gateway mount kit (accessories included) |
| 5 | Gateway Protection Foam | | |
| 6. | Waterproof Connector | 1 | RJ45 CABLE CONNECTOR ASS'Y |
| 7. | GPS RF cable | 1 | 3 Meter RF cable (Return loss < -20dB) |
| 8. | 3G/4G Antenna | 1 | ● Frequency Range<br>698~960MHz/1710~2700MHz<br>● Average Gain:0~1dBi<br>● Polarization: Vertical Linear<br>● Connector type: N-type |
| 9. | Power code | 1 | According to country standards |
| 10. | Power over Ethernet (PoE) | 1 | ● Power over Ethernet Output:<br>Pin Assignment and Polarity:4/5 (+), 7/8 (−)<br>Output Power Voltage: 55Vdc<br>User Port Power: 30Watts (Guaranteed) |

| | | | | • 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: |
| | | | -4º to 104ºF (-20 to 40ºC) @ 30W |
| | | | -4º to 131ºF (-20 to 55ºC) @ 22.5W |
| | | | Operating Humidity: |
| | | | Maximum 90%, Non-condensing |
| | | | Storage Temperature: |
| | | | -4º to 158ºF (-20º to 70ºC) |
| | | | 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 (Additional accessories) | 2 | 1 connected to PoE 、 <br> 1 connected to WAN Cat5e FTP |
| 12 | LoRa Antenna (Additional accessories) | 2 | • N type antenna connectors <br> • LoRa antenna is optional by customer. <br> • Distance between the two antennas must be at least 100cm |
| 13 | Lighting arrester (Additional accessories) | 1 | • VSWR < 1.5 |

Note: Additional accessories are not included in the standard package. Please contact Browan personnel for additional purchases.

# Chapter 2 Micro Outdoor Gateway System Installation Instructions

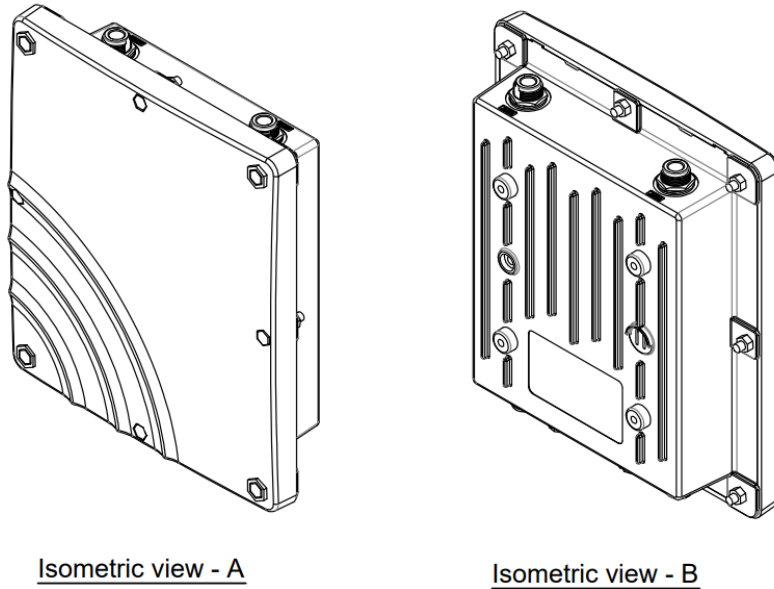## 2.1 Exterior Appearance of the Gateway Device:



Isometric view - A          Isometric view - B

Figure 4    Gateway Front and Rear View



Outdoor Micro Gateway
(Access Point, AP)

Size: 230*200*68 mm

1. Antenna (N-type female)
2. Antenna (N-type female)
3. 3G/4G mini SIM card
4. GPS 1.5 GHz Antenna (N-type female)
5. Ethernet to PoE (Connection to the Gateway installed with waterproof connector)
6. 3G/4G Antenna (N-type female)

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.
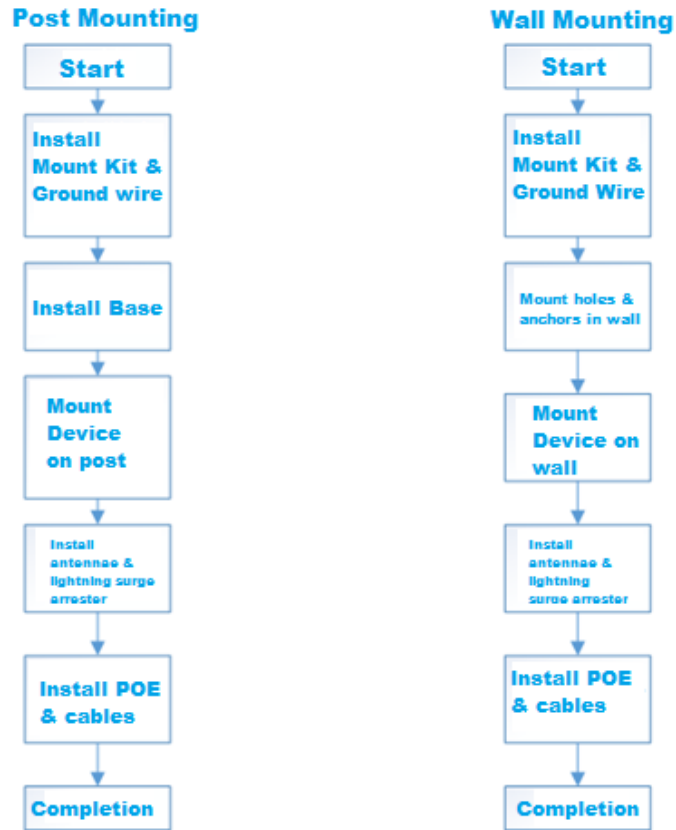


Figure 6    Diagram of Equipment Installation Procedures

### 2.2.1 Post Mounting

**Pre-installation preparations**

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

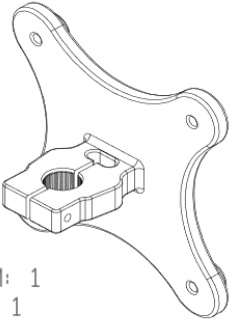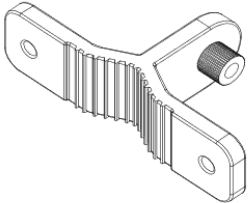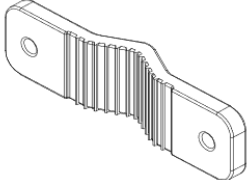➢Tools: Allen wrenches (M5 and M8) or an adjustable wrench, Philips screwdriver

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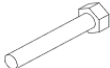
> List of components:

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

| | | |
|---|---|---|
| LTEM: 1<br>Qty: 1<br>BASE | LTEM: 5<br>Qty: 1<br>ADJUSTABLE PLATE | LTEM: 9<br>Qty: 1<br>FIXING PLATE |
| LTEM: 2<br>Qty: 4<br>Bolt M5∗20mm | LTEM: 6<br>Qty: 1<br>Bolt M8∗50mm | LTEM: 10<br>Qty: 5<br>Washer M8 |
| LTEM: 3<br>Qty: 5<br>Spring Washer M5 | LTEM: 7<br>Qty: 1<br>Bolt M5∗35mm | LTEM: 11<br>Qty: 6<br>Spring Washer M8 |
| LTEM: 4<br>Qty: 4<br>Washer M5 | LTEM: 8<br>Qty: 1<br>Washer M8∗19mm | LTEM: 12<br>Qty: 3<br>Nut M8 |
| ⚠ Mount kits, frames, screws, and anchors are not included in the standard product and must be purchased separately. | LTEM: 13<br>Qty: 2<br>Bolt M8∗100mm | |

**Step 1**

Secure the base frame of the mount kit to the Gateway device, as shown in the figure below:
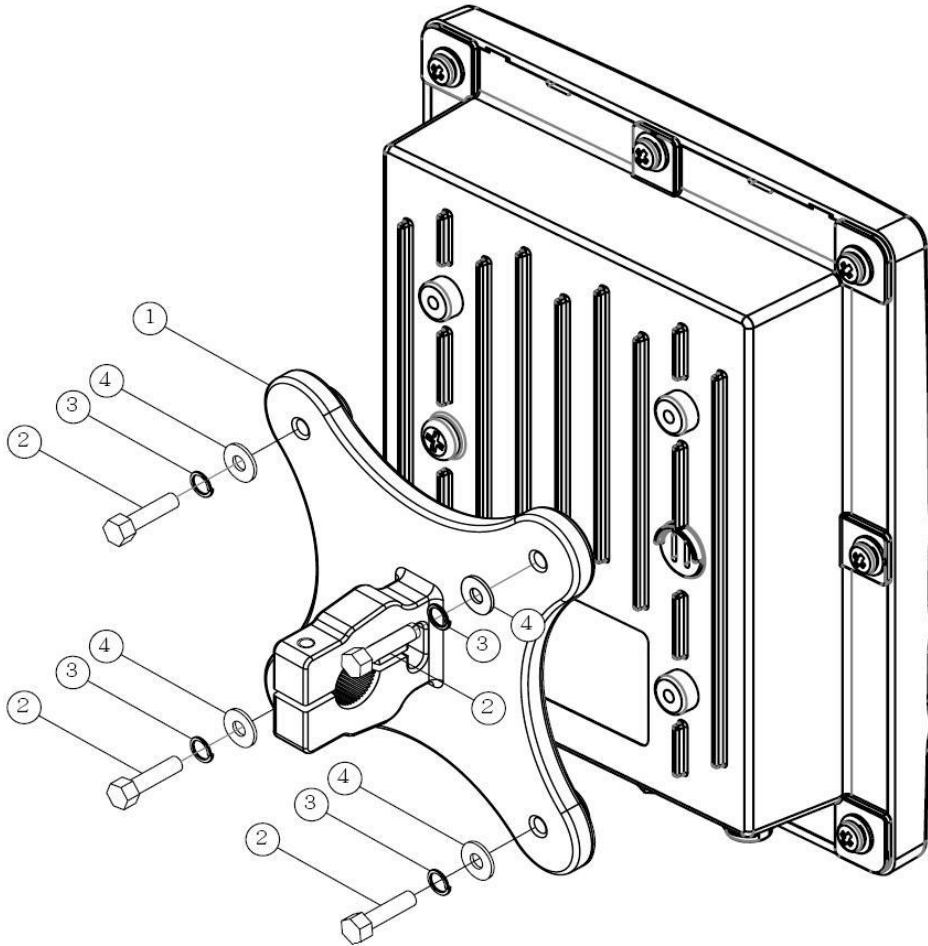
Figure 7    Assembling the Base Frame - Diagram I

**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 an ⊜ icon. When the ground wire resistance is less than 5 ohms, the recommended diameter of the ground wire would be less than 6 mm$^2$.
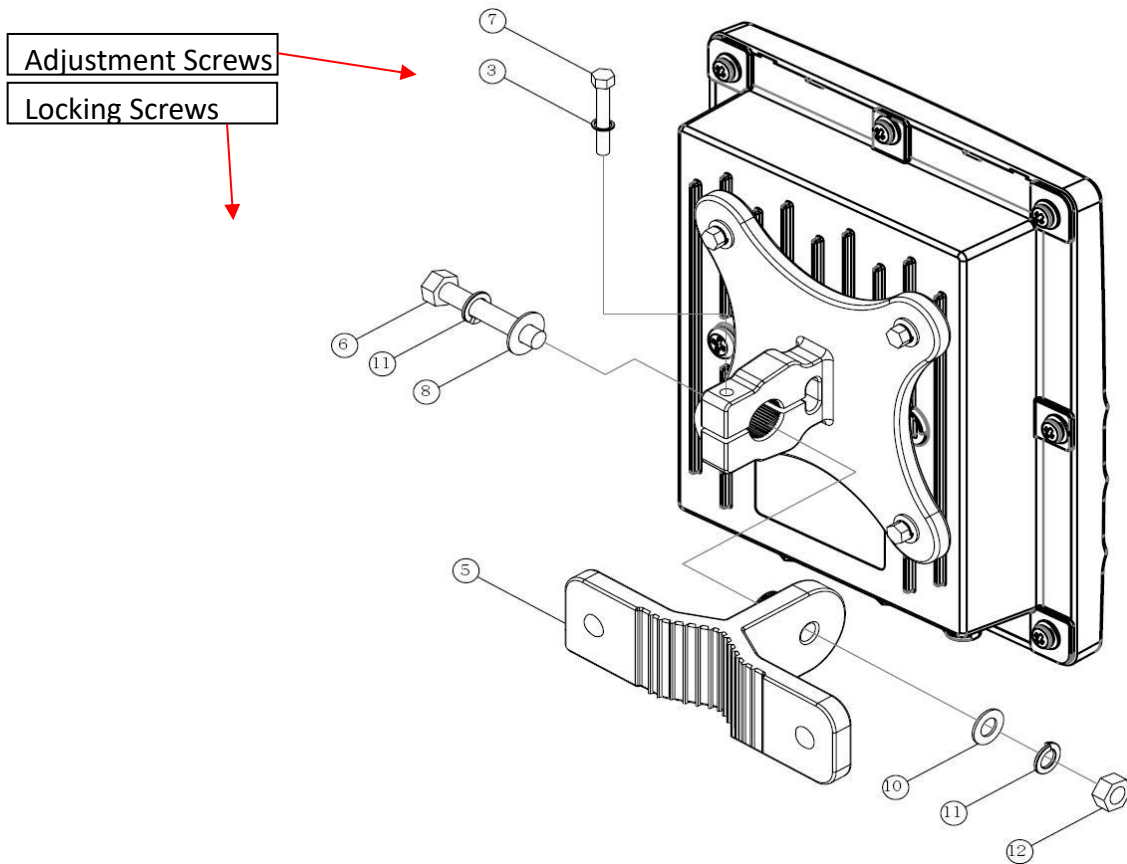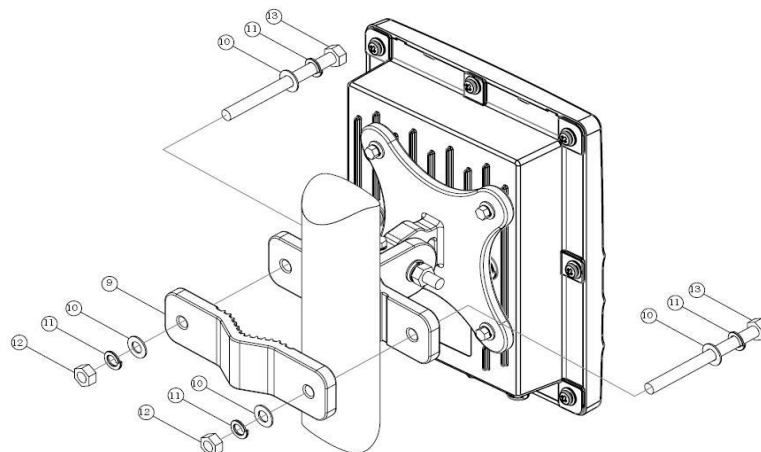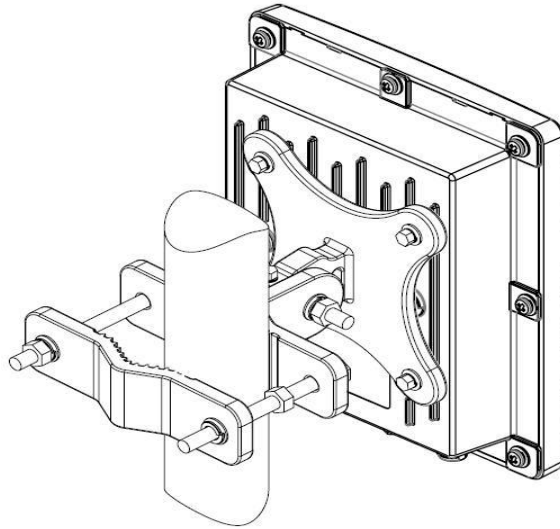


Figure 10    Diagram II of Pole Installation

**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 Φ12.7mm), 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 Φ12.7mm drill bit. As shown in the following figure below.
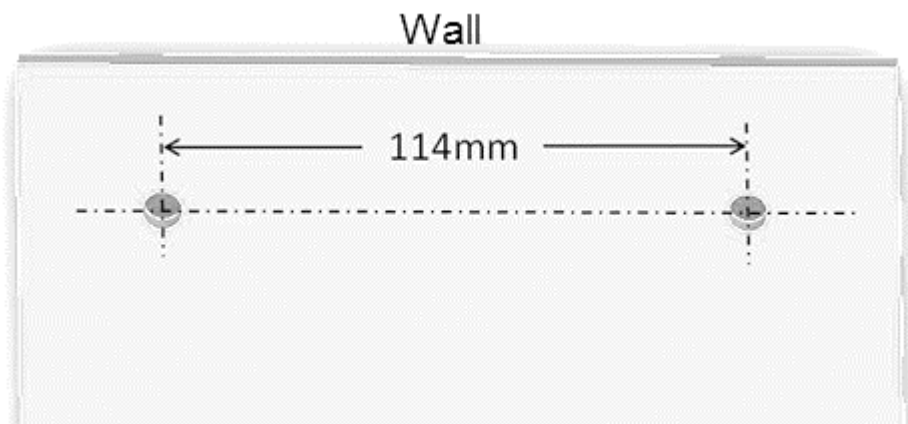


Figure 11    Width between the wall mounting holes

## 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.
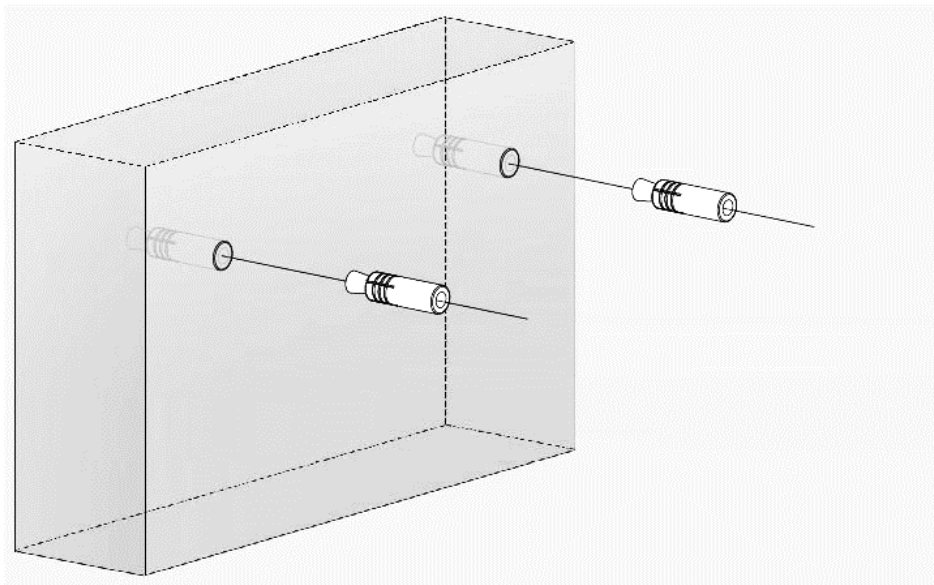


Figure 12    Installation Diagram of Wall Mount Anchors (Stainless Steel)

**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.
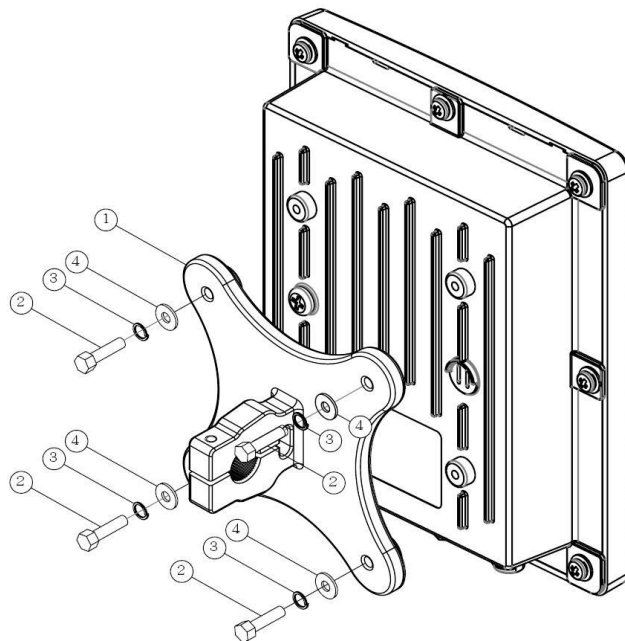


Figure 14    Assembling Diagram of Base Frame
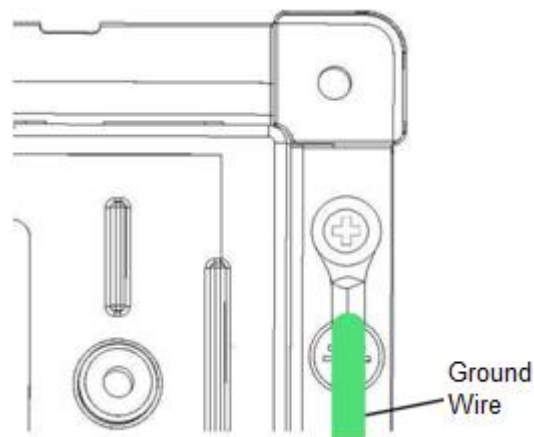
Figure 15    Depiction of Ground Wire

**Step 5**: **Fastening the Gateway to complete the installation**
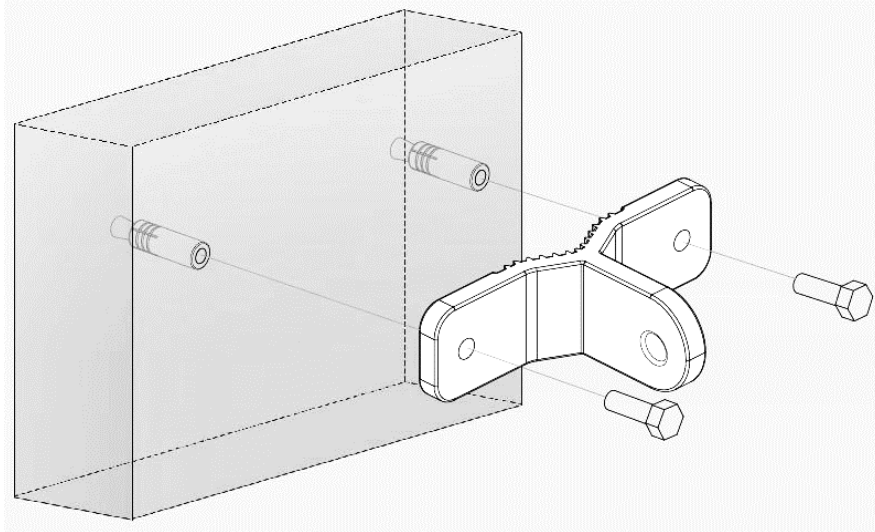
Match and secure the Gateway base frame against the adjustable plate by inserting M8x50mm locking screws through the conjoining ends and fasten the screw with nuts. Adjust the Gateway to the appropriate angle and fasten with M5x35mm adjustable screws to secure the device in place. Please see the following diagram:
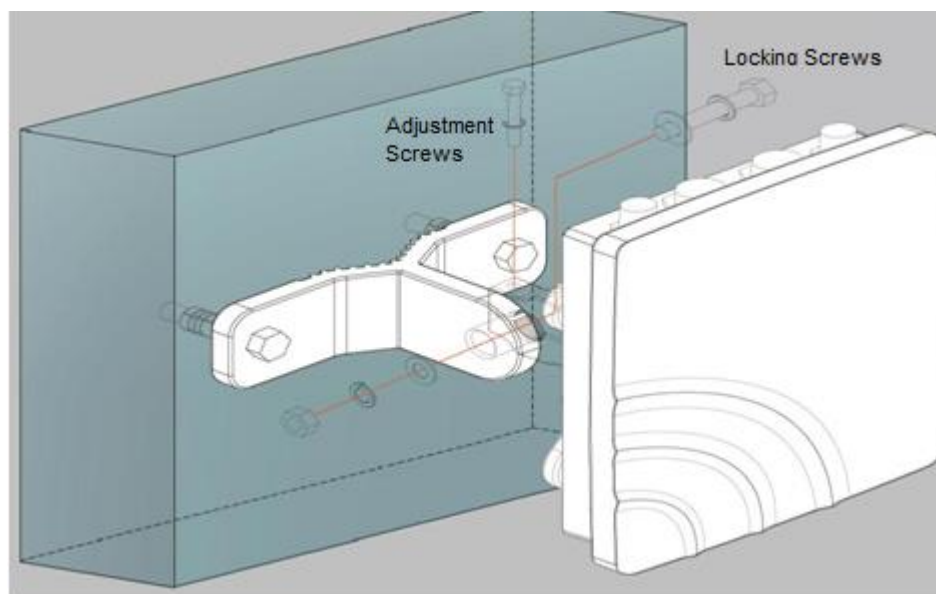


Figure 16    Installation Completion

**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.

| ⚠️ | **Note:** Install the lightning arrester between the antenna and the gateway device. |
|---|---|
| ⚠️ | **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. |
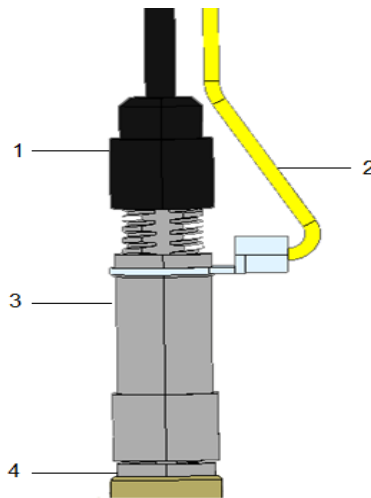


Figure 17    Connecting the RF Cable

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].

Before the installation, an RJ-45 Ethernet cable and the waterproof connector must be conjoined. Make sure that the Ethernet cable used should be an 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.

**Side View**



Body Gasket  Seals  Clip  Sealing Nut

Body
Gasket

Seals

Clip

Sealing Nut

ⵁ26.0

42.0(Ref.)

**Process of Assembly:**

① 

Finished          ⚠ Unassembled

Plug Insertion Direction

② 



⚠ Avoid Gasket Damage By
Plug Latch When Assembled.

Gasket

Plug Latch

Finished

Screw In Body Tightly.
The Body Torque Force: 8~10 kgf–cm

③

⚠ Attention Waterproof Line Direction



Finished.

④

Screw In Sealing Nut Tightly.
The Screw Nut Torque Force: 8~10 kgf-cm

Assembly Finished.

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.<br>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 equipment must be properly grounded.
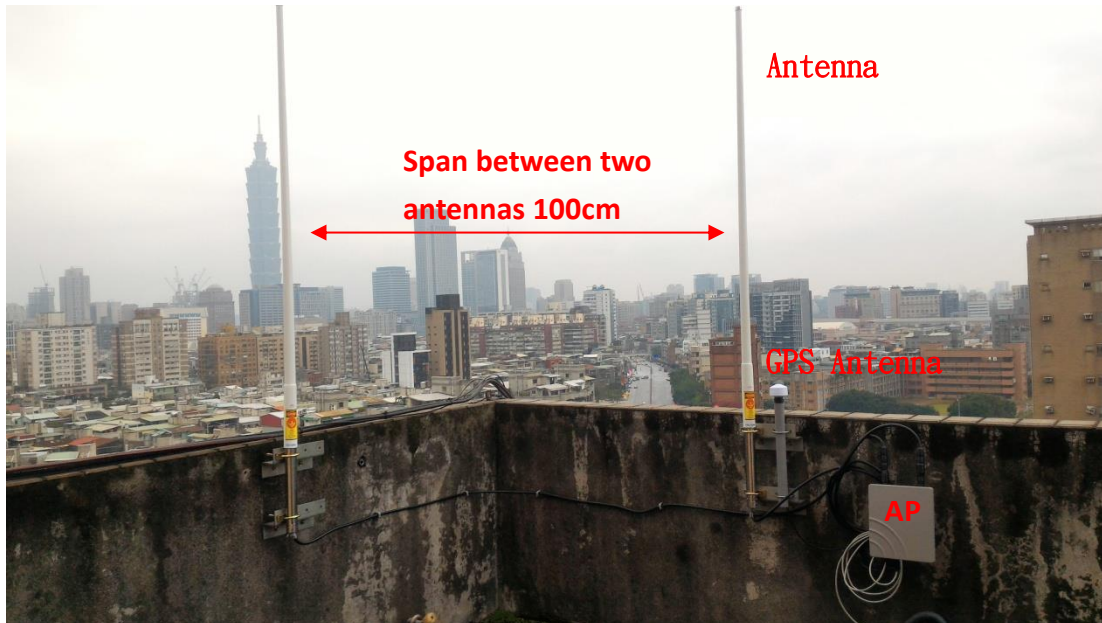
## 3.1 Wall-mount Installation



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

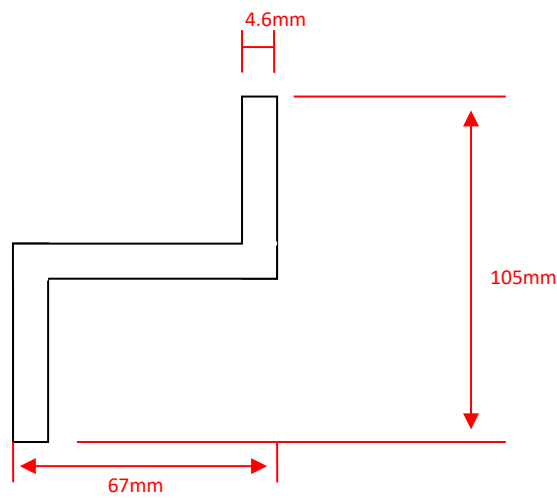Figure 27    Customized Metal Bracket – Image 3



Figure 28    Specifications for Customized Metal Bracket – Image 1
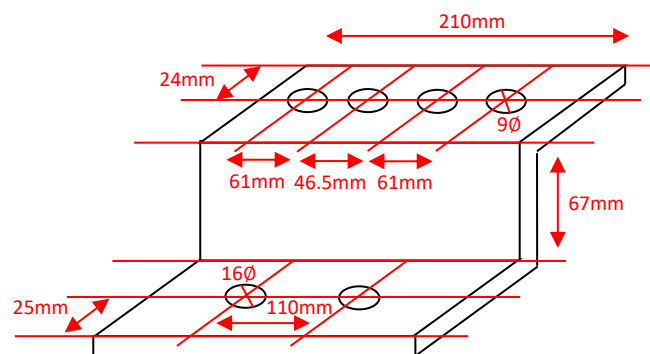


Figure 29    Specifications for Customized Metal Bracket – Image 2

Step 4. The grounding wire that connects the lightning arrester to the gateway device should be 5.5mm$^2$ 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
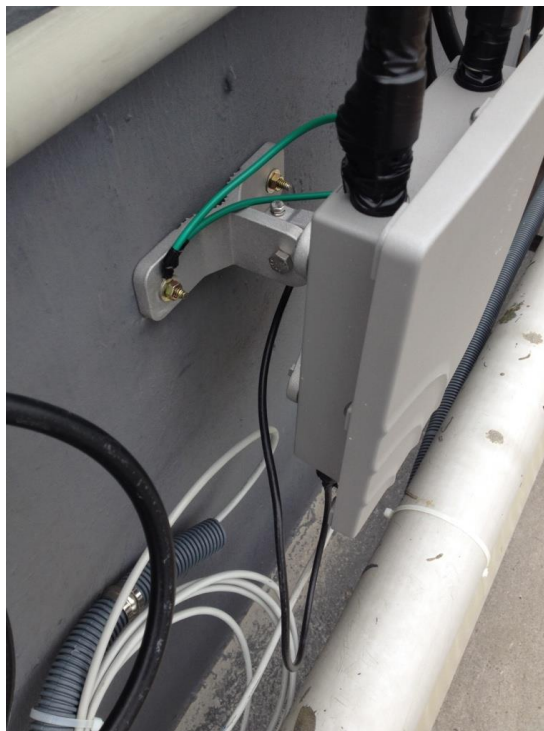


Figure 31    Lightning Protections and Grounding Equipment – Image 2

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.
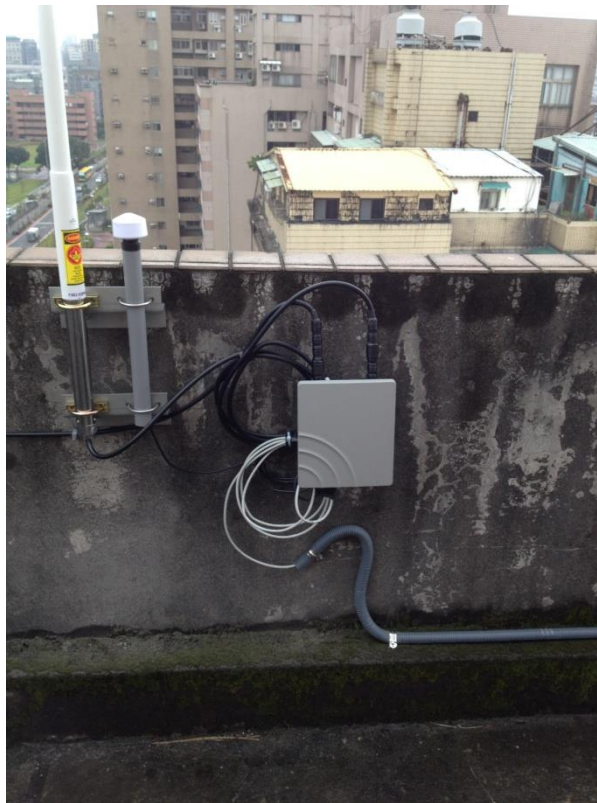


Figure 32    6 PVC cable protection hose

## 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.

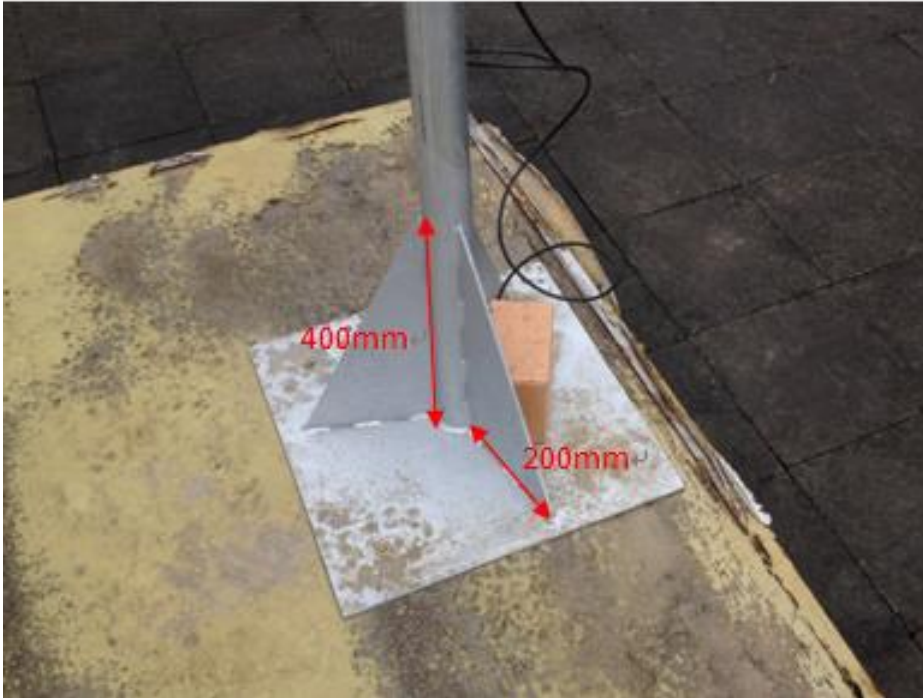Step 3. Secure the base of the galvanized pipe. Please see image as shown below.

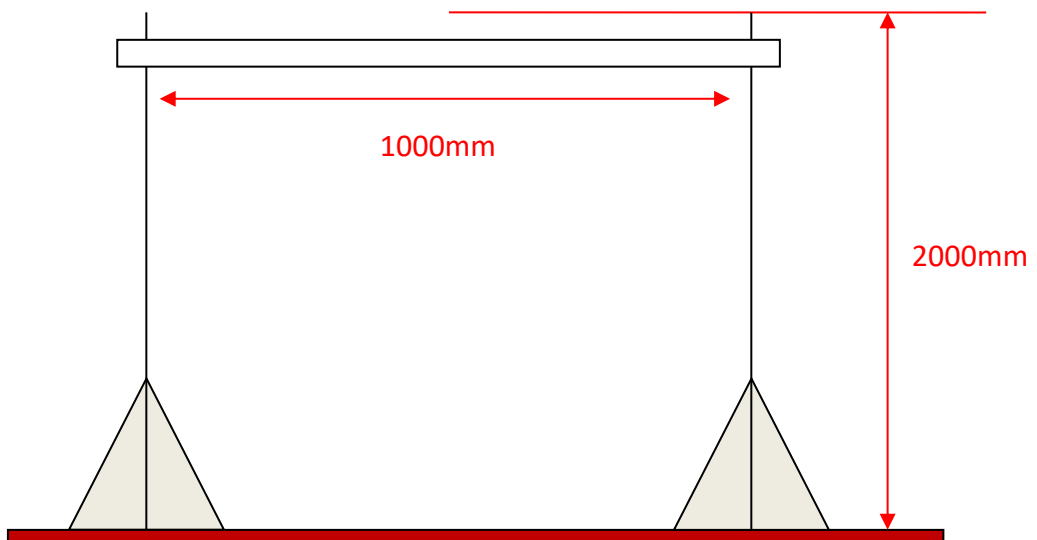Figure 34    Establishing the Base -1



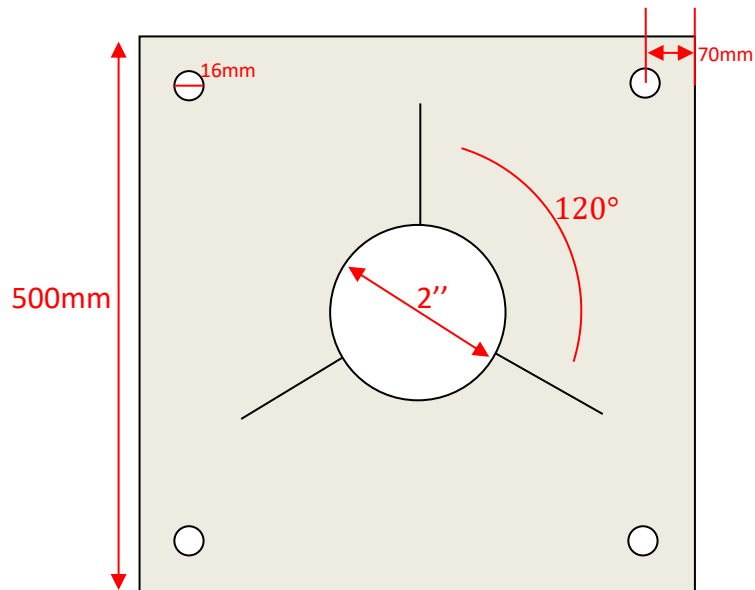Figure 35    Establishing the Base -2

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 5.5mm$^2$ in diameter.