# Installation manual for LoRa Gateway


**Contela, Inc.**

**Version 1.0**

# [Change History]

| Version | Changes | Remark |
|---|---|---|
| 1.0 | Draft | |
| | | |

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# 1. Hardware Installation Manual

## 1.1 Packing accessories

■ Check packaging

Check the LoRa Gateway for damage during transport and unpack it to check its contents.

- LoRa Gateway : 1EA
- AC Input cable connector : 1EA
- Mounting bracket : 1EA
- Assembly screws for mounting bracket : 4EA

  Antenna

  Reverse N-Type Cable

■ Descriptions about Internal, external components and Interface

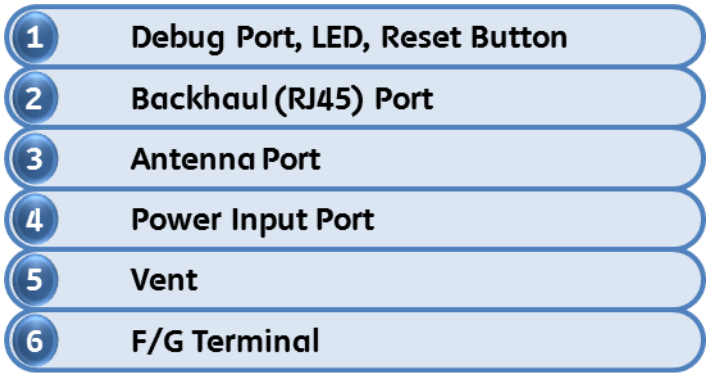


Figure 1.10-1 Components and Interface of LoRa Gateway

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## ■ Hardware Specification

- Supporting Band
  - 900MHz(UL : 902.3MHz ~ 914.9MHz , DL : 923.3MHz ~ 927.5MHz)
- Transmitted Power
  - 23dBm(200mW)
- Channel BW & Capacity
  - Channel BW : UL 125KHz , DL 500KHz
  - Channel : 8CH(Rx) , 1CH(Tx)
- Synchronization
  - GPS
- Backhaul
  - 10/100/1000 Base-T Ethernet
- Environment
  - Natural convection
  - Operating Temperature & Humidity : -30℃ ~ 50℃ , 10% ~ 90%
  - Storage Temperature & Humidity : -40℃ ~ 70℃ , 10% ~ 95%
- Power
  - Power Supply : AC100V ~ 120V , 50Hz / 60Hz
- Mechanical
  - Dimension : 175.0 x 250.0 x 55.4(W x H x D mm)
  - Weight : approximately 1.36kg
  - Mount type : Pole / Wall mounting
  - Dust & Water Protection : IEC529-IP54
  - GR-63-Core Earthquake Zone 4

## ■ Definition of LED Status


A. LED operation

| LED Name | LED Color | LED ACTION | Status |
|---|---|---|---|
| STATUS | OFF | - | Power off |
| | Green | ON | In Service |
| | | Blink | Start-up |
| | Red | ON | Error on LoRa gateway |
| | | Blink | Communication error with Network Server (Blinking every second) |
| | Orange | Blink | Communication error with G-EMS (Blinking every second) |

B. Actions/measures depending on LED operation status

(1) In case the LED is permanently red

- Open 'LED Status panel' and press the Reset Button (RST) for at least 1 second.


- If the LED operation is not restored by Reset Button, unplug the power from the distribution box and wait until the discharge is complete (when the STATUS LED

is off), then apply power. (It takes about 20 ~ 30 seconds)

(2) In case the red LED flashes repeatedly

- Through G-EMS, check the IP address of Network Server is registered in LoRa Gateway.
- Check if the LoRa gateway is registered as a LoRa gateway that can be interworked to the Network Server.
- If the current state continues after checking all above, check with the local NOC for the circuit configuration status.

(3) In case the orange LED flashes repeatedly

- Check if MMC command execution from G-EMS to LoRa Gateway is working.
- In case MMC command from G-EMS is executed
  - ◆ Check if the G-EMS address registered in LoRa Gateway is correct.
  - ◆ Check if the Gateway's request is processed normally on the G-EMS.
- In case MMC command from G-EMS is not executed
  - ◆ Check the configuration of the line to make sure that there is no problem in network connection with G-EMS.

## 1.2 Hardware Installation

### ■ Check lists for LoRa Gateway installation

A. Check the installation materials of LoRa Gateway

- Check the contents of LoRa Gateway (AC input cable connector etc.)
- Identification of facility materials (main installation bolt/nut, facility structure, etc.)

B. Check the external condition of LoRa Gateway before installation.

- Make sure that the tightening screws of the LoRa Gateway are tightened and there is no problem with the waterproof structure.
- Make sure that there is no apparent problem during the movement of each external port.

C. Check the installation direction of the LoRa Gateway. (Ports are always downward)

- LoRa Gateway should be installed in a position where the upper side of the LoRa Gateway is open to see the sky so that the GPS antenna can receive the satellite signals smoothly with the built-in GPS antenna.

### ■ Installation of LoRa Gateway

Check that all the installation materials of LoRa Gateway are prepared.

The following figure is an example of installing a pole, and it can be installed using a U-bolt (or pole mounting device, pole fixing band, etc.) as shown.

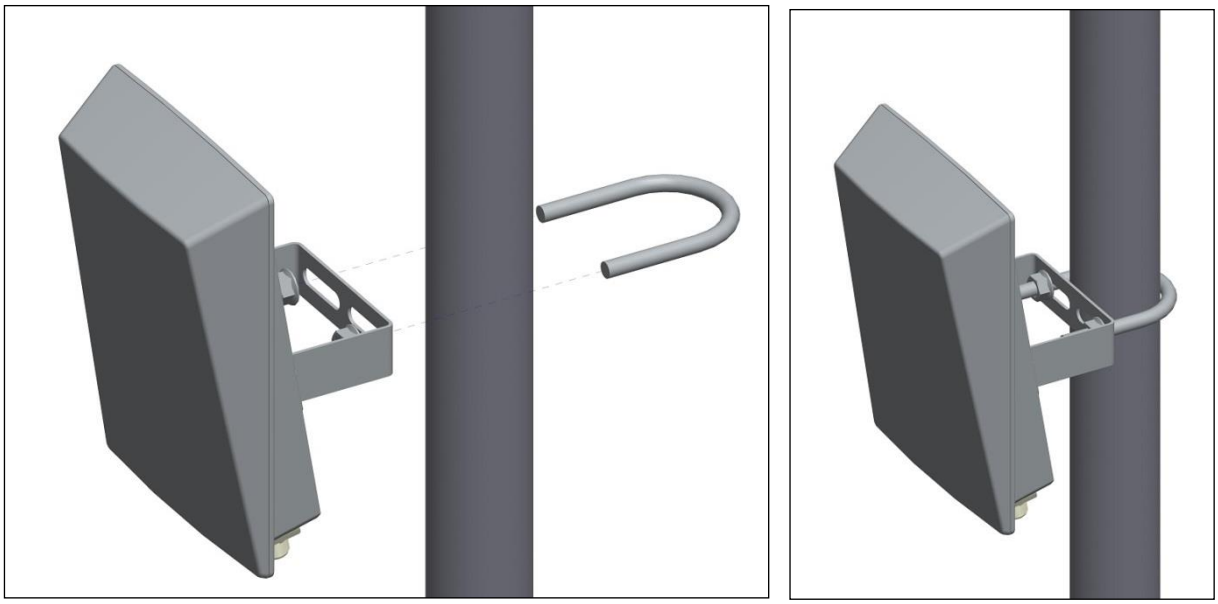


Figure 1.20 Example of pole installation for LoRa Gateway 2

Once LoRa Gateway is installed, proceed with the RF service antenna connection, Backhaul connection, AC power connection and grounding work.

⚠ Cautions

Be careful not to install this LoRa Gateway inside the building because it is a GPS receiver embedded.

A. RF service antenna connection

The RF service antenna connection connector uses N-type Reverse (N-50Ω) connector. After connecting the antenna cable, finish it with a waterproof shrink tube to make it waterproof. Fix the cables so that they do not shake in vibration or wind.

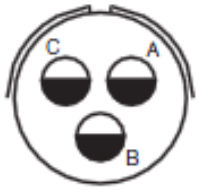
B. Backhaul Connection

RJ45 connector is used for backhaul connector, and Cable grand (DAM25, Dong-A) is used for connector external waterproof connector. The Ethernet cable for Backhaul is constructed by connecting method that can be waterproofed by using corrugated pipe fitting to the cable grand.

After connection, waterproof finishing is done to prevent moisture from entering into the enclosure by using waterproof shrink tube or waterproof silicone. Fix the cable so that it does not shake with vibration or wind.

C. AC power connection

Connect the AC power to the LoRa Gateway through an external power distribution box.
The AC power cable is not provided separately. Only the connector that is connected to the LoRa Gateway is provided, and connect the AC power cable by assembling the waterproof connector that comes with LoRa Gateway.
The figure below shows the pin map of the AC input connector.
When working on AC input cable in the field, make sure to use it according to the pin map shown below.




**A : AC_H**
**B : AC_N**
**C : GND**

Figure 1.20-7 AC Power connector Pin map 4

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The AC power connector specification conforms to the MS3106A-10SL-3 (MIL-C-5015)
And the connector connected to the cable is MS3106A-10SL-3 (MIL-C-5015).
When installing, prepare the MS3106A-10SL-3 (MIL-C-5015) (supplied) and make the cable according to the pin map above.
After connecting the power cable, be sure to finish using a waterproof shrink tube to make it waterproof and fix the cable to prevent it from being shaken by wind and vibration.

⚠ Cautions

When connecting the power connector, make sure that it is aligned with the erroneous insertion protrusion, and be careful not to forcibly force the connector or damage the connector.

D. Grounding

Connect the ground wire through the ground terminal located on the right side (or left side) of the enclosure.

## 1.3 Cautions before installation

- Check the contents of the package before installation to ensure that the equipment components are correct.
- This equipment must be installed using the supplied mounting bracket.
- Since this LoRa Gateway is installed outdoors, ensure waterproof finish during installation. (Backhaul Port, RF Service Antenna Port, AC Input Power Port)
- After installation, the connectors of each cable should be firmly connected using tools so that they cannot be released by hand.
- When connecting the AC power source, the specified waterproof connector must be used.
- AC Connector Specification: MS3106A-10SL-3
- Also, when making cables in the field, connect them according to the pin map.
- Before turning on the LoRa Gateway, check that the external RF service antenna cable is connected.
- Fix the external cables so that they will not be shaken by wind or other vibrations.
- Grounding work must be carried out.

# CAUTIONS BEFORE USE

■ This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

■ Caution : Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void user's authority to operate the equipment.

■ This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 ㎝ must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

FCC Compliance statement

- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
- This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.