Air Quality Monitoring Solution

Quick start guide

Explanatory videos and reference documents

www.assek.ca/resources

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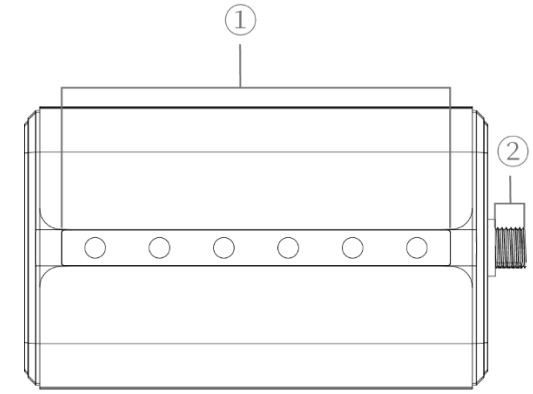
1. Internet Gateway (UG65)

1.1 Overview

UG65 is a LoRaWAN® gateway used to collect data from multiple sensors and transmit it over the Internet to an application server. The gateway is designed to use an Ethernet Internet connection but can optionally use a WiFi or LTE connection.

Sensor data is transmitted in real-time using standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distance while consuming very little power.

1.2 Hardware Overview

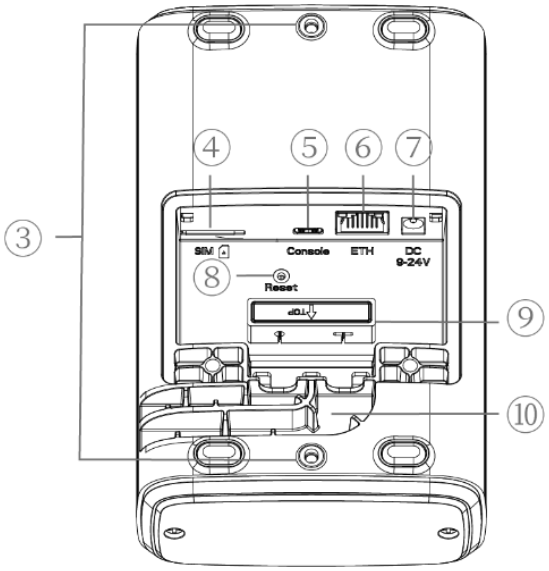


Front View:

① LED Area

POWER: Power Indicator
STATUS: System Indicator
LoRa: LoRa Indicator
Wi-Fi: Wi-Fi Indicator
LTE: Cellular Indicator
ETH: Ethernet Port Indicator

② LoRa Antenna Connector



Back View:

③ Bracket Mounting Screws

④ SIM Slot

⑤ Type-C Port

⑥ Ethernet Port (PoE)

⑦ Power Connector

⑧ Reset Button

⑨ Waterproof silicone

⑩ Cable Groove

1.3 Installation

Positioning of the gateway is the most complex installation step. Since the UG65 gateway is used to receive and transfer data from the sensors to the information system, it is important that their position provides a good coverage of the LoRaWAN® network. Depending on the size and composition of the building, more than one gateway may be needed. **Note that it is preferable to install the gateway in the corridor to facilitate its access at all times.**

1.3.1 Gateway Location

While choosing the gateway location, the 3 following rules must be respected:

A) Be near an Ethernet cable (Internet)

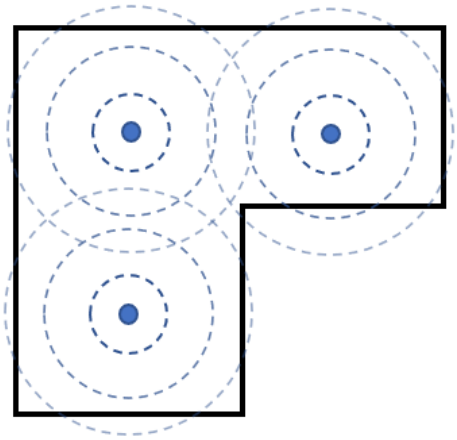
B) Be near a power outlet (if PoE is not used)

C) All the sensors must be in range of at least one gateway
In order to obtain the best signal coverage possible, the gateway should be installed in the center of the targeted sensors of a given floor. In addition, it is recommended to install the gateway on an intermediate floor, which allows the sensors installed on the neighboring floors to also be within its range.

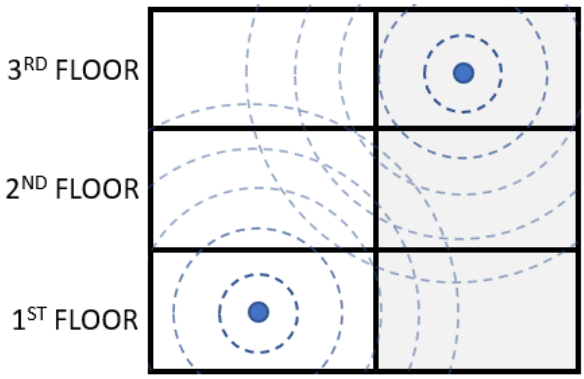
For illustrative purposes, one gateway can easily cover a horizontal area of 12 classes per floor on up to 3 floors[1].

The image below illustrates how the signal travels horizontally and across floors. It represents a proper multi-location set up when multiple gateways are used.

[1] For illustrative purposes only. Depends on the gateway location, the surrounding objects and the composition of the building.



TOP VIEW



FRONT VIEW

Note:
To check if all the sensors are in range of a gateway, refer to the information system. When it is not the case, it is necessary to relocate or add an additional gateway.

1.3.2 Power and Ethernet Cable Installation

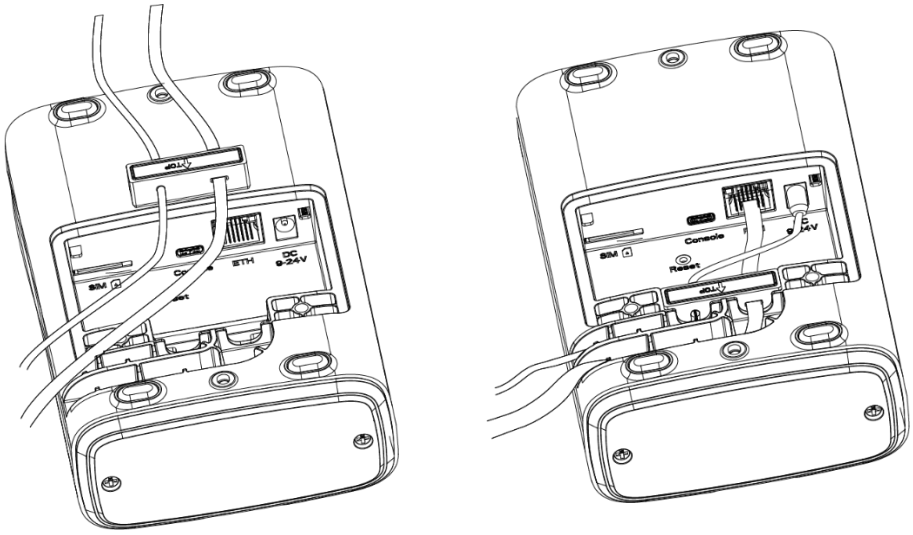
1. Open the back lid of the gateway with a screwdriver.

2. Connect the Ethernet cable and the power cable (if PoE is not used) to corresponding interfaces.

   Note:
   UG65 can also be powered by 802.3af PoE (Power over Ethernet). If both the DC power supply cable and the PoE cable are connected, DC power is preferred.

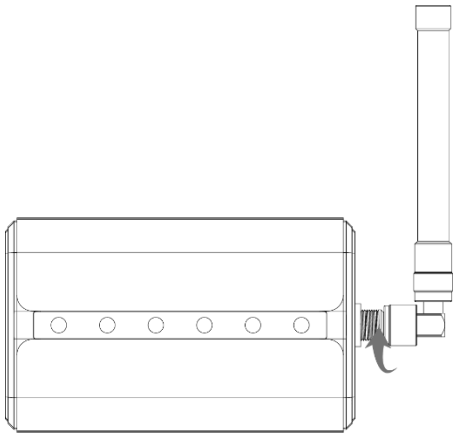
3. Pass the two cables through the waterproof silicone and slide it into the groove.

4. Place back and screw the gateway back lid.



1.3.3 Antenna Installation

To install the external LoRaWAN® antenna, simply rotate clockwise the antenna into the connector on the right side of the gateway. The antenna should always be installed vertically in an upward position.



1.3.4 Gateway Installation

The gateway should preferably be **fixed to a corridor wall**. When possible, it should be installed at a height where it is out of reach of students while being properly connected. The steps to install the gateway are:

1. Connect the power cable to the wall outlet (if PoE is not used).

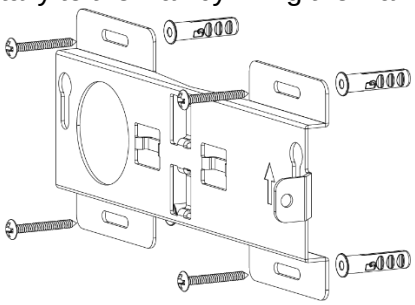
2. Align the mounting bracket horizontally to the desired position on the wall, use a marker pen to mark four holes on the wall. Then remove the bracket from the wall.

3. Drill the four holes with a depth of 32 mm by using a drill with a 6 mm drill bit.

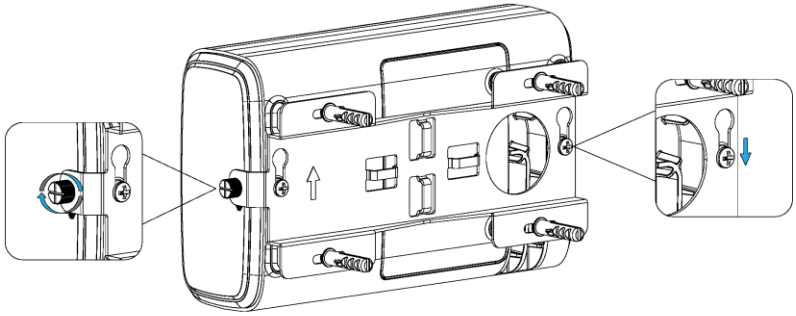
Note :
Be sure to follow applicable standards if you drill into materials that contains asbestos.

4. Insert four wall plugs into the holes with a hammer.

5. Mount the mounting bracket horizontally to the wall by fixing the wall mounting screws into the wall plugs.



6. Screw the bracket fixing screws to the back panel of the gateway, then hang the device to the mounting bracket on the wall.



7. Align the antenna vertically in an upright position.

1.4 Configuration

To allow the Gateway to connect to the organization network, some configurations need to be made by **your IT department**. For security reasons, the configuration to be applied is not shared publicly. It will automatically be emailed to the organization's IT contact after every shipment. If necessary, contact our support team for more information.

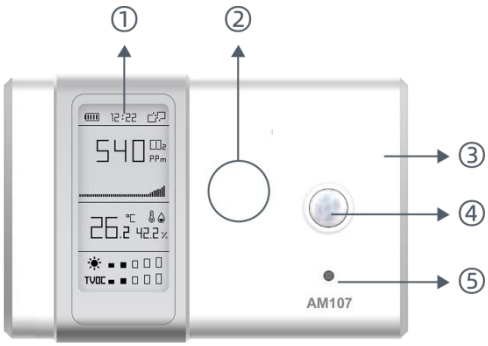
2. Indoor Air Quality Sensor (AM107)

2.1 Overview

AM107 is a compact indoor air quality sensor used for temperature, humidity, CO_2 and motion monitoring. It is a battery powered device and is designed to be wall mounted.

Sensor data are transmitted in real-time using standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distance while consuming very little power.

2.2 Hardware Overview

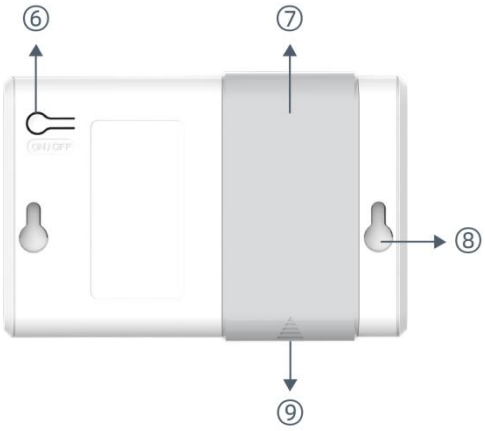


Front Panel:

① E-ink screen

② NFC Area

③ LoRa Antenna (Internal)



Back Panel:

⑥ Power button

⑦ Battery Cover

⑧ Mounting Holes

2.3 Installation

2.3.1 Sensor Location

The indoor air quality sensor must be installed:

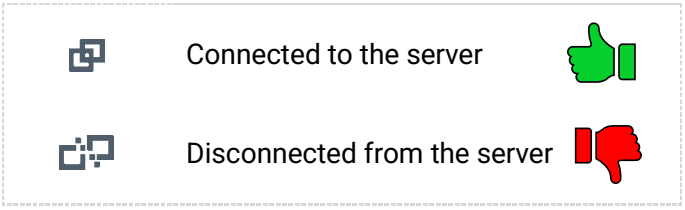
- More than 2 meters away from the following:
  - Ventilation grids or air diffusers.
  - Opening windows.
  - Heat sources (radiators).
- In a visible place and not behind a cupboard.
- More than 1.5 meter away from an occupant.
- At the height at which the occupants breathe (between 0.5 meter and 2 meters from the ground).
- On an interior wall (not exterior).

2.3.2 Turning ON the Sensor

1. Turn ON the sensor by pressing and holding the power button for 3 seconds until the screen changes state.

   Note :
   It may take up to 5 minutes for the sensor to display a first CO2 level value.

2. Wait a few minutes, then confirm the sensor is in range of a gateway by checking the server connection pictogram in the upper right corner of the screen. If it is not the case, validate the designated gateway is in operation.



   Note :
   It may be necessary to wait a few minutes for the sensor to connect to a gateway. If the sensor has remained turned ON and not connected to the server for more than one hour, it is recommended to turn it OFF (press and hold the power button for 3 seconds), then restart it to force a new connection attempt.

   Note :
   If the sensor cannot reach a gateway, it may be necessary to relocate the gateway while making sure it remains in the center of the targeted sensors. When it is not possible to achieve a configuration where all sensors are within range of a gateway, it may be necessary to install an additional gateway. If necessary, contact Assek Technologie by writing to support@assek.ca or by calling 1-888-833-8044.

2.3.3 Wall Installation

1. Place the mounting sticker horizontally to the classroom wall.

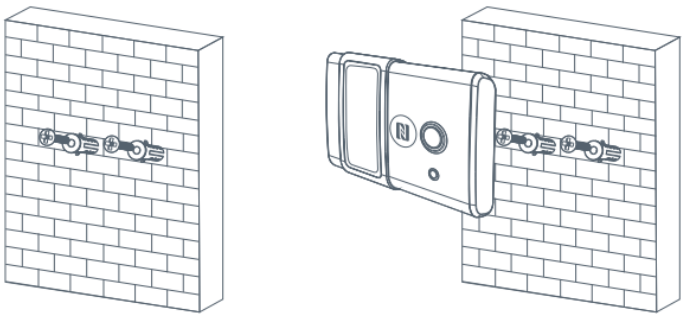
2. Drill two mounting holes with a 6 mm drill bit according to the sticker's mark.

   Note:
   Be sure to follow applicable standards if you drill into materials that contains asbestos.

3. Remove the mounting sticker from the wall.

4. Place the wall plugs into the holes using a hammer, then the mounting screws using a screwdriver leaving a space of about 5 mm between the screw head and the wall.

5. Mount the device on the wall by inserting the screws attached to the wall in its mounting cavities.



3. Outdoor Ambience Monitoring Sensor (EM500-CO2)

3.1 Overview

EM500-CO_2 is a sensor mainly used for outdoor environment monitoring through wireless LoRa network. EM500-CO_2 device is battery powered and designed for multiple mounting ways.

Sensor data are transmitted in real-time using standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distance while consuming very little power.

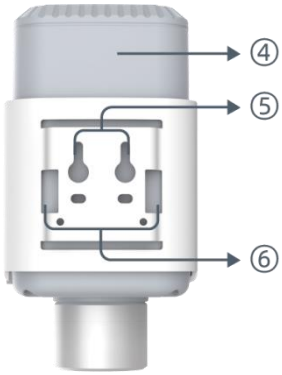
3.2 Hardware Overview

Front View:

① LoRa Antenna (Internal)

② NFC Area

③ Vent Tube



Back View:

④ Battery (Internal)

⑤ Wall Mounting Holes

⑥ Pole Mounting Holes

3.3 Installation

3.3.1 Sensor Location

The outdoor ambience monitoring sensor must be installed **outside the building** and **in a way it is never obstructed by a snow accumulation**. It must be positioned:

- At least 2 meters away from the following:
    - Stale air vents from the building.
    - Opening windows.
    - Sources of CO_2 (boiler exhaust, parking, etc.)
- In a place that is not accessible from the yard (to avoid vandalism).
- Preferably out of direct sunlight.

For example, the sensor can be installed on the roof where it is out of everyone's reach.

3.3.2 Turning ON the Sensor

1. Remove the white mounting bracket.

2. Gently disassemble the enclosure (see section 3.4).

3. Install the D battery provided with the sensor on the circuit board.

4. Turn On the device (see section 3.5).

5. Reassemble the enclosure and make sure the rubber screw covers are in place.

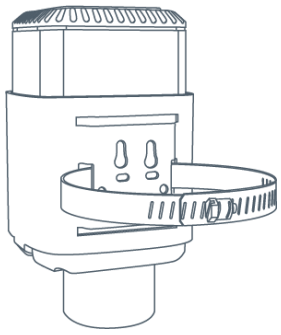
6. Insert the sensor in its white mounting bracket and secure it with the two screws underneath it.

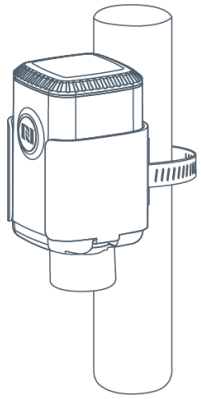
3.3.3 Pole Mounting

1. Loosen the hose clamp by turning the locking mechanism counter-clockwise.

2. Straighten out the hose clamp and slide it through the rectangular holes in the mounting bracket. Wrap the hose clamp around the pole.

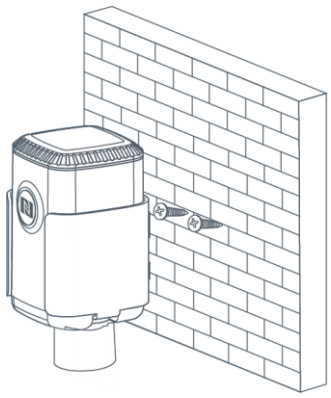
3. Use a flat screwdriver to tighten the locking mechanism by turning it clockwise.





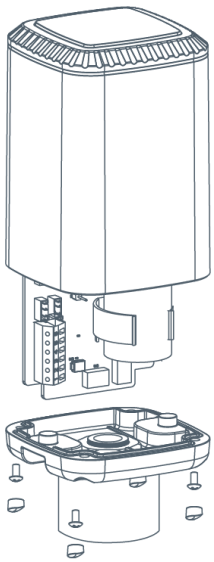
3.3.4 Wall Mounting

1. Place the mounting bracket on the wall and mark two holes on the wall.
2. Drill two mounting holes with a 6 mm drill bit according to the marks.
3. Screw the mounting screws into the holes.
4. Mount the device on the wall by inserting the screws attached to the wall in its mounting cavities.



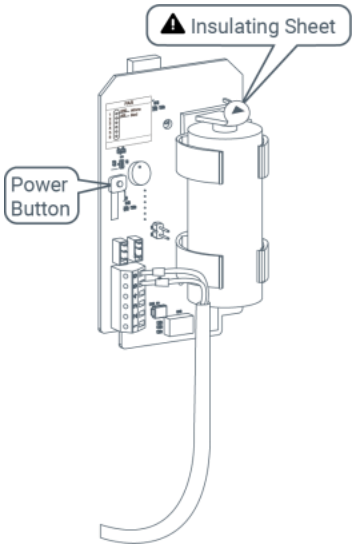
3.4 Enclosure Disassembly

To disassemble the device and access the battery and power button, take off the mounting bracket, remove the lid and screws on the bottom of the device and take off the enclosure cover.



3.5 Power Button

To turn ON the device, simply press and hold the power button for more than 3 seconds until the indicator light next to the button turns green. You can check its status (ON or OFF) by quickly pressing the power button. See the reference table below.



Function	Action	LED Indicator
Turn ON	Press and hold the button for more than 3 seconds.	OFF → Static green
Turn OFF	Press and hold the button for more than 3 seconds.	Static green -> OFF
Check ON/OFF status	Quickly press the power button.	Light ON: Device is ON
		Light OFF: Device is OFF