

## Installation Manual

105A/125A Temperature & Humidity  
105B/125B Temperature, Humidity & CO<sub>2</sub>



### Communications Protocols

The LoRa versions of the transmitter are only compatible with ISL UltraRF GSM Gateways. They use a dedicated encrypted radio protocol. The LoRaWAN versions of the transmitter are LoRa alliance certified and are compatible with any LoRaWAN certified gateway. Devices will be shipped with default LoRaWAN keys in either ABP or OTAA mode. These are on a removable label attached to the device. Activation keys are fully user configurable via the ISL SetupPro application. This application can be supplied on request. A USB radio dongle will also be required. The NB-IoT versions of the transmitter are supplied either with an embedded SIM or require a 4FF nano NB-IoT SIM card. They can operate on any mobile network that supports NB-IoT. Invisible Systems can supply pre-fitted with an embedded SIM.

### LoRa & LoRaWAN

Prior to installing the transmitters, it is recommended for LoRa and LoRaWAN devices that the gateways are already installed and setup. NB-IoT devices connect direct to the cellular network and need no gateway.

### Environmental Monitoring

If the transmitter is to be used to monitor room environments:

✓	Do consider why you are monitoring the area when installing the devices. A room transmitter will be used to monitor the temperature and occupancy of the area, so it is best placed at head height.
✗	Do not place the transmitter above a heater or in the direct path of the airflow from an AHU or window that may be opened.
✗	Do not place the transmitter in areas where condensation will occur.
✗	Do not place this transmitter in an oven, microwave, fridge, freezer, chiller, outdoors or any other extreme environment.

### Using with Realtime-Online

The transmitter must be added to the Realtime-Online cloud portal before it can be seen. See overleaf for instructions. It is recommended that transmitters are installed and set up on Realtime-Online simultaneously. Use of the Invisible Systems Sensor Setup app is recommended.

### Safety Notice

The non-rechargeable 3.6V lithium thionyl chloride battery used in this product is a hermetically sealed structure. It is not hazardous when used according to the recommendations of the manufacturer.

⚠	DO NOT exceed temperatures of -55°C to +85°C.
⚠	DO NOT short circuit, recharge, puncture, incinerate, crush, immerse, force discharge. Risk of fire or explosion.

Under normal usage conditions, the electrode materials and liquid electrolyte cannot leak to the outside. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container.

### Storage Conditions

Please store the transmitter and batteries in clean, cool (not over +30°C), dry (less than 30%RH) and well-ventilated conditions. Attempting to operate the device outside of these conditions may result in damage to the transmitters internal components. Clean with a damp cloth using only water. Do not use any cleaning chemicals on the product as this may affect the sensor accuracy.

### Changing the Battery

The non-rechargeable battery is not user replaceable. Since the battery lasts up to ten years, depending on configuration, the user is not expected to change the battery. If new batteries are required, please contact Invisible Systems Ltd for further information. Batteries must be disposed of safely according to local regulations.

### Pre-installation

The transmitters are wireless and use one of the following technologies:

- Long range radio frequency for LoRa and LoRaWAN devices (in the licence free bands)
- Narrowband cellular radio frequencies for NB-IoT devices

Refer to datasheet for operating frequencies.

In either case, the signal is affected by physical barriers such as walls, metallic furniture, and racking, as well as sources of electromagnetic interference such as mains electrical cabling and high-power electrical equipment.

### Switching on the Transmitter

During shipment, the unit is in sleep mode to save the battery. Before installation, 'wake up' the unit by removing the lid and pressing the button on the left marked RESET (see Figure 1). The LED on the right should flash green. Once switched on, the sensor should start to transmit. See section 'Calibrating CO<sub>2</sub> Sensor' below for 105B/125B only, before installing. Otherwise, replace the cover. Install the transmitter in the desired location - see sections on 'Pre-installation' and 'Environmental Monitoring'. Use strong double-sided tape for mounting if possible without damaging walls.

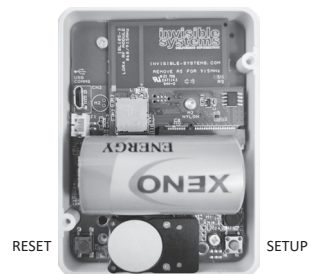


Figure 1: Location of RESET & SETUP buttons

### 105B/125B Only - Calibrating CO<sub>2</sub> Sensor

For accurate CO<sub>2</sub> readings, the sensor should be calibrated before use. Move the sensor to fresh air (ideally outside) and leave for 20 minutes to stabilise. Then, whilst avoiding breathing near the sensor, hold the setup button down, press & release the reset button, then release the setup button. This should cause the LED to flash 4 times quickly, indicating the start of baseline calibration. Approximately 9 seconds later, a longer green flash indicates successful calibration. If a yellow LED flash is seen, try repeating the above steps. The cover can now be fitted and the sensor installed. If Auto Baseline Calibration (ABC) is enabled in the device, it will look after itself from here on. Otherwise, it should be re-calibrated periodically.