ARWIN SENSO8 LoRaWAN IAQ Sensor User Guide

Contents [**hide**

ARWIN

ARWIN SENSO8 LoRaWAN IAQ Sensor

Introduction

SENSO8 LoRaWAN IAQ Sensor is an LPWAN wireless indoor air quality sensor which can detect indoor temperature, humidity, and a wide range of gases like carbon dioxide, ammonia and hydrogen sulfide. The sensor reads the environment data and uploads the data to the LoRaWAN server with a simple, open API.

The user guide is applicable for the SENSO8 LoRaWAN IAQ Sensor models:

- LRS10701-xxxx

110-220 AC to
12V DC Adaptor
(for external DC Power models)

SENSO8 IAQ
Sensor

Cloud Server and dashboard

Sensor Setup

1. Make sure the sensor is not connected to any DC power supply.
2. Unfasten the screws and open the sensor's cover.

3. Connect the wires connecting to the DC power supply to the terminal block on the bottom of the sensor or insert two ER26500 Li-SOCl2 batteries into the battery compartment.
4. Put on the cover and fasten the screws on the corners.
5. If DC supply is used, connect the wires from the terminal block a DC power supply, the LED indicator on the top cover will light up. For battery powered models, press and hold the button on the side for 3 seconds to power on the sensor.
6. On power on, the sensor will send a data report. Check the server backend or dashboard to make sure the connection has been established and data can be successfully uploaded.

Installation

1. Perform a site survey and make sure the SENSO8 IAQ sensor has a good LoRaWAN network coverage.
2. Mount the base of the sensor to the wall with the double arrows pointing upwards, and fix it with 4 screws.
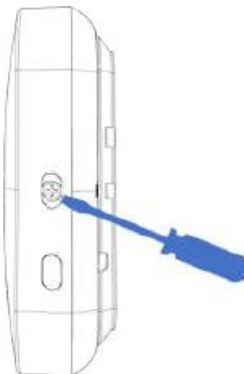

Double Arrow UP

4x Crews hole for wall mount
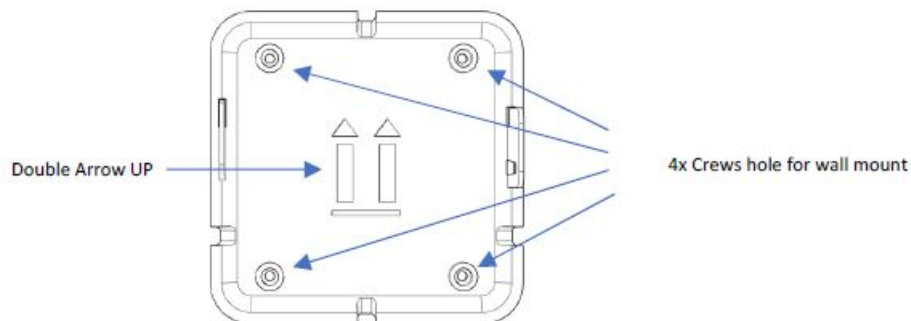
3. Attach the sensor main body to the base in the proper orientation as shown below.

ENSO8 Sensor body
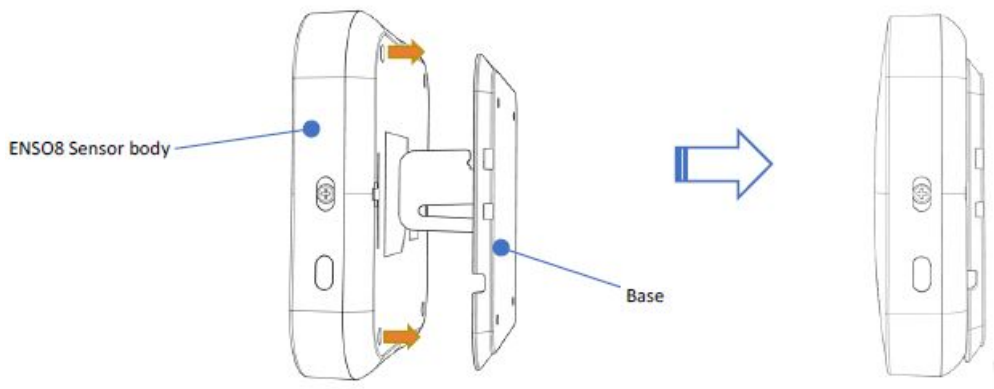
Base

4. Slide the sensor main body down until it is locked to the base.

SENSO8 Sensor body

Base
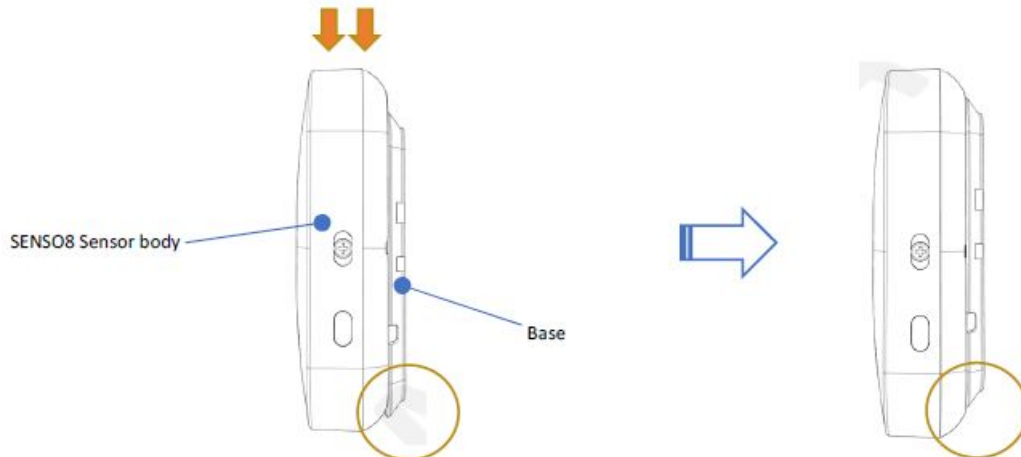
5. Lock the sensor main body with a screw.

6. Power on the sensor
    1. Plug the DC adaptor to the AC main, the sensor will power on automatically on DC supply (for DC supply models), OR
    2. Press the multi-function button for 3 seconds to power on the sensor (for battery operated models).
7. On power on, the sensor will publish a data report to the LoRaWAN server. Check the server backend or dashboard to make sure the connection has been established and data can be successfully uploaded.

Operating Instruction

Power On

- For DC supply models, the sensor powers on automatically when connected to the power supply.
- For battery powered models, press the multi-function button for 3 seconds to power on the sensor.
- The LED indicator will light up and the sensor will upload a data message to the LoRaWAN server.

Power Off

- Press and hold the multi-function button 5 seconds, the LED indicator will flash 3 times to indicate that it is shut down.

Report Latest Data

- Press the multi-function button briefly, the LED indicator will flash once. The sensor will upload the latest sensor data to the LoRaWAN server.

Sensor Operation
The sensor performs a sensor measurement every minute in the background. If the reading exceeds either one of the thresholds, the sensor will send an uplink data to the network server immediately with the corresponding alert. Otherwise, the sensor will go back to sleep mode. When the data upload interval is reached, the sensor will send an uplink data with the latest sensors' reading.
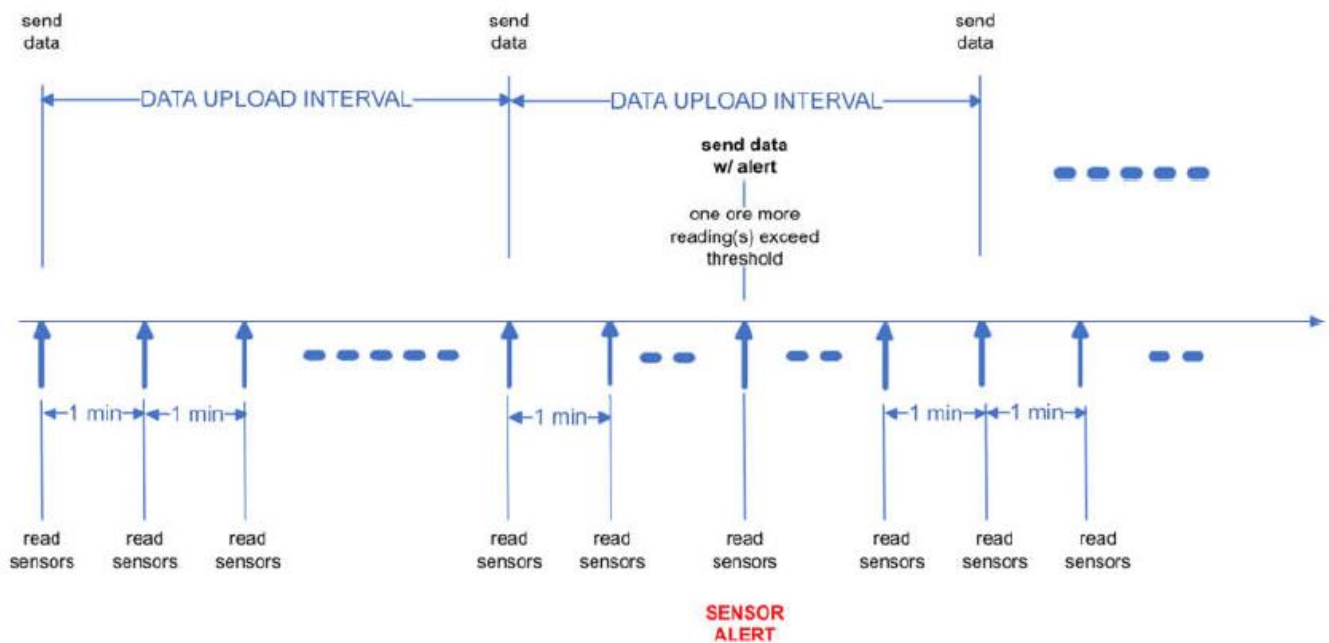
Configurable Sensor Settings
The following sensor settings are configurable via downlink data. The details of the data payload format can be found on the SENSO8 LoRaWAN IAQ Sensor Data Payload Format Document.

Setting	Default Value	Unit
Data Upload Interval	600	second
High Temperature Threshold	30	°C
Low Temperature Threshold	18	°C
High Humidity Threshold	70	%
Low Humidity Threshold	40	%
Carbon Dioxide Concentration Threshold	1500	ppm
TVOC Concentration Threshold	435	ppb
Formaldehyde Concentration Threshold	200	ppb
Ammonia Concentration Threshold	2000	ppb
Hydrogen Sulfide Concentration Threshold	2000	ppb

Carbon Monoxide Concentration Threshold	12400	ppb
Nitrogen Dioxide Concentration Threshold	360	ppb
PM2.5 Concentration Threshold	56	ug/m3
PM10 Concentration Threshold	254	ug/m3
LED ON/OFF Status	ON	–

LED Indicator

Device Status

Event	LED Pattern	Description
Powered On	Blue LED on	Device powered on, and uploading the first data. In OTAA mode, the LED will stay on until the sensor joined the network.
Powered Off	Blue LED flashes 3 times	Device powered off.
Report Latest Data	Blue LED on	The IAQ sensor is uploading the data when the function button is pressed.

Error Status
If the sensor is configurated for the OTAA activation mode and it cannot join the LoRaWAN network in 3 minutes after power up, the LED indicator will be flashed in Blue for 2 minutes.

Air Quality Index Indicator
The LED indicator reports Air Quality Index during normal operation. The Air Quality Index (AQI) provides an

indicator of the quality of the air and its health effects with a range of 0 to 500. The table below LED indicator colour and the corresponding AQI.

On battery powered sensors, the LED indicator flashes every 5 seconds. On DC powered sensors, the LED indicator has a breathing effect.

AQI	Category	LED Colour
<=50	Good	
51-100	Moderate	
101-150	Unhealthy for Sensitive Group	
151-200	Unhealthy	
201-300	Very Unhealthy	
301-500	Hazardous	Flashing

Troubleshooting Guide

Symptom	Fix
The LoRaWAN network server cannot receive data from the sensor.	Check the configuration (activation mode, frequency plan, device info and all security key) on the LoRaWAN server and the sensor. If there is any mis-match, the data cannot be sent to the LoRaWAN network server.
The sensor cannot be configured via downlink command.	Check the downlink command is sent as CONFIRMED downlink message.
The alert is not cleared when the reading is returned to the normal level.	For each alert, there is a hysteresis setting to prevent the alert from triggering repetitively when the reading fluctuates around the threshold. *Example*: If the high temperature threshold is 30, it will trigger an alert when the temperature is higher than 30. The alert will be cleared when the temperature falls below 29 (hysteresis is 1) rather than 30.

Regulatory Compliance Information

FCC ID: 2AMWTLRS10701

MADE IN CHINA

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.

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

Note: 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.

RF Exposure Compliance

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Revision History

Revision	Description	Date
1.0	Initial release.	10 Dec 2021
1.01	Added AQI indictor colour table.	28 Jan 2022
1.1	Separate the user guide into NB-IoT and LoRaWAN versions. Add sensor operations and configurable sensor settings.	20 Jun 2022
1.2	Add Regulatory Compliance Information section	21 Oct 2022

Documents / Resources

SE●SO SENSO8 LoRaWAN IAQ Sensor User Guide	**ARWIN SENSO8 LoRaWAN IAQ Sensor** [pdf] User Guide LRS10701, 2AMWTLRS10701, SENSO8 LoRaWAN IAQ Sensor, SENSO8, LoRaWAN IAQ Sensor, IAQ Sensor, Sensor