Operating manual

STO10

Introduction

DESCRIPTION

The Senstick STO10 is an industry-leading LoRaWAN solution engineered specifically for high-precision temperature monitoring in demanding environments. By integrating advanced Sensirion sensing technology with long-range connectivity, the STO10 serves as an essential node in the digitalization of climate-sensitive facilities, transforming raw thermal data into actionable intelligence.

DATASHEET

Enclosure	
Weight	90g w/ batteries / 140 g with batteries
Dimensions	105mm x 25mm
Materials	UV stable plastic
IP rating	IP67

Operating conditions	
Temperature	-40°C to +85°C
Humidity	0 to 100% RH

Configuration	
Sending interval	Configuration via NFC and downlink
Data upload interval	Configuration via NFC and downlink
NFC configuration	Native Android App

Connectivity	
Wireless Technology	LoRaWAN® 1.0.3
Wireless Security	LoRaWAN® End-to-End encryption (AES-CTR), Data Integrity Protection (AES-CMAC)
LoRaWAN Device Type	Class A - End-device
Supported regions	US902–928, EU863–870, AS920-923, AU915–928 (All bands available)
Link Budget	137dB (SF7) to 151dB (SF12)
RF Transmit Power	14dBm (Region specific)

Power supply	
Battery type	1 x 1.5V AA Alkaline
Expected operation	<7 years (depending on sampling, signal, environment)

SENSORS

Temperature	
Range	-40°C to +85°C
Accuracy	±0.2°C

Acceleration	
Range	±2g to ±16g
Accuracy	±40mg

PARTS AND BATTERIES

Senstick is generally composed of three parts: Sensor probe with UV stable plastic housing, PCB (where the battery is located), and antenna.

Senstick Temperature Only STO10 operates using 1 x 1.5V AA Alkaline battery, which is inserted onto the PCB inside the casing. The device is designed for long-term autonomous operation, with an expected battery life of up to 7 years, depending on sampling, signal, and environmental conditions. Batteries are not included by default.

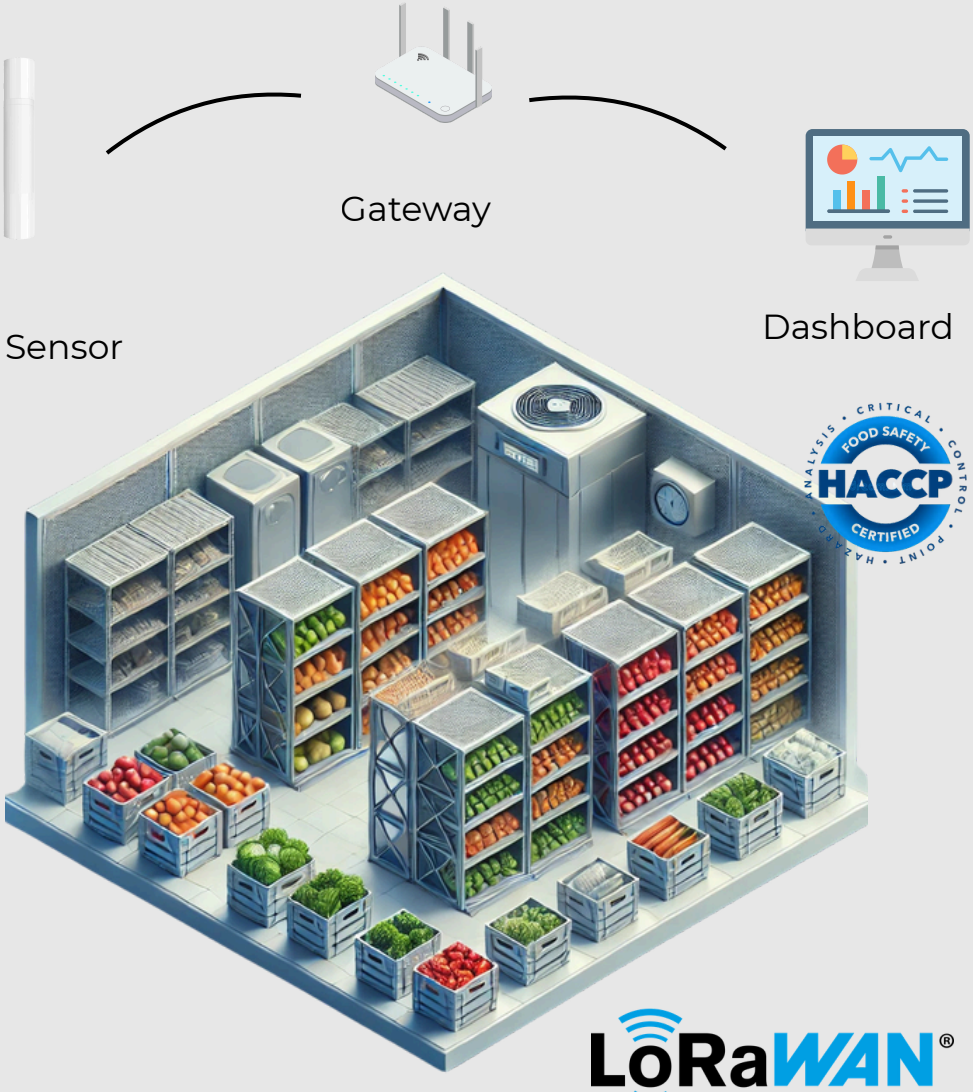
For optimal performance, industrial-grade batteries that can withstand a wider temperature range (from -40°C to +85°C) are recommended to match the device's operating capabilities.

UNDERSTANDING THE LORAWAN ARCHITECTURE

Senzemo sensors operate via LoRaWAN, meaning they collect environmental data and wirelessly transmit it to a nearby LoRa Gateway. The Gateway then forwards this data to a Senzemo Dashboard or your own custom platform, where it becomes available for analysis, visualization, or integration with third-party systems.

Senzemo devices are compatible with any LoRaWAN platform. For customers seeking a streamlined experience, we also offer complete end-to-end solutions - from data acquisition to visualization.

In case of any questions on this topic, please feel free to contact: support@senzemo.com



LoRaWAN PROTOCOL MANUAL

For detailed instructions on integrating the Senstick STO10 with your LoRaWAN network, including sending downlink commands, decoding uplink payloads, and configuring network parameters, please refer to the complete LoRaWAN Protocol Manual for this hardware version (HWv1.0) below:

Senstick_STO10-HWv1.0_FWv1.x-LoRaWAN_Protocol_v1.0.pdf

DECODER:

By default, Senzemo provides a JavaScript decoder compatible with The Things Network (TTN). With minimal adjustments, this script can be adapted for use with other LoRaWAN network servers such as AWS IoT Core, ChirpStack, Loriot, and others. You can access the decoder for the STO10 model at the following link:

https://senzemo.com/wp-content/uploads/2024/06/Senstick-Temperature-Only-STO10.txt

In case of any support needed, please feel free to contact: support@senzemo.com

Activity and Data Transmission

The factory settings of the Senstick are the following:

Measurement Interval: The sensor performs a measurement and transmits data every 15 minutes.

Adaptive Data Rate (ADR): ON. This allows the LoRaWAN network to automatically optimize the data rate based on signal quality (SNR), extending battery life.

Movement Detection: OFF (0). An internal accelerometer monitors for movement. If enabled, the device can send an immediate additional transmission and flag the event in the payload.

Packet Acknowledgment: Every 24th packet. To ensure the device remains connected without wasting energy on every message, the sensor requests an acknowledgment (ACK) from the network once every 24 transmissions.

If the device does not receive an ACK, it will automatically attempt to rejoin the network:

Starts every minute (for immediate recovery).

Gradually extends to every hour.

Further extends to every 6 hours.

Finally, once every 24 hours until the connection is re-established.

Configuration

The Senstick parameters, from the previous topic, can be configured by either the Senstick Android App or via Downlink (look at the protocol manual from the
page 7)

To download the app, visit Google Play Store:
https://play.google.com/store/apps/details?id=org.se.senstick&pcampaignid=web_share

Please note that the user must follow the rules of LoRaWAN standards, which include limitations on sending rates, packet acknowledgment, and adaptive data rates.
Senzemo does not take responsibility for network issues, battery drain, or connectivity problems resulting from user-modified settings that violate LoRaWAN specifications or best practices.

SENSTICK INSTALLATION ACCESSORIES

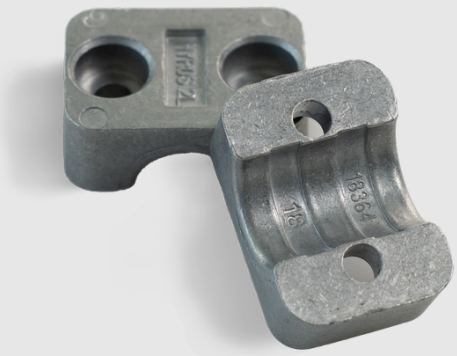
To ensure secure and stable mounting across a wide range of environments, the STO10 supports two primary mounting kits, available separately:

The **MPOM10** snap mounting kit is designed for quick and straightforward installation of the STO10 communication module on poles or flat surfaces. It enables the device to be easily clipped into place while maintaining the antenna in an upright position, ensuring optimal signal performance and reliable connectivity.

The **MALU10** aluminum mounting kit provides a robust, heavy-duty solution for more demanding industrial or outdoor deployments. It delivers a rigid and durable connection between the sensor module and the mounting structure, ensuring maximum stability and long-term reliability in harsh conditions.

Snap Mounting kit MPOM10:
(Also available with magnets)

ALU Mounting kit MALU10:



STO10 INSTALLATION INSTRUCTIONS

After registering the device and activating the batteries, follow these steps to install the STO10:

1. Orientation & Signal
Always mount the Senstick with the antenna (white cap) facing upwards. For the best signal, ensure the module is positioned above ground level. If used in a cold room, place it near the door to help the signal penetrate the insulation.

2. Mounting Options
Zip Ties: Secure the module to racks, pipes, or poles.
MPOM Mount: Use the adapter for flat surfaces via:
- Double-sided tape (for quick attachment).
- Screws (for permanent fixing).

3. Sensor Placement
The STO10 is designed for ambient air temperature monitoring. Place the device in a location with natural airflow to ensure rapid response to temperature changes. Do not place the unit directly in front of cooling fans or heat sources, as this will result in inaccurate readings.