Operating manual

SAM20

Introduction

DESCRIPTION

The Senstick Ambient SAM20 is a discreet LoRaWAN sensor for reliable temperature, humidity and air pressure monitoring. Its low-profile and robust design blends into any setting, while integrated motion detection provides immediate alerts if the device is moved. It is the ideal choice for rapid deployment in warehouses, storage facilities, datacenters and retail environments.

DATASHEET

Enclosure	
Weight	24g without batteries / 39g with batteries
Dimensions	132 x 29 x 25mm
Materials	UV stable plastic
IP rating	IP20

Operating conditions	
Temperature	0°C to +50°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, Single Frequency (On Request)
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 (Industrial lithium recommended)
Expected operation	<7 years (depending on sampling, signal, environment

SENSORS

Temperature	
Range	0°C to +50°C
Accuracy	±0.2°C

Relative humidity	
Range	0%C to 100%
Accuracy	±1.8%

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

Air Pressure	
Range	300 to 1200hPa
Accuracy (absolute)	±1hPa

PARTS AND BATTERIES

Senstick Ambient SAM20 is generally composed of two parts: the sensor enclosure and the PCB (where the battery is located).

The Senstick Ambient SAM20 is powered by 1 × AA 1.5 V battery. For optimal performance and extended battery lifetime, an industrial-grade lithium battery is recommended. The battery is inserted onto the PCB as illustrated below and is not included by default.

For optimal performance and maximum battery lifetime of up to 7 years (depending on the reporting interval and operating conditions), the use of industrial-grade alkaline batteries with an extended operating temperature range is recommended.

For a more detailed description and battery manual, please check our YouTube video:

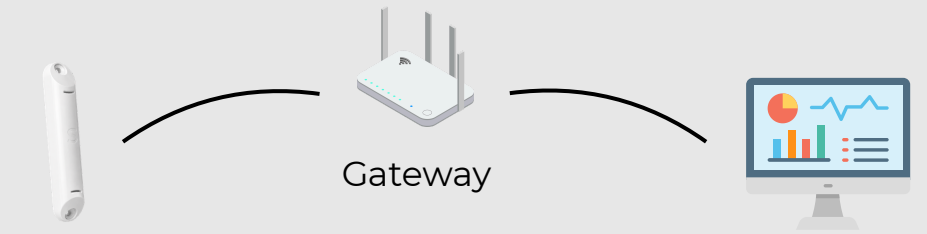
Youtube video on SAM20

UNDERSTANDING THE LORAWAN ARCHITECTURE

Senzemo sensors operate via LoRaWAN, meaning they collect environmental data and wirelessly transmit it to a nearby LoRaWAN 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 Senstick with your LoRaWAN network, including sending downlink commands, decoding uplink payloads, and configuring network parameters, please refer to the complete LoRaWAN Protocol Manual below:

https://senzemo.com/wp-content/uploads/2026/09/SAM20-HWv2.0_FWv1.0-LoRaWAN_Protocol_v1.docx.pdf

DECODER:

By default, Senzemo provides a decoder compatible with The Things Network (TTN). However, with minimal adjustments, it can be adapted for use with other LoRaWAN servers such as AWS IoT Core, ChirpStack, Loriot, and others.

You can access the decoder at the following link:

https://senzemo.com/wp-content/uploads/2026/09/SAM20-TTN-Decoder-V1.pdf

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: 15 minutes
The sensor performs a measurement and sends data every 15 minutes.

Adaptive Data Rate: ON
ADR automatically adjusts the data rate based on signal quality and network conditions. This helps optimize battery usage and ensures reliable communication.

Movement detection: ON
The sensor monitors for movement events. If movement is detected, the device can trigger an additional data transmission and flag the event in its payload.

Packet Acknowledgment: Every 24th packet
Every 24th LoRaWAN uplink message requests an acknowledgment (ACK) from the network.

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

The retry process follows a backoff strategy:

Rejoin attempts start every minute,

then gradually extend to every hour,

then every 6 hours,

and finally, once per 24 hours until the connection is re-established.

This approach ensures network stability while preserving battery life.

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

SAM20 has a variety of mounting addons available to be purchased separately.

Magnetic Mounting:

Screw Mounting:

Double-sided Tape Mounting:

Nail Mounting:

Installation instructions

After registering the device and inserting the battery, the user can proceed with the installation of the Senstick Ambient SAM20.

For optimal LoRaWAN signal strength, the sensor should always be mounted with the "S" logo on the PCB facing upwards.

Please see some real use case examples below: