

Operating manual  
**SSM40**



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# DESCRIPTION

The Senstick SSM40 is an industry-leading, LoRaWAN solution engineered specifically for the demands of precision agriculture and large-scale environmental monitoring. By integrating advanced sensing technology with long-range connectivity, the SSM40 serves as an essential node in the digitalization of soil management, transforming raw environmental data into actionable intelligence.

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# DATASHEET

Enclosure	
Weight	170g w/ batteries / 230 g with batteries
Dimensions	Casing: 105mm x 25mm / Probe: 20mm x 140 mm
Materials	UV stable plastic
Cable length	1.5 m or custom
IP rating	IP68

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
Link Budget	137dB (SF7) to 151dB (SF12)
RF Transmit Power	14dBm (Region specific)

Power supply	
Battery type	1 x 3.6V AA Lithium
Expected operation	<7 years (depending on sampling, signal, environment)

# SENSORS

Volumetric water content (VWC)	
Range	0% to 100%

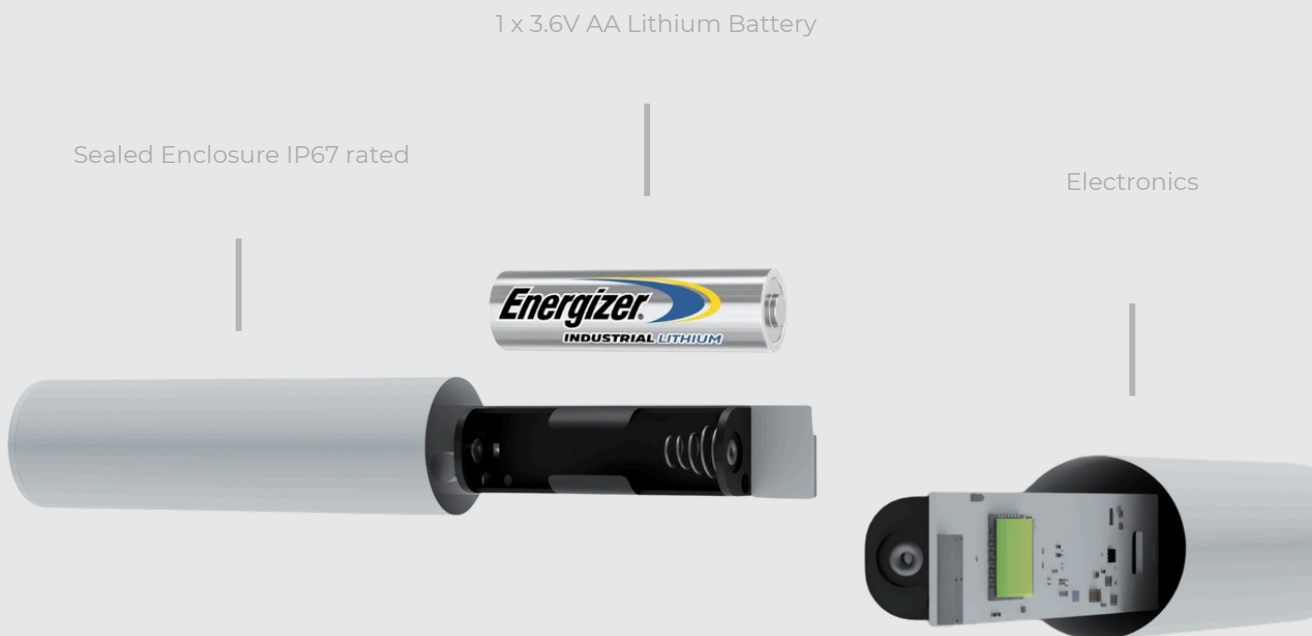
Acceleration	
Range	$\pm 2g$ to $\pm 16g$

# 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 Probe Soil Moisture SSM40 operates using 1 x 3.6V AA Lithium 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 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.



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

[Youtube video on SSM40](#)

# UNDERSTANDING ARCHITECTURE

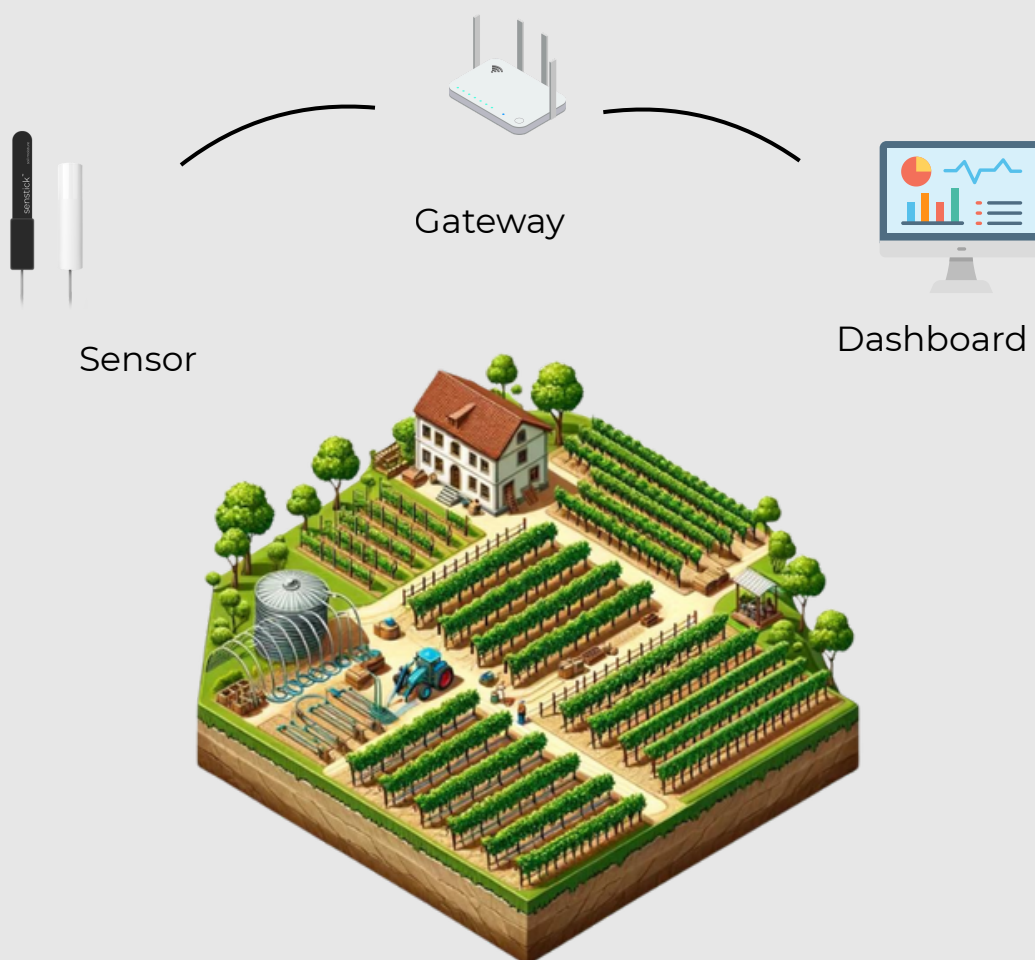
# THE

# LORAWAN

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](mailto:support@senzemo.com)



# LoRaWAN PROTOCOL MANUAL

For detailed instructions on integrating the Senstick SSM40 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 (HWv4.0) below:

[Senstick\\_SSM40-HWv4.0\\_FWv1.0-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 SSM40 model at the following link:

You can access the decoder at the following link:

<https://senzemo.com/wp-content/uploads/2024/01/SSM40-decoder-1.0.txt>

In case of any support needed, please feel free to contact: [support@senzemo.com](mailto: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:** ON. An internal accelerometer monitors for movement. If triggered, 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](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

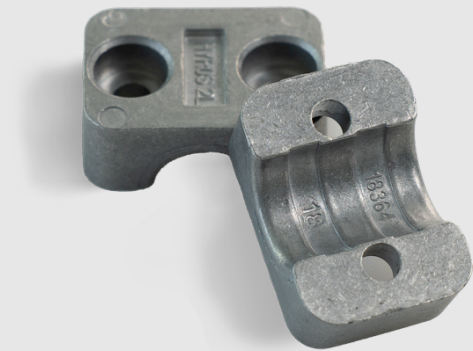
**The MPOM10** snap mounting kit is designed for quick and easy attachment of the SSM40 communication module to poles or flat surfaces. It allows the device to be securely clipped into place, ensuring the antenna part remains upright for optimal signal strength.

**The MALU10** aluminum mounting kit provides a heavy-duty solution for more demanding industrial or outdoor environments. It ensures a rigid and durable connection between the sensor module and the mounting structure, offering maximum stability for long-term soil moisture monitoring.

Snap Mounting kit MPOM10:  
(Also available with magnets)



ALU Mounting kit MALU10:



## INSTALLATION INSTRUCTIONS

After registering the device on your LoRaWAN network and ensuring the batteries are active, you can proceed with the installation of the SSM40.

For optimal signal strength and accurate measurements, the Senstick should always be mounted with the antenna part (white cap) facing upwards. Ensure the communication module is positioned above the ground level.

The communication module can be secured using several methods depending on your environment:

Zip Ties: Use a zip tie (or similar fastener) to attach the module to a suitable pole or vertical object.

MPOM Mount: For professional mounting, use the MPOM mount, which supports:

Adhesive: Apply double-sided tape to the mount to stick it onto smooth surfaces.

Screws: Use screws to fix the mount permanently to a solid surface.

The soil probe should be inserted vertically into the ground to the desired depth. It is critical to ensure a tight fit with the soil (avoiding air gaps) to guarantee accurate moisture and temperature readings.



