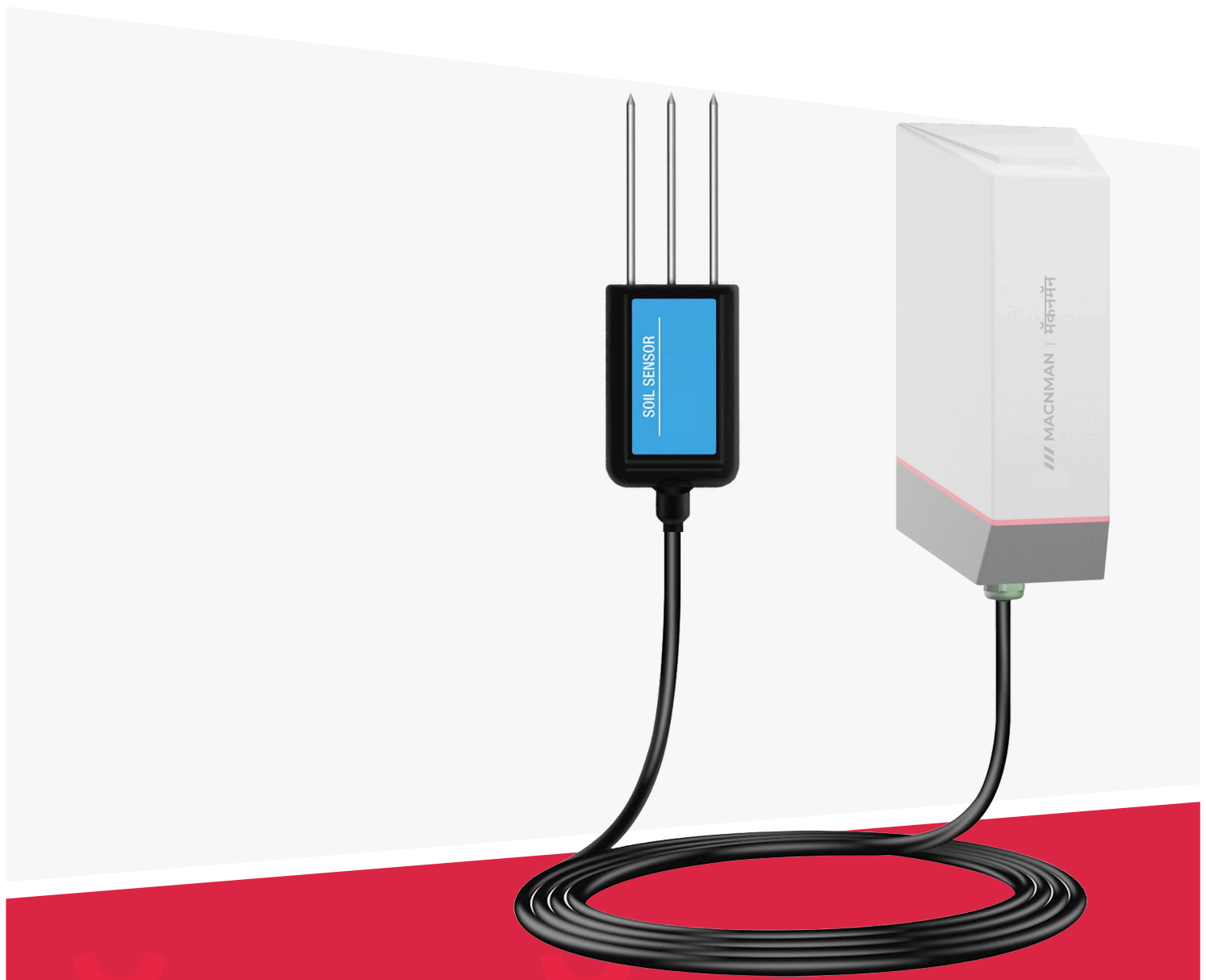




# LoRaWAN® Soil Temperature & Moisture Sensor

## MacSync LSS X2



## Introduction

The MacSync LSS X2 is an industrial-grade LoRaWAN® Soil Temperature & Humidity Sensor designed for continuous real-time monitoring of soil moisture and soil temperature across farms, greenhouses, irrigation systems, plantations, and precision agriculture deployments. Built with rugged IP68 sensing technology and long-range LoRaWAN® connectivity, the sensor delivers reliable soil intelligence for harsh outdoor agricultural environments.

The device enables farmers and agricultural teams to optimize irrigation cycles, improve crop productivity, monitor soil conditions remotely, and support data-driven farming operations. With ultra-low power architecture, configurable alerts, BLE-based configuration, and compatibility with public and private LoRaWAN® networks, the MacSync LSS X2 is ideal for scalable smart agriculture and irrigation monitoring infrastructure.

## Features

- Real-Time Soil Temperature & Moisture Monitoring
- Industrial-Grade Capacitive Soil Sensing Technology
- Accurate Volumetric Water Content (VWC) Measurement
- High Stability Soil Temperature Monitoring
- Corrosion-Resistant Agricultural Probe Design
- Compatible with Public & Private LoRaWAN® Networks & Macnman MacTalk Protocol
- Configurable Threshold-Based Soil Alerts
- Rugged IP68 Waterproof Soil Probe
- Designed for Harsh Outdoor Agricultural Deployments

## Key Advantages

- Supports Precision Irrigation & Water Optimization
- Supports Smart Farming & Precision Agriculture Initiatives
- Supports Greenhouse, Plantation & Horticulture Applications
- Enables Scalable Wireless Agricultural Monitoring Infrastructure
- Reduces Installation Complexity with Wireless LoRaWAN® Connectivity

## Soil Moisture Measurement Specifications

Measurement Type	Capacitive Sensing (VWC-Based)
Range	0% – 100% VWC
Accuracy	±3% (0–53% VWC), ±5% (53%+ VWC)
Resolution	0.1%
Sensor Response Time	< 10 Seconds

## Soil Temperature Measurement Specifications

Range	-45°C to +115°C
Accuracy	±0.5°C
Response Time	< 10 Second

## Wireless Specifications

Wireless Protocols	LoRaWAN® (v1.0.4), Macnman MacTalk Protocol
Antenna	Internal high-efficiency antenna
Supported Bands	IN865 / RU864 / EU868 / US915 / AU915
Tx Power	23 dBm @ 865 MHz
Sensitivity	-137 dBm @ 300 bps
LoRaWAN® Class	Class A (Default), Configurable to Class C via Maya
Device Activation	OTAA
Supported LNS	Private LNS , ChirpStack ,The Things Network , MQTT, Orbiwise

## Device Management

Configuration Method	Via Macnman Maya Android App
Local Configuration	BLE-Based Local Configuration
Remote Configuration	Over-the-Air Configuration (Downlink Commands)
Status LED	1 × Internal Multi-Color LED

## Device Configuration Parameters

Data Reporting Mode	Periodic / Event-Based / Hybrid
Transmission Interval	Independent uplink interval for optimized power consumption
Threshold-Based Alerts	Configurable Soil Thresholds for Event-Triggered Transmission
Sampling Interval	Configurable data acquisition interval (e.g., 1 min to 24 hours)

## Power & Battery Performance

Power Supply	Integrated Battery - 19,000 mAh
Battery Type	Lithium Thionyl Chloride (Li-SOCl <sub>2</sub> )

**Estimated Battery Life at 25 °C**

5-minute reporting interval	~2 years
15-minute reporting interval	~4 years
60-minute reporting interval	~6+ years

**Physical & Environmental Specifications****Enclosure & Mechanical**

Material	Glass Filled Nylon
Protection Rating	IP65
Dimensions	152 mm X 62 mm X 43 mm
Weight	~175 g

**Mounting & Installation**

Wall - Mounted Installation	Supported , With Clip
Pole - Mounted Installation	Supported , Without Clip

**Environmental Conditions**

Operating Temperature	-40°C to +80°C
Operating Humidity	0% to 95% RH (Non-Condensing)

**Regulatory Certifications & Compliance**

Wireless Certification	WPC
Environmental	RoHS compliant

**What's in the Box?**

- MacSync LSS X2 Sensor
- Mounting Clip
- User Manual
- Warranty Card
- IP68 Cable Extender \*
- Mounting Screws
- Power Adapters \*

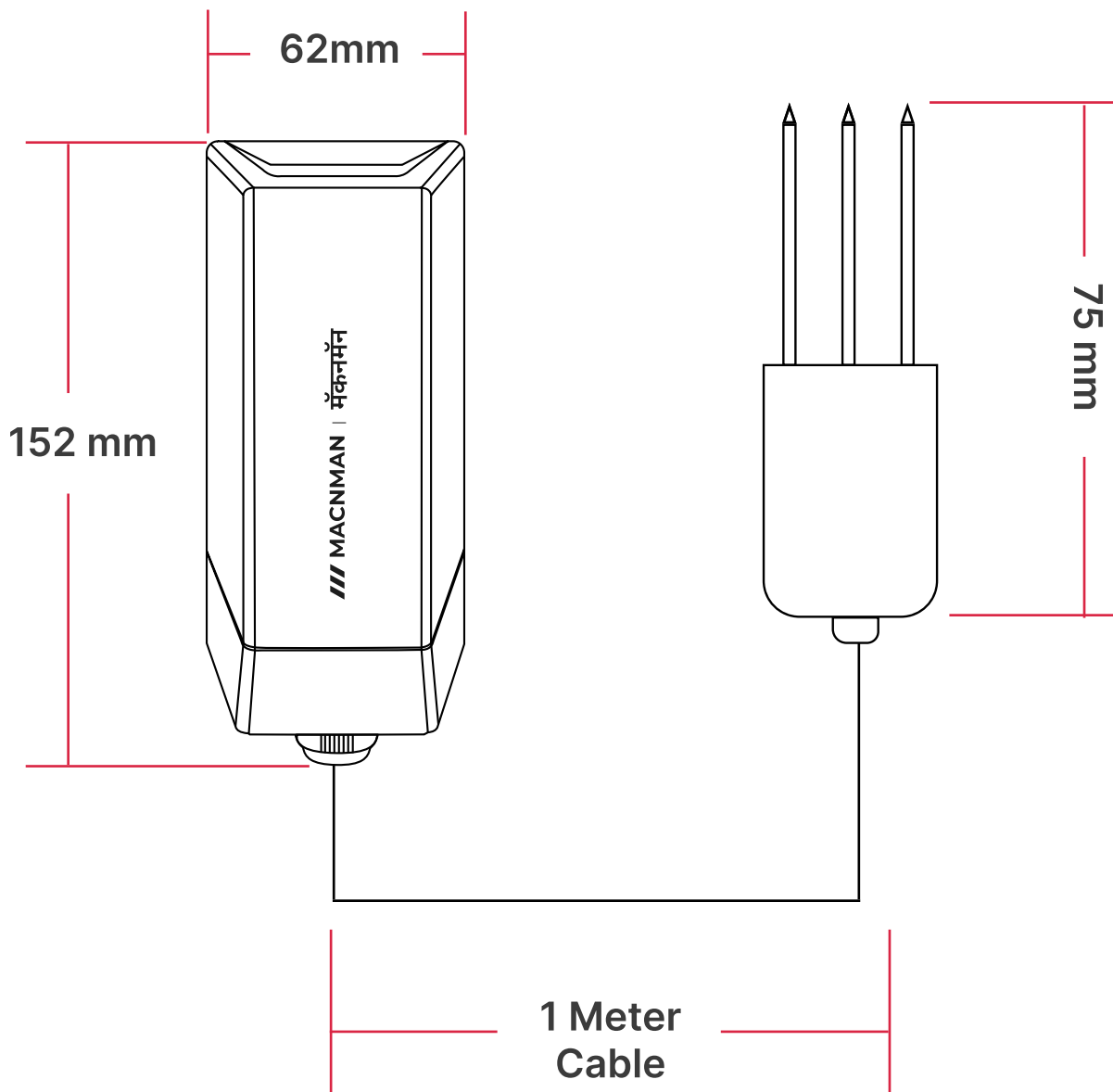
## Models & Ordering Information

Variant Name	Power Source	SKU
MacSync LSS X2 B0	Integrated Battery - 19,000 mAh	832
MacSync LSS X2 S0	20 W Solar Panel + 8000 mAh Battery	833

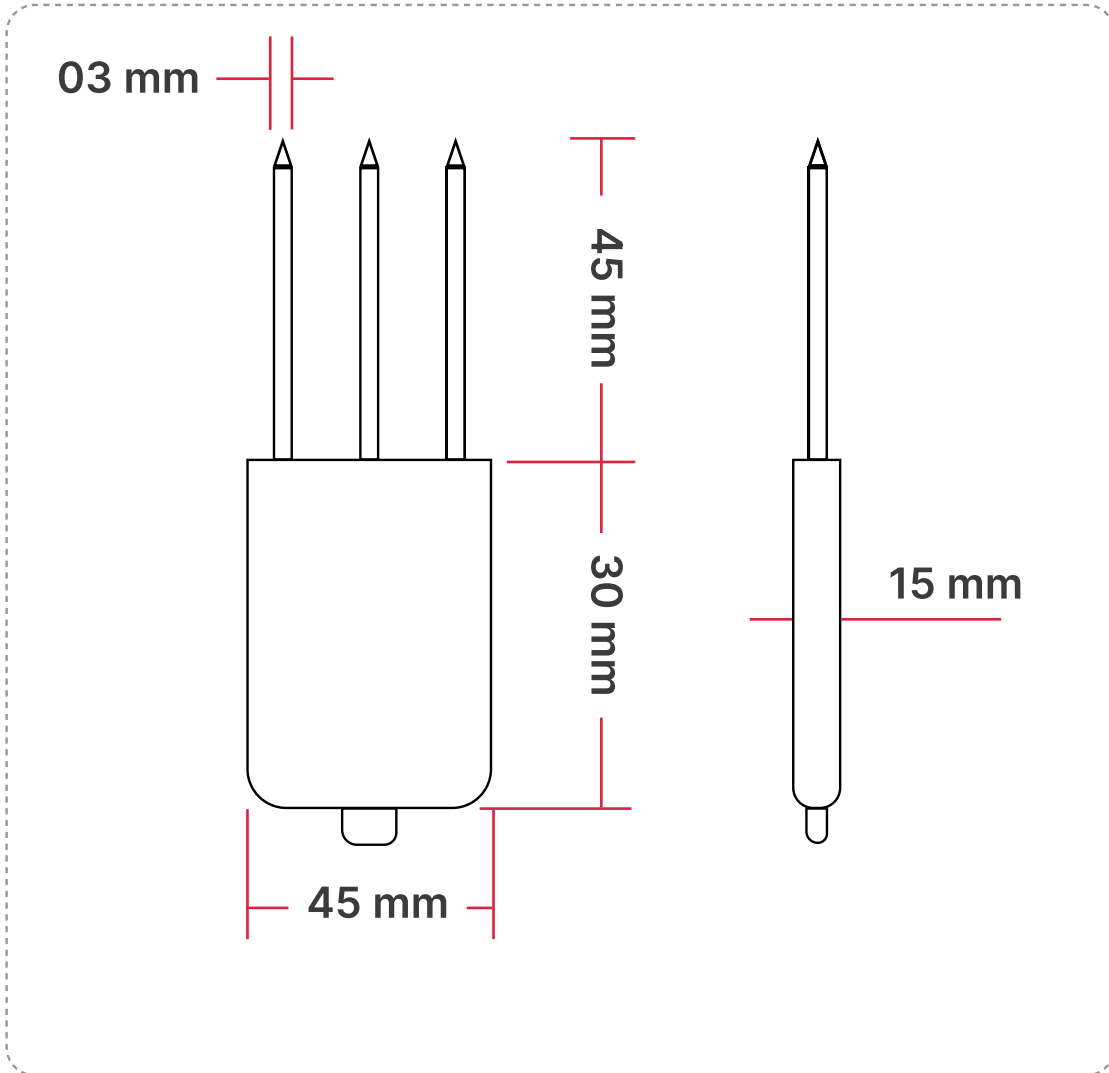
## Notes

- Power-operated variants require external DC power input & external sensor probe
- (\*) Marked accessories must be purchased separately

## Device Dimensions



## Device Dimensions






Sensor Probe

y to serve you. तुमची सेवा करण्याची संधी दिल्याबद्दल धन्यवाद. మీకు సేవ చేసే అ  
के अवसर के लिए धन्यवाद भवतः सेवायाः अवसरस्य कृते धन्यवादः तमारी सेवा करवानी

## Say Hello 🙌

-  [www.macnman.com](http://www.macnman.com)
-  [info@macnman.com](mailto:info@macnman.com)
-  +91 7972856163
-  Office -15, 635 1B, Bibwewadi, Pune,  
Maharashtra 411037

### Support Mails

-  [chat@macnman.com](mailto:chat@macnman.com)
-  [helpdesk@macnman.com](mailto:helpdesk@macnman.com)
-  [support@macnman.com](mailto:support@macnman.com)

This manual and all its contents are the intellectual property of Macnman Technologies Pvt. Ltd. and are protected under Indian copyright laws and applicable international conventions.

All trademarks, certifications, and logos mentioned in this document or related products are used with appropriate licensing. These may include, but are not limited to, certifications such as CE, FCC, RoHS, REACH, BQB, WEEE, and others. Ownership of trademarks, logos, and trade names remains with their respective owners. For instance, the Bluetooth® trademark and logo are the property of Bluetooth SIG, Inc. Other trademarks belong to their rightful proprietors.

Given the compact size of the module, the "®" symbol is omitted from Bluetooth-related trademarks in compliance with applicable regulations.

Macnman Technologies Pvt. Ltd. reserves the right to modify the content of this manual to align with advancements in technology. Updated versions may be released without prior notification. Unauthorized modification, reproduction, or use of part or all of this manual without written consent from Macnman Technologies Pvt. Ltd. is strictly prohibited. Legal action will be taken against violators in accordance with Indian law.

By using this manual, you agree to comply with the terms stated herein.