

SOIL MONITORING / DATA SHEET

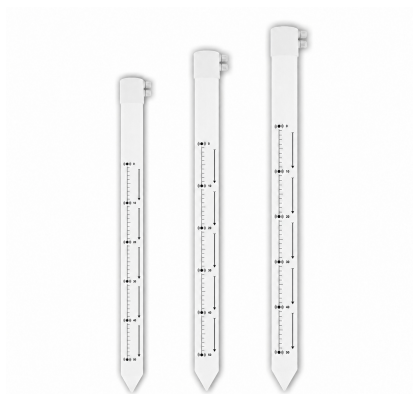
SS204-01

Multi-Depth Soil Sensor

Configurable multi-layer soil moisture, temperature, EC and tilt monitoring for field applications.

Overview

- SS204-01 is a dielectric-principle sensor for dynamic monitoring of soil conditions at multiple depths.
- Three- to five-layer configurations are available for soil moisture, temperature, electrical conductivity and optional tilt monitoring.
- The PVC tube allows high-frequency probe signals near 1 GHz to pass through while protecting the internal electronics.
- RS485 Modbus-RTU, GPRS/GSM and 4G configurations support local or remote data acquisition.

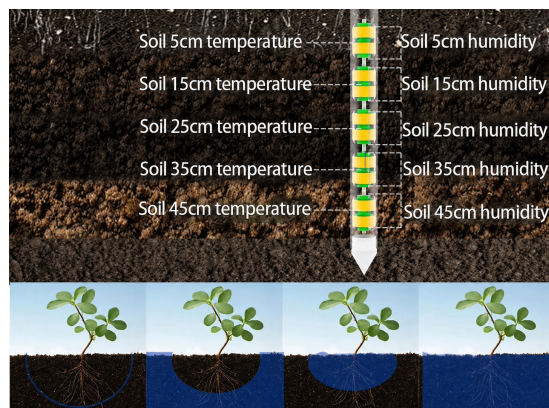


Measurement layers 3–5 layers	Soil moisture range 0–100%	Point spacing 10 cm	Output RS485 / GPRS / 4G
Key Advantages • 3–5 measurement layers with optional EC and tilt channels. • Dielectric sensing through a PVC tube; electrodes do not contact soil. • Source material indicates no influence from salts, fertilizer, pesticides or irrigation. • RS485 Modbus-RTU and network upload options support field integration.		Application Scenarios • Soil moisture and drought monitoring. • Agricultural irrigation scheduling and crop management. • Meteorological, rainfall and soil monitoring stations. • Hydrology, water-conservancy and remote solar-powered field projects.	

MEASUREMENT PRINCIPLE

Technical Principle

SS204-01 uses the dielectric response of soil to monitor moisture at multiple depths. A high-frequency probe signal near 1 GHz passes through the PVC tube and is used to sense soil conditions at each configured observation point. Optional temperature, electrical-conductivity and tilt channels extend the monitoring scope according to the selected configuration. The sensing electrodes do not directly contact the soil, helping avoid interference with soil and plants.



Illustrative multi-depth soil monitoring layout

SYSTEM DATA

Technical Specifications

Item	Specification
Operating temperature	−40°C to +80°C
Soil moisture range	0–100%
Soil temperature range	−15°C to +35°C
Soil electrical conductivity (EC) range	0–20,000 μ S/cm or 0–10,000 μ S/cm, depending on multi-layer EC configuration
Tilt range	−90° to +90°
Soil moisture accuracy	±5% (@50%, 25°C)
Soil temperature accuracy	±0.5°C (25°C)
EC accuracy	±3% FS within 0–10,000 μ S/cm; ±5% FS within 10,000–20,000 μ S/cm (brown soil, 60%, 25°C)
Tilt accuracy (typical)	X/Y: static ±0.1°, dynamic ±0.5°; Z: static ±0.5°, dynamic integral error exists
Tilt temperature drift	±(0.5°–1°), −40°C to +60°C
Measurement point spacing	10 cm
Power supply	10–30 V DC wide-range supply (RS485 versions); battery, external supply or solar supply (network versions)
Battery operation duration	Up to one week of outdoor operation (network versions; configuration dependent)
Housing material	PVC tube
Protection rating	IP68 for the below-ground section
Output signal	RS485 (Modbus protocol); GPRS/GSM cellular network; 4G cellular network
Power consumption	3-layer RS485: 0.7 W / 0.75 W with multi-layer EC; 3-layer network: 0.15 W / 0.2 W with multi-layer EC; 5-layer RS485: 0.96 W / 1.0 W with multi-layer EC; 5-layer network: 0.18 W / 0.25 W with multi-layer EC
Response time (RS485)	≤60 s
Cloud platform (network versions)	Default upload to the general monitoring cloud platform
Upload interval (network versions)	External power supply: 1 min; battery supply: 5 min

Note: Values marked as configuration-dependent correspond to the selected measurement layer, communication mode or optional channel combination.

ORDERING INFORMATION

Product Selection

Use the code segments below to specify the measurement configuration, communication mode, GPS option and advanced tube version. Codes are translated from the supplied source table.

Category	Code	Description
Base model	SS204-01	SpeSense multi-depth soil sensor

Measurement configuration

Code	Description	Code	Description
3S-	3 layers of soil moisture	4S-	4 layers of soil moisture
5S-	5 layers of soil moisture	3W3S-	3 layers of soil temperature and moisture
4W4S-	4 layers of soil temperature and moisture	5W5S-	5 layers of soil temperature and moisture
3S3E	3 layers of soil moisture and 3 layers of EC	4S4E	4 layers of soil moisture and 4 layers of EC
5S5E	5 layers of soil moisture and 5 layers of EC	3W3S3E	3 layers of soil temperature/moisture and 3 layers of EC
4W4S4E	4 layers of soil temperature/moisture and 4 layers of EC	5W5S5E	5 layers of soil temperature/moisture and 5 layers of EC
EC3S	1 layer of EC and 3 layers of soil moisture	EC4S	1 layer of EC and 4 layers of soil moisture
EC5S	1 layer of EC and 5 layers of soil moisture	EC3W3S	1 layer of EC and 3 layers of soil temperature/moisture
EC4W4S	1 layer of EC and 4 layers of soil temperature/moisture	EC5W5S	1 layer of EC and 5 layers of soil temperature/moisture
Q3S-	3 layers of soil moisture and tilt	Q4S-	4 layers of soil moisture and tilt
Q5S-	5 layers of soil moisture and tilt	Q3W3S-	3 layers of soil temperature/moisture and tilt
Q4W4S-	4 layers of soil temperature/moisture and tilt	Q5W5S-	5 layers of soil temperature/moisture and tilt

Communication, GPS and version

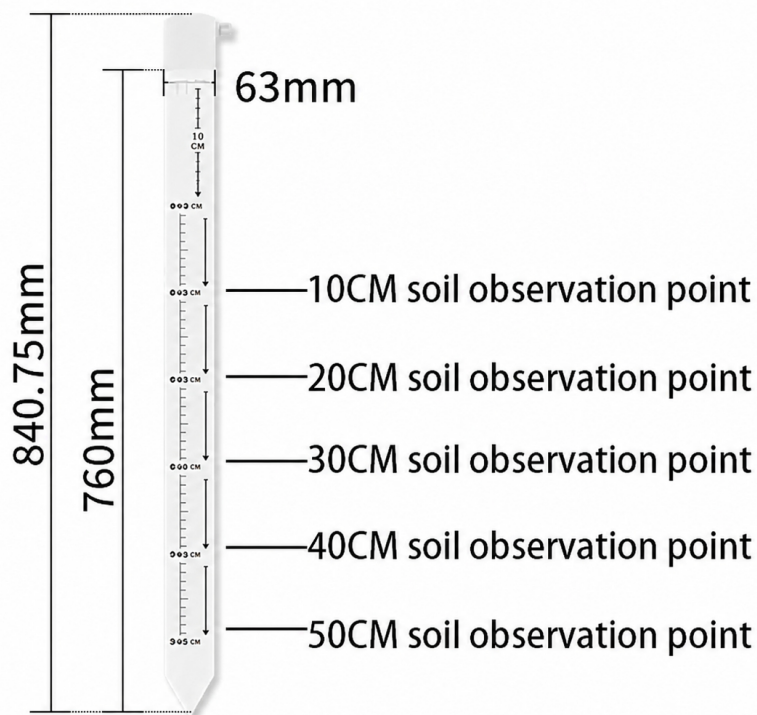
Code	Description	Code	Description
N01-	Standard Modbus-RTU RS485 communication	4G-L-	4G data upload; without built-in battery and button switch

Code	Description	Code	Description
4G-	4G data upload	(blank)	Without GPS positioning
GPS-	With GPS positioning	TR-6	Advanced tube soil moisture monitoring sensor; potted waterproof version

MECHANICAL DATA

Mechanical Dimensions & Installation

The dimension drawing below shows the five-layer configuration. Numeric dimensions are retained from the source material and labels are presented in English.



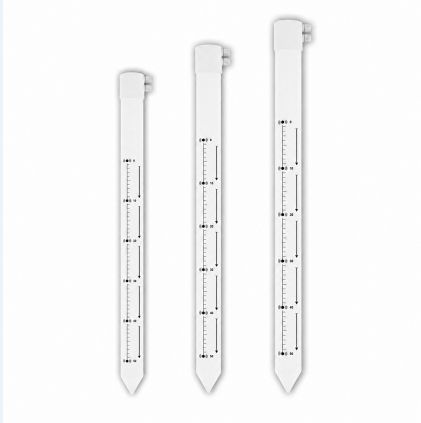
Five-layer configuration: 840.75 mm overall length, 760 mm sensing section, 63 mm housing diameter

INSTALLATION & OPERATION

Installation Notes

- Install the sensor vertically so the observation points are positioned at the intended soil depths.
- Select the measurement-layer and channel configuration according to the monitoring plan and required soil depths.
- For network versions, select the external-power, battery or solar configuration according to the field power design.
- Verify the communication mode, upload interval and optional GPS/tilt/EC functions before commissioning.
- Use the potted TR-6 advanced tube version where the source configuration requires a fully waterproof tube design.

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3-5 layer configurations

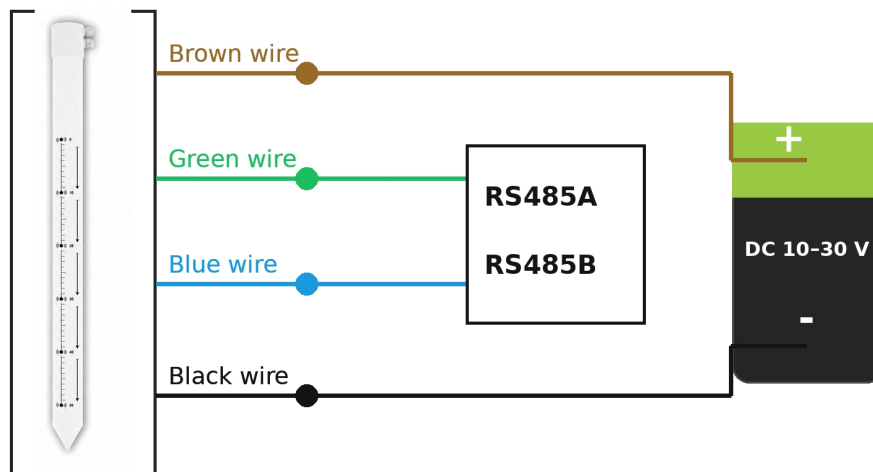
Configuration & Support Summary

- Measurement depth, channel combination and communication mode are selected through the ordering code.
- RS485 Modbus-RTU versions support long-distance communication up to 2000 m as stated in the source material.
- Network versions support GPRS/GSM or 4G upload with configurable power and upload intervals.
- Engineering support is available for product selection, configuration and field integration.

ELECTRICAL CONNECTION

Wiring Instructions

For the RS485 configuration, connect the sensor according to the wire-color assignment below. Verify the final wiring against the supplied product configuration before installation.



RS485 wiring assignment

CONTACT / SUPPORT

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