Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

SMS-5z

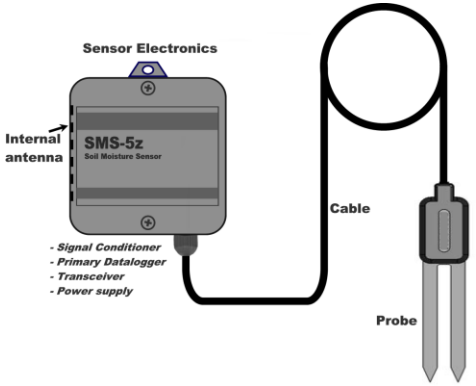
Soil Moisture Sensor

www.phyto-sensor.com

Introduction

The SMS-5z sensor measures the dielectric constant of the soil in order to find its volumetric water content. The SMS-5z operates at a high frequency (70 MHz) that allows it to be used in any soil type and in soils with varying degrees of EC (up to 8dS/m). Its typical accuracy in all soil types without calibration is ±3%. With calibration, it is 1-2%.

The SMS-5z probe comes with the 5-m cable, and a weatherproof box with electronics, which combines signal conditioner, primary datalogger, RF 2.4 GHz transceiver, and power supply (3xAA Alkaline batteries).



The SMS-5z sensor has three factory calibrations for Mineral Soil, Potting Soil, and for Rock Wool.

Communication

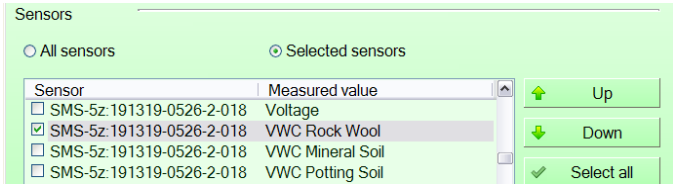
The SMS-5z communicates over the radio 2.4 GHz channel with a network data logging unit. Activation of the sensor and measurement settings are described in the 'PM-11z Phytomonitor Quick Start Guide'

Power

The SMS-5z is powered by three AA Alkaline batteries.

Readings

SMS-5z represents four values: output voltage of the probe, and three values of the volumetric water content (VWC), which corresponds to three available factory calibrations for different media.



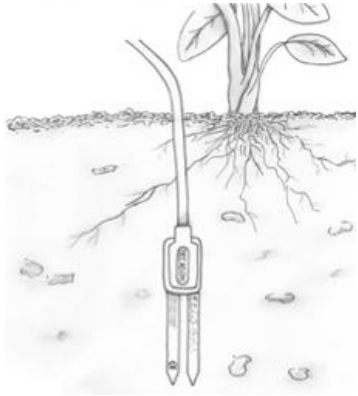
You may select necessary calibration by checking the appropriate box. For instance, the Rockwool calibration is selected in the screenshot above.

If necessary, SMS-5z users may conduct a soil-specific calibration by selecting the voltage output of the sensor and placing the sensor in the soil sampler with the controlled variable volumetric water content.

Installing the sensor

When selecting a site for installation, it is important to remember that the soil adjacent to the sensor surface has the strongest influence on the sensor reading and that the sensor measures the volumetric water content. Therefore any air gaps or excessive soil compaction around the sensor can profoundly influence the readings. Also, do not install the sensors adjacent to large metal objects such as metal poles or stakes. This can attenuate the sensor's electromagnetic field and adversely affect output readings. Because the SMS-5z has gaps between its prongs, it is also important to consider the size of the media you are inserting the sensor into. It is possible to get sticks, bark, roots or other material stuck between the sensor prongs, which will adversely affect readings. Finally, be careful when inserting the sensors into dense soil, as the prongs will break if excessive sideways force is used when pushing them in.

Procedure



When installing the SMS-5z, it is best to maximize contact between the sensor and the soil.

1. The SMS-5z sensor was designed for easy installation into the soil. After digging a hole to the desired depth, push the prongs on the sensor into undisturbed soil at the bottom of the hole or into the sidewall of the hole. Make sure that the prongs and black overmolding are buried completely as shown below.

The sensor may be difficult to insert into extremely compact or dry soil. If you have difficulty inserting the sensor, try loosening the soil somewhat or wetting the soil. Never pound it in***!***

2. Carefully backfill the hole to match the bulk density of the surrounding soil. Be careful not to bend the black overmolding connecting the sensor to the cable.

Orientation
The sensor can be oriented in any direction. However, orienting the flat side perpendicular to the surface of the soil will minimize effects on downward water movement.

Removing the Sensor
When removing the sensor from the soil, do not pull it out of the soil by the cable! Doing so may break internal connections and make the sensor unusable.

Specifications:

Accuracy: at least 0.03 m3/m3 (3% VWC) all soils, up to 8 dS/m
With soil-specific calibration: ±.02 m3/m3 (±2%)
Resolution: 0.001 m3/m3 (0.1%) VWC
Power Requirements: 4.5 Vdc (3xAA Alkaline batteries)
Operating Environment: -40 to +60 °C
Range of Measurement: 0 to saturation
Probe dimensions: 8.9cm x 1.8cm x 0.7cm
Cable length: 5m standard, custom lengths or extension cables are available upon request
Datalogger Compatibility: Bio Instruments S.R.L.: PM-11z Phytomonitor and/or USB Gateway

Customer Support

If you ever need assistance with your SMS-5z, or if you just have questions or feedback, please e-mail at support@phyto-sensor.com. Please include as part of your message your name, address, phone, and fax number along with a description of your problem.

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