Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

SMTE

Soil Moisture, Temperature, and EC Sensor

www.phyto-sensor.com

Introduction

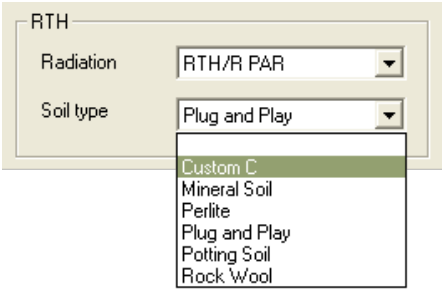
SMTE sensor is a modified version of the 5-TE Probe (Decagon Devices Inc., USA), which was adapted for operation with the RTH Meter, a smart environmental measurement unit, which is a part of PM-11 Phytomonitor and PTM-48A Photosynthesis Monitor.

The SMTE is designed to measure the volumetric water content (VWC), electrical conductivity (EC), and temperature of soil or another media. Using an oscillator running at 70 MHz, it measures the dielectric permittivity of soil to determine the water content. A thermistor in thermal contact with the probe prongs provides an average prong temperature, while the two stainless steel screws on the surface of the sensor form a two-point electrical array to measure electrical conductivity. The sensor is supplied with the standard 5-m cable and the IP67 plug at the end.

Connection

Plug the sensor into SMTE digital input of the RTH-11 or the RTH-48 Meter. In the PC program, specify the soil type.

- **Mineral Soil, Perlite, Potting Soil,** and **Rock Wool** are factory calibrations for those typical growth media.
- **Plug and Play** call last calibration used in the last Project. That calibration is stored in the RTH memory.
- To exclude the SMTE sensor from the project, please click the **blank row** at the top of the list.
- **Custom C** allows seeing the raw output signal of the SMTE sensor that is counts. Please contact the manufacturer for more details of using this option for producing a user defined calibration.



Project Window in PM-11 / PTM-48A

Installation

When installing the sensor's probe, it is important to avoid air gaps or extremely compact soil around the probe, which can skew readings. Do not install the probe next to large metal objects, which can attenuate the probes' electromagnetic field and distort output readings. Because the probe have gaps between their prongs, it is also important to consider the size of the media you are inserting the probe into. It is possible to get sticks, bark, roots or other material stuck between the probe prongs, which will adversely affect readings. Finally, be careful when inserting the probes into dense soil, as the prongs will break if excessive force is used when pushing them in.

The sensor can be inserted directly into growing media or soil. The probe needs to be completely covered by soil. If you have difficulty inserting the probe, try loosening the soil somewhat or wetting the soil. Never pound the probe in. The probes can be oriented in any direction.

When using the sensor in Rockwool, only the prongs shall be inserted into the growing media. This is very important because the sensor is calibrated for such kind of installation.

Removing the Probes

When removing either probe, do not pull it by the cable! This could break the internal wires and cause the probe to malfunction or not function at all.

Specifications

Volumetric water content (VWC) :	
Range	0 to 100% VWC
Resolution	0.1% VWC
Accuracy	< ±3% VWC typical in mineral soils that have solution EC < 10% dS/m
Electrical Conductivity (bulk):	
Range	0 to 15 dS/m
Resolution	0.01 dS/m
Accuracy	±10% from 0 to 7 dS/m
Temperature:	
Range	−40 ℃ to +50 ℃
Resolution	0.1 ℃
Accuracy	±1 ℃
Output cable length	5 m

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