

5TM Soil Moisture and Temperature Sensor



The 5TM sensor incorporates a temperature reading into our traditional soil moisture sensor allowing you to have two measurements in one sensor. Volumetric water content is obtained by measuring the dielectric constant of the media through the utilization of capacitance/frequency domain technology while temperature is measured using an onboard thermistor. 5TM sensor incorporates the same high frequency oscillation as the EC-5, which allows the sensor to accurately measure soil moisture in any soil or soilless media with minimal salinity and textural effects. Applications include seed germination and growth studies, soil respiration, and greenhouse monitoring.

More of the data that you need

The 5TM allows you to have more than just volumetric water content without the extensive capabilities of the 5TE. In the field, the robust design of the 5TM allows the sensor to be pushed directly into undisturbed soil. However, the compact design of the 5TM makes it possible to measure volumetric water content in labs and greenhouses. Factory calibrations are included for mineral soils, potting soils, rockwool, and perlite.

Integrate with CSI Data Loggers

The 5TM serial or SDI-12 communication means lots of options for integration with systems run by other data loggers (like CSI). Please [see our integrator's guide](#) for detailed instructions for using the 5TM in SDI-12 mode.

Reasons to pick the 5TM:

If you need volumetric water content and ...

- anticipate temperature changes in your soil or soilless substrate
- are interested in mechanisms that are affected by temperature
- want to utilize SDI-12 with your system

5TM Applications:

- Shallow soil moisture monitoring
- Desert soil monitoring
- Soil respiration
- Seed germination and growth studies

Volumetric Water Content:

Accuracy:	Apparent dielectric permittivity (ϵ_a): $\pm 1 \epsilon_a$ (unitless) from 1-40 (soil range), $\pm 15\%$ from 40-80 VWC: <ul style="list-style-type: none">• Using Topp equation: $\pm 0.03 \text{ m}^3/\text{m}^3$ ($\pm 3\%$ VWC) typical in mineral soils that have solution electrical conductivity $< 10 \text{ dS/m}$• Using medium specific calibration, $\pm 0.01 - 0.02 \text{ m}^3/\text{m}^3$ ($\pm 1-2\%$ VWC) in any porous medium
Resolution:	ϵ_a : $0.1 \epsilon_a$ (unitless) from 1-20, $< 0.75 \epsilon_a$ (unitless) from 20-80 VWC: $0.0008 \text{ m}^3/\text{m}^3$ (0.08% VWC) from 0 to 50% VWC 0.25% VWC (rockwool)
Range:	ϵ_a : 1 (air) to 80 (water) VWC: 0-100%

Temperature:

Accuracy:	$\pm 1^\circ\text{C}$
Resolution:	0.1°C
Range:	-40°C to $+50^\circ\text{C}$

General:

Dimensions:	10 x 3.2 x 0.7 cm
Measurement Time:	150 ms
Power:	3.6 - 15 VDC, 0.3 mA quiescent, 10 mA during 150 ms measurement
Output:	Serial (TTL) or SDI-12
Operating Temperature:	-40°C to $+50^\circ\text{C}$
Connector Types:	3.5 mm "stereo" plug or stripped and tinned lead wires (3)
Cable Length:	5 m, custom cable lengths available upon request
Datalogger Compatibility (not exclusive):	<i>Decagon:</i> Em50, EM50R, ProCheck <i>Campbell Scientific:</i> CR200X-series, CR800/CR850, CR1000, CR3000, CR9000X <i>Other:</i> Any data acquisition system capable of 3.6-15 V excitation and serial or SDI-12 communication
Warranty:	One year, parts and labor