



**METER**



# TEROS 11

Advanced Soil Moisture & Temperature Sensor

## YOU NEED SENSOR LONGEVITY

Soil can be highly variable in space, requiring many measurements and frustrating amounts of your research dollars. Not to mention the extra cost and hassle of replacement sensors if you need long-term data. Make large sensor networks simpler, longer-lasting, and more affordable with the ultra-dependable TEROS 11 soil moisture and temperature sensor.

## BETTER ACCURACY—VERIFIED

The TEROS 11 uses a completely new calibration procedure that maximizes accuracy and minimizes sensor-to-sensor variability while keeping the cost reasonable. So you can be confident that every sensor you install is going to read exactly like the next one. Unlike other sensors on the market which spec an unverifiable  $\pm 1.0\%$  VWC accuracy, the TEROS 11 was rigorously tested by our soil physicists across a challenging range of soil types and EC levels so you can be confident in the accuracy of your data.

Plus, TEROS sensor repeatability can be checked with an accuracy verification standard. No other soil moisture sensor has this ability. Just slide the verification clip onto a sensor and plug it into a logger. If it reads within the right range, your sensor is good to go.

## FEATURES

- Increased volume of influence (1010 mL)
- Easy installation with borehole installation tool (minimizes air gaps for cleaning readings)
- Dependable, long-life volumetric soil moisture sensor
- Reduced sensor-to-sensor variability
- 3-year long-life guarantee
- Check installation or troubleshoot with the ZSC Bluetooth sensor interface
- Repeatability can be checked with an accuracy verification standard
- Robust, epoxy body for tough field conditions
- Minimizes salinity and textural effects by using 70 MHz frequency capacitance technology
- Steel needles cut through the soil for better soil-sensor contact
- Easy-to-use SDI-12 communication for non-METER data loggers
- Ferrite core eliminates cable noise

## SPECS

<b>Volumetric Water Content Range</b>	<b>Mineral Soil Calibration:</b> 0.00–0.70 m <sup>3</sup> /m <sup>3</sup> <b>Soilless Media Calibration:</b> 0.0–1.0 m <sup>3</sup> /m <sup>3</sup> <b>Apparent Dielectric Permittivity (<math>\epsilon_a</math>):</b> 1 (air) to 80 (water)  <b>NOTE:</b> The VWC range is dependent on the media the sensor is calibrated to. A custom calibration will accommodate the necessary ranges for most substrates.
<b>VWC Resolution</b>	0.0010 m <sup>3</sup> /m <sup>3</sup>
<b>VWC Accuracy</b>	<b>Generic Calibration:</b> $\pm 0.03$ m <sup>3</sup> /m <sup>3</sup> ( $\pm 3.00\%$ VWC) typical in mineral soils that have solution EC <8,000 $\mu\text{S}/\text{cm}$ <b>Medium Specific Calibration:</b> $\pm 0.01$ – $0.02$ m <sup>3</sup> /m <sup>3</sup> in any porous medium <b>Apparent Dielectric Permittivity (<math>\epsilon_a</math>):</b> 1–40 (soil range) , $\pm 1 \epsilon_a$ (unitless) 40–80, 15% of measurement
<b>Dielectric Measurement Frequency</b>	70 MHz
<b>Temperature</b>	<b>Range:</b> –40 to +60 °C <b>Resolution:</b> 0.1 °C <b>Accuracy:</b> $\pm 1.0$ °C from –40 to 0 °C $\pm 0.5$ °C from 0 to +60 °C  <b>NOTE:</b> Temperature measurement, for applicable sensors, may not be accurate if sensor is not fully immersed in the medium of interest, due to longer equilibration time.
<b>Communication Output</b>	DDI serial or SDI-12 communication protocol
<b>Data Logger Compatibility</b>	METER ZL6, EM60, and Em50 data loggers or any data acquisition system capable of 4.0- to 15-VDC power and serial or SDI-12 communication
<b>Dimensions</b>	<b>Length:</b> 9.4 cm (3.70 in) <b>Width:</b> 2.4 cm (0.95 in) <b>Height:</b> 7.5 cm (2.95 in)
<b>Probe Length</b>	5.5 cm (2.17 in)
<b>Operating Temperature Range</b>	<b>Minimum:</b> –40.00 °C <b>Typical:</b> NA <b>Maximum:</b> 60.00 °C  <b>NOTE:</b> Sensors may be used at higher temperatures under certain conditions; contact Customer Support for assistance.
<b>Cable Length</b>	5 m (standard) 75 m (maximum custom cable length)  <b>NOTE:</b> Contact Customer Support if a nonstandard cable length is needed.
<b>Cable Diameter</b>	0.165 $\pm$ 0.004 (4.20 $\pm$ 0.10mm) with minimum jacket of 0.030 (0.760 mm)
<b>Connector Types</b>	3.5-mm stereo plug connector or stripped and tinned wires
<b>Stereo Plug Connector Diameter</b>	3.5 mm
<b>Conductor Gauge</b>	22-AWG / 24-AWG drain wire

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