

## GS3 Ruggedized Soil Moisture, Temperature, & Electrical Conductivity Sensor



### GS3 Ruggedized Soil Moisture, Temperature and EC

The GS3 soil moisture, temperature, and EC sensor is built with an epoxy body and stainless steel needles. The internal circuitry is the same cutting edge design that you'll find in other Decagon soil moisture sensors, but the form factor has been optimized for use in soilless substrates or harsh environments, giving it a wider range of EC measurement and an increased temperature range. Not only do the steel needles improve sensor contact, but they also improve the sensor's ability to measure EC in porous substrates such as peat or perlite.

### Accuracy at a Fraction of the Cost

The GS3 measures water content, temperature, and EC independently. Its 70 MHz frequency minimizes salinity and textural effects, making it accurate in most soil or soilless media. Stainless steel needles have an extended surface area to optimize EC measurements, while minimizing substrate disturbance during insertion. Temperature is measured with an onboard thermistor, and electrical conductivity is measured using a stainless steel electrode array.

### Understand Your Measurements

When used with our DataTrac 3 software, your GS3 data can be used to determine plant available water, growing degree days, and pore water electrical conductivity.

### Easy Integration

Each GS3 comes standard with both serial and SDI-12 communication options, meaning easy integration with systems manufactured by other companies.

### Advantages of the GS3

- Measure VWC, EC, and temperature in soilless substrates or harsh environments
- Manage salts
- SDI-12 compatible

## SPECIFICATIONS:

<b>ACCURACY</b>	Apparent Dielectric Permittivity ( $\epsilon_a$ ): $\pm 1 \epsilon_a$ (unitless) from 1 - 40 (soil range), $\pm 15\%$ from 40 - 80
	Soil Volumetric Water Content (VWC): Using a generic calibration: $\pm 0.03$ m <sup>3</sup> /m <sup>3</sup> ( $\pm 3\%$ VWC) typical in mineral soils that have solution electrical conductivity < 10 dS/m; using medium specific calibration, $\pm 0.01$ - 0.02 m <sup>3</sup> /m <sup>3</sup> ( $\pm 1$ - 2% VWC) in any porous medium
	Electrical Conductivity (EC): $\pm 5\%$ from 0 to 5 dS/m, $\pm 10\%$ from 5-23 dS/m
	Temperature: $\pm 1^\circ\text{C}$  Note: Temperature measurement may not be accurate if sensor is not fully immersed in the medium of interest, due to excessively long equilibration time.
<b>RESOLUTION</b>	$\epsilon_a$ : 0.1 $\epsilon_a$ (unitless) from 1 - 20, < 0.75 $\epsilon_a$ (unitless) from 20 - 80 VWC: 0.002 m <sup>3</sup> /m <sup>3</sup> (0.2% VWC) from 0 to 40% VWC, 0.001 m <sup>3</sup> /m <sup>3</sup> (0.1% VWC) > 40% VWC EC: 0.001 dS/m from 0 to 23 dS/m Temperature: 0.1 $^\circ\text{C}$
<b>RANGE</b>	$\epsilon_a$ : 1 (air) to 80 (water) EC: 0 - 25 dS/m (bulk) Temperature: -40 to 60 $^\circ\text{C}$ * *Sensors can be used at higher temperatures under some conditions. Contact Decagon for more details.
<b>MEASUREMENT SPEED</b>	150 ms (milliseconds)
<b>SENSOR TYPE</b>	VWC: Frequency domain EC: Two probe design Temperature: Thermistor
<b>OUTPUT</b>	Serial TTL, 3.6 Volt Levels or SDI-12
<b>OPERATING ENVIRONMENT</b>	-40 $^\circ\text{C}$ to 60 $^\circ\text{C}$
<b>POWER</b>	3.6 - 15 VDC, 0.3 mA quiescent, 25 mA during 150 ms measurement
<b>CABLE LENGTH</b>	Sensors come standard with 5 m cable. Custom cable lengths available. Maximum cable length of 75 m. Please contact Decagon if you need longer cable lengths.
<b>CABLE CONNECTOR TYPES</b>	3.5 mm "stereo" plug, or stripped and tinned lead wires (3)
<b>SENSOR DIMENSIONS</b>	9.3 cm x 2.4 cm x 6.5 cm
<b>DATA LOGGER COMPATIBILITY (NOT EXCLUSIVE)</b>	Decagon Em50 Series, ProCheck, Campbell Scientific
<b>WARRANTY</b>	One year, parts and labor