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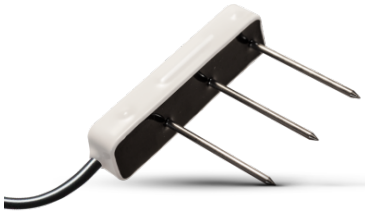
WHEN MEASUREMENTS MATTER

GS3

Soil Moisture, EC and Temperature Sensor



GS3:The Greenhouse Sensor

Slim, stainless steel needles that measure water content, electrical conductivity and temperature.

Overview

The GS3 is designed to measure the water content, electrical conductivity and temperature of many types of growing media. The GS3 was designed for greenhouse applications where the slim, stainless steel needles could be inserted easily into many types of substrates, but it can also work in many other applications.

Volumetric Water Content

The GS3 sensor uses an electromagnetic field to measure the dielectric permittivity of the surrounding medium. The sensor supplies a 70 MHz oscillating wave to the sensor prongs that charges according to the dielectric of the material. The stored charge is proportional to substrate dielectric and substrate volumetric water content. The GS3 microprocessor measures the charge and outputs a value of dielectric permittivity from the sensor. The dielectric value is then converted to substrate water content by a calibration equation specific to the media you are working in.

Temperature

The GS3 uses a small thermistor to take temperature readings. It is located underneath the sensor overmold, next to one of the prongs so it remains in thermal equilibrium with the medium, and reads the temperature of the prong surface.

Electrical Conductivity

GS3 bulk EC measurements are normalized to EC at 25°C. In the GS3 the bulk EC is factory calibrated to ensure measurement accuracy within °10% from 0 to 10 dS/m. This range is adequate for most greenhouse and nursery applications. However, some special applications in highly saline substrates may require measurements with bulk EC greater than the specified range. The GS3 will measure up to 23 dS/m bulk EC, but user calibration is required above 10 dS/m.

Specifications

General Specifications	
Dimensions	9.3 x 2.4 x 6.5 cm
Prong Length	5.5 cm (2.2 in)
Dielectric Measurement Frequency	70 MHz
Measurement Time	150 ms (milliseconds)
Power requirements	3.6 to 15 VDC, 0.03 mA quiescent, 25 mA during 150 ms measurement
Output	Serial TTL, 3.6 Volt Levels or SDI-12
Operating Temperature	-40 to +60 °C
Connector types	3.5 mm (stereo) plug or stripped & tinned lead wires (Pigtail)

Cable Length	5 m standard; custom cable length available upon request

Volumetric Water Content

Accuracy	±1 εa (unitless)
Resolution	0.1 εa (unitless) from 1–20 › 0.001 m3/m3 (0.1% VWC) >40% VWC › Medium Specifi c Calibration ±0.01–0.02 m3/m3 (±1 to 2% VWC) in any porous medium › Generic Calibration: ±0.03 m3/m3 typical (±3% VWC) typical in mineral soils that have solution electrical conductivity < 5 dS/m › <0.75 εa (unitless) from 20–80 › 0.002 m3/m3(0.2% VWC) from 0 to 40% VWC
Range	Apparent dielectric permittivity (εa): 1 (air) to 80 (water)

Bulk Electrical Conductivity

Accuracy:	±5% from 0 to 5 dS/m, ±10% from 5 to 23 dS/m, user calibration required above 10 dS/m
Resolution:	0.001 dS/m from 0 to 23 dS/m
Range:	0 to 25 dS/m (bulk)

Temperature

Accuracy:	±1 °C Temperature measurement may not be accurate if sensor is not fully immersed in the medium of interest, due to excessively long equili- bration time.
Resolution	0.1 °C
Range	-40 to 60 °C

Warranty

Warranty	The GS3 has a one year warranty on parts and labor. The warranty activates when the instrument arrives at your location.

For comprehensive details, visit: www.campbellsci.ca/gs3-

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