EC-5 Soil Water Content Sensor

Large network soil moisture sensing

ECH$_2$O EC-5

Low cost individual sensors for large sensor networks

The EC-5 delivers research-grade accuracy at a price that makes large sensor networks economically practical. You can adequately characterize your site with soil moisture sensors at multiple depths and locations, even if you're on a tight budget.

Engineered for accuracy

The EC-5 determines volumetric water content (VWC) by measuring the dielectric constant of the media using capacitance/frequency domain technology. Its 70 MHz frequency minimizes salinity and textural effects, making this sensor accurate in almost any soil or soilless media. Factory calibrations are included for mineral soils, potting soils, rockwool, and perlite.

Easy installation

Just 5 cm long with a ~0.2 L measurement volume, this handy little sensor is easy to install in the field and can also be used in nursery pots. The EC-5's compact design makes it easy to push directly into undisturbed soil to ensure good accuracy.

Easy integration

The EC-5's analog signal means no-hassle integration with systems manufactured by other companies.

Features

- Measures volumetric water content
- Affordable: ideal for large sensor networks
- Simple sensor with excellent accuracy
- Small volume of influence (eg., field spatial variability, lab column studies, or greenhouse research)
- 70 MHz frequency minimizes salinity and textural effects
- Factory calibrations included for mineral soils, potting soils, rockwool, and perlite
- Small size means easy installation
- Plug and play capability
- Easy integration with other systems
- Use with ZL6 data logger to collect data remotely

Specifications

MEASUREMENT SPECIFICATIONS	
Volumetric water content (VWC)	**Range:** 0%–100% **Resolution:** 0.001 m^3/m^3 VWC in mineral soils, 0.25% in growing media **Accuracy:** Generic calibration: ±0.03 m^3/m^3 typical in mineral soils that have solution EC <8 dS/m Medium specific calibration: ±0.02 m^3/m^3 in any porous medium (± 2%)
Measurement volume	See comparison article
COMMUNICATION SPECIFICATIONS	
Output	10%–50% of excitation voltage (250–1,250 mV at 2,500 mV excitation)

Data logger compatibility	METER data loggers (ZL6, EM50/60 series, Em5b) or any data acquisition systems capable of switched 2.5–3.6 VDC excitation and single-ended voltage measurement at greater than or equal to 12-bit resolution. **NOTE: These calibration constants only apply to 2,500-mV excitation; use of these numbers with any other excitation voltage results in erroneous readings!**
PHYSICAL SPECIFICATIONS	
Dimensions	Length: 8.9 cm (3.50 in) Width: 1.8 cm (0.71 in) Height: 0.7 cm (0.28 in)
Prong length	5 cm (1.97 in)
Operating temperature range	Minimum: –40 °C Typical: NA Maximum: +60 °C **NOTE: Sensors may be used at higher temperatures under certain conditions; contact Customer Support for assistance.**
Cable length	5 m (standard) 40 m (maximum custom cable length) **NOTE: Contact Customer Support if a nonstandard cable length is needed.**
Connector types	3.5-mm stereo plug connector or stripped and tinned wires
ELECTRICAL AND TIMING CHARACTERISTICS	
Supply voltage (VIN to GND)	Minimum: 2.5 VDC at 10 mA Typical: NA Maximum: 3.6 VDC at 10 mA
Measurement duration	Maximum 10 ms

COMPLIANCE	Manufactured under ISO 9001:2015 EM ISO/IEC 17050:2010 (CE Mark) 2014/30/EU 2011/65/EU EN61326-1:2013 EN50581:2012