

Decagon 10HS Moisture

Measures the dielectric constant of the soil in order to find its volumetric water content (VWC)

The 10HS is used to measure volumetric moisture content of soils and other material for scientific research and agricultural applications.

The 10HS measures volumetric water content via the dielectric constant of the soil using capacitance technology. The sensor uses a 70 MHz frequency, which minimises salinity and textural effects, making it an ideal sensor in agricultural and standard scientific projects.

10HS Sensor:

- High resolution allows daily or hourly tracking of water use
- Voltage output proportional to water content
- Low-cost dielectric water content sensor
- Low sensitivity to salt and temperature
- Very low power requirement

Applications:

- Irrigation scheduling
- Vadose zone monitoring
- Plant-soil-water interaction studies



Larger Volume of Influence

Looking for a soil moisture sensor with a larger volume of influence? Use the 10HS to accurately measure water content where a large volume of influence is needed, with minimal salinity and textural effects in most soils.

Characterise Spatial Variability

At 10 cm long, the 10HS has a 1 litre area of influence. Imagine the probe running the length of a one litre bottle—the bottle represents the approximate area of influence. The 10HS estimates the volumetric water content of the soil within that volume.

Engineered for Accuracy

The 10HS determines volumetric water content (VWC) by measuring the dielectric constant of the soil using capacitance/frequency domain technology. Using a 70 MHz frequency minimises salinity and textural effects, making the 10HS accurate in most soils. Factory calibrations can be used in most typical soils with a saturation extract EC of 10 dS/m.

Integrate with CSI Data Loggers

The 10HS's analogue signal means no-hassle integration with systems manufactured by other companies (such as Campbell Scientific). An on-board voltage regulator allows the Decagon factory calibrations to be used with any excitation voltage between 3 and 15V.

Use with the Topp Equation

The 10HS's output can be set to dielectric for use with the Topp Equation or other dielectric-to-volumetric water content conversion equations.



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Reasons to pick the 10HS:

- If volumetric water content is the only measurement you need.
- If you just want a simple, all-purpose sensor with excellent accuracy.
- If you are interested in a large volume of influence.



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Specifications

Measurement

Range:	Apparent dielectric permittivity (ϵ_a) : 1 (air) to 50 Soil volumetric water content : 0 – 0.57 m ³ /m ³ (0 -57% VWC)
Accuracy:	Apparent Dielectric Permittivity (ϵ_a) : ± 0.5 from (ϵ_a) of 2 to 10, ± 2.5 from (ϵ_a) of 10 to 50 (VWC) VWC: Using standard calibration equation: ± 0.05 m ³ /m ³ ($\pm 5\%$ VWC) typical in mineral soils. Using soil site specific calibration, ± 0.02 m ³ /m ³ ($\pm 2\%$ VWC)
Resolution:	(ϵ_a): 0.1 from ϵ_a of 1 to 30, 0.2 from (ϵ_a) of 30 to 50 VWC: 0.0008 m ³ /m ³ (0.08% VWC) in mineral soils from 0 to 0.50 m ³ /m ³ (0-50% VWC)
Time	10 ms (milliseconds)

Power

Power requirements:	3VDC @ 12mA to 15 VDC @ 15 mA On board voltage regulator allows 10HS sensor to be used with any excitation voltage above 3V
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Operating Conditions

Operating Temperature:	0 – 50°C
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Interface

Frequency:	70 MHz
Output:	300 (dry soil) – 1250 (saturated) mV, independent of excitation voltage

Mechanical

Connector Types	3.5 mm "stereo" plug or stripped and tinned lead wires
Cable Length	5 m standard
Dimensions	Dimensions 14.5 x 3.3 x 0.7 cm

[SENSOR COMPARISON TABLE](#)

ANALOG SENSORS

DIGITAL SENSORS

SENSOR	EC-5	10HS	5TM	5TE	GS3	MPS-2
MEASURES	volumetric water content, dielectric permittivity	volumetric water content, dielectric permittivity	volumetric water content, dielectric permittivity, temperature	volumetric water content, dielectric permittivity, temperature, electrical conductivity	volumetric water content, dielectric permittivity, temperature, electrical conductivity	water potential, temperature



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VOLUME OF INFLUENCE	0.3 L	1 L	0.3 L	0.3 L	0.3 L	N/A
DATA LOGGER COMPATIBILITY	Em5b, Em50, Em50R, Em50G, ProCheck, ECH ₂ O Check, Campbell Scientific*	Em5b, Em50, Em50R, Em50G, ProCheck, ECH ₂ O Check, Campbell Scientific*	Em50, Em50R, Em50G, ProCheck, Campbell Scientific*, SDI-12 capable	Em50, Em50R, Em50G, ProCheck, SDI-12 capable	Em50, Em50R, Em50G, ProCheck, SDI-12 capable	Em50, Em50R, Em50G, ProCheck, SDI-12 capable
MEASUREMENT RANGE	0 to 100% VWC	0 to 57% VWC	0 to 100% VWC -40 to 50°C	0 to 100% VWC -40 to 50°C 0 to 23 dS/m	0 to 100% VWC -40 to 80°C 0 to 23 dS/m	-10 to -500 kPa (pF 2 – pF 3.71) -40 to 50°C
BEST IF	WVC is all that you need. You're establishing a large sensor network.	You want a large volume of influence.	You have high temperature variability in your soils. You are monitoring shallow or desert soils where data must be corrected for temperature effects. You need to monitor soil temperature for	You are managing salts in your system. You want to use SDI-12.	You are measuring water content of soilless substrates. You need high accuracy EC. You need to measure at high temperatures	You want to compare soil moisture at different research sites. You want to determine water available for plant growth. You are monitoring deficit irrigation. You want to measure



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biological activities.

water potential.

You want to use SDI-12.

BUT NOT IF

You cannot apply a regulated voltage (only applies to non-Decagon data loggers).

You are measuring in nursery pots. You are installing in rocky soil.

N/A

You want to monitor soiless substrates or potting soils.

You are doing downhole installations .

You want to monitor soils at or near saturation.



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Accessories



SMM3 Soil Moisture Meter

Soil Moisture Meter - Configured for Decagon's EC-5 sensor. 10 sensor capacity; IP68 rated enclosure; stand-alone logging capability to 2GB MicroSD Card; Windows software; breakout board; user manual.



DataTrac 3 Software

DataTrac 3 Software for organising and analysing data



EM50 Data Logger



EM50G Data Logger



ICT-ELT-2-HP LoRaWAN Node

The ICT-ELT-2-HP is a general LoRaWAN device for measuring analogue or digital signals. ICT-ELT-2-HP can for example be used together with electricity meters, flow meters, analogue sensors, moisture sensors, temperature sensors, water leak cable or ultrasonic distance sensors.



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Accessories



ProCheck Handheld Reader



EM5B Data Logger



Delmation
products



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Blauw-roodlaan 300
2718 SK Zoetermeer
079 - 342 20 41

www.delmation.nl | info@delmation.nl