

The Technology

Sentek sensors utilize capacitance based technology to provide near continuous measurements within the soil profile. By creating a high frequency electrical field around the sensor, extending through the access tube into the surrounding soil, the sensors detect the changes in dielectric constant, or permittivity, of the soil over time. At high frequency the measurement is affected predominantly by water molecules. The greater the amount of water, the smaller the frequency measured between the two brass rings of the sensor.

Soil Moisture Sensor

The soil moisture sensor gives an output in volumetric water content (mm of water per 100 mm of soil measured). This is converted from a scaled frequency reading using a default calibration equation, which is based on data obtained from numerous scientific studies in a range of soil textures.

User defined, or site specific calibration equations can be applied to each individual sensor to provide a very high level of accuracy. Sentek's soil moisture sensor is suitable for use in all soil types under all conditions of soil water content, from saturated to oven dry.



 Integration with humidity / temperature sensor available

TriSCAN™ Sensor

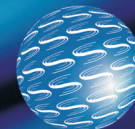
The TriSCAN sensor provides measurements of both soil water and salinity. By employing a patented measurement technique the TriSCAN sensor is able to distinguish between soil water content and salt content.

This information is then processed using a Sentek derived model to calculate soil volumetric ion content (VIC) separately from the Volumetric Water Content. The TriSCAN sensor is designed for fertilizer and salinity management in research, agriculture and environmental applications. The TriSCAN sensor is optimized for one of agriculture's most common soil textures of sands and sandy loams, and is currently not suitable for clays.

 Integration with humidity / temperature sensor available



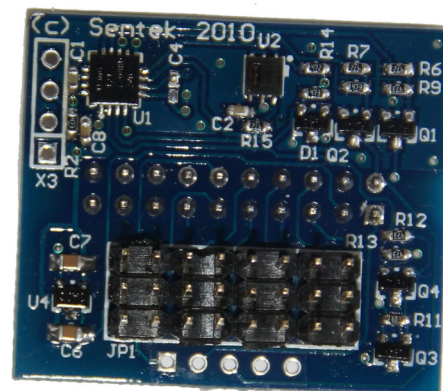
Sensor Type	Calibrated Accuracy	Precision	Reading Range	Radial Sphere Influence	Axial Sphere of influence	Sensor Diameter
Soil Moisture	$R^2 \geq 0.992$	+/- 0.003% vol	Oven dry to saturation	99% of reading within first 10cm of outside wall of access tube	100% of reading contained within 10cm	EnviroSCAN: 50.5mm
TriSCAN	$R^2 \geq 0.992$ +/- 8.06% EC at 4-20% moisture range and 0-4.9 mS/cm	+/- 0.003% vol	Oven dry to saturation (moisture) 0-17 dS/m (salinity)	99% of reading within first 10cm of outside wall of access tube	100% of reading contained within 10cm	EnviroSCAN: 50.5mm



Humidity / Temperature Sensor

The humidity / temperature sensor measures soil temperature and the humidity inside the probe. The internal humidity allows for preventative action to be taken to prevent damage to the electronics if the humidity rises. A sudden increase in humidity can indicate that moisture is entering through a damaged cable. A slow increase can indicate that the silica gel bags need replacing.

This sensor is a small PCB that can stand alone, or be added to a moisture sensor or a TriSCAN sensor.

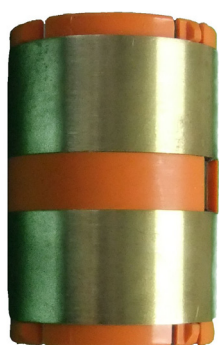


Temperature

Parameter	Condition	min	typ	max	Units
Resolution ¹	14 bit		0.01		°C
	12 bit		0.04		°C
Accuracy tolerance ²	typ		±0.3		°C
	max				°C
Repeatability			±0.1		°C
Operating Range	extended ⁴	-40		125	°C
Response Time ⁷	τ 63%	5		30	s
Long Term Drift			< 0.04		°C/yr

Relative Humidity


Parameter	Condition	min	typ	max	Units
Resolution ¹	12 bit		0.04		%RH
	8 bit		0.7		%RH
Accuracy tolerance ²	typ		±2.0		%RH
	max				%RH
Repeatability			±0.1		%RH
Hysteresis			±1		%RH
Nonlinearity			<0.1		%RH
Response time ³	τ 63%		8		s
Operating Range	extended ⁴	0		100	%RH
Long Term Drift ⁵	normal		< 0.5		%RH/yr



Class 18 Sensor (for deep installations)

Class 18 Sensor is designed to fit inside class 18 tubes which are thicker walled and can be screwed together.

Depths up to 30m have been measured with class 18 sensors.

 This sensor can be integrated with the humidity / temperature sensor, and can be either moisture or TriSCAN.