

Soil Moisture Sensor

Description

The probes PCTUM012 (two electrodes) and PCTUM013 (three electrodes) measure the soil volumetric water content by using a capacitive measurement principle which allows fast measurements in the field and with minimal invasiveness.

The three-electrode probe is particularly suitable for the measurement in small volumes, for example for cultivations in pots.

The circuit board is protected inside a housing made of plastic material and sealed with epoxy resin which allows achieving reliable measurements even in harsh environmental conditions.

The probes are factory-calibrated and do not require any further calibration by the end user. They are equipped with a fixed cable, 5 or 10m standard length, with open wires at the end.

The version with analog output has two 0,5 ...3V standard voltage outputs: one for the volumetric water content and one for the temperature. On request, 0...2,5V, 0...5V or 0...10V outputs can be delivered.

Volumetric Water Content

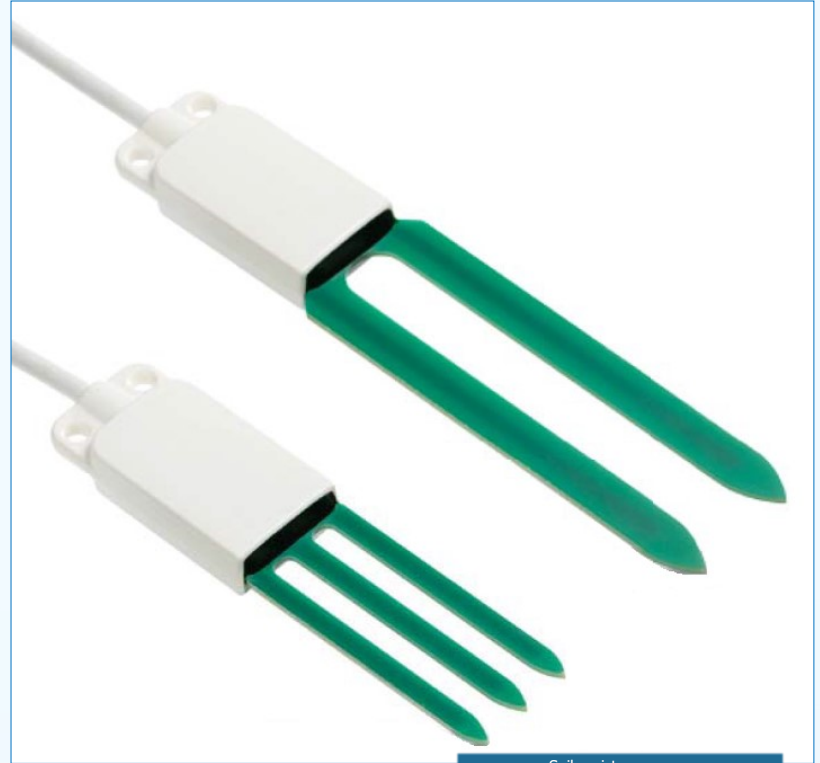
The moist soil is composed of a solid part (minerals), a liquid part (generally water) and a gaseous part (air, water vapor).

The Volumetric Water Content (VWC) is defined as the ratio between the volume occupied by the water (V_w) in a certain portion of the soil and the total volume of the soil portion (V): $VWC = V_w / V$.

It can also be expressed as a percentage (% VWC) of the water volume in the total volume.

The volumetric water content is a parameter used in hydrology for the study of the hydraulic properties of the soil, and in agriculture to determine the need to irrigate crops.

The sensor has an IP67 protection degree.



Soil moisture sensor

Technical specifications may be varied without prior notice

Technical specifications

VOLUMETRIC WATER CONTENT	
Measuring principle	Capacitive
Measuring range	0...60% VWC
Resolution	0,1%
Accuracy (@ 23°C)	±3% range 0 ... 50% VWC (standard mineral soil, EC < 5mS/cm)
Measuring volume	Ø=60mm x H = 150mm (2 electrode probe) Ø=40mm x H = 110mm (3 electrode probe)
Operating temperature	-40 ...+60°C
TEMPERATURE	
Sensor	NTC 10 KΩ @ 25°C
Measuring range	-40 ...+60°C
Resolution	0,1°C
Accuracy	±0,5°C
Long-term stability	0,1°C / year
GENERAL DATA	
Power supply	3,6 ... 30V analog output 0 ... 2,5V 5 ... 30V analog output 0,5 ... 3V 7 ... 30V analog output 0 ... 5V 12 ... 30V analog output 0 ... 10V 5 ... 30Vdc digital output RS485-Modbus
Power consumption	Analog output: 2,5mA average / 15mA peak @ 12V Output RS485-Modbus: 2mA average / 15mA peak@ 12V
Output	Analog output: 0,5 ... 3V (0,5V = 0%VWC o -40°C, 3V = 60%VWC o +60°C, minimum load resistance 10 KΩ) Digital output: RS 485 Protocollo Modbus-RTU o SDI-12
Materials	Handle: thermoplastic material and epoxy resin Electrodes: epoxy glass, thickness 2mm
Weight	About 150g (including 5m cable)
Protection rate	IP67

Ordering codes

Soil moisture sensor with two electrodes. Output RS485	PCTUM012
Soil moisture sensor with three electrodes. Output RS485	PCTUM013
Soil moisture sensor with two electrodes. Analog output	PCTUM017
Soil moisture sensor with three electrodes. Analog output	PCTUM018
Soil moisture sensor with two electrodes. Output SDI-12	PCTUM022
Soil moisture sensor with three electrodes. Output SDI-12	PCTUM023

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