



## High Accuracy and Precision

Designed for long-term  
monitoring

### Overview

The CS616 measures the volumetric water content (VWC) of porous media (such as soil) from 0% to saturation. The probe outputs a megahertz oscillation frequency, which is

scaled down and easily read by a Campbell Scientific data logger.

### Benefits and Features

- › Compatible with most Campbell Scientific data loggers
- › High accuracy and high precision
- › Fast response time
- › Designed for long-term unattended water content monitoring
- › Compatible with AM16/32-series multiplexers, allowing measurement of multiple sensors
- › Probe rods can be inserted from the surface or buried at any orientation to the surface.

### Detailed Description

The CS616 is comprised of two 30-cm-long stainless-steel rods connected to the measurement electronics. The circuit board is encapsulated in epoxy, and a shielded four-conductor cable is connected to the circuit board to supply power, enable the probe, and monitor the output.

The CS616 uses the time-domain measurement method to measure VWC; a reflectometer (cable tester) such as the TDR200 is not required. This method consists of the CS616 generating an electromagnetic pulse. The elapsed travel time and pulse reflection are then measured and used to calculate soil volumetric water content.

### Response Characteristics

The signal propagating along the parallel rods of the CS616 is attenuated by free ions in the soil solution and conductive constituents of the soil mineral fraction. In most applications, the attenuation is not enough to affect the CS616 response to changing water content, and the response is well described by the standard calibration. However, in soil with relatively high soil electrical conductivity levels, compacted soils, or soils with high clay content, the calibration should be adjusted for the specific medium. Guidance for making these adjustments is provided in the [instruction manual](#).

## Specifications

Measurements Made	Volumetric water content (VWC) of porous media (such as soil)
Measurement Range	0% to saturation
Water Content Accuracy	±2.5% VWC (using standard calibration with bulk EC of $\leq 0.5$ dS $m^{-1}$ , bulk density of $\leq 1.55$ g $cm^{-3}$ , and measurement range of 0% to 50% VWC)
Required Equipment	Measurement system
Soil Suitability	Long rods and lower frequency are well-suited for soft soil with low electrical conductivity ( $< 2$ dS/m).
Rods	Not replaceable
Sensors	Not interchangeable
Operating Temperature Range	0° to +70°C
Probe-to-Probe Variability	±0.5% VWC in dry soil, ±1.5% VWC in typical saturated soil
Precision	Better than 0.1% VWC

Resolution	0.1% VWC
Output	±0.7 V square wave (with frequency dependent on water content)
Current Drain	› 65 mA @ 12 Vdc (when enabled) › 45 $\mu$ A (quiescent typical)
Power Supply Voltage	5 Vdc minimum; 18 Vdc maximum
Enable Voltage	4 Vdc minimum; 18 Vdc maximum
Electromagnetic	CE compliant (Meets EN61326 requirements for protection against electrostatic discharge.)
Rod Spacing	32 mm (1.3 in.)
Rod Diameter	3.2 mm (0.13 in.)
Rod Length	300 mm (11.8 in.)
Probe Head Dimensions	85 x 63 x 18 mm (3.3 x 2.5 x 0.7 in.)
Cable Weight	35 g per m (0.38 oz per ft)
Weight	280 g (9.9 oz) without cable

For comprehensive details, visit: [www.campbellsci.com/cs616-reflectometer](http://www.campbellsci.com/cs616-reflectometer) 



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