Campbell Scientific

CS616 / CS626

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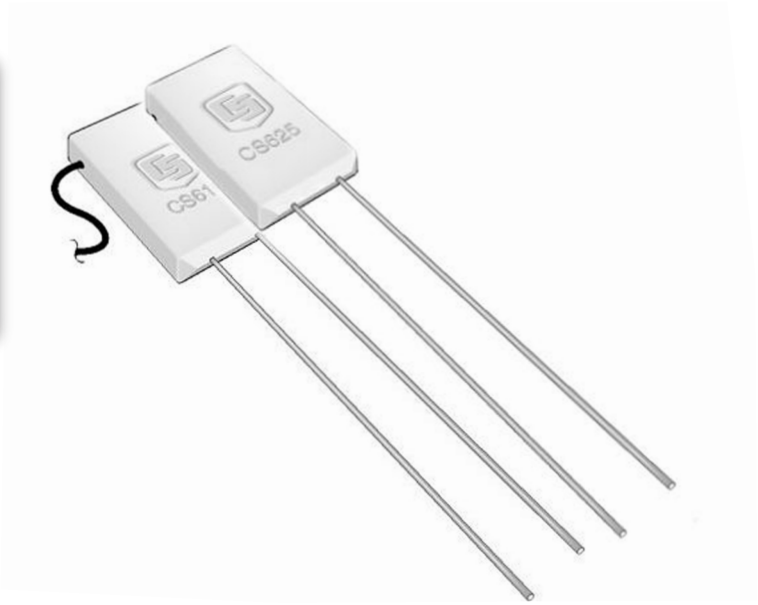
CS616 / CS625 Water Content Reflectometer

- *Measures **soil moisture / volumetric water content** in conjunction with a Campbell data logger*
- *Measurements are made using Time-Domain-Reflectometry methods*
- *Optional **insertion tools** available for rocky or high density soils*



Time-Domain Reflectometry is a proven technique for measuring volumetric water content. The CS616 and CS625 sensors allow data logger users to monitor soil moisture using TDR-based principles without the costly cable testing equipment that is generally used in research applications.

The probes consist of an epoxy-coated circuit board that is connected to two, 30cm stainless steel rods. When activated, the circuit board generates an electrical output which is transmitted along the rods. The time taken for the transmission and subsequent reflection of this signal is based on the dielectric permittivity of the material in contact with the rods. In the case of soil, this is governed predominantly by water content.

The sensor output is connected to one of the data logger's single ended analog inputs by the four-conductor cable. The data logger program is used to convert the probe's analog (square wave) output into a volumetric water content measurement.

The CS616 probes are suitable for use with our CR800 series, CR1000, CR3000 & CR5000 data loggers, while the CS625 has been specifically designed to work with our smallest data logger, the CR200 series.

Optional Installation Tools

The 14384 Pilot Tool helps the insertion of the sensor in high density or rocky soils. Its rods have similar diameters and the same spacing as the probes. The 14383 Installation Tool is used to help maintain the proper spacing and parallel orientation of rods during insertion. Use of the 14383 may reduce measurement errors by minimizing soil disturbance.

Summary of Measurement Performance

- Probe-to-probe variability: ±0.5% VWC in dry soil, ±1.5% VWC in typical saturated soil
- Accuracy ±2.5% VWC using standard calibration with bulk electrical conductivity ≤0.5 deciSiemen meter^{-1} (dS m^{-1}) and bulk density ≤1.55 g cm^{-3} in measure ment range 0% VWC to 50% VWC
- Precision 0.1% VWC
- Resolution 0.1% VWC

FREE Technical Support & Basic Software

Ordering Information

CS616-Lx	Water Content Reflectometer. Enter lead length (X) in metres.
CS625-Lx	Water Content Reflectometer for CR200-series dataloggers. Enter lead length (X) in metres.
14384	Optional Pilot Tool
14383	Optional Installation Tool

Specifications

Note - All specifications are for both sensors unless otherwise stated

Output

CS616: ±0.7 volt square wave with frequency dependent on water content

CS625: 0 to 3.3 V square wave with frequency dependent on water content

Power

65 milliamps @ 12 Vdc when enabled, 45 microamps quiescent typical

Measurement Time

CS616: With Instruction 138: 0.50 milliseconds

With Instruction 27: 50 milliseconds

CS625: 0.50 milliseconds typical

Power Supply Voltage

5 Vdc minimum, 18 Vdc maximum

Enable Voltage

4 Vdc minimum, 18 Vdc maximum

Maximum cable length

305m (1000 ft)

Electromagnetic Compatibility

The RF emissions are below FCC and EU limits as specified in EN61326 if the sensor is enabled less than 0.6 milliseconds, and measurements are made at a 1 Hz (1 per second) or slower frequency. External RF sources can also affect the sensor operation. Consequently, the sensor should be located away from significant sources of RF such as ac power lines and motors. The sensor meets EN61326 requirements for protection against electrostatic discharge.

Interpole Interface

The CS625 rods are antennae that both transmit and receive electromagnectic signals. Probes enabled simultaneously and with ~9" of each other can cause erratic measurements. If probes must be close to each other, configure the enable lines to the datalogger control ports so the probes are not enabled simultaneously.

Dimensions

Rods:	300 mm (11.8") long, 3.2 mm (0.13") diameter, 32 mm (1.3") spacing
Probe Head:	85 mm x 63 mm x 18 mm (3.3" x 2.5" x 0.7")

Weight

Probe (without cable):	280 g (9.9 oz)
Cable:	35 g m^{-1} (0.38 oz ft^{-1})
Probe (without cable):	280 g (9.9 oz)
Cable:	35 g m^{-1} (0.38 oz ft^{-1})
14384:	57 g (2 oz.)
14383:	260 g (9.2 oz.)