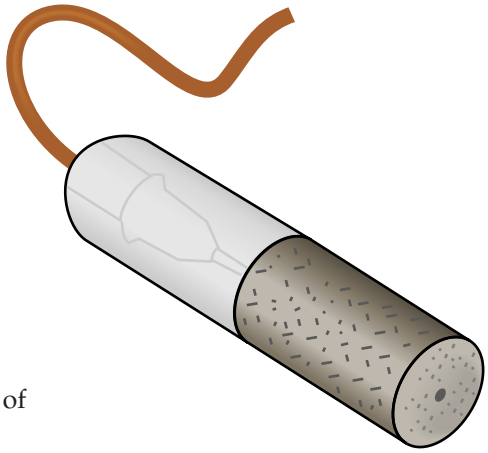
Water Matric Potential Sensor

Models 229, CE4, CE8



The 229-L Water Matric Potential Sensor measures soil water potential from 0.1 to 10 bars. The sensor consists of a heating element and thermocouple emplaced in epoxy in a hypodermic needle, which is encased in a porous ceramic matrix. To calculate soil water matric potential, a Current Excitation Module applies a 50 mA current to the 229's heating element, and the 229 thermocouple measures the temperature rise. The magnitude of the temperature rise varies according to the amount of water in the porous ceramic matrix, which changes as the surrounding soil wets and dries. Soil water matric potential is determined by applying a second-order polynomial equation to the temperature rise. Users must individually calibrate each of their 229 sensors in the soil type in which the sensors will reside.

A Campbell Scientific datalogger controls the Current Excitation Module, measures the thermocouple, and calculates soil water matric potential. Compatible dataloggers include the CR10(X), 21X (retired), CR23X, CR5000, CR7, and CR9000. The 229 is not compatible with our CR200-series, CR500, or CR510 dataloggers.

Two Current Excitation Modules are offered, the CE4 and CE8. These modules differ only in the number of 229 sensors to which they source current. The CE4 sources current for up to four 229s, and the CE8 sources current for up to eight. Both modules require a 12 Vdc power source.

The CE4 or CE8 may be connected to an AM16/32 or AM416 (retired) multiplexer. Multiplexers allow more than eight 229 sensors to be measured. Please note that both the CE4 and CE8 modules switch currents that are greater than 30 mA, which degrades the contact surfaces of the mechanical relays. Therefore the multiplexer channels to which the CE4 or CE8 have been connected may become unsuitable for other applications (refer to the multiplexer manuals for more information).

Ordering Information

229-L	Water Matric Potential Sensor. Enter lead length, in feet, after L. Requires either a CE4 or CE8
CE4	4-Channel Excitation Current Module; requires a 12 Vdc source
CE8	8-Channel Excitation Current Module; requires a 12 Vdc source

CAMPBELL SCIENTIFIC, INC.
815 W. 1800 N. • Logan, Utah 84321-1784 • (435) 753-2342 • FAX (435) 750-9540 • www.campbellsci.com

Specifications

229

Measurement range:	0.1 to 10 bars (-10 to -1000 kPa)
Measurement time:	30 seconds
Thermocouple type:	copper/constantan
Dimensions:	0.6" (1.5 cm) diameter, 1.3" (3.2 cm) length of ceramic cylinder, 2.4" (60 mm) length of entire sensor
Weight:	0.14 oz (4 g) for ceramic cylinder, 0.35 oz (10 g) for entire sensor, cable weighs about 0.25 oz (7 g) per foot

CE4/CE8

Output:	50 mA ±0.25 mA, regulated
Output channels:	4 (CE4), 8 (CE8)
Current drain (during excitation):	25 mA + (50 mA)(the number of 229 sensors connected to the CE4 or CE8 outputs). Duration of excitation is 31 seconds per measurement
Dimensions:	CE4: 4.5" (11.5 cm) x 2.1" (5.4 cm) x 1.1" (2.7 cm) CE8: 6.5" (16.5 cm) x 2.1" (5.4 cm) x 1.1" (2.7 cm)
Weight:	CE4: 4.6 oz (131 g) CE8: 6.5 oz (184 g)

CAMPBELL SCIENTIFIC, INC.
815 W. 1800 N. • Logan, Utah 84321-1784 • (435) 753-2342 • FAX (435) 750-9540
Offices also located in: Australia • Brazil • Canada • England • France • South Africa • Spain

Copyright © 2003
Campbell Scientific, Inc.
Printed September 2003