



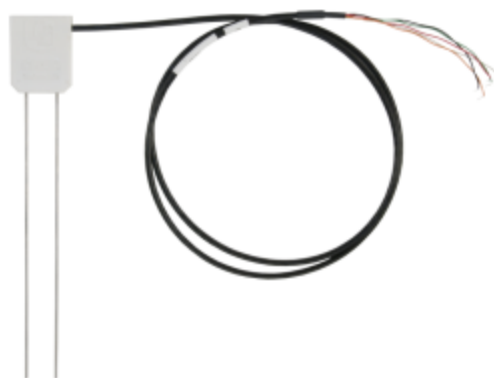
CS650 时域反射土壤含水量传感器

高电导率土壤中测量精度更精确

概览

CS650 是多参数智能传感器，使用革新的技

术监测土壤**体积含水量**、**容积电导率**和**土壤温度**。它的信号输出方式为 SDI-12，可用于大多数的 Campbell Scientific 数据采集器。如果采用到 ET107 蒸散站的话请选用 CS650-LC。



产品特点：

- ◆ 更精确的土壤含水量测量，容积电导率可达 3 dS m^{-1} ，无需实施特定土壤校准
- ◆ 更大的采集体积，减少了误差
- ◆ 对土壤质地和电导率的影响进行测量修正
- ◆ 估算很多种矿质土类型土壤中的含水量
- ◆ 多功能的传感器 — 可测量介电常数、容积电导率 (EC) 和土壤温度

技术说明：

CS650 含有连接到印刷电路板的 2 根 30 cm 长的不锈钢探针。电路板用环氧树脂封装，附着在电路板的带屏蔽线缆提供与数据采集器的连接。

CS650 测量传输时间、信号衰减和温度；再从这些原始测量值解析得到介电常数、体积含水量和容积电导率。



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测量的信号衰减是用于反射检测的损失效应及传播时间的修正。损失效应修正可以让探头在容积电导率 $\leq 3 \text{ dS m}^{-1}$ 的土壤中，测量出高精度的体积含水量，并不需要实施特定的土壤校准。

由衰减测量还可以计算得到土壤容积电导率。靠近环氧树脂表面的与探针保持热接触的热敏电阻用来测量温度。如果传感器水平安装，可以得到与土壤含水量测量相同深度的精确温度测量。如果以其它的方位安装传感器，那么温度测量只能代表环氧树脂附近探针的区域。

产品规格:

Measurements Made	Soil electrical conductivity (EC), relative dielectric permittivity, volumetric water content (VWC), soil temperature
Required Equipment	Measurement system
Soil Suitability	Long rods with large sensing volume (> 6 L) are suitable for soils with low to moderate electrical conductivity.
Sensing Volume (探测体积)	7800 cm ³ (~7.5 cm radius around each probe rod and 4.5 cm beyond the end of the rods)
Electromagnetic	CE compliant (Meets EN61326 requirements for protection against electrostatic discharge and surge.)
Operating Temperature Range	-50° to +70°C
Sensor Output	SDI-12; serial RS-232
Warm-up Time	3 s
Measurement Time	3 ms to measure; 600 ms to complete SDI-12 command
Power Supply Requirements	6 to 18 Vdc (Must be able to supply 45 mA @ 12 Vdc.)
Maximum Cable Length	610 m (2000 ft) combined length for up to 25 sensors





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	connected to the same data logger control port
Rod Spacing	32 mm (1.3 in.)
Ingress Protection Rating	IP68
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)
Probe Weight	280 g (9.9 oz) without cable
Electrical Conductivity 电导率	
Range for Solution EC	0 to 3 dS/m
Range for Bulk EC	0 to 3 dS/m
Accuracy	$\pm(5\% \text{ of reading} + 0.05 \text{ dS/m})$
Precision	0.5% of BEC
Relative Dielectric Permittivity 相对介电常数	
Range	1 to 81
Accuracy	$\pm(2\% \text{ of reading} + 0.6)$ from 1 to 40 for solution EC $\leq 3 \text{ dS/m}$ ± 1.4 (from 40 to 81 for solution EC $\leq 1 \text{ dS/m}$)
Precision	< 0.02
Volumetric Water Content 体积含水量	
Range	0 to 100% (with M4 command)
Water Content Accuracy	$\pm 1\%$ (with soil-specific calibration) where solution





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$\pm 3\%$ (typical with factory VWC model) where
solution EC < 3 dS/m

Precision < 0.05%

Soil Temperature

Range -50° to +70°C

Resolution 0.001°C

Accuracy $\pm 0.1^\circ\text{C}$ (for typical soil temperatures [0 to 40°C]
when probe body is buried in soil)
 $\pm 0.5^\circ\text{C}$ (for full temperature range)

Precision $\pm 0.02^\circ\text{C}$

