

# 253 and 257

## Soil Water Potential Sensors

The 253<sup>1</sup> and 257<sup>2</sup> soil moisture blocks provide a convenient method of estimating soil water potential between 0 and -2 bars (typically wetter or irrigated soils). If agricultural practices allow, these soil moisture blocks can be left in the soil all year—eliminating the need to remove the sensor during fallow periods.

The 253 and 257 are essentially the same, except the 257 contains a blocking capacitor. The blocking capacitor allows the 257 to connect directly to our dataloggers. The 253 needs to be connected to an AM16/32-series multiplexer. It is intended for applications where a larger number of points will be monitored.

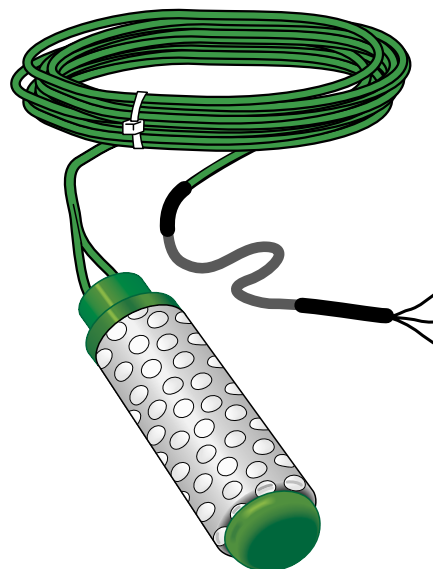
### Construction

The 253 and 257 consist of two concentric electrodes embedded in a reference matrix material. The matrix material is surrounded by a synthetic membrane for protection against deterioration. An internal gypsum tablet buffers against the salinity levels found in irrigated soils. The cable jacket is made of Santoprene rubber, which is resistant to temperature extremes, water, and UV degradation.

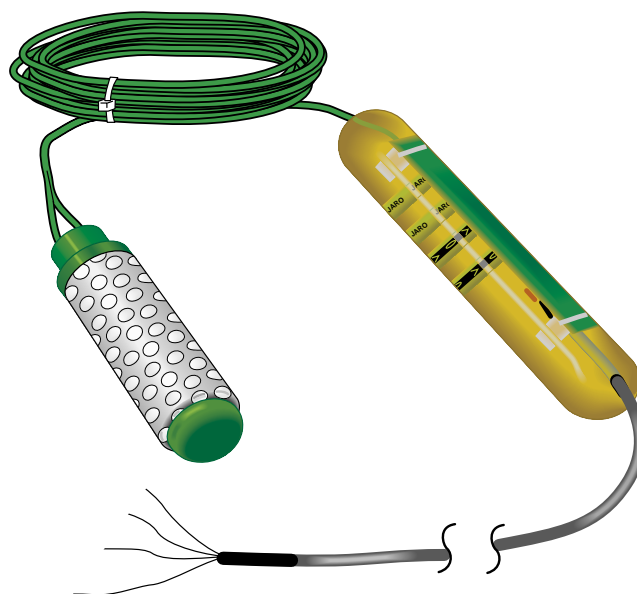
### Operation

When the amount of water in the soil surrounding the sensor changes, a difference in water potential between the soil and the sensor material is established. This gradient in potential causes a water flux between the two materials. For example, an irrigation or precipitation event results in movement of soil water into the 253 or 257 until equilibrium in water potential between the sensor and the soil occurs. An increase in the amount of water in the sensor reduces the electrical resistance between the sensor electrodes.

The datalogger measures the resistance between electrodes, and then converts the resistance measurement to soil water potential by using calibration values supplied with the sensor.



Campbell Scientific's 253 is designed for use with our AM16/32-series multiplexers.



Campbell Scientific's 257 includes blocking capacitors in its cable to mitigate ground loops and galvanic degradation.

<sup>1</sup>Campbell Scientific's 253 is the Watermark 200 modified for use with our multiplexers.

<sup>2</sup>Campbell Scientific's 257 is the Watermark 200 modified for use with our dataloggers.

## Ordering Information

### Soil Matric Potential Block

- 253-L** Watermark Soil Matric Potential Block for Multiplexer Use. Enter cable length (in feet) after the -L. Requires a 1 kohm resistor at the datalogger wiring panel to complete the measurement circuit (see below).
- 257-L** Watermark Soil Matric Potential Block with blocking capacitors. Enter cable length (in feet) after the -L. Must choose a cable termination option (see below).

### Cable Termination Options for the 257-L (choose one)

- PT** Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.
- PW** Cable terminates in connector for attachment to a prewired enclosure.

### Completion Resistor for the 253-L

- 3041** 1 kohm, 0.1% Resistor 1/8 W 10 ppm.

## Specifications

**Range:** 0 to -2 bars (0 to 200 kPa)

### Dimensions

**Length:** 3.25 inches (8.26 cm)

**Diameter:** 0.75 inches (1.91 cm)

**Weight:** 0.8 lbs (362.9 g)

### Compatible Dataloggers

**253:** CR800, CR850, CR1000, CR3000, CR5000, CR7, CR10(X), CR23X

**257:** CR800, CR850, CR1000, CR3000, CR5000, CR7, CR9000(X), CR510, CR10(X), CR23X

