

Calibration Equations for the S-SMC-M005 and W-SMC Soil Moisture Sensors Application Note



*Decagon Devices, Inc.
Pullman, WA*

The ECH₂O EC-5 probe that is used in the S-SMC-M005 and W-SMC soil moisture sensors can be used in a variety of soil and soil-less media types, some of which require an adjustment to the probe calibration. To help with this, we provide this application note that includes calibration equations for several types of media. If the media type that you are using does not appear in the calibration list, you may be required to conduct a calibration yourself.

The S-SMC-M005 and W-SMC soil moisture sensors provide data directly in VWC soil moisture using a mineral soil calibration equation. These sensors can be used in other soil types, but the values provided by the sensors must be adjusted for the different soil types. The equations to do this conversion for other soil types are given below. These equations can be used in a spreadsheet program like Microsoft® Excel® to convert a whole data set.

Mineral Soil

The S-SMC-M005 and W-SMC soil moisture sensors provide data directly in VWC soil moisture using an internal mineral soil calibration equation. This equation will generally suffice for all mineral soil types with electrical conductivities from 0.1 dS/m to 10 dS/m, with no additional conversion required.

Potting Soil

The following equation can be used to convert S-SMC-M005 and W-SMC output to water content in potting soil:

$$\theta = 1.773 * \theta_{smc} + 0.036$$

Where θ_{smc} is the value provided by the S-SMC-M005 or W-SMC sensor.

Rockwool

The following equation can be used to convert S-SMC-M005 and W-SMC readings to water content in Grodan Master rockwool with solution electrical conductivities up to 4.5 dS/m.

$$\theta = 1.857 * \theta_{smc}^2 + 1.063 * \theta_{smc} + 0.089$$

Where θ_{smc} is the value provided by the S-SMC-M005 or W-SMC sensor.

Perlite

The following equation can be used to convert S-SMC-M005 and W-SMC readings to water content in coarse perlite:

$$\theta = -0.167 * \theta_{smc}^2 + 0.824 * \theta_{smc} + 0.150$$

Where θ_{smc} is the value provided by the S-SMC-M005 or W-SMC sensor.