

The Science Behind HydraProbe

HydraProbe is a “dielectric impedance”- based sensor developed by the physics department at Dartmouth College, USA. Unlike capacitance or time domain based soil sensors, HydraProbe fully characterises the dielectric spectrum using a radio frequency at 50 MHz. Complex mathematical computations performed by an onboard microprocessor process the reflected signal measurements to accurately determine the soil’s dielectric permittivities - the key parameters behind the soil moisture and bulk EC measurement. Low inner-sensor variability means there is no need for sensor-specific calibrations. This method has passed the most rigorous scientific peer review from dozens of journals such as the Vadose Zone Journal, American Geophysical Union and The Journal of Soil Science Society of America. Read more about the different soil sensor technologies at soilsensor.com



About EC (Electrical Conductivity / Salinity)

- The bulk EC (electrical conductivity) of the soil is correlated to the soil's salinity because when salts are mixed with water they will conduct electricity. The bulk EC parameter is sometimes called “salinity”.
- Many nutrients are salts - a source of salinity. Nutrient accumulation, poor drainage and saline irrigation water can lead to the unwanted build-up of salinity in soil.
- High bulk EC can affect moisture readings and create errors with capacitance based moisture sensors.
- HydraProbe's soil moisture measurement is less sensitive to salinity than other capacitance based probes.
- The soil bulk EC can change dramatically with water content and can be affected by the quality of the irrigation water, fertilisation, drainage and other natural processes.
- Compaction, clay content and organic matter, can influence moisture holding trends over time, also affecting bulk EC capacities in soil.
- The effect of bulk EC on the moisture availability to a plant's roots is great. As salinity changes the water needs also change.
- A temperature corrected bulk EC parameter is available so the user can make comparison independent of soil temperature.
- Because HydraProbe also measures the dielectric permittivities, algorithms can be applied to approximate the EC of the soil pore water allowing for better soil salinity characterisations.