



# Introducing the SRS

Spectral Reflectance Sensor

*Monitor the Normalized Difference Vegetation Index or the Photochemical Reflectance Index.*

## Continuous Monitoring

The Spectral Reflectance Sensor (SRS) is intended for continuous monitoring of the Normalized Difference Vegetation Index (NDVI) or the Photochemical Reflectance Index (PRI) of plant canopies. The SRS is low cost, rugged, easily and quickly deployable, and has been designed to provide years of reliable operation. Sensors are intended to be deployed over individual plants, research plots or distributed spatially over a plant canopy to record canopy phenology, foliar pigment dynamics, leaf area index, light interception and light use efficiency.

## Preliminary Specifications

- Four configurations: (1) NDVI or (2) PRI sensors with diffuse cosine receptors. (3) NDVI or (4) PRI sensors with 20° field stops sealed with clear acrylic.
- NDVI bands centered at 630 nm and 800 nm (50 nm and 40 nm FWHM\*, respectively).
- PRI bands centered at 532 nm and 570 nm (both 10 nm FWHM\*).
- Sensors can be mounted facing up or down, singly or in tandem, leveled or aimed.
- NIST traceable radiance ( $\text{W m}^{-2} \text{ nm}^{-1} \text{ sr}^{-1}$ ) or irradiance ( $\text{W m}^{-2} \text{ nm}^{-1}$ ) calibration with coefficient values stored onboard sensor.
- Accuracy of 10% or better.
- Fully sealed from the elements and UV resistant to minimize drift over time.
- SDI-12 digital sensor, compatible with Decagon's EM50 family and CSI loggers.

\*FWHM: Full width half maximum band width

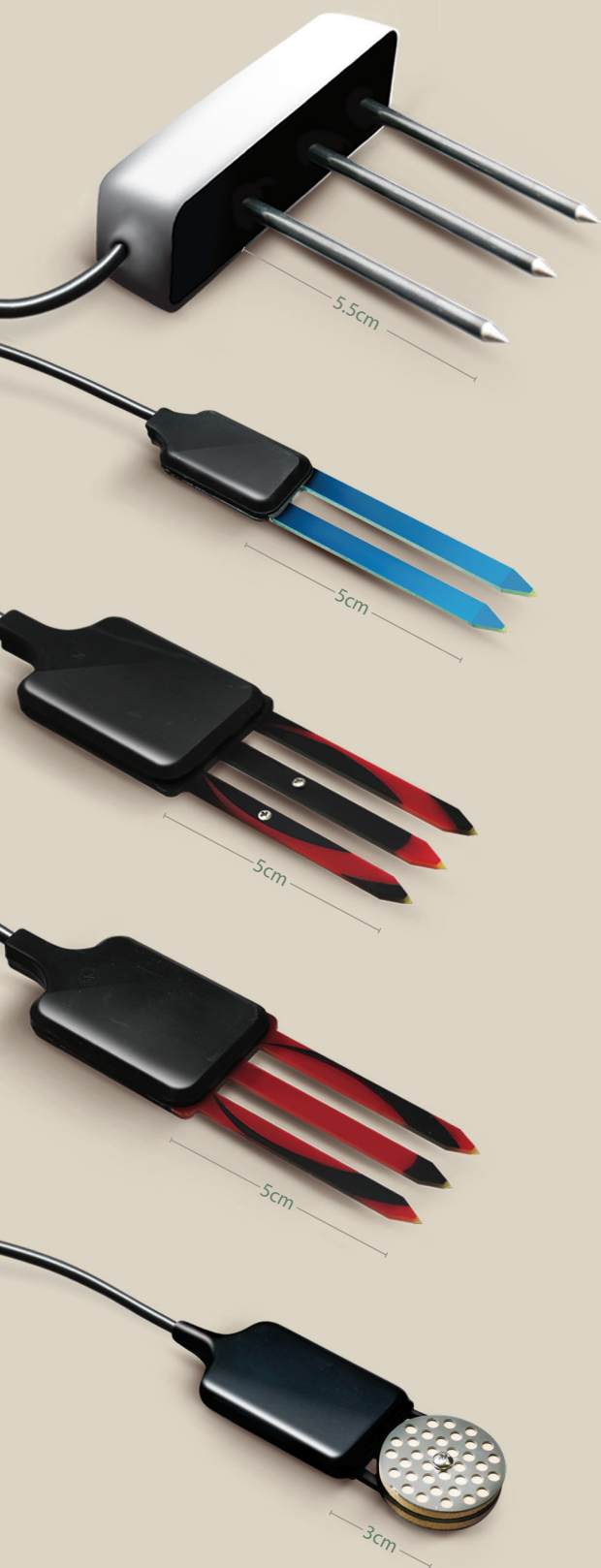
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we measure the world®

# Soil Moisture Networks



Measurement & Benefits	Range	Accuracy
<b>GS3</b> Volumetric Water Content, Electrical Conductivity, Dielectric Permittivity, Temperature.  <b>Benefits:</b> Optimized for greenhouse and nursery substrates.	<b>VWC:</b> 0–100%.  <b>Apparent dielectric permittivity (<math>\epsilon_a</math>):</b> 1 (air) to 80.  <b>Temperature:</b> -40 to 80°C. <b>EC:</b> 0 to 23 dS/m (bulk).	<b>(<math>\epsilon_a</math>):</b> $\pm 1 \epsilon_a$ (unitless) from 1–40 (soil range), $\pm 15\%$ from 40–80.  <b>Electrical Conductivity (EC):</b> $\pm 10\%$ from 0 to 10 dS/m, user calibration required above 10 dS/m.  <b>Temperature:</b> $\pm 1^\circ\text{C}$ .
<b>EC-5</b> Volumetric Water Content.  <b>Benefits:</b> All purpose, least expensive soil moisture sensor.	<b>VWC:</b> 0–100%.	<b>VWC:</b> $\pm 3\%$ , typical mineral soils up to 8 dS/m.  <b>VWC Rockwool:</b> $\pm 3\%$ VWC, 0.5 to 8 dS/m.  <b>VWC Potting soil:</b> $\pm 3\%$ VWC, 3 to 14 dS/m.
<b>5TE</b> Volumetric Water Content, Electrical Conductivity, Dielectric Permittivity, Temperature.  <b>Benefits:</b> Manage salts and fertilizers in your soils.	<b>VWC:</b> 0–100%.  <b>Apparent dielectric permittivity (<math>\epsilon_a</math>):</b> 1 (air) to 80.  <b>EC:</b> 0 to 23 dS/m (bulk).  <b>Temperature:</b> -40 to 50°C.	<b>VWC:</b> $\pm 3\%$ , typical mineral soils up to 8 dS/m.  <b>(<math>\epsilon_a</math>):</b> $\pm 1 \epsilon_a$ (unitless) from 1–40 (soil range) $\pm 15\%$ from 40–80.  <b>Bulk EC:</b> $\pm 10\%$ .  <b>Temperature:</b> $\pm 1^\circ\text{C}$ .
<b>5TM</b> Volumetric Water Content, Dielectric Permittivity, Temperature.  <b>Benefits:</b> Include temperature dependencies in your research study.	<b>VWC:</b> 0–100%.  <b>Apparent dielectric permittivity (<math>\epsilon_a</math>):</b> 1 (air) to 80.  <b>Temperature:</b> -40 to 50°C.	<b>VWC:</b> $\pm 3\%$ , typical mineral soils up to 8 dS/m.  <b>(<math>\epsilon_a</math>):</b> $\pm 1 \epsilon_a$ (unitless) from 1–40 (soil range) $\pm 15\%$ from 40–80.  <b>Temperature:</b> $\pm 1^\circ\text{C}$ .
<b>MPS-2</b> Soil Matrix Potential, Temperature.  <b>Benefits:</b> Maintenance-free water potential and soil temperature monitoring measurements that do not drift over time.	<b>Soil water potential (<math>\Psi</math>):</b> -10 to -500kPa (pF 1.71 to pF 3.71).  <b>Temperature:</b> -40°C to 50°C.	<b><math>\Psi</math>:</b> $\pm 25\%$ of reading from -5 to -100 kPa*  <b>Temperature:</b> $\pm 1^\circ\text{C}$ .  <small>*Accuracy significantly improved with custom calibration.</small>