The 5TE lets you monitor bulk electrical conductivity (EC), in addition to volumetric water content (VWC) and soil temperature.

Featured soil moisture sensor. Measures volumetric water content, temperature, and electrical conductivity in soil. This three-pronged, 5 cm long sensor is for use in soil only. High frequency oscillation and patented signal filtering deliver excellent accuracy with minimal textural effects. Serial or SDI-12 communication options come standard with each 5TE, giving lots of options for integrating into systems manufactured by other companies.

The 5TE makes all three measurements (volumetric water content, temperature, and EC) independently. Like all ECH2O sensors, the 5TE determines volumetric water content (VWC) by measuring the dielectric constant of the media using capacitance/frequency domain technology. The sensor uses a 70 MHz frequency, which minimizes salinity and textural effects, making the 5TE accurate in most soils. The 5TE measures temperature with an onboard thermistor, and electrical conductivity using a stainless steel electrode array. VWC in mineral soils is calculated using the Topp equation; other calibrations are provided on request. Temperature and electrical conductivity are factory calibrated for all soil types.

5TE Soil Moisture Sensor Features

- For measuring volumetric water content, dielectric permittivity, temperature, electrical conductivity
- Data Logging Compatibility with Em50, Em50R, Em50G, ProCheck, SDI-12 capable
- Measurement Range 0 to 100% VWC -40 to 50°C 0 to 23 dS/m
5TE SOIL SENSOR

**RANGE**
VWC: 0 – 100%
EC (bulk): 0-23 dS/m (bulk)

**TEMPERATURE**
-40°C to 50 °C

**RESOLUTION**
VWC: 0.08% from 0 to 50% VWC

**POWER**
3-16 VDC

**MEASUREMENT TIME**
10 ms

**OUTPUT**
Digital 12-bit

**OPERATING TEMPERATURE**
-40°C to 50°C

**CONNECTOR TYPES**
3.5 mm “stereo” plug or stripped and tinned lead wires.

**CABLE LENGTH**
5 metres

**DIMENSIONS**
14.5 cm x 3.3 cm x 0.7 cm

**DATALOGGER COMPATIBILITY**
Em50

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**SENSOR COMPARISON TABLE**

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<tr>
<th>ANALOG SENSORS</th>
<th>DIGITAL SENSORS</th>
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<td>SENSOR</td>
<td>10HS</td>
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<tr>
<td>MEASURES</td>
<td>volumetric water content, volumetric water content, dielectric permittivity, temperature, electrical conductivity</td>
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<tr>
<td>VOLUME OF INFLUENCE</td>
<td>0.3 L</td>
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<tr>
<td>DATA LOGGER COMPATIBILITY</td>
<td>Em5b, Em5G, Em50R, Em50G, ProCheck, ECH2O, Em5b, Em50, Em50R, Em50G, ProCheck, ECH2O, Em5b, Em50, Em50R, Em50G, ProCheck, ECH2O, Em50, Em50R, Em50G, ProCheck, SDI-12 Em50, Em50R, Em50G, ProCheck, SDI-12</td>
</tr>
<tr>
<td>MEASUREMENT RANGE</td>
<td>0 to 100% VWC</td>
</tr>
<tr>
<td></td>
<td>0 to 57% VWC</td>
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<table>
<thead>
<tr>
<th>5TE</th>
<th>GS3</th>
<th>MPS-2</th>
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</thead>
</table>
| VWC: 0 – 100% | Volumetric water content, volumetric water content, dielectric permittivity, temperature, electrical conductivity | Water potential, temperature |}

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ABOUT THE 5TE SOIL SENSOR

In water-limited areas, salt management is a serious concern. In these areas, monitoring salt levels can be as important as monitoring soil moisture. The 5TE allows you to measure salt levels through bulk electrical conductivity.

EC measurements require good contact between the stainless steel electrodes on the sensor, and the soil. Because of large air spaces in potting soil and soilless media, the 5TE cannot be used accurately in potting soils or soilless substrates. However, the new GS3 Soil Moisture, Temperature, and EC sensor is designed specifically for use in these media.

The 5TE’s small size makes it easy to install–perfect in field installations. This robust probe should be pushed directly into undisturbed soil to ensure good accuracy.

Volumetric Water Content

The 5TE sensor uses an electromagnetic field to measure the dielectric permittivity of the surrounding medium. The sensor supplies a 70 MHz oscillating wave to the sensor prongs that charges according to the dielectric of the material. The stored charge is proportional to soil dielectric and soil volumetric water content. The 5TE microprocessor measures the charge and outputs a value of dielectric permittivity from the sensor.

Temperature

The 5TE uses a surface-mounted thermistor to take temperature readings. The thermistor is underneath the sensor overmold, next to one of the prongs, and it reads the temperature of the prong surface. The 5TE outputs temperature in °C unless otherwise stated in DataTrac 3 or ECH2O Utility preferences file.

It is important to note that if the black polyurethane overmold of the sensor is in direct sunshine, the temperature measurement may read high. We do not recommend that the sensor be installed with the overmold in the sun.

Electrical Conductivity

Electrical conductivity (EC) is the ability of a substance to conduct electricity and can be used to infer the amount of polar molecules that are in solution. Measure EC by applying an alternating electrical current to two electrodes and measuring the resistance between them. Conductivity is then derived by multiplying the inverse of the resistance (conductance) by the cell constant (the ratio of the distance between the electrodes to their area).

The 5TE uses a two-sensor array to measure the EC. The array is located on the screws of two of the 5TE prongs.
Note: Small amounts of oil from skin contact with the screws will cause significant inaccuracy in the EC measurement.

The 5TE uses a two-electrode array to measure the bulk EC of the surrounding medium. Decagon factory calibrates the bulk EC measurement to be accurate within 10% from 0 to 7 dS/m. This range is adequate for most field, greenhouse and nursery applications. However, some special applications in salt affected soils may require measurements with bulk EC greater than the specified range. The 5TE can measure up to 23.1 dS/m bulk EC, but requires user calibration above 7 dS/m. Additionally; EC measurements above 7 dS/m are sensitive to contamination of the electrodes by skin oils, etc.