Quickstart Guide

SOIL MOISTURE SENSORS

DECAGON DEVICES

READ FIRST

This guide describes how to start using your soil moisture sensors immediately. If you read nothing else, read through this guide.

For more detailed information, download the complete user manual online at ***www.decagon.com/sm***

OVERVIEW & BASICS

1 Before installing your sensors in the field, set up and test your system (sensors and data loggers) in your lab or office. Make sure that you are using the most up-to-date software and firmware with Decagon data loggers. Visit the individual Decagon data logger product page for the most up-to-date software and firmware.

2 Take some measurements with the sensor using a ProCheck. Keep in mind that sensors will not necessarily read 100% VWC in water and 0% in air. The sensors are optimized to read soils, and the factory mineral calibration is done in real soils; not air and water.

You can check sensor functionality in air and water:
Values below are given in terms of % VWC using the factory mineral soils calibration

MODEL	WATER	AIR
EC-5	50-60	slightly negative
10HS	50-60	slightly negative
5TE	~98	slightly negative
5TM	~98	slightly negative
GS3	~98	slightly negative

3 Sensors vary less than 1% from one sensor to the next. If you would like to check this for yourself, compare the output of the sensors when they are placed in Peak Gold brand anti-freeze (ethylene glycol) rather than water. Ethylene glycol has a dielectric permittivity similar to that of unsaturated soils.

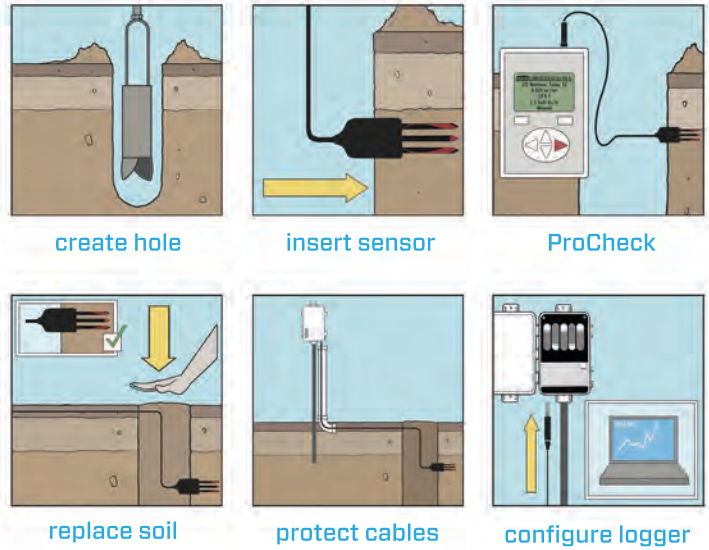
4 Watch our installation video ***www.decagon.com/install*** for important set-up information. Installation methods and protection measures (including using PVC pipe to protect cables where they emerge from the soil) will have a critical impact on sensor function and data quality.

PROPER SENSOR INSTALLATION

1. Auger or trench a hole to the desired sensor depth.
2. Insert the sensor into undisturbed soil vertically, or horizontally.
3. Use the ProCheck to take a reading of the sensor. If you don't think that the sensor has good soil-to-sensor contact, uninstall and reinsert into undisturbed soil.
4. When you are confident that the sensor has good soil-to-sensor contact, backfill the soil in the trench or hole to the approximate bulk density of the surrounding soil.
5. Protect the cables with PVC casing above the ground surface.
6. Plug your sensors into the data logger and configure the logger with Decagon software.

Warning: Incorrect sensor installation can void your sensor warranty.

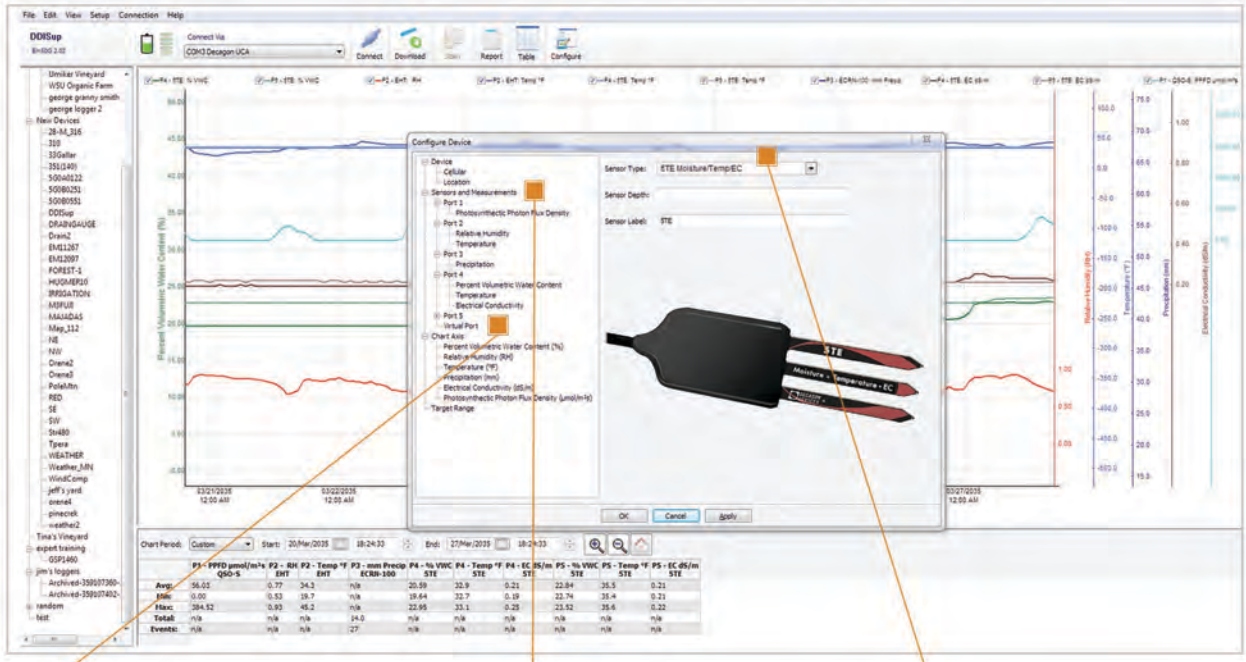
Warranty: All Decagon products have a 30-day satisfaction guarantee and a one-year warranty.



LOGGER CONFIGURATION

You can configure your data loggers using either DataTrac 3 or ECH$_2$0 Utility Software.

DataTrac3

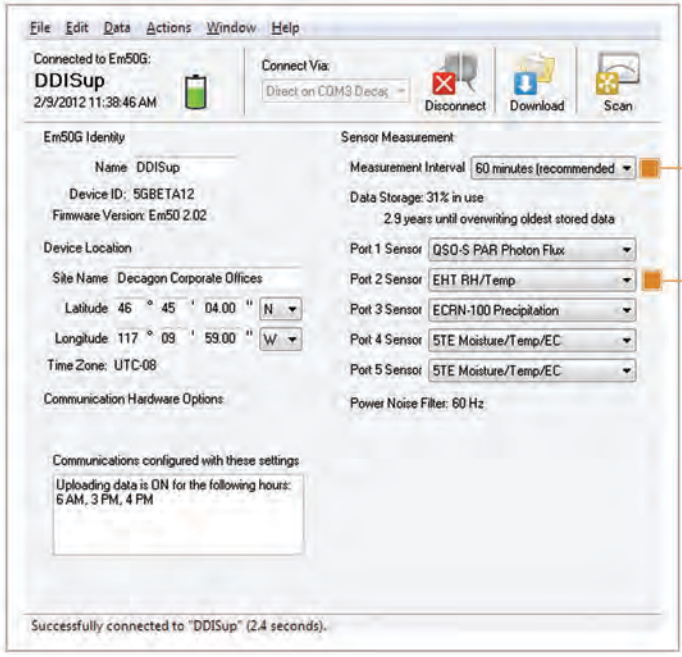


Use virtual tools to calculate meaningful metrics, such as plant available water and vapor pressure deficit.

Pick your measurement interval by selecting "sensors and measurements."

Select the sensor plugged into each port.

ECH$_2$O Utility



ECH$_2$O Utility is included with every Em50 logger purchase.

Pick your measurement interval.

Select the sensor plugged into each port.

Try out DataTrac3 free for 30 days at www.decagon.com/datatrac3

SOIL CALIBRATION INFORMATION

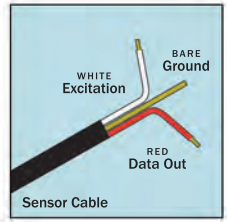
Decagon has developed factory calibrations that can be used with typical soils and some soilless substrates. These calibrations are incorporated into Decagon software. If you choose to do a custom calibration, you only need to calibrate one sensor type (not every sensor) to your specific soil. We have complete instructions on custom calibrations at:

www.decagon.com/calibrate

Decagon can provide you with a custom calibration service.

USING SENSORS WITH NON-DECAGON DATA LOGGERS

Our user manuals and integrator's guides have complete information for interfacing Decagon sensors with non-Decagon loggers. In addition, we suggest that you use the specific logger manual during set-up. Below are some general guidelines to get you started.



3-Wire Interface

MODEL	EXCITATION	OUTPUT
EC-5	2.5-3.6 V	analog
10HS	3.6-15 V	analog
5TE	3.6-15 V	digital
5TM	3.6-15 V	digital
GS3	3.6-15 V	digital

Factory calibrations for typical mineral soils and soilless substrates can be found in the user manual.

Lightning: If you are using the sensors in a lightning-prone areas, follow our directions for providing lightning protection at:

www.decagon.com/lightning

RELATED DECAGON PRODUCTS

GS3
Volumetric water content, temp, EC

5TE
Volumetric water content, temp, EC

5TM
Volumetric water content, temp

EC-5
Volumetric water content

10HS
Volumetric water content

MPS-2
Soil matric potential, temp

LEAF WETNESS SENSOR
Duration of leaf wetness

RT-1
Rugged temperature sensor

PYR
Total solar radiation

QSO-S
PAR photon flux

CUP ANEMOMETER
Wind speed, direction

TEMP/RH
Temp and relative humidity

CTD SENSOR
Water depth, temp, EC

DRAIN GAUGE
Deep drainage monitor

ECRN-50
Low-resolution rain gauge

ECRN-100
High-resolution rain gauge

DATATRAC 3
Graphing and database software

EM50R DATA LOGGER
Radio data logger

EM50G DATA LOGGER
Cellular data logger

EM50 DATA LOGGER
Direct connect logger

PROCHECK
Sensor read-out and storage system

SOIL MOISTURE PRODUCTS.

Seller warrants new equipment of its own manufacture against defective workmanship and materials for a period of one year from date of receipt of equipment (the results of ordinary wear and tear, neglect, misuse, accident and excessive deterioration due to corrosion from any cause are not to be considered a defect); but Seller's liability for defective parts shall in no event exceed the furnishing of replacement parts F.O.B. the factory where originally manufactured. Material and equipment covered hereby which is not manufactured by Seller shall be covered only by the warranty of its manufacturer. Seller shall not be liable to Buyer for loss, damage or injuries to persons (including death), or to property or things of whatsoever kind (including, but not without limitation, loss of anticipated profits), occasioned by or arising out of the installation, peration, use, misuse, nonuse, repair, or replacement of said material and equipment, or out of the use of any method or process for which the same may be employed. The use of this equipment constitutes Buyer's acceptance of the terms set forth in this warranty. There are no understandings, representations, or warranties of any kind, express, implied, statutory or otherwise (including, but without limitation, the implied warranties of merchantability and fitness for a particular purpose), not expressly set forth herein.

Application of Council Directive:89/336/EE6 Standards to which conformityEN61326 : 1998 is declared:EN51022 : 1998 Type of Equipment: ECH2O soil moisture sensor. Model Number: EC-5, 10HS, 5TE, 5TM, GS3. Year of First Manufacture:2001Manufacturer's Name: Decagon Devices, Inc. 2365 NE Hopkins Court Pullman, WA 99163 USA

2365 NE Hopkins Court, Pullman, WA 99163. Fax: 509.332.5158 International: 1.509.332.2756.