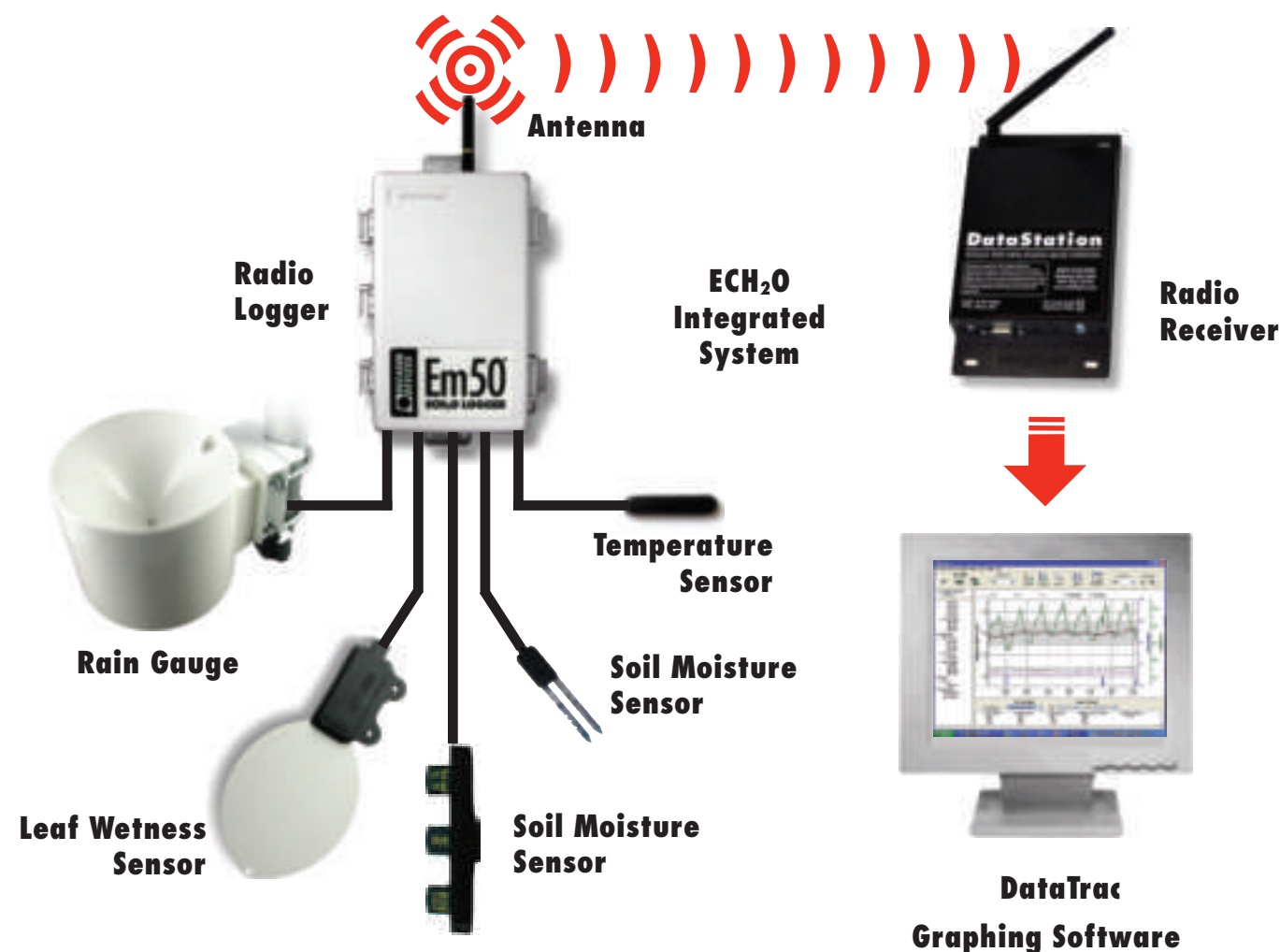


The ECH₂O system gives you the best accuracy at the lowest cost.



A variety of sensors for the loggers can be found at: www.decagon.com/environmental/climate

ONE DATASTATION CAN TALK TO HUNDREDS OF DATALOGGERS. Connect up to five of any ECH₂O sensors to each datalogger in any combination. This gives you the ability to set up a "micro-environment station," monitor soil moisture, temperature, rain, etc. at one location. Data can either be transmitted remotely via radio or downloaded directly to a computer and then analyzed using DataTrac or other software.



▲ **CABLE ARMOR** Threading the armor with cable.

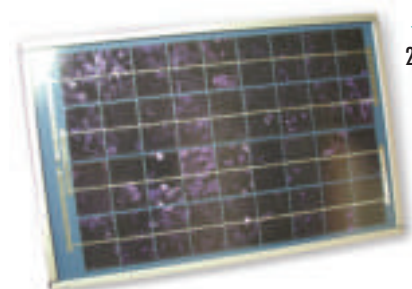
RODENT-RESISTANT PLASTIC
Rodents are a major problem in many locations. Rodents are drawn to the aromatic odors of polymers, the bright inner wire colors, and the polymer texture. These rodents destroy underground cable by chewing off cable insulation, which can expose bare wires and cause short circuits.

Cable Armor protects your cables by increasing the outer diameter of the cable with plastic shielding.



▲ **Remote Outdoor Enclosure**
34.3cm H x 24.1cm W x 17.8cm D.

◀ **REMOTE OUTDOOR ENCLOSURE**
Protects your DataStation from the elements. Includes a weather-proof metal case for the DataStation, Solar Power panels and all mounting hardware. The DataStation, outdoor antenna, and antenna extension cable are sold separately.



◀ **Solar Panel**
27.9cm H x 41.9cm W x 2.5cm D.

EC-20 & EC-10 Installation Kit

For both trench and bore hole installations.



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■ **Decagon has manufactured research-grade instruments for over 20 years. Our goal is always to provide high quality at the best price, so you can do more with your instrumentation budget.**



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ECH₂O BENEFITS FOR SOIL SCIENCE

- Durable materials for accurate long-term moisture content monitoring.
- Measure at different depths over a wide geographic area with relatively low system and maintenance cost.
- Measure the soil dielectric constant to determine volumetric water content.
- Low sensitivity to saline and temperature effects in the soil.
- Very low power for long-term cost-effective monitoring.
- Extremely high resolution making possible accurate daily or hourly water monitoring.
- Measure temperature and electrical conductivity (EC) together with water content for more useful information about soil conditions.



Long-term soil water content sensors.

The following specifications are common to all probes:

Cable Length 5m

Operating Environment

-40 to 60°C, 0–100% RH

Measurement Time 10ms

Resolution

0.002m³/m³ typical with Em50 and Em5b loggers, other loggers may vary.



ECH₂O

Model	EC-5	EC-TM	ECH ₂ O TE	EC-20	EC-10	EA-10
Length	5cm	5cm	5cm	20cm	10cm	10cm
Measurement	Volumetric Water Content	Volumetric Water Content and Temperature	Volumetric Water Content, Electrical Conductivity, Temperature	Volumetric Water Content	Volumetric Water Content	Volumetric Water Content
Accuracy	±3% typical on all soils, up to 8 dS/m, ±1 to 2% with soil-specific calibration	MINERAL SOIL : ±3% VWC up to 8 dS/m, ±1 to 2% with soil-specific calibration ROCKWOOL ±3% VWC, 0.5 to 8 dS/m POTTING SOIL ±3% VWC, 3 to 14 dS/m	MINERAL SOIL : ±3% VWC up to 8 dS/m, ±1 to 2% with soil-specific calibration ROCKWOOL ±3% VWC, 0.5 to 8 dS/m POTTING SOIL ±3% VWC, 3 to 14 dS/m	±4% typical on low EC & medium-textured mineral soils, ±1 to 2% with soil-specific calibration	±4% typical on low EC & medium-textured mineral soils, ±1 to 2% with soil-specific calibration	±4% typical on low EC & medium-textured mineral soils, ±1 to 2% with soil-specific calibration
Range	0–100% VWC	0–100% VWC	0–100% VWC	0–40% VWC	0–40% VWC	0–40% VWC
Electrical interface	3.5mm plug, 3-wire	3.5mm plug, 3-wire	3.5mm plug, 3-wire	3.5mm plug, 3-wire	3.5mm plug, 3-wire	2-wire analog, 4–20mA
Supply voltage	2.5–5V DC @ 10mA	3–16 VDC, 0.3 mA quiescent, 10 mA for 9 ms measurement	3–16 VDC, 0.3 mA quiescent, 10 mA for 9 ms measurement	2.5–5V DC @ 10mA	2.5–5V DC @ 10mA	line-powered 7–32 VDC, overvoltage & reverse-polarity protected
Frequency	70 MHz	70 MHz	70 MHz	5 MHz	5 MHz	5 MHz
Output	Voltage, correlated linearly (soil) or polynomially (growing media) with VWC	Serial 3V TTL, 8 bit, 1-stop bit, no parity	Serial 3V TTL, 8 bit, 1-stop bit, no parity	Voltage, correlated linearly with soil VWC	Voltage, correlated linearly with soil VWC	Voltage, correlated linearly with soil VWC
Benefits	Accuracy in high temp / high EC small soil volume	Accuracy in high temp / high EC small soil volume	Accuracy in high temp / high EC small soil volume	High soil volume	Medium soils volume	Industrial applications

■ **THE ECH₂O PROBES** are well-known for their durability and cost-effectiveness. Now they've just become more accurate for the same low price. Our new EC-5, ECH₂O-TE and EC-TM sensors operate at a higher frequency than most capacitance probes, giving them an accuracy of ±3% in all soil types with the standard factory calibration.



www.decagon.com/echo

ECH₂O Check



▲ Great for sensor testing.

- ECH₂O Check Portable readout. Readings are instantaneously displayed in units of volume percent (cm/m), inches per foot (in/ft), or ADAC (raw data).

For EC-5, EC-10, & EC-20
Measurement speed <1s.
Resolution 1mV, 0.1%, 0.01 in/ft. Adjustable calibration.

Meter accuracy ±3%.
Power 3V CR2 lithium battery.
Battery life 3–4 years.
Case Stainless steel with silicone elastomer spacer.
Case size 8.9x10.2cm (oval).
Weight 115 grams.
Operating environment 0–40°C.

- **Gelox Case** and hinged cover make it easy to collect data and replace batteries.

- **Improved O-ring seal.**

- **Dedicated download port.**

- **Reinforced cable strain relief.**



▲ Em50 logger is a turn-key logger for all Decagon's sensors.

Em5b Logger



▲ The Em5b has 5 channels that allow even scientists on a tight budget to monitor soil moisture and other environmental parameters inexpensively.

Em5b Logger

For EC-5, EC-10, EC-20, ECRN-50 & ECT
Storage 3,400 scans.

1/minute to 1/day.

Communication RS232

Resolution <0.1% VWC.

Power 4 AAA alkaline batteries, life 3+ years.

Dimensions

9.5cm W x 7cm H x 3.2cm D

Download software included with Em5b purchase.

Em50 Logger

Channels 5.

Storage >36,000 scans. Each scan includes logger name, date, time, and five measurements.

Scan Interval

User-programmable from 1/minute to 1/day.

Communication RS232 and/or spread spectrum radio.

Resolution <0.1% VWC.

Power 5 AA alkaline batteries.

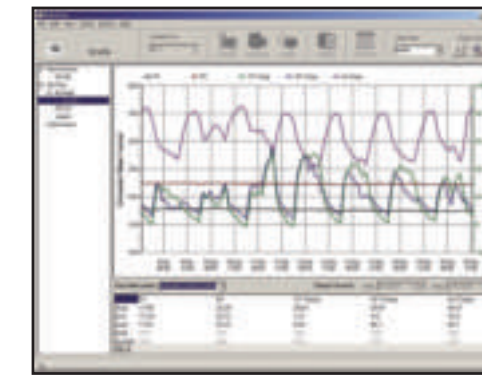
Battery service life > 1 year logging only, 6+ months with radio telemetry.

Dimensions 12.7cm W x 20.3cm H x 5.1cm D

Enclosure Rating IP55, NEMA3

Download software included with Em50 purchase.

ECH₂O System Software



Display collected data in chart form.

DataTrac is the premier ECH₂O system software designed to help users organize and visualize their measurement data. DataTrac automatically organizes and stores data for each data logger, and its powerful charting engine displays data graphically. DataTrac makes it easy for users to apply custom calibrations to individual sensors. Users can also view and edit data in table format, create reports, and transfer data to other DataTrac users.

ECH₂O Utility Mobile brings the usefulness of ECH₂O Utility to the HP iPAQ line of handheld computers—enabling users to bring their PDA to the field instead of an expensive laptop. Like the desktop version, ECH₂O Utility Mobile allows users to configure their data logger, make real-time measurements, and download data.

ECH₂O Utility is free software that is included with the purchase of an Em5b, Em50 or Em50R data logger. ECH₂O Utility enables you to configure your data logger, make real-time sensor measurements, and download raw data to your computer.

Minimum System Requirements (DataTrac and ECH₂O Utility)

Microsoft Windows 98 or better
Monitor set to display 1024x768 pixels (minimum)

Minimum System Requirements (ECH₂O Utility Mobile)

Pocket PC 2003, Pocket PC 2003SE or Windows Mobile 5
Available serial port



DataStation



- External antenna connector.
- RS232 serial cable connectivity.
- Storage for over 36,000 broadcast packets.
- Flexible 9-24V AC/DC power.

◀ The DataStation is a radio base station that allows you to remotely collect and store data from multiple Em50R data loggers. The DataStation is always on, receiving and saving data from Em50R loggers operating in transmit mode. Data can then be downloaded directly from the DataStation to your laptop at your convenience. DataStation data can be exported to spreadsheet programs or graphed and analyzed using ECH₂O DataTrac software.
18.4cm L x 10.5cm W x 2.86cm H

Archer Field PC

► The ultra-rugged Archer Field PC is our recommended platform for managing data in-the-field. The Archer is water-proof, shock-resistant, and remarkably versatile. The Archer is capable of a wide range of adaptations, including:

- Capture, map, or navigate using GPS options.
- Communicate wirelessly via Bluetooth, Wi-Fi, or cellular modems.
- Snap pictures using a CF or SD camera.
- Custom configuration.



The ergonomic Archer fits you hand and stows in your pocket. Depend on the Archer for your field information technology.