



Delta-T Devices

The EQ3 next generation Equitensiometer has extra features and a new look. With maintenance-free operation and a wide measurement range it continues to set the standard for reliable water potential measurement. In addition it now measures soil temperature.

The precision-built EQ3 uses class leading ThetaProbe technology to avoid the many problems of water-filled tensiometers. It measures water potential (matric potential) in the range 0 to -1000 kPa and provides an accurate loggable output. It is well suited for use in dry soils.

- Convenient, accurate, reliable alternative to water-filled tensiometers
- Excellent range 0 to -1000 kPa
- Maintenance-free: no refilling or degassing
- No recalibration required
- New built-in temperature sensor
- New extendable cable system

New features

The EQ3 Equitensiometer is an improved replacement for the EQ2 model. It provides extra functionality and is easier to use.

The addition of a thermistor sensor to the EQ3 enables the simultaneous logging of soil temperature and water potential.

A new cabling system makes it simple to extend or replace cables, offering a choice of 1m, 5m, 10m and 25m extensions. EQ3 cables and connectors are buriable and environmentally protected to IP68.



EQ3 Equitensiometer with GP2 Data Logger

EQ3 Equitensiometer



How it works

The EQ3 Equitensiometer is based on the ML3 ThetaProbe - a precision soil moisture sensor. The measuring rods of the ThetaProbe are embedded in a porous material (the equilibrium body). This material has a known, stable relationship between water content and matric potential. When the EQ3 is inserted into the soil, the matric potential within the equilibrium body equilibrates to that of the surrounding soils. The water content of the matric material is measured directly by the ThetaProbe, and this can be converted into the matric potential of the surrounding soil using the calibration curve supplied with each Equitensiometer.

EQ3 Equitensiometer

Installation

The EQ3 is buriable and maintenance-free. It can be inserted into augered holes or positioned in the wall of a trench (which is then carefully back-filled). Optional extension tubes assist placement and removal when burying at depth.

Applications

The EQ3 Equitensiometer is ideally suited to static long term monitoring of water potential in soils and substrates. It can even be left installed in frozen soils. Typical applications include environmental, plant, soil, ecology and geo-sciences research, as well as civil engineering and agricultural engineering applications.

The EQ3's full range is 0 to -1000 kPa but best accuracy is achieved between -100 and -500 kPa. This makes it well suited to plant water stress studies - even in very dry soils.

Please note that despite its many strengths (and advantages over water-filled tensiometers), the EQ3 should not be seen as a rapid response sensor that covers the full range of water potentials at high accuracy. Such a sensor does not yet exist. EQ3 equilibration time is typically several hours.

As the EQ3 is maintenance-free (no refilling, degassing, or topping up required) frost resistant and low powered, it can be conveniently used at remote sites over long periods of time. In such instances it is possible to access sensor data wirelessly via a GPRS enabled data logger such as the GP2.

Data Logging

The EQ3 can be logged by any Delta-T data logger, including the powerful GP2. It is also compatible with many other manufacturers' data loggers

Temperature range

The EQ3 has an impressive operating temperature range. Tests demonstrate that the EQ3 can operate down to -40 degrees C (non-flexing cables).



Patents

UK patent 2300485B / US patents: 5804976 & 5898310

Specifications

Matric Potential	
Accuracy	±10kPa over 0 to -100kPa, ±5% of reading over -100 to -1000kPa
Measurement range	0 to -1000kPa (-10bar)
Hysteresis	Not detectable if the change of matric potential is slower than 0.1kPa/min
Soil types	Suitable for all non-saline soil types
Output signal	0-1V differential, non-linear. (Calibration data and graph supplied with each sensor)
Output compatible with	GP1, GP2, DL6, DL2e, HH2
Temperature (EQ3 must be fully buried to accurately measure soil temp)	
Sensor accuracy	±0.5°C over 0-40°C <i>not including logger or cabling error</i>
Output	Resistance: 5.8kΩ to 28kΩ
Output compatible with	GP1, GP2, DL6 ¹ , DL2e, HH2
Cabling error contribution (for temperature readings)	Negligible for GP1, GP2 & DL6 (100m cable limit) Negligible for DL2e (with 5m cable) ²
Max cable length	100m (GP1, GP2 & DL6 data loggers) 100m (DL2e: water content measurement) 25m (DL2e: temperature measurement)
Power requirement	5 to 15V, 20mA for 1s
Operating range	-0 to +40°C (Not damaged by use in frozen soils)
Environmental	IP68
Dimensions/weight	181mm x 40.5mm dia./260 gm (without cable)

Ordering Information

EQ3	EQ3 Equitensiometer <i>NB: Order cable separately</i>
ML/EX50	0.5m extension tube
ML/EX100	1m extension tube
SM-AUG-100	45mm diameter spiral auger to install EQ3 Equitensiometers at depth, length 1.2m
Cable Options	
SMSC/sw-05	5m cable terminating in bare wires for connection to GP1, GP2, or DL6
SMSC/lw-05	5m cable terminating in bare wires for connection to DL2e
EXT/5W-01 EXT/5W-05 EXT/5W-10 EXT/5W-25	1m, 5m, 10m, and 25m extension cables, M12 connector to M12 connector

¹ Note: The DL6 has only one temperature channel. The DL6 error contribution to EQ3 temperature measurement is negligible compared to the accuracy of the EQ3 temperature sensor itself. The two only become comparable below -15C.

² DL2e Logger users can apply a correction in the Ls2Win logging software (for cable lengths >5m).

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