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Delta-T Devices

**Leaders in Soil Moisture
Data Logging and
Plant Science**

Product Summary

GP2 Advanced Logger and Controller

Ideal solution for demanding research applications

- **Powerful and rugged field data logger**
- **12 differential (or 24 single ended) channels**
- **Unique Simulator feature**

The GP2 is a powerful, weatherproof, research grade data logger with unique features for recording and controlling field experiments. The GP2's exceptional ease of use, reliability and flexibility is built on Delta-T Devices 25 years experience of designing data loggers.



Delta-T has over 40 years experience in the design and manufacture of research equipment - we can provide expert help with your measurement and monitoring challenges – whatever your specialisation.

- soil and crop science
- agro-meteorology
- environmental research
- irrigation monitoring
- global climate change



Data Logging and Environmental Sensors

Data Logger & Controller - GP2

- Powerful and rugged field data logger
- 12 differential channels
- Up to 6 relay outputs
- Unique Simulator feature



The GP2 is an advanced 12 channel data logger that is easy to use, versatile, rugged and reliable. It is compatible with most sensor types and is the ideal data logger for demanding field work.

The GP2 Data Logger features powerful controller functionality, and sophisticated programs can be easily created via a simple scripting editor.

Data Logger - GP1

- High accuracy 7 channel data logger
- Smart relay suitable for irrigation control



The GP1 is ideal for logging Delta-T soil moisture sensors: up to 2 ThetaProbes, 4 SM300s or 4 SM150s. The GP1 can also log readings from the WET Sensor, and is compatible with most other analog environmental sensors. For irrigation applications, the GP1 provides versatile control relay options.

Data Logger - DL2e

- Waterproof rugged and portable
- 15 input channels, expandable to 62



The DL2e is a highly versatile logging system, suitable for most types of sensor. It can log voltage, current, resistance, contact closure, logic state and frequency.

The DL2e is particularly suitable for applications requiring a large number of sensor inputs.

Soil Moisture Logger - DL6

- Ideal for Profile Probes and ThetaProbes
- High accuracy 8 channel data logger



The DL6 is optimised for use with Delta-T soil moisture sensors. It can log Profile Probes or single point soil moisture sensors (ML3, SM300, SM150). The DL6 can also accept a rain gauge and soil temperature probe input. The DL6 is environmentally sealed to IP67.

Weather Station - WS-GP2

- Unattended weather recording at remote and exposed sites
- Wide choice of sensors
- GPRS modem communications



The advanced WS-GP2 Automatic Weather Station is based on the powerful GP2 Data Logger. It is an ideal solution for research and environmental monitoring applications. The WS-GP2 provides a highly rugged and flexible system - users can select the optimal combination of sensors, logger, power and communications.

The GP2 Data Logger has the flexibility to handle almost any environmental sensor, which means the WS-GP2 Weather Station can be as simple or as complex as your application requires.

Weather Station - WS-GP1

- Highly portable
- Pre-wired for rapid set-up



The WS-GP1 is an affordable weather station supplied as a ready-to-use package. The high grade sensors make the WS-GP1 a good choice for research, agricultural and environmental applications. Based on the GP1 Data Logger, the system includes sensors to measure rain, solar radiation, wind speed, wind direction, relative humidity and air temperature, all mounted on a 2m tripod mast.

Environmental and Solar Radiation Sensors

- agronomy
- meteorology
- hydrology
- irrigation
- horticulture
- global climate change
- plant water relations
- evapotranspiration
- phyto-remediation
- water use efficiency

Solar Radiation

- global and diffuse
- DNI
- sunshine duration
- UVA & B
- net radiation
- albedo
- crop radiation interception

Atmosphere

- temperature
- relative humidity
- barometric pressure
- wind strength, direction
- precipitation & rainfall
- surface wetness
- evaporation

Soil

- temperature
- soil moisture
- soil water profile
- water depth
- matric potential

Temperature – specialist

- leaf
- precision & fast response

Soil Moisture Measurement

ThetaProbe - ML3

- Excellent $\pm 1\%$ soil moisture accuracy
- New built-in temperature measurement
- New adaptable cable system for easy handling

The ThetaProbe is known world-wide for its accuracy, reliability and ease of use. For continuous monitoring (including temperature measurement) the ML3 can be left buried in the ground, connected to a data logger such as the Delta-T GP2 or GP1. The probe can also be used with the HH2 Meter to make rapid spot readings of soil moisture.



Soil Moisture Sensor - SM300

- Research grade sensor
- Soil moisture and temperature

The SM300 features excellent temperature stability and low sensitivity to salinity. It offers a fast response time and high accuracy ($\pm 2.5\%$).

The SM300 is compact and particularly easy to install. It can be used with the HH2 Moisture Meter for instant soil moisture readings or can be connected to a data logger for long term recording.



WET Sensor – WET-2

- Measures pore water conductivity in situ
- Precision horticulture and soil science

The WET Sensor measures three vital properties of substrates: water content, EC and temperature. Readout and data storage are handled by the HH2 Moisture Meter, which also holds the selected generic soil or specialist media calibrations. Alternatively the WET Sensor can be connected to the GP2 or GP1 data logger. The compact sensor can be inserted directly into the growing medium with minimal disturbance to roots or shoots.

The WET Sensor provides essential data for fertigation control, the management of container-grown shrubs, or soil salinity studies.



Profile Probe - PR2

- Monitor soil moisture profiles
- Portable, simple and accurate

No other system enables you to monitor your soil water status with such ease and flexibility. Install an access tube into the soil, insert the PR2 and press the HH2 read button to display an instantaneous reading, or connect the PR2 to a data logger (GP2, DL6 or DL2e) and leave the system to record moisture changes over time.

The PR2 is built around patented sensing technology which provides unprecedented performance in all soil types, with minimal influence from either salinity or temperature. The PR2/4 model measures at 4 depths down to 40cm or the PR2/6 model measures at 6 depths down to 100cm.



Soil Moisture Sensor - SM150

- Cost effective soil moisture sensor
- $\pm 3\%$ accuracy
- Good temperature and salinity stability

The SM150 Soil Moisture Sensor is a simple, reliable, low cost option for making soil moisture measurements. It measures volumetric soil moisture content with 3% accuracy and offers precision and reliability at an extremely affordable price.

An SM150 Kit is also available - comprising an SM150 Soil Moisture Sensor, a dedicated HH150 Moisture Meter and a handy carry case. The HH150 Meter is very easy to use, being a readout-only device (no PC connectivity).



Moisture Meter - HH2

- Readout and data storage for Delta-T soil moisture sensors

The HH2 is a versatile readout unit for use with Profile Probes, ThetaProbes, SM300 & SM150 soil moisture sensors and the multi-parameter WET Sensor. The HH2 can be operated with one hand for convenience in the field. Readings are displayed on LCD and can be stored for later download to a PC.



Equitensiometer – EQ3

- Maintenance-free and wide range: now with temp sensor

The EQ3 Equitensiometer is an improved replacement for the EQ2 model. A new built-in temperature sensor and detachable cable system provides extra functionality and improved ease of use. The EQ3 uses class leading ThetaProbe technology to avoid the many problems of water-filled tensiometers. It measures water potential in the range 0 to -1000 kPa and provides an accurate loggable output. It is well suited for use in dry soils.

Delta-T also offers a range of water-filled tensiometers, which achieve good accuracy in wetter soils.



Plant Science and Canopy Analysis

Porometer - AP4

- Direct readout of conductance or resistance
- Simple and rapid calibration in the field

The AP4 measures the stomatal conductance of plant leaves quickly and easily. It is a highly practical instrument for field work, being based on the cycling diffusion principle, which makes it possible to have a lightweight sensor head (130g) and to run quick calibration checks in the field.



WinDIAS - WD3

- Automated measurement of diseased, healthy and pest-damaged leaf areas
- Choice of camera or scanner systems

WinDIAS 3 provides high speed measurement and analysis of leaf area and leaf features. The system comprises a high resolution video camera, a light box and overhead lighting, or a scanner based system, and enables accurate measurement of total leaf area and percentage diseased/healthy leaf area, as well as perimeter, length, width and object count.



Sunshine Pyranometer - SPN1

- Measures solar radiation and sunshine duration
- Global and diffuse irradiance in $W.m^{-2}$
- DNI calculations
- Sunshine status

The innovative SPN1 Sunshine Pyranometer measures global (total) and diffuse radiation, and sunshine state – all in one instrument. It is easy to use, having no moving parts. Output from an SPN1 Sunshine Pyranometer enables calculation of DNI (Direct-Normal Irradiance) in sun tracking, horizontal and tilted installations.

The SPN1 is a meteorological class instrument and is an affordable alternative to traditional shade-ring pyranometers.

Non-destructive estimates of Leaf Area Index (LAI) in crop and forest canopies

- Crop management
- Ground truthing of satellite LAI data
- Climate change and carbon balance
- Biomass data

SunScan System - SS1

- Field instrument for PAR light measurement in canopies
- Computes instant LAI readout

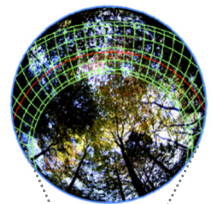
SunScan is optimised for low regular canopies such as most agricultural crops. The 1 metre probe permits rapid spatial averaging of large areas, and PAR mapping for non-uniform crops such as vineyards and orchards. With the unique BF5 reference PAR sensor, SunScan is usable in most weather conditions.



HemiView System - HVM1

- Hemispherical image analysis system with digital camera and fisheye lens
- Ideal for tall canopies e.g. trees and forest

The powerful HemiView Image analysis software estimates LAI, gap fraction, solar tracks and 30 other site factors and parameters. A Self Levelling Mount assists with exact horizontal camera orientation.



Sunshine Sensor - BF5

- No moving parts, no shade rings

The BF5 provides outputs of total and diffuse radiation, and sunshine duration. No routine daily adjustments are required. Outputs can be logged as energy ($W.m^{-2}$), PAR ($\mu mol.m^{-2}.s^{-1}$) or illuminance (klux). The BF5 is an affordable alternative to the high performance SPN1.



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