CASE STUDY

GP2 Data Logger

East Malling Research

Precision Irrigation experiments and commercial crop trials

In early 2012 world-renowned horticultural research institute **East Malling Research (EMR)** identified a requirement for a sophisticated and reliable Data Logger and Controller - for application in a number of challenging long-term research and commercial trial projects. The projects are on-going and focus on the cultivation of substrate-grown soft fruit crops, and the effects that precision automated irrigation treatments have on marketable yields and quality of fresh produce.

EMR selected the GP2 Data Logger and Controller (in combination with volumetric water content sensors) as an ideal technical solution to support the research. Mike Davies, a Principal Scientific Assistant at EMR, explains a key benefit of the GP2 which was central to their decision to use the logger:

"A major advantage of the GP2 Data Logger is that up to 12 moisture sensors can be monitored concurrently. This enables us to easily position multiple sensors in strategic locations across the cropping area - to help account for the inherent variability in soft fruit growing systems."

Another advantage of the GP2 is that it provides an easily accessible way for users to create scripts for implementing models and systems. This enables the East Malling team to quickly create custom rules to control each experiment, and they are able to define their own algorithms and formulas without the need for specialist programming skills. In addition, the team are able to utilise a unique feature of the GP2 Data Logger – real time adjustment of threshold values, *whilst* the logging/control program is running.

Mike Davies explains further:

"Throughout the experiments, individual values from the sensors are averaged using the GP2 script function, so that irrigation events are triggered once a user defined threshold is reached.

We create the upper and lower thresholds for irrigation events as a script in the GP2 logger - and these can then be easily changed, without stopping the program. This means that we can adjust the frequency and duration of irrigation events (on-the-fly) to account for changes in environmental conditions or different crop developmental stages – an invaluable feature."

Another key aspect of the GP2 Data Logger which is central to the research experiments and field trials relates to its advanced communications capability.

Mike Davies, Science Project Leader at East Malling Research, accessing project data from a GP2 Logger.

"A great advantage of the GP2 is that the logger can be accessed remotely, via the Delta-T GPRS system." says Mike,

"This allows us to view both real time sensor readings and the stored data set. It's a very useful feature that allows us to monitor substrate volumetric moisture contents, to check that irrigation events have been applied and to identify any issues with readings from individual sensors.

The GPRS system also allows us to make changes to the loggers remotely, such as changing the threshold values that trigger irrigation, or changing the programme within the logger."

It's clear that the important on-going experiments and trials at EMR and associated farms have been well served by the GP2 Data Logger and controller. Mike Davies concludes that:

"In collaboration with Delta-T and other industry partners, we are continuing to develop the GP2-based precision control of irrigation and fertigation of substrate-grown soft fruit crops, and other potted protected edible crops. The aim of this research is to improve resource use efficiency, marketable yields, shelf life, and consistency of quality of fresh produce."

Calculation of full ASCE/FAO 56 Penman-Monteith evapotranspiration equation

The GP2 Data Logger and DeltaLINK software (versions 3.7 and later), in combination with relevant sensors, enables the full ASCE/FAO-56 Penman-Monteith equation for calculating reference evapotranspiration (ETo).

ETo is calculated by the GP2 Data Logger using the available measurements of relative humidity, wind speed, solar radiation, and air temperature. This ET implementation includes the ability to vary crop albedo/LAI, canopy resistances, crop height and sensor heights.

The functionality can be easily accessed by users as a selectable recording option within DeltaLINK. Calculated ET can be recorded as hourly and daily values – and may be used in further bespoke calculations or to guide field irrigation decisions.