ēKo
PRO Series ®

ēKo Sensors

FOR ENVIRONMENTAL MONITORING

The Crossbow ēKo Pro Series is a wireless agricultural and environmental sensing system for crop monitoring, microclimate studies and environmental research. ēKo introduces a new generation of sensor integration and wireless technology.

The system can be easily enhanced with various sensors such as soil moisture, ambient temperature and humidity, leaf wetness, soil water content, solar radiation, etc. This solution provides users with an easy to deploy wireless monitoring system to efficiently gather data about the needs of their environment from multiple locations. The system is available in a pre-defined kit or as individual components to meet your specific requirements.

ēKo Sensor Interface

Each ēKo Node can support up to four sensors. Sensors are simply plugged into the unit, and when the ēKo Node is reset, it scans the sensor ports to auto-identify the sensors. ēKo Nodes are designed to accommodate almost any type of low-power sensor and allow for future support of many sensors. The ēKo Pro Series system can potentially support a wide range of external sensors from different manufacturers. Its plug-and-play Environmental Sensor Bus (ESB) architecture provides the versatility to interface both smart and custom sensors, with direct plug-in for any 2 or 3-wire sensors. The availability of the ESB Developer's kit allows users to quickly and easily interface their own simple and smart sensors to this solution.

Applications:

- Precision Agriculture
- Crop Monitoring
- Irrigation Management
- Environmental Science
- Climate Change
- Conservation
- Soil & Water Contamination
- Pollution Detection
- Natural Resources
- Disease Prediction

ēKo Sensors

	ES1100/1101	ES1110	ES1201	ES1301	ES1401
Sensor Manufacturer	Watermark	Decagon EC-5	Crossbow (Sensirion SHT75)	Decagon LWS	Davis 6450
Range	• Water Potential: 0 to 200 cbar • Temperature*: -40C to +70C	0-0.3 m^3 /m^3 water content	• Humidity: 0 to 100%RHI • Temperature: -40C to 70C	N/A	0 to 1800 W/m
Accuracy	+/- 5%	0.03 m^3 /m^3 all soil up to 8 dS/m	• Humidity: +/-3% [10 to 90%RHI] • Temperature: +/-2C full range, +/-1C above -20	N/A	+/-5% of full scale
Cable Length	16ft / 4.8m	16ft	20ft / 6m	15ft	16ft
Connector	6 pin Switchcraft	6 pin Switchcraft	6 pin Switchcraft	6 pin Switchcraft	6 pin Switchcraft
Size	• Soil Moisture: 3.25" x ¾" (diameter) • Soil Temperature*: 1" x ¼" (diameter)	3.5" x 0.7" x 0.275	$3^5/_8$" x 1.4" (diameter)	4.4" x 2.28" x .03"	6" x 4.25" x 3.25"
Weight	0.6 lbs including cable	0.3 lbs	0.5 lbs including cable	0.3 lbs	0.15 lbs

* Temperature data only available with ES1101

MEMSIC

Powerful Sensing Solutions for a Better Life

ES1100/1101 – Soil Moisture and Soil Temperature*

The ES1101 Watermark Sensor (granular matrix sensor) is a soil moisture and soil temperature sensor. Up to four ES1101 sensors can be connected to one ēKo Node to measure soil moisture at different soil depths. By monitoring the sensor measurements between irrigations, it is possible to measure the rate at which the soil is drying out.

* *Temperature data only available with eS1101*

ES1110 – Soil Water Content

The ES1110 uses the Decagon EC-5 which obtains volumetric water content by measuring the dielectric constant of the media through the utilization of capacitance/ frequency domain technology. It incorporates a high frequency oscillation which allows the sensor to accurately measure soil moisture in any soil with minimal salinity and textural effects.

ES1201 – Ambient Temperature and Humidity

The ES1201 is a temperature/humidity sensor that measures the ambient relative humidity and air temperature. These readings are also used to calculate dew point. The sensor enclosure protects the sensor from mechanical damage, and a membrane filter protects the sensor elements from dust, dirt, and water spray.

ES1301 – Leaf Wetness

The ES1301 is the leaf wetness sensor from Decagon. Many fungal and bacterial diseases affect plants only when moisture is present on a leaf surface. The ES1301 determines the presence and duration of canopy wetness allowing users to forecast disease and protect the plant canopy. Algorithms have been integrated into Crossbow's ēKoView interface to allow users to easily manage and make decisions based on the data collected.

ES1401 – Solar Radiation

The ES1401 uses the Davis Solar Radiation sensor and measures global radiation, both the direct and diffuse components of solar irradiance. Allows users to monitor evapotranspiration. Algorithms have been integrated into Crossbow's ēKoView interface to allow users to easily manage and make decisions based on the data collected for disease modeling and prediction.