ēKo PRO Series

ēKo Components

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. Crossbow has triggered a revolution in the world of precision agriculture and environmental monitoring. This system is not a weather station or an irrigation controller; it is a wireless sensor monitoring system that provides critical, real-time data both reliably and in a user friendly format.

ēKo is ideally suited to address the monitoring needs within precision agriculture, crop monitoring, irrigation management, environmental science, encompassing areas such as climate change, conservation, biodiversity, water quality, groundwater contamination, soil contamination, use of natural resources, waste management, sustainable development and air pollution.

Applications:

- Precision Agriculture
- Irrigation Management
- Frost Detection
- Environmental Science
- Pollution Detection
- Water Conservation
- Disease Prediction

The ēKo Pro Series provides ease in setup and use within every aspect of the solution. There are no maintenance, cellular or satellite fees. Your live data is viewable from any simple web browser anywhere in the world. The main components of this system are the node, base radio and gateway. These components are the foundation of this cutting-edge system.

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. The ēKo solution provides users with an easy to deploy wireless monitoring system to efficiently gather vital 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 Node
eN2100

ēKo Base Radio
eB2110

ēKo Gateway
eG2100

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The ēKo Node – eN2100

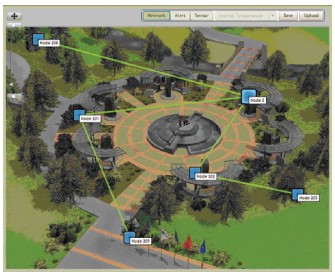
The ēKo Node is a fully integrated, rugged outdoor sensor package that uses an energy-efficient radio and sensors for extended battery-life and performance. The ēKo Node integrates Crossbow's IRIS processor/radio board and antenna that are powered by rechargeable batteries and a solar cell. The node is capable of an outdoor radio range of 500ft to 1500ft depending on the deployment environment. The nodes themselves form a wireless mesh network that can be used to extend the range of coverage. By simply adding an additional ēKo Node, it is easy to expand your coverage area. The nodes come pre-programmed and pre-configured with Crossbow's XMesh low-power networking protocol.

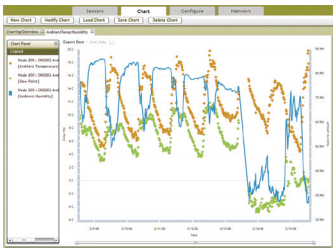
Sensor Ports	
Number of Ports	**4**: Each port can support one ēKo compatible sensor.
Sensor Types	Each port supports either an ēKo compatible simple or smart sensor (Crossbow ESB protocol).
Sensor Measurement Interval	One measurement every 15 minutes (default).
Connectors	Compatible with 6 pin, Switchcraft
Radio	
Frequency	2.405 to 2.480 GHz
Channels	16 channels available selectable via rotary switch
Type	DSSS, IEEE 802.15.4
Transmitter Power Output	+3dbm (typical)
Receive Sensitivity	-101dbm (typical)
Outdoor Range Per Single Radio Hop	Typical 500ft to 1500ft line-of-sight per hop. Range extended through mesh networking hops.
Outdoor Coverage (typical)	• **Flat with no overhead canopy:** One eN2100 per 15-25 acres • **Hilly but no overhead canopy:** One eN2100 per 5-7 acres • **Overhead canopy such as forest, orchards:** One eN2100 per 1-2 acres
Antenna	Dipole, internal
Certification	FC CE RoHS COMPLIANT
Visual Indicators	
LED	One tricolor LED to indicate sensor and network connectivity
Power	
Operating Current	0.4 mA average (no sensors) at 15 minute data sampling rate
Solar Panel	Self-contained 1.3"x 2.5" solar panel to recharge batteries
Batteries	**Standard:** 3 AA low-leakage NiMH rechargeable (via internal solar panel). • Life Expectancy: 3 months with no solar recharging > 5 years field life **Optional:** 3 D alkaline cells (no solar recharging) • Life Expectancy: 3 yrs
Mechanical	
Water / Dust Resistance	IP66 (Protected from dust and high pressure water jets)
Operating Temperature	-40C to +60C
Operating Humidity	0 to 100 %RHI, Condensing
Storage Temperature	-45C to +70C
Mounting Bracket	Wall/pole attachable bracket for quick disconnect of eN2100.
Size	3.75" x 3.5" x 10.5" / 95 x 89 x 267mm
Weight	1.2 lbs/544g

ēKo Gateway – eG2100

The ēKo Gateway, eG2100, is an embedded Sensor Network gateway device. The ēKo Gateway runs the Debian Linux operating system. It comes preloaded with Crossbow's Sensor Network management and data visualization software packages, ēKoView and XServe. These programs are automatically started when the gateway is turned on. Plug-and-play at start-up, the gateway and ēKoView web interface easily allows users to view data real-time, run reports, set alerts and more.

Gateway	
Operating System	Debian Linux OS
Flash Memory	
Type	USB plug – in
Memory Size	2 GB (gigabytes)
Connectors	
Ethernet	1 RJ45
USB	2 USB 2.0 host (USB 1.0/1.1 compatible)
Visual Indicators	
5 LEDs	Status indicators
Power	
Supply Voltage	5V
Power	4W
Mechanical	
Enclosure	Indoor rated
Operating Temperature	6C to 40C ambient
Operating Humidity	10% to 80% non-condensing
Size	5.2" x 0.83" x 3.6"
Weight	0.35 lbs





ēKoView – Web Interface

ēKoView offers a familiar and intuitive web browser based (i.e. Internet Explorer, Firefox, etc.) interface for sensor network data visualization. The ēKoView web application makes it easy for users to start monitoring and access their data from anywhere in the world via a laptop or smart phone. Through ēKoView's simplified intuitive interface, users can quickly setup and easily configure their views to display only the data that they are interested in. Real-time vital data and easy to use algorithms for disease modeling, etc. gives users the control needed to manage and maintain crop health. ēKoView comes pre-installed on the ēKo Gateway, a plug-and-play web server.

ēKo Base Radio – eB2110

The ēKo Base Radio, eB2110, is a fully integrated package that provides the connection between the nodes, sensors and Gateway. The base radio integrates a Crossbow IRIS processor/radio board, antenna and USB interface board which is preprogrammed with Crossbow's XMesh low-power networking protocol for communication with ēKo Nodes. The USB interface is used for data transfer between the base radio and the ēKoView application running inside the ēKo Gateway.

Radio	
Frequency	2.405 to 2.480 GHz
Channels	16 channels available
Type	DSSS, IEEE 802.15.4
Transmitter Power Output	+3dbm (typical)
Receive Sensitivity	-101dbm (typical)
Outdoor Range Per Hop	Typical 500ft to 1500ft line of sight per hop. Range extends through mesh networking hops.
Antenna	Removable dipole antenna. Optional outdoor and indoor antennas available.
Antenna Connector	Reverse SMA compatible with most wifi indoor and outdoor antennas
Certifications	FC CE RoHS COMPLIANT
Visual Indicator	
5 LED	Indicate power and radio communication
Cables	
USB	6ft USB cable between eB2110 and eB2100 gateway. (Accommodates up to 100ft USB extenders to remotely locate eB2110 from gateway)
Power	
Voltage	Supplied via USB cable from gateway.
Operating Current	30 mA average
Mechanical	
Enclosure	Indoor rated
Operating Temperature	6C to 40C ambient
Operating Humidity	10% to 80% non-condensing
Size	2.25" x 1.25" x 4"
Weight	0.25 lbs