ēKo
PRO Series

ēKo Outdoor Wireless System

FOR ENVIRONMENTAL MONITORING

The MEMSIC eKo Pro Series is an outdoor wireless environmental sensing system for precision agriculture, microclimate and conservation studies, environmental research, and crop monitoring. eKo introduces a new generation of sensor integration and wireless technology previously unavailable by empowering users with the knowledge and data to understand their environment with a tool unrivaled.

This system is not just a new type of 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. eKo is ideally suited to address the monitoring needs within environmental science, precision agriculture, crop monitoring, irrigation management, encompassing areas such as climate change, conservation, biodiversity, water quality, smart water grids, groundwater contamination, soil contamination, use of natural resources, waste management, sustainable development and air pollution.

Applications

- Environmental Research

- Precision Agriculture

- Irrigation Management

- Pollution Detection

- Conservation

- Smart Water Grids

Key Benefits Include:

- Solar Powered Node Promoting Green Technology

- Web-based Data Viewing from Anywhere, Anytime

- Customizable Alarm Settings and Alerts

- Effortless Setup and Scalability; No Monthly Fees

- Reliable Wireless Mesh Communication

- Environmental Sensor Bus (ESB) for plug-and-play sensor capability

- Vast Portfolio of Integrated Sensor Devices (see eKo sensors datasheet)

This revolutionary solar-powered system has miniaturized and expanded the idea of outdoor wireless monitoring enabling users to take nature's pulse and gain a competitive advantage in a resource constrained world.

The ēKo Node

The eKo Node is a fully integrated, rugged outdoor sensor package that uses an energy-efficient radio and sensors for extended battery-life and performance. The eKo Node integrates MEMSIC's IRIS processor/radio board and antenna that are powered by rechargeable batteries and a solar cell. An eKo Node is capable of an outdoor radio range upto 2 miles depending on the deployment and the hardware configuration chosen. The nodes themselves form a wireless mesh network that can be used to extend the range of coverage. By simply adding an additional eKo Node, it is easy to expand your coverage area. The nodes come pre-programmed and configured with MEMSIC's XMesh low-power networking protocol. This provides plug-and-play network scalability for wireless sensor networks.

(*For a list of the various sensors currently available from MEMSIC for the eKo System, see the eKo Sensors datasheet*).

| eKo Node	EN2100	EN2120
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 (MEMSIC 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)	+18dBm (typical*)
Receive Sensitivity	-101dBm (typical)	
Outdoor Range Per Single Radio Hop	Typical 500ft to 1500ft line-of-sight per hop.	Typical 2000ft to 2 miles line-of-sight per hop.
Outdoor Coverage (typical)	• **Flat with no overhead canopy:** 1 eN2100 per 15-25 acres • **Hilly but no overhead canopy:** 1 eN2100 per 5-7 acres • **Overhead canopy such as forest, orchards:** 1 eN2100 per 1-2 acres	• **Flat with no overhead canopy:** One eN2120 per 100-150 acres • **Hilly but no overhead canopy:** One eN2120 per 20-30 acres • **Overhead canopy such as forest, orchards:** 1 eN2120 per 4-5 acres
Antenna	Dipole, internal	
Certification	FCC 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	0.5 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	
Mechanical		
Water / Dust Resistance	IP66 (Protected from dust and high pressure water jets)	
Operating Temperature	-40C to +60C (battery life degraded above 50C)	
Operating Humidity	0 to 100 %RHI, Condensing	
Storage Temperature	-45C to +70C (excluding battery)	
Mounting Bracket	Wall/pole attachable bracket for quick disconnect	
Size	3.75" x 3.5" x 10.5" / 95 x 89 x 267mm	
Weight	1.2 lbs/544g	

*Non-US: typical +10dBm

ēKo Gateway

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

Gateway	EG2100
Operating System	Debian Linux OS
Flash Memory	
Type	USB plug – in
Memory Size	4 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 / Weight	5.2" x 0.83" x 3.6" / 0.35 lbs
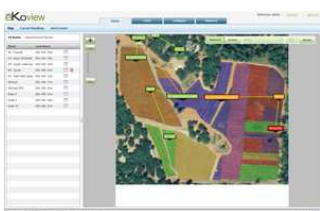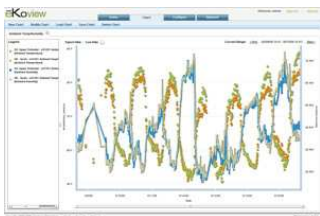
ēKoView – Web Interface

eKoView offers a familiar and intuitive web browser based (i.e. Internet Explorer, Firefox, etc.) interface for sensor network data visualization. The eKoView 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 eKoView's simplified intuitive interface, users can quickly setup and easily config-ure 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. eKoView comes pre-installed on the eKo Gateway, a plug-and-play web server.

Key Features

- Create user-defined map view of sensor nodes across overall network

- Manage user-defined chart configurations

- Create trend charts of multiple sensors across customized time spans

- View details of individual sensor data

- Monitor performance of network and health of individual nodes

- Set alert levels and get notified via SMS or email

- Assign custom names to nodes and sensors

ēKo Base Radio

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

eKo Base Station	EB2110	EB2120
Radio		
Frequency	2.405 to 2.480 GHz	
Channels	16 channels available	
Type	DSSS, IEEE 802.15.4	
Transmitter Power Output	+3dBm (typical)	+18dBm (typical)*
Receive Sensitivity	-101dBm (typical)	
Outdoor Range Per Hop	Typical 500ft to 1500ft line of sight per hop. Range extends through mesh networking hops.	Typical 2000ft to 2 miles of sight per hop. Range extends through mesh networking hops.
Antenna	Removable dipole antenna.	
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 eKo base radio and eG2100 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 / Weight	2.25" x 1.25" x 4" / 0.25 lbs	

Non-US: typical +10dBm

Ordering Information

Model	Description
EK2110	eKo Outdoor Wireless Monitoring System
EK2120**	eKo Outdoor Long Range Wireless Monitoring System

*** EK2120 pending international certifications. Available for purchase for US end-use only.*