



ēKo Outdoor Wireless System for environmental monitoring



- Solar-powered node
- Web-based data viewing from anywhere, anytime
- Customisable 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

Applications

- Environmental research
- Precision agriculture
- Irrigation management
- Pollution detection
- Conservation
- Smart water grids

The MEMSIC ēKo Pro Series is an outdoor wireless environmental sensing system for precision agriculture, microclimate and conservation studies, environmental research, and crop monitoring. ēKo 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. ēKo 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.

This revolutionary solar-powered system has miniaturised 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 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 MEMSIC's IRIS processor/radio board and antenna that are powered by rechargeable batteries and a solar cell. An ēKo Node is capable of an outdoor radio range up to 3 kilometres 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 ēKo 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.



ēKo 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	  	
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	-45°C to +70°C (excluding battery)	
Mounting Bracket	Wall/pole attachable bracket for quick disconnect	
Size	95 x 89 x 267mm	
Weight	544g	

*Non-US: typical +10dBm

ēKo Gateway

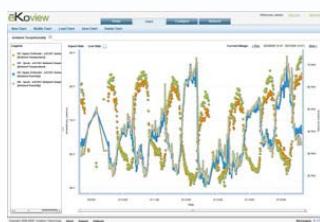


The ēKo Gateway is an embedded Sensor Network gateway device. The ēKo Gateway runs the Debian Linux operating system and comes preloaded with MEMSIC's Sensor Network management and data visualisation software packages, ēKoView and XServe. These programs are automatically started when the gateway is turned 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	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	6°C to 40°C ambient
Operating Humidity	10% to 80% non-condensing
Size / Weight	13.2 cm x 2.1 cm, 159 grams

ēKoView – Web Interface

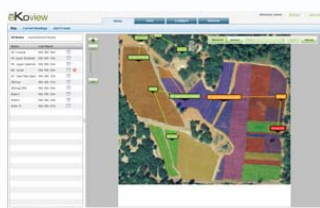


ēKoView offers a familiar and intuitive web browser based (i.e. Internet Explorer, Firefox, etc.) interface for sensor network data visualisation. The ēKoView web application makes it easy for users to start monitoring and access their data from anywhere in the world via a laptop or smart phone. Through 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.



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 customised 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 ēKo Base Radio is a fully integrated package that provides the connection between ēKo Nodes and sensors and the ēKo Gateway. The base radio integrates a MEMSIC IRIS processor/radio board, antenna and USB interface board which is pre-programmed with MEMSIC'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

ēKo Base Station	EN2100	EN2120
Radio		
Frequency	2.405 to 2.480 GHz	
Channels	16 channels available	
Type	DSSS, IEEE 802.15.4	
Transmitter Power Output	+3dBm (typical)	+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.	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 Wi-Fi indoor and outdoor antennas	
Certifications	  	
Visual Indicator		
5 LEDs	Indicate power and radio communication	
Cables		
USB	6ft USB cable between ēKo 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	5.7 cm x 3.17cm, 113 grams	

*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.