pacific data systems

Solutions. Technology. Simple.

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 ofintegrated 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 lowpower networking protocol. This provides plug-and-play network scalability for wireless sensor networks.

Sensor Ports 4. Each port an support one 6k0 compatible sensor. Sensor Types Each port supports either an éKo compatible simple or smart sensor (MENSIC ESB protocol). Sensor Measurement Interval One measurement every 15 minutes (default). Connectors Compatible with 6 pin, Switchcraft Ratio Frequency Channels 16 channels available selectable via rotary switch Type DSSS, IEEE 802.15.4 Transmitter Power Output +18dBm (typical) Action Range Per Single Typical 500ft to 1500ft line-of-sight per hop. Radio Hop Typical 2000ft to 2 miles line-of-sight per hop. Addio Coverage (typical) Flat with no overhead canopy: 1 eN2100 per 15-25 acres Outdoor Coverage (typical) Flat with no overhead canopy: 1 eN2100 per 15-25 acres Overhead canopy such as forest, orchards: 1 eN2120 per 4.3 acres Overhead canopy such as forest, orchards: 1 eN2120 per 4.3 acres Attenna Dipole, internal Certification Certification clero sensors) at 15 minute data sampling rate Solar Panel Standard: 3A low-leakage NMH rechargeable (via internal solar panel). Life Expectancy: 3 months with no solar recharge balteries	ēKo Node	EN2100 EN2120					
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Size 95 x 89 x 267mm	Mounting Bracket	Wall/pole attachable bracket for quick disconnect					
	Size	95 x 89	x 267mm				
Weight 544g	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-andplay 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	
Туре	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.

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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	2.480 GHz		
Channels	16 channe	ls available		
Туре	DSSS, IEE	E 802.15.4		
Transmitter Power Output	+3dBm (typical)	+3dBm (typical)		
Receive Sensitivity	-101dBm	n (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	t Wi-Fi indoor and outdoor antennas		
Certifications	FC CE			
Visual Indicator				
5 LEDs	Indicate power and	radio communication		
Cables				
USB	6ft USB cable between ēKo ba	ase radio and eG2100 gateway.		
Power				
Voltage	Supplied via USB of	cable from gateway.		
Operating Current	30 mA average			
Mechanical				
Enclosure	Indoo	r 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.