DATA SHEET

WIRELESS ANALOG NODES

Model EWN-01A/04A

INTRODUCTION

Wireless sensor network are vital in monitoring construction sites, large structures and landslide areas. They are extensively used in applications where geotechnical and other sensors are used for data collection and transfer to a central server for access by multiple users.

Encardio-rite offers an innovative wireless solution, consisting of suitable nodes and gateway that allows real-time monitoring of geotechnical and structural sensors in challenging conditions with reliable data transfer without any delay. With real-time data collected from the wireless system, the project owner, consultants and contractors remain aware of the slightest change in the data. Early warning system allows timely decisions, project delays and consequently cost effectiveness.

FEATURES

- Provides reliable and high resolution read- ings with long term stability
- Innovative long range radio wireless network for data collection that provides seamless connectivity in large sites and tunnels
- Easy to install and monitor hard to access sites and tunnels remotely
- Empowers real-time decision-making that increases productivity and safety
- Battery life 6-60 months depending upon application increased safety, reduction in

APPLICATION

- Critical applications where real time monitoring and early warning is required in order to protect life and valuable assets.
- Large civil engineering projects
- Dams, barrage, mines, tunneling, structural, landslide, bridge monitoring
- Deformation of embankment, retaining wall monitoring

ANALOG WIRELESS NODE

Model EWN-01A/04A series of wireless nodes are designed to expand the data collection possibilities from analog sensors (with millivolt, voltage, 4-20 mA, wheatstone bridge output) via wireless RF network, eliminating the need for running lengthy cables. These are especially useful at locations where sensors are distributed over wide areas and running cable lengths to long distances can be tricky and /or at locations where construction activity can disrupt the running sensor cables.

The wireless analog node is a highly reliable integrated system which collects sensor data and transmits measurements through long rage radio frequency wireless communication network to the Gateway. The node consists a radio-transceiver with an antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source.

The node is available in single and multi channel variants to connect one analog sensor (model EWN-01A), to up to four sensors (model EWN-04A). The complete range of analog sensors can be connected to wireless node including:

- Resistive strain gage type load cells
- MEMS tilt meters
- Electrolytic level (EL) tilt meters
- Thermistors
- Sensors with millivolt output
- Sensors with 4-20 mA output

The node is tested in terms of its measurement precision and its wireless communication performance. It is housed in a rugged enclosure designed for use in harsh environments with wide temperature tolerance with resistance to moisture and humidity.

Resistive strain gage type center hole load cell connected to model EWN-04A analog node

WIRELESS MESH NETWORK MONITORING

In our end-to-end wireless monitoring system, the sensors are interfaced with the long range, low power wireless network through nodes that send recorded data to the Gateway with utmost reliability. Gateway uploads the collected sensor data to the central/cloud server.

The long range radio frequency based wireless data collection network provides complete automation of monitoring with seamless connectivity in large construction sites, tunnels and landslide projects. The wireless system eliminates the need for running lengthy cables. It is especially useful at locations where sensors are distributed over wide areas and running cable lengths to long distances can be tricky and/or at locations where construction activity can damage the running sensor cables.

Encardio-rite wireless system is a highly scalable system. It allows client to add or replace nodes in an ongoing project, without compromising data integrity.

The nodes can be configured to scan and transmit data at any frequency between 2 min to 2 hr, depending on site requirements. The system automatically mitigates well-known wireless problems like signal blockages and interference, allowing the sensors to reliably send their data to the gateway every time. Every single radio transmission in the system is secured using AES-128 encryption to maximize security of the sensor data gathered by the system.

A cloud-hosted data management and configuration software is used to manage the network. The configuration is done with an easy to use smartphone application that comes free with the system.

The application provides step-by-step instructions and displays whether the radio signals or battery strength is good enough

NODE   RELAY NODE

Obstruction

GATEWAY

NODE   Typical layout   NODE
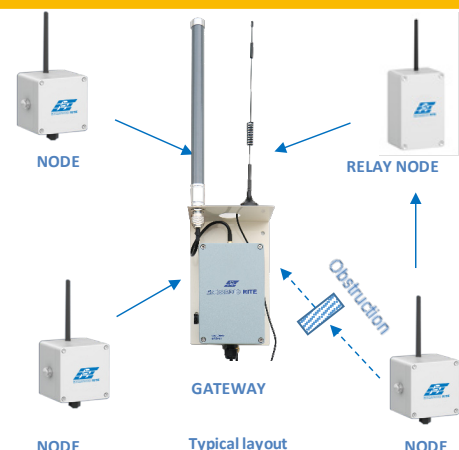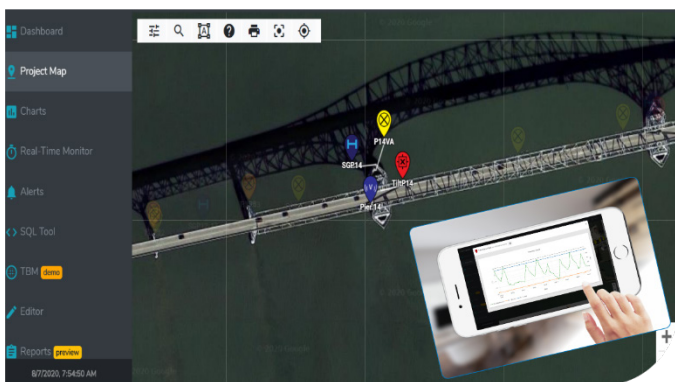
REAL-TIME WEB-BASED DATA MANAGEMENT SYSTEM

Drishti, a cloud-hosted data management software is available to process and manage the huge data collected at project site. The database management system allows analysis and visualization of the sensor data collected from project site/installation locations.

The data is accessible 24 x 7, in meaningful visual formats, to all the related authorities. The system can generate automatic reports and provide automated alerts over SMS or email for any reading crossing the pre-defined alert levels.

The data management system includes everything needed to publish monitored data in real time on internet. Users can interact with software using their web-browser, when connected to the internet, from any location in the world. It allows multiple authorized users at different locations to view any data or report from the same project site simultaneously. The real time display, graphs & reports can be viewed using popular web browsers like Microsoft Internet Explorer or Mozilla Fire Fox amongst others.

Data from Encardio-rite cloud based web monitoring service can be accessed from any type of device, like a desktop or laptop, tablet, smart phone, etc., that supports a standard web browser.

Encardio-rite cloud services work on a rental model. User has to pay a small setup fee for first time and then a monthly rental has to be paid for accessing the data over the cloud as long as required.

SPECIFICATION

Analog Node	
Sensor supply voltage	12 V / 24 V
Measurement range	±5 V / ±2.5 V / 4-20 mA
Resolution	24-bit ADC
Operating temp.	-40°C to +85°C
Reading resolution	1 µA @ FS 20 mA 0.1 mV @ FS ±5 V 0.1°C for NTC
Internal non-rechargeable batteries	D-Cell Li-SOCl2 3.6 V Nominal Voltage, 14 Ah batteries •1 no. in model EWN-01A node •2 no. in model EWN-04A node

Measure type and power supply

- Current loop: Range 0-25 mA
  Power supply: 24 VDC, 12 VDC (1.1W)
- Voltage: Range ±500 mV, ±2.5 V, ±5 V
  Power supply: 24 VDC, 12 VDC, 5 V DC (1.1 W)
- Wheatstone bridge: Range ±10 mV/V
  Max bridge resistance: 10 kΩ,
  Min. bridge resistance: 200 Ωs
  Power supply: 5 VDC (10 mA)
- Thermistor (NTC 3KΩ): Range -50°C to +150°C

Radio Frequency	
Radio bands	Sub-1 GHz band – complies with unlicensed ISM band specifications in most countries
Link data speed	625 bps – 2.5 kbps variable bitrate
Data security	AES128 encrypted end to end data

Gateway	
Nodes per Gateway	Up to 50
Power supply	12 V DC @ 2A nominal, Solar panel
Battery	1 D-cell Lithium Thionyl Chloride (Li-SOCl2) 3.6 V 19 Ah batteries.
Typical current drain	200 mA typical operating current
Internal connectivity	In-built 3G/4G modem, Ethernet

TUNNELS   HYDROELECTRIC   CONSTRUCTION   STRUCTURAL   METRO & RAIL   BRIDGES   MINING

Encardio-Rite Group - India | Bhutan | Bahrain | Qatar | Saudi Arabia | UAE | Greece | Spain | UK | USA