

# USERS MANUAL

## NEXAWAVE HUB

*Model EWG-01*



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TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



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**IMPORTANT NOTE**

Please read the following cautions carefully before using the wireless system:

- **Battery and Power Supply:** Always place the internal batteries (2 x 3.6 V) and the 9-30V external power supply into the gateway before use.
- **Correct Polarity:** Ensure correct polarity of batteries and the external power supply before connecting.
- **Do Not Power On Without Batteries:** Do not switch power ON without placing the internal batteries in the Gateway.
- **Set Scan Interval and Next Scan Time Simultaneously:** During the configuration of the Gateway, always set the scan interval and next scan time simultaneously every time whenever required to avoid any time lag during scanning.
- **Battery Specifications:** Always use 3.6V lithium batteries suitable for -40°C operating temperatures. (Refer to Section 10 for a recommendation of Batteries)

## 1 INTRODUCTION

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### 1.1 Wireless network

Wireless sensors 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 it to a central server for access by multiple users. Encardio Rite offers an innovative network solution that allows real-time monitoring of geotechnical and structural sensors in challenging conditions with reliable data transfer without any delay.

In Encardio Rite's comprehensive wireless monitoring system, the sensors are seamlessly integrated into a long-range, low-power radio frequency (RF) network via suitable nodes, connecting them to a gateway. This efficient setup allows the sensors to transmit recorded data to the gateway via the RF network with utmost reliability. Subsequently, the gateway effortlessly uploads the collected data from the sensors to a central or cloud server.

The system operates on ISM sub 1 GHz operating frequency bands adjustable to requirement of each territory. The system can be adjusted to different frequency bands; for example: .

India	865 – 868 MHz
Europe	868 MHz
USA/Canada/Singapore/Australia	903-927MHz

A detailed reference for frequency bands allowed in different Countries is available at:

<https://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country.html>

### 1.2 Conventions used in this manual

**WARNING!** Warning messages call attention to a procedure or practice that if not properly followed could possibly cause personal injury.

**CAUTION:** Caution messages call attention to a procedure or practice, that if not properly followed may result in loss of data or damage to equipment.

**NOTE:** Note contains important information and is set off from the regular text to draw the users' attention.

### 1.3 How to use this manual

This users' manual is intended to provide you with sufficient information for making optimum use of Gateways in your applications.

To make the manual more useful we invite valuable comments and suggestions regarding any additions or enhancements. We also request to please let us know of any errors that are found while going through the manual.

**NOTE:** Installation personnel must have a background of good installation practices and knowledge of fundamentals of geotechnics. Novices may find it very difficult to carry on installation work. The intricacies involved in installation are such that even if a single essential but apparently minor requirement is ignored or overlooked, the most reliable of instruments will be rendered useless.

## 2 GENERAL DESCRIPTION

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### 2.1 Gateway

The Encardio Rite model EWG-01 NexaWave Hub is gateway used as a main networking hardware, which uploads data gathered from all the geotechnical sensors connected to suitable nodes, to the remote server.

The gateway enabled with wireless network provides reliable data transfer over long distances, without any delay. It is a rugged outdoor unit (IP66) specifically designed for long-term monitoring in harsh environments. By enabling continuous data logging and real-time monitoring, it plays a crucial role in providing early warnings for potential failures, allowing ample time for corrective actions or even safe evacuation if required.

One of the notable advantages of the wireless system is its ability to eliminate the need for extensive cable installations. This proves particularly beneficial in areas where sensors are spread over a wide geographical range, making cable routing both challenging and risky. Additionally, stakeholders have round-the-clock access to the collected data, ensuring constant availability and collaboration.

Furthermore, through the implementation of our cloud-hosted data management and configuration software, the system can be tailored to automatically generate reports and trigger alerts via SMS or email whenever readings surpass pre-defined alert thresholds. This intelligent automation streamlines operations and enhances responsiveness.

#### **NexaWave Hub features**

- Design, configuration and supervision of entire wireless sensor network.
- Data collection from various sensors in the network.
- Synchronise the clock of whole network.
- Remote access of the nodes through appointment.
- Processing of collected data to remote FTP server through cellular network.

### 2.2 System components

Provided by Encardio-rite

- NexaWave Hub (EWG-01) with RF antenna and cellular antenna
- Mounting accessories for installation on wall or pole (as ordered), consisting of installation plate, , fasteners and brackets and bracket to install antenna
- USB to RS-232 FTDI cable
- Android Smartphone with Application software
- Application software for Windows

To be arranged by Client

- Laptop
- Activated data SIM card - 1 no.
- D-Cell Li-SOCl<sub>2</sub> 3.6 V 14 Ah batteries (Non Rechargeable) – 2 no.
- Power supply unit 9-30 V, 1 A (12 V, 1 A power supply easily available can be used) – 1 no.
- Tools required for mounting the device

### 3 TECHNICAL SPECIFICATION

Basic			
Internal Battery	2X3.6V Li-Ion Battery (D-cell ER34615M)		
External Power	9-30V 1A Standard adaptor or EBS-01(available on order)		
Operating Current	150 mA (maximum)		
Dimension	210X178X92 (LXWXH) without antenna 270X178X92 (LXWXH) with antenna		
Weight	0.915 Kg (Without Battery) 1.12 Kg (With Battery)		
Storage	SD card 16GB expandable up to 32GB		
Enclosure			
Material	ASA+PC		
IP Rating	IP-66		
Fire Proof	Approved		
Protocol			
ER Protocol	Proprietary Encardio Protocol		
Radio			
LoRa Chipset	SX1276		
Frequency	EU	US	ROA
	863-870 MHz	903-927 MHz	920-928 MHz
Transmit Power	863-870 MHz (EU)	903-927 MHz(US)	920-928 MHz (ROA)
	14 dBm	15.84dBm	15.79 dBm
Data Rate	810 bps		
Receiver Sensitivity	-132 dBm		
Transmission Distance	(1 ~ 15 Km )*		
Antenna (LoRa)	4.44 dBi		
Cellular			
4G Modem	EG-25G (Quectel)		
Antenna	Stub Antenna (3 dBi)		

\*800 m in urban areas