

# WIRELESS TILT WITH LASER DISPLACEMENT SENSOR (RF)

NexaWave TiltRange

## DATASHEET



NEXAWAVE TILTRANGE  
TILT WITH LASER DISPLACEMENT SENSOR



NEXAWAVE HUB  
GATEWAY



ESP-12V1A SOLAR  
POWER SUPPLY

## OVERVIEW

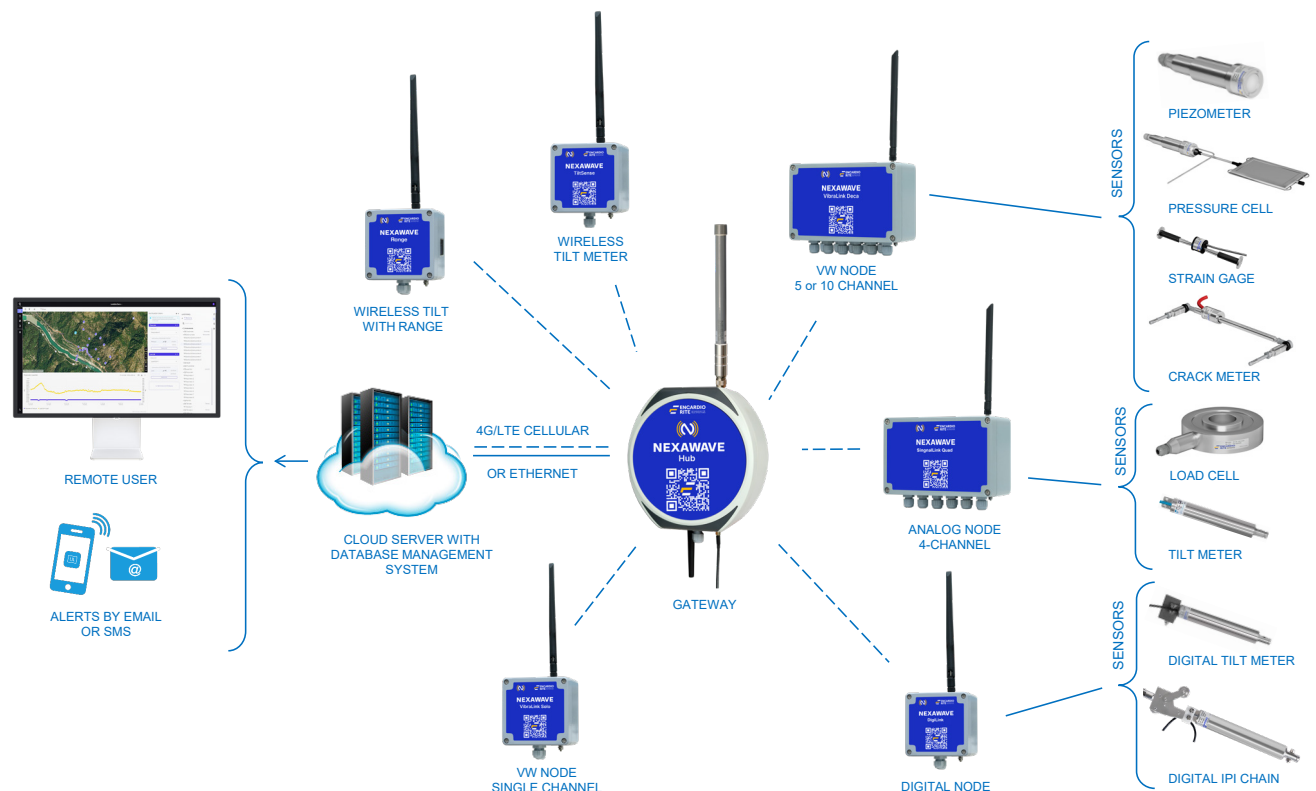
The **NexaWave TiltRange** sensor is a high-performance laser displacement sensor, now with the added capability of tilt measurement, designed for precise, non-contact monitoring of displacement and inclination in geotechnical and structural applications. By combining an advanced laser displacement sensor with a MEMS-based triaxial tilt meter, TiltRange provides a comprehensive solution for applications where both displacement and structural stability must be closely monitored. The sensor operates reliably in continuous field applications, transmitting data via the long-range, low-power LoRa RF wireless network for seamless remote monitoring and data collection. The tilt measurement feature adds significant value in critical applications such as tunnels, bridges, embankments, and retaining walls, where both displacement and tilt are key indicators of structural integrity.

Encardio Rite's wireless LoRa RF system offers a reliable and efficient method for monitoring geotechnical and infrastructure health. The system consists of various sensors, nodes, and a gateway that operates in a MESH (currently only STAR) configuration. These sensors and nodes are plug-and-play, with intuitive on-site configuration available via an Android device.

Compact and easy to install even in confined spaces, the TiltRange sensor is designed for efficient operation in challenging field conditions, with the ability to transmit data to a remote server via a gateway. By providing real-time data on both displacement and tilt, TiltRange enables timely decision-making, enhances safety, reduces project delays, and offers a cost-effective solution for comprehensive structural monitoring.

## FEATURES

- **Versatile wireless sensor:** Combines laser displacement with triaxial tilt sensor, and has an integrated datalogger.
- **Standalone operation:** Standalone unit in weatherproof compact enclosure; suitable to monitor hard to access sites and tunnels remotely.
- **Reliable data transmission:** High-resolution readings with long-term stability and uninterrupted data transmission.
- **Easy configuration:** Plug and play sensor installation. Intuitive set up and configuration on your mobile.
- **Scan rate:** The nodes can be configured to scan and transmit data at customizable frequencies, ranging from 3 minutes to 24 hours.
- **Remote gateway configuration:** Configure an inaccessible Gateway remotely using any RF sensor or node in network.
- **Seamless connectivity:** 200 RF sensor/nodes to 1 Gateway over large distances in MESH (presently only STAR) configuration.
- **Automatic alerts and reports:** Real-time alerts via SMS or email for data that crosses pre-defined alert levels allowing timely response to critical events or changes in the monitored parameters.
- **Cloud-hosted data management:** The collected sensor data is uploaded to a central/cloud server to be processed to provide 24/7 access to the data allowing advanced data analysis and visualization on our platform Proqio.
- **Privacy:** AES-128 encryption, maximizing the security of the sensor data collected.
- **High battery life:** 6 – 60 months for nodes, depending upon the application and data transmission rate.  
In gateway, batteries are only for emergency (as a short time back-up in case of power failure).
- **Versatile power options:** Choose from battery, mains, or optional solar power (model ESP-12V1A). For remote sites, mains or solar power is advised.
- **Cost-effective solution:** It eliminates the need for lengthy cables and reduces installation and maintenance costs.



WIRELESS TILTRANGE SENSOR WITH OTHER NODES CONNECTED TO GATEWAY IN LORA NETWORK

## PRODUCT OFFERING

### Description

The **NexaWave TiltRange** sensor combines an advanced laser displacement sensor with a triaxial tilt meter. Utilizing the pulsed time-of-flight measurement principle, the laser sensor delivers fast, accurate, and repeatable displacement measurements between two points, making it ideal for monitoring small changes in settlement or deformation. Additionally, TiltRange integrates a MEMS-based triaxial tilt sensor that detects slight changes in inclination and vertical rotation, further enhancing its ability to monitor structural stability.

### Mounting arrangement

The TiltRange sensors are supplied with standard fasteners for easy mounting on either vertical or horizontal surfaces/walls. An optional mounting bracket, which provides enhanced flexibility in installation, is available upon request for an additional cost.

### Datalogging

The TiltRange sensor transmits data to the Gateway via the long-range (LoRa), low-power RF wireless network. The intuitive configuration is straightforward and can be completed using any Android device with the free accompanying app. The Gateway then uploads the collected data to the central/cloud server via a GSM/GPRS network.

### Real-time data management system

Proqio, our data intelligence platform hosted on a central server, enables users to remotely monitor and manage structures with advanced infrastructure intelligence. Leveraging machine learning, it provides real-time insights and analytics, offering a clear visualization of the project's status. Proqio also features customized automatic reporting tailored to specific project needs, ensuring a comprehensive performance overview. Additionally, Proqio provides instant alerts via SMS or email when readings exceed predefined alert levels, enhancing project management and responsiveness.

## SPECIFICATIONS

### Displacement sensor

Laser range (mm)	100, 200, 400, 600, 800, 1000
Repeatability (1 Sigma)	± 0.15 mm
Resolution	0.1 mm
Internal non-rechargeable batteries	2 D-Cell Lithium Thionyl Chloride (Li-SOCl <sub>2</sub> ) 3.6 V Nominal Voltage, 14 Ah batteries
Operating Temperature	-40°C to +70°C
Antenna (LoRa)	Fiber Glass Antenna Omni directional (3 dBi)

### Tilt sensor

Standard range	± 90°, triaxial
Resolution	± 1 arc second
Accuracy <sup>1</sup>	± 0.1% fs
Operating Temp.	-40°C to +70°C

<sup>1</sup>As tested under laboratory conditions.

### Hub (EWG-01) Gateway

Nodes per Gateway	Up to 200
Storage	SD card 16 GB expandable up to 32 GB
Typical current drain	200 mA typical operating current
Internet connectivity	In-built 4G modem
Radio Frequency	EU: 863-870 MHz; US& ROA: 902-928 MHz
Antenna (Cellular)	Stub Antenna (3 dBi) External Whip Antenna (5 dBi)
Antenna (LoRa)	Fiber Glass Antenna Omni directional (3 dBi)

### Power supply for tilt meter and gateway

Internal non-rechargeable batteries	2 D-Cell Lithium Thionyl Chloride 3.6 V Nominal Voltage, 14 Ah batteries In gateway, batteries are only for emergency (as a short time back-up in case of power failure).
Power supply	9-30 VDC @ 1 A nominal
Solar power supply	Model ESP-12V1A solar power supply 12 VDC @ 1A, available on order. 9 VDC option available for Tilt meter.

\*All specifications are subject to change without prior notice

DATASHEET | 2403-24 R01



Dams



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Tunnels



Transportation



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Energy



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Monitoring



Pipelines



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