

WiSenMeshNET: Omni Tilt & Tilt R Node Wireless Monitoring System



This internally powered sensor node allows measurement of tilt from the horizontal plane. With a full tilt range (360°any axis) and very high accuracy ($\pm 0.002^\circ$) and resolution ($\pm 0.0001^\circ$). The omni-axis sensors can be installed in any orientation and automatically detect the horizontal plane.

The nodes also include an integrated temperature sensor and wireless mesh radio transmitter via the external antenna.

The battery lifespan is up to 17 years at hourly readings.

It is also available in a configuration designed specifically for rail track monitoring with an integrated internal antenna.

WiSenMeshNET nodes communicate via bespoke encrypted mesh radio technology can be up to 400m from each other or the SmartGateway. The sensors mesh together and automatically form a network relaying data off each other (up to 10 sub mesh levels of data hop) and back to a central data hub called a SmartGateway which contains the data logging functions, radio mesh control systems and external communication to the WiSen cloud-based datacentre or local hosted system.

FEATURES

- WiSenMeshNET Node
- Omni-axis tilt 360° range
- $\pm 0.002^\circ$ accuracy
- $\pm 0.0002^\circ$ precision
- $\pm 0.0001^\circ$ resolution
- Intelligent node/repeater
- Battery life up to 17 years
- 1 second to 1 hour variable readings
- End user configurable
- Rugged Housing
- IP66
- Gravity Orientation Sensor

WiSenMeshNET: Omni Tilt & Tilt-R Node

PHYSICAL PROPERTIES

Dimensions (L x W x H)	80mm x 75mm x 57mm (excluding antenna)
Weight	0.43kg
Casing and Painting Materials	Aluminium-Alloy & Epoxy Polyester Powder Coating
International Protection Mark Rating	≥IP66
Operating Temperature	-40 to +85°C

LOCAL STORAGE

Local Flash Memory Storage	Min. 450 Data Packets
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POWER

Primary DC Power	1 x ER34615 Lithium D Cell Battery
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Battery Life Expectancy ¹

Sampling Time Interval - T	Duration (Days) ¹	Duration (Months) ¹	Duration (Years) ¹
1 Min	161	5.3	0.4
5 Mins	669	22.0	1.8
15 Mins	1878	61.7	5.1
30 Mins	3527	116.0	9.6
1 Hour	6239	205.1	17.0

(1) Quoted battery life are best case scenarios with minimal hops. For example, a node taking 9-10 hops could lead to a reduction of 40%. Please contact WiSen for further advice

Accuracy Stop Voltage	2.7VDC
Mesh Stop Voltage	2.1VDC
Battery Connection	Standard Aluminum Battery Holder
Working Current (DC)	Max. 17mA (Typically 12mA)

PRIMARY SENSOR

Sensor Type	MEMS Triple-Axis Tilt Sensor
Range	± 90° per axis
Accuracy	For ± 0.0° to ± 2.0° ± 0.0020° 7.20" 0.0349mm/m (or mrad) For ± 2.0° to ± 90° ± 0.0050° 18.0" 0.0872mm/m (or mrad)
Precision	± <0.00020° 07.20" 0.00349mm/m (or mrad)
Resolution	± 0.0001° 0.36" 0.0017mm/m (or mrad)
Long Term Stability	@ 10 Years 0.014°
Vibration Resistance	Conformance to EN60068-2-64:2004 & EN50125-3:2003+COR R2010 Standards for railtrack vibration/shock acceleration for on sleeper placement associated to peak vibration 800m/s ² / 2ms or 81.6g
Impact Resistance (2)	1000g (Powered Mode)

(2) The sensor should not be subject to an impact greater than quoted number. Care and Consideration must be undertaken for this precise equipment.

RADIO SPECIFICATIONS

Protocol	WiSenMeshNET® proprietary radio encryption
Radio Frequency	2.4GHz System

SERVICE INSPECTION

Inspection Period	Every 3 Years by Manufacture (or inspected by arranged methods)
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CERTIFICATION

Regional Conformity	UKCA
Network Rail	PADS Number: 0055/162721
London Underground	Reg Number: 3224

Mounting	
WM028-00155	WiSen L-Bracket for Tilt Sensor Node*
WM028-00187	WiSen Flat Mounting Plates with U Clamps for Sensor Nodes*
WM028-00203	WiSen Railway Two-Part Aluminium Mounting Plate

ACCESSORIES

Radio Antennas	
WA029-00002	WiSenMeshNET Whip Mesh Antenna (+5dBi/195mm)
WA029-00039	WiSenMeshNET Whip Mesh Antenna (+10dBi/395mm)
Power Supply	
WB016-00016	3.6V ER34615 19Ahr D Cell Lithium Battery

*Compatible with magnet fixings for non-intrusive installations

INSTALLATION ORIENTATIONS AND ASSOCIATED X, Y & Z AXIS TILT RESULTANT VALUES

The below is from 'Load Sensing' Datasheets. I think it would be good to create similar. We would need to draw our node then orientate so we have same sign outcome as below

