

Tilt and Vibration Sensor WMS Series

Data you want, when you want it...

A high precision wireless MEMS sensor with built-in temperature compensation. The sensor can operate in various modes with user defined data transfer and alert thresholds to meet your monitoring needs.

- Single Axis Tilt with Impact Detection
- Dual Axis Tilt with Impact Detection
- Three Axis Vibration

Features

- No Cables - Complete Wireless Solution^{*1}
- Easy to Install and Uninstall – No Technician Needed
- Totally Sealed Case with Magnet On/Off Switch
- Remotely Managed and Configured
- Alert Management Functionality
- Up to 100 Sensors per Wireless Mesh Network
- Network can Span Kilometers
- Low Power Battery Operation – Can Last Years
- Powered by Readily Available AA Alkaline or D Cell Lithium Primary Batteries^{*2}
- High Reliability Network and Data Transfer
- Heartbeat Message (with Data)
- Energy Harvesting Option^{*3}
- Built-in Temperature Compensation
- Precision Tilt Resolution 0.0035°
- Vibration PPV Resolution: 0.05 to 3,000mm/sec

Applications

- Structural Health Monitoring (Buildings, Bridges, Tunnels)
- Large Area and Long Distance Monitoring (Construction Sites, Railways, Pipelines)
- Natural Slopes / Cut Slope Monitoring
- Barrier Impact Detection
- Foundation Monitoring

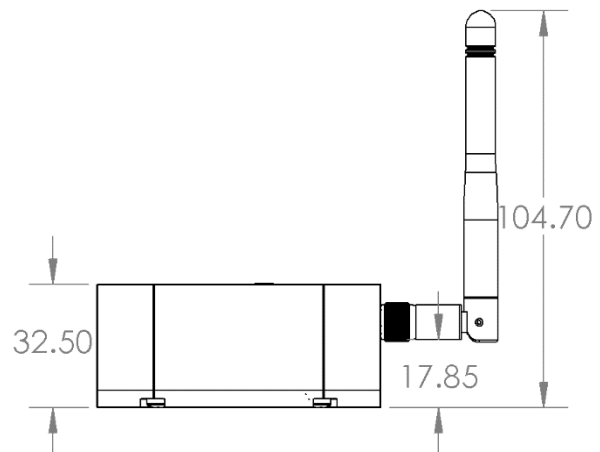
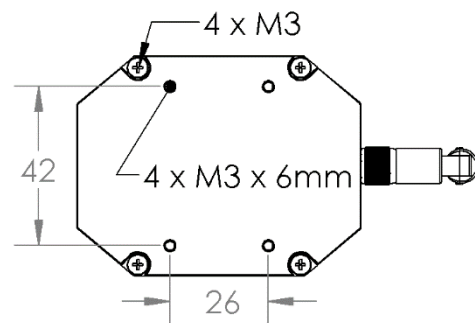
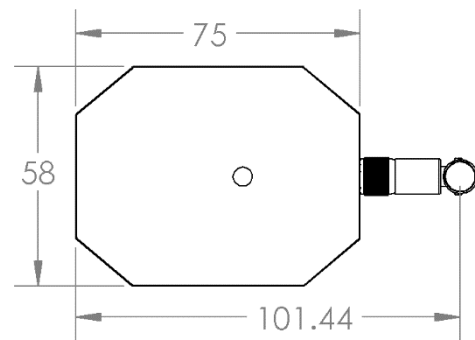
*1 Requires Management Node

*2 Requires D Cell Lithium Battery Option

*3 Requires Energy Harvesting Option



Dimensions



Tilt and Vibration Sensor WMS Series



Tilt Mode Specifications	
Euler Angles	Pitch $\pm 90^\circ$ Roll $\pm 90^\circ$
Resolution	0.0035°
Accuracy	$\pm 0.005^\circ$
Temperature Stability	+/- .05° (-45° to 110°C)
Stabilisation Time	10 secs
Step Response Time	2 secs
Sample Rate	50Hz
Heartbeat Interval	10 sec to 12 hours
Buffer Size	128Kb
Pre-Alert Buffer	8192 samples (- Post Alert Buffer)
Post-Alert Buffer	8192 samples (- Pre Alert Buffer)
Pre Alert Rate	1 sec/sample to 10 sec/sample
Post Alert Rate	1 sec/sample to 10 sec/sample
Alert Thresholds	0.5° to 70.0°
Rearm Tolerance	0.5° to 45.0°
Rearm Stable	1 sec to 300 sec
Impact Component	
Impact Range	0.004G to 2g
Impact Duration	5ms to 500ms
Sample Rate	50Hz
Alert Thresholds	32mg to 2048mg
Rearm Tolerance	32mg to 2048mg

Vibration Mode Specifications			
Vibration Limit	X $\pm 8g$	Y $\pm 8g$	Z $\pm 8g$
Conformance	DIN45669		
VDV ^{*4}	0.1ms ^{-1.75} to 1.0ms ^{-1.75}		
VdB ^{*4 *5}	40 to 150		
Response	3Hz to 1KHz		
Accuracy	$\pm 5\%$		
Samples/Reading	2048		
Sample Rate	2KHz		
Principal Frequency	Range 1Hz to 500Hz		
Peak Particle Velocity	0.05 mm/sec to 3000 mm/sec		
Peak PPV Period	30 sec to 1 hour		
Heartbeat Interval	10 sec to 12 hours		
Time Stamping	1 millisecond/node		
Buffer Size	128Kb		
Trigger Threshold	0.008g to 1g		
Alert Thresholds	1 to 624mm/sec (@ 2g Range)		
Rearm Stable	1 sec to 300 sec		
Power Consumption	200 μA		

*4 Requires GSS TAV Console application v2.3.40 or later

*5 Sensor range dependent

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General Specifications			
Integrated Sensors	Dual tri-axial Accelerometers, Dual tri-axial Gyroscopes, and multiple Temperature sensors		
Part Numbers	WMS-01/2-T: Tilt (single or dual axis) with Impact WMS-01/2-V: Vibration WMS-01/2-TV: Tilt & Vibration		
Data Outputs	Tilt and Impact: Exponential Moving Average Filter (EMA). Attitude estimates in Euler angles (Pitch, Roll and Yaw). Euler threshold alerts and historical trend. Impact alerts and historical trend readings Vibration: Zero Crossing. Peak amplitude/frequency values (3Hz to 1KHz), Peak Particle Velocity (mm/s), Peak Vector Sum (mm/s) Threshold alerts, historical trend readings.		
File Outputs	Tilt and Impact: Alert File with Pre & Post Alert Data CSV Format Vibration: Alert File in CSV Format; Report File in Binary Format; Acceleration File in CSV Format (generated by TAV Console or WMM3G)		
Operating Parameters			
Communication			
Standards	2.4 GHz 6LoWPAN and 802.15.4e standards		
Range	Up to 300m line of sight (3dB antenna)		
Reliability	>99.999%		
Upload Rate	~3.2Kb/s		
Security	Secure Mesh with 128-bit AES Encryption. NIST Certified Security		
Time Stamping	Highly Accurate Time Stamping to 1millisecond/node		
Power Consumption	< 50 μ A when routing only		
Power & Environmental			
Operating Mode	Tilt	Tilt with Impact	Vibration
Est Battery Life (2 x AA batteries) *6	200 days	150 days	60 days
Est Battery Life (D Cell Lithium battery) *6	3 years	2 years	1 year
Operating Temperature	-10 °C TO +85 °C		
Mechanical Shock Limit	500 G (Calibration Unaffected) 1000 G (Bias Affected) 5000 G (Survivability)		
MTBF	1.1 Million Hours (Telcordia Method I, GF/30C) 0.4 Million Hours (Telcordia Method I, GM/35C)		
Dimensions of Base Unit	Ø 74mm x H 38.6mm		
Weight (grams)	AA: 150g, D Cell: 320g		
Transducer Density (grams/cc)	4.4g/cc		
Regulatory Compliance	ROHS, CE	Korea: CRM LT9 Eterna Japan: 208-130008	IC: 5853A Eterna2 FCC ID: SJC Eterna2
Integration			
Connectors	1 x 2Pin EN2P Connector*7 1 x SMA RP Male Antenna Connector		
Software	GSS TAV Console Application (Windows XP,7,8 and 10)		
Calibration			
Calibration Certification	Must be performed by GSS or GSS certified laboratory		
Options			
Cases	Bespoke Case Design and Production Available		
Mounting Brackets	A range of mounting options available		

*6 Est Battery Life based on normal usage

*7 When fitted with Solar Power option