

WIRELESS MONITORING SYSTEM



Laser distance meter node

LS-G6-LASER

The Loadsensing laser distance meter node measures the relative distance between pairs of reference points. One of the two points can be a natural surface or target foils while the node can be placed at the other end point. It can be used to measure changes in the distance between walls, tunnel convergence, bearing and joint movements in bridges, lifting and placement of structures and movements of historical buildings. It can also be used to monitor slope movements and for fracture and faults surveillance.

Measurement of tunnel convergence is one of the most important controls of the NATM (New Austrian Tunneling Method) construction. Portable devices like tape extensometers, levels and temporarily installed total stations allow sporadic measurements. On the other hand, one of the most commonly used methods, the measuring tape, disrupts construction activities due to the use of aerial work platforms.

Laser distance nodes can be easily relocated along the convergence cross sections up to the excavation front or until the measured relative displacements are stabilized when the required frequency of measurements is reduced. It can also be used when permanent monitoring is required.

In a similar way, the laser distance node measures deformations in underground excavations and mining without causing work disruptions and delays. The Loadsensing laser distance node is an easy-to-use product that reduces costs and increases the quality and availability of data in different applications.

The Loadsensing laser distance node is capable of measuring the relative distance and transmitting the data via long-range radio to a gateway connected to the Internet. One gateway can support hundreds of Loadsensing nodes in the same network that are also measuring other sensors installed in the monitoring sections (borehole extensometers, pressure cells, load cells, strain gauges etc.). It can be easily configured and connected with a USB cable and an Android phone.

FEATURES

- Wireless sensor
- Accurate distance measurement
- Long battery life (>6 years @1h sampling rate)
- Reduced size (150 x 100 x 61 mm)
- Visible Laser Class II laser with 655 nm
- High repeatability

SOFTWARE

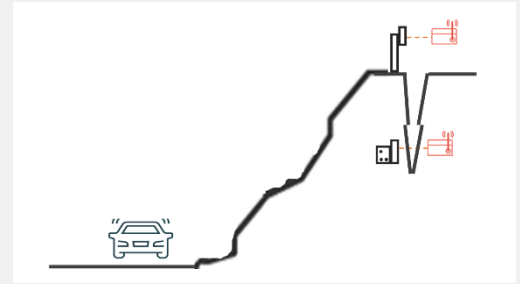
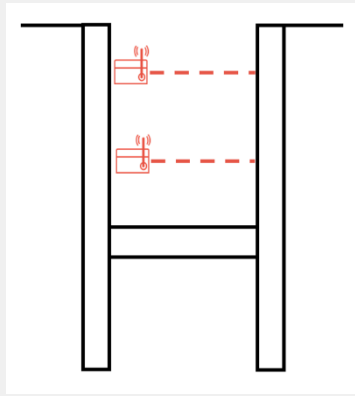
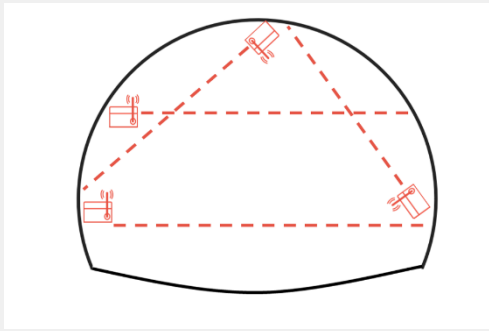
- User-friendly Android configuration app included
- Pointing mode for an easy installation
- Web browser software
- Standard CSV download, FTP push, Modbus TCP and API access

APPLICATIONS

- Tunnel and mining convergence monitoring
- Deformations in underground excavations
- Remote monitoring of slope movements
- Fracture and faults surveillance
- Bearing and expansion joint movements
- Monitoring displacement in structures and buildings

ADVANTAGES

- High reliability and robustness
- Integrated unit (2-in-1 sensor + data node)
- Long-range communications (up to 15 km)
- Low-power, long battery life (over 5 years)
- Robust, small and weather-proof box
- Easy configuration



SPECIFICATIONS

GENERAL			MEMORY	
Battery life – sampling rate 5 min	1.5 years	Life time estimates are based on distance measurements between 10 and 20 m and a model considering Barcelona temperature profile	Reading capacity	200,000 readings
Battery life – sampling rate 1 h	6.4 years		MECHANICAL	
Battery life – sampling rate 6 h	8.5 years		Box dimensions (WxLxH)	100x100x61 mm
Battery type	2 x 3.6V C-Size user-replaceable batteries (recommended Saft LSH 14)		Overall dimensions	150x100x61 mm (excluding antenna)
Sampling rate	30 seconds to 1 day		Operating temperature	-10°C to +50°C
Internal temperature collected and transmitted at each reading (Accuracy: ±1 °C)			Storage temperature	-25°C to + 70 °C
Configuration software	Android App		Weather protection	IP67
App features:	Pointing mode and radio signal coverage tests for an easy installation		External antenna	100 mm length (including connector)
LASER DISTANCE METER			External Port	Mini USB port for configuration and data access. Can also be used to power the node
Measuring range at favorable conditions	0.05 to 150 m		Box material	Aluminium alloy
Typical measuring accuracy	±1 mm		RADIO - ISM sub 1 GHz operating frequency bands adjustable	
Resolution	0.1 mm		Range open field	15 km
Repeatability (1 sigma)	0.15 mm		Range city street	4 km
Laser type (light source)	Visible Laser Class II laser with 655 nm		Range manhole in a city street	2 km
Accuracy	in favorable conditions*	in unfavorable conditions**	Tunnel	4 km
@ 1 m	±1 mm	±2 mm	Bidirectional communications	Remote sampling rate change / Clock synchronization
@ 10 m	±1 mm	±2 mm	Maximum link budget	151 dB / 157 dB
@ 20 m	±1.5 mm	±3 mm	Configuration	Star (no repeaters needed)
@ 50 m	±4 mm	±7 mm	Accessories***	
@ 100 m	±9 mm	±15 mm	Adjustable mounting plate for vertical surface	
@ 150 m	±16 mm	not applicable	Adjustable mounting plate for horizontal surface	
* on natural objects (white wall, low target illumination <3K lx, moderate temperatures)			Swivel mounting bracket. It can be mounted on a wall or on a convergence bolt with 3/8" male thread	
** on natural objects (white wall, high target illumination with 30K lx, full specified operating temperature range)			*** Other mounting brackets and accessories available on request	