

WIRELESS MONITORING SYSTEM



Laser distance meter node

LS-G6-LASER

The Loadensing 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 Loadensing laser distance node is an easy-to-use product that reduces costs and increases the quality and availability of data in different applications.

The Loadensing 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 Loadensing 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

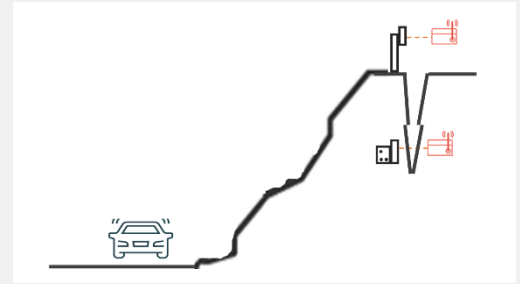
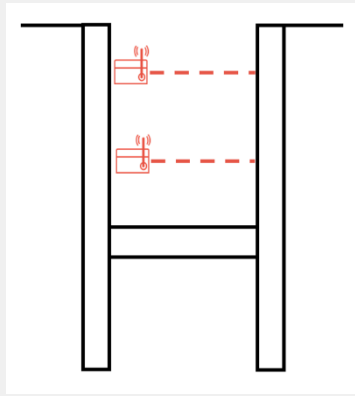
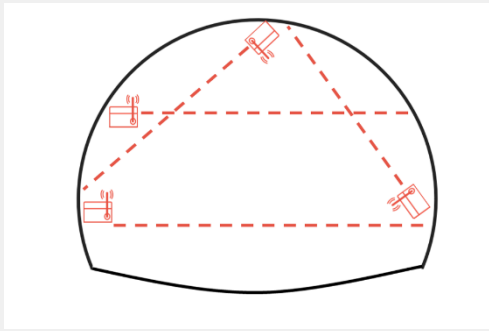
- User-friendly Android configuration app included
- Pointing mode for an easy installation
- Web browser software
- Standard CSV download, FTP push, Modbus TCP and API access

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

| | | |
|---|--|--|
| 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 |
| Battery life – sampling rate 1 h | 6.4 years | |
| Battery life – sampling rate 6 h | 8.5 years | |
| Battery type | 2 x 3.6V C-Size user-replaceable batteries (recommended Saft LSH 14) | |
| Sampling rate | 30 seconds to 1 day | |
| Internal temperature collected and transmitted at each reading (Accuracy: ± 1 °C) | | |
| Configuration software | Android App | |
| App features: Pointing mode and radio signal coverage tests for an easy installation | | |

LASER DISTANCE METER

| | | |
|---|--|-----------------------------|
| Measuring range at favorable conditions | 0.05 to 150 m | |
| Typical measuring accuracy | ± 1 mm | |
| Resolution | 0.1 mm | |
| Repeatability (1 sigma) | 0.15 mm | |
| Laser type (light source) | Visible Laser Class II laser with 655 nm | |
| Accuracy | in favorable conditions* | in unfavorable conditions** |
| @ 1 m | ± 1 mm | ± 2 mm |
| @ 10 m | ± 1 mm | ± 2 mm |
| @ 20 m | ± 1.5 mm | ± 3 mm |
| @ 50 m | ± 4 mm | ± 7 mm |
| @ 100 m | ± 9 mm | ± 15 mm |
| @ 150 m | ± 16 mm | not applicable |

* on natural objects (white wall, low target illumination <3K lx, moderate temperatures)

** on natural objects (white wall, high target illumination with 30K lx, full specified operating temperature range)

MEMORY

Reading capacity 200,000 readings

MECHANICAL

| | |
|------------------------|---|
| Box dimensions (WxLxH) | 100x100x61 mm |
| Overall dimensions | 150x100x61 mm (excluding antenna) |
| Operating temperature | -10°C to +50°C |
| Storage temperature | -25°C to +70 °C |
| Weather protection | IP67 |
| External antenna | 100 mm length (including connector) |
| External Port | Mini USB port for configuration and data access. Can also be used to power the node |
| Box material | Aluminium alloy |

RADIO - ISM sub 1 GHz operating frequency bands adjustable

| | |
|--------------------------------|---|
| Range open field | 15 km |
| Range city street | 4 km |
| Range manhole in a city street | 2 km |
| Tunnel | 4 km |
| Bidirectional communications | Remote sampling rate change / Clock synchronization |
| Maximum link budget | 151 dB / 157 dB |
| Configuration | Star (no repeaters needed) |

Accessories***

- Adjustable mounting plate for vertical surface
- Adjustable mounting plate for horizontal surface
- Swivel mounting bracket. It can be mounted on a wall or on a convergence bolt with 3/8" male thread

*** Other mounting brackets and accessories available on request