Trimble GNSS Meter

WIRELESS SENSORS

Trimble® GNSS meter is a wireless sensor that enables precise automated measurement of surface point movements. It features advanced multi-band Real-Time Kinematic (RTK) technology and innovative edge processing that delivers survey-grade precision with great reliability.

Integrated Tiltmeter and environmental sensors

The GNSS meter comes with an integrated tiltmeter to ensure supplementary monitoring data even when conditions for precise RTK measurement are not met, and it also allows monitoring vertical changes in structures and mounting elements.

Survey-grade precision

Achieve reliable, survey-grade precision with RTK technology, ensuring the most cost-efficient data collection available. Position measurements provided every hour with two levels of aggregation: 6 h, and 24 h.

Advanced edge data-processing

Statistics related to the quality of the position measurement and the performance of the system, transmitted via radio and available in CMT.

Wireless, autonomous and low-power

The GNSS meter leverages the capabilities and efficiency of our Trimble portfolio. Autonomous, battery-powered devices with D-size batteries that can last more than two years in most cases.

Flexible configuration options

The GNSS meter has flexible configuration options that allow the devices to function as either a base station or a rover, adapting to various monitoring needs. The Trimble Geotech App can be used to check the radio link from the base to the rover.

Ease of use

A user-friendly set up and intuitive interface make rapid deployment possible with minimal training needed. This reduces the time and cost associated with traditional GNSS-based movement monitoring systems while ensuring long-term sensor reliability.

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Find out more at:
geospatial.trimble.com

SPEC SHEET

Trimble GNSS Meter

LSG7GNS-SXLH-MON

Technology powered by Worldsensing

The GNSS meter leverages field-proven Loadsensing technology, which ensures long-range connectivity without dependence on internet or cellular networks. Designed for scalability and robustness, the GNSS meter integrates seamlessly with the rest of the portfolio (powered by Worldsensing[1]) that stream data from other geotechnical sensors such as piezometers, inclinometers, and extensometers, allowing comprehensive, automated monitoring. Its industrial-grade, field-tested devices ensure reliable and unattended operation, even in the harshest environments. The GNSS meter supports multiple base deployments within the same LoRa network, guaranteeing accurate and reliable transmission of corrections from base to rovers.

BENEFITS

- Suitable for large-scale projects
- Corrections transmitted from base to rover through LoRa, not requiring cellular coverage or internet
- Easy configuration through the Trimble Geotech mobile application and CMT Edge
- Easy deployment, thanks to being battery-operated
- Survey- grade precision with advanced Real-Time Kinematic (RTK) technology
- A standalone or complementary solution to Trimble total stations or GNSS receivers, as well as other geotechnical devices powered by Worldsensing
- Easy data integration for further analysis, reporting, and alarming in Trimble 4D Control™ software

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Main Applications

Thanks to its cost-effectiveness and ease of installation and setup, the new wireless GNSS meter is ideal for applications such as slope stability in open pit mines, surface subsidence, tailings and embankment monitoring and areas and assets affected by landslides, with the primary goal of ensuring safety on the site.

Subsidence and heave

- Marine and coastal
- Landslides

Slope monitoring

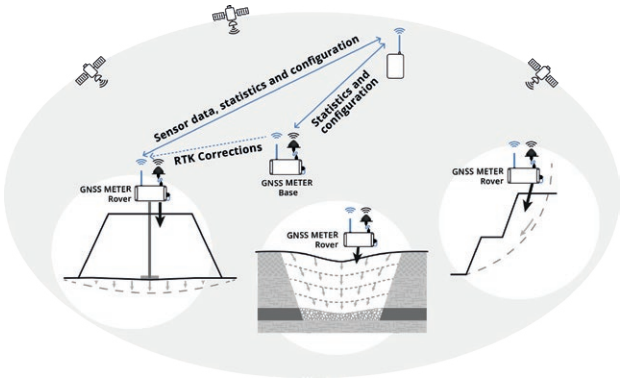
- Open pit mine
- Landfills
- Quarries

Construction settlement

- Tunnel boring
- Road construction

Infrastructure monitoring

- Bridge piers
- Dam headwall



The graphic illustrates the GNSS meter's operation. Rovers collect satellite data and receive RTK corrections from a base station via LoRa, which enables precise positioning. The GNSS meter then transmits sensor data and performance statistics to the gateway using LoRa. Remote configuration is also possible via CMT through the gateway, ensuring flexibility and control.

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GENERAL SPECIFICATIONS	
Sensor type	GNSS
Secondary sensor	Tiltmeter
Environmental sensor	Barometer, integrated temperature and humidity sensor
Power source	4 x 3,6 V D-size user-replaceable, high energy density batteries
Reporting period	1 h
Communications	LoRa radio
GNSS time synchronisation	±1 s
Reporting format	Position (WGS84) data for; Last hour sample, Last 6 h aggregate, Last 24 h aggregated
Device configuration	Trimble Geotech App, CMT Edge
GNSS SENSOR	
Correction technology	Real-Time Kinematic (RTK)
Constellations/ GNSS signals receives	GPS / QZSS: L1C/A, L2C, GLONASS: L1OF, L20F, Galileo: E1-B/C, E5b, BeiDou: B1I, B2I
GNSS warm-up time	Selectable from: 10 s, 20 s, 30 s
TILTMETER	
Sensor	3-axis MEMS accelerometer
Range	±90°
Axes	3-axis inclination measurement with respect to gravity's direction. Reports the two axes of rotation from the horizontal plane in any orientation
Accuracy	±2°:±0.0025° ±15°:±0.013° ±80°:±0.023°
Offset temperature dependency	±0.002°/°C
TEMPERATURE SENSOR	
Range	-40 °C to +80 °C (-40 °F to +175 °F)
Resolution	0.1 °C
HUMIDITY SENSOR	
Sensor type	Humidity sensor to detect lack of sealing/locking of the enclosure. Statistics of the relative humidity measurements transmitted in the health messages
MECHANICAL	
Box dimensions (W×L×H)	200 mm × 100 mm × 61 mm
Overall dimensions	205 mm × 1200 mm × 61 mm
GNSS antenna	External 26 dB LNA gain 66.7 × 66.7 × 76 mm
LoRa antenna	• External • -0.3 dBi gain • 11ø mm, 101 mm long
Operating temperature	-40 °C to +80 °C (-40 °F to +175 °F)
Weather protection	IP68 (at 2 m for 2 h)
Weight (excluding batteries)	960 g
Communication ports	GNSS antenna: RP N-Type Female, LoRa antenna: RP SMA Female, USB Type-C Female
Mounting options	Possible mounting options are: Compact vertical mount using anchor rods, on 50mm pole using U-bolts or other columns using metal clamps Compact horizontal mount using anchor rods Survey pole mount with extended GNSS antenna Surface mount with extended LoRa antenna Surface mount with extended GNSS antenna
Box material	Aluminium alloy
Lid material	Polycarbonate
Battery holder	4 cells, D size battery holder

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GNSS PRECISION[2]							
		50TH PERCENTILE			95TH PERCENTILE		
Distance base to rover	Axis	1 h last sample	6 h aggregated	24 h aggregated	1 h last sample	6 h aggregated	24 h aggregated
40 m	Horizontal	3 mm	1 mm	1 mm	9 mm	3 mm	2 mm
	Vertical	4 mm	2 mm	1 mm	20 mm	5 mm	3 mm
4000 m	Horizontal	6 mm	3 mm	2 mm	21 mm	8 mm	4 mm
	Vertical	8 mm	4 mm	2 mm	31 mm	15 mm	7 mm

RADIO SPECIFICATIONS	
Radio band	ISM sub 1 GHz
Operating frequency	Adjustable
Bidirectional communications	GNSS sensor configuration including mode (base/rover), creation of new base entities, base position, assigning rovers to a specific base, warm-up time, among others
Maximum link budget	151 dB / 157 dB
Radio configuration	LoRa/LoRa WAN
Network topology Node to gateway	LoRa Star LoRa Tree(K20 Edge repeater)
Network topology Base to rover	LoRa Star

NODE TO GATEWAY RADIO RANGE[3]	
Range open site	15 km
Range city street	4 km
Range manhole in a city street	2 km
Tunnel	4 km

BASE TO ROVER RADIO RANGE (LINE OF SIGHT REQUIRED)	
Range open site	5 km

BATTERY LIFE ESTIMATIONS[4]			
Warm-up time	10 s	20 s	30 s
Base	2.1 years	1.8 years	1.6 years
Rover	2.6 years	2.2 years	1.9 years

ACCESSORIES	
LS-ACC-BIG-HVP- MON	**VERSATILE MOUNT PLATE FOR LARGE DEVICES** Suited for horizontal or vertical surface mounting, pole mounting with 50mm U-bolts or pole mounting with metal clamps. Compatible with large G6/G7 devices.
LS-ACC-ANT-HVP-MON	**VERSATILE MOUNT PLATE FOR GNSS ANTENNA** Suited for horizontal or vertical mount of the GNSS antenna LS-ACC-GNSS-ANT. It can be either fixed to the versatile mount plate for large nodes or for standalone mount on surface or pole mount using 50mm U-bolts or metal clamps.
LS-ACC-GNSS-CL3-MON	**GNSS ANTENNA CABLE EXTENSION 3 M** Male N-Type RP to TNC Male
LS-ACC-ANT-LORA-MON	**MOUNT BRACKET FOR LORA ANTENNA** Enables horizontal or vertical mounting of the LoRa antenna with cable extension LS-ACC- ANTE-G7 or LS-ACCANTS-G7. Can attach to LS-ACC-BIG-HVP or be used standalone with anchor rods or clamps.
LS ACC-ANTE-G7-MON	**LORA ANTENNA CABLE EXTENSION 2.5 M FOR G7 DEVICES** RP-SMA (Male) to RP-SMA (Female). For G7 edge devices.
121920-01-MON	USB-C to USB-C charge and sync cable.

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ACCESSORIES CONT...	
LS-ACC-PRS-VP	**VERTICAL MOUNT PLATE FOR PRISM** Designed to align the prism with the centre of the GNSS antenna. It can be mounted with either the versatile mount plate for large nodes (LS-ACC-BIG-HVP) or the versatile mount plate for the GNSS antenna (LS-ACC ANT-HVP). The assembled set can then be mounted on a wall or pole using anchor rods (LS-ACC-ANC-H), 50 mm U-bolts (WS-ACC-U50), or metal clamps.
LS-ACC-GNSS-RD	**5/8-INCH SURVEY POLE MOUNT FOR GNSS** Antenna Mount for the GNSS meter antenna with a 5/8-inch survey pole connection
LS ACC-ANTS-G7	**LORA ANTENNA CABLE EXTENSION 0.45 M FOR G7 DEVICES** RP-SMA (Male) to RP-SMA (Female). For G7 edge devices.
LS-ACC-GNSS-CL2	**GNSS ANTENNA CABLE EXTENSION 1.5 M** Male N-Type RP to TNC Male
WS-ACC-CELL-1D	Saft LSH20 high power density 3.6 V, D-size spiral cell

Accessories not ending with "MON" are not part of the Trimble portfolio. These can be purchased directly from Worldsensing.

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2 Under favourable conditions, in an open-sky environment in the Province of Barcelona.
3 The distances have been tested by Worldsensing and verified in actual projects using the standard antenna. However, radio range depends on the environment, so these distances are only indicative. Please contact us regarding your specific application.
4 Battery life estimations using recommended Saft batteries LSH20. Calculations assuming GNSS clear sky visibility default base configuration with a maximum time of 6 minutes to test the radio link between base and rover and 1 hour sampling period. Receiver offset enabled. Typical Europe radio configuration using SF9, radio transmit power 14dBm. Considering laboratory conditions. Consumption varies depending on the sensor used, sampling rate and environmental and wireless network conditions. Battery life estimations based on the lifetime mathematical model using Barcelona weather profile. Average values provided.

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