



Wireless Mesh Tiltmeter

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Tiltmeters are used to monitor small changes in inclination. They are ideal for monitoring structural rotation, differential settlement, deformation, and convergence. The addition of a laser extensometer adds the ability to monitor structural displacements.

Wireless mesh tiltmeters are a new generation of efficient, battery-powered, radio-equipped, digital sensors.

Applications

- Monitoring the stability of structures adjacent to excavations.
- Monitoring landslides, rockfalls, and embankments.
- Monitoring movement of shoring walls.
- Monitoring the tilt of piers and piles.
- Monitoring differential settlement and heave.
- Monitoring deformation in tunnels.
- Monitoring jet, compaction, and compensation grouting in real time.
- Monitoring lateral or vertical displacements (laser extensometer)

Advantages

- **High Performance:** Wireless mesh tiltmeters provide high resolution, high precision, low noise measurements.
- **Local or Internet Access:** The USB gateway provides on-site access for real-time control. The cellular gateway transmits measurements to the internet, where they can be accessed by an internet browser.
- **Versatile Mounting Options:** Wireless mesh tiltmeters can be installed in any orientation. A wide variety of plates and brackets provide convenient mounting to walls, stakes and poles, and track ties.
- **Self-Configuring Communications:** Wireless mesh tiltmeters automatically optimize communication paths to the gateway.
- **Cable-Free:** Wireless mesh tiltmeters provide their own power and transmit measurements by radio, entirely eliminating the cost of cables, cable protection, and cable maintenance.



Wireless Mesh Tiltmeter with Laser Extensometer

Specifications for Tiltmeter

Sensors: 3 MEMS sensors to measure tilt in three axes.

Range: $\pm 90^\circ$ in each axis.

Resolution: 0.0001° .

Repeatability: $\pm 0.0005^\circ$.

Communications: Wireless mesh network, IEEE 802.15-4 compliant. FCC approved. Signal range up to 980 feet.

Battery life: 12 to 15 years, with data transmissions at 25 minute intervals, and even when acting as a relay node in the mesh network.

Environmental: IP68 at 1m for 24 hours, -40°C to $+85^\circ\text{C}$.

Dimensions: 3.5 x 3.5 x 2.4 inch high.

Specifications for Laser Extensometer

Sensor: Laser Class 2, 655 nm (visible red).

Range: 165 feet from natural surface target, 330 feet from white target, 500 feet from reflective target.

Resolution: 0.004 inch.

Repeatability: ± 0.006 inch.

Communications: Wireless mesh network, IEEE 802.15-4 compliant. FCC approved. Signal range up to 980 feet.

Battery life: 10 years at 1 hour reporting interval, 8 years at 30 minute reporting interval, including acting as a relay.

Environmental: IP68 at 1m for 24 hours, -10°C to $+50^\circ\text{C}$ for full functionality of laser, -25°C to $+85^\circ\text{C}$ for tiltmeter.

Specifications for Mesh Communications

Protocol: Proprietary, IEEE802.15.4 compliant.

Frequency: 2400-2485 MHz ISM Band.

Max Transmit power: 6.5 dBm.

Max Antenna Gain: 2.2 dBi.

Range: 980 feet point to point, not including nodes acting as relays.

Gateway to Internet: Cellular.