

Portable Tiltmeter

Applications

The Model 6201 Portable Tiltmeter is designed to measure tilt in structures including...

- Buildings
- Dams
- Embankments
- Slopes
- Excavation walls
- Open pits



• Model 6201 with case and cable.



• Model 6201 Tiltmeter shown with circular, ceramic tiltplate.

Operating Principle

The Geokon Model 6201 Tiltmeter is a portable device designed to measure tilt in structures such as buildings, dams and embankments and also for measurements related to the stability of slopes, open pits and the walls of excavations (e.g. slurry walls).

In use, the tiltmeter is placed on a tiltplate that has been permanently attached to the structure to be monitored. Measurements can be made on horizontal or vertical surfaces (readings in two orthogonal directions can be obtained on horizontal surfaces). The readings are taken in pairs, 180 degrees to each other, to eliminate instrument bias and thereby obtain true tilt. Subsequent sets of readings show how the structure is behaving and will give an indication of any tilting as time progresses.

Advantages and Limitations

The Model 6201 was designed as a low-cost, portable tiltmeter, for use in various locations, with a standard resolution of 10 arc seconds (when used with the Geokon Model GK-603 Readout Box).

The sensor has outstanding temperature stability and very low power requirements with minimal warm-up time. The power requirements consist of a simple unregulated 9 to 18 VDC; no negative voltage is required.

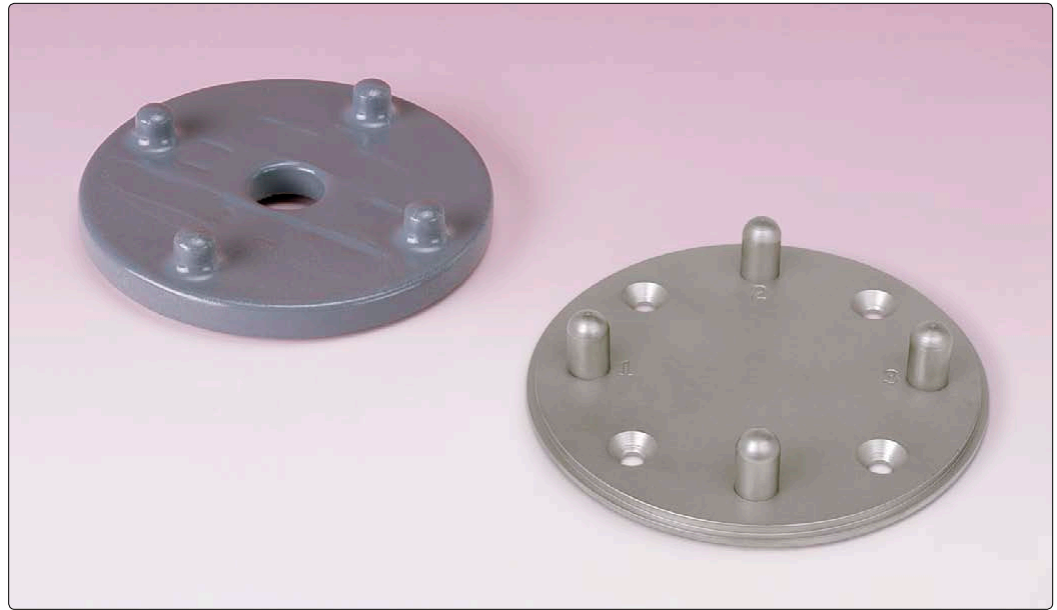
The electronics and sensor are enclosed inside a fully sealed, waterproof housing.

Tilts greater than 30 degrees can be accommodated but the resolution diminishes with the cosine of the angle. For instance, at 45 degrees the resolution is only 14 arc seconds.

Internal stops prevent the accelerometer from being over-ranged and the suspension of the pendulous mass is relatively rugged. However, care must be exercised when handling the tiltmeter to avoid damage.



● Geokon Model GK-603 Readout Box for use with the Model 6201.



● Geokon Model 6201 ceramic and stainless steel tiltplates (tiltplates are permanently attached to structure being monitored).

System Components

At the heart of the tiltmeter is a force-balanced servo-accelerometer, which consists of a pendulous mass attached to a flexure-supported torque-balance system. As the tiltmeter is tilted the mass attempts to move, and the incipient movement is detected by a position sensor attached to the body of the accelerometer. The position sensor outputs an error signal, which is amplified and then returned to the torque motor to restore the mass to its original null position. The magnitude of the restoring current is proportional to the sine of the angle of tilt and is measured by passing it through a standard resistor and measuring the voltage drop.

The Model 6201 Tiltmeter is used in conjunction with the Geokon Model GK-603 Readout Box. A connecting cable is supplied.

Two styles of tiltplates are available – ceramic and stainless steel. The stainless steel tiltplates are recommended where vandalism may be a problem.

Technical Specifications

Full Scale Range	±30°
Resolution	±10 arc seconds (±0.05 mm/m)
Accuracy ¹	±0.02% F.S.
Non-Linearity & Hysteresis	0.02% F.S.
Output @ 30°	±5.00 VDC
Output Impedance	1 kΩ
Input Supply Voltage	±9 to ±18 VDC
Input Supply Current	6 mA
Temperature Range	(operating) 0°C to +50°C (storage) -25°C to +70°C
Shock Survival	1000 g
Connector	Lemo ERA 3E30CNL
Weight	6.5 kg (including case)
Dimensions (L × W × H)	159 × 89 × 143 mm

¹Established under laboratory conditions.



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