

RST Tiltmeters are available in either portable or in-place versions utilizing force balanced servo-accelerometers to measure tilt in either one or two axial planes perpendicular the surface of the base plate.

Portable Tiltmeters require placing the tiltmeter in a reproducible position on a reference plate attached to the surface being monitored. The portable tiltmeter system has a demountable sensor and is designed for applications where a large number of measuring points are to be observed.

In-place tiltmeters are intended to be permanently or semi-permanently installed, providing long term observation with maximum resolution and sensitivity, and/or where remote data acquisition is required.



FEATURES

- Portable or in-place models.
- Uniaxial or biaxial sensors available.
- Horizontal or vertical applications.
- Readout units and portable sensor are lightweight and easy to use.
- Can be monitored with standard inclinometer readout equipment.
- Data logger compatible.
- High accuracy and repeatability.
- Operational range and temperature coefficients exceed that of bubble sensor devices.

FUNCTIONS

- Monitor tilt of retaining and building walls.
- Tilt of concrete dams.
- Landslide monitoring.
- Ground subsidence.
- Building safety along adjacent excavations.
- Applications where the failure mode is expected to have a rotational component.
- Differential compression in earth dams and embankments.
- Observation of benches and berms in open pit mines.
- Bridge piers.



Specifications may change without notice. ICB0004E



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SERVO TYPE TILT METER

The RST Instruments Management System is certified to ISO 9001:2000



OPERATING PRINCIPLE

RST Tiltmeters contains solid state, DC powered, closed-loop, and forced balanced servo accelerometers. The output is an analog DC signal directly proportional to the sine of angle of tilt. In the horizontal position the DC output is zero. When tilted in one direction, the tiltmeter output is 0 to +5 VDC full scale. When tilted in the opposite direction, the output is 0 to -5 VDC full scale.

The heart of the sensor is a gravity referenced, flexure supported torque balance system. As the sensor tilts, a pendulous mass, due to the force of gravity, attempts to move in the direction of tilt. A torque motor is utilized to pull the pendulum back to the original null position. The current draw of this torque motor is directly and accurately proportional to tilt.

Stops are provided on both sides of the pendulum to limit its travel when not powered. When powered, the pendulum moves to the null position.

IN-PLACE SYSTEMS

In-Place systems consist of the tiltmeter, interconnecting cable, and readout instrument or logger. The tiltmeter may either be uniaxial or biaxial and is available in both horizontal or vertical versions. The electronics are housed in a NEMA 4X enclosure for environmental protection and is typically bolted or bonded to the structure. For maximum resistance against water ingress, the cable is typically hardwired to the enclosure, however connectors may be provided, if required. The interconnecting cable is suitable for direct burial, and available in an armored version to suit demanding site conditions.

Readout may be either a portable manual instrument, a portable data logger device, or an automatic data acquisition system. As the tiltmeter electronics are identical to those in an inclinometer, RST Inclinometer Readout Instruments will monitor tiltmeters. Please refer to our inclinometer brochure for complete readout features and specifications.

PORTABLE SYSTEMS

Portable systems consist of the tiltmeter, interconnecting cable, brass or ceramic tiltplates, and the readout instrument. Tiltplates may be of either brass or ceramic construction. They are bolted or bonded to the structure to accurately, and repeatedly, locate the sensor. Ceramic plates are preferred in applications with high plate wear or where maximum temperature stability is required. When not in use, we recommend that the plates be shielded from damage with a protective stainless steel cover. Readout is either a manual or logger type RST Inclinometer Readout Instrument.

ACCESSORIES (Specify when ordering)

Protective cover for tilt plates

Bonding compound for tilt plates & in-place sensors

Portable tilt meter readout



TILT PLATE SPECIFICATIONS

MODEL	MATERIAL	DIMENSIONS	WEIGHT	INSTALLATION
ICTS0001	Ceramic	5.6 in. OD X 1.2 high (142 X 31 mm) 4 pegs equally spaced on 4 in. (102 mm) diameter	1.2 lbs (0.52 kg)	Epoxy resin
ICTS0002	Brass	5.5 in. OD x 2.5 ID x 0.95 (140 x 63 x 14 mm) 4 pegs equally spaced on 4 in. (102 mm) diameter	1.5 lbs (0.68 kg)	Epoxy or mechanical 4 x ¼ mounting holes on 4 in. (102 mm) diameter

TILT SENSOR SPECIFICATIONS

MODEL	RANGE	RESOLUTION	TYPE	MATERIAL
In-Place	±15, ±30, ±45	0.001% full range	Servo accelerometer	Aluminum NEMA 4X (IP-65) weather proof enclosure. Stainless steel mounting plate.
Portable	±30	8 arc sec.	Servo accelerometer	Stainless steel

Model Numbers

ICTS0003 - Portable, horizontal & vertical
ICTS0004 - In-place, uniaxial vertical
ICTS0005 - In-place, biaxial vertical

ICTS0006 - In-place, uniaxial horizontal
ICTS0007 - In-place, biaxial horizontal

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