Portable MEMS Inclinometer

Proven MEMS technology
Wireless communication to readout
Lightweight
Rugged construction
On board calibration in probe
Probes and reels are interchangeable
Portable MEMS Inclinometer

Overview

The MEMS Portable Inclinometer System utilises the very latest in Bluetooth and MEMS (Micro-Electro-Mechanical) technology to provide fast and highly accurate readings.

The system comprises a slimline probe (detachable), lightweight cable reel and a rugged PDA (Personal Digital Assistant) which is used to view and/or download data at the borehole.

The probe is fitted with guide wheels and contains MEMS accelerometers measuring tilt in two perpendicular planes: One in the plane of the inclinometer wheels is known as the A axis; the other, in a plane perpendicular to that of the wheels, is known as the B axis.

Kevlar® reinforced cable is mounted on a lightweight, tough plastic reel which houses the Bluetooth module for wireless communication to the PDA. The cable is attached to the probe via a waterproof (to 1500m) quick connection which allows the probe to be detached, significantly reducing transport costs when returned for re-calibration.

The probe contains ‘on board’ calibration making it completely interchangeable with any reel. A MEMS Spiral Sensor is also available and is also compatible with any reel.

System comprises:

- MEMS Digital probe & carrying case
- Reel and cable with case & spare battery
- PDA with data collection & transfer software
- Charger & accessories for reel & PDA
- 70 & 85mm inclinometer casing cable grips

APPLICATIONS

Dams & embankments
Retaining walls & deep excavations
Slopes & embankments
Tunnels & shafts
Bridges
Ground improvement

USED TO MONITOR

Lateral displacement of soil or rock
Lateral displacement of diaphragm walls
Lateral displacement of retaining walls
Lateral displacement of dam cores
Downstream face of rock filled dams
Settlement & heave under tanks

FEATURES

High accuracy
Fast stability of readings
MEMS technology
Wireless communication to readout
Lightweight
Rugged construction
On-board calibration in probe
Probes and reels are interchangeable
Only probe needs to be returned for calibration
Kevlar® reinforced cable with swaged cable marks

www.geosense.co.uk
Portable MEMS Inclinometer

Specifications

MODELS

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Full Scale Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>±30° from vertical</td>
</tr>
<tr>
<td>Inclined</td>
<td>±15° from 45°</td>
</tr>
<tr>
<td>Horizontal</td>
<td>±30° from horizontal</td>
</tr>
</tbody>
</table>

PERFORMANCE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>±2mm per 25m</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.005mm per 500mm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.002°</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40 to +70°C</td>
</tr>
</tbody>
</table>

PROBE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Wheelbase</td>
<td>0.5m</td>
</tr>
<tr>
<td>Probe diameter</td>
<td>25.4mm</td>
</tr>
<tr>
<td>Probe length (including connector)</td>
<td>719mm</td>
</tr>
<tr>
<td>Probe weight</td>
<td>1.06kg</td>
</tr>
<tr>
<td>Probe material</td>
<td>Stainless steel</td>
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</tbody>
</table>

CABLE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Cable diameter</td>
<td>6.4mm (±0.1)</td>
</tr>
<tr>
<td>Cable weight</td>
<td>2.3kg / 50m</td>
</tr>
<tr>
<td>Cable tensile strength</td>
<td>5.90 kN</td>
</tr>
<tr>
<td>Cable jacket</td>
<td>Polyurethane</td>
</tr>
<tr>
<td>Cable stretch (in 50m dry borehole)</td>
<td>7.0mm</td>
</tr>
<tr>
<td>Cable lengths</td>
<td>30, 50, 75, 100 150m³</td>
</tr>
</tbody>
</table>

CABLE CONNECTOR

- Connector material made of 316 stainless steel
- Rating for underwater use, with wet connection at 1524m in salt water
- Includes a spring strain relief to enhance cable durability at the connector entrance

CABLE REELS

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Up to 75m cable reel diameter</td>
<td>310mm</td>
</tr>
<tr>
<td>100 to 200m cable reel diameter</td>
<td>380mm</td>
</tr>
<tr>
<td>+225m cable reel diameter</td>
<td>460mm</td>
</tr>
<tr>
<td>Reel weight with 50m cable</td>
<td>4.7kg</td>
</tr>
</tbody>
</table>

1 Other ranges available on request
2 Using 3rd order polynomial
3 Longer available on request

www.geosense.co.uk
The Ultra-Rugged Field PC² is a data collector which provides a high-level user interface, industry-leading memory, optional Flash data security, on-site data analysis and instant USB synchronisation with office computers. It also offers on-board wireless communication options for ease of use and reliability.

Support and interface software is available which enables the Ultra-Rugged Field PC² to be used with the following systems and data loggers:

- Digital MEMS Inclinometer System
- Digital MEMS Tilt Meters
- In-place Inclinometers
- Digital ThermArray Systems
- Single Channel Data logger
- 5/10 Channel Data logger

Applications

- On-site data collection
- Compatible with several systems and dataloggers

Features

- Rugged design for use in extreme environments
- Wireless options
- Battery easily changed in the field
- 8GB flash storage, user-accessible micro SD/SDHC slot
- Secure Digital (SD or SDIO) can be used with memory cards and other peripherals
- Secure Hand Strap
- On-board stylus for quick access
- Compatible accessories
## Ultra-Rugged Field PC² & Accessories

### Specifications

#### OPERATING SYSTEM AND MEMORY
- 1.0GHz ARM Cortex A8 i.MX53 processor
- Windows® Embedded Handheld 6.5.3
- Microsoft® Office Mobile 2010
- Bluetooth® Wireless Communication
- Wi-Fi® 802 11b/g/n with extended range
- Internal solid state 512 MB Flash memory
- 8GB flash storage, user-accessible micro SD/SDHC slot
- Both USB Host and Client plus 9-pin RS-232
- Real-time clock keeps correct date & time even without battery

#### DISPLAY
- Active viewing area of 109mm diagonal
- High visibility backlit LCD - brilliant contrast in direct sunlight
- VGA LCD TFT (800 x 480 pixels). Portrait or landscape orientation
- Scratch resistant screen
- On-board stylus with tether
- Projected capacitive touch interface ‘optically bonded’ to display for increased visibility

#### POWER
- Intelligent Li-Ion battery pack, 3.7VDC @ 10600mAh, 38.7Whr
- 20 hour battery life on single charge (2 to 4 hours charge time)
- Battery easily changed in the field

#### ENVIRONMENTAL
- Operating temperature -30 to 60°C
- Size 91mm(w) x 184mm(l) x 38mm(d)
- Weight 590g
- Port: Both USB Host & Client plus 9-pin RS 232
- Bluetooth® rated to -20°C
- Waterproof and dustproof, IP68
- Shockproof: multiple drops from 1.5 m on to concrete
- MIL-STD-810G: high/low temp, temp shock, rain, humidity, sand & dust, immersion, vibrations, altitude, shock

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