INCLINOMETER SYSTEMS

EVOLUTION + INNOVATION

WIRELESS COMMUNICATION  DIGITAL MEMS TECHNOLOGY
Since 2003, RST’s inclinometer systems have had the shortest overall length available for a given base length compared to competitive inclinometers. Undaunted, we’ve forged ahead and improved on our very own industry-leading specifications. With a new minimum negotiable casing radius of 1.99 m, RST’s Digital MEMS inclinometer can still traverse a smaller radius bend than all other inclinometers available in the industry. A local microcontroller in the probe manages data collection, applies precision digital calibration, and provides a fast settling time which results in very efficient data collection.

The Ultra-Rugged Field PC² functions as the data collector. It provides a high-level user interface, “at-the-borehole” data analysis and graphical comparison to previous data sets.

Technical Specifications:

- **Processor:** 1.0GHz ARM Cortex A8 i.MX53 processor
- **Operating System:** Microsoft® Windows Embedded Handheld 6.5.3
- **Memory:** Microsoft® Office Mobile 2010 (Word, Excel, PowerPoint, Outlook)
- **Networking:** Bluetooth® Wireless Communication
- **Communication:** Wi-Fi® 802.11b/g/n with extended range
- **Memory:** Internal solid state 512 MB Flash memory (2 million biaxial data sets)
- **Storage:** 8GB flash storage, user-accessible micro SD/SDHC slot
- **Connections:** Both USB Host and Client plus 9-pin RS-232
- **Timekeeping:** Real-time clock keeps correct date & time, even without battery
- **Display:**
  - Active viewing area of 109 mm (4.3 in.) diagonal
  - WVGA LCD TFT (800x480) - portrait or landscape orientation
  - High visibility backlit LCD - brilliant contrast in direct sunlight
  - Projected capacitive touch interface, “optically bonded” to display for increased visibility.
  - Scratch-resistant screen
  - On-board stylus with tether
- **Battery:**
  - Intelligent Li-Ion battery 3.7VDC @ 10600mAh, 38.16Whr
  - 20 hour battery life on single charge (2 to 4 hrs. charge time)
  - Battery easily changeable in field
- **Temperature:**
  - Operating temperature: -30 to 60°C (-22 to 140°F)
  - Bluetooth® rated to -20°C (-4°F)
  - IP68 waterproof and dustproof
  - Shockproof (multiple drops from 1.5 m (5 ft.) on to concrete
  - MIL-STD-810G: high/low temp., temp. shock, rain, humidity, sand & dust, immersion, vibration, altitude, shock

**RST Connector**

The RST Digital MEMS Inclinometer Probe with industry leading system accuracy of ±2 mm per 25 m, shown connected to the cable.

**Interference**

Interference at connector is visibly inherent in other inclinometers (left) while RST’s Digital MEMS Inclinometer (right) can clearly traverse a smaller radius bend (1.99 m) than all other inclinometers.

**Minimum Negotiable Casing Radius**

- **Other Inclinometers:** 3.12 m
- **RST Inclinometer:** 1.99 m

0.5 m wheelbase probes shown in 70 mm OD inclinometer casing.
The inclinometer reel can be charged without removing the battery and offers up to 30 hours of continuous use from a full charge. Its battery life can also be viewed with the Ultra-Rugged Field PC.

RST’s newly developed connector is by far the industry leader for the least amount of connector interference.

RST also provides the most robust cable on the market with a breaking strength of 1.8 kN (400 lbs.) Also, our new non-slip, swaged cable marks are unmatched in grip strength.

The compact reel system with 50 m cable weighs a very manageable 4.7 kg and can be easily held with one hand. A padded carrying case is included.

<table>
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<tr>
<th>SPECIFICATIONS</th>
<th>METRIC SYSTEM</th>
<th>IMPERIAL SYSTEM</th>
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<tbody>
<tr>
<td><strong>INCLINOMETER</strong></td>
<td></td>
<td></td>
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<tr>
<td>Wheelbase</td>
<td>0.5 m</td>
<td>24 in</td>
</tr>
<tr>
<td>Probe diameter</td>
<td>25.4 mm</td>
<td>1.00 in</td>
</tr>
<tr>
<td>Probe length (including connector)</td>
<td>719 mm</td>
<td>32.6 in</td>
</tr>
<tr>
<td>Probe weight</td>
<td>1.06 kg</td>
<td>2.45 lbs</td>
</tr>
<tr>
<td>Probe material</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Full-scale range (other ranges available)</td>
<td>±30 degrees</td>
<td>±30 degrees</td>
</tr>
<tr>
<td>Data resolution</td>
<td>0.005 mm per 500 mm</td>
<td>0.00002 ft per 2 ft</td>
</tr>
<tr>
<td>Memory</td>
<td>&gt;1,000,000 readings</td>
<td>&gt;1,000,000 readings</td>
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<tr>
<td>Repeatability</td>
<td>±0.002°</td>
<td>±0.002°</td>
</tr>
<tr>
<td>System Accuracy</td>
<td>±2 mm per 25 m</td>
<td>±0.1 in. per 100 ft</td>
</tr>
<tr>
<td>Axis alignment</td>
<td>Digitally nulled</td>
<td>Digitally nulled</td>
</tr>
<tr>
<td>Temperature rating</td>
<td>-40 to +70°C</td>
<td>-40 to +158°F</td>
</tr>
<tr>
<td>Sensor Type</td>
<td>MEMS Accelerometer, Biaxial</td>
<td></td>
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<tr>
<td><strong>CABLE</strong></td>
<td></td>
<td></td>
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<tr>
<td>Cable diameter</td>
<td>6.40 mm (±0.1 mm)</td>
<td>0.25 in</td>
</tr>
<tr>
<td>Cable weight</td>
<td>2.3 kg / 50 m</td>
<td>3.1 lbs / 100 ft</td>
</tr>
<tr>
<td>Cable breaking strength</td>
<td>1.8 kN</td>
<td>400 lbs</td>
</tr>
<tr>
<td>Cable reinforcement</td>
<td>Kevlar® ‡</td>
<td>Kevlar® ‡</td>
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<tr>
<td>Cable jacket</td>
<td>Polyurethane</td>
<td>Polyurethane</td>
</tr>
<tr>
<td>Cable stretch (suspended in 50 m dry borehole)</td>
<td>7.0 mm</td>
<td>0.27 in</td>
</tr>
<tr>
<td><strong>CABLE REELS</strong></td>
<td></td>
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<tr>
<td>Up to 75 m cable reel diameter</td>
<td>310 mm</td>
<td>12.2 in</td>
</tr>
<tr>
<td>100 to 200 m cable reel diameter</td>
<td>380 mm</td>
<td>15 in</td>
</tr>
<tr>
<td>+225 m cable reel diameter</td>
<td>460 mm</td>
<td>18 in</td>
</tr>
<tr>
<td>Reel weight with 50 m (100 ft.) cable</td>
<td>4.7 kg</td>
<td>8.4 lbs</td>
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The RST Digital MEMS Inclinometer System and Inclinalysis™ Software offer a powerful combination for quick and efficient reduction of large volumes of inclinometer data. Data can be analyzed and presented quickly in a variety of formats.

RST Inclinalysis™ Software is powerful, yet easy to use. Plotting, manipulating data and printing are all only a few clicks away. Menu and plot functions are designed to be intuitive making the program very easy to learn. Designed to complement the Digital MEMS Inclinometer System, data is organized in a standard file structure which makes importing data seamless between Inclinalysis™ and the Ultra-Rugged Field PC².

**Plot**
- Plot data at the click of a button. View several plots simultaneously across the screen. Ability to save multiple reports for a single borehole.

**Customize**
- Create custom plot titles and change graph properties. Change reading units instantly to millimeters, metres, inches or feet. Specify top or bottom data reference. Correct for bias-shift.

**Import**
- Import inclinometer data in a variety of formats from different manufacturers including spiral data.

**Assess**
- Create vector plots displaying change in magnitude and direction, and time plots to assess the rate of movement at a particular depth or in a specific movement zone. Instant visual data validation by plotting checksum data.

**Compare**
- Display data in tabular format and compare directly to plots. Take direct measurements off any plot.

**Intuitive**
- Menu and plot functions are designed to be intuitive and easy to learn. Cascade windows to display multiple plots and tabular data on the same screen.

**OPTIONAL SYSTEM ACCESSORIES**
- IC35805 Dummy Probe 0.5 m wheelbase - METRIC
- IC35802 Dummy Probe 2 ft wheelbase - IMPERIAL
- IC35705 Digital MEMS Inclinometer Spiral Sensor (see separate brochure)
- IC35600 RST Inclinalysis™ - Digital Inclinometer Analysis Software
- IC35650 Protective Aluminum Carrying Case - for Inclinometer Probe
- Horizontal MEMS Inclinometer (probe available in custom lengths in Metric and Imperial units - view separate brochure or contact sales at RST Instruments).

**INCLUDED SYSTEM COMPONENTS**
- MEMS Digital Inclinometer probe with protective case
- Cable Reel with Wireless Communication System
- Cable Reel Carrying Case
- Silicone spray for probe/cable connectors
- Data collection & transfer software
- 70 & 85 mm cable grips
- Ultra-Rugged Field PC² (with rechargeable Li-Ion battery)
- AC Adapter for Ultra-Rugged Field PC²
- AC Adapter for Reel Battery Charger
- USB cable for Ultra-Rugged Field PC²
- Quick start guide for Ultra-Rugged Field PC²
- Ultra-wide hand strap for Ultra-Rugged Field PC²
- Stylus with tether for Ultra-Rugged Field PC²