

## C17-PRO VERTICAL DIGITAL INCLINOMETER SYSTEM

Datasheet C17-PRO

### Advanced PRO Features

- Robust reinforced Kevlar® cable, 6.8kN breaking strength
- Sim enabled large 7" display robust field tablet
- Borehole recognition system
- Low wear, non slip stainless steel cable markers.
- Auto run feature for rapid borehole runs
- Includes In-Profile borehole analysis software<sup>2</sup>
- Review datasets graphically upon completion of borehole run
- Small diameter probe for traversing tighter bend radius in inclinometer casing
- Over 40 hours reel battery life.
- Permanently moulded cable for reliable connection and long service life



### Description

The Vertical Digital Inclinometer Pro System is used to measure lateral deflections within a borehole. The system comprises a biaxial probe, cable reel and ultra-rugged Field Tablet supplied with 'In-Port Pro' data capture software.

The probe incorporates MEMS technology allowing highly accurate and repeatable readings, transferred via a digital signal. Bluetooth communication enables a cable free data transmitting system with no connectors to corrode or break.

The robust reinforced Kevlar® cable consists of a non slip cable marker system which, when used in conjunction with the cable gate, provides highly accurate and repeatable depth control.

With all these combined features, the Vertical Digital Inclinometer Pro System is a robust and highly accurate system that is light, compact and easy to operate in any site environment.

### Features

- No connectors between probe, cable reel and Field Tablet
- Probe is manufactured from 316 Stainless Steel
- Precision sprung wheel assemblies
- Bluetooth connection between cable reel and Field Tablet
- Accurate and precise measurements using MEMS sensors
- Repeatable depth control using low wear stainless steel markers and cable gate system
- Ultra-rugged Field Tablet allows easy transfer of data
- Enhanced 'In-Port Pro' software to use with Field Tablet for easy data capture
- Large 7" high visibility touchscreen display

### Benefits

- Moulded cable connection eliminates water ingress and connection problems
- Digital signal allows interference-free data transmission
- Advanced electronics ensure long, trouble free use in a harsh site environment
- Easy data transfer via Bluetooth, direct connection or internet using Wi-Fi or GSM network
- Waterproof Field Tablet for continuous use in harsh site environments
- Very long battery life
- Lightweight and easily portable



Comprehensive information about this product and our full range is available at [www.soilinstruments.com](http://www.soilinstruments.com)  
If you would like to speak with someone directly please call +44 (0)1825 765044 or email [sales@soilinstruments.com](mailto:sales@soilinstruments.com)



Microelectromechanical Systems, or MEMS, is a technology that uses miniaturised mechanical and electromechanical elements that are made using the techniques of microfabrication. The physical dimensions of MEMS devices can vary from well below one micron all the way to several millimetres.

Our MEMS microsensor is a small discrete device that converts a measured mechanical signal, gravity (g) into a voltage signal.

### Operation

The inclinometer probe is inserted into the inclinometer casing and lowered to depth, ensuring the probe wheels are correctly aligned and slotted within the keyways of the casing. The probe is connected by a graduated cable to the cable reel.

Displacement readings are taken at regular intervals of 0.5m (2ft for imperial systems) within the casing (the gauge length between the probe wheels). This is measured and controlled by stainless steel markers crimped around the cable, these pass through a notch in the cable gate, giving an exact position for each reading.

By pressing the screen button or using auto run mode you can save readings from the MEMS sensors, which are transmitted to the Field Tablet from the cable reel via Bluetooth transmission.

An initial or 'base' set of inclinometer readings are obtained at each increment within the casing.

The summation of each incremental reading provides a profile of horizontal displacement of the casing as a function of depth.

When you take all subsequent readings at identical depths the comparison of successive casing profiles indicates the depth, direction, magnitude and the rate of change of movement.

You can see the clearest indication of movement by plotting the change in displacement of the casing against depth using 'In-Profile' Inclinometer Data Management Package.

### Applications

Inclinometer systems are used to measure lateral displacement in the ground or structure. They are useful for determining the depth, direction, magnitude and rate of movement.

Typical applications include:

- **Slope failures and landslides**
- **Shear and slip zones**
- **Diaphragm or sheet pile walls**
- **Monitoring bending in piles**
- **Verifying design assumptions and finite element analysis**
- **Embankments**
- **Dams**
- **Retaining walls**



### Associated products

For details on:	Catalogue code:
EC Casing	C9
Standard Casing	C18
'In-Profile' Software	C13
Inclinometer Test Probe	C10

View our full product range on [www.soilinstruments.com](http://www.soilinstruments.com)

### THE TECHNICAL RATING FOR THIS PRODUCT:

As the correct installation of any monitoring sensor or system is vital to maximise performance and accuracy, Soil Instruments makes the following recommendations, for the skill level of the installation contractor.

#### ADDITIONAL SUPPORT

We offer installation and monitoring services to support this system. For more information please email : [sales@soilinstruments.com](mailto:sales@soilinstruments.com) or call : **+44 (0) 1825 765044**

**BASIC** 

**ADVANCED** 

**INTERMEDIATE** 

**BASIC** 

The installer is trained and experienced in the installation of this type of instrument or systems, and is ideally a specialist Instrumentation and Monitoring contractor.

The installer already has previous experience and/or training in the installation of this instrument or system.

As a minimum the installer has read and fully comprehends the manual, and if possible has observed these instruments or systems being installed by others.

## Specifications

### Probe

Probe gauge length	500mm (metric system) or 24" [imperial system]
Probe diameter	25.4mm
Calibrated ranges	±30° (±250mm) [±12"]
Resolution	0.005mm [0.0002"]
Sensor accuracy	±0.02% full scale (±0.1mm)
Operating temperature	-20 to +70°C
Repeatability	±0.005% full scale
System accuracy <sup>1</sup> (over 25m)	±2mm
Minimum casing internal diameter	38mm
Maximum casing internal diameter	83mm
Minimum traversable bend radius <sup>3</sup>	2.06m

### Cable

Type	Kevlar® re-enforced Polyurethane coated 4 core cable
Weight	82g per metre (approx)
Cable marker	Stainless Steel
Breaking strength	6.8kN
Cable diameter	7.5mm

### Cable Reel

Dimensions	483 x 385 x 315mm
Battery life	40 hrs' continuous use

### Weight (complete with probe)

30 metre	9kg
50 metre	11kg
100 metre	15Kg

### Field Tablet

Display	7", high visibility display
Connectivity	Bluetooth® 2.1, Wi-Fi® 802.11 b/g/n, 3.5G
Dimensions	213 x 141 x 17.8mm
Weight	1.35kg
Camera	8 MP (Rear facing) / 2 MP (Front facing)
Operating Temperature	-20 to +60°C
Battery Life	Up to 20 hours
Ingress Protection	IP67
GPS	GPS / WAAS / SBAS
Ports	USB Client (Micro B), 3.5mm Audio, SIM Slot, Micro SD/SDHC Slot

<sup>1</sup>Derived empirically from surveys that include systematic and random errors introduced by casing, probe and operator.

Achieved using Soil Instruments Easy Connect (EC) Casing installed within 3° of vertical and operated in accordance with the user manual.

<sup>2</sup>'In-Profile' Basic included. Advanced version available as option.

<sup>3</sup>Based on Soil Instruments 70mm EC Casing.

## Ordering information

### Vertical Digital Inclinometer System

Includes biaxial 500mm probe, cable, cable reel & charger, cable gate, robust Field Tablet & charger, calibration certificate and manual.  
For use with up to 85mm outer diameter casing.

C17-PRO-30M	30metre cable length, $\pm 250\text{mm}/500\text{mm}$ ( $\pm 30$ arc degree)
C17-PRO-50M	50metre cable length, $\pm 250\text{mm}/500\text{mm}$ ( $\pm 30$ arc degree)
C17-PRO-75M	75metre cable length, $\pm 250\text{mm}/500\text{mm}$ ( $\pm 30$ arc degree)
C17-PRO-100M	100metre cable length, $\pm 250\text{mm}/500\text{mm}$ ( $\pm 30$ arc degree)

### 'In-Profile' Inclinometer Data Management Package (Advanced)

C13-PRO	In-Profile licence key
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### Imperial Digital Inclinometer System

Includes biaxial 2 foot length probe, cable, cable reel & charger, cable gate, robust Field Tablet & charger, calibration certificate and manual.  
For use with up to 85mm outer diameter casing.

C17-PRO-100F	24inch Probe with 100feet cable Length ( $\pm 30$ arc degree)
C17-PRO-200F	24inch Probe with 200feet cable Length ( $\pm 30$ arc degree)
C17-PRO-300F	24inch Probe with 300feet cable Length ( $\pm 30$ arc degree)

### Inclinometer Accessories

C10-3.1	Test Probe With 50 Metre Steel Cable & Cable Reel
C10-3.2	Test Probe With 100 Metre Steel Cable & Cable Reel
C10-3.8	Probe Reference Frame

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INSTRUMENTS



FM 611948

Bell Lane, Uckfield, East Sussex  
TN22 1QL United Kingdom t: +44 (0) 1825 765044 e: [info@soilinstruments.com](mailto:info@soilinstruments.com) w: [www.soilinstruments.com](http://www.soilinstruments.com)

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