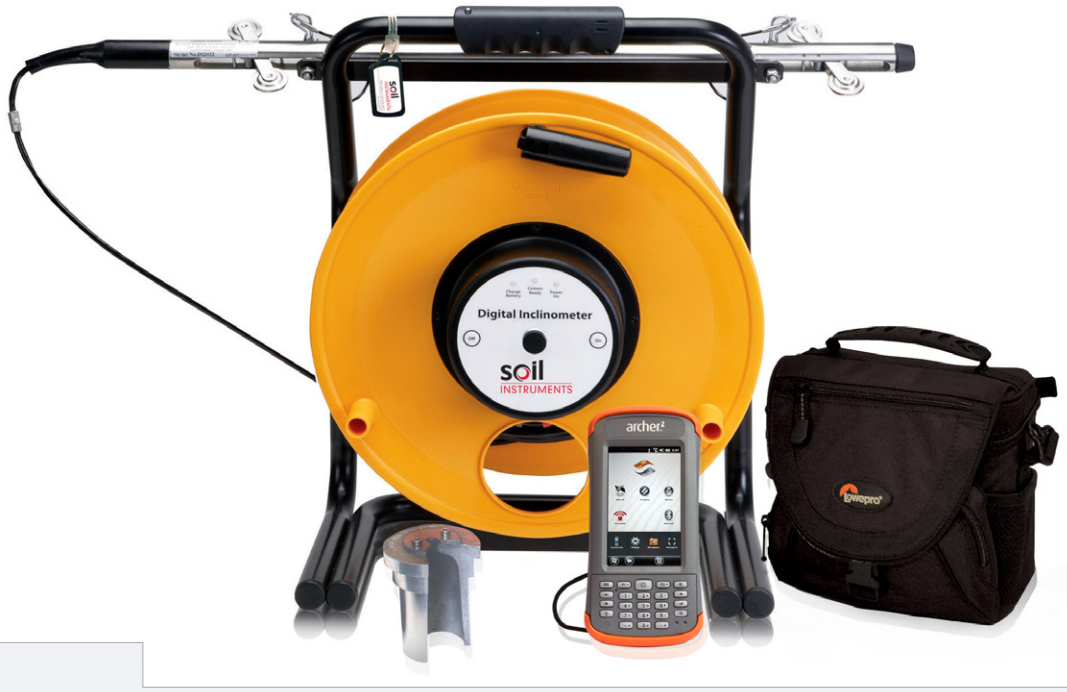
C17 VERTICAL DIGITAL INCLINOMETER SYSTEM

Datasheet C17



Description

The Vertical Digital Inclinometer System is used to measure lateral deflections within a borehole. The system comprises a biaxial probe, cable reel and ultra-rugged Field PC supplied with 'In-Port' 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 Kevlar cable consists of a 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 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 PC**
- **Probe is manufactured from 316 Stainless Steel**
- **Precision sprung wheel assemblies**
- **Bluetooth connection between cable reel and Field PC**
- **Accurate and precise measurements using MEMS sensors**
- **Repeatable depth control using metal markers and cable gate system**
- **Ultra-rugged IP68 Field PC allows easy transfer of data**
- **Enhanced 'In-Port' software to use with Field PC for easy data capture**
- **Large 4.3" 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 PC 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
If you would like to speak with someone directly please call +44 (0)1825 765044 or email sales@soilinstruments.com

MICROELECTROMECHANICAL SYSTEMS (MEMS)

MEMS

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 within the casing (the gauge length between the probe wheels). This is measured and controlled by metal markers crimped around the cable that pass through a notch in the cable gate, giving an exact position for each reading.

A key fob activates the saving of readings from the MEMS sensors, which are transmitted to the Field PC from the cable reel via Bluetooth transmission and saved.

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.

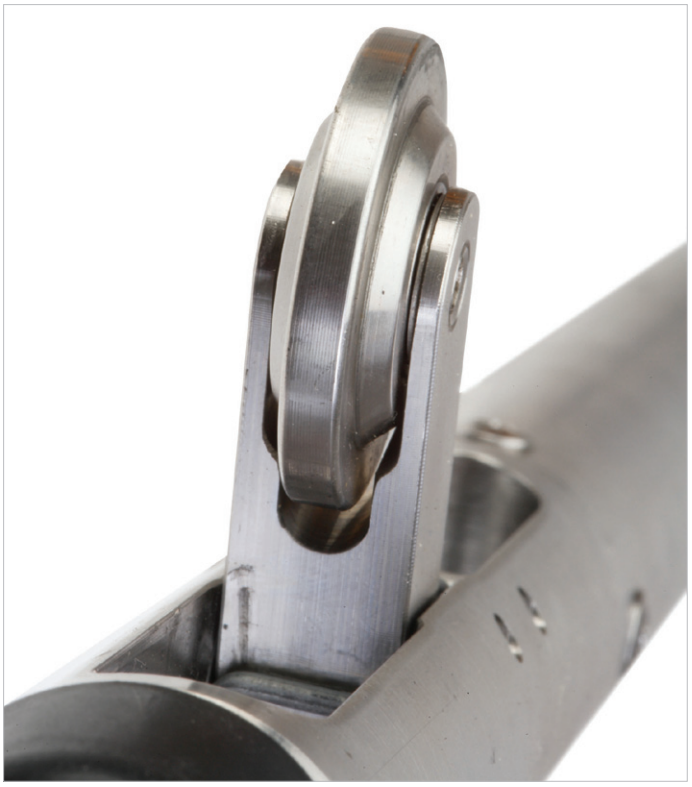
You can see the clearest indication of movement by plotting the change in displacement of the casing against depth using 'In-Site' Inclinometer Data Management Package.

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-Site' Software	C13
Inclinometer Test Probe	C10

View our full product range on www.soilinstruments.com

THE TECHNICAL RATING FOR THIS PRODUCT:

BASIC

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** or call : **+44 (0) 1825 765044**

ADVANCED	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.
INTERMEDIATE	The installer already has previous experience and/or training in the installation of this instrument or system.
BASIC	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	28.5mm [1⅛"]		
Calibrated ranges	±30° (±250mm) [±12"]	±60° (±433mm) [±20.78"]	±90° (±500mm) [±24"]
Resolution	0.01mm [0.001"]		
Sensor accuracy	±0.02% full scale (±0.1mm)	±0.02% full scale (±0.17mm)	±0.02% full scale (±0.2mm)
Operating temperature	-20 to +60°C		
Repeatability	±0.008% full scale		
System accuracy[1] (over 25m)	±2mm	±3mm	±4mm
Minimum casing internal diameter	48mm		
Maximum casing internal diameter	83mm		

Cable	Standard Cable	Heavy Duty Cable
Type	Kevlar re-enforced Polyurethane coated 4 core cable	Steel / Kevlar re-enforced Polyurethane Coated 4 core cable
Weight	42g per metre (approx)	126g per metre (approx)
Cable marker	Hard anodised colour coded	Stainless Steel numbered

Cable Reel

Dimensions	483 x 385 x 315mm	483 x 385 x 365mm (100m) (30m & 50m as standard)
Battery life	12 hrs' continuous use	

Weight (complete with probe)

30 metre	8.5kg	11.4kg
50 metre	9.5kg	14.3kg
100 metre	11.5Kg	21.6Kg

Field PC

Display	4.3", Illumiview©, high visibility
Connectivity	Bluetooth© 2.1, Wi-Fi©, 3G
Dimensions	184 x 91 x 38mm
Weight	590g
Camera	5 MP
Operating Temperature	-30 to +60°C
Battery Life	Up to 20 hours
Ingress Protection	IP68
Tested to	MIL-STD-810G
GPS	GPS / GLONASS / SBAS
Included software	Office Mobile© 2010, 'In-Port'
Ports	RS 232C, USB Host (Full A), USB Client (Micro B), 3.5mm Audio

Key Fob (remote handheld activator)

Dimensions	65 x 35 x 15mm
Weight	26g
Battery	1 x GP23A

[1]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.

Ordering information

Vertical Digital Inclinometer System

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

C17-30M	30metre cable length, ±250mm/500mm (±30 arc degree)
C17-50M	50metre cable length, ±250mm/500mm (±30 arc degree)
C17-75M	75metre cable length, ±250mm/500mm (±30 arc degree)
C17-100M	100metre cable length, ±250mm/500mm (±30 arc degree)
C17-125M	125metre cable length, ±250mm/500mm (±30 arc degree)
C17-150M	150metre cable length, ±250mm/500mm (±30 arc degree)
C17-175M	175metre cable length, ±250mm/500mm (±30 arc degree)
C17-200M	200metre cable length, ±250mm/500mm (±30 arc degree)
C17-225M	225metre cable length, ±250mm/500mm (±30 arc degree)
C17-250M	250metre cable length, ±250mm/500mm (±30 arc degree)
C17-30M-±60°	30metre cable length, ±433mm/500mm (±60 arc degree)
C17-50M-±60°	50metre cable length, ±433mm/500mm (±60 arc degree)
C17-100M-±60°	100metre cable length, ±433mm/500mm (±60 arc degree)
C17-150M-±60°	150metre cable length, ±433mm/500mm (±60 arc degree)
C17-200M-±60°	200metre cable length, ±433mm/500mm (±60 arc degree)
C17-30M-±90°	30metre cable length, ±500mm/500mm (±90 arc degree)
C17-50M-±90°	50metre cable length, ±500mm/500mm (±90 arc degree)
C17-100M-±90°	100metre cable length, ±500mm/500mm (±90 arc degree)
C17-150M-±90°	150metre cable length, ±500mm/500mm (±90 arc degree)
C17-200M-±90°	200metre cable length, ±500mm/500mm (±90 arc degree)
C17-250M-±90°	250metre cable length, ±500mm/500mm (±90 arc degree)

'In-Site' Inclinometer Data Management Package

Priced per dongle licence, includes installation CD, manual & dongle per licence. Multiple licences available at reduced rates

C13-1	In-Site package with 1 dongle licence key

Imperial Digital Inclinometer System

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

C17-100F	24inch Probe with 100feet cable Length (±30 arc degree)
C17-200F	24inch Probe with 200feet cable Length (±30 arc degree)
C17-300F	24inch Probe with 300feet cable Length (±30 arc degree)

Replacement Battery Charger and Cables

C17-4.1	Universal inclinometer battery charger kit (3 LED 2 pole connection) Includes UK mains cable, select alternatives from below
C17-4.2	Mains cable Australasia region plug 1.9 metre long
C17-4.3	Mains cable, EU region plug 1.9 metre long
C17-4.4	Mains cable, USA region plug 1.9 metre long

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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