

E2 MAGNETIC PROBE EXTENSOMETER

Datasheet E2



Description

The Magnetic Extensometer System is installed at locations where monitoring of settlement or heave is required.

The Magnetic Extensometer System comprises a probe, a graduated tape on a reel and an access pipe along which magnetic targets are positioned at pre-determined intervals.

The reed switches within the probe detect the magnets as it moves along the length access pipe.

When a magnet is detected, the switch circuit closes causing a light to display and a buzzer to sound at the reel.

There are various types of magnetic targets available; three-legged and six-legged spider magnets, retained by leaf springs for use in boreholes, and plate magnets for placing in soil or fill when adding further sections of access tube during construction.

Features

- Versatile system with a variety of magnetic targets to suit different applications
- Larger diameter magnetic targets available for use with inclinometer casing
- Up to 200m tape lengths available
- Access tube can be extended through fill material
- Reel provides audio and visual indication of magnetic targets

Benefits

- Reliable and accurate measuring system that is easy to read
- Can be combined with inclinometer readings to provide three dimensional measurements
- Any number of targets can be monitored in a single borehole
- Cost effective; one probe reads all locations



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

Operation

The access tube is installed within a borehole by coupling together three metre lengths until the pre-determined depth is obtained.

In an ideal installation, the bottom of the access tube is installed into stable ground and a datum magnet anchored in place, to provide a fixed point for all other target readings to be referenced relative to the datum. Should it not be possible to anchor the access tube in stable ground, each target must be referenced to the top of the access tube using a topographic survey measurement as a datum point.

Magnetic targets are then installed to the required depths along the access tube.

Any settlement or heave of the ground being measured will cause the magnets to move along the axis of the access tube.

Fixed joints or telescoping sections should be used if large amounts of ground movement in the axis of the tubing are expected.

Measurements are taken by lowering the probe down the access tube using the handle on the cable reel until the light is displayed and the buzzer is heard. When the sound from the buzzer is clear and consistent, the graduated tape is used to measure the distance from the top of the access tube to each magnetic target.

Displacement is measured by taking repeated readings of each target over a period of time. Changes in this distance relative to the datum magnet at the base of the access tube will reflect the movement with the rock or soil.



Applications

The Magnetic Extensometer System is used to monitor settlement or heave in soil or rock.

Typical applications include:

- Excavations
- Foundations
- Dams
- Embankments
- Retaining structures, such as sheet piles and slurry walls
- Tunnels and shafts
- Surcharge sites.

Associated products

For details on:	Catalogue code:
EC Casing	C9
Standard Casing	C18
Vertical Digital Inclinometer System	C17
'In-Site' Software	C13

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THE TECHNICAL RATING FOR THIS PRODUCT:

INTERMEDIATE



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 / Reel

Range ¹	30m 50m 100m 150m 200m
Resolution	±1mm
Repeatability ²	±2mm
Operating temperature range	-30 to +80° C
Graduations	mm/cm/m
Indicators	Audio & visual
Probe material	Stainless Steel
Probe diameter	16mm
Tape type	Contoured /shaped copper conductors
Tape material	Steel / polyethylene coated
Reel material	Steel frame / polypropylene hub
Battery life	12 hrs continuous use
Battery type	1 x PP3 / 6LR61 / MN1604
Weight	1.7kg 2.0kg 3.0kg 3.8kg 4.6kg

Magnet Targets

Type	Spider	Plate	Datum
Body material	PVC	PVC	PVC
Leg material	Stainless Steel	N/A	N/A

Access Tubing

Material	PVC
Dimensions	24mm ID x 33.5mm OD x 3m long
Joint type	Flush coupled bonded or flush coupled bonded thread

Telescoping Access Tubing

Material	PVC
Internal section dimensions	24mm ID x 33.5mm OD x 2m long
External section dimensions	38mm ID x 48.5mm OD x 2m long
Effective section length	3m
Telescoping range	1m

¹Longer lengths available and imperial graduations available.

²Dependent on operator experience

Ordering Information

Magnet Targets

For 33.4mm outer diameter access tube

E2-1.1-1	Datum magnet
E2-1.1-2	3 leaf spider magnet push in. For 65-120mm diameter bore
E2-1.1-4	3 leaf spider magnet push in. For 120-225mm diameter bore
E2-1.1-5	Plate mounted magnet
E2-1.1-6	6 leaf spider magnet. Mechanical Release, for 120-225mm diameter bore

Magnet Targets

For 70mm outer diameter inclinometer casing

E2-1.2-1	Datum magnet
E2-1.2-2	Plate mounted magnet
E2-1.2-3	6 leaf spider magnet. Mechanical Release, for 130-250mm diameter bore
E2-1.2-4	3 leaf spider magnet push in. For 150-200mm diameter bore
E2-1.2-5	3 leaf spider magnet push in. For 180-325mm diameter bore

Magnet Targets

For 85mm outer diameter inclinometer casing

E2-1.3-1	Datum magnet
E2-1.3-2	Plate mounted magnet
E2-1.3-3	6 leaf spider magnet. Mechanical Release, for 140-270mm diameter bore

Ordering Information

Tubes and Fittings

E2-2.1-A	Access tube, flush threaded 33.4mm outer diameter. 3metre length
E7-2.11	Telescoping access tube 33.4mm outer diameter. Internal tube, 2metre length
E7-2.12	Telescoping Access Tube 48.5mm outer diameter. 2metre length. 1No required per extension rod
E2-2.9	End cap. To fit 35mm outer diameter tubing
S17-4.2	End cap. To fit 50mm outer diameter tubing
E2-2.13	Protective cover. 2inch BSP Threaded cap. 50mm inner diameter, 500mm length
E2-2.14	Security cover. With bar and padlock. 50mm inner diameter, 500mm length

Installing Equipment

W6-4.1	PVC adhesive - 250ml. Sufficient for approx.150 joints
E2-3.2	Placing head for push-in targets. For 34mm outer diameter access tube only, ¾ inch BSP coupling
W1-2.1	PVC standpipe tubing, 3metre length. Rigid PVC tube, internal diameter 19mm, includes ¾ inch BSP threaded coupling
W1-2.15	PVC standpipe tubing, 1.5metre length. Rigid PVC tube, internal diameter 19mm, includes ¾ inch BSP threaded coupling
W1-2.16	PVC standpipe tubing, 1metre length. Rigid PVC tube, internal diameter 19mm, includes ¾ inch BSP threaded coupling
E2-3.5	Release pin. Not recommended for use over 25metre depth
E2-3.6	Pull cord. Price per 100metres, 4mm outer diameter
W6-4.3	Sealing tape. Can be used to secure targets to access tube during installation. Price per roll
C9-3.5	Mastic applicator
C9-3.4	Sealing mastic
E2-3.7	Pneumatic cutter. Used with control unit E2-3.9, includes 30metre tube. Wade olives to cutter, Enots to control unit
E2-3.7-U	Pneumatic cutter. Used with control unit E2-3.9, Excludes 30metre tube
E2-3.8	Nylon filament. Per 500metre reel
E2-3.9	Pneumatic control unit. Includes 13.8Bar pressure gauge, for use with ¾ inch tube. Enots olive used for connection to tubing
W6-7.5	Foot pump. For pressurising control unit E2-3.9
E2-3.1	Additional tubing ¾ inch. Price per 30metre roll
W6-3.11	Spare nut & olive, Enots ¾ inch. For pneumatic tubing ¾ inch tube
E2-3.11	Spare olive, Enots ¾ inch. For pneumatic tubing ¾ inch tube
W6-3.10	Straight coupling ¾ inch. For pneumatic tubing ¾ inch tube, Wade olives used
E10-4.8	Grout pipe . Price per metre - 19mm outer diameter, nylon braided PVC hose
W3-4.8	Tube cutter

Magnetic Settlement Probe for Access Tube

33.4mm outer diameter access tube, E2

E2-4.1-0	30metre tape length
E2-4.1-1	50metre tape length
E2-4.1-2	100metre tape length
E2-4.1-3	200metre tape length
E2-1.1-6	6 leaf spider magnet. Mechanical Release, for 120-225mm diameter bore

Magnetic Settlement Probe for Inclinometer Casing

Includes a probe centraliser

E2-4.2-0	30metre tape length
E2-4.2-1	50metre tape length
E2-4.2-2	100metre tape length
E2-4.2-3	200metre tape length
E2-1.1-6	6 leaf spider magnet. Mechanical Release, for 120-225mm diameter bore

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