

E13 CONTINUOUS ROD EXTENSOMETER

Datasheet E13



Description

The Continuous Rod Extensometer system accurately measures settlement and/or heave at single or multiple anchor points in a borehole and at its reference head.

The system employs up to eight rods, anchored along the axis of a borehole, terminating in the reference head at the borehole entrance.

Displacement along the axis of the borehole from the anchor is recorded by measuring movement of the top of the rod relative to the reference head.

The Continuous Rod Extensometer is pre-assembled to specified lengths.

A versatile range of options are available for Continuous Rod Extensometers:

- Automatic or manual reading
- Hydraulic anchoring for soil
- Groutable anchoring for rock
- Multiple or single point rod reference

Features

- Rods and anchors are delivered pre-assembled to customer specified length
- Various anchor types available according to soil conditions and installation method
- Manual or remote monitoring
- Remote option uses Vibrating Wire or potentiometric displacement transducers
- Up to 8 measuring points per borehole

Benefits

- Installation in drillholes or boreholes at any orientation
- Quicker installation than conventional rod extensometer systems
- Fibreglass less sensitive to temperature changes than steel
- Particularly useful in confined areas
- For borehole diameters up to 200mm



Comprehensive information about this product and our full range is available at www.soil.co.uk
If you would like to speak with someone directly please call +44 (0)1825 765044 or email sales@soil.co.uk

PRECISELY MEASURED

instrumentation and monitoring

Operation

Relative movement between the end anchor and the reference tube is measured with either a digital depth gauge, or a displacement transducer inserted through the reference tube and registering on to the free end of the rod.

The ground condition determines the type of anchor to use:

- Groutable anchors for downhole installation in rocks
- Hydraulic type anchors (single or double ended) for soft soils
- Packer anchors for jointed rocks, where there is flowing water, or uphole installations

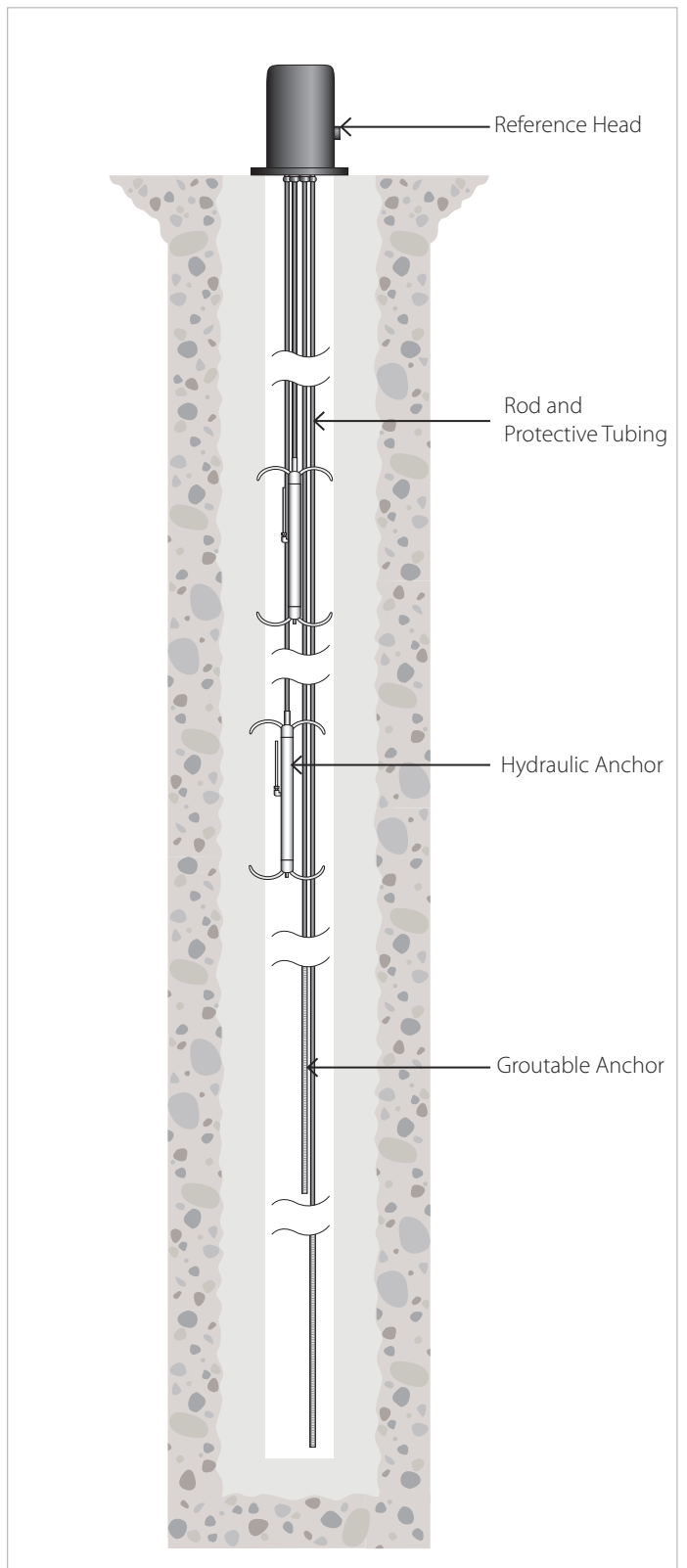
The extensometers have reference heads with provision for up to eight measuring points per borehole. Borehole diameters may be in the range of 100mm-200mm.

Applications

Continuous Rod Extensometers are used to monitor small scale rock and soil movements to a high degree of accuracy, including settlement and heave of foundations, the relaxation or subsidence of rock around tunnels, shafts, caverns and abutments.

Typical applications include:

- Monitoring settlement and heave in foundations
- Monitoring tunnels, shafts, caverns and abutments
- Control of natural and cut slopes, quarry and mining excavations
- Monitoring deformation of retaining walls, bridge piers and abutments



Associated products

For details on:

Catalogue code:

Dataloggers

D1

VWnote

RO-1-VW-NOTE

View our full product range on www.soil.co.uk

THE TECHNICAL RATING FOR THIS PRODUCT:

ADVANCED



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@soil.co.uk 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

Sensors and Gauges

Type	Vibrating Wire Transducer	Linear Potentiometer	Digital Depth Gauge
Ranges	30mm 50mm 100mm	25mm 50mm 100mm	±60mm
Accuracy	0.2% full scale	±0.5% full scale	±0.02mm
Resolution ¹	±0.025% full scale	Virtually infinite	0.01mm
Temperature range	-20 to +80°C	-20 to +80°C	N/a
Thermistor fitted	NTC 3k Ω	No	N/a
Thermistor accuracy	±0.5°C	N/a	N/a
Thermistor resolution ¹	0.1°C	N/a	N/a
Excitation method	Pluck or sweep	N/a	N/a
Material	316 grade Stainless Steel		N/a
Ingress protection	IP68 to 1700kPa		N/a

Anchors

Type	Groutable	Hydraulic – single ended or double ended
Material	Zinc plated steel	Steel
Diameter	16mm	32mm
Length	540mm	450mm (single) / 820mm (double)
Borehole diameter range	100-200mm	

Rod

Material	PVC coated fibreglass
Diameter	6.35mm
Maximum length	100m
Maximum number of rods	8

Sleeves

Material	Polyethylene HDPE
Outer diameter	16mm

¹ Dependent on readout

Ordering Information

Groutable Anchors

16mm diameter x 500mm long and head tube assembly

E13-1.1	For use with 30mm VW Displacement Transducer
E13-1.2	For use with 50mm VW Displacement Transducer
E13-1.3	For use with 100mm VW Displacement Transducer
E13-1.4	For use with Digital Vernier instruments

Hydraulic Anchors – Single ended

Hydraulic anchor and head tube assembly. For boreholes up to 200mm diameter

E13-2.1	For use with 30mm VW Displacement Transducer
E13-2.2	For use with 50mm VW Displacement Transducer
E13-2.3	For use with 100mm VW Displacement Transducer
E13-2.4	For use with Digital Vernier instruments

Hydraulic Anchors – Double ended

Hydraulic anchor and head tube assembly. For boreholes up to 200mm diameter

E13-3.1	For use with 30mm VW Displacement Transducer
E13-3.2	For use with 50mm VW Displacement Transducer
E13-3.3	For use with 100mm VW Displacement Transducer
E13-3.4	For use with Digital Vernier instruments

Ordering Information

Single and Multiple Rod Reference Heads – Manual Readings

For use with Digital Vernier

E13-4.1-1	Single point rod reference head
E13-4.1-2	2 Point rod reference head
E13-4.1-3	3 Point rod reference head
E13-4.1-4	4 Point rod reference head
E13-4.1-5	5 Point rod reference head
E13-4.1-6	6 Point rod reference head
E13-4.1-7	7 Point rod reference head
E13-4.1-8	8 Point rod reference head

Single and Multiple Rod Reference Heads – Remote Readings

For use with both Vibrating Wire Displacement Transducers and Linear Potentiometers

E13-5.1-1	Single point rod reference head
E13-5.1-2	2 Point rod reference head
E13-5.1-3	3 Point rod reference head
E13-5.1-4	4 Point rod reference head
E13-5.1-5	5 Point rod reference head
E13-5.1-6	6 Point rod reference head
E13-5.1-7	7 Point rod reference head
E13-5.1-8	8 Point rod reference head

Linear Potentiometers

E13-6.6-25	Linear Displacement Transducer – 25mm range with termination cable to reference head
E13-6.6-50	Linear Displacement Transducer – 50mm range with termination cable to reference head
E13-6.6-75	Linear Displacement Transducer – 75mm range with termination cable to reference head
E13-6.6-100	Linear Displacement Transducer – 100mm range with termination cable to reference head

Measuring Equipment

E13-6.1	Digital Vernier with mounting bush adaptor for manual reading; ± 60 mm
E10-6.5-T	Vibrating Wire Displacement Transducer; 30mm range with thermistor and termination cable to reference head
E10-6.3-T	Vibrating Wire Displacement Transducer; 50mm range with thermistor and termination cable to reference head
E10-6.4-T	Vibrating Wire Displacement Transducer; 100mm range with thermistor and termination cable to reference head

Rod and Sleeves

E13-7.1	GRP rod; priced per metre, $\varnothing 6$ mm GRP rod with plastic covering to $\varnothing 9.5$ mm
E13-7.2	HDPE sleeve; priced per metre, 16mm OD x 12.4mm ID HDPE tube

Installation Equipment

E13-8.1	Grout plate for in place grouting applications (reusable)
E10-4.8	Grout pipe, priced per metre
E10-4.9	Air vent pipe, priced per metre
E13-8.2	Installation tool kit
CA-2.2-6-SC	6 core cable (2 x VW sensors, 1 x thermistor)
CA-2.2-8-SC	8 core cable (3 x VW sensors, 1 x thermistor)
CA-2.2-10-SC	10 core cable (4 x VW sensors, 1 x thermistor)
CA-2.2-12-SC	12 core cable (5 x VW sensors, 1 x thermistor)
CA-2.2-18-SC	18 core cable (6 to 8 x VW sensors, 1 x thermistor)
E13-8.3	Groutable fixing kit for head assembly
E13-8.4	Expanding fixing kit for head assembly
E13-8.5	Single point grout plate

Manual

MAN-224	Continuous GRP Rod Extensometer Installation
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INSTRUMENTS



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