# E7 VIBRATING WIRE SOIL EXTENSOMETER

Datasheet E7

## Description

The Vibrating Wire Soil Extensometer measures lateral deformation of soil and rock, particularly in embankment dams and quarry or mining excavations.

A chain of successive displacement transducers and anchor beams may be employed to provide a continuous profile of movement.

The Extensometer consists of a Vibrating Wire displacement transducer contained within a heavy duty sealed housing.

A telescoping PVC sleeve protects the extension rod from soil contact, ensuring its free movement.

As lateral movement occurs, the distance between the VW transducer and the anchor is changed. This causes a change of frequency in the VW transducer; the change is measured and can be converted to give the displacement in millimetres.

## Features

- **Accurate, robust with very good long-term stability**
- **Heavy duty steel housing suitable for burial in rock-fill**
- **Suitable for remote reading**
- **Over-voltage surge arrestor fitted to protect against electrical damage**
- **Connecting cable is strong, flexible, armoured and can be used in lengths in excess of 1000m**
- **Waterproof and sealed to 1000kPa**

## Benefits

- **Suitable for remote reading and datalogging**
- **Very heavy duty**
- **Accuracy unaffected by cable length**

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

## VIBRATING WIRE PRINCIPLE

VW

A high carbon steel wire is held in tension between a fixed point and a movable point within the sensor.

The physical changes measured by the sensor result in small changes to the position of the movable point which results in a change to the tension of the wire.

The wire may be excited by either plucking or sweeping via a coil adjacent to the wire. The resulting resonant frequency (which is relative to the tension of the wire) is then recorded by the same coil. The reading can be displayed by instrument readout or recorded by data logging equipment.

## Operation

The Soil Extensometer is connected between two anchor beams.

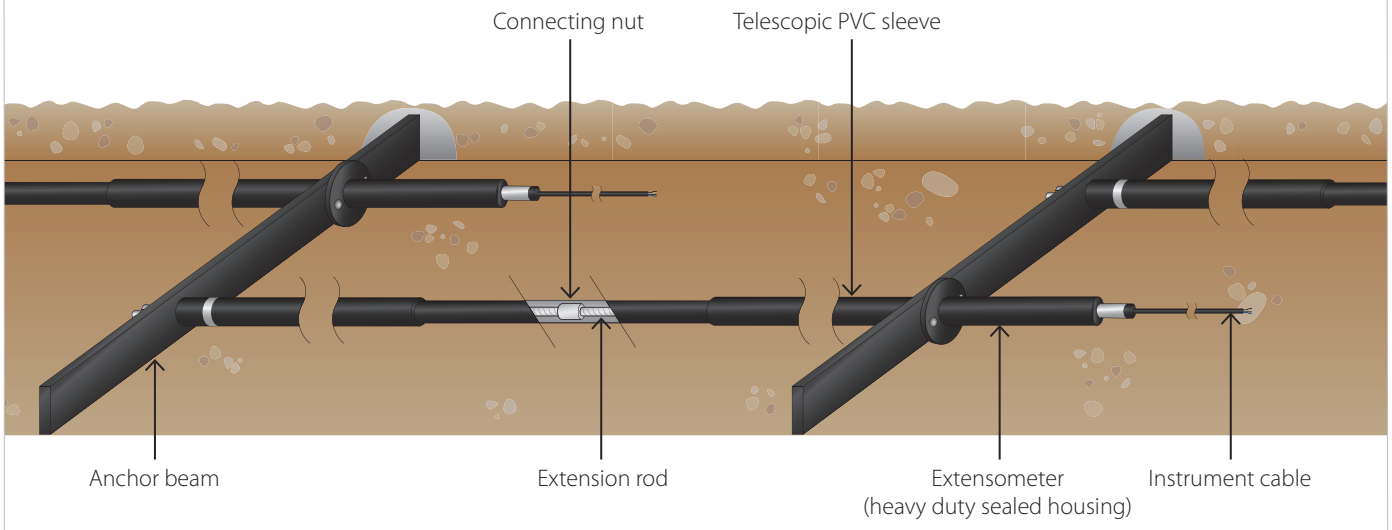
Any displacement between the anchor beams will cause movement to the VW transducer, via its connecting rod. This changes the tension in the vibrating causing a change in frequency.

The resulting displacement can then be measured in millimetres.

## Applications

The measurement of soil and rock movements including:

- Horizontal and vertical displacements within embankment fill material
- Displacements of retaining walls and abutments
- Foundation spreading
- Control of natural and cut slopes, quarry and mining excavations




## Associated products

| For details on: | Catalogue code: |
|---|---|
| Dataloggers | D1 |
| VWnote | RO-1-VW-NOTE |

View our full product range on www.soilinstruments.com

## 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

### Vibrating Wire Soil Extensometer Transducer

| | |
|---|---|
| Range | 300mm |
| Resolution[1] | 0.025% |
| Accuracy | ±0.2% |
| Operating frequency | 1300Hz to 2700Hz |
| Operating temperature | –20 to +80°C |
| Thermistor type | NTC 3k Ω |
| Thermistor accuracy | ±0.5°C |
| Thermistor resolution[1] | 0.1°C |
| Ingress protection | IP68 to 1000kPa |

### Extensometer Body

| | |
|---|---|
| Length[2] | 1m |
| Body diameter | 50mm |
| Flange diameter | 150mm |
| Weight | 10Kg |

### Extension Rod

| | |
|---|---|
| Length | 3m |
| Outside diameter | 12mm |

### Protective Telescoping Tube

| | Internal | External |
|---|---|---|
| Inside diameter | 24.5mm | 38mm |
| Outside diameter | 33.4mm | 48.5mm |
| Weight | 1.2Kg | 2Kg |
| Length | 2m nominal | |

### Adjustment Unit

| | |
|---|---|
| Dimensions | |
| Length | 500mm |
| Adjustment range | 350mm |
| Boss length | 135mm |
| Max diameter | 64mm |
| Weight | 1.8Kg |

### Ground Anchor Beam

| | | |
|---|---|---|
| Dimensions | Length: 1.5m | Beam Section: 75mm x 38mm |
| Weight | 10Kg | |

[1] Dependent on readout
[2] In the closed position

## Ordering Information

### Vibrating Wire Soil Extensometer

Armoured cable can only be fitted on site with joint sealing kit CA-4.1

| | |
|---|---|
| E7-1.10 | Vibrating wire soil extensometer; 300mm range with thermistor, supplied with 1m cable only |

### Extension Rod, Tubes and Anchor

| | |
|---|---|
| E7-2.10 | Extension rod; 3m length, 12mm OD; mild steel, includes threaded coupling for connection to further rods. Should not exceed 10m between extensometers |
| E7-2.11 | PVC protective tube, internal telescoping; 2m length, 1No. required per extension rod |
| E7-2.12 | PVC protective tube, external telescoping; 2m length, 1No. required per extension rod |
| E7-2.13 | Anchor beam; 1No. required per sensor plus 1No. extra per chain |
| E7-2.14 | Adjustment unit; for adjusting the rod length to the extensometer |
| W6-4.3 | Sealing tape |

### Connecting Cable and Fittings

| | |
|---|---|
| CA-1.1-4-A | Armoured cable, 4 cores; 1.5mm$^2$, PVC jacket, for instruments with thermistors, priced per metre |
| CA-4.1 | Joint sealing kit |
| CA-4.2 | Coloured adhesive tapes; set of 10No |
| CA-4.3 | Crimping tool |
| CA-4.4 | Crimping sleeves; set of 100No |
| W6-6.1 | Nylon ties; 150mm x 3.5mm, pack of 100No |
| ST1-3.5 | Nylon ties; 370mm x 4.7mm, pack of 100No |

### Manual

| | |
|---|---|
| MAN-65 | Vibrating Wire Soil Extensometer |

soil INSTRUMENTS

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