



## BOREHOLE EXTENSOMETER

### MODEL EDS-70V

#### INTRODUCTION

The Encardio-rite model EDS-70V borehole extensometer is a precision instrument designed to help civil engineers and geologists in the measurement of deformation of rock mass and adjacent or surrounding soil. Together with anchor bolt load cell and tape extensometer, it is an essential equipment for investigation and monitoring of foundations, slopes & embankments and for studying the behavior of rock around underground cavities, tunnels and mines. The borehole extensometer is an important instrument specially in investigation of underground cavities and landslides.

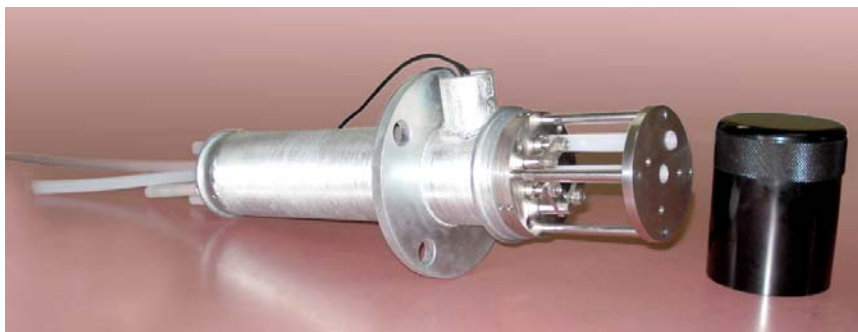
#### GENERAL DESCRIPTION

The borehole extensometer measures extension (displacement) that takes place with time in a bored hole or in several bored holes in a rock mass. The borehole extensometer essentially consists of one or more anchors and a reference. The anchor or anchors are set in the same borehole or in different boreholes drilled adjacent to the first borehole. They help to accurately measure distance between the various anchors with respect to the reference and monitor their relative displacement with passage of time. It is usually assumed that the deepest anchor is in stable ground and so any change in the anchor spacing is interpreted as sag of the roof bed, movement of side wall or slope, settlement of the foundation etc..

#### EDS-70V ELECTRONIC EXTENSOMETER

The model EDS-70V borehole extensometer incorporates vibrating wire transducer for measurement of displacement. A groutable reinforced bar anchor (1) is attached to fibre glass (2.a) or AISI 410 stainless steel (2.b) connecting rods of appropriate length, as specified in the design. Fibre glass connecting rods are supplied from factory in single lengths. The connecting rods are enclosed inside heavy duty protective tubing to allow for free movement.

The displacement sensor is coupled to the connecting rod using link plate and lock nut. Details of mounting of the sensor is shown in figure 1



#### APPLICATIONS

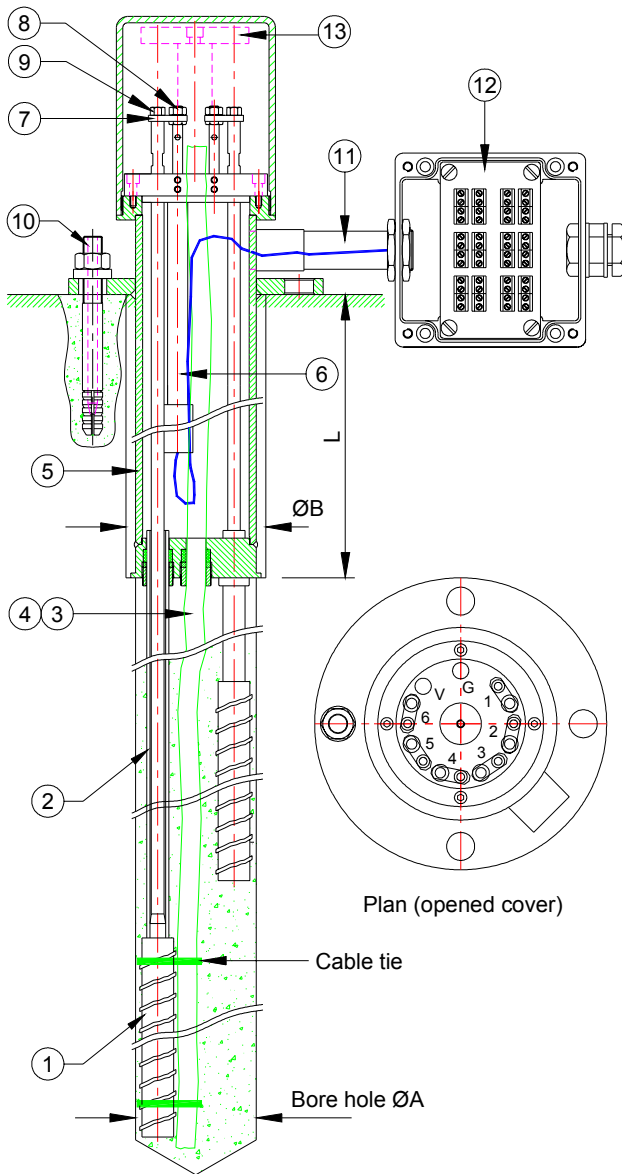
- ♦ To determine how the roof or wall of a mine, under ground cavity or tunnel behaves during excavation operation and to study the effectiveness of the support system.
- ♦ To predict potential roof or wall fall before it actually occurs. Roof or wall fall in an underground cavity is almost invariably preceded by measurable sag as the strata opens up and the movement usually occurs at an increasing rate as fall conditions are approached. Unsuspected roof and wall fall may result in serious accidents and may require costly patch-up and repair operations.
- ♦ To measure and monitor the movement in a slope or foundation due to excavation of underground cavities or due to the construction of a heavy structure like concrete, rockfill, masonry or earth dam over the foundation.

on next page. The system is rugged and is protected by a heavy duty cover. EDS-70V can be ordered from the factory for monitoring settlement at up to six depths. It is suitable for a 3"  $\phi$  (~76 mm) borehole for up to 1~3 points and 4"  $\phi$  (~102 mm) borehole for 4~6 points. To house the head assembly, the diameter at the mouth of the borehole is increased to 90 mm (for 1~3 points) and 125 mm (for 4~6 points).

Model EDI-51V portable read out logger is used to measure displacement of model EDE-VXX vibrating wire linear displacement transducers. The readings can also be monitored remotely using model EDAS-10 data acquisition system.

#### EDS-70M MECHANICAL EXTENSOMETER

A model EDS-70M version of this borehole extensometer is available for taking reading with a mechanical dial gage. This model is supplied without the



**Figure 1**

vibrating wire sensors. At a later date, this extensometer can be converted to take reading electronically by installing vibrating wire displacement sensors.

### EDE-VXX LINEAR DISPLACEMENT SENSOR

The Encardio-rite model EDE-VXX vibrating wire linear displacement transducer incorporates a vibrating wire sensor having a stroke of 50 mm (EDE-V05), 100 mm (EDE-V10) or 150 mm (EDE-V15). It converts mechanical displacement to an electrical output in frequency form.

For further details please refer to our datasheet # 1085.

Bill of materials		
Item	Description	Qty
1.a	Anchor for fibre glass rod	*
1.b	Anchor for stainless steel rod	*
2.a	Connecting rod (fibre glass) assly. with tube	#
2.b	Connecting rod stainless steel	#
	PVC pipe (o.d.- 14 x 2 thick)	#
3	Air vent tube (o.d.- 12 x 1 thick)	●
4	Grout tube (o.d.- 12 x 1 thick)	●
5	Reference head assembly	1
6	Electronic displacement sensor	*
7	Link plate	*
8	Lock nut	*
9	Reference button	*
10	Expandable anchor	4
11	Pipe nipple (1"x6" long)	1
12	Junction box assembly	1
13	Reference plate with mounting accessories	1
*	Quantity depends upon number of positions	
#	Quantity depends upon number of positions and depth of anchors	
●	Length varies from application to application	
■	For use only with model EDS-70M	
ØA - 76 mm for 1 - 3 point & 102 mm for 4 - 6 point		
ØB - 90 mm for 1 - 3 point & 125 mm for 4 - 6 point		
L = for 50 mm sensor - 255 mm. 100 mm sensor - 385 mm.		

### ORDERING CODE & INFORMATION

#### EDS-70 M/V-XYZ -NNN

<div style="border-bottom: 1px solid black; padding-bottom: 5px;"> <p>Range of EDE-VXX linear displacement transducer. 050: 50 mm (± 25 mm) 100: 100 mm (± 50 mm) 150: 150 mm (± 75 mm)</p> </div> <div style="border-bottom: 1px solid black; padding-bottom: 5px;"> <p>S: Stainless steel connecting rod F: Fibre glass connecting rod</p> </div> <div style="border-bottom: 1px solid black; padding-bottom: 5px;"> <p>U: Upward mounting D: Downward or near horizontal mounting</p> </div> <p>Number of anchors per system</p>	
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Beside the above information (in ordering code), depth of each anchor in metre is also to be specified.

*Specifications are subject to change without notice.*

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DATA SHEET 1080-06R1