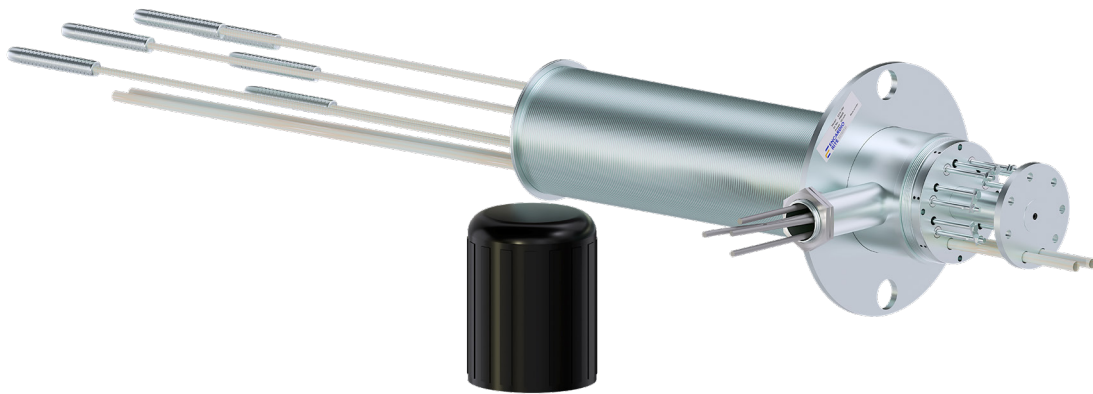


BOREHOLE EXTENSOMETER VW MULTI-POINT

DATASHEET

MODEL EDS-70V/EDS-70M



OVERVIEW

The Encardio Rite model EDS-70V multipoint borehole extensometers are high-precision instruments designed to measure rock mass and soil deformation. Essential for geotechnical investigations, structural health monitoring, disaster prevention, and research, these instruments monitor the behavior of mine roofs, tunnel walls, underground cavities, foundations, slopes, and embankments during excavation and operation.

The borehole extensometer comprises one or more anchors and a reference. Anchors, set in the same boreholes, allow precise measurement of distances relative to the reference, monitoring their relative displacement over time. Typically, the deepest anchor is assumed to be in stable ground. Therefore, any change in the anchor spacing is interpreted as sag of the roof bed, side wall or slope movement, foundation settlement, etc.

The EDS-70V uses vibrating wire transducers, groutable bar anchors, and fiberglass or stainless steel rods to measure displacement in boreholes. It can monitor up to six depths and is compatible with 3" and 4" diameter boreholes. The vibrating wire sensor (EDE-VXX-RC series) converts mechanical displacement into an electrical frequency output, enabling measurements via any vibrating wire readout unit or transmission to a cloud server through a suitable datalogger.

The EDS-70M, a mechanical multipoint borehole extensometer, provides readings using a mechanical dial gauge. For enhanced functionality, it can be upgraded to the electronic EDS-70V model by integrating vibrating wire displacement sensors.

FEATURES

- **Precision measurement:** Utilizes a vibrating wire sensor for highly accurate displacement readings, ensuring reliable data for monitoring deformation.
- **Long-term reliability:** The excellent zero stability, rugged and waterproof design of displacement sensor makes it a good choice for long-term measurements in severe environments.
- **Robust construction:** Durable connecting rods made from fiberglass or AISI 410 stainless steel withstand severe embedment conditions.
- **Installation versatility:** Can be customised for different depths in upward, downward or horizontal boreholes, providing flexibility based on site conditions.
- **User-friendly setup:** Features a simple installation process, enabling efficient deployment in various applications.
- **Versatile datalogging:** Can be used with compatible VW readout units for manual data collection. For continuous monitoring, it can be connected to a suitable datalogger.
Encardio Rite offers a range of NexaWave dataloggers equipped with GSM/GPRS or RF communication capabilities, ensuring reliable and efficient data acquisition and transmission at desired frequencies.
- **Infrastructure data intelligence platform:** Encardio offers Proqio software to facilitate data processing, analysis, and real-time visualization providing 24/7 insights. Benefit from instant alerts for critical events and automated reports, supporting informed decision-making.
- **Cross-compatibility:** The sensor can work with any manufacturer's Dataloggers and Data Management Systems.

SYSTEM COMPONENTS

Displacement sensors: Model EDE-VXX series displacement sensors with 50, 10 or 150 mm range. The sensor utilizes vibrating wire technology to convert mechanical displacement into a frequency-based electrical output, facilitating precise measurement.

For further details on vibrating wire displacement sensor refer to our datasheet # 1085.

Groutable reinforced bar anchor: The anchors are installed at different depths, with the deepest anchor installed in stable ground serving as the fixed measurement point in the borehole.

Connecting rods with protective tubing: The connecting rods are available in either fiberglass or AISI 410 stainless steel, to cater to various site requirements. They link the sensors to the anchors, allowing for the transfer of displacement data. The rods are encased in heavy-duty tubing for protection and unrestricted movement. Fiber glass rods with protective tubing is supplied from factory in single lengths, while SS rods with rigid PVC protective pipes are available in lengths of 3, 2, and 1 m.

Reference plate: Positioned at the top of the borehole, the reference plate serves as a stable measurement point against which displacement is measured.

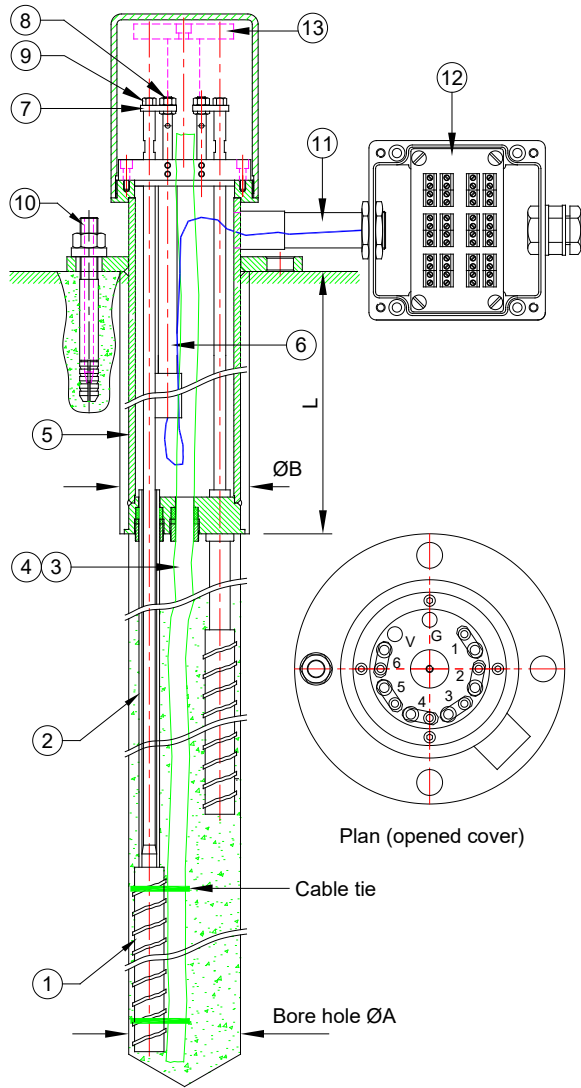
Head assembly: Houses the displacement sensor and reference point at borehole's mouth, which is slightly enlarged to accommodate the assembly. Suitable for a 3" dia (~76 mm) borehole for up to 1-3 points and 4" dia (~102 mm) for up to 4-6 points with the diameter at top increased to 90 mm for 1-3 points and 125 mm for 4-6 points.

Spacer adjustment (optional): Accommodates movement beyond the standard range due to heave or settlement, enhancing the extensometer's monitoring range.

Datalogger: Vibrating wire sensor's frequency output is readable by standard vibrating wire readouts. Data can be automatically collected, stored, and transmitted to a remote server via a suitable datalogger. The initial sensor reading serves as the baseline, with subsequent readings compared to determine the change in displacement.

EDS-70M mechanical extensometer

Model EDS-70M variant of the MPBX is similar to the EDS-70V, but lacks the vibrating wire sensors. Instead, a mechanical dial gauge is used to take displacement readings manually. If required, the vibrating wire displacement sensors can be mounted in the housing at a later date to enable remote data collection.



Typical scheme with system components



SPECIFICATIONS

Model	EDS-70V
Range (mm)	50, 100, 150
Accuracy	± 0.2 % fs normal ± 0.1 % fs optional
Sensitivity	± 0.02 % fs
Non linearity	± 0.5 % fs
Temperature limit	- 10 to 80°C (operational)
Thermistor	YSI 44005 or equivalent (3 kOhms at 25°C)



ORDERING INFORMATIONS

EDS-70V(M)-D/U-X-Y-NNN

| Range:
 050: 50 mm (± 25 mm)
 100: 100 mm (± 50 mm)
 150: 150 mm (± 75 mm)
 S: Stainless steel connecting rod
 F: Fibre glass connecting rod
 2-6: Number of points
 U: Upward mounting
 D: Downward or near horizontal mounting

Sl #	Description	Qty	Sl #	Description	Qty
1.a	Anchor for fiber glass rod	*	5	Reference head assembly	1
1.b	Anchor for stainless steel rod	*	6	Displacement sensor	1
2.a	Fiber glass connecting rod (Ø 6.3 mm) with PVC protective tube (o.d. 12 mm x 2 mm thick)	#	7	Link plate	1
2.b	SS connecting rod (Ø 8 mm) with PVC tube (o.d.-14 mm x 2 mm thick)	#	8	Lock nut	1
3	Air vent tube (o.d.-12 mm x 1 mm thick)	•	9	Reference button	1
4	Grout tube (o.d.- 12 mm x 1 mm thick)	•	10	Expandable anchor	4
*	Quantity depends upon number of positions		11	Pipe nipple (1" x 6" long)	2
#	Quantity depends upon number of positions, depth of anchors		12	Junction box assembly	1
•	Length varies from application to application		13	Reference plate with mounting accessories	1
L =	255 mm for 50 mm sensor; 385 mm for 100 mm sensor				

*All specifications are subject to change without prior notice

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Dams



Mining



Tunnels



Transportation



Construction



Bridges



Landslides



Energy



Environmental Monitoring



Pipelines



Structural Health Monitoring



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