ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

BOREHOLE EXTENSOMETER
VW SINGLE-POINT
DATASHEET

MODEL EDS-71V/EDS-71M

OVERVIEW

The Encardio Rite model EDS-71V single-point borehole extensometer (SPBX) is a precision instrument for measuring deformation in rock masses and surrounding soil. Commonly used by civil engineers and geologists, its primary function is to detect and measure sub-surface settlement and deformations over time, facilitating early detection of potential structural issues and maintaining safe conditions.

The extensometer plays a critical role in monitoring foundations, slopes, embankments, underground cavities, tunnels, and mines. Paired with an anchor bolt load cell, it helps assess how rock or soil behaves under excavation, loading, or natural forces. Typical applications include evaluating the structural stability in underground cavities and tunnels, predicting potential roof or wall falls, and monitoring movement in slopes and foundations during excavation or when heavy structures like dams are constructed. It is particularly effective in determining how the roof or wall of a mine, underground cavity, or tunnel behaves during excavation operations, as well as in studying the effectiveness of support systems.

EDS-71V SPBX comprises of an anchor attached to connecting rod enclosed inside protective tubing. To the other end of connecting rod, a displacement sensor is attached, inside a reference head assembly. When installed in a borehole (2" or 50 mm dia), the SPBX measures displacement between the anchor, fixed at desired stable depth, and the reference at borehole's surface. Over time, any movement in the anchor's position—interpreted as ground movement, wall sagging, or slope shifting—is detected and recorded. The data allows for proactive assessment of stability in critical areas.

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 installed in upward or downward boreholes, providing flexibility based on site conditions.
- **User-friendly setup:** Features a simple installation process, enabling efficient deployment in various applications without requiring complex equipment.
- **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 sensor: Model EDE-VXX series displacement sensor with 50, 10 or 150 mm range. It 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 anchor, typically installed in stable ground, serves as the fixed measurement point in the borehole.

Connecting rods with protective tubing: The connecting rod is available in either fiberglass or AISI 410 stainless steel, depending on project requirements. It links the sensor to the anchor, allowing for the transfer of displacement data. The rods are encased in heavy-duty tubing for protection and unrestricted movement.

Fiber glass rod 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.

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

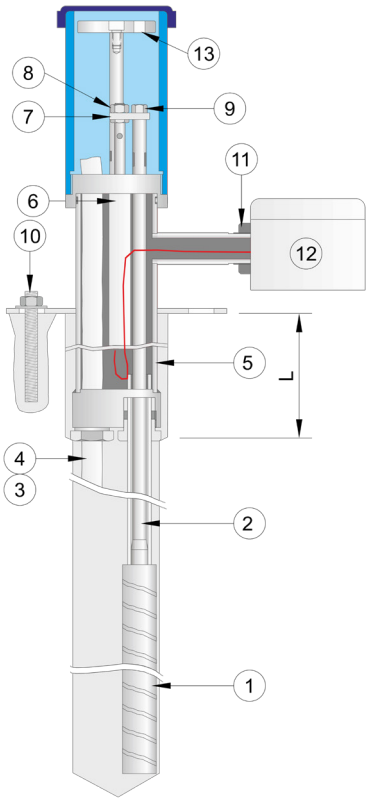
Datalogger: Vibrating wire sensor's frequency output is readable by standard vibrating wire readouts. Data can be automatically collected, stored, and transmitted to a remote server via a suitable datalogger. The initial sensor reading serves as the baseline, with subsequent readings compared to determine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

EDS-71M mechanical extensometer

Model EDS-71M variant of the SPBX is similar to the EDS-71V, but lacks the vibrating wire sensor. 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.

PLAN (without cover)



Typical scheme with system components

SPECIFICATIONS

Model	EDS-71V
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-71V(M)-D/U-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

U: Upward mounting
D: Downward or near horizontal mounting

Sl #	Description	Qty	Sl #	Description	Qty
1.a	Anchor for fiber glass rod	1	5	Reference head assembly	1
1.b	Anchor for stainless steel rod	1	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 depth of anchors*		11	Chuck nut	2
•	*Length varies from application to application*		12	Junction box assembly	1
L =	255 mm for 50 mm sensor; 385 mm for 100 mm sensor		13	Reference plate with mounting accessories	1

*All specifications are subject to change without prior notice

DATASHEET | 1221-12 R02

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