

ENCARDIO RITE



SHOTCRETE STRAIN GAGE

Model EDS-30V

OVERVIEW

Encardio-rite model EDS-30V shotcrete strain gage is a vibrating wire strain gage specially designed to monitor both tensile and compressive strains in shotcrete or concrete linings of underground excavations.

EDS-30V has a much larger strain measurement range compared to other conventional concrete embedment strain gages like Encardio-rite model EDS-20V-E or equivalent. It is especially useful in shotcrete applications where the freshly applied shotcrete can sometimes develop a compressive strain of much more than 3000 micro strain which is beyond the measurement range of other conventional strain gages.



The sensor is of stainless steel construction and is suitable for all types of hostile environmental conditions.

DESCRIPTION

The EDS-30V shotcrete strain gage can be considered as a miniature high resolution vibrating wire displacement sensor in a stainless steel housing. It is pretensioned at around the middle of its measurement range using a very thin aluminium tubing so that it can measure both tensile and



FEATURES

- ♦ Accurate, robust and low cost.
- ♦ Long term stability with high reliability.
- ♦ Easy installation.
- ♦ Stainless steel construction.
- ♦ Frequency signal can be transmitted over long distance.
- ♦ Continuous and remote data logging possible.
- ♦ Temperature monitoring by thermistor.

APPLICATIONS

- ♦ Monitoring of strain in shotcrete or concrete linings in underground excavations and tunnels.
- ♦ Study of stress distribution in the underground cavities and tunnels.
- ♦ Long term monitoring of the inner tunnel lining or other concrete structures such as bridges and dams.

compressive strains of up to 30,000 micro strain.

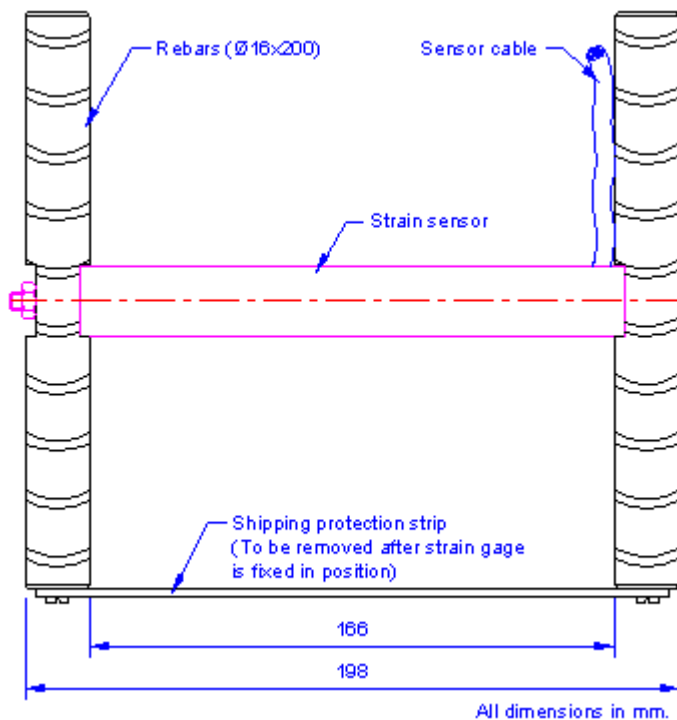
Two short lengths of rebar are fixed, parallel to each other, at each end of the strain gage for gripping in shotcrete. The distance between the rebars is the gage length of the strain gage. The aluminium tubing is covered with a polyolefin sleeve to decouple it from the surrounding concrete so that the measured strain is the average strain in concrete lying between the two lengths of rebar.

The sensor houses a permanent magnet and a plucking coil assembly. The wire when plucked by the sensor vibrates at its natural frequency that is proportional to the tension in the wire. Any change in strain, directly effects the tension in the wire, resulting in a corresponding change in its frequency of vibration. The strain is proportional to the square of the frequency.

The sensor also includes a thermistor for measuring the temperature of shotcrete. Measurement of temperature enables application of correction factors for more accurate result.

A high resolution vibrating wire indicator, like Encardio-rite model EDI-51V (version 5 and above), is needed to realize the high resolution of EDS-30V strain gage. The EDI-51V indicator additionally provides direct readout in micro strain units. Individual gage factors are supplied with each EDS-30V strain gage for better accuracy. EDI-51V also displays the thermistor readings directly in °C.

The strain and temperature measurements can also be read or logged at a remote location by an automatic data acquisition system like Encardio-rite model EDAS-10 data acquisition system.



SPECIFICATIONS

Type	Vibrating wire
Measurement range	± 15,000 micro strain Overall
length	200 mm nominal Effective gage
length	166 mm

Central Strain Gage

Overall diameter	19 mm
Coil resistance	160 Ohms typical @ 25°C
Operating temperature range	-20 to 80°C
Temperature sensor	Thermistor, 3 kOhms @ 25°C;
temperature range:	-50 to 150°C
Cable length	4 conductor shielded, standard
length half metre	
Protection class	IP 68

Transverse bars

Material	Rebar (TMT Fe415)
Length	200 mm
Diameter	16 mm

* All specifications are subject to change without prior notice.

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