



# ENCARDIO RITE



## EARTH & CONCRETE PRESSURE CELL

**MODEL EPS-30V-X**

### INTRODUCTION

The earth and concrete pressure cell is designed to measure total pressure in earth fills and embankments; as well as pressure on the surface of retaining walls, buildings, bridge abutments, tunnel linings and to measure stress in mass concrete.

Proper evaluation of total pressure may help in:

- ✦ Verifying design assumptions that will promote safer and more economical design and construction.
- ✦ Monitoring for safety; warning of soil pressures in excess of those the structure is designed to withstand.

### EARTH AND CONCRETE PRESSURE CELL

The Encardio-rite earth and concrete pressure cell basically consists of a flexible, circular flat capsule, constructed from two stainless steel discs welded around the periphery and connected to a specially designed Encardio-rite pressure transducer incorporating the latest vibrating wire technology to provide remote and digital readout. The pressure cell has an inherently high sensitivity and it is not necessary to produce a large strain in the area being monitored for the measurement of stress. Encardio-rite offers three types of pressure cells:

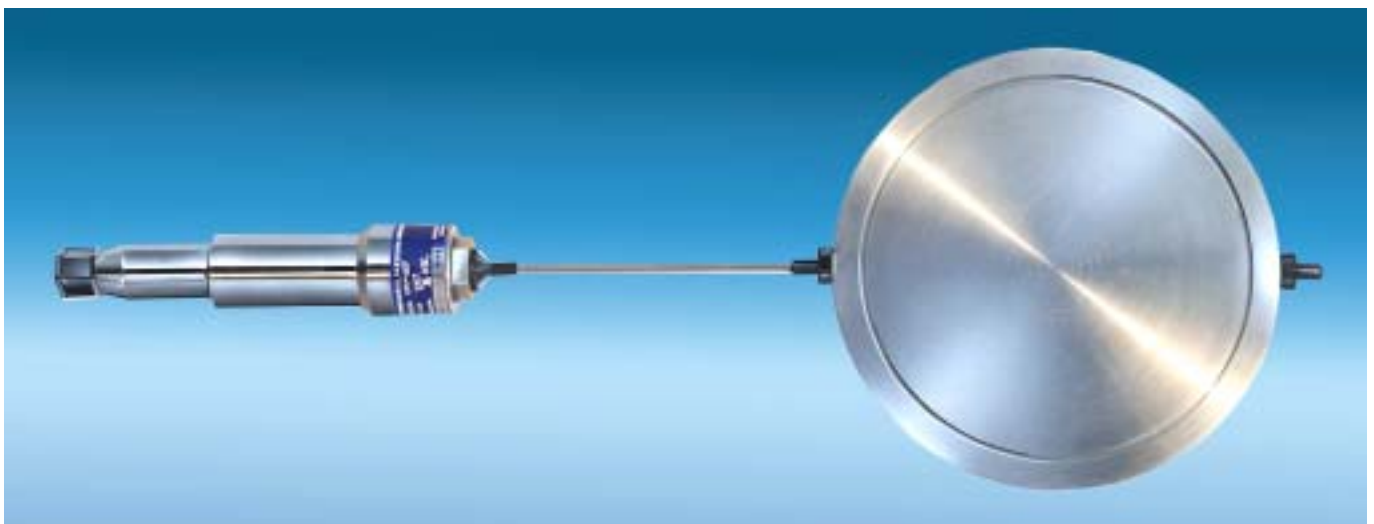
- ✦ Suffix 'S': for use in soil, earth or rock fills.
- ✦ Suffix 'I': for use at concrete and soil interface.
- ✦ Suffix 'C': for use in concrete

### FEATURES

- ✦ Accurate, robust and low cost.
- ✦ Long term stability with high reliability.
- ✦ High sensitivity and high pressure range.
- ✦ Low volumetric displacement.
- ✦ Fluid filled for high rigidity, accurate and fast response.
- ✦ Thermistor available for temperature correction.
- ✦ Remote digital readout available.
- ✦ Ease in data logging.

### APPLICATIONS

- ✦ To measure the orientation and magnitude of total pressure and stress distribution within dam embankments and the interface of soil and concrete.
- ✦ To determine contact pressure on retaining and diaphragm walls, piers and abutments.
- ✦ For measuring pressure on and within lining of underground excavations.
- ✦ Monitoring of stress in the rock walls of unlined caverns and tunnels.
- ✦ Evaluating foundation bearing pressures



## DESCRIPTION OF EQUIPMENT

The pressure cell essentially consists of a flat circular capsule and a pressure transducer connected to each other by a 6 mm  $\phi$  x 165 mm long stainless steel tube.

### EPS-30V-S/1

#### FOR SOIL, EARTH AND ROCK FILLS

This pressure capsule is 200 mm  $\phi$  x 7 mm thick. It consists of two stainless steel diaphragm plates which are electron beam welded around the edges. The narrow gap between the plates is filled with fluid by a special process which guarantees that almost all the air is excluded from the fluid.

### EPS-30V-I/1

#### FOR SOIL & ROCK/CONCRETE INTERFACE

This pressure capsule is similar to the above excepting that it is 200 mm  $\phi$  x 10 mm thick and the diaphragm on one of the sides is rigid.

### EPS-30V-C/1

#### FOR EMBEDMENT IN CONCRETE

This pressure capsule is similar to EPS-30V-S/1. If specially required, different fluid may be taken as per ambient condition and available fluid option.

For applications in which the concrete pressure cell is embedded in concrete, a 600 mm long pinch tube is welded to the transducer. After the concrete is cured, to account for any shrinkage in it, the pinch tube is squeezed to push the fluid into the cell and develop a positive pressure in it.

### EPS-30V-X/2

#### VIBRATING WIRE TRANSDUCER

The stainless steel pressure transducer is 42 mm  $\phi$  x 190 mm long. It incorporates the vibrating wire, the coil/magnet assembly and the cable joint housing.

## OPERATING PRINCIPLE

The pressure applied by the earth or concrete acts on the cell and is transmitted through the fluid in the stress capsule to an integral diaphragm, which forms part of the pressure transducer. Attached to the other side of the diaphragm is a vibrating wire strain gage. Change in pressure causes the diaphragm to deflect, thus altering the tension of the wire. Any change in the tension of the wire, affects its resonant frequency of vibration which is related to the pressure acting on the cell.

The resonant frequency with which the wire vibrates can be accurately measured by model EDI-51V vibrating wire readout unit or any other conventional vibrating wire readout unit. The signal can also be transmitted over long distances to a remote automatic data acquisition system like Encardio-rite model EDAS-10.

## SPECIFICATIONS

<b>Type</b>	Vibrating wire
<b>Model</b>	EPS-30V-X
<b>Range (MPa)</b>	0.5, 1.0, 2.0, 3.5, 5.0, 10.0, specify
<b>Accuracy (of pressure transducer)</b>	$\pm 0.5$ % fs with our EDI-51V digital read-out. $\pm 0.1$ % fs available on request
<b>Temperature limit: Operational</b>	-20 to 70°C
<b>Over range limit</b>	150 % of range
<b>Over range effect</b>	$\pm 0.1$ % fs upto 120 %
<b>Enclosure</b>	Stainless steel
<b>Thermistor</b>	YSI 44005 or equivalent (3 kOhms at 25°C)

*Specifications are subject to change without prior notice.*

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