ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

JACK-OUT PRESSURE CELL

MODEL EPS-30V-J

DATASHEET

OVERVIEW

The Encardio Rite model EPS-30V-J jack-out pressure cell is a specialized instrument designed for precise stress measurement at the interface between soil and structural elements, such as base slabs, diaphragm walls, and slurry walls. It is designed to measure the total stress i.e. the effective stress due to the soil together with the pore water pressure in the voids between soil grains. It is suitable for measuring static or slowly varying stresses only.

Jack-out pressure cell is essential for applications where concrete is cast directly against soil, serving as a critical tool for monitoring earth pressures that may exceed design limits. It provides essential data for validating design assumptions and guiding safer, more cost-effective construction practices.

These cells consist of a robust, circular flat capsule connected to a high-precision vibrating wire pressure sensor. The pressure capsule comprises two stainless steel plates welded together at the edges, with the narrow gap between the plates filled with fluid. When subjected to external pressure from soil or concrete, the fluid pressure within the capsule rise as the steel plates are squeezed together, transmitting this pressure through the hydraulic fluid to the sensor. The sensor's diaphragm deflects in response to the pressure, altering the tension of the internal vibrating wire, changing its resonant frequency. The measured frequency directly correlates to the applied pressure.

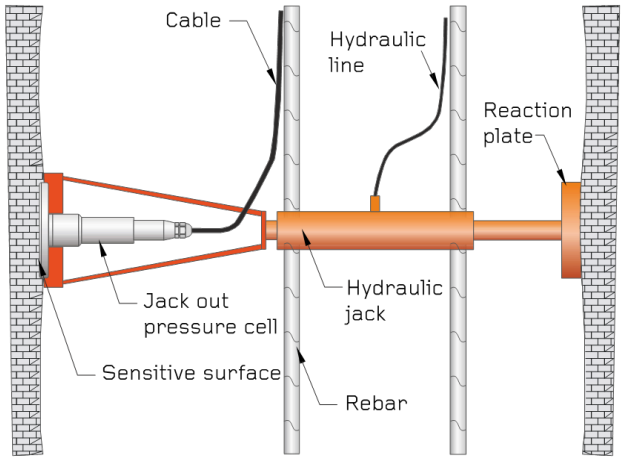
FEATURES

- **Reliable & accurate:** Offer long-term stability, high sensitivity, and a broad pressure range for dependable measurements in various scenarios.
- **Fluid-filled capsule**: The pressure capsule is filled with a special fluid to ensure optimal pressure transmission.
- **Temperature compensation:** Each pressure sensor is individually temperature compensated to 0.03%/°C to minimize measurement errors.
- **Hermetically sealed sensor**: Hermetically sealed under a vacuum of 0.001 Torr and stainless steel construction ensures protection against severe environmental factors.
- **Integrated temperature monitoring:** Enhances measurement accuracy by accounting for temperature variations.
- **Robust construction**: The stainless steel construction ensures durability and reliability in harsh environments.
- **Long-distance signal transmission:** Maintains signal integrity over long distances, ensuring accurate data collection.
- **Versatile datalogging:** Compatible with various readout units for manual data collection. For continuous monitoring, it can be connected to a suitable datalogger, allowing for data acquisition at desired frequencies.
  Encardio Rite offers a range of NexaWave dataloggers equipped with GSM/GPRS or RF communication capabilities, ensuring reliable and efficient data transmission.
- **Infrastructure data intelligence platform**: Integrates with Proqio software to facilitate data processing, analysis, andreal-time visualization, and generates instant alarms for critical events to keep all stakeholders informed.
- **Cross-compatibility:** The sensor can work with any manufacturer's Dataloggers and Data Management Systems.

PRODUCT OFFERINGS

The EPS-30V-J features a robust, fluid-filled pressure capsule, meticulously constructed from two stainless steel discs welded around the periphery. This design eliminates the use of 'O' rings, resulting in a fully metal-enclosed hydraulic system that is both airtight and exceptionally durable. The narrow space between the discs is filled with de-aired fluid, ensuring that no air bubbles compromise the accuracy of stress measurements.

The capsule consists of an active face - a thin, flexible diaphragm approximately 3 mm thick - positioned flush with the soil. The inactive face is a thicker, rigid plate about 12 mm thick, positioned on the concrete side through another thick support plate. To prevent uneven stress on the cell, the hydraulic jack applies force on the support plate, rather than directly on the cell.



Typical installation scheme

SPECIFICATIONS

To ensure precise measurement, the cell's sensitive surface must be perfectly flush with the soil at the concrete-soil interface. This alignment is achieved by using a hydraulic jack to maintain the cell's position during concrete pouring. The jack's pressure is set slightly higher than the stress exerted by the fresh concrete, preventing any seepage into the soil-cell interface and ensuring that the capsule remains in full contact with the surrounding material.

Like any closed hydraulic system, pressure cell is sensitive to temperature effects. Any change in temperature of surrounding concrete can give an unauthentic reading, magnitude of which depends upon elasticity of surrounding concrete and relative coefficient of expansions of materials in contact & filled fluid inside the pressure cell. The sensor has an in-built thermistor to assist in separating these unauthentic temperature effects from actual pressure changes.

Sensor type	Vibrating wire
Range (MPa)	0.5, 1.0, 2.0, 3.5, 5.0, specify
Accuracy of pressure sensor	± 0.5 % fs standard ± 0.1 % fs optional
Temperature limit operational	-20 to 80°C
Over range limit	150 % of range
Thermistor	YSI 44005 or equivalent (3 kOhms at 25°C)
Overall dimension	125 mm Ø x 190 mm height 200 mm Ø x 190 mm height
Enclosure	Stainless steel
Cable connection	Glass to metal seal cable connection

ORDERING INFORMATION

Model EPS-30V-J- **Ø - X - Y**

Pressure pad size

Range

Cable housing type

(suitable for cable Ø 3.5-8 mm or 9-14 mm)

**All specifications are subject to change without prior notice*

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