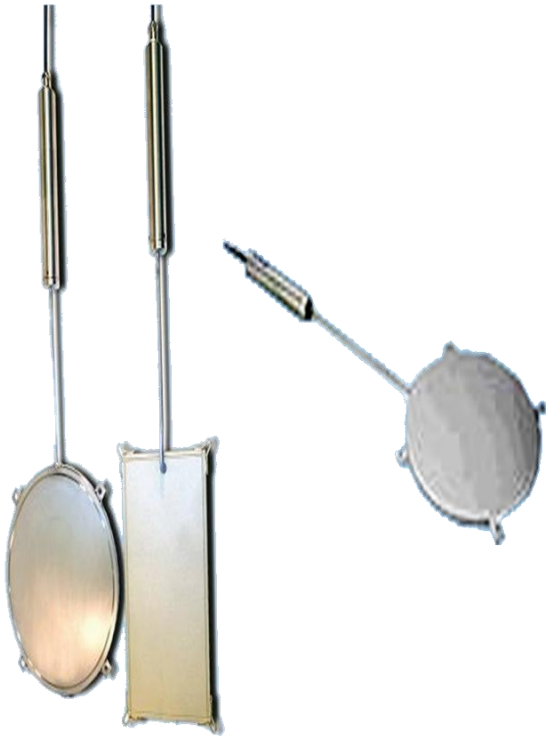
PRESSURE CELLS



Model SIS-1100 Series Total Pressure Cells are used to measure total pressure in soils and embankments, at the interface of two different materials or measurement of stress in concrete. They are also used for measurement of contact pressures on retaining walls, buildings, bridge abutments, tunnel linings etc.

The Pressure Transducer consists of a rigid cylindrical housing having inside it with vibrating wire sensor with the resonant frequency of vibration of a tensioned steel wire is proportional to the strain or tension in the wire. This fundamental relationship is utilized in a variety of configurations for the measurement of pressure. Vibrating wire sensors are well known for their long term stability.

Unprecedented sensitivity
Long term stability and reliability
Isolation of the sensor from the effects of total stresses acting on the body of the Strain gage
Robust and sturdy construction
Slim-line design

TYPICAL APPLICATION:

As suggested by the name, Total Pressure Cells are used to measure *total pressure* acting at their point of installation. This pressure is the sum of pore pressure and the stress. To know the value of stress alone, the pore pressure at that point should also be ascertained and deducted from the total stress.

Some important applications of Total Pressure cells are:
To assess changes in stress distribution within embankments of earth or concrete dams
To measure stress at the interface of soil and concrete.
To determine contact pressure on retaining and diaphragm walls, piers, tunnel linings
For measuring pressure on and within lining of underground excavations

DESCRIPTION:

The Pressure Cell consists of two circular stainless steel plates welded together around their periphery leaving a narrow cavity between them. The cavity is filled with antifreeze fluid. During installation, care has to be taken to see that the cavity lies perpendicular to the stress to be measured. A small length of high pressure stainless steel tubing connects the cavity to a pressure transducer.

VIBRATING WIRE SENSOR

The Vibrating Wire sensor is secured inside the rigid cylindrical housing of the Piezometer. It comprises of a small stainless steel enclosure having a high tensile strength, heat treated and tempered steel wire. The wire is anchored at one end to the enclosure and to a small diaphragm at the other. A magnet coiled assembly is precisely located at the center of the wire inside the same enclosure. This greatly enhances the response characteristics of the vibrating wire. The vibrating wire sensor is self-compensated against temperature variations.
The 'O' ring seal provides complete waterproofing and a high degree of protection from humid and corrosive environment conditions. The sensor is completely isolated from the total stresses acting on the body of the transducer.

OPERATION:

Any change in the pressure on the pressure pad has to be balanced by a corresponding change in the pressure of the internal fluid. The latter is communicated to the pressure transducer and changes the tension of the vibrating wire. The wire is plucked by energizing the coil magnet so that it vibrates at its natural frequency. The resonant frequency is proportional to the square root of the tension in the wire. A conventional readout unit can accurately measure the resonant frequency of the wire. A microprocessor based readout unit can display the frequency as well as the value of the measured parameter directly in engineering units.

Alternatively, data loggers can be used to record data, in engineering units, automatically at predetermined intervals. By the use of appropriate software, the data logger can present recorded data in desired formats, predict trends of variations and even generate alarms at pre-determined set points. A thermistor mounted in the transducer enables simultaneous measurement of temperature changes. Transducers with lightning protection are available on request.

EARTH PRESSURE CELL consist of two circular stainless steel plates welded together around their periphery and spaced apart by a narrow cavity filled with de-aired oil.

FLAT BACK PRESSURE CELL has an extra thick backplate to minimize any point loading effects.

SHOTCRETE STRESS CELL is designed for the measurement of tangential and radial stresses in shotcrete tunnel linings.

EARTH PRESSURE CELL	**FLAT BACK PRESSURE CELL**	**SHOTCRETE STRESS CELL**
SPECIFICATION MODEL SIS-1101 Standard Ranges 70, 170, 350, 700 kPa 1, 2, 3, 5, 7.5, 20 MPa Over Range 150% F.S. (maximum) Resolution 0.025% F.S. Accuracy ±0.1% F.S. Temp. Range −20°C to +60°C Height × Diameter 6 × 230 mm	**SPECIFICATION** MODEL SIS-1102 Standard Ranges 350, 700 kPa 1, 2, 3, 5 MPa Over Range 150% F.S. (maximum) Resolution 0.025% F.S. Accuracy ±0.1% F.S. Temp. Range −20°C to +60°C Height × Diameter 12 × 230 mm	**SPECIFICATION** MODEL SISA-1103 Standard Ranges 2, 3, 5 ,7.5, 20, 35 MPa Over Range 150% F.S. Resolution 0.025% F.S. Accuracy ±0.1% F.S. Temp.Range −20°C to +60°C L × W × H 200 × 100 × 6 mm 250 × 150 × 6 mm

ACCESSORIES:

- Special coating on the surface for salt application
- Splicing kit
- Junction box
- Readout Unit