

P6 VIBRATING WIRE PRESSURE CELL

Datasheet P6



Description

The Vibrating Wire Pressure Cell is used to measure total pressure, particularly in earth or rockfill structures.

The cells are normally used to validate design assumptions and to give adequate warning of soil pressures in excess of those which a structure is designed to withstand.

The VW Pressure Cell has two designs; the double face design is formed from a circular flat cell comprising two flexible plates of

Stainless Steel welded together around their periphery, providing two active faces, the single face design has one thick metal plate and one flexing plate, providing one active face.

A narrow gap is formed between the plates and is filled with highly de-aired hydraulic oil, a Vibrating Wire pressure transducer is connected to the cell by a short length of steel tubing forming a closed hydraulic system.

Features

- Uses proven Vibrating Wire technology
- Accurate, reliable and robust
- Low, medium and high pressure ranges available
- Low volume change and slender profile
- Single and double active faces available
- Various ranges of size and pressure available
- Suitable for manual or remote monitoring

Benefits

- Accurate, repeatable readings over long cable lengths
- Long working life with long-term stability
- Arching and stress concentrations minimised
- Over-voltage surge arrestor protects against electrical damage
- Design prevents case stresses from affecting readings



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VIBRATING WIRE PRINCIPLE



A high carbon steel wire is held in tension between a fixed point and a movable point within the sensor.

The physical changes measured by the sensor result in small changes to the position of the movable point which results in a change to the tension of the wire.

The wire may be excited by either plucking or sweeping via a coil adjacent to the wire. The resulting resonant frequency (which is relative to the tension of the wire) is then recorded by the same coil. The reading can be displayed by instrument readout or recorded by data logging equipment.

Operation

Both cell and transducer are embedded in the medium to be monitored with an armoured cable that connects the instrument to a terminal unit, portable readout unit or datalogger. Any external pressure on the cell causes the steel plates to compress creating a change in pressure in the oil within the cell.

The change in pressure is converted by the VW transducer into an electrical signal and may be remotely read using a VW readout or datalogger.

The readout or datalogger can display either frequency based units or, by inputting the instrument calibration factors, engineering based units.

The double faced cell measures the pressure from two directions while the single faced cell will only measure the pressure acting on its thinner plate.

Applications

Vibrating Wire Pressure Cells are installed within fills to determine the distribution, magnitude and directions of total pressure. They can also be installed with one surface against a structure to measure total pressure acting on retaining walls, or against piles, pipes and slurry trench walls.

Typical applications include:

- Concrete, Embankment and Tailings Dams
- Diaphragm or Sheet Pile Wall
- Retaining Wall

Associated products

For details on:

Catalogue code:

VWnote

R0-1-VW-NOTE

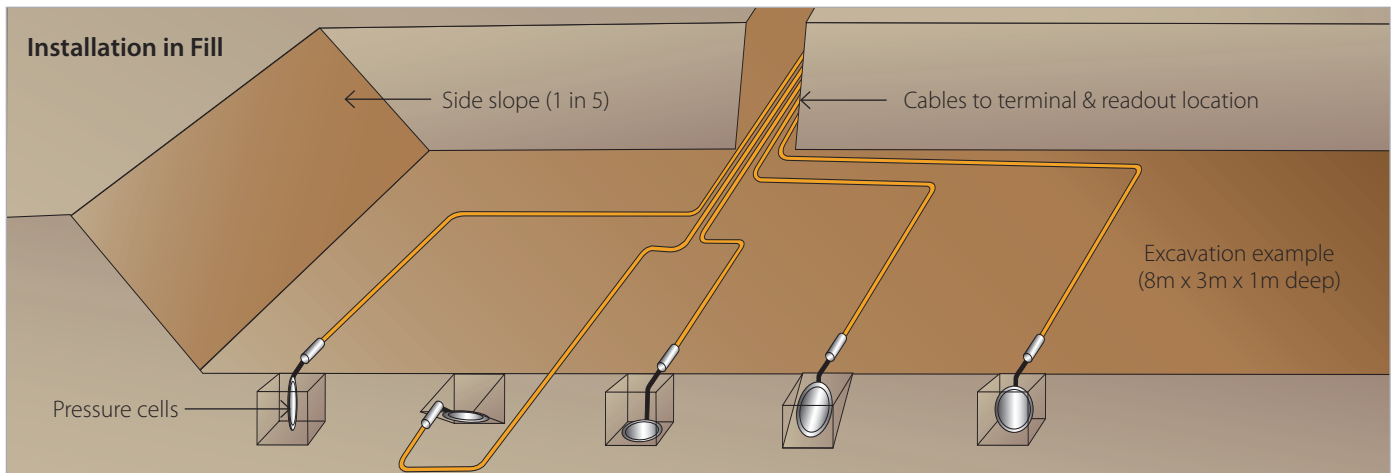
Dataloggers

D1

Terminal and Junction Boxes

R0-TB/JB/TJ

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THE TECHNICAL RATING FOR THIS PRODUCT:

INTERMEDIATE



As the correct installation of any monitoring sensor or system is vital to maximise performance and accuracy, Soil Instruments makes the following recommendations, for the skill level of the installation contractor.

ADDITIONAL SUPPORT

We offer installation and monitoring services to support this system. For more information please email : sales@soil.co.uk or call : **+44 (0) 1825 765044**

ADVANCED



The installer is trained and experienced in the installation of this type of instrument or systems, and is ideally a specialist Instrumentation and Monitoring contractor.

INTERMEDIATE



The installer already has previous experience and/or training in the installation of this instrument or system.

BASIC



As a minimum the installer has read and fully comprehends the manual, and if possible has observed these instruments or systems being installed by others.

Specifications

Cell	
Standard ranges (kPa)	300 500 700 1000 1500 2000 3000 4000 6000 10000 15000
Frequency range	1700 – 2800Hz
Resolution ¹	0.025% full scale (minimum)
Accuracy ²	±0.1% full scale
Linearity ²	±0.1% full scale
Temperature range	-20 to +80°C
Over-range capacity	150% full scale
Excitation method	Pluck or sweep

Thermistor	
Type	NTC 3K Ω
Accuracy	0.5°C
Resolution ¹	0.1°C

Weights, Dimensions and Materials

Type	Two active faces – 200mm	Single active face – 240mm	Two active faces – 300mm	Single active face – 345mm
Active face diameter	176mm	176mm	276mm	276mm
Length excluding cable	670mm	670mm	770mm	765mm
Weight excluding cable	2.7kg	5.4kg	4.5kg	9.1kg
Material	Stainless Steel	Powder coated	Stainless Steel	Powder coated

Cables	
Type	2 core Armoured PVC outer sheath
Accuracy	12mm
Weight /m	220g
Type	4 core Armoured PVC outer sheath
Accuracy	13mm
Weight /m	336g

¹ Dependent on readout. ² Of the pressure transducer

Ordering Information

Vibrating Wire Earth Pressure Cell – two active faces, 200mm diameter

For use in soil and rock fill. Oil filled, Stainless Steel pressure cell

P6-1.1-SS-3	300kPa pressure range
P6-1.1-SS-5	500kPa pressure range
P6-1.1-SS-10	1000kPa pressure range
P6-1.1-SS-20	2000kPa pressure range
P6-1.1-SS-40	4000kPa pressure range
P6-1.1-SS-60	6000kPa pressure range
P6-1.1-SS-100	10000kPa pressure range
P6-1.1-SS-150	15000kPa pressure range
P6-1.1-SS-3-T	300kPa pressure range with thermistor
P6-1.1-SS-5-T	500kPa pressure range with thermistor
P6-1.1-SS-10-T	1000kPa pressure range with thermistor
P6-1.1-SS-20-T	2000kPa pressure range with thermistor
P6-1.1-SS-40-T	4000kPa pressure range with thermistor
P6-1.1-SS-60-T	6000kPa pressure range with thermistor
P6-1.1-SS-100-T	10000kPa pressure range with thermistor
P6-1.1-SS-150-T	15000kPa pressure range with thermistor

Vibrating Wire Earth Pressure Cell – two active faces, 300mm diameter

For use in soil and rock fill. Oil filled, Stainless Steel pressure cell

P6-1.2-SS-3	300kPa pressure range
P6-1.2-SS-5	500kPa pressure range
P6-1.2-SS-10	1000kPa pressure range
P6-1.2-SS-20	2000kPa pressure range
P6-1.2-SS-40	4000kPa pressure range
P6-1.2-SS-60	6000kPa pressure range
P6-1.2-SS-100	10000kPa pressure range
P6-1.2-SS-150	15000kPa pressure range
P6-1.2-SS-3-T	300kPa pressure range with thermistor
P6-1.2-SS-5-T	500kPa pressure range with thermistor
P6-1.2-SS-10-T	1000kPa pressure range with thermistor
P6-1.2-SS-20-T	2000kPa pressure range with thermistor
P6-1.2-SS-40-T	4000kPa pressure range with thermistor
P6-1.2-SS-60-T	6000kPa pressure range with thermistor
P6-1.2-SS-100-T	10000kPa pressure range with thermistor
P6-1.2-SS-150-T	15000kPa pressure range with thermistor

Ordering Information

Vibrating Wire Earth Pressure Cell – single active face, 240mm diameter

For interface between concrete and soil. Oil filled, mild steel pressure cell

P6-2.1-MS-3	300kPa pressure range
P6-2.1-MS-5	500kPa pressure range
P6-2.1-MS-10	1000kPa pressure range
P6-2.1-MS-20	2000kPa pressure range
P6-2.1-MS-40	4000kPa pressure range
P6-2.1-MS-60	6000kPa pressure range
P6-2.1-MS-100	10000kPa pressure range
P6-2.1-MS-150	15000kPa pressure range
P6-2.1-MS-3-T	300kPa pressure range with thermistor
P6-2.1-MS-5-T	500kPa pressure range with thermistor
P6-2.1-MS-10-T	1000kPa pressure range with thermistor
P6-2.1-MS-20-T	2000kPa pressure range with thermistor
P6-2.1-MS-40-T	4000kPa pressure range with thermistor
P6-2.1-MS-60-T	6000kPa pressure range with thermistor
P6-2.1-MS-100-T	10000kPa pressure range with thermistor
P6-2.1-MS-150-T	15000kPa pressure range with thermistor

Vibrating Wire Earth Pressure Cell – single active face, 345mm diameter

For interface between concrete and soil. Oil filled, mild steel pressure cell

P6-2.2-MS-3	300kPa pressure range
P6-2.2-MS-5	500kPa pressure range
P6-2.2-MS-10	1000kPa pressure range
P6-2.2-MS-20	2000kPa pressure range
P6-2.2-MS-40	4000kPa pressure range
P6-2.2-MS-60	6000kPa pressure range
P6-2.2-MS-100	10000kPa pressure range
P6-2.2-MS-150	15000kPa pressure range
P6-2.2-MS-3-T	300kPa pressure range with thermistor
P6-2.2-MS-5-T	500kPa pressure range with thermistor
P6-2.2-MS-10-T	1000kPa pressure range with thermistor
P6-2.2-MS-20-T	2000kPa pressure range with thermistor
P6-2.2-MS-40-T	4000kPa pressure range with thermistor
P6-2.2-MS-60-T	6000kPa pressure range with thermistor
P6-2.2-MS-100-T	10000kPa pressure range with thermistor
P6-2.2-MS-150-T	15000kPa pressure range with thermistor

Connecting Cable and Fittings

CA-1.1-2-A	Armoured cable, 2 cores, 1.5mm ² ; PVC jacket, priced per metre
CA-1.1-4-A	Armoured cable, 4 cores, 1.5mm ² ; PVC jacket, for instruments with thermistors, priced per metre
CA-4.1	Joint sealing kit
CA-4.2	Coloured adhesive tapes; set of 10No.
CA-4.3	Crimping tool
CA-4.4	Crimping sleeves; set of 100No.
W6-6.1	Nylon ties; 150mm x 3.5mm, pack of 100No.
ST1-3.5	Nylon ties; 370mm x 4.7mm, pack of 100No.

Manual

MAN-34	Vibrating Wire Pressure Cell
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INSTRUMENTS