Total pressure cell

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STRUMENTI E MISURE GEOTECNICHE
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WARNINGS

This instrument must be utilized only for the application it has been designed for, OTR declines all responsability for any improper use.

During the installation phase, disconnect the instrument from measuring devices or appliances connected to the electricity grid;

Do not put the instrument in flammable liquids or potentially explosive gases.

Don't overload the cell;

Use protective gloves.

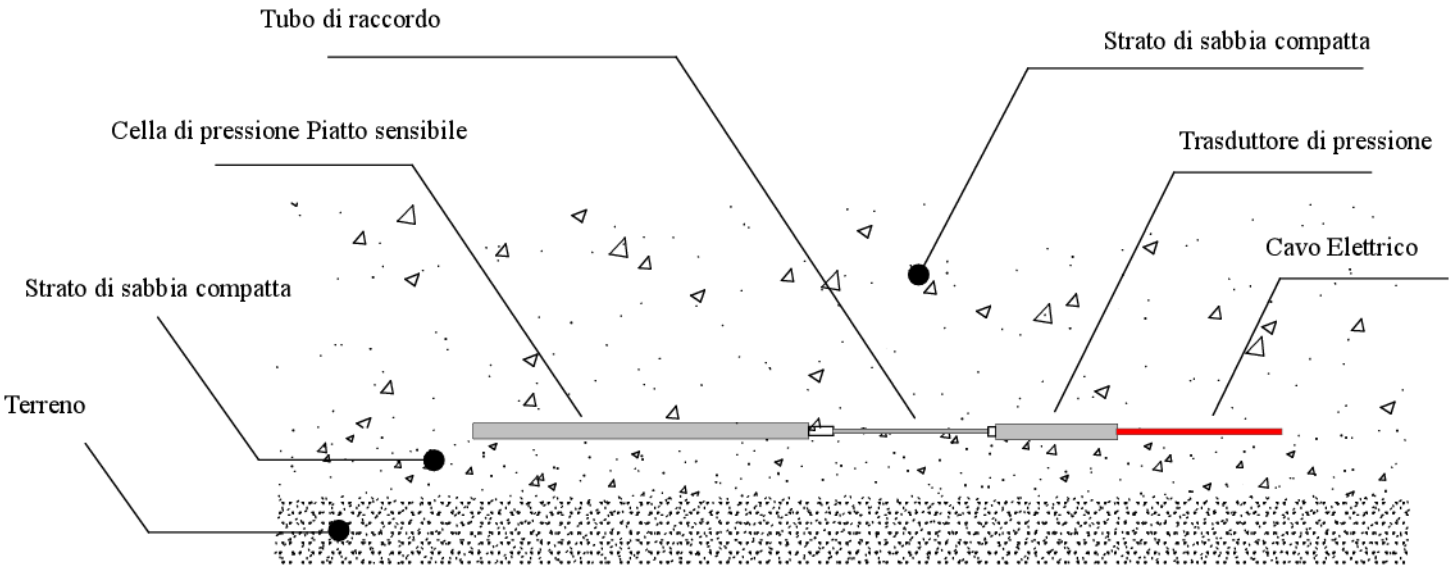
Furthermore

- Do not open the instrument, contact the manufacturer for checks and repairs;
- Keep out of reach of children;
- Do not connect the instrument to the readout unit with wet hands;
- Clean the instrument and its cable with alcohol or water, do not use acetone or aggressive liquids for plastics or labels;
- Use surge arresters for installations with unprotected cables longer than 30 meters.
- Do not load the cell in an eccentric way or with shear stresses;

Applications

Total pressure load cell are designed to monitor the total ground pressure:

- Contact pressures between diaphragm and retaining walls and soil;
- Inside an embankment or earthen dam;
- Pressures under foundations, piers and abutments of viaducts.



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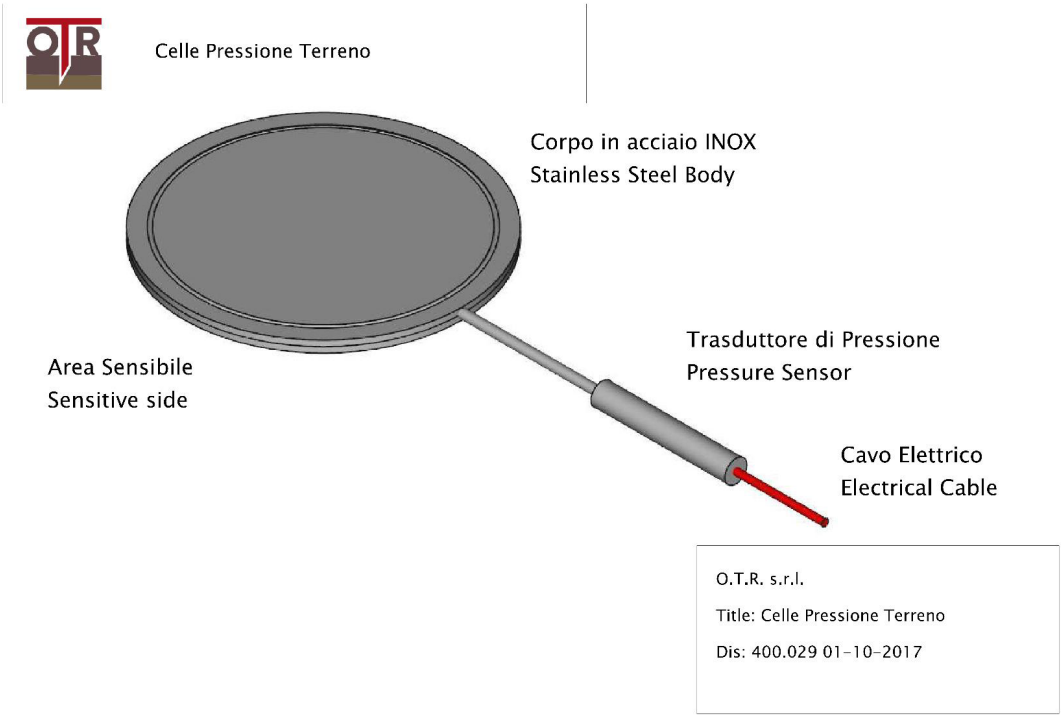
Description



Total pressure cell are made up by two stainless steel membranes shaped and welded connected to a pressure trasductor using a steel pipe. Cell is extremly rugged and has got a full support base of 314cm (for every side). The instrument, completly made up of stainless steel and the insulation IP68 makes this tool extremly reliable because it's easy to use and impossible to instal wrong.
It's filled with deareate oil and it's kept vacuum inside to have good thermal performancees and an high sensivity for low pressures too.
Cell and connection pipe are saturated in vacuum with deareated oil. the trasductor has a rugged and thick external stainless steel protection and it's directly connected to the pressure cell.

Identification

Every load cell has got plates to identify:

- Serial number with associated calibration report;
- Model indication;
- Range indication;
- Input/Output

Technical Features

Material	Stainless steel
Full Scale	5-7-10 Kg/cm2
Output	4-20 mA
Thickness	9 mm

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Installation

Total pressure cell has to be correctly installed to measure the soil push. Proceed in the following way:

In case of even ground:

1. Compact the cell support soil;
2. Cover the instrument with sand for 50-100 mm and then compact it.

In case of not even ground:

1. Create an even support layer with 50-100 mm of compacted sand;
2. Then proceed with the covering of the instrument as in the previous point.

In case of cement handiwork:

1. Smooth out the roughness of the support surface and create a smooth surface with mortar;
2. Place the non-sensitive side of the cell on the prepared supporting surface;
3. Use the 4 lateral perforated supports for the initial fixing (especially in case of vertical installation);
4. Then proceed with the covering according to the site requirements.

The cable should be compacted or displaced by land subsidence. This should mechanical stress the conductors. To relieve this event follow the suggestions:

Pose the instrument with 20% more of cable than the real distance;

Place the cable in coil way starting to the instrument;

In case of extremely severe conditions, use corrugated or reinforced conduit.

Readouts

To readout are used some manual or automatical instruments. Geotester 2 highlights on the display a mA value or in phisics' unit. Consult the manual of the model use for more specification.

Taking measurements

To take the measurements, instrumental cable has to be connected to the centraline following the scheme and the readouts unit instruction:

Output signal 4-20mA:

Cell's red cable	=+ 15 volt
Black cable	=– Loop
Shield	=Terra Datalogger

Processing measurement

- Pressure measurement is the detection of the output's current of the electric pressure trasductor, proportional to the cell load. Depending on the measurement units, electric measure is expressed in mA, changable in Kg/cm^2 using sensibility value of convertion on the calibration sheet (provided by the manufacturing company) of every instrument.

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Calculations & Formulas

According to the following definitions and assuming a generic reading:

E = Electrical reading (read on the control unit and expressed in mA)
K = Coefficiente di sensibilità (riportato sul foglio di calibrazione)

L (KN) = ExK (Reading expressed in engineering units Kg/cm2)