Anchor Load Cell

STRUMENTI E MISURE GEOTECNICHE
E STRUTTURALI

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INDIEX

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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 installation phase compare always the output signal with the load imposed by the tensioning machine;
Do not overload the load cell;

Do not put the instrument where potentially explosive gases are present;
Don't place the load cell directly to the concrete, use everytime distribution plates.

Do not use the instrument in water where an electric dissipation is in progress;

Use protective gloves;

Inoltre

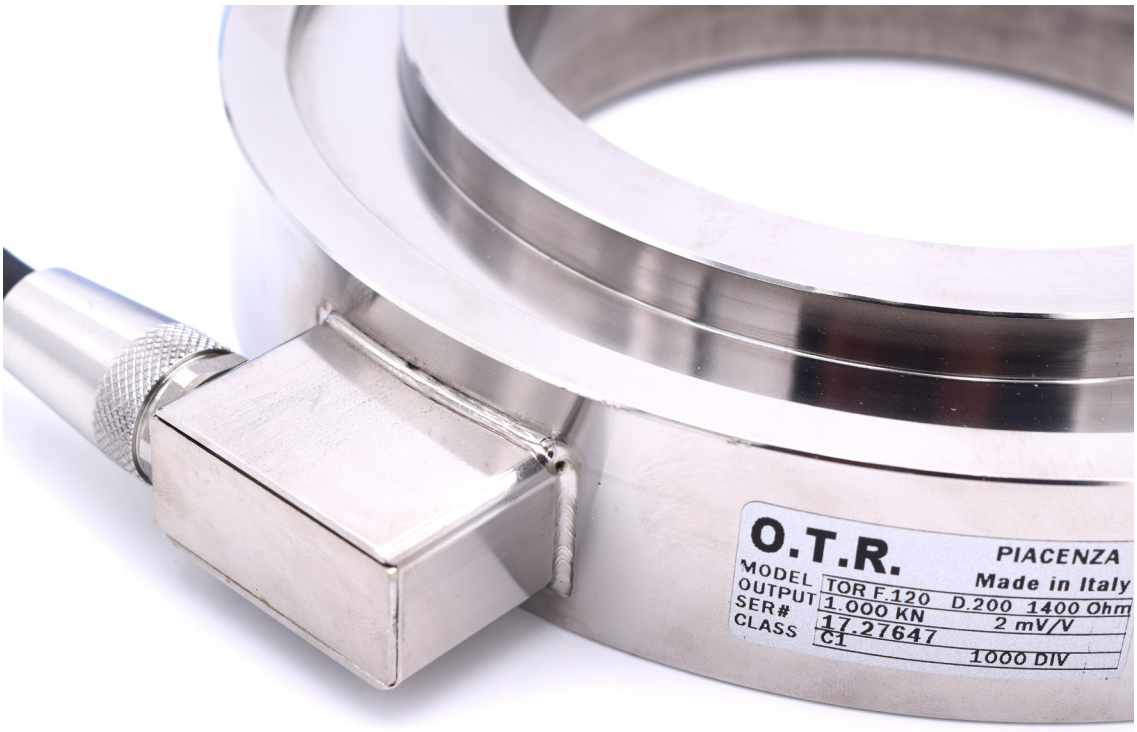
- Do not open the instrument, contact the manufacturer for checks and repairs;
- Keep out of reach of children;
- Do not connect the instrument to the readout unit with wet hands;
- Clean the instrument and its cable with alcohol or water, do not use acetone or aggressive liquids for plastics or labels;
- Use surge arresters for installations with unprotected cables longer than 30 meters;
- During the installation phase, disconnect the instrument from measuring devices or from any device connected to the AC power supply;
- Do not place the cell directly on concrete, use alway a dimensioned plate.

Application

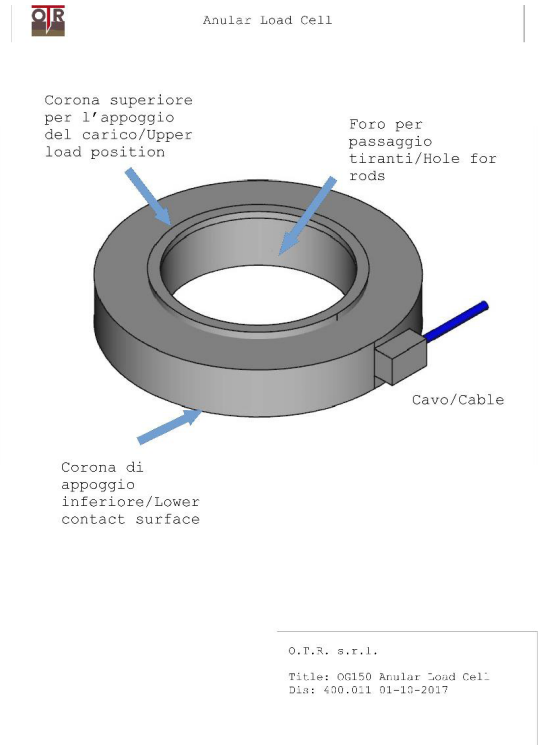
The anchor load on the cell is an important indication of the state and the functionality of anchorage, showing eventual overloads on the structure.

The load is directly measured by installing a steel plate.
Load cells can be used to:

- Measuring tension in cable anchors and rock bolts
- Monitoring loads on structural beams
- Monitoring load at a centering base
- Monitoring loads in steel supporting structures in tunnels
- Measurement of loads during pile testing
- Monitoring of diaphragms, walls, retaining walls e bulkheads



Description



The cell is made of a stainless steel cylindrical body equipped with 8 or 16 resistance strain gauges. Strain gauges are equally distributed along the cell and are in a Wheatstone bridge configuration. This instrument is extremely reliable thanks to the material it is made of (100% stainless steel), its IP68 protection, and its excellent thermal compensation. Installation is simple and the chance of a wrong placement is very low, adding to the reliability of this instrument. Cells are compensated for misaligned loads. Internal parts are completely filled up with gel in order to prevent any type of infiltration of moisture and water for a long period of time. When cells are loaded, their strain gauges change their resistance value. Output signal is directly proportional to the applied load. To equally spread the supplied load, cells for tunnels supporting structures are equipped with a spherical distribution plate, while anchor load cells are equipped with bearing plates (where necessary).

Identification

Every load cell is identified by:

- Serial number associated with a calibration report;
- Model;
- Full scale;
- Input/Output.

Technical Features

Material	Stainless Steel
Full scale	200-500-1000-1500-2000 KN
Output	2 mV/V, 4-20 mA
Height	40 mm
External diameter	30/160/200/250/275/300 mm
Internal hole	18/30/40/60/120/165/175/200 mm

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Installation

In order to install an anchor laod cell follow these steps:

- Before installation of the load cell take a zero reading (when the load has no load) using a manual readout unit, annotate this value and compare it with the value on calibration chart. It is normal that a little difference between the two values is present. This beginning procedure is very important to check that all instrumentation is correctly connected and utilized;
- Use a correct dimensioned steel plate in order to distribute the load on the structure (also concrete) to be monitored.
- Install the load cell and verify that all surfaces are planar and that the load can be correctly distributed;
- Check that the internal hole of the cell is large enough to avoid that ropes/rods of the anchorage do not touch the instrument when tensioned;
- Install the top plat of the anchorage, it is very important that top plate cover more than completely the surface of the cell where the load is applied.
- Connect the readout unit, take again a reading before tensioning.
- Start tensioning the anchorage checking at every step that expected value is congruent with the value of the instrument. If this does not happen check all the components before going further;
- It is normal that when anchorage is stuck the load can decrease of 5-10%.
- Take measures during the flollowing hours/days, an adjustment may occur after tensioning.

When installation is complete protect cables and connectors.

Readouts

Measurements can be taken by a portable, manual readout unit or by a data logger (which is advised for continuous monitoring) and they are expressed in electrical units (mV/V) or they can directly be converted into KN or Tons.
The Geotester readout unit can display the value as a tension (mV/V) and/or as a physical quantity.
For indications on how to use a given readout unit, please refer to its instruction manual.

Taking Measurements

The measurement yuo need to connect the instrumental cable to the readout unit following the instruction of the tool used. Load Cell's power supply should fluctuate from 5 to 18V and often the outputs in mV.

Cable indication for mV/V models:

Red Cable	= + Supply
Black Cable	= - Supply
Green Cable	= + Signal
White Cable	= - Signal
Shield	= Earth of datalogger

Cable indication for 4-20 mA models:

Red Cable	= + Supply
Black Cable	= - Supply
Green Cable	= Loop
Shield	= Earth of datalogger

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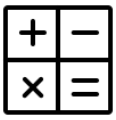
Data Processing

Load measures is calculated with the output signal of the weight on the cell. The output is expressed in mV/V changeable in KN using the datas on the calibration sheet of every instumentations.

Calculations & Formulas

Use polynomial factors to encrease precision

E = Electrical readout (read on the control unit and expressed in mV)
K = Sensitivity coefficient (reported on the calibration sheet)



L (KN) = ExK (Physical quantity expressed in KN)