Subminiature Load Cell
Tension/Compression
Model 8417

Application
This tension/compression load cell is an especially small component, which can be easily integrated in a girder assembly between two cables or chains for measuring force. The outside threadings along its axis of symmetry can accommodate various adapters or are suitable for screwing into a threaded hole that is quick and easy to produce.

The radial connection cable is extremely flexible and designed for a wide range of motion. In order to achieve the greatest possible stability for such a small sensor, making it suitable not only for the laboratory but also for industrial use, all parts have been welded together including the cable guide bush in the sensor housing.

Typical areas of application include the determining forces in Bowden cable, testing the durability of soldered and welded joints, measuring tractive forces of plug connections or monitoring forces when winding cables onto cable reels.

Description
Load cell model 8417 measures the tension or compression force between both axially mounted metric exterior threads on the cylindrical sensor housing. Forces are only applied to the threadings, which are especially long, to accommodate counter nuts and must not be affected by external influences such as bending, lateral force or torsion. Any contact with units affixed to the sensor housing - even on the front - must be avoided.

The measurement element is a membrane perpendicular to the axis of the sensor with a strain gauge full bridge applied to the inner surface, which requires stable excitation with a rated value of approx. 1.2 mV/V.

The connection cable is fed radially through a sleeve from the housing. Standardization of the output signal in the cable to 1.0 mV/V is optional.

NEW
measuring ranges from 0 ... 10 N

- Measuring ranges from 0 ... 10 N to 0 ... 5 kN
- Very small dimensions
- Made of stainless steel
- Rugged construction
- Simple screw mounting
**Technical Data**

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Measuring Range</th>
<th>Dimensions [mm]</th>
<th>Thread</th>
<th>Weight with / without Cable [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>8417-5010-DA700BU</td>
<td>0 ... 50 N</td>
<td>10.0 x 7.0 x 8.5</td>
<td>M3 x 0.5</td>
<td>11 / 3</td>
</tr>
<tr>
<td>8417-5020-DA700BU</td>
<td>0 ... 20 N</td>
<td>10.0 x 7.0 x 8.5</td>
<td>M3 x 0.5</td>
<td>11 / 3</td>
</tr>
<tr>
<td>8417-5050-DA700BU</td>
<td>0 ... 50 N</td>
<td>10.0 x 7.0 x 8.5</td>
<td>M3 x 0.5</td>
<td>11 / 3</td>
</tr>
<tr>
<td>8417-5100-0</td>
<td>0 ... 100 N</td>
<td>12.0 x 9.0 x 9.5</td>
<td>M4 x 0.7</td>
<td>20 / 8</td>
</tr>
<tr>
<td>8417-5200-0</td>
<td>0 ... 200 N</td>
<td>12.0 x 9.0 x 9.5</td>
<td>M4 x 0.7</td>
<td>20 / 8</td>
</tr>
<tr>
<td>8417-5500-0</td>
<td>0 ... 500 N</td>
<td>12.0 x 9.0 x 9.5</td>
<td>M4 x 0.7</td>
<td>20 / 8</td>
</tr>
<tr>
<td>8417-6001-0</td>
<td>0 ... 1000 N</td>
<td>12.0 x 9.0 x 9.5</td>
<td>M4 x 0.7</td>
<td>20 / 8</td>
</tr>
<tr>
<td>8417-6002-0</td>
<td>0 ... 2000 N</td>
<td>20.0 x 12.0 x 14.0</td>
<td>M6 x 1.0</td>
<td>40 / 28</td>
</tr>
<tr>
<td>8417-6005-0</td>
<td>0 ... 5000 N</td>
<td>20.0 x 12.0 x 14.0</td>
<td>M6 x 1.0</td>
<td>40 / 28</td>
</tr>
</tbody>
</table>

**Electrical values**
- Bridge resistance:
  - measuring range ≤ 0 ... 50 N: 500 Ω, nominal*
  - measuring range ≥ 0 ... 100 N: 350 Ω, nominal*
- Excitation: 5 V DC
- Nominal value:
  - measuring range ≤ 0 ... 50 N: 5 ... 30 mV/V, nominal*
  - measuring range ≥ 0 ... 100 N: 1.2 mV/V, nominal*
- Insulation resistance: > 10 MΩ
  *(Deviations from the stated value are possible.

**Environmental conditions**
- Nominal temperature range:
  - measuring range ≤ 0 ... 50 N: + 15 °C ... + 60 °C
  - measuring range ≥ 0 ... 100 N: + 15 °C ... + 70 °C
- Range of operating temperature: 0 °C ... + 80 °C
- Influence of temperature on zero:
  - measuring range ≤ 0 ... 50 N: ± 2.5 % F.S./50 K
  - measuring range ≥ 0 ... 100 N: ± 1.5 % F.S./50 K
- Influence of temperature on sensitivity:
  - measuring range ≤ 0 ... 50 N: ± 2.5 % Rdg./50 K
  - measuring range ≥ 0 ... 100 N: ± 1.5 % Rdg./50 K

**Mechanical values**
- Combined value consisting of non-linearity, hysteresis and non-repeatability, in installation position:
  - measuring range ≤ 0 ... 50 N: ± 0.9 % F.S.
  - measuring range ≥ 0 ... 1000 N: ± 0.5 % F.S.
- Kind of measurement: compressive and tensile forces
  - measuring range ≤ 0 ... 50 N: calibration in compressive direction (preferential direction), otherwise tensile force
  - Upon operation against the preferential direction a changed characteristic is possible.
- Deflection, full scale: max. 20 µm
- Static overload safe: 100 % of capacity
- Overload: 200 % of capacity
- Dynamic performance: recommended 50 % of capacity, maximum 70 % of capacity
- Material: 1.4542
- Electrical connection:
  - Shielded, PTFE cable with an open end for soldering; circuit board
  - Crimping, PTFE cable with a open end for soldering; circuit board
- Cable length: measuring range ≤ 0 ... 50 N: 1.7 m otherwise 2 m
- Bending radius: 15 mm
- Protection class: acc. to EN 60529 IP54
- Wiring code: red / white excitation voltage positive
  - black / brown excitation voltage negative
  - green / green signal output negative
  - white / yellow signal output positive
- Dimensions: refer to drawing
- General tolerance of dimensioning: acc. to ISO 2768-f
- Weight: refer to table

**Mounting Instructions**
- The measuring force has to be applied centrically and free from lateral force via the exterior threading. All lateral forces must be kept away from the sensor as they could result in incorrect measurements or damage.
- In order to ensure that the force sensor is securely fitted, it is possible to affix it to the threading with adhesive. When applying compression force, appropriate means (e.g. attachments) are to be used to prevent buckling.
- During handling and installation it is important to ensure that the cable outlet and sensor connection cable are not subject to too much tensile or bending force. Effective strain relief may be necessary.
- Two nuts are attached to the sensor, for use as a counter-torque. The force may be transmitted via the threads only.