Subminiature Load Cell

Model 8411

**Application**
The sensors series 8411 have deliberately been given small dimensions, so that they can easily be incorporated into existing structures or fitted into locations where access is difficult. Tensile and compressive forces are introduced to the cylindrical sensor housing through the two threaded bolts. Typical applications for these subminiature load cells include their use as measuring devices in equipment construction in general, in production lines, in measurement and control equipment, test equipment and so forth.

The sensor is to be carefully screwed into place using the threaded bolts. Tools must not be used for assembly.

The force must only be applied centrally, along the center line, and only through the threads. Other fitted parts must not touch the sensor housing; it is recommended that adhesive is applied to the threads. Bending, flexing or torsion forces will cause errors in the measurements and can damage the sensor. To avoid overload during assembly, it is helpful if electrical connections are made to the sensor beforehand and if the measurement on the display is watched during the process.

**Description**
The forces to be measured are applied centrally to the load cell through the two threaded pins. One covering surface of the cylindrical sensor housing is implemented as a measuring element, with the strain gauge being applied to its inner side. Under the influence of force, the full bridge circuit is unbalanced, and an output signal proportional to the force is generated.

A rigid compensation circuit board, 7 mm wide and 70 mm long, is located in the connecting cable to the sensor about 900 mm from the sensor body. This contains a resistor network for balancing the bridge and for temperature compensation. Removing the circuit board, or changing the cable length, will disturb the sensor's calibration figures.

The strong, rigid design leads to high natural frequencies up to 160 kHz as a result, which is beneficial for dynamic measurements. The active side is the thread next to the cable.

- Very small dimensions
- Robust construction
- Made of stainless steel
- High resonance frequency
- For tensile and compressive forces
- Characteristic curve deviation < 0.5% F.S.
Influence of temperature on sensitivity:
Nominal temperature range: +15 °C ... +70 °C

Proper strain relief may be provided.
unacceptably large tensile or bending forces. Proper strain relief may
be provided that buckling does not occur when compression forces are applied.
As the provision of guides for mounted parts, must be used to ensure
position, adhesive can be applied to the thread. Suitable design, such
in order to ensure that the load cell is securely fastened in its proper
force, through the external thread. It is essential that the sensor is not
exposed to clamping forces that act sideways, as this can cause errors in
the measurement or damage to the sensor.
In order to ensure that the load cell is securely fastened in its proper
position, adhesive can be applied to the thread. Suitable design, such
as the provision of guides for mounted parts, must be used to ensure
that buckling does not occur when compression forces are applied.
Take care when handling and fitting to ensure that the point where the
cable emerges and the sensor connection cable are not subjected to
unacceptably large tensile or bending forces. Proper strain relief may
need to be provided.

Environmental conditions
Range of operating temperature: -55 °C ... +120 °C
Nominal temperature range: +15 °C ... +70 °C
Influence of temperature on zero: ≤ ±0.02 % F.S./K
Influence of temperature on sensitivity: ≤ ±0.02 % Rdg./K

Mechanical values
Relative error: < ±0.5 % F.S.
Relative hysteresis error: < ±0.5 % F.S.
Relative variation: < ±0.1 % F.S.
Kind of measurement: tensile and compressive forces, calibration in tensile direction (preferential direction)
On operation against preferential direction, you have to count with changed characteristics.

Deflection: 13 μm ... 38 μm
Maximum static load: 150 % of nominal load
Dynamic load: recommended 70 % of nominal load possible 100 % of nominal load
Material: stainless steel 17-4 PH (similar to 1.4542)

Electrical connection:
High flexible, color coded, teflon isolated wire with open end for soldering. Length 1.5 m. Steep circuit board, width approximately 7 mm, length 70 mm, for bridge leveling, calibration and temperature compensation, 0.7 m away from the sensor body. Cable shield between sensor and circuit board.

Protection class: acc. to EN 60529 IP54
Wiring code: red excitation voltage positive black excitation voltage negative green signal output negative white signal output positive
Dimensions:
Ranges ≥ 0 ... 100 N have a steep cable cover at the sensor body length 7.6 mm, ø 2.5 mm.
Ranges ≥ 0 ... 1000 N without a collar at the housing, near the thread.

Order Information
Subminiature load cell measuring range 0 ... 20 N Model 8411-20
Accessory
Connector
12 pin, suitable to all burster desktop devices Model 9941
9 pin, suitable to SENSORMASTER and DIGIFORCE® Model 9900-V209

Installation of a connector to the sensor cable for primary use:
in preferential direction (positive measuring signal for tensile forces)
Order Code: 99004
only for connection to SENSORMASTER model 9163 desktop unit
Order Code: 99002
against preferential direction (positive measuring signal for compressive forces)
Order Code: 99007
only for connection to SENSORMASTER model 9163 desktop unit
Order Code: 99008

Analysis units, amplifiers and controllers like amplifier module model 9243, digital indicator model 9180 or DIGIFORCE® model 9307 please refer to section 9 of the catalog

Option
Standardization of characteristic in the sensor cable, only for ranges ≥ 0 ... 10 N to 1.0 mV/V ± 0.5 % -V010

Factory Calibration Certificate (WKS)
Calibration of a load cell separately as well as connected to an indicator.
Standard is a certificate with 11 points, starting at zero, running up and down in 20% increments covering the complete measuring range for preferential direction. Special calibrations on request. Calculation of costs by base price plus additional costs per point.
Order Code 84WKS-84...