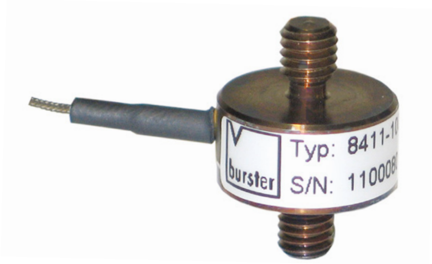
Subminiature Load Cell

Model 8411

Code:	8411 EN
Delivery:	10 weeks
Warranty:	24 months



- **Very small dimensions**
- **Robust construction**
- **Made of stainless steel**
- **High resonance frequency**
- **For tensile and compressive forces**
- **Characteristic curve deviation < 0.5% F.S.**

8411 EN

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.

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Technical Data

Order Code	Measuring Range	Dimensions [mm]						Thread	Resonance Frequency	Charac-teristic Nominal	Torsional Moment max.
		ø D	H	B	L	M	ø K	T	[kHz]	[mV/V]	[Nm]
8411-2,5	0 ... 2,5 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	3.0	15	0.45
8411-5	0 ... 5 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	4.0	15	0.45
8411-10	0 ... 10 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	7.0	2	0.45
8411-20	0 ... 20 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	11.0	2	0.45
8411-50	0 ... 50 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	18.0	2	0.45
8411-100	0 ... 100 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	26.0	2	0.45
8411-200	0 ... 200 N	12.7	6.6	7.4	5.1	2.2	1.9	M 3 x 0,5	40.0	2	0.45
8411-500	0 ... 500 N	12.7	6.6	7.4	5.1	2,2	1.9	M 3 x 0,5	67.0	2	0.45
8411-1000	0 ... 1000 N	19.1	9.7	-	7.9	4.6	2.5	M 6 x 1,0	85.0	2	2.25
8411-2000	0 ... 2000 N	19.1	9.7	-	7.9	4.6	2.5	M 6 x 1,0	98.0	2	2.25
8411-5000	0 ... 5000 N	19.1	9.7	-	7.9	4.6	2.5	M 6 x 1,0	167.0	2	2.25

Electrical values

Bridge resistance (full bridge):
measuring range ≤ 0 ... 5 N semiconductor strain gauge 500 Ω, nominal
measuring range ≥ 0 ...10 N foil strain gauge 350 Ω, nominal

Reference excitation voltage: 5 V DC

Nominal sensitivity: refer to table

Insulation resistance: > 5000 MΩ at 50 V DC

Shunt resistor: 59 kΩ ±0.1 %

The bridge output voltage, caused by a shunt resistor of value is given in the calibration protocol.

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

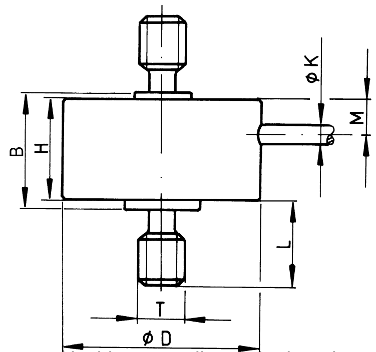
Dimensions: refer to table and dimensional drawing
Ranges ≥ 0 ... 1000 N have a steep cable cover at the sensor body length 7.6 mm, ø 2.5 mm.

Weight:
measuring range ≤ 0 ... 500 N without cable approx. 7 g
measuring range ≥ 0 ... 1000 N without cable approx. 19 g

Mounting Instructions

The force to be measured must be applied centrally, without transverse 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.

Dimensional drawing model 8411



Ranges ≥ 0 ... 1000 N without a collar at the housing, near the thread.

The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

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...

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