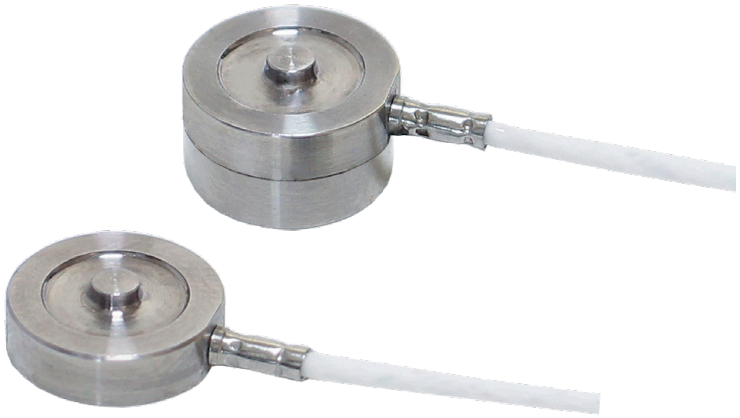
Subminiature Load Cell

Model 8413
Model 8414 with overload protection

Code:	8413 EN
Delivery:	ex stock
Warranty:	24 months



- **Measuring ranges 0 … 2.5 N to 0 … 5 kN**
- **Especially flat design from 3.3 mm**
- **Non-linearity 0.25 % of full scale**
- **Model 8414 with mechanical overload protection**
- **Temperature compensation - 55 °C ... 120 °C**
- **Made of high quality stainless steel**
- **High frequencies of resonance**

8413 EN

Application

This miniature force sensor was optimised with respect to its height and is, at only 3.4 mm, the lowest known sensor with strain gauge technology. Hardly higher than the diameter of its connection cable, it can also be housed in conditions where space is limited. Along with its minimal geometry, the force sensor is also particularly light. It has a high resonance frequency to follow quickly changing load alternations. Despite its extreme miniaturisation, in its application it remains completely robust and suitable for industry, not only with regard to the highly flexible cable connections or the full welding of sensors for the measurement ranges ≥ 0 … 10 N.

Examples of applications are

- ► Adjustment of gauges
- ► Force measurements on the inside of precision tools
- ► Monitoring of control elements
- ► Regulation of forces in medical technology
- ► Control instruments in precision machinery
- ► Adjustment and pre-load of devices
- ► Measurement technology in aircraft construction
- ► Fitting of test components and prototypes

Description

The miniature compression force sensors are flat, cylindrical discs with covered bottoms. The central load application button for taking on compression forces is an integrated part of the top, which is the sensor's membrane. On its bottom, the strain gauges are fixed on the inside of the housing and interconnected with a full Wheatstone bridge. This passes on, for force applications, an output voltage which is directly proportional to the size of the measurement.
The connection cable exits radially from the sensor housing and is additionally stabilised by a case for measurement ranges ≥ 0 … 10 N. The support area of the bottom of the sensor is circular, however arranged circularly for measurement ranges ≤ 0 … 5 N.

Technical Data

Model 8413

Order Code	Measuring Range	Dimensions [mm]									Resonance Frequency [kHz]	Nominal Value [mV/V]	Weight without Cable [g]
		Ø D 1	Ø D 2	Ø D 3	H 1	H 2	A	M	Ø L	Ø K			
8413-5002	0 ... 2.5 N	9.7	-*	2.3	3.3	2.6	11.0**	1.2	-	1.2	3	15	1.2
8413-5005	0 ... 5 N	9.7	-*	2.3	3.3	2.6	11.0**	1.2	-	1.2	4	15	1.2
8413-5010	0 ... 10 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	4	1	1.5
8413-5020	0 ... 20 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	6	1	1.5
8413-5050	0 ... 50 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	12	1	1.5
8413-5100	0 ... 100 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	15	1	1.5
8413-5200	0 ... 200 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	15	2	2.0
8413-5500	0 ... 500 N	12.7	10.0	3.0	3.8	3.3	10.5	1.0	1.6	1.0	16	2	3.0
8413-6001	0 ... 1000 N	12.7	10.0	3.0	3.8	3.3	10.5	1.0	1.6	1.0	20	2	3.0
8413-6002	0 ... 2000 N	19.1	16.0	6.4	6.4	5.7	13.7	1.5	1.6	1.0	13	2	10.0
8413-6005	0 ... 5000 N	19.1	16.0	6.4	6.4	5.7	13.7	1.5	1.6	1.0	15	2	10.0

Model 8414 with overload protection

Order Code	Measuring Range	Dimensions [mm]									Resonance Frequency [kHz]	Nominal Value [mV/V]	Weight without Cable [g]
		Ø D 1	Ø D 2	Ø D 3	H 1	H 2	A	M	Ø L	Ø K			
8414-5002	0 ... 2,5 N	9.4	-*	2.3	6.4	5.8	11.0**	4.2	-	1.2	3	12	3.8
8414-5005	0 ... 5 N	9.4	-*	2.3	6.4	5.8	11.0**	4.2	-	1.2	4	12	3.8
8414-5010	0 ... 10 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	4	1	4.0
8414-5020	0 ... 20 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	6	1	4.0
8414-5050	0 ... 50 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	12	1	4.0
8414-5100	0 ... 100 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	15	1	4.0

* Measurement ranges ≤ 0 ... 5 N have circular contact surfaces on the bottom with Ø 8.5 mm
** Cable at this length rigid but without a case

Electrical values

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

Excitation: 5 V DC

Nominal value: refer to table

Insulation resistance: > 5000 MΩ by 50 V DC

Shunt calibration resistor:
measuring ranges ≤ 0 ... 5 N 10 kΩ ± 0.1 %
measuring ranges 0 ... 10 N to 0 ... 100 N 100 kΩ ± 0.1 %
measuring ranges ≥ 0 ... 200 N 59 kΩ ± 0.1 %
The bridge output voltage caused by a shunt of this value is shown in the calibration certificate.

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

Non-linearity: < ± 0.5 % F.S.

Accuracy: < ± 0.5 % F.S.

Non-repeatability: < ± 0.1 % F.S.

Deflection full scale:
measuring ranges ≤ 0 ... 5 N 13 µm ... 38 µm
measuring ranges ≥ 0 ...10 N 25 µm ... 50 µm

Static overload capacity: model 8413, 150 % of nominal load

Maximum static overload stop: model 8414, 500 % of nominal load

Dynamic load: recommended 70 % of nominal load
maximum 100 % of nominal load

Material: stainless steel 17-4 PH (similar to 1.4542)

Electrical connection: length approx. 1.5 m
Measuring range ≤ 0 ... 5 N
Highly flexible teflon isolated with open ends for soldering. Length approx. 1.5 m. Steep board, with approx. 7 mm, length 50 mm, for bridge balance, calibration and temperature compensation approx. 0.6 m away from the sensor body. Open cable shielding between sensor and board. Covered in housing without case.
Measuring range ≤ 0 ... 10 N
Shielded, highly flexible, Teflon-insulated cable, 1 mm diameter. Minimal bend radius 15 mm, for static use 10 mm.

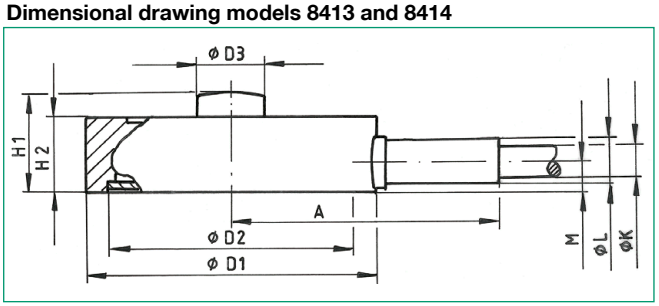
Protecting class: measuring range ≤ 0 ... 10 N acc. to EN 60529 IP54

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

Weight: refer to table

Dimensional drawing models 8413 and 8414



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 ... 50 N **8413-5050**

Accessories

Connector
12 pin, suitable to all burster desktop devices **Model 9941**
9 pin, suitable to SENSORMASTER and DIGIFORCE®
Model 9900-V209

Mounting of mating connector to conductor cable
Oder Code: 99004

Only for connection of sensor to SENSORMASTER Model 9163 desktop housing **Oder Code: 99002**

Amplifiers, sensor supply instruments and process controllers as e.g. digital indicator model 9163, model 9243 or DIGIFORCE® 9307
refer to section 9 of the catalog.

Option

Standardization of the nominal value only for measuring range ≥ 0 ... 10 N in the connection cable to 1.0 mV/V ± 0.25 % **...-V010**

Extension of the nominal temperature range to - 55 ° ... 120 °C for measuring range ≥ 0 ... 10 N **...-Vx1xxxxx**

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...

2376-008413EN-5672-081524