

# Ultra-Miniature Load Cell

## MODEL 8416



Option  
Non-linearity  
 $\leq \pm 0.15 \% \text{ F.S.}$



Model 8416 original size

### Highlights

- Measuring ranges from 0 ... 20 N up to 0 ... 5 kN  
0 ... 4.5 lbs up to 0 ... 1124.0 lbs
- Dragchain cable
- Inexpensive
- Minimum diameter

### Options

- burster TEDS
- Temperature compensated range -40 °C ... +90 °C
- Standardization of the nominal sensitivity
- Connection cable from single strand

### Applications

- Equipment construction
- Production lines
- Measuring and control equipment
- Testing systems
- Handling gear

### Product description

Due to their extremely compact design, these load cells can be used wherever static or dynamic load forces have to be measured in very tight spaces.

Model 8416 is perfect for use in micro-technology and just as suitable for measuring tasks in the research and development sector.

The ultra-miniature compression load cell model 8416 is a flat, circular disc, the bottom of which is sealed with a cover. The load application button for receiving the compression forces is an integrated part of the sensor.

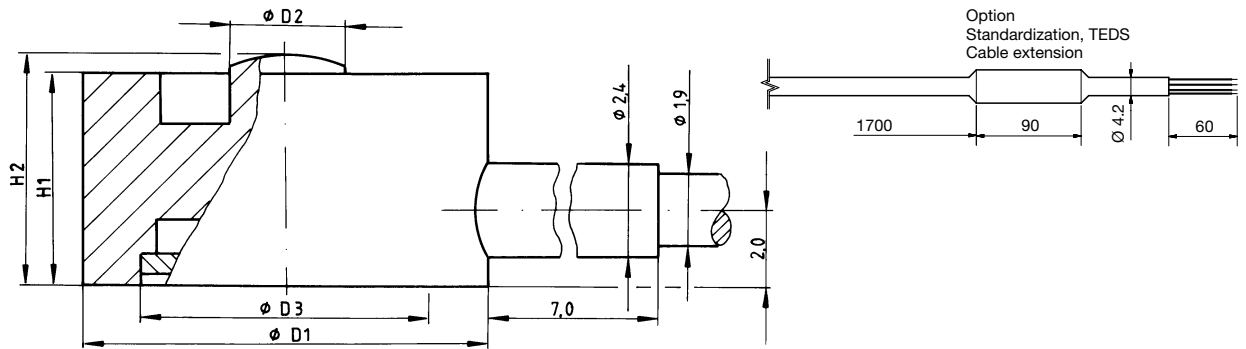
The sensor element inside the body carries a strain gage full bridge which outputs voltage directly proportional to the measurement variable upon application of force.

The short nominal measurement distance of the ultra-miniature compression load cells due to their design provides a high degree of rigidity. If needed, the nominal characteristic value can be standardized in the sensor connection cable. This allows for quick and easy interchange or simultaneous connection of several sensors to a single evaluation unit.

## Technical Data

8416	-	5020	5050	5100	5200	5500	6001	6002	6005	
Measuring range calibrated in N and kN from 0 ...		20 N	50 N	100 N	200 N	500 N	1 kN	2 kN	5 kN	
		4.5 lbs	11.2 lbs	22.5 lbs	45.0 lbs	112.4 lbs	225.0 lbs	450.0 lbs	1124.0 lbs	
<b>Accuracy</b>										
Relative non-linearity*		≤ ±0.25 % F.S. (option ≤ ±0.15 % F.S.)					≤ ±0.5 % F.S. (0.25)		≤ ±0.75 % F.S. (0.5)	
Characteristic curve deviation*		≤ ±0.25 % F.S.					≤ ±0.5 % F.S.		≤ ±1.0 % F.S.	
Relative hysteresis		≤ ±0.25 % F.S.					≤ ±0.3 % F.S.		≤ ±0.5 % F.S.	
Temperature effect on zero output		≤ ±0.3 % F.S./10 K								
Temperature effect on nominal sensitivity		≤ ±0.3 % F.S./10 K								
<b>Electrical value</b>										
Sensitivity nominal		1 mV/V								
Measurement direction		compression direction								
Standardization		option 0.8 mV/V (±0.5 %) realized on board in connection cable, 1.7 m from sensor housing or 0.3 m from cable end								
Bridge resistance		350 Ω nominal (deviations are possible)								
Excitation		max. 5 V DC or AC								
Insulation resistance		> 30 MΩ at 45 V								
<b>Environmental conditions</b>										
Nominal temperature range		+15 °C ... +70 °C								
Operating temperature range		0 °C ... +80 °C								
<b>Mechanical values</b>										
Deflection full scale		20 μm								
Maximum operating force		150 % of capacity								
Overload burst		> 250 % of capacity								
Dynamic performance		recommended: 70 % of capacity maximum: 100 % of capacity								
Protection class (EN 60529)		IP54								
<b>Other</b>		5020	5050	5100	5200	5500	6001	6002	6005	
Material		stainless steel 1.4542								
Natural frequency	[kHz]	6	6	6	20	18	30	45	80	
Mass without cable	[g]	10								

\* The data in the area 20 % - 100 % of rated load F

Dimensional drawing **Model 8416**

8416	-	5020	5050	5100	5200	5500	6001	6002	6005	
Measuring range from 0 ...		20 N	50 N	100 N	200 N	500 N	1 kN	2 kN	5 kN	
<b>Geometry</b>										
Ø D1	[mm]	10.6								12.6
Ø D2	[mm]	3								
Ø D3	[mm]	8.3	7.65							
H 1	[mm]	4.5				5.5	6.5	6.9		
H 2	[mm]	5				6	7	7.5		
General tolerance of dimension		ISO 2768f								

**Mounting**

## Mounting instructions

The measurement force must be introduced centrally and without any lateral forces. To prevent contact at just a few points, ensure that the sensor is installed on a flat surface.

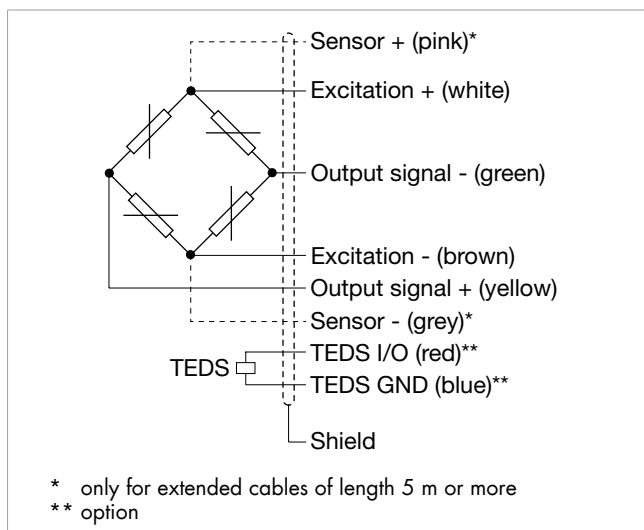
The sensor can be secured, for example, with silicon, wax or adhesive cement. Do not subject the sensor to lateral clamping forces as these would lead to measurement errors.

When handling and installing the sensor, ensure that the cable outlet and sensor cable are not subject to excessively high tensile or lateral forces. Strain relief may be necessary.

## Electrical termination

### Output signal

burster load cells are based on a strain-gage Wheatstone bridge. This measurement principle means that the output voltage mV/V is highly dependent on the sensor supply voltage. Our website contains details of suitable instrumentation amplifiers, indicator and display devices and process instruments.



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Measuring range from 0 ...		20 N	50 N	100 N	200 N	500 N	1 kN	2 kN	5 kN
<b>Electrical termination</b>									
Specifications		shielded, PTFE coated, 4 wire cable with bare ends for soldering, cable length 1.7 m, drag chain							
Cable fastening		cable cover							
Bending protection		without							
Bending radius		≥ 6 mm rigidly laid; ≥ 20 mm moving at temperatures > -20 °C moving connection cable not approved							

## Accessories

### Connectors and units

#### Order code

#### Connectors

9941	Connectors 12 pin, suitable to all burster desktop units
9900-V209	Connectors 9 pin, suitable to SENSORMASTER, DIGIFORCE® and TRANS CAL
9900-V229	Connectors 9 pin with TEDS
9900-V245	Connectors 8 pin, suitable to ForceMaster

#### Units

7281-V0001	Mobile measuring device with strain gage simulator and sensor test ( $R_{ir}$ , $R_g$ , Shunt, $R_{ISO}$ )
refer to section 9	Sensor electronics, amplifier and process control units like digital indicator model 9180, model 9163, modular amplifier model 9250 or DIGIFORCE® model 9307

## Calibration

<b>Test and calibration certificate</b>	
Included in scope of delivery of sensor	Amongst other data, includes figures for zero point, full-scale output and calibration offset
<b>Standard factory calibration certificate for load cells or measurement chains (WKS)</b>	
Optionally available	Our standard factory calibration certificate includes 11 measurement points, starting at zero, spread evenly in 20% steps over the full measuring range, for increasing and decreasing load under the same installation conditions.
<b>Special factory calibration certificate for load cells or measurement chains (WKS)</b>	
On request	We are happy to calibrate sensors and measurement chains to the customer's specification.
<b>German-accredited DAkkS calibration certificate for sensors and measurement chains (DKD)</b>	
Optionally available	Our DAkkS-certified calibration laboratory provides calibration certificates to DIN EN ISO 376. The calibration certificate includes 21 measurement points, starting at zero, spread evenly in 10% steps over the measuring range, for increasing and decreasing load under various installation conditions. DAkkS calibrations can be performed in the compression and/or tension direction depending on the sensor type.

## Order Code

Measuring range	Code	Measuring range
0 ... 20 N	5 0 2 0	0 ... 4.5 lbs
0 ... 50 N	5 0 5 0	0 ... 11.2 lbs
0 ... 100 N	5 1 0 0	0 ... 22.5 lbs
0 ... 200 N	5 2 0 0	0 ... 45.0 lbs
0 ... 500 N	5 5 0 0	0 ... 112.4 lbs
0 ... 1 kN	6 0 0 1	0 ... 225.0 lbs
0 ... 2 kN	6 0 0 2	0 ... 450.0 lbs
0 ... 5 kN	6 0 0 5	0 ... 1124.0 lbs

										Delivery ex stock at short notice										
										N	0	0	0	S	0	0	0			
<b>8</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>-</b>					<b>-</b>					<b>0</b>		<b>0</b>	<b>0</b>			
<ul style="list-style-type: none"> <li>Nominal sensitivity/not standardized</li> <li>Standardization at 0.8 mV/V</li> </ul>										N										
<ul style="list-style-type: none"> <li>Connection cable 1.7 m (with standardization in the cable 2 m)</li> <li>Connection cable 3 m</li> <li>Connection cable 5 m</li> <li>Connection cable 3 m, extended by a circuit board at 1,7 m *</li> <li>Connection cable 5 m extended *</li> </ul>										0	F	G	L	M						
* shortened delivery time compared with cable length 3 m and 5 m in one piece																				
<ul style="list-style-type: none"> <li>Open cable ends + 6 cm single strands</li> <li>9 pins Sub-D connector model 9900-V209</li> <li>9 pins Sub-D connector model 9900-V209 for 9163-V3xxxx</li> <li>12 pins round connector model 9941 for burster desktop devices</li> <li>9 pins Sub-D connector with burster TEDS model 9900-V229</li> </ul>										0	B	E	F	T						
<ul style="list-style-type: none"> <li>Non-linearity according to specification *</li> <li>Relative non-linearity <math>\leq \pm 0.15\%</math> F.S. *</li> </ul>															S	L				
* The data in the area 20% - 100% of rated load F																				
<ul style="list-style-type: none"> <li>Temperature compensated range +15 °C ... +70 °C</li> <li>Temperature compensated range -40 °C ... +90 °C</li> </ul>																			0	A

## Note

- Brochure**  
Our brochure „Load cells for production, automation, R&D and quality assurance“ is available for download on our website. It contains numerous applications, detailed product specifications and overviews.
- Product videos**  
Watch our **How-to-do video** at: [www.youtube.com/bursterVideo](http://www.youtube.com/bursterVideo)
- CAD data**  
Download via [www.burster.com](http://www.burster.com) or directly at [www.traceparts.com](http://www.traceparts.com)

