

Miniature Ring Load Cell

MODEL 8438



Highlights

- Measuring ranges from 0 ... 100 N up to 0 ... 200 kN
- Continuous centric internal hole measured to fit
- Flat disc design
- Protection class IP65
- Completely welded sensor body
- Internal thread in the bottom for fixing

Options

- burster TEDS
- Standardization of the nominal sensitivity
- Various cable lengths available
- Customization of geometry possible

Applications

- Force monitoring during riveting
- Measuring contact forces in hydraulic stamps
- Monitoring pulling forces during wire production
- Monitoring of forces in prestressed concrete structure



Medium measuring ranges



Small measuring ranges

Product description

The force to be measured must be introduced axially and perpendicularly to the entire surface of the inner and outer bands of the sensor in the opposite direction. Conversion of the acting force into an electrical output signal is performed by strain gages connected together in a full bridge circuit.

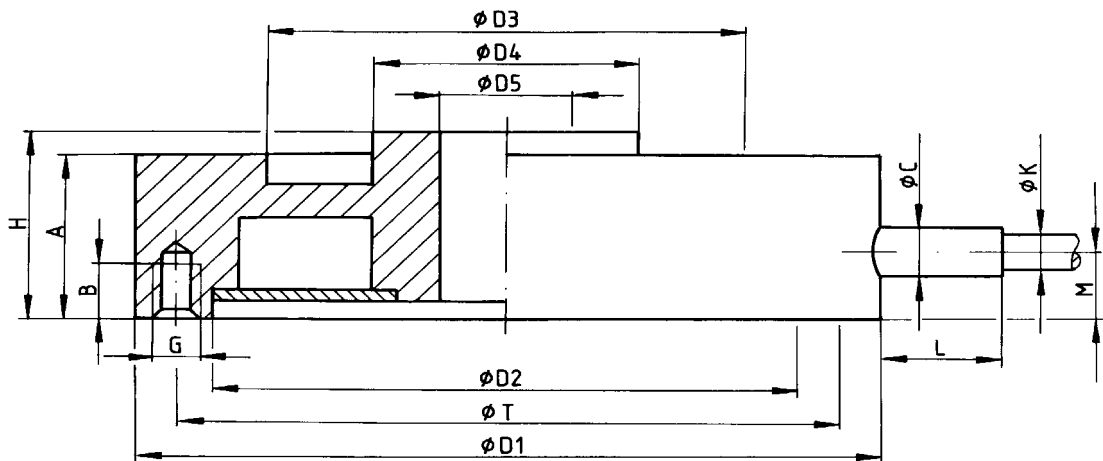
To achieve optimal accuracy, the base of the sensor should rest on a smooth level surface, hardened to at least ≥ 58 HRC with sufficient dimensions. The base cover welded to the surface has a stabilizing effect on the sensor element. Lateral forces must be avoided anyway as they distort the measured results. Tension and bending relief for the sensor cable is to be carried out on the machine side.

Technical Data

8438	-	5100	5200	5500	6001	6002	6005	6010	6020	6050	6100	6200	
Measuring range calibrated in N and kN from 0 ...		±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN	±10 kN	±20 kN	±50 kN	±100 kN	±200 kN	
		±22.5 lbs	±45.0 lbs	±112.4 lbs	±225.0 lbs	±450.0 lbs	±1124.0 lbs	±2.2 klbs	±4.5 klbs	±11.2 klbs	±22.5 klbs	±45.0 klbs	
Accuracy													
Relative non-linearity*		≤ 0.5 % F.S.											
Characteristic curve deviation*		≤ 0.5 % F.S.					≤ 0.75 % F.S.				≤ 1 % F.S.		
Relative hysteresis*		≤ 0.5 % F.S.					≤ 0.75 % F.S.				≤ 1 % F.S.		
Temperature effect on zero output		≤ ±0.03 % F.S./K											
Temperature effect on nominal sensitivity		≤ ±0.03 % F.S./K											
Electrical value													
Sensitivity nominal		1.5 mV/V				2 mV/V				1.5 mV/V			
Measurement direction		compression direction. Calibration and positive signal in compression direction.											
Standardization		1 mV/V (±1 %), option realized on board 48 x 7mm (L x B) in the cable after 1.5 m and 1.7 m from the sensor resp. 0.3 m from cable end (±0.25 %)											
Bridge resistance		approx. 350 Ω, nominal											
Excitation		5 V DC											
Insulation resistance		> 10 MΩ											
Environmental conditions													
Nominal temperature range		+15 °C ... +70 °C											
Operating temperature range		0 °C ... +85 °C											
Mechanical values													
Deflection full scale		approx. 60 μm											
Maximum operating force		150 % of capacity											
Overload burst		200 % of capacity											
Dynamic performance		recommended: 50 % of capacity maximum: 70 % of capacity											
Protection class (EN 60529)		IP54									IP65		
Other		5100	5200	5500	6001	6002	6005	6010	6020	6050	6100	6200	
Material		1.4542											
Natural frequency	[kHz]	1.2	2	3.7	3.4	5.5	10	15	14	24	22	37	
Mass without cable	[g]	16		17	52			66	145		626	660	

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



Dimensional drawing **Model 8438**

8438	-	5100	5200	5500	6001	6002	6005	6010	6020	6050	6100	6200
Measuring range from 0 ...		±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN	±10 kN	±20 kN	±50 kN	±100 kN	±200 kN
Geometry												
Ø D1	[mm]		28.0				38.0			49.0		78.0
Ø D2	[mm]		25.0				30.5			41.0		60.0
Ø D3	[mm]		22.0				25.0			35.0		54.0
Ø D4	[mm]		9.0				13.5			23.0		42.0
Ø D5	[mm]		5.5 ^{H8}				7.0 ^{H8}			15.0 ^{H8}		28.0 ^{H8}
A	[mm]		7.0				9.0			15.0		24.0
H	[mm]		8.0				10.0			16.0		25.0
Ø C	[mm]		2.2				3.6					5.6
L	[mm]					8.0						10.0
Ø K	[mm]		1.9				3.0					5.0
M	[mm]		2.5				3.0		4.5			6.5
B	[mm]		-				3.0					5.5
Ø K	[mm]		-				33.5		45.0			69.0
G			-				M2.5 x 0.45					M4.0 x 0.7
General tolerance of dimension							ISO 2768f					

Mounting

Mounting instructions

Requirements for evenness of the mounting surfaces: 5 µm, Parallelism of the mounting surfaces: 20 µm.
Surface hardness: ≥ 58 HRC.

Mounting: measuring range ≥ 0 ... 1000 N

There are three mounting holes on the lower side of the sensor, equally spaced on T diameter with division 120°, one hole is located directly across the cable exit. This kind of mounting is allowed for compression load only

Electrical termination

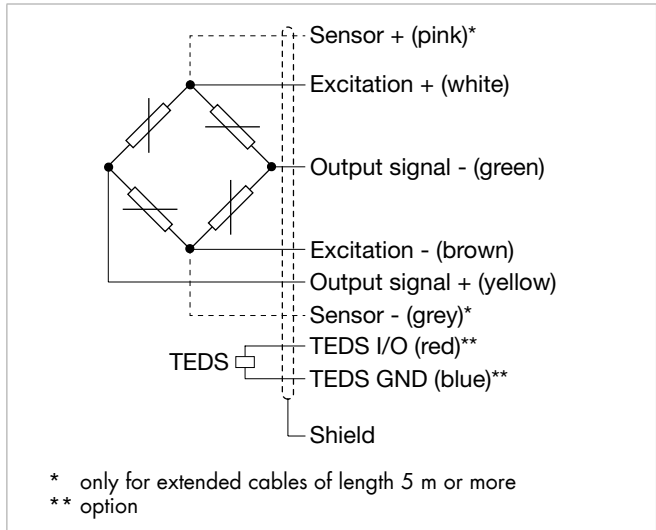
Output signal

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.



burster TEDS

The "**burster** Transducer **E**lectronic **D**ata **S**heet" (TEDS) is a memory in which identification data of the sensor, calibration data and other sensor parameters are saved. In conjunction with your own suitable burster device, there is the option of performing a simple adjustment in order to achieve the maximum accuracy of the measuring chain. A simple sensor exchange is thus possible in just a few steps without losing precision.



8438	-	5100	5200	5500	6001	6002	6005	6010	6020	6050	6100	6200
Measuring range from 0 ...		±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN	±10 kN	±20 kN	±50 kN	±100 kN	±200 kN
Electrical termination												
Specifications		shielded, TPE coated, 4 wire cable with bare ends for soldering, drag chain, cable length 1.7 m, with standardization in cable 2.0 m										
Cable fastening		cable cover										
Bending protection		without										anti-kink protection
Bending radius		≥ 6 mm rigidly laid; ≥ 20 mm moving; at temperatures > -20 °C moving connection cable not approved				≥ 9 mm rigidly laid; ≥ 30 mm moving; at temperatures > -20 °C moving connection cable not approved						
Cable model		PUR cable 2 mm customer length 1.7 m, assembled				PUR cable 3 mm customer length 1.7 m, assembled						

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_{T} , R_{a} , 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

Test and calibration certificate	
Included in scope of delivery of sensor	Amongst other data, includes figures for zero point, full-scale output and calibration offset
Standard factory calibration certificate for load cells or measurement chains (WKS)	
Optionally available	Our standard factory calibration is performed in 5 force steps (20% steps) starting from zero until the reaching the nominal force, for increasing and decreasing compression load under the same installation position.
Special factory calibration certificate for load cells or measurement chains (WKS)	
On request	We are happy to calibrate sensors and measurement chains to the customer's specification.
Calibration certificate with accreditation symbol for product group load cell 8438	
Optionally available	Calibration certificate with accreditation symbol for load cell 8438. Calibration is performed on the basis of the accreditation of the calibration laboratory D-K-15141-01-00, for the scope of accreditation listed in the annex to the certificate. The traceability to national standards as well as a wide international recognition (DAkkS as signatory of the Multilateral Agreements of EA, ILAC and IAF) are thus guaranteed. Calibration is performed according to ISO 376 in 10 force steps (10% steps) vstarting from zero until the reaching the nominal force, for increasing and decreasing compression load under various installation positions.



Order Code

Measuring range	Code				Measuring range
0 ... ±100 N	5	1	0	0	0 ... ±22.5 lbs
0 ... ±200 N	5	2	2	0	0 ... ±45.0 lbs
0 ... ±500 N	5	5	5	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
0 ... ±10 kN	6	0	1	0	0 ... ±2.2 klbs
0 ... ±20 kN	6	0	2	0	0 ... ±4.5 klbs
0 ... ±50 kN	6	0	5	0	0 ... ±11.2 klbs
0 ... ±100 kN	6	1	0	0	0 ... ±22.5 klbs
0 ... ±200 kN	6	2	0	0	0 ... ±45.0 klbs

										Delivery ex stock at short notice									
										N	0	0	0	S	0	0	0	0	0
8	4	3	8	-						-				0	S	0	0	0	0

■ Nominal sensitivity/not standardized	N
■ Standardization of the sensitivity to 1.0 mV/V	C
■ Connection cable 1.7 m (with standardization in the cable 2 m)	0
■ Connection cable 3 m	F
■ Connection cable 5 m	G
■ Connection cable 3 m, extended *	L
■ Connection cable 5 m extended * (with sens line)	M
* shortened delivery time compared with cable length 3 m and 5 m in one piece	
■ Open cable ends + 6 cm single strands	0
■ 9 pins Sub-D connector model 9900-V209	B
■ 9 pins Sub-D connector model 9900-V209 for 9163-V3xxxx	E
■ 12 pins round connector model 9941 for burster desktop devices	F
■ 9 pins Sub-D connector with burster TEDS model 9900-V229	T
■ 8 pins coupling connector model 9900-V245 for 9110	H
■ Non-linearity according to specification	S