Bending Beam Tension and Compression Load Cell

MODEL **8511**

burster TEDS

Measuring direction

Easy installation

Highlights

- Measuring ranges from 0 ... 5 N up to 0 ... 2 kN, 0 ... 1.1 lbs up to 0 ... 449.6 lbs
- Easy installation
- High linearity
- Special design upon request

Options

- Non-linearity up to ±0,03 % F.S.
- Standardized nominal sensitivity
- burster TEDS

Applications

- Dosing system
- Tension force measurement for wire or thread winders
- Cable force
- Review of pull-off forces

Product description

The measuring element of the load cell consists of a double bending beam on which strain gages are applied. The applied force detunes the measuring bridge so that a proportional output voltage is generated. The strain gages on the measuring element are protected against dirt and water spray by a rubber bellows.

The sensor can be easily mounted via two mounting holes. The tension or compression force to be measured is introduced at the opposite end perpendicular to the sensor axis.

Due to its special design, the influence by an extension (e.g. touch finger) on the measuring signal is low. Overload protection can be realized with little effort using a mechanical stop.

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Technical Data

8511	–	5005	5010	5020	5050	5100	5200	5500	6001	6002
Measuring range calibrated in N from 0 …		±5 N	±10 N	±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN
		±1.1 lbs	±2.2 lbs	±4.4 lbs	±11.2 lbs	±22.4 lbs	±44.9 lbs	±112.4 lbs	±224.8 lbs	±449.6 lbs
Accuracy										
Relative non-linearity*		≤ ±0.25 % F.S.				≤ ±0.1 % F.S.				
Relative non-linearity*		option ≤ ±0.1 % F.S.				option ≤ ±0.03 % F.S.				
Characteristic curve deviation*		≤ ±0.25 % F.S.				≤ ±0.2 % F.S.				
Relative hysteresis		≤ 0.15 % F.S.								
Temperature effect on zero output		≤ 0.01 % F.S./K								
Temperature effect on nominal sensitivity		≤ 0.02 % F.S./K								
Electrical values										
Sensitivity nominal		1.0 mV/V			1.5 mV/V					
Measurement direction		Tension and compression direction. Load calibration in compression direction (clearly marked by an arrow on the sensor). The full-scale output is likely to be different when used in the tension direction. Positive signal in compression direction.								
Standardization**		option 1.0 mV/V (±0.25 %)								
Bridge resistance		350 Ω nominal (deviations are possible)								
Excitation		recommended 5 V DC or AC			recommended 5 V DC or AC; max. 10 V DC or AC					
Insulation resistance		> 30 MΩ at 45 V								
Environmental conditions										
Nominal temperature range		+15 °C … +70 °C								
Operating temperature range		-30 °C … +90 °C								
Mechanical values										
Deflection full scale	[µm]	150	200	150	150	300	200	200	200	300
Maximum operating force***		150 % of full scale								
Overload burst		> 200 %						> 250 %		
Dynamic performance***		recommended: 50 %								
Protection class (EN 60529)		IP54								
Installation										
Intended mounting screws		2 pcs. M4				2 pcs. M5		2 pcs. M6		
Tightening torque	[N*m]	2				4		10		
Mounting screws		resistance 8.8 or higher						resistance 12.9 or higher		
Installation instructions		Two holes are provided for mounting the sensor. On the opposite on the lying side there is a hole for attaching a suitable receptacle for force application. (e.g. a load button or touch finger). For high quality force measurements, lateral forces and moments are avoided.								
Other										
Material		sensor body made of high-strength aluminium, anodized						sensor body made of stainless steel 1.4542		
Natural frequency	[Hz]	130	180	150	120	280	230	200	180	300
Mass	[g]	0.05				0.1		0.35		

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

** Realized on board in connection cable, 1.7 m from sensor housing or 0.3 m from cable end (temperature range for the optional TEDS or standardization board 0 … 60 °C)

*** The sensor is not designed for a very large number of load change cycles up to the nominal load

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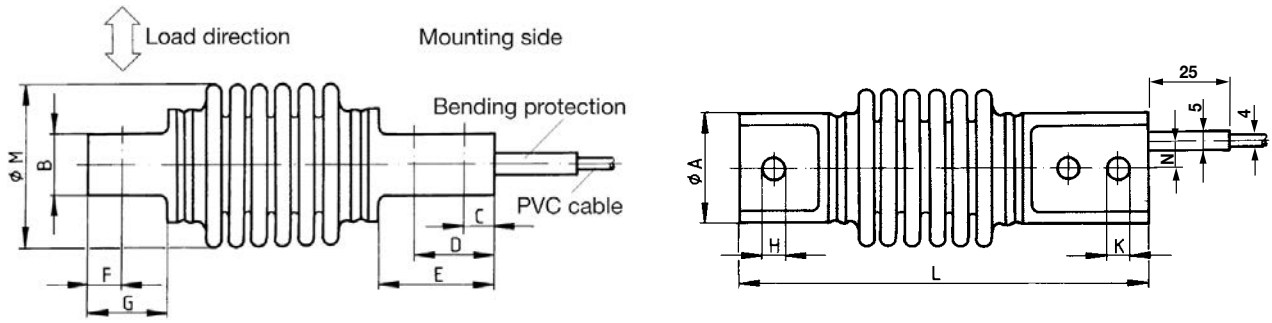
Dimensional drawing



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Measuring range from 0 ...		±5 N	±10 N	±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN
Geometry										
Ø A	[mm]	19.5				28.0				
B	[mm]	10.0				15.0				
C	[mm]	5.0				7.5				
D	[mm]	15.0				20.0				
E	[mm]	22.0				29.0				
F	[mm]	6.5				8.5				
G	[mm]	18.5				20.0				
Ø H	[mm]	5.5 (E9)						6.5 (E9)		
Ø K	[mm]	4.5				5.5		6.5		
L	[mm]	86.5				101.0				
Ø M	[mm]	28.0				40.0				
N	[mm]	6.0				8.5				
General tolerance of dimension		ISO 2768-f								

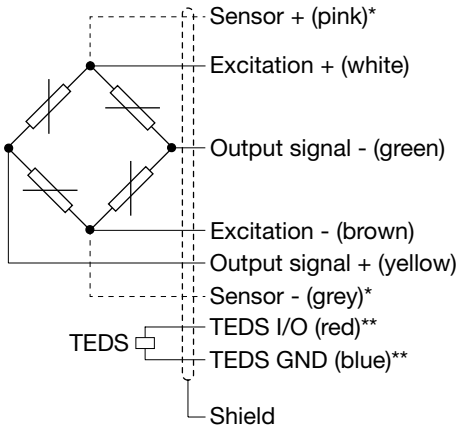
Electrical termination

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 T**ransducer **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.



* only for extended cables of length 5 m or more
** option

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Measuring range from 0 ...		±5 N	±10 N	±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN
Electrical termination										
Specifications		highly flexible, oil resistant, drag chains suitable								
Cable fastening		cable cover, crimped with shrink tube cover								
Bending protection		no bending protection								
Bending radius		three times the diameter for fixed cable, ten times the diameter for cable permanently moving								
Cable model		PUR, Ø = 3.0 mm				PUR, Ø = 4.2 mm				

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		
7270		Mobile measuring device of strain gage based sensors
7281-V0001		Mobile measuring device with strain gage simulator and sensor test (R_i, 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®

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Calibration

Test and calibration certificate	
Supplied with the 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 20% steps starting from zero until the reaching the nominal force, for increasing and decreasing load with unchanged installation position. Factory calibration can be performed in compression and/or tension direction.
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 8511	
Optionally available	Calibration certificate with accreditation symbol for load cells 8511. 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 load under various installation positions.

Order Code

Measuring range	Code				Measuring range
0 ... ±5 N	5	0	0	5	0 ... ±1.1 lbs
0 ... ±10 N	5	0	1	0	0 ... ±2.2 lbs
0 ... ±20 N	5	0	2	0	0 ... ±4.4 lbs
0 ... ±50 N	5	0	5	0	0 ... ±11.2 lbs
0 ... ±100 N	5	1	0	0	0 ... ±22.4 lbs
0 ... ±200 N	5	2	0	0	0 ... ±44.9 lbs
0 ... ±500 N	5	5	0	0	0 ... ±112.4 lbs
0 ... ±1 kN	6	0	0	1	0 ... ±224.8 lbs
0 ... ±2 kN	6	0	0	2	0 ... ±449.6 lbs

									Delivery ex stock at short notice					
									N	0	0	0	S	0	0	0
8	**5**	**1**	**1**	**–**					**–**			**0**		**0**	**0**	**0**

■ Nominal sensitivity/not standardized	N
■ Standardization at 1.0 mV/V ***	C

*** temperature range for the optional TEDS or standardization board 0 ... 60 °C

■ Connection cable 1.7 m (Standardization 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 wires	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

*** temperature range 0 ... 60 °C for the connector with TEDS

■ Non-linearity 0.25 % F.S. (in the measuring ranges 5 N up to 50 N) ** Non-linearity 0.1 % F.S. (in the measuring ranges 100 N up to 2 kN) **	S
■ Non-linearity 0.1 % F.S. (in the measuring ranges 5 N up to 50 N) ** Non-linearity 0.03 % F.S. (in the measuring ranges 100 N up to 2 kN) **	L

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

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