Tension and Compression Load Cell

MODEL **8523**

Highlights

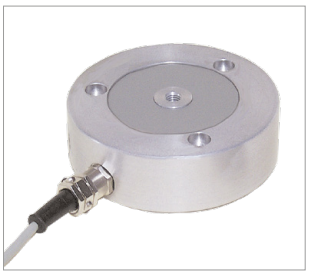
- Measuring ranges from 0 ... 20 N to 0 ... 5 kN, 0 ... 4.4 lbs up to 0 ... 1.1 klbs
- Tilt-free installation thanks to point-contact mounts
- Excellent price/performance ratio
- Easy mounting

Options

- Pull plate for directing tension forces
- Load buttons for simple measurement of compressive loads
- Standardized output signal
- burster TEDS

Applications

- Machine tools
- Reference sensor for comparative measurements
- All forms of test benches
- R&D



High ranges

With load buttons

With pull plates + rod end bearings

Product description

The tension & compression load cells from the 8523 series are designed for a wide range of uses. The sensors feature many benefits, including three point-contact mounts for tilt-free installation. Thanks to this feature, excellent measurement results can be achieved even with a sub-optimum mounting surface.

The force to be measured is applied to the central threaded hole in the tension or compression direction. For measuring purely compressive loads, using load buttons from our accessories range saves the need for complex sensor-integration mechanisms. Tensile loads in rods or chains can also be detected with ease using the optional pull plate.

Inside the sensor is an elastic membrane, on which are applied strain gages connected in a full Wheatstone bridge. If a tensile or compressive load is applied to the sensor, the ohmic resistance of the measuring bridge changes and detunes the output signal in proportion to the measured load in mV/V.

Technical Data

8523	–	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
		±4.4 lbs	±11.2 lbs	±22.4 lbs	±44.9 lbs	±112.4 lbs	±224.8 lbs	±449.6 lbs	±1.1 klbs
Accuracy									
Relative non-linearity*		≤ ±0.25 % F.S.	≤ ±0.20 % F.S.				≤ ±0.15 % F.S.		
Characteristic curve deviation*		≤ ±0.3 % F.S.	≤ ±0.2 % F.S.				≤ ±0.2 % F.S.		
Relative hysteresis		≤ 0.5 % F.S.	≤ 0.25 % F.S.						
Temperature effect on zero output		≤ ±0.01 % F.S./K					≤ ±0.02 % 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	1.7 mV/V				
Measurement direction		tension and compression direction. Load calibration in compression direction. The full-scale output is likely to be different when used in the tension direction. Positive output signal in compression direction.							
Standardization**		option (from measuring range of 100 N) 1.5 mV/V (±0.5 %)							
Bridge resistance		350 Ω nominal (deviations are possible)							
Excitation		max. 5 V DC	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 … +80 °C							
Mechanical values									
Deflection full scale		< 80 µm							
Maximum operating force		130 % of capacity							
Overload burst		> 300 % of capacity							
Dynamic performance		recommended: 50 %							
Material		high-grade aluminium, anodized							
Protection class (EN 60529)		IP52					IP64		
Installation									
Intended mounting screws		3 pieces M4						3 pieces M5	
Tightening torque mounting screws	[N*m]	3						6	
Mounting screws		resistance 12.9							
Installation instructions		The entire bearing area of the sensor must be mounted on a base which is hardened (60 HRC), flat, polished or better lapped. Counter bores in compliance with DIN 74-km, in compliance with DIN 912 head cap screws							
Other									
Material		high-grade aluminium, anodized							
Natural frequency	[kHz]	0.5	0.75	0.8	1.1	2.3	1	1.8	3
Mass	[kg]	0.15					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

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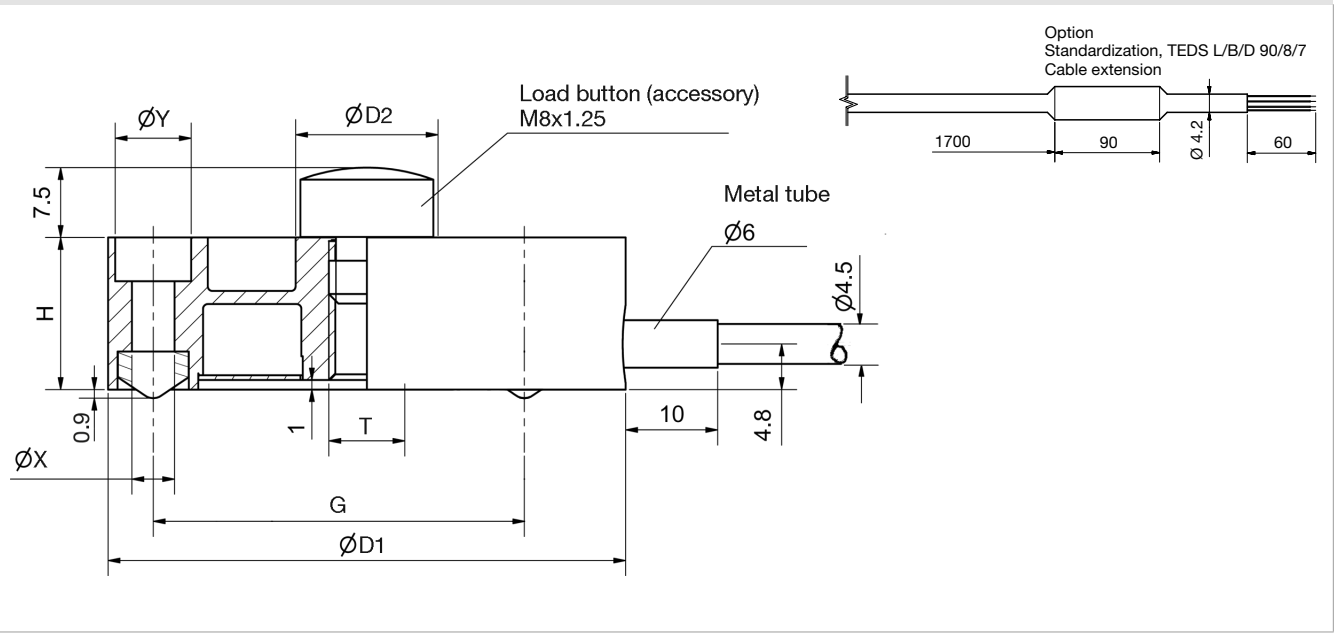
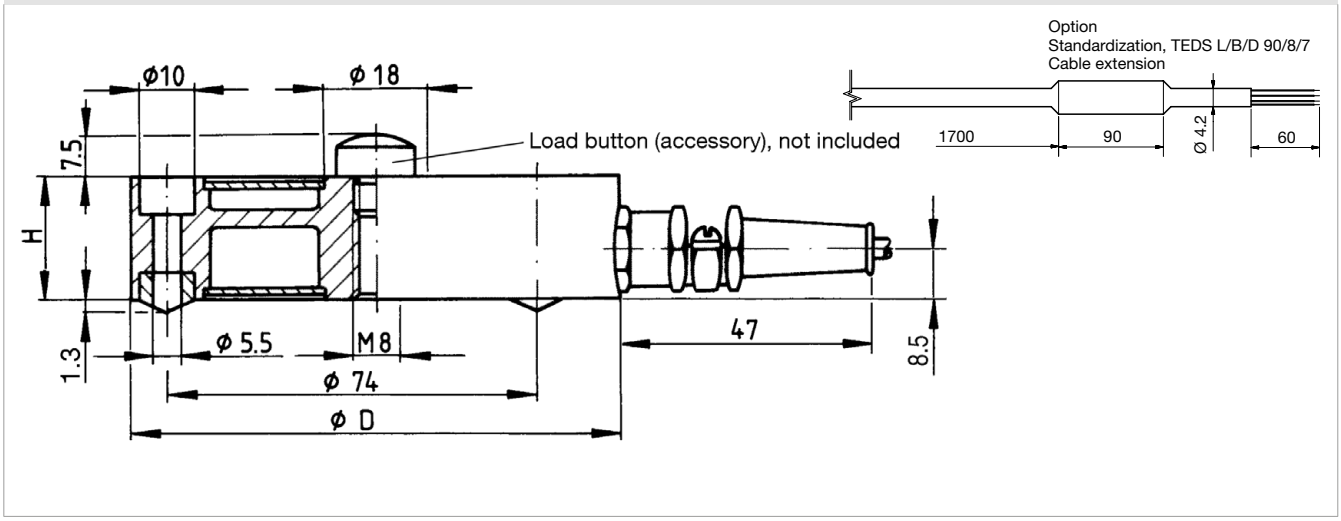
Dimensional drawing 1 – **Measuring ranges from ≤ 0 ... ±500 N | from ≤ 0 ... ±112.4 lbs**



8523	–	5020	5050	5100	5200	5500
Measuring range from 0 ...		±20 N	±50 N	±100 N	±200 N	± 500 N
Geometry						
Ø D1	[mm]	54.5				
Ø D2	[mm]	15.0				
H	[mm]	16.0				
G	[mm]	45.0				
Ø X	[mm]	4.5				
Ø Y	[mm]	8.0				
Central blind threaded hole T		M8 x 1.25				
Number of clearing holes in Ø		3 (with edges, H + 0.9 mm)				
Dimensional drawings		dimensional drawing 1				

Dimensional drawing 2 – **Measuring ranges from ≥ 0 ... ±1000 N | from ≥ 0 ... ±224.8 lbs**

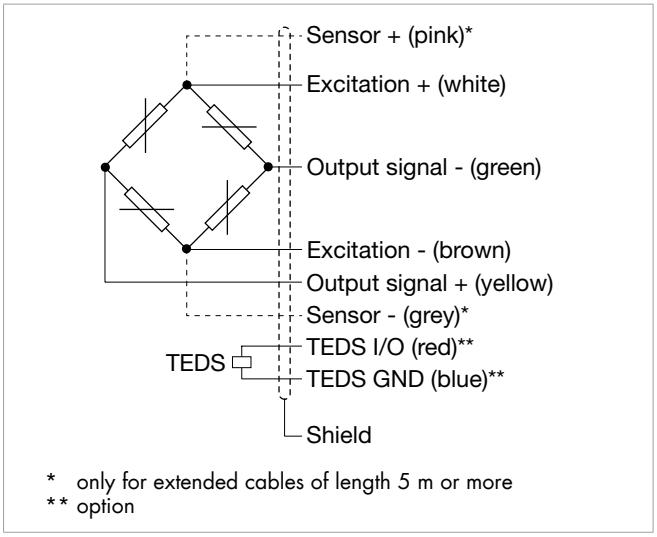


8523	–	6001	6002	6005
Measuring range from 0 ...		±1 kN	±2 kN	±5 kN
Geometry				
Ø D1	[mm]	89.5	99.5	
Ø D2	[mm]	18.0		
H	[mm]	22.0	30.0	
G	[mm]	74.0		
Ø X	[mm]	5.5		
Ø Y	[mm]	10.0		
Central blind threaded hole T		M8 x 1.25		
Number of clearing holes in Ø		3 (with edges, H + 1.3 mm)		
Dimensional drawings		dimensional drawing 2		

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.



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

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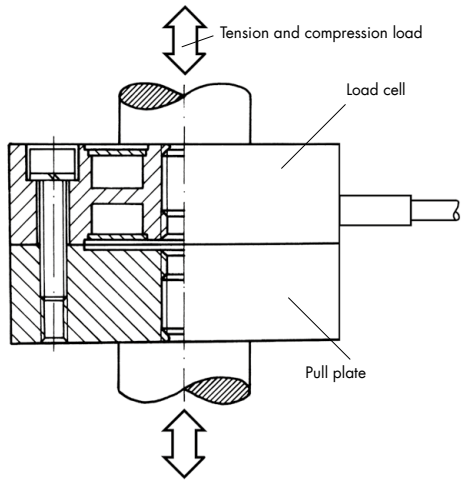
8523	–	5020	5050	5100	5200	5500	6001	6002	6005
Measuring range from 0 ...		±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN
Electrical termination									
Specifications		highly flexible, shielded, drag chains suitable. Bending radius three times the diameter for fixed cable, ten times the diameter for cable permanently moving							
Cable fastening		cable cover					cable connection with tension relief		
Bending protection		shrinking tube					rubber cover		
Bending radius		Bending radius three times the diameter for fixed cable, ten times the diameter for cable permanently moving.							
Cable type		PUR, Ø = 4,2 mm							

Options

Pull plates

A pull plate extends the range of potential uses of tension & compression load cells to measuring tensile loads in moving assemblies (cable tension or forces in joints). The pull plate is fastened by its outer flange to the sensor's flange. Customized threaded parts or even joint lugs can be fitted in the central threaded hole. Once fitted, the pull plates form part of the sensor. Sensor and plate are calibrated as a unit and are supplied only as a pre-assembled combination. Bolts of strength 12.9 are required for fitting the pull plates.

Sensor with pull plate



Order number		see order code							
Compatible for measuring range from 0 ...		±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN
Geometry									
Central blind threaded hole T		M8 x 1.25							
Installation									
Tightening torque mounting screws	[N*m]	3						6	
Other									
Mass	[kg]	0.4						0.8	

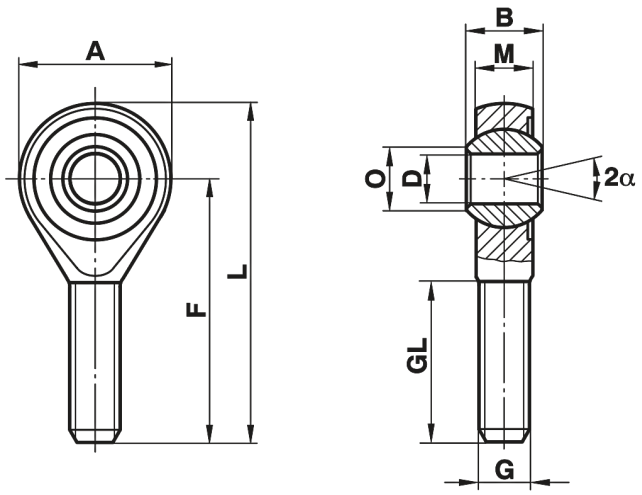
Accessories

Rod end bearings

The 8523 load cell can be optionally supplied with a rod end bearing. In combination with a pull plate (see option), up to two rod end bearings can be used. Rod end bearings ensure optimum load application when the sensor is used in the tension direction. In addition, they can compensate for slight misalignment in the compression direction.

- Optimal force introduction
- Compensation of misalignments
- Very high dynamic und static load capacity
- Material: stainless steel
- Temperature range: - 45 °C to + 120 °C
- PTFE insert, maintenance-free
- DIN 648 series K
- Bore holes H7, recommended connection pin: g6
- Inner ring not suitable for permanent rotary operation

Rod end bearings with external thread



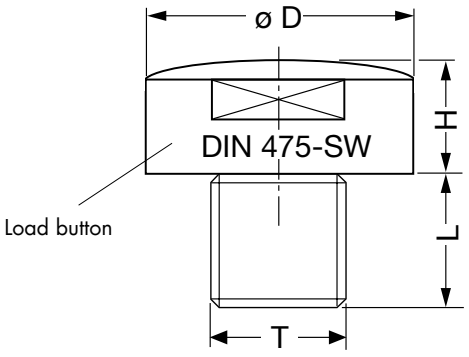
Order Code

8591	-	Z08M
B	[mm]	12
M	[mm]	9.00
A	[mm]	24
F	[mm]	42
L	[mm]	54
O	[mm]	10.4
D	[mm]	8
G		M8 x 1.25
GL	[mm]	25
α	[°]	14
Other		
Stat. load factor	[kN]	19.5
Dyn. load factor	[kN]	16.7
Weight	[g]	33

Accessories

Load buttons

Load buttons are used when purely compressive forces are meant to be applied to the load cell and when direct coupling to the surrounding mechanical structure via the central threaded hole in the sensor is not required/possible. The domed surface of the load button minimizes angle errors for loads applied at an angle of up to 3°. The compressive force must be applied to the button via a flat and hardened contact surface. The optimum hardness is 60 HRC or more.



Order Code

8580	-	V008							
Compatible for measuring range from 0 ...		±20 N	±50 N	±100 N	±200 N	±500 N	±1 kN	±2 kN	±5 kN
Geometry									
Ø D	[mm]	14.0							
H	[mm]	7.3							
L	[mm]	7.0							
T		M8 x 1.25							
SW	[mm]	-							
R		20							
Installation									
Tightening torques	[N*m]	max. 5							
Other									
Mass	[kg]	0.01							

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_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® model 9307

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 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. Factory calibrations can be performed in the compression and/or tension direction depending on the sensor type.
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.
German-accredited DAkkS calibration certificate for sensors and measurement chains (DKD)		
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 ... ±4.4 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
0 ... ±5 kN	6	0	0	5	0 ... ±1.1 klbs

										For short delivery ex stock				
										N	0	0	0	S	0	0	0
8	**5**	**2**	**3**	**–**					**–**				**0**	**S**		**0**	**0**

■ Nominal sensitivity/not standardized	N
■ Standardization at 1.5 mV/V *	S

* for measuring range from 100 N ... 5 kN, temperature range limited to 0 ... +60 °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 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 limited to 0 ... +60 °C

■ No option	0
■ Pull plate (sensors with 500 N – 10 kN)	5

Note

- **Brochure**
  Our brochure **„Load cells for production, automation, R&D and quality assurance“** is available for download on our website. It conatains numerous applications, detailed product specifications and overviews.

- **Product videos**
  Watch our **How-to-do video** at: **www.youtube.com/bursterVideo**

- **CAD data**
  Download via **www.burster.com** or directly at **www.traceparts.com**

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