

# Tension and Compression Load Cell



## 1. Application

This tension and compression sensor with its compact construction is designed for heavy-duty use in rough environments as well as for laboratory and test purposes.

The housing and the protective covers are made of stainless steel. The protective cover for lower ranges is made of aluminum. The sensor has a low overall height and a central lead-in/lead-out of the load. Therefore the sensor can be retrofitted easily into existing structures.

The tension and compression load cells of this type are all-round instruments for both static and dynamic measurements.

Some fields of application:

- Press-in operations,
- Draw-pull forces,
- Spring power measurements,
- Measurements of cutting forces,
- Drill feed forces,
- Force measurements on mounting devices
- Weighing techniques

## 2. Description

The force links operate by the approved strain gauge method. The measuring unit contains an applied strain gauge full bridge which converts the affecting energy in an electrical signal.

A metric thread is cut in the middle axis through which the measurement force is fed either by means of a load button or an application-related screw part.

To obtain best results, the load cell must be mounted on a plane flat surface.

Lateral forces within an angular range of  $\pm 2.5^\circ$  to the horizontal can be neglected. In case of greater lateral forces, constructive methods must be taken to lead the lateral forces away from the sensor (e.g. by levers held by roller bearings, movable bearings). The use of the integral screw holes guarantees a simple mounting possibility for the sensor.

## 3. Special features

- Available measuring ranges from 0 ... 500 N up to 0 ... 200 kN
- Accuracy better than 0.25 % F.S.
- Material: stainless steel
- Standardized sensitivity
- Simple mounting

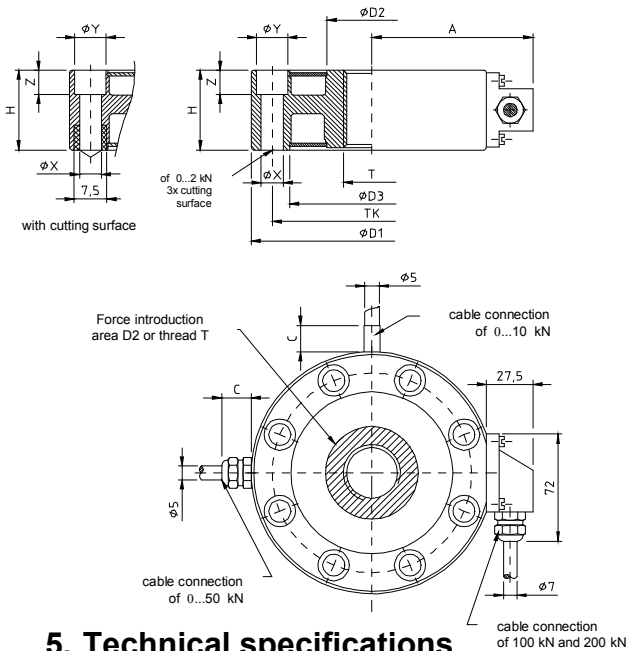
28.04.2003

**Tension and Compression  
Load Cell**

**108524**

## 4. Dimensions

Meas. Range [kN]	Article No.	Dimensions [mm]										Thread T	Clearance holes on TK	Natural frequency [kHz]
		ØD1	ØD2	ØD3	H	A	C	TKØ	ØX	ØY	Z			
0...0,5	12931	54,5	15	35,5	16	-	10	45	4,5	8	4,6	M8 x 1,25	3	>2
0...1	12932	54,5	15	35,5	16	-	10	45	4,5	8	4,6	M8 x 1,25	3	>3
0...2	12933	54,5	15	35,5	16	-	10	45	4,5	8	4,6	M8 x 1,25	3	>5
0...5	12934	54,5	15	35,5	16	-	10	45	4,5	8	4,6	M8 x 1,25	6	>8
0...10	12935	54,5	15	35,5	16	-	-	45	4,5	8	4,6	M8 x 1,25	6	>12
0...20	12936	79	25	59	25	58	15	68	4,5	8	4,6	M12 x 1,5	8	>4
0...50	12937	119	35	94	35	73	15	105	6,6	11	6,8	M24 x 1,5	8	>3
0...100	12938	155	50	109	50	105	-	129	13,5	20	13	M36 x 3	8	>3
0...200	12939	155	50	109	50	105	-	129	13,5	20	13	M36 x 3	8	>5



## 5. Technical specifications

### 5.1 Electrical specifications:

Bridge resistance :

Foil SG, (full bridge circuit) 350 Ω, nominal  
(Deviations are possible)

Calibration resistance:

Meas. range 0 ... 0.5 kN 100 kΩ ± 0.1 %

Meas. range ≥ 0 ... 1 kN 80 kΩ ± 0.1 %

The bridge output signal resulting from a shunt of this value is shown in the calibration certificate.

Excitation: recommended: 5 V DC or AC  
max.: 10 V DC or AC

Output: 1.5 mV/V ± 0.25 %  
standardized

► Option: sensitivity 1,0 mV/V

supplementing of art.-no.: ...."1"

For example: measuring range 0...0,5 kN art.no.: 12931"1"

### 5.2 Environmental conditions:

Operating temperature range: - 30 °C ... + 80 °C

Rated temperature range: + 15 °C ... + 70 °C

Temperature influence

on zero: ≤ 0.02 % F.S./ K

on span: ≤ 0.02 % Rdg./ K

### 5.3 Mechanical specifications:

combined value for non-linearity, hysteresis and repeatability:  
< 0,25 % of full scale

Type of measurement: tension & compression (calibration in compression direction)

Deflection: approx. 80 µm

Overload - safe: 150 % of capacity

Overload - burst: >250 % of capacity

Dynamic performance: recommended: 70 % of capacity  
maximum: 100 % of capacity

Material: stainless steel 1.4542

Weight: approx. 250 g ... 5,2 kg

Protection class (according to DIN 40050): ≤ 0...10 kN: IP 52  
≥ 0...20 kN: IP 65

Dimensions: see table and scale drawing

Meas. ranges ≤ 0...2 kN are equipped with edges within clearance holes, so they are 1.5 mm higher

Meas. range ≤ 0...50 kN cable port radial

Meas. range ≤ 0...50 kN cable port tangential

Mounting:

Meas. range to 2 kN: 3 clearance holes with edges for three-point-support

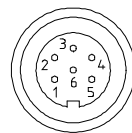
Meas. range of 5 kN: 6 or 8 clearance holes

### 5.4 Electrical connection:

4-wire, shielded, flexible PVC-cable, belding radius minimum 25 mm, length approx. 2 m, with connection plug Tuchel, 6-poles

Meas. range 20...50 kN: threaded cable outlet

Pin connection



Top view  
connection plug

Pin	wire	signal	
1	brown	excitation	-
2	white	excitation	+
3	(blank)	shield	
4	yellow	signal output	+
5	green	signal output	-

Assembly instruction area of support:

Height: ≈ sensor height

Hardness: 60 HRC

Evenness: < 20 µm

Parallelism: < 50 µm

## 6. Order Information

e.g. Tension and compression load cell, 0...100 kN

**108524** - **100 kN** - **12938** **1**

Data sheet Meas. range Article No. Option 1,0 mV/V