Force Transducer K

Precision force transducer for tension and compression forces static and dynamic

- Nominal capacity from 200 N to 500 kN
- Accuracy class 0,02
- Independent to excentric load application and lateral forces
- Fatigue proof until ± 80% nominal load
- Compatible with torque transducer Series M
- Low mass, high natural frequency

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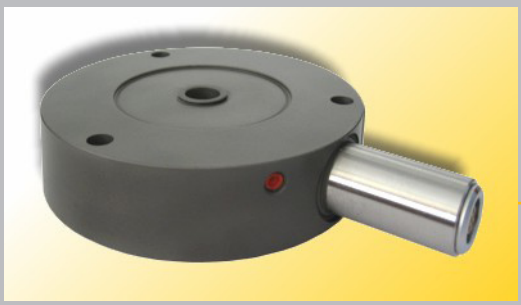
Characteristics

The FEM-optimized force transducer Series K has a rotational-symmetric design. Due to the integrating measuring principle disturbing components (bending moments, torque, lateral forces) have nearly no influence on the axial force. This results in a very high measuring accuracy, even below 10% of nominal force.

The fatigue proof transducer with its low-profile construction is made of stainless steel and for long term stability filled with inert gas.

Depending on capacity the force introduction happens through a central thread or a flange mounting (for further information to the connections see the separate data sheets).

The Series K is compatible with the torque transducers Series M. Combined a torque-axial force transducer is achieved in a simple way.



Options

- Fixed cable or plug connection
- Redundancy: Dual bridge for axial force measurement
- Additional bridges for the bending moments M_x and M_y (to verify central, purely axial force introduction)
- Tension-Torsion combination with Series M torque transducer (for further information see the separate data sheet of Series M)

Accessories

- Stretch bolts
- Base plate
- Thread adapter
- Tension adapter
- Tension rods
- Load button

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Technical Data

General Data (relative to full scale output)

Nominal capacity tension/compression	F_{nom}	± kN	0.2; 0.5 1; 2.5	5	10; 20 25	50 63	100	150	160	250	400 500
Accuracy class			0.02								0.03
Reproducibility error	f_{rep}	± %	0.003								
Linearity error	d_{lin}	± %	0.02	0.015						0.02	0.03
Hysteresis	u	± %	0.02							0.03	0.05
Temperature influence on zero	TK_o	± %/K	0.001								
Temperature influence on span	TK_C	± %/K	0.004								
Maximum force	F_L	± %	150								
Maximum lateral force	F_Q	± %	100								
Breaking force	F_B	± %	› 300								
Weight		kg	0.5		1	1.2	3.7			10.4	20
Nominal displacement		mm	0.05	0.06	0.07		0.09			0.19	0.29
Natural frequency		kHz	8	6	4.5	6.8	5			3.7	4

Electrical Data

Nominal sensitivity	C_{nom}	mV/V	2				1; 2	2	1	1; 2	
Bridge impedance nominal	R_e	Ω	360 - 400	1000 - 1100	1100 - 1300	1100 - 1200	1300 - 1500			1000 - 1200	1100 - 1400
Maximum excitation	$U_{e, max}$	V	12	20							
Cable connection			5 m long (6-wire); ø 6.5 mm								
Environmental protection			IP 50 with plug-in connection (EN60529) IP67 with fixed cable								

Additional Data (relative to actual value)

Total error (incl. hysteresis, linearity and temperature error) in the range from 1% to 100% F_{nom} in the range from 0.4% to 1% F_{nom}	ΔF/F	± %	0.4 0.8
Rel. creep (t_B = 30 min)	$d_{cr, F, E}$	± %	0.025
Nominal temperature range	$B_{t, nom}$	°C	+ 10 bis + 60
Lateral force influence	d_Q	± %/0.1 F_{nom}	0.02
Torque influence	d_M	± %/mm F_{nom}	0.005
Eccentricity influence	d_E	± %/mm	0.015

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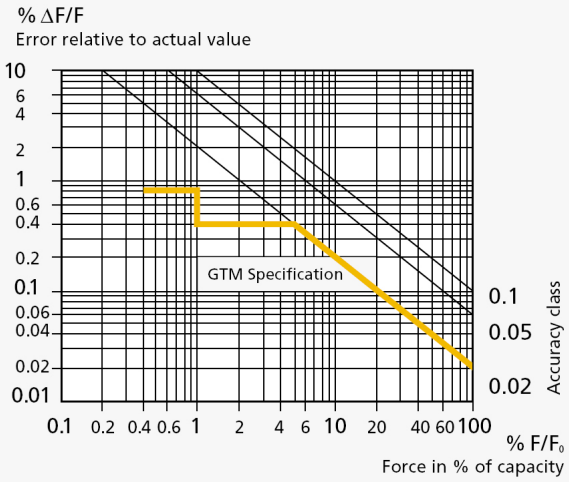
Error limits



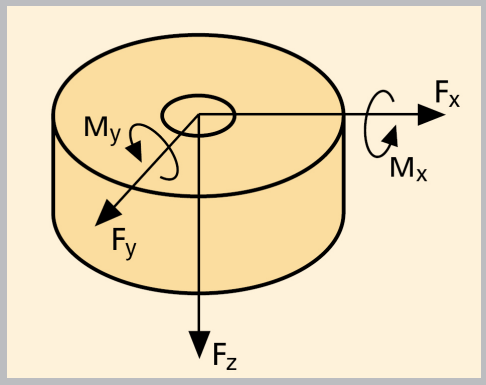
The accuracy class normally refers to the linearity error and is relative to the capacity. Important is the usable measuring range and the errors therein relative to the actually applied load (total error). Hence the accuracy class alone is not a criterion to judge the measuring quality of a force transducer.

The total error (relative to the applied load) of the Series K is

- 0.4 % in the range from 1% to 100 % F_{nom}
- 0.8 % in the range from 0.4 % to 1 % F_{nom}

Thus highly precise measurements from the lowest utilisation right up to full capacity is possible.

Option bending moment measuring circuit



In addition to the axial force F_z the horizontal bending moments M_x and M_y are measured and fed out as separate channels. The cable connection is possible as fixed cable or plug-and-socket type.

Axial capacity	F_{nom}	kN	1 to 500 (2 mV/V)	100 to 500 (1 mV/V)
Nominal bending moment	M_{nom}	N·m	F_{nom} · 8 mm	F_{nom} · 12 mm
Nominal sensitivity	$C_{M, nom}$	mV/V	ca. 0.5	
Reproducibility error	f_{rep}	± %	0.01	
Temperature influence on zero	TK_o	± % / K	0.08	
Temperature influence on span	TK_C	± % / K	0.05	
Bridge impedance nominal	R_B	Ω	350	
Maximum excitation	$U_{e, max}$	V	12	

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