

U10 M

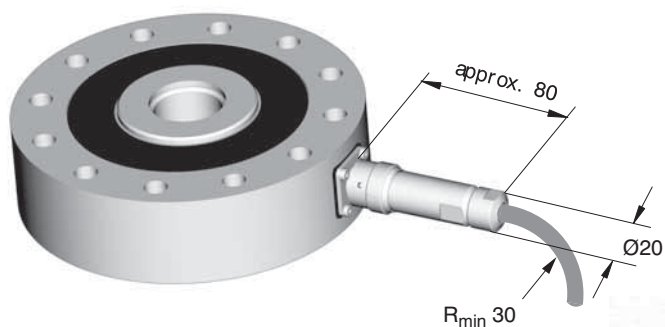
Force transducers



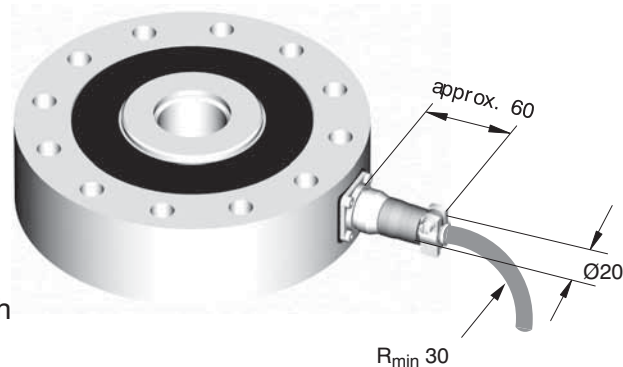
Special features

- Tensile/compressive force transducer
- For dynamic and static applications
- Fatigue strength to full scale dynamic amplitude
- Electronic bending moment compensation
- Optional double bridge version
- Stainless material

Mounting dimensions of connection variants

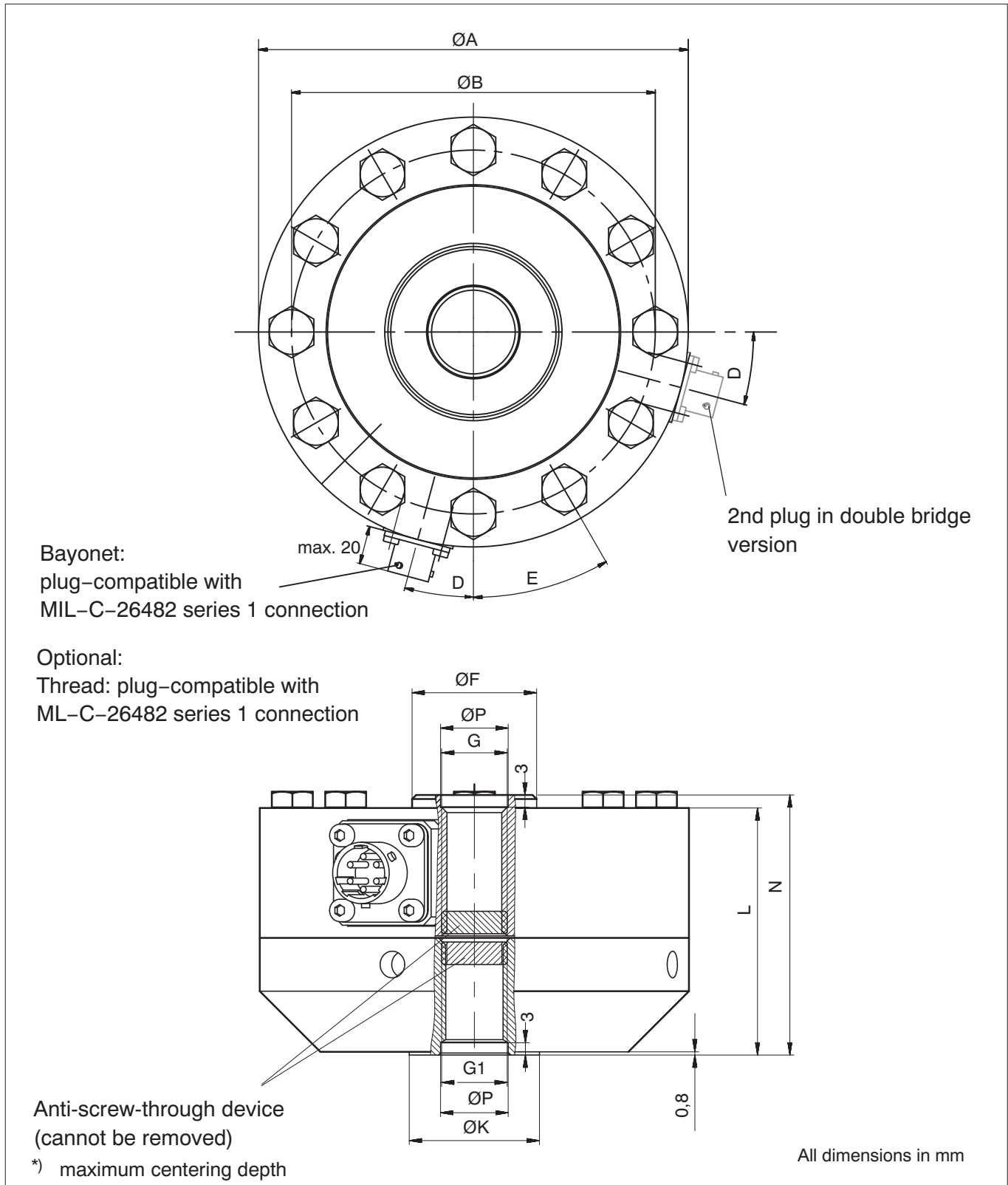


Connection cable **KAB 157-3** with bayonet locking



Connection cable **KAB 158-3** with threaded locking

Dimensions of U10M with fitted adapter

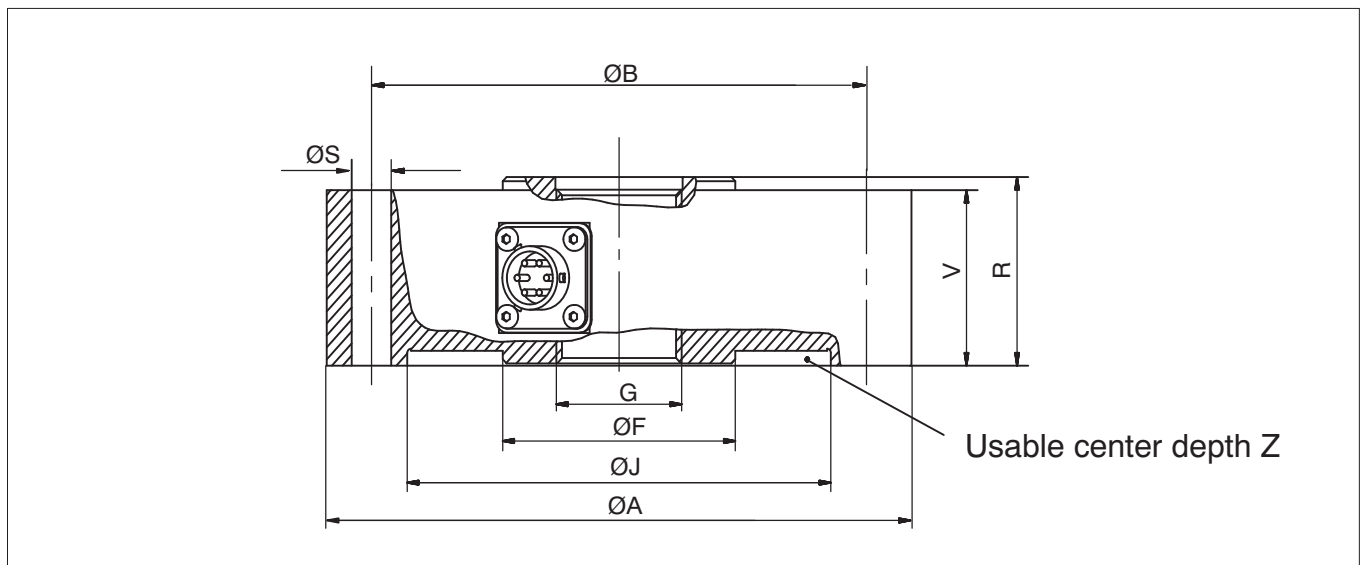


Nom. (rated) force	ØA	ØB	D	E	ØF	G	$G1$	ØK	L	N	ØPH^8
1.25–25kN	104.8	88.9	22.5°	45°	30.4 ¹⁾	M16x2–4H 28.4 deep	M16x2–4H 22.1 deep	31.8	60.3	63.5	16.5
50–125kN	153.9	130.3	15°	30°	61.2 ²⁾	M33x2–4H 35.6 deep	M33x2–4H 35.6 deep	57.2	85.	89	33.5
250kN	203.2	165.1	11.25°	22.5°	95.5	M42x2–4H 54.6 deep	M42x2–4H 44.5 deep	76.2	108	114.3	43
500kN	279	229	11.25°	22.5°	122.2	M72x2–4H 82.6 deep	M72x2–4H 69.8 deep	114	152.4	165.1	73

¹⁾ 12.5 kN and 25 kN: 31.5

²⁾ 125 kN: 67.3

Dimensions of U10M without adapter



Nominal (rated) force	ØA	ØB	ØS	ØF	ØJ ^{H8}	G	V	R	Z
1.25 kN	104.8	88.9	6.8	30.4	78	M16x2-4H	31.7	34.9	2.5
2.5 kN				30.4					
5 kN				30.4					
12.5 kN				31.5					
25 kN				31.5					
50 kN	153.9	130.3	10.4	62.2	111.5	M33x2-4H	41.4	44.5	2.5
125 kN				67.3					
250 kN	203.2	165.1	13.5	95.5	143	M42x2-4H	57.2	63.5	3.5
500 kN	279	229	16.8	122.2	175	M72x2-4H	76.2	88.9	6

Connector and cable assignment

Connector pin assignment

Cable assignment with pigtails (free ends)

	B	Measurement signal (+) U _A	wh (white)
	D	Excitation voltage (-) U _B	bk (black)
	C	Measurement signal (-) U _A	rd (red)
	A	Excitation voltage (+) U _B	bu (blue)
	F	Sensor circuit (+)	gn (green)
	E	Sensor circuit (-)	gr (gray)
		Cable shield, connected to enclosure	Shield

*) only if option T has been selected (transducer identification)

Accessories (to be ordered separately):

Cables / Plugs	Ordering number
Connection cable with bayonet locking; IP67; 3 m long; TPE outer sheath; 6 x 0,25 mm ² ; free ends, shielded; outside diameter 6,5 mm	1-KAB157-3
Connection cable with threaded locking; IP64, 3 m long; TPE outer sheath; 6 x 0,25 mm ² ; free ends, shielded; outside diameter 6,5 mm	1-KAB158-3
Loose cable socket, bayonet locking	3-3312.0382
Loose cable socket, threaded terminal end	3-3312.0354


Specifications (VDI/VDE 2638)

Nominal (rated) force	F_{nom}	kN	1.25	2.5	5	12.5	25	50	125	250	500	
Nominal (rated) sensitivity	C_{nom}	mV/V	1 to 1.5 ¹⁾				2 to 2.5 ¹⁾					
Relative deviation from zero	$d_{s,o}$	%	< ± 1									
Relative reversibility error (0.4 F_{nom}) ²⁾	$u_{0,4}$	% _{VI}	< 0.075			< 0.1			< 0.125		< 0.15	
		% _{VC}	0.03			0.04			0.05		0.06	
Relative repeatability error without rotation		%	0.025									
Linearity deviation	d_{lin}	%	< ± 0.03			< ± 0.04			< ± 0.04		< ± 0.06	
Temperature influence on sensitivity/10K relative to the sensitivity	TK_C	%	< ± 0.015									
Temperature influence on zero signal/10K relative to the sensitivity	TK_0	%	< ± 0.015									
Bending moment influence (at 10 % x F_{nom} x 10 mm)	d_Q	%	< 0.01									
Relative creep over 30 min	d_{crF+E}	%	< ± 0.04			< ± 0.025						
Input resistance	R_i	Ω	> 345									
Output resistance	R_o	Ω	280 to 360									
Insulation resistance	R_{is}	Ω	> 2 x 10 ⁹									
Reference excitation voltage	U_{ref}	V	5									
Operating range of the excitation voltage	$B_{U,G T}$	V	0.5 to 12									
Nominal (rated) temperature range	$B_{t,nom}$	°C	-10 to +45									
Operating temperature range	$B_{t,G}$	°C	-30 to +85									
Storage temperature range	$B_{t,S}$	°C	-30 to +85									
Reference temperature	t_{ref}	°C	+23									
Maximum operating force	(F_G)	%	230									
Breaking force	(F_B)	%	> 400									
Static lateral limit force (transducer with adapter) ³⁾	(F_Q)	%	100									
Maximum permissible torque		N·m	30	60	125	315	635 ⁴⁾	1270	3175 ⁴⁾	5715	11430	
Maximum permissible bending moment		N·m	30	60	125	315	635	1270	3175	5715	11430	
Material measuring body			high-strength aluminium alloy				stainless material					
Weight with adapter without adapter		kg	1.2			3			10		23	60
		kg	0.5			1.3			5		11	28
Rel. permissible vibrational stress to DIN 50100	F_{rb}	%	200									
Degree of protection to DIN 60529			IP67 ⁵⁾									
Natural frequency	f_g	kHz	4.5	5.9	9.3	6.6	9.2	6.5	8.1	6.6	6.1	
Stiffness	F/S	N/mm	6,2 · 10 ⁴	1,25 · 10 ⁵	2,5 · 10 ⁵	4,1 · 10 ⁵	8,33 · 10 ⁵	1,67 · 10 ⁶	3,13 · 10 ⁶	5,0 · 10 ⁶	8,33 · 10 ⁶	
Nominal (rated) displacement	s_{nom}	mm	0.02			0.03		0.03	0.04	0.05	0.06	
Transducer identification	TEDS, in accordance to IEEE 1451.4											

- 1) Option: Adjustment of sensitivity to 2 mV/V (or 1 mV/V)
- 2) Specifications at 200 % typically corresponds to those at nominal (rated) force
- 3) Pure lateral force related to half the measuring body height (0.5 x V, see drawing on page 3)
- 4) Transducer with 25 kN adapter: 370 N·m; 125 kN: 2640 N·m
- 5) For plug-in bayonet connector version

Versions and order numbers

Code	Measuring range	Order number
1k25	1.25 kN	1-U10M / 1.25 kN
2k50	2.5 kN	1-U10M / 2.5 kN
5k00	5 kN	1-U10M / 5 kN
12k5	12.5 kN	1-U10M / 12.5 kN
25k0	25 kN	1-U10M / 25 kN
50k0	50 kN	1-U10M / 50 kN
125k	125 kN	1-U10M / 125 kN
250k	250 kN	1-U10M / 250 kN
500k	500 kN	1-U10M / 500 kN

 Preferential version, available soon

Number of measuring bridges	Sensitivity	Calibration	Transducer identification	mechanical version	Plug protection	Plug version bridge A	Plug version bridge B
Single bridge SB	not adjusted N	100% (dyn.) 1	without TEDS S	with adapter W	without plug protection U	Bayonet connector B	Bayonet connector B
Double bridge DB	adjusted J	200% (stat.) 2	with TEDS T	without adapter N	with plug protection P	Threaded connector G	Threaded connector G

K-U10-	12k5	DB	J	2	T	W	P	B	G
--------	------	----	---	---	---	---	---	---	---

Number of measuring bridges	For reasons of redundancy, in devices relevant to safety it is necessary to check the plausibility of the measurement signal with a second measuring bridge (applied on the measuring element). The signals are independently conditioned and evaluated using two separate measuring amplifiers.
Sensitivity	The exact nominal (rated) sensitivity is specified on the identification plate. The transducer can also be adjusted to a linear, adjusted sensitivity of 1 mV/V or 2 mV/V (when 200% calibration is selected: 2 mV/V or 4 mV/V). The rel. sensitivity deviation is then 0.1% of the nominal (rated) sensitivity. The sensitivity range of a non-adjusted transducer is between 1 and 1.3 or 2 and 2.3 mV/V.
Calibration	In the standard version, the transducer is designed for dynamic application up to a vibration bandwidth of $\pm 100\% F_{nom}$. For quasistatic applications, the transducer can be used up to $200\% F_{nom}$. The option is available to calibrate accordingly to $200\% F_{nom}$.
Transducer identification	TEDS integration (integrated electronic data sheet) in accordance with IEEE1451.4
mechanical version	The sensitivity is determined at the factory with the bolted-on adapter. The bolted-on adapter ensures the best-possible screw-fastening conditions and allows the transmission of axial force through a central internal thread. If this is not used, a sensitivity deviation of $< 1\%$ must be taken into account.
Plug protection	Mechanical protection through the installation of an additional square profile around the connector. Approximate dimensions: width x height x depth: 30x30x20
Plug version bridge A	The standard version is the male device connector with bayonet locking (PT02E10-6P-compatible). The option is also available to install a screw-fitting male device connector (PC02E10-6P-compatible).
Plug version bridge B	The standard version is the male device connector with bayonet locking (PT02E10-6P-compatible). The option is also available to install a screw-fitting male device connector (PC02E10-6P-compatible). Both these connection variants are often used for differentiation in the double-bridge version.

