

U9C

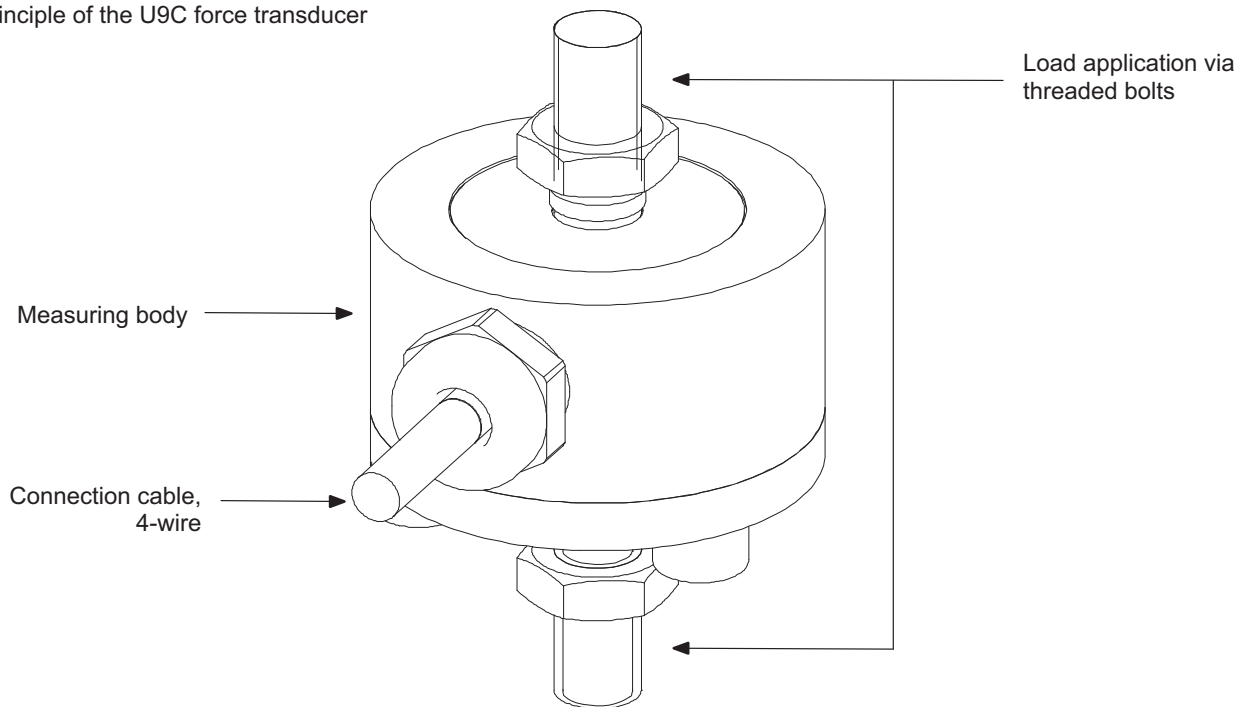
Force Transducer

Special features

- Tensile/compressive force transducer
- Accuracy class 0.2
- Nominal (rated) forces 50 N - 50 kN
- Available on request as a measurement chain with permanently connected inline amplifier
- Non-rusting, protection class IP67
- Configurable with different cable lengths, plug assembly on request
- High rigidity, particularly suited for dynamic measurement tasks

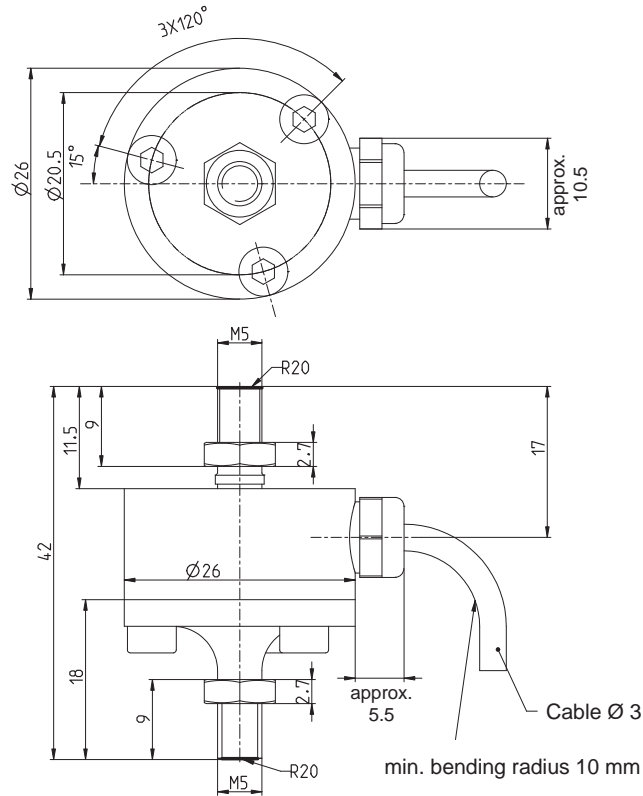


Principle of the U9C force transducer

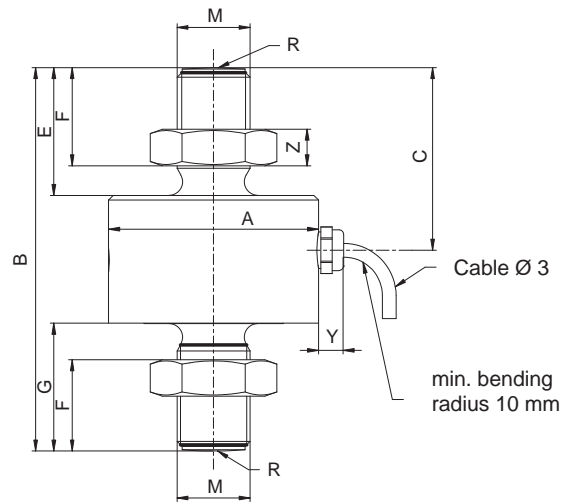


Dimensions (in mm)

U9C with nominal (rated) forces 50 N, 100 N and 200 N

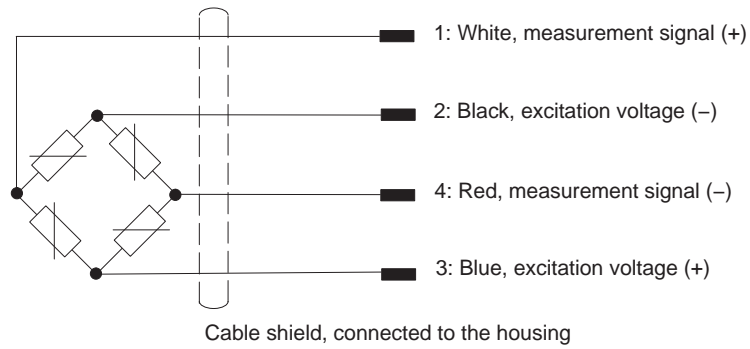


U9C with nominal (rated) forces 0.5 kN to 50 kN

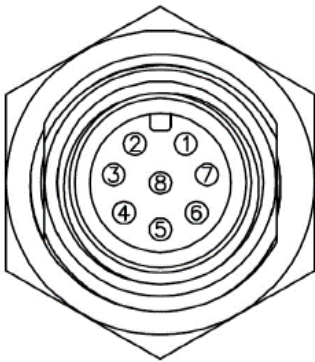


Nominal (rated) force of the U9C	A _{0.1}	B	C	E	F	G	M	R	Y	Z
	[mm]									
0.5 kN to 1 kN	26	44.5	20.5	13	9.5	13.5	M5	20	approx. 5.5	2.7
2 kN to 20 kN	26	60	28.5	21	16	21	M10	40	approx. 5.5	5
50 kN	46	84	40	28	21.5	28	M16 x 1.5	80	approx. 5.5	8

Wiring diagram of U9C without inline amplifier

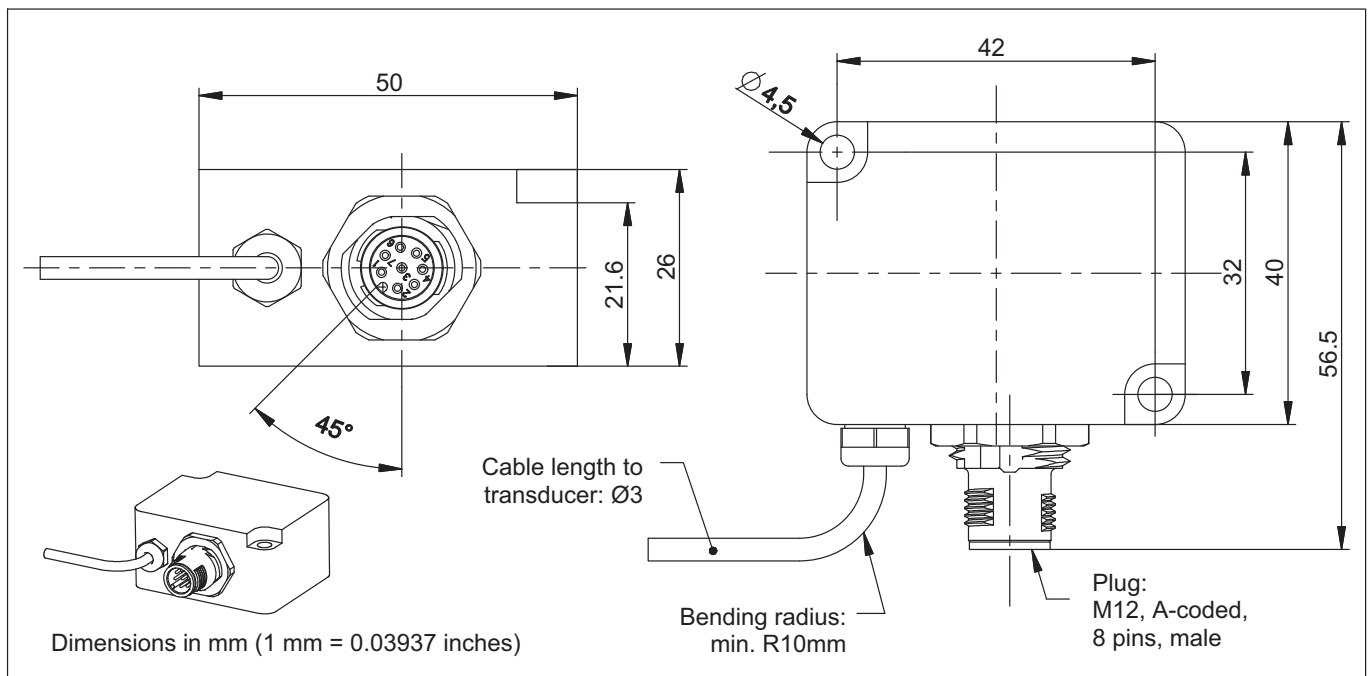


Pin assignment of inline amplifier



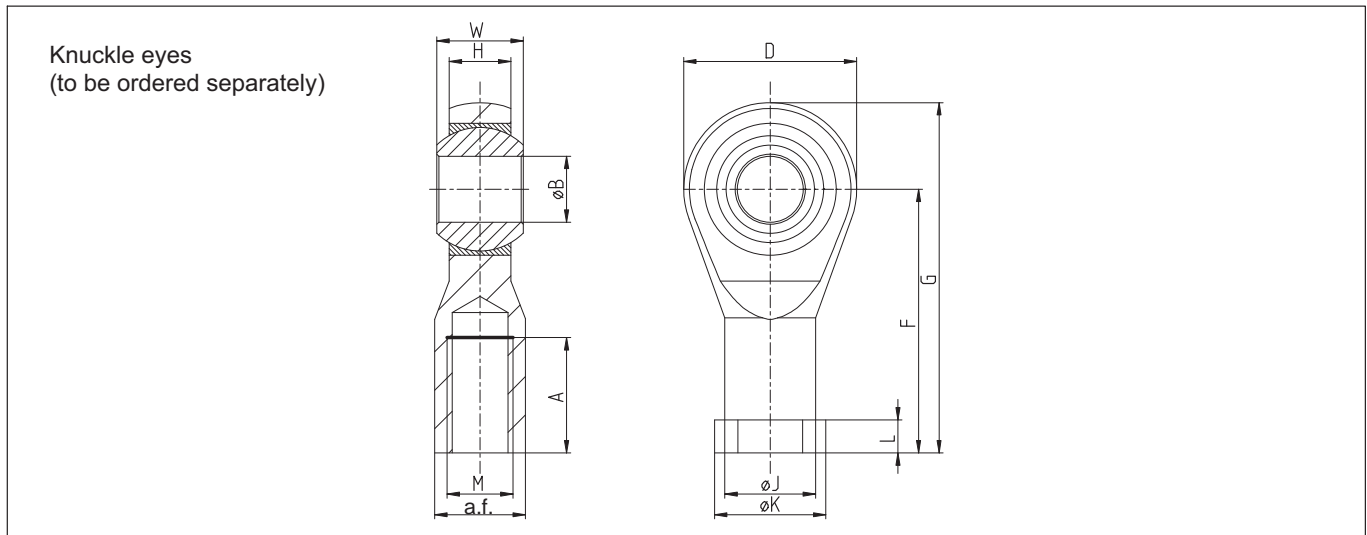
Pin	Version VA 1 (voltage output)	Version VA 2 (current output)	KAB168 connection cable wire assignment
1	Supply voltage 0 V (GND)		white
2	Not in use		brown
3	Control input zero setting		green
4	Not in use		yellow
5	Output signal 0 ... 10 V	Output signal 4 ... 20 mA	gray
6	Output signal 0 V	Not in use	pink
7	Not in use		blue
8	Voltage supply -19 ... +30 V		red

Dimensions of inline amplifier

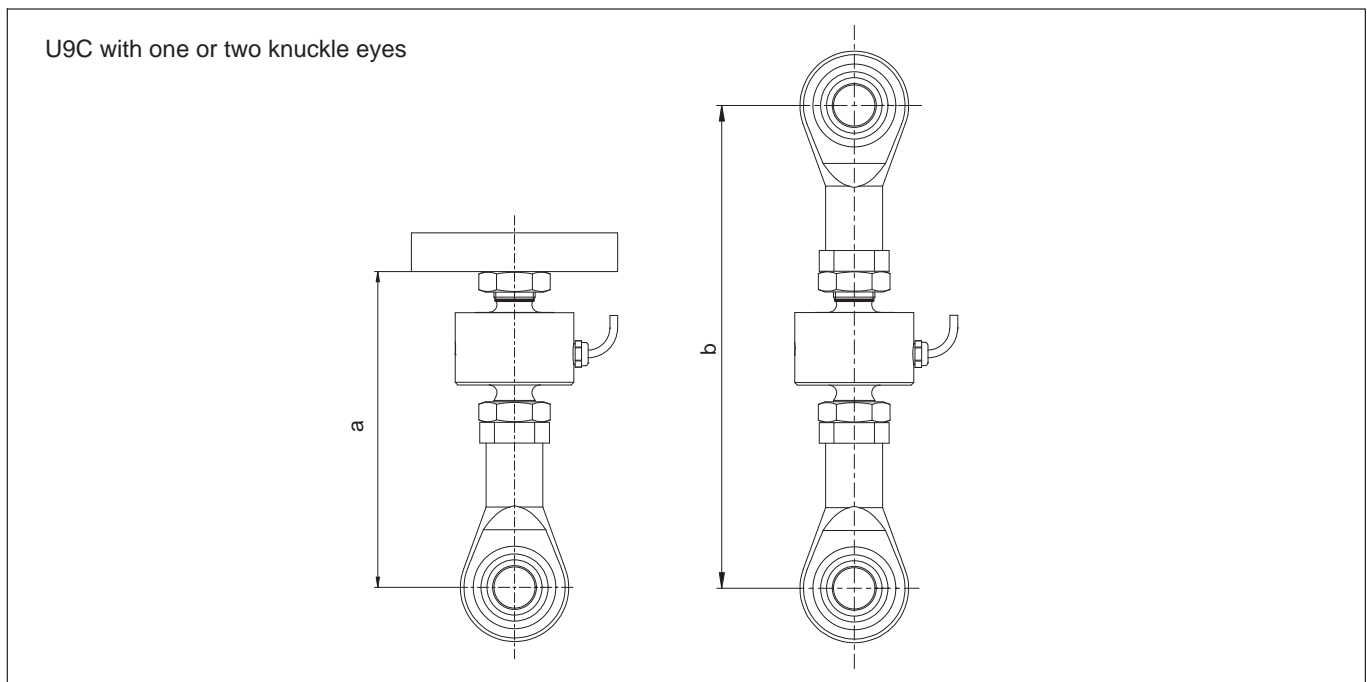


Accessories	Ordering number
KAB168-5, PUR connection cable with M12 plug and free ends, 5 m long	1-KAB168-5
KAB168-20, PUR connection cable with M12 plug and free ends, 20 m long	1-KAB168-20

Mounting accessories (dimensions in mm)



Nominal (rated) forces	Ordering number	A	B ^{H7}	D	F	G	H	J	K	L	M	a.f.	W
		[mm]											
50 N to 1 kN	1-Z8/100kg/ZGW	10	5	18	27	36	6	9	11	4	M5	9	8
2 kN to 20 kN	1-U9/20KN/ZGWR	20	10	28	43	57	10.5	15	19	6.5	M10	17	14
50 kN	1-U9a/50kN/ZGW	28	16	42	64	85	15	22	27	8	M16 x 1.5	22	21



Nominal (rated) force	a _{min}	a _{max}	b _{min}	b _{max}
	[mm]			
50 - 20 N	55	59	82	86
0.5 - 1 kN	56	61	83	88
2 - 20 kN	79	82	122	125
50 kN	116	116	180	180

Mounting dimensions of the U9C when using knuckle eyes

Specifications U9C

Nominal (rated) force	F _{nom}	N	50	100	200								
		kN				0.5	1	2	5	10	20	50	
Accuracy													
Accuracy class			0.2										
Relative reproducibility and repeatability errors without rotation	b _{rg}	%	< 0.2										
Relative reversibility error	v _{0.5}	%	< 0.2										
Non-linearity	d _{lin}	%	< 0.2										
Relative creep (30 min)	d _{cr,F}	%	< 0.2				< 0.1						
Effect of the bending moment at 10% F _{nom} * 10 mm (typical)	d _{Mb}	%	0.055		0.045		2.35			2.45		0.5	
Effect of temperature on sensitivity													
in the nominal (rated) temperature range	TK _C	% / 10 K	0.2										
in the operating temperature range	TK _C	% / 10 K	< 0.5										
Effect of temperature on the zero signal													
in the nominal (rated) temperature range	TK ₀	% / 10 K	< 0.2										
in the operating temperature range	TK ₀	% / 10 K	< 0.50										
Electrical characteristics													
Nominal (rated) sensitivity	C _{nom}	mV/V	1										
Relative zero signal error	d _{s,0}	mV/V	+/- 0.2										
Sensitivity error	d _c	%	< +/-1 tensile , < +/-2 compressive										
Tensile/compressive sensitivity variation	d _{zd}	%	< 2										
Input resistance	R _i	Ω	250 - 400				300 - 450						
Output resistance	R _o	Ω	200 - 400				145 - 450						
Insulation resistance	R _{is}	Ω	> 1*10 ⁹										
Operating range of the excitation voltage	B _{u,gt}	V	0.5 - 12										
Reference excitation voltage	U _{ref}	V	5										
Connection			4-wire circuit										
Temperature													
Reference temperature	t _{ref}	°C	23										
Nominal (rated) temperature range	B _{t,nom}	°C	-10 to +70										
Operating temperature range	B _{t,g}	°C	-30 to +85										
Storage temperature range	B _{t,S}	°C	-30 to +85										
Characteristic mechanical quantities													
Max. operating force	F _G	% of F _{nom}	200				150						
Limit force	F _L		> 200				> 150						
Breaking force	F _B		> 400										
Limit torque		Nm	1.7	3.4	2.5	3.7	4.5	28	23	11	11	35	
Limit bending moment when loading with nominal (rated) force		Nm	0.17	0.7	1.5	3.7	3.8	10.2	14.4	8.2	8.6	28.5	
Static lateral limit force when loading with nominal (rated) force ²⁾	F _q	% of F _{nom}	100				50	100	50	18	6	8	
Nominal (rated) displacement		mm	0.008				0.018			0.03	0.05	0.09	0.14
Fundamental resonance frequency		kHz	6.5	9.1	12.6	15.3	15.9	13.2	14.5	14.6	14.6	7.2	
Relative oscillation width		% of F _{nom}	70				80					70	

Nominal (rated) force	F _{nom}	N	50	100	200							
		kN				0.5	1	2	5	10	20	50
Maximum impact load to ICE 60068-2-6												
Number												1,000
Duration		ms										3
Acceleration		m/s ²										1,000
Vibrational stress to IEC 60068-2-27												
Frequency range		Hz										5 ... 65
Duration		min										30
Acceleration		m/s ²										150
General information												
Degree of protection per EN 60529 ¹⁾												IP67
Spring element material												Steel
Potting material												Silicone
Cables												Four-wire circuit, PUR insulation
Cable length		m										1.5, 3, 7, 12
Weight		g			75						100	400

¹⁾ 1 m water column; 0.5 h

²⁾ Pure lateral force without bending moment

Specifications of inline amplifier

Module type		VA1	VA2
Accuracy			
Accuracy class	%	0.15	
Relative linearity error	%	0.01	
Effect of temperature on amplification	%	0.10	
Effect of temperature on zero point	%	0.15	
Rated electrical output			
Output signal		0... 10 V	4 ... 20 mA
Nominal (rated) output		10 V	16 mA
Rated output tolerance		± 0.1 V	± 0.16 mA
Zero signal		5 V	12 mA
Range of output signal		-0.3... 11 V	3 ... 21 mA
Cut-off frequency (-3 dB)	kHz	2	
Supply voltage	V	19 ... 30	
Nominal (rated) voltage	V	24	
Maximum current consumption	mA	15	30
Temperature			
Nominal (rated) temperature range	°C	-10...+50	
Operating temperature range	°C	-20...+60	
Storage temperature range	°C	-25...+85	
Reference temperature	°C	23	
Maximum impact load to ICE 60068-2-6			
Number			1,000
Duration	ms		3
Acceleration	m/s ²		1,000
Vibrational stress to IEC 60068-2-27			
Frequency range	Hz		5 ... 65
Duration	min		30
Acceleration	m/s ²		150

Module type		VA1	VA2
General information			
Housing material		Aluminum	
Weight without cable	g	125	
Maximum cable length for supply voltage/output signal	m	30	
Degree of protection per EN 60529		IP67	

Versions and ordering numbers

Code	Measuring range	Ordering number
0050	50 N	1-U9C/50N
0100	100 N	1-U9C/100N
0200	200 N	1-U9C/200N
00K5	0.5 kN	1-U9C/0.5KN
01k0	1 kN	1-U9C/1KN
02k0	2 kN	1-U9C/2kN
05k0	5 kN	1-U9C/5kN
10k0	10 kN	1-U9C/10kN
20k0	20 kN	1-U9C/20KN
50k0	50 kN	1-U9C/50KN

The ordering numbers shown in gray are preferred types, they can be delivered rapidly.

All force transducers with 1.5 m cable, open ends and without TEDS.

The order no. for the preferred types is 1-U9C...

The order no. for customer-specific designs is K-U9C-...

The ordering number example **K-U9C-05k0-12m0-F-T** shown further below refers to a: U9C, 5 kN nominal (rated) force with 12 m cable, 15-pin Sub-D connector and TEDS

Cable length	Electrical connection	Transducer identification
1.5 m 01m5	Free ends Y	With TEDS T
3 m 03m0	15-pin Sub-D connector F	Without TEDS S
5 m 05m0	MS3106PEMV connector N	
6 m 06m0	15-pin Sub-HD connector Q	
7 m 07m0	With inline amplifier 0 .. 10 V VA1	
12 m 12m0	With inline amplifier 4 .. 20 mA VA2	

K-U9C-	05k0-	12m0-	F-	T
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All cable lengths can be combined with all plugs.

TEDS can only be ordered in conjunction with a plug option. It is not possible to combine TEDS and free cable ends.

Versions with inline amplifiers (VA1 and VA2) can only be combined with cable lengths 1.5 m and 3 m; TEDS is not available for these measurement chains.