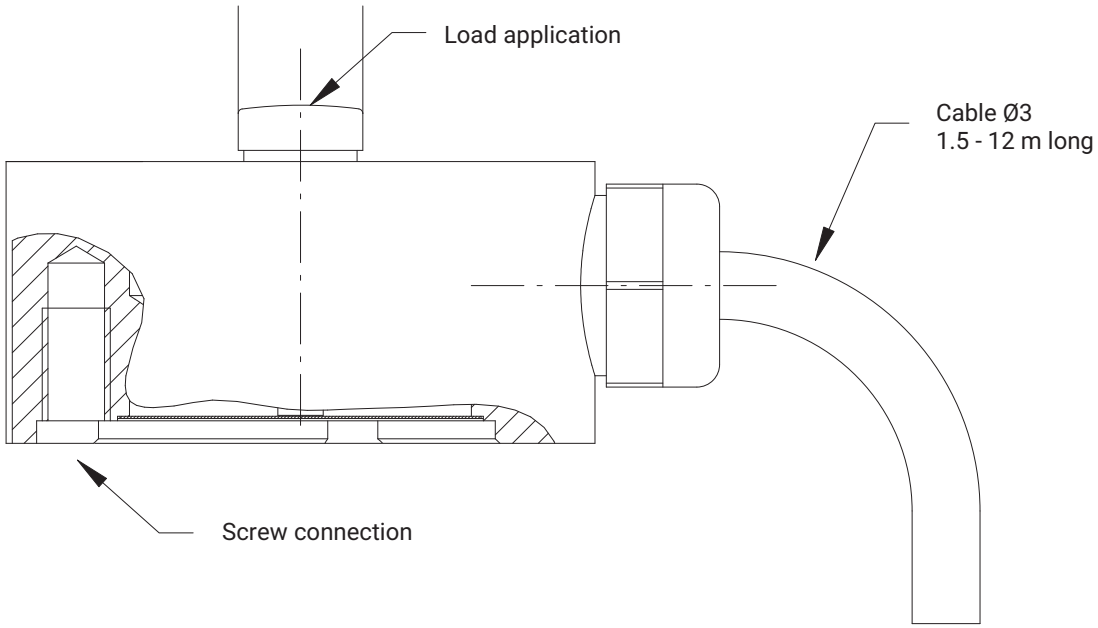
DATA SHEET

C9C
Force Transducer

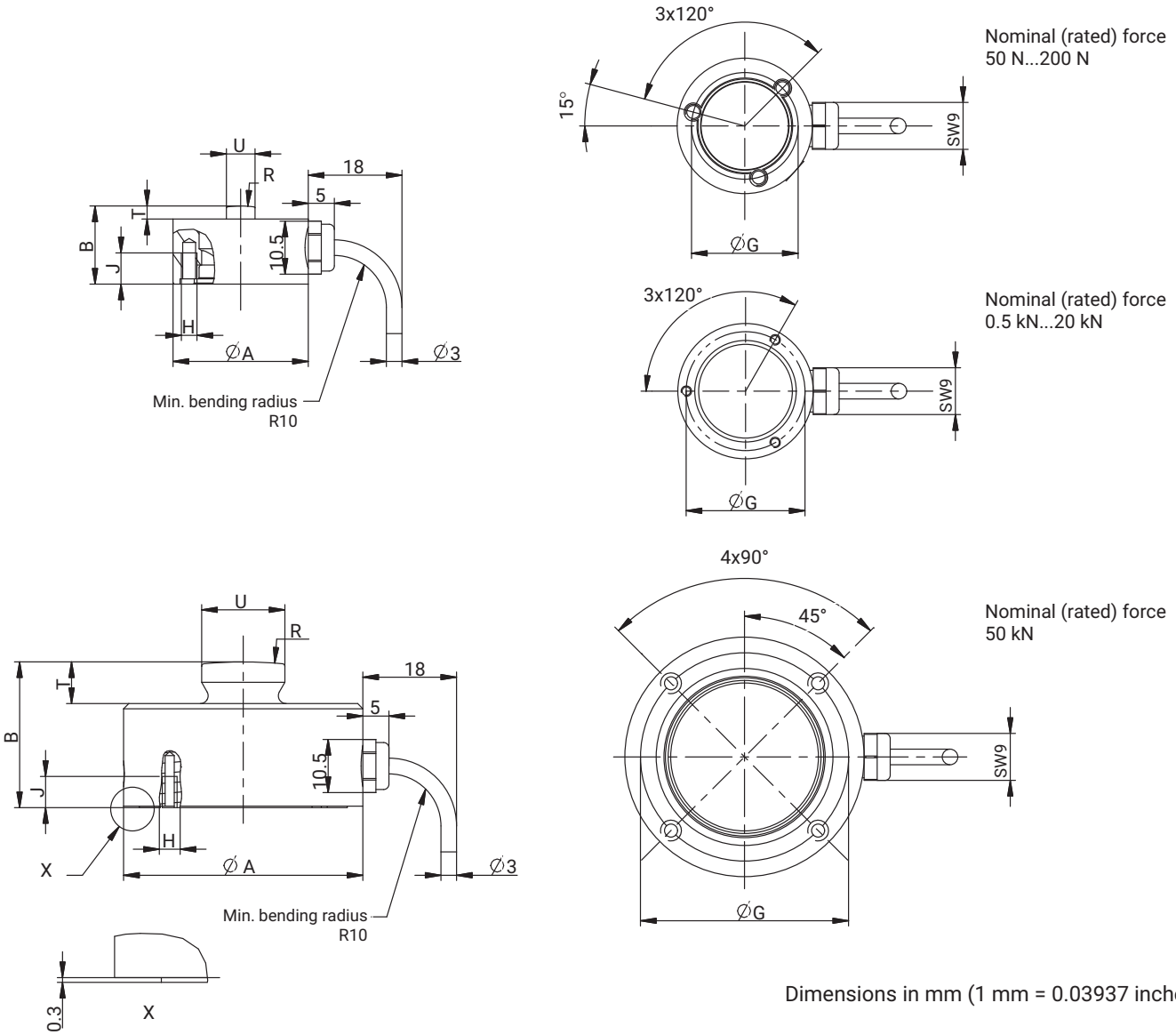
SPECIAL FEATURES

- Compact design 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.
  Output signals: mA, V or IO-Link
- Configurable with different cable lengths, plug assembly and TEDS on request
- Stainless, protection class IP67
- High rigidity, ideally suited for dynamic measurement tasks
- Cable suitable for drag chains, resistant to most oils and operating materials.

PRINCIPLE OF THE C9C FORCE TRANSDUCER



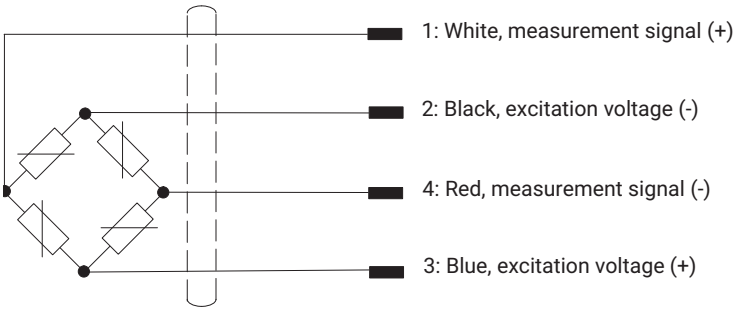
DIMENSIONS OF C9C



Dimensions in mm (1 mm = 0.03937 inches)

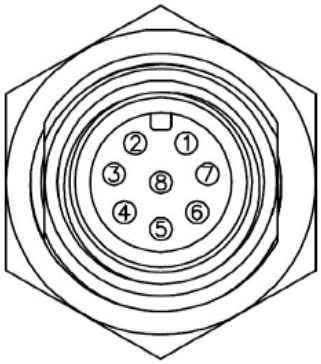
Nominal (rated) force of C9C	$A_{-0.1}$	B	$G_{+/-0.1}$	H	J	R	T	$U_{-0.1}$	X
	[mm]								
50 N - 200 N	26	15	20.5	3 x M3	6	20	2.5	5.5	10.5
0.5 kN - 20 kN	26	13	22.75	3 x M2	3.5	40	1	8	10.5
50 kN	46	28	40	4 x M4	6	80	8	16	10.5

Wiring diagram of C9C without inline amplifier



Cable shield, connected to the housing

VA1, VA2 INLINE AMPLIFIER WIRING DIAGRAM



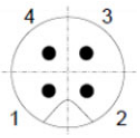
Pin	Version VA 1 (voltage output)	Version VA 2 (current output)	KAB168 connection cable wire assignment
1	Supply voltage 0 V (GND)		White
2	Not in use		Brown
3	Zero control input		Green
4	Not in use		Yellow
5	Output signal 0 ... 10 V	Output signal 4 ... 20 mA	Gray
6	Output signal 0 V	Not in use	Pink
7	Not in use		Blue
8	Voltage supply -19 ... +30 V		Red

Accessory	Ordering number
KAB168-5, PUR connection cable with M12 plug and free ends, 5 m long. Not suitable for use with the IO-Link interface.	1-KAB168-5
KAB168-20, PUR connection cable with M12 plug and free ends, 20 m long. Not suitable for use with the IO-Link interface.	1-KAB168-20

PIN ASSIGNMENT OF VAIO INLINE AMPLIFIER

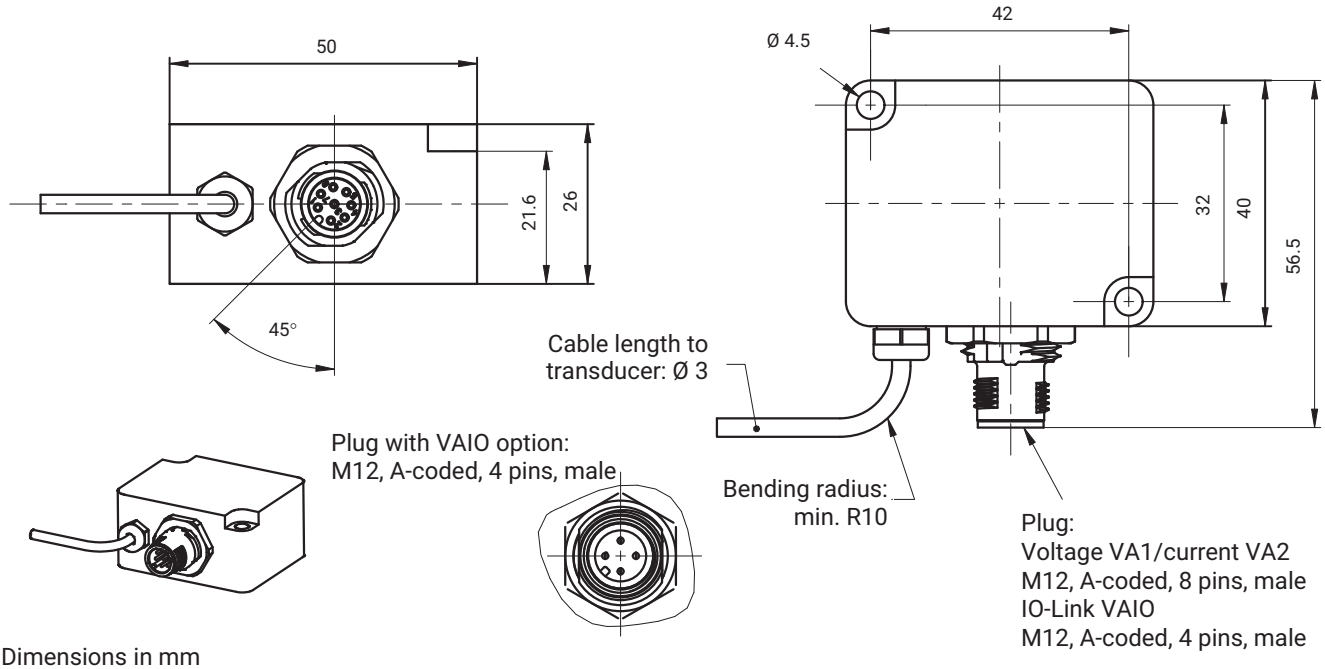
PIN	U9/C9 plug assignment
1	Supply voltage +
2	Digital output (DI/DO pin function)
3	Supply voltage –, reference potential
4	IO-Link data (C/Q), switchover to the digital output (SIO mode) possible

Class A



Male
(device)

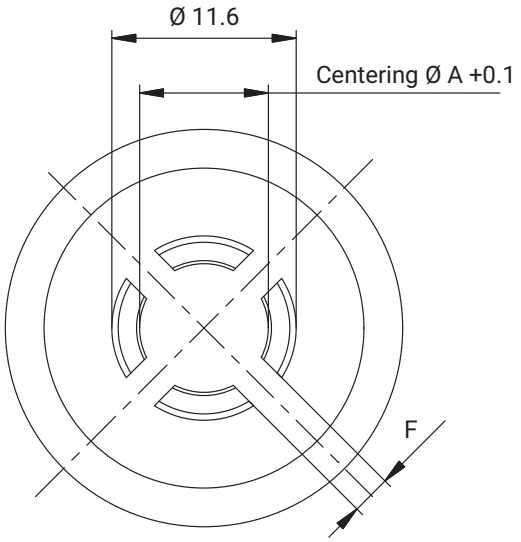
DIMENSIONS OF VA1, VA2, VAIO INLINE AMPLIFIERS



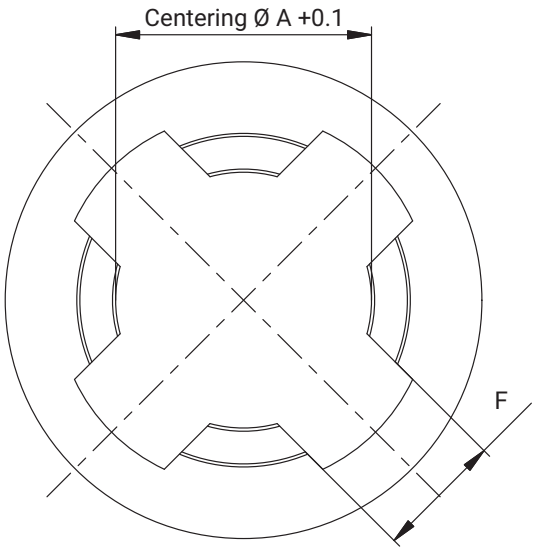
Dimensions in mm

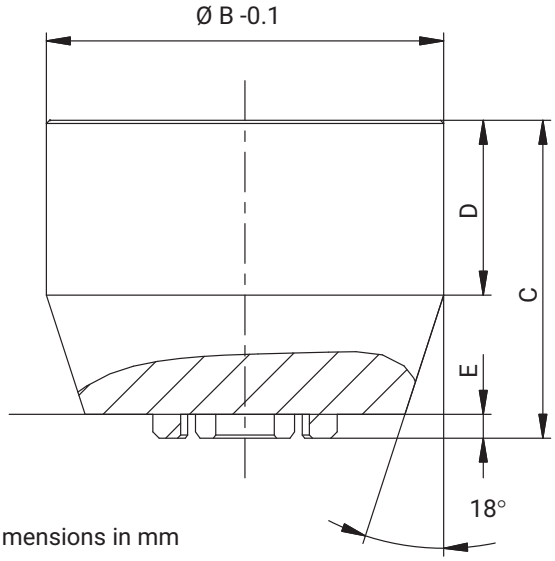
DIMENSIONS OF EDO9

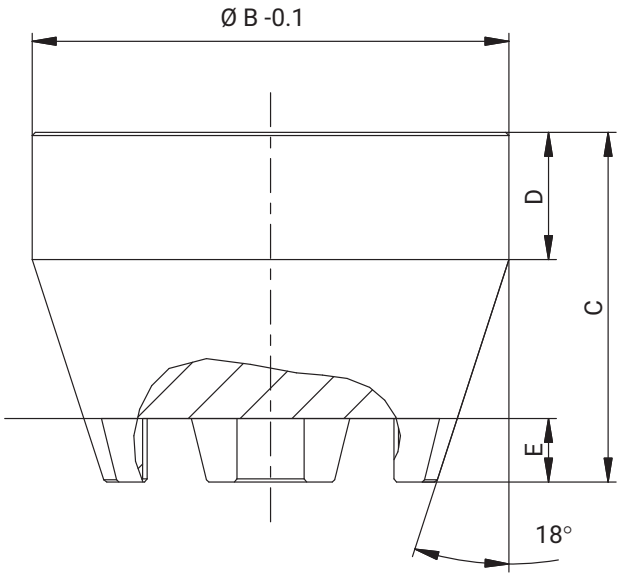
Nominal (rated) force 0.5…20 kN



Nominal (rated) force 50 kN







Dimensions in mm

EDO9 Ordering number	Force range	øA	øB	C	D	E	F
		[mm]					
1-EDO9/20kN	0.5 … 20 kN	8.1	25	20	11	1.5	2.5
1-EDO9/50kN	From 50 kN	16.1	30	22	8	4	8

SPECIFICATIONS FOR C9C

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 in unchanged mounting position	b_{rg}	%	< 0.2									
Relative reversibility error	v	%	< 0.2									
Non-linearity	d_{lin}	%	< 0.2									
Relative creep	d_{crf+E}	%	< 0.2			< 0.1						
Temperature coefficient of sensitivity												
In the nominal (rated) temperature range	TC_S	%/10K	< 0.2									
In the operating temperature range	TC_S	%/10K	< 0.50									
Temperature coefficient of zero signal												
In the nominal (rated) temperature range	TC_0	%/10K	< 0.2									
In the operating temperature range	TC_0	%/10K	< 0.50									
Rated electrical output												
Nominal (rated) output	C_{nom}	mV/V	1									
Tolerance range of zero signal	$d_{s,0}$	mV/V	± 0.2									
Sensitivity error	d_c	%	< 1									
Input resistance	R_e	Ω	250 - 400			300 - 450						
Output resistance	R_a	Ω	200 - 400			100 - 450						
Insulation resistance	R_{Iso}	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 temperature range	$B_{t,nom}$	°C	-10...+70									
Operating temperature range	$B_{t,g}$	°C	-30...+85									
Storage temperature range	$B_{t,S}$	°C	-30...+85									
Characteristic mechanical quantities												
Max. operating force	F_G	% of F_{nom}	200			120						
Force limit	F_L	% of F_{nom}	> 200			> 150						
Breaking force	F_B	% of F_{nom}	> 400									
Permissible eccentricity when loaded with nominal (rated) force	e_g	mm	2.6	2.5	2.5	3.5	2.6	3.2	1.8	2.0	0.8	2.5
Nominal (rated) displacement ±15%	S_{nom}	mm	0.009			0.015	0.019	0.020	0.025	0.040	0.055	0.075
Natural frequency	f_G	kHz	7.3	10	15.7	3.5	5	7	13	15.1	20	12
Permissible oscillation stress	F_{rb}	% of F_{nom}	80									70
Maximum impact load to IEC 60068-2-6												
Number			1000									
Duration		ms	3									
Acceleration		m/s^2	1000									
Vibrational stress as per IEC 60068-2-27												
Frequency range		Hz	5 ... 65									

Nominal (rated) force	F_{nom}	N	50	100	200							
		kN				0.5	1	2	5	10	20	50
Duration		min	30									
Acceleration		m/s^2	150									
General information												
Degree of protection as per EN 60529			IP67									
Spring element material			Steel									
Measuring point protection			Hermetically welded									
Cable			Four-wire circuit, PUR insulation									
Cable length	m		1.5 m; 3 m; 5 m; 6 m; 7 m; 12 m									
Weight	g		55			65						260

SPECIFICATIONS OF VA1, VA2 INLINE AMPLIFIERS

Module type		VA1	VA2
Accuracy			
Accuracy class	%	0.15	
Effect of temperature on amplification	%	0.10	
Relative linearity error	%	0.01	
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
Sensitivity tolerance		± 0.1 V	± 0.16 mA
Zero signal		0 V	4 mA
Output signal range		-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 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 IEC 60068-2-6			
Number		1000	
Duration	ms	3	
Acceleration	m/s^2	1000	
Vibrational stress as per IEC 60068-2-27			
Frequency range	Hz	5 ... 65	
Duration	min	30	
Acceleration	m/s^2	150	
General information			
Housing material		Aluminum	
Weight without cable	g	125	
Max. cable length for supply voltage/output signal	m	30	
Degree of protection as per EN 60529		IP67	

SPECIFICATIONS OF INLINE AMPLIFIER VAIO

Module type		VAIO
Accuracy		
Accuracy class		0.01
Effect of temperature on amplification	%/10K	0.01
Effect of temperature on zero point	%/10K	0.01
Rated electrical output		
Output signal; interface		COM3, to IO-Link standard, class A
Min. cycle (max. output rate)	ms	0.9
Sample rate (internal)	S/s	40000
Cut-off frequency (-3 dB)	kHz	4
Reference supply voltage	V	24
Supply voltage range	V	19 - 30
Max. power consumption	mW	3200
Noise	ppm of nominal force	With Bessel filter 1 Hz: 25 With Bessel filter 10 Hz: 63 With Bessel filter 100 Hz: 195 With Bessel filter 200 Hz: 275 Without filter: 3020
Filter		
Low-pass filter		Freely adjustable cut-off frequency, Bessel or Butterworth characteristic, 6th order
Device functions		
Limit value switches		2 limit value switches. Invertible, freely adjustable hysteresis. Output via process data or digital output
Digital IO		According to IO-Link Smart Sensor Profile, 1 permanently available digital output, 1 output can be set to data output, then no measurement possible
Lag indicator function		Yes
Peak value memory		Yes
Peak-to-peak memory		Yes
Warning functions		Warning on exceeding nominal (rated) force/maximum operating force; Nominal (rated) temperature/maximum operating force
Temperature		
Nominal temperature range	°C	-10 … +50
Operating temperature range	°C	-10 … +60
Storage temperature range	°C	-25 … +85
Reference temperature	°C	23
Maximum impact load to IEC 60068-2-6		
Number		1000
Duration	ms	3
Acceleration	m/s^2	1000
Maximum vibrational stress to IEC 60068-2-27		
Frequency range	Hz	5 … 65
Duration	min	30
Acceleration	m/s^2	150

VERSIONS AND ORDERING NUMBERS

Code	Measuring range	Ordering number
050 N	50 N	1-C9C/50N
100 N	100 N	1-C9C/100N
200 N	200 N	1-C9C/200N
00K5	0.5 kN	1-C9C/0.5KN
01K0	1 kN	1-C9C/1KN
02K0	2 kN	1-C9C/2kN
05K0	5 kN	1-C9C/5kN
10K0	10 kN	1-C9C/10kN
20K0	20 kN	1-C9C/20KN
50K0	50 kN	1-C9C/50KN

The ordering numbers shown in gray are preferred types. They can be delivered rapidly.
All preferred types with 1.5 m cable, open ends, without TEDS and without firmware.
The ordering number for the preferred types is 1-C9C...
The ordering number for customer-specific designs is K-C9C...

The ordering number example **K-C9C-05K0-03m0-VAIO-S-IO02** below is a: C9C, nominal force 5 kN with 3 m cable, inline amplifier with IO-Link output

	Nominal (rated) force	Cable length	Electrical connection	Transducer identification	FW version
	50 N **050N**	1.5 m **01m5**	Free ends **Y**	With TEDS chip **T**	No firmware **N**
	100 N **100N**	3 m **03m0**	15-pin Sub-D connector **F**	Without TEDS chip **S**	IO 1.2.6 **IO01**
	200 N **200N**	5 m **05m0**	Male connector MS3106PEMV **N**		IO .2.0.0 **IO02**
	0,5 kN **00K5**	6 m **06m0**	15-pin Sub-HD connector **Q**		IO .2.0.8 **IO03**
	1 kN **01K0**	7 m **07m0**	8-pin M12 connector **M**		
	2 kN **02K0**	12 m **12m0**	With inline amplifier 0 .. 10 V **VA1**		
	5 kN **05K0**		With inline amplifier 4 .. 20 mA **VA2**		
	10 kN **10K0**		With IO-Link inline amplifier **VAIO**		
	20 kN **20K0**				
	50 kN **50K0**				
K-C9C-	**05K0-**	**03m0-**	**VAIO-**	**S-**	**IO02**

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, VA2 and VAIO) can only be combined with cable lengths of 1.5 m and 3 m; TEDS is not available for these measurement chains.

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