DATA SHEET

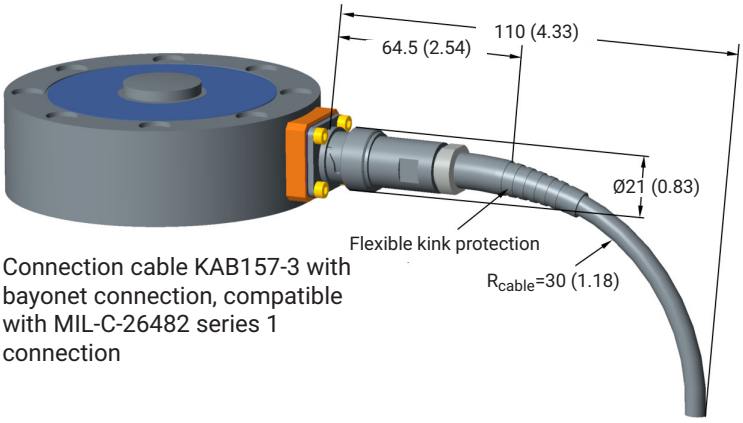
C10
Force transducer

SPECIAL FEATURES

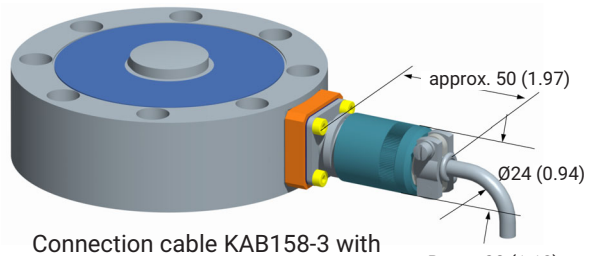
- Force transducer for static and dynamic applications
- Made of non-rusting materials
- Precise (accuracy class from 0.02)
- Numerous options (double bridge, TEDS, 50% calibration, various connector variants)
- High output signal of up to >4 mV/V

CONNECTOR VERSIONS

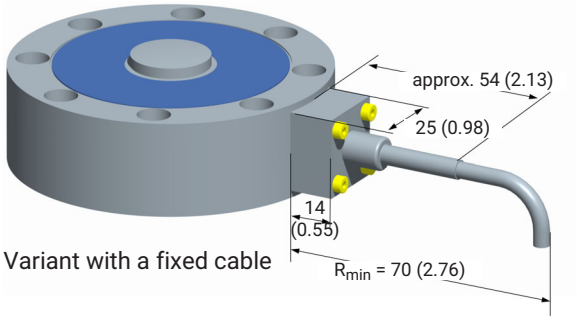
Dimensions in mm (1 mm = 0.03937 inches)



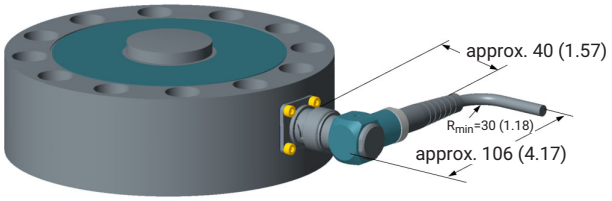
Connection cable KAB157-3 with bayonet connection, compatible with MIL-C-26482 series 1 connection



Connection cable KAB158-3 with screw locking, compatible with MIL-C-26482 series 1 connection

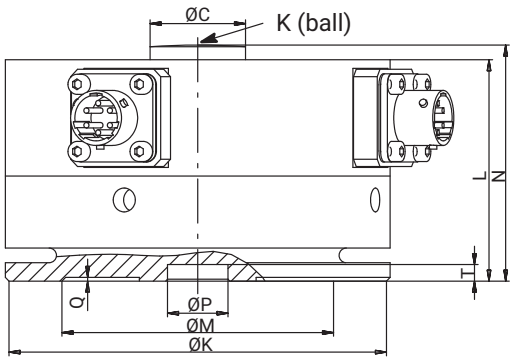


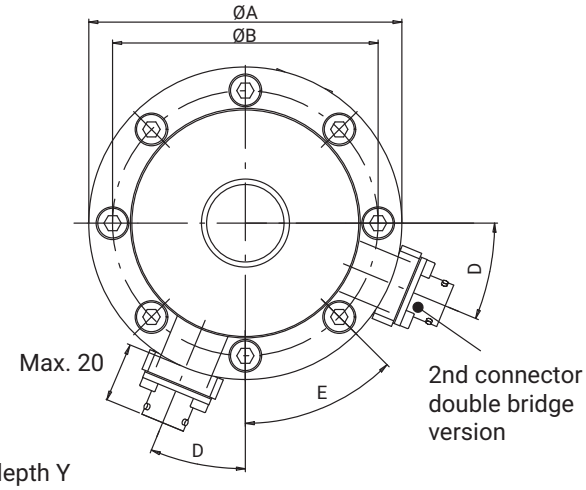
Variant with a fixed cable

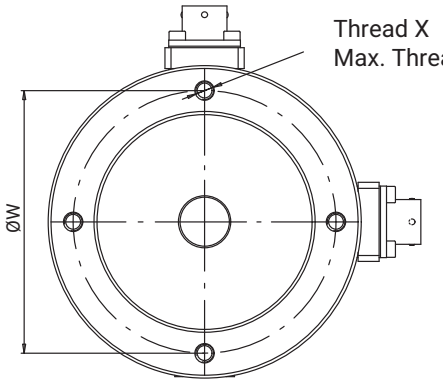


Configurable K-CAB-F connection cable with option of angled bayonet connector

DIMENSIONS C10 WITH FOOT ADAPTER

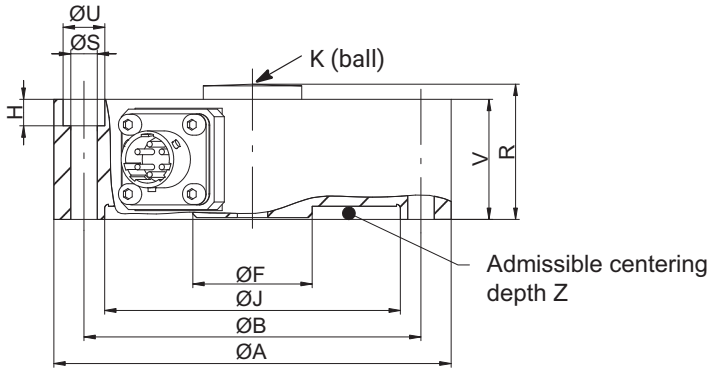


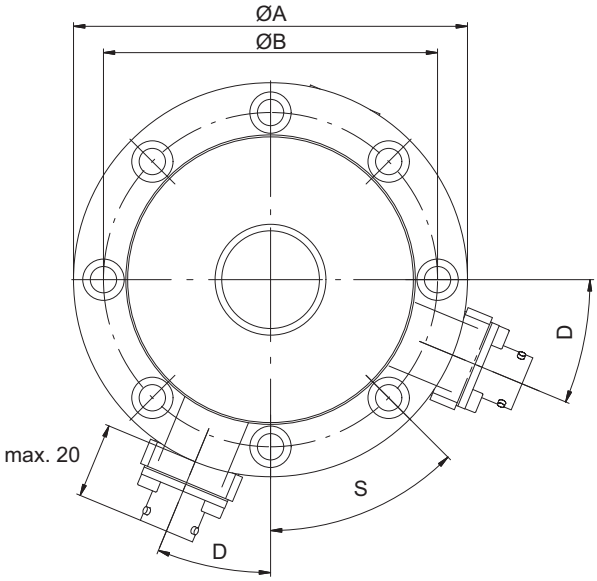




Dimension [unit]		Nominal (rated) force					
		up to 10 kN	25 to 50 kN	100 kN	250 kN	500 kN	1 MN
ØA	[mm]	104.8	104.8	153.9	153.9	203.2	279
ØB	[mm]	88.9	88.9	130.3	130.3	165.1	229
ØC	[mm]	26	26	40	40	64	80
D	[°]	22.5	22.5	15	15	11.25	11.25
E	[°]	45	45	30	30	22.5	22.5
ØK	[mm]	102.8	102.8	151.9	151.9	201.2	277
K	mm]	180	180	320	320	450	640
L	[mm]	60.3	60.3	85.9	85.9	108	152.4
ØM	[mm]	74	74	120	120	156	210
N	[mm]	64.3	64.3	92	92	116	160.9
$ØP^{H8}$	[mm]	16.5	16.5	33.5	33.5	43	73
Q	[mm]	1	1	1	1	1	1
T	[mm]	4.5	4.5	4.5	4.5	6	8
ØW	[mm]	88	88	132	132	172	238
X		M6	M6	M8	M8	M12	M16
Y	[mm]	8.5	8.5	12	12	17.5	22.5

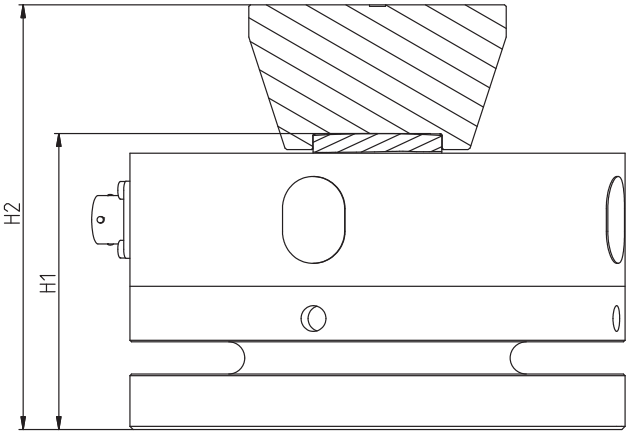
DIMENSIONS C10 WITHOUT FOOT ADAPTER





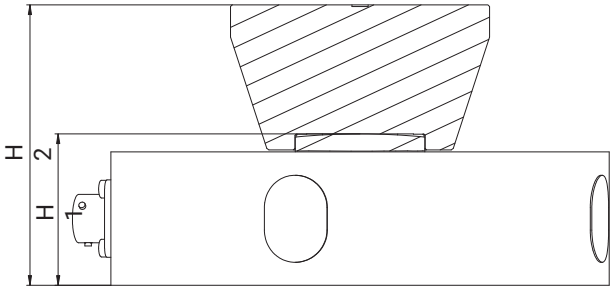
Dimension [unit]		Nominal (rated) force					
		up to 10 kN	25 to 50 kN	100 kN	250 kN	500 kN	1 MN
ØA	[mm]	104.8	104.8	153.9	153.9	203.2	279
ØB	[mm]	88.9	88.9	130.3	130.3	165.1	229
ØS	[mm]	7	7	10.5	10.5	13.5	17
ØF	[mm]	30.4	31.5	61.2	67.3	95.5	122.2
H	[mm]	7	7	10.5	10.5	13	16.5
$ØJ^{H8}$	[mm]	78	78	111.5	111.5	143	175
K	[mm]	180	180	320	320	450	640
R	[mm]	35.7	35.7	47.5	47.5	65.2	84.7
ØU	[mm]	11	11	17	17	19	25
V	[mm]	31.7	31.7	41.4	41.4	57.2	76.2
Z	[mm]	2.5	2.5	2.5	2.5	3.5	6

C10 MOUNTING HEIGHTS WITH ADAPTER AND EDO3 THRUST PIECE



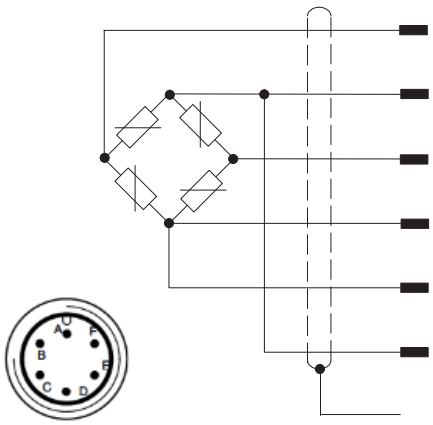
Nominal (rated) force	Height of transducer with adapter, H1 (mm)	Height of transducer, adapter and thrust piece, H2 (mm)
2.5 kN	64.3	88.3
5 kN	64.3	88.3
10 kN	64.3	88.3
25 kN	64.3	88.3
50 kN	64.3	88.3
100 kN	92.0	132.0
250 kN	92.0	132.0
500 kN	116.0	172.0
1 MN	160.9	226.9

MOUNTING HEIGHTS WITHOUT ADAPTER



Nominal (rated) force	Height of transducer, H1 (mm)	Height of transducer and thrust piece, H2 (mm)
2.5 kN	35.7	59.7
5 kN	35.7	59.7
10 kN	35.7	59.7
25 kN	35.7	59.7
50 kN	35.7	59.7
100 kN	47.5	87.5
250 kN	47.5	87.5
500 kN	65.2	121.2
1 MN	84.7	150.7

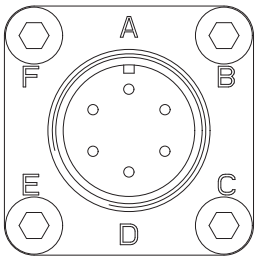
CONNECTOR AND CABLE ASSIGNMENT IN SIX-WIRE CIRCUIT



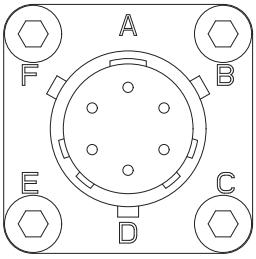
	Device plug pin assignment	Cable assignment
B	Measurement signal (+)	wh (white)
D	Excitation voltage (-)	bk (black)
C	Measurement signal (-)	rd (red)
A	Excitation voltage (+)	bu (blue)
F	Sense lead (+)	gn (green)
E	Sense lead (-)	gy (gray)
	Cable shield, connected to the housing	Shield

PIN ASSIGNMENT FOR HBM CABLES

Threaded connector



Bayonet connector



SPECIFICATIONS (FOR 100 % CALIBRATION)

For the 100% calibration version (standard version)											
Type			**C10**								
Nominal (rated) force	**F_{nom}**	**kN**	**2.5**	**5**	**10**	**25**	**50**	**100**	**250**	**500**	**1000**
Accuracy											
Accuracy class			0.02			0.03	0.04				0.05
Relative reproducibility and repeatability errors without rotation	$b_{r,g}$	%	0.025								
Rel. reversibility error (hysteresis) at 0.4 F_{nom}, relative to full scale value	v	%	0.02			0.03	0.04				0.05
Non-linearity	d_{lin}	%	0.02			0.025	0.035				0.05
Relative creep over 30 min	$d_{cr, F+E}$	%	0.02								
Effect of eccentricity	d_E	%/mm	0.04								
Temperature influence on sensitivity	TC_C	%/10K	0.015								
Effect of temperature on the zero signal	TC_0	%/10K	0.0075								
Electrical values											
Nominal (rated) sensitivity	C_{nom}	mV/V	2			4					
Relative zero signal error	$d_{s,0}$	%	1								
Relative sensitivity error with “adjusted rated output” option	d_c	%	0.1								
Rated output range without "adjusted rated output" option	d_c	mV/V	2 … 3			4 … 4.9					
Input resistance	R_i	Ω	>345								
Output resistance with “adjusted rated output” option	R_a	Ω	365								
Output resistance without "adjusted rated output" option	R_a	Ω	280…360								
Tolerance of the output resistance with the "adjusted rated output" option	D_{Ra}	Ω	±0.5								
Insulation resistance	R_i	Giga Ω	>2								
Operating range of excitation voltage	$B_{U, G}$	V	0.5…12								
Reference excitation voltage	U_{ref}	V	5								
Connector			Six wire circuit								
Temperature											
Reference temperature	T_{ref}	°C	23								
Nominal (rated) temperature range	$B_{T, nom}$	°C	-10…+45								
Operating temperature range	$B_{T, G}$	°C	-30…+85								
Storage temperature range	$B_{T, S}$	°C	-30…+85								
Mechanical quantities											
Max. operating force	F_G	% of F_{nom}	120								
Limit force	F_L		120								
Breaking force	F_B		>200								
Max. eccentricity	e_G	mm	10.2			9.9	9.1	14.1	12	20.6	23.9
Nominal (rated) displacement	s_{nom}	mm	0.04			0.06			0.08	0.1	0.12
Fundamental resonance frequency	f_G	kHz	4.7	6.5	8.6	5.8	8.2	5.7	7.3	5.9	5.4
Relative permissible oscillatory stress	F_{rb}	%	100								
General information											
Degree of protection per DIN 60529 with bayonet connector			IP67								
With threaded connector			IP64								

For the 100% calibration version (standard version)											
Nominal (rated) force	**F_{nom}**	**kN**	**2.5**	**5**	**10**	**25**	**50**	**100**	**250**	**500**	**1000**
With a fixed cable			IP67			IP68					
Measuring body material			Aluminum			Stainless steel					
Cable (with corresponding option)			Measurement cable with TPE insulation, wires twisted in pairs, 6 or 15 m								
Mechanical shock resistance as per IEC 60068-2-27											
Number		n	1000								
Duration		ms	3								
Acceleration		m/s^2	1000								
Vibrational stress to IEC 60068-2-6											
Frequency range		Hz	5 … 65								
Duration		min	30								
Acceleration		m/s^2	150								
Mass											
Without adapter		kg	0.5			1.3		3.9		10.4	28.5
With adapter			1.24			3.24		10.7		24.1	67

SPECIFICATIONS (FOR 50 % CALIBRATION)

For 50% calibration version											
Type			**C10**								
Nominal (rated) force	**F_{nom}**	**kN**	**2.5**	**5**	**12.5**	**25**	**50**	**125**	**250**	**500**	
		MN									**1**
Calibration force	**F_{cal}**	**kN**	**1.25**	**2.5**	**5**	**12.5**	**25**	**50**	**125**	**250**	**500**
Accuracy											
Accuracy class			0.02			0.03	0.04				0.05
Relative reproducibility and repeatability errors without rotation	$b_{r,g}$	%	0.025								
Rel. reversibility error (hysteresis) at 0.4 F_{nom}, relative to full scale value	v	%	0.02			0.03	0.04				0.05
Non-linearity	d_{lin}	%	0.02			0.025	0.035				0.05
Relative creep over 30 min	$d_{cr,\ F+E}$	%	0.04			0.025					
Effect of eccentricity	d_E	%/mm	0.04								
Temperature influence on sensitivity	TC_C	%/10K	0.015								
Effect of temperature on the zero signal	TC_0	%/10K	0.015								
Electrical values											
Nominal (rated) sensitivity	C_{nom}	mV/V	1			2					
Relative zero signal error	$d_{s,0}$	%	2								
Relative sensitivity error with “adjusted rated output” option	d_c	%	0.1								
Rated output range without "adjusted rated output" option	d_c	mV/V	1 … 1.5			2 … 2.5					
Input resistance	R_i	Ω	>345								
Output resistance with “adjusted rated output” option	R_a	Ω	365								
Output resistance without "adjusted rated output" option	R_a	Ω	280…360								
Tolerance of the output resistance with the "adjusted rated output" option	D_{Ra}	Ω	±0.5								

For 50% calibration version											
Nominal (rated) force	F_{nom}	**kN**	**2.5**	**5**	**12.5**	**25**	**50**	**125**	**250**	**500**	
		MN									**1**
Calibration force	F_{cal}	**kN**	**1.25**	**2.5**	**5**	**12.5**	**25**	**50**	**125**	**250**	**500**
Insulation resistance	R_i	Giga Ω	>2								
Operating range of excitation voltage	$B_{U, G}$	V	0.5…12								
Reference excitation voltage	U_{ref}	V	5								
Connector			Six wire circuit								
Temperature											
Reference temperature	T_{ref}	°C	23								
Nominal temperature range	$B_{T, nom}$	°C	-10…+45								
Operating temperature range	$B_{T, G}$	°C	-30…+85								
Storage temperature range	$B_{T, S}$	°C	-30…+85								
Mechanical quantities											
Max. operating force	F_G	% of F_{nom}	120								
Limit force	F_L		120								
Breaking force	F_B		>200								
Max. eccentricity	e_G	mm	10.2			9.9	9.1	14.1	12	20.6	23.96
Nominal (rated) displacement	s_{nom}	mm	0.02			0.03			0.04	0.05	0.06
Fundamental resonance frequency	f_G	kHz	4.7	6.5	8.6	5.8	8.2	5.7	7.3	5.9	5.4
Relative permissible oscillatory stress	F_{rb}	%	200								
General information											
Degree of protection per DIN 60529 with bayonet connector			IP67								
With threaded connector			IP64								
With fixed cable			IP67			IP68					
Measuring body material			Aluminum			Stainless steel					
Cable (with corresponding option)		m	Measurement cable with TPE insulation, wires twisted in pairs, 6 or 15 m								
Mechanical shock resistance as per IEC 60068-2-27											
Number		n	1000								
Duration		ms	3								
Acceleration		m/s^2	1000								
Vibrational stress to IEC 60068-2-6											
Frequency range		Hz	5 … 65								
Duration		min	30								
Acceleration		m/s^2	150								
Mass											
Without adapter		kg	0.5			1.3		3.9		10.4	28.5
With adapter			1.24			3.24		10.7		24.1	67

C10 VERSIONS AND ORDER NUMBERS

Preferred version, available at short notice

The order numbers for preferred types are 1_C10/..., the order numbers for customer specific versions are K-C10....

Code	Measuring range	Order No.
2k50	2.5 kN	1-C10/2.5kN
5k00	5 kN	1-C10/5kN
10k0	10 kN	1-C10/10kN
25k0	25 kN	1-C10/25kN
50k0	50 kN	1-C10/50kN
100k	100 kN	1-C10/100kN
250k	250 kN	1-C10/250kN
500k	500 kN	1-C10/500kN
1M00	1 MN	1-C10/1MN

Number of measuring bridges	Characteristic value	Calibration	Transducer identification	Mechanical design	Plug protection	Electrical connection		Male connector version for the "fixed cable" option	
						Bridge A	Bridge B	Bridge A	Bridge B
Single bridge **SB**	Not adjusted **D**	100 % **1**	Without TEDS **S**	With adapter **W**	Without **U**	Bayonet connector **B**		Free ends **Y**	
Double bridge **DB**	Adjusted **J**	50% **5**	With TEDS **T**	Without adapter **D**	With **P**	Threaded connector **G**		D-sub-HD15, 15-pin **F**	
						Fixed cable, 6 m **K**		HD-Sub connector, 15-pin **Q**	
						Fixed cable, 15 m **V**		Male connector ME3106PEMV **N**	
								ODU male connector, 15-pin **P**	
								Female connector M12, 8-pin **M**	

Order example: K-C10-1M00-DB-N-5_T-N-U-K-K-Y-Y

The example is a C10 with nominal force 1 MN, double bridge design, rated output not adjusted, calibrated for half the nominal force (here 500 kN), with TEDS, without a foot adapter, and fixed cable with free ends on both measuring bridges.

Number of measuring bridges
For reasons of redundancy, it is necessary in devices relevant to safety to check the plausibility of the measurement signal with a second measuring bridge electrically isolated from the first one on the same measuring body. This makes it possible to connect two amplifiers working independently of one another.

Characteristic value
The exact sensitivity is always stated on the type plate and on the manufacturing certificate. The C10 can be adjusted to a sensitivity of 2 mV/V (nominal (rated) forces 2.5 kN to 10 kN), or 4 mV/V (all other nominal (rated) forces). If you choose the "Rated output adjusted" option, the output resistance will also be adjusted so that C10s with the same equipment and capacity are suitable for parallel connection.

Calibration
The sensitivity of the standard version of the C10 is more than 4 mV/V for nominal (rated) forces from 25 kN. (>2 mV/V for nominal (rated) forces 2.5 kN to 10 kN). If required, you have the option to calibrate the transducers to half the nominal (rated) force, so that the output signal for the calibration force is also halved.

Transducer identification
TEDS integration (integrated data sheet storing the characteristic values of the sensor) as per IEEE1451.4.

Mechanical design	The C10 is delivered with an adapter as standard. Upon request, we can deliver the sensor without the foot adapter to reduce the construction height. The requirements relating to the surface quality (flatness, hardness) of the construction element on which the C10 is mounted are thus increased.
Plug protection	Mechanical protection provided by fitting an additional square section around the connector. External dimensions (WxHxD) in mm: 30 x 30 x 20.
Electrical connection bridge A	The standard version is a bayonet connector (PT02E10-6P-compatible). The option is also available to fit a screw-type device plug (PC02E10-6P-compatible). A third variant where the force transducers are fitted with a fixed cable is also available. In this version, all C10s with a nominal (rated) force greater than/equal to 25 kN achieve protection class IP68.
Electrical connection bridge B	The standard version is a bayonet connector (PT02E10-6P-compatible). The option is also available to fit a screw-type device plug (PC02E10-6P-compatible). A third variant where the force transducers are fitted with a fixed cable is also available. In this version, all C10s with a nominal (rated) force greater than/equal to 25 kN achieve protection class IP68.
Male connector selection for the "fixed cable" option	If you have ordered the C10 with an integrated cable, you can have a male adapter assembly attached to the end of the cable, so the force sensor can be connected directly to a signal conditioner. Y = free ends, no plug assembly F = D-sub-HD15, 15 pin, for connection to MGC+ (e.g. AP01) Q = HD-sub-male connector, 15-pin, for connecting to many HBM signal conditioners in the series Quantum (MX410, Mx440, MX840) N = MS male connector, for connecting to HBM signal conditioner, such as MGC+ (Ap03), DMP or DK38 P = ODU male connector, 14-pin. Degree of protection IP68. For connecting to all HBM signal conditioners in the Somat XR series that are suitable for measuring full bridge circuits. M = female connector M12 for connecting the HBM electronics PAD near the sensor

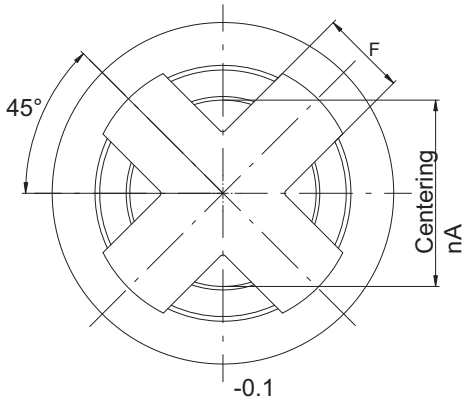
SCOPE OF DELIVERY

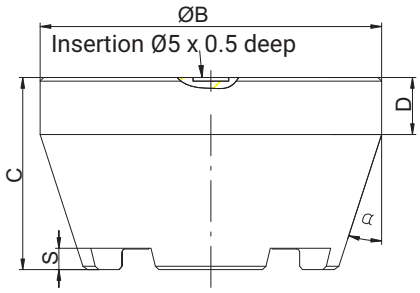
- C10 force transducer
- C10 mounting instructions
- Test certificate
- 2 handles (500 kN and 1 MN versions)

ACCESSORIES (NOT INCLUDED IN THE SCOPE OF SUPPLY)

Connection cable/ground cable/thrust pieces	Order No.
Connection cable KAB157-3, IP67 (with bayonet locking), 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 KAB158-3, IP64 (with threaded connector), 3 m long, TPE outer sheath, 6 x 0.25 mm^2, free ends, shielded, outside diameter 6.5 mm	1-KAB158-3
Connection cable, freely configurable (cable length, plug at amplifier end, etc.)	K-CAB-F
Loose cable socket (bayonet connection)	3-3312.0382
Loose cable socket (screw connection)	3-3312.0354
Ground cable, 400 mm	1-EEK4
Ground cable, 600 mm	1-EEK6
Ground cable, 800 mm	1-EEK8
Thrust piece for nominal (rated) forces 2.5 kN-50 kN	1-EDO3/50KN
Thrust piece for nominal (rated) forces 100 kN-250 kN	1-EDO3/100KN
Thrust piece for nominal (rated) force 500 kN	1-EDO3/500KN
Thrust piece for nominal (rated) force 1 MN	1-EDO3/1MN

DIMENSIONS EDO3 THRUST PIECES FOR C10





Dimension [unit]		Nominal (rated) force (for 100% calibration)			
		up to 50 kN	100 to 250 kN	500 kN	1 MN
ØA	[mm]	26.2	40.2	64.2	80.2
ØB	[mm]	48	80	112	130
C	[mm]	27	45	62	72
D	[mm]	8	10	15	15
E	[mm]	3	5	6	6
F	[mm]	12	23	30	36
α	[°]	18	18	18	18
Order No.		1-EDO3/50KN	1-EDO3/100KN	1-EDO3/500KN	1-EDO3/1MN

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