DATA SHEET

C6B
Force transducers

SPECIAL FEATURES

- Rugged compressive force transducers
- Nominal (rated) force 200 kN ... 10 MN
- Hermetically welded, versions with IP68 available
- Extensive mounting aids
- Can be configured with different cable lengths, plug fitting, integrated amplifier and TEDS on request

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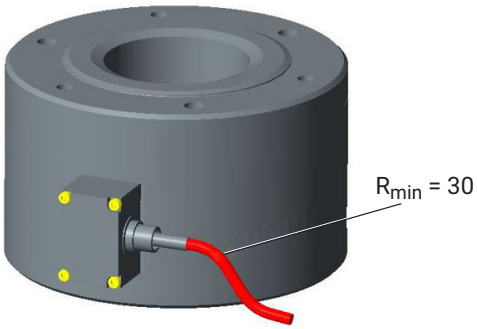
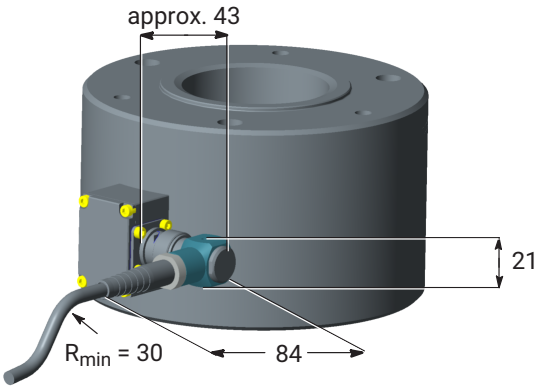
MOUNTING DIMENSIONS OF CONNECTION VARIANTS

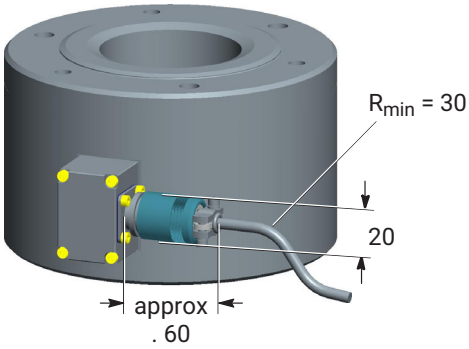
Dimensions in mm



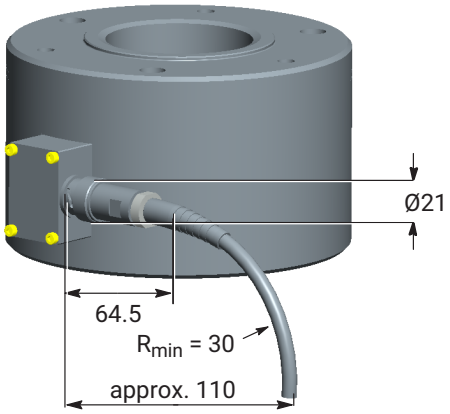
With fixed cable



Configurable connection cable **K-CAB-F** with option of angled bayonet connector, compatible with the MIL-26482 series 1 connector



Connection cable **KAB 158** with screw locking, compatible with a MIL-C-26482 series 1 connector

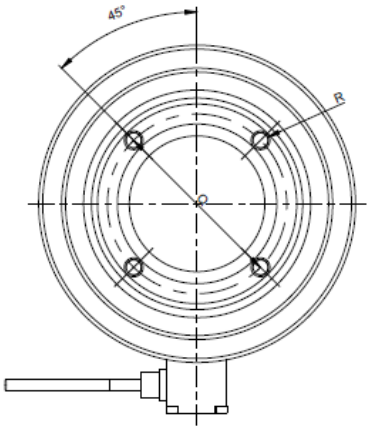


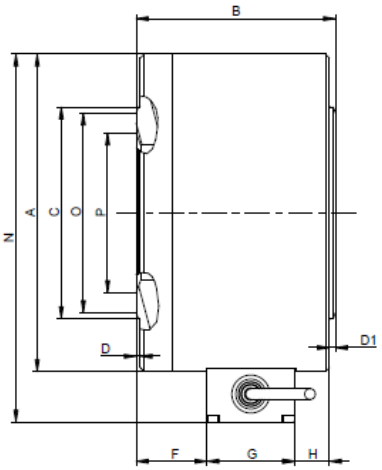
Connection cable KAB 157-3 with bayonet connection, compatible with a MIL-C-26482 series 1 connector

DIMENSIONS (IN MM)

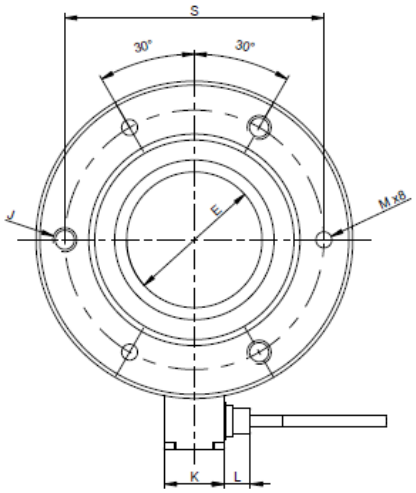
Force transducer C6B

Bottom view



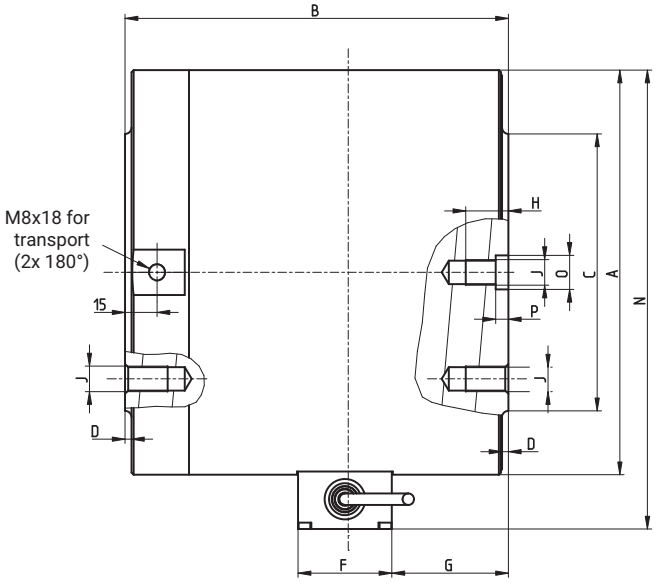


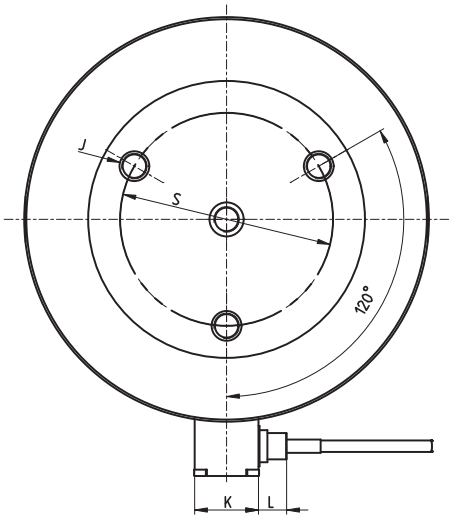
Top view



Nominal (rated) force	A	B	C ±0.1	D	D1	E ±0.1	F	G	H	J	K	L[1)]	L[2)]	M H11	N[1)]	N[2)]	O	P	Q ±0.1	R	S ±0.1
200 kN	80	60	40.4	1	1	32	16.25	42	0.75	M8, 8 mm deep	26	12	14	6	100	106	-	35	48	M6, 8 mm deep	64
500 kN	80	60	52	1	1	32	16.25	42	0.75		26	12	14	6	100	106	-	-	42		64
1 MN	159	100	88	2	3	68	35.5	44	17.5	M12, 15 mm deep	31	12	14	8	184	186	-	75	98	M8, 15 mm deep	130
2 MN	159	100	106	2	3	68	35.5	44	17.5		31	12	14	8	184	186	100	80	90		130

1) Fixed cable option
2) Plug option

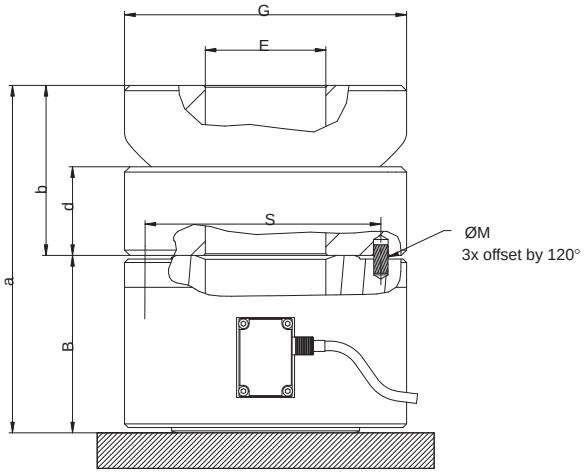




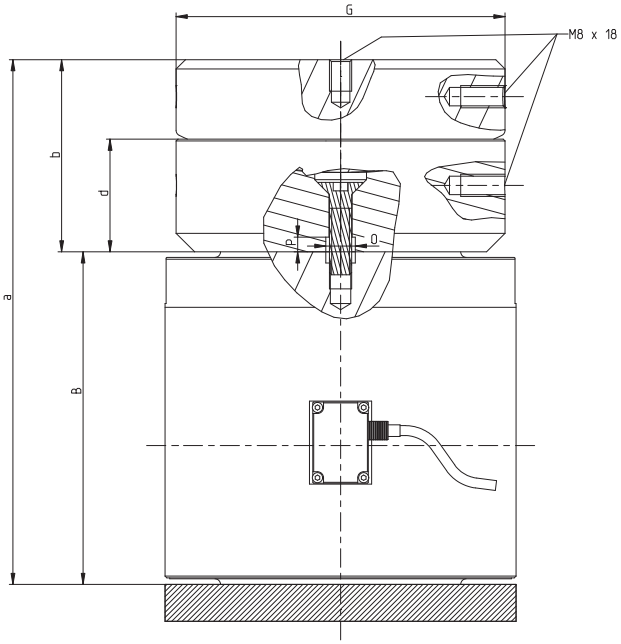
Nominal (rated) force	A	B	C	D	F	G	H	J	K	L[1)]	L[2)]	N[1)]	N[2)]	O F7	P	S
5 MN	190	180	130	3	44	55	20	M12	31	12	14	216	218	16	6	100±0.2
10 MN	267	240	180	3	44	96	30	M20	31	12	14	293	295	25	10	140

1) Fixed cable option
2) Plug option

Mounting aid: Spherical cap ZK



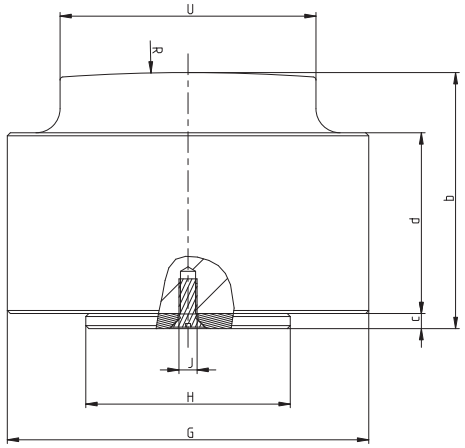
200 kN - 2 MN



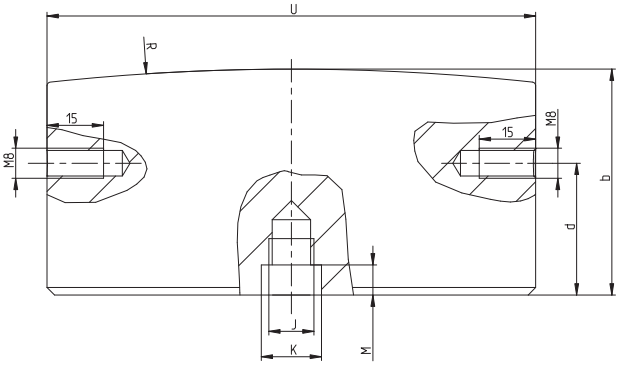
5 MN & 10 MN

Nominal (rated) force	ZK ordering number	Weight in kg	B	E±0.1	G	M H11	O F7	P	S	a	b	d
200 kN ...500 kN	1-C6/50T/ZK	1.7	60	32	82	6	-	-	64±0.1	112	52	28
1 MN	1-C6/100T/ZK	3.8	100	68	121	8	-	-	130±0.1	174.5	75.3	40
2 MN	1-C6/200T/ZK	11.6	100	68	159	8	-	-	130±0.1	195	95.5	50
5 MN	1-C6/500T/ZK	20.6	180	-	178	-	16	8		284	104	61
10 MN	1-C6/10MN/ZK	50.2	240	-	240	-	25	12		385	145	88

Mounting aid: Load button ZL



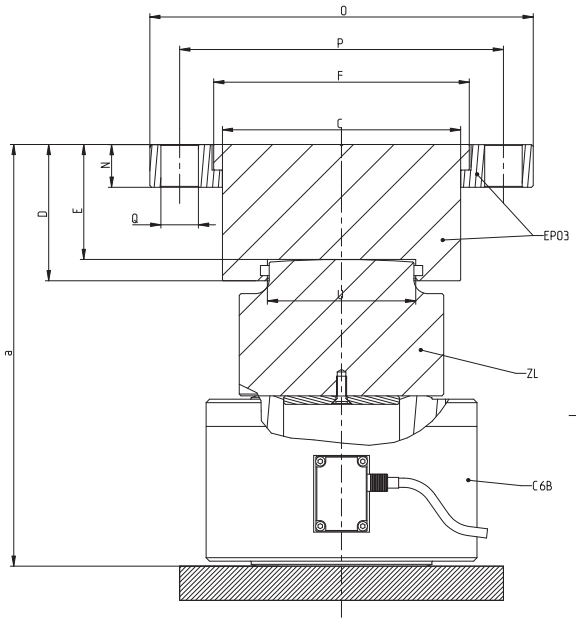
200 kN - 2 MN



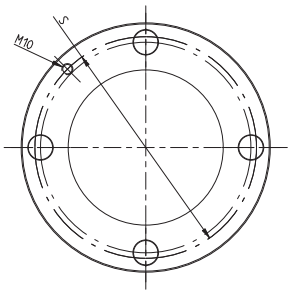
5 MN & 10 MN

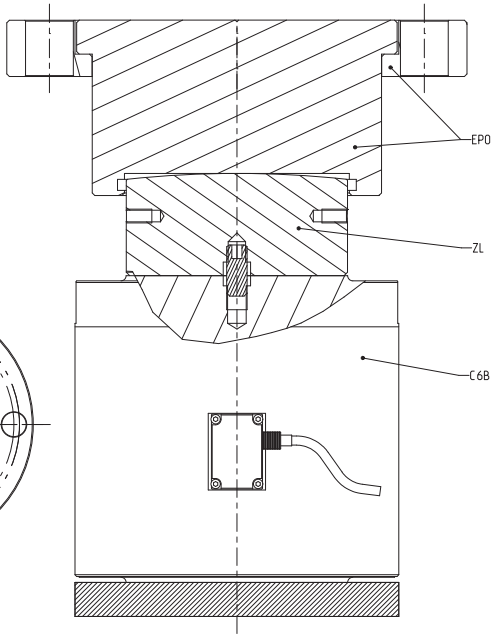
Nominal (rated) force	ZL ordering number	Weight in kg	G	$H_{-0.1}$	J	R	$U_{-0.2}$	K F7	M	b	c	d
200 kN	1-C6/20T/ZL	0.8	60	31.9	M5	300	32	-	-	50	5	30
500 kN	1-C6/50T/ZL	0.8	60	31.9	M5	300	44	-	-	50	5	30
1 MN	1-C6/100T/ZL	6.4	120	67.9	M6	600	64	-	-	85	5	60
2 MN	1-C6/200T/ZL	6.8	120	67.9	M6	600	85	-	-	85	5	60
5 MN	1-C6/500T/ZL	6.5	-	-	M12	600	129.8	16	8	60	-	35
10 MN	1-C6/10MN/ZL	30.1	-	-	M20	1000	219.8	25	12	110	-	67

Mounting aid: Thrust piece EPO3



200 kN - 2 MN



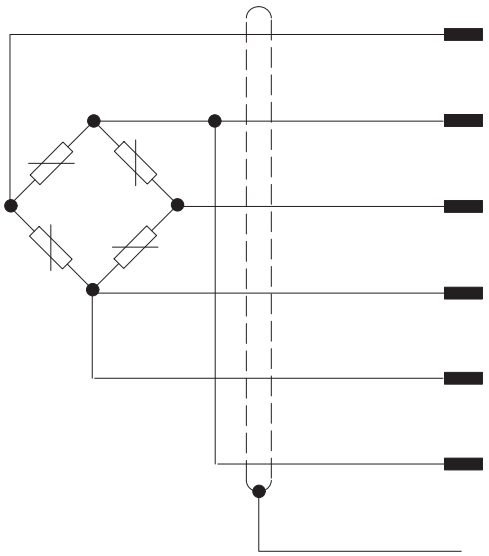


5 MN & 10 MN

Nominal (rated) force	EPO3 ordering number	Weight in kg	C	D	E	F	N	O	P	Q	S	$U_{-0.2}$	a
200 kN	1-EPO3R/20T	1.2	47.8	27.5	20	58	14	110	90	13	90	32	125
500 kN	1-EPO3/50T	3.4	81.8	50	39.5	89	10	147	120	18	130	44	144.5
1 MN	1-EPO3/100T	3.2	81.9	50	39.5	89	10	147	120	18	130	64	219.5
2 MN	1-EPO3/250T	13	139.8	80	67.5	150	25	225	190	22	200	85	247.5
5 MN	1-EPO3/500T	27	169.8	103	90	188	33	270	220	28	250	130	250
10 MN[1)]	1-EPO3/10MN	55	260	140	120	290	-	-	-	-	-	220	430

[1)] Version with nominal (rated) force 10 MN is supplied without clamping ring

Pin assignment without integrated amplifier

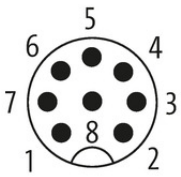


	Device plug pin assignment	Cable assignment
B	Measurement signal (+)	wh (white)
D	Excitation voltage (-)	bk (black)
C	Measurement signal (-)	rd (red)
A	Excitation voltage (+)	bu (blue)
F	Sense lead (+)	gn (green)
E	Sense lead (-)	gy (gray)
	Cable shield, connected to housing	Shield

Pin assignment with integrated amplifier

M12 device plug				Cable assignment fixed cable with free end
Pin	Color code	Version VA 1 (voltage output)	Version VA 2 (current output)	
1	White	Supply voltage 0 V (GND)		White
2	Brown	Not assigned		Black
3	Green	Zero control input		Green
4	Yellow	Not assigned		Not assigned
5	Gray	Output signal 0 ... 10 V	Output signal 4 ... 20 mA	Gray
6	Pink	Output signal 0 V	Not assigned	Blue
7	Blue	Not assigned		Not assigned
8	Red	Power supply +19...+30 V		Red
Cable shield, connected to housing				

Male



Specifications C6B without integrated amplifier

Nominal (rated) force	F_{nom}	kN	200	500				
		MN			1	2	5	10
Accuracy								
Accuracy class			0.5					
Relative reproducibility and repeatability errors in unchanged mounting position	b_{rg}	%						
When hardened compression plates are used			0.2	0.1	0.06			
If load button ZL is used, or with load button ZL and thrust piece EPO			0.1	0.06				
When used with spherical cap ZK			0.2	0.1	0.06			
Rel. reversibility error (hysteresis) at 0.5 Fnom	$V_{0.5}$	%						
When hardened compression plates are used			0.5					
If load button ZL is used, or with load button ZL and thrust piece EPO			0.5	0.3				
When used with spherical cap ZK			0.5					
Non-linearity	d_{lin}	%						
When hardened compression plates are used			1					
If load button ZL is used, or with load button ZL and thrust piece EPO			0.4					
When used with spherical cap ZK			1					
Relative creep	d_{crf+E}	%	0.06					
Effect of eccentricity	d_E	%/mm	0.2	0.06				
Temperature coefficient of sensitivity	TC_S	%/10K	0.1					
Temperature coefficient of zero signal	TC_0	%/10K	0.05					
Rated electrical output								
Nominal (rated) output	C_{nom}	mV/V	2					
Rel. zero signal deviation	$d_{s,0}$	%	1					
Deviation of the characteristic value with optional "adjusted rated output"	d_c	%						
When hardened compression plates are used			2.5					
If load button ZL is used, or with load button ZL and thrust piece EPO			0.5					
When used with spherical cap ZK			0.5					
Rated output range (without rated output adjustment)	C	mV/V	2 … 2.48 mV/V					
Input resistance	R_e	Ω	380 … 420					
Output resistance	R_a		280 … 360					
Output resistance with “adjusted rated output” option	d_{Ra}		365					
Insulation resistance	R_{is}	GΩ	>5					
Operating range of the excitation voltage	$B_{U,G}$	V	0.5 … 12					
Reference excitation voltage	U_{ref}		5					
Connection			6-wire circuit					

Nominal (rated) force	F_{nom}	kN	200	500				
		MN			1	2	5	10
Temperature								
Reference temperature	T_{ref}	°C	+23					
Nominal (rated) temperature range	$B_{t,nom}$		-10 ... +70					
Operating temperature range	$B_{T,G}$		-30 ... +85					
Storage temperature range	$B_{T,S}$		-50 ... +85					
Characteristic mechanical quantities								
Maximum operating force	F_G	% of F_{nom}	150					
Force limit	F_L		150					
Breaking force	F_B		>200					>180
Static lateral force limit	F_Q	% of F_{nom}						
When hardened compression plates are used			No specification possible					
If load button ZL is used, or with load button ZL and thrust piece EPO			20				10	
When used with spherical cap ZK			3					
Permissible eccentricity	e_G	mm	5	6	11	12	10	10
Nominal (rated) displacement	s_{nom}	mm	0.13	0.15	0.2	0.2	0.5	0.7
Natural frequency	f_G	kHz	11.6	14.4	6.1	6.9	5.3	4
Permissible oscillation stress	F_{rb}	% of F_{nom}	70					
Stiffness	c_{ax}	10^6 N/mm	1.54	3.33	5	10		14.29
General information								
Degree of protection in accordance with EN 60 529 with"fixed cable" (standard version)			IP68 [1]					
Degree of protection in accordance with EN 60 529 with "bayonet connector" option, socket connected to sensor			IP67					
Degree of protection in accordance with EN 60 529 with "threaded connector" option			IP64					
Spring element material			Stainless steel					
Measuring point protection			Hermetically welded measuring body					
Cable (standard version)			Outside diameter 5.4 mm					
Cable length		m	6 or 15					
Mechanical shock resistance as per IEC 60068-2-6								
Number		n	1000					
Duration		ms	2					
Acceleration		m/s²	650					
Vibrational stress as per IEC 60068-2-27								
Frequency range		Hz	5 … 65					
Duration		min	30					
Acceleration		m/s²	150					
Weight	m	kg	1.6	1.8	10.1	10.7	32.0	84.0
	m	lbs	3.5	4.0	22.3	23.6	70.5	185.2

[1] Test condition: 1 m water column, 100 hours

Specifications C6B with integrated amplifier

Module type		VA1	VA2
Rated electrical output			
Output signal		0 ... 10 V	4 ... 20 mA
Nominal (rated) output		10 V	16 mA
Deviation of the characteristic value with optional "adjusted rated output"			
When hardened compression plates are used		10 V ± 0.25 V	16 mA ± 0.4 mA
If load button ZL is used, or with load button ZL and thrust piece EPO		10 V ± 0.05 V	16 mA ± 0.08 mA
When used with spherical cap ZK			
Zero signal		0 V	4 mA
Range of output signal		-0.3 ... 11 V	3 ... 21 mA
Cut-off frequency (-3dB)	kHz	2	
Supply voltage	V	19 ... 30	
Nominal (rated) voltage	V	24	
Max. 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	

VERSIONS AND ORDERING NUMBERS

Nominal force	Ordering number
200 kN	1-C6B/200KN
500 kN	1-C6B/500KN
1 MN	1-C6B/1 MN
2 MN	1-C6B/2MN
5 MN	1-C6B/5MN
10 MN	1-C6B/10MN

The ordering numbers shown in gray are preferred types. They can be delivered rapidly.
All preferred types with 6 m cable, open ends and without TEDS.
The ordering number for the preferred types is 1-C6B..., the ordering number for customer-specific designs is K-C6B-...

The ordering number example **K-C6B-500K-N-S-OO-U-00A8-O-VA2** shown below is a: C6B, nominal (rated) force of 500 kN, without rated output adjustment, without TEDS, without load application, without plug protection and with integrated amplifier.

Nominal force	Rated output adjustment	Transducer identification	Mechanical design	Plug protection	Electrical connection	Plug version for the "permanently attached cable" option	Integrated amplifier
200 kN **200K**	Not adjusted **N**	Without TEDS chip **S**	Without load application **OO**	Without plug protection **U**	With fixed cable, 6 m **K**	Free ends **Y**	Without integrated amplifier **N**
500 kN **500K**	Adjusted **J**	With TEDS chip **T**	With spherical cap ZK **ZK**	With plug protection **P**	With fixed cable, 15 m **V**	D-sub-HD15, 15-pin **F**	Amplifier VA1: 0…10V **VA1**
1 MN **1M00**			With the ZL load button and EPO thrust piece **ZE**		With bayonet connector **B**	D-SUB-HD15, 15-pin **Q**	Amplifier VA2: 4…20 mA **VA2**
2 MN **2M00**					With threaded connector **G**	Male connector ME3106PEMV **N**	
5 MN **5M00**					M12 male connector, 8-pin, A-coded[1] **00A8**	ODU male connector, 14-pin **P**	
10 MN **10M0**						M12 male connector, 8-pin **M**	
						Without fixed cable **O**	

[1] M12 male connector, 8-pin, A-coded, only possible in conjunction with VA1/VA2

Ordering example

K-C6B-	500K-	N-	S-	OO-	U-	00A8-	O-	VA2

Rated output adjustment	The exact rated output is specified on the type plate. The sensor can be adjusted to an exact rated output of 2 mV/V. Then the relative tolerance of the rated output is dependent on the selected loading fittings. (see specifications, section "Rated electrical outputs"). You can connect the C6B in parallel if you order the sensor with adjusted rated output.
Transducer identification	Integration of TEDS chip (integrated electronic data sheet) as per IEEE 1451.4. If the relevant amplifier electronics are provided, the measurement chain will parameterize itself automatically.
Mechanical design	Standard delivery does not include load application parts. The C6B is optionally available with the appropriate load application parts and calibrated or adjusted.
Plug protection	A square profile is installed around the plug for mechanical protection. Dimensions WxHxD: 30 x 30 x 20 mm

Electrical connection	Permanently attached cable, 6 m is standard; options: Fixed cable, 15 m; bayonet connection (PT02E10-P-compatible); threaded connector (PT02E10-P-compatible); 8-pin M12 plug, A-coded.
Plug version for the "fixed cable" option	If you order your C6B with a fixed cable, it comes with free ends as standard. We are happy to mount connector plugs for connection to HBK measuring amplifiers, if requested. Y = Free ends, no plug fitted F = D-sub-HD15, 15-pin, for connection to MGC+ (e.g. AP01), Scout Q = HD-sub-HD15, 15-pin, for connection to many HBK measuring amplifiers of the Quantum series (MX410, MX440, MX840) N = MS plug, for connection to HBK measuring amplifiers such as MGC+ (AP03), DMP or DK38 P = ODU plug, 14-pin, degree of protection IP68, for connection to all HBK measuring amplifiers from the Somat XR series that are suitable for measuring full bridge circuits. M = M12 plug, 8-pin, suitable for measuring amplifiers digiBOX and DSE O = Without fixed cable
Integrated amplifier	The sensors can be purchased with an integrated amplifier, optionally delivering an output signal in volts or milliamps.

ACCESSORIES

Accessories not included in the scope of supply.

Cables/plugs	Ordering number
Configurable cable, available in different lengths and on request with plug mounted for connecting directly to the amplifier	K-CAB-F
Connection cable KAB157-3; IP67 (with bayonet connector); 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; IP54 (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 KAB168 with M12 male connector, for connecting sensors with integrated amplifier. Available in 20 m (KAB168-20) and 5 m (KAB168-5)	1-KAB168-20; 1-KAB168-5
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

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Hottinger Brüel & Kjaer GmbH
Im Tiefen See 45 · 64293 Darmstadt · Germany
Tel. +49 6151 803-0 · Fax +49 6151 803-9100
www.hbkworld.com · info@hbkworld.com

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