



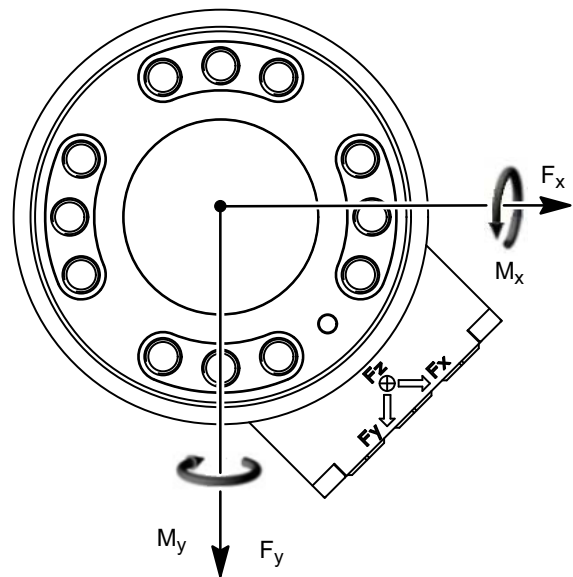
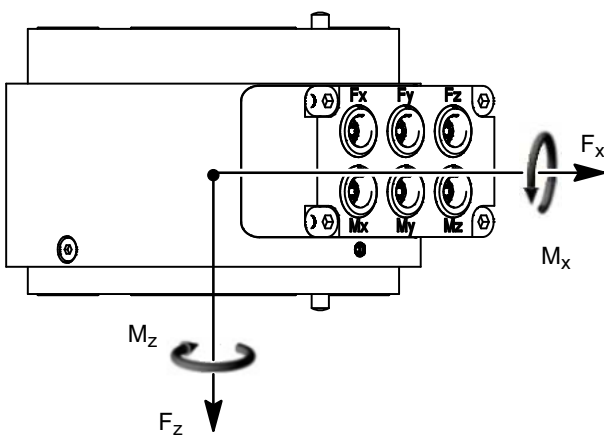
MCS10

Multicomponent sensor

Special features

- Compact multicomponent sensor
- Different nominal (rated) measuring ranges
- Up to 6 components
- Can be adapted to many measurement tasks by choosing the required measurement outputs
- Flange connection with centering and pin for positioning
- Degree of protection IP67
- TEDS
- Customization possible

Data sheet



Specifications

Size			BG1	BG2			BG3
Type			005	010	025	050	100
Accuracy class			0.2		0.1		
Nominal lateral force F _x & F _y	F _{x,nom} ; F _{y,nom}	kN	1	2	5	10	20
Nominal axial force F _z	F _{z,nom}	kN	5	10	25	50	100
Nominal bending moment M _x & M _y	M _{x,nom} ; M _{y,nom}	kN·m	0.05	0.15	0.35	0.7	2
Nominal torsional moment M _z	M _{z,nom}	kN·m	0.05	0.15	0.25	0.5	1.5
Nominal sensitivity F _x & F _y ¹⁾	C _{Fx,nom} ; C _{Fy,nom}	mV/V	1.5±0.3				1.3±0.3
Nominal sensitivity F _z ¹⁾	C _{Fz,nom}	mV/V	1.4±0.3				1.3±0.3
Nominal sensitivity M _x & M _y ¹⁾	C _{Mx,nom} ; C _{My,nom}	mV/V	1.8±0.3				
Nominal sensitivity M _z ¹⁾	C _{Mz,nom}	mV/V	1.4±0.3	1.6±0.3	1.1±0.3		
Relative zero signal error, related to nominal sensitivity	d _{S,0}	%	±1				
Temperature effect per 10K in the nominal (rated) temperature range on the output signal, related to the actual value on the zero signal, related to the nominal (rated) sensitivity	TC _c	%	<±0.2		<±0.1		
	TC ₀	%	<±0.1		<±0.1		
Linearity deviation, related to nominal sensitivity	d _{lin}	%	<±0.05				
Rel. reversibility error (0.2F _{nom} to F _{nom}), related to nominal sensitivity Forces (F _x , F _y & F _z) Moments (M _x , M _y & M _z)	U (d _{hy})	%	<±0.1				
		%	<±0.1	<±0.15	<±0.1		
Rel. creep over 30 mins.	d _{crF+E}	%	<0.15				
Rel. standard deviation of repeatability per DIN 1319, related to the variation of the output signal	σ _{rel}	%	<±0.05				
Input resistance ²⁾	R _i	Ω	300 ... 800				
Output resistance ²⁾	R _o	Ω	300 ... 800				
Insulation resistance	R _{is}	Ω	> 2x10 ⁹				
Reference excitation voltage	U _{ref}	V	5				
Operating range of the excitation voltage	B _{U,G}	V	0.5 to 12				
Nominal temperature range	B _{t,nom}	°C	-10 to +70				
Operating temperature range	B _{t,G}	°C	-10 to +85				
Storage temperature range	B _{t,s}	°C	-30 to +85				
Reference temperature	t _{ref}	°C	+23				

¹⁾ The individual sensitivity can be found in the test certificate and is stored in the TEDS. This sensitivity has a maximum deviation of 0.5%

²⁾ Dependent on measuring range and measuring bridge

Specifications (continued)

Size				BG1	BG2			BG3
Type				005	010	025	050	100
Crosstalk without matrix compensation								
Determined at uniaxial load. With a smaller, interfering component, crosstalk is reduced by the same factor. Matrix compensation can reduce the crosstalk.								
Influencing component	Affected component			Crosstalk at nominal load				
Lateral force (F _{x,nom} ; F _{y,nom})	Axial force (F _{z,nom})	XT _{F_x->F_z} XT _{F_y->F_z}	%	<±1	<±0.5	<±0.5		
Bending moment (M _{x,nom} ; M _{y,nom})		XT _{M_x->F_z} XT _{M_y->F_z}	%	<±1	<±1	<±1		
Torsional moment (M _{z,nom})		XT _{M_z->F_z}	%	<±3	<±1	<±0.5		
Axial force (F _{z,nom})	Lateral force (F _{x,nom} ; F _{y,nom})	XT _{F_z->F_x} XT _{F_z->F_y}	%	<±3	<±1	<±1		
Lateral force (F _{x,nom} ; F _{y,nom})		XT _{F_x->F_y} XT _{F_y->F_x}	%	<±1	<±0.5	<±0.3		
Bending moment (M _{x,nom} ; M _{y,nom})		XT _{M_x->F_x} XT _{M_x->F_y} XT _{M_y->F_x} XT _{M_y->F_y}	%	<±2	<±1.5	<±1		
Torsional moment (M _{z,nom})		XT _{M_z->F_x} XT _{M_z->F_y}	%	<±3	<±3	<±1		
Axial force (F _{z,nom})	Bending moment (M _{x,nom} ; M _{y,nom})	XT _{F_z->M_x} XT _{F_z->M_y}	%	<±3	<±3	<±1.5		
Lateral force (F _{x,nom} ; F _{y,nom})		XT _{F_x->M_x} XT _{F_x->M_y} XT _{F_y->M_x} XT _{F_y->M_y}	%	<±1.5	<±1.5	<±1.5		
Bending moment (M _{x,nom} ; M _{y,nom})		XT _{M_x->M_y} XT _{M_y->M_x}	%	<±1.5	<±1	<±0.5		
Torsional moment (M _{z,nom})		XT _{M_z->M_x} XT _{M_z->M_y}	%	<±1.5	<±1	<±1		
Axial force (F _{z,nom})	Torsional moment (M _{z,nom})	XT _{F_z->M_z}	%	<±3	<±1.5	<±1.5		
Lateral force (F _{x,nom} ; F _{y,nom})		XT _{F_x->M_z} XT _{F_y->M_z}	%	<±3	<±1	<±1		
Bending moment (M _{x,nom} ; M _{y,nom})		XT _{M_x->M_z} XT _{M_y->M_z}	%	<±1.5	<±1	<±1		

Specifications (continued)

Size		BG1	BG2			BG3
Type		005	010	025	050	100
Load limits						
Load ratio sum at multiaxial load (theoretical value for calculating load ranges)						
$LRS = \left[1.5 \cdot \frac{\sqrt{F_x^2 + F_y^2}}{F_{x,nom}} + \frac{ F_z }{F_{z,nom}} + \frac{\sqrt{M_x^2 + M_y^2}}{M_{x,nom}} + 1.5 \cdot \frac{ M_z }{M_{z,nom}} \right] \cdot 100\%$						
Criterion for the nominal (rated) measuring range to be met at multiaxial load (The load of each individual component must not exceed its maximum capacity)		%	LRS<400		LRS<350	
Criterion for the fatigue strength range to be met at multiaxial pulsating load (The load of each individual component must not exceed its maximum capacity)		%	LRS<400		LRS<320	
Criterion for the fatigue strength range to be met at multiaxial alternating load (The load of each individual component must not exceed its maximum capacity)		%	LRS<300		LRS<250	
Criterion for the static load range to be met at multiaxial load (The load of each individual component must not exceed its limit load)		%	LRS<500		LRS<410	
Lateral force limit (Fx, Fy), related to F _{x,nom} ; F _{y,nom} ³⁾	F _{x(y),L}	%	150			
Axial force limit (Fz), related to F _{z,nom} ³⁾	F _{z,L}	%	150			
Bending moment limit (Mx, My), related to M _{x,nom} ; M _{y,nom} ³⁾	M _{x(y),L}	%	130			
Torsional moment limit (Mz), related to M _{z,nom} ³⁾	M _{z,L}	%	130			
Criterion for the (static) range without break to be met at multiaxial load (The load of each individual component must not exceed its breaking load)		%	LRS <650	LRS <750	LRS <550	LRS <650
Lateral force at break (Fx, Fy), related to F _{x,nom} ; F _{y,nom} ³⁾	F _{x(y),B}	%	>300			
Axial force at break (Fz), related to F _{z,nom} ³⁾	F _{z,B}	%	>300			
Bending moment at break (Mx, My), related to M _{x,nom} ; M _{y,nom} ³⁾	M _{x(y),B}	%	>300			
Torsional moment at break (Mz), related to M _{z,nom} ³⁾	M _{z,B}	%	>300			

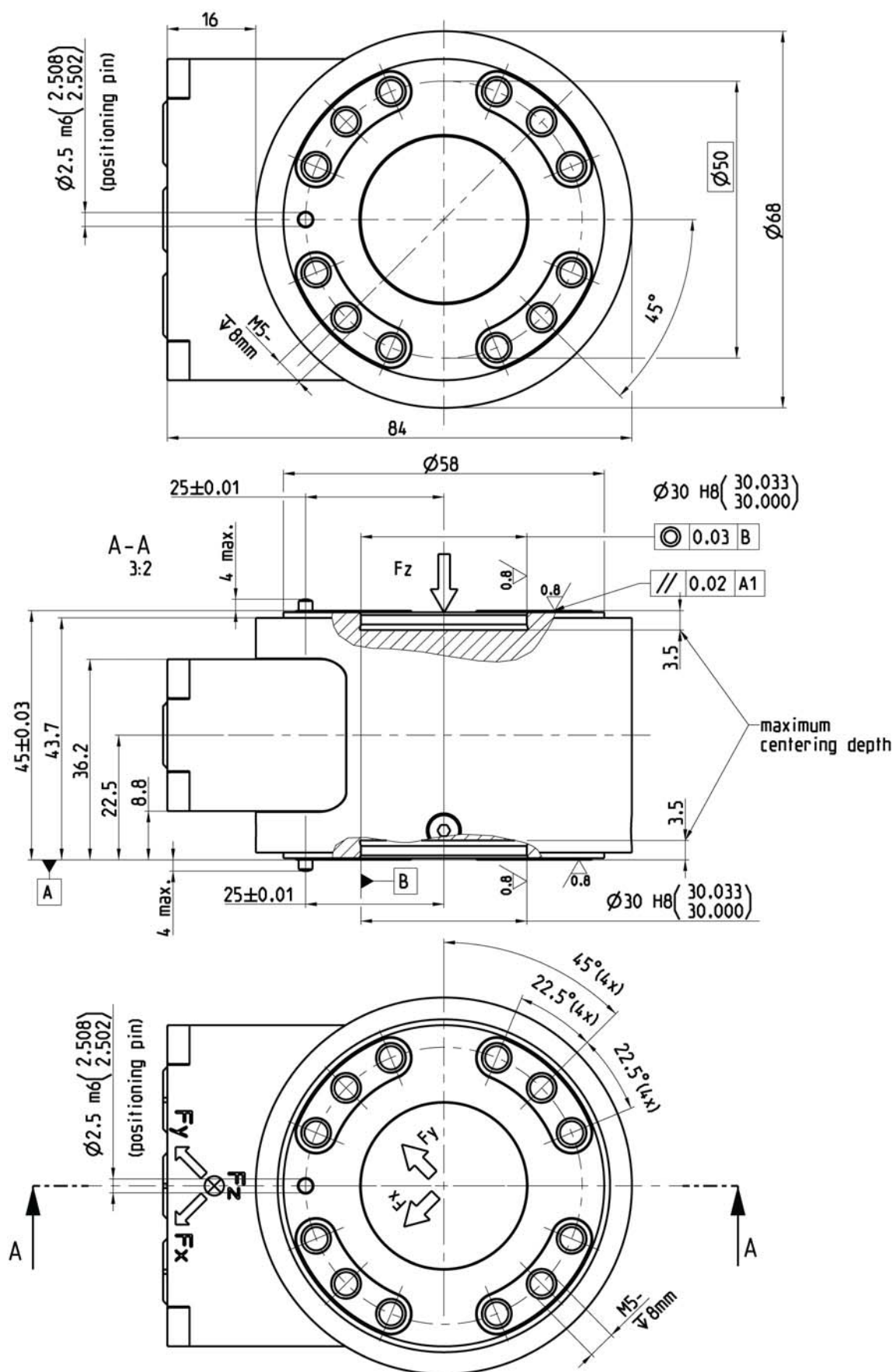
³⁾ At static load and uniaxial load

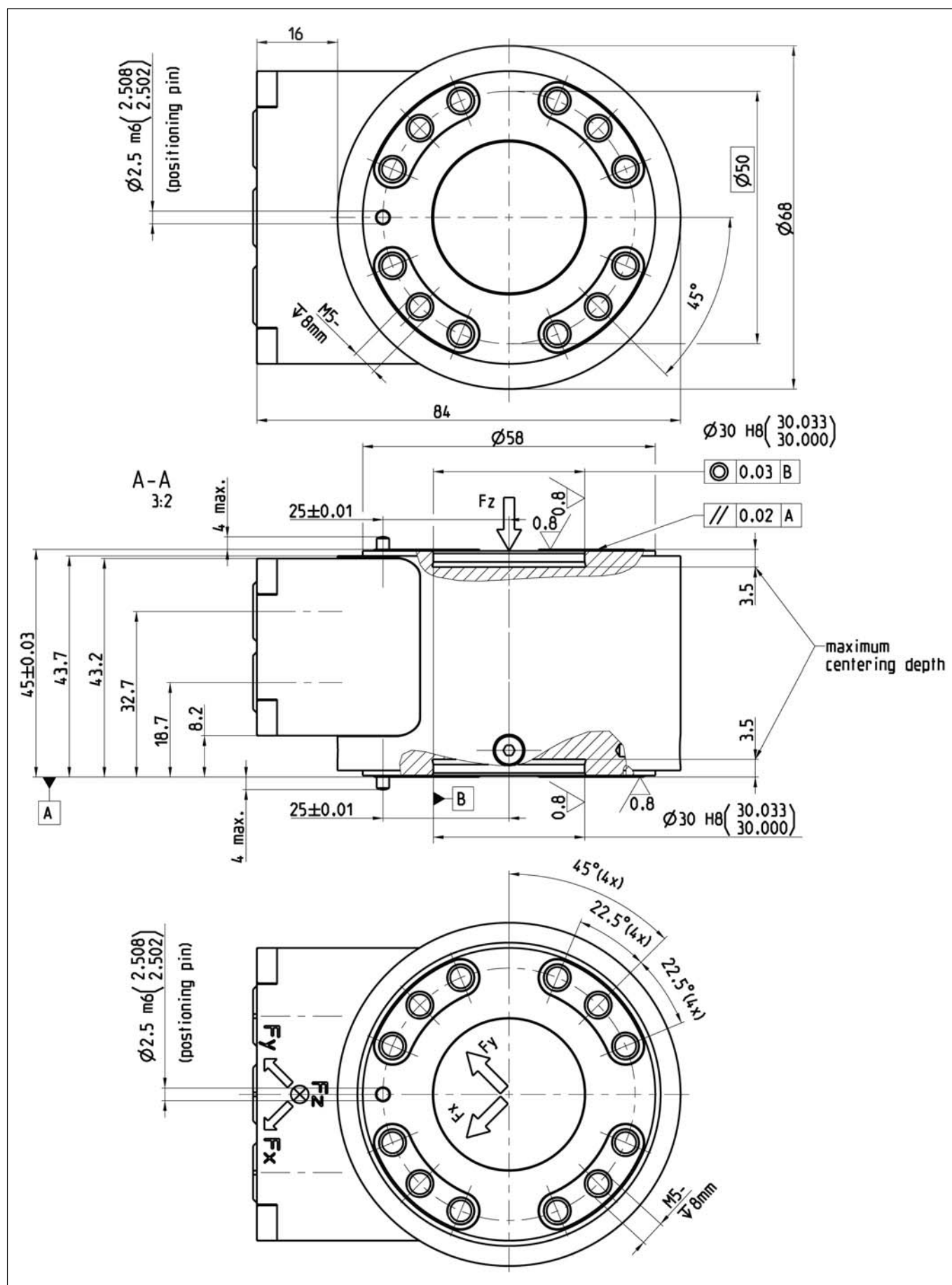
The load criteria apply to the sum of all simultaneously occurring loads, regardless of whether these are measured or parasitic.

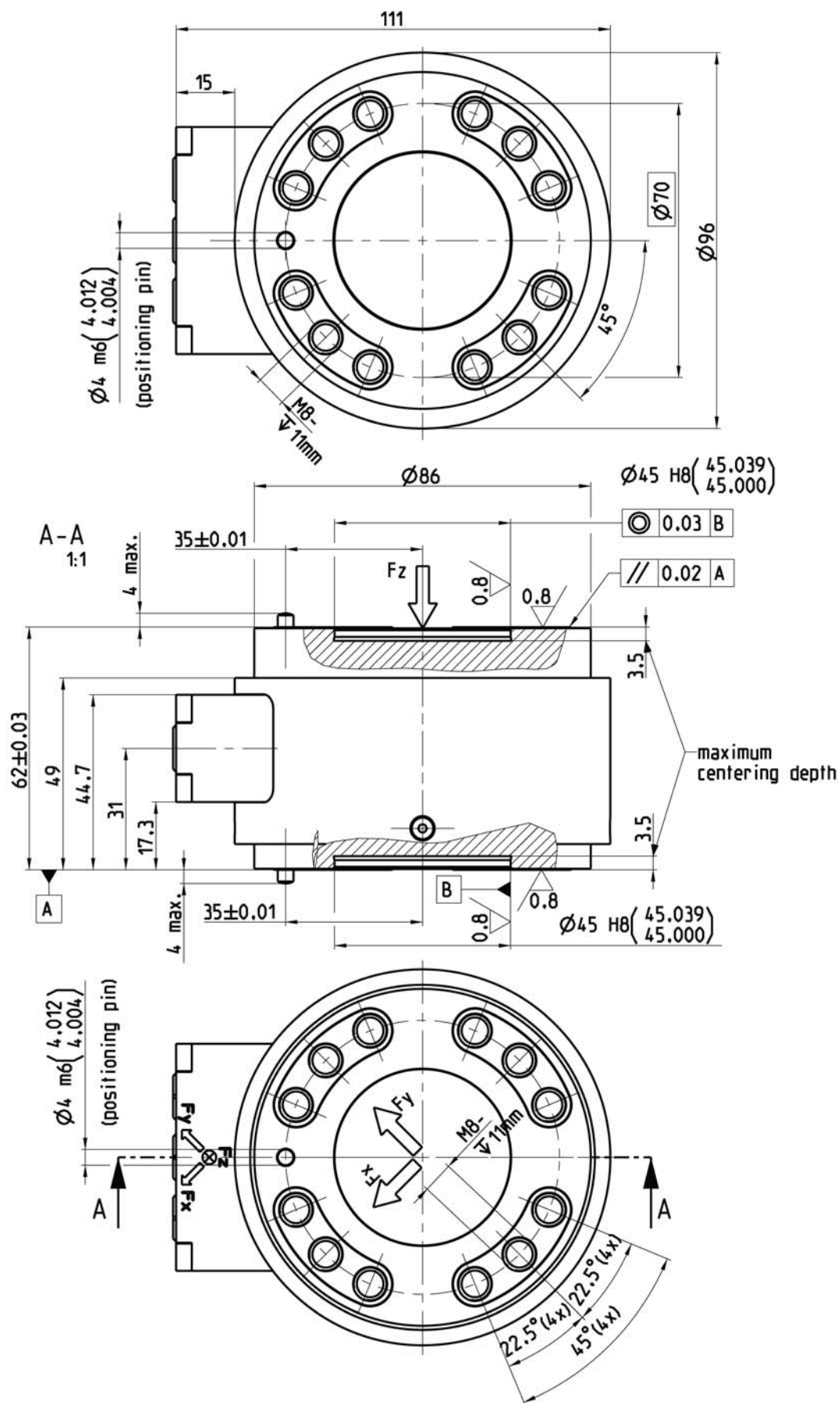
The origin of the sensor coordinates is in the geometric center (half the height of the sensor). In the application, the bending moment generated by a lateral force must be taken into account when determining the maximum bending moment that can occur. Please note that half the height of the sensor must be taken into account as an additional lever arm.

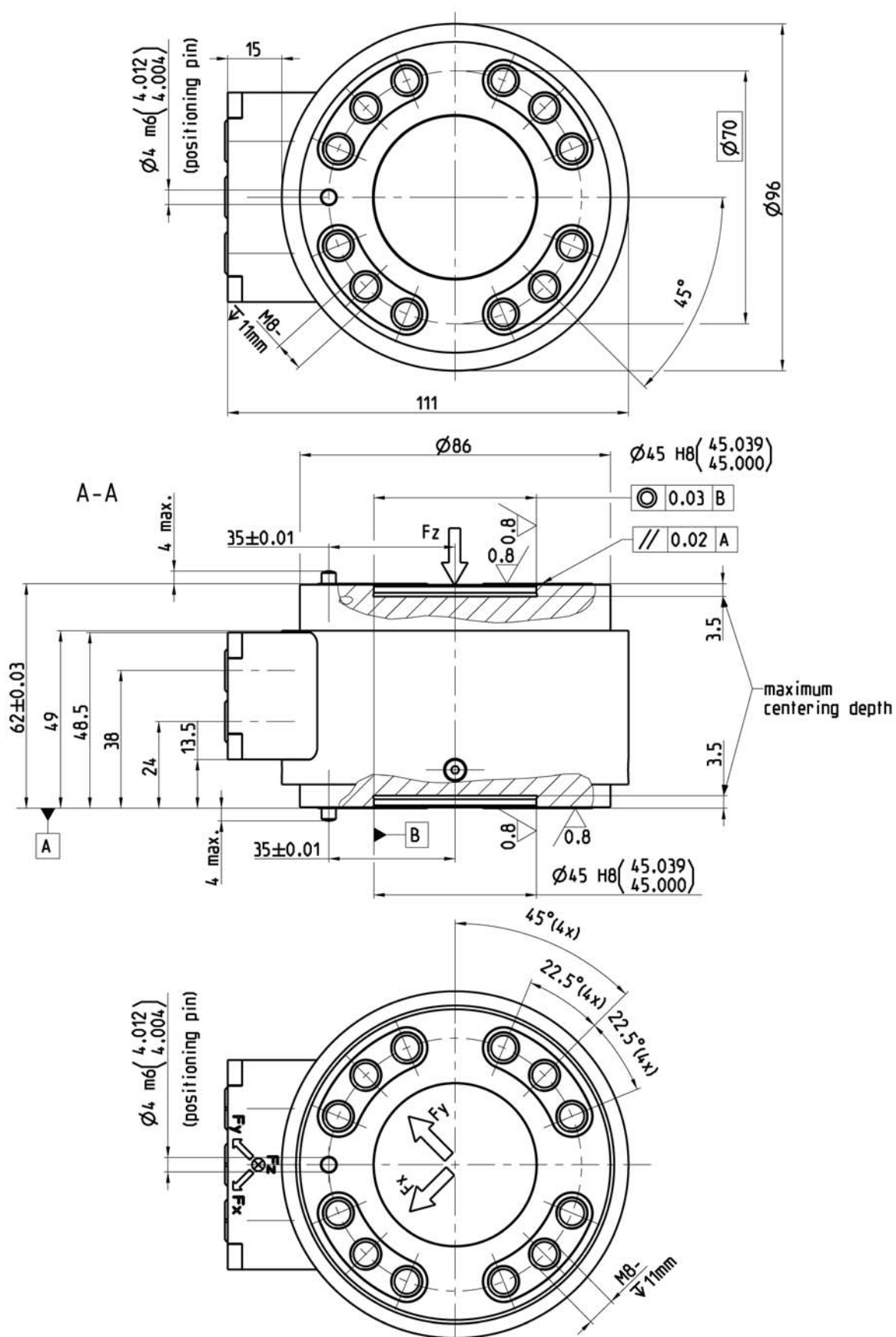
Specifications (continued)

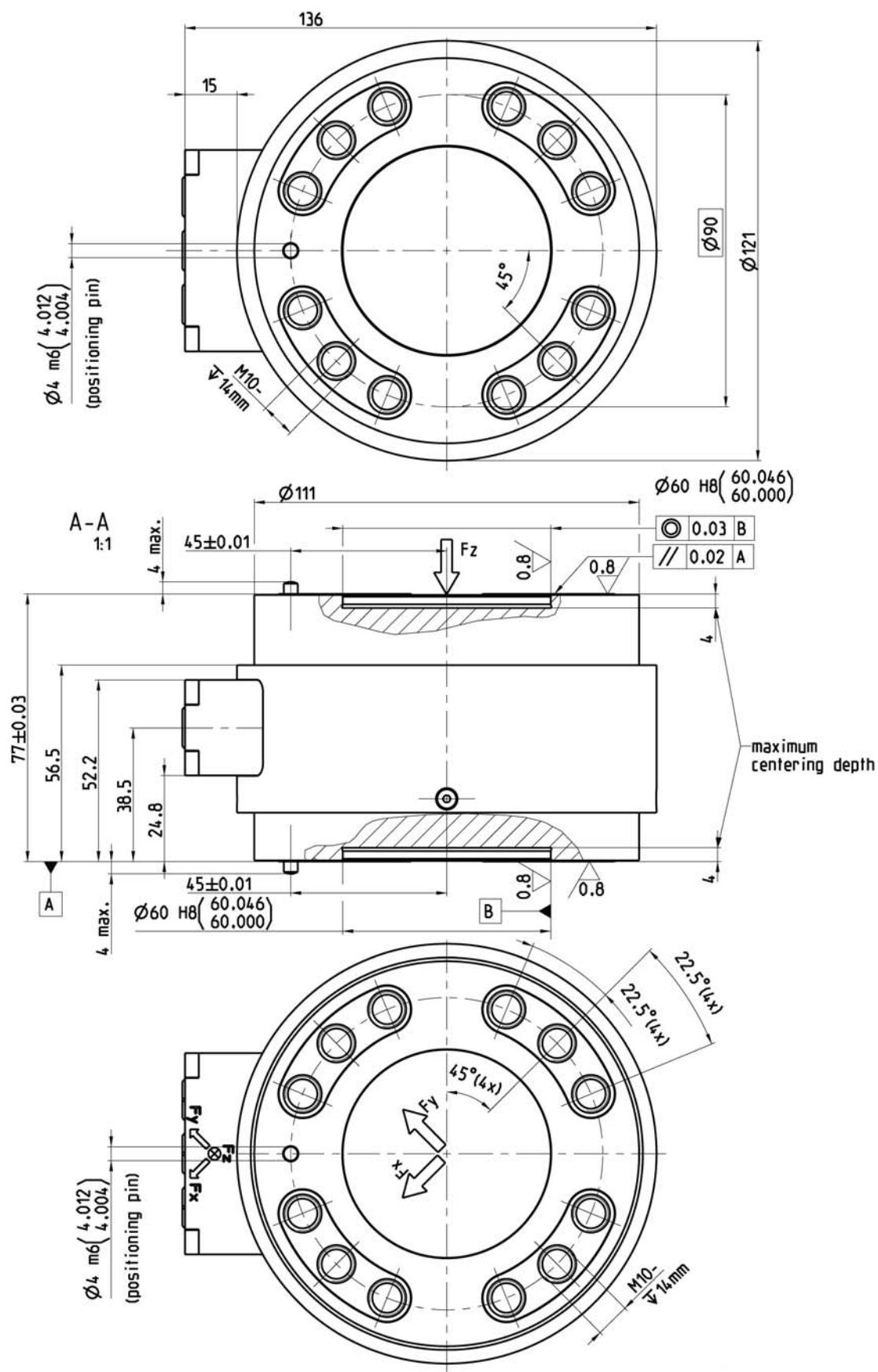
Size		BG1	BG2			BG3
Type		005	010	025	050	100
Mechanical values						
Nominal (rated) displacement at lateral force Fx & Fy	mm	<0.02	<0.03	<0.03	<0.04	<0.04
Nominal (rated) displacement at axial force Fz	mm	<0.03	<0.04	<0.05	<0.05	<0.05
Tilt angle at M _{x,nom} ; M _{y,nom}	degrees	<0.04	<0.05	<0.05	<0.06	<0.05
Torsion angle at M _{z,nom}	degrees	<0.08	<0.08	<0.06	<0.07	<0.08
Stiffness in the axial direction (z)	kN/mm	353	471	993	1664	3018
Stiffness in the radial direction (x or y)	kN/mm	37	54	117	202	452
Stiffness during the bending moment round a radial axis (x or y)	kN·m/degrees	1.37	3.75	7.93	13.34	41.45
Stiffness during the torsional moment round the axial axis (z)	kN·m/degrees	0.69	2.14	4.59	7.59	27.43
General information						
Weight (approx.)	kg	0.5	1.0	1.8		3.8
Material: Measuring body		Titanium alloy		Stainless steel		
Material: Housing		Aluminum alloy, powder coated				
Degree of protection per EN 60529		IP67				
Maximum cable length (6-wire configuration) of the standard cable for multiple components	m	50				
Transducer identification		TEDS, per IEEE 1451.4				
Emission (EME) (EN 61326-1, Section 7)						
RFI field strength		Class B				
Immunity to interference (EN 61326-1, Table 2)						
Electromagnetic fields (AM)	V/m	10				
Power-frequency magnetic fields	A/m	100				
Electrostatic discharge (ESD)						
Contact discharge	kV	4				
Air discharge	kV	8				
Fast transients (burst)	kV	1				
Impulse voltages (surge)	kV	1				
Conducted interference (AM)	V	10				
Mechanical shock (EN 60068-2-27)						
Number	n	1000				
Duration	ms	3				
Acceleration (half sine)	m/s ²	650				
Vibration in 3 directions (EN 60068-2-6)						
Frequency range	Hz	10...2000				
Duration	h	2.5				
Acceleration (amplitude)	m/s ²	150				

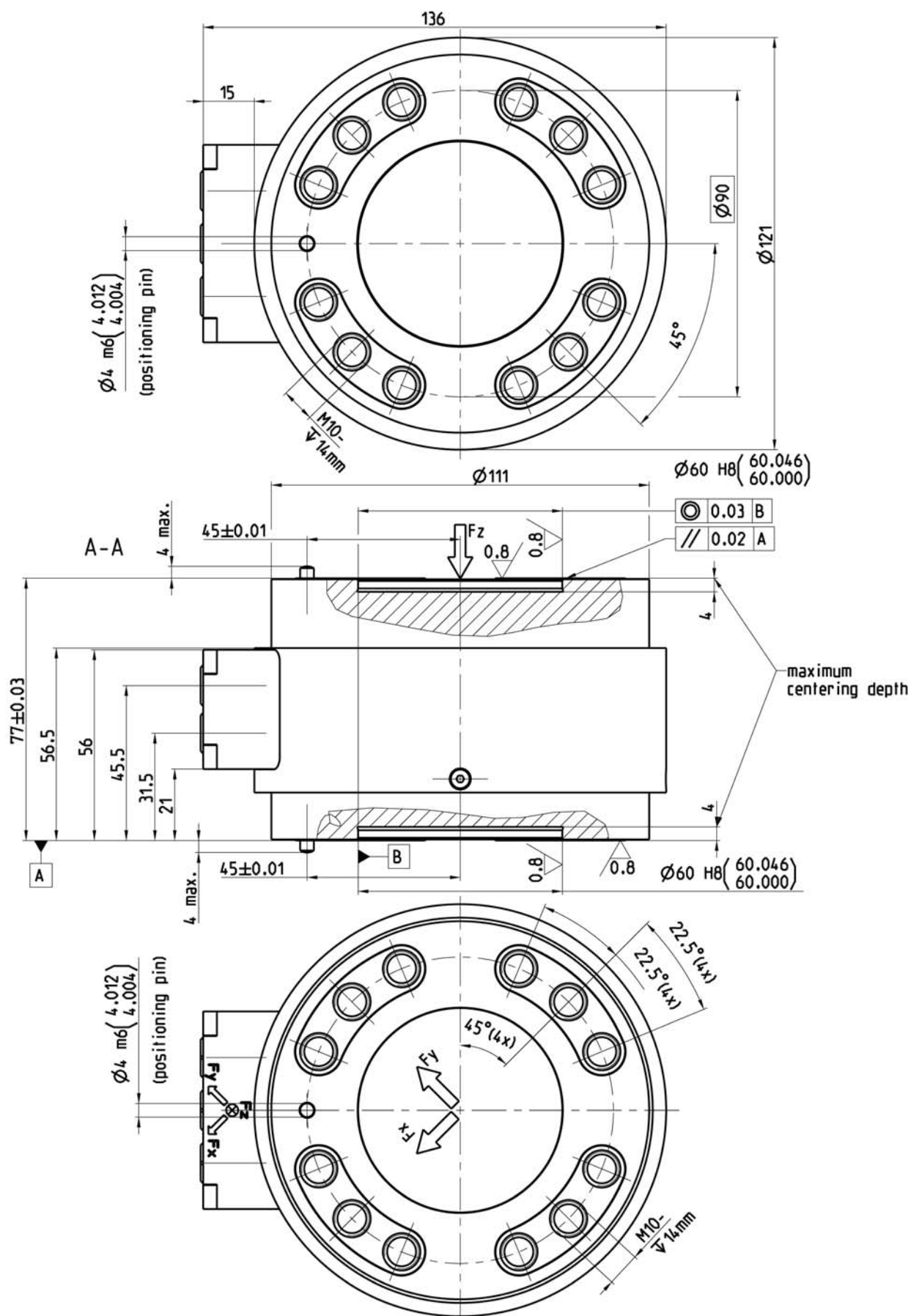




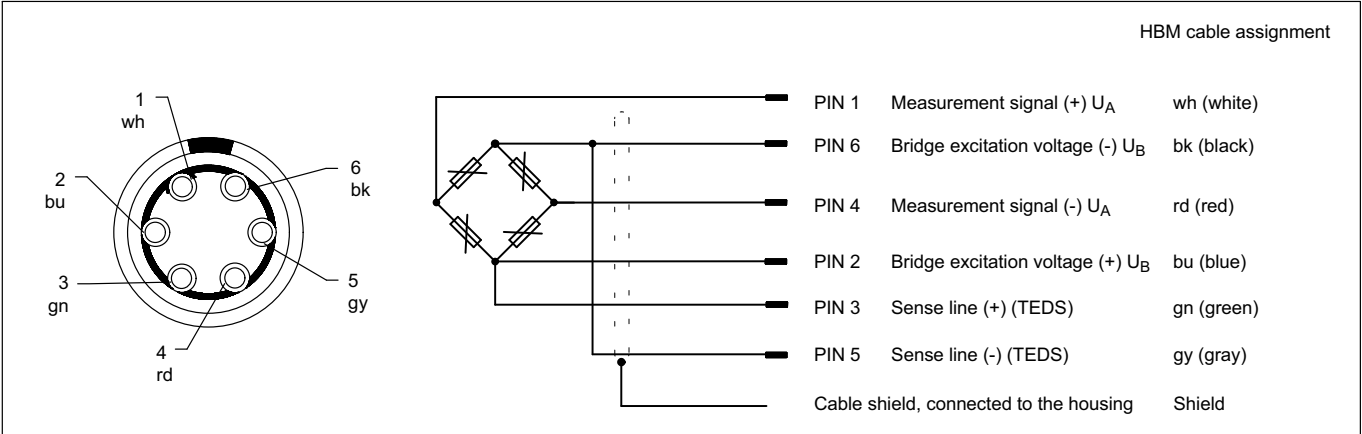




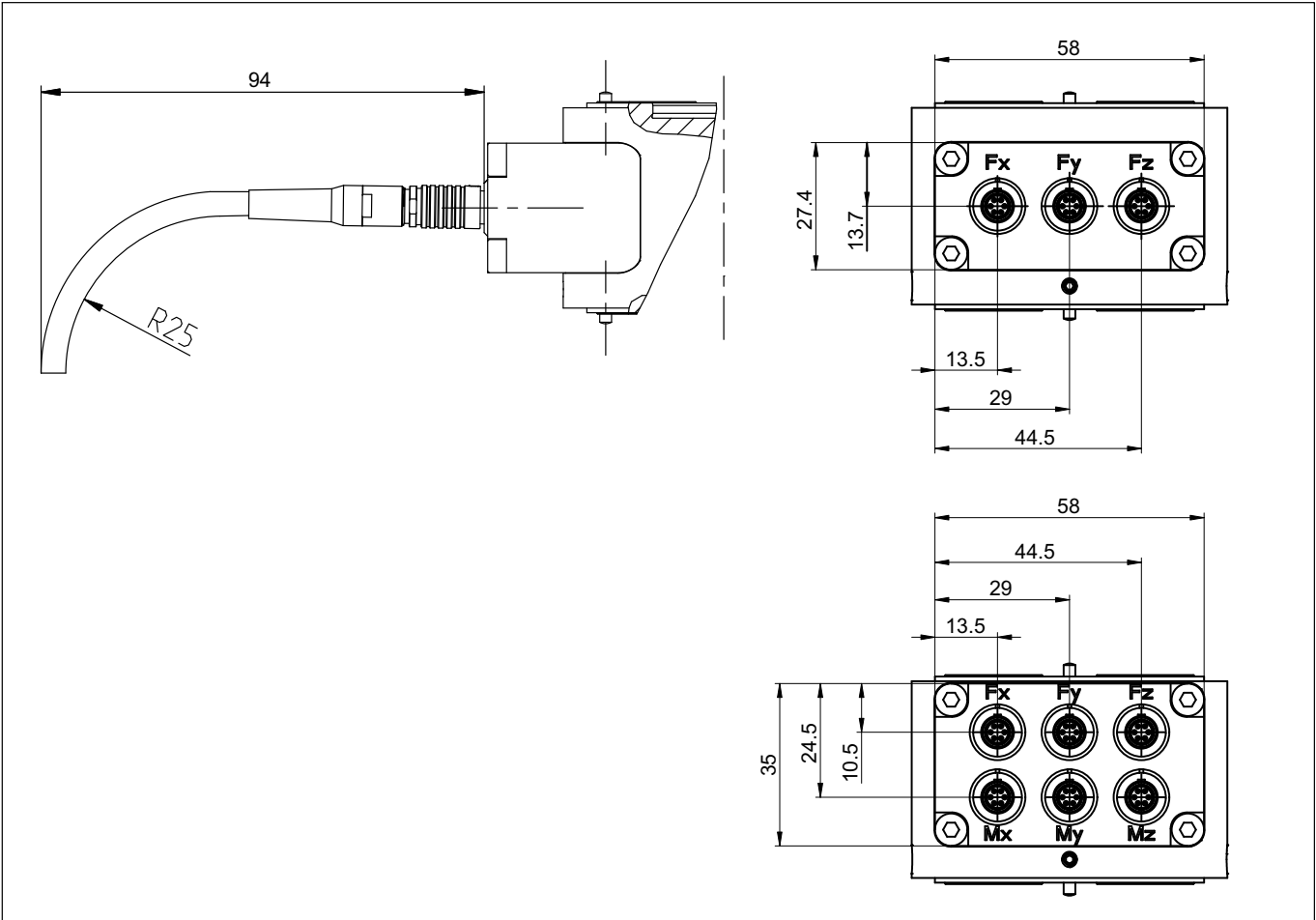




Pin assignment



Cable



Ordering number MCS10

Ordering number		
K-MCS10		
1	Code	Measurement range
	005	$F_x=1\text{ kN}$; $F_y=1\text{ kN}$; $F_z=5\text{ kN}$; $M_x=0.05\text{ kNm}$; $M_y=0.05\text{ kNm}$; $M_z=0.05\text{ kNm}$
	010	$F_x=2\text{ kN}$; $F_y=2\text{ kN}$; $F_z=10\text{ kN}$; $M_x=0.15\text{ kNm}$; $M_y=0.15\text{ kNm}$; $M_z=0.15\text{ kNm}$
	025	$F_x=5\text{ kN}$; $F_y=5\text{ kN}$; $F_z=25\text{ kN}$; $M_x=0.35\text{ kNm}$; $M_y=0.35\text{ kNm}$; $M_z=0.25\text{ kNm}$
	050	$F_x=10\text{ kN}$; $F_y=10\text{ kN}$; $F_z=50\text{ kN}$; $M_x=0.7\text{ kNm}$; $M_y=0.7\text{ kNm}$; $M_z=0.5\text{ kNm}$
	100	$F_x=20\text{ kN}$; $F_y=20\text{ kN}$; $F_z=100\text{ kN}$; $M_x=2\text{ kNm}$; $M_y=2\text{ kNm}$; $M_z=1.5\text{ kNm}$
2	Code	Version
	3C	Option for 3 components - only forces (F_x , F_y & F_z)
	6C	Option for 6 components - obligatory for moments
3	Code	Component F_x
	FX	Measurement output F_x
	00	No measurement output
4	Code	Component F_y
	FY	Measurement output F_y
	00	No measurement output
5	Code	Component F_z
	FZ	Measurement output F_z
	00	No measurement output
6	Code	Component M_x
	MX	Measurement output M_x
	00	No measurement output
7	Code	Component M_y
	MY	Measurement output M_y
	00	No measurement output
8	Code	Component M_z
	MZ	Measurement output M_z
	00	No measurement output

For example:

K-MCS10 -

0	1	0
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 -

6	C
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 -

F	X
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 -

F	Y
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 -

0	0
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 -

M	X
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 -

0	0
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 -

M	Z
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1 2 3 4 5 6 7 8

Accessories (to be ordered separately)

Article	Ordering number
Configurable connection cable	K-KAB-M
Connection cable 6 m with free ends	1-KAB146-6

Subject to modifications.
All product descriptions are for general information
only. They are not to be understood as a guarantee
of quality or durability.

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