Data sheet

T12

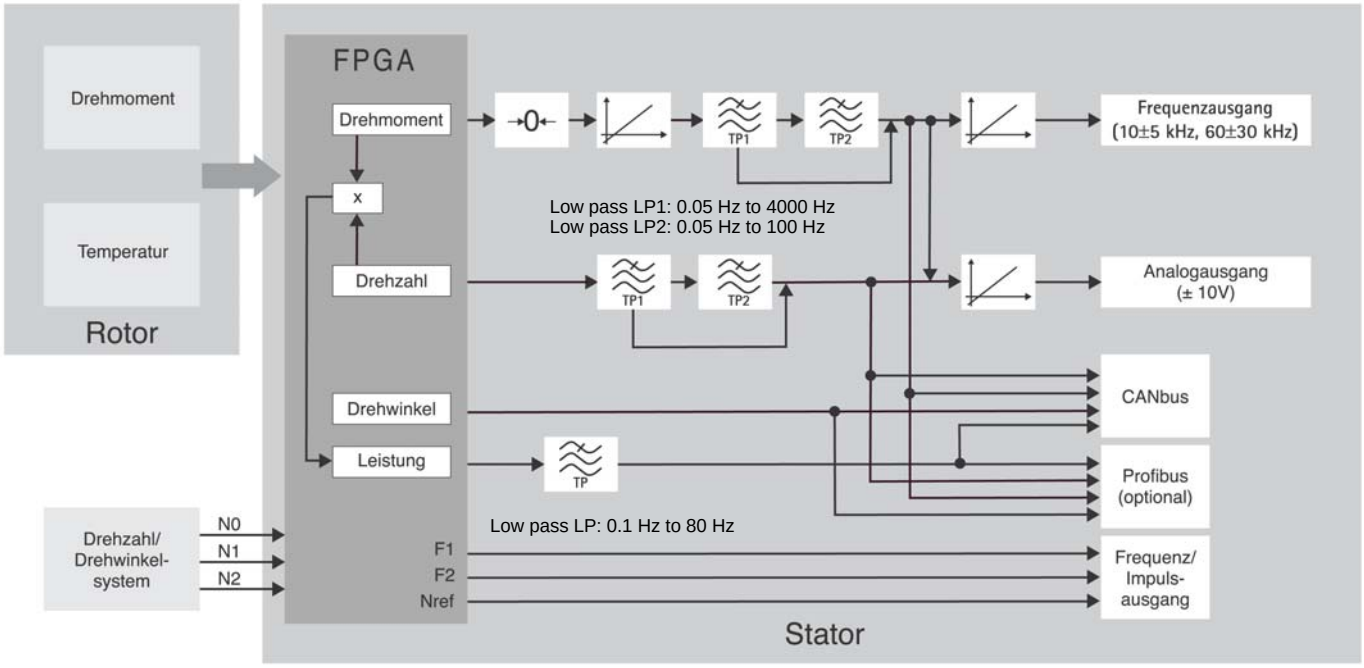
Digital Torque Transducer

smart torque® by HBM

Special features

- **Nominal (rated) torques 100 N·m, 200 N·m, 500 N·m, 1 kN·m, 2 kN·m, 3 kN·m, 5 kN·m and 10 kN·m**
- **Nominal (rated) rotational speeds from 10 000 rpm to 18 000 rpm**
- **Large measurement frequency range up to 6 kHz (−3 dB)**
- **Fast digital measurement signal transmission of 4800 measured values/s**
- **High resolution of 19 bits (integrative method)**
- **Monitoring functions**
- **Extensive options**

Signal flow block diagram



Specifications

Type		**T12**							
Accuracy class		0.03							
Torque measuring system									
Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
Nominal (rated) rotational speed n_{nom}									
Option 3, code L [1]	rpm	15 000		12 000				10 000	
Option 3, code H [1]	rpm	18 000		16 000				14 000	12 000
Non-linearity including hysteresis, related to nominal (rated) sensitivity									
Fieldbuses, frequency output 10 kHz/60 kHz									
For a max. torque in the range:									
between 0% of M_{nom} and 20% of M_{nom}	%	< ± 0.006 (optional < ± 0.004)							
> 20% of M_{nom} and 60% of M_{nom}	%	< ± 0.013 (optional < ± 0.007)							
> 60% of M_{nom} and 100% of M_{nom}	%	< ± 0.02 (optional < ± 0.01)							
Voltage output									
For a max. torque in the range:									
between 0% of M_{nom} and 20% of M_{nom}	%	< ± 0.015							
> 20% of M_{nom} and 60% of M_{nom}	%	< ± 0.035							
> 60% of M_{nom} and 100% of M_{nom}	%	< ± 0.05							
Relative standard deviation of repeatability per DIN 1319, related to the variation of the output signal									
Fieldbuses/frequency output	%	± 0.01							
Voltage output	%	± 0.03							
Temperature effect per 10 K in the nominal (rated) temperature range									
on the output signal, related to the actual value of the signal span									
Fieldbuses/frequency output	%	± 0.03							
Voltage output	%	± 0.1							
on the zero signal, related to the nominal (rated) sensitivity									
Fieldbuses/frequency output	%	± 0.02 (optional ± 0.01)							
Voltage output	%	± 0.1							
Nominal (rated) sensitivity (span between torque = zero and nominal (rated) torque)									
Frequency output 10 kHz/60 kHz	kHz	5/30							
Voltage output	V	10							
Sensitivity tolerance (deviation of the actual output quantity at M_{nom} from the nominal (rated) sensitivity)									
Frequency output	%	± 0.05							
Voltage output	%	± 0.1							
Output signal at torque = zero									
Frequency output 10 kHz/60 kHz	kHz	10/60							
Voltage output	V	0							
Nominal (rated) output signal									
Frequency output									
with positive nominal (rated) torque 10 kHz/60 kHz	kHz	15/90 (5 V symmetrical [2])							
with negative nominal (rated) torque 10 kHz/60 kHz	kHz	5/30 (5 V symmetrical [2])							
Voltage output									
with positive nominal (rated) torque	V	+10							
with negative nominal (rated) torque	V	−10							
Scaling range									
Frequency output/voltage output	%	10 to 1000 (of M_{nom})							
Resolution									
Frequency output 10 kHz/60 kHz	Hz	0.03/0.25							
Voltage output	mV	0.33							
Residual ripple									
Voltage output	mV	3							

1) See page 19.
2) RS−422 complementary signals, note termination resistance.

Specifications (continued)

Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
Maximum modulation range [3]									
Frequency output 10 kHz/60 kHz	kHz	4 to 16/24 to 96							
Voltage output	V	−10.2 to +10.2							
Load resistance									
Frequency output	kΩ	≥ 2							
Voltage output	kΩ	≥ 10							
Long-term drift over 48 h									
Voltage output	mV	± 3							
Measurement frequency range									
Frequency output/voltage output −1 dB	Hz	0 to 4000							
Frequency output/voltage output −3 dB	Hz	0 to 6000							
Low-pass filter LP1	Hz	0.05 to 4000 (fourth-order Bessel, −1 dB); factory setting 1000 Hz							
Low-pass filter LP2	Hz	0.05 to 100 (fourth-order Bessel, −1 dB); factory setting 1 Hz							
Group delay (low pass LP1: 4 kHz)									
Frequency output 10 kHz/60 kHz	µs	320/250							
Voltage output	µs	500							
Energy supply									
Nominal (rated) supply voltage (DC) (separated extra-low voltage)	V	18 to 30							
Current consumption in measuring mode	A	< 1 (typ. 0.5)							
Current consumption in startup mode	A	< 4							
Nominal (rated) power consumption	W	< 18							
Maximum cable length	m	50							
Shunt signal		50% of M_{nom} or 10% of M_{nom}							
Tolerance of the shunt signal, related to M_{nom}	%	± 0.05							
Rotational speed/angle of rotation measuring system		Optical, using infrared light and a metallic slotted disc							
Mechanical increments	number	360						720	
Positional tolerance of the increments	mm	± 0.05							
Tolerance of the slot width	mm	± 0.05							
Pulses per revolution (adjustable)	number	360; 180; 90; 60; 45; 30						720; 360; 180; 120; 90; 60	
Pulse frequency at nominal (rated) rotational speed n_{nom}									
Option 3, code L [4]	kHz	90		72				120	
Option 3, code H [4]	kHz	108		96				168	
Minimum rotational speed for sufficient pulse stability	rpm	2							
Group delay	µs	< 5 (typ. 2.2)							
Hysteresis of direction of rotation reversal in the case of relative vibrations between rotor and stator									
Torsional vibration of the rotor	degrees	< approx. 2							
Radial vibrations of the stator	mm	< approx. 2							
Permitted degree of contamination, in the optical path of the sensor pickup (lenses, slotted disc)	%	< 50							
Effect of turbulence on the zero point, related to the nominal (rated) torque									
Option 3, code L [4]	%	< 0.05	< 0.03	< 0.03	< 0.02			< 0.01	
Option 3, code H [4]	%	< 0.08	< 0.04	< 0.03	< 0.02			< 0.01	
Output signal for frequency/pulse output	V	5 [5] symmetrical, 2 square-wave signals, approx. 90° out-of-phase							
Load resistance	kΩ	≥ 2							

3) Output signal range in which there is a repeatable correlation between torque and output signal.

4) See page 19.

5) RS−422 complementary signals, note termination resistances.

Specifications (continued)

Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
Rotational speed									
Fieldbuses									
Resolution	rpm	0.1							
System accuracy (with torsional vibrations of max. 3% of the current rotational speed at 2x rotational frequency)	ppm	150							
Max. rotational speed variation at nominal (rated) rotational speed (100 Hz filter)	rpm	1.5							
Voltage output									
Measuring range	V	±10							
Resolution	mV	0.33							
Scaling range	%	10 to 1000							
Overload limits	V	±10.2							
Load resistance	kΩ	> 10							
Linearity error	%	< 0.03							
Nominal (rated) power consumption	W	< 18							
Maximum cable length	m	50							
Temperature effect per 10 K in the nominal (rated) temperature range									
on the output signal, related to the actual value of the signal span	%	< 0.03							
on the zero signal	%	< 0.03							
Residual ripple	mV	< 3							
Angle of rotation									
Accuracy	degrees	1 (typ. 0.1)							
Resolution	degrees	0.01							
Correction of runtime deviation between torque LP1 and the angle of rotation for filter frequencies	Hz	4000; 2000; 1000; 500; 200; 100							
Measuring range	degrees	0 to 360 (single-turn) to ±1440 (multi-turn)							
Performance									
Measurement frequency range	Hz	80 (−1 dB)							
Resolution	W	1							
Full scale value	W	$P_{max} = M_{nom} \cdot n_{nom} \cdot \frac{\pi}{30}$ [M_{nom}] in N·m [n_{nom}] in rpm							
Temperature effect per 10 K in the nominal (rated) temperature range on the power signal, related to the full scale value	%	$\pm 0.05 \cdot n/n_{nom}$							
Non-linearity including hysteresis, related to the full scale value	%	$\pm 0.02 \cdot n/n_{nom}$							
Sensitivity tolerance (deviation of the actual measurement signal span of the power signal related to the full scale value)	%	± 0.05							
Temperature signal of the rotor									
Accuracy	K	1							
Measurement frequency range	Hz	5 (−1 dB)							
Resolution	K	0.1							
Physical unit	–	°C							
Data rate	Meas. values/s	40							

Specifications (continued)

Fieldbuses						
CAN Bus						
Protocol	–	CAN 2.0B, CAL/CANopen-compatible				
Data rate	Measured values/s	max. 4800 (PDO)				
Hardware bus link		as per ISO 11898				
Baud rate	kBit/s	1000	500	250	125	100
Maximum line length	m	25	100	250	500	600
Connector	–	5-pin, M12x1, A-coding per CANopen DR−303−1 V1.3, electrically isolated from power supply and measurement ground				
PROFIBUS DP						
Protocol	–	PROFIBUS DP Slave, per DIN 19245-3				
Baud rate	MBaud	max. 12				
PROFIBUS Ident Number	–	096C (hex)				
Input data, max.	bytes	152				
Output data, max.	bytes	40				
Diagnostic data	bytes	18 (2 · 4-byte module diagnosis)				
Connector	–	5-pin, M12x1, B-coding, electrically isolated from power supply and measurement ground				
Update rate [6]						
Configuration entries ≤ 2	Measured values/s	4800				
≤ 4		2400				
≤ 8		1200				
≤ 12		600				
≤ 16		300				
> 16		150				
Limit value switches (on fieldbuses only)						
Number	–	4 for torque, 4 for rotational speed				
Reference level	–	Torque low pass 1 or low pass 2 Rotational speed low pass 1 or low pass 2				
Hysteresis	%	0 to 100				
Adjustment accuracy	digits	1				
Response time (LP1 = 4000 Hz)	ms	typ. 3				
TEDS (Transducer Electronic Data Sheet)						
Number	–	2				
TEDS 1 (torque)	–	A choice of voltage sensor or frequency sensor				
TEDS 2 (rotational speed/angle of rotation)	–	Frequency/pulse sensor				

6) When CAN PDOs are activated simultaneously, the update rate on the PROFIBUS is reduced.

Specifications (continued)

Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
General information									
EMC									
Emission (per FCC 47, Part 15, Subpart C)[7]	–								
Emission (per EN61326−1, Table 3)[8]									
RFI voltage	–								
RFI power	–								
RFI field strength	–								
Immunity from interference(EN61326−1, Table A.1)									
Electromagnetic field (AM)	V/m								
Magnetic field	A/m								
Electrostatic discharge (ESD)									
Contact discharge	kV								
Air discharge	kV								
Fast transients (burst)	kV								
Impulse voltages (surge)	kV								
Conducted interference (AM)	V								
Degree of protection per EN 60529									
Reference temperature	°C								
Nominal (rated) temperature range	°C								
Operating temperature range	°C								
Storage temperature range	°C								
Impact resistance, test severity level per DIN IEC 68; Part 227; IEC 682271987									
Number	n								
Duration	ms								
Acceleration (half sine)	m/s^2								
Vibration in 3 directions according to DIN IEC 68, Part 2-6: IEC 68-2-6-1982									
Frequency range	Hz								
Duration	h								
Acceleration (amplitude)	m/s^2								
Load limits[9]									
Limit torque, (static) ±	% of M_{nom}								
Breaking torque, (static) ±	% of M_{nom}								
Longitudinal limit force (static) ±	kN								
Longitudinal limit force (dynamic) amplitude	kN								
Lateral limit force (static) ±	kN								
Lateral limit force (dynamic) amplitude	kN								
Limit bending moment (static) ±	N·m								
Limit bending moment (dynamic) amplitude	N·m								
Oscillation width per DIN 50100 (peak-to-peak)[10]	N·m								

					50				50
					200			160	
					> 400			> 320	
		5	10	16	19	39	42	80	120
		2.5	5	8	8.5	19.5	21	40	60
		1	2	4	5	9	10	12	18
		0.5	1	2	2.5	4.5	5	6	9
		50	100	200	220	560	600	800	1200
		25	50	100	110	280	300	400	600
		200	400	1000	2000	4000	4800	8000	16000

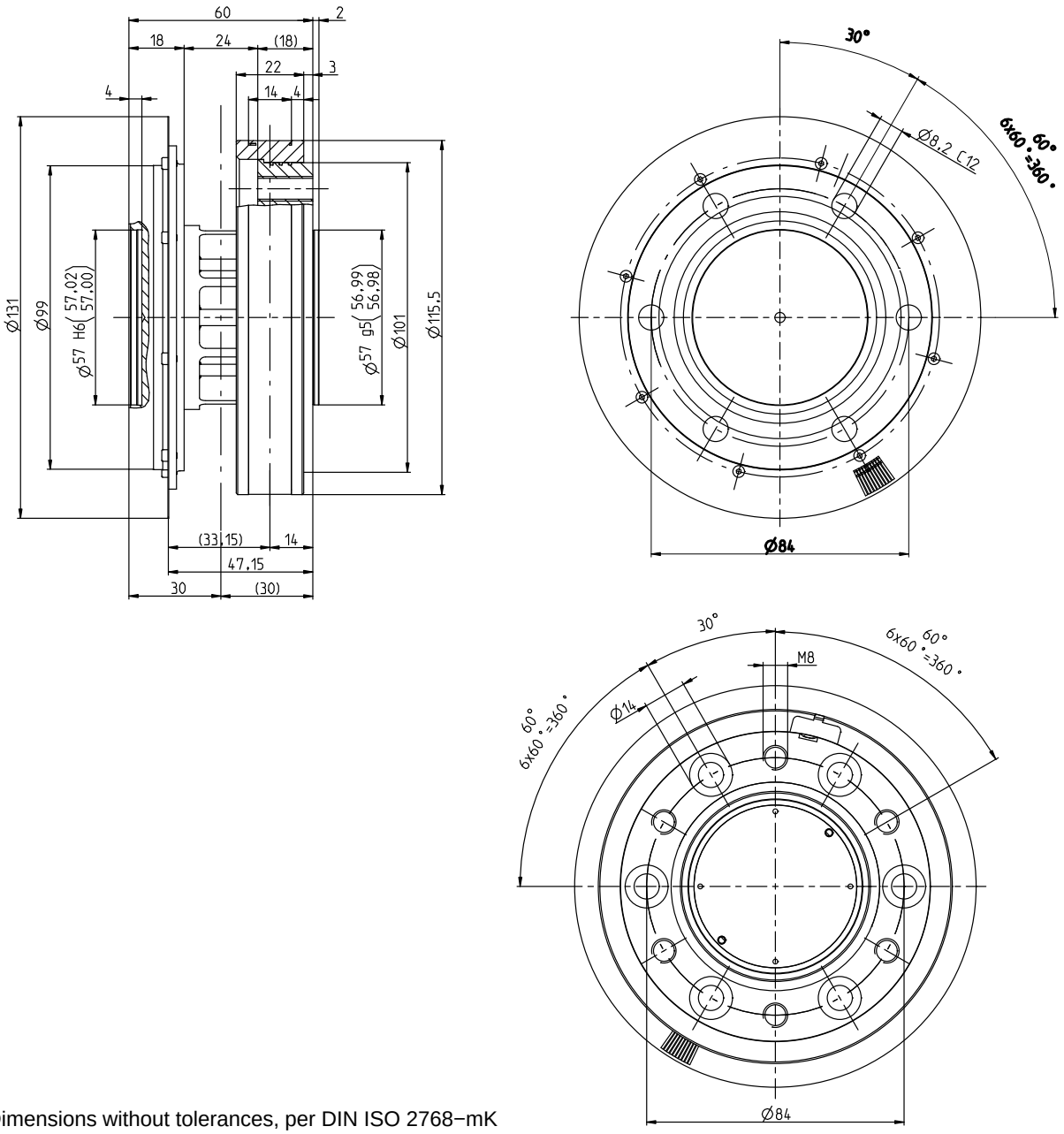
7) Option 9, Code U
8) Option 9, Code N
9) Each type of irregular stress (bending moment, lateral or longitudinal force, exceeding nominal (rated) torque) can only be permitted up to its specified limit, provided none of the others can occur at the same time. If this condition is not met, the limit values must be reduced. If 30% of the limit bending moment and lateral limit force occur at the same time, only 40% of the longitudinal limit force is permissible and the nominal (rated) torque must not be exceeded. The effects of permissible bending moments, longitudinal and lateral forces on the measurement result are $\leq \pm 0.3\%$ of the nominal (rated) torque.
10) The nominal (rated) torque must not be exceeded.

Specifications (continued)

Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
Mechanical values									
Torsional stiffness c_T	kN·m/rad	230	270	540	900	2300	2600	4600	7900
Torsion angle at M_{nom}	degrees	0.048	0.043	0.055	0.066	0.049	0.066	0.06	0.07
Stiffness in the axial direction c_a	kN/mm	420	800	740	760	950	1000	950	1600
Stiffness in the radial direction c_r	kN/mm	130	290	550	810	1300	1500	1650	2450
Stiffness during the bending moment round a radial axis c_b	kN·m/deg.	3.8	7	11.5	12	21.7	22.4	43	74
Maximum deflection at longitudinal limit force	mm	< 0.02		< 0.03		< 0.05		< 0.1	
Additional max. radial deviation at lateral limit force	mm	< 0.02							
Additional plumb/parallel deviation at limit bending moment (at ∅ d_B)	mm	< 0.03		< 0.05		< 0.07			
Balance quality level per DIN ISO 1940		G 2.5							
Max. limits for relative shaft vibration (peak-to-peak) [11] Undulations in the connection flange area, based on ISO 7919−3	µm	Normal operation (continuous operation) $s_{(p-p)} = \frac{9000}{\sqrt{n}}$ Start and stop operation / resonance ranges (temporary) $s_{(p-p)} = \frac{13200}{\sqrt{n}}$ (n in rpm)							
Mass moment of inertia of the rotor									
I_V (around rotary axis)	kg·m²	0.0023	0.0033	0.0059		0.0192		0.037	0.097
I_V with optical rotational speed measuring system	kg·m²	0.0025	0.0035	0.0062		0.0196		0.038	0.0995
Proportional mass moment of inertia for the transmitter side									
without rotational speed measuring system	%	58		56		54		53	
with optical rotational speed measuring system	%	56		54		53		52	
Max. permissible static eccentricity of the rotor (radially) to the center point of the stator									
without rotational speed measuring system	mm	±2							
with rotational speed measuring system	mm	±1							
Max. permissible axial displacement of the rotor to the stator	mm	±2							
Weight, approx. Rotor	kg	1.1	1.8	2.4		4.9		8.3	14.6
Stator	kg	2.3				2.4		2.5	2.6

[11] The influence of radial deviations, impact, defects of form, notches, marks, local residual magnetism, structural variations or material anomalies on the vibrational measurements needs to be taken into account and isolated from the actual undulation.

Dimensions of rotor 100 N·m to 200 N·m (in mm)

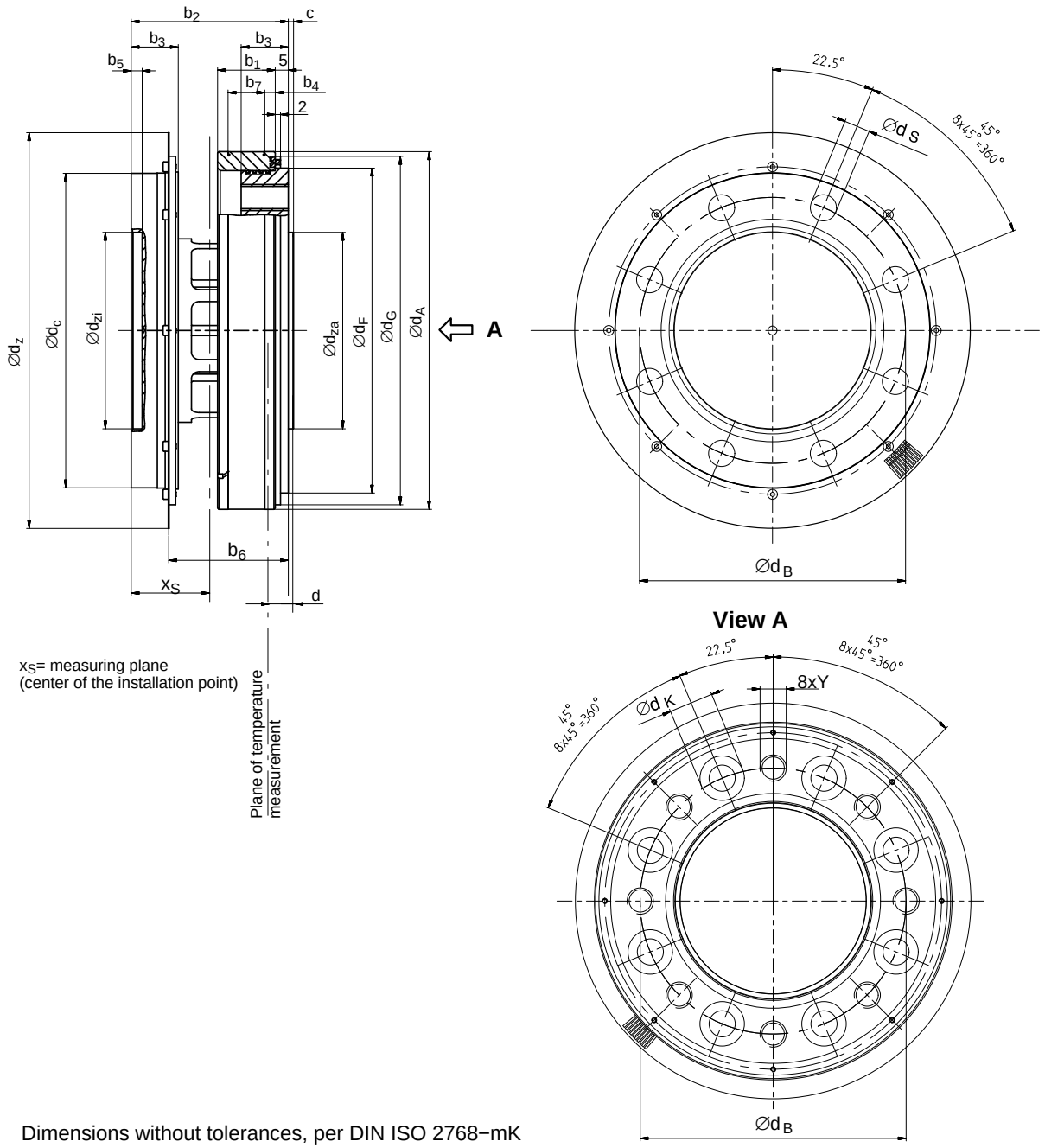


Dimensions without tolerances, per DIN ISO 2768−mK

Measuring range	Dimensions in mm (1 mm = 0.03937 inches)										
	b_1	b_2	b_3	b_4	b_5	b_6	b_7	c	d	x_S	Y
100 N·m/200 N·m	22	60	18	4	4	47.15	14	2	12.5	30	M8

Measuring range	Dimensions in mm (1 mm = 0.03937 inches)									
	$Ød_A$	$Ød_B$	$Ød_C$	$Ød_F$	$Ød_G$	$Ød_K$	$Ød_S{}^{C12}$	$Ød_Z$	$Ød_{za\ g5}$	$Ød_{zi}{}^{H6}$
100 N·m/200 N·m	115.5	84	99	101	110	14	8.2	131	57	57

Dimensions of rotor 500 N·m to 10 kN·m (in mm)

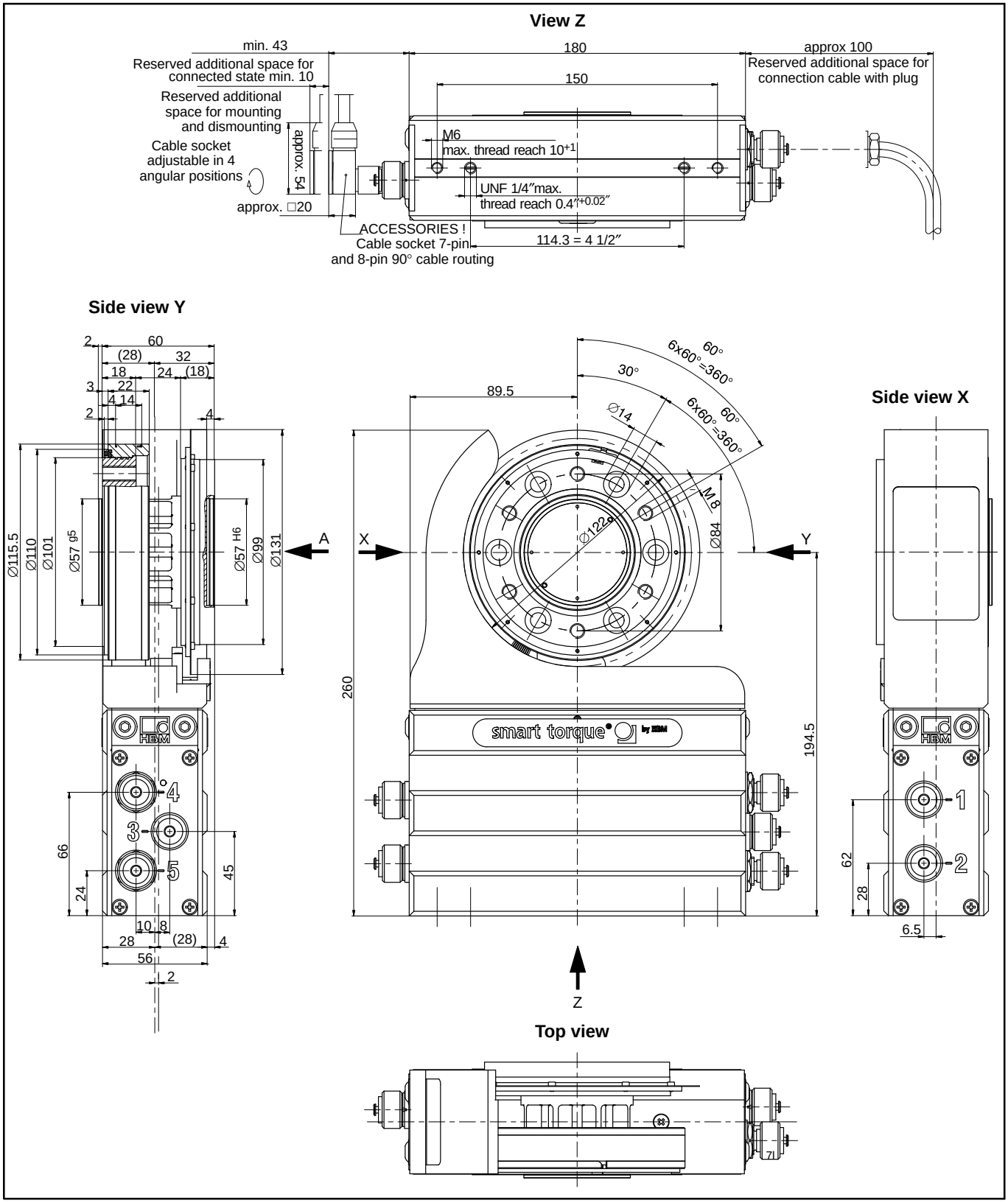


Dimensions without tolerances, per DIN ISO 2768−mK

Measuring range	Dimensions in mm (1 mm = 0.03937 inches)										
	b_1	b_2	b_3	b_4	b_5	b_6	b_7	c	d	x_S	Y
500 N·m/1 kN·m	22	60	18	4	4	45.7	14	2	8	30	M10
2 kN·m/3 kN·m	23	64	20	5	4	47.7	14	2.5	8	32	M12
5 kN·m	24.8	84	26	3.3	3	62.7	17.5	2.8	8	42	M14
10 kN·m	24.8	92	30	3.3	4	66.7	17.5	3.5	10	46	M16

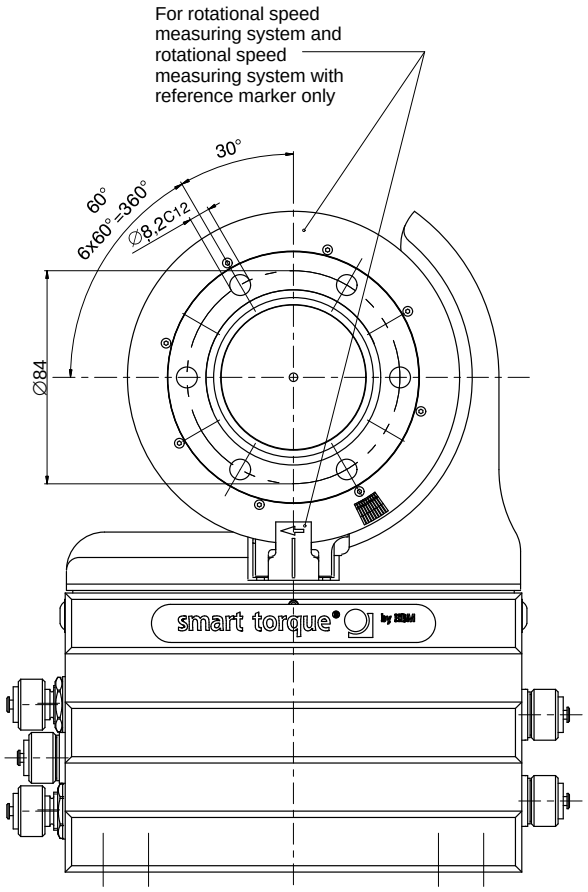
Measuring range	Dimensions in mm (1 mm = 0.03937 inches)									
	$Ød_A$	$Ød_B$	$Ød_C$	$Ød_F$	$Ød_G$	$Ød_K$	$Ød_S{}^{C12}$	$Ød_Z$	$Ød_{za\ g5}$	$Ød_{zi\ H6}$
500 N·m/1 kN·m	136.5	101.5	120	124	133	17	10.5	151	75	75
2 kN·m/3 kN·m	172.5	130	155	160	169	19	12.5	187	90	90
5 kN·m	200.5	155.5	179	188	197	22	14.5	221	110	110
10 kN·m	242.5	196	221	230	239	26	17	269	140	140

Dimensions of stator 100 N·m to 200 N·m (in mm)

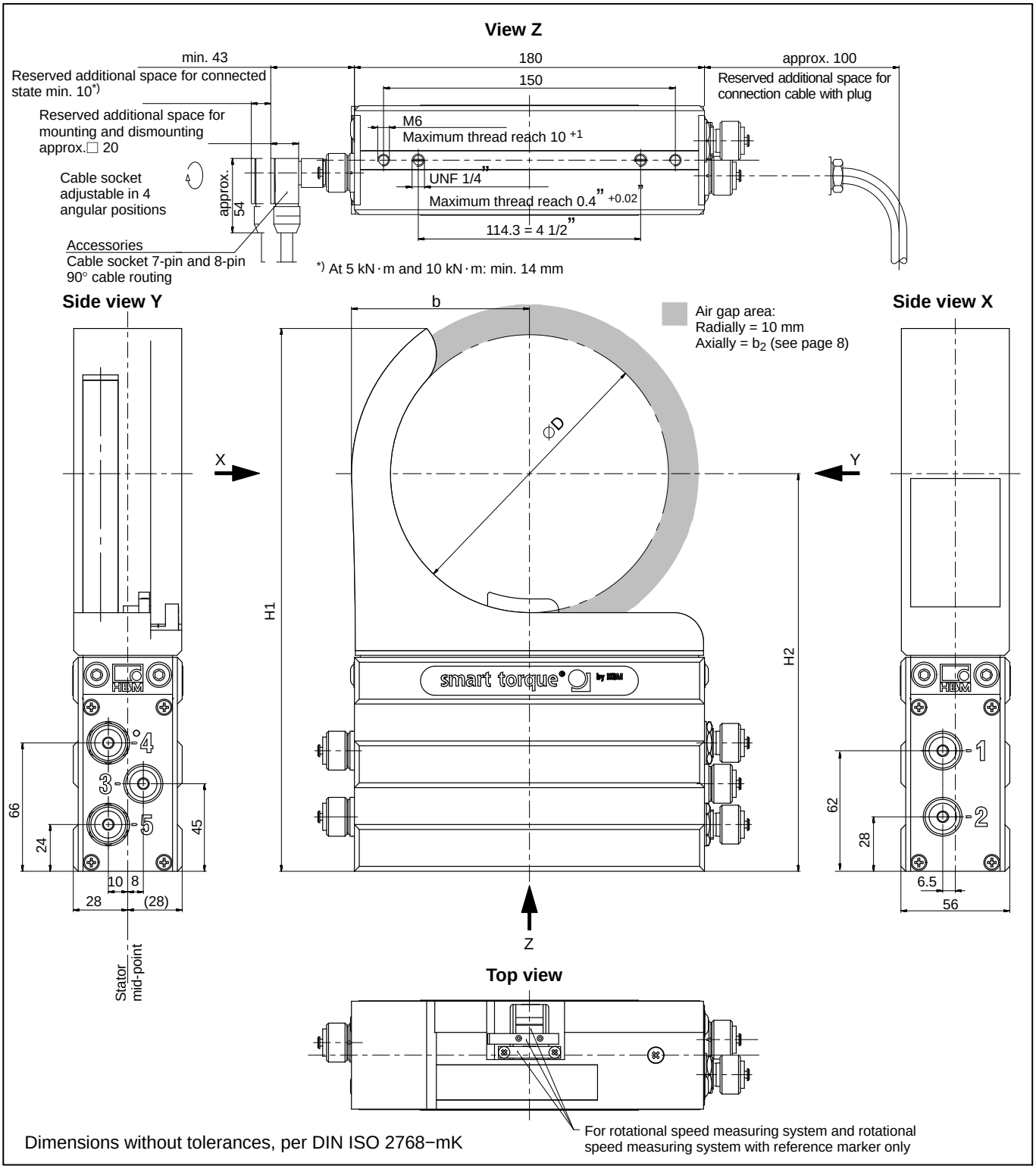


Dimensions of stator 100 N·m to 200 N·m (in mm)

View A

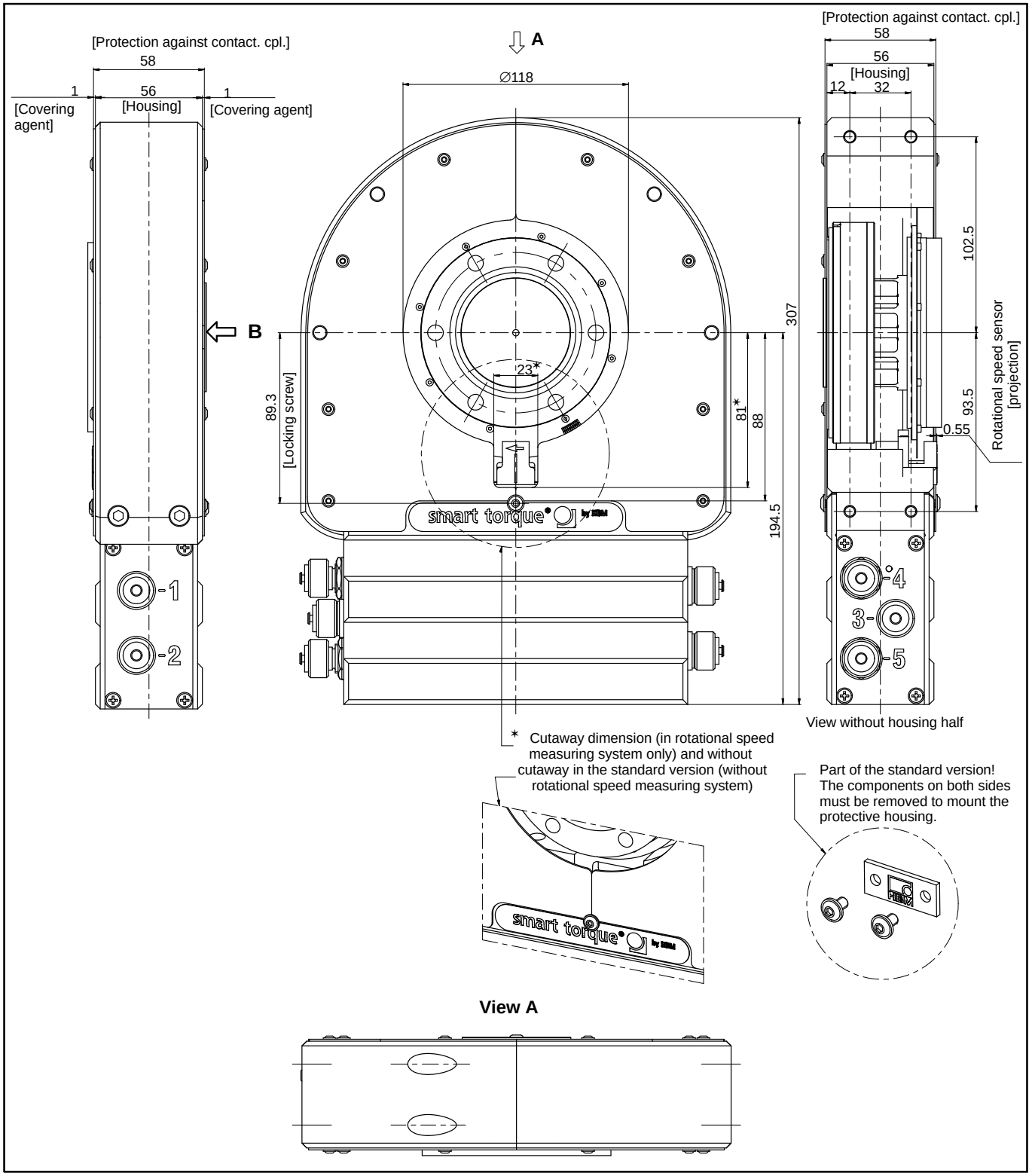


Dimensions of stator 100 N·m to 10 kN·m (in mm)



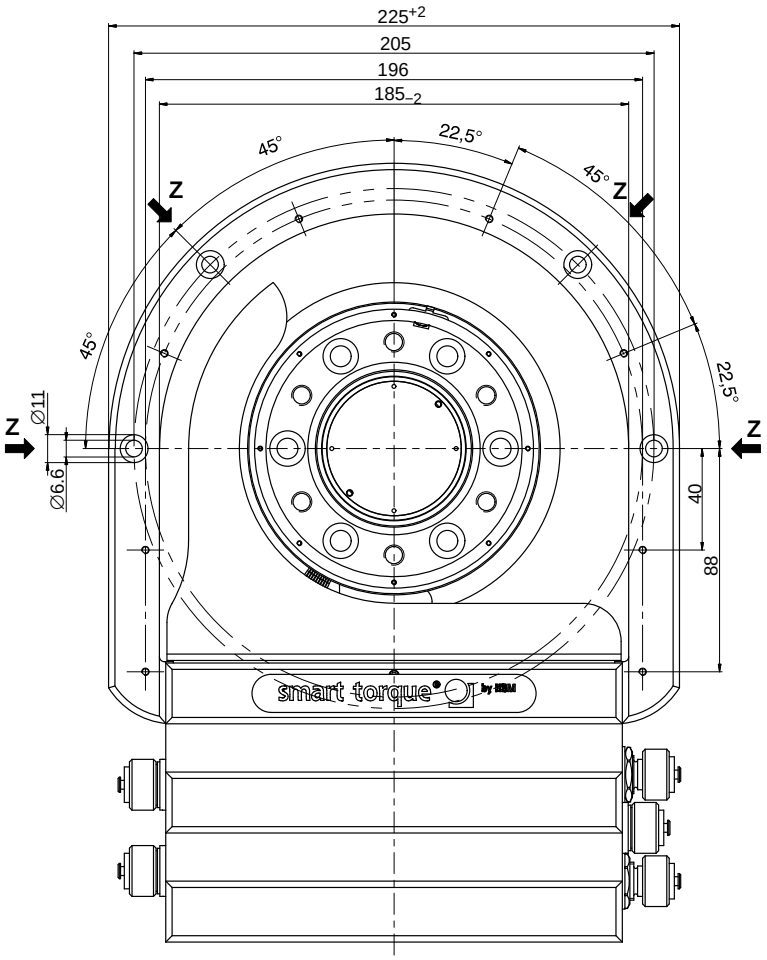
Measuring range (N·m)	Dimensions in mm (1 mm = 0.03937 inches)			
	b	ØD	H1	H2
100 200	81	122	260	194.5
500 1 k	91.5	143	280	204.5
2 k 3 k	109.5	179	310	222.5
5 k	123.5	207	333	239.5
10 k	144.5	249	369	263.5

Dimensions of stator 100 N·m to 200 N·m with protection against contact (in mm)



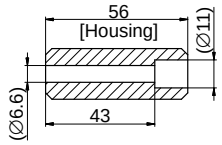
Dimensions of stator 100 N·m to 200 N·m with protection against contact (in mm)

View B



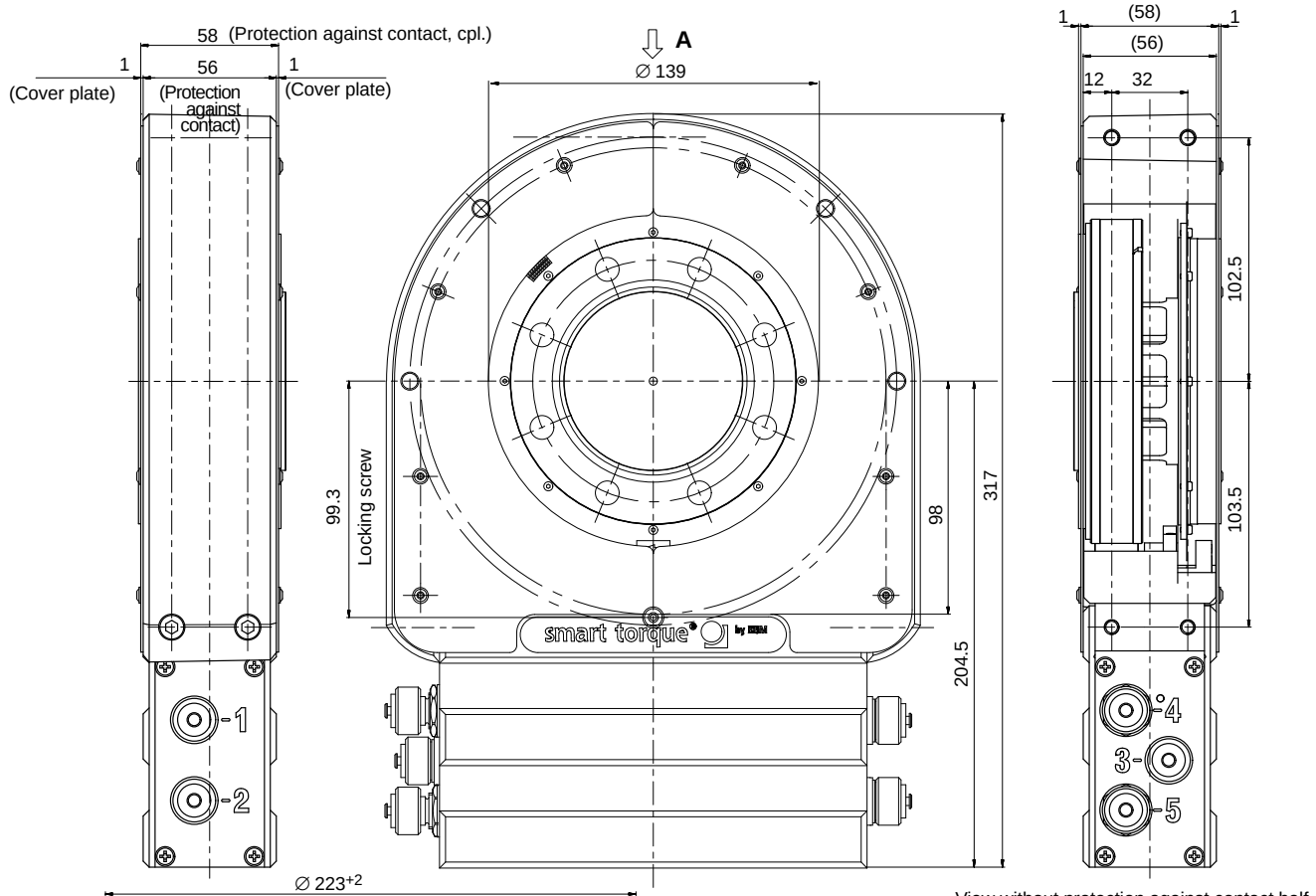
View without covering agent

Connection holes Z

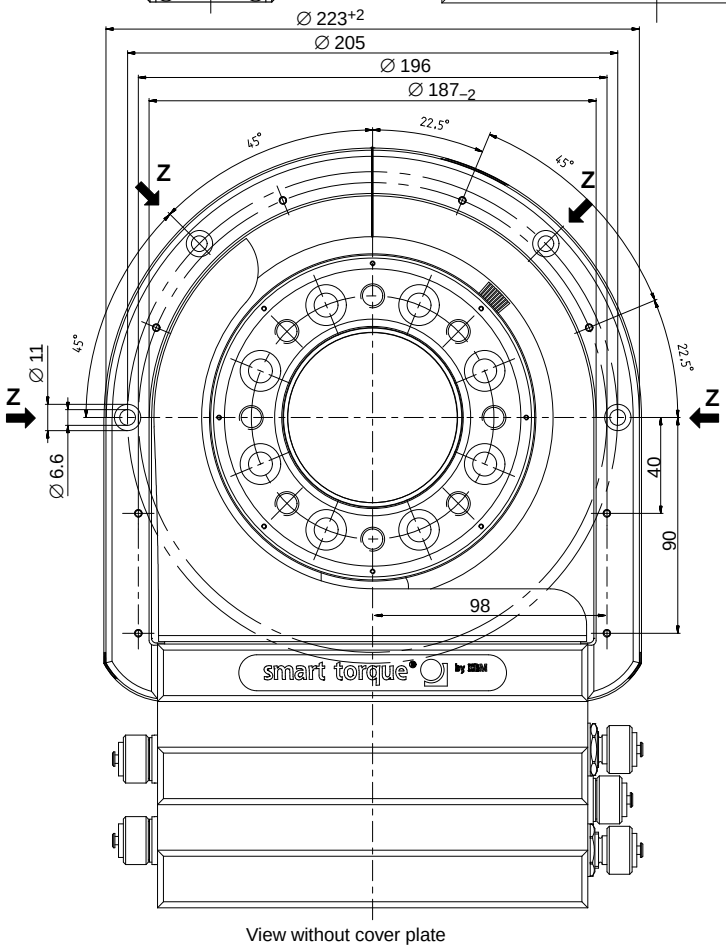


Connection hole with countersinking

Dimensions of stator 500 N·m to 1 kN·m with protection against contact (in mm)

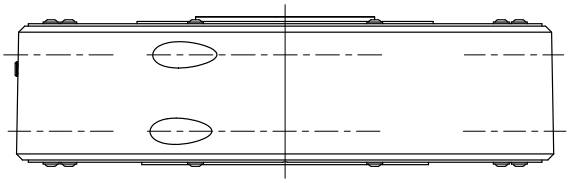


View without protection against contact half

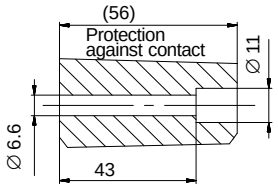


View without cover plate

View A

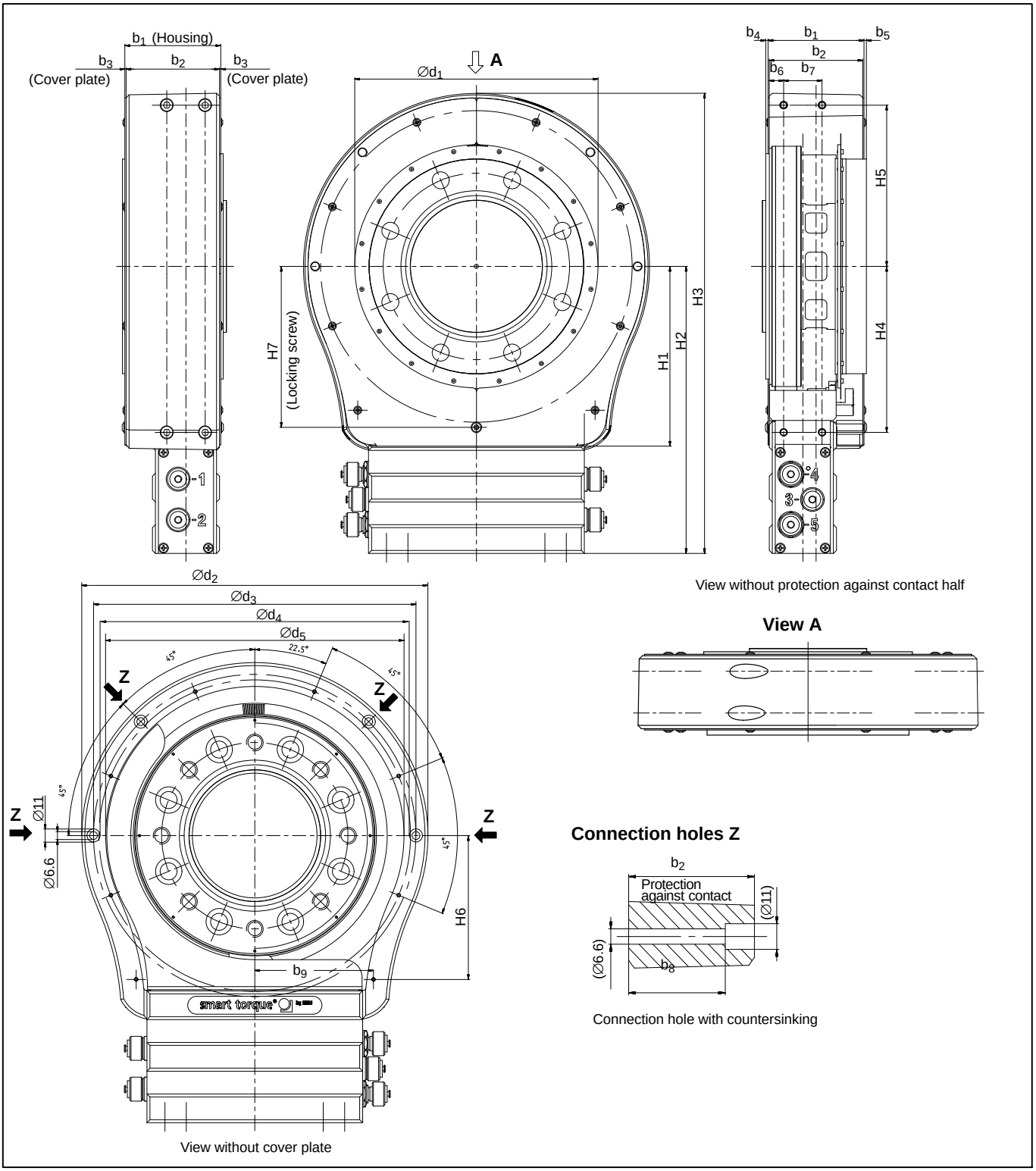


Connection holes Z



Connection hole with countersinking

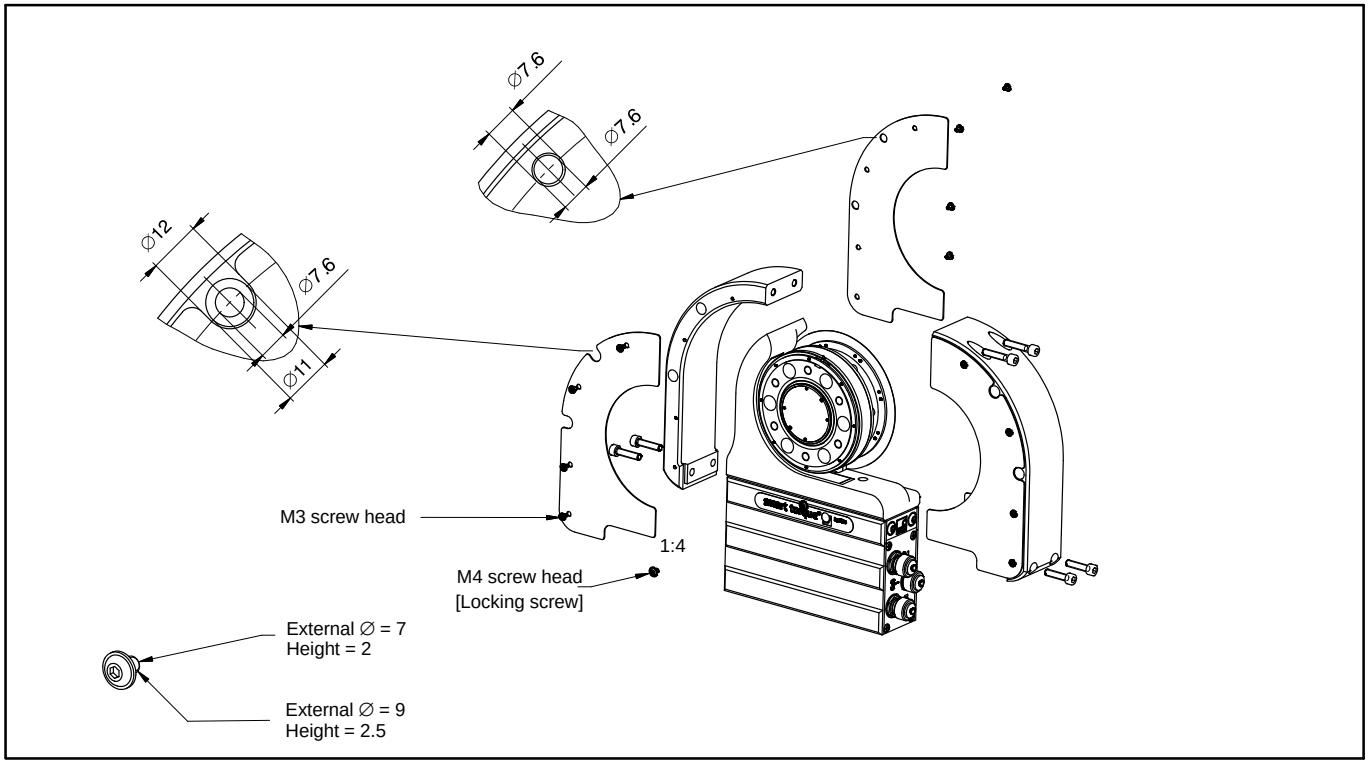
Dimensions of stator 2 kN·m to 10 kN·m with protection against contact (in mm)



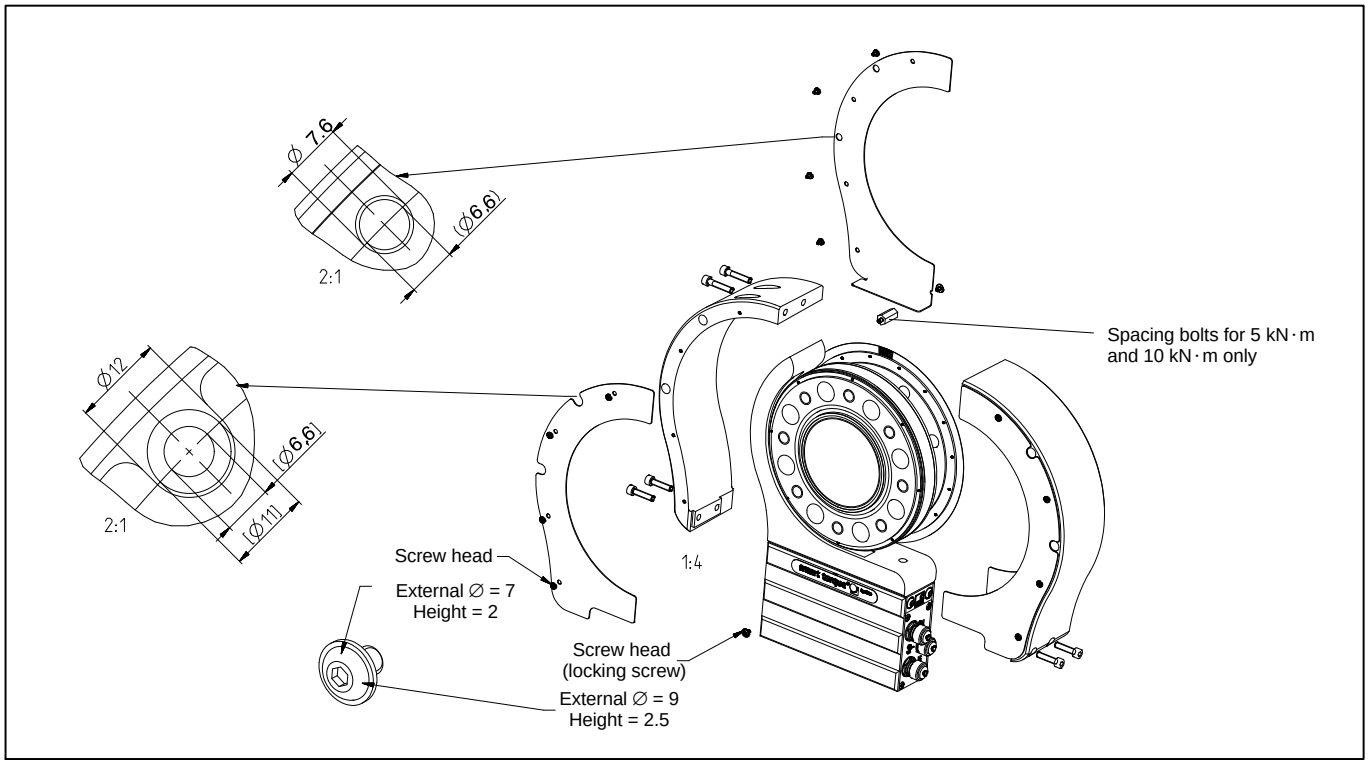
Measuring range	Dimensions in mm (1 mm = 0.03937 inches)															
	b_1	b_2	b_3	b_4	b_5	b_6	b_7	b_8	b_9	H1	H2	H3	H4	H5	H6	H7
2 kN·m/3 kN·m	58	56	1	2	4	12	32	43	97.5	116	222.5	353	121.5	120.5	107	117.3
5 kN·m	80	78	1	2	2	12	32	65	99	133	239.5	384	138.5	134.5	120	134.3
10 kN·m	88	86	1	2	2	12	32	73	99	157	263.5	429	162.5	155.5	145	158.3

Measuring range	Dimensions in mm (1 mm = 0.03937 inches)				
	$⌀d_1$	$⌀d_2$	$⌀d_3$	$⌀d_4$	$⌀d_5$
2 kN·m/3 kN·m	175	259^{+2}	241	232	223_{-2}
5 kN·m	203	289^{+2}	269	260	249_{-2}
10 kN·m	245	331^{+2}	311	302	291_{-2}

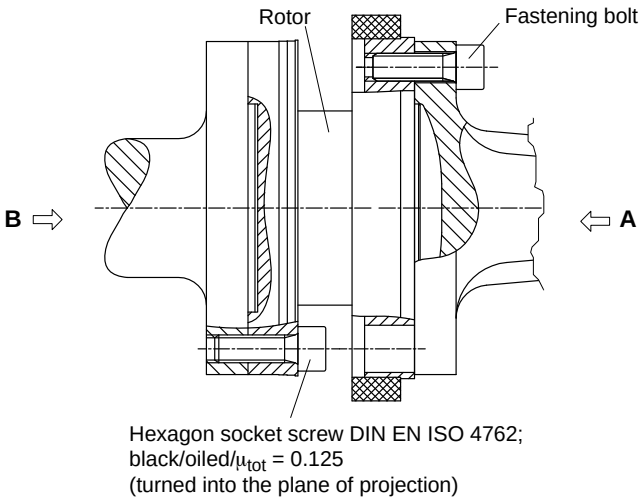
Dimensions of protection against contact plates 100 N·m to 200 N·m (in mm)



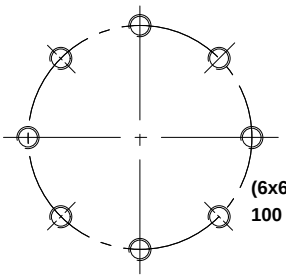
Dimensions of protection against contact plates 500 N·m to 10 kN·m (in mm)



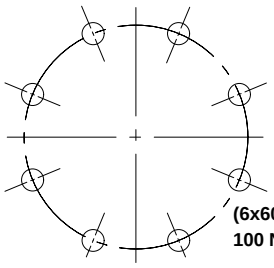
Bolted rotor connection



Bolt distribution view A

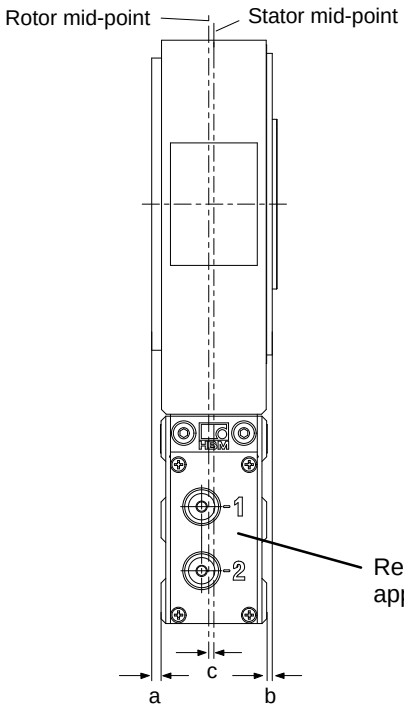


Bolt distribution view B



Nominal (rated) torque (N·m)	Fastening bolts	Fastening bolt property class	Prescribed tightening torque (N·m)
100	M8	10.9	34
200	M8		
500	M10		67
1 k			
2 k	M12		115
3 k		12.9	135
5 k	M14		220
10 k	M16		340

Mounting dimensions

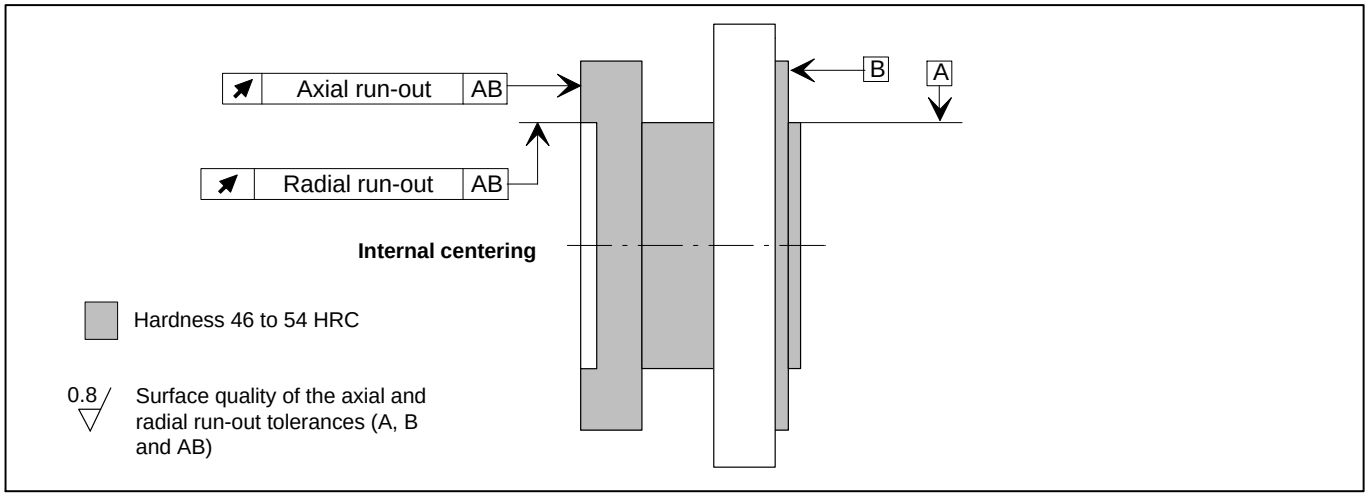


Mounting dimensions			
Measuring range	Mounting dimension (mm)		
	a	b	c
100 N·m 200 N·m	4	0	2
500 N·m 1 kN·m	2	2	0
2 kN·m 3 kN·m	5	3	1
5 kN·m	25	3	11
10 kN·m	33	3	15

(Tolerance ±1 mm)

Reserved add. space for fieldbus connection cables:
approx. 140 mm, from plug connection tag

Radial and axial run-out tolerances



Measuring range (N·m)	Axial run-out tolerance (mm)	Radial run-out tolerance (mm)
100	0.01	0.01
200	0.01	0.01
500	0.01	0.01
1 k	0.01	0.01
2 k	0.02	0.02
3 k	0.02	0.02
5 k	0.025	0.025
10 k	0.025	0.025

Ordering number

Code	Option 1: measuring range
S100Q	100 N·m
S200Q	200 N·m
S500Q	500 N·m
S001R	1 kN·m
S002R	2 kN·m
S003R	3 kN·m
S005R	5 kN·m
S010R	10 kN·m

Code	Option 2: accuracy
S	Standard
G	Greater accuracy[1)] Lin. $< \pm 0.01$ % and $TK_0 < \pm 0.01$ %/10 K

Code	Option 3: nominal (rated) rotational speed
L	Measuring range dependent up to 15 000 rpm
H	Measuring range dependent up to 18 000 rpm

Code	Option 4: electrical configuration
DF1	Output signal 60 kHz ± 30 kHz
DU2	Output signal 60 kHz ± 30 kHz and ±10 V
SF1	Output signal 10 kHz ± 5 kHz
SU2	Output signal 10 kHz ± 5 kHz and ±10 V

Code	Option 5: Bus connection
C	CANopen (2 device connector)
P	CANopen and PROFIBUS DPV1

Code	Option 6: rotational speed measuring system
N	Without rotational speed measuring system
1	With optical rotational speed measuring system; 360 or 720 pulses/revolution
A	With optical rotational speed measuring system; 360 or 720 pulses/revolution and reference signal

Code	Option 7: protection against contact
N	Without protection against contact
Y	With protection against contact

Code	Option 8: MODULFLEX® coupling[2)]
N	Without coupling
Y	With fitted coupling

Code	Option 9: customized modification
N	No customized modification
U	US & Canada Version

Order no.

K-T12 – [ ][ ][ ][ ][ ] – [ ] – [ ] – [ ][ ][ ] – [ ] – [ ] – [ ] – [ ] – [ ]

Ordering example:

K-T12 – [S][5][0][0][Q] – [S] – [L] – [S][F][1] – [C] – [1] – [N] – [N] – [N]

1) For voltage output: lin. $< \pm 0.05\%$; $TK_0 < \pm 0.1\%/10$ K

2) For Option 3, code L only; see data sheet B1957-xx de for specifications.

Accessories, to be ordered separately

Article	Order no.
Connection cable, set	
Torque	
Torque connection cable, Binder 423 7-pin − D-Sub 15-pin, 6 m	1−KAB149−6
Torque connection cable, Binder 423 − free ends, 6 m	1−KAB153−6
Rotational speed	
Rotational speed connection cable, Binder 423 8-pin − D-Sub 15-pin, 6 m	1−KAB150−6
Rotational speed connection cable, Binder 423 8-pin, free ends, 6 m	1−KAB154−6
Rotational speed connection cable, reference signal, Binder 423 8-pin − D-Sub 15-pin, 6 m	1−KAB163−6
Rotational speed connection cable, reference signal, Binder 423 8-pin − free ends, 6 m	1−KAB164−6
CAN Bus	
CAN Bus M12 connection cable, A-coded − D-Sub 9-pin, switchable termination resistor, 6 m	1−KAB161−6
Plugs/sockets	
Torque	
423G−7S, 7-pin cable socket, straight cable entry, for torque output (plug 1, plug 3)	3−3101.0247
423W−7S, 7-pin cable socket, 90° cable entry, for torque output (plug 1, plug 3)	3−3312.0281
Rotational speed	
423G−8S, 8-pin cable socket, straight cable entry, for rotational speed output (plug 2)	3−3312.0120
423W−8S, 8-pin cable socket, 90° cable entry, for rotational speed output (plug 2)	3−3312.0282
CAN Bus	
TERMINATOR M12/termination resistor, M12, A-coded, 5-pin, plug	1−CANHEAD−TERM
Termination resistor, CAN Bus M12, A-coded, 5-pin, socket	1−CAN−AB−M12
T-SPLITTER M12/T-piece M12, A-coded, 5-pin	1−CANHEAD−M12−T
Cable plug/socket/CAN Bus M12, cable socket 5-pin M12, A-coded, cable plug 5-pin M12, A-coded	1−CANHEAD−M12
PROFIBUS	
Connection cable, Y-splitter, M12 socket, B-coded; M12 plug, B-coded; M12 socket, B-coded, 2 m	1−KAB167-2
Cable plug/socket/PROFIBUS M12, cable socket 5-pin M12, B-coded, cable plug 5-pin M12, B-coded	1−PROFI−M12
Termination resistor PROFIBUS M12, B-coded, 5-pin	1−PROFI−AB−M12
T-piece PROFIBUS M12, B-coded, 5-pin	1−PROFI−VT−M12
Connection cable, by the meter	
Kab8/00−2/2/2	4−3301.0071
Kab8/00−2/2/2/1/1	4−3301.0183
DeviceNet cable	4−3301.0180
Other	
Setup toolkit for T12 (System-CD T12, PCAN-USB adapter, CAN Bus connection cable, 6 m)	1−T12-SETUP-USB

Hottinger Baldwin Messtechnik GmbH

Im Tiefen See 45 · 64293 Darmstadt · Germany
Tel. +49 6151 803-0 · Fax: +49 6151 803-9100
Email: info@hbm.com · www.hbm.com

B1941−10.0