

# TB1A

## Reference Torque Measuring Discs

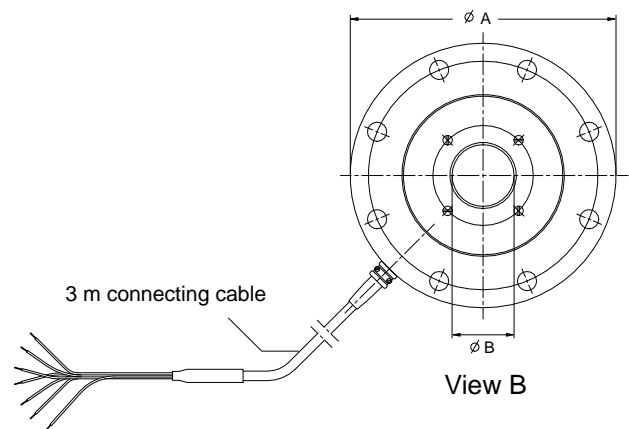
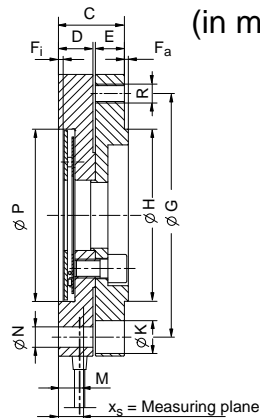
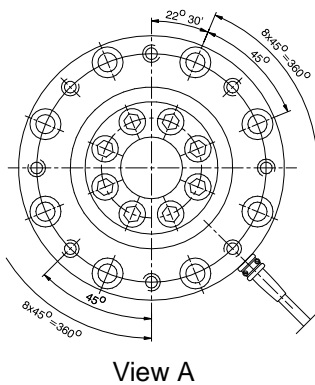


### Special features

- Accuracy class 0.05
- Nominal torques from 100 N·m to 10 kN·m
- Little space required due to low profile
- Extremely insensitive to lateral and axial forces and to bending moments
- High permissible oscillation amplitude

### Dimensions

(in mm; 1 mm= 0.03937 inches)



Nominal torque	∅A	∅B <sub>±0.1</sub>	C	D	E	F <sub>i</sub>	F <sub>a</sub>	∅G <sub>±0.1</sub>	∅H <sub>G6</sub>	∅K	M	∅N	∅PH7	R	x <sub>s</sub>
100 N·m	100	40.2	25	15.5	7.5	2.5	3.0	87	75	11	7.8	6.4	75	8xM6	13
200 N·m	121	40.2	30.5	17.5	11	2.5	3.0	105	90	14	8.8	8.4	90	8xM8	14
500 N·m	156	41	40.5	20.5	18	2.5	3.0	133	110	20	9	13	110	8xM12	15.5
1 kN·m	156	41	40.5	20.5	18	2.5	3.0	133	110	20	9	13	110	8xM12	15.5
2 kN·m	191	69	42.5	22.5	18	2.5	3.0	165	140	24	9	15	140	8xM14	16.5
5 kN·m	238	79	64	28.5	33.5	2.5	3.0	206	174	30	9	19	174	8xM18	19.5
10 kN·m	238	79	69	33.5	33.5	2.5	3.0	206	174	30	9	19	174	8xM18	22.5

# Specifications

Type	TB1A							
Accuracy class	0.05							
Torque measuring system								
Nominal torque $M_N$	N·m	100	200	500	1 k	2 k	5 k	10 k
<b>Nominal sensitivity</b> (nominal signal span between torque = zero and nominal torque)	mV/V	1.5						
<b>Sensitivity tolerance</b> (deviation of the actual output quantity at $M_N$ from the nominal signal span)	%	< ±0.1						
<b>Temperature effect per 10 K in the nominal temperature range</b>								
On output signal (related to actual value)	%	< ±0.05						
On zero signal (related to nominal sensitivity)	%	< ±0.05						
<b>Linearity deviation, including hysteresis</b> (related to nominal sensitivity)	%	< ±0.03						
<b>Relative standard deviation of repeatability according to DIN 1319</b> (related to variation of output signal)	%	< ±0.01						
<b>Input resistance at reference temperature</b>	Ω	1750 ± 200						
<b>Output resistance at reference temperature</b>	Ω	1400 ± 30						
<b>Reference excitation voltage</b>	V	5						
<b>Maximum permissible excitation voltage</b>	V	20						
<b>Operating range of the excitation voltage</b>	V	2.5...12						
<b>Reference temperature</b>	°C [°F]	+23 [+73.4]						
<b>Nominal temperature range</b>	°C [°F]	+10 ... +60 [+50 ... +140]						
<b>Operating temperature range</b>	°C [°F]	-10 ... +60 [+14 ... +140]						
<b>Storage temperature range</b>	°C [°F]	-20 ... +70 [-13 ... +158]						
<b>Load limits<sup>1)</sup></b>								
<b>Limit torque</b> , related to $M_N$	%	200						
<b>Breaking torque</b> , related to $M_N$	%	>400						
<b>Axial limit force</b>	kN	2	4	7	7	12	22	31
<b>Lateral limit force</b>	kN	1	3	6	8	15	30	40
<b>Bending limit moment</b>	N·m	70	140	500	500	1000	2500	4000
<b>Oscillation bandwidth according to DIN 50100</b> (peak-to-peak) <sup>2)</sup>	kN·m	0.16	0.32	0.8	1.6	3.2	8.0	12.0
<b>Mechanical data</b>								
<b>Torsional stiffness</b>	kN·m/rad	160	430	1000	1800	3300	9900	15000
<b>Rotation angle</b>	degree	0.036	0.027	0.028	0.032	0.034	0.029	0.038
<b>Max. deflexion at axial limit force</b>	mm	<0.03						
<b>Additional max. concentricity error at lateral limit force</b>	mm	<0.01		<0.02		<0.03		
<b>Additional plumb parallel deviation at bending limit moment</b>	mm	<0.2						
<b>Mass moment of inertia of the rotor (around the axis of rotation) x 10<sup>-3</sup></b>	kg·m <sup>2</sup>	1.3	3.4	13.2	13.2	29.6	110	120
<b>Pro rata mass moment of inertia (measurement side)</b>	%	51	44	39	39	38	31	33

<sup>1)</sup> Each type of irregular stress can only be permitted with its given limit value (bending moment, lateral force or axial force, exceeding the nominal torque) if none of the others can occur. Otherwise the limit values must be reduced. If for instance 30 % of the bending limit moment and also 30 % of the lateral limit force are present, only 40 % of the axial limit force are permitted, provided that the nominal torque is not exceeded. With maximum additional loading, measuring errors of the order of approx. 1 % of the nominal torque can occur.

<sup>2)</sup> The nominal torque must not then be exceeded.

## Specifications (continued)

<b>Nominal torque <math>M_N</math></b>	N·m	100	200	500	1 k	2 k	5 k	10 k
<b>Additional reliability data</b>								
<b>Impact resistance, test severity level to IEC 68; part 2-27; IEC 68-2-27-1987</b>								
Number of impacts	n				1000			
Duration	ms				3			
Acceleration (half-sine)	m/s <sup>2</sup>				650			
<b>Vibration resistance, test severity level to IEC 68; part 2-6; IEC 68-2-6-1987</b>								
Frequency range	Hz				5...65			
Duration	h				1.5			
Acceleration (amplitude)	m/s <sup>2</sup>				50			
<b>Degree of protection</b> according to EN 60 529					IP 54			
<b>Weight, approx.</b>	kg	0.95	1.8	3.5	3.5	5.8	14.0	15.2

## Complementary data for classification using DKD measurement according to DIN 51309.

<b>Type</b>		<b>TB1A</b>						
<b>Class</b>		0.1 (typically 0.05)						
<b>Nominal torque <math>M_N</math></b>	N·m	100	200	500	1 k	2 k	5 k	10 k
<b>Rel. error of the zero signal <math>f_0</math></b> (zero point return), related to the full scale	%	< ± 0.025 (typically < ± 0.012)						
<b>Rel. repeatability and reproducibility errors (0.2<math>M_N</math> to <math>M_N</math>), rel. to actual value</b>								
in unchanged mounting position b'	%				< 0.025 (typically < 0.01)			
in different mounting positions b	%				< 0.05 (typically < 0.02)			
<b>Rel. reversibility error (0.2<math>M_N</math> to <math>M_N</math>) h</b> , related to the actual value	%				< 0.12 (typically < 0.06)			

## Accessories, to be ordered separately:

Connector mounting

Factory-made cable extension 1-Kab0304A-10

Cable extension Kab8/00-2/2/2, length from 10 m

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Subject to modifications.

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