

# T20WN

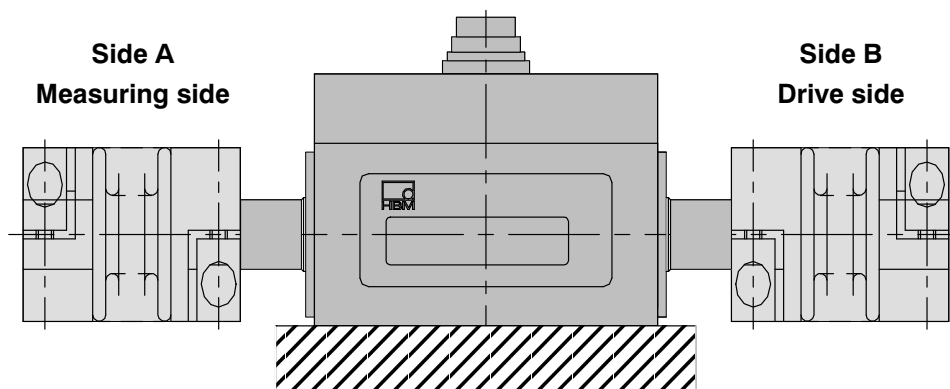
## Torque transducers

### Special features



- Nominal (rated) torques 0.1 N·m, 0.2 N·m, 0.5 N·m, 1 N·m, 2 N·m, 5 N·m, 10 N·m, 20 N·m, 50 N·m, 100 N·m, 200 N·m
- Accuracy class: 0.2
- Contactless transmission of measurement signals
- Measurement on rotating or stationary parts
- Cylindrical shaft ends for non-play friction joints
- Integrated measurement system for rotational speed and angle of rotation
- Torque output signal  $\pm 10$  V

### Installation example with bellows couplings



Two of the couplings provided are needed for this example

## Specifications - T20WN

Type		T20WN											
Accuracy class		0.2											
<b>Torque measuring system</b>													
Nominal (rated) torque $M_{nom}$	N·m	0.1	0.2	0.5	1	2	5	10	20	50	100	200	
Nominal (rated) sensitivity (nominal (rated) signal range between torque = zero and nominal (rated) torque)	V	10											
Sensitivity tolerance (deviation of actual output quantity at $M_{nom}$ from nominal (rated) signal range)	%	± 0.2											
Output signal at torque = zero	V	0 ± 0.2											
Nominal (rated) output signal													
at positive nominal (rated) torque	V	+10											
at negative nominal (rated) torque	V	-10											
Load resistance	MΩ	> 1											
Long-term drift over 48 h	mV	< ± 50											
Cut-off frequency (-3 dB)	Hz	200											
Residual ripple	mV <sub>PP</sub>	< 80											
Group delay	ms	< 1.0											
Temperature effect per 10 K in nominal (rated) temperature range													
on the output signal, related to the actual value of the signal span	%	± 0.1											
on the zero signal, related to the nominal (rated) sensitivity	%	± 0.2											
Power supply													
Nominal (rated) supply voltage (separated extra-low voltage (SELV))	V (DC)	12 (10.8 - 13.2)											
Calibration signal triggering	V	5 - 13.2											
Current consumption in measuring mode	A	< 0.2											
Nominal (rated) power consumption	W	< 2.4											
Max. ripple on supply voltage	mV <sub>pp</sub>	200											
Non-linearity including hysteresis, related to nominal (rated) sensitivity	%	< ± 0.1											
Relative standard deviation of the repeatability per DIN 1319, related to the variation of the output signal	%	< ± 0.05											
Calibration signal	V	+10 ± 0.2%											
<b>Measurement system for rotational speed/angle of rotation</b>													
Measurement system		optical											
Pulses per revolution	Number	360											
Output signal	V	5 (asymmetrical); two square wave signals approx. 90° phase shifted											
Minimum rotational speed for sufficient pulse stability	min <sup>-1</sup>	0											
Load resistance	kΩ	> 10											
Group delay	μs	< 3											
		for 1.5 m cable between T20WN and junction box VK20A (without VK20A, the group delay is dependent on the connected impedance / cable & evaluating device)											
Max. measurable rotational speed	min <sup>-1</sup>	3000											
<b>General data</b>													
<b>EMC</b>													
<b>Immunity from interference (DIN EN50082-2)</b>													
Electromagnetic field													
Housing	V/m	10											
Leads	V <sub>PP</sub>	10											
Magnetic field													
Burst	kV	2/1											
ESD	kV	4/8											

## Specifications – T20WN (continued)

General data												
<b>Emission (EME)</b> (EN55011)		Class B										
RFI voltage		Class B										
RFI field strength		Class B										
<b>Degree of protection per EN 60529</b>		IP40										
<b>Weight, approx.</b>	kg	0.17					0.34			0.6		
<b>Nominal (rated) torque <math>M_{nom}</math></b>	N·m	0.1	0.2	0.5	1	2	5	10	20	50	100	200
<b>Nominal (rated) temperature range</b>	°C	+5 to +45										
<b>Operating temperature range</b>	°C	0 to +60										
<b>Storage temperature range</b>	°C	-5 to +70										
<b>Impact resistance, test severity level per DIN IEC 68; Part 2-27; IEC 68-2-27-1987</b>												
Number	n	1000										
Duration	ms	3										
Acceleration (half sine)	m/s <sup>2</sup>	650										
<b>Vibration resistance, test severity level per DIN IEC 68, Part 2-6; IEC 68-2-6-1982</b>												
Frequency range	Hz	5 – 65										
Duration	h	1.5										
Acceleration (amplitude)	m/s <sup>2</sup>	50										
<b>Nominal (rated) rotational speed</b>	min <sup>-1</sup>	10 000										
<b>Load limits <sup>1)</sup></b>												
<b>Limit torque, related to <math>M_{nom}</math></b>	%	200 <sup>2)</sup>										
<b>Breaking torque, related to <math>M_{nom}</math></b>	%	> 280										
<b>Longitudinal limit force</b>	kN	0.2	0.2	0.2	0.34	0.5	1.1	1.75	2.75	5.3	7.6	12.5
<b>Lateral limit force</b>	N	3.6	3.6	3.6	5.7	8.3	18.2	29	46	88	127	207
<b>Limit bending moment</b>	N·m	0.12	0.12	0.12	0.23	0.4	0.93	1.9	3.7	10	17	36
<b>Oscillation width per DIN 50 100 (peak-to-peak)<sup>3)</sup></b>	%	80										
Mechanical values												
<b>Torsional stiffness <math>c_T</math></b>	kN·m/rad	0.03	0.03	0.03	0.05	0.07	0.91	1.9	3.25	14	21.9	32.6
<b>Torsion angle at <math>M_{nom}</math></b>	deg.	0.2	0.38	0.96	1.1	1.7	0.32	0.3	0.35	0.2	0.26	0.35
<b>Max. limits for relative shaft vibration (peak-to-peak)<sup>4)</sup></b>	µm	$s_{max} = \frac{4500}{\sqrt{n}}$										
<b>rms value for the vibration velocity of the enclosure designated in VDI 2056</b>	mm/s	$v_{eff} = \frac{\sqrt{n}}{3}$										
<b>Mass moment of inertia of the rotor (around rotary axis) with rotational speed measuring system (<math>\times 10^{-3}</math>)</b>	gm <sup>2</sup>	0.06	0.06	0.06	0.063	0.068	6.1	6.13	6.23	53.7	54.6	57.2
<b>Balance quality level per DIN ISO 1940</b>	-	G 6.3										

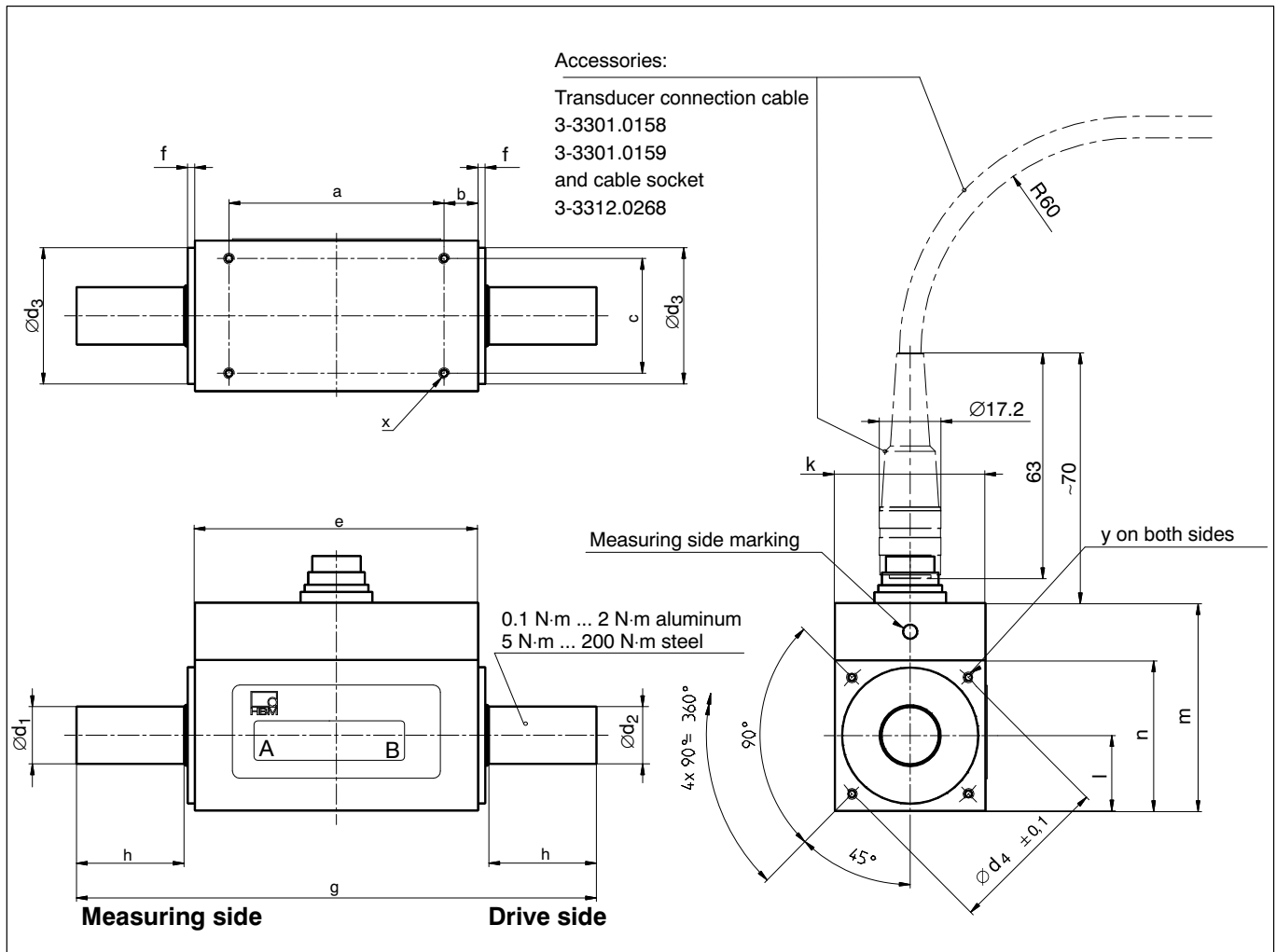
<sup>1)</sup> Each type of irregular stress (bending moment, lateral or longitudinal force, exceeding nominal (rated) torque) can only be permitted up to its specified static load limit, provided none of the others can occur at the same time. If this condition is not met, the limit values must be reduced. 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 permissible bending moments, longitudinal forces and lateral forces can affect the measurement result by approx. 1% of the nominal (rated) torque.

<sup>2)</sup> Note the maximum moment ( $T_{Kmax}$ ) of the coupling.

<sup>3)</sup> The nominal (rated) torque must not be exceeded.

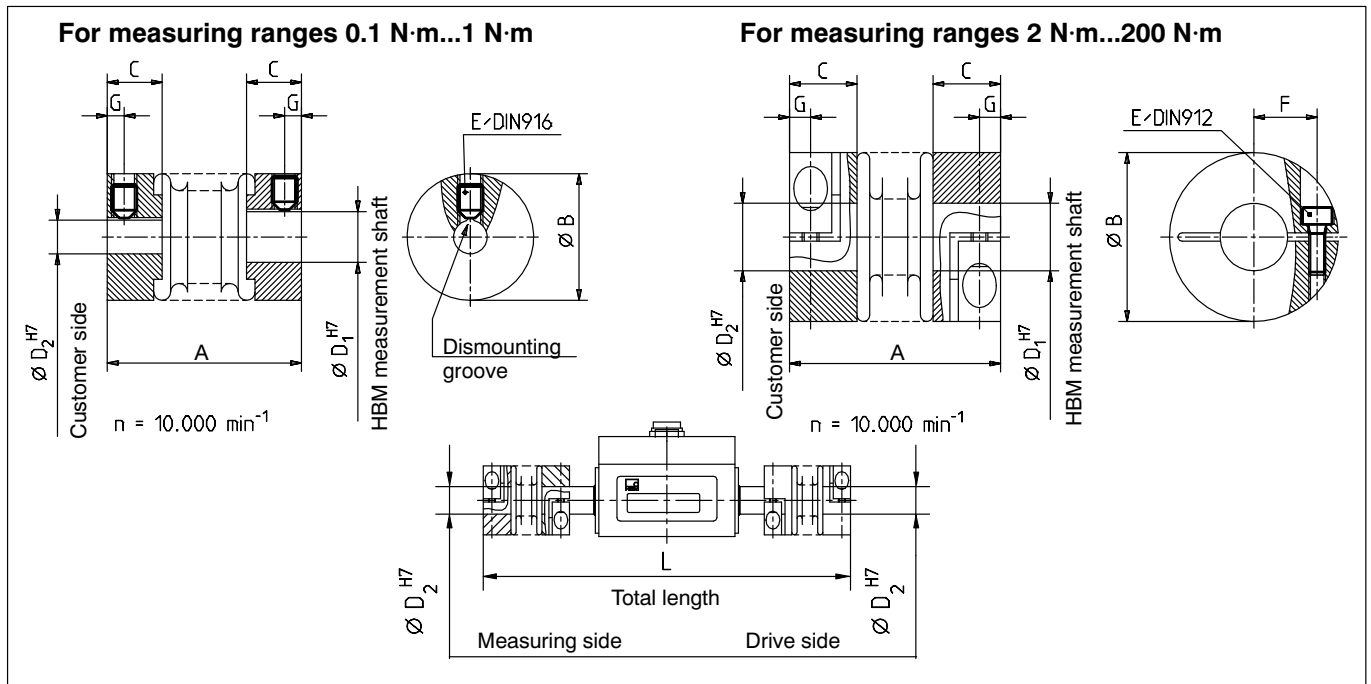
<sup>4)</sup> Relative undulations, following DIN 45670/VDI 2059.

# Dimensions - T20WN



Measuring range (N-m)	Dimensions in mm																
	a	b	c	e <sub>±1</sub>	f	g	h	k <sub>±1</sub>	l	m <sub>±1</sub>	n	∅d <sub>1</sub> g6	∅d <sub>2</sub> g6	∅d <sub>3</sub> -0.1	∅d <sub>4</sub> ±0.1	y	x
0.1	40	11	22	62	2	95	14	28	14	48.5	30	6	8	27	32	M3/6 deep	M3/5 deep
0.2	40	11	22	62	2	95	14	28	14	48.5	30	6	8	27	32	M3/6 deep	M3/5 deep
0.5	40	11	22	62	2	95	14	28	14	48.5	30	6	8	27	32	M3/6 deep	M3/5 deep
1	40	11	22	62	2	95	14	28	14	48.5	30	6	8	27	32	M3/6 deep	M3/5 deep
2	40	11	22	62	2	95	14	28	14	48.5	30	6	8	27	32	M3/6 deep	M3/5 deep
5	60	9.5	32	79	2	145	30	42	21	58	42	16	16	38	46	M3/6 deep	M3/6 deep
10	60	9.5	32	79	2	145	30	42	21	58	42	16	16	38	46	M3/6 deep	M3/6 deep
20	60	9.5	32	79	2	145	30	42	21	58	42	16	16	38	46	M3/6 deep	M3/6 deep
50	42	15	40	72	3	170	45	56	28	73	56	26	26	54	65	M4/8 deep	M4/8 deep
100	42	15	40	72	3	170	45	56	28	73	56	26	26	54	65	M4/8 deep	M4/8 deep
200	42	15	40	72	3	170	45	56	28	73	56	26	26	54	65	M4/8 deep	M4/8 deep

## Bellows couplings



## Dimensions




Measuring range (N·m)	Part no.	Dimensions in mm									
		A	ØB	C	ØD <sub>1</sub>		ØD <sub>2</sub> variable from-to	E	F	G	L
					Measuring side T20WN	Drive side T20WN					
0.1	3-4412.0001	23 <sub>-1</sub>	15	6.5	6	8	3-9	M3	-	2	128
0.2											
0.5											
1	3-4412.0002	25 <sub>-1</sub>	15	6.5	6	8	3-9	M3	-	2	132
2	3-4412.0003	40 <sub>-1</sub>	25	13	6	8	3-12.7	M3	8	4	149
5	3-4412.0004	50 <sub>-1</sub>	40	16	16	16	5-22	M4	15	5	213
10											
20	3-4412.0005	69 <sub>-2</sub>	56	21	16	16	10-32	M6	19	7.5	241
50	3-4412.0006	80 <sub>-2</sub>	66	23.5	26	26	12-32	M8	23	9.5	283
100	3-4412.0007	93 <sub>-2</sub>	82	28	26	26	19-40	M10	27	11	300
200	3-4412.0008	109 <sub>-2</sub>	110	35	26	26	24-56	M12	39	13	318

When ordering, please specify: connection holes  $D_2$  as requested by the customer within specified limits; boring tolerance H7.

When using with just **one** bellows coupling, specify the mounting side of the coupling:

**Measuring side = 6 mm / drive side = 8 mm.**

## Specifications

Measuring range (N-m)	Torque coupling $T_{Kmax}$ (N-m)	Mass moment of inertia (kg-cm <sup>2</sup> )	Weight (g)	Torsional stiffness (kN-m/rad)	Max. permissible offset			Spring stiffness		Material hub and mounting ring	Tightening torque for clamping bolts (N-m)
					axial (mm) 	radial (mm) 	angular (degree) 	axial (N/mm)	radial (N/mm)		
0.1	0.5	0.012	6	0.21	0.5	0.2	1.5	13.4	47.7	Aluminum	0.35
0.2								27.4	84.3		
0.5								20.6	88		
1	1	0.018	7	0.38	0.5	0.2	1.5	27.4	84.3		0.75
2	2	0.27	38	1.3	0.6	0.2	1.5	20.6	88		0.75
5	10	1.6	120	9.05	1	0.2	1.5	33.3	389		1.5
10								50	366		
20								67	679		
50	60	2.0	400	72	1.5	0.15	1.5	77	960	Steel	75
100	150	20	1600	141	2	0.15	1.5	124	2940		120
200	300	40	3800	157	2	0.15	1.5				

## General instructions

- Only tighten the clamping bolts of the couplings when the shafts are mounted in the coupling hubs!
- The bellows coupling must not be overstretched beyond the specified permissible flexibility limits.
- Drive and output shafts must be free from grease and burrs.
- Implement a tolerance of j6 for the shaft diameter, to produce the preferred fit of H7/j6.

## Mounting position

The T20WN torque transducer can be operated with bellows couplings in any mounting position (horizontally, vertically or at an angle). When mounting vertically or at an angle, please make sure that the additional elements are adequately supported.

## Condition at the time of delivery

The couplings and the torque transducer are delivered as separate items.

## Accessories for the T20WN, to be ordered separately

Transducer connection cable, 5m long, order no. 3-3301.0158

Transducer connection cable, 10m long, order no. 3-3301.0159

Cable socket, 12-pin (Binder), order no. 3-3312.0268

Junction box, order no. 1-VK20A

Bellows couplings

Modifications reserved.

All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability and do not constitute any liability whatsoever.

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