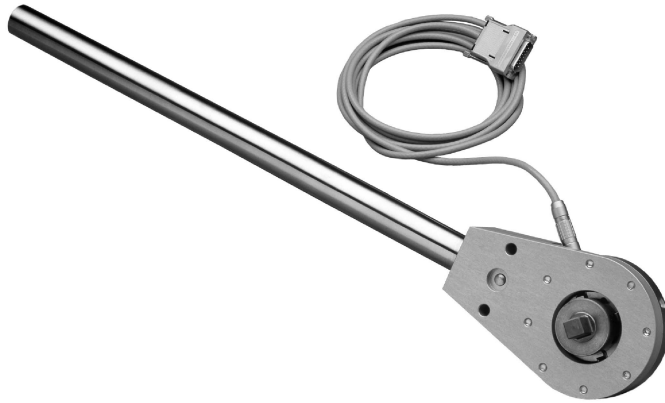


TTS

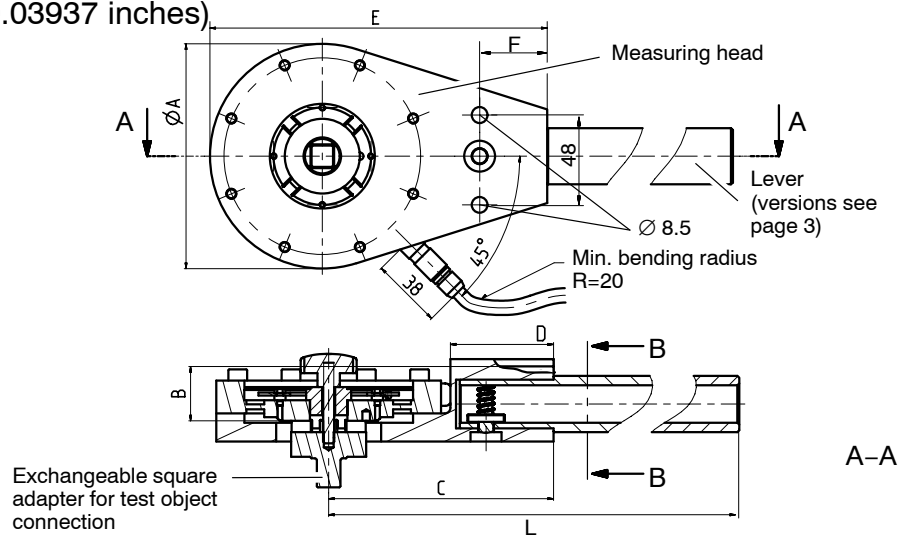
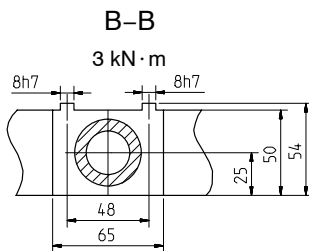
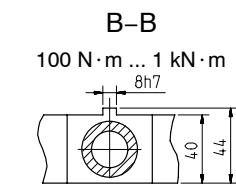
Transfer Torque Wrench



Special features

- Transfer transducer for calibrating torque wrench calibrating devices
- Accuracy class 0.2 according to DKD-R 3-7
- Nominal (rated) torques 100 N·m, 200 N·m, 500 N·m, 1 kN·m and 3 kN·m
- Extremely insensitive to lateral and axial forces and to bending moments

Dimensions (in mm; 1 mm=0.03937 inches)



Nominal (rated) torque (N·m)	A	B	C	D	E	F	L	Square adapter across flats (inch)
100	100	29	110	55	160	36	555	1/2
200	120	29	120	55	180	36	760	1/2
500	156	24	200	115	278	50	1040	3/4
1 k	156	24	200	115	278	50	1040	1/1
3 k	190	34	217	115	312	20 and 80	1817	1 1/2

Specifications

Type		TTS				
Class according to DKD-R 3-7		0.2 ¹⁾				
Nominal (rated) torque M_{nom}	N·m kN·m	100	200	500	1	3
Sensitivity range (output signal at nominal torque, sensitivity of the individual see DKD calibration certificate)	mV/V	1.5 ... 2.4				
Reference sensitivity	mV/V	1.5				
Temperature effect per 10 K in the nominal temperature range on output signal (related to actual value) on zero signal (related to nominal sensitivity)	% %	< ± 0.05 < ± 0.05				
Input resistance at reference temperature	Ω	1530 ± 30				
Output resistance at reference temperature	Ω	1400 ± 30				
Reference excitation voltage	V	5				
Operating range of the excitation voltage	V	2.5 ... 12				
EMC						
Immunity from interference (EN 61326-1, table A.1)						
Electromagnetic field (AM)	V/m	10				
Electrostatic discharge (ESD)						
Contact discharge	kV	4				
Fast transients (burst)	kV	1				
Line interferences (AM)	V	3				
Degree of protection according to EN 60529		IP 22				
Impact resistance, test severity level to DIN IEC 68, part 2-27; IEC 68-2-27-1987						
Number	n	3				
Duration	ms	6				
Acceleration (half sine)	m/s ²	350				
Vibration resistance, test severity level to DIN IEC 68, part 2-6; IEC 68-2-6-1982						
Frequency range	Hz	5 ... 65				
Duration per direction	h	0.5				
Acceleration (amplitude)	m/s ²	50				
Reference temperature	°C	+23				
Nominal (rated) temperature range	°C	+10 ... +60				
Operating temperature range	°C	-10 ... +60				
Storage temperature range	°C	-20 ... +60				

¹⁾ The classification results from a DKD calibration certificate (or PTB calibration certificate) which is included in the scope of supply, allowing the transducer to be used as a transfer torque wrench. The testing procedure is carried out according to DKD guideline DKD-R 3-7.

Specifications (continued)

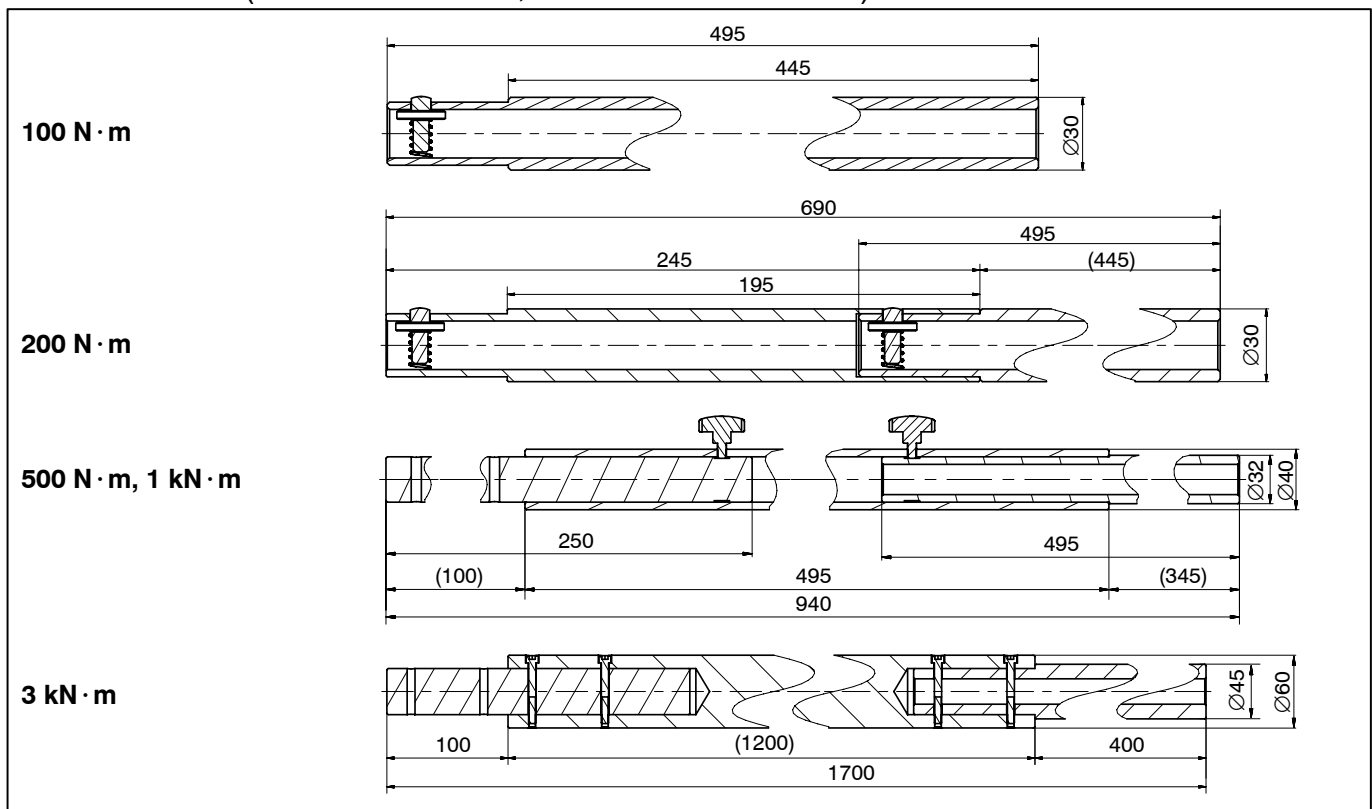
Load limits ²⁾						
Limit torque related to M_{nom}	%	150				
Breaking torque related to M_{nom}	%	200				
Axial limit force	kN	2	4	5	5	5
Lateral force limit	kN	1	3	6	8	15
Bending limit moment	N·m	70	90	110	110	200
External square adapter (within scope of supply)	inch	1/2		3/4	1	1 1/2
Weight with case and a square adapter	kg	8	9.5	15		32

²⁾ The specified values are mainly determined by the square adapter and its fixation. They are valid if the square adapter is used which is included in the standard scope of supply. If used appropriately, it is not possible, in practical applications, to apply bending moments and axial forces up to the specified limits, because these are transferred by the square connector only to a limited degree. Each type of irregular stress (bending moment, lateral or axial load, exceeding the nominal torque) can only be permitted with its given static load limit 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 (rated) torque is not exceeded. With the permitted bending moments, axial and lateral limit forces, measuring errors of about 1 % of the nominal (rated) torque can occur. The effects of the bending moments and lateral forces on the measurement result have already been taken into account upon determination of the class according to guideline DKD-R-3-7 as far as these result from the intended use of transfer torque wrenches (torque generation through force application on the lever).

Classification features according to DKD-R 3-7						
Nominal (rated) torque M_{nom}	N·m kN·m	100	200	500	1	3
Class according to DKD-R 3-7 ³⁾		0.2				
Relative repeatability error $b^{(3)}$ in one mounting position	%	0.1				
Relative reproducibility error $b^{(3)}$ in varying mounting positions	%	0.2				
Relative reproducibility error $b_l^{(3)}$ with varying lever arm lengths	%	0.2				
Relative zero error f_0 related to sensitivity	%	0.05				
Relative reversibility error $h^{(3)}$	%	0.25				
Relative interpolation error $f_a^{(3)}$	%	0.1				

³⁾ The values refer to the actual torque (actual value) and are valid for torques $\geq 20\%$ of M_{nom} .

Lever versions (Dimensions in mm; 1 mm= 0.03937 inches)



Scope of supply

- Transfer torque wrench (measuring head, lever, connecting elements) in aluminum case
- Square adapter with external square shaft for test object (square size see specifications for the respective nominal (rated) torque)
- DKD-R 3-7 calibration certificate
- Connecting cable, with Lemo® connector on transducer side, 15-pin Sub D connector on amplifier side, length 3 m

Accessories

Square adapters with internal or external square according to DIN 3120.

Square size a./f. (inch)	Suitable for TTS with nominal (rated) torque	Maximal torque (N·m)	∅ d	l	h	Order no.
External square						
1/4	100 N·m ... 1 kN·m	30	40	7.5	32.5	1-TTS/AV-1/4
3/8		135	40	11	33	1-TTS/AV-3/8
1/2		340	40	15.5	35.5	1-TTS/AV-1/2
3/4		1000	45	23	43	1-TTS/AV-3/4
1		1500	48	28	48	1-TTS/AV-1
1 1/2	3 kN·m	3000	82	39.3	59.3	1-TTS/AV-1 1/2
Internal square						
1/4	100 N·m ... 1 kN·m	30	40	8	48	1-TTS/IV-1/4
3/8		135	40	12	28	1-TTS/IV-3/8
1/2		340	40	16	48	1-TTS/IV-1/2
3/4		1000	45	24	48	1-TTS/IV-3/4
1		1500	48	29	48	1-TTS/IV-1
1 1/2	3 kN·m	3000	82	43	65	1-TTS/IV-1 1/2



Modifications reserved.

All details describe our products in general form only. They are not to be understood as express warranty and do not constitute any liability whatsoever.

Hottinger Baldwin Messtechnik GmbH

Im Tiefen See 45, D-64293 Darmstadt, Germany

Tel.: +49 6151 803-0, Fax: +49 6151 803 9100

E-mail: support@hbm.com Internet: www.hbm.com



measurement with confidence