

# TTS

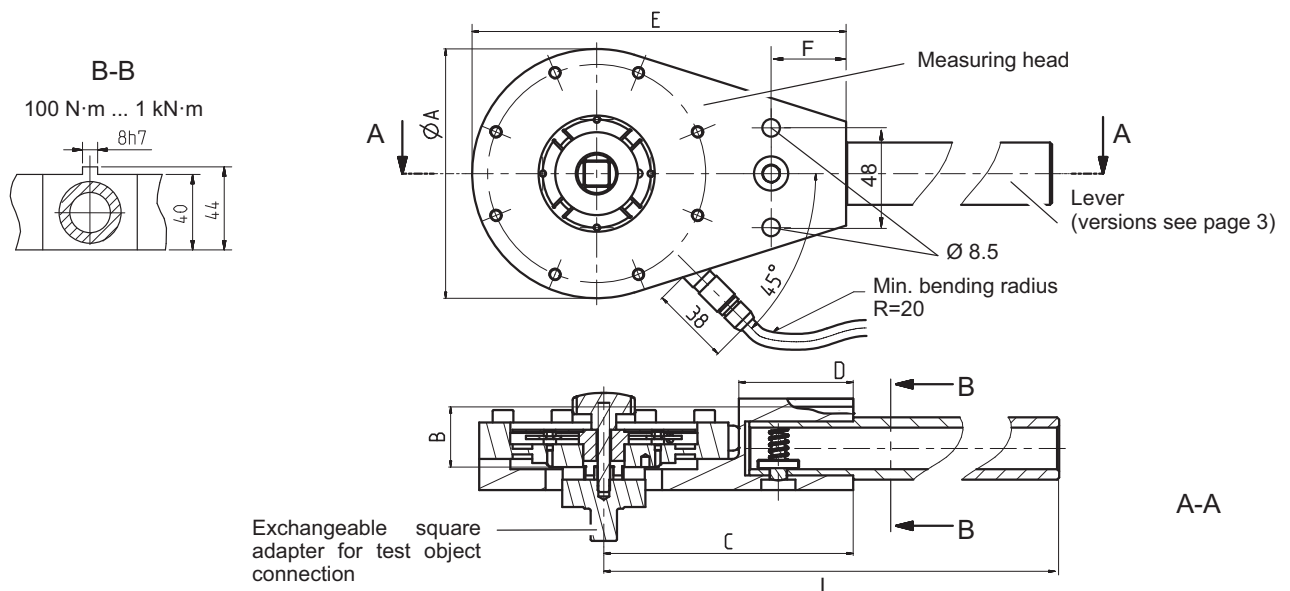
## Transfer Torque Wrench

### Special features

- Transfer transducer for calibrating torque wrench calibrating devices
- Accuracy class 0.5 according to DKD-R 3-7
- Nominal (rated) torques 100 N·m, 200 N·m, 500 N·m and 1 kN·m
- Extremely insensitive to lateral and axial forces and to bending moments



Dimensions (in mm; 1 mm=0.03937 inches)



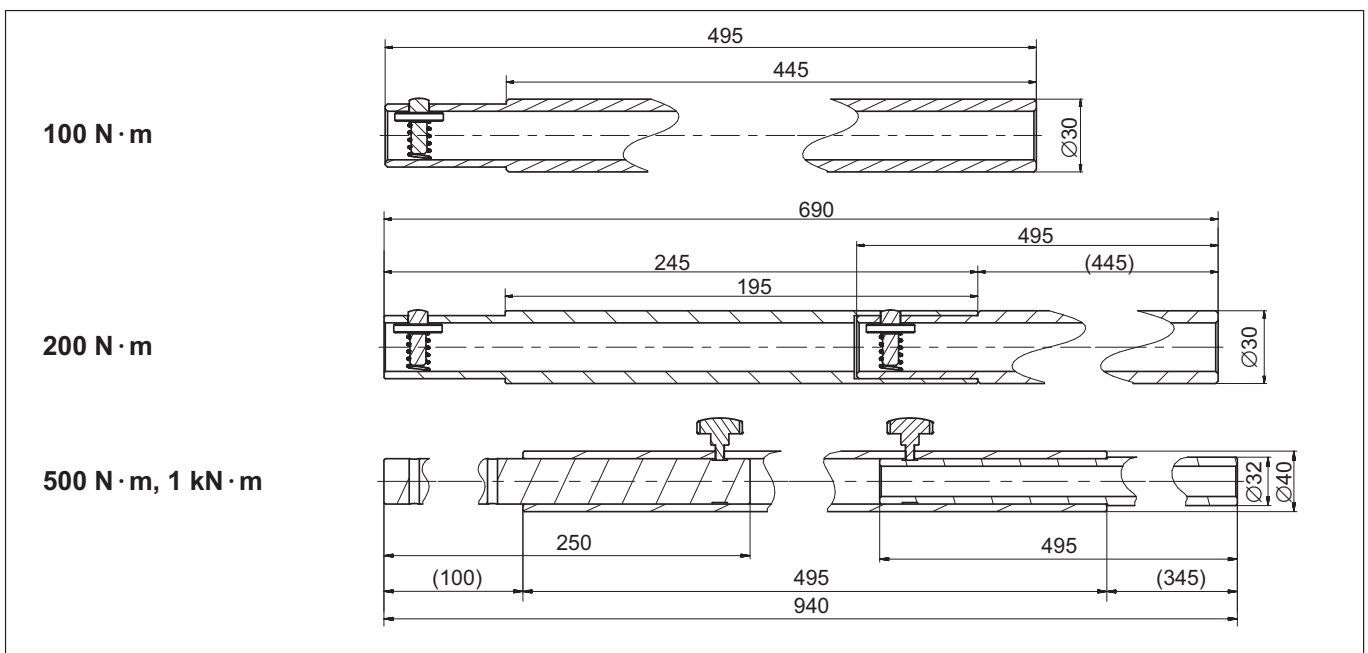
## Specifications

Type		TTS			
<b>Class according to DKD-R 3-7</b>		<b>0.5<sup>1)</sup></b>			
<b>Nominal (rated) torque <math>M_{nom}</math></b>	N·m kN·m	<b>100</b>	<b>200</b>	<b>500</b>	<b>1</b>
<b>Sensitivity range</b> (output signal at nominal torque, sensitivity of the individual see DKD calibration certificate)	mV/V	1.5 ... 2.4			
<b>Reference sensitivity</b>	mV/V	1.5			
<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>Input resistance at reference temperature</b>	Ω	1530 ± 30			
<b>Output resistance at reference temperature</b>	Ω	1400 ± 30			
<b>Reference excitation voltage</b>	V	5			
<b>Operating range of the excitation voltage</b>	V	2.5 ... 12			
<b>EMC</b>					
<b>Immunity from interference (EN 61326-1, table A.1)</b>					
Electromagnetic field (AM)	V/m	10			
Electrostatic discharge (ESD)					
Contact discharge	kV	4			
Fast transients (burst)	kV	1			
Line interferences (AM)	V	3			
<b>Degree of protection according to EN 60529</b>		IP 22			
<b>Impact resistance, test severity level to DIN IEC 68, part 2-27; IEC 68-2-27-1987</b>					
Number	n	3			
Duration	ms	6			
Acceleration (half sine)	m/s <sup>2</sup>	350			
<b>Vibration resistance, test severity level to DIN IEC 68, part 2-6; IEC 68-2-6-1982</b>					
Frequency range	Hz	5 ... 65			
Duration per direction	h	0.5			
Acceleration (amplitude)	m/s <sup>2</sup>	50			
<b>Reference temperature</b>	°C	+23			
<b>Nominal (rated) temperature range</b>	°C	+10 ... +60			
<b>Operating temperature range</b>	°C	-10 ... +60			
<b>Storage temperature range</b>	°C	-20 ... +60			
<b>Load limits<sup>2)</sup></b>					
<b>Limit torque</b> related to $M_{nom}$	%	150			
<b>Breaking torque</b> related to $M_{nom}$	%	200			
<b>Axial limit force</b>	kN	2	4	5	5
<b>Lateral force limit</b>	kN	1	3	6	8
<b>Bending limit moment</b>	N·m	70	90	110	110
<b>External square adapter</b> (within scope of supply)	inch	1/2		3/4	1
<b>Weight with case and a square adapter</b>	kg	8	9.5	15	
<b>Classification features according to DKD-R 3-7</b>					
<b>Class according to DKD-R 3-7<sup>3)</sup></b>		0.5			
<b>Relative repeatability error b'</b> in one mounting position	%	0.1			

Type		TTS			
		100	200	500	1
Nominal (rated) torque $M_{nom}$	N·m kN·m				1
Relative reproducibility error $b$ in varying mounting positions	%	0.2			
Relative reproducibility error $b_l$ with varying lever arm lengths	%	0.2			
Relative zero error $f_0$ related to sensitivity	%	0.05			
Relative reversibility error $h^{3)}$	%	0.63			
Relative interpolation error $f_a^{3)}$	%	0.25			

- 1) The classification results from a DKD calibration certificate, 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. DKD calibration certificate is not in the scope of supply and has to be ordered separately.
- 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).
- 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)



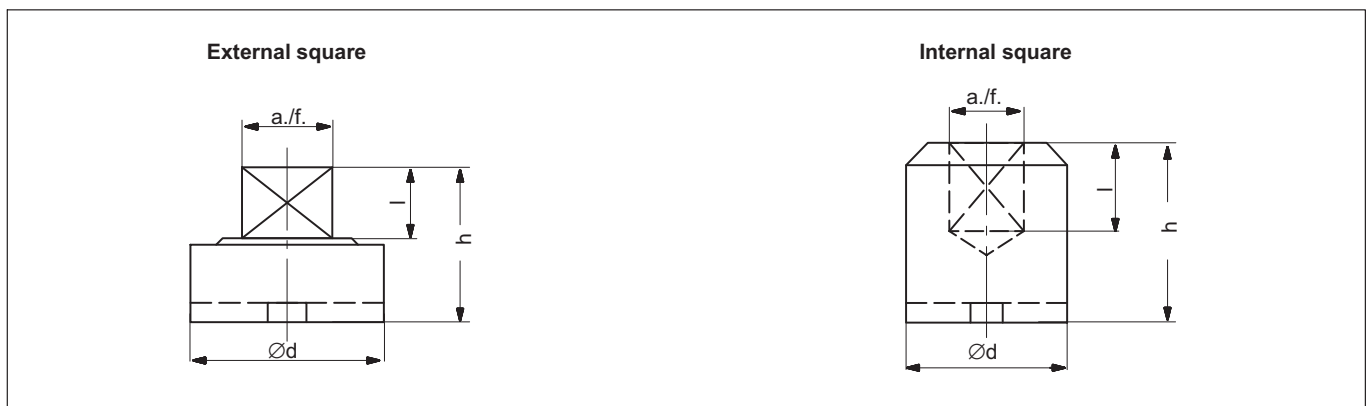
## Scope of supply

- 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)
- 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)	Ø d	l	h	Order no.
<b>External square</b>						
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
<b>Internal square</b>						
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



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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