

TB2

Torque reference transducer



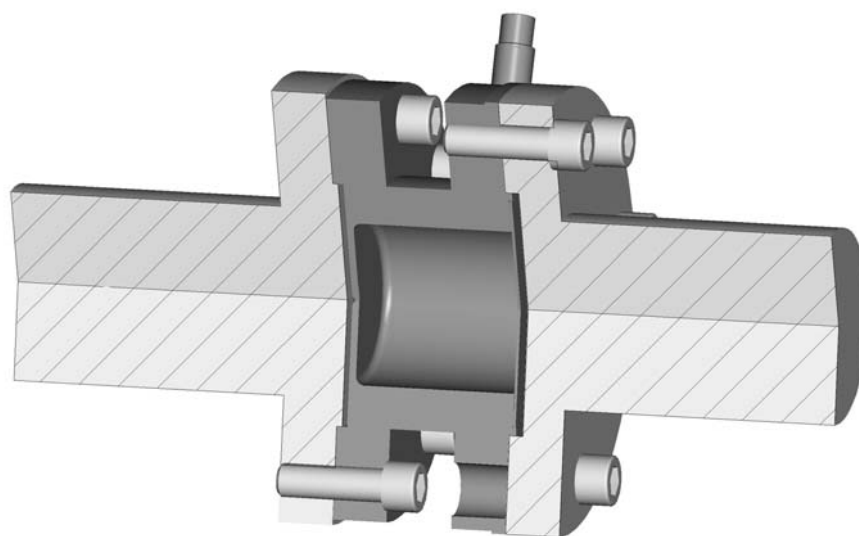
Standard version



Optional: Protection IP67

Special features

- Accuracy class 0.03
- 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
- High permissible oscillation
width
- In combination with DKD
calibration certificate, Class
0.05 as per DIN 51309 or
EA-10/14
- Optional: Degree of protection
IP67 per EN 60529



Specifications

Type		TB2								
Accuracy class		0.03								
Nominal (rated) torque M_{nom}	N-m	100	200	500						
	kN-m				1	2	3	5	10	
Nominal (rated) sensitivity (spread between torque = zero and nominal (rated) torque)		mV/V	1							
Sensitivity tolerance (deviation of the actual output quantity at M_{nom} from the nominal (rated) sensitivity)		%	< ± 0.1							
Temperature effect per 10K in the nominal (rated) temperature range on the output signal, related to the actual value on the zero signal, related to the nominal (rated) sensitivity		%	< ± 0.03							
		%	< ± 0.02							
Linearity deviation, including hysteresis relative to nominal (rated) sensitivity		%	< ± 0.03							
the relative standard deviation of repeatability according to DIN 1319, relative to the variation of the output signal		%	< ± 0.01							
Input resistance at reference temperature		Ω	1550 ± 100							
Output resistance at reference temperature		Ω	900 ... 1500							
Reference excitation voltage		V	5							
Operating range of excitation voltage		V	2.5 ... 12							
Emission in accordance with (EN61326-1, Table 4) RFI field strength			Class B							
Interference immunity (EN61326-1, Table A.1)										
Electromagnetic field (AM)		V/m	10							
Magnetic field		A/m	100							
Electrostatic discharge (ESD)										
Contact discharge		kV	4							
Air discharge		kV	8							
Burst (rapid transients)		kV	2							
Surge (impulse voltages)		kV	1							
Cable based interferences		V	10							
Degree of protection per EN 60,529		-	IP54, optional IP67							
Nominal (rated) temperature range		°C	+10 ... +60							
Operating temperature range		°C	-10 ... +80							
Storage temperature range		°C	-50 ... +85							
Mechanical shock, test severity level per DIN IEC 68; Part 227; IEC 682271987										
Number		n	1000							
Duration		ms	3							
Acceleration (half sine)		m/s ²	650							
Vibrational stress, test severity level according to DIN IEC 68; Part 26; IEC 68261982										
Frequency range		Hz	5 ... 65							
Duration		h	1.5							
Acceleration (amplitude)		m/s ²	50							
Load limits ¹⁾										
Limit torque, related to M_{nom}		%	200				160			
Breaking torque, related to M_{nom}		%	>400				>320			
Longitudinal limit force		kN	5	10	16	19	39	42	80	120
Lateral limit force		kN	1	2	4	5	9	10	12	18
Limit bending moment		N-m	50	100	200	220	560	600	800	1200
Oscillation width per DIN 50100 (peaktopeak)		N-m	200	400	1000	2000	4000	4800	8000	16000

1) 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 bending limit 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. 0.2% of the nominal (rated) torque.

Specifications

Mechanical values									
Nominal (rated) torque M_{nom}	N·m	100	200	500					
	kN·m				1	2	3	5	10
Torsional stiffness	kN·m/rad	230	270	540	900	2300	2600	4600	7900
Torsion angle at M_{nom}	Degree	0.048	0.043	0.055	0.066	0.049	0.066	0.06	0.07
Stiffness in axial direction, approx.	kN/mm	420	800	900	970	1000	1100	950	1600
Stiffness in radial direction, approx.	kN/mm	130	290	700	840	1400	1600	1400	2500
Stiffness during the bending moment around a radial axis	N·m/rad	66	120	165	170	380	390	550	1240
Maximum deflection at longitudinal force limit	mm	0.02		< 0.03		< 0.05		< 0.1	
Additional max. radial run-out deviation at lateral limit force	mm	< 0.01							
Additional plane/parallel deviation at bending moment limit	mm	< 0.03		< 0.04		< 0.06		< 0.1	
Mass moment of inertia (without taking flange bolts into account) of rotor I_v (around the longitudinal axis)	kg·m ² ·10 ⁻³	1.6	2.6	5.9		19.2		37	97
Proportional mass moment of inertia (measuring side)	%	56		55		52		50	
Position of SG level (as distance to level of adaption surface of flange with external centering)	% of total length	50							
Weight, approx. (excl. cable)	kg	0.7	1.7	2.4		4.9		8.3	14.6
Weight, IP67 version, approx. (incl. cable)	kg	0.9	1.9	2.6		5.1		8.5	14.8

Supplementary data as per DIN 51309 or EA 10/14		
Class as per DIN 51309		0.05
Rel. zero error (zero signal return)	%	< ± 0.008 (typical < 0.003)
Relative reproducibility and repeatability errors (0.1 M_{nom} to M_{nom}) for:		
a constant mounting position	%	< 0.02 (typical < 0.01)
a changing mounting position	%	< 0.03 (typical < 0.02)
Relative hysteresis error (0.1 M_{nom} to M_{nom})	%	< 0.06 (typical < 0.03)

Scope of supply:

TB2

Transducer connection cable, 3m, (Lemo® FGG6-free ends)

Test certificate

Mounting instructions

Option:

Degree of protection IP67 per EN 60529

Order No.: D-TB2/IP67

Accessories:

Connecting plug MS 3106PEMV, mounted on cable

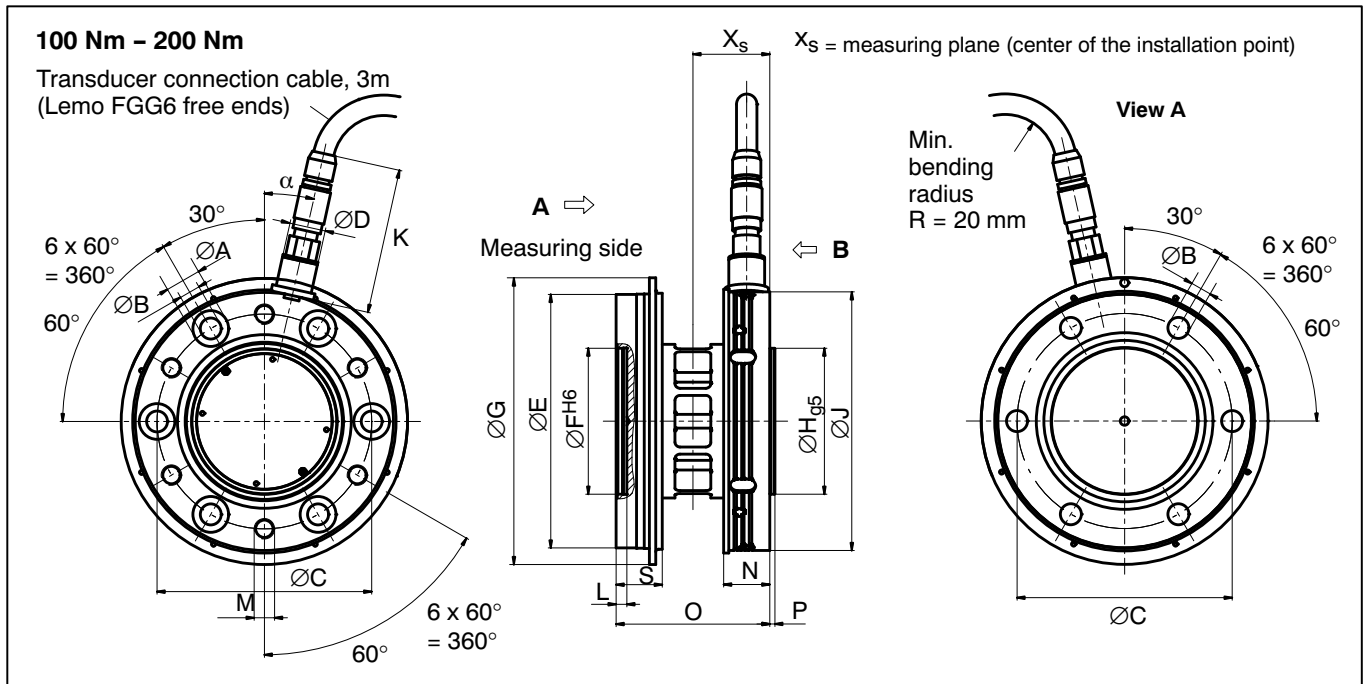
15 pin D-plug, mounted on cable

DKD calibration certificate to DIN 51309 or EA10/14

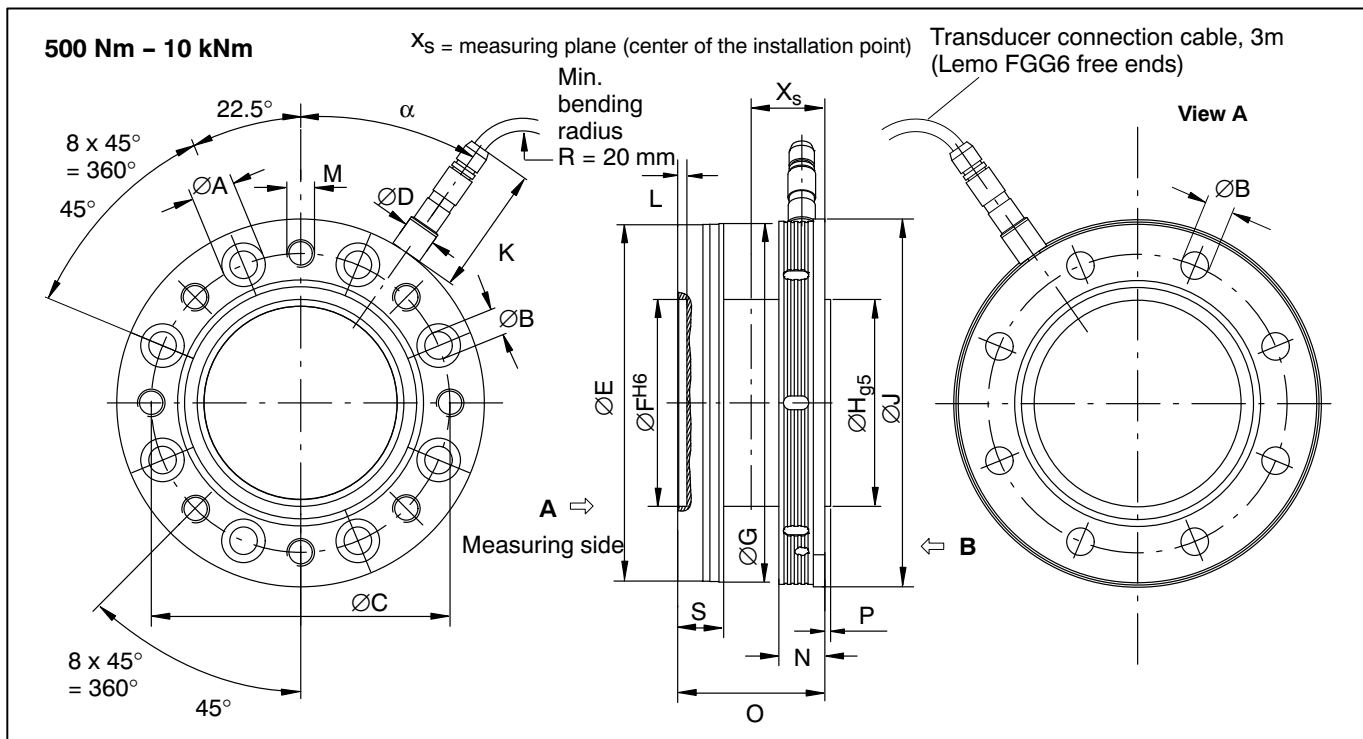
Order No.: D-MS/MONT

Order No.: D-15D/MONT

Standard version Dimensions (in mm; 1 mm = 0.03937 inches)

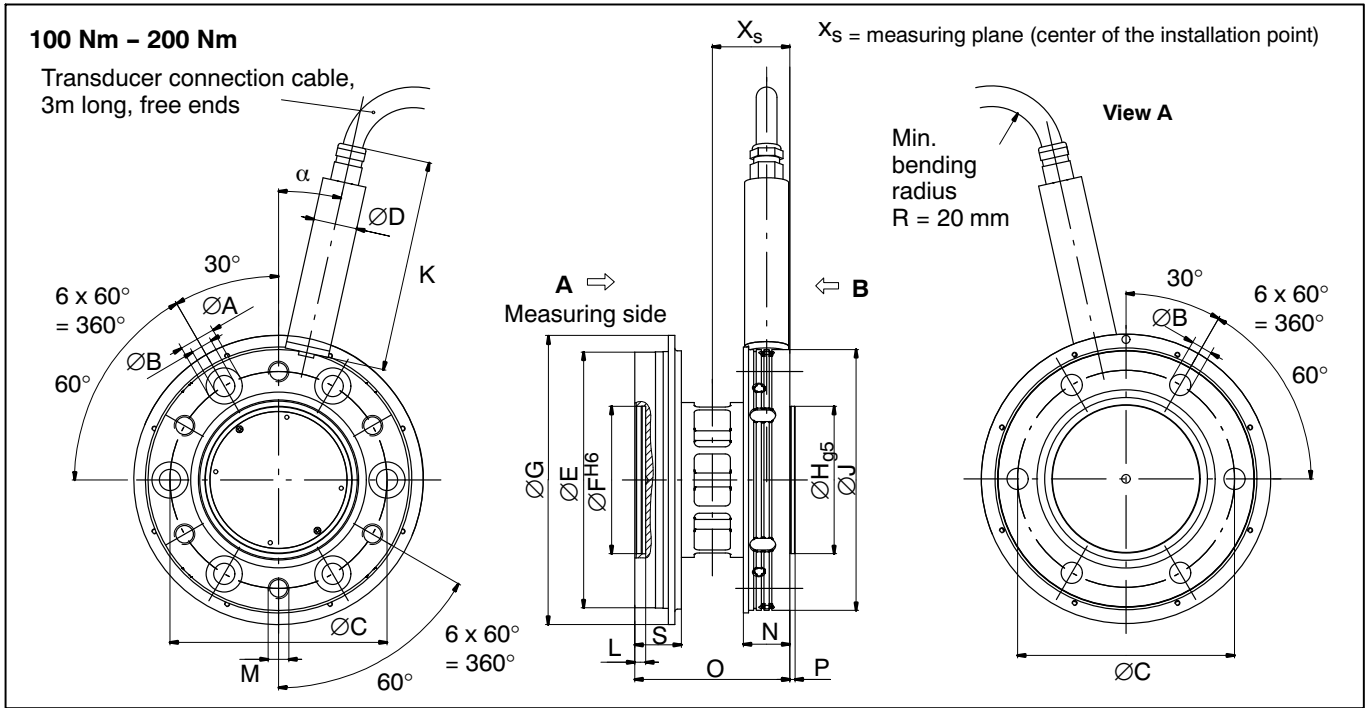


Nominal (rated) torque	$\varnothing A$	$\varnothing B$	$\varnothing C$	$\varnothing D$	$\varnothing E$	$\varnothing FH6$	$\varnothing G$	$\varnothing Hg_5$	$\varnothing J$	K	α	M	S	L	N	O	P	X_s
100 N·m – 200 N·m	14	8.2	84	14	99	57	112	57	101	57	12.5	M8	18	4.2	18	60	$2^{+0.4}$	30

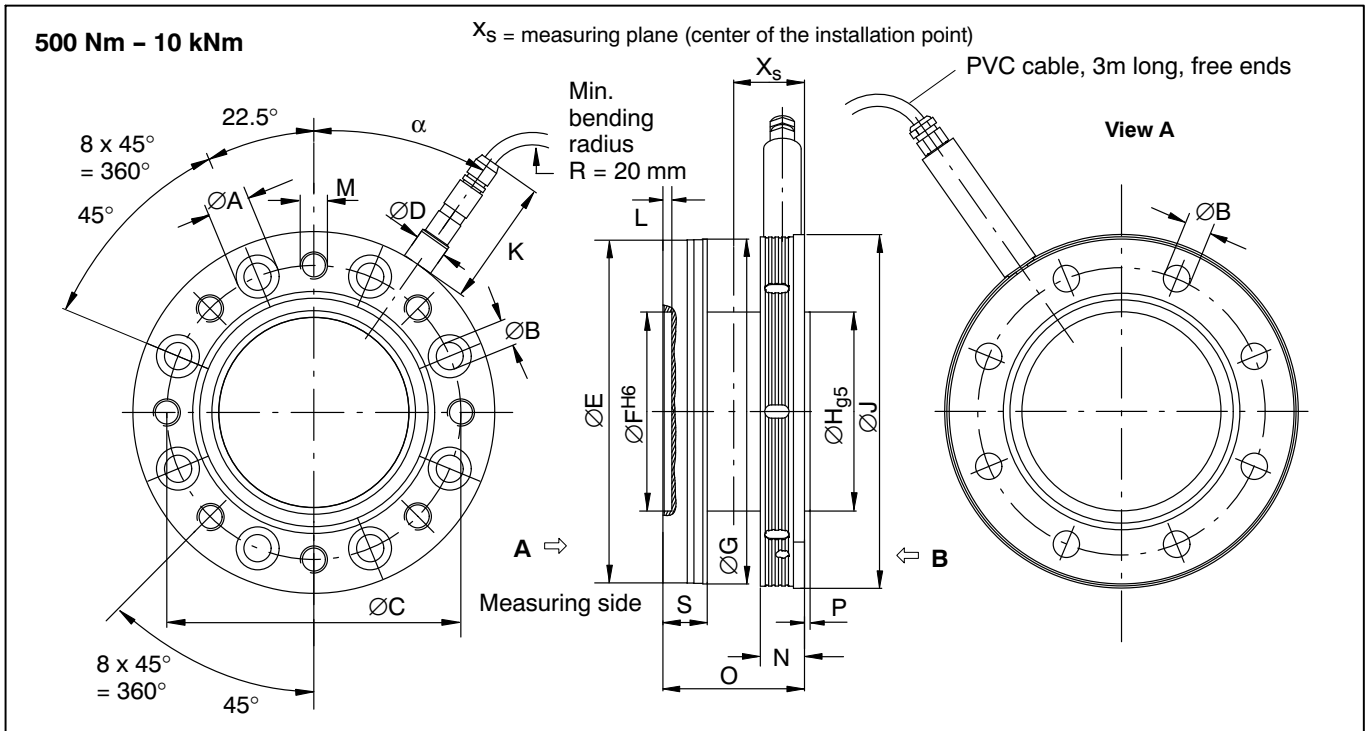


Nominal (rated) torque	$\varnothing A$	$\varnothing B$	$\varnothing C$	$\varnothing D$	$\varnothing E$	$\varnothing FH6$	$\varnothing G$	$\varnothing Hg_5$	$\varnothing J$	K	α	M	S	L	N	O	P	X_s
500 N·m – 1 kN·m	17	10	101.5	14	120	75	121	75	124	57	35.8	M10	18	4	18	60	$2^{+0.4}$	30
2 kN·m – 3 kN·m	19	12	130	14	155	90	156	90	160	57	35	M12	20	4	20	64	$2.5^{+0.4}$	32
5 kN·m	22	14.2	155.5	14	179	110	180	110	188	57	10	M14	26	3	26	84	2.8	42
10 kN·m	26	17	196	14	221	140	222	140	230	57	10	M16	30	4	30	92	$3.5^{+0.5}$	46

Option: Degree of protection IP67 (Dimensions in mm; 1 mm = 0.03937 inches)

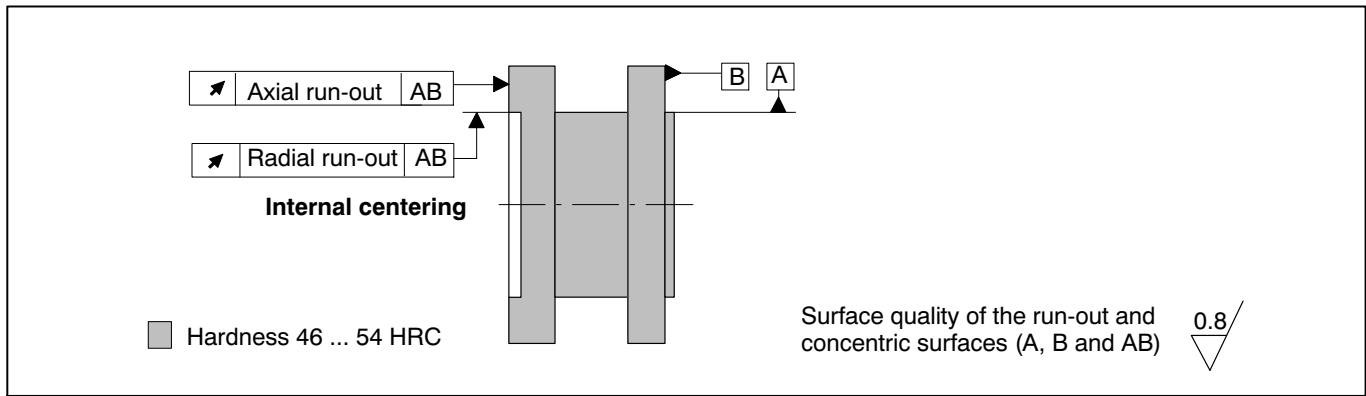


Nominal (rated) torque	$\varnothing A$	$\varnothing B$	$\varnothing C$	$\varnothing D$	$\varnothing E$	$\varnothing FH6$	$\varnothing G$	$\varnothing H_{g5}$	$\varnothing J$	K	α	M	S	L	N	O	P	X_s
100 N·m – 200 N·m	14	8.2	84	17	99	57	112	57	101	82	12.5	M8	18	4.2	18	60	$2^{+0.4}$	30



Nominal (rated) torque	$\varnothing A$	$\varnothing B$	$\varnothing C$	$\varnothing D$	$\varnothing E$	$\varnothing FH6$	$\varnothing G$	$\varnothing H_{g5}$	$\varnothing J$	K	α	M	S	L	N	O	P	X_s
500 N·m – 1 kN·m	17	10	101.5	17	120	75	121	75	124	80	35.8	M10	18	4	18	60	$2^{+0.4}$	30
2 kN·m – 3 kN·m	19	12	130	17	155	90	156	90	160	80	35	M12	20	4	20	64	$2.5^{+0.4}$	32
5 kN·m	22	14.2	155.5	17	179	110	180	110	188	80	10	M14	26	3	26	84	2.8	42
10 kN·m	26	17	196	17	221	140	222	140	230	80	10	M16	30	4	30	92	$3.5^{+0.5}$	46

Run-out and concentric tolerances



Measuring range	Axial run-out tolerance (mm)	Radial run-out tolerance (mm)
100 N·m – 1 kN·m	0.01	0.01
2 kN·m – 10 kN·m	0.02	0.02

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