

# Data sheet

---

## Torque Transducer Series M

(2 N·m – 10000 N·m)



### Benefits/Application

---

- For static and dynamic moments
- Non-rotational construction
- Very high-cycle fatigue resistant up to 80 % of nominal load
- Extremely robust against side forces and bending moments
- Easy assembling, lots of possibilities

### Options/Accessories

---

- Optional solid or plug-in connection
- Available from size 20 N·m with a redundant measuring circuit
- Tension-Torsion combination with Serie K

# Technical data

2 up to 500 N·m

		$M_{nom}$	N·m	2	5	10	20	50	100	200	500
Metrological Data	Rated Torque										
	Accuracy class			0,05							
	Torque measurement range		%	1 - 100							
	Linearity error	$d_{lin}$	%	0,05							
	Interpolation error	$f_c$	%	0,4							
	Hysteresis	$h$	%	0,05							
	Reversibility error	$v$	%	0,2							
	Repeatability (f.s.)		%	0,003							
	Creep		%	0,025							
	Temperature effect on characteristic value per 10 K	$TK_c$	%/10 K	0,04							
	Temperature effect on zero signal per 10 K	$TK_0$	%/10 K	0,025							
	Bending moment effect		%/N·m	$1 \cdot 10^{-2}$	$4 \cdot 10^{-3}$	$2 \cdot 10^{-3}$	$1 \cdot 10^{-3}$	$4 \cdot 10^{-4}$	$2 \cdot 10^{-4}$	$1 \cdot 10^{-4}$	$4 \cdot 10^{-5}$
	Lateral force effect		%/kN	0,9	0,5	0,3	0,15	0,1	0,05	0,03	0,02
Axial force effect		%/kN	0,6	0,3	0,2	0,1	0,06	0,04	0,02	0,01	
Characteristic value difference, anticlockwise/clockwise	$d_{RL}$	%	0,2								
Electrical Data	Rated characteristic value	$C_{nom}$	mV/V	1,8	1,6	2					
	Characteristic value tolerance	$d_c$	%	1)		0,2					
	Zero signal deviation	$d_{s,0}$	%	0,5							
	Input resistance	$R_e$	$\Omega$	1100 - 1500							
	Output resistance	$R_a$	$\Omega$	800 - 1200							
	Insulation resistance	$R_{is}$	$\Omega$	$> 10^9$							
	Operating range of excitation voltage	$B_{U,G}$	V	5 - 15							
	Protection (DIN EN 60529)			IP 54							

## 2 up to 500 N·m

Mechanical Data	Rated Torque	$M_{nom}$	N·m	2	5	10	20	50	100	200	500	
	Rated torsion angle	$j_{nom}$	rad	0,01			0,018	0,013	0,011	0,009	0,007	
	Torsional rigidity	$c_T$	N·m/rad	200	500	1000	1111	3846	9090	22220	71428	
	Mass	$m$	kg	0,3			0,5	0,6	1,6			
	Fundamental resonant frequency	$f_G$	kHz	30				40	50	30	40	
	Permissible oscillation stress		%	80								
Limits	Torque limit		%	150								
	Breaking torque		%	>300								
	Lateral force limit		kN	2	5	15	25	40	65	100		
	Bending moment limit	$M_{bzul}$	%	100								
	Axial force limit	$F_{azul}$	kN	5	10	20	40	60	100	160		
	Rated temperature range	$B_{T, nom}$	°C	10 - 60								
	Operating temperature range	$B_{T, G}$	°C	-40 - +120								

†) The individual nominal value is specified on the nameplate.

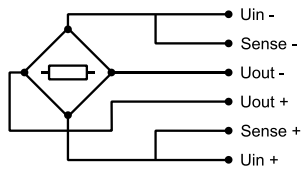
# Technical data

1 up to 10 kN·m

	Rated Torque	$M_{nom}$	N·m	1000	1500	2000	3000	4000	5000	6000	10000
Metrological Data	Accuracy class			0,05							
	Torque measurement range		%	1 - 100							
	Linearity error	$d_{lin}$	%	0,05							
	Interpolation error	$f_c$	%	0,4							
	Hysteresis	$h$	%	0,05							
	Reversibility error	$v$	%	0,2							
	Repeatability (f.s.)		%	0,003							
	Creep		%	0,025							
	Temperature effect on characteristic value per 10 K	$TK_C$	%/10 K	0,04							
	Temperature effect on zero signal per 10 K	$TK_0$	%/10 K	0,025							
	Bending moment effect		%/N·m	$2 \cdot 10^{-5}$	$1 \cdot 10^{-5}$		$1 \cdot 10^{-5}$	$5 \cdot 10^{-6}$	$4 \cdot 10^{-6}$	$3 \cdot 10^{-6}$	$2 \cdot 10^{-6}$
	Lateral force effect		%/kN	0,01	0,009	0,007	0,006	0,005	0,004	0,003	0,002
	Axial force effect		%/kN	0,01	0,006	0,005	0,004	0,003	0,003	0,002	
	Characteristic value difference, anticlockwise/clockwise	$d_{RL}$	%	0,2							
Electrical Data	Rated characteristic value	$C_{nom}$	mV/V	2							
	Characteristic value tolerance	$d_c$	%	0,2							
	Zero signal deviation	$d_{S,0}$	%	0,5							
	Input resistance	$R_e$	$\Omega$	1100 - 1500							
	Output resistance	$R_a$	$\Omega$	800 - 1200							
	Insulation resistance	$R_{is}$	$\Omega$	$> 10^9$							
	Operating range of excitation voltage	$B_{U,G}$	V	5 - 15							
	Protection (DIN EN 60529)			IP 54							

Mechanical Data	Rated Torque	$M_{nom}$	N·m	1000	1500	2000	3000	4000	5000	6000	10000	
	Rated torsion angle	$j_{nom}$	rad	0,006	0,0055	0,005	0,004				0,006	
	Torsional rigidity	$c_T$	N·m/rad	$1,7 \cdot 10^5$	$2,7 \cdot 10^5$	$4 \cdot 10^5$	$7,5 \cdot 10^5$	$1 \cdot 10^6$	$1,25 \cdot 10^6$	$1,5 \cdot 10^6$	$1,8 \cdot 10^6$	
	Mass	$m$	kg	4,8		7,6	7,7	7,8	7,9	28		
	Fundamental resonant frequency	$f_G$	kHz	1,5	1,9	2,3	1,5	1,7	1,9	2,2	1,6	
	Permissible oscillation stress		%	80								
Limits	Torque limit		%	150								
	Breaking torque		%	300								
	Lateral force limit		kN	180	200	300	400	500	650	800	1000	
	Bending moment limit	$M_{bzul}$	%	100								
	Axial force limit	$F_{azul}$	kN	250	300	400	600	700	850	1000	1500	
	Rated temperature range	$B_{T,nom}$	°C	10 - 60								
	Operating temperature range	$B_{T,G}$	°C	-40 - +120								

\*) Data on request



Permanent connection end connected <sup>1)3)4)</sup> 7-pin LEMO Series 1 Female	Connection pluggable <sup>1)2)5)</sup> 7-pin LEMO Series 0 Female: - Male:

Connection		Pin
Supply voltage (+)	$U_{in+}$	3
Supply voltage (-)	$U_{in-}$	2
Measurement signal (+)	$U_{out+}$	1
Measurement signal (-)	$U_{out-}$	4
Sense (+)	Sense+	5
Sense (-)	Sense-	6

### Shielding

1) View to o weldingside

3) Up to size 10 N·m.

5) A available from size 20 N·m.

2) Female LEMO S.A. Typ: EGG.1B.307.CLL; Male: FGG.1B.307.CLA.D72

4) Cable lenght 0,5 m.

### Housing



Permanent connection  
end connected  
(up to size 10 N·m)

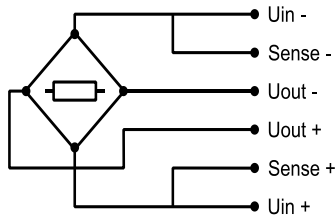


Pluggable connection

- More cable types and lengths on request
- Available types of connectors for the cable: D-Sub 9 pol ;D-Sub 15pol ;M-S 7pol ;LEMO Series1 7pol
- Configuration with customer defined connection is possible

# Cable connection

## permanent connection



Permanent connection  
end not connected<sup>1)</sup>

Grey cable<sup>2)</sup>  
Ø 6,5 mm  
6 x 0,25 mm<sup>2</sup>  
Temperature range: -35 °C to +90 °C

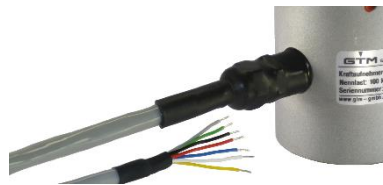
Black cable 6-pin<sup>3)</sup>  
Ø 2,9 mm  
vibration-proof, 6 x 0,04 mm<sup>2</sup>  
Temperature range: -50 °C to +105 °C

Connection		Color	
Supply voltage (+)	U <sub>in+</sub>	blue	
Supply voltage (-)	U <sub>in-</sub>	black	
Measurement signal (+)	U <sub>out+</sub>	white	
Measurement signal (-)	U <sub>out-</sub>	red	
Sense (+)	Sense+	green	
Sense (-)	Sense-	grey	yellow
Shielding		yellow	grey

1) Cable length 5 m.

2) Available from size 20 N·m

3) Up to size 10 N·m



Permanent connection  
end not connected  
(Ø 6,5 mm)



Permanent connection  
end not connected  
(Ø 2,9 mm)

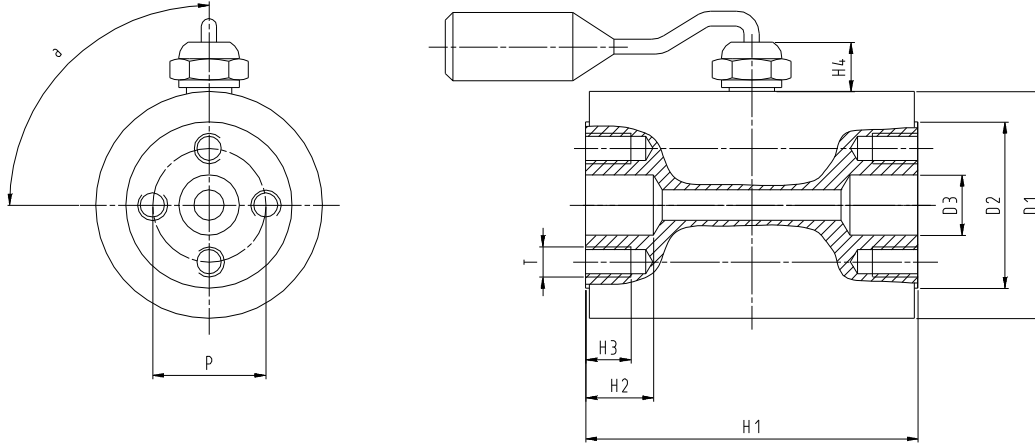
## Option: 2.Measuring circuit

- In case of two circuits the technical data are similarly valid for both circuits
- From size 20 N · m possible
- The location of the cable outlet can be chosen on request

# Mating dimensions

up to 10 N·m

Type: 2 N·m - 10 N·m



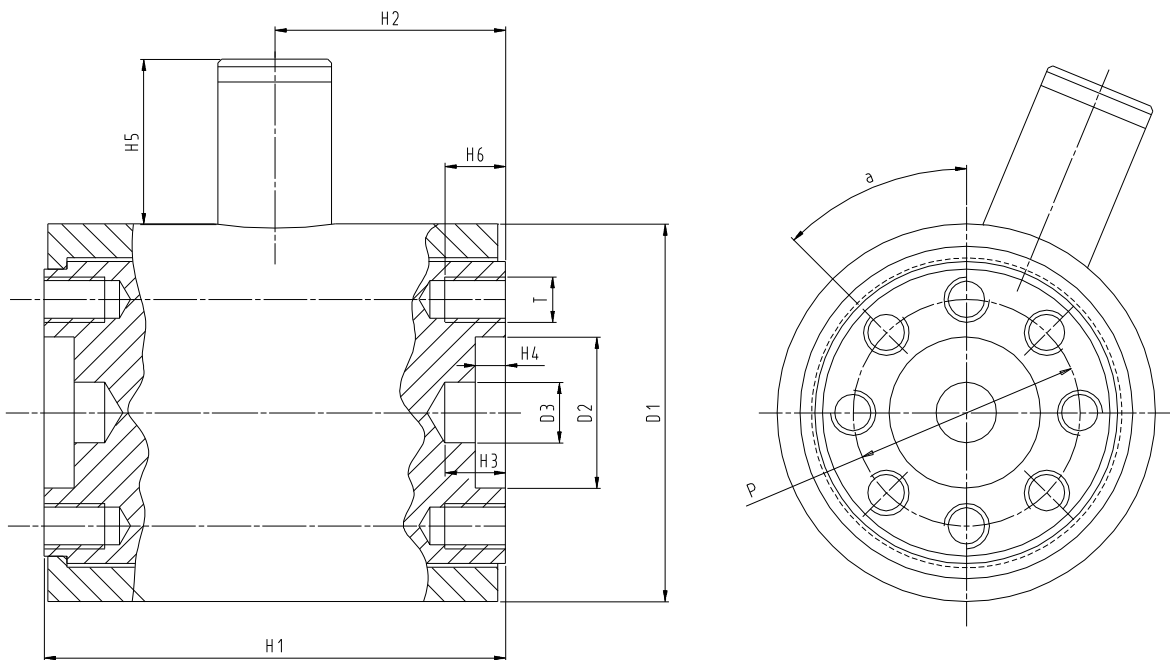
Rated Torque	$M_{nom}$	N·m	2; 5; 10
Diameter	$\varnothing D_1$	mm	30
Diameter	$\varnothing D_2$	mm	22
Diameter	$\varnothing D_3$	mm	8 <sub>H7</sub>
Pitch circle diameter	$\varnothing P$	mm	15
Thread	$T_1$		M4
Height	$H_1$	mm	44
Height	$H_2$	mm	9
Height	$H_3$	mm	6
Height	$H_4$	mm	ca. 7
Angle	$a$		90°



# Mating dimensions

up to 20 N·m

Type: 20 N·m - 10000 N·m



Rated Torque	$M_{nom}$	N·m	20 50 100	200 500	1000 1500 2000	3000 4000 5000 6000	10000
Diameter	$\varnothing D_1$	mm	50	73	107	141	205
Diameter	$\varnothing D_2$	mm	20H7	30H7	45H7	60H7	120H7
Diameter	$\varnothing D_3$	mm	8H8	10H8			
Pitch circle diameter	$\varnothing P$	mm	30±0,1	45±0,1	71±0,1	95±0,1	155±0,1
Thread	$T_1$		M6	M10	M16	M20	M24
Height	$H_1$	mm	61-0,1	82-0,1	107-0,1	130	170
Height	$H_2$	mm	30,5	41	54	65	85
Height	$H_3$	mm	8				12
Height	$H_4$	mm	4				8
Height	$H_5$	mm	22				
Height	$H_6$	mm	8	15	22	25	35
Angle	$a$		45°				

Änderungen vorbehalten. Alle Angaben beschreiben unsere Produkte in allgemeiner Form. Sie stellen keine vereinbarte Beschaffenheit im Sinne des § 434 Abs. 1 BGB dar.

**GTM**  
DEFINING PRECISION

GTM Testing and Metrology GmbH  
Philipp-Reis-Straße 4-6, 64404 Bickenbach, Germany  
www.gtm-gmbh.com  
Phone +49(0)6257-9720-0, Fax +49(0)6257-9720-77