

# TM 300 SERIES

## IN-LINE TORQUE TRANSDUCERS

### FEATURES

- Integrated torque and speed conditioning
- Torque Range: 0.1 N·m ... 10 kN·m  
(0.07 lb·ft ... 7375 lb·ft)
- Accuracy: <0.1 %
- Overload Capacity: 200 %
- Breaking Limit: >400 %
- High Speed Applications: up to 50 000 rpm
- Non-Contact (no sliprings)
- No Electronic Components in Rotation
- High Electrical Noise Immunity
- Single DC Power Supply: 20 ... 32 VDC
- Immediate Speed Detection
- Adjustable Torque Signal Frequency  
Pass Band up to 5 kHz
- Built-In Test Function (B.I.T.E.)
- Stainless Steel Shaft
- EMC Susceptibility Conforms to  
European Standards



Fig. 1: TM312 & TM308 In-Line Torque Transducer with smooth shaft

### DESCRIPTION

Magtrol's In-Line Torque Transducers provide extremely accurate torque and speed measurement over a very broad range. Each model has an integrated conditioning electronic module providing a  $\pm 5$  VDC ( $\pm 10$  VDC) torque output and an open collector speed output. Magtrol Torque Transducers are very reliable, providing high overload protection, excellent long term stability and high noise immunity.

All transducer models employ our unique non-contact differential transformer torque measuring technology. This measuring technology offers many benefits, most notably that no electronic components rotate during operation.

To provide customers with several price/performance options, Magtrol offers three torque transducer models: basic model (TMB Series), high accuracy (TM Series) and high speed with high accuracy (TMHS Series).

Each transducer consists of a hardened stainless steel shaft with smooth, splined or keyway shaft ends, an anodized aluminium housing containing the guide bearings and an electronic measurement conditioner.

The integrated electronic circuit, supplied by single DC voltage, provides torque and speed signals without any additional amplifier. The transducer is a stand-alone measuring chain. Connections are made by means of a 6-pole male connector mounted on the housing. A removable aluminium base (delivered as standard with TM Series and TMHS Series models, and as an option for TMB Series transducers) allows fixed mounting of the transducer.

## OPERATING PRINCIPLES

The measuring system, based on the principle of a variable, torque proportional transformer coupling, consists of two concentric cylinders shrunk on the shaft on each side of the shaft's deformation zone, and two concentric coils attached to the housing.

Both cylinders have a circularly disposed coinciding row of slots and rotate with the shaft inside the coils. An alternating current with the frequency of 20 kHz flows through the primary coil. When no torque is applied, the slots on the two cylinders fail to overlap. When torque is applied, the deformation zone undergoes an angular deformation and the slots begin to overlap.

Thus a torque-proportional voltage is on the secondary coil. The conditioning electronic circuit incorporated in the transducer converts the voltage to a nominal torque signal of  $0 \dots \pm 5 \text{ VDC}$ . A low-pass filter (Butterworth/ $2^{\text{nd}}$  order), adjustable from 5 kHz... 1 Hz, allows tuning of the torque signal frequency limitation.

An optical sensor reads the speed on a toothed pattern machined directly on the measuring system. The electronic conditioner outputs a frequency signal proportional to the shaft rotational speed. An active circuit compensates the zero and sensitivity temperature drifts within a tolerance of 0.1 % / 10 K.

## APPLICATIONS

TM, TMB and TMHS Series Torque Transducers provide dynamic torque and speed measurement of:

- Propellers - aerospace, marine and helicopter
- Windshield wipers, electrical windows, starters, generators and brakes in automobile industry
- Pumps - water and oil
- Reduction gears and gearboxes
- Clutches
- Motorized valves
- Drills, pneumatic tools and other machine tools

## SYSTEM CONFIGURATION

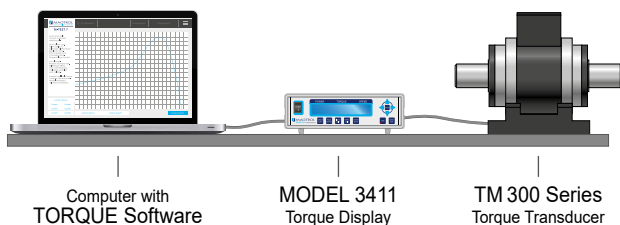


Fig. 2: TM300Series connected with MODEL 3411 Torque Display and a computer with TORQUE Software

## ELECTRICAL CONFIGURATION

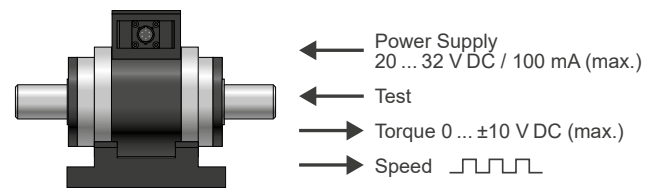


Fig. 3: TM300Series electrical input and output

## SUPPORTED & SUSPENDED INSTALLATIONS

The TMB Series is dedicated for use in a basic configuration or for low speed applications. The TMB300 Series ranges from TMB304 (1 N·m) to TMB313 (500 N·m). Due to dedicated low speed usage, the TMB Series is **delivered without base mount** however, a base is available as an option.

The TM300 Series ranges (TM309...TM317) can also be installed without the base mount in a suspended configuration. This configuration is **only allowed for low speed measurement**. The benefit of this configuration is the use of a single element coupling, creating a shorter drive train.

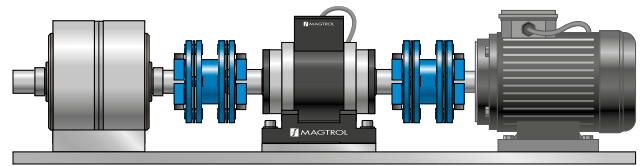


Fig. 4: **Supported installation**  
Mandatory for standard and high speed applications

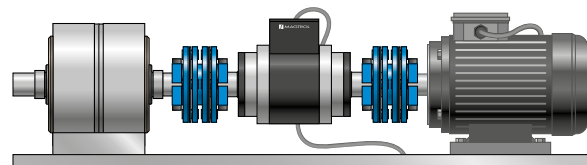


Fig. 5: **Suspended installation for low speed application only.**  
Use single element coupling to create a shorter drive train.

**SPECIFICATIONS**
**TORQUE TRANSDUCER RATINGS**

MODEL	Nominal Rated Torque (RT)		TMB 300 Series		TM 300 Series		TMHS 300 Series (High speed) <sup>a)</sup>	
	N·m	lb·ft	Accuracy class	Max. speed rpm	Accuracy class	Max. speed rpm	Accuracy class	Max. speed rpm
TM301	0.1	0.07	N/A	6000	<0.2%	20000	N/A	40000
TM302	0.2	0.15						
TM303	0.5	0.37						
TM304	1	0.70						
TM305	2	1.50						
TM306	5	3.70						
TM307	10	7.40						
TM308 <sup>e)</sup>	20	15	<0.1%	4000	<0.1%	10000	50000	
TM309 <sup>e)</sup>	20	15						
TM310	50	37						
TM311	100	74						
TM312	200	148						
TM313	500	369	N/A	7000	10000	32000	24000	
TM314	1000	737						
TM315	2000	1475						
TM316	5000	3687						
TM317	10000	7375			<0.15%	5000	<0.15%	12000

**MECHANICAL CHARACTERISTICS**

MODEL	NOMINAL RATED TORQUE (RT)		TORSIONAL STIFFNESS		MOMENT OF INERTIA		WEIGHT <sup>b)</sup>		SHAFT ENDS			BASE MOUNT	
	N·m	lb·ft	N·m / rad	lb·ft	kg·m <sup>2</sup>	lb·ft·s <sup>2</sup>	kg	lb	Smooth	Splined	Keyway	TM/TMHS	TMB
TM301	0.1	0.07	29	21	2.50x10 <sup>-5</sup>	1.84x10 <sup>-5</sup>	1.1	2.43	X	-	-	integrated	
TM302	0.2	0.15	29	21	2.50x10 <sup>-5</sup>	1.84x10 <sup>-5</sup>	1.1	2.43	X	-	-		
TM303	0.5	0.37	66	48	2.55x10 <sup>-5</sup>	1.88x10 <sup>-5</sup>	1.1	2.43	X	-	-		
TM304	1	0.70	145	107	2.82x10 <sup>-5</sup>	2.07x10 <sup>-5</sup>	1.2	2.65	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM305	2	1.50	290	214	2.91x10 <sup>-5</sup>	2.14x10 <sup>-5</sup>	1.2	2.65	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM306	5	3.70	725	535	3.08x10 <sup>-5</sup>	2.27x10 <sup>-5</sup>	1.2	2.65	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM307	10	7.40	1450	1069	2.63x10 <sup>-5</sup>	1.94x10 <sup>-5</sup>	1.2	2.65	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM308 <sup>e)</sup>	20	15	2900	2139	2.66x10 <sup>-5</sup>	1.96x10 <sup>-5</sup>	1.2	2.65	X	- <sup>c)</sup>	- <sup>c)</sup>	included	optional
TM309 <sup>e)</sup>	20	15	2400	1770	1.49x10 <sup>-4</sup>	1.03x10 <sup>-4</sup>	2.5	5.51	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM310	50	37	5700	4204	1.52x10 <sup>-4</sup>	1.12x10 <sup>-4</sup>	2.5	5.51	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM311	100	74	11400	8408	1.55x10 <sup>-4</sup>	1.14x10 <sup>-4</sup>	2.5	5.51	X	- <sup>c)</sup>	- <sup>c)</sup>		
TM312	200	148	38200	28200	4.85x10 <sup>-4</sup>	3.57x10 <sup>-4</sup>	4.1	9.04	X	X <sup>d)</sup>	- <sup>c)</sup>		
TM313	500	369	95800	70700	5.16x10 <sup>-4</sup>	3.80x10 <sup>-4</sup>	4.4	9.70	X	X <sup>d)</sup>	- <sup>c)</sup>		
TM314	1000	737	3.28x10 <sup>5</sup>	2.419x10 <sup>6</sup>	3.01x10 <sup>-3</sup>	2.21x10 <sup>-3</sup>	9.9	21.80	-	X <sup>d)</sup>	X		
TM315	2000	1475	6.56x10 <sup>5</sup>	4.838x10 <sup>6</sup>	3.30x10 <sup>-3</sup>	2.43x10 <sup>-3</sup>	10.8	23.80	-	X <sup>d)</sup>	X		
TM316	5000	3687	1.94x10 <sup>6</sup>	1.4x10 <sup>7</sup>	9.95x10 <sup>-3</sup>	7.32x10 <sup>-3</sup>	20.0	44.10	-	X <sup>d)</sup>	- <sup>c)</sup>		
TM317	10000	7375	2.26x10 <sup>6</sup>	1.7x10 <sup>7</sup>	1.18x10 <sup>-2</sup>	8.66x10 <sup>-3</sup>	22.3	49.20	-	X <sup>d)</sup>	-		

a) Higher speed versions available for some models

b) The weight for the TM, TMHS or specifically TMB, ordered without the foot mount is slightly lower. Weight is given for the heavier version (shaft end) of TM300Series. Effective weight depending on the model is available on request.

c) Versions available on request

d) Magtrol recommends using adaptation flanges (available on request)

e) For 20Nm, Model TM309 is recommended

**SPECIFICATIONS**

STANDARD VERSION	TM 300 Series	TMHS 300 Series	TMB 300 Series
------------------	---------------	-----------------	----------------

**TORQUE MEASUREMENT**

Maximum Dynamic Torque Peak Value (Measuring Overload Capacity)	0% ... ±200% of RT		
Maximum Dynamic Torque (Overload Limit with possible 0 deviation)	0% ... ±400% of RT (±200% for TM317)		
Combined Error of Linearity and Hysteresis to 100% of RT	<±0.1% of RT (<±0.15% for TM317)	<±0.1% of RT	
Combined Error of Linearity and Hysteresis from 100% to 200% of RT	<±0.15% of RT (<±0.2% for TM317)	<±0.15% of measured value	
Influence of Speed on Zero Torque Signal	<±0.01% of RT / 1000 rpm	<±0.02% of RT / 1000 rpm	

**SPEED MEASUREMENT**

Rated range of use	1 ... 50000 rpm (see « Torque Transducer Ratings » section)		
Number of teeth	60 Z		
Minimum speed detection	1 rpm		

**ENVIRONMENT & MECHANICAL CHARACTERISTICS**

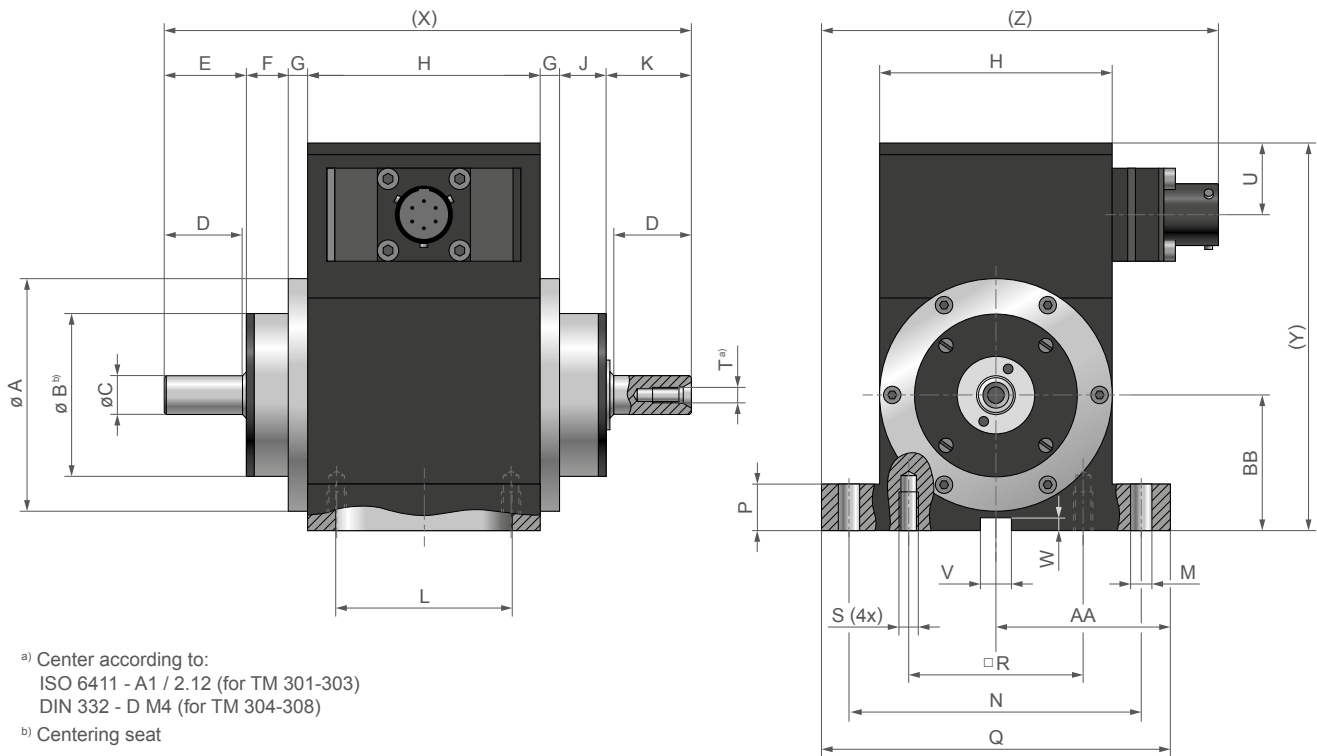
Operating Temperature	-40 °C ... +85 °C		
Storage Temperature	-40 °C ... +100 °C		
Temperature Influence on Zero / on Sensitivity:	<ul style="list-style-type: none"> <li>· In Compensated Range +10° C to +60° C &lt;±0.1% of RT / 10K</li> <li>· In Compensated Range -25° C to +80° C &lt;±0.2% of RT / 10K</li> </ul>		
Long-term Stability of Sensitivity	<±0.05% of RT / year	<±0.1% of RT / year	
Mechanical Shock	according to IEC 68.2.27 / Class D3		
Vibration	according to IEC 68.2.6 / Class D3		
Protection class	IP44		
EMC / EMI compatibility	IEC 61326-1 / IEC 61321-2-3		
Balancing Quality	G1 according to ISO 1940	G2.5 according to ISO 1940	

**ELECTRICAL CHARACTERISTICS**

Power supply (max. voltage / current)	20 ... 32VDC / 100mA		
Torque output (rated / max.)	±5VDC / ±10VDC		
Filter Cutoff (frequency)	5000, 2500, 1000, 500, 200, 100, 40, 20, 10, 5, 2, 1 Hz		
Speed output (frequency)	open collector (15Ω in series), max. 30 VDC, protected against short circuits		

**ELECTRICAL CONNECTION**

Output connector	Axial connector Souriau 851 02 E 106P5029		
Connection cable assembly	Option (see « Options & Accessories » section)		
Wiring diagram			

**TM 301-308 (SMOOTH SHAFT) DIMENSIONS**


- a) Center according to:  
 ISO 6411 - A1 / 2.12 (for TM 301-303)  
 DIN 332 - D M4 (for TM 304-308)
- b) Centering seat

**CAUTION:** MAGTROL has redesigned the fixation for its small torque transducers (TM301 ... TM308). The new housing allows installation of the torque transducer from the bottom as before, but also allows installation from the top. It also integrates a centering key underneath its housing. The old fastening system (from the bottom only) is still available as an alternative option.

**NOTE:** Dimensions are the same for every series (TM300 Series, TMHS 300 Series). Original dimensions are in SI units. Dimensions converted to English Engineering Units have been rounded up to 3 or 4 decimal places.

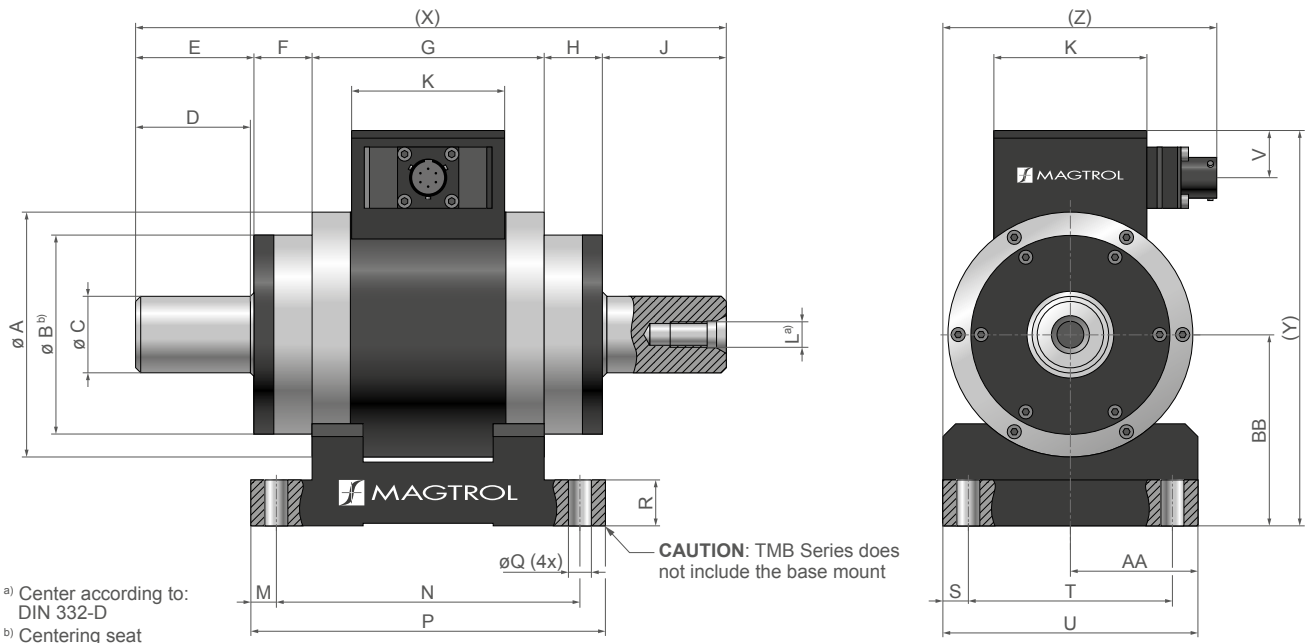
MODEL	Units	ø A	ø B	ø C	D	E	F	G	H	J	K	L	M	N
TM301 - 303	mm	60	42g6	6h6	12	13.2	7.8	5	60	9	14	45.5	5.5	75
	in	2.362	1.6533 1.6526	0.2362 0.2359	0.472	0.520	0.307	0.197	2.362	0.354	0.551	1.791	0.217	2.953
TM304 - 308	mm	60	42g6	10h6	20	21.2	10.8	5	60	12	22	45.5	5.5	75
	in	2.362	1.6533 1.6526	0.3937 0.3933	0.787	0.835	0.425	0.197	2.362	0.472	0.866	1.791	0.217	2.953

MODEL	Units	P	Q	□R	S	T <sup>a)</sup>	U	V	W	X	Y	Z	AA	BB
TM301 - 303	mm	12	90	45	M5x10	ø1	18.5	8H9	3.3	114	100	101	45 <sup>(0/-0.1)</sup>	35 <sup>(0/-0.1)</sup>
	in	0.472	3.543	1.772	M5x10	ø1	0.728	0.3164 0.3149	0.13	4.488	3.937	3.976	1.7717 1.7677	1.3780 1.3740
TM304 - 308	mm	12	90	45	M5x10	M4	18.5	8H9	3.3	136	100	101	45 <sup>(0/-0.1)</sup>	35 <sup>(0/-0.1)</sup>
	in	0.472	3.543	1.772	M5x10	M4	0.728	0.3164 0.3149	0.13	5.354	3.937	3.976	1.7717 1.7677	1.3780 1.3740

a) Center according to DIN 6411-A or DIN 332-D

**NOTE:** 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.

TM 309-313 (SMOOTH SHAFT) DIMENSIONS



NOTE: Dimensions are the same for every series (TM 300 Series, TMHS 300 Series and TMB 300 Series). Original dimensions are in metric units. Dimensions converted to English Engineering Units have been rounded up to 3 or 4 decimal places.

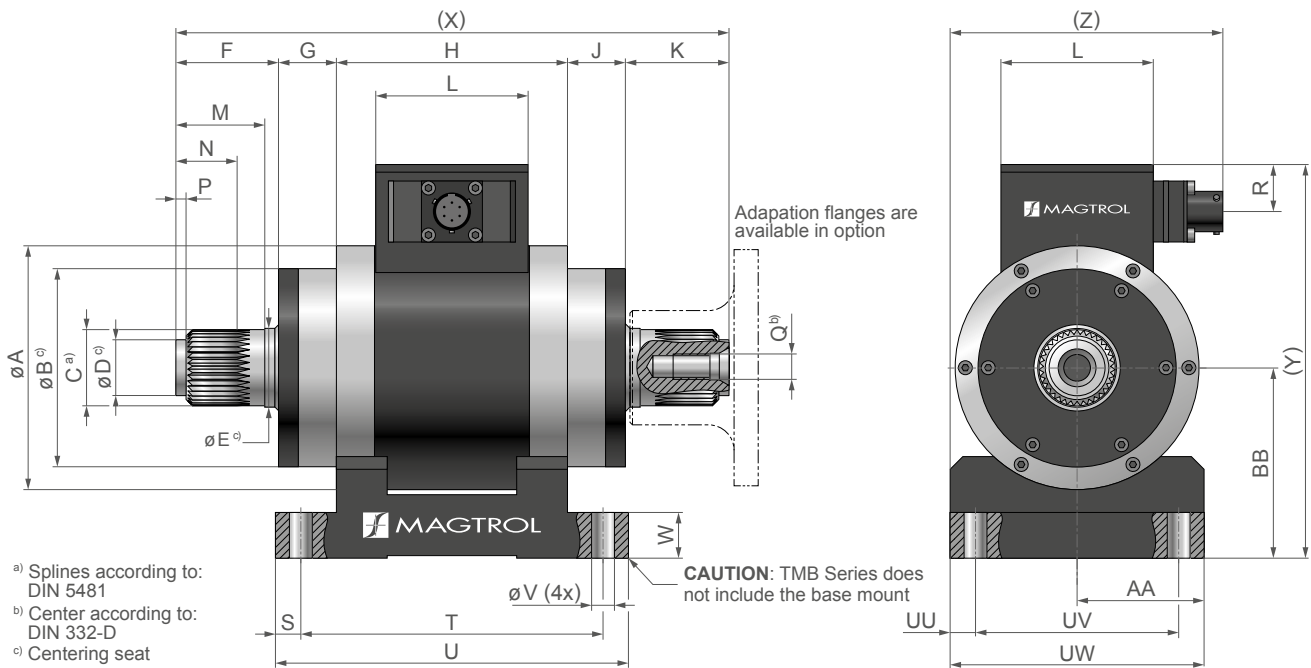
MODEL	Units	ø A	ø B	ø C	D	E	F	G	H	J	K	L <sup>a)</sup>	M	N
TM 309	mm	82g6	64	20h6	25	26.2	16.8	86	15	26.4	60	M6	10	110
	in	3.2283 3.2270	2.52	0.7874 0.7869	0.984	1.031	0.661	3.386	0.591	1.039	2.362		0.394	4.331
TM 310	mm	82g6	64	20h6	35	36.2	16.8	86	15	36.4	60		10	110
	in	3.2283 3.2270	2.52	0.7874 0.7869	1.378	1.425	0.661	3.386	0.591	1.433	2.362		0.394	4.331
TM 311	mm	82g6	64	20h6	40	41.2	16.8	86	15	41.4	60		10	110
	in	3.2283 3.2270	2.52	0.7874 0.7869	1.575	1.662	0.661	3.386	0.591	1.630	2.362		0.394	4.331
TM 312	mm	96g6	78	30h6	45	46.4	22.8	91	21	46.8	60	M10	10	119
	in	3.7791 3.7782	3.071	1.1811 1.1806	1.772	1.827	0.898	3.583	0.827	1.842	2.362		0.394	4.685
TM 313	mm	96g6	78	30h6	55	56.4	22.8	91	21	56.8	60		10	119
	in	3.7791 3.7782	3.071	1.1811 1.1806	2.165	2.220	0.898	3.583	0.827	2.236	2.362		0.34	4.685

MODEL	Units	P	ø Q	R	S	T	U	V	X	Y	Z	AA	BB
TM 309	mm	130	6.6	12	8	74	90	18.5	170.4	134	90	45	60 ( <sup>0</sup> / <sub>-0.05</sub> )
	in	5.118	0.260	0.472	0.315	2.913	3.543	0.728	6.709	5.276	3.543	1.772	2.3622 2.3603
TM 310	mm	130	6.6	12	8	74	90	18.5	190.4	134	90	45	60 ( <sup>0</sup> / <sub>-0.05</sub> )
	in	5.118	0.260	0.472	0.315	2.913	3.543	0.728	7.496	5.276	3.543	1.772	2.3622 2.3603
TM 311	mm	130	6.6	12	8	74	90	18.5	200.4	134	90	45	60 ( <sup>0</sup> / <sub>-0.05</sub> )
	in	5.118	0.260	0.472	0.315	2.913	3.543	0.728	7.890	5.276	3.543	1.722	2.3622 2.3603
TM 312	mm	139	9	18	10	80	100	18.5	228.0	155	100	50	75 ( <sup>0</sup> / <sub>-0.05</sub> )
	in	5.472	0.354	0.709	0.394	3.150	3.937	0.728	8.976	6.102	3.937	1.967	2.9527 2.9508
TM 313	mm	139	9	18	10	80	100	18.5	248.0	155	100	50	75 ( <sup>0</sup> / <sub>-0.05</sub> )
	in	5.472	0.354	0.709	0.394	3.150	3.937	0.728	9.764	6.102	3.937	1.967	2.9527 2.9508

a) Center according to DIN 332-D

NOTE: 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.

TM 312-313 (SPLINED SHAFT) DIMENSIONS



NOTE: Dimensions are the same for every series (TM 300 Series, TMHS 300 Series and TMB 300 Series). Original dimensions are in metric units. Dimensions converted to English Engineering Units have been rounded up to 3 or 4 decimal places.

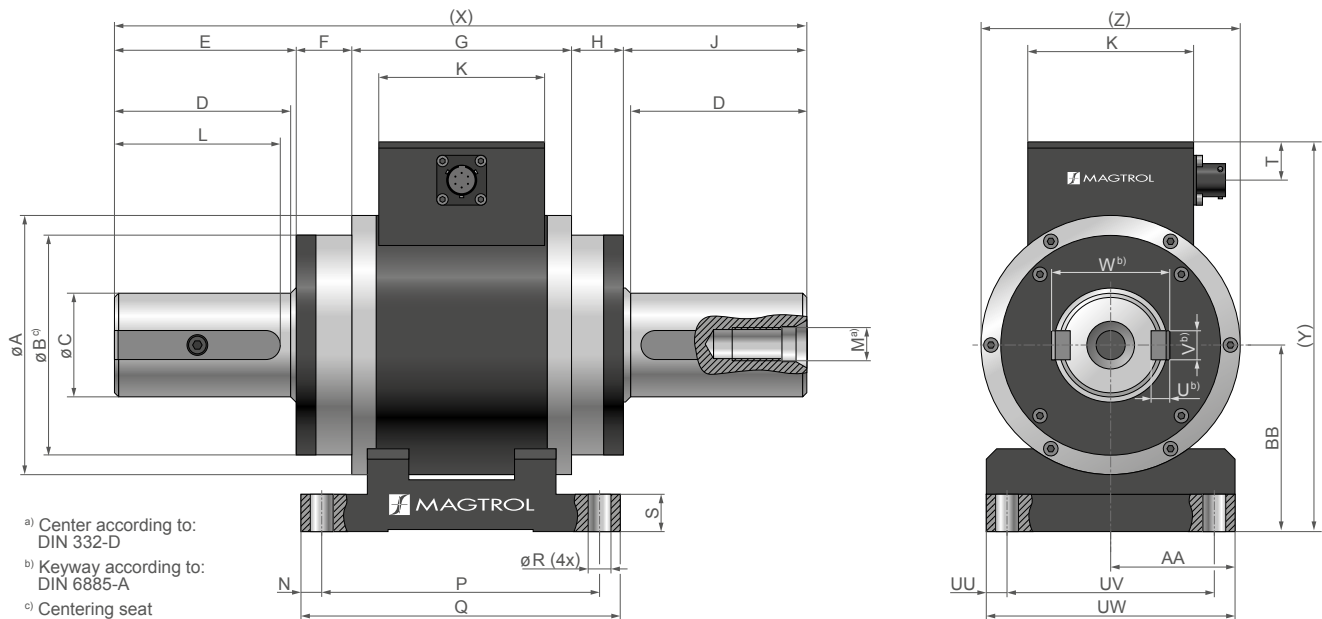
MODEL	Units	ø A	ø B	ø C <sup>a)</sup>	ø D	ø E	F	G	H	J	K	L	M	N	P	Q <sup>b)</sup>
TM312	mm	96g6	78	26x30	22h6	31h6	40.4	22.8	91	21	40.8	60	35	24	4	M10
	in	3.7791 3.7782	3.071	26x30	0.8661 0.8656	1.2205 1.2198	1.591	0.898	3.583	0.827	1.606	2.362	1.378	0.945	0.157	M10
TM313	mm	96g6	78	26x30	22h6	31h6	52.4	22.8	91	21	52.8	60	47	36	4	M10
	in	3.7791 3.7782	3.071	26x30	0.8661 0.8656	1.2205 1.2198	2.063	0.898	3.583	0.827	2.079	2.360	1.850	1.417	0.157	M10

MODEL	Units	R	S	T	U	ø V	W	UU	UV	UW	X	Y	Z	AA	BB
TM312	mm	18.5	10	119	139	9	18	10	80	100	216	155	107	50	75 <sup>(0/-0.05)</sup>
	in	0.728	0.394	4.685	5.472	0.354	0.709	0.394	3.15	3.937	8.504	6.102	4.213	1.969	2.9527 2.9508
TM313	mm	18.5	10	119	139	9	18	10	80	100	240	155	107	50	75 <sup>(0/-0.05)</sup>
	in	0.728	0.394	4.685	5.472	0.354	0.709	0.394	3.15	3.937	9.449	6.102	4.213	1.969	2.9527 2.9508

- a) Splines according to DIN 5481
- b) Center according to DIN 332-D

NOTE: 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.

TM 314-315 (KEYWAY SHAFT) DIMENSIONS



NOTE: Dimensions are the same for every series (TM300 Serie and TMHS 300 series). Original dimensions are in metric units. Dimensions converted to English Engineering Units have been rounded up to 3 or 4 decimal places.

MODEL	Units	øA	øB	øC	D	E	F	G	H	J	K	L	M <sup>a)</sup>	N	P	Q
TM314	mm	125g6	106	50h6	65	67.7	26.8	106	25	68.5	80	60	M16	10	134	154
	in	4.9207 4.9197	4.173	1.9685 1.9679	2.559	2.665	1.055	4.173	0.984	2.697	3.150	2.362		0.394	5.276	6.063
TM315	mm	125g6	106	50h6	85	87.7	26.8	106	25	88.5	80	80		10	134	154
	in	4.9207 4.9197	4.173	1.9685 1.9679	3.346	3.453	1.055	4.173	0.984	3.484	3.150	3.150		0.394	5.276	6.063

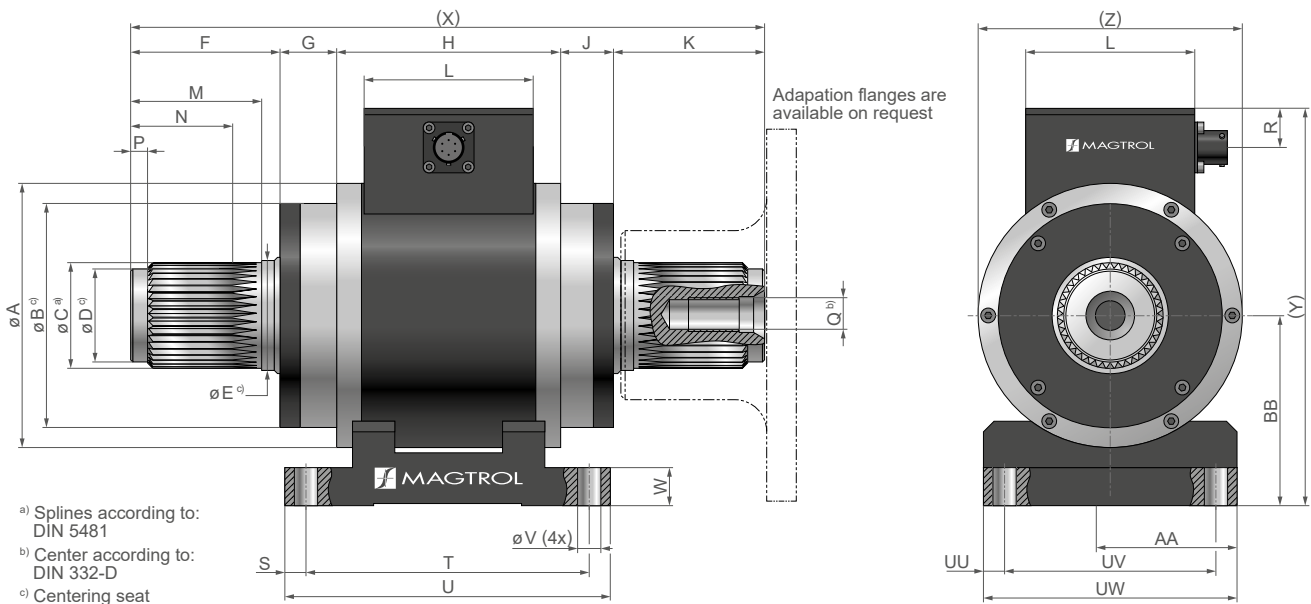
MODEL	Units	øR	S	T	UU	UV	UW	U <sup>b)</sup>	V <sup>b)</sup>	W <sup>b)</sup>	X	Y	Z	AA	BB
TM314	mm	11	18	18.5	10	100	120	9h11	14h9	57	294	187.5	125	60	90 <sup>(0/-0.05)</sup>
	in	0.433	0.709	0.728	0.394	3.937	4.724	0.3543 0.3508	0.5512 0.5495	2.244	11.575	7.382	4.921	2.362	3.5433 3.5414
TM315	mm	11	18	18.5	10	100	120	9h11	14h9	57	334	187.5	125	60	90 <sup>(0/-0.05)</sup>
	in	0.433	0.709	0.728	0.394	3.937	4.724	0.3543 0.3508	0.5512 0.5495	2.244	13.150	7.382	4.921	2.362	3.5433 3.5414

a) Center according to DIN 332-D  
 b) Keyway according to DIN 6885-A

NOTE: 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.



TM 314-317 (SPLINED SHAFT) DIMENSIONS



NOTE: Dimensions are the same for every series (TM 300 Series and TMHS 300 Series). Original dimensions are in metric units. Dimensions converted to English Engineering Units have been rounded up to 3 or 4 decimal places.

MODEL	Units	$\phi A$	$\phi B$	$\phi C^{a)}$	$\phi D$	$\phi E$	F	G	H	J	K	L	M	N	P	$\phi Q^{b)}$
TM314	mm	125g6	106	45x50	44h6	52h6	50.7	26.8	106	25	51.5	80	42	28	8	M16
	in	4.9207 4.9197	4.173	45x50	1.7323 1.7317	2.0472 2.0465	1.996	1.055	4.173	0.984	2.028	3.150	1.654	1.102	0.315	
TM315	mm	125g6	106	45x50	44h6	52h6	70.7	26.8	106	25	71.5	80	62	48	8	M16
	in	4.9207 4.9197	4.173	45x50	1.7323 1.7317	2.0472 2.0465	2.784	1.055	4.173	0.984	2.815	3.150	2.441	1.890	0.315	
TM316	mm	155g6	135	60x65	55h6	70h6	82.7	25.8	124	24	83.5	80	70	50	8	M20
	in	6.1018 6.1008	5.315	60x65	2.1654 2.1646	2.7559 2.7552	3.256	1.016	4.882	0.945	3.287	3.150	2.756	1.968	0.315	
TM317	mm	155g6	135	65x70	60h6	72h6	107.7	25.8	124	24	108.5	80	95	80	8	M20
	in	6.1018 6.1008	5.315	65x70	2.3622 2.3615	2.8346 2.8339	4.240	1.016	4.882	0.945	4.272	3.150	3.740	3.150	0.315	

MODEL	Units	R	S	T	U	$\phi V$	W	UU	UV	UW	X	Y	Z	AA	BB
TM314	mm	18.5	10	134	154	11	18	10	100	120	260	187.5	125	60	90 ( $^{0}_{-0.05}$ )
	in	0.728	0.394	5.276	6.063	0.433	0.709	0.394	3.937	4.724	10.236	7.382	4.921	2.362	3.5433 3.5414
TM315	mm	18.5	10	134	154	11	18	10	100	120	300	187.5	125	60	90 ( $^{0}_{-0.05}$ )
	in	0.728	0.394	5.276	6.063	0.433	0.709	0.394	3.937	4.724	11.811	7.382	4.921	2.362	3.5433 3.5414
TM316	mm	18.5	10	150	170	11	18	10	140	160	340	217.5	160	80	105 ( $^{0}_{-0.05}$ )
	in	0.728	0.394	5.905	6.693	0.433	0.709	0.394	5.512	6.299	13.386	8.563	6.299	3.149	4.1338 4.1319
TM317	mm	18.5	10	150	170	11	18	10	140	160	390	217.5	160	80	105 ( $^{0}_{-0.05}$ )
	in	0.728	0.394	5.905	6.693	0.433	0.709	0.394	5.512	6.299	15.354	8.563	6.299	3.149	4.1338 4.1319

a) Splines according to DIN 5481  
 b) Center according to DIN 332-D

NOTE: 3D STEP files of most of our products are available on our website: [www.magtrol.com](http://www.magtrol.com) ; other files are available on request.

SYSTEM OPTIONS AND ACCESSORIES

MIC & BKC SERIES - COUPLINGS

When Magtrol TMB, TM and TMHS Series Torque Transducers are to be mounted in a drive train, double-element miniature couplings are the ideal complement, although single-element couplings can be used for low speed applications. The criteria for selecting appropriate couplings for torque measurement is as follows:

- High torsional spring rate: Ensures a high torsional stiffness and angular precision
- Balancing quality (according to speed range)
- Speed range
- Alignment capability
- Clamping quality (should be self-centering and of adequate strength)

The higher the speed of the application, the more care is required in selecting the coupling and assembling (alignment and balancing) the drive train configuration. Magtrol provides a wide range of couplings suitable for torque measurement applications and can assist you in choosing the right coupling for your transducer.



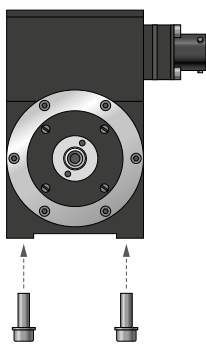
Fig. 6: BKC Series Metal Bellows Coupling



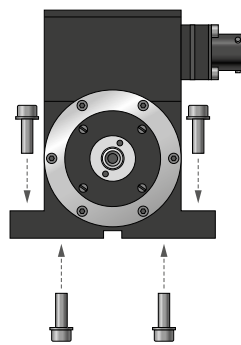
Fig. 7: MIC Series Miniature coupling

FIXATION FOR TM 301-308

MAGTROL has redesigned the mounting system for its small torque transducers (TM301-308). The new mounting base allows not only installation of the torque transducers from below as before, but also installation from the top. It also integrates a centering key underneath its housing. The old fastening system (from below only) is still available as an alternative.



Old housing (fastening from bottom only)



New housing (fastening from top and bottom)

TSB - TORQUE SPEED BOX



Magtrol's TSB Torque Speed Box allows data acquisition from two torque transducers simultaneously and provides the torque's analog signal output and speed's TTL signal output.

Fig. 8: TSB | Torque Speed Box»

DSP 7000 - DYNAMOMETER CONTROLLERS



Fig. 9: DSP 7001 | Dynamometer Controllers

Magtrol's MODEL DSP 7000 High Speed Programmable Dynamometer Controller employs state-of-the-art Digital Signal Processing Technology to provide superior motor testing capabilities. Designed for use with any Magtrol Hysteresis, Eddy-Current or Powder Dynamometer, Magtrol In-Line Torque Transducer or auxiliary instrumentation, the DSP 7000 can provide complete PC control via the USB or optional IEEE-488. With up to 500 readings per second, the DSP 7000 is ideally suited for both the test lab and the production line.

MODEL 3411 - TORQUE DISPLAYS



Fig. 10: MODEL 3411 | Torque Display

Magtrol offers the MODEL 3411 Torque Display which supplies the power to any TM/TMHS/TMB Transducer and displays torque, speed and mechanical power. Features include:

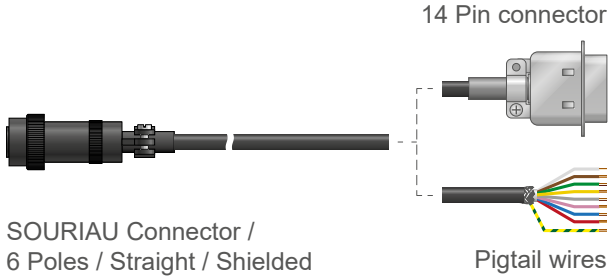
- Adjustable English, metric and SI torque units
- Large, easy-to-read vacuum fluorescent display
- Built-in self-diagnostic tests (B.I.T.E.)
- Overload indication
- Tare function
- USB & Ethernet interface
- Torque and speed outputs
- Closed-box calibration
- Includes Magtrol's TORQUE Software

«TORQUE» SOFTWARE

Magtrol's TORQUE Software is an easy-to-use LabVIEW™ executable program, used to automatically collect torque, speed and mechanical power data. The data can be printed, displayed graphically or quickly saved as a Microsoft® Excel spreadsheet. Standard features of TORQUE include: peak torque capture, multi-axes graphing, measured parameter vs. time, adjustable sampling rates and polynomial curve fitting.

SYSTEM OPTIONS & ACCESSORIES

CABLE ASSEMBLY



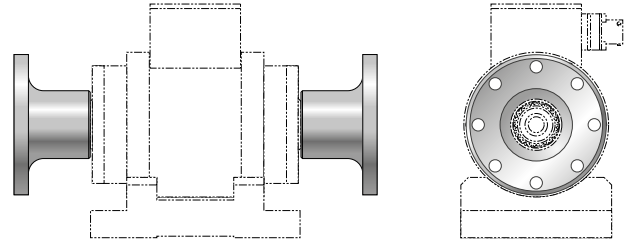
SOURIAU Connector /  
6 Poles / Straight / Shielded

ORDERING NUMBER	ER 1	--	/ 0	--
07 : Pigtail wires				
13 : 14 Pin connector <sup>a)</sup>				
1 : Cable length 5 m				
2 : Cable length 10 m				
3 : Cable length 20 m				

a) For use with MODEL3411 Torque Display or DSP 7000 Dynamometer Controller

FLANGES OPTION (for splined shaft)

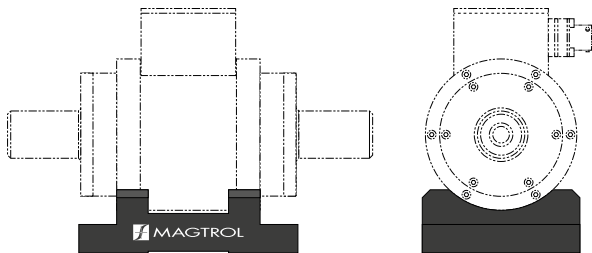
Adaptation flanges are optional for torque transducers with splined shaft ends. Magtrol flanges are recommended because they are specially designed for Magtrol Torque Transducers.



ORDERING NUMBER	FTM 2	--
12, 13, ... , 17 : according to TM300 Series model		

BASE MOUNT OPTION (for TMB 300 Series)

TMB 300 Series Transducers are delivered without base mount.



TMB309 - 311	PTM310
TMB312 - 313	PTM312

COUNTER CONNECTOR

Axial connector	Souriau 851 06 JC 10 6S 5029
90° connector	Souriau 851 08 EC 10 6S 50

ORDERING INFORMATION

ORDERING NUMBER	TM	--	3	--	/ X	--	X
HS : high-speed version (TM303-TM317)							
B : basic version (TM304-TM313)							
01, 02, ... , 17 : Model TM300 Series							
1 : Smooth shaft TM309-TM313 (and narrow body for TM301 - 308) <sup>a)</sup>							
2 : Splined shaft TM312-TM317							
3 : Keyway shaft TM314-TM315							
5 : Smooth shaft, wide base TM301-TM308 <sup>a)</sup>							

a) CAUTION: TM301-TM308 is still available with old narrow body (fixation from bottom only). (please see options and accessories section)

Example: TM312 In-line Torque Transducer high speed version with splined shaft would be ordered as : **TMHS 312/X2X**.