

## Torque Sensor rotating, non-contact transfer

### MODEL 8645 MODEL 8646



Model 8645 with round shaft



Model 8646 with square ends

#### Highlights

- Measuring range 0 ... 2.5 N·m to 0 ... 500 N·m
- Extended temperature range -40 °C ... 85 °C
- High axial forces allowed
- Integrated amplifier

#### Areas of application

- Automotive (steering, gearing, motors)
- Drilling systems
- Textile machines
- Pumps, mechanical conveying technology
- Fitness and workout gears, household appliances

#### Product description

This sensor uses a non-contact and maintenance-free technology to convert the torque into an electrical signal. The nickel steel shaft is conditioned with a permanent magnetic pattern. Apart from this, no other components such as strain gages or wiring are required on the shaft.

The magnetic pattern changes as a result of the torque being measured. This produces a measurement signal that is dependent on the torque. Via the integrated amplifier, the sensor supplies an output voltage of 0.5 ... 4.5 V. The zero point is at 2.5 V, which makes it easy to evaluate the direction of torque.

## Technical Data

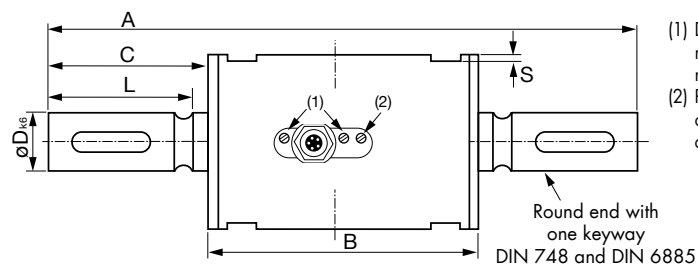
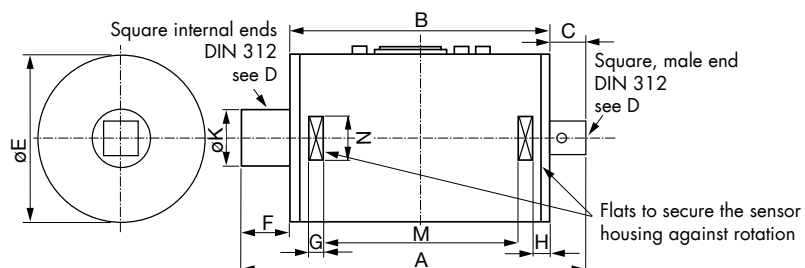
8645, 8646	-	5002.5	5005	5007.5	5017.5	5075	5175	5250	5500	
Measuring range 0 ...		±2.5 N·m	±5 N·m	±7.5 N·m	±17.5 N·m	±75 N·m	±175 N·m	±250 N·m	±500 N·m	
<b>Measurement accuracy</b>										
Relative linearity error		<±1 % F.S.								
Relative reversibility error		<±1 % F.S.								
Relative repeatability error		<±0.1 % F.S.								
Temperature effect on zero signal		<±0.1 % F.S./K								
Temperature effect on characteristic value		<±0.1 % F.S./K								
<b>Electrical values</b>										
Excitation voltage		6 ... 15 V DC								
Excitation current (40 mA for a period of 10 ms at the start)		10 mA								
Analog output signal (dependent on sensor)		≈0.5 V ... 4.5 V DC								
Signal output at 0 Nm (depending on sensor)		≈2.5 V DC								
Output resistance		50 Ω								
Cut-off frequency (-3 dB)		1 kHz								
<b>Environmental conditions</b>										
Operating temperature range		-40 °C ... +85 °C								
Resistance to magnetic field		max. 300 kA/m at distance 70 mm (4000 Oe) (Do not apply torque sensor within dynamic magnetic fields, e.g. near high running motors.)								
<b>Mechanical values</b>										
Resolution		0.1 % F.S.								
Rotary speed		model 8645: max. 5000 min <sup>-1</sup> model 8646: max. 1000 min <sup>-1</sup>								
Max. operating torque		150 % of nominal torque								
Breaking moment		300 % of nominal torque								
Protection class (acc. EN 60529)		IP50								
Shaft material housing		NiCrNi 14								
<b>Mechanical connection</b>										
8645		both shaft end with keyway acc.				measuring range 250 Nm	1 keyway acc. DIN 6885-1A			
						measuring range 500 Nm	2 keyways acc. DIN 6885-1A			
8646		Square, male and female, acc. DIN 3121								
<b>Mounting</b>										
Mounting instructions		For mounting the sensor it should be respected that the shafts are arranged exactly in line to the connecting shafts. There should not exist any axial and radial load. To avoid that please use flexible shaft couplings, torsionally stiff. The four flats on the housing should be only used to secure the sensor against rotation. Refer to clamps and accessories. Avoid any axial or radial load between housing and shaft during the installation.								
<b>Sonstiges</b>										
Axial force	[N]*	1000				2600	4000		7000	
Lateral force	[N]*	20		30	100	300	500		800	
Bending moment	[Nm]*	2.5		3.7	12.5	41.7	89.5		176	

\* Every irregular exposure (axial force, lateral force, bending moment, overstepping of max. operating force) is acceptable if only one of them occurs. Axial load = load applied directly to the shaft. Only 50 % of the load is permissible if the load is applied to the retaining ring/bearing. See the supplied test certificate for the exact sensor-specific values.

## Geometry

Dim. tolerance acc. ISO 2768-f

8645	-	5002.5	5005	5007.5	5017.5	5075	5175	5250	5500
A	[mm]	125				139	179		220
B	[mm]				70				87
C	[mm]	27.5				34.5	54.5		66.6
$\varnothing D_{k6}$	[mm]	9				14	19		25
E <sup>+0,3</sup>	[mm]	40				50			60
F	[mm]	-							
G	[mm]				8				10.5
H	[mm]				5				2
K	[mm]	12				18	24		33.5
L	[mm]	-							
M	[mm]				43.9				61.4
N	[mm]	15					18		19
P	[mm]	37					47		57
S	[mm]	1.5							
Moment of inertia	[g·cm <sup>2</sup> ]	5.97		6.62	10.73	49.22	191.26		797.54
Weight	[g]	400			450	700	900	1000	1300
8646	-	5002.5	5005	5007.5	5017.5	5075	5175	5250	5500
A	[mm]	95.5				107	123.5		146
B	[mm]				70				87
C	[mm]	9.5				13	18.5		29.6
D/Square	[mm]	1/4"				3/8"	1/2"		3/4"
E	[mm]	40					50		60
F	[mm]	16				24	35		29.6
G	[mm]				8				10.5
H	[mm]				5				2
K	[mm]	12				18	24		33.5
L	[mm]	-							
M	[mm]				43.9				61.4
N	[mm]	15					18		19
P	[mm]	37					47		57
S	[mm]	1.5							
Moment of inertia	[g·cm <sup>2</sup> ]	5.82		6.48	9.04	33.39	132.94		577.70
Weight	[g]	400			450	700	800		900

Dimensional drawing **model 8645** – round endsDimensional drawing **model 8646** – square ends

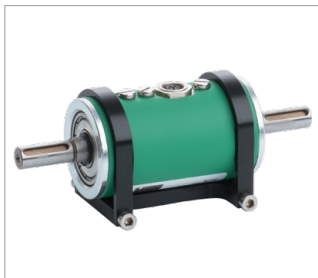
**Wire code cable**

	Wire code	Connection at sensor
Excitation	+ white	1
Signal output	+ brown	2
Excitation/signal GND	- black	3
Free	blue	4
Reference voltage	Vref (2.5 V) grey	5

Upon delivery without mounted connector please use a connector with shielding. Generally the shielding should escort the signal as far as possible. The use of another cable than the one included in delivery can affect the proper function of the sensor system.

**Accessories**

Order code	
99195-000A-0090050	Connecting cable length 5 m, one end free (included in delivery)
8645-Z003	Clamp for 8645 and 8646 for ranges up to 17.5 Nm
8645-Z004	Clamp for 8645 and 8646 for ranges from 75 Nm



8645-Z003



8645-Z004

## Order Code 8645

Measuring range	Code							
0 ... ±2.5 N·m	5	0	0	2,5				
0 ... ±5 N·m	5	0	0	5				
0 ... ±7.5 N·m	5	0	0	7,5				
0 ... ±17.5 N·m	5	0	1	7,5				
0 ... ±75 N·m	5	0	7	5				
0 ... ±175 N·m	5	1	7	5				
0 ... ±250 N·m	5	2	5	0				
0 ... ±500 N·m	5	5	0	0				
	...	...	...	...				
<b>8</b>	<b>6</b>	<b>4</b>	<b>5</b>	<b>-</b>				

## Order Code 8646

Measuring range	Code							
0 ... ±2.5 N·m	5	0	0	2,5				
0 ... ±5 N·m	5	0	0	5				
0 ... ±7.5 N·m	5	0	0	7,5				
0 ... ±17.5 N·m	5	0	1	7,5				
0 ... ±75 N·m	5	0	7	5				
0 ... ±175 N·m	5	1	7	5				
0 ... ±250 N·m	5	2	5	0				
0 ... ±500 N·m	5	5	0	0				
	...	...	...	...				
<b>8</b>	<b>6</b>	<b>4</b>	<b>6</b>	<b>-</b>				

## Note

### ■ Brochure

Our brochure „Torque sensors for production, automation, R&D and quality assurance“ is available for download on our website. It contains numerous applications, detailed product specifications and overviews.

### ■ Product videos

Watch our **product videos** at: [www.youtube.com/bursterVideo](http://www.youtube.com/bursterVideo)



### ■ CAD data

Download via [www.burster.com](http://www.burster.com) or directly via [www.traceparts.com](http://www.traceparts.com)

