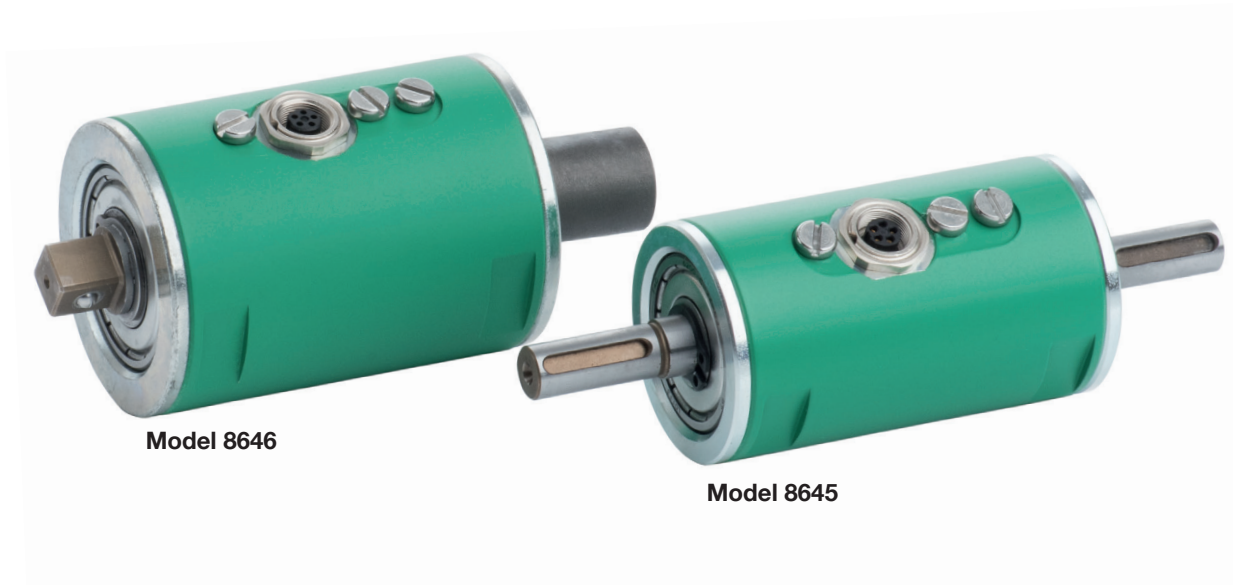


# Torque Sensor

## Rotating, non-contact transfer

**Model 8645 with round shaft**  
**Model 8646 with square ends**

Code:	8645 EN
Delivery:	ex stock
Warranty:	24 months



Model 8646

Model 8645

**Very low price**

- Measuring range 0 ... 2.5 Nm to 0 ... 500 Nm
- Very low price
- Speed up to 5000 1/min
- Integrated amplifier
- High axial and radial load allowed
- Extended temperature range - 40 °C ... + 120 °C on request

### Application

This torque sensor enables the maintenance-free measurement of static and dynamic torques. It opens up new applications thanks to its low price, ease of use and high insensitivity to lateral forces and bending moments.

In addition to classic torque measurement on test benches, in production facilities and for monitoring bolting tools, cost-effective torque measurement is also possible in applications including:

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

### 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 gauges 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.

**8645 EN**

**Technical Data**

**Model 8645, round ends**

Dim. tolerance acc. ISO 2768-f

Order Code	Measuring Range	Dimensions [mm]													Moment of Inertia [g · cm <sup>2</sup> ]	Weight [g]	Max. axial force [N]*	Max. lateral force [N]*	Max. bending moment [Nm]*	
		A	B	C	ø D <sub>k6</sub>	E <sup>+0.3</sup>	F	G	H	K	L	M	N	P						S
8645-5002.5	0 ... ± 2.5 Nm	125	70	27.5	9	40	-	8	5	-	23	43.9	15	37	1.5	5.97	400	1000	20	2.5
8645-5005	0 ... ± 5 Nm	125	70	27.5	9	40	-	8	5	-	23	43.9	15	37	1.5	5.97	400	1000	20	2.5
8645-5007.5	0 ... ± 7.5 Nm	125	70	27.5	9	40	-	8	5	-	23	43.9	15	37	1.5	6.62	400	1000	30	3.7
8645-5017.5	0 ... ± 17.5 Nm	125	70	27.5	9	40	-	8	5	-	23	43.9	15	37	1.5	10.73	450	1000	100	12.5
8645-5075	0 ... ± 75 Nm	139	70	34.5	14	50	-	8	5	-	30	43.9	18	47	1.5	49.22	700	2600	300	41.7
8645-5175	0 ... ± 175 Nm	179	70	54.5	19	50	-	8	5	-	50	43.9	18	47	1.5	191.26	900	4000	500	89.5
8645-5250	0 ... ± 250 Nm	179	70	54.5	19	50	-	8	5	-	50	43.9	18	47	1.5	191.26	1000	4000	500	89.5
8645-5500	0 ... ± 500 Nm	220	87	66.6	25	60	-	10.5	2	-	-	61.4	19	57	1.5	797.54	1300	7000	800	176

**Model 8646, square end**

Order Code	Measuring Range	Dimension [mm]													Moment of Inertia [g · cm <sup>2</sup> ]	Weight [g]	Max. axial force [N]*	Max. lateral force [N]*	Max. bending moment [Nm]*	
		A	B	C	Square	E	F	G	H	K	L	M	N	P						S
8646-5002,5	0 ... ± 2.5 Nm	95.5	70	9.5	1/4"	40	16	8	5	12	-	43.9	15	37	1.5	5.82	400	1000	20	2.5
8646-5005	0 ... ± 5 Nm	95.5	70	9.5	1/4"	40	16	8	5	12	-	43.9	15	37	1.5	5.82	400	1000	20	2.5
8646-5007,5	0 ... ± 7.5 Nm	95.5	70	9.5	1/4"	40	16	8	5	12	-	43.9	15	37	1.5	6.48	400	1000	30	3.7
8646-5017,5	0 ... ± 17.5 Nm	95.5	70	9.5	1/4"	40	16	8	5	12	-	43.9	15	37	1.5	9.04	450	1000	100	12.5
8646-5075	0 ... ± 75 Nm	107	70	13	3/8"	50	24	8	5	18	-	43.9	18	47	1.5	33.39	700	2600	300	41.7
8646-5175	0 ... ± 175 Nm	123.5	70	18.5	1/2"	50	35	8	5	24	-	43.9	18	47	1.5	132.94	800	4000	500	89.5
8646-5250	0 ... ± 250 Nm	123.5	70	18.5	1/2"	50	35	8	5	24	-	43.9	18	47	1.5	132.94	800	4000	500	89.5
8646-5500	0 ... ± 500 Nm	146	87	29.6	3/4"	60	29.6	10.5	2	33.5	-	61.4	19	57	1.5	577.70	900	7000	800	176

\* Every irregular exposure (axial force, lateral force, bending moment, overstepping of max. operating force) is acceptable if only on of them occurs.

**Electrical values**

Excitation voltage: 9 ... 12 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  
 Signal output at 0 Nm (adjustable): 2.5 VDC  
 Output resistance: 50 Ω  
 Cut-off frequency (-3 db): 1 kHz

**Environmental conditions**

Operating temperature range: 0 ... 70 °C  
 Temperature effect on zero signal: < ± 0.1 % F.S./K  
 Temperature effect on characteristic value: < ± 0.1 % F.S./K  
 Do not apply torque sensor within dynamic magnetic fields, e.g. near high running motors.

Resistance to magnetic fields: max. 300 kA/m at distance of 70 mm (4000 Oe)

**Mechanical values**

Relative linearity error, relative reversibility error and signal variations during rotation:  
 measuring ranges up to 250 Nm < ± 1 % F.S.  
 measuring range 500 Nm < ± 2 % F.S.  
 Relative repeatability error: < ± 0.1 % F.S.  
 Resolution: 0.1 % F.S.  
 Rotary speed:  
 model 8645 (permanent ≤ 3000) max. 5000 min<sup>-1</sup>  
 model 8646 max. 1000 min<sup>-1</sup>

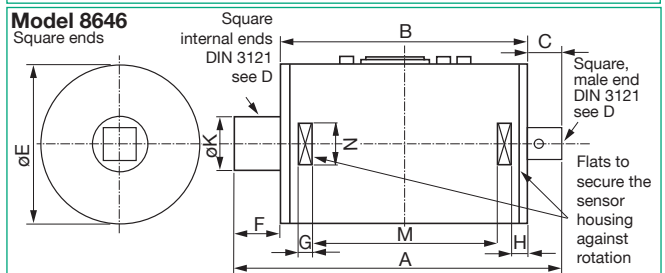
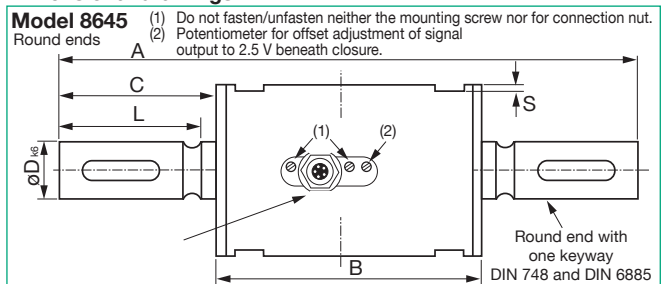
Protection class: acc. EN 60529 IP50  
 Max. operating torque: 150 % of nominal torque  
 Breaking moment: 300 % of nominal torque  
 Shaft material housing: Ni Cr Ni 14  
 Electrical connection: 5 pin socket, mating connector mounted on cable 5 m, included in delivery

Mechanical connection:  
 Model 8645 both shaft ends with keyway acc. 1 keyway acc. DIN 6885-1A  
 measuring range up to 250 Nm  
 measuring range 500 Nm 2 keyways acc. DIN 6885-1A  
 Model 8646 Square, male and female, acc. DIN 3121

Wiring Code Cable	Wiring Code	Connection at Sensor
excitation	+ white	1
signal output	+ brown	2
excitation/signal GND	- black	3
free		4
reference voltage	V <sub>ref</sub> (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.

**Dimensional drawings**



The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.

Download via [www.burster.com](http://www.burster.com) or directly at [www.traceparts.com](http://www.traceparts.com). For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

**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 exit 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.

**Order Information**

Torque sensor, round ends, measuring range 0 ... ± 5 Nm, (cable 5 m included) **Model 8645-5005**

**Accessories**

- Connector for connecting the sensor to burster desktop devices **Model 9941**
- Installation of a connector to the sensor cable **Order Code 99004**
- Connecting cable length 5 m, one end free (included in delivery) **Model 8645-Z005**
- Clamp for 8645 and 8646 for ranges up to 17.5 Nm **Model 8645-Z003**  
for ranges from 75 Nm **Model 8645-Z004**
- Amplifier, process indicators like e.g. digital displays 9163, 9180 **see section 9 of the catalog.**