Torque Sensor rotating, non-contact transfer

MODEL **8645**

Model 8645 with round shaft

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)
- 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	–	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
Measurement accuracy									
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							
Electrical values									
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							
Environmental conditions									
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.)							
Mechanical values									
Resolution		0.1 % F.S.							
Rotary speed		max. 5000 min^{-1}							
Max. operating torque		150 % of nominal torque							
Breaking moment		300 % of nominal torque							
Protection class (acc. EN 60529)		IP50							
Shaft material housing		NiCrNi 14							
Mechanical connection									
		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		
Mounting									
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.							
Sonstiges	–	5002.5	5005	5007.5	5017.5	5075	5175	5250	5500
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.

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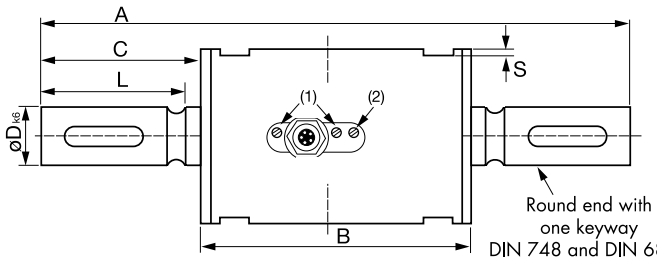
Geometry

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
Ø D_{k6}	[mm]	9				14	19		25
$E^{+0,3}$	[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·cm²]	5.97		6.62	10.73	49.22	191.26		797.54
Weight	[g]	400			450	700	900	1000	1300

Dimensional drawing **model 8645** – round ends



(1) Do not fasten/unfasten neither the mounting screw nor for connection nut.
(2) Potentiometer for offset adjustment of signal output to 2.5 V beneath closure.

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 for ranges up to 17.5 Nm
8645-Z004		Clamp for 8645 for ranges from 75 Nm

8645-Z003

8645-Z004

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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
	⋮	⋮	⋮	⋮
8 6 4 5 –				

Note

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

- **Product videos**
  Watch our **product videos** at: **www.youtube.com/bursterVideo**

- **CAD data**
  Download via **www.burster.com** or directly via **www.traceparts.com**