

Torque Sensor

Rotating, non-contact transmission of measured value,
integrated detection of angle or speed of rotation (option)

Model 8651

Code:	8651 EN
Delivery:	ex stock / 4 weeks
Warranty:	24 months

CAD data 2D/3D for this sensor:
Download directly at www.traceparts.com
Info: refer to data sheet 80-CAD-EN



- Ranges 0 ... ± 50 Nm up to 0 ... ± 1000 Nm
- Non-linearity up to 0.1 % F.S.
- Analog output signal ± 10 V
- Maintenance-free operation
- Angle or speed measurement (option)
- Max. speed 35000 min⁻¹
- Protection class IP67, data sheet on request

Application

The slip-ring-free torque sensor for the measurement of torque, angular rotation or speed with integral measuring amplifier is suitable for use in the laboratory and in an industrial environment.

Thanks to the inductive, non-contact transfer of the excitation voltage and the optical, non-contact transmission of the measuring signal, the sensor can be used wherever low-wear and maintenance-free operation, high speeds or continuous running are required.

The reliable measurement of constant and variable torques on rotating and standing shaft enables it to be used in quality assurance in the test area and in test rigs and machines as well as in the service area.

Description

The main components of the torque sensor consist of the measuring shaft with applied precision strain gauge, the rotating electronics with secondary coil and optical transmission ring. Power is supplied to the strain gauge bridge without contact by means of a rotary transformer.

A torque applied between the two ends of the shaft produces a mechanical strain, which is measured with the help of a strain gauge bridge circuit. An output signal is obtained from the bridge, which is proportional to the applied torque. This voltage converted into a frequency-modulated signal is transmitted by means of infrared LEDs to the receiver in the stator.

As an option, a conditioned, rectangular output voltage of 5 V can be provided for the direct further processing of the angle or speed of rotation signal by means of the electronics integrated within the sensor.

Use couplings to avoid axial lateral forces and bending moments caused by parallel or angle deviation.

Technical Data

Table 1

Order Code	Measurement Range [Nm]	A1	A2	B	D1g6 ø	D2g6 ø	D3-0,1 ø	H	H1	L	L1	L2	L3	L4	LK±0.1 ø	M1	M2
8651 - 5050-V0000	0 ... ± 50	42	40	56	26	26	54	73	28	170	72	45	45	78	65	M 4 x 8 deep	M 4 x 8 deep
8651 - 5100-V0000	0 ... ± 100	42	40	56	26	26	54	73	28	170	72	45	45	78	65	M 4 x 8 deep	M 4 x 8 deep
8651 - 5200-V0000	0 ... ± 200	42	40	56	26	26	54	73	28	170	72	45	45	78	65	M 4 x 8 deep	M 4 x 8 deep
8651 - 5500-V0000	0 ... ± 500	46	70	88	45	45	80	104	44	270	84	85	85	90	98	M 6 x 12 deep	M 6 x 12 deep
8651 - 6001-V0000	0 ... ± 1000	46	70	88	45	45	80	104	44	270	84	85	85	90	98	M 6 x 12 deep	M 6 x 12 deep

Higher measurement ranges, up to 20 000 Nm, on request.

Dim. tolerance acc. DIN 2768-m

Specifications, based on measurement range

Table 2

Order Code	Measurement Range [Nm]	Spring Constant C [Nm/rad]	Mass Moment of Inertia J [g · cm ²]	Max. Permissible Axial Load [N]	Max. Permissible Radial Load [N]	Weight [g]	Max. Rotary Speed [1/min]
8651 - 5050-V0000	0 ... ± 50	17 x 10 ³	690	1 800	125	1 300	13 000
8651 - 5100-V0000	0 ... ± 100	31 x 10 ³	700	1 800	215	1 300	13 000
8651 - 5200-V0000	0 ... ± 200	55 x 10 ³	730	1 800	450	1 300	13 000
8651 - 5500-V0000	0 ... ± 500	266 x 10 ³	9 400	4 150	650	4 500	7 900
8651 - 6001-V0000	0 ... ± 1000	400 x 10 ³	9 600	4 150	1 275	4 500	7 900

Electrical values

Torque sensor

Excitation voltage U_b: + 15 V DC +5 %/-10 %
 Excitation current: without option < 130 mA
 with option < 150 mA
 Output at rated capacity: ± 10 V
 Tolerance of sensitivity: 0.2 %
 Rise time 10 ... 90 %: 2 ms
 Internal resistance: 100 Ω
 Insulation resistance: > 5 MΩ
 Cut-off frequency - 3dB: 200 Hz
 Ripple: < 100 mV_{SS}
 Calibration signal: the output voltage is +10V, if U_b at Pin 6 res. Pin K is put on

The supply is electrically isolated from the measuring channel.

Angle and speed sensor (options, see table below)

Output: open coll.
 Internal pull-up resistor: 10 kΩ (5 V level)
 External pull-up U_{max.} = 24 V / I_{max.} = 20 mA
 (Current open-collector output: I_{max.} = 20 mA)
 Angle measurement: 360 pulses per round
 indicated of direction by two pulse-outputs, displacement of phase 90° ahead output A, at clockwise direction of the driving side.
 Max. speed: 3 000 1/min
 Speed measurement: 60 pulses/rev.
 Max. speed: 10 000 1/min

Environmental conditions

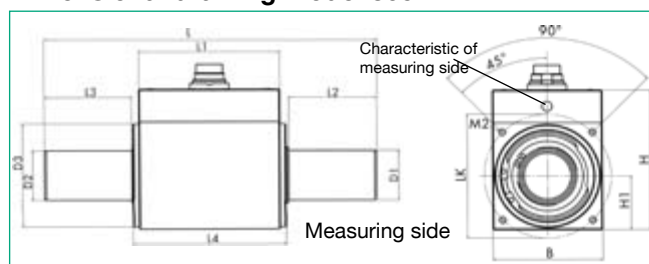
Operating temperature range: 0 °C ... 60 °C
 Temperature compensated: 5 °C ... 45 °C
 Temperature effect:
 on zero ± 0.02 % F.S./K
 on span + 0.01 % F.S./K

Mechanical values

Non-linearity: < ± 0.1 % F.S.
 Hysteresis: < ± 0.1 % F.S.
 Torque of usage: 200 % of nominal torque
 Fracture torque: 300 % of nominal torque
 Alternating load: 70 % of nominal torque
 Material:
 case high tensile, anodized aluminium
 shafts stainless construction steel

Protection class acc. EN 60529: IP40
 Mechanical coupling: round shaft ends
 Weight: see table 2
 Electrical connection: 6 pins coupling socket, model 9953
 sensor without option angle or speed detection (included on delivery)
 Electrical connection: 12 pins coupling socket model 9940
 sensor with option angle or speed detection (included on delivery)

Dimensional drawing model 8651



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

Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Mounting Instructions

Both ends and bottom of sensor case with 4 threaded holes for fixing see drawing and table Installing the sensor, make sure that the shaft ends are aligned as much possible to each other. Avoid damages through radial and angle disalignment by using couplings. For further information refer to the manual. Never exceed the limit of axial and radial forces, shown in table 2.

Order Information

Torque sensor, **Model 8651-5100-V0000**
 range 100 Nm

Accessories

For sensor without option speed or angle detection
 Mating connector 6 pin **Model 9953**
 Connecting cable, length 3 m, one end free **Model 99553-000C-0160030**

For sensor included option speed or angle detection
 Mating connector 12 pin **Model 9940**
 Connection cable, length 3 m, one end free **Model 99540-000B-0270030**

For sensor included option angle detection
 Mains adapter for standard rail, 15 V DC, ± 5 %, 0,4 A **Model 8651-Z004**
 Mains adapter 15 V DC, stabilized, 1 A **Model 4497-V001**

Code	Description
Vxx1x	integral angle detection, 360 pulses per round
Vxx2x	integral speed detection, 60 pulses per round
Vxxx2	shaft end with keyways

Manufacturer Calibration Certificate (WKS)

Calibrated of a sensor or a sensor with indicator for clockwise or counter clockwise torques in 20 % steps raising and decreasing.