

## Torque Sensor

Square, rotating, contactless

## MODEL 8655



#### Highlights

- Measurement ranges of 0 ... 1 N·m to 0 ... 160 N·m
- Internal square and external square
- Very short design
- Output signal 0 ... ±10 V

#### Options

- Speed and angle measurement with resolution of up to 400 increments
- USB port including software

#### Applications

- Monitoring and regulation of screwing processes
- Quality monitoring of tools and machines
- Machinery and plant engineering



Small measuring range

Large measuring range

#### **Product description**

The compact torque sensor model 8655 with standard square is contactless constructed. The torque is recorded by the torsion of the shaft using the strain gage principle. Thanks to the inductive and optical transmission of the signals, the sensor is maintenance-free, the signals are digitized directly on the shaft and made available by the evaluation electronics as a voltage signal or via USB. The direction of rotation can be seen from the potential of the output voltage, clockwise rotation corresponds to positive output voltage, counterclockwise rotation the voltage level is negative.

The standard square enables simple integration into existing systems or devices, additional components such as couplings are not require.

To record the speed and angle of rotation, the sensor can optionally be equipped with an incremental disc with 400 increments. This speed / angle signal is available as a TTL output signal.

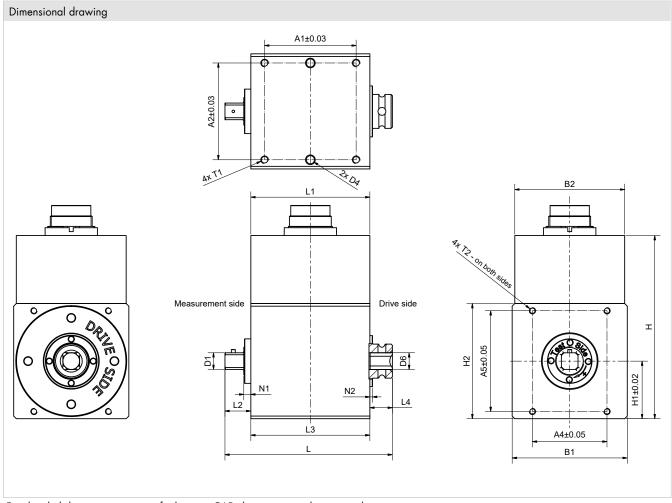
The free DigiVision software is available in connection with USB, alternatively drivers for LabVIEW and DASYLab are ready for download.

Connection cables in various lengths, metal bellows couplings and mounting brackets are available for integration in customer-specific systems.

## **Technical Data**

8655	-	5001	5002	5005	5012	5025	5050	5063	5100	5160			
Measuring range calibrated in N∙m from 0		±1 N∙m	±2 N∙m	±5 N∙m	±12 N·m	±25 N∙m	±50 N∙m	±63 N∙m	±100 N·m	±160 N·m			
Accuracy													
Relative non-linearity						0.25 % F.S.							
Relative hysteresis		0.2 % F.S.											
Tolerance of sensitivity						0.25 % F.S.							
Electrical values													
Rated supply voltage range	•	10 30 V DC (or 5 V via USB)											
DC power consumption						approx. 2 W	/						
Output voltage at ± rated torque						±10 V							
Output resistance						1 kΩ							
Insulation resistance		> 5 MΩ											
Update rate						400/sec.							
Ripple						$< 50 \text{ mV}_{ss}$							
Control signal						10.00 V DC	2						
Environmental condi	itions												
Range of operating and nominal temperature		0 °C +60 °C											
Sensitivity of temperature effects						o point 0.01 sitivity 0.01							
Mechanical values													
Dynamic overload safe					recommende	d 70 % of n	ominal torqu	e					
Max. operation torque					120 %	6 of nominal	torque						
Breakaway torque					300 %	6 of nominal	torque						
Alternating load					70 %	of nominal	forque						
Maximum limit axial load	[N]		7	0			150		165				
Maximum limit radial load	[N]	5	10	13	20	25	3	0	50	65			
Spring constant	[N·m/rad]	30	00	10	000		5000		16000				
Mass moment of inertia measuring side	[10 <sup>.6</sup> kg*m²]		3.	50			7.10		21.50				
Mass moment of inertia drive side	[10 <sup>-6</sup> kg*m²]		1.0		1.05	8.50 34.00							
Max. rotary speed	[min <sup>-1</sup> ]					3000							
Other													
Material		Housing: made of anodized aluminium; stainless steel shaft 1.4542											
Protection class		acc. EN 60529, IP40											
Weight	[g]		3	10		450 750							
Installation													
Installation instructions					rmitted axial rating instruc								

ourster



For detailed dimensions you can find sensor CAD data on our website www.burster.com.

8655	-	5001	5002	5005	5012	5025	5050	5063	5100	5160
Measuring range from 0		±1 N∙m	±2 N∙m	±5 N·m	±12 N·m	±25 N·m	±50 N∙m	±63 N·m	±100 N·m	±160 N⋅m
Geometry										
A1	[mm]				35			33.5		
A2	[mm]		3	37			36	41		
A4	[mm]		28	3.5			44		50	
A5	[mm]		38	3.5			41	48		
B1	[mm]		4	14			50		59	
B2	[mm]					42				
D1	[mm]		<sup>1</sup> ⁄4″ extern DIN 312	nal square 21 form E		³⁄8″ DI	external squ N 3121 forr	½″ external square DIN 3121 form E		
D6 / deep	[mm]		<sup>1</sup> ⁄4″ interr DIN 3121 fe	nal square orm H, 8 mr	n	3%" DIN 31	internal squ 21 form H, 1	½" internal square DIN 3121 form H, 16.5 mm		
D4 Ø / deep	[mm]					Ø 3.1 / 6				
H1	[mm]		2	22			25	29.5		
H2	[mm]		4	14			50	59		
L	[mm]		6	54		71.10			89.4	
L2	[mm]		9	.9			13.5	17.90		
L3	[mm]		45	5.5						
L4	[mm]		8	.6			10.1	24		
T1 / deep	[mm]		M3	/7						
T2 / deep	[mm]		M2.	5/8			M3 / 8	M4 /8		

## **Electrical values**

12-pin connector or USB connection for configuration / measurement (option, USB connection cable included)

Pin	Assignment	Cable colour (99540-000F-052XXXX)
А	NC	
В	Angular exit B	violet
С	Moment output +	yellow
D	Moment output -	green
E	Supply -	blue
F	Supply +	red
G	Angular exit A	pink
Н	NC	
J	Ground angle output	black
К	Control signal	white
L	NC	brown
Μ	NC	

## Options

#### Integrated amplifier with USB interface

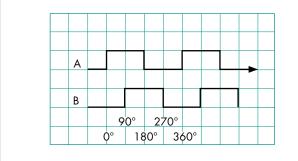


This sensor version has an USB connection instead of the  $\pm 10~\text{V}$  output. The sensor is powered via USB, no further connections required.

In addition to torque, the speed or rotation angle measured values are optionally available at the output. The mechanical performance calculated in the sensor can also be displayed using the DigiVision software.

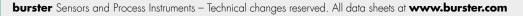
Free drivers are available for integration into LabVIEW and DASYLab, also a DLL for integration into your own programs.

#### Torque sensor with integrated rotational speed / angular displacement measurement



8655 torque sensors are optionally available with integrated rotational speed and angular displacement measurement. Two pulse channels with TTL level – channel A and channel B – are always available. For clockwise rotation (looking at the test side), channel A leads channel B with a phase shift of 90°. Only one pulse channel is needed for speed measurement.

For angular displacement measurement (or direction detection), both channels need to be evaluated. To achieve the maximum angular resolution, four-edge decoding must be used to read both the rising and falling edges, so an angular resolution of 0.255 ° is possible.



### Accessories

#### Mounting block model 8600-Z02X



The mounting block has a central hole and special design allowing a range of options for reliable cable attachment. Two clips ensure the sensor is fixed securely.

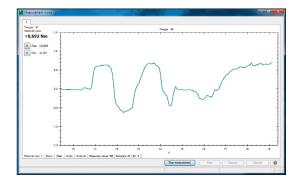
For further information please see accessories data sheet 8600-Z02X

# DigiVision configuration and analysis software

#### Features

- Can be used to actuate tare function
- Configuration options for averaging and filters
- Intuitive user interface
- Automatic sensor identification
- Sensor calibration data readout

DigiVision Light PC so	oftware
freely available on our website	DigiVision configuration and anal- ysis software max. 200 measured value/s for one sensor
DigiVision Standard	PC software
Model 8655-P100	DigiVison configuration and anal- ysis software up to 16 channels
PC-Software DigiVisio	on Professional
Model 8655-P200	DigiVision configuration and analysis software with additional configurable maths channel; up to 32 channels



#### **USB** measurement option

- Numerical & graphical display and measurement of the physical torque value
- Practical start and stop trigger functions
- 4 limits can be configured for each measurement channel
- MIN/MAX value acquisition
- Automatic scaling
- Measurement reports can be saved as Excel or PDF file
- Archive viewer for displaying sets of curves
- X Multichannel measurements, even with different sensors (e.g. 9206, 8631, 8625, 8661) available with standard version

## Accessories

Order code	
9940	Mating connection 12 pin (scope of delivery)
9900-V539	Mating connection 90°-angle
99540-000F-0520030	Connecting cable, length 3 m, other end free
99539-000F-0520030	Connecting cable, length 3 m, plug with 90°-angle, other end free
99209-540G-0160030	Connecting cable for model 7281 and model 9311, length 3 m, with external supply
99163-540A-0150030	Connecting cable, length 3 m, 8655 to DIGIFORCE® 9307combined cannel D (option channel)
99209-215A-0090004	Adapter cable to DIGIFORCE® 9307 standard channel A/B and C (usable only in connection with type 99163-540A-015xxxx)
	DigiVision Light configuration and analysis software, max. 200 measured value/s for one sensor (freely available on our website)
8661-Z010	USB cable, length 2 m (included with the USB version)
8655-P100	DigiVision Standard configuration and analysis software; up to 16 channels
8655-P200	DigiVision Professional with additional configurable maths channel; up to 32 channels
8600-Z02X	Mounting block, see accessories data sheet 8600-Z02X

## Calibration

Manufacturer Calibration Certificate (WKS)									
	Special calibration for clockwise or/and counter clockwise direction torque, in 20% steps of range up and down.								
DAkkS Calibration Certificate									
	DAkkS calibration certificate per DIN 51309, clockwise or/and counter clockwise torque, with eight steps spaced across the measurement range, increasing and decreasing.								



## Order Code

		Co	de												
0 ±1 N⋅m						0	0	1							
	0 ±2 N·m				5	0	0	2							
	0	±5	N∙n	ı	5	0	0	5							
	0	±12	N√n	า	5	0	1	2							
	0	±25	N∙n	า	5	0	2	5							
	0	±50	N∙m	า	5	0	5	0							
	0	±63	N√m	า	5	0	6	3							
	0	±100	N∘m	า	5	1	0	0							
	0	±160	N∙m	า	5	1	6	0				Stan	dard		
											0	0	0	1	0
8	6	5	5	-					-	V	0			1	0
With	hout an	gle/spe	ed mea	suremen	nt							0			
				t 400 in											
Outpu	ut sign	als													
-	-		±10 V										0		
	<ul> <li>Output voltage 0 ±10 V</li> <li>USB interface</li> </ul>												1		
														1	
Inter	Internal square and external square acc. DIN 3121														

