

## Technical data



- Nominal torque: 60 Nm, bidirectional
- Rotational speed:  $\leq 5.000$  rpm
- Accuracy:  $\leq \pm 0,5$  %
- Temperature range:  $-40$  °C to  $+85$  °C
- Protection class: IP50
- Output signals: 0-10 V/4-20 mA/CAN-Bus
- Output frequency: 2.500 Hz

## Your advantages

- Made in Germany (nearby Munich, Bavaria)
- Delivery ex warehouse (< two weeks)
- Best price-performance ratio
- Integrated electronic (Plug & Play)
- Contactless measurement system
- Including 5 m cable and calibration certificate

### Short description

The 6000 series is torque measuring metal bellow coupling.

This series is mainly used in automotive test facilities, electric motors (Servo motors), machine tools, packaging machinery and woodworking machines.

Transmitted torque can be measured statically and dynamically in real time. Each sensor can be configured individually with a lot of extras, such as customized bore hole and angle sensor.

Series 6000 offers a wide range of output signals such as 0-10 V, 4-20 mA, Can-Bus.

The sensor is provided as a complete unit with integrated evaluation electronic, including 5 m cable and calibration certificate.

## Technical characteristics

No.	Model	Unit	Series 6000	
	Accuracy class <sup>1</sup>		0,5	
			Value	
1	Linearity deviation incl. hysteresis	%ME <sup>2</sup>	< ±0,5	
2	Rotational Signal Uniformity (RSU)		< ±0,5	
3	Repeatability		< ±0,05	
Output signal in general		Unit	Value	
4	Frequency range, -3dB point, Bessel characteristics	Hz	2.500	
5	Analog signal	V   mA	0 ... 10	4 ... 20
6	Signal at torque = Zero <sup>3</sup>	V   mA	5	12
7	Signal at positive nominal torque <sup>3</sup>	V   mA	9	20
8	Signal at negative nominal torque <sup>3</sup>	V   mA	1	4
9	Calibration parameter (normed) <sup>3</sup>	V/Nm mA/Nm	4 V/Measurement range	8 mA/Measurement range
10	Error output	V   mA	10	22
11	Output resistance	Ω	50	
Effect of temperature		Unit	Value	
12	Zero point drift over temperature	%/10 K	< 0,5	
13	Signal drift over temperature within nominal temperature range	%/10 K	< 0,5	
Power supply		Unit	Value	
14	Supply voltage	VDC	9 ... 28	
15	Current consumption (max.)	mA	40	
16	Start-up peak	mA	< 100	
17	Absolute max. supply voltage	VDC	30	
General information		Unit	Value	
18	Protection class according to EN 60529 <sup>4</sup>	IP	50	
19	Reference temperature	°C	+15 ... +35	
20	Operational temperature range	°C	-40 ... +85	
21	Storage temperature range	°C	-40 ... +85	

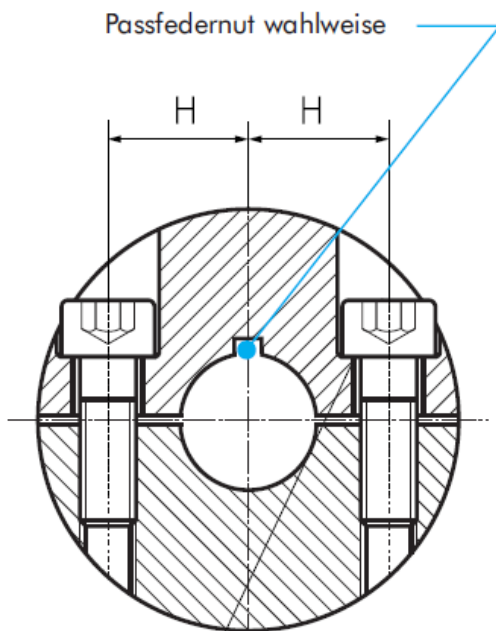
<sup>1</sup> The accuracy class implies that taken separately both the linearity deviation as well as the rotational signal uniformity are either lower than or equal to the value of the accuracy class.

<sup>2</sup> %ME: related to a full scale measurement range.

<sup>3</sup> Please check the exact data at you're the sensors calibration certificate.

<sup>4</sup> Wiring connected.

	Technical characteristics of coupling	Unit	Value
22	Mass	Kg	2
23	Mass torque of inertia	J (kg*mm <sup>2</sup> )	6.533
Spring stiffness		Unit	Value
24	Torsion CT 10 <sup>3</sup>	Nm/rad	75
25	Radial CR	N/mm	1.150
26	Axial CA	N/mm	90
Offset		Unit	Value
27	Radial ΔKr	mm	0,15
28	Axial ΔKa	mm	0,6
29	Angle ΔKw	mm	1,5



F ISO 4762

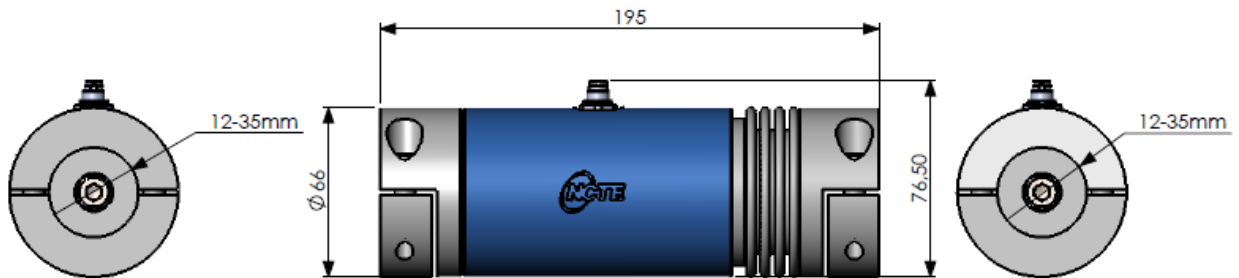
Tightening torque of the screws: 40 Nm

Material of bellow: stainless steel

Material of hub: aluminum

Bore holes will be done in H7.

## Dimensions

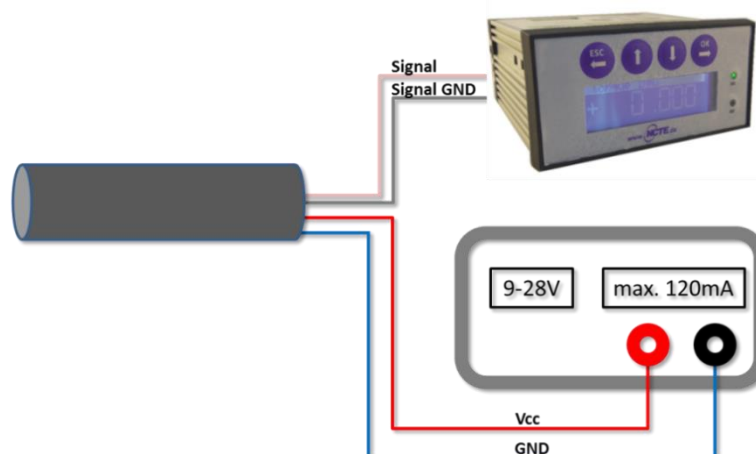


Smaller bore holes available on request.

## Connection plan

Typ	Assignment connections Binder connector		
Pin	Color	Description	Value
A	White	USB D-/CAN-H	-
B	Brown	USB D-/CAN-L	-
E	Grey	Analog GND	-
F	Pink	Output signal analog Voltage	0 V ... 10 V 4 mA ... 20 mA
G	Blue	Ground GND	-
H	Red	Supply voltage V <sub>CC</sub>	9 V ... 28 V

Connection example:



**Order options**

Series 6000		Price
<b>Measurement range</b>		
60	Nm inklusive 5 m Kabel und Kalibrierschein	
<b>Bore hole 1<sup>st</sup> side</b>		
XX	Customised	
<b>Bore hole left 2<sup>nd</sup> side</b>		
XX	Customised	
<b>Analog output</b>		
A	Analog voltage 0-10 V	
S	Current output 4-20 mA	
<b>Digital output (optional)</b>		
C	CAN-Bus	
<b>Keyway</b>		
P1	Keyway for 1 <sup>st</sup> bore hole	
P2	Keyway for 2 <sup>nd</sup> bore hole	
6000		

Please feel free to contact your Sales Manager Serial products for additional information. Email: [sales@ncte.de](mailto:sales@ncte.de) or Phone: +49 89 66 56 19 17

## Instruction manual

### Scope of delivery

The torque sensor set consists of the sensor itself (signal pick-up and signal processing integrated into sensor housing), one connection cable 5 meters with a soldered plug (binder plug) and the instruction manual.

Datasheets and instruction manuals are available at [www.ncte.com](http://www.ncte.com).

### Installation and removal

Make sure to install the sensor shafts exactly with the proper aligned connecting shafts. The key stone adapter/square endings of the connecting shafts are to be attached forceless to the corresponding ones of the sensor. No external axial force should be on the housing of the sensor from distortion. A maximum cable length of 5 m must not to be exceeded. Using a cable or connector other than supplied by **NCTE**, or a similar cable that is of a different length may affect the overall performance of the sensor.

Do not remove the shaft with torque applied to the sensor.

### Offset adjustment

If required the zero point output signal (5 V/12 mA) can be adjusted by pressing the Tare-button. By factory default the sensor is set to 5 V or 12 mA at zero torque.

### Interface description

Mechanical connection:

The adapters on both ends of the measurement shaft are intended for torque transmission.

Electrical connector:

On the sensor housing there is a 12-pin socket for the power supply and the signal output (see chapter connection plan).

### Operation (in regular case or in optimal case)

Optimal measurement parameters can be achieved if the sensor is applied in accordance to the specification. By compliance with the specification the sensor works generally trouble-free and maintenance-free.

### Irregular operation, measures against disturbance

The mechanical overload on the sensor (e. g. exceeding of maximum allowed torque or severe vibrations) may cause damage to the sensor and in consequence the incorrect signal output. In such cases please do not open the sensor. Contact **NCTE** directly for assistance.

### Commissioning

After sensor installation pay attention to the following:

- Switch on the power supply unit and check the supply voltage. Peak voltage must be avoided! Be sure to verify the power supply voltage before connecting the sensor!
- Connect the sensor to the power supply unit by using the delivered cable.
- Connect the sensor output to a high-resistance device such as an A/D converter, oscilloscope, PC measurement board. The sensor should be in mechanical unloaded state while connecting it.

### Handling and transportation

By handling, storage and transportation keep the sensor away from magnetic or electromagnetic fields which may exceed the maximal intensity defined from EMC (chapter technical characteristics) for instance degaussing machines.

---

## Precautions

- Do not open the sensor housing under any circumstances.
- Use the sensor only according to the specification (chapter technical characteristics).

## Service and maintenance

### Recommended NCTE maintenance plan

Recalibration	12 month
Control of wiring, plug and shaft	12 month

Service-Hotline:        Phone: +49 89 66 56 19 17                      Fax:     +49 89 66 56 19 29  
                                        Email: sales@ncte.de

## Disposal

For disposal the sensor has to be returned to **NCTE AG, Inselkammerstrasse 4, 82008 Unterhaching, Germany.**