Technical data

- Nominal torque: up to 10.000 Nm, bidirectional
- Customer-specific calibration (>10.000) upon request
- Rotational speed: ≤ 2.500 rpm
- Accuracy: ≤ ±0,5 %
- Temperature range: -30 °C to +85 °C
- Protection class: IP50, IP65
- Output signal options: 0-10 V/4-20 mA/CAN-Bus/USB
- Cut-off frequency: 2.500 Hz

Your advantages

- Made in Germany
- Short lead time (< two weeks)
- Best price-performance ratio
- Integrated electronic (Plug & Play)
- Contactless measurement system
- Including 5 m cable and calibration certificate

Short description

The series 5000 is special build for high torque measurements (≥10.000 Nm)

This series is mainly used in high performance automotive test facilities, rail applications, component stress testing and process control of heavy lift charge or container transhipment. Additional fields of applications are professional testing constructions and quality control in general.

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 nominal torque and angle sensor.

Series 5000 offers a wide range of output signals such as 0-10 V, 4-20 mA, CAN-Bus or USB. USB is offered including a special NCTE software enables to show data in real time.

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

Model series 5000

Series 5000	Nominal torque bidirectional (+/-) [Nm]	Rotational speed [rpm]
1	10.000	2.500
2	Customer-specific calibration > 10.000 on request	On request

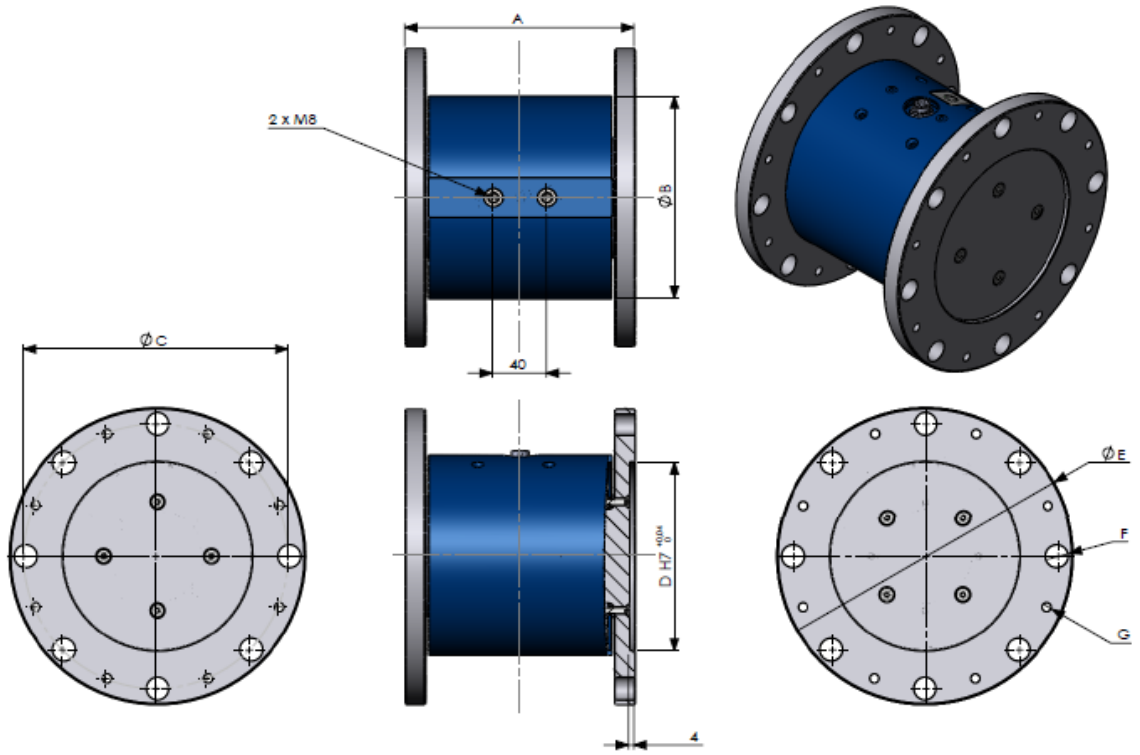
Note: This Sensor does not facilitate overload and should be operated only within the mentioned Nominal torque range. In case of overload, the sensor needs to be recalibrated at NCTE AG.

Technical characteristics

No.	Model		Series 5000	
	Accuracy class[1]		0,5	
		Unit	Value	
1	Linearity deviation incl. hysteresis	%ME[2]	< ±0,5	
2	Rotational Signal Uniformity (RSU)		< ±0,5	
3	Repeatability		< ±0,1	
	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[3]	V | mA	5	12
7	Signal at positive nominal torque[3]	V | mA	9	20
8	Signal at negative nominal torque[3]	V | mA	1	4
9	Calibration parameter (normed)[3]	V/Nm mA/Nm	4 V/Measurement range	8 mA/Measurement range
10	Error output	V | mA	0/10	<4/20<
11	Output resistance (Voltage output)	Ω	50	
12	Output resistance (Current output)	kΩ	≥ 600	
	Effect of temperature	**Unit**	**Value**	
13	Zero point drift over temperature	%/10 K	< 0,5	
14	Signal drift over temperature within nominal temperature range	%/10 K	< 0,5	
	Power supply	**Unit**	**Value**	
15	Supply voltage	VDC	9 … 28	
16	Current consumption (max.)	mA	40	
17	Start-up peak	mA	< 100	
18	Absolute max. supply voltage	VDC	30	
	General information	**Unit**	**Value**	
19	Protection class according to EN 60529[4]	IP	50	
20	Reference temperature	°C	+15 … +35	
21	Operational temperature range	°C	-40 … +85	
22	Storage temperature range	°C	-40 … +85	

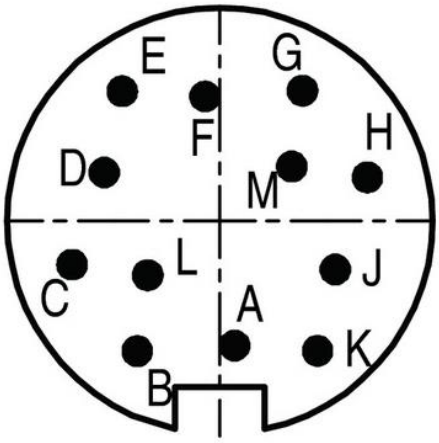
[1] The accuracy class implies that taken separately both the linearity deviation as well as the rotational signal uniformity are either lower than or equal to the value of the accuracy class.
[2] %ME: related to a full scale measurement range.
[3] Please check the exact data at the sensors calibration certificate.
[4] Wiring connected.

Dimensions



Dimensions (in mm)	
Size	**10.000 Nm**
A	170
B	150
C	196
D	140
E	220
F	17
G	-
Tightening torque	8x M16, 12.9; 145 Nm

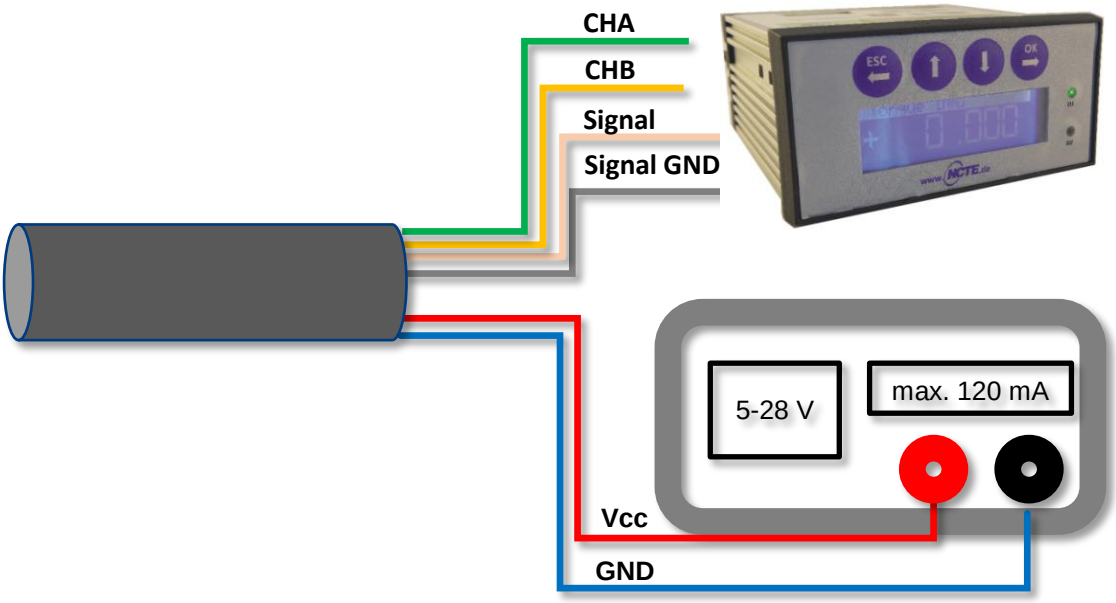
Connection plan



Connector
Power supply and outputs

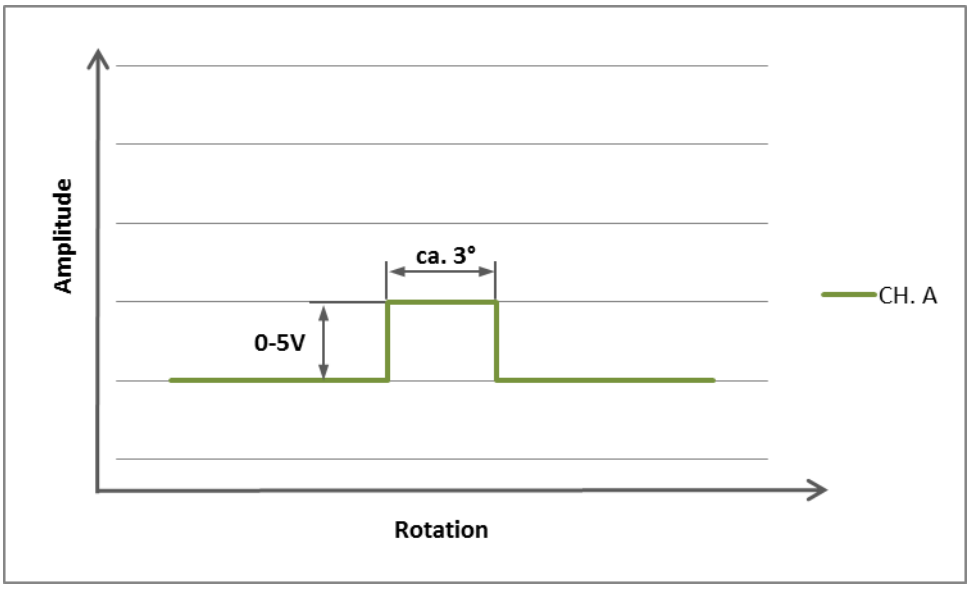
Typ	Binder series 423 connector IP67 color code according to DIN 47100		
Pin	**Colour**	**Description**	**Value**
A	White	CAN/USB	H/D-
B	Brown	CAN/USB	L/D+
C	Green	Angle Channel A	0 … 5 V
D	Yellow	Angle Channel B	0 … 5 V
E	Grey	Analog GND	-
F	Pink	Analog voltage Analog current	0 … 10 V 4 … 20 mA
G	Blue	Ground GND	-
H	Red	Supply voltage VCC	9 … 28 V
J	Black	USB GND	-
K	Violet	-	-
L	Grey-Pink	USB	+5 V
M	Red-Blue	-	-

Connection example:



Speed sensor

Magnetic (Hall Effect) speed sensor with 60 CPR.



Parameter	Min.	Typ.	Max.	Unit
Operating frequency	0	-	8.000	Hz
Analog band width	20	40	-	kHz
High Level Output Voltage	2,4	5	-	V
Low Level Output Voltage	-	0	0,4	V

Order options

Series 5000 accuracy 0,5 %

Measurement range

10	kNm including 5 m cable and calibration certificate
XX	kNm customised calibration including 5 m cable and calibration certificate Price on request

Angle sensor

0	Without angle sensor
2	Speed sensor 60CPR

Analog output

A	Voltage output 0-10 V
S	Current output 4-20 mA

Digital output (Optional)

U	USB incl. NCTE Software and 2,8 m cable
C	CAN-Bus (only with speed sensor)

Protection class according to EN 60529

0	IP50
1	IP65

5000	10	2	A	U	0	Example Sensor configuration

Please feel free to contact your Sales Manager Serial products for additional information.
Email: sales@ncte.de or Phone: +49 89 66 56 19 30.

Series 5000 - accessories

Readout Unit

A	**Eingang: Analoge Spannung 0 – 5 V und 0 – 10 V** Order number: 400010-ATS001 (Ar. Nr.: 400010005) 1 x angle encoder input (A/B) USB Interface, Software for Windows included SD card slot to use for data logging
S	**Eingang: Stromausgang 4-20 mA** Order number: 400010-ATS002 (Ar. Nr.: 400010006) 1 x angle encoder input (A/B) USB Interface, Software for Windows included SD card slot to use for data logging

Instructions for use

Scope of delivery

The torque sensor set consists of the sensor itself (signal pick-up and signal processing integrated into sensor housing), one **connecting cable** 5 m with a **soldered plug** (binder plug no. 99-5630-15-12) and the calibration certificate.

USB-cable will be delivered in 2,80 m length, if USB option is ordered.

Datasheets and instruction manuals are available at https://ncte.com/en/standard-products/#.

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 necessary, the zero point output signal (5 V or 12 mA) can be set. The sensor is factory set to 5 V or 12 mA at zero torque.

Interface description

Mechanical connection:
The key stone adapters on both ends of the measurement shaft are intended for torque transmission.

Electrical connector:
On the sensor housing there is a 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

While handling, storage and transportation, make sure that the sensor is not exposed to strong magnetic or electromagnetic fields (e.g. demagnetizing coils).

Precautions

- Opening the sensor housing and individual screws is not permitted.
- Do not loosen or tighten the flange-mounting nut of the socket-connector (See chapter, Dimensions).
- Use only a separate power supply for the sensor.
- Use the sensor only according to the specification (See Chapter, Technical characteristics).
- The sensor is not to be used as a support bearing. The existing mounting options are only for protection against rotation of the housing.
- To protect your system, we recommend that you increase the torque over several stages

Service and maintenance

As part of your test and measurement equipment management, we recommend regular inspection of your test and measurement equipment. Please also note the relevant standards and guidelines.

Recommended NCTE maintenance plan	
Recalibration	12 month
Control of wiring, plug and shaft	12 month

Service-Hotline: Phone: +49 89 66 56 19 30
Email: sales@ncte.de

Disposal

For disposal the Sensor has to be returned to **NCTE AG, Raifeisenalle 3, 82041 Oberhaching, Germany.**