Technical data

- Nominal torque: 10.000 Nm to 25.000 Nm, bidirectional
- Customer-specific calibration upon request
- Rotational speed: ≤ 8.000 rpm
- Accuracy: ≤ ±0,5 %
- Temperature range: -30 °C to +85 °C
- Protection class: IP50, IP65
- Output signals: 0-10 V/4-20 mA/CAN-Bus/USB
- Output frequency: 2.500 Hz

Your advantages

- Made in Germany (nearby Munich, Bavaria)
- Fast availability
- 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; already obstructed up to 150.000 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, angle sensor and protection class IP65.

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, keystones (Round shaft) and calibration certificate.

Model series 5000

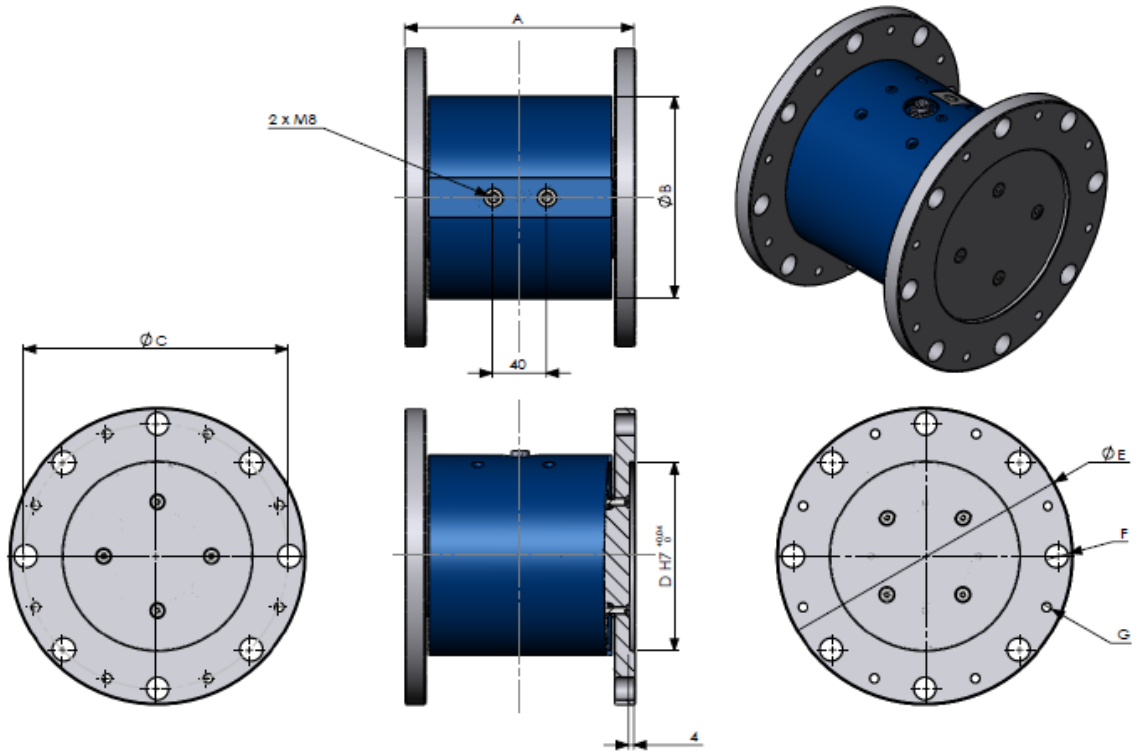
Series 5000	Unit	Nominal torque bidirectional (+/-)	Max. load bidirectional (+/-)	Rotational speed [rpm]
1	[Nm]	12.000	20.000	8.000
2	[Nm]	Customer-specific calibration on request	30.000	5.000

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	
	Signalausgabe Digital; CAN-Bus		10 (max. 1.000)[3]	
5	Analog signal	V | mA	0 … 10	4 … 20
6	Signal at torque = Zero[4]	V | mA	5	12
7	Signal at positive nominal torque[3]	V | mA	9	19
8	Signal at negative nominal torque[3]	V | mA	1	5
9	Calibration parameter (normed)[3]	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[5]	IP	50/65	
19	Reference temperature	°C	+15 … +35	
20	Operational temperature range	°C	-40 … +85	
21	Storage temperature range	°C	-40 … +85	
22	Bearing operating hours	h	approx. 20.000	

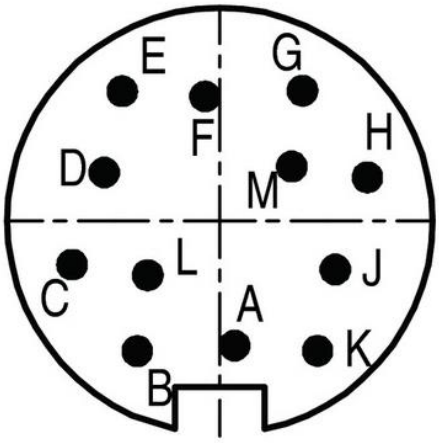
[1] The accuracy class implies that taken separately both the linearity deviation as well as the rotational signal uniformity are either lower than or equal to the value of the accuracy class.
[2] %ME: related to a full scale measurement range.
[3] Individuelle Änderungen möglich. Can-Bus max. bis 1.000.
[4] Please check the exact data at the sensors calibration certificate.
[5] Wiring connected.

Dimensions



Dimensions (in mm)		
	10.000 – 15.000	customised
A	170	200
B	150	190
C	196	288
D	140	174
E	220	326
F	17	19
G	-	-
Screws Tightening torque	8 x M16, 12.9 145 Nm	16 x M18, 12.9 500 Nm

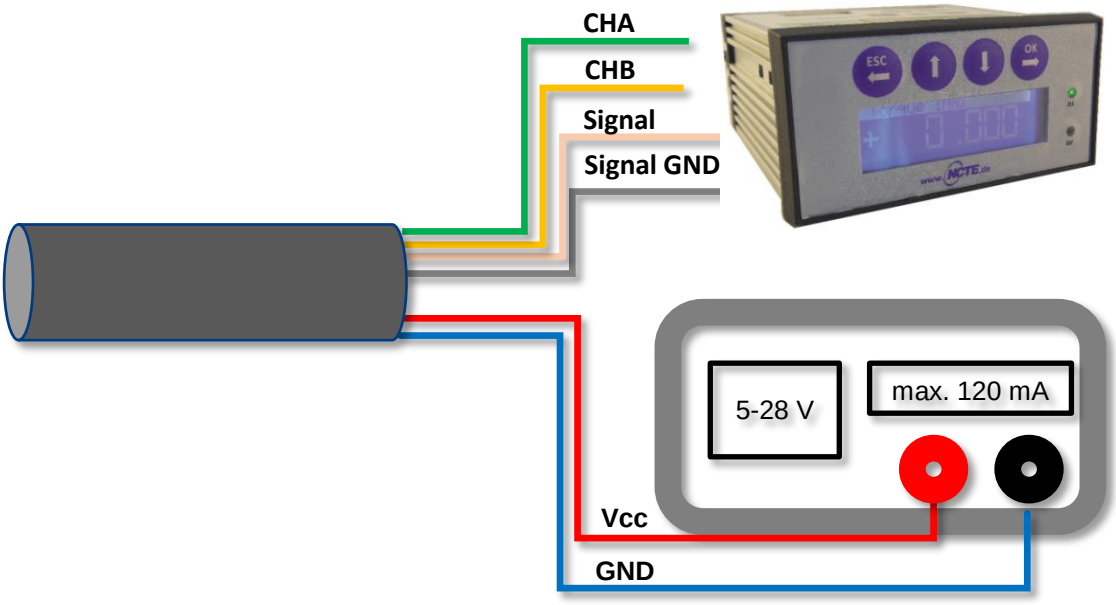
Connection plan



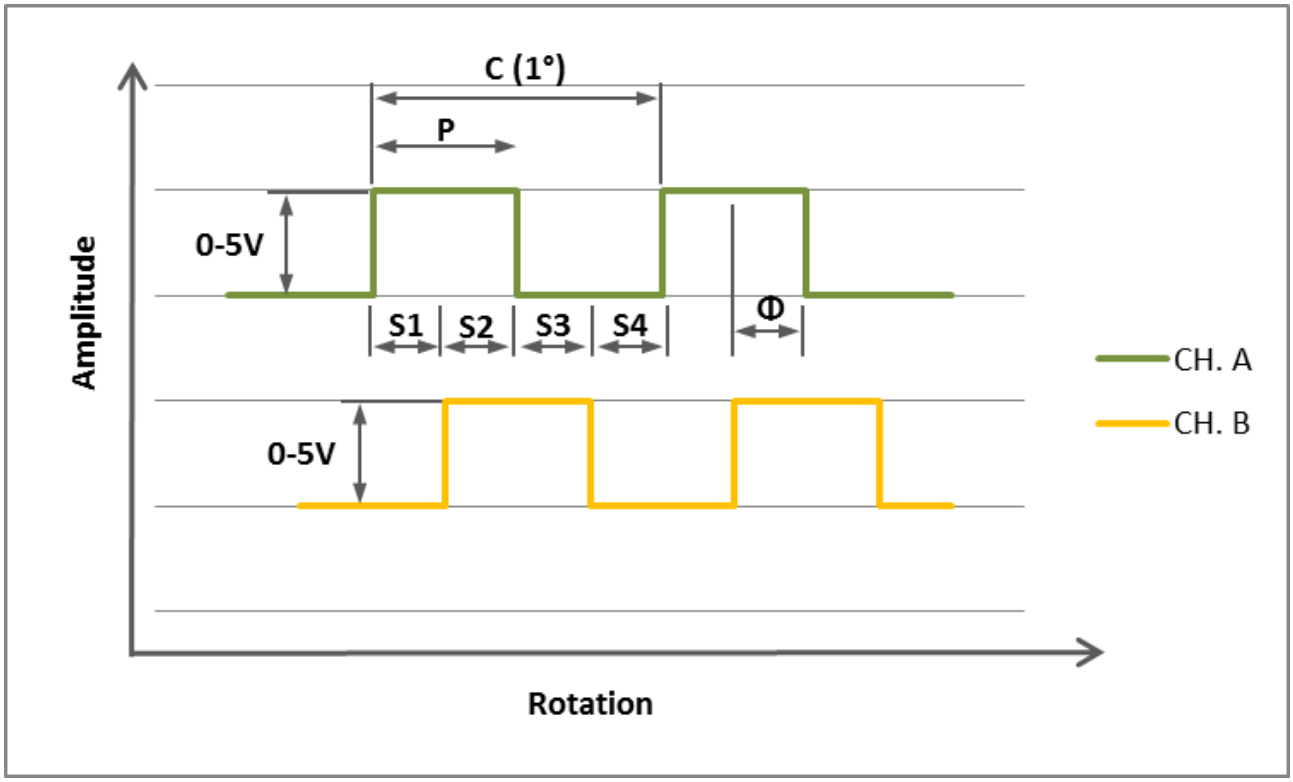
Connector
Power supply and outputs

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:



Angle sensor

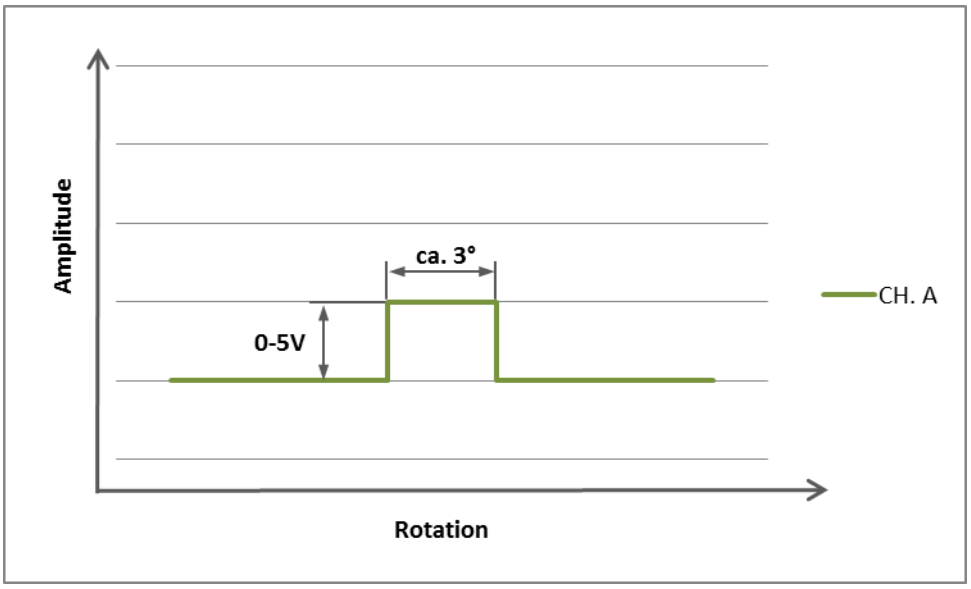


Parameter	Min.	Typ.	Max.	Units
High Level Output Voltage	2,4	5	-	V
Low Level Output Voltage	0	-	0,4	V

Parameter	Description
C	One cycle of 360 CPR (degrees)
P	The duration of high state of the output within one cycle.
S	The number of electrical degress between a transition in Channel A and the neighboring transition in Channel B.
Φ	The number of electrical degrees between the center of high state of Channel A and the Center of high state of Channel B.

Speed sensor

Magnetic (Hall Effect) speed sensor with 1 CPR or 60 CPR.



Parameter	Min.	Typ.	Max.	Unit
Operating frequencv	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 %							Price
Measurement range							
10	kNm including 5 m cable and calibration certificate						
15	kNm including 5 m cable and calibration certificate						
XX	kNm including 5 m cable and calibration certificate Price on request						
	Angle sensor						
	0	Without angle sensor					
	1	Speed sensor 1CPR					
	2	Speed sensor 60CPR					
	3	Angle sensor 1024 PPR (only with IP50)					
		Analog output					
		A	Voltage output 0-10 V				
		S	Current output 4-20 mA				
			Digital output				
			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							

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

Accessories			Price
NCTE Readout works with all NCTE Sensors			
A	**Torque sensor input: Voltage output 0-5 V and 0-10 V** Order number: 400010-ATS001 1 angle encoder input, A/B USB interface, Windows software included SD card slot		545 €
S	**Torque sensor input: current output 4-20 mA** Order number: 400010-ATS002 1 angle encoder input, A/B USB interface, Windows software included SD card slot		590 €
	Coupling		
	X	Customized couplings, price on request	

Please feel free to contact your Sales Manager Serial products for additional information. Email: 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 **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.

Datasheets and instruction manuals are available at 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 key stone adapters on both ends of the measurement shaft are intended for torque transmission.

Electrical connector:
On the sensor housing there is a 8-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:

- The sensor may only be operated with a shielding.
- 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.

Tare function and error indication:

Series 3000 contains a LED button on the housing surface. Pressing the button will set the signal output to 5 V. The illumination of the button serves as a function/malfunction indicator.

Functional indicator:
LED off: missing power supply or sensor is damaged
LED on: Sensor is ready.

Error indicator:
LED flashes: The sensor is not ready.
Flashing of LED can have several possible causes. Various causes are interpreted through a flash code. After each flash code the LED makes a short pause before repeating the code.

2x flashing: Magnet field sensors defective. 4x flashing: Electronics defective.

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.
- Do not remove or loosen the locking rings on the shaft ends.
- Do not loosen or tighten the flange-mounting nut of the socket-connector (chapter dimensions).
- Use only a separate power supply for the sensor.
- Use the sensor only according to the specification (chapter technical characteristics).

Maintenance and overhaul

As part of your testing and measuring equipment management, we recommend regular checking of your testing and measuring equipment. Please also observe the corresponding standards and guidelines.

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

Repairs

Repairs must be carried out exclusively by employees of NCTE AG. The sensor must be sent to the NCTE AG together with an RMA formula (Return Merchandise Authorization). You will receive an RMA formula via the NCTE service-hotline.

Disposal

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

Service-Hotline

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