



## Technical data

- Nominal torque: 3.000 Nm to 8.000 Nm, bidirectional
- Rotational speed:  $\leq 3.600$  rpm
- Accuracy:  $\leq \pm 0,5$  %
- Temperature range:  $-40$  °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)
- 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 7000 series is extremely robust and the most reliable torque measuring system.

This series is mainly used in test facilities, automotive engineering (agriculture and off-highway), process monitoring and quality control.

Transmitted torque can be measured statically and dynamically in real time. This series offers a lot of different connection possibilities used in agriculture or off-highway for instance PTO shaft. Also a flange system is available. Each sensor can be configured individually with a lot of extras, such as angle sensor, speed sensor and protection class IP65.

Series 7000 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 7000

Model series 7000	Nr. of teeth on gear	Unit	Nominal torque bidirectional (+/-)	Max. load bidirectional (+/-)	Rotational speed [rpm]
1 3/8 Zoll	6	[Nm]	3.000	3.500	3.600
	21				
1 3/4 Zoll	6		5.000	6.000	
	20				
Flange	-		5.000	10.000	

### Technical characteristics

No.	Model	Unit	Series 7000	
	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	1.000	
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	43	
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	

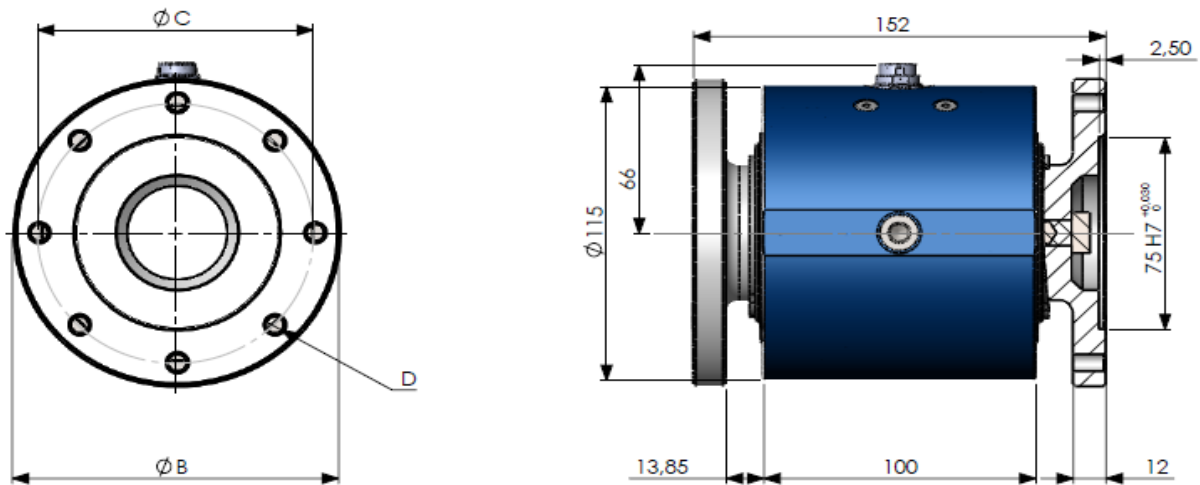
<sup>1</sup> The accuracy class implies that taken separately both the linearity deviation as well as the rotational signal uniformity are either lower than or equal to the value of the accuracy class.

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

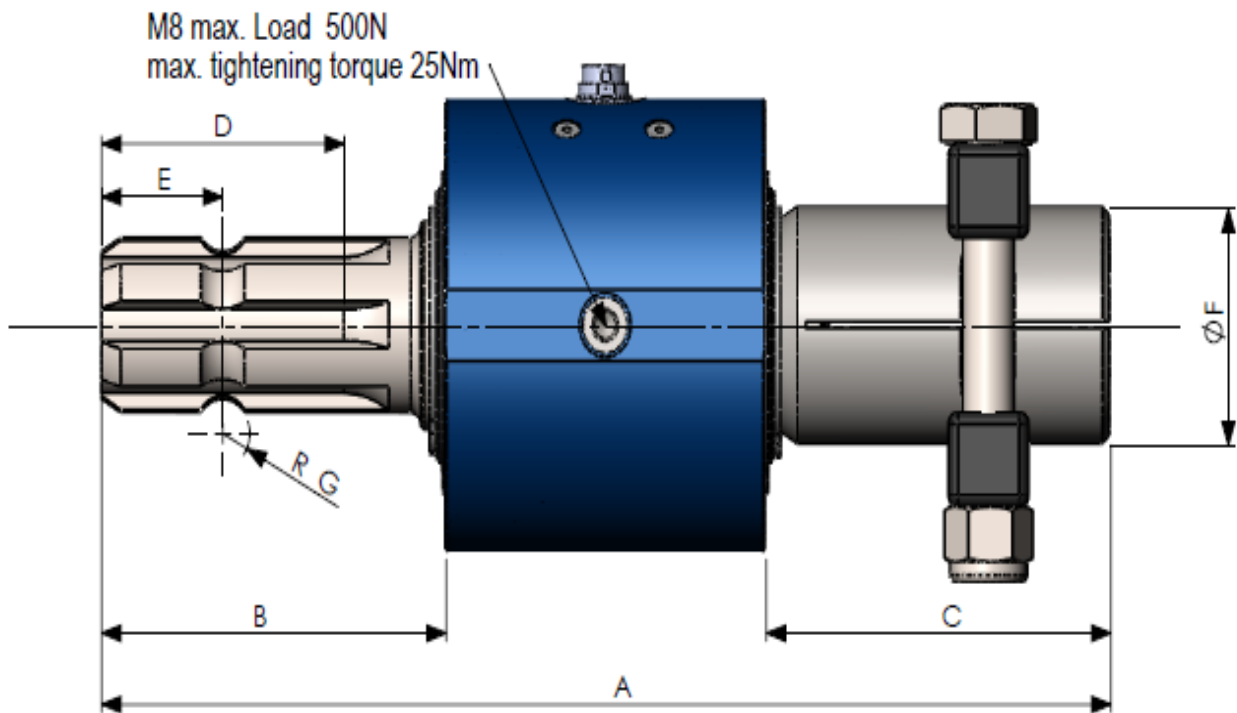
<sup>3</sup> Please check the exact data at the sensors calibration certificate.

	Power supply	Unit	Value
14	Supply voltage	VDC	9 ... 28
15	Current consumption (max.)	mA	100
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	50/65
19	Reference temperature	°C	+15 ... +35
20	Operational temperature range	°C	-40 ... +85
21	Storage temperature range	°C	-40 ... +85
22	EMV	-	EN 61000/EN 55011

## Dimensions

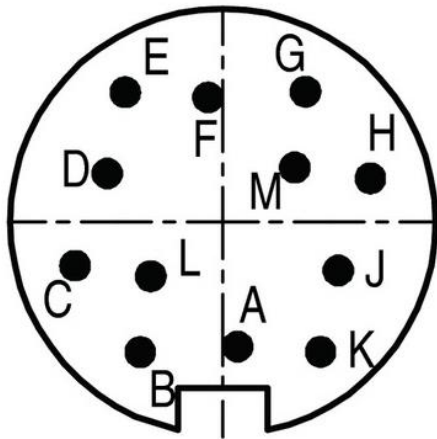


<sup>4</sup> Wiring connected.



Dimensions	Mounting parts				Flange		
	In [mm]	6 teeth on gear (1 3/8")	6 teeth on gear (1 3/4")	21 teeth on gear (1 3/8")	20 teeth on gear (1 3/4")	bilt circle 101,5 mm 8xM8	bilt circle 84 mm 8xM8
A	306	316	316	336	10,9	10,9	8
B	98	108	98	123	120	105	tbd.
C	108	108	118	113	101,9	84	tbd.
D	76	76	65	90	8x M8	8x M8	tbd.
E	38	38	25,5	38	-	-	-
F	50	60	50	60	-	-	-
G	6,8	8,4	6,8	8,4	-	-	-

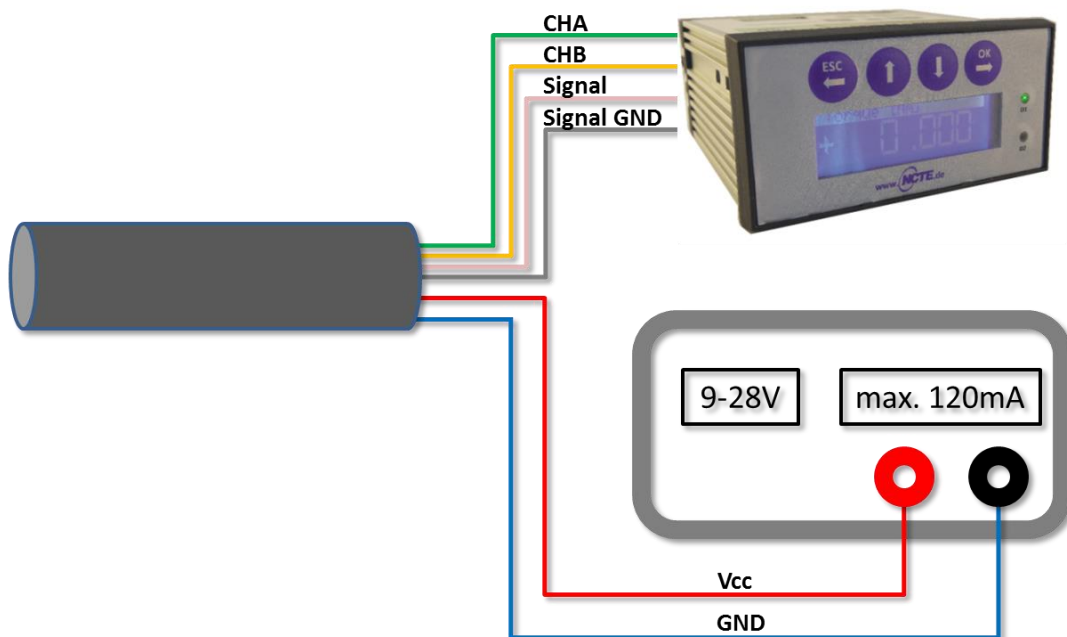
**Connection plan**



Connector  
Power supply and outputs

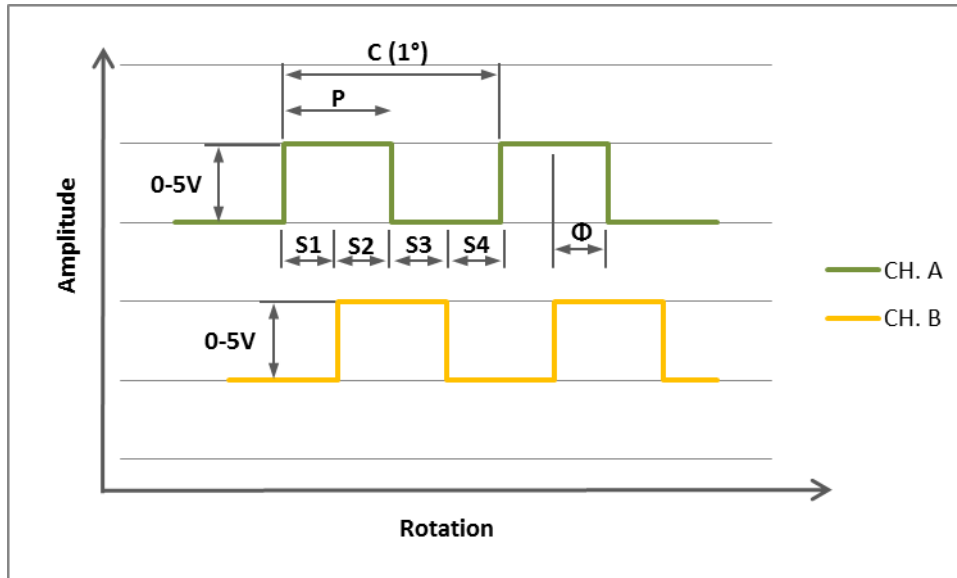
Typ	Binder series s712-M9 connector IP67 colour coding according to DIN 47100		
Pin	Color	Description	Value
A	White	CAN / USB	H/D-
B	Brown	CAN / USB	L/D+
C	Green	Angle channel A	0 V ... 5 V
D	Yellow	Angle channel B	0 V ... 5 V
E	Grey	Analog GND	-
F	Pink	Analog voltage Analog current	0 V ... 10 V 4 mA ... 20 mA
G	Blue	Ground GND	-
H	Red	Supply voltage VCC	9 V ... 28 V
J	Black	USB GND	-
K	Violet	-	-
L	Grey-Pink	USB	+5 V
M	Red-Blue	-	-

Connection example:



## Angle sensor

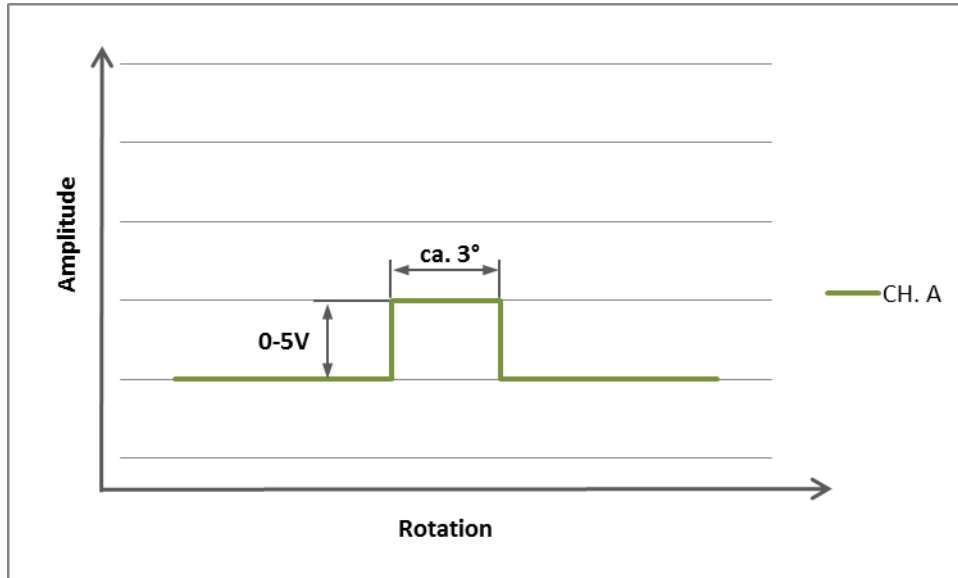
Optical angle sensor with 360 CPR.



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 degrees 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 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 7000 accuracy 0,5 %		Price
<b>Measurement range</b>		
3.000	Nm (1 3/8") including 5 m cable and calibration certificate	
5.000	Nm (1 3/4") including 5 m cable and calibration certificate	
XXXX	Selectable between 3.000 Nm and 8.000 Nm including 5 m cable and calibration certificate	
<b>1<sup>st</sup> Shaft end</b>		
0	PTO shaft 6 teeth (1 3/8"), ≤ 3000 Nm	
1	PTO shaft 20 teeth (1 3/4")	
2	PTO shaft 21 teeth (1 3/8"), ≤ 3000 Nm	
6	Flange with bolt circle 101,5 mm with 8xM8	
7	Flange with bolt circle 101,5 mm with 8xM8	
8	PTO shaft 6 teeth (1 3/4")	
10	Flange with bolt circle 140 mm16xM12, ≤ 8000 Nm	
11	Flange X-Toothing	
X	Customized flange	
<b>2<sup>nd</sup> Shaft end</b>		
3	PTO bush 6 teeth (1 3/4")	
4	PTO bush 20 teeth (1 3/4")	
5	PTO bush 21 teeth (1 3/8"), ≤ 3000 Nm	
6	Flange with bolt circle 101,5 mm with 8xM8	
7	Flange with bolt circle 101,5 mm with 8xM8	
9	PTO bush 6 teeth (1 3/8"), ≤ 3000Nm	
10	Flange with bolt circle 140 mm16xM12, ≤ 8000 Nm	
11	Flange X-Toothing	
X	Customized flange	
<b>Angle or Speed sensor</b>		
0	Without angle sensor	
1	Angle sensor 360CPR (only with IP50)	
2	Speed sensor 1CPR	
3	Speed sensor 60CPR	
<b>Analog output</b>		
A	Voltage output 0-10 V	
S	Current output 4-20 mA	





## 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](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.

