Technical data

- Nominal torque: 3.000 Nm to 8.000 Nm, bidirectional
- Rotational speed: ≤ 3.600 rpm
- Accuracy: ≤ ±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. Additional to the flange system it is possible to order a variety of different shafts and bushes as accessories. 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]
Flange	-	[Nm]	5.000	10.000	3.600

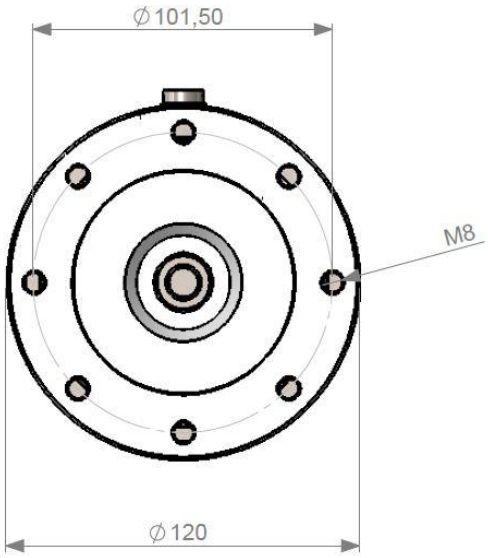
Technical characteristics

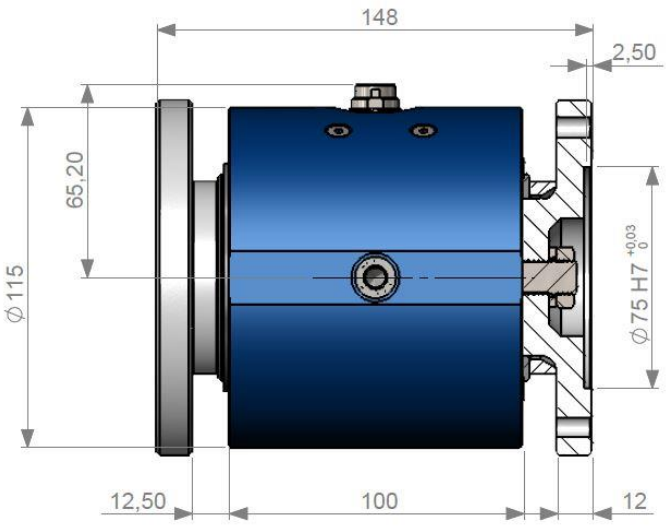
No.	Model		Series 7000	
	Accuracy class[1]		0,5	
		Unit	Value	
1	Linearity deviation incl. hysteresis	%ME[2]	< ±0,5	
2	Rotational Signal Uniformity (RSU)		< ±0,5	
3	Repeatability		< ±0,05	
	Output signal in general	**Unit**	**Value**	
4	Frequency range, -3dB point, Bessel characteristics	Hz	1.000	
5	Analog signal	V | mA	0 … 10	4 … 20
6	Signal at torque = Zero[3]	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	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	

[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.

	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[4]	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





Flange has to be fixed by eight screws M8 steel grade 12.9 and 42 Nm. There could be some changes with customised options.

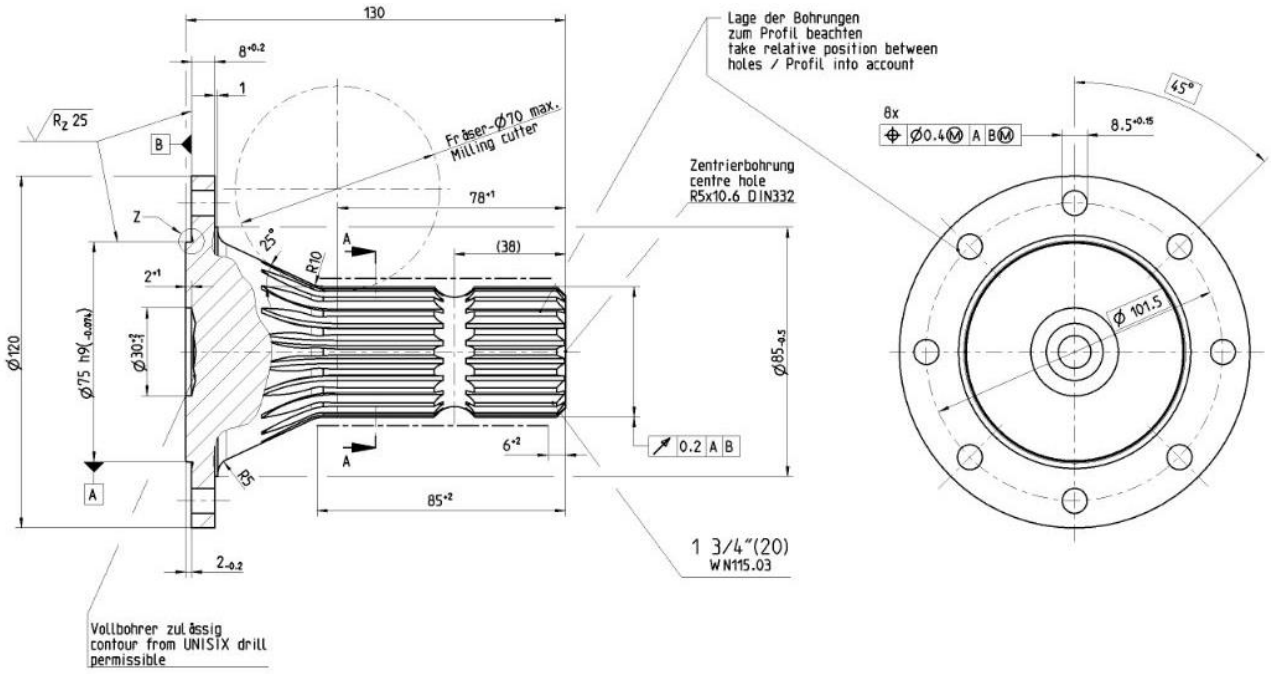
[4] Wiring connected.

Additional shafts and bushes for NCTE flange sensors (Accessories)

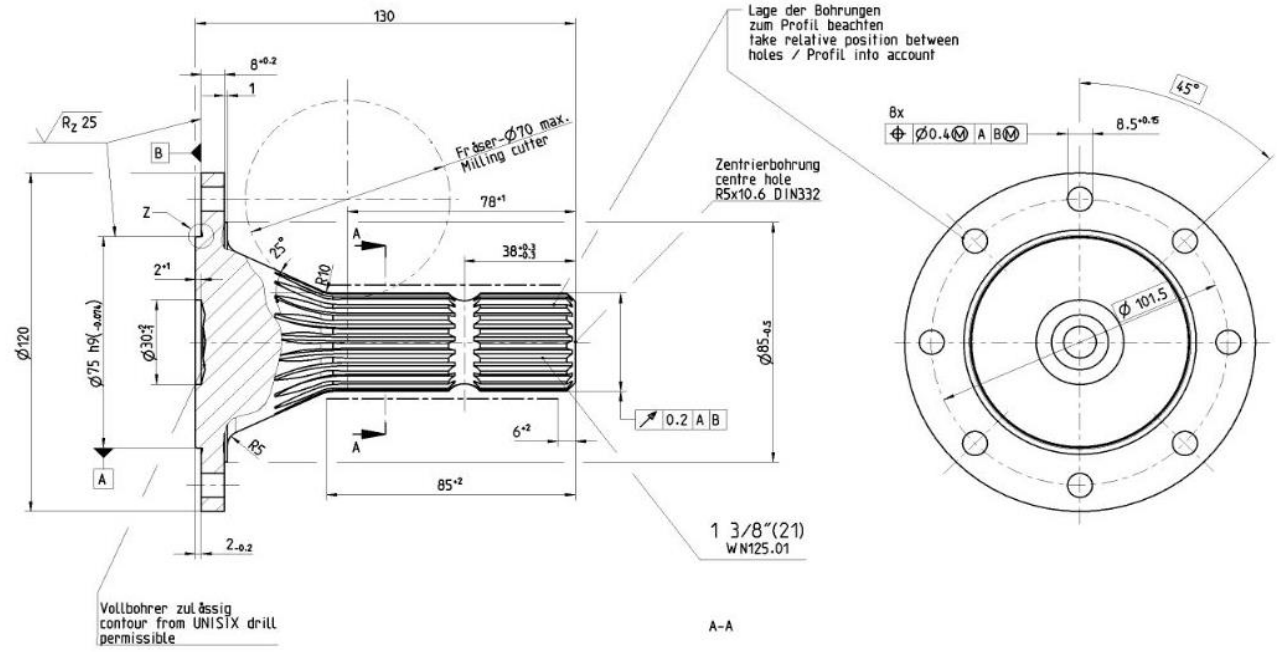
Please check the following link for additional information.
http://www.ncte.de/download/Downloadlink/series7000additional.zip

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.

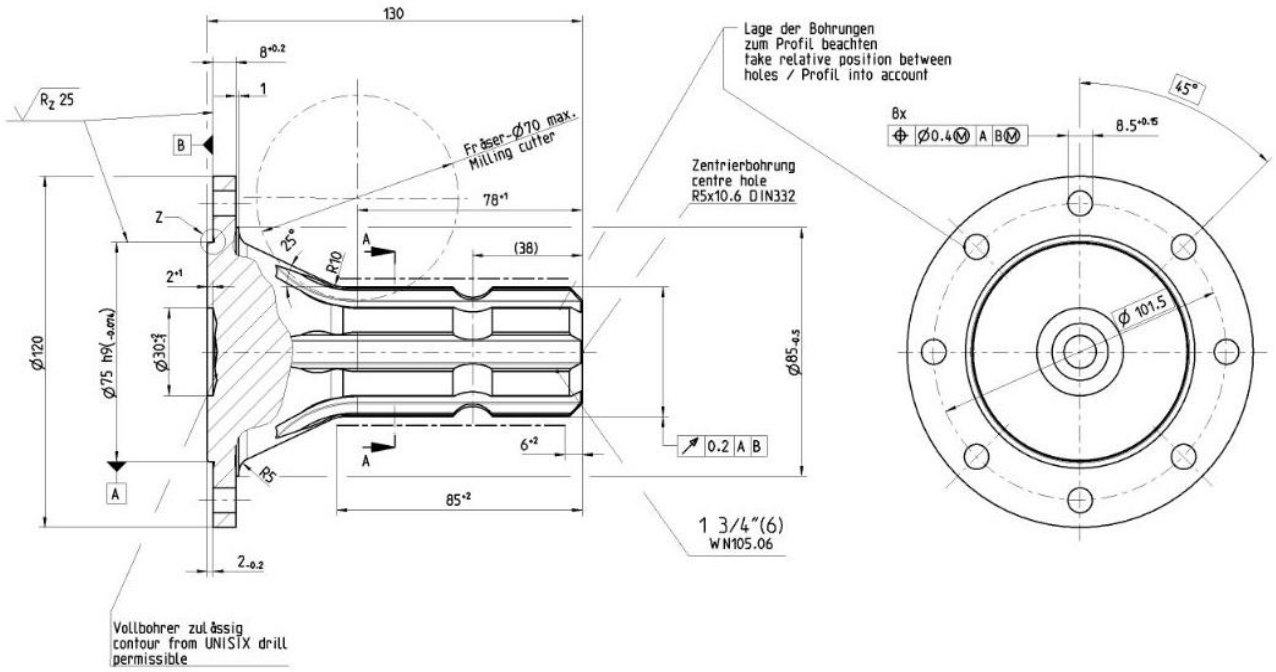
PTO shaft 20 teeth (1 3/4'')



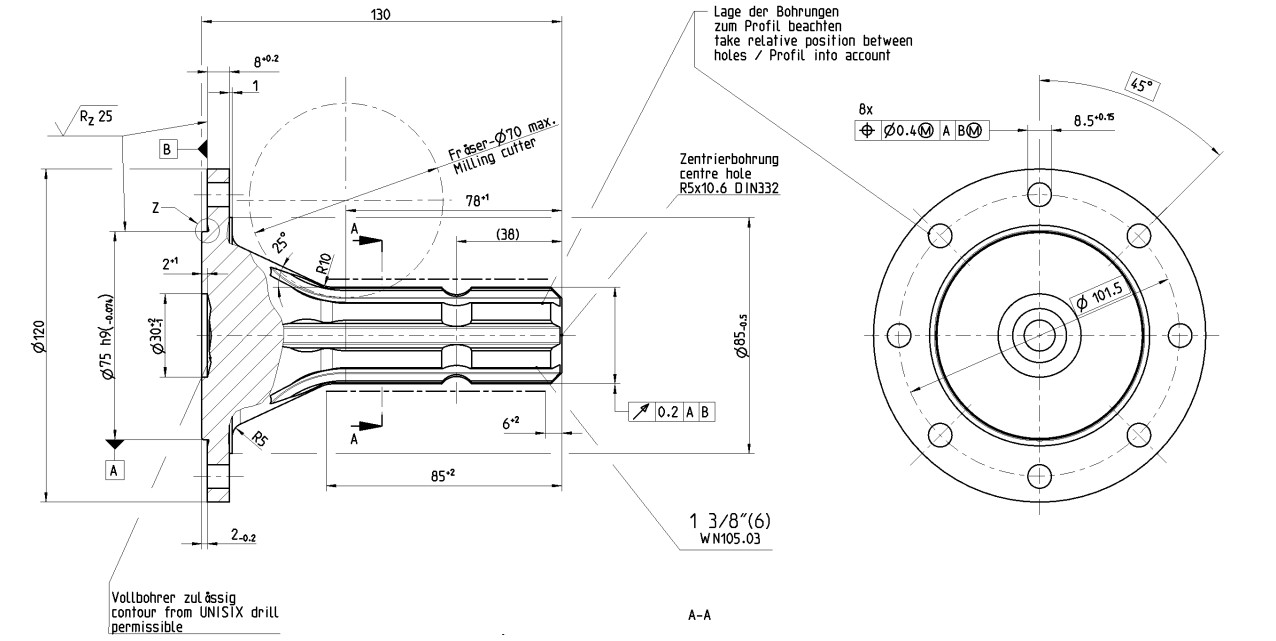
PTO shaft 21 teeth (1 3/8''), ≤ 3000 Nm



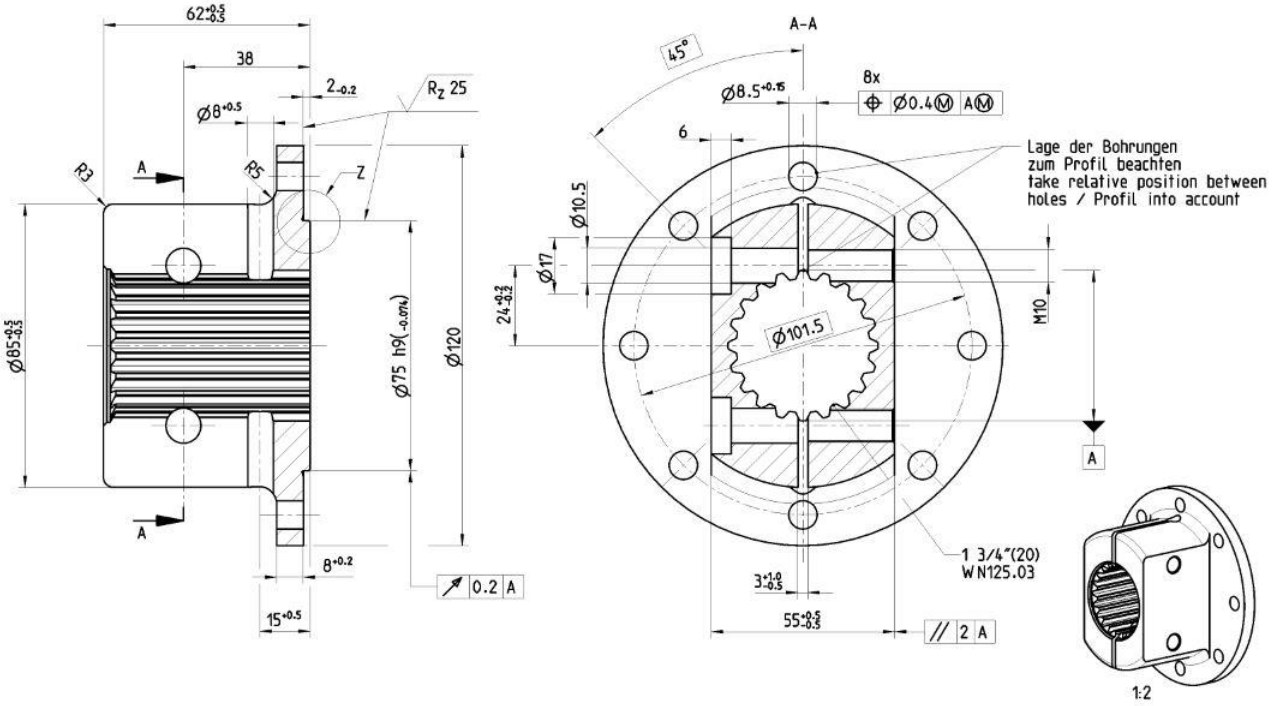
PTO shaft 6 teeth (1 3/4'')



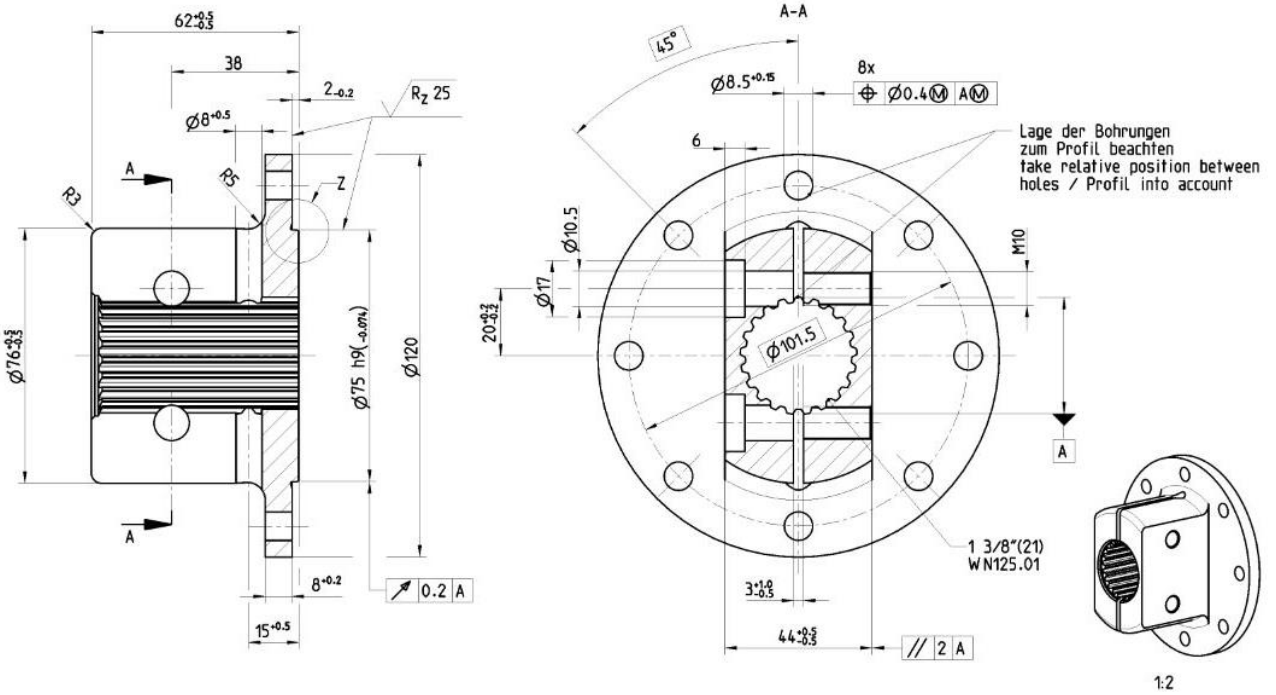
PTO shaft 6 teeth (1 3/8''), ≤ 3000 Nm



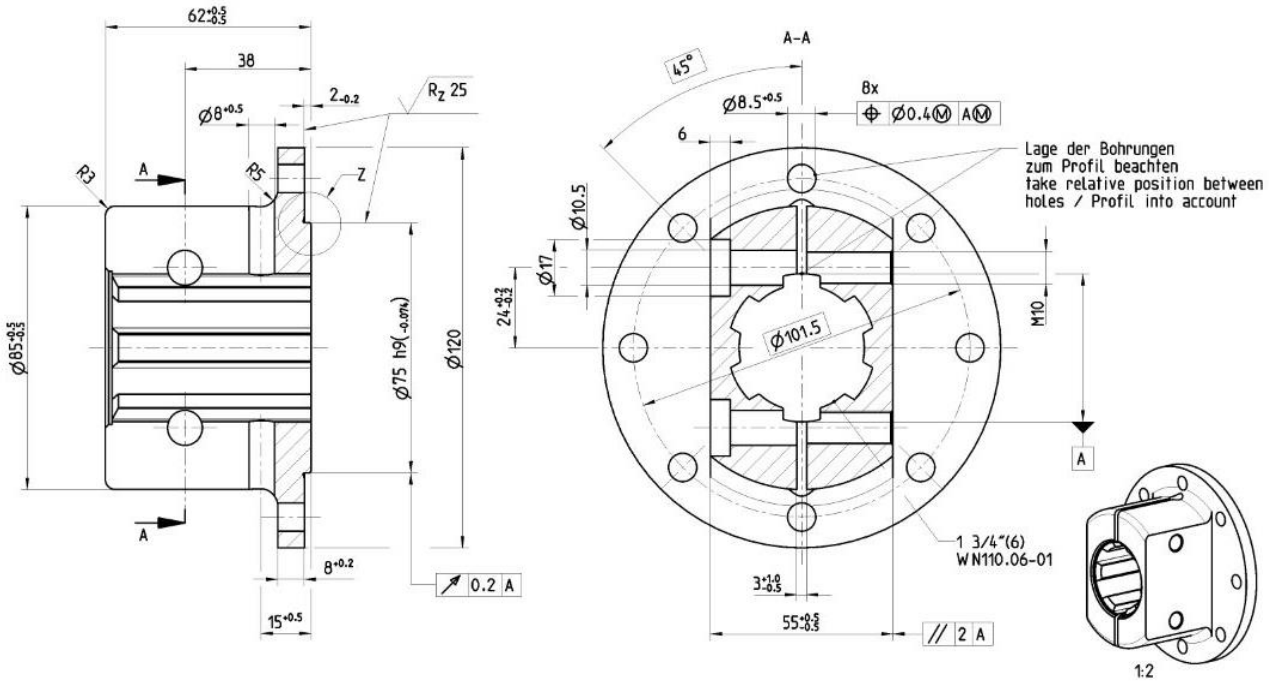
PTO bush 20 teeth (1 3/4'')



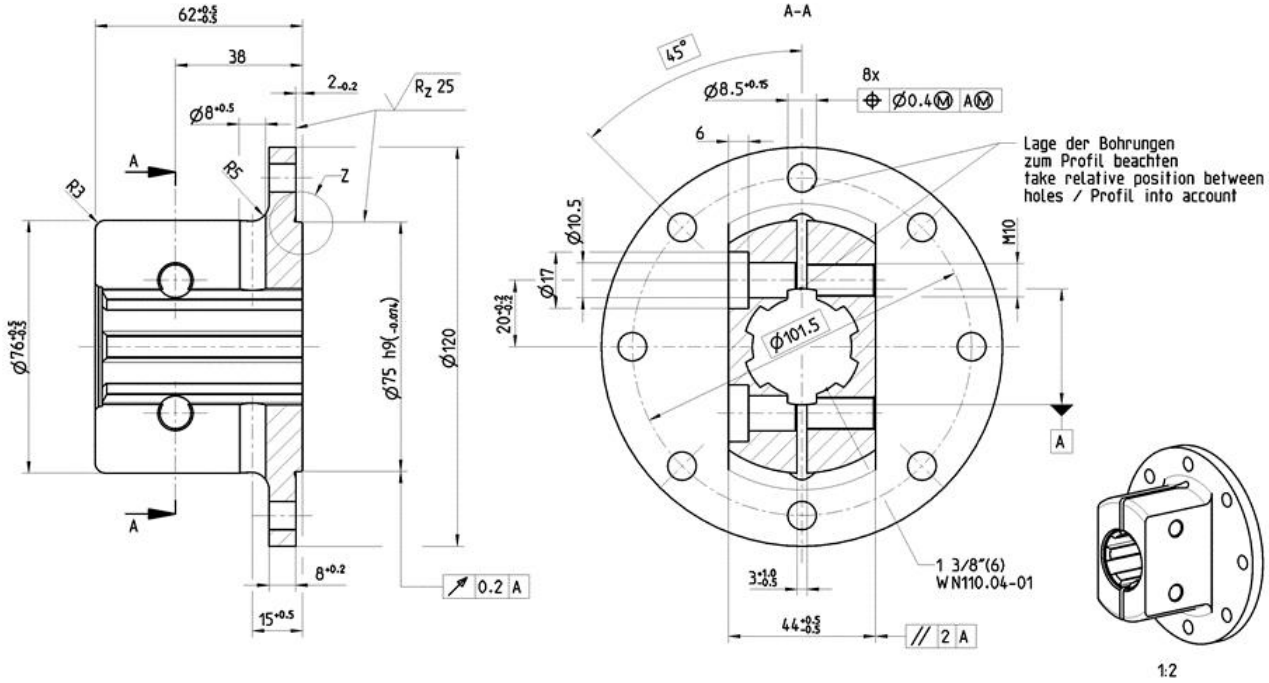
PTO bush 21 teeth (1 3/8''), ≤ 3000 Nm



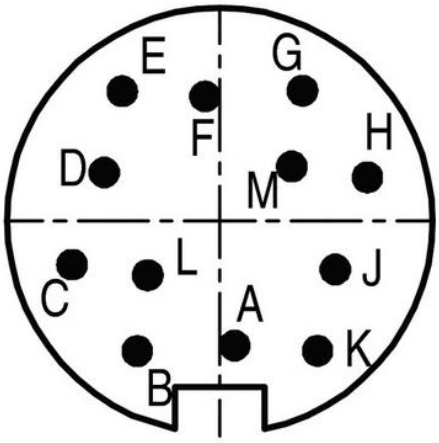
PTO bush 6 teeth (1 3/4'')



PTO bush 6 teeth (1 3/8''), ≤ 3000 Nm



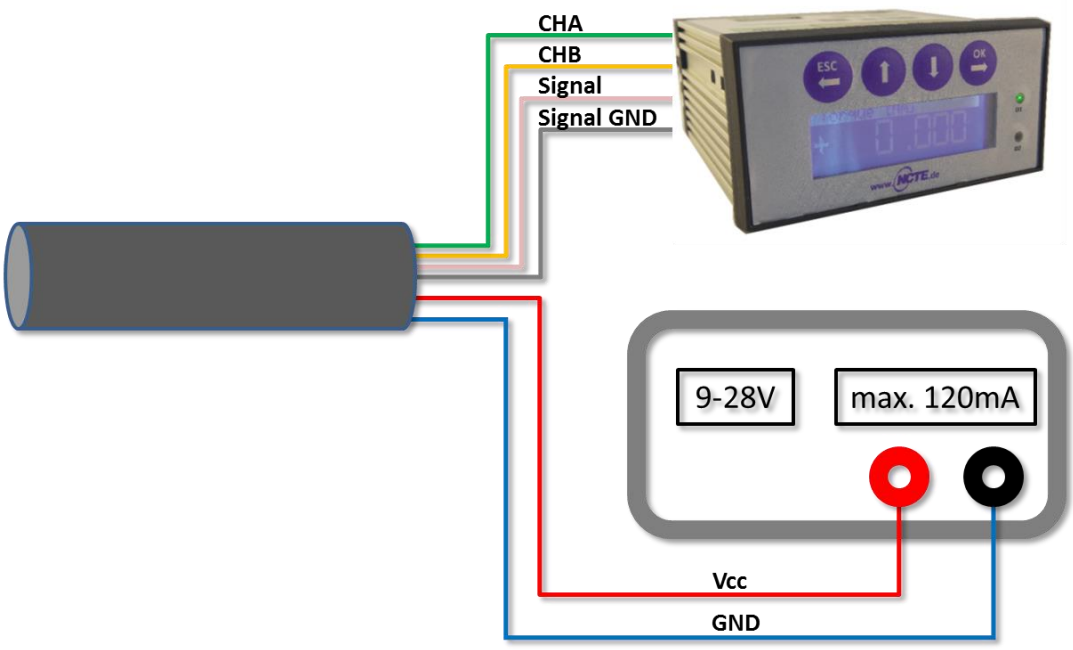
Connection plan



Connector
Power supply and outputs

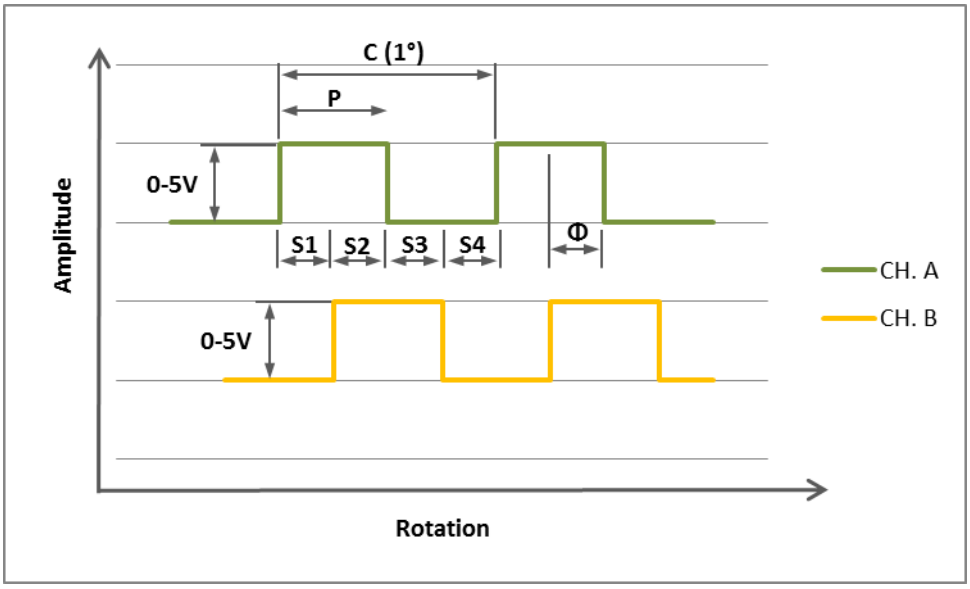
Typ	Binder series s712-M9 connector IP67 colour coding according to DIN 47100		
Pin	**Color**	**Description**	**Value**
A	White	CAN / USB	H/D-
B	Brown	CAN / USB	L/D+
C	Green	Angle channel A	0 V ... 5 V
D	Yellow	Angle channel B	0 V ... 5 V
E	Grey	Analog GND	-
F	Pink	Analog voltage Analog current	0 V ... 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.

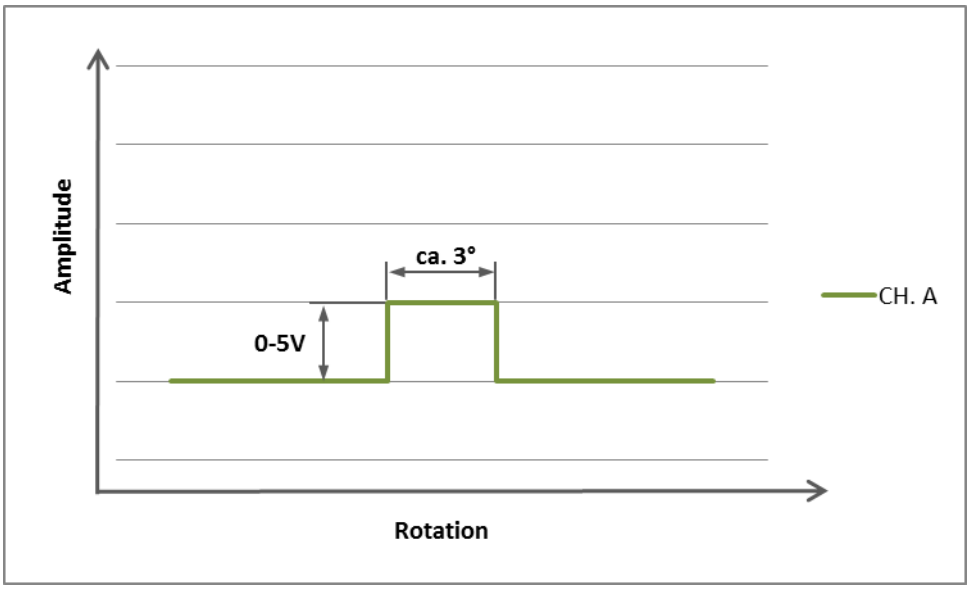


Parameter	Min.	Typ.	Max.	Units
High Level Output Voltage	2,4	5	-	V
Low Level Output Voltage	0	-	0,4	V

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 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 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
	Measurement range								
	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							
		1st Shaft end							
		6	Flange with bolt circle 101,5 mm with 8xM8						
		X	Customized						
			2nd Shaft end						
			6	Flange with bolt circle 101,5 mm with 8xM8					
			X	Customized					
				Angle or Speed sensor					
				0	Without angle sensor				
				1	Angle sensor 360CPR (only with IP50)				
				2	Speed sensor 1CPR				
				3	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 (Speed sensor only)		
							Inverted output signal		
							I	All output signals inverted	
								Protection class according to EN 60529	
								0	IP50
								1	IP65 (only with Speed sensor)
7000									

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

Accessories				Price
NCTE Readout Unit, 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			
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			
	Additional shafts for NCTE flange sensors			
	1	400012-ATM215 PTO shaft 6 teeth (1 3/4''), ≤ 4.000 Nm*		
	3	400012-ATM211 PTO shaft 6 teeth (1 3/8''), ≤ 3.500 Nm*		
	5	400012-ATM217 PTO shaft 20 teeth (1 3/4''), ≤ 4.000 Nm*		
	7	400012-ATM213 PTO shaft 21 teeth (1 3/8''), ≤ 3.500 Nm*		
		Additional bushes for NCTE flange sensors		
		2	400012_ATM214 PTO bush 6 teeth (1 3/4''), ≤ 4.000Nm*	
		4	400012-ATM210 PTO bush 6 teeth (1 3/8''), ≤ 4.000Nm*	
		6	400012-ATM216 PTO bush 20 teeth (1 3/4''), ≤ 4.000Nm*	
		8	400012-ATM212 PTO bush 21 teeth (1 3/8''), ≤ 4.000 Nm*	

Please check the following link for additional information.
http://www.ncte.de/download/Downloadlink/series7000additional.zip

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

* In situations of dynamic constant load the max torque is limited to 1870 Nm.

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 shafts end has to be attached forceless to the corresponding ones. 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.

The security against rotation may only occur via the M8 thread (screws M8 steel grade 12.9) on the flattening of the housing. Maximum load at the thread is 25 Nm.

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.
- 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).

Caution Type IP 65 in long-term usage the surface of the sensor can reach 85 degree Celsius. Please be careful and use protection!

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.**