Data sheet

1 Key Facts

Technical	Distinctive features
• Nominal torque: up to 5000 Nm, bidirectional • Speed: ≤ 3600 rpm • Accuracy: ≤ ±0.5 % • Operating temperature: -40 °C to +85 °C • Protection class: IP50, IP65 • Output signal options: 0-10 V / 4-20 mA / CAN-Bus / USB • Cut-off frequency: 2500 Hz	• Made in Germany • Short delivery time (< two weeks) • Excellent price / performance ratio • Integrated electronic (Plug & Play) • Completely contactless measuring system • Delivery including 5 m cable and calibration certificate • Suitable accessories (PTO profile shafts, PTO profile sleeve, readout unit)

2 Torque ranges

Model line Series 7000	Nominal torque bidirectional (+/-) [Nm]	RPM [U/min]
NCTE Flange	3000	3600
NCTE Flange	5000	
Customised flange	Customer-specific up to 5.000	

Note: In case of overload, the sensor leads to a measurement offset. In such case, the sensor needs to be recalibrated at NCTE AG. The sensor should be operated only within the specified nominal torque range.

3 Load characteristics

Model line Series 7000	Axial force [N][1]	Limit transverse force [N]	Limit bending moment [Nm]
NCTE	16000	to be avoided	to be avoided
Customer-specific	16000	to be avoided	to be avoided

Any irregular stress (bending moment, transverse or axial force, exceeding the nominal torque) up to the specified static load limit is only permissible as long as none of the other stresses can occur. Otherwise the limit values must be reduced. If 30 % of the limit bending moment and 30 % of the limit transverse force are present in each case, only 40 % of the axial force is permissible, whereby the nominal torque must not be exceeded.

4 Technical characteristics

No.	Accuracy class [2]		0.5	
	Description	Unit	Value	
1	Linearity deviation incl. hysteresis	%ME[3]	< ±0.5	
2	Rotational Signal Uniformity (RSU)		< ±0.5	
3	Repeatability		< ±0.05	
	Output signal general	Unit	Value	
4	Frequency range, -3dB point, Bessel characteristics	Hz	2500	
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[5]	V | mA	9	20
8	Signal at negative nominal torque[5]	V | mA	1	4
9	Calibration parameter (normed)[5]	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	43	
12	Output resistance (Current output)	k Ω	≥ 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	

[1] Specified values only apply to direct axial force on the shaft. If the axial force acts on the circlip, only 50 % of the force is permissible.
[2] The accuracy class means that the linearity deviation as well as the circulation modulation, individually, are each less than or equal to the value specified as the accuracy class. The accuracy class must not be confused with a classification according to DIN 51309 or EA-10/14.
[3] % ME: Related to the measuring range.
[4] Zero point can be set to 5 V using a tare button.
[5] The exact sensor-specific values can be found in the calibration certificate supplied.

	Power supply	Unit	Value	
15	Supply voltage	VDC	9 … 28	
16	Current consumption (max.)	mA	100	
17	Start-up peak	mA	< 100	
18	Absolute max. supply voltage	VDC	30	
	General information	**Unit**	**Value**	
19	Protection class according to EN 60529[6]	IP	50/65	
20	Reference temperature	°C	+15 … +35	
21	Operational temperature range	°C	-40 … +85	
22	Storage temperature range	°C	-40 … +85	
	Nominal torque (bi-directional)	**Nm**	**3000 / 5000**	**Customer-specific**
23	Weight	kg	4.2	-
24	Moment of inertia	kg mm^2	7850	-
	Load limits[7]	**Unit**	**Value**	
25	Maximum measurable torque	Nm	5000	8000

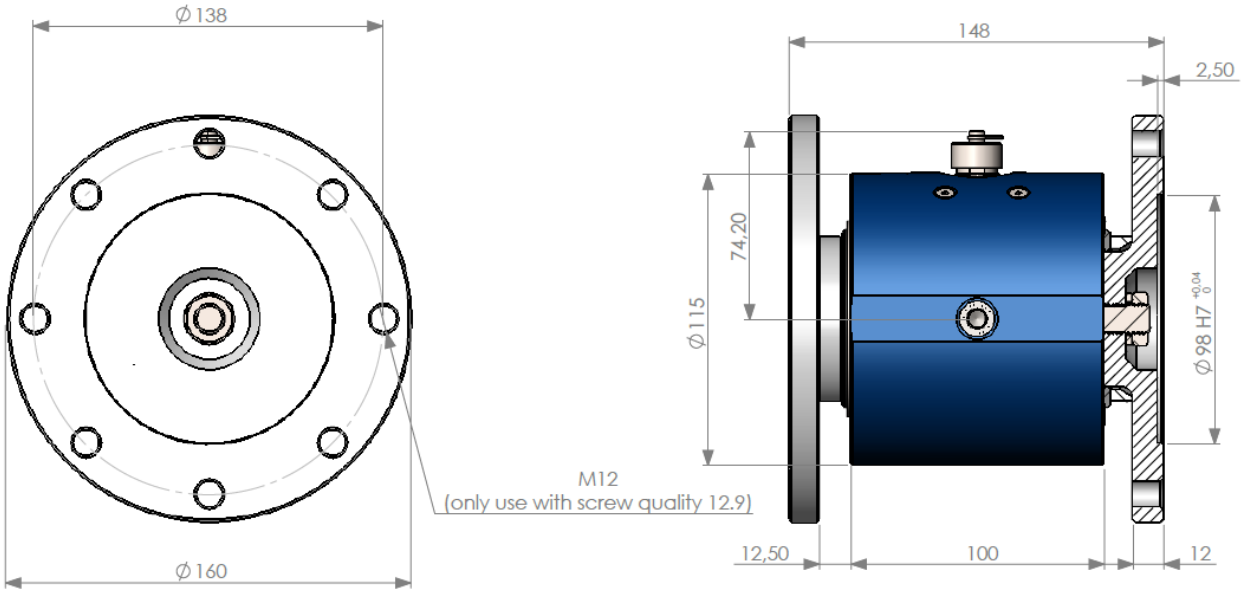
5 EMV Emission data

EMV immunity and emitted interference (DIN EN IEC 61000-6-2 / DIN EN IEC 61000-6-4 / DIN EN 61326-1)

Examination	Test specification	Admission	Evaluation criteria
Discharge of static electricity (ESD)	IEC 61000-4-2	± 6 kV Contact discharge	**A** passed
Electromagnetic HF-field	IEC 61000-4-3	80 - 1000 MHz; 10 V/m; 80% AM	**A** passed
Rapid transients	IEC 61000-4-4	± 2 kV	**A** passed
High frequency, asymmetrical	IEC 61000-4-6	0.15 - 80 MHz; 10V; 80% AM	**A** passed
Examination	**Test specification**	**Admission**	**Evaluation criteria**
Interference voltage 0.15 - 30 MHz	CISPR 11:2009 + A1:2010	**Class B**	Limit values observed
Radio interference field strength 30 - 1000 MHz	CISPR 11:2009 + A1:2010	**Class B**	Limit values observed

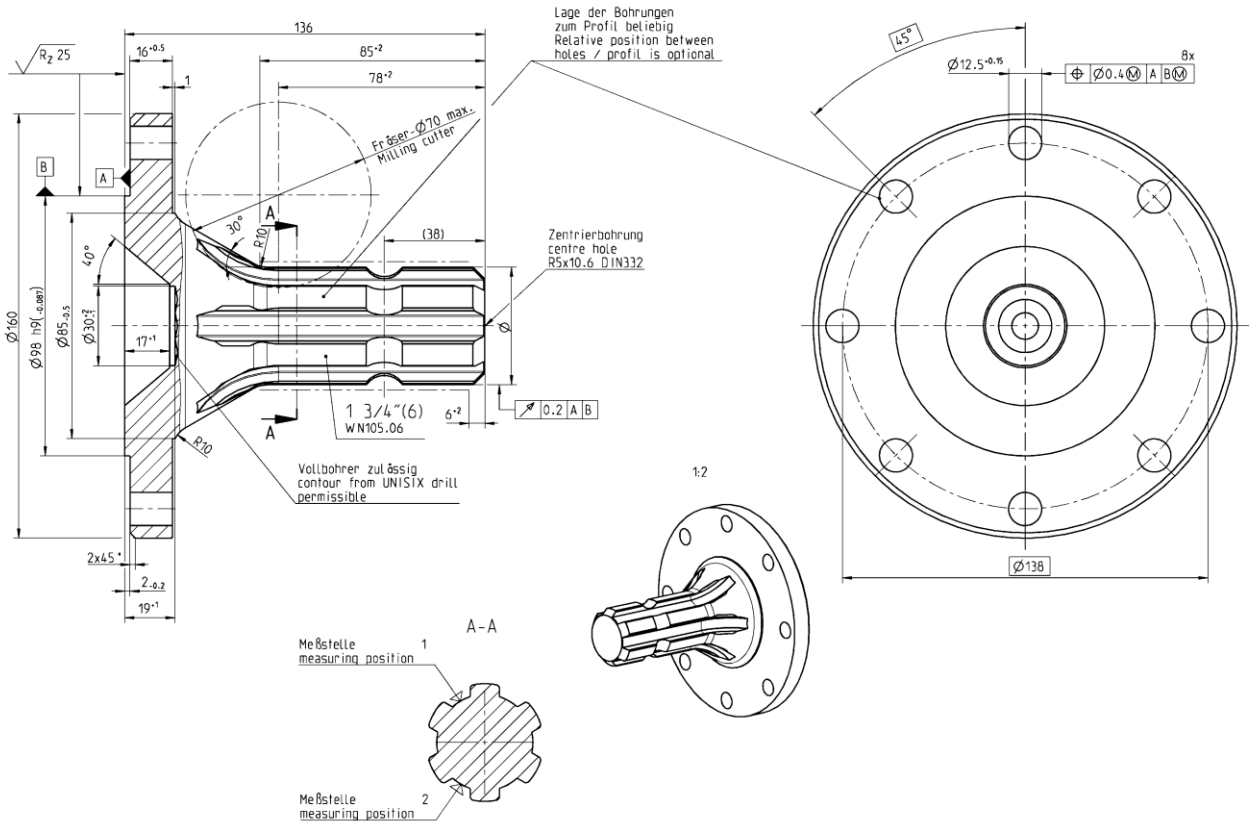
[6] Wiring connected.
[7] Based on the non-contact measurement principle the torque sensor is quite insensitive to bending and shearing forces. Self-aligning couplings are recommended in case of dynamic loads.

6 Dimensions

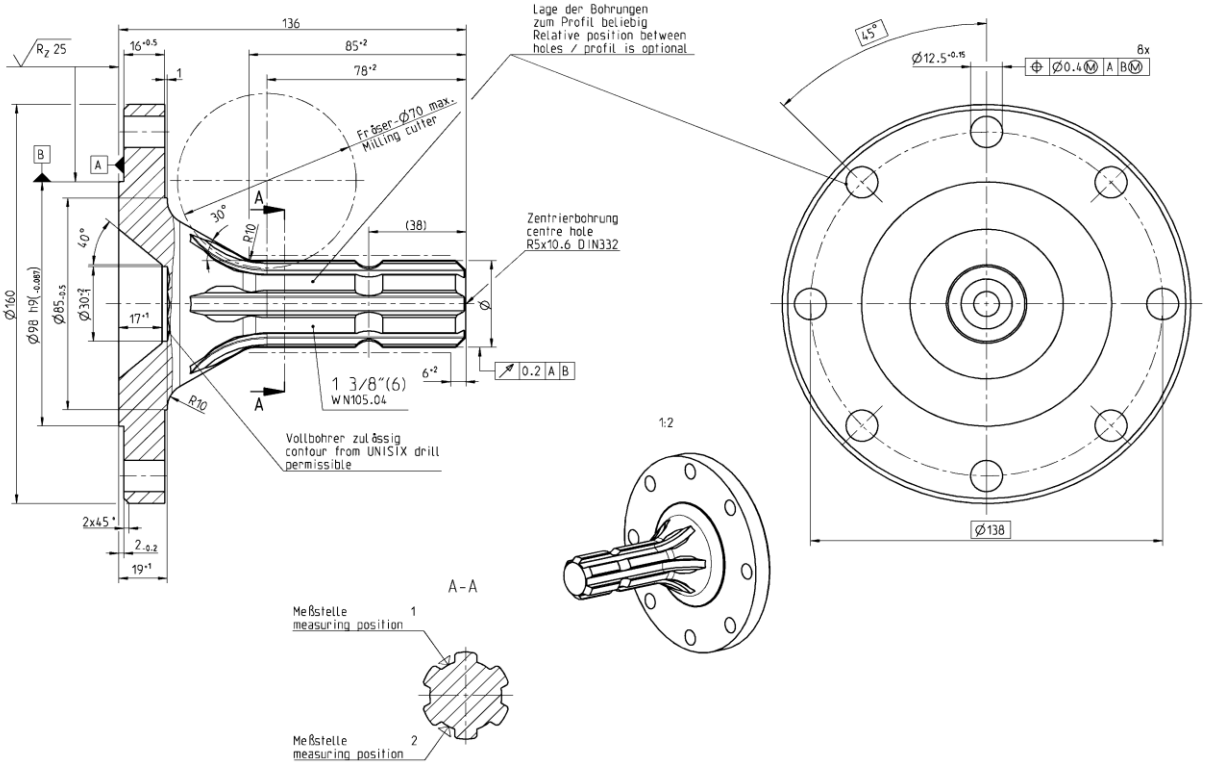


7 Additional profile shafts for NCTE flange sensors (accessories)

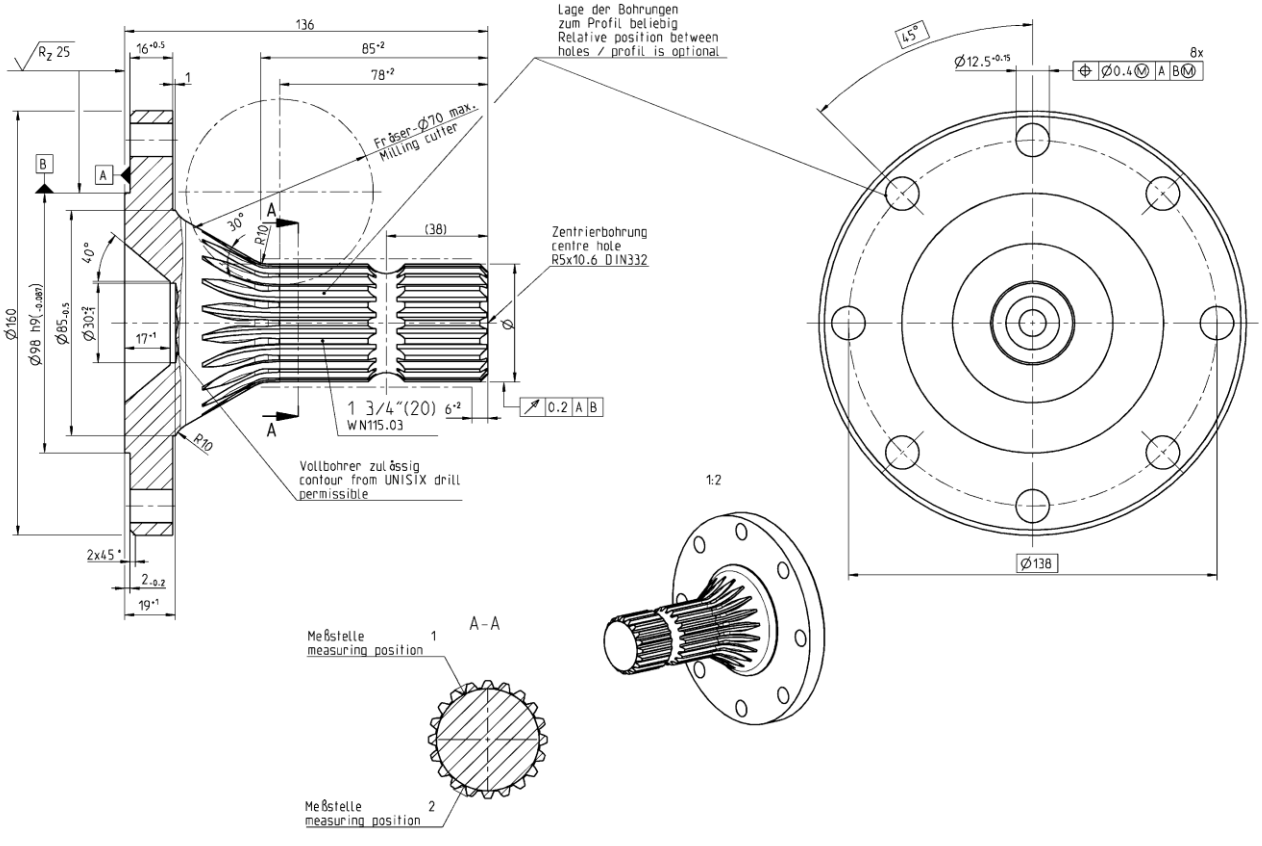
Profile shaft 6 teeth (1 3/4''), ≤ 4500 Nm continuous dynamic load



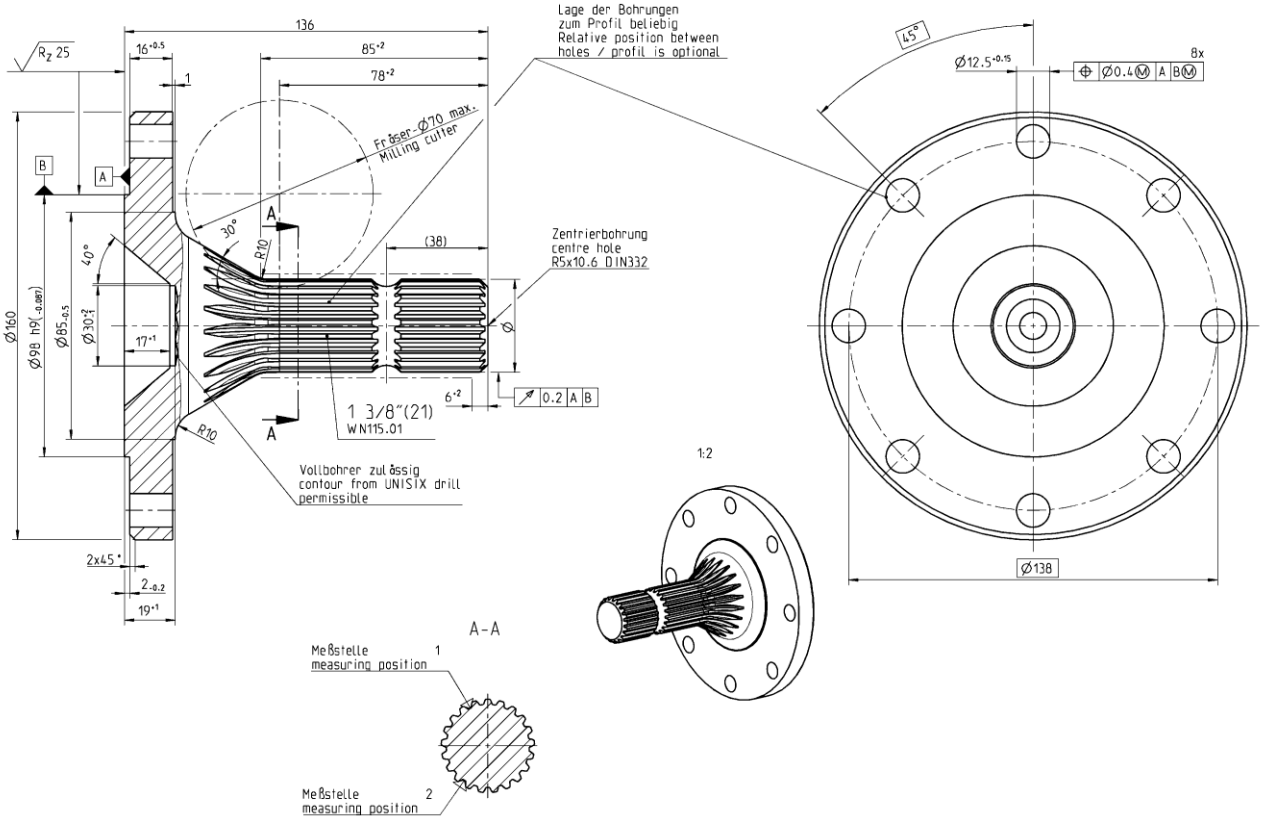
Profile shaft 6 teeth (1 3/8''), ≤ 2500 Nm continuous dynamic load



Profile shaft 20 teeth (1 3/4''), ≤ 5000 Nm continuous dynamic load

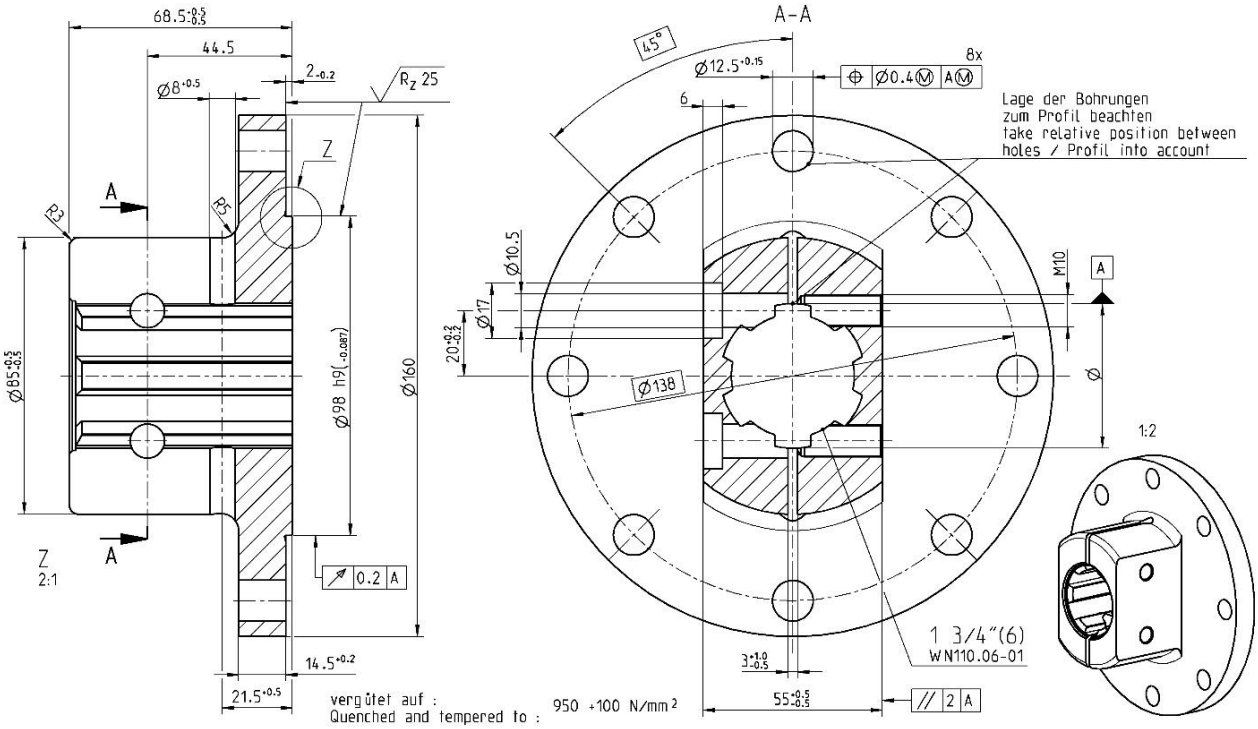


Profile shaft 21 teeth (1 3/8''), ≤ 3000 Nm continuous dynamic load

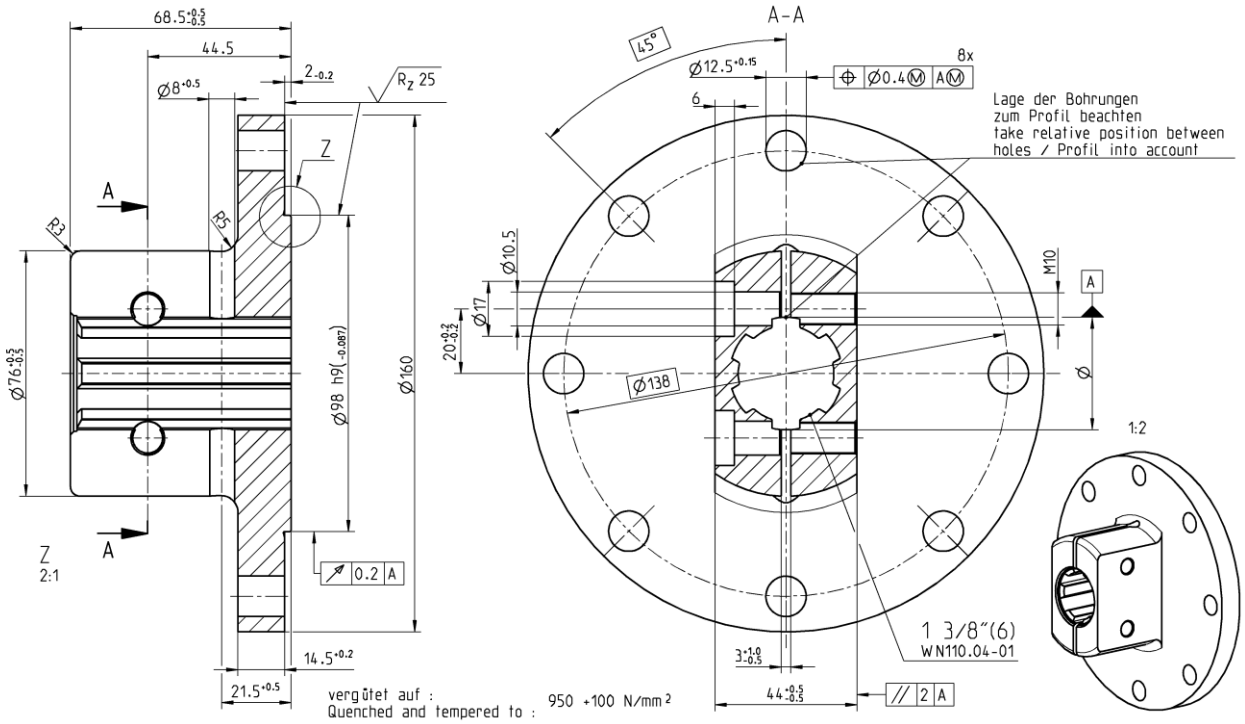


8 Additional profile sleeve for NCTE flange sensors (accessory)

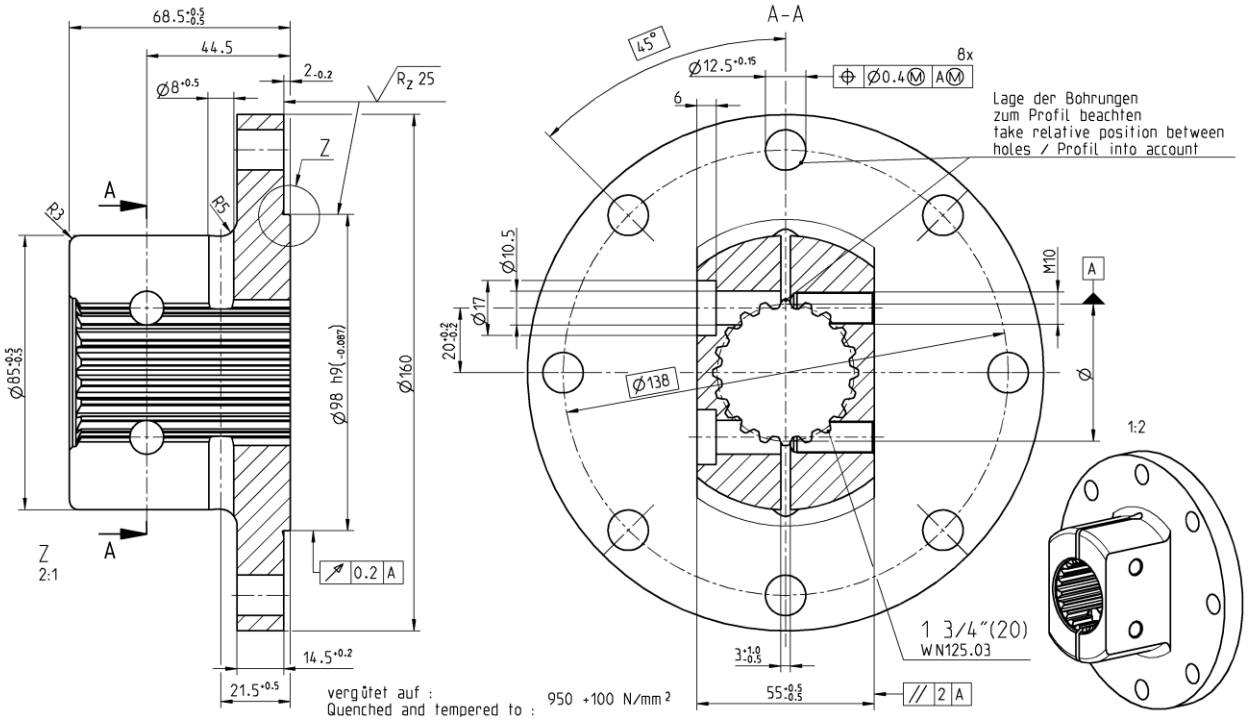
Profile sleeve 6 teeth (1 3/4'') ≤ 5000 Nm continuous dynamic load



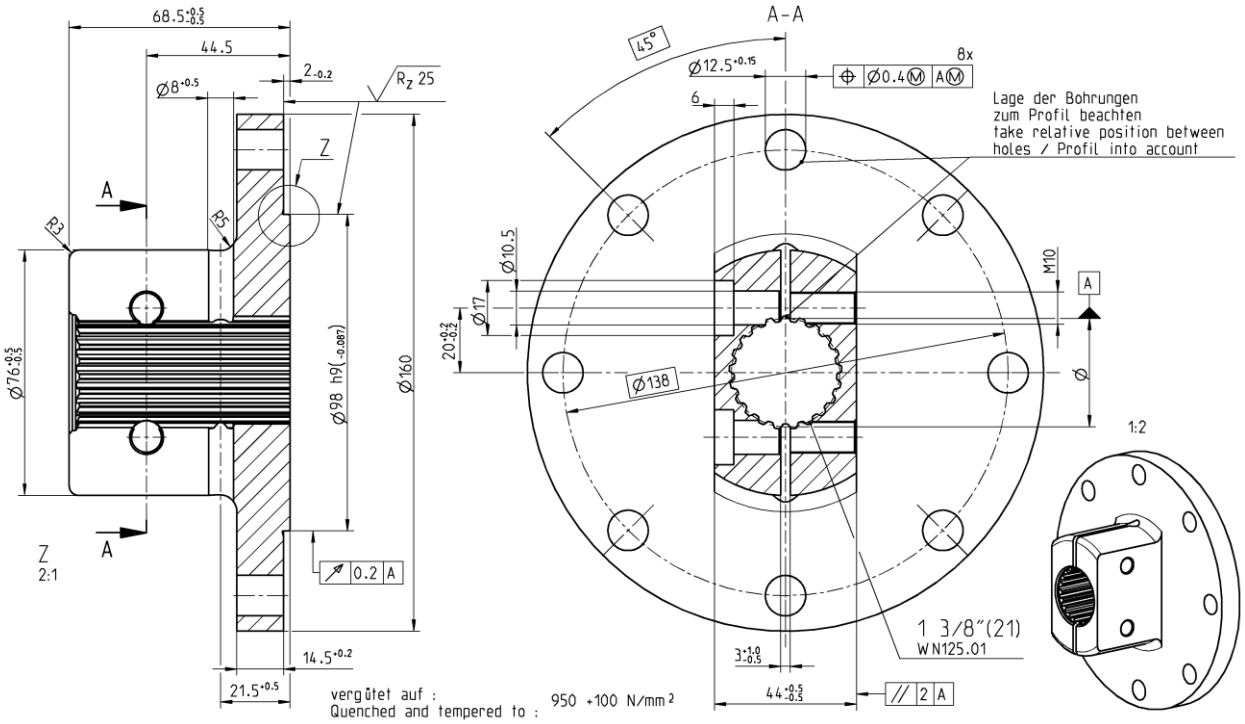
Profile sleeve 6 teeth (1 3/8''), ≤ 5000 Nm continuous dynamic load



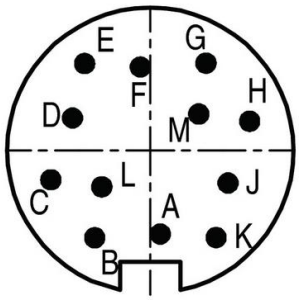
Profile sleeve 20 teeth (1 3/4''), ≤ 5000 Nm continuous dynamic load



Profile sleeve 21 teeth (1 3/8''), ≤ 5000 Nm continuous dynamic load



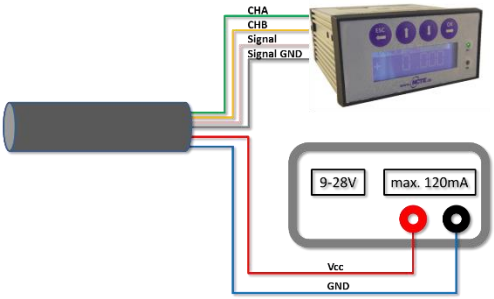
9 Wiring diagram



Connector
Power supply and outputs

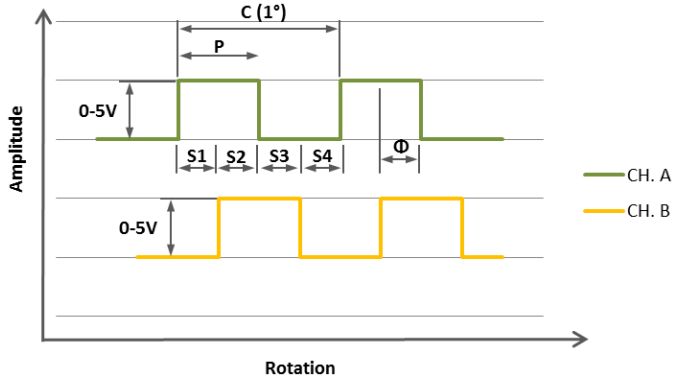
Type	Binder Plug Series 423/723/425 IP67 (Colour coding acc. to DIN 47100)		
Pin	**Colour**	**Description**	**Value**
A	White	CAN / USB	H/D-
B	Brown	CAN / USB	L/D+
C	Green	Angle channel	0V … 5V
D	Yellow	Angle channel	0V … 5V
E	Grey	Analog GND	-
F	Pink	Output signal analogue voltage / current	0V … 10V 4 … 20 mA
G	Blue	Supply voltage GND	-
H	Red	Supply voltage V_{CC}	9 … 28 V
J	Black	USB GND	-
K	Purple	-	-
L	Grey-Pink	USB	+5 V
M	Red-Blue	-	-

10 Sensor wiring



11 Speed sensor

Optical angle sensor with 360 CPR.

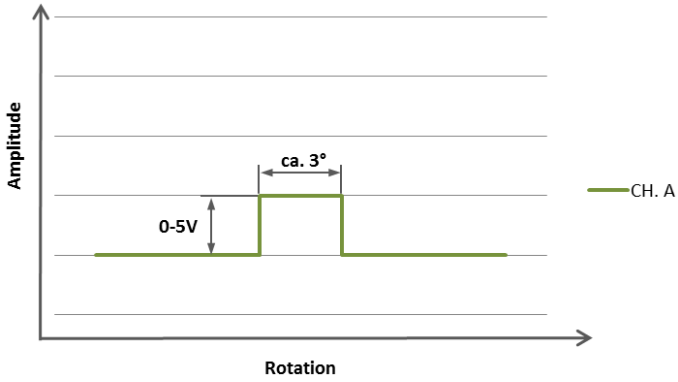


Parameter	Min.	Typ.	Max.	Unit
Upper level Output signal	2.4	5	-	V
Lower level Output signal	0	-	0.4	V

Parameter	Description
C	One cycle (pulse) of 360 CPR
P	Pulse width, or the length of the upper level of the output signal
S	Status width, the length of the electrical degrees between a change from CH. A and the adjacent change from CH. B.
Φ	The number of electrical degrees between the centre of the upper level of CH. A and the centre of the upper level of CH. B.

12 Speed Sensor

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



Parameter	Min.	Typ.	Max.	Unit
Operating frequency	0	-	8000	Hz
Analogue signal bandwidth	20	40	-	kHz
Upper level Output signal	2.4	5	-	V
Lower level Output signal	-	0	0.4	V

13 Order options

Series 7000 Accuracy 0,5 %									
Measuring range [Nm]									
3000	including 5m cable and calibration certificate								
5000	including 5m cable and calibration certificate								
customer	Customer-specific up to 5,000 Nm including 5 m cable and calibration certificate								
	Shaft end first side								
	0	NCTE flange (bolt circle 138 mm with 8 x M12)							
	X	Customer-specific							
		Shaft end second side							
		0	NCTE flange (bolt circle 138 mm with 8 x M12)						
		X	Customer-specific						
			Angle / speed sensor						
			0	Without angle sensor					
			1	Angle sensor 360CPR (only with IP50)					
			2	Speed sensor 1CPR					
			3	Speed sensor 60CPR					
				Output signal analogue					
				A	voltage output 0-10 V				
				S	Current output 4-20 mA				
					Digital output signal (optional)				
					U	USB incl. NCTE software and 2.8 m cable			
					C	CAN bus (not with angle sensor)			
						Inverted output signals (optional)			
						I	All output signals inverted		
							Protection class to EN 60529		
							0	IP 50	
							1	IP 65	
7000	5000	0	0	1	S	C	0	1	Example sensor configuration

We would be pleased to provide you with further information about serial products in a personal contact under
Phone: +49 (0)89 66 56 19 30 or by e-mail: sales@ncte.de.

14 Accessories

Readout unit 		
A	Order number 400010-ATS001 (Art. No.: 400010005)	**Sensor input: Voltage output 0-5 V and 0-10 V** 1 x angle encoder input, A/B USB interface, Software Windows included SD card slot to use for data logging
B	Order number: 400010-ATS002 (Art. No.: 400010006)	**Sensor input: current output 4-20 mA** 1 x angle encoder input, A/B USB interface, Software for windows included SD card slot to use for data logging

	Additional profile shafts for NCTE sensors with flange	**Mounting**	**Max. continuous dynamic load [Nm]**
1	400012-ATM224 PTO Profile shaft 6 teeth (1 3/4'')	8 x M12, 12.9	4500
3	400012-ATM220 PTO Profile shaft 6 teeth (1 3/8'')	8 x M12, 12.9	2500
5	400012-ATM226 PTO Profile shaft 20 teeth (1 3/4'')	8 x M12, 12.9	5000
7	400012-ATM222 PTO Profile shaft 21 teeth (1 3/8'')	8 x M12, 12.9	3000
	Additional profile sleeve for NCTE sensors with flange	**Mounting**	**Max. continuous dynamic load [Nm]**
2	400012-ATM225 PTO Profile sleeve 6 teeth (1 3/4'')	8 x M12, 12.9	5.000
4	400012-ATM221 PTO Profile sleeve 6 teeth (1 3/8'')	8 x M12, 12.9	5.000
6	400012-ATM227 PTO Profile sleeve 20 teeth (1 3/4'')	8 x M12, 12.9	5.000
8	400012-ATM223 PTO Profile sleeve 21 teeth (1 3/8'')	8 x M12, 12.9	5.000

You can obtain further or additional accessories and special requests in a personal discussion with your contact person for series products by calling +49 (0)89 66 56 19 30 or by e-mail: sales@ncte.de.

Your experts for magnetostrictive sensors