

Data sheet

1 Key Facts

Technical	Distinctive features
<ul style="list-style-type: none"> Nominal torque: up to 1000 Nm, bidirectional Speed: ≤ 10000 rpm Accuracy: ≤ ±0.1 % Operating temperature: -40 °C to +85 °C Protection class: IP50 Output signal options: 0-10V / 4-20 mA Cut-off frequency: 2500 Hz 	<ul style="list-style-type: none"> 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 (readout unit, couplings)

2 Torque ranges

Model line Series 4000 Round shaft	Nominal torque bidirectional (+/-) [Nm]	Limiting torque unidirectional [Nm]	Limiting torque bidirectional (+/-) [Nm]	RPM [rpm]
∅ 15 mm	50	65	65	10000
	100	130	130	
∅ 25 mm	250	325	325	8000
∅ 40 mm	1000	1300	1300	5000

Model line Series 4000 Square shaft	Nominal torque bidirectional (+/-)	Limiting torque unidirectional	Limiting torque bidirectional (+/-)	RPM [rpm]
⅜ inch	50	50	35	10000
¾ inch	250	250	250	8000
1 inch	1000	1000	670	5000

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 4000 Measuring range	Axial force [N] ¹	Limit transverse force [N]	Limit bending moment [Nm]
50 and 100	2300	300	41.7
250	7000	800	176
1000	24000	2000	700

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		0.1	
	Description	Unit	Value	
1	Linearity deviation incl. hysteresis	%ME ³	< ±0.1	
2	Rotational Signal Uniformity (RSU)		< ±0.1	
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	62	
12	Output resistance (Current output)	k Ω	≥ 600	
Effect of temperature		Unit	Value	
13	Zero point drift over temperature	%/10 K	< 0.2	

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.

14	Signal drift over temperature within nominal temperature range	%/10 K	< 0.5			
Power supply		Unit	Value			
15	Supply voltage	VDC	11 ... 28			
16	Current consumption (max.)	mA	150			
17	Start-up peak	mA	< 200			
18	Absolute max. supply voltage	VDC	30			
General information		Unit	Value			
19	Protection class according to EN 60529 ⁶	IP	50			
20	Reference temperature	°C	+15 ... +35			
21	Operational temperature range	°C	-40 ... +85			
22	Storage temperature range	°C	-30 ... +85			
Nominal torque (bi-directional)		Nm	50	100	250	1000
23	Weight	kg	1.4	2.5	6	
24	Moment of inertia	kg mm ²	5.9	59.5	626	
Load limits⁷		Unit	Value			
25	Maximum measurable torque	%	110			

5 EMV Emission data

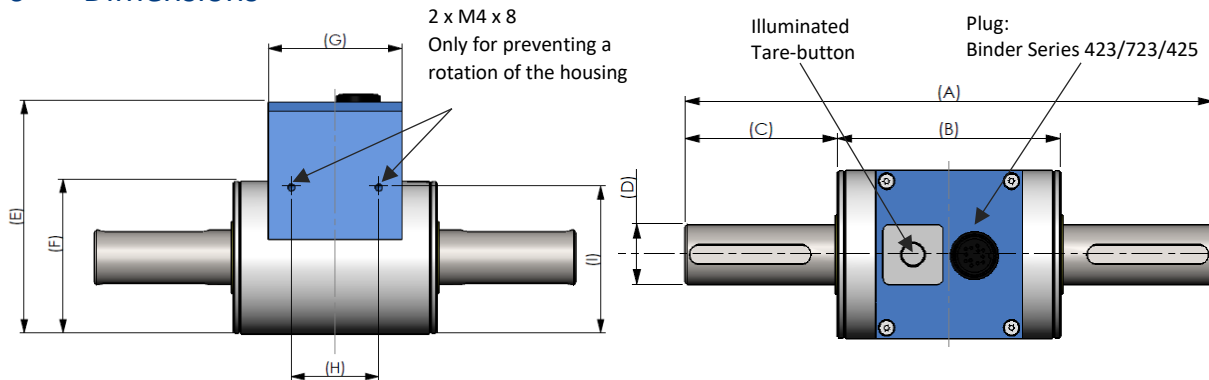
EMV immunity and emitted interference (DIN EN IEC 61000-6-2 / DIN EN IEC 61000-6-4 / DIN EN 61326-1)

Examination	Test specification	Admission	Evaluation criteria
Discharge of static electricity (ESD)	IEC 61000-4-2	± 4 kV Contact discharge	B passed
Electromagnetic HF-field	IEC 61000-4-3	80 - 1000 MHz; 10 V/m; 80% AM	A passed
Rapid transients	IEC 61000-4-4	± 1 kV	B 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.

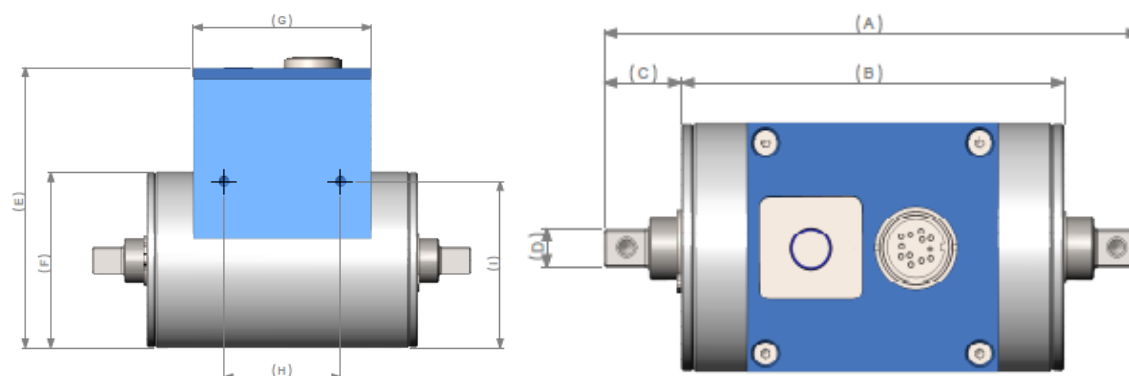
6 Dimensions



Dimensions round shaft [mm]				
Measuring range	50 Nm	100 Nm	250 Nm	1000 Nm
A	160	160	220	350
B	93	93	101	130
C	33.5	33.5	59.5	110
D	15g6	15g6	25g6	40g6
E	96	96	106	126
F	60	60	70	90
G	61	61	61	80
H	40	40	40	60
I	57	57	67	87

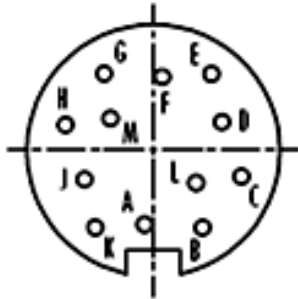
Dimensions keystone [mm]				Keystone DIN 6885			Keystone position
Shaft	Width	Depth	Length	Height	Length	Amount	Distance L
Ø 15 mm	5N9	3	25.5	5	25	1	130.5
Ø 25 mm	8N9	4	50.5	7	50	2	165.5
Ø 40 mm	12N9	5	90.5	8	90	2	252.0

For high alternating loads, torque transmission by positive and frictional locking via a suitable fit or coupling is recommended.



Dimensions square shaft [mm]									
	A	B	C	D	E	F	G	H	I
50 Nm	130	93	18.5	3/8 inch	96	60	61	40	57
250 Nm	180	101	39.5	3/4 inch	106	70	61	40	67
1000 Nm	230	130	50	1 inch	126	90	80	60	87

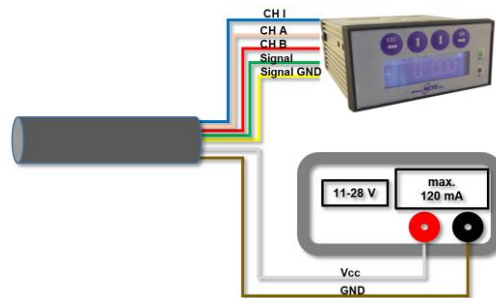
7 Wiring diagram



Connector
Power supply and
outputs

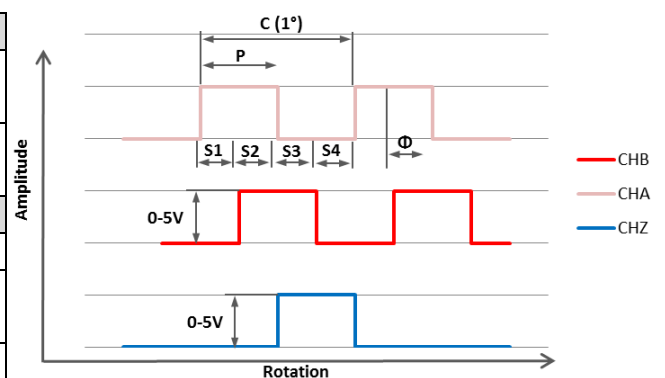
Type	Binder Plug Series 423/723/425 IP67 (Colour coding acc. to DIN 47100)		
Pin	Colour	Description	Value
A	White	Supply voltage V_{CC}	11V ... 28V
B	Brown	Ground GND	-
C	Green	Analog Out	0V ... 10V
D	Yellow	Analog GND	-
E	Grey	Analog Out	4mA ... 20mA
F	Pink	Angle Ch A	0V ... 5V
G	Blue	Angle Ch Z	0V ... 5V
H	Red	Angle Ch B	0V ... 5V
J	Black	-	-
K	Purple	For internal use only	RX (TTL Pegel)
L	Grey-Pink	For internal use only	RX (TTL Pegel)
M	Red-Blue	Digital GND	-

8 Sensor wiring



9 Angle sensor

Parameter	Min.	Typ.	Max.	Einheit
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 neighbouring transition in Channel B.			
Φ	The number of electrical degrees between the centre of high state of Channel A and the Centre of high state of Channel B.			





10 Order options

Series 4000 accuracy 0.1 %	
Measuring range [Nm]	
50	including 5m cable and calibration certificate
100	including 5m cable and calibration certificate
250	including 5m cable and calibration certificate
1000	including 5m cable and calibration certificate
Angle sensor	
0	Without angle sensor
1	Angle sensor 360 CPR
Analog output	
A	Voltage output 0-10V
S	Current output 4-20mA
Shaft ends	
0	Round shaft with keystone
1	Square shaft (available with 50/250/1000 Nm)
Protection class according to EN 60529	
0	IP50
3000	100
1	A
0	0
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.

11 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
Couplings		
		
Coupling Type	Used for	D2 max.
KB4C/60-67-15-D2	3000/4000 – D 15	32
KB4C/150-78-15-D2	3000/4000 – D15	42
KB4C/300-94-25-D2	3000/4000 – D25	60
KB4C/500-100-25-D2	3000/4000 – D25	70
KB4/1400-168-40-D2	3000/4000 – D40	80
KB4C/300-94-19-D2	3000/4000 – D40	85

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

