

## Torque Sensor, rotating Series 86-2212

These sensors have a contactless and digital signal transmission from rotor to stator, which means no signal falsification and maintenance-free



86-2212

### **86-2212-xxxx, 86-2212R-xxxx**

Nominal torque from 0.1 Nm ... 20000 Nm  
Accuracy class optional 0.05%  
Active output  $\pm 5$  V (opt.  $\pm 10$  V)  
Speed up to  $15000 \text{ min}^{-1}$   
Integrated speed/angle measurement optional  
Very short axial length  
High torsional stiffness  
Reliable and durable  
Simple handling and assembly  
Special version on request

### **86-2512-xxxx      86-2512R-xxxx**

Nominal torque from 0.1 Nm ... 20000 Nm  
Accuracy class optional 0.05%  
Digital output RS485  
Speed up to  $15000 \text{ min}^{-1}$   
Integrated speed/angle measurement optional  
Very short axial length  
High torsional stiffness  
Reliable and durable  
Simple handling and assembly  
Special version on request  
Auto identification of: measuring range, serial number, date of calibration

## Technical Data

### Model 86-2212, 86-2512

Order code	Article No. 86-2212	Nominal Torque [Nm]	Limit Speed [min <sup>-1</sup> ]	Springrate [N·m/rad]	Mass moment of inertia		Limit Thrust Load [N]	Limit Shear Force [N]
					[kg·m <sup>2</sup> ] <sup>1</sup>			
					Drive side	Test side		
86-2212-4100	103819	0,1	15000	1,80E+01	1,90E-06	2,80E-07	30	0,9
86-2212-4200	103820	0,2	15000	1,80E+01	1,90E-06	2,80E-07	30	1,2
86-2212-4500	102921	0,5	15000	1,20E+02	1,90E-06	2,80E-07	30	2,9
86-2212-5001	102866	1	15000	1,20E+02	2,00E-06	2,80E-07	30	2,9
86-2212-5002	102437	2	12000	4,40E+02	1,00E-05	8,10E-06	62	8,5
86-2212-5005	102922	5	12000	4,40E+02	1,00E-05	8,10E-06	62	8,5
86-2212-5010	102794	10	12000	1,70E+03	1,00E-05	8,20E-06	62	28
86-2212-5020	102909	20	12000	4,50E+03	1,20E-05	9,90E-06	62	43
86-2212-5030	104212	30	12000	4,50E+03	1,20E-05	9,90E-06	62	65
86-2212-5050	102457	50	12000	8,50E+03	1,30E-05	1,20E-05	62	64
86-2212-5100	102836	100	12000	8,40E+03	1,30E-05	1,20E-05	62	64
86-2212-5200	103337	200	7000	9,20E+04	1,30E-03	8,00E-04	760	350
86-2212-5500	103602	500	7000	9,20E+04	1,30E-03	8,00E-04	760	420
86-2212-6001	103822	1000	7000	3,10E+05	1,60E-03	1,10E-03	760	800
86-2212-6002	103821	2000	5500	7,20E+05	5,30E-03	4,30E-03	1100	860
86-2212-6005	103709	5000	5500	8,00E+05	5,40E-03	4,30E-03	1100	860
86-2212-6010	105485	10000	3500	3,10E+06	4,00E-02	3,70E-02	2800	2300
86-2212-6020	105486	20000	3500	3,70E+06	4,00E-02	3,80E-02	2800	2300

### Model 86-2212R, 86-2512R

Order code	Article No. 86-2212R	Nominal Torque [Nm]	Limit Speed [min <sup>-1</sup> ]	Springrate [N·m/rad]	Mass moment of inertia		Limit Thrust Load [N]	Limit Shear Force [N]
					[kg·m <sup>2</sup> ] <sup>1</sup>			
					Drive side	Test side		
86-2212R-4100	108693	0,1	15000	1,80E+01	1,90E-06	2,80E-07	30	0,9
86-2212R-4200	108694	0,2	15000	1,80E+01	1,90E-06	2,80E-07	30	1,2
86-2212R-4500	108695	0,5	15000	1,20E+02	1,90E-06	2,80E-07	30	2,9
86-2212R-5001	108696	1	15000	1,20E+02	2,00E-06	2,80E-07	30	2,9
86-2212R-5002	108697	2	12000	4,40E+02	1,00E-05	8,10E-06	62	8,5
86-2212R-5005	108698	5	12000	4,40E+02	1,00E-05	8,10E-06	62	8,5
86-2212R-5010	108699	10	12000	1,70E+03	1,00E-05	8,20E-06	62	28
86-2212R-5020	108701	20	12000	4,50E+03	1,20E-05	9,90E-06	62	43
86-2212R-5050	108702	50	12000	8,50E+03	1,30E-05	1,20E-05	62	64
86-2212R-5100	108703	100	12000	8,40E+03	1,30E-05	1,20E-05	62	160
86-2212R-5200	108704	200	7000	9,20E+04	1,30E-03	8,00E-04	760	350
86-2212R-5500	108705	500	7000	9,20E+04	1,30E-03	8,00E-04	760	420
86-2212R-6001	108706	1000	7000	3,10E+05	1,60E-03	1,10E-03	760	800

[1] Without option speed/angle measurement

## Technical Data

	86-2212 (86-2212R)	86-2512 (86-2512R)
Accuracy class	0,1 (0,2) % f. s.	0,1 (0,2) % f. s.
Repeatability (DIN 1319)	±0,02 (±0,04) %	±0,02 (±0,04) %
Excitation voltage	12 ... 28 VDC	12...28 VDC
Current consumption	max. 60 mA	max. 60 mA
Output signal	±5 V	±25000 digits per Software
Control signal excitation	L <2,0; H >3,5 V	
Sample rate	10 kSample	5 kSample
Reference temperature	23 °C	23 °C
Nominal temperature range	5 ... 45 °C	5 ... 45 °C
Service temperature range	0 ... 60 °C	0 ... 60 °C
Storage temperature range	-10 ... 70 °C	-10 ... 70 °C
Temp. coeff. of sensitivity	±0,01 (±0,015) % f. s.	±0,01 (±0,015) % f. s.
Temp. coeff. of zero signal	±0,02 (±0,03) % f. s.	±0,02 (±0,03) % f. s.
Service torque (static)	150 % f. s.	150 % f. s.
Limit torque (static)	200 % f. s.	200 % f. s.
Ultimate torque (static)	>300 % f. s.	>300 % f. s.
Bandwidth (DIN 50100)	70 (peak - peak) %	70 (peak - peak) %
Level of protection (DIN EN 60529)	IP50	IP50
Electrical connection	12-pin series 581 <sup>[2]</sup>	12-pin series 581 <sup>[2]</sup>

## Pin Connection Model 86-2212, 86-2212R

### 12pin

Pin	Signal	Level
Pin A	NC	-
Pin B	Opt. Signal angle B	5 V TTL
Pin C	Signal (+)	±5 V (±10V)
Pin D	Signal (GND)	0 V
Pin E	Excitation (GND)	0 V
Pin F	Supply (+)	12 ... 28 VDC
Pin G	Opt. Signal angle A	5 V TTL
Pin H	NC	-
Pin J	NC	-
Pin K	Control signal	L <2,0 V; H >3,5 V
Pin L	NC	-
Pin M	Shield	

## Pin Connection

### Model 86-2512, 86-2512R

#### 12pin

Pin	Signal	Level
Pin A	NC	-
Pin B	Opt. signal angle B	5 V TTL
Pin C	NC	-
Pin D	NC	-
Pin E	Supply (GND)	0 V
Pin F	Supply (+)	12 ... 28 VDC
Pin G	Opt. signal angle A	5 V TTL
Pin H	NC	-
Pin J	RS485	RS485 (B)
Pin K	NC	-
Pin L	RS485	RS485 (A)
Pin M	Shield	

## Option/Accessories

### Article No. Description

101695	Accuracy class 0,05 % f. s.
103562	Output signal ±10 V
101560	Speed/angle measurement, 2 x 360 impulses, 90° displaced, 5 V TTL
104097 <sup>[3]</sup>	Speed measurement, 1 x 60 impulses, 5 V TTL
41382	Female cable connector 12-pin series 581
45598	Female angled connector 12-pin series 682
10270	Connection cable, 3 m, 12-pin series 581, free soldered ends
10345	Connection cable angled, 3 m, 12-pin series 682, free soldered ends
on request	Feather key groove according DIN 6885

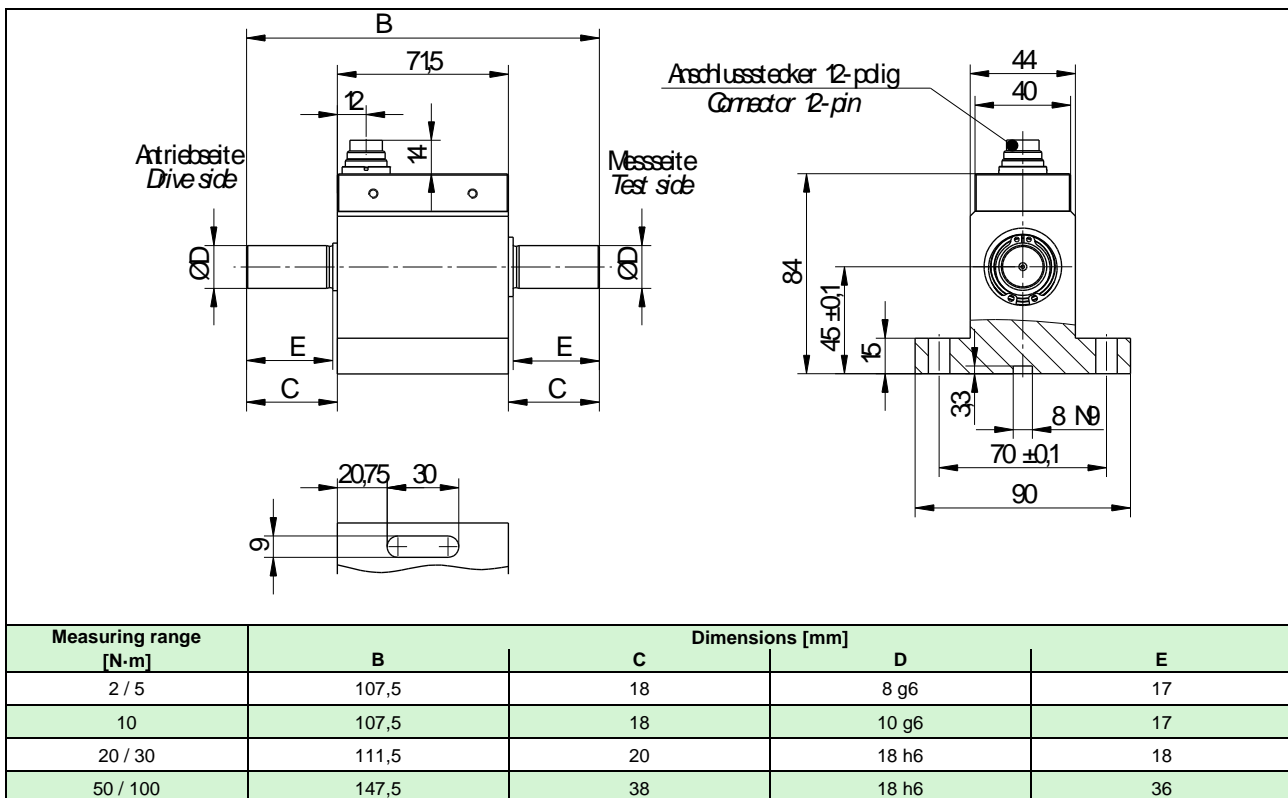
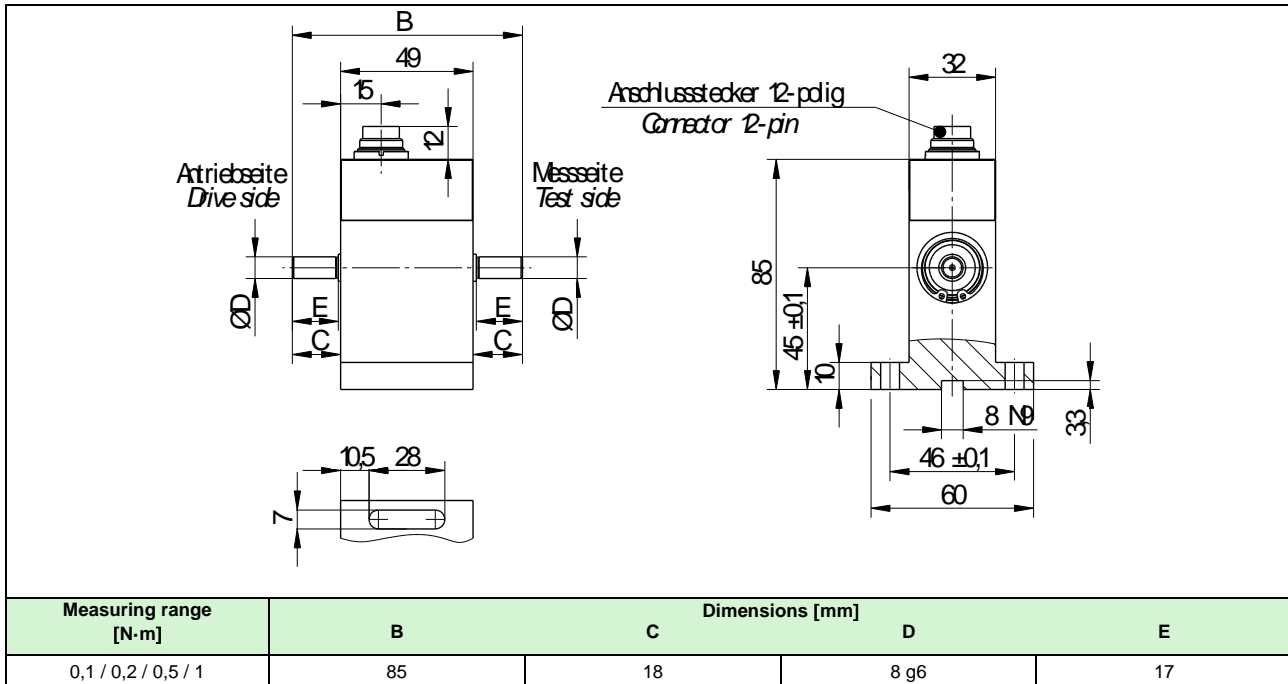
## Option Calibrations

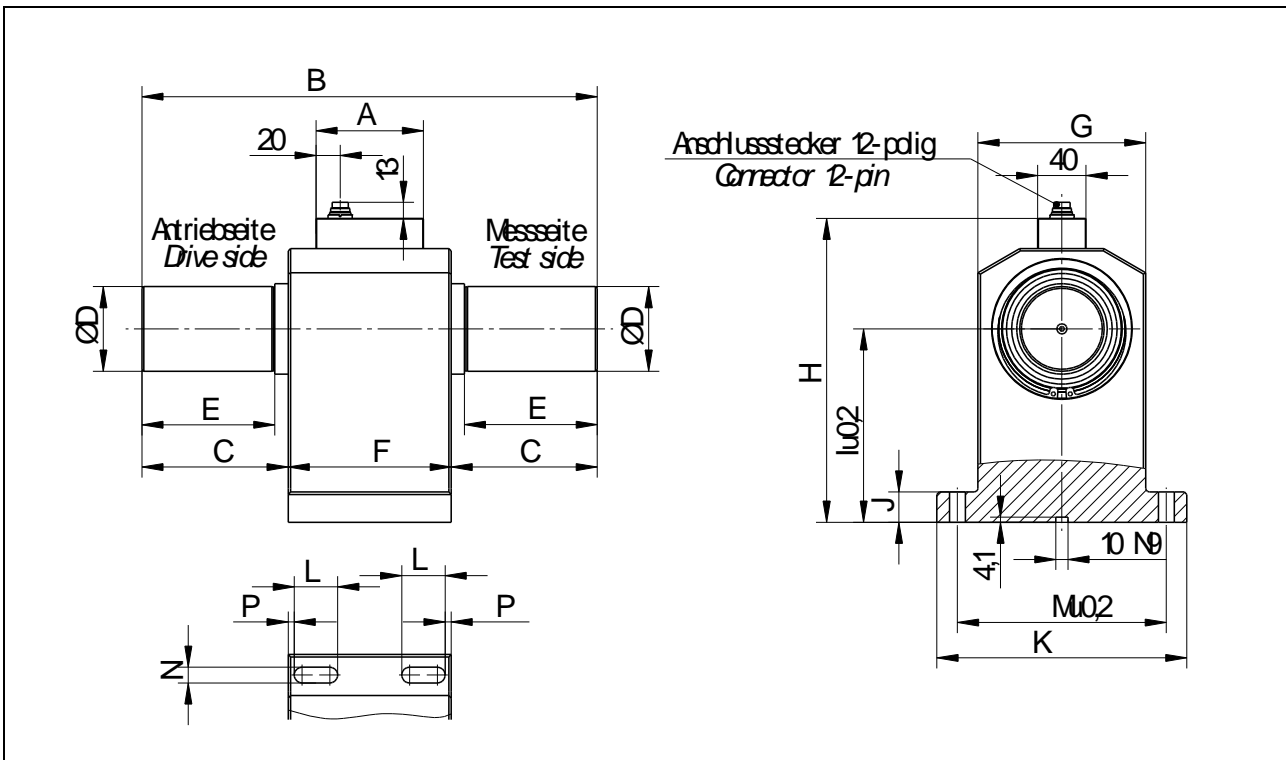
Article No.	Description	Steps	Norm
400676	Linearity diagram	25%	Factory standard
400664	Linearity diagram	10%	
400961	Proprietary calibration	3	
400700	Proprietary calibration	5	VDI/VDE 2646
400688	Proprietary calibration	8	
	DAkKS-Calibration		on request

[2]female cable connector in scope of delivery at first delivery

[3]Measuring ranges ≥2000 N·m

## Mechanical Dimensions





Measuring range [N·m]	Dimensions [mm]														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P
200 / 500	89	217	43,5	32 h6	38	130	115	190,4	112	20	175	30	145	11	5
1000	89	262	66	50 h7	58	130	115	190,4	112	20	175	30	145	11	5
2000 / 5000	89	377	121	70 h7	110	135	139	251,5	160	25	207	36	173	13	5
10000 / 20000	89	470	140	110 h7	120	190	210	343	215	40	300	45	260	17	15

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