

## Rotating Torque Sensors: DR-2412/DR-2412-P and DR-2412-R/DR-2412-R-P (contactless) with Nominal Torque from 0.1 ... 20000 N·m



*This sensor has a contactless and digital signal transmission from rotor to stator without signal falsification of the measurement data. It is therefore highly accurate and maintenance-free.*

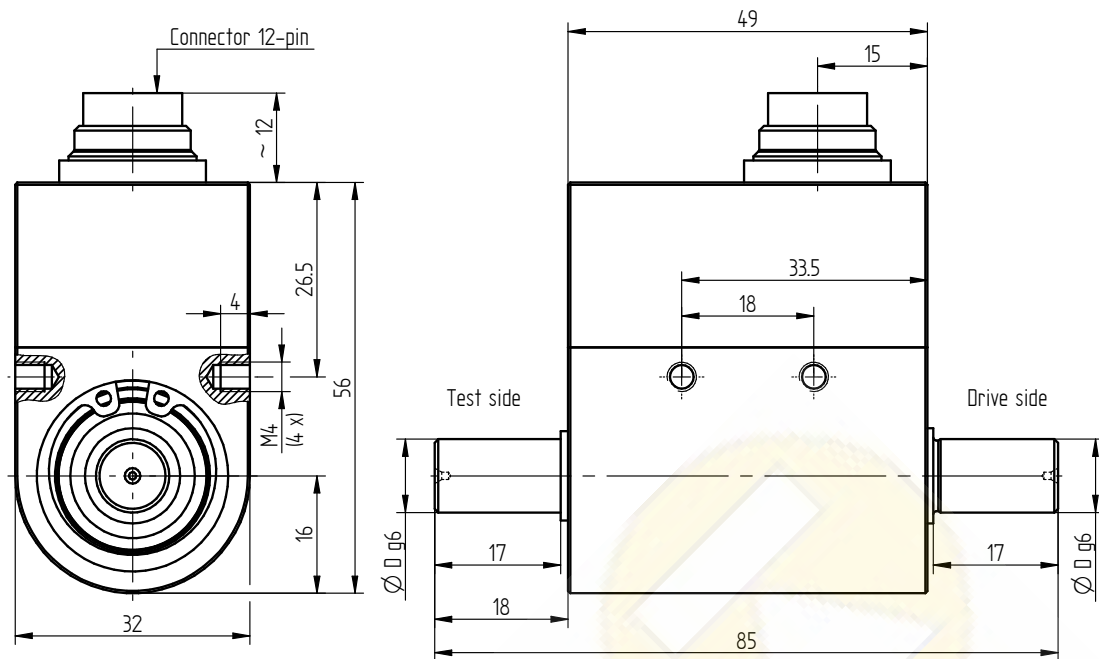
### Performance Features

- Torque sensor for e.g. test bench applications
- Accuracy class 0.05%, optional
- Digital output RS485
- Integrated speed/angle measurement, optional
- Speed up to 15000 min<sup>-1</sup>
- Very short axial length
- High torsional stiffness
- Simple handling and assembly
- Auto identification of measuring range, serial number, calibration date
- Special versions on request

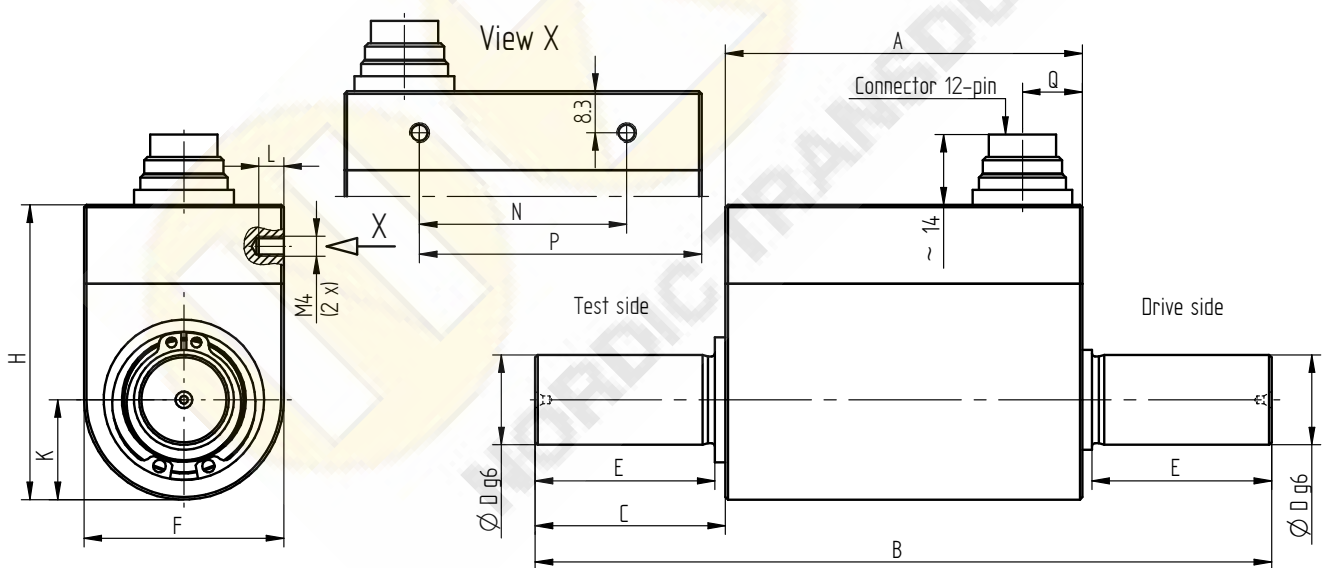
### Application

- Research and development
- Process measuring and control technology
- Fully automated machining centres
- Measuring and control devices
- Tool engineering
- Special mechanical engineering

## Dimensions of DR-2412/DR-2412-P and DR-2412-R/DR-2412-R-P in mm

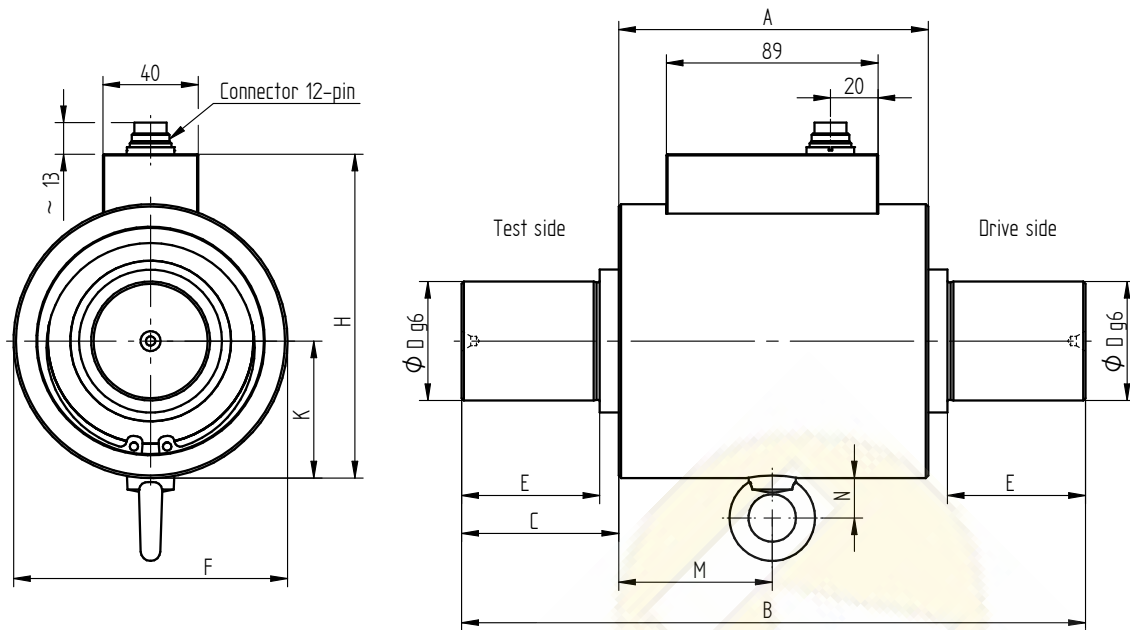


Nominal Torque [N·m]	Dimensions [mm]		Weight [kg]
	ØD		
0.1/0.2/0.5/1/2/5	8		0.2
10	10		0.2



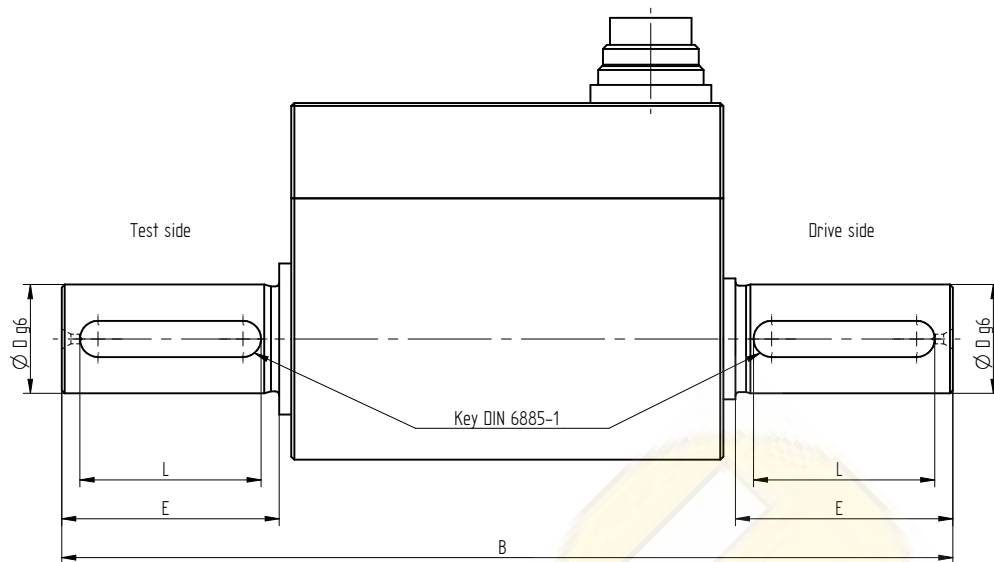
Nominal Torque [N·m]	Dimensions [mm]												Weight [kg]
	A	B	C	ØD	E	F	H	K	L	N	P	Q	
20/30	71.5	111.5	20	18	18	40	59	20	5	41.5	56.5	12	0.5
50/100	71.5	147.5	38	18	36	40	59	20	5	41.5	56.5	12	0.6
200/500	72.5	159.5	43.5	32	38	58	76	29	6	29.5	51.5	15	1.5

## Dimensions of DR-2412/DR-2412-P and DR-2412-R/DR-2412-R-P in mm



Nominal Torque [N·m]	Dimensions [mm]										Weight [kg]
	A	B	C	ØD	E	ØF	H	K	M	N	
1000	130	262	66	50	58	115	136	57.5	64.5	~17	7.2
2000/5000	135	377	121	70	110	139	161	69.5	67.5	~17	15.5
10000/20000	190	470	140	110	120	210	233	105	95	~17	47.5

## Dimensions of Version with Feather Keys in mm



Nominal Torque [N·m]	Dimensions [mm]					Weight [kg]
	B	ØD	E	L	Feather Key <sup>1</sup>	
0.1/0.2/0.5/1/2/5	85	8	17	14	2 x 2 x 14	0.2
10	85	10	17	14	3 x 3 x 14	0.2
20/30	111.5	18	18	14	6 x 6 x 14	0.5
50/100	147.5	18	36	30	6 x 6 x 30	0.6
200/500	159.5	32	38	36	10 x 8 x 36	1.5
1000	262	50	58	50	14 x 9 x 50	7.2
2000/5000	377	70	110	100	20 x 12 x 100	15.5
10000 / 20000	570	110	170	160	28 x 16 x 160	47.5

## Connection Assignment

12-pin	DR-2412/DR-2412-P and DR-2412-R/DR-2412-R-P	Series 581
Pin A	NC	-
Pin B	NC	-
Pin C	NC	-
Pin D	NC	-
Pin E	Supply (GND)	0V
Pin F	Supply (+)	12 ... 28VDC
Pin G	Speed measurement (option) <sup>2</sup>	5V TTL
Pin H	NC	-
Pin J	RS485	RS485 (B)
Pin K	NC	-
Pin L	RS485	RS485 (A)
Pin M	Shield	-

<sup>1</sup> Calculated load type for feather key: single side light shocks

<sup>2</sup> Nominal torque  $\geq 2000$  N·m

## Technical Data acc. to VDI/VDE/DKD 2639

Torque Sensor		DR-2412/DR-2412-P	DR-2412-R/DR-2412-R-P
Nominal torque $M_{nom}$	N·m	0.1 ... 20000	0.1 ... 1000
Accuracy class	% $M_{nom}$	0.1 (optional 0.05)	0.2
Relative repeatability error in unchanged mounting position $b'$	% $M_{nom}$	±0.02	±0.04
Rated range of supply voltage	VDC	12 ... 28	
Current consumption	mA	≤60	
Output signal	digits	±25000	
Control signal excitation		per software	
Sample rate	kSample/s	5	
Electrical connection		12-pin series 581 <sup>3</sup>	
Reference temperature $T_{ref}$	°C	23	
Rated temperature range	°C	5 ... 45	
Operating temperature range	°C	0 ... 60	
Storage temperature range	°C	-10 ... 70	
Temperature effect on zero signal $TK_0$	% $M_{nom}/10 K$	±0.2	±0.3
Temperature effect on characteristic value $TK_C$	% $M_{nom}/10 K$	±0.1	±0.15
Maximum operating torque $M_G$ (static)	% $M_{nom}$	150	
Torque limit $M_{max}$ (static)	% $M_{nom}$	200	
Breaking torque $M_B$ (static)	% $M_{nom}$	>300	
Permissible oscillation stress when subjected to torque $M_{df}$	% $M_{nom}$	70 (peak-to-peak)	
Level of protection		IP50	

Article-No. DR-2412	Article-No. DR-2412-P <sup>4</sup>	Nominal Torque [N·m]	Limit Speed [min <sup>-1</sup> ]	Springrate [N·m/rad]	Mass Moment of Inertia [kg·m <sup>2</sup> ] <sup>5</sup>		Axial Force Limit [N] <sup>6</sup>	Lateral Force Limit [N] <sup>6</sup>
					Drive Side	Test Side		
104139	115384	0.1	15000	1.8E+01	1.9E-06	2.8E-07	42	0.9
104140	115387	0.2	15000	1.8E+01	1.9E-06	2.8E-07	58	1.2
104141	115388	0.5	15000	1.2E+02	1.9E-06	2.8E-07	172	1.9
104142	115393	1	15000	1.2E+02	1.9E-06	2.8E-07	227	2.9
104143	115394	2	15000	3.6E+02	1.9E-06	2.9E-07	348	5.5
104144	115395	5	15000	4.0E+02	1.9E-06	2.9E-07	650	14
104145	115397	10	15000	9.3E+02	2.1E-06	3.8E-07	1000	26
104147	115419	20	15000	4.5E+03	1.2E-05	9.9E-06	1680	43
104148	115420	30	15000	4.5E+03	1.2E-05	9.9E-06	2200	65
104149	115427	50	15000	8.5E+03	1.3E-05	1.2E-05	3100	80
104150	115426	100	12000	8.5E+03	1.3E-05	1.2E-05	4800	160
104151	115425	200	10000	6.7E+04	1.0E-04	9.0E-05	8000	290
104152	114155	500	10000	7.1E+04	1.0E-04	9.0E-05	14000	700
104153	115428	1000	8000	3.1E+05	1.6E-03	1.1E-03	23000	900
104154	115480	2000	5500	7.2E+05	5.3E-03	4.3E-03	33000	1200
104155	115481	5000	5500	8.0E+05	5.4E-03	4.3E-03	57000	2800
105871	115482	10000	5000	3.1E+06	4.0E-02	3.7E-02	90000	4400
105872	115483	20000	5000	3.7E+06	4.0E-02	3.8E-02	130000	8200

<sup>3</sup> Female cable connector in scope of delivery at first delivery

<sup>4</sup> Version „-P“ feather key

<sup>5</sup> Without option speed/angle measurement

<sup>6</sup> Unsupported shaft

## Technical Data acc. to VDI/VDE/DKD 2639 (continued)

Article-No. DR-2412-R <sup>7</sup>	Article-No. DR-2412-R-P <sup>4</sup>	Nominal Torque [N·m]	Limit Speed [min <sup>-1</sup> ]	Springrate [N·m/rad]	Mass Moment of Inertia [kg·m <sup>2</sup> ] <sup>5</sup>		Axial Force Limit [N] <sup>6</sup>	Lateral Force Limit [N] <sup>6</sup>
					Drive Side	Test Side		
108708	115303	0.1	15000	1.8E+01	1.9E-06	2.8E-07	42	0.9
108709	115307	0.2	15000	1.8E+01	1.9E-06	2.8E-07	58	1.2
108710	115306	0.5	15000	1.2E+02	1.9E-06	2.8E-07	172	1.9
108711	115308	1	15000	1.2E+02	1.9E-06	2.8E-07	227	2.9
108712	115309	2	15000	3.6E+02	1.9E-06	2.9E-07	348	5.5
108713	115310	5	15000	4.0E+02	1.9E-06	2.9E-07	650	14
108714	115311	10	15000	9.3E+02	2.1E-06	3.8E-07	1000	26
108716	115305	20	15000	4.5E+03	1.2E-05	9.9E-06	1680	43
108717	115312	30	15000	4.5E+03	1.2E-05	9.9E-06	2200	65
108718	115313	50	15000	8.5E+03	1.3E-05	1.2E-05	3100	80
108719	114722	100	12000	8.5E+03	1.3E-05	1.2E-05	4800	160
108720	115304	200	10000	6.7E+04	1.0E-04	9.0E-05	8000	290
108721	112568	500	10000	7.1E+04	1.0E-04	9.0E-05	14000	700
108722	115302	1000	8000	3.1E+05	1.6E-03	1.1E-03	23000	900

## Options

Article-No.	Description	
101695	Accuracy class	0.05 % M <sub>nom</sub>
115391	Speed/angle measurement, RS485	
	Speed resolution	1 min <sup>-1</sup>
	Speed accuracy	1 % full scale ±1 digit
	Angle of rotation resolution	0.25 degree
	Output signal speed / angle of rotation	±32511 digits
104097 <sup>8</sup>	Speed measurement, 1x60 impulses	5V TTL

## Calibrations

Article-No.	Description	
400676	Linearity diagram in accordance to factory standard	25 % steps
400664	Linearity diagram in accordance to factory standard	10% steps
400961	Proprietary calibration acc. to VDI/VDE 2646	3 steps
400700	Proprietary calibration acc. to VDI/VDE 2646	5 steps
400688	Proprietary calibration acc. to VDI/VDE 2646	8 steps
401023	Proprietary calibration for the angle of rotation acc. to VDI/VDE 2648-1	
	DAkKS-Calibration/Standard on request	

<sup>4</sup> Version „-P“ feather key

<sup>5</sup> Without option speed/angle measurement

<sup>6</sup> Unsupported shaft

<sup>7</sup> Version „-R“ accuracy class 0.2% M<sub>nom</sub>

<sup>8</sup> Nominal torque ≥2000 N·m



## Accessories

### Electrical Connection

Article-No.	Description
41382	Female cable connector 12-pin series 581
45598	Female angled connector 12-pin series 682
10270	Connection cable, 3 m, with 12-pin female cable connector series 581 and free strands
10345	Connection cable angled, 3 m, with 12-pin female angled connector series 682 and free strands

