

DATA SHEET

# KMR+ Force transducers

## SPECIAL FEATURES

- Drift-free load washers
- Nominal (rated) forces 20 kN ... 2 MN
- Degree of protection IP68
- Good reproducibility
- Can be configured with a plug assembly and various cable lengths upon request
- Hardened and ground load application disks included in the scope of supply

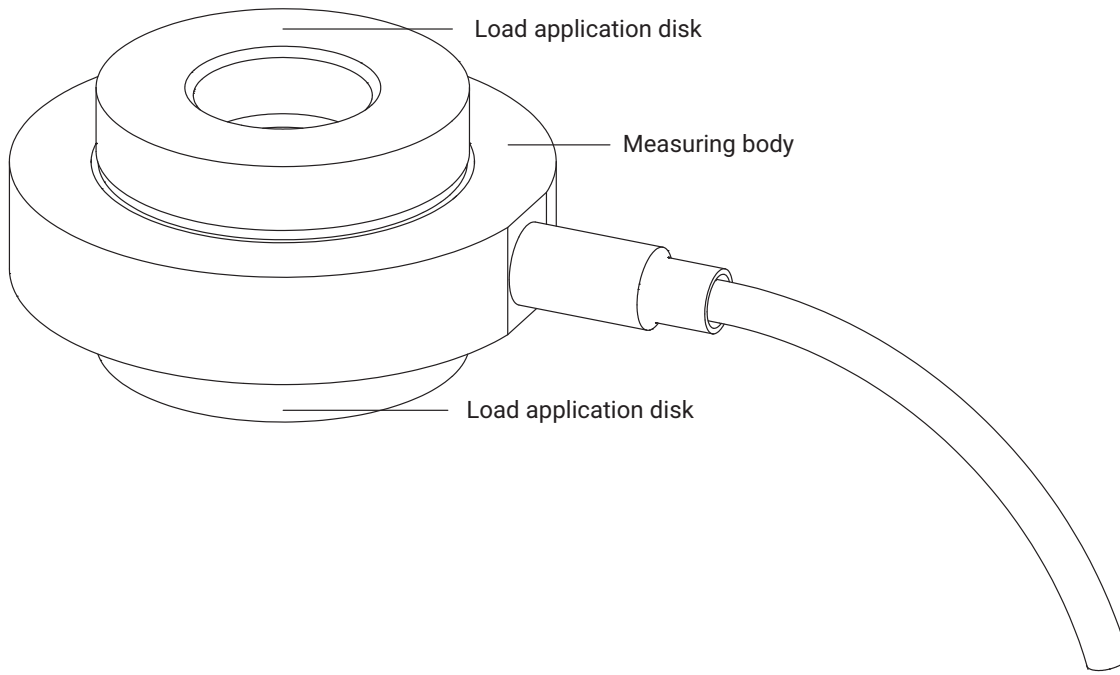


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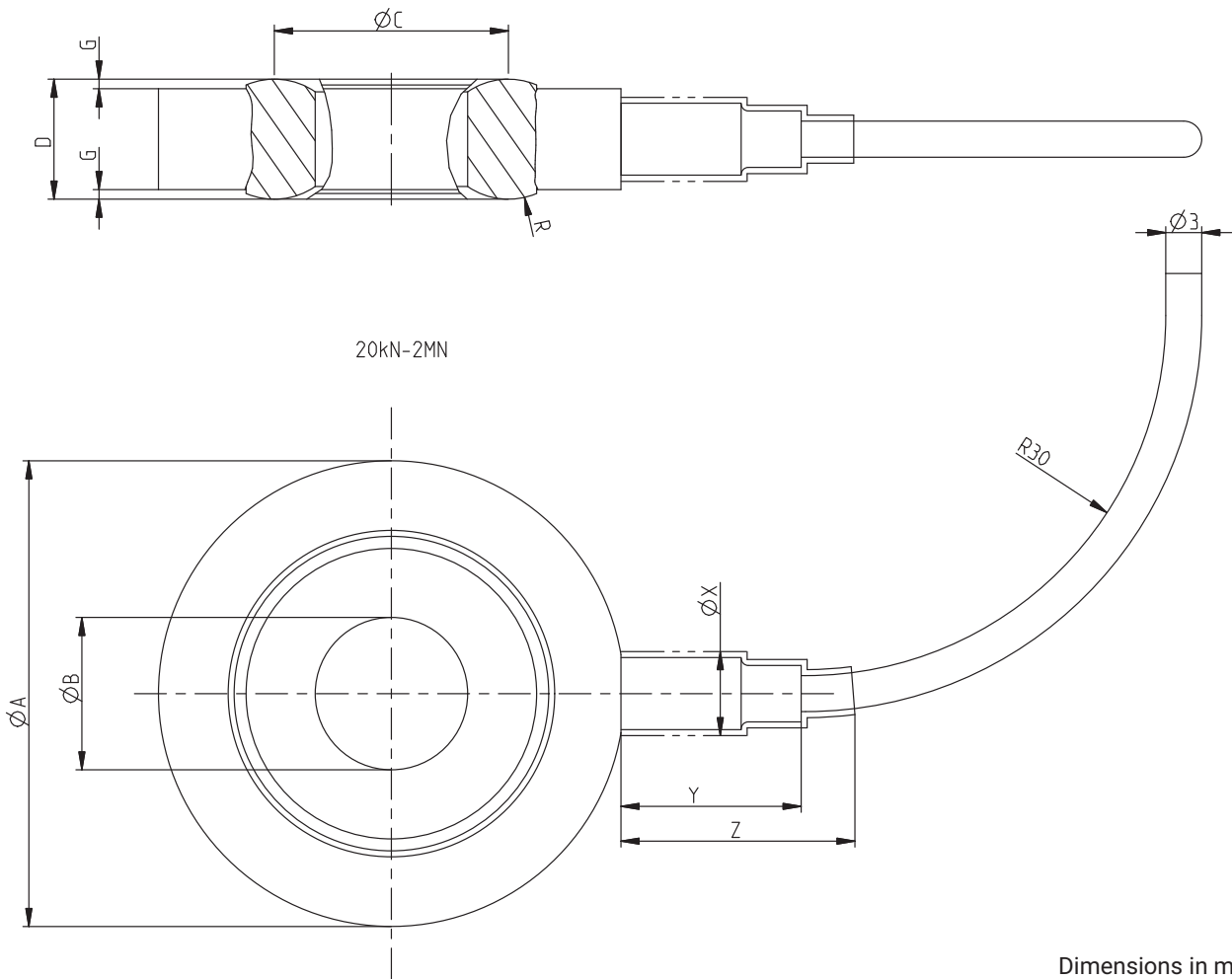
## KMR+ PRINCIPLE

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## DIMENSIONS

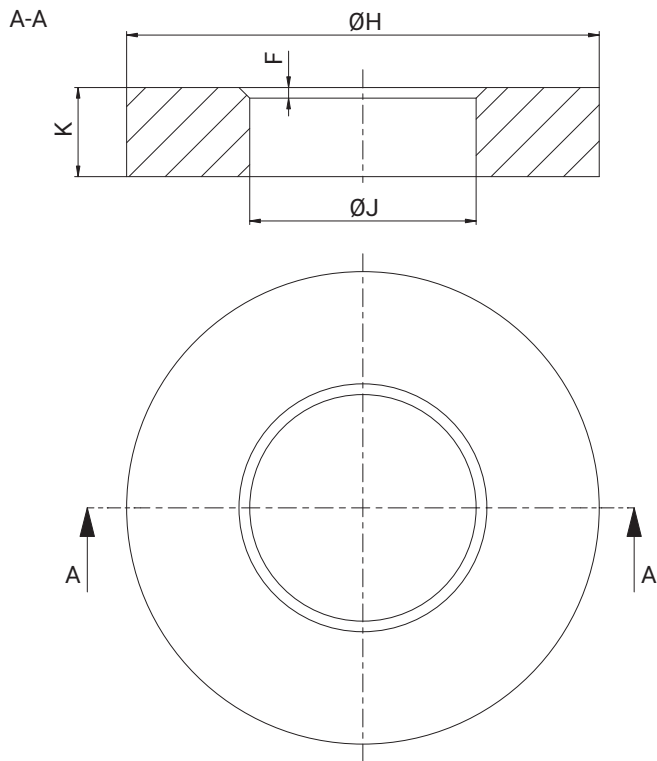
### KMR+ dimensions



Dimensions in mm

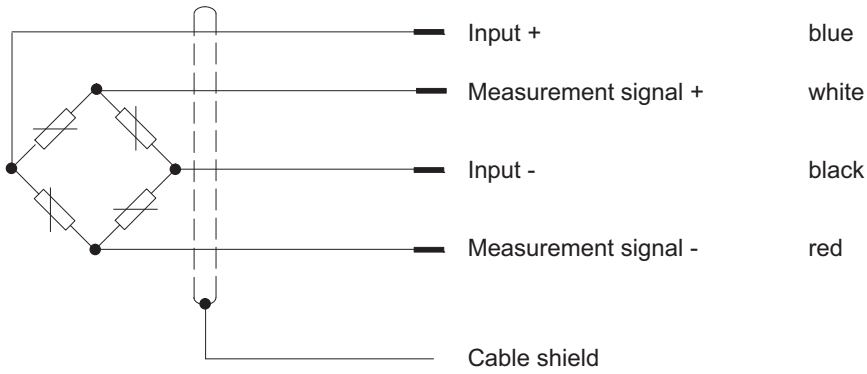
Nominal (rated) force	$\text{ØA}_{-0.2}$	$\text{ØB}_{+0.1}$	C	D	G	R	$\text{ØX}_{\pm 0.5}$	Y	Z	Screws
20 kN	19.9	6.5	9.05	8.5	0.65	5	6.7	15	30	M6; 1/4"
40 kN	23.6	8.0	10.84	8.5	0.65	8	6.7	15	30	M8; 5/16"
60 kN	26.9	10.0	13.82	8.5	0.65	12	6.7	15	30	M10; 3/8"
100 kN	38.8	12.7	19.50	10.0	0.80	6	6.7	15	30	M12; 1/2"
200 kN	48.0	16.0	27.35	10.0	0.80	16	6.7	15	30	M16; 5/8"
300 kN	56.3	21.0	35.20	10.5	1.05	18	6.7	15	30	M20; 3/4"
400 kN	60.6	25.0	38.20	12.5	2.05	20	6.7	15	30	M24; 1"
500 kN	66.6	28.0	42.80	14.5	0.80	22	6.7	15	30	M27; 1 1/8"
600 kN	72.1	31.0	46.90	16.5	1.30	24	6.7	15	30	M30; 1 1/4"
1 MN	87.1	37.0	57.85	24.5	1.30	40	6.7	15	30	M36; 1 1/2"
2 MN	120.8	43.0	73.80	44.5	1.60	80	6.7	15	30	M42; 1 5/8"

## Dimensions load application disks



Nominal (rated) force	$\varnothing H_{-0.1}$	$\varnothing J_{+0.1}$	K	Fx45°
20 kN	17.0	6.5	3.0	0.25
40 kN	21.0	8.0	3.0	0.40
60 kN	24.0	10.0	4.0	0.40
100 kN	26.5	12.7	5.0	0.60
200 kN	34.0	16.0	6.0	0.60
300 kN	42.0	21.0	6.0	1.50
400 kN	46.0	25.0	8.0	1.50
500 kN	55.0	28.0	10.9	1.10
600 kN	60.0	31.0	12.4	1.10
1 MN	75.0	37.0	18.4	1.10
2 MN	100.0	43.0	33.4	1.20

## ELECTRICAL CONNECTION



## SPECIFICATIONS AS PER VDI/VDE 2638

Nominal (rated) force	$F_{nom}$	kN	20	40	60	100	200	300	400	500	600		
			MN										1
<b>Accuracy</b>													
HBK accuracy class			1.5										
Relative reproducibility and repeatability errors with unchanging mounting position	$b_{rg}$	%	1.0										
Rel. reversibility error	$v_{0.5}$	%	1.5										
Linearity deviation <sup>1))</sup>	$d_{lin}$	%	1.5										
Relative creep (30 min)	$d_{crf}$	%	0.5										
Temperature coefficient of sensitivity	$TC_S$	%/10 K	0.5										
Temperature coefficient of zero signal	$TC_0$	%/10 K	0.5										
<b>Rated electrical output</b>													
Rated output (nominal)	$C_{nom}$	mV/V	2										
Sensitivity error	$d_C$	%	15										
Relative zero signal error	$d_{s,0}$	mV/V	0.2										
Input resistance	$R_e$	$\Omega$	310 ... 410				620 ... 800						
Output resistance	$R_a$	$\Omega$	310 ... 370				620 ... 720						
Insulation resistance	$R_{is}$	$\Omega$	$> 10^9$										
Operating range of the excitation voltage	$B_{U,G}$	V	0.5 ... 12										
Reference excitation voltage	$U_{ref}$	V	5										
Connection												4-wire circuit	
<b>Temperature</b>													
Reference temperature	$t_{ref}$	$^{\circ}C$	23										
Nominal (rated) temperature range	$B_{T,nom}$	$^{\circ}C$	-30...70										
Operating temperature range	$B_{T,G}$	$^{\circ}C$	-30...85										
Storage temperature range	$B_{T,S}$	$^{\circ}C$	-30...85										

Nominal (rated) force	F <sub>nom</sub>	kN	20	40	60	100	200	300	400	500	600		
		MN											1
<b>Characteristic mechanical quantities</b>													
Maximum operating force	F <sub>G</sub>	% of F <sub>nom</sub>	125				150				160	180	
Force limit	F <sub>L</sub>	% of F <sub>nom</sub>	125				150				160	180	
Breaking force	F <sub>B</sub>	% of F <sub>nom</sub>	> 300				> 400						
Static lateral limit force <sup>2))</sup> (when loaded with nominal (rated) force)	F <sub>Q</sub>	% of F <sub>nom</sub>	12										
Permissible eccentricity (when loaded with nominal (rated) force)	e <sub>g</sub>	mm	1.6	2.0	3.4	1.5	4.6	4.4	5.2	5.5	6.3	9.9	12.8
Permissible eccentricity (when loaded with 50% of the nominal (rated) force)	e <sub>g</sub>	mm	3.4	4.3	5.3	7.3	10.3	12.4	14.3	16.1	17.6	21.7	27.7
Permissible torque (when loaded with nominal (rated) force)	M <sub>G</sub>	Nm	33	75	169	194	975	1425	2250	3000	3750	8250	20250
Nominal (rated) displacement ±15%	S <sub>nom</sub>	µm	19.0	23.9	24.2	32.0	35.1	41.5	49.8	56.8	60.4	85.8	140.8
Stiffness	c	kN / µm	1.1	1.7	2.5	3.1	5.7	7.2	8.0	8.8	9.9	11.6	14.2
Fundamental frequency	f <sub>G</sub>	kHz	48.1	51.7	54.9	42.6	44.1	41.3	38.1	33.2	30.5	21.6	12.6
Permissible oscillation stress	F <sub>rb</sub>	% of F <sub>nom</sub>	85										
<b>General information</b>													
Weight (without cable)	g		12	16	21	43	74	108	140	202	270	633	2275
Cable lengths	m		1.5 (Standard) / 3.0 / 5.0 / 6.0 / 7.0 / 12.0										
Degree of protection in accordance with DIN EN 60529 <sup>3))</sup>			IP68										
Measuring body/casing material			Stainless steel										
Cable			4-wire, PUR insulation, shielded										

- 1) With an initial load of 30 % of the nominal (rated) force when installed  
2) The maximum lateral force is limited by the coefficient of friction (0.12)  
3) Testing condition: 1 meter water pressure, 100 hours

## VERSIONS AND ORDERING NUMBERS

Nominal (rated) force	Ordering number	
20 kN	1-KMR+/20KN	<p>All ordering numbers shown in gray are preferred types. They can be delivered rapidly.</p> <p>All preferred types are delivered with 1.5 m cable and open cable ends</p> <p>The ordering number of the preferred type is 1-KMR+/.....</p> <p>The ordering number of the customized sensors is K-KMR+.....</p> <p>The ordering number example <b>K-KMR+-500K-07M0-F</b> shown below is a: KMR+, with a nominal (rated) force of 500 kN, cable length of 7 m and with a mounted D-sub plug.</p>
40 kN	1-KMR+/40KN	
60 kN	1-KMR+/60KN	
100 kN	1-KMR+/100KN	
200 kN	1-KMR+/200KN	
300 kN	1-KMR+/300KN	
400 kN	1-KMR+/400KN	
500 kN	1-KMR+/500KN	
600 kN	1-KMR+/600KN	
1 MN	1-KMR+/1MN	
2 MN	1-KMR+/2MN	

Nominal (rated) force	Cable length	Plug version
20 kN <b>20K0</b>	1.5 m <b>01M5</b>	Free ends <b>Y</b>
40 kN <b>40K0</b>	3 m <b>03M0</b>	15-pin SUB-D connector <b>F</b>
60 kN <b>60K0</b>	5 m <b>05M0</b>	Male connector MS3106PEMV <b>N</b>
100 kN <b>100K</b>	6 m <b>06M0</b>	15-pin SUB-HD connector <b>Q</b>
200 kN <b>200K</b>	7 m <b>07M0</b>	8-pin M12 connector <b>M</b>
300 kN <b>300K</b>	12 m <b>12M0</b>	
400 kN <b>400K</b>		
500 kN <b>500K</b>		
600 kN <b>600K</b>		
1 MN <b>1M00</b>		
1 MN <b>2M00</b>		

### Ordering example

<b>K-KMR+-</b>	<b>500K-</b>	<b>07M0-</b>	<b>F</b>
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### Plug version

The KMR+ comes as standard without the plug fitted. In this case, the cable is suitably prepared (insulated cable ends, shielding ready for fitting). We can fit the following plugs if you wish:

Y = free ends, no plug assembly

F = D-sub-HD15, 15-pin, for connecting to MGC+ (e.g. AP01), Scout

Q = HD-sub-HD15, 15-pin, for connecting to many HBK measuring amplifiers of the Quantum series (MX410, MX440, MX840)

N = MS plug, for connecting to HBK measuring amplifiers, such as MGC+ (AP03), DMP or DK38

M = M12 plug, 8-pin, suitable for measuring amplifiers digiBOX and DSE

## ACCESSORIES

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The load application disks are included in the scope of supply. They are available as replacement parts, delivered in a set (2-piece).

Ordering number	
1-KMRW/20kN	2x load application washers suitable for KMR+/20 kN
1-KMRW/40kN	2x load application washers suitable for KMR+/40 kN
1-KMRW/60kN	2x load application washers suitable for KMR+/60 kN
1-KMRW/100kN	2x load application washers suitable for KMR+/100 kN
1-KMRW/200kN	2x load application washers suitable for KMR+/200 kN
1-KMRW/300kN	2x load application washers suitable for KMR+/300 kN
1-KMRW/400kN	2x load application washers suitable for KMR+/400 kN
1-KMRW/500kN	2x load application washers suitable for KMR+/500 kN
1-KMRW/600kN	2x load application washers suitable for KMR+/600 kN
1-KMRW/1MN	2x load application washers suitable for KMR+/1 MN
1-KMRW/2MN	2x load application washers suitable for KMR+/2 MN

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