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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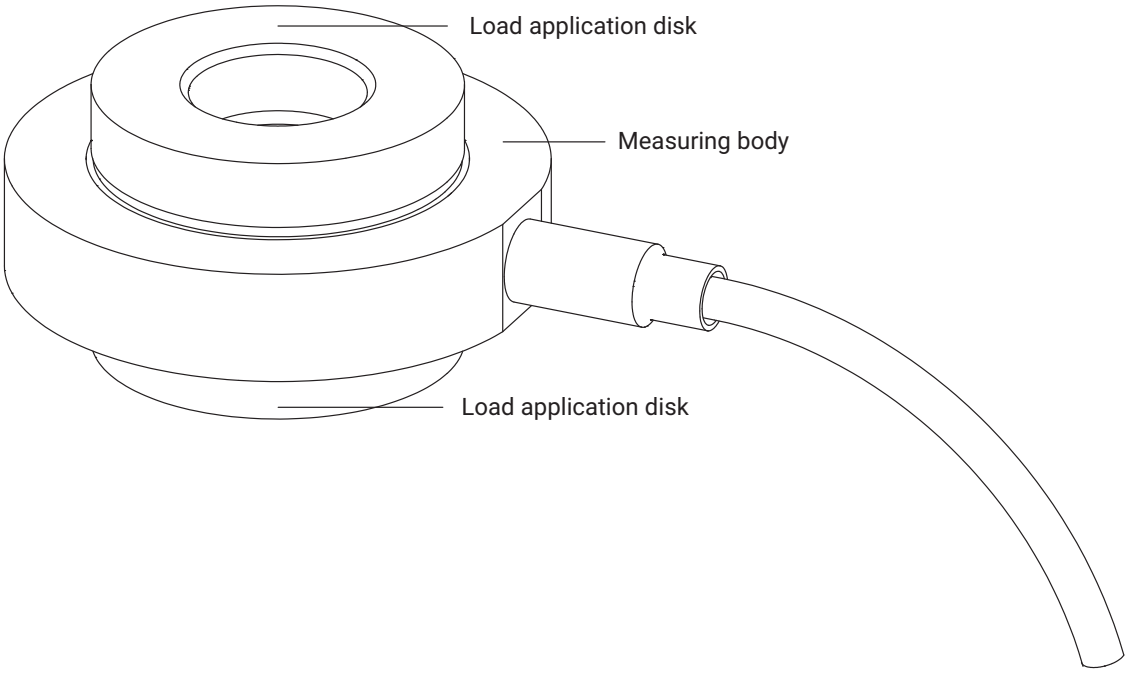
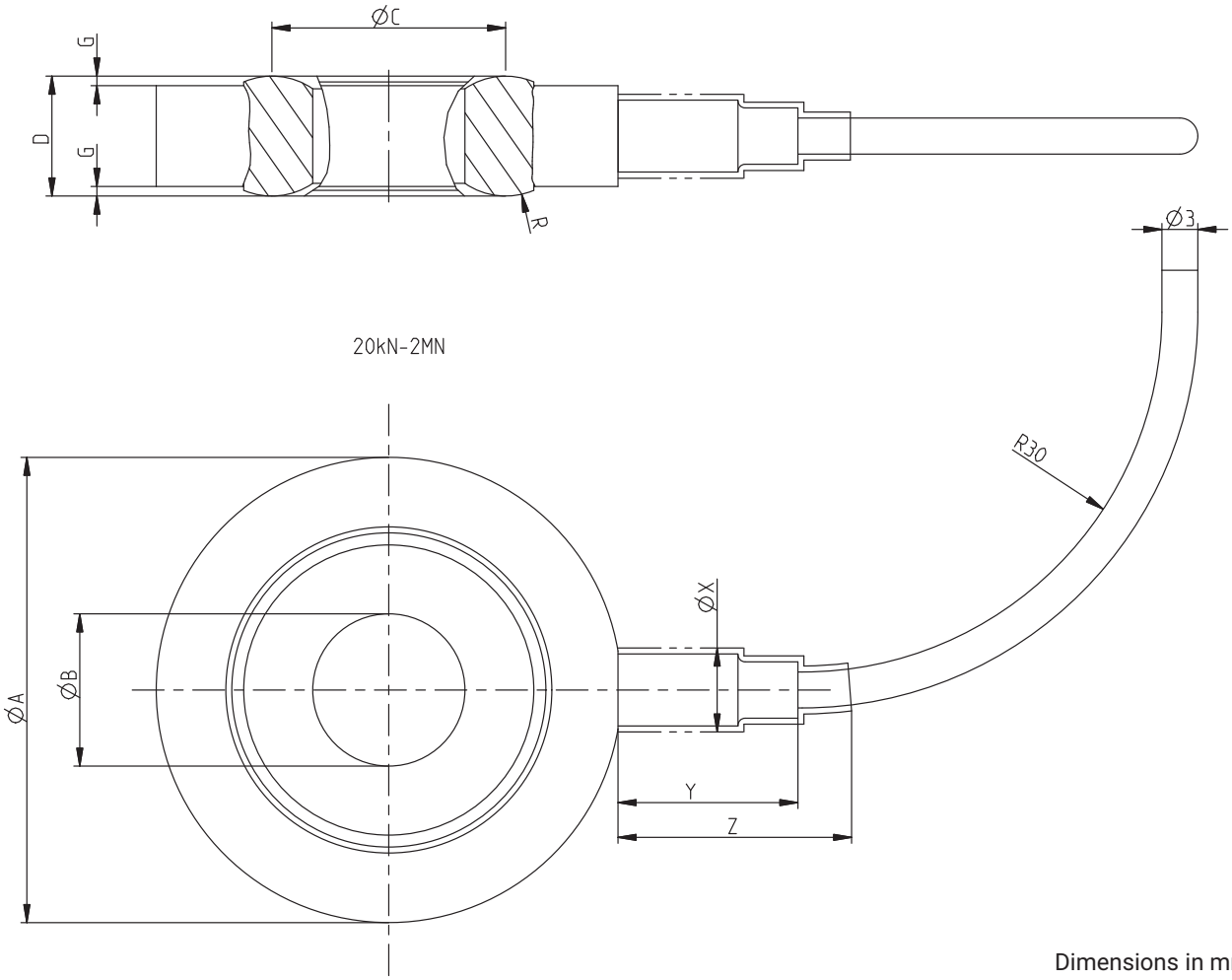
KMR+ PRINCIPLE



DIMENSIONS

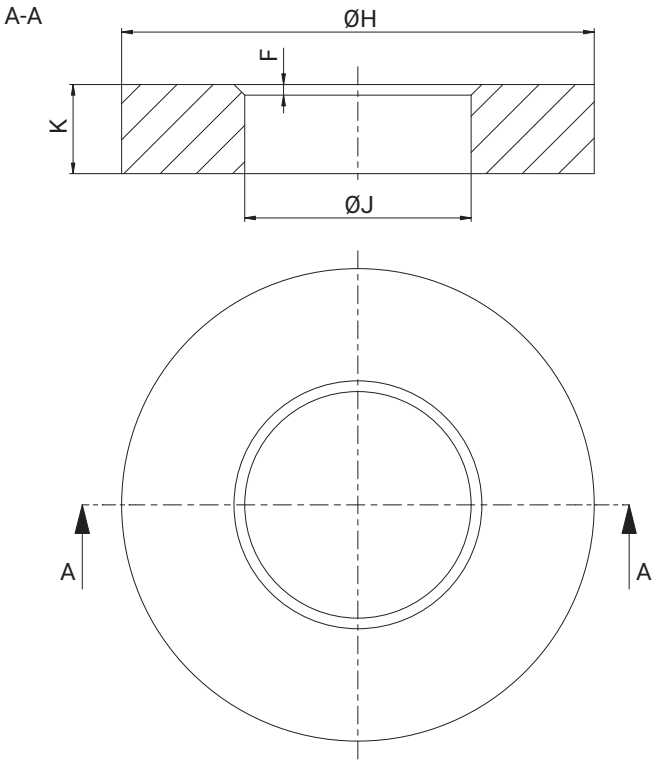
KMR+ dimensions



Dimensions in mm

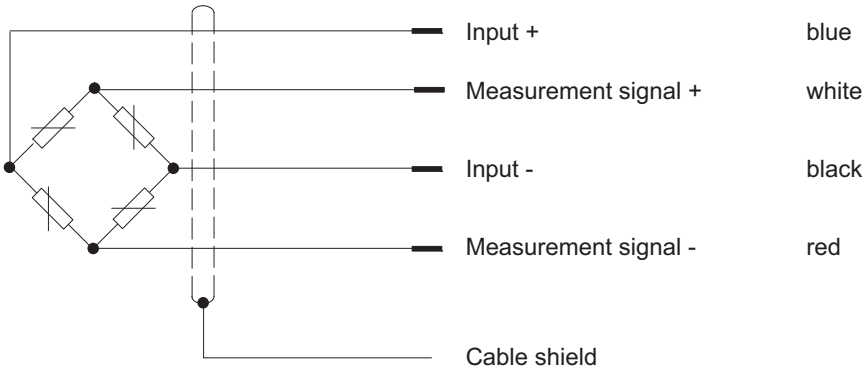
Nominal (rated) force	ØA $_{-0.2}$	ØB $^{+0.1}$	C	D	G	R	ØX $_{\pm 0.5}$	Y	Z
20 kN	19.9	6.5	9.05	8.5	0.65	5	6.7	15	30
40 kN	23.6	8.0	10.84	8.5	0.65	8	6.7	15	30
60 kN	26.9	10.0	13.82	8.5	0.65	12	6.7	15	30
100 kN	38.8	12.7	19.50	10.0	0.80	6	6.7	15	30
200 kN	48.0	16.0	27.35	10.0	0.80	16	6.7	15	30
300 kN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

Dimensions load application disks



Nominal (rated) force	ØH $_{-0.1}$	ØJ $^{+0.1}$	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	2
Accuracy													
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[1)]	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										
Rated electrical output													
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	Ω	310 … 410			620 … 800							
Output resistance	R_a	Ω	310 … 370			620 … 720							
Insulation resistance	R_{is}	Ω	> 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										
Temperature													
Reference temperature	$t_{, ref}$	°C	23										
Nominal (rated) temperature range	$B_{T,nom}$	°C	-30…70										
Operating temperature range	$B_{T,G}$	°C	-30…85										
Storage temperature range	$B_{T,S}$	°C	-30…85										

Nominal (rated) force	F_{nom}	kN	20	40	60	100	200	300	400	500	600		
		MN										1	2
Characteristic mechanical quantities													
Maximum operating force	F_G	% of F_{nom}	125				150					160	180
Force limit	F_L		125				150					160	180
Breaking force	F_B		> 300			> 400							
Static lateral limit force [2] (when loaded with nominal (rated) force)	F_Q	% of F_{nom}	12										
Permissible eccentricity (when loaded with nominal (rated) force)	e_g	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_g	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_G	Nm	33	75	169	194	975	1425	2250	3000	3750	8250	20250
Nominal (rated) displacement ±15%	S_{nom}	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_G	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_{rb}	% of F_{nom}	85										
General information													
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 [3]			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
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

All ordering numbers shown in gray are preferred types. They can be delivered rapidly.

All preferred types are delivered with 1.5 m cable and open cable ends

The ordering number of the preferred type is 1-KMR+/.....

The ordering number of the customized sensors is K-KMR+-.....

The ordering number example **K-KMR+-500K-07M0-F** 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.

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

Ordering example

K-KMR+-	500K-	07M0-	F

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

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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