

# KMR

Force washer for monitoring tasks

## Special features

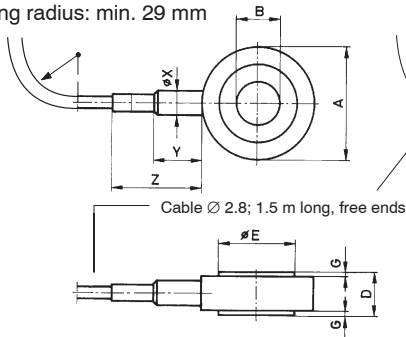


- Measuring washer
- Nominal (rated) force 20 kN ... 400 kN
- Degree of protection IP 67
- Stainless steel
- Good reproducibility

Dimensions (in mm; 1 mm = 0.03937 inches)

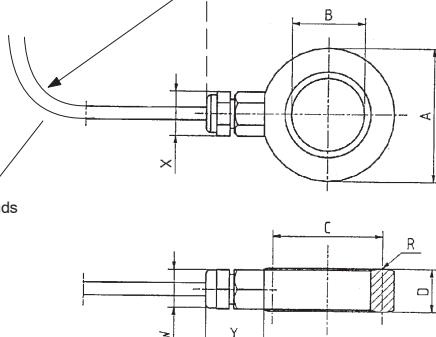
**KMR; 20kN, 40kN, 60kN**

Bending radius: min. 29 mm



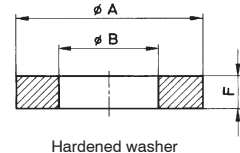
**KMR; 100 kN, 200 kN, 300 kN and 400 kN**  
(with PG gland and sphere radius R)

Bending radius: min. 29 mm



**KMR cable assignment**

Assignment	Cable wire color
Measurement signal (+)	white
Measurement signal (+)	red
Bridge excitation voltage (+)	blue
Bridge excitation voltage (-)	black
Shielding	yellow



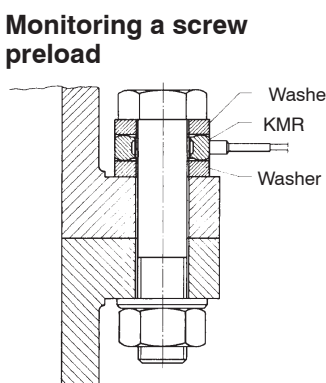
Nominal (rated) force in kN	Ø A <sub>-0,1</sub>	Ø B <sup>+0,1</sup>	C	D	E	F	G	R	X	Y	N	for screws	SW
20	17	6.5	-	6	9	3	0.5	-	approx. 6	approx.11.5	approx. 25	M6; 1/4"	-
40	21	8	-	6	13	3	0.5	-	approx. 6	approx.11.5	approx. 25	M8; 5/16"	-
60	24	10	-	8	16	4	0.5	-	approx. 6	approx.11.5	approx. 25	M10; 3/8"	-
100	26.5	12.7	19.75	10	-	5	-	6	approx.10.5	approx.14.5	-	M12; 1/2"	9
200	31	16	25.5	10	-	6	-	8	approx.10.5	approx.14.5	-	M16; 5/8"	9
300	37	21	31.5	10.5	-	6	-	9	approx.10.5	approx.14.5	-	M20; 3/4"	9
400	46	25	38	12.5	-	8	-	10	approx.10.5	approx.14.5	-	M24; 7/8"	9

# Specifications

Type		KMR						
		20	40	60	100	200	300	400
Nominal (rated) force	kN	20	40	60	100	200	300	400
Sensitivity range	mV/V	1.7 ... 2.3 <sup>*)</sup>						
Effect of temperature on sensitivity per 10 K in the nominal (rated) temperature range	%	1						
Temperature effect on the zero signal/10 K in the nominal (rated) temperature range	%	0.5						
Repeatability constant mounting position	%	1						
Creep over 30 min., at room temp.	%	2						
Input resistance at room temp.	Ohm	> 345						
Output resistance at room temp.	Ohm	300 ... 400						
Insulation resistance	GOhms	> 5						
Reference excitation voltage	V	5						
Operating range of excitation voltage	V	0.5 ... 5			0.5 ... 12			
Nominal (rated) temperature range	°C	-10 ... +70						
Operating temperature range	°C	-10 ... +70						
Storage temperature range	°C	-30 ... +85						
Limit force	%	150						
Breaking force	%	> 500						
Relative static lateral limit force	%	20						
Nominal (rated) displacement ± 15 %	mm	0.06	0.06	0.06	0.08	0.11	0.21	0.32
Natural frequency ± 15 %	kHz	22	45	47	27	22	18	15
Weight without cable	g	5	7	12	32	40	50	70
Permissible dynamic loading (vibration bandwidth in accordance with DIN 30100)	%	50						
Degree of protection as per DIN EN 60529		IP 67						

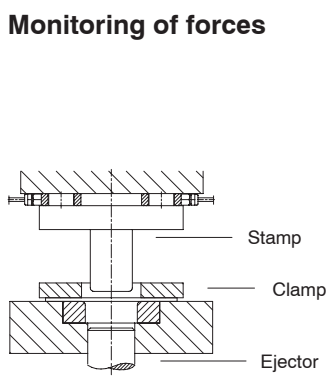
\*) The sensitivity of the force washer lies, dependent on the installation situation, between 1.7 ... 2.3 mV/V.

## Example applications



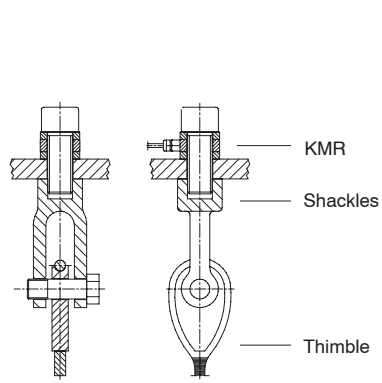
**Monitoring a screw preload**

**Fig. 1:** The pre-stressing curve is measured with a repeatability of <math>< \pm 1\%</math>.



**Monitoring of forces**

**Fig. 2:** The force washer monitors the set deep-draw pressing force with a repeatability of <math>< \pm 1\%</math>.



**Monitoring of cable forces**

**Fig. 3:** Monitoring of cable forces.

**Scope of delivery:** KMR force washer, two hardened washers, mounting instructions

Subject to modifications.  
All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability.

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