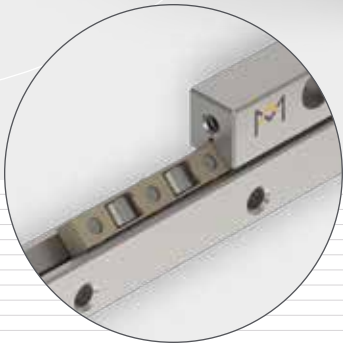
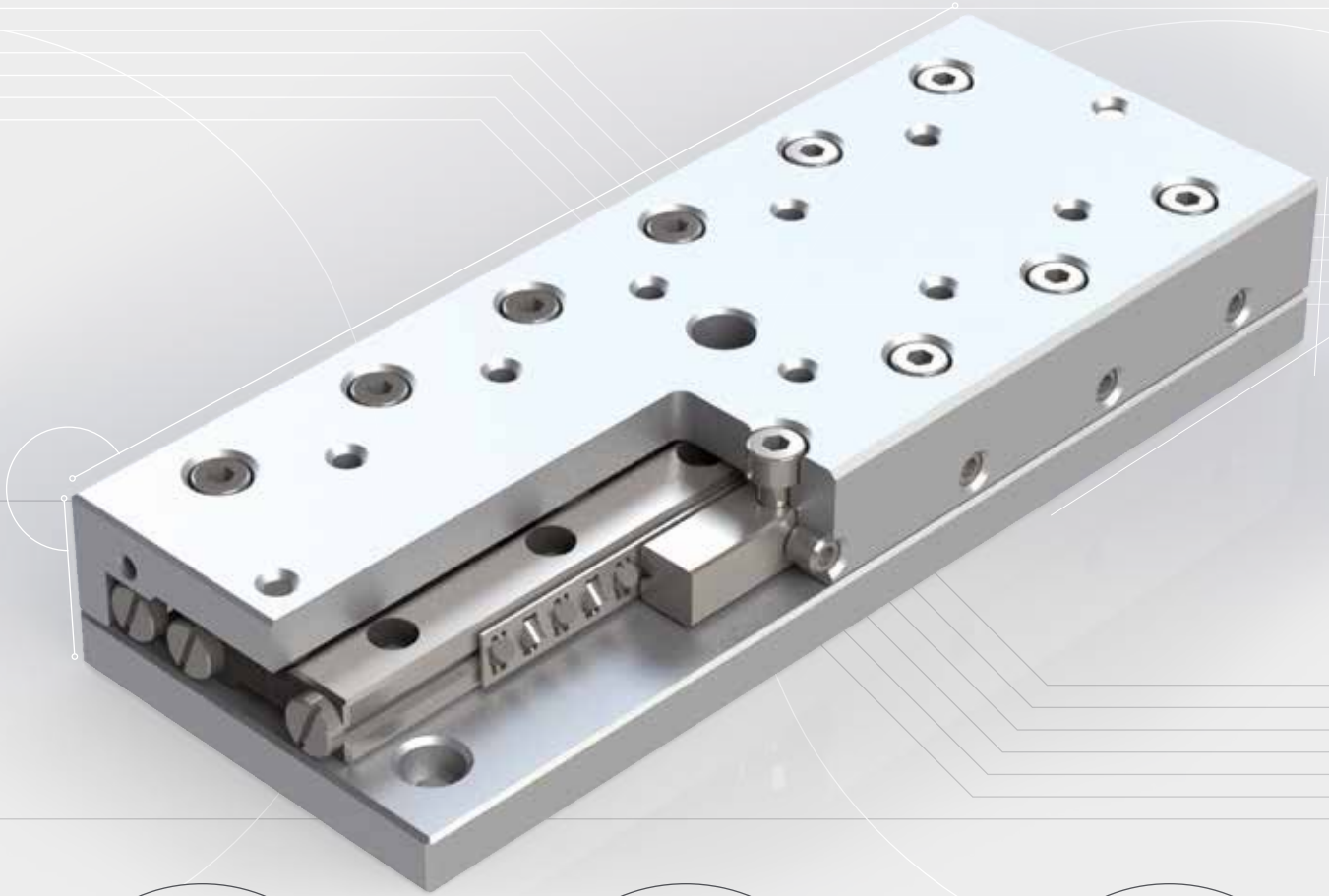


OVER
50
YEARS
of success



LINEAR BEARING TYPE RNG



Company's headquarters in Dedemsvaart, Netherlands



Innovative design and manufacture of precision linear bearings, frictionless slides, positioning stages and engineered-to-spec motion systems.





INTRODUCTION

PM has engineered and manufactured innovative and top quality precision linear bearings and slides at our research and production facilities in the Netherlands since 1966. We are experts in finding solutions that meet the specific requirements of a wide variety of industry applications. A trusted partner for hundreds of industry heavyweights around the globe, our client base ranges from the semiconductor industry, medical technology and metrology sectors, to industrial automation, space and defence industries.

COMPANY

The key to the exceptional quality of PM products lies in our highly specialised manufacturing machinery and facilities. Specifically, the PM production facility is temperature controlled and built to suppress and minimise distortions caused by vibration. Our precision rails are produced with remodeled, non-standard machinery. The resulting high quality of our products makes PM an attractive supplier for various high-tech industries including semiconductor, optical and life sciences.

NEW PRODUCTS

We constantly deploy the latest technologies to create new products or functionally enhance existing products in our range. Clients typically choose to work with PM for our proven ability to meet a complex set of requirements, mostly including maximum performance of parts in the most compact of spaces. We are always working to further refine the performance of PM products, in order to ensure that we consistently meet the requirements of clients in high-tech industries. The following new PM products are the result of our relentless drive to be operating at the cutting edge of the latest technologies:

- **Linear bearing type RNG:** is a compact design with high load capacity. Available with optional Anti Cage Creep solution (ACC). Perfectly integrates robustness and compactness.
- **Micro roller slide type PMMR:** featuring crossed-rollers. Designed for best performance in micro-sized applications.
- **Flat Mounted Bearing type FMB:** is an extremely flat, low-friction and easy to install table bearing.

CUSTOMISED PARTS

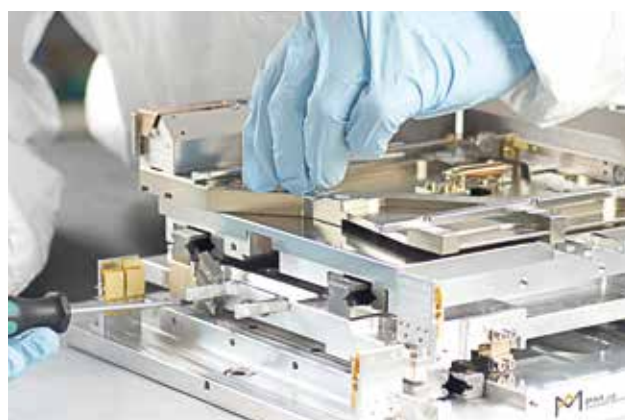
In addition to offering high-quality standardised products, we design and manufacture engineered linear bearings and positioning systems meeting our clients' application-specific requirements.

PM combines the latest knowledge from its in-house R&D department, developments in manufacturing technology

more widely as well as performance insights generated by industry deployment of precision applications.

Over the past 50 years PM has expanded its reach to serve a global client base. Our experienced, multilingual engineering and sales teams stand ready to work with you in realising your demanding projects.

Technical data in this catalogue is based on standard quality grade Q8 (no suffix). For higher quality grades please contact our product experts to discuss your requirements.



DISCLAIMER

This catalogue is the result of a full revision of its previous edition. It reflects the latest progress in linear bearings technology as well as insights gathered from industry application. Any information from previous editions that does not correspond to the data in this current edition, is therefore invalid. Due to the continuous development of our product range, we reserve the right to make modifications without prior notice.

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PRODUCT OVERVIEW

PM linear bearings are used as components in multiple industries worldwide. What really sets apart PM products is their unsurpassed quality and technical performance in terms of accuracy, their extremely low levels of friction, high rigidity and long lifetime.

Our wide range of linear bearings allows for maximum design flexibility, realising a play-free linear movement that is both cost-effective and the best fit for its application. Popular linear bearings are also available as set packages including all the essential components like cages, end pieces and attachment screws. In the following pages, this catalogue presents these standard sets, specifying options for load capacity and stroke length.

Importantly, PM customers benefit from over 50 years' experience in the field of linear bearings manufacturing. As a result of our continuous testing of innovations and new insights in engineering and manufacturing, our linear bearings are constantly being optimised further and often become an industry benchmark.

At PM we are always driven by our goal to be industry leaders in quality and performance. We possess the expertise and manufacturing capability to supply custom made linear bearings and linear slides.

So whether you choose a standard product as presented in this catalogue or a customised component that meets your specific needs, we only ever deliver top quality.

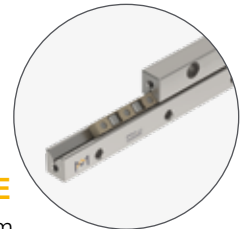
1. LINEAR BEARING TYPE RSD

- Equipped with balls or rollers
- For light up to medium load
- Available in size 1.5 - 24 mm
- Lengths from 20 - 1400 mm
- Also available as a set, see page 41



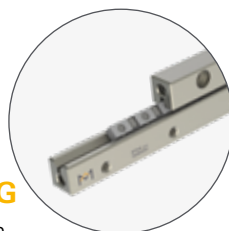
2. LINEAR BEARING TYPE RSDE

- Equipped with rollers, size 3 – 9 mm
- For precision applications
- For medium up to high loads
- Anti cage creep technology optional
- Also available as a set, see page 57



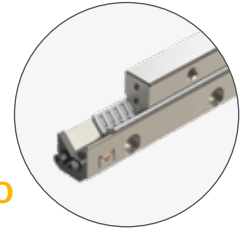
3. LINEAR BEARING TYPE RNG

- Equipped with rollers 4 and 6 mm
- Very compact design and high load ratings
- Offers reduced weight
- Anti cage creep technology optional
- Also available as a set, page 67



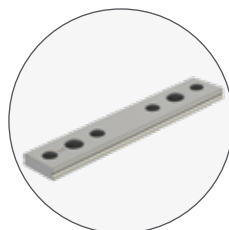
4. LINEAR BEARINGS TYPE N/O AND M/V

- Equipped with needle rollers
- Best load ratings and maximum rigidity
- Lengths from 100 - 1200 mm
- Anti cage creep technology optional



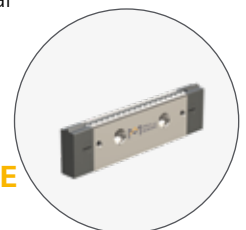
5. DOUBLE PRISM TYPE DS

- Compact design
- Can be combined with RSD linear bearings and recirculating units UK and UR
- Available in size 2 - 15 mm
- Lengths up to 1400 mm



6. RECIRCULATING UNITS TYPE UK AND UR

- For unlimited travel
- Low profile and space saving design
- Equipped with balls (UK) or rollers (UR)
- Available in size 2 - 15 mm





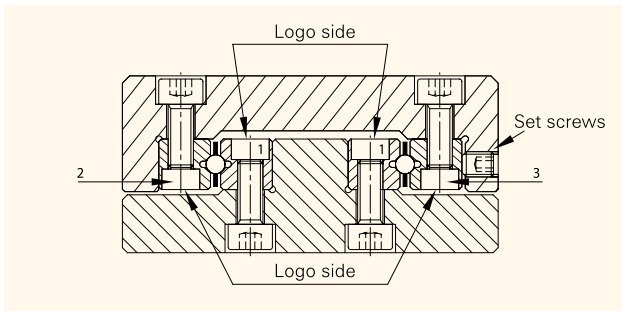
ASSEMBLY PROCEDURE

PRIOR TO ASSEMBLY

PM linear bearings are precision components; they have to be handled with meticulous care. To achieve a perfect linear bearing, it is necessary to respect the following guidelines:

- When handling the components. Damage on the rail surface will impact the running performance and operational lifetime
- Prevent contact with any foreign materials when mounting the rails
- During assembly, ensure that all linear bearing components have the same temperature
- For uniform tightening of the bolts the use of a torque screw driver is recommended. Various models are available.

ASSEMBLY LINEAR BEARINGS



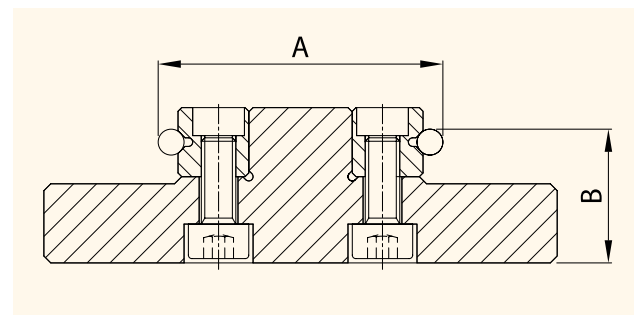
For satisfactory installation of all types of linear bearings in this catalogue, it is necessary to consider the following points:

- 1) To determine the location of fixing holes in the support structure (slide base) the holes in the rails should be taken as a reference and "copied" onto the support structure. This is highly desirable as the original pitch of individual holes may have altered during hardening by as much as 0.4 mm. To compensate this, special type GD or GDN attachment screws can be supplied. The dimensions of these screws are listed in the tables at the end of each chapter.
- 2) Carefully de-burr and clean all elements, to ensure a flat surface and a perfect fit of the rails.
- 3) Now, as a required first step, to fasten the inner rail pair (marked as 1 in figure above) the base and reference face 1 of the linear bearing rails should be lightly oiled before they are clamped against the mounting and reference shoulder. Subsequently,

they can be fastened by starting from one end and working towards the opposite end.

- 4) Parallelism of the V-groove of the rails (A and B) should be checked to ensure they don't exceed the tolerance of the linear bearings (page 14). After these steps have been followed, the slide element is ready for assembly.

Parallelism of rails V-groove: ΔA and ΔB

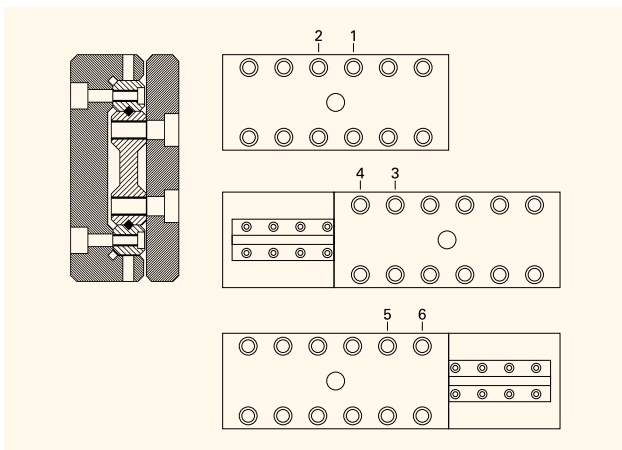


- 4.1) The fixed bearing rail (2) should be mounted as described under step 3 above, but care should be taken not to tighten the adjustable rail (marked as 3 in figure on the left side) too much, so as to leave a gap between the V-grooves for the insertion of ball cages, roller cages or needle cages.
- 5) If any end stop screws are present, remove them now.
- 6) Carefully insert the cages. When placed in their exact position, lightly secure the adjustable rail until the screws are finger-tight.
- 7) Fit the end screws or end pieces.
- 8 I) The linear bearing set is now ready to be backlash free-adjusted using the lateral preload set screws (page 19, Preload Settings). The amount of preload is given in the tables at page 23.
- 8 II) Before starting the preload procedure carefully move the slide top over its stroke length back and forth and feel that there are no irregularities.
- 9) Preload procedure: put the slide on a clean surface on its side with the lateral preload set screws up. Follow step 1, 2 and 3 for the correct preload sequence.
 - Step 1. Start in the middle position and adjust the set screws with the recommended torque value, working outwards from the middle. Notice: Only adjust the screws directly above the cage.



Step 2. Move the slide top in one direction and adjust the set screws to the recommended torque value.

Step 3. Move the slide top in opposite position and repeat the adjusting for the screws which are now above the cages.



Again move the slide top back and forth a couple of times and feel that there are no irregularities.

- 10) Secure the attachment screws on the adjusting rail.
- 11) When assembly is complete, the linear bearings must be checked for absence of play and inspected for running quality.



TABLES

RECOMMENDED PRELOAD SETTINGS

Table 1 Linear bearings type RSD with roller cages

Roller size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
1.5	3	M2.5	10	0.75
2	4	M3	15	1.50
3	5	M5	25	4.50
4	7	M5	40	11.50
6	9	M6	100	27.50
9	14	M8	100	105.50
12	18	M10	100	212.00
15	20	M12	100	370.00

Table 5 Linear bearings type N/O and M/V with needle cages

Needle size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
2	4.5	M6	50	1.05
2	4.5	M8	100	1.30
2.5	5	M8	100	2.70
2.5	5.5	M8	100	2.90
3	6	M12	100	5.70
3.5	7	M14	100	7.70

*pitch between the preload setscrews

Table 2 Linear bearings type RSD with ball cages

Ball size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
1.5	3	M2.5	10	0.15
2	4	M3	15	0.36
3	5	M5	25	1.05
4	7	M5	40	2.70
6	9	M6	50	4.00
9	14	M8	100	11.70
12	18	M10	100	25.00
15	20	M12	100	34.50

Table 3 Linear bearings type RSDE with roller cages

Roller size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
3	3.3	M5	25	16
4	4.4	M5	40	41
6	6.6	M6	50	86
9	On request			

Table 4 Linear bearings type RNG with roller cages

Roller size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
4	4.4	M3	25	14
6	6.6	M4	25	25



RNG linear bearings are compact, reliable and suitable for high loads. The RNG linear bearings in size 4 and 6 are a further development of the RSDE type, with more advanced mechanical characteristics. Significantly higher load ratings and stiffness are complemented by more compact installation dimensions, achieved through optimisation of the groove's internal geometry.

STRUCTURE AND FEATURES

The set consists of two pairs of linear bearings; one pair consists of two similar 90° V-groove, through-hardened and precision ground rails, equipped with a crossed roller cage in between (KRE cage: rollers retained). The rails are equipped with countersunk attachment holes, according to a standard configuration.

Key features are:

- Load capacity approx. 30% higher than that of competitors
- **Compact design** with space between rails reduced to a minimum
- Designed for higher speeds and accelerations

Roller cages are available in POM or PEEK material.

Rail ends have threaded holes for fixing type GBN end pieces.

For assembly of the rails, special type GDN screws are available to order separately.

Anti cage creep technology available on request, page 94 and 95.

ORDER NOTES

One set of linear bearings RNG consists of:
4 pcs. rails (=2 pairs) RNG, 2 pcs. cages KRE and 8 pcs. end pieces type GBN

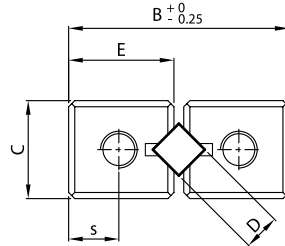
Please specify the following in your order note:

- Quantity and type of rails needed
- Quantity, type and length of cages or max. stroke
- Quantity and type of end pieces

Example:

To order one linear bearing set of 150 mm length, size 4 mm for a 60 mm stroke in standard quality please specify:

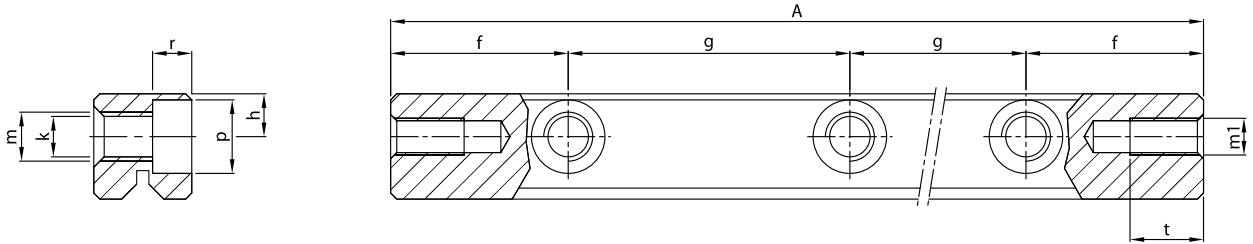
- 4 pcs. rails type RNG-4150
- 2 pcs. roller cages type R4x27KRE
- 8 pcs. end pieces type GBN-4



Rail type		Main dimensions					Mounting holes						
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p	
RNG-4050	RNG-4050-SS	50						1x25					
RNG-4075	RNG-4075-SS	75						2x25					
RNG-4100	RNG-4100-SS	100						3x25					
RNG-4125	RNG-4125-SS	125						4x25					
RNG-4150	RNG-4150-SS	150						5x25					
RNG-4175	RNG-4175-SS	175	19	9	9	4	12.5	6x25	3.5 ± 0.2	2.65	M3	5.5	
RNG-4200	RNG-4200-SS	200						7x25					
RNG-4225	RNG-4225-SS	225						8x25					
RNG-4250	RNG-4250-SS	250						9x25					
RNG-4275	RNG-4275-SS	275						10x25					
RNG-4300	RNG-4300-SS	300						11x25					
RNG-6100	RNG-6100-SS	100						3x25					
RNG-6150	RNG-6150-SS	150						5x25					
RNG-6200	RNG-6200-SS	200						7x25					
RNG-6250	RNG-6250-SS	250	25	12	12	6	12.5	9x25	5 ± 0.2	3.3	M4	7	
RNG-6300	RNG-6300-SS	300						11x25					
RNG-6350	RNG-6350-SS	350						13x25					
RNG-6400	RNG-6400-SS	400						15x25					

Bold = Short lead time item

Regular = Long lead time item - please ask us about prices and lead times



r	End holes			Weight (g)	Type	Accessories
	m1	s	t			
2.7	M3	3.5	6	27	RNG-4050	Cages: KRE End pieces: GBN Attachment screws: GDN-4
				41	RNG-4075	
				55	RNG-4100	
				69	RNG-4125	
				83	RNG-4150	
				97	RNG-4175	
				111	RNG-4200	
				125	RNG-4225	
				139	RNG-4250	
				153	RNG-4275	
167	RNG-4300					
3.2	M3	3.5	6	92	RNG-6100	Cages: KRE, KREV End pieces: GBN Attachment screws: GDN-6
				138	RNG-6150	
				184	RNG-6200	
				230	RNG-6250	
				276	RNG-6300	
				322	RNG-6350	
				368	RNG-6400	

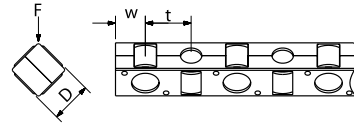
Units: mm

ACCESSORIES

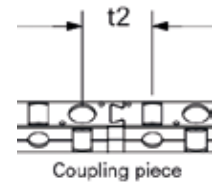
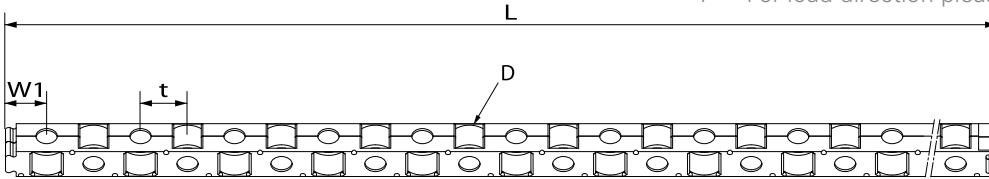
FOR RAIL TYPE RNG

Roller cage type KRE and KREV, size 4 and 6 mm

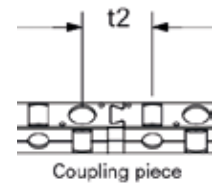
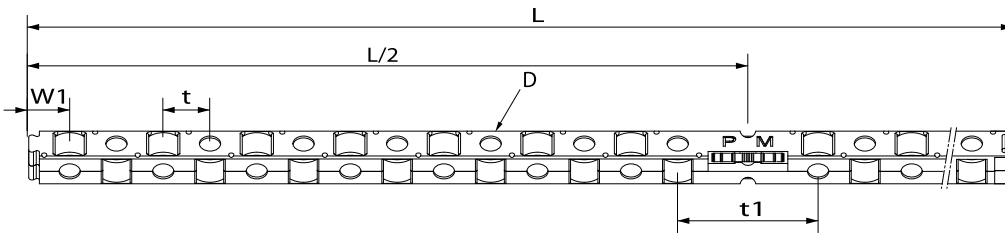
- Snap-on cage, rollers retained
- For horizontal and vertical application
- KRE material POM
- KREV material PEEK (suitable for UHV application)



F = For load direction please refer to picture provided



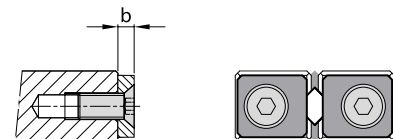
Roller cage with anti cage creep technology KRE-ACC



Cage type		Main dimensions							Accessories	
Standard	Stainless steel	D	t	t1	t2	w	w1	L	Suitable for rail	End pieces
R4xKRE	R4xKRE-SS	4	4.4	-	6.7	2.8	3.85	135.3	RNG-4	GBN
R4xKRE-ACC	R4xKRE-SS-ACC	4	4.4	13.2	6.7	2.8	3.85	135.3		GBN
R4xKREV	R4xKREV-SS	4	4.5	-	6.7	2.8	on request			GBN
R4xKREV-ACC	R4xKREV-SS-ACC	4	4.5	13.2	6.7	2.8	on request			GBN
R6xKRE	R6xKRE-SS	6	6.6	-	10.6	4.3	6.3	204	RNG-6	GBN
R6xKRE-ACC	R6xKRE-SS-ACC	6	6.6	19.8	10.6	4.3	6.3	204		GBN
R6xKREV	R6xKREV-SS	6	6.7	-	10.6	4.3	on request			GBN
R6xKREV-ACC	R6xKREV-SS-ACC	6	6.7	19.8	10.6	4.3	on request			GBN

End pieces type GBN, size 4 - 6 mm

- For horizontal and vertical application
- For cages type KRE, KREV
- For rails type RNG

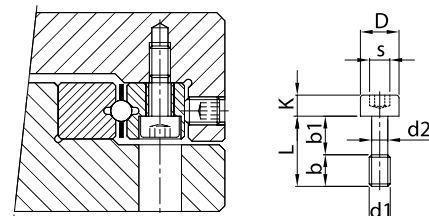


b = 4 mm for RNG-4 and RNG-6

Attachment screw type GDN, size 4 - 6 mm

- For compensation of pitch distances between mounting holes
- Recommended for installation of the preload rail
- For rails type RNG

Type	Size								Max. tightening torque (Nm) ¹
	L	b	b1	D	d1	d2	K	s	
GDN-4	12	5	7	4.5	M2.5	1.85	2.5	2	0.60
GDN-6	16	5	11	5.5	M3	2.3	3	2.5	1.60

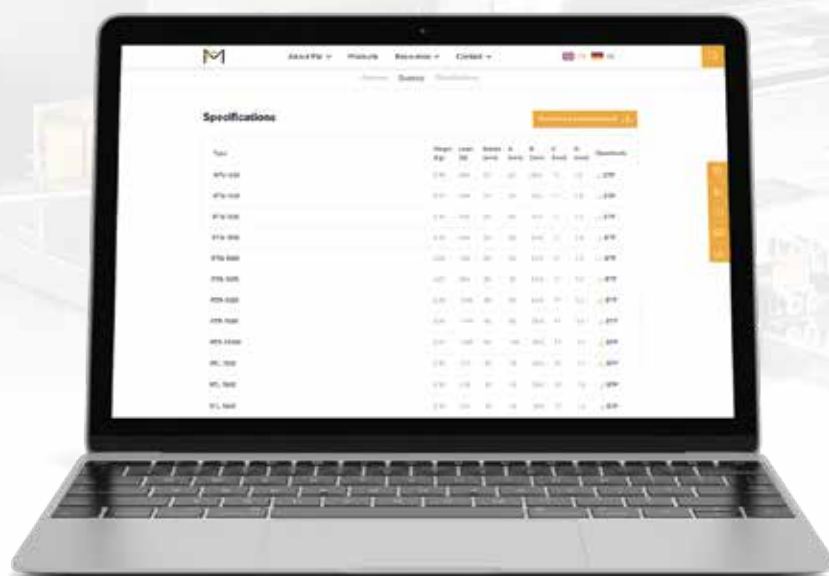


¹ Strength class 12.9



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2020