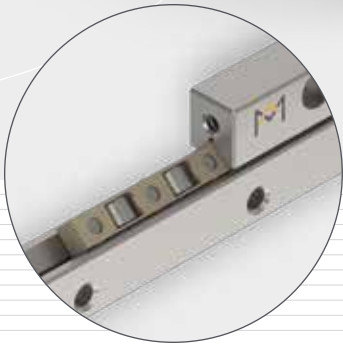
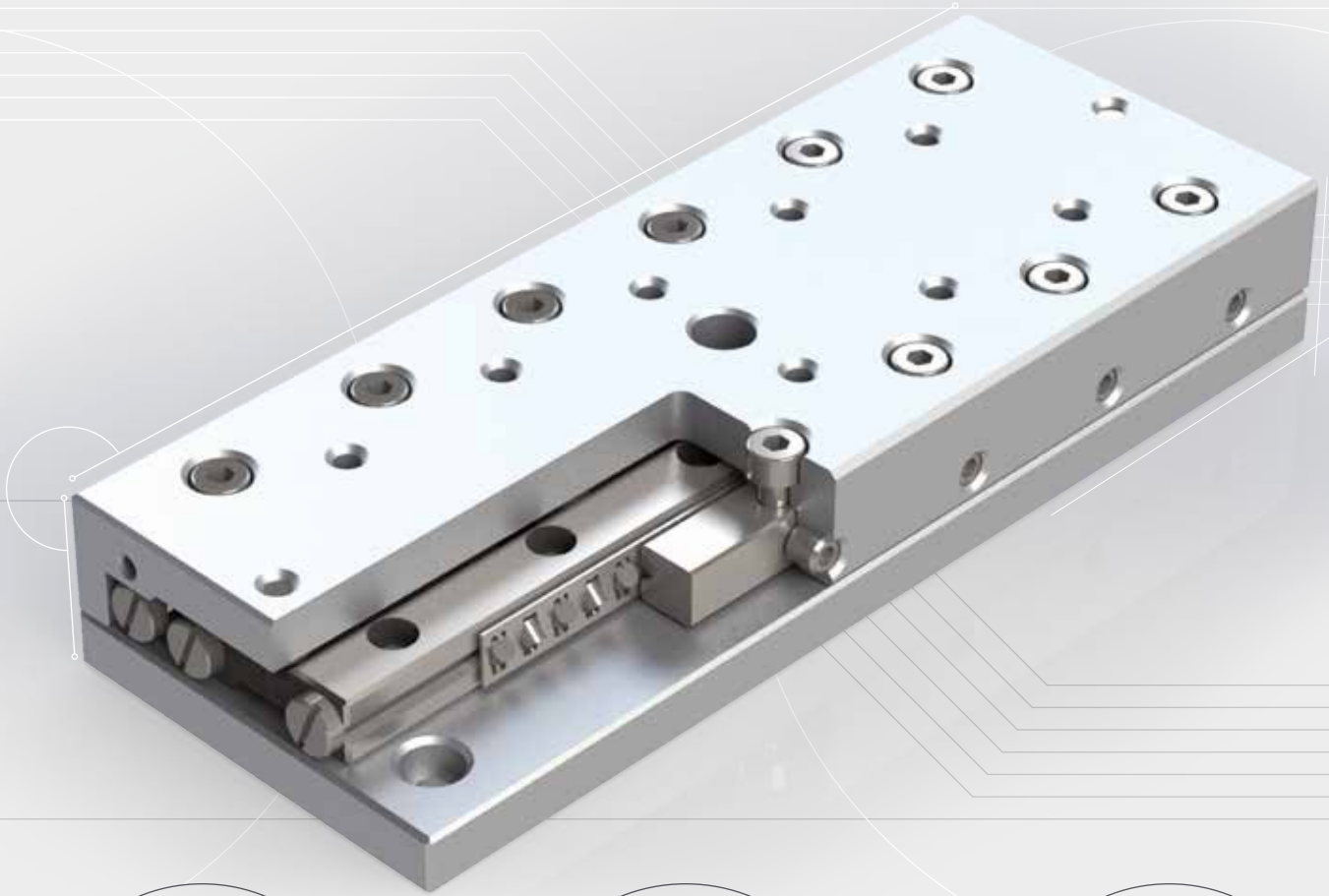


OVER  
**50**  
YEARS  
*of success*



## **LINEAR BEARING TYPE RSDE**



## 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.

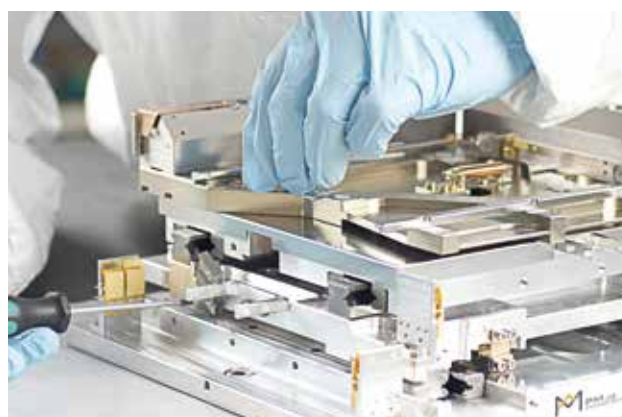
## CUSTOMISED PARTS

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.*

© Copyright October 2020, second edition  
PM B.V. - Discover Precision

Reproduction in part or in whole is only allowed with written authorization of PM.



# 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.

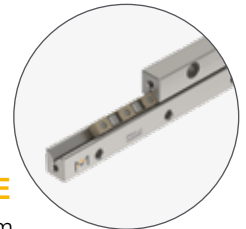
## 1. LINEAR BEARING TYPE RSD

- 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



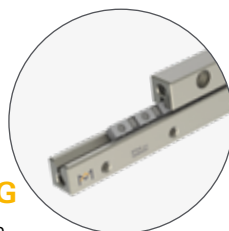
## 2. LINEAR BEARING TYPE RSDE

- 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



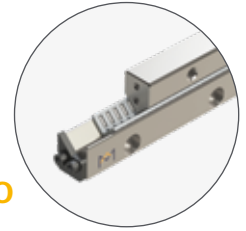
## 3. LINEAR BEARING TYPE RNG

- 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



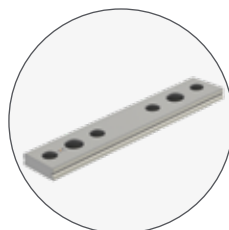
## 4. LINEAR BEARINGS TYPE N/O AND M/V

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



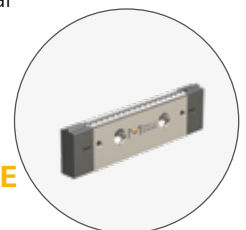
## 5. DOUBLE PRISM TYPE DS

- 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





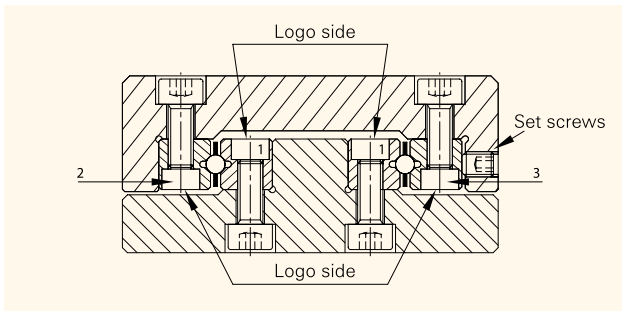
# ASSEMBLY PROCEDURE

## 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



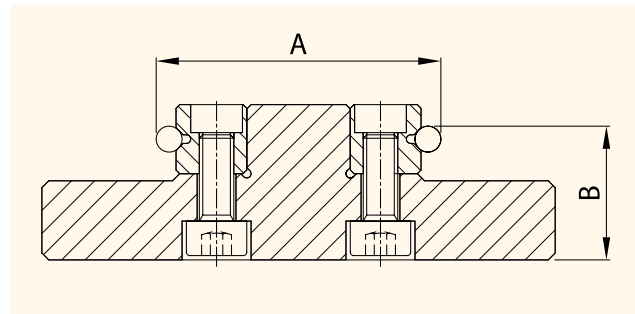
For satisfactory installation of all types of linear bearings in this catalogue, it is necessary to consider the following points:

- 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:  $\Delta A$  and  $\Delta B$

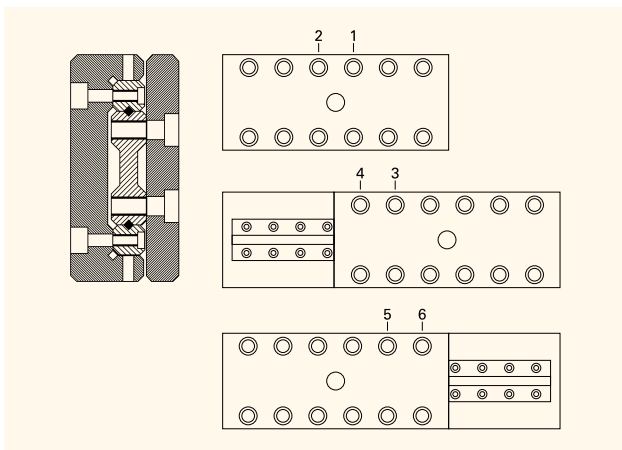


- 4.1) The fixed bearing rail (2) should be mounted as described under step 3 above, but care should be taken not to tighten the adjustable rail (marked as 3 in figure on the left side) too much, so as to leave a gap between the V-grooves for the insertion of ball cages, roller cages or needle cages.
- 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



*Linear bearings type RSDE are a next generation development of the RSD type. The deeper V-groove in combination with the high density roller cages offer higher load ratings and stiffness without changing the boundary dimensions of the rails. RSDE linear bearings are used mostly in highly dynamic applications requiring high speed, high running accuracy and outstanding quality.*

## 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 come with countersunk attachment holes, according to standard configuration.

Key features are:

- Load capacity approx. 3 times that of a RSD linear bearing
- Stiffness increases by a factor 2, owing to the running surface's larger contact area (approx. 80% for a type RSDE, compared to 35% for conventional types)
- The design, with space between rails reduced to a minimum, prevents dust and dirt from entering the interior of the rails
- Designed for higher speeds and accelerations, with optional Anti Cage Creep solution

Roller cages are available in POM and PEEK material.

Rail ends have threaded holes compatible with type GA end screws.

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

Anti cage creep available on request, see page 90 - 93.

## ORDER NOTES

One set of linear bearings RSDE consists of:  
4 pcs. rails (=2 pairs) RSDE, 2 pcs. cages KRE and 8 pcs. end screws with type GA screws.

Please specify the following in your order note:

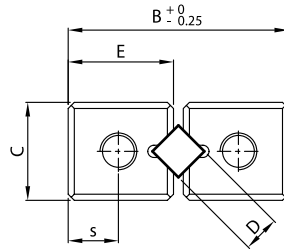
- Quantity and type of rails needed
- Quantity, type and length of cages or max. stroke
- Direction of movement (eg: horizontal, vertical or in between)
- Quantity and type of end screws needed

### Example:

To order one linear bearing set of 125 mm length, size 3 mm for a 75 mm stroke in standard quality please specify as follows:

- 4 pcs. Rails type RSDE-3125
- 2 pcs. Roller cages type R3x26KRE
- 8 pcs. End screws type GA-3

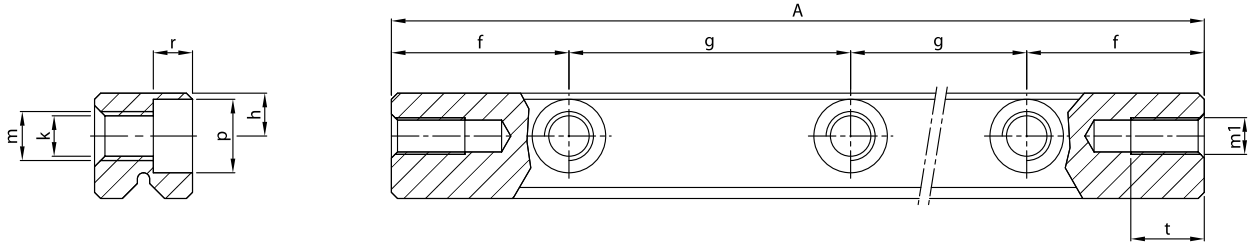




Rail type		Main dimensions					Mounting holes						
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p	
<b>RSDE-3050</b>	RSDE-3050-SS	50						1x25					
<b>RSDE-3075</b>	RSDE-3075-SS	75						2x25					
<b>RSDE-3100</b>	RSDE-3100-SS	100						3x25					
<b>RSDE-3125</b>	RSDE-3125-SS	125						4x25					
<b>RSDE-3150</b>	RSDE-3150-SS	150						5x25					
<b>RSDE-3175</b>	RSDE-3175-SS	175	18	8	8.6	3	12.5	6x25	3.5 <sup>±0.2</sup>	3.2	M4	6	
<b>RSDE-3200</b>	RSDE-3200-SS	200						7x25					
<b>RSDE-3225</b>	RSDE-3225-SS	225						8x25					
<b>RSDE-3250</b>	RSDE-3250-SS	250						9x25					
<b>RSDE-3275</b>	RSDE-3275-SS	275						10x25					
RSDE-3300	RSDE-3300-SS	300						11x25					
RSDE-3350	RSDE-3350-SS	350						13x25					
RSDE-4080	RSDE-4080-SS	80						1x40					
RSDE-4120	RSDE-4120-SS	120						2x40					
RSDE-4160	RSDE-4160-SS	160						3x40					
RSDE-4200	RSDE-4200-SS	200						4x40					
RSDE-4240	RSDE-4240-SS	240						5x40					
RSDE-4280	RSDE-4280-SS	280	22	11	10.6	4	20	6x40	4.5 <sup>±0.2</sup>	4.3	M5	7.5	
RSDE-4320	RSDE-4320-SS	320						7x40					
RSDE-4360	RSDE-4360-SS	360						8x40					
RSDE-4400	RSDE-4400-SS	400						9x40					
RSDE-4440	RSDE-4440-SS	440						10x40					
RSDE-4480	RSDE-4480-SS	480						11x40					

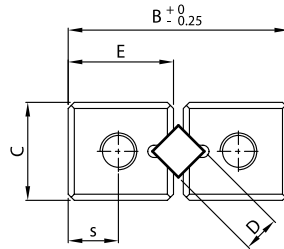
**Bold** = Short lead time item

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



r	End holes			Weight (g)	Type	Accessories
	m1	s	t			
3.2	M3	4.1	5.5	22	<b>RSDE-3050</b>	Cages: KRE End screws: GA-3 Attachment screws: GD-3
				34	<b>RSDE-3075</b>	
				46	<b>RSDE-3100</b>	
				58	<b>RSDE-3125</b>	
				70	<b>RSDE-3150</b>	
				82	<b>RSDE-3175</b>	
				94	<b>RSDE-3200</b>	
				106	<b>RSDE-3225</b>	
				118	<b>RSDE-3250</b>	
				130	<b>RSDE-3275</b>	
				142	RSDE-3300	
166	RSDE-3350					
4.1	M3	5	7	65	RSDE-4080	Cages: KRE, KREV End screws: GA-4 Attachment screws: GD-4
				98	RSDE-4120	
				131	RSDE-4160	
				164	RSDE-4200	
				197	RSDE-4240	
				230	RSDE-4280	
				263	RSDE-4320	
				296	RSDE-4360	
				329	RSDE-4400	
				362	RSDE-4440	
				395	RSDE-4480	

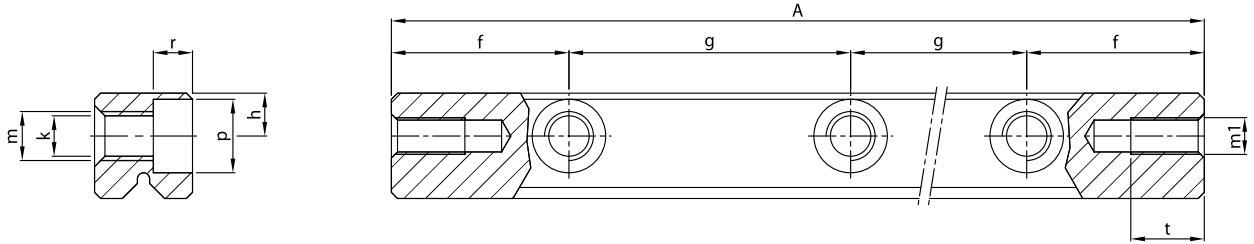
Units: mm



Rail type		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RSDE-6100	RSDE-6100-SS	100						1x50				
RSDE-6150	RSDE-6150-SS	150						2x50				
RSDE-6200	RSDE-6200-SS	200						3x50				
RSDE-6250	RSDE-6250-SS	250						4x50				
RSDE-6300	RSDE-6300-SS	300						5x50				
RSDE-6350	RSDE-6350-SS	350						6x50				
RSDE-6400	RSDE-6400-SS	400						7x50				
RSDE-6450	RSDE-6450-SS	450	31	15	14.9	6	25	8x50	6 <sup>±0.2</sup>	5.2	M6	9.5
RSDE-6500	RSDE-6500-SS	500						9x50				
RSDE-6600	RSDE-6600-SS	600						11x50				
RSDE-6700	RSDE-6700-SS	700						13x50				
RSDE-6800	RSDE-6800-SS	800						15x50				
RSDE-6900	RSDE-6900-SS	900						17x50				
RSDE-61000	RSDE-61000-SS	1000						19x50				
RSDE-61100	RSDE-61100-SS	1100						21x50				
RSDE-61200	RSDE-61200-SS	1200						23x50				
RSDE-9100	RSDE-9100-SS	100					25	1x50				
RSDE-9200	RSDE-9200-SS	200						1x100				
RSDE-9300	RSDE-9300-SS	300						2x100				
RSDE-9400	RSDE-9400-SS	400						3x100				
RSDE-9500	RSDE-9500-SS	500						4x100				
RSDE-9600	RSDE-9600-SS	600	44	22	21.3	9	50	5x100	9 <sup>±0.2</sup>	6.8	M8	11
RSDE-9700	RSDE-9700-SS	700						6x100				
RSDE-9800	RSDE-9800-SS	800						7x100				
RSDE-9900	RSDE-9900-SS	900						8x100				
RSDE-91000	RSDE-91000-SS	1000						9x100				
RSDE-91100	RSDE-91100-SS	1100						10x100				
RSDE-91200	RSDE-91200-SS	1200						11x100				

**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			
5.2	M5	7	8.5	147	RSDE-6100	Cages: KRE, KREV End screws: GA-6 Attachment screws: GD-6
				219	RSDE-6150	
				293	RSDE-6200	
				365	RSDE-6250	
				439	RSDE-6300	
				512	RSDE-6350	
				585	RSDE-6400	
				661	RSDE-6450	
				731	RSDE-6500	
				876	RSDE-6600	
				1021	RSDE-6700	
				1165	RSDE-6800	
				1312	RSDE-6900	
				1457	RSDE-61000	
				1604	RSDE-61100	
				1752	RSDE-61200	
6.2	M6	9.9	10	315	RSDE-9100	Cages: On request End screws: GA-9 Attachment screws: GD-9
				630	RSDE-9200	
				945	RSDE-9300	
				1260	RSDE-9400	
				1575	RSDE-9500	
				1890	RSDE-9600	
				2205	RSDE-9700	
				2520	RSDE-9800	
				2835	RSDE-9900	
				3150	RSDE-91000	
				3466	RSDE-91100	
				3780	RSDE-91200	

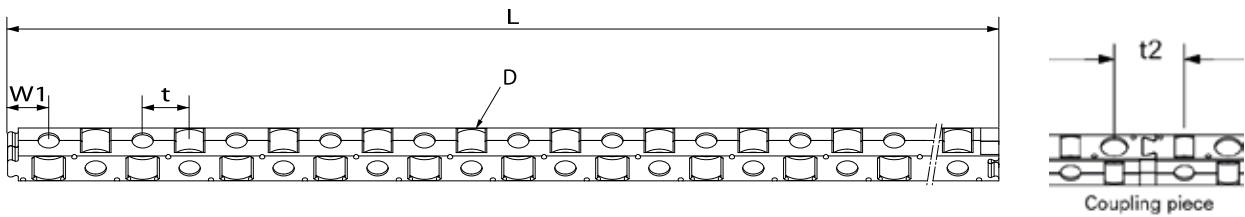
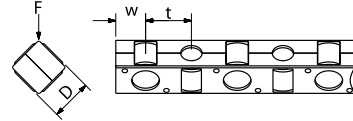
Units: mm

# ACCESSORIES

## FOR RAILS TYPE RSDE

### Roller cage type KRE and KREV size 3, 4 and 6 mm

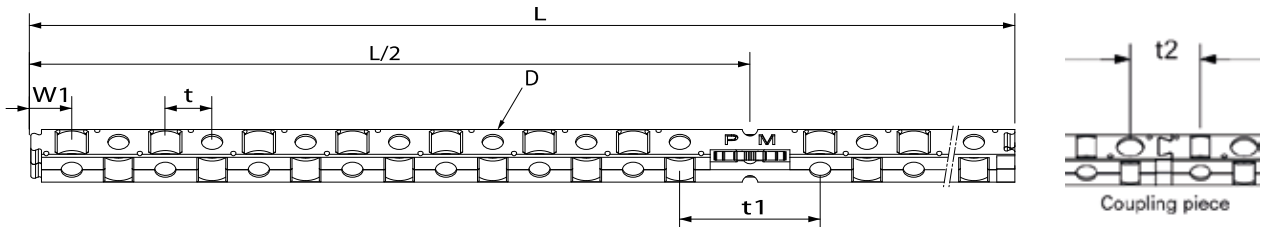
- Snap-on cage, rollers retained
- Suitable for horizontal and vertical application
- KRE material POM
- KREV material PEEK (suitable for UHV application in size 4 and 6)



### Roller cage type KRE and KREV size 3, 4 and 6 mm

- Snap-on cage, rollers retained
- Suitable for horizontal and vertical application
- KRE material POM
- KREV material PEEK (suitable for UHV application in size 4 and 6)

### Roller cage with anti cage creep technology KRE-ACC

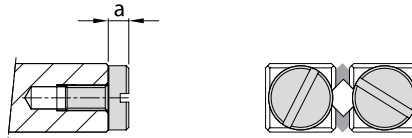


Cage type		Main dimensions							Accessories	
Standard	Stainless steel	D	t	t1	t2	w	w1	L	Suitable for rail	End screws
R3xKRE	R3xKRE-SS	3	3.3	-	5.1	2.2	2.95	101.6	RSDE- 3	GA
R3xKRE-ACC	R3xKRE-ACC-SS	3	3.3	10.9	5.1	2.2	2.95	101.6		GA
R4xKRE	R4xKRE-SS	4	4.4	13.2	6.7	2.8	3.85	135.3	RSDE- 4	GA
R4xKRE-ACC	R4xKRE-ACC-SS	4	4.4	13.2	6.7	2.8	3.85	135.3		GA
R4xKREV	R4xKREV-SS	4	4.5	13.2	6.7	2.8	on request			GA
R4xKREV-ACC	R4xKREV-ACC-SS	4	4.5	13.2	6.7	2.8	on request			GA
R6xKRE	R6xKRE-SS	6	6.6	19.8	10.6	4.3	6.3	204	RSDE- 6	GA
R6xKRE-ACC	R6xKRE-ACC-SS	6	6.6	19.8	10.6	4.3	6.3	204		GA
R6xKREV	R6xKREV-SS	6	6.7	19.8	10.6	4.3	on request			GA
R6xKREV-ACC	R6xKREV-ACC-SS	6	6.7	19.8	10.6	4.3	on request			GA
R9x...	R9x...-SS	on request							RSDE-9	GA
R9x...-ACC	R9x...-ACC-SS	on request								GA

F = For load direction please refer to picture provided

**End screws type GA, size 3 - 9 mm**

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

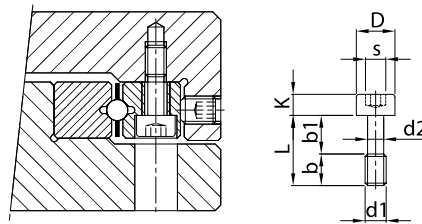


Dimensions	Size			
	3	4	6	9
a	2.4	2.7	3.7	4.2

Order template (adjust as needed): 8 pcs. End screws type GA-6  
 Stainless steel: 8 pcs. End screws type GA-6-SS

**Attachment screws type GD, size 3 - 9 mm**

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



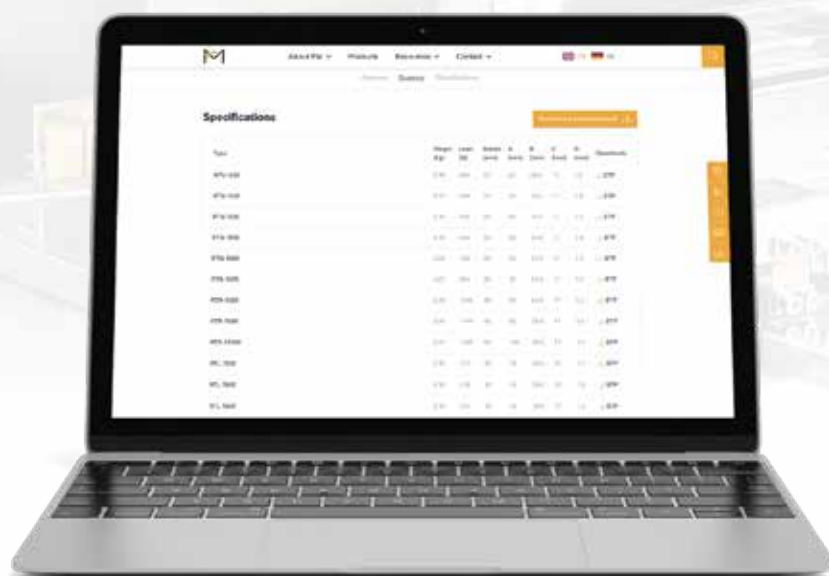
Type	Size								Max. tightening torque (Nm) <sup>1</sup>
	L	b	b1	D	d1	d2	K	s	
GD-3	12	5	7	5	M3	2.3	3	2.5	1.60
GD-4	16	7	9	6.5	M4	3	4	3	3.92
GD-6	20	8	12	8	M5	3.9	5	4	7.68
GD-9	30	12	18	8.5	M6	4.6	6	5	13.60

<sup>1</sup> Strength class 12.9



## SAVE TIME!

Direct access to the 3D CAD models of our standard products



[www.PM.NL](http://www.PM.NL)

# PM RESEARCH AND PRODUCTION FACILITIES



## **PM B.V.**

Galileistraat 2  
NL-7701 SK, Dedemsvaart  
The Netherlands

Tel: +31 523 61 22 58  
info@PM.nl

**[www.PM.nl](http://www.PM.nl)**

2020