



DESIGN INFORMATION

ACCURACY GRADES

The linear bearings manufactured by PM come in three grades of quality. The quality grade refers to the degree of parallellism between the running surfaces and reference surfaces A and B of the rail, as illustrated in graph and figure below.



- Q8: Standard precision grade, is suitable for most machine requirements
- Q4: Meets the demands for high precision applications
- Q2: Suitable for the highest accuracy requirements

If accuracy grade Q4 or Q2 is required for your order, please add a suffix "Q4" or"Q2" to the rail type number (for example: RSD-6300-Q4). Higher accuracies can be supplied on request. If applicable, please consult your PM advisor.

In order to achieve high running accuracy, PM linear bearings are very tightly toleranced (\pm 0.005 mm). This also means PM linear bearings can be deployed individually, making it unnecessary to include any identification markers on the rails.



SF-GRADE; SUPER FINISH GRADE

New technologies require tighter tolerances and higher speeds. Linear bearings finished in SF-Grade meet this requirement and provide outstanding performances for ultra-fine precision equipments.

Key features are:

- Reduction of surface roughness <0.05 Ra
 Rail V-groove surfaces obtain mirror finishing through smooth grinding
- Vibrations in sub-micron area are significantly reduced
- Further reduction of friction which results in a more smooth running linear motion

Your advantages:

- Low wear results in longer lifetime
- Virtually friction-free
- Higher rigidityAllows microscopic precision positioning

SF-Grade finish



Standard finish



Ideal applications for linear bearings in SF-Grade include wire bonding stages, measuring devices, material testing equipments, microscope stages and manipulators. Please contact us to discuss appropriate use of a lubricant that suits your specific needs.

TOLERANCES ON LENGTH AND MOUNTING HOLES



Linear bearings exceeding the maximum length of 1400 mm will be composed of different sections that are ground together and provided with end markings for assembly. The tolerance on length (A) is within ± 2 mm.



MATCHED PAIRS

For gravity-loaded rails that are matched, the tolerance level on height B for B1 to B2 is \pm 0.01 mm, and the pairs are marked. If several sets are ordered they will be marked accordingly.

In case of UK/UR recirculating elements, if two or more are b (mm): arranged one behind another in the application, we recommend ordering matched pairs by adding a suffix "MP" in your order note.



ASSEMBLY OF THE RAILS

When using threaded holes in the rails for assembly, special type GD attachment screws with a smaller shaft can be used for the adjustable rail. After inserting the cages between the rails, the linear bearing set needs some adjustment to eliminate play. The adjustable rail will move slowly to the other rail, thus requiring GD screws which allow for additional clearance in the mouting holes.



HEIGHT DIFFERENCE △H

To achieve best performance and for an even distribution of the load over the rolling elements the offset between mounting surfaces for the linear bearings should be within the calculated value offset ΔH .

The ΔH is calculated according to the following formulas. For rails with crossed roller cages:

 $\Delta H < 0.1 \cdot b$

For rails with needle roller cages:

∆H < 0.07 · b

 ΔH (μm):
 Maximum permissible deviation from the theoretically correct position

 b (mm):
 Centre distances of the bearings





TOLERANCES OF MOUNTING SURFACE

For standard applications an average mounting surface roughness of Ra 1.6 must be observed. For guality classes Q4 and Q2 the mounting surface roughness values are Ra 0.8 and 0.2

To achieve precision of the system the rails must be pushed against the mounting surface and reference shoulder.

To achieve best performance, the bearings must be mounted on rigid and fine-machined, (preferably grinded) flat surfaces and be supported over their entire length. The mounting and reference shoulder surfaces must be square to each other, with a maximum angular error of 0.3 µm/mm. The rails must be parallel to each other to prevent local overloading of rollers and dislocation of the cage. For applications with high accelerations we recommend the use of our Anti Cage Creep mechanism so as to prevent creeping of the cage out of its original position. Please see page 86 and 87 of this catalogue.



The tolerance of linear bearings in loaded or unloaded situations should not exceed the following values: Balls or rollers (RSD / RSDE / RNG) 0.3 µm/mm Needles (N/O / M/V) 0.1 µm/mm





 $\frac{K}{X} \ge 1$

- = Cage length
- = Stroke / travel = Rail length
- Α Atot = Overall length

RECOMMENDED STROKE LENGTH 'H'

As regards cage length and the associated load capacity, PM recommends a stroke length (H) of 70% of the (longest) rail length (A). In case the rail length is longer than 400 mm the stroke length can be increased up to a maximum of 100%. $H/A \le 0.7$ (for $H \le 400$ mm)

 $H/A \le 1$ (for H > 400 mm)

CALCULATION OF THE CAGE LENGTH 'K'

Cages travel at half the speed of moving rails and through half the distance i.e.: the stroke of the cage equals half the stroke of the moving bearing member or the slide top: K=H/2

On the other hand, with a normal frictionless sliding table, the upper member can move equal distances to either side of the center.

K=A-H/2 (i.e.: cage length = rail length - half of the max. stroke)

Relationship between cage length and distance between rails (x):



 $A_{tot} = A_{+}H_{+}2a$

- = Rail distance
 - a = End screw

LOAD CAPACITY 'C' USING ROLLERS Standard constructions with rollers: two roller cages, each in between rails of equal length, both longer than the cage. $C_{total} = Z \cdot C_{roller} \cdot \frac{1}{2}$ (amount of rollers $\cdot C_{dyn}$ per roller). Normally only half of the total number of rollers will have load on them; the other half resists possible lift-off forces. There is one exception: all rollers will be loaded if a pair of rails is installed horizontal, but one above the other, with the V-groove of the lower rail facing up and that of the upper rail facing down; i.e.: in the direction of the applied load, assumed here to be vertical.

For example: assuming a normal horizontal application, with two roller cages:

> R3x22AA: Z = 22 and C_{dyn} roller = 136 N per roller. C_{dyn} total = $(22 \cdot 2 \cdot 136)/2 = 2992$ N.

LOAD CAPACITY 'C' USING BALLS

A standard construction with balls consists of two ball cages, each interposed between rails of equal length, each longer than the cage.

Ctotal = Z x Cball

Z = Amount of rolling elements

Note: all the balls in the cages are load bearing. $C_{total} = Z \times C_{ball} = (no. of balls) \times (dynamic load rating per ball).$ Example: cage K3 x 23JJ; Z=23; Cdvn=30 N per ball. Ctotal=23 x 2 x 30=1380 N.

CALCULATION OF NUMBER OF ROLLING **ELEMENTS 'Z'**

$Z = \frac{K}{t}$

- Z = Amount of rolling elements
- K = Cage length
- t = Pitch between rolling elements

Example

K = 200 mm (cage length)

t = 5 mm (for 3 mm diameter rollers / balls) Z = 200 / 5 = 40 rollers or balls See load capacity table on page 12.

CAGE DESIGNATION

R3x40AA; roller size = 3 mm; 40 rollers; for horizontal application only. R6x18AL; roller size = 6 mm; 18 rollers; horizontal and vertical application. K3x20JJ: balls size = 3 mm; 20 balls; horizontal and vertical application.

SEALING

The rails must be kept clean at all times in order to prevent damage to the linear bearing. If the rails are subjected to contaminants, the use of telescopic bellows, covers or other shields is recommended

END PIECES

End pieces prevent the cage from moving out of the load zone. In order to ensure the quality of the rails during operation, it is necessary to protect the rails against contaminations. For this purpose, end pieces with type GCA wipers are available which are mounted over the end holes in the rails

Type GC end pieces are also suitable for linear bearing sets with combined rail lengths where the type GC end piece will be mounted in the longest rail.

MAXIMUM VELOCITY AND ACCELERATION RSD type linear bearings

Max. recommended speed v = 60 m/min. Max. acceleration $a = 50 \text{ m/sec}^2$.

RSDE and RNG type linear bearings

Max. recommended speed v = 60 m/min. Max. acceleration $a = 50 \text{ m/sec}^2$.

RSDE and RNG type with ACC-solution

Max. recommended speed v = 60 m/min. Max. acceleration $a = 150 \text{ m/sec}^2$, (15g).

N/O and M/V type linear bearings

Max. recommended speed v = 60 m/min. Max. acceleration $a = 50 \text{ m/sec}^2$. (depending on the cage type used).

UK and UR type recirculating units

Max. recommended speed v = 120 m/min. Max. acceleration a = 50 m/sec².

To achieve the above mentioned values for maximum acceleration and speed without skidding of balls and rollers (which could result in cage creeping), it is necessary to have appropriate preload settings in place. Please contact PM to obtain our expert guidance on preload settings.

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ASSEMBLY INSTRUCTIONS

One set of linear bearings consists of 4 pcs. rails (2 pairs), Example: Use of a type GD attachment screw 2 pcs. cages and 8 pcs. end screws or end pieces.

STANDARD FITTING EXAMPLES

Our range of linear bearing components can be positioned in any spatial orientation or direction required for your application. Rails can be attached to the slide base construction either using the threaded holes or using the through holes.

Use of RSD, RSDE or RNG



Use of N/O or M/V



PRELOAD SETTINGS

In order to assure a play-free movement and to increase the stiffness and accuracy of the linear bearing, preload adjustment is necessary. To adjust the preload uniformly, PM supplies especially designed type GD attachment screws. These screws are recommended for use with the through holes of the rail and the threaded holes in the slide members. Type GD screws allow for additional clearance in the mounting holes for the preload rail.



The smoothest running performance can be obtained by adjusting the preload setscrews (ISO 4026, DIN 913) opposite the rollers. By moving the slide, each of the preload setscrews can be adjusted. In applications where the cage runs outside the rails it is the shorter rail that has to be preloaded. For each mounting screw along the rail length one preload screw should be used.

The size of the preload set screw depends on the size of the rail (table 1 - 5, page 21).



The amount of preload depends on the size of the rail and the rigidity of the base construction. Based on our experience we recommend that the amount of preload, under normal conditions, is set between 2% to 20% of the permissible load C. For linear bearings type N/O we advise 2.5%C.

Under normal operating conditions, the recommended preload settings can be selected from table 1 - 5 on page 21.

AMOUNT OF PRELOAD FORCE

A calculation example of preload torque and the resulting preload force is provided here:

Rail RSDE-3150; g = 25 mm Roller cage type KRE-3; t = 3.3 mm, Cdyn = 392 N Attachment screw M4 Factor f (for rollers = 1; for balls / needles = 2); f = 1Amount of preload p. p = 8%Factor a in cm (please refer to the table below)

Set screw	Factor a
M2	0.0238
M2.5	0.0294
M3	0.035
M4	0.0469
M5	0.058
M6	0.0699
M8	0.0926
M10	0.1152
M12	0.1378
M14	0.1591
M16	0.1811

Calculation amount of force per set screw

 $Pps = q / t \cdot C_{dyn} \cdot p / 100 \cdot f$ Pps = 25 / 3.3 · 392 · 8 / 100 · 1 = 219 N

Calculation tightening torque on set screw Tightening torque = $Pps \cdot a$

Tightening torque = $219 \cdot 0.0469 = 10.27$ Ncm

The following figures illustrate typical methods used for applying preload.





Longitudinal wedge



RECOMMENDED STROKE LIMITING

The stroke must be limited either by the machine parts or by using limit switches. Cages may never be used as stroke limit. If they are, they can damage the running surface of the rails. Therefore we recommend the use of emergency hard stops which should be mounted in line with the bearing axis to prevent additional loads and moments on the linear bearings.

OVERRUNNING CAGES

Overrunning cages are used where a shorter slide moves over a longer rail. As the use of end pieces is not possible for the short rails, which get mounted in the moving slide, the short rails should be ordered with rounded inlets (please add a suffix "RI" in your order note). Rounded inlets enable the rollers to move in and out of the preload smoothly. For the longer rails we recommend type GB and GC end pieces. Not all for cages are overrunning suitable structures, as cage material, and lenght geometry all need to be considered. Please ask a PM expert for advice or follow the specifications provided for type.

As a general guideline the permissible application ratio A to A1 is determined as follows:

- For fixed rails 1 : 2
- For laid on rails 1 : 4











ASSEMBLY PROCEDURE

PRIOR TO ASSEMBLY

PM linear bearings are precision components; they have to be handled with meticulous care. To achieve a perfect 4) 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 Parallelism of rails V-groove: ΔA and ΔB 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 6) in this catalogue, it is necessary to consider the following points

- 1) To determine the location of fixing holes in the 7) support structure (slide base) the holes in the 8) 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 9) compensate this, special type GD or GDN attach-10) ment screws can be supplied. The dimensions of these screws are listed in the tables at the end of each chapter.
- Carefully de-burr and clean all elements, to ensure 2) 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.

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.



- 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.
 - Carefully insert the cages. When placed in their exact position, lightly secure the adjustable rail until the screws are finger-tight.
 - Fit the end screws or end pieces.
 - The linear bearing set is now ready to be backlash free-adjusted using the lateral preload set screws (page 18, Preload Settings). The amount of preload is given in the tables at page 21.
 - Secure the attachment screws on the adjusting rail.
- When assembly is complete, the linear bearings must be checked for absence of play and inspected for running quality.

TABLES

Roller

1.5

2

3

4

6

9

12

15

Roller

3

4

6

9

RECOMMENDED PRELOAD SETTINGS

Table 1 Linear bearings type RSD with roller cages

Roller	Pitch	Set		
size	cage	screw	Pitch*	Preload
(mm)	(mm)		(mm)	(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	12	M6	100	18.50
9	14	M8	100	105.50
12	22	M10	100	176.50
15	20	M12	100	370.00

Table 2 Linear bearings type RSD with ball cages

M2.5

M3

M5

M5

M6

M8

M10

M12

Set

M5

M5

M6

Table 3 Linear bearings type RSDE with roller cages

Pitch*

10

15

25

40

50

100

100

100

25

40

50

Preload (Ncm)

0.20

0.40

1.10

2.70

4.00

11.70

25.00

34.50

16

41

86

Pitch

3

4

5

7

9

14

20

Pitch

3.3

4.4

6.6

On request

15.5

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

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

Roller	Pitch	Set		
	cage	screw	Pitch*	Preload
(mm)	(mm)		(mm)	(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

RECOMMENDED TIGHTENING TORQUE FOR ATTACHMENT SCREWS

Table 6 Tightening torque strength grade 12.9

Max.	Max. tightening torques (Nm)										
	Tightening	Attachment									
	Torque	screws type GD									
Size	DIN 912	and GDN									
M2	0.60	0.48									
M3	2.00	1.60									
M4	4.90	3.92									
M5	9.60	7.68									
M6	17.00	13.60									
M8	41.00	19.20									
M10	79.00	38.40									
M12	140.00	66.40									
M14	220.00	66.40									

*pitch between the preload setscrews





AVAILABLE OPTIONS LINEAR BEARINGS

		RSD	RSDE	RNG	N/0 & M/V	DS	UK & UR
Order code	Catalogue page	25	47	61	69	95	97
Material / co	ating						
SS	Linear bearings made of stainless steel	٠	•	•	•	•	•
DI 1)	Dicronite® dry lube treatment	•	•	•	•	•	•
DU 1)	Duralloy® coating	•	•	•	•	•	•
Rail finishing							
RI	Rounded inlets at both rail ends	•	•	•	•	•	•
MP	Matched pairs, selected on height	•	•	•	•	•	•
SF	Super finish grade	•	•	•	•	•	•
Quality grade							
Q4	Quality grade meet the demands for high precision	•	•	•	•	•	•
Q2 ²⁾	Quality grade suitable for highest accuracy requirements	•	•	•	•	•	•
Special envir	ronment						
UHV	Ultra high vacuum cleaned and packed	•	٠	٠	•	•	•
CL	Cleanroom cleaned and packed	•	•	•	•	•	•
Anti cage cre	eeping technology						
ACC	Anti cage creep technology	•	•	•	٠	•	•
ACCI	Anti cage creep integrated tech- nology	•	• 3)	•	•	•	•
Mounting ho	les						
03	Threaded hole	•	•	•	• 4)	•	•
10	Through hole	•	•	•	• 4)	•	•
13	Threaded inserts integrated in the rail	•	•	•	• 4)	•	•
15	Through hole with countersunk (standard at M/V, no suffix needed)	•	•	•	• 4)	•	•

Available Not available

¹⁾ There are limitations to maximum rail lenght. Options available for standard grade, other quality grades on request

²⁾ Q2 quality grade only made to order

³⁾ Only available for linear bearings type RSDE made from stainless steel

⁴⁾ Only available for linear bearings type M/V

ORDERING CODE LINEAR BEARINGS PACKED AS SET

One set includes: 4 rails + 2 roller cages + 8 end screws/end pieces



¹⁾ Type of rails RSD, RSDE and RNG

²⁾ Standard 4 rails of the same lenght

³⁾ No code, supplied as standard listed in the product tables

 $^{\scriptscriptstyle 4)}$ Sets with ACC are delivered without end pieces

⁵⁾ By order ACC always indicate stroke lenght in order text



LINEAR BEARINGS







Our RSD linear bearings are compact rails for precise linear motion providing high accuracy and superior reliability. Depending on the load requirements they can be equipped either with ball or roller cages. Benefiting from many years of development, RSD bearings are the global standard for use in high-tech applications requiring first class quality and performance at a minimal cost.

STRUCTURE AND FEATURES

Depending on the construction, the linear bearing can be equipped with ball or roller cages with alternately crossed rollers. The set consists of two pairs of linear bearings; one pair consists of two similar 90° V-groove rails, through hardened and precision ground, equipped with a cage in between. Crossed roller cages are used in high load and high precision applications (note: good dust protection is required). Cages equipped with balls are used in applications requiring lower capacity, low friction resistance, or where dust and dirt are likely to gather in the rails. Balls are affected by dust and dirt to a lesser extend, owing to their self-cleaning properties.

Rails are equipped with countersunk attachment holes, bored according to a standard configuration.

Rail ends come with threaded holes for fixing end pieces and wipers.

For the attachment of the rails, special type GD screws are available to order separately (see page 37).

On request we supply linear bearings with roller size ø 18 mm and ø 24 mm. Please contact us for further information.

For long travel purpose type RSD rails can be combined with recirculating units type UK and UR, listed on page 97.

ORDER NOTES

One set linear bearing RSD consists of: 4 pcs. rails (=2 pairs), 2 pcs. cages and 8 pcs. end screws.

Please specify the following in your order:

- Quantity and type of rails
- Quantity, type and length of cages or max. stroke
 Direction of movement (eg: horizontal, vertical or in between)
- Quantity and type of end screws or end pieces with or without wipers (eg: in case of GC and GC-A, only 4 pieces are needed)

Example:

To order one linear bearing set of 300 mm length, size 6 mm for a 120 mm long horizontal stroke in standard quality please specify as follows:

- 4 pcs. Rails type RSD-6300
- 2 pcs. Roller cages type R6x20AA
- 8 pcs. End screws type GA-6











R	Main dimensions					Mounting holes						
Standard	Stainless steel	Α	В	C	E	D	f	g	h	k	m	р
RSD-1520	RSD-1520-SS	20						1x10				
RSD-1530	RSD-1530-SS	30						2x10				
RSD-1540	RSD-1540-SS	40						3x10				
RSD-1550	RSD-1550-SS	50						4x10				
RSD-1560	RSD-1560-SS	60						5x10				
RSD-1570	RSD-1570-SS	70	8.5	4	3.9	1.5	5	6x10	1.8 ^{±0.1}	1.6	M2	3
RSD-1580	RSD-1580-SS	80						7x10				
RSD-1590	RSD-1590-SS	90						8x10				
RSD-15100	RSD-15100-SS	100						9x10				
RSD-15120	RSD-15120-SS	120						11x10				
RSD-15140	RSD-15140-SS	140						13x10				
RSD-2030	RSD-2030-SS	30						1x15				
RSD-2045	RSD-2045-SS	45						2x15				
RSD-2060	RSD-2060-SS	60						3x15				
RSD-2075	RSD-2075-SS	75						4x15				
RSD-2090	RSD-2090-SS	90						5x15				
RSD-2105	RSD-2105-SS	105	12	6	5.5	2	7.5	6x15	$2.5^{\pm 0.1}$	2.5	M3	4.3
RSD-2120	RSD-2120-SS	120						7x15				
RSD-2135	RSD-2135-SS	135						8x15				
RSD-2150	RSD-2150-SS	150						9x15				
RSD-2165	RSD-2165-SS	165						10x15				
RSD-2180	RSD-2180-SS	180						11x15				

				3	RSD-1520	
				4	RSD-1530	
				5	RSD-1540	
				6	RSD-1550	
				7	RSD-1560	Cages: AA, KZR, JJ, KKLK
1.4	M1.8	1.95	3.1	8	RSD-1570	
				9	RSD-1580	End pieces: GA, GB
				10	RSD-1590	
				12	RSD-15100	
				14	RSD-15120	
				16	RSD-15140	
				8	RSD-2030	
				11	RSD-2045	
				14	RSD-2060	
				17	RSD-2075	
				20	RSD-2090	Cages: AA, KZR, JJ, KKLK
2	M2.5	2.75	4.5	23	RSD-2105	
				26	RSD-2120	End pieces: GA, GB
				30	RSD-2135	
				34	RSD-2150	
				37	RSD-2165	
				40	RSD-2180	

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Bold = Short lead time item

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









R	Main dimensions					Mounting holes						
Standard	Stainless steel	Α	В	C	E	D	f	g	h	k	m	р
RSD-3050	RSD-3050-SS	50						1x25				
RSD-3075	RSD-3075-SS	75						2x25				
RSD-3100	RSD-3100-SS	100						3x25				
RSD-3125	RSD-3125-SS	125						4x25				
RSD-3150	RSD-3150-SS	150						5x25				
RSD-3175	RSD-3175-SS	175	18	8	8.25	3	12.5	6x25	$3.5^{\pm0.2}$	3.2	M4	6
RSD-3200	RSD-3200-SS	200						7x25				
RSD-3225	RSD-3225-SS	225						8x25				
RSD-3250	RSD-3250-SS	250						9x25				
RSD-3275	RSD-3275-SS	275						10x25				
RSD-3300	RSD-3300-SS	300						11x25				
RSD-3350	RSD-3350-SS	350						13x25				
RSD-4080	RSD-4080-SS	80						1x40				
RSD-4120	RSD-4120-SS	120						2x40				
RSD-4160	RSD-4160-SS	160						3x40				
RSD-4200	RSD-4200-SS	200						4x40				
RSD-4240	RSD-4240-SS	240						5x40				
RSD-4280	RSD-4280-SS	280	22	11	10	4	20	6x40	$4.5^{\pm0.2}$	4.3	M5	7.5
RSD-4320	RSD-4320-SS	320						7x40				
RSD-4360	RSD-4360-SS	360						8x40				
RSD-4400	RSD-4400-SS	400						9x40				
RSD-4440	RSD-4440-SS	440						10x40				
RSD-4480	RSD-4480-SS	480						11x40				

r	m1	S	t	Weight (g)	Туре	Accessories
				22	RSD-3050	
				33	RSD-3075	
				44	RSD-3100	
				55	RSD-3125	Cages: AA, KZR, JJ, KKLK
				66	RSD-3150	
3.2	M3	4.1	5.5	77	RSD-3175	End pieces: GA, GB, GC, GCA-wiper
				88	RSD-3200	
				99	RSD-3225	Attachment screws: GD-3
				110	RSD-3250	
				121	RSD-3275	
				132	RSD-3300	
				155	RSD-3350	
				64	RSD-4080	
				96	RSD-4120	
				120	RSD-4160	
				160	RSD-4200	Cages: AA, JJ
				192	RSD-4240	
4.1	M3	5	7	224	RSD-4280	End pieces: GA, GB, GC, GCA-wiper
				256	RSD-4320	
				288	RSD-4360	Attachment screws: GD-4
				320	RSD-4400	
				352	RSD-4440	
				384	RSD-4480	

Bold = Short lead time item

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

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R	ail type	Main dimensions					Mounting holes					
Standard	Stainless steel	Α	В	C	E	D	f	g	h	k	m	р
RSD-6100	RSD-6100-SS	100						1x50				
RSD-6150	RSD-6150-SS	150						2x50				
RSD-6200	RSD-6200-SS	200						3x50				
RSD-6250	RSD-6250-SS	250						4x50				
RSD-6300	RSD-6300-SS	300						5x50				
RSD-6350	RSD-6350-SS	350						6x50	1			
RSD-6400	RSD-6400-SS	400						7x50				
RSD-6450	RSD-6450-SS	450	31	15	14	6	25	8x50	6 ^{±0.2}	5.2	M6	9.5
RSD-6500	RSD-6500-SS	500						9x50				
RSD-6600	RSD-6600-SS	600						11x50				
RSD-6700	RSD-6700-SS	700						13x50				
RSD-6800	RSD-6800-SS	800						15x50				
RSD-6900	RSD-6900-SS	900						17x50				
RSD-61000	RSD-61000-SS	1000						19x50				
RSD-61100	RSD-61100-SS	1100						21x50				
RSD-61200	RSD-61200-SS	1200						23x50				
RSD-9100	RSD-9100-SS	100					25	1x50				
RSD-9200	RSD-9200-SS	200						1x100				
RSD-9300	RSD-9300-SS	300						2x100				
RSD-9400	RSD-9400-SS	400						3x100				
RSD-9500	RSD-9500-SS	500						4x100				
RSD-9600	RSD-9600-SS	600	44	22	19.8	9	50	5x100	9 ^{±0.2}	6.8	M8	11
RSD-9700	RSD-9700-SS	700						6x100				
RSD-9800	RSD-9800-SS	800						7x100				
RSD-9900	RSD-9900-SS	900						8x100				
RSD-91000	RSD-91000-SS	1000						9x100				
RSD-91100	RSD-91100-SS	1100						10x100				
RSD-91200	RSD-91200-SS	1200						11x100				

				142	RSD-6100	
				213	RSD-6150	
				288	RSD-6200	
				360	RSD-6250	
				432	RSD-6300	
				504	RSD-6350	Cages: AA, AL, KZR, JJ, KKLK
				576	RSD-6400	
5.2	M5	7	8.5	648	RSD-6450	End pieces: GA, GB, GC, GCA-wiper
				720	RSD-6500	
				864	RSD-6600	Attachment screws: GD-6
				1008	RSD-6700	
				1152	RSD-6800	
				1296	RSD-6900	
				1440	RSD-61000	
				1584	RSD-61100	
				1728	RSD-61200	
				306	RSD-9100	
				616	RSD-9200	
				926	RSD-9300	
				1236	RSD-9400	Cages: AA, AL, KZR, JJ, KKLK
				1546	RSD-9500	
6.2	M6	9.9	10	1856	RSD-9600	End pieces: GA, GB, GC, GCA-wiper
				2166	RSD-9700	
				2476	RSD-9800	Attachment screws: GD-9
				2786	RSD-9900	
				3096	RSD-91000	
				3406	RSD-91100	
				3716	RSD-91200	

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Bold = Short lead time item

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









R	ail type	Main dimensions					Mounting holes						
Standard	Stainless steel	Α		C	m	D	f	g		k		р	
RSD-12200		200						1x100					
RSD-12300		300						2x100					
RSD-12400		400						3x100					
RSD-12500		500						4x100					
RSD-12600		600						5x100					
RSD-12700	on request	700	58	28	25.9	12	50	6x100	12 ^{±0.2}	8.5	M10	13.5	
RSD-12800	Unicquest	800						7x100					
RSD-12900		900						8x100					
RSD-121000		1000						9x100					
RSD-121100		1100						10x100					
RSD-121200		1200						11x100					
RSD-121400		1400						13x100					
RSD-15300		300						2x100					
RSD-15400		400						3x100					
RSD-15500		500						4x100					
RSD-15600		600						5x100					
RSD-15700		700						6x100					
RSD-15800	on request	800	71	36	31.9	15	50	7x100	14 ^{±0.2}	10.3	M12	16.5	
RSD-15900		900						8x100					
RSD-151000		1000						9x100					
RSD-151100		1100						10x100					
RSD-151200		1200						11x100					
RSD-151400		1400						13x100					

				1011	DCD 10000	
				1011	RSD-12200	
				1525	RSD-12300	
				2039	RSD-12400	
				2553	RSD-12500	Cages: AA, AL, JJ, KKLK
				3067	RSD-12600	
8.3	M8	12.95	15	3581	RSD-12700	End pieces: GA, GB, GC, GCA-wiper
				4095	RSD-12800	
				4609	RSD-12900	Attachment screws: GD-12
				5123	RSD-121000	
				5637	RSD-121100	
				6151	RSD-121200	
				7693	RSD-121400	
				2426	RSD-15300	
				3221	RSD-15400	
				4027	RSD-15500	
				4833	RSD-15600	Cages: AA, AL, JJ
				5639	RSD-15700	
10.3	M8	15.95	15	6445	RSD-15800	End pieces: GA, GB, GC, GCA-wiper
				7251	RSD-15900	
				8057	RSD-151000	Attachment screws: GD-15
				8863	RSD-151100	
				9669	RSD-151200	
				10475	RSD-151400	

Bold = Short lead time item

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



LINEAR BEARINGS



ACCESSORIES

FOR LINEAR BEARINGS TYPE RSD AND DS

Roller cage type AA, size 1.5 - 15 mm

- Rollers retained
- For horizontal application
- Material steel, 1.5 6 mm cage material stainless steel 304

Roller cage type AL, size 6 - 15 mm

- Rollers retained
- For horizontal and vertical application
- Suitable for protruding cages
- Cage material aluminum





Roller cage type KZR, size 1.5 - 9 mm

- Rollers retained
- For horizontal and vertical application
- · Cage material plastic (reinforced cages available in
- size 6 and 9 mm)
- Max. roller amount of 24 for 1.5 and 2 mm cages
- Suitable for protruding cages

Ball cage type KKLK, size 1.5 - 12 mm

- Balls retained
- For horizontal and vertical application
- Material plastic
- Suitable for protruding cages

Ball cage type JJ, size 1.5 - 15 mm

- Balls retained (size 6 15 mm)
- For horizontal and vertical application
- Cage material brass





Cag	e type			Main dimens	sions		Acces	sories
							Suitable for	
Standard	Stainless steel	D		d		w	rail	End pieces
R1.5xAA	R1.5xAA-SS		3.8	0.2	2.5	2		GA
R1.5xKZR	R1.5xKZR-SS	1.5	3.86	0.5	3	2		GB
K1.5xJJ	K1.5xJJ-SS	1.5	3.5	0.5	3	1.5	RSD-1.5	GB
K1.5xKKLK	K1.5xKKLK-SS		3.5	0.45	2.2	1.5		GB
R2xAA	R2xAA-SS		5.6	0.3	4	2		GA
R2xKZR	R2xKZR-SS	2	5.5	0.7	4	2	PCD 2	GB
K2xJJ	K2xJJ-SS	2	5.5	0.8	4	2	1 130-2	GB
K2×KKLK	K2×KKLK-SS		5	0.75	3.9	3		GB
R3xAA	R3xAA-SS		7.5	0.5	5	2.5		GA
R3xKZR	R3xKZR-SS		7	1	5	2.5		GB, GC
K3xJJ	K3xJJ-SS	3	7.5	1.2	5	2.5	nsD-3	GB, GC
K3xKKLK	K3xKKLK-SS		7	1	4.2	2.7		GB, GC
R4xAA	R4xAA-SS	4	10	0.5	7	5	PSD 4	GA
K4xJJ	K4xJJ-SS	4	10	1.0	7	5	n3D-4	GB, GC

F = For load direction please refer to picture provided

Cag	e type			Main dimen			Accessories		
							Suitable for		
Standard	Stainless steel	D	b	d	t	w	rail	End pieces	
R6xAA	R6xAA-SS		14	0.75	9	6		GA	
R6xAL	R6xAL-SS		14	2.5	9	6	1	GB, GC	
R6×KZR	R6xKZR-SS	6	14	2.5	8.5	6	RSD-6	GB, GC	
K6xJJ	K6xJJ-SS		14	2.5	9	6		GB, GC	
K6×KKLK	K6xKKLK-SS		14	2.5	9	6		GB, GC	
R9xAA	R9xAA-SS		20	1	14	9		GA	
R9xAL	R9xAL-SS		20	4	14	9	RSD-9	GB, GC	
R9xKZR	R9xKZR-SS	9	20	3	14	9		GB, GC	
K9xJJ	K9xJ-SS		20	4	14	9		GB, GC	
K9×KKLK	K9xKKLK-SS		20	3.5	14	9		GB, GC	
R12xAA			26	1.2	18	11		GA	
R12xAL]	10	25	5	18	11	DCD 12	GB, GC	
K12xJJ	on request	12	25	5	18	11	NSD-12	GB, GC	
K12xKKLK			20	4	15.5	11		GB, GC	
R15xAA			35	1.2	20	12		GA	
R15xAL	on request	15	35	5	20	12	RSD-15	GB, GC	
K15xJJ			35	5	20	12	1	GB, GC	

F = For load direction please refer to picture provided





End screws type GA, size 1.5 - 15 mm For horizontal application KE For cages type AA For rails type RSD End pieces type GB, size 1.5 - 15 mm • For horizontal and vertical application • For cages type AL, KZR, JJ, KKLK, KRE, KREV For rails type RSD and RSDE Size 3-15 mm Size 1.5 mm Size 2 mm 00

End pieces GC and wipers GCA, size 3 - 15 mm

- · For horizontal and vertical application
- For cages type AL, KZR, JJ, KKLK
- For rails type RSD
- Suitable for protruding cages
- 4 pcs. per set are needed



	Size												
Dimensions	1.5	2	3	4	6	9	12	15					
а	1.5	2	2.4	2.7	3.7	4.2	5.3	5.3					
b	2	2.6	2	2.5	3.2	4.2	5.2	6.3					
С	-	-	5	2.7	6.2	7.2	8.2	9.3					

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 - 15 mm

- To compensate for pitch distances between
- mounting holes
- Recommended for application of preload rail
- For rails type RSD and RSDE



				Max. tightening					
Туре	L	b	b1	D	d1	d2	K	S	torque (Nm) ¹
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
GD-12	40	17	23	11.3	M8	6.2	8	6	19.20
GD-15	45	16	29	13.9	M10	7.9	10	8	38.40

¹Strength class 12.9



LINEAR BEARINGS







LINEAR BEARING SET

User benefits

- Packaged as a set
- Standard stroke lengths*
- Ready for assembly, reducing cost
- Cages are straightened
- Short lead times
- Global standard
- All parts come pre-selected with stroke and load ratings

*Do you require longer stroke lengths? Roller cages can easily be shortened. Cage length should be at least 70% of the rail length.

Linear bearings set type RSD

Used by industries around the world, type RSD linear bearings provide high accuracy and superior reliability. A standard set consists of:

- 4 pcs. Rails type RSD
- 2 pcs. Roller cages type AA
- 8 pcs. End screws type GA inserted in the rail ends Packed and delivered as a set.

Example: RSD-3100x14AA

One set consists of:

- 4 pcs. Rails type RSD-3100
- 2 pcs. Roller cages type R3x14AA
- 8 pcs. End screws type GA-3

PRODUCT CODES

To specify your detailed order, please follow the product code format as set out in the table below.

Type + Size	Rail length	Quality grade (Suffix Q4, Q2)	Number of rollers	Cage type (Suffix KRE, KREV)	Stainless steel (Suffix SS)
RSD- 3	100		x10	AA	

Order template (adjust as needed): Standard: 1 set RSD-3100x10AA Stainless steel: 1 set RSD-3100x10AA-SS

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End

Cdyn (N



RSD-1520x4KZR







One set includes: 4 rails + 2 roller cages + 8 end screws

RS	D Kit	Ma	ain dim	nensio	ns		Mounting holes					
Standard	Stainless steel	Α	В	С	E	D	f	g	h		m	р
RSD-1520x4KZR	RSD-1520x4KZR-SS	20						1x10				
RSD-1530x6KZR	RSD-1530x6KZR-SS	30						2x10				
RSD-1540x8KZR	RSD-1540x8KZR-SS	40						3x10				
RSD-1550x10KZR	RSD-1550x10KZR-SS	50	8.5	4	3.9	1.5	5	4x10	1.8 ^{±0.1}	1.6	M2	3
RSD-1560x13KZR	RSD-1560x13KZR-SS	60						5x10				
RSD-1570x15KZR	RSD-1570x15KZR-SS	70						6x10				
RSD-1580x17KZR	RSD-1580x17KZR-SS	80						7x10				
RSD-2030x5AA	RSD-2030x5AA-SS	30						1x15				
RSD-2045x8AA	RSD-2045x8AA-SS	45						2x15				
RSD-2060x11AA	RSD-2060x11AA-SS	60						3x15				
RSD-2075x13AA	RSD-2075x13AA-SS	75						4x15				
RSD-2090x16AA	RSD-2090x16AA-SS	90						5x15				
RSD-2105x18AA	RSD-2105x18AA-SS	105	12	6	5.5	2	7.5	6x15	$2.5^{\pm0.1}$	2.5	M3	4.3
RSD-2120x21AA	RSD-2120x21AA-SS	120						7x15				
RSD-2135x23AA	RSD-2135x23AA-SS	135						8x15				
RSD-2150x26AA	RSD-2150x26AA-SS	150						9x15				
RSD-2165x29AA	RSD-2165x29AA-SS	165						10x15				
RSD-2180x32AA	RSD-2180x32AA-SS	180						11x15				
RSD-3050x7AA	RSD-3050x7AA-SS	50						1x25				
RSD-3075x10AA	RSD-3075x10AA-SS	75						2x25				
RSD-3100x14AA	RSD-3100x14AA-SS	100						3x25				
RSD-3125x17AA	RSD-3125x17AA-SS	125						4x25				
RSD-3150x21AA	RSD-3150x21AA-SS	150						5x25				
RSD-3175x24AA	RSD-3175x24AA-SS	175	18	8	8.2	3	12.5	6x25	3.5 ^{±0.2}	3.2	M4	6
RSD-3200x28AA	RSD-3200x28AA-SS	200						7x25				
RSD-3225x31AA	RSD-3225x31AA-SS	225						8x25				
RSD-3250x35AA	RSD-3250x35AA-SS	250						9x25				
RSD-3275x38AA	RSD-3275x38AA-SS	275						10x25				
RSD-3300x42AA	RSD-3300x42AA-SS	300						11x25				

RSD-1530x6KZR RSD-1540x8KZR 1.4 0.5 1.5 3.8 2.25 RSD-1550x10KZR RSD-1560x13KZR RSD-1570x15KZR RSD-1580x17KZR RSD-2030x5AA RSD-2045x8AA RSD-2060x11AA RSD-2075x13AA RSD-2090x16AA 5.6 0.3 2.8 RSD-2105x18AA RSD-2120x21AA RSD-2135x23AA RSD-2150x26AA RSD-2165x29AA RSD-2180x32AA RSD-3050x7AA RSD-3075x10AA RSD-3100x14AA RSD-3125x17AA RSD-3150x21AA 3.5 3.2 2.4 7.5 0.5 RSD-3175x24AA RSD-3200x28AA RSD-3225x31AA RSD-3250x35AA RSD-3275x38AA RSD-3300x42AA

F = For load direction please refer to picture provided

Units: mm

Bold = Short lead time item

 $\label{eq:Regular} Regular = Long \ \text{lead time item - please ask us about prices and lead times}$











One set includes: 4 rails + 2 roller cages + 8 end screws

RS	Ma	in din	ensio	ns		Mounting holes						
Standard	Stainless steel	Α	В	C	E	D	f	g	h	k	m	р
RSD-4080x7AA	RSD-4080x7AA-SS	80						1x40				
RSD-4120x11AA	RSD-4120x11AA-SS	120						2x40				
RSD-4160x15AA	RSD-4160x15AA-SS	160						3x40				
RSD-4200x19AA	RSD-4200x19AA-SS	200						4x40				
RSD-4240x23AA	RSD-4240x23AA-SS	240						5x40				
RSD-4280 x27AA	RSD-4280x27AA-SS	280	22	11	10	4	20	6x40	$4.5^{\pm0.2}$	4.3	M5	7.5
RSD-4320x31AA	RSD-4320x31AA-SS	320						7x40				
RSD-4360x35AA	RSD-4360x35AA-SS	360						8x40				
RSD-4400x39AA	RSD-4400x39AA-SS	400						9x40				
RSD-4440x43AA	RSD-4440x43AA-SS	440						10x40				
RSD-4480x47AA	RSD-4480x47AA-SS	480						11x40				
RSD-6100x8AA	RSD-6100x8AA-SS	100						1x50				
RSD-6150x12AA	RSD-6150x12AA-SS	150						2x50				
RSD-6200x15AA	RSD-6200x15AA-SS	200						3x50				
RSD-6250x19AA	RSD-6250x19AA-SS	250						4x50				
RSD-6300x23AA	RSD-6300x23AA-SS	300						5x50				
RSD-6350x27AA	RSD-6350x27AA-SS	350	31	15	14	6	25	6x50	6 ^{±0.2}	5.2	M6	9.5
RSD-6400x30AA	RSD-6400x30AA-SS	400						7x50				
RSD-6450x34AA	RSD-6450x34AA-SS	450						8x50				
RSD-6500x38AA	RSD-6500x38AA-SS	500						9x50				
RSD-6600x46AA	RSD-6600x46AA-SS	600						11x50				

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Bold = Short lead time item

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

	End	Weight	Load rating	g Roller cag			age			
r	pieces a	(g)	C _{dyn} (N)	b	d	t	w	Z	Stroke	Туре
		282	1862					7	58	RSD-4080x7AA
		420	2915					11	82	RSD-4120x11AA
		561	3975					15	105	RSD-4160x15AA
		702	5035					19	130	RSD-4200x19AA
		843	6095					23	150	RSD-4240x23AA
4.1	2.7	985	7155	10	0.5	7	5	27	175	RSD-4280x27AA
		1121	8480					31	200	RSD-4320x31AA
		1263	9275					35	225	RSD-4360x35AA
		1405	10335					39	250	RSD-4400x39AA
		1545	11395					43	270	RSD-4440x43AA
		1687	12455					47	295	RSD-4480x47AA
		627	4320					8	55	RSD-6100x8AA
		942	6480					12	84	RSD-6150x12AA
		1260	8100					15	120	RSD-6200x15AA
		1570	10260					19	150	RSD-6250x19AA
		1880	12420					23	185	RSD-6300x23AA
5.2	3.7	2200	14580	14	0.75	9	6	27	214	RSD-6350x27AA
		2510	16200					30	245	RSD-6400x30AA
		2830	18360					34	280	RSD-6450x34AA
		3140	20520					38	310	RSD-6500x38AA
		3770	24840					46	360	RSD-6600x46AA

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F = For load direction please refer to picture provided





Stroke

RSD-9200x10AA

RSD-9300x15AA







One set includes: 4 rails + 2 roller cages + 8 end screws

RS	D Kit	Ma	in dim	ensio	ns		Mounting holes					
Standard	Stainless steel	Α	В	C	E		f	g	h	k	m	р
RSD-9200x10AA	RSD-9200x10AA-SS	200						1x100				
RSD-9300x15AA	RSD-9300x15AA-SS	300						2x100				
RSD-9400x20AA	RSD-9400x20AA-SS	400						3x100				
RSD-9500x25AA	RSD-9500x25AA-SS	500						4x100				
RSD-9600x30AA	RSD-9600x30AA-SS	600						5x100				
RSD-9700x35AA	RSD-9700x35AA-SS	700	44	22	19.8	9	50	6x100	9 ^{±0.2}	6.8	M8	11
RSD-9800x40AA	RSD-9800x40AA-SS	800						7x100				
RSD-9900x45AA	RSD-9900x45AA-SS	900						8x100				
RSD-91000x50AA	RSD-91000x50AA-SS	1000						9x100				
RSD-91100x55AA	RSD-91100x55AA-SS	1100						10x100				
RSD-91200x60AA	RSD-91200x60AA-SS	1200						11x100				
RSD-12200x7AA		200						1x100				
RSD-12300x11AA		300						2x100				
RSD-12400x15AA		400						3x100				
RSD-12500x18AA		500						4x100				
RSD-12600x23AA		600						5x100				
RSD-12700x26AA	On request	700	58	28	25.9	12	50	6x100	12 ^{±0.2}	8.5	M10	13.5
RSD-12800x31AA		800						7x100				
RSD-12900x34AA		900						8x100				
RSD-121000x37AA		1000						9x100				
RSD-121100x42AA		1100						10x100				
RSD-121200x46AA		1200						11x100				

RSD-9400x20AA RSD-9500x25AA RSD-9600x30AA 6.2 4.2 RSD-9700x35AA RSD-9800x40AA RSD-9900x45AA RSD-91000x50AA RSD-91100x55AA RSD-91200x60AA RSD-12200x7AA RSD-12300x11AA RSD-12400x15AA RSD-12500x18AA RSD-12600x23AA 8.3 1.2 RSD-12700x26AA 5.3 RSD-12800x31AA RSD-12900x34AA RSD-121000x37AA RSD-121100x42AA RSD-121200 x46AA

F = For load direction please refer to picture provided

Units: mm

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

Bold = Short lead time item