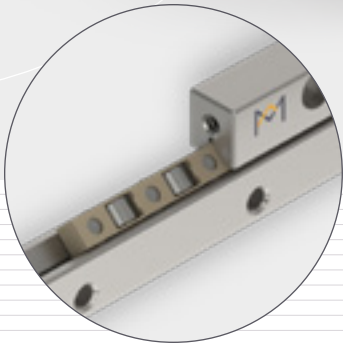
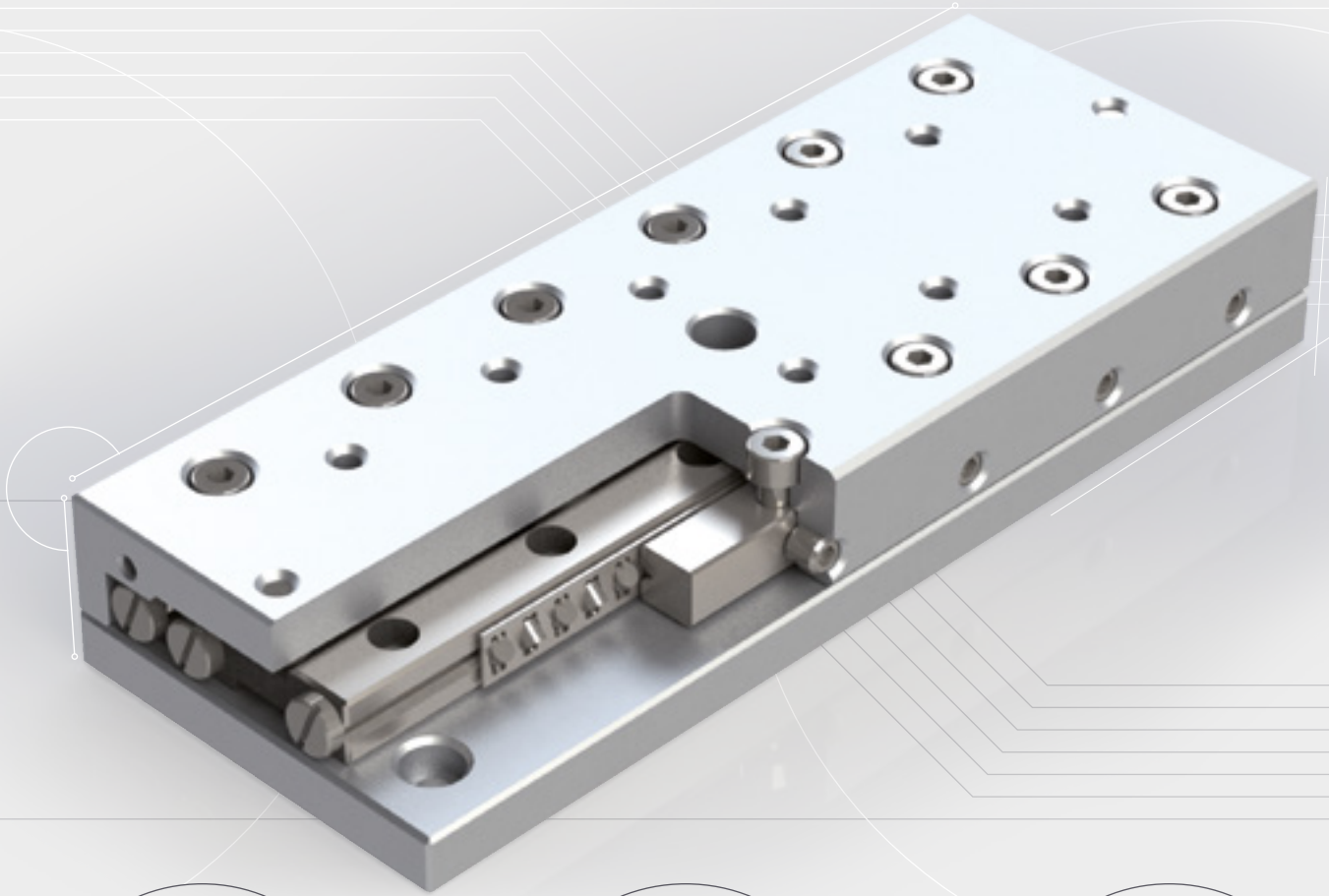


OVER
50
YEARS
of success



PRODUCT CATALOGUE LINEAR BEARINGS AND SLIDES



Company's headquarters in Dedemsvaart, Netherlands



Innovative design and manufacture of precision linear bearings, frictionless slides, positioning stages and mechatronic 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

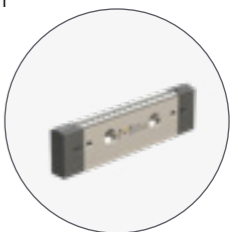
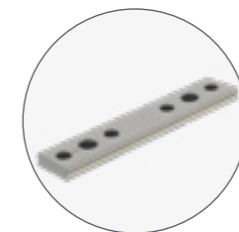
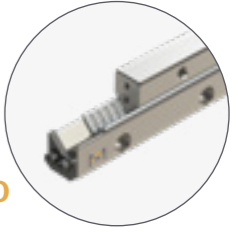
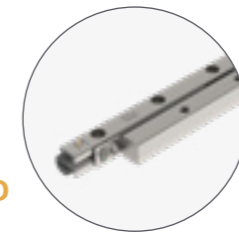
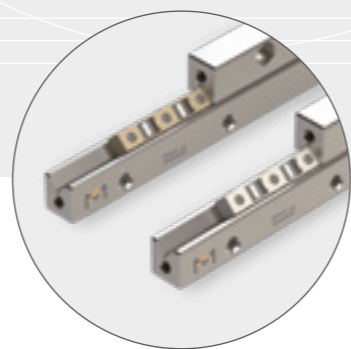
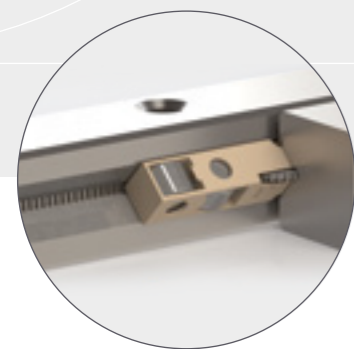
PM linear bearings are used as components in multiple industries worldwide. What really sets apart PM products is their unsurpassed quality and technical performance in terms of accuracy, their extremely low levels of friction, high rigidity and long lifetime.

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.

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.

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 37

2. LINEAR BEARING TYPE RSDE

- Equipped with rollers, size 3 – 9 mm
- For precision applications
- Lengths from 50 - 1200 mm
- Anti cage creep technology optional
- Also available as a set, see page 53

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 63

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

4. 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



TECHNICAL SPECIFICATIONS

GENERAL

PM linear bearings and frictionless precision slides are available in various models with ball and roller diameters available in many standard lengths and sizes.

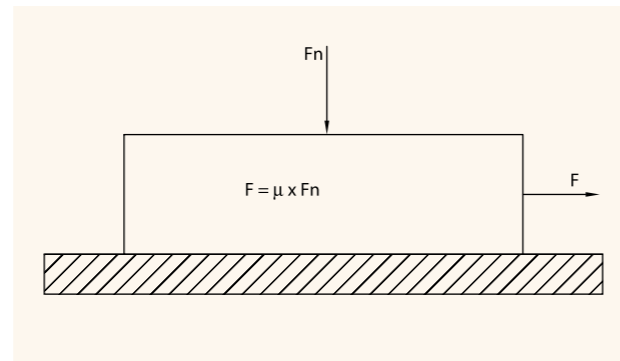
The range of sizes and lengths covers virtually all industry applications and allows the designer to solve most problems in the field of linear movement when it comes to frictionless movement with adjustable preloads. Additionally, PM linear bearings are virtually free of wear and require little lubrication or maintenance (specific conditions of use need to be considered for every application). Application fields include:

- Semiconductor industry
- Machine tools
- Automation technology
- Measuring machines and microscopy
- Optical devices

PM parts are available in compact dimensions, have high accuracy of movement and high durability, resulting in lower maintenance costs. Parts are designed to be easily interchangeable in the event of wear. As linear bearings and slides are crucial components in most applications, PM parts are manufactured with the greatest care to provide the maximum amount of linear accuracy and reliability.

FRICTION

Friction is the mechanical resistance created by the process of one moving surface or object when coming into contact with another. A smoothly grinded surface has the beneficial effect of reducing the level of friction. PM uses the highest quality of rollers in combination with precision ground rails which are manufactured by our own team of specialists.



μ = Coefficient of friction
 F_n = Normal force
 F = Frictional resistance

Note: The use of wipers and seals increases friction.

LUBRICATION

PM linear bearings are a key component in the construction of machines. The standard of high quality has to be maintained for the duration of the calculated lifetime (page 11). The linear bearings have to be protected against contaminated environments. Lubrication creates a film between rolling surfaces and helps to protect against corrosion.

Other benefits are for example:

- Friction reduction
- Reduction of wear
- Extended lifetime
- Heat reduction

We prefer to use lubrication by CLP oil, such as DIN 51519 and HLP oil, such as DIN 51524. Assuming viscosity values between ISO-VG15 and ISO-VG100. In case of grease, the use of a lubricant on a lithium soap basis is recommended. Lubrication is a factor to be taken into account when using PM linear bearings, due to components being manufactured from non-standardised materials and their potential for use in highly specialised operational environments. Please contact us if you require further information.

MATERIALS

The rails are made of tool steel 1.2842 or bearing steel 1.3505, through hardened between 58 and 62 HRC. The rolling elements are made of bearing steel 1.3505 and have a hardness between 60 and 64 HRC. For application which requiring stainless steel, the rails and rolling elements are made of 1.4034 or 1.4112, through hardened between 54 and 57 HRC.

CAGES

Depending on the type and size of the linear bearing, different cage types are available. In applications with high operating temperatures or extreme operating conditions PM is able to supply customised cages. Please contact a PM advisor to discuss requirements for your application.

CHARACTERISTICS OF CAGES

Cages in precision rails have a wide range of different purposes:

- They maintain appropriate distance between rolling elements, prevent their mutual contact and thus reduce friction
- They ensure an even distribution of rolling elements, thus resulting in a smooth run
- They guide the rolling elements in the unloaded zone of a rail and thus improve rolling conditions to prevent detrimental sliding movements from occurring

CAGES FOR RSD AND DS RAILS

Cylindrical roller cages

AA-cages: steel cages with retained rollers.

Available to order with all rail sizes.

Suitable for horizontal application.

Available in stainless steel with order code AA-SS with cage body made out of stainless steel or nickel plated and rollers made of stainless steel.

AL-cages: starting from 3 mm to 12 mm.

Cage body made from aluminum with retained rollers.

Suitable for horizontal and vertical application.

Cage is suitable for overrunning use. Due to its low-weight properties and low friction coefficient, this cage is suitable for a wide range of applications.

KZR-cages: plastic cages with retained rollers.

Size 1.5 and 2 mm are made from POM (polyacetylene), other sizes are made from reinforced PA12 glass fibre. For size 6 mm, a strong design cage featuring two stainless steel wires in the interior of the cage design is available as an option. The KZR cage is characterised by its low weight and smooth running and sliding quality.

Ball cages

JJ-cages: solid brass ball cages for horizontal and vertical application. Available for size 1.5 – 24 mm, from size 6 mm upwards available with retained balls. This cage is extremely durable, reliable and has low-friction properties.

KKLK-cages: plastic ball cages with retained balls.

Size 1, 2 and 3 mm is made of POM (polyacetylene). Other sizes are made of reinforced PA12 glass fibre (30% GF).

CAGES FOR RSDE AND RNG RAILS

Cylindrical roller cages

KRE-cages: POM cages for size 3 to 6 mm with retained rollers. Suitable for horizontal and vertical application.

For overrunning cages purposes please consult a PM advisor.

KREV-cages: PEEK (polyetheretherketone) cages are available in size 4 and 6 mm with retained rollers. They are often used in vacuum and ultra-high vacuum applications and suited for horizontal and vertical applications. Also suitable for high accelerations and high operating temperatures.

For overrunning cages purposes please consult a PM advisor.

OPERATING TEMPERATURE

PM linear bearings are capable of operating in temperature of +120 °C. For linear bearings with plastic components, the operating temperature range is -30 °C to 80 °C. In case of any doubt or when using motors, ball screws, measuring systems, etc., please contact us. For any enquiries about applications that are to operate beyond this temperature range, please consult a PM advisor.



TEMPERATURE

Operating environments that have temperature conditions falling outside the usual range (i.e. either lower or higher than usual) require that specific demands for the rails, cages and lubricant are taken into consideration. Both material and mechanical properties change under the influence of temperature, reducing the lifetime of the linear bearing and affecting the running properties. In addition, the attachment screws are subject to thermal stress. If the above is applicable, please contact a PM product expert to discuss an appropriate solution.

PACKAGING

PM products can either be delivered packed as a set or as single components. The rails and roller cages are delivered with an oil-based corrosion protection. Before assembly, the product should be cleaned to remove the corrosion protection oil from the rails and roller cages. Subsequently and prior to operation, they should be lubricated with oil or grease in accordance with lubrication instructions provided by PM.

CERAMIC LINEAR BEARINGS

For decades, PM has supplied linear bearings made out of full ceramic as well as hybrid versions. Hybrid linear bearings are supplied with stainless steel rails and rolling elements made of ceramic, often Si₃N₄. The cages used are usually made of PEEK material. Hybrid offers great advantages in high dynamic applications where stiffness, reliability, precision, very low friction and long service life are required.

Full ceramic rails are used in applications where properties such as non-magnetic, high temperature, dry running and low weight are required.

Applications of ceramics:

- Medical technology, e.g. magnetic resonance imaging (MRI)
- Electron microscopy
- Semiconductor industry - Bonding machines
- Cryogenic environment

HIGH VACUUM AND UHV APPLICATION

The semiconductor industry as well as medical and research laboratories require linear rails that do not contaminate the vacuum. Choice of material and modifications such as vented holes and special lubricants are among the many considerations when delivering applications for these industries. Upon request, PM is able to deliver items UHV-cleaned and double-packaged, or according to your specific instructions.



EXPECTED LIFETIME

LOAD RATINGS AND EXPECTED LIFETIME

The cylinder and needle rollers we use are compliant with DIN ISO standard 14728-1: 2017. The listed ratings are based on an expected service life L10 of 100.000 m.

Some suppliers, mostly from the Far East, use higher loadings based on an expected service life of 50.000 m (=L50). These C50 values can be converted using the following formula according to L10 values:

- Conversion of the load ratings to L50
- Ball cage guide C50 = 1.26 · C100
- Cylinder and needle roller cage guide C50 = 1.23 · C100

- Conversion of the load ratings to L100
- Ball cage guide C100 = 0.79 · C50
- Cylinder and needle roller cage guide C100 = 0.81 · C50

FATIGUE

Fatigue is a surface-pitting type failure resulting from built-up stress caused by contact between moving surfaces. A loaded surface typically moves over another surface, e.g. in a rolling motion, the rolling elements move over the rail V-grooves. The end of the rolling contact life is reached when the built-up stress causes the material to crack and the contact surface shows damage and "pitting". "Pitting" as a function of running time is commonly seen in the running surfaces or in the rolling elements, thus resulting in pitting in the material. Different variables can have an impact on material fatigue, for example:

- Load applied onto rails
- Amount of acceleration and speed
- Quality and age of the lubricant

SHORT STROKE

"Short stroke" can occur as a consequence of the specific rail and roller size, cage type and travel distance. If the rolling elements fail to roll completely and stroke H < diameter D, this is referred to as "short stroke". It can result in the surface being compressed, and in combination with very high-frequency strokes this can result in cracks in the lubrication film causing steel-on-steel contact. In either case, the precision rails accuracy and lifetime are negatively affected. To re-instate a lubrication film between the rolling element and the running surface, one or more lubri-

cation strokes (service strokes) should be applied. As a minimum, the recommended stroke H should be greater than the diameter of the rolling element.

NOMINAL OPERATIONAL CALCULATION LIFE (L₁₀)

We refer to the amount of time during which the performance of the linear bearing is satisfactory as the expected lifetime. The calculation below can be used to estimate the expected lifetime for linear bearings – assuming that PM's recommendations regarding operating conditions, lubrication and protection from contaminants are being followed.

By definition, within the expected lifetime and under similar operating conditions, 10% of the linear bearings will not attain the lifetime under the dynamic load C_{dyn}. as listed in below table.

$$L_{10} = a_1 \cdot (C_{dyn}/P)^E \cdot 1.15 \cdot F_T \cdot F_H \cdot 10^6 \text{ meters}$$

- L = Expected life in meters
- a₁ = Reliability factor
- C_{dyn} = Effective dynamic load rating in N
- P = Equivalent load in N
- E = 10/3 for cylinder and needle rollers, or 3 for balls
- 1.15 = An empirical factor applicable to the materials employed
- F_T = Correction factor for temperature effects
- F_H = Correction factor for rail hardness grades (below 58 HRC)

Reliability factor		
Reliability (%)	Ln	a ₁
70	L30	2.77
80	L20	1.82
90	L10	1.00
95	L5	0.62
96	L4	0.53
97	L3	0.44
98	L2	0.33
99	L1	0.21



TEMPERATURE FACTOR F_T

Diminished rail hardness will start to occur in PM linear bearings when deployed at temperatures over 150 °C. As a result, load ratings must be reduced with a factor F_T as shown in the table below. This applies to the reduction of the dynamic load rating C_{dyn} and the static load rating C_0 .

Temperature in °C	Temperature Factor F_T
125	1.00
150	1.00
175	0.95
200	0.90
225	0.82
250	0.76
275	0.68
300	0.61

HARDNESS FACTOR F_H

PM rails have a minimum hardness value of 58 HRC, corresponding to hardness factor $F_H=1$. The table below shows the applicable amount of reduction in load capacity in the case of stainless steel rails which have lower hardness values. For example, rails made of stainless steel 1.4034 have a minimum hardness of 54 HRC, whilst the hardness factor is $F_H=0.75$.

Rockwell HRC	Stiffness		Stiffness Factor F_H
	Vickers HV	Brinell HB	
60	697	-	1.00
59	674	-	1.00
58	653	-	1.00
57	633	-	0.96
56	613	-	0.89
55	595	-	0.81
54	577	-	0.75
53	560	-	0.71
52	544	500	0.67
51	528	487	0.63
50	513	475	0.60
40	392	371	0.30
30	302	286	0.20
20	238	226	0.10
10	196	187	0.07

Load ratings specified in this catalogue are based on a Rockwell hardness of 58 HRC.

STATIC AND DYNAMIC LOAD RATINGS

Table: Static and dynamic load ratings (material 1.3505)

D (mm)	C_{dyn} (N)	C_0 (N)	Cage Type	Suitable rails
1.5	52	63	AA	RSD
1.5	52	63	KZR	RSD
1.5	10	14	JJ	RSD
1.5	10	14	KKLK	RSD
2	86	105	AA	RSD
2	86	105	KZR	RSD
2	21	23	JJ	RSD
2	21	23	KKLK	RSD
3	136	165	AA	RSD
3	136	165	KZR	RSD
3	392	540	KRE	RSDE, RNG
3	30	31	JJ	RSD
3	30	31	KKLK	RSD
4	265	310	AA	RSD
4	48	48	JJ	RSD
4	785	1050	KRE	RSDE, RNG
4	785	1050	KREV	RSDE, RNG
6	540	630	AA	RSD
6	540	630	AL	RSD
6	540	630	KZR	RSD
6	1765	2120	KRE	RSDE, RNG
6	1765	2120	KREV	RSDE, RNG
6	78	78	JJ	RSD
6	78	78	KKLK	RSD
9	1350	1450	AA	RSD
9	1350	1450	AL	RSD
9	1350	1450	KZR	RSD
9	150	150	JJ	RSD
9	150	150	KKLK	RSD
12	2560	2610	AA	RSD
12	2560	2610	AL	RSD
12	260	260	JJ	RSD
12	260	260	KKLK	RSD
15	4500	4520	AA	RSD
15	4500	4520	AL	RSD
15	420	420	JJ	RSD

STATIC SAFETY FACTOR

The static safety factor S_0 determines the degree of safety against permanent deformation of the contact surfaces of the rails and rolling elements. The safety factor represents the relationship between the basic static load rating C_0 and the equivalent maximum static load P_0 and can be calculated using the following formula:

$$S_0 = \frac{C_0}{P_0}$$

The static equivalent load P_0 is a hypothetical load and is considered to be approximately the maximum applied load F_{max} as:

$$P_0 = F_{max}$$

- C_0 = Static load capacity (N), see dimension slides
- P_0 = Static equivalent load (N)
- F_{max} = Maximum applied load (N)
- S_0 = Static safety factor

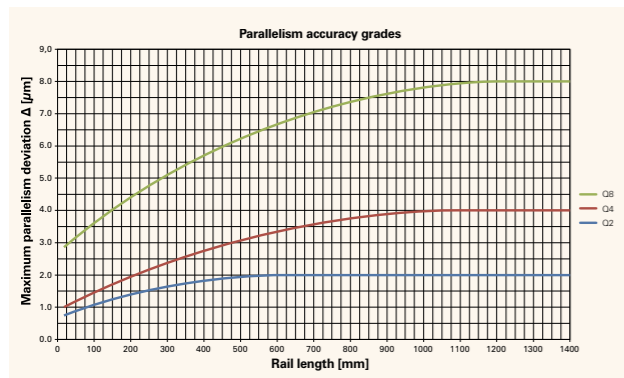
In use cases where high importance is placed on running accuracy and smoothness, a static $S_0 \leq 2$ should be applied. If not, under normal conditions S_0 should be between 2 and 4. For general machinery with loads subject to variable operating conditions, medium vibrations or heavy impact loading on the linear bearings, a static safety factor S_0 between 4 and 5 is recommended.



DESIGN INFORMATION

ACCURACY GRADES

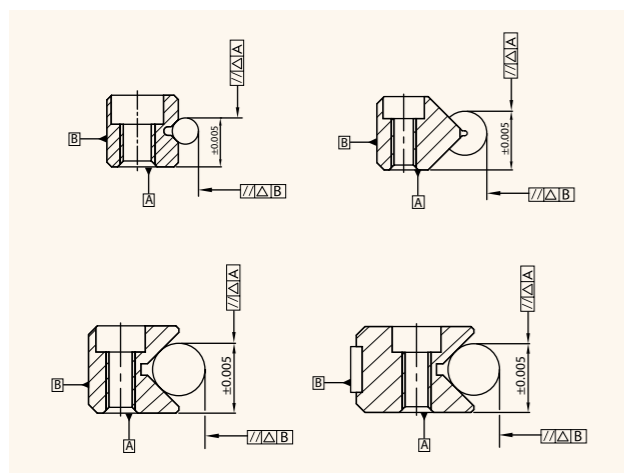
The linear bearings manufactured by PM come in three grades of quality. The quality grade refers to the degree of parallelism between the running surfaces and reference surfaces A and B of the rail, as illustrated in graph and figure below.



- 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 (± 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 rigidity
- Allows microscopic precision positioning

SF-Grade finish

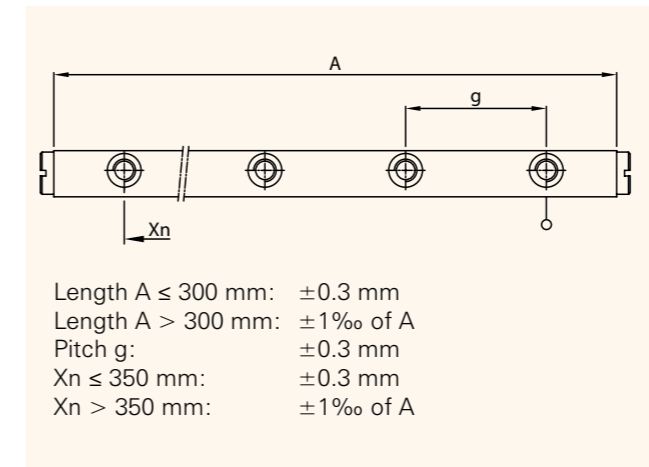


Standard finish

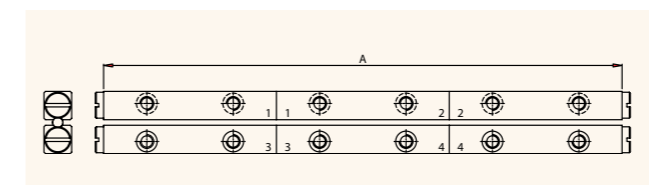


Ideal applications for linear bearings in SF-Grade include wire bonding stages, measuring devices, material testing equipments, microscope stages and manipulators. Please contact us to discuss appropriate use of a lubricant that suits your specific needs.

TOLERANCES ON LENGTH AND MOUNTING HOLES



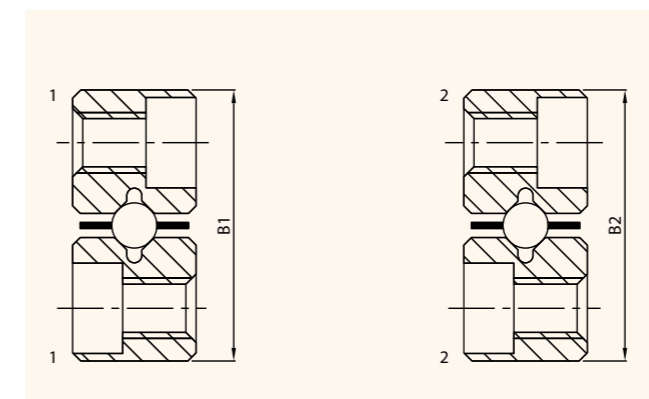
Linear bearings exceeding the maximum length of 1400 mm will be composed of different sections that are ground together and provided with end markings for assembly. The tolerance on length (A) is within ± 2 mm.



MATCHED PAIRS

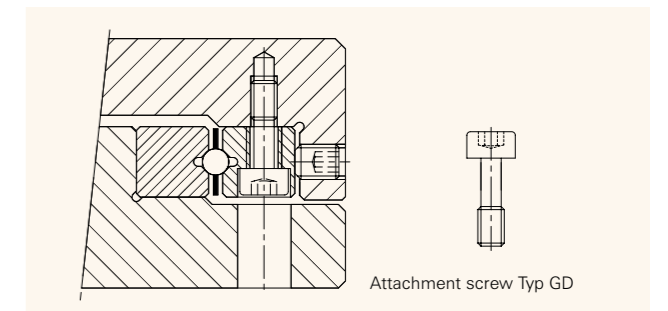
For gravity-loaded rails that are matched, the tolerance level on height B for B1 to B2 is ± 0.01 mm, and the pairs are marked. If several sets are ordered they will be marked accordingly.

In case of UK/UR recirculating elements, if two or more are 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 mounting holes.



HEIGHT DIFFERENCE ΔH

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:

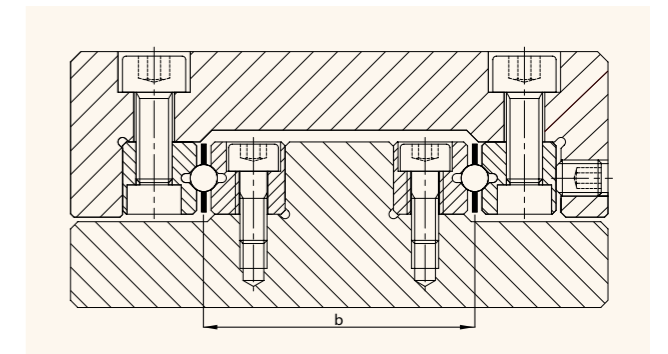
$$\Delta H < 0.1 \cdot b$$

For rails with needle roller cages:

$$\Delta H < 0.07 \cdot b$$

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

b (mm): Centre distances of the bearings



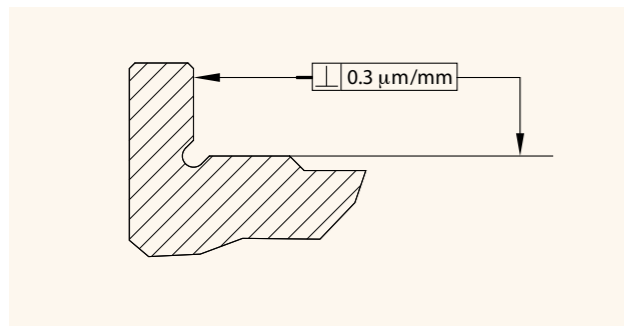


TOLERANCES OF MOUNTING SURFACE

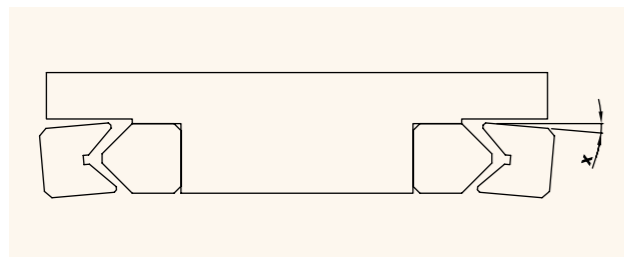
For standard applications an average mounting surface roughness of Ra 1.6 must be observed. For quality classes Q4 and Q2 the mounting surface roughness values are Ra 0.8 and 0.2.

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 84 and 85 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



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%.

$$H/A \leq 0.7 \text{ (for } H \leq 400 \text{ mm)}$$

$$H/A \leq 1 \text{ (for } H > 400 \text{ mm)}$$

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:

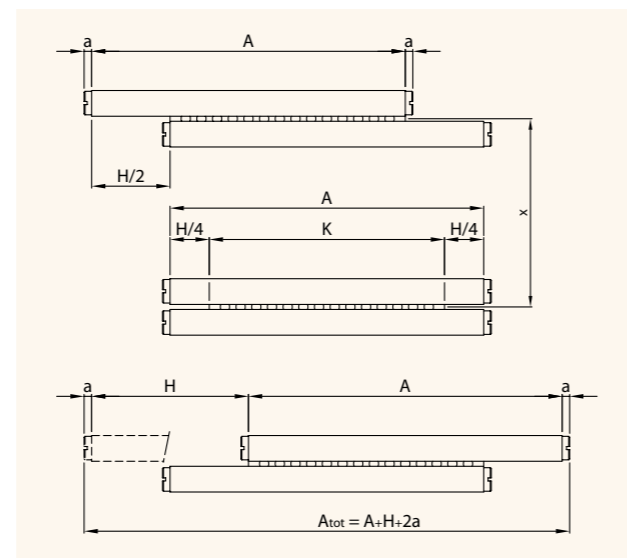
$$K = H/2$$

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

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

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

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



- K = Cage length
- H = Stroke / travel
- A = Rail length
- A_{tot} = Overall length
- x = 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 · 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:

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

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.

$$C_{total} = Z \cdot x$$

Z = Amount of rolling elements

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

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 = 50 m/min.
Max. acceleration a = 8 m/sec².

RSDE and RNG type linear bearings

Max. recommended speed v = 50 m/min.
Max. acceleration a = 25 m/sec².

RSDE and RNG type with ACC-solution

Max. recommended speed v = 150 m/min.
Max. acceleration a = 300 m/sec².

N/O and M/V type linear bearings

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



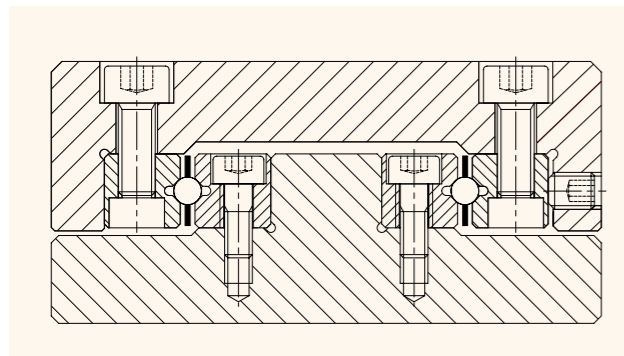
ASSEMBLY INSTRUCTIONS

One set of linear bearings consists of 4 pcs. rails (2 pairs), 2 pcs. cages and 8 pcs. end screws or end pieces.

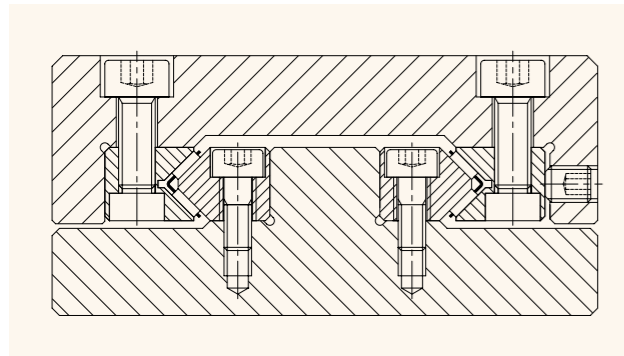
STANDARD FITTING EXAMPLES

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



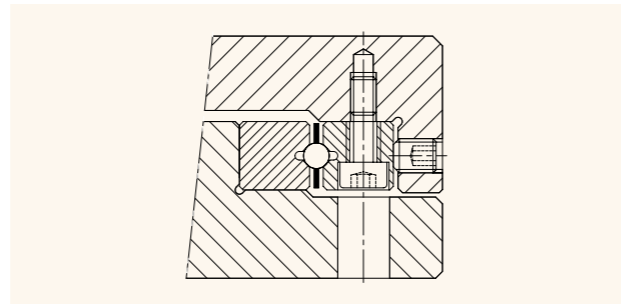
Use of N/O or MV



PRELOAD SETTINGS

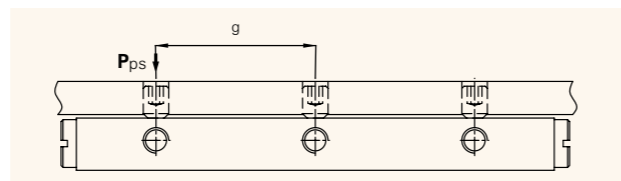
In order to assure a play-free movement and to increase the stiffness and accuracy of the linear bearing, preload adjustment is necessary. To adjust the preload uniformly, PM supplies especially designed type GD attachment screws. These screws are recommended for use with the through holes of the rail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

Example: Use of a type GD attachment screw



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; $g = 25 \text{ mm}$
 Roller cage type KRE-3; $t = 3.3 \text{ mm}$, $C_{dyn} = 392 \text{ N}$
 Attachment screw M4
 Factor f (for rollers = 1; for balls / needles = 2); $f = 1$
 Amount 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

$$P_{ps} = g / t \cdot C_{dyn} \cdot p / 100 \cdot f$$

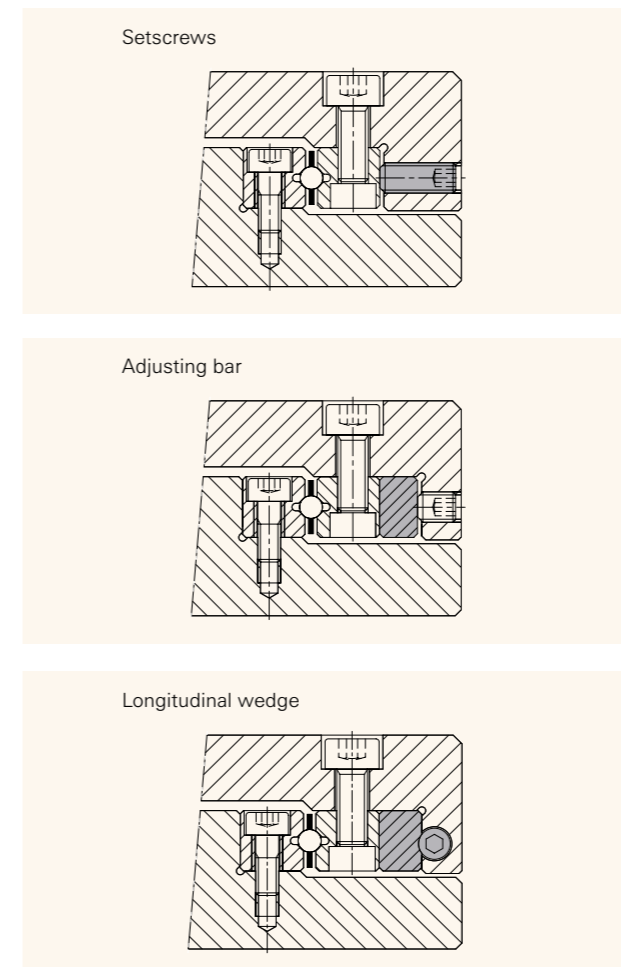
$$P_{ps} = 25 / 3.3 \cdot 392 \cdot 8 / 100 \cdot 1 = 219 \text{ N}$$

Calculation tightening torque on set screw

$$\text{Tightening torque} = P_{ps} \cdot a$$

$$\text{Tightening torque} = 219 \cdot 0.0469 = 10.27 \text{ Ncm}$$

The following figures illustrate typical methods used for applying preload.



RECOMMENDED STROKE LIMITING

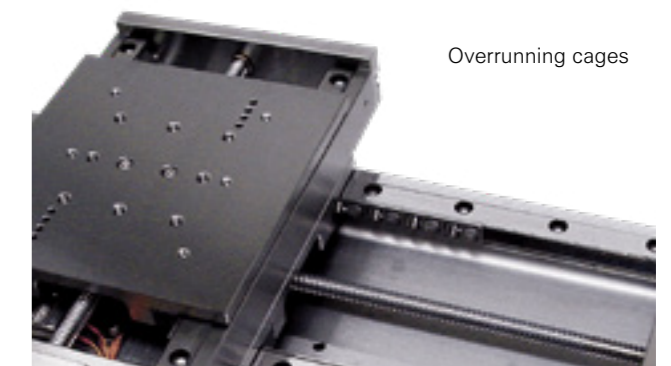
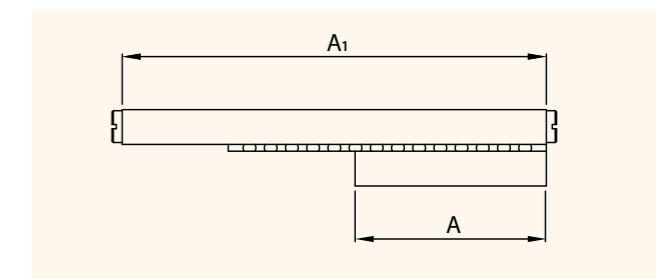
The stroke must be limited either by the machine parts or by using limit switches. Cages may never be used as stroke limit. If they are, they can damage the running surface of the rails. Therefore we recommend the use of emergency hard stops which should be mounted in line with the bearing axis to prevent 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 length 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 A_1 is determined as follows:

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





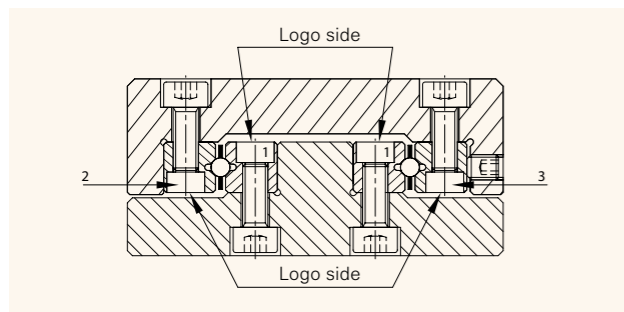
ASSEMBLY PROCEDURE

PRIOR TO ASSEMBLY

PM linear bearings are precision components; they have to be handled with meticulous care. To achieve a perfect 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



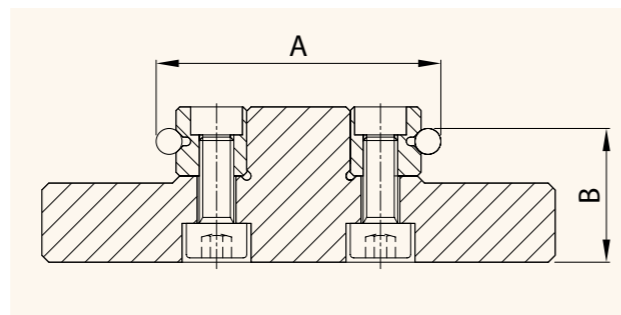
For satisfactory installation of all types of linear bearings in this catalogue, it is necessary to consider the following points:

- 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) 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.
- 9) Secure the attachment screws on the adjusting rail.
- 10) 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	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

Roller size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
1.5	3	M2.5	10	0.20
2	4	M3	15	0.40
3	5	M5	25	1.10
4	7	M5	40	2.70
6	9	M6	50	4.00
9	14	M8	100	11.70
12	15.5	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

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

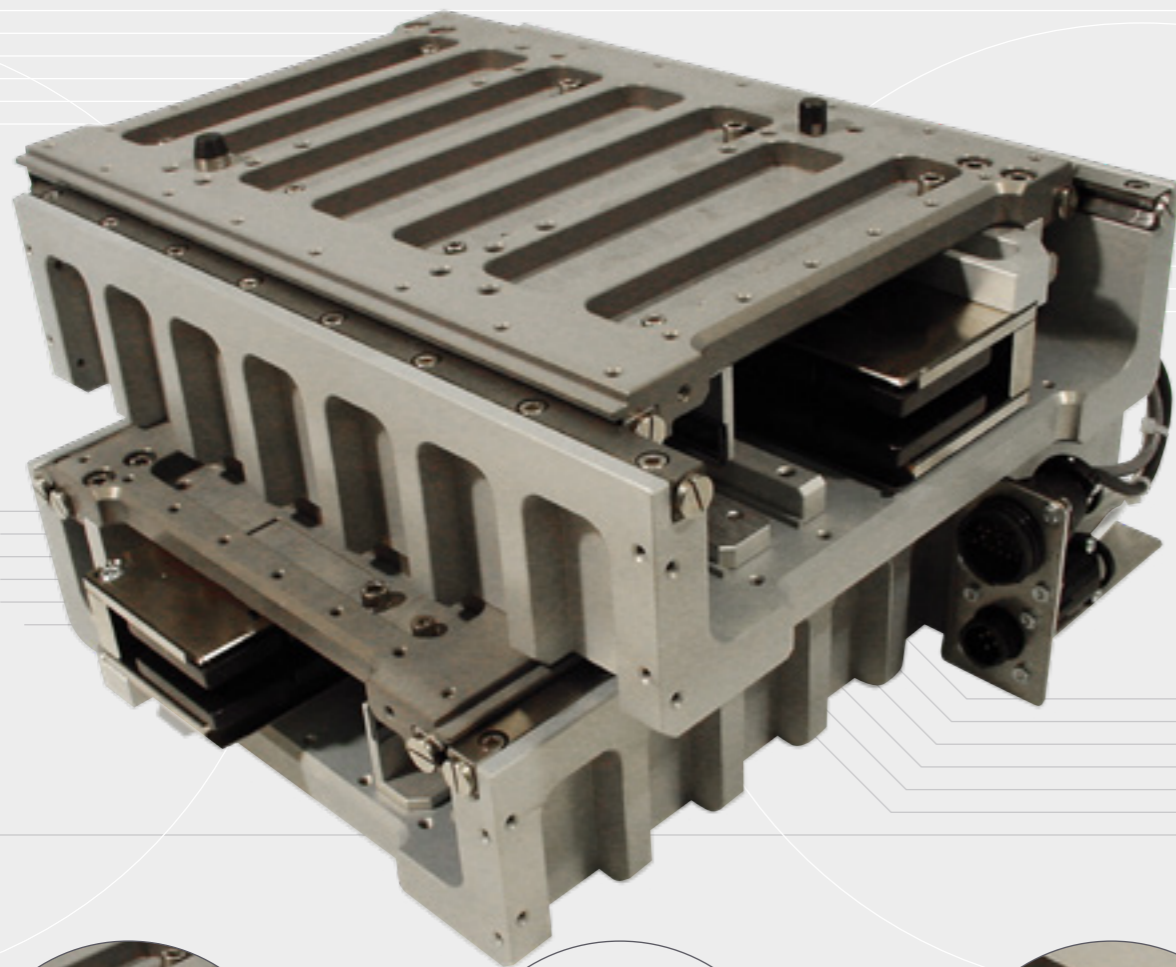
Roller size (mm)	Pitch cage (mm)	Set screw	Pitch* (mm)	Preload (Ncm)
2	4.5	M6	50	1.05
2	4.5	M8	100	1.30
2.5	5	M8	100	2.70
2.5	5.5	M8	100	2.90
3	6	M12	100	5.70
3.5	7	M14	100	7.70

RECOMMENDED TIGHTENING TORQUE FOR ATTACHMENT SCREWS

Table 6 Tightening torque strength grade 12.9

Size	Max. tightening torques (Ncm)	
	Tightening Torque DIN 912	Attachment screws type GD 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	32.80
M10	79.00	63.20
M12	140.00	112.00
M14	220.00	176.00

*pitch between the preload setscrews



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 35).

On request we supply linear bearings with roller size \varnothing 18 mm and \varnothing 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 95.

ORDER NOTES

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

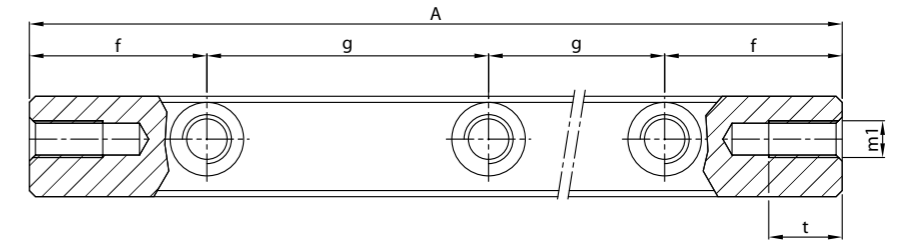
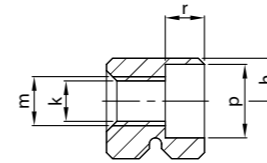
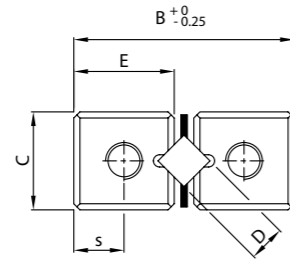
Please specify the following in your order:

- 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



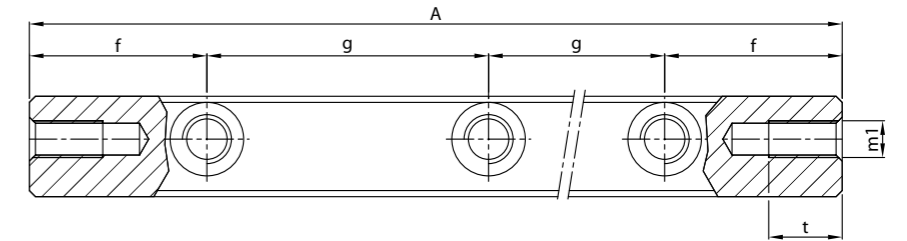
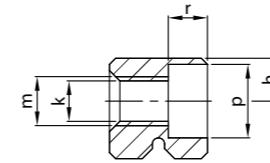
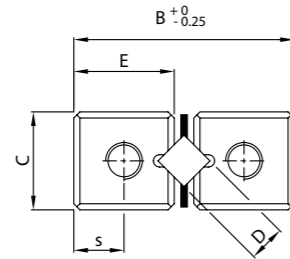
Rail type		Main dimensions					Mounting holes						
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p	
RSD-1520	RSD-1520-SS	20						1x10					
RSD-1530	RSD-1530-SS	30						2x10					
RSD-1540	RSD-1540-SS	40						3x10					
RSD-1550	RSD-1550-SS	50						4x10					
RSD-1560	RSD-1560-SS	60						5x10					
RSD-1570	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 ^{±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					

r	End holes			Weight (g)	Type	Accessories
	m1	s	t			
1.4	M1.8	1.95	3.1	3	RSD-1520	Cages: AA, KZR, JJ, KCLK End pieces: GA, GB
				4	RSD-1530	
				5	RSD-1540	
				6	RSD-1550	
				7	RSD-1560	
				8	RSD-1570	
				9	RSD-1580	
				10	RSD-1590	
				12	RSD-15100	
				14	RSD-15120	
16	RSD-15140					
2	M2.5	2.75	4.5	8	RSD-2030	Cages: AA, KZR, JJ, KCLK End pieces: GA, GB
				11	RSD-2045	
				14	RSD-2060	
				17	RSD-2075	
				20	RSD-2090	
				23	RSD-2105	
				26	RSD-2120	
				30	RSD-2135	
				34	RSD-2150	
				37	RSD-2165	
40	RSD-2180					

Bold = Short lead time item

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

Units: mm



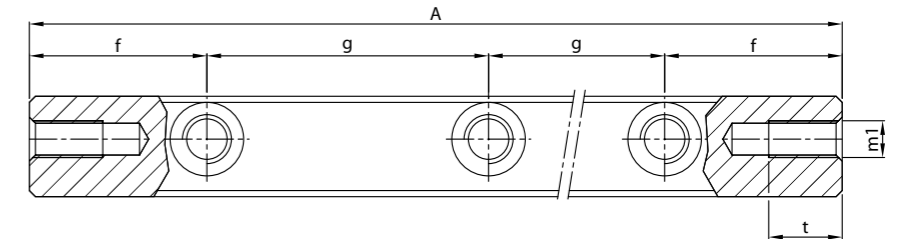
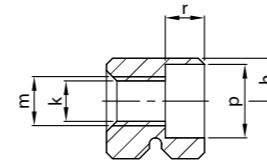
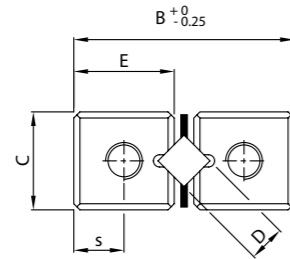
Rail type		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RSD-3050	RSD-3050-SS	50						1x25				
RSD-3075	RSD-3075-SS	75						2x25				
RSD-3100	RSD-3100-SS	100						3x25				
RSD-3125	RSD-3125-SS	125						4x25				
RSD-3150	RSD-3150-SS	150						5x25				
RSD-3175	RSD-3175-SS	175	18	8	8.25	3	12.5	6x25	3.5 ^{+0.2}	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 ^{+0.2}	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	End holes			Weight (g)	Type	Accessories
	m1	s	t			
3.2	M3	4.1	5.5	22	RSD-3050	Cages: AA, KZR, JJ, KCLK End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-3
				33	RSD-3075	
				44	RSD-3100	
				55	RSD-3125	
				66	RSD-3150	
				77	RSD-3175	
				88	RSD-3200	
				99	RSD-3225	
				110	RSD-3250	
				121	RSD-3275	
4.1	M3	5	7	132	RSD-3300	Cages: AA, JJ End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-4
				155	RSD-3350	
				64	RSD-4080	
				96	RSD-4120	
				120	RSD-4160	
				160	RSD-4200	
				192	RSD-4240	
				224	RSD-4280	
				256	RSD-4320	
				288	RSD-4360	
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

Units: mm



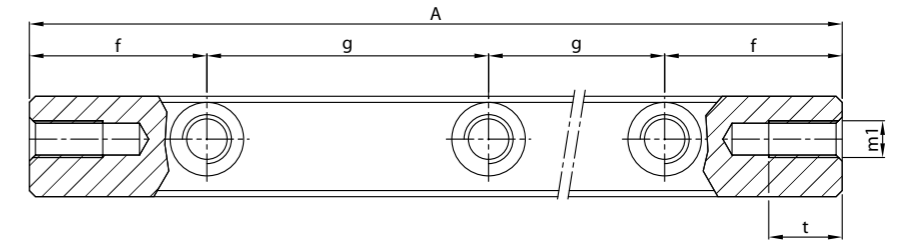
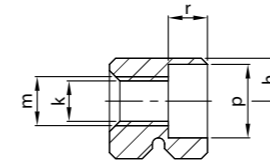
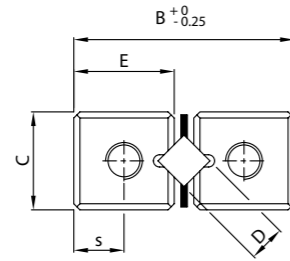
Rail type		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RSD-6100	RSD-6100-SS	100						1x50				
RSD-6150	RSD-6150-SS	150						2x50				
RSD-6200	RSD-6200-SS	200						3x50				
RSD-6250	RSD-6250-SS	250						4x50				
RSD-6300	RSD-6300-SS	300						5x50				
RSD-6350	RSD-6350-SS	350						6x50				
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				

r	End holes			Weight (g)	Type	Accessories
	m1	s	t			
5.2	M5	7	8.5	142	RSD-6100	Cages: AA, AL, KZR, JJ, KCLK End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-6
				213	RSD-6150	
				288	RSD-6200	
				360	RSD-6250	
				432	RSD-6300	
				504	RSD-6350	
				576	RSD-6400	
				648	RSD-6450	
				720	RSD-6500	
				864	RSD-6600	
				1008	RSD-6700	
				1152	RSD-6800	
1296	RSD-6900					
1440	RSD-61000					
1584	RSD-61100					
1728	RSD-61200					
6.2	M6	9.9	10	306	RSD-9100	Cages: AA, AL, KZR, JJ, KCLK End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-9
				616	RSD-9200	
				926	RSD-9300	
				1236	RSD-9400	
				1546	RSD-9500	
				1856	RSD-9600	
				2166	RSD-9700	
				2476	RSD-9800	
				2786	RSD-9900	
				3096	RSD-91000	
				3406	RSD-91100	
				3716	RSD-91200	

Bold = Short lead time item

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

Units: mm



Rail type		Main dimensions					Mounting holes						
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p	
RSD-12200	on request	200						1x100					
RSD-12300		300						2x100					
RSD-12400		400						3x100					
RSD-12500		500						4x100					
RSD-12600		600						5x100					
RSD-12700		700	58	28	25.9	12	50	6x100	12 ^{±0.2}	8.5	M10	13.5	
RSD-12800		800						7x100					
RSD-12900		900						8x100					
RSD-121000		1000						9x100					
RSD-121100		1100						10x100					
RSD-121200		1200						11x100					
RSD-121400		1400						13x100					
RSD-15300		on request	300						2x100				
RSD-15400			400						3x100				
RSD-15500	500							4x100					
RSD-15600	600							5x100					
RSD-15700	700							6x100					
RSD-15800	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					

r	End holes			Weight (g)	Type	Accessories					
	m1	s	t								
8.3	M8	12.95	15	1011	RSD-12200	Cages: AA, AL, JJ, KKLK End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-12					
				1525	RSD-12300						
				2039	RSD-12400						
				2553	RSD-12500						
				3067	RSD-12600						
				3581	RSD-12700						
				4095	RSD-12800						
				4609	RSD-12900						
				5123	RSD-121000						
				5637	RSD-121100						
				6151	RSD-121200						
				7693	RSD-121400						
				10.3	M8		15.95	15	2426	RSD-15300	Cages: AA, AL, JJ End pieces: GA, GB, GC, GCA-wiper Attachment screws: GD-15
									3221	RSD-15400	
4027	RSD-15500										
4833	RSD-15600										
5639	RSD-15700										
6445	RSD-15800										
7251	RSD-15900										
8057	RSD-151000										
8863	RSD-151100										
9669	RSD-151200										
10475	RSD-151400										

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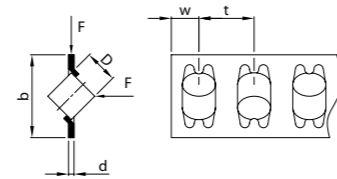
Units: mm

ACCESSORIES

FOR LINEAR BEARINGS TYPE RSD AND DS

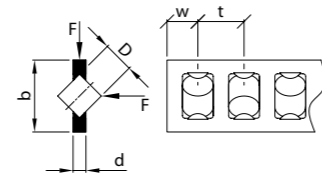
Roller cage type AA, size 1.5 - 15 mm

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



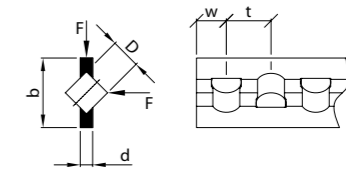
Roller cage type AL, size 6 - 15 mm

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



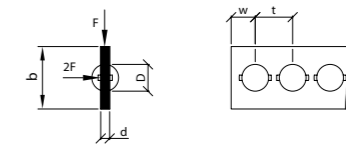
Roller cage type KZR, size 1.5 - 9 mm

- 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



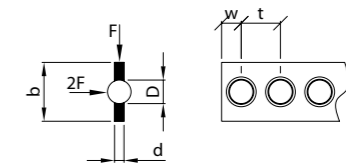
Ball cage type KKLK, size 1.5 - 12 mm

- 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



Cage type		Main dimensions					Accessories	
Standard	Stainless steel	D	b	d	t	w	Suitable for rail	End pieces
R1.5xAA	R1.5xAA-SS	1.5	3.8	0.2	2.5	2	RSD-1.5	GA
R1.5xKZR	R1.5xKZR-SS		3.86	0.5	3	2		GB
K1.5xJJ	K1.5xJJ-SS		3.5	0.5	3	1.5		GB
K1.5xKKLK	K1.5xKKLK-SS		3.5	0.45	2.2	1.5		GB
R2xAA	R2xAA-SS		2	5.6	0.3	4		2
R2xKZR	R2xKZR-SS	5.5		0.7	4	2	GB	
K2xJJ	K2xJJ-SS	5.5		0.8	4	2	GB	
K2xKKLK	K2xKKLK-SS	5		0.75	3.9	3	GB	
R3xAA	R3xAA-SS	3		7.5	0.5	5	2.5	RSD-3
R3xKZR	R3xKZR-SS		7	1	5	2.5	GB, GC	
K3xJJ	K3xJJ-SS		7.5	1.2	5	2.5	GB, GC	
K3xKKLK	K3xKKLK-SS		7	1	4.2	2.7	GB, GC	
R4xAA	R4xAA-SS		4	10	0.5	7	5	
K4xJJ	K4xJJ-SS	10		1.0	7	5	GB, GC	

F = For load direction please refer to picture provided

Cage type		Main dimensions					Accessories	
Standard	Stainless steel	D	b	d	t	w	Suitable for rail	End pieces
R6xAA	R6xAA-SS	6	14	0.75	9	6	RSD-6	GA
R6xAL	R6xAL-SS		14	2.5	9	6		GB, GC
R6xKZR	R6xKZR-SS		14	2.5	8.5	6		GB, GC
K6xJJ	K6xJJ-SS		14	2.5	9	6		GB, GC
K6xKKLK	K6xKKLK-SS		14	2.5	9	6		GB, GC
R9xAA	R9xAA-SS	9	20	1	14	9	RSD-9	GA
R9xAL	R9xAL-SS		20	4	14	9		GB, GC
R9xKZR	R9xKZR-SS		20	3	14	9		GB, GC
K9xJJ	K9xJJ-SS		20	4	14	9		GB, GC
K9xKKLK	K9xKKLK-SS		20	3.5	14	9		GB, GC
R12xAA	on request	12	26	1.2	18	11	RSD-12	GA
R12xAL			25	5	18	11		GB, GC
K12xJJ			25	5	18	11		GB, GC
K12xKKLK			20	4	15.5	11		GB, GC
R15xAA	on request	15	35	1.2	20	12	RSD-15	GA
R15xAL			35	5	20	12		GB, GC
K15xJJ			35	5	20	12		GB, GC

F = For load direction please refer to picture provided

Units: mm

End screws type GA, size 1.5 - 15 mm

- For horizontal application
- For cages type AA
- For rails type RSD



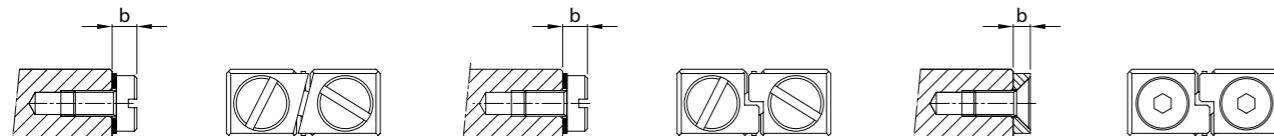
End pieces type GB, size 1.5 - 15 mm

- For horizontal and vertical application
- For cages type AL, KZR, JJ, KCLK, KRE, KREV
- For rails type RSD and RSDE

Size 1.5 mm

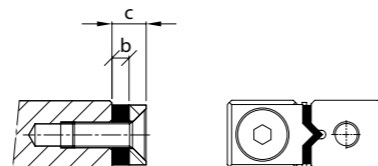
Size 2 mm

Size 3-15 mm



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

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

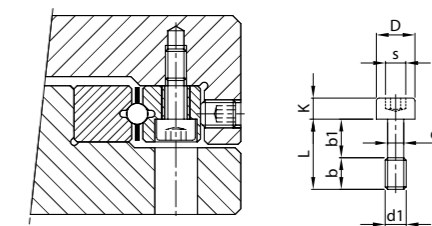


Dimensions	Size							
	1.5	2	3	4	6	9	12	15
a	1.5	2	2.4	2.7	3.7	4.2	5.3	5.3
b	2	2.6	2	2.5	3.2	4.2	5.2	6.3
c	-	-	5	2.7	6.2	7.2	8.2	9.3

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



Type	Size								Max. tightening torque (Nm) ¹
	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
GD-12	40	17	23	11.3	M8	6.2	8	6	32.80
GD-15	45	16	29	13.9	M10	7.9	10	8	63.20

¹ Strength class 12.9



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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:

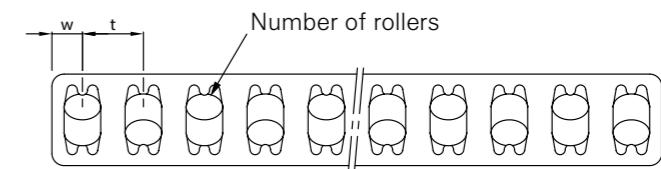
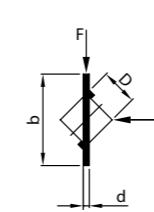
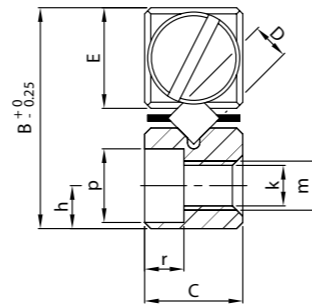
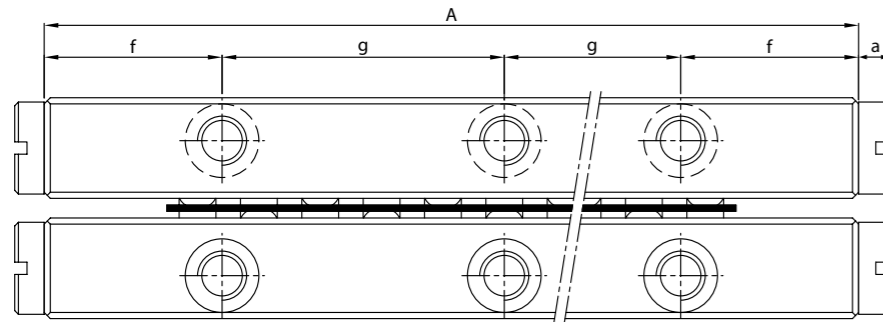
- 4 pcs. Rails type RSD-3100
- 2 pcs. Roller cages type R3x14AA
- 8 pcs. End screws type GA-3

PRODUCT CODES

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

Type + Size	Rail length	Higher quality grade (Suffix Q4, Q2, SF)	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



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

RSD Kit		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
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 ^{±0.1}	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				

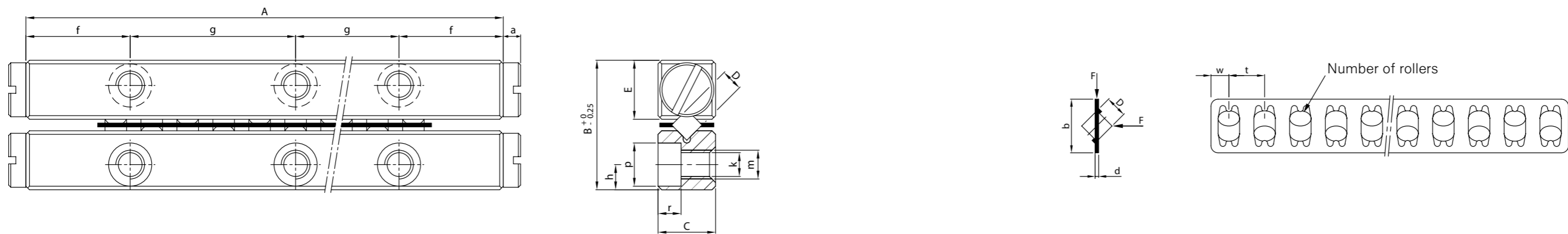
Bold = Short lead time item

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

r	End pieces a	Weight (g)	Load rating C _{dyn} (N)	Roller cage					Stroke	Type
				b	d	t	w	Z		
1.4	1.5	10	208					4	10	RSD-1520x4KZR
		14	312					6	18	RSD-1530x6KZR
		18	416					8	27	RSD-1540x8KZR
		22	520	3.8	0.5	3	2.25	10	30	RSD-1550x10KZR
		27	676					13	35	RSD-1560x13KZR
		31	780					15	40	RSD-1570x15KZR
		34	884					17	50	RSD-1580x17KZR
2	2	28	430					5	18	RSD-2030x5AA
		42	688					8	24	RSD-2045x8AA
		55	946					11	30	RSD-2060x11AA
		69	1118					13	44	RSD-2075x13AA
		83	1376					16	50	RSD-2090x16AA
		96	1548	5.6	0.3	4	2.8	18	64	RSD-2105x18AA
		110	1806					21	70	RSD-2120x21AA
		123	1978					23	84	RSD-2135x23AA
		137	2236					26	90	RSD-2150x26AA
		151	2494					29	95	RSD-2165x29AA
165	2752					32	100	RSD-2180x32AA		
3.2	2.4	94	952					7	28	RSD-3050x7AA
		135	1360					10	48	RSD-3075x10AA
		187	1904					14	58	RSD-3100x14AA
		234	2312					17	78	RSD-3125x17AA
		281	2856					21	88	RSD-3150x21AA
		327	3264	7.5	0.5	5	3.5	24	105	RSD-3175x24AA
		374	3808					28	115	RSD-3200x28AA
		421	4216					31	135	RSD-3225x31AA
		468	4760					35	145	RSD-3250x35AA
		514	5168					38	165	RSD-3275x38AA
561	5712					42	175	RSD-3300x42AA		

F = For load direction please refer to picture provided

Units: mm



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

RSD Kit		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
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 ^{+0.2}	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				

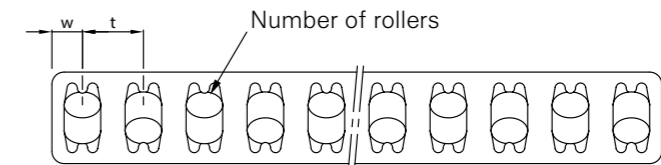
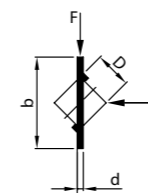
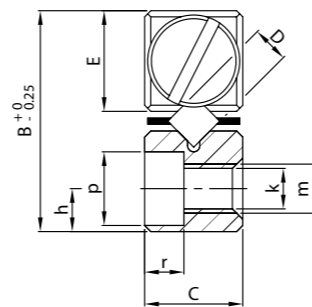
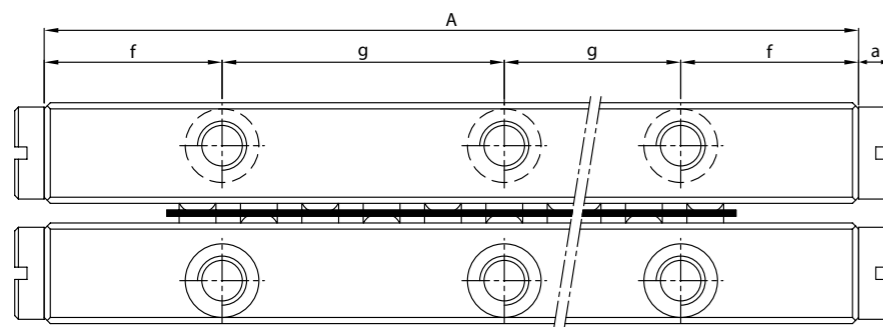
Bold = Short lead time item

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

r	End pieces a	Weight (g)	Load rating C _{dyn} (N)	Roller cage					Stroke	Type
				b	d	t	w	Z		
4.1	2.7	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
		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		
5.2	3.7	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
		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

F = For load direction please refer to picture provided

Units: mm



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

RSD Kit		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
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	On request	200						1x100				
RSD-12300x11AA		300						2x100				
RSD-12400x15AA		400						3x100				
RSD-12500x18AA		500						4x100				
RSD-12600x23AA		600						5x100				
RSD-12700x26AA		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				

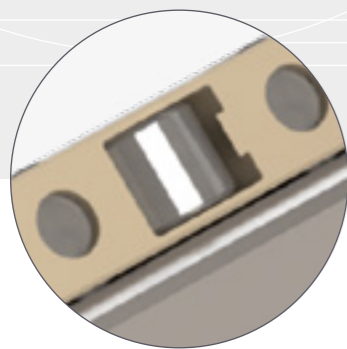
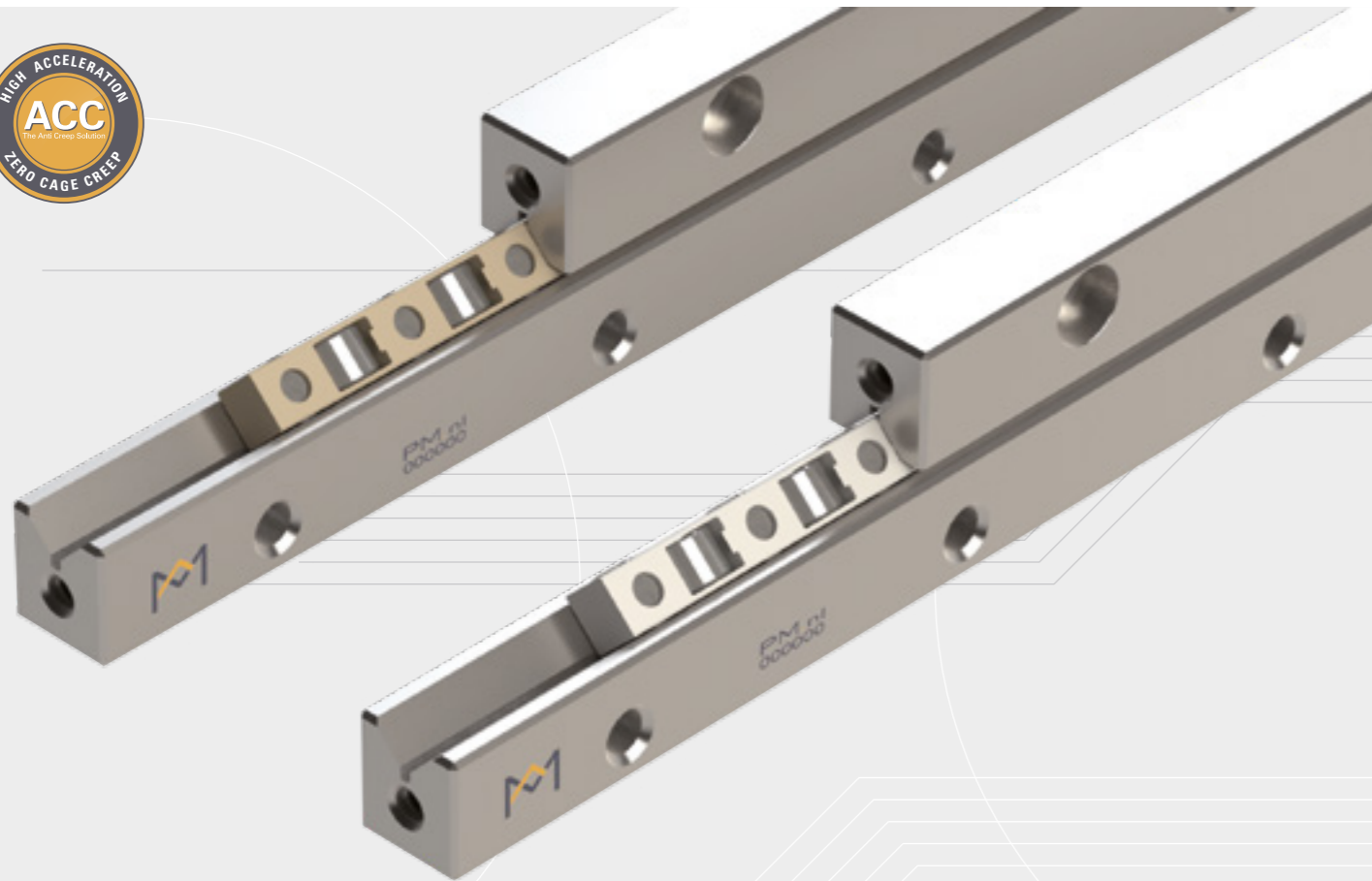
Bold = Short lead time item

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

r	End pieces a	Weight (g)	Load rating C _{dyn} (N)	Roller cage					Stroke	Type
				b	d	t	w	Z		
6.2	4.2	2720	13500					10	115	RSD-9200x10AA
		4030	20250					15	175	RSD-9300x15AA
		5380	27000					20	235	RSD-9400x20AA
		6700	33750					25	295	RSD-9500x25AA
		8050	40500					30	355	RSD-9600x30AA
		9230	47250	20	1	14	9	35	415	RSD-9700x35AA
		10501	54000					40	475	RSD-9800x40AA
		11900	60750					45	535	RSD-9900x45AA
		13000	67500					50	595	RSD-91000x50AA
		14099	74250					55	655	RSD-91100x55AA
		15200	81000					60	715	RSD-91200x60AA
		8.3	5.3	4670	17920					7
6880	28160							11	200	RSD-12300x11AA
9090	38400							15	240	RSD-12400x15AA
11400	46080							18	320	RSD-12500x18AA
13700	58880							23	360	RSD-12600x23AA
15800	66560			26	1.2	18	12	26	440	RSD-12700x26AA
18200	79360							31	480	RSD-12800x31AA
20500	87040							34	560	RSD-12900x34AA
22800	94720							37	640	RSD-121000x37AA
25000	107520							42	680	RSD-121100x42AA
27300	117760							46	720	RSD-121200 x46AA

F = For load direction please refer to picture provided

Units: mm



POM (KRE) AND PEEK (KREV) CAGES
OPTIONAL CERAMIC ROLLERS



POM (KRE) AND PEEK (KREV) CAGES
ANTI CAGE CREEP OPTIONAL



OPTIONAL DIMENSIONS 3 MM WITH 4 MM ROLLERS
OPTIONAL DIMENSIONS 4MM WITH 6 MM ROLLERS



Our linear bearings type RSDE are a next generation development of the RSD type. The deeper V-groove in combination with uniquely designed cylindrical rollers and cages offer higher load ratings and stiffness without changing the boundary dimensions of the rails. RSDE rails 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 an RSD rails
- 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 compact 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 GB end pieces.

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

Anti cage creep available on request, see page 86 - 89.

ORDER NOTES

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

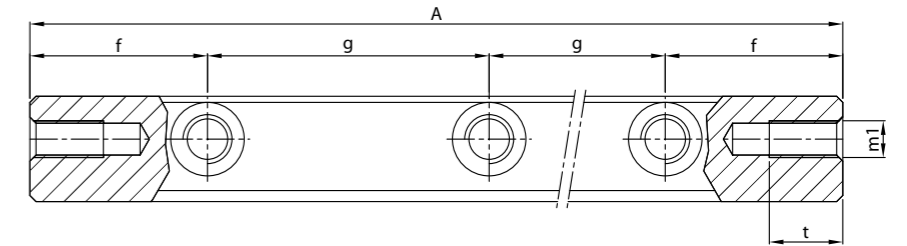
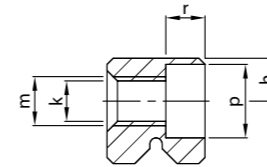
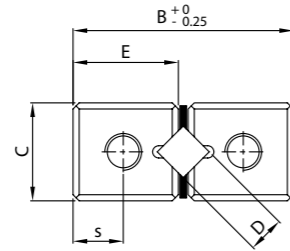
Please specify the following in your order note:

- 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 pieces needed

Example:

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

- 4 pcs. Rails type RSDE-3125
- 2 pcs. Roller cages type R3x26KRE
- 8 pcs. End pieces type GB-3



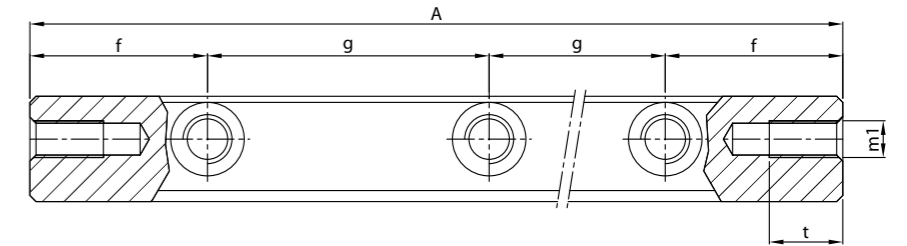
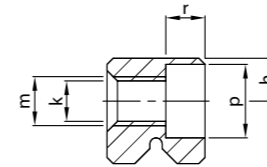
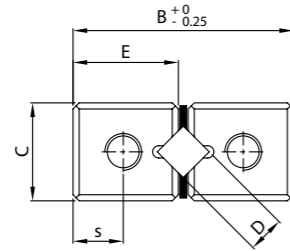
Rail type		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RSDE-3050	RSDE-3050-SS	50						1x25				
RSDE-3075	RSDE-3075-SS	75						2x25				
RSDE-3100	RSDE-3100-SS	100						3x25				
RSDE-3125	RSDE-3125-SS	125						4x25				
RSDE-3150	RSDE-3150-SS	150						5x25				
RSDE-3175	RSDE-3175-SS	175	18	8	8.6	3	12.5	6x25	3.5 ^{+0.2}	3.2	M4	6
RSDE-3200	RSDE-3200-SS	200						7x25				
RSDE-3225	RSDE-3225-SS	225						8x25				
RSDE-3250	RSDE-3250-SS	250						9x25				
RSDE-3275	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 ^{+0.2}	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				

r	End holes			Weight (g)	Type	Accessories
	m1	s	t			
3.2	M3	4.1	5.5	22	RSDE-3050	Cages: KRE End pieces: GB Attachment screws: GD-3
				34	RSDE-3075	
				46	RSDE-3100	
				58	RSDE-3125	
				70	RSDE-3150	
				82	RSDE-3175	
				94	RSDE-3200	
				106	RSDE-3225	
				118	RSDE-3250	
				130	RSDE-3275	
142	RSDE-3300					
166	RSDE-3350					
4.1	M3	5	7	65	RSDE-4080	Cages: KRE, KREV End pieces: GB 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					

Bold = Short lead time item

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

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 ^{±0.2}	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 ^{±0.2}	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 pieces: GB 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	
6.2	M6	9.9	10	1312	RSDE-6900	Cages: On request End pieces: GA Attachment screws: GD-9
				1457	RSDE-61000	
				1604	RSDE-61100	
				1752	RSDE-61200	
				315	RSDE-9100	
				630	RSDE-9200	
				945	RSDE-9300	
				1260	RSDE-9400	
6.2	M6	9.9	10	1575	RSDE-9500	Cages: On request End pieces: GA Attachment screws: GD-9
				1890	RSDE-9600	
				2205	RSDE-9700	
				2520	RSDE-9800	
				2835	RSDE-9900	
6.2	M6	9.9	10	3150	RSDE-91000	Cages: On request End pieces: GA Attachment screws: GD-9
				3466	RSDE-91100	
				3780	RSDE-91200	

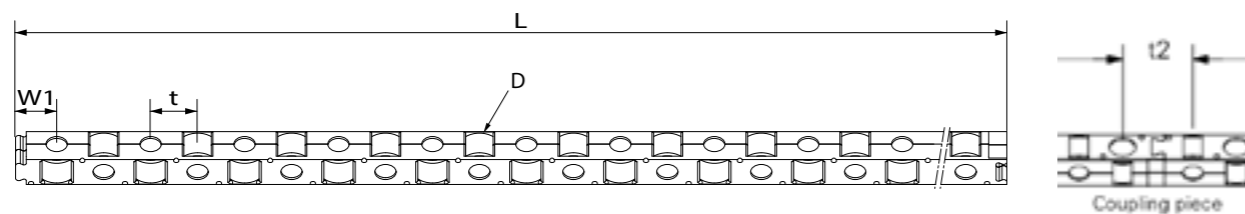
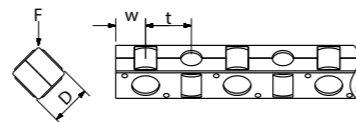
Units: mm

ACCESSORIES

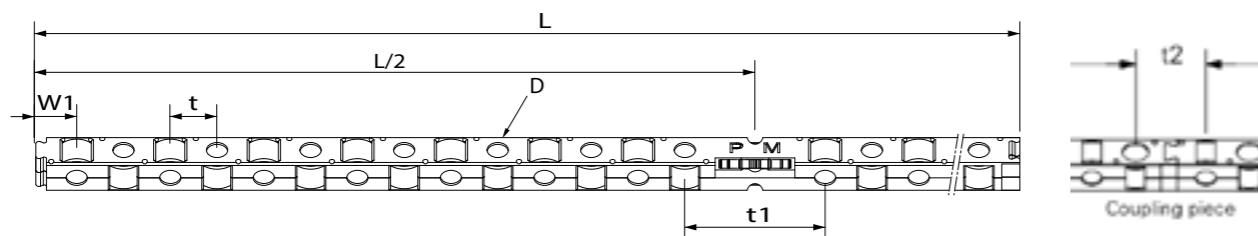
FOR RAILS TYPE RSDE

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 with anti cage creep technology KRE-ACC

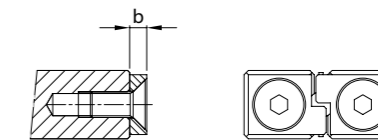


Cage type		Main dimensions							Accessories	
Standard	Stainless steel	D	t	t1	t2	w	w1	L	Suitable for rail	End pieces
R3xKRE	R3xKRE-SS	3	3.3	-	5.1	2.2	2.95	101.6	RSDE- 3	GB
R3xKRE-ACC	R3xKRE-ACC-SS	3	3.3	10.9	5.1	2.2	2.95	101.6		GB
R4xKRE	R4xKRE-SS	4	4.4	13.2	6.7	2.8	3.85	135.3	RSDE- 4	GB
R4xKRE-ACC	R4xKRE-ACC-SS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

F = For load direction please refer to picture provided

End pieces type GB, size 1.5 - 15 mm

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

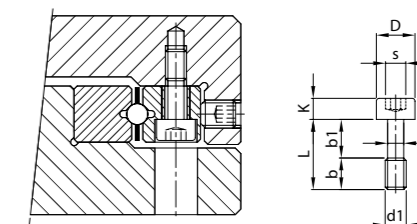


Dimensions	Size			
	3	4	6	9
b	2	2.5	3.2	4.2

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

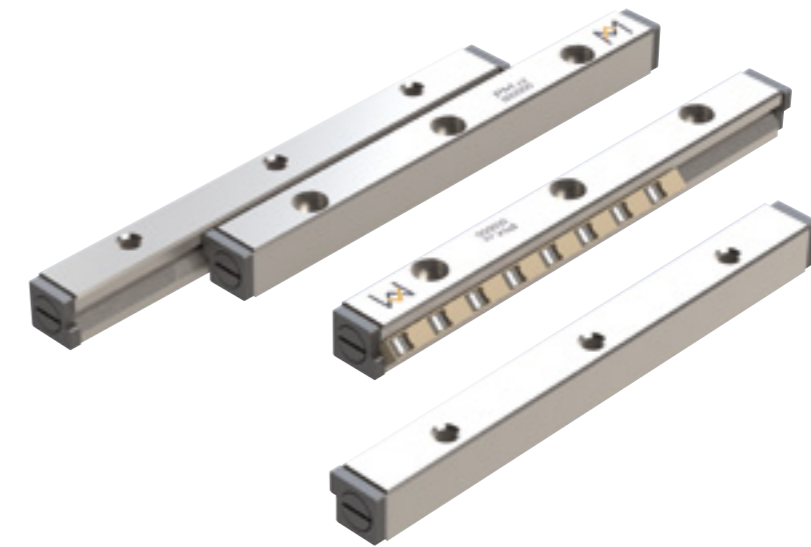
Attachment screws type GD, size 3 - 9 mm

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



Type	Size								Max. tightening torque (Nm) ¹
	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

¹ Strength class 12.9



LINEAR BEARINGS SET

User benefits

- Packaged as a set
- Standard stroke lengths*
- Ready to install, therefore cost-effective
- Roller 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 RSDE

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

- 4 pcs. Rails type RSDE
- 2 pcs. Roller cages type KRE
- 8 pcs. End pieces + screws type GB inserted in the rail ends. Packed and delivered as a set.

Example: RSDE-4120x24KRE

One set consists of:

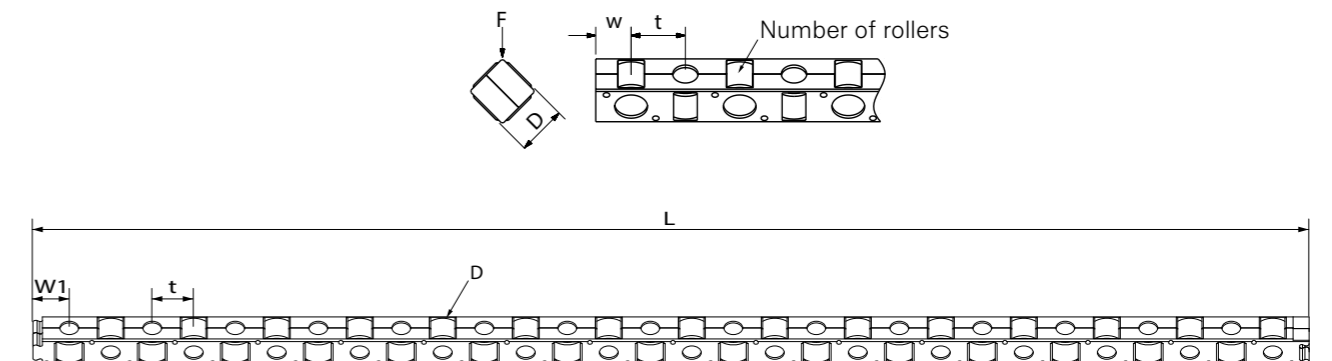
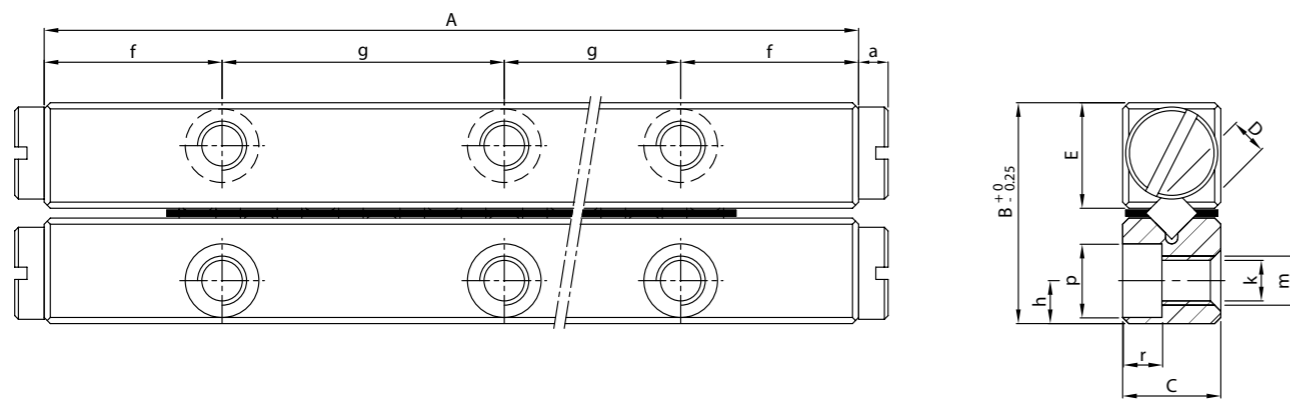
- 4 pcs. Rails type RSDE-4120
- 2 pcs. Roller cages type R4x24KRE
- 8 pcs. End pieces + screws type GB-4

PRODUCT CODES

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

Type + Size	Rail length	Higher quality grade (Suffix Q4, Q2, SF)	Number of rollers	Cage type (Suffix KRE, KREV...)	Stainless steel (Suffix SS)	ACC/ACCI
RSDE- 4	200		x30	KRE		

Order template (adjust as needed): Standaard: 1 set RSDE-4200x30KRE
 Stainless steel: 1 set RSDE-4200x30KRE-SS



One set includes: 4 rails, 2 roller cages and 8 end pieces

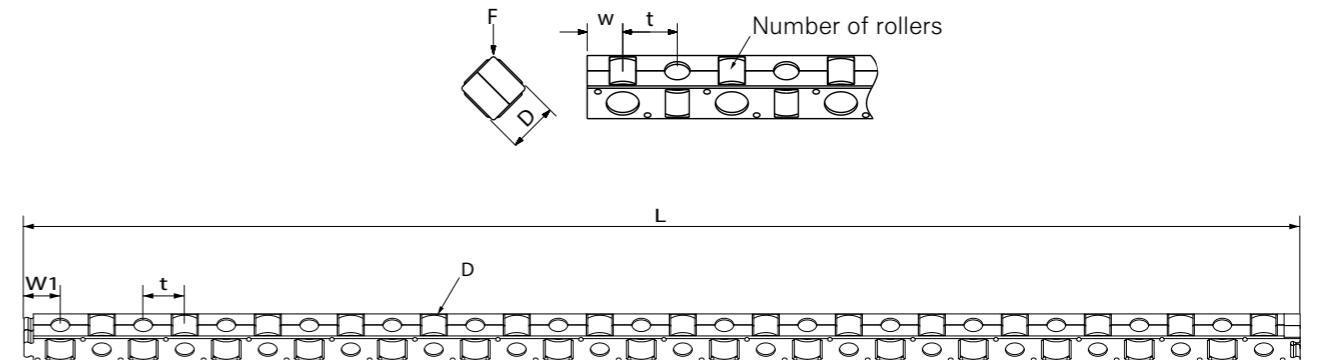
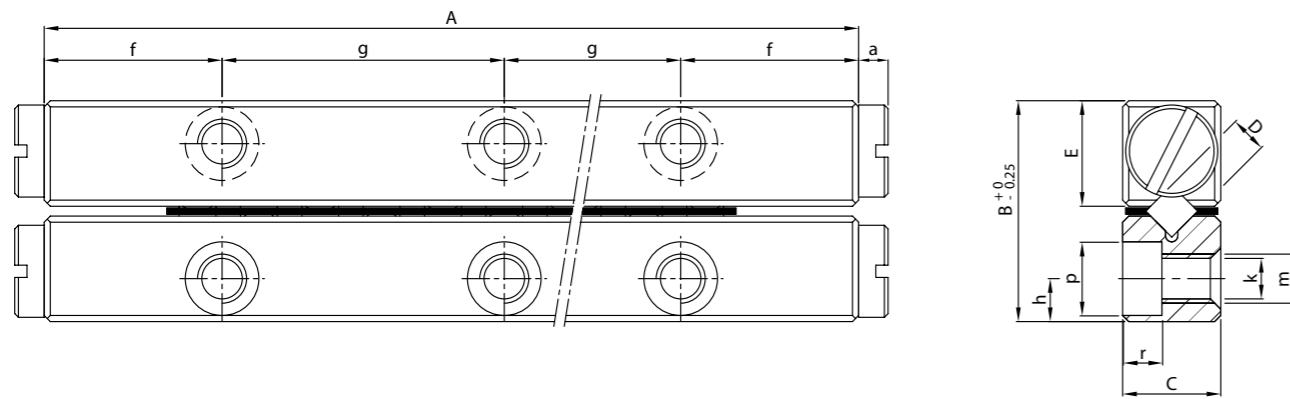
RSDE kit		Main dimensions				D	Mounting holes					
Standard	Stainless steel	A	B	C	E		f	g	h	k	m	p
RSDE-3050x10KRE	RSDE-3050x10KRE-SS	50					1x25					
RSDE-3075x15KRE	RSDE-3075x15KRE-SS	75					2x25					
RSDE-3100x21KRE	RSDE-3100x21KRE-SS	100					3x25					
RSDE-3125x25KRE	RSDE-3125x25KRE-SS	125					4x25					
RSDE-3150x31KRE	RSDE-3150x31KRE-SS	150					5x25					
RSDE-3175x36KRE	RSDE-3175x36KRE-SS	175	18	8	8.6	3	6x25	3.5 ^{+0.2}	3.2	M4	6	
RSDE-3200x42KRE	RSDE-3200x42KRE-SS	200					7x25					
RSDE-3225x46KRE	RSDE-3225x46KRE-SS	225					8x25					
RSDE-3250x53KRE	RSDE-3250x53KRE-SS	250					9x25					
RSDE-3275x57KRE	RSDE-3275x57KRE-SS	275					10x25					
RSDE-3300x63KRE	RSDE-3300x63KRE-SS	300					11x25					
RSDE-4080x11KRE	RSDE-4080x11KRE-SS	80					1x40					
RSDE-4120x17KRE	RSDE-4120x17KRE-SS	120					2x40					
RSDE-4160x23KRE	RSDE-4160x23KRE-SS	160					3x40					
RSDE-4200x30KRE	RSDE-4200x30KRE-SS	200					4x40					
RSDE-4240x36KRE	RSDE-4240x36KRE-SS	240					5x40					
RSDE-4280x42KRE	RSDE-4280x42KRE-SS	280	22	11	10.6	4	6x40	4.5 ^{+0.2}	4.3	M5	7.5	
RSDE-4320x49KRE	RSDE-4320x49KRE-SS	320					7x40					
RSDE-4360x54KRE	RSDE-4360x54KRE-SS	360					8x40					
RSDE-4400x62KRE	RSDE-4400x62KRE-SS	400					9x40					
RSDE-4440x68KRE	RSDE-4440x68KRE-SS	440					10x40					
RSDE-4480x74KRE	RSDE-4480x74KRE-SS	480					11x40					

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

r	End pieces a	Weight (g)	C _{dyn} in (N)	Roller cage						Stroke	Type
				D	t	w	w1	L	Z		
3.2	2.4	112	3920					34.2	10	28	RSDE-3050x10KRE
		161	5880					50.7	15	48	RSDE-3075x15KRE
		206	8232					70.5	21	58	RSDE-3100x21KRE
		256	9800					83.7	25	78	RSDE-3125x25KRE
		310	12152					105.3	31	88	RSDE-3150x31KRE
		360	14112	3	3.3	2.2	2.95	121.8	36	105	RSDE-3175x36KRE
		404	16464					141.6	42	115	RSDE-3200x42KRE
		454	18032					154.8	46	135	RSDE-3225x46KRE
		505	20776					177.9	53	140	RSDE-3250x53KRE
		551	22344					191.1	57	165	RSDE-3275x57KRE
4.1	2.7	601	24696					212.7	63	174	RSDE-3300x63KRE
		314	8635					49.6	11	58	RSDE-4080x11KRE
		471	13345					76	17	82	RSDE-4120x17KRE
		628	18055					102.4	23	105	RSDE-4160x23KRE
		785	23550					133.2	30	130	RSDE-4200x30KRE
		942	28260					161.9	36	150	RSDE-4240x36KRE
		1099	32970	4	4.4	2.8	3.85	188.3	42	175	RSDE-4280x42KRE
		1256	38465					219.1	49	200	RSDE-4320x49KRE
		1413	42390					241.1	54	225	RSDE-4360x54KRE
		1570	49455					278.6	62	240	RSDE-4400x62KRE
1727	53380					305	68	270	RSDE-4440x68KRE		
1884	58090					331.4	74	295	RSDE-4480x74KRE		

F = For load direction please refer to picture provided

Units: mm



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

RSDE kit		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RSDE-6100x10KRE	RSDE-6100x10KRE-SS	100						1x50				
RSDE-6150x16KRE	RSDE-6150x16KRE-SS	150						2x50				
RSDE-6200x20KRE	RSDE-6200x20KRE-SS	200						3x50				
RSDE-6250x25KRE	RSDE-6250x25KRE-SS	250						4x50				
RSDE-6300x31KRE	RSDE-6300x31KRE-SS	300						5x50				
RSDE-6350x36KRE	RSDE-6350x36KRE-SS	350	31	15	14.9	6	25	6x50	6 ^{±0.2}	5.2	M6	9.5
RSDE-6400x40KRE	RSDE-6400x40KRE-SS	400						7x50				
RSDE-6450x46KRE	RSDE-6450x46KRE-SS	450						8x50				
RSDE-6500x51KRE	RSDE-6500x51KRE-SS	500						9x50				
RSDE-6600x62KRE	RSDE-6600x62KRE-SS	600						11x50				

Bold = Short lead time item

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

r	End pieces a	Weight (g)	C _{dyn} in (N)	Roller cage						Stroke	Type
				D	t	w	w1	L	Z		
		646	17650					68	10	55	RSDE-6100x10KRE
		964	28240					107.6	16	84	RSDE-6150x16KRE
		1287	35300					134	20	120	RSDE-6200x20KRE
		1606	44125					167	25	150	RSDE-6250x25KRE
		1933	54715					210.6	31	175	RSDE-6300x31KRE
5.2	3.7	2252	63540	6	6.6	4.3	6.3	243.6	36	210	RSDE-6350x36KRE
		2575	70600					270	40	245	RSDE-6400x40KRE
		2906	81190					309.6	46	280	RSDE-6450x46KRE
		3216	90015					342.6	51	310	RSDE-6500x51KRE
		3853	109430					419.2	62	360	RSDE-6600x62KRE

F = For load direction please refer to picture provided

Units: mm

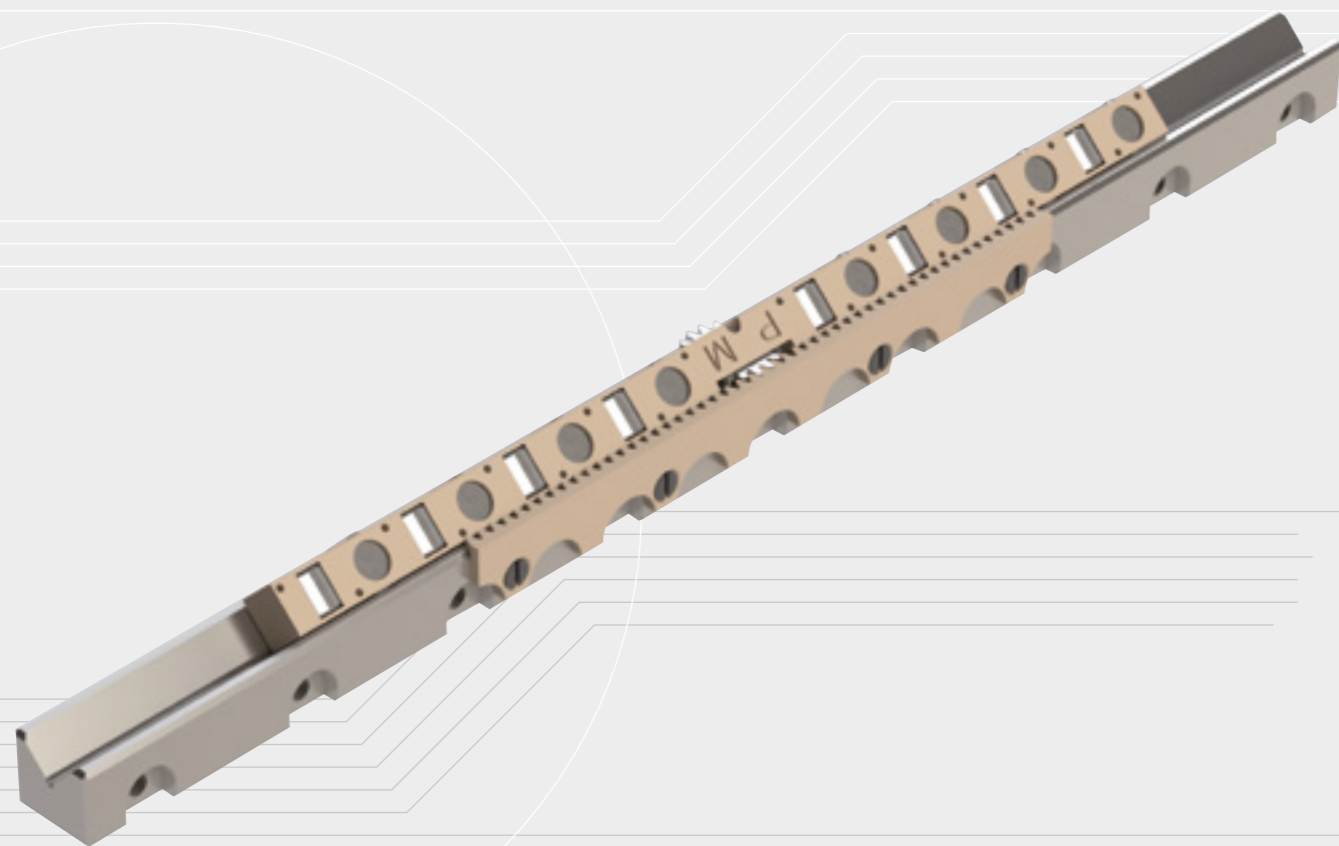


CUSTOMISED SOLUTIONS

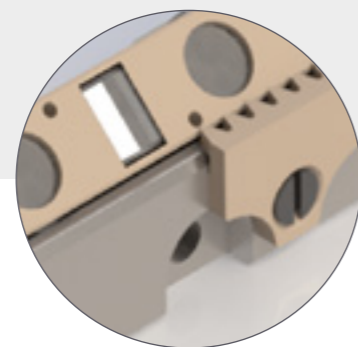
At PM we are experts in supplying linear bearings, frictionless slides and positioning stages to your unique application requirements. As a company with over 50 years' experience, our design engineers rely on deep industry know-how and state-of-the-art manufacturing facilities to

create the most technologically advanced and cost-effective solutions, custom-designed to even the most demanding specifications.

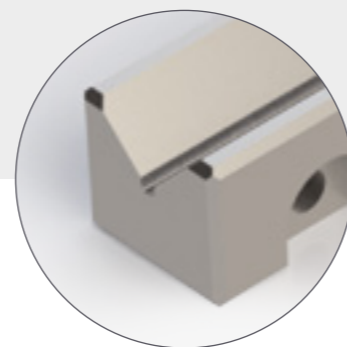
Please contact a PM product expert for more information.



CUSTOM HOLE DESIGN



CUSTOM ACC DESIGN



CUSTOM SIZE DESIGN



Our RNG linear bearings are compact, reliable and suitable for high loads. The RNG linear bearings in size 4 and 6 mm 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 our 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 screws.

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

Anti cage creep technology available on request, page 90 and 91.

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

Please specify the following in your order note:

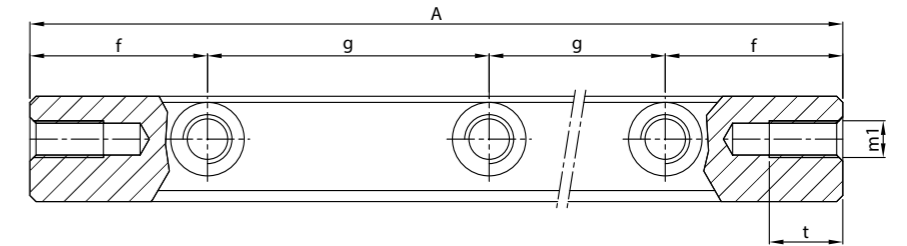
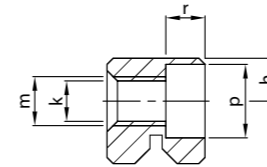
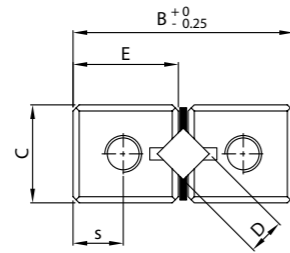
- Quantity and type of rails needed
- Quantity, type and length of cages or max. stroke
- Quantity and type of end pieces with or without wipers

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

ORDER NOTES



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				

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	

Bold = Short lead time item

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

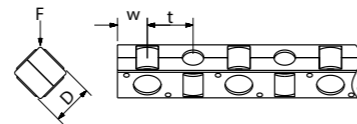
Units: mm

ACCESSORIES

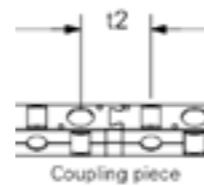
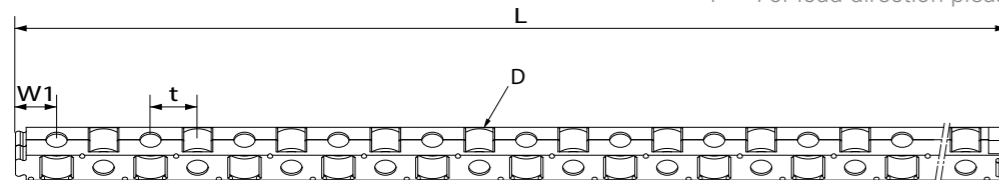
FOR RAIL TYPE RNG

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

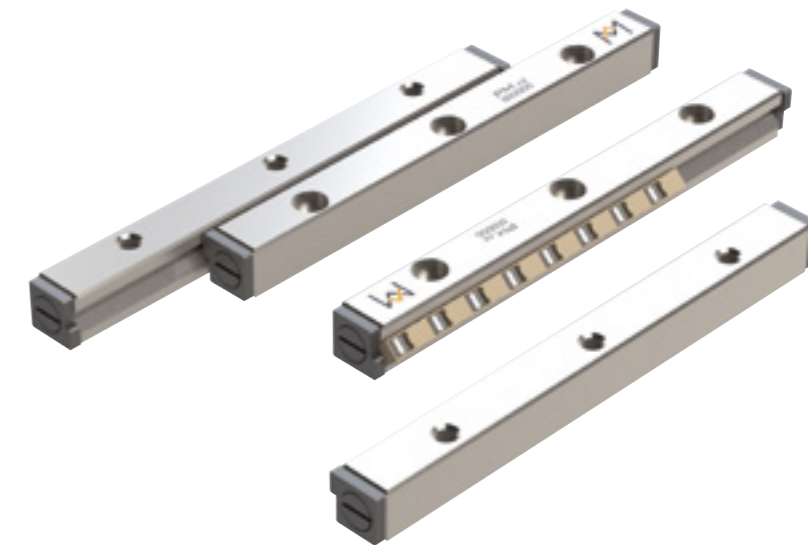
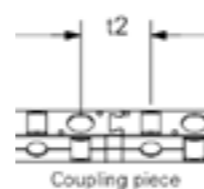
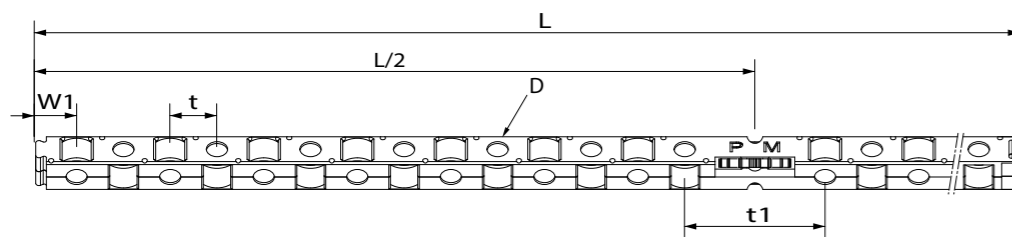
- Snap-on cage, rollers retained
- For horizontal and vertical application
- KRE material POM
- KREV material PEEK (suitable for UHV application)



F = For load direction please refer to picture provided



Roller cage with anti cage creep technology KRE-ACC



LINEAR BEARINGS SET

User benefits

- Packaged as a set
- Standard stroke lengths*
- Ready for assembly, therefore cost-effective
- Cages are straightened
- Short lead times
- Global standard
- Pre selection by load capacity and travel length

Linear bearings set type RNG

Used by industries around the world, high precision linear motion applications provide high accuracy and superior reliability with a compact design. A standard set consists of:

- 4 pcs. Rails type RNG
 - 2 pcs. Roller cages type KRE
 - 8 pcs. End screws type GBN inserted in the rail ends
- Packed and delivered as a set.

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

Example: RNG-4150x22KRE

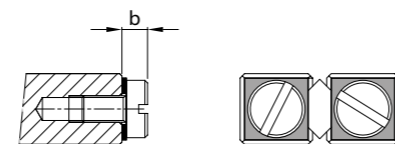
One set consists of:

- 4 pcs. Rails type RNG-4150
- 2 pcs. Roller cages type R4x22KRE
- 8 pcs. End screws type GBN-4

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	6.3	204		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

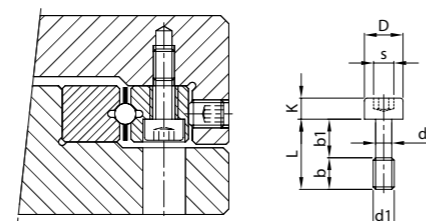


b = 4 mm for RNG-4 and RNG-6

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



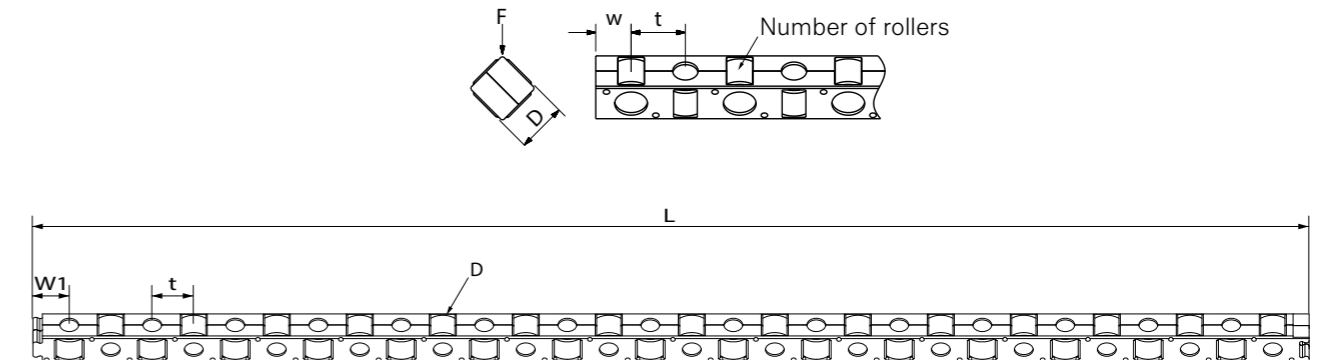
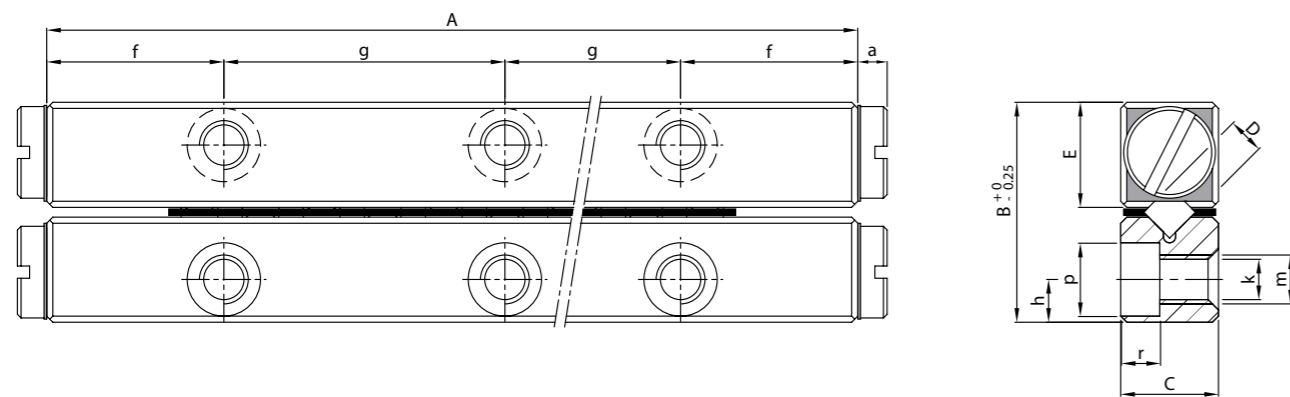
¹ Strength class 12.9

PRODUCT CODES

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

Type + Size	Rail length	Special quality (Suffix Q4, Q2, SF)	Number of rollers	Cage (Suffix KRE, KREV...)	Stainless steel (Suffix SS)	ACC
RNG-4	150		22	KRE		

Order template (adjust as needed): Standard: 1 set RNG-4150x22KRE
Stainless steel: 1 set RNG-4150x22KRE-SS



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

RSDE kit		Main dimensions					Mounting holes					
Standard	Stainless steel	A	B	C	E	D	f	g	h	k	m	p
RNG-4050x7KRE	RNG-4050x7KRE-SS	50						1x25				
RNG-4075x11KRE	RNG-4075x11KRE-SS	75						2x25				
RNG-4100x15KRE	RNG-4100x15KRE-SS	100						3x25				
RNG-4125x19KRE	RNG-4125x19KRE-SS	125						4x25				
RNG-4150x23KRE	RNG-4150x23KRE-SS	150						5x25				
RNG-4175x27KRE	RNG-4175x27KRE-SS	175	19	9	9	4	12.5	6x25	3.5 ^{±0.2}	2.65	M3	5.5
RNG-4200x30KRE	RNG-4200x30KRE-SS	200						7x25				
RNG-4225x32KRE	RNG-4225x32KRE-SS	225						8x25				
RNG-4250x35KRE	RNG-4250x35KRE-SS	250						9x25				
RNG-6100x10KRE	RNG-6100x10KRE-SS	100						3x25				
RNG-6150x16KRE	RNG-6150x16KRE-SS	150						5x25				
RNG-6200x20KRE	RNG-6200x20KRE-SS	200						7x25				
RNG-6250x25KRE	RNG-6250x25KRE-SS	250						9x25				
RNG-6300x31KRE	RNG-6300x31KRE-SS	300						11x25				
RNG-6350x36KRE	RNG-6350x36KRE-SS	350	25	12	12	6	12.5	13x25	5 ^{±0.2}	3.3	M4	7
RNG-6400x40KRE	RNG-6400x40KRE-SS	400						15x25				

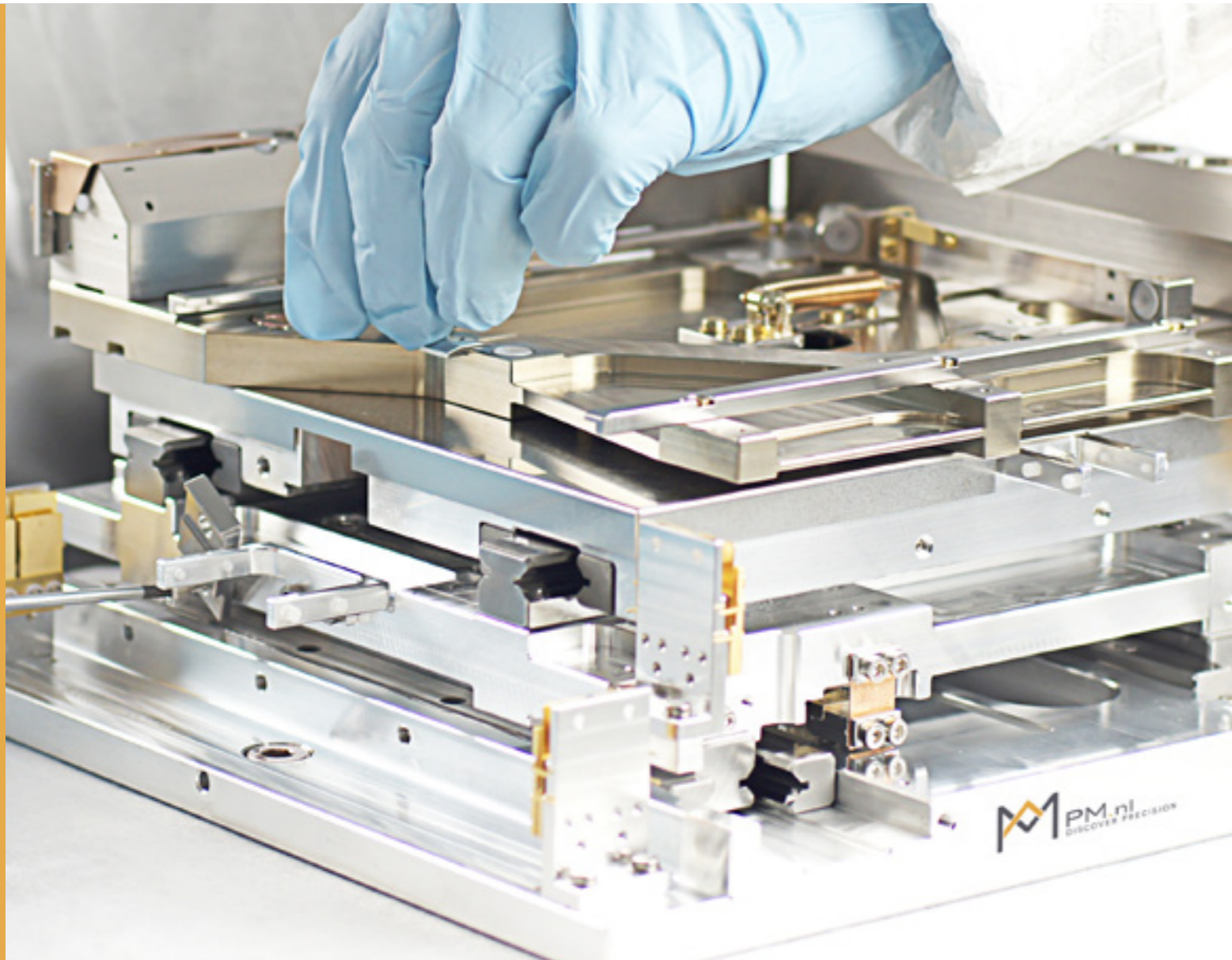
Bold = Short lead time item

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

r	End pieces a	Weight (g)	C _{dyn} in (N)	Roller cage						Stroke	Type
				D	t	w	w1	L	Z		
2.7	4	125	5495					32	7	30	RNG-4050x7KRE
		205	8635					49.6	11	45	RNG-4075x11KRE
		275	11775					67.2	15	60	RNG-4100x15KRE
		345	14915					84.8	19	75	RNG-4125x19KRE
		415	18055					102.4	23	90	RNG-4150x23KRE
		485	21195	4	4.4	2.8	3.85	120	27	105	RNG-4175x27KRE
		555	23550					133.2	30	130	RNG-4200x30KRE
		625	25120					144.3	32	155	RNG-4225x32KRE
		695	27475					157.5	35	180	RNG-4250x35KRE
3.2	4	460	17650					68	10	50	RNG-6100x10KRE
		690	28240					107.6	16	80	RNG-6150x16KRE
		920	35300					134	20	120	RNG-6200x20KRE
		1150	44125					167	25	150	RNG-6250x25KRE
		1380	54715					210.6	31	175	RNG-6300x31KRE
		1610	63540	6	6.6	4.3	6.3	243.6	36	210	RNG-6350x36KRE
		1840	70600					270	40	245	RNG-6400x40KRE

F = For load direction please refer to picture provided

Units: mm



Linear needle bearings of the N/O and M/V types are suitable for highly accurate support and guiding of high loads and moments. By virtue of their closely spaced needle rollers they provide extremely high stiffness, high linear motion accuracy. With their compact size, they are ideal for use in the machine tool industry.

STRUCTURE AND FEATURES

One set consists of 2 pairs of linear bearings; each pair consist of two rails, one N-type (female) and one O-type (male), through hardened and precision ground, with one needle roller cage between them.

The rails are made to very high manufacturing tolerances and matched together as a set. Mixing components from different sets may adversely affect the accuracy.

Rails are equipped with countersunk attachment holes, according to standard configuration. Rail ends come with threaded holes for fixing end-stops and wipers. Special type GD screws suitable for the attachment are available separately (see page 75 and 83).

ORDER NOTES

Normally, one set of linear bearing consists of:
4 pcs. rails (= 2 pairs) N/O, 2 pcs. needle cages and 8 pcs. endstops

Please make sure to specify the following product details in your order note:

- Quantity and type of rails needed
- Quantity and type of cages or max. stroke
- Quantity and type of end stop screws or end stop pieces with or without wipers.

Please note that for end stop type GH with GH-A wipers, as well as end stop type GW with GW-A wipers, only 4 pieces are needed

Example 1:

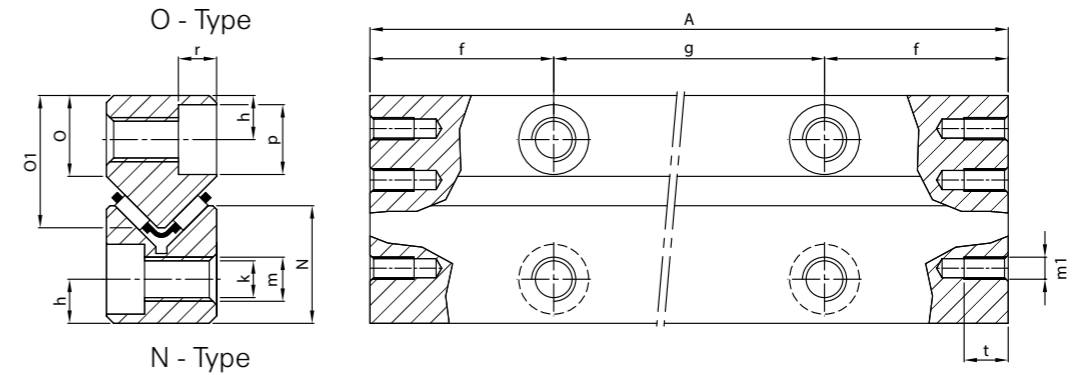
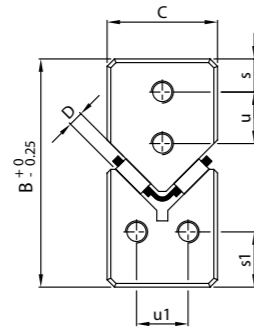
To order one linear bearing set of 600 mm length, size 2025 for a 350 mm stroke in standard quality please specify:

- 2 pcs. Rails type N-2025x600
- 2 pcs. Rails type O-2025x600
- 2 pcs. Needle cages type HW-15x425 mm
- 4 pcs. End pieces type GFN-2025
- 4 pcs. End pieces type GFO-2025

Example 2:

To order one linear bearing set of 300 mm length, size 3015 for a 150 mm stroke in standard quality specify as follows:

- 2 pcs. Rails type M-3015x300
- 2 pcs. Rails type V-3015x300
- 2 pcs. Needle cages type HW-10x225 mm
- 2 pcs. End pieces type EM-3015
- 2 pcs. End pieces type EAM-3015



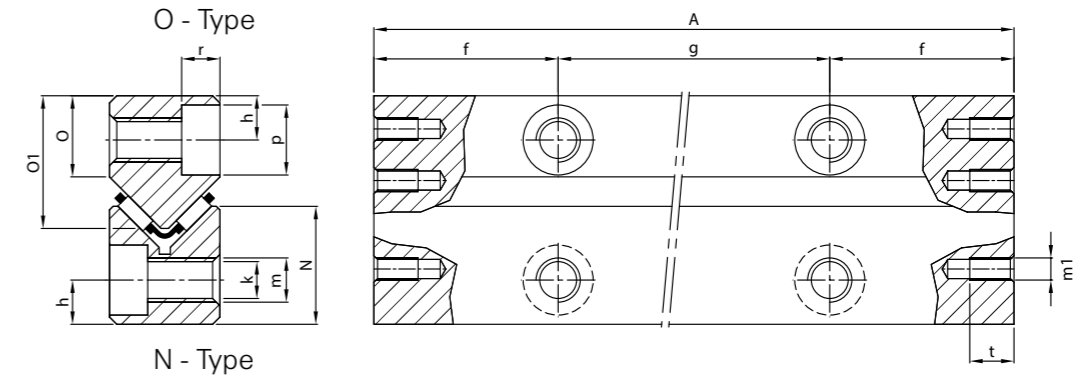
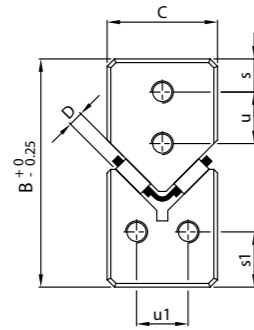
Rail type		Main dimensions							Mounting holes				
N-Type	O-Type	A	B	C	N	O	O1	D	f	g	h	k	m
N-62015x100	O-62015x100	100								1x50			
N-62015x150	O-62015x150	150								2x50			
N-62015x200	O-62015x200	200								3x50			
N-62015x250	O-62015x250	250								4x50			
N-62015x300	O-62015x300	300								5x50			
N-62015x350	O-62015x350	350								6x50			
N-62015x400	O-62015x400	400	31	15	16	11	18	2	25	7x50	6	5.2	M6
N-62015x450	O-62015x450	450								8x50			
N-62015x500	O-62015x500	500								9x50			
N-62015x600	O-62015x600	600								11x50			
N-62015x700	O-62015x700	700								13x50			
N-62015x800	O-62015x800	800								15x50			
N-62015x900	O-62015x900	900								17x50			
N-62015x1000	O-62015x1000	1000								19x50			
N-92025x200	O-92025x200	200								1x100			
N-92025x300	O-92025x300	300								2x100			
N-92025x400	O-92025x400	400								3x100			
N-92025x500	O-92025x500	500								4x100			
N-92025x600	O-92025x600	600								5x100			
N-92025x700	O-92025x700	700	44	22	24	15	24.5	2	50	6x100	9	6.8	M8
N-92025x800	O-92025x800	800								7x100			
N-92025x900	O-92025x900	900								8x100			
N-92025x1000	O-92025x1000	1000								9x100			
N-92025x1100	O-92025x1100	1100								10x100			
N-92025x1200	O-92025x1200	1200								11x100			

End holes		Weight (g)		Type N/O	Accessories					
p	r	Type N	Type O							
				62015x100	Cages: HW-10 End pieces: GF, GH, GW Wipers: GH-A, GW-A Attachment screws: GD-6					
				62015x150						
				62015x200						
				62015x250						
				62015x300						
				62015x350						
9.5	5.2	M3	4.5	7.5		7	7	581	652	62015x400
								652	734	62015x450
								724	815	62015x500
								866	979	62015x600
								1019	1142	62015x700
								1162	1305	62015x800
								1305	1468	62015x900
								1448	1631	62015x1000
							683	693	92025x200	
							1019	1030	92025x300	
							1346	1356	92025x400	
							1692	1702	92025x500	
							2018	2029	92025x600	
10.5	6.2	M4	6	11	8	10	2365	2375	92025x700	
							2691	2701	92025x800	
							3028	3038	92025x900	
							3364	3374	92025x1000	
							3700	3710	92025x1100	
							4027	4037	92025x1200	

Bold = Short lead time item

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

Units: mm



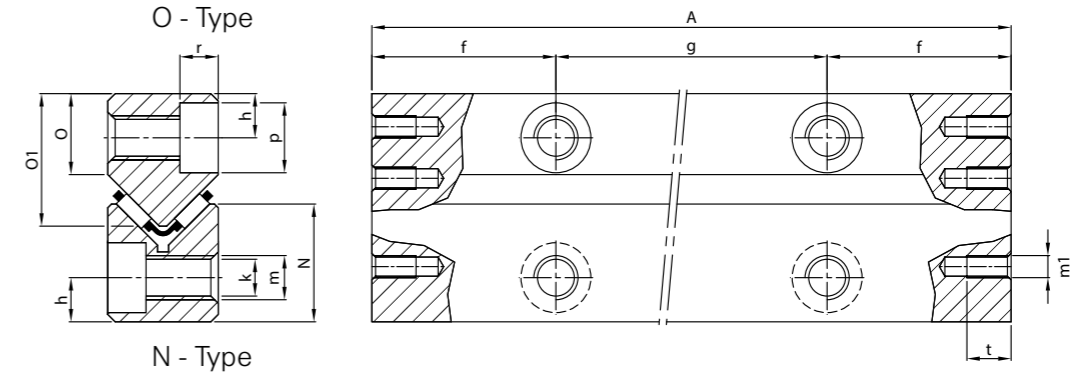
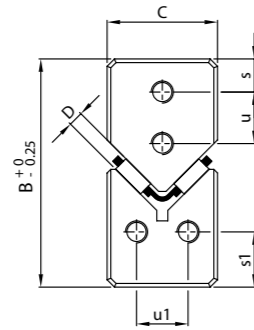
Rail type		Main dimensions							Mounting holes				
N-Type	O-Type	A	B	C	N	O	O1	D	f	g	h	k	m
N-2025x200	O-2025x200	200								1x100			
N-2025x300	O-2025x300	300								2x100			
N-2025x400	O-2025x400	400								3x100			
N-2025x500	O-2025x500	500								4x100			
N-2025x600	O-2025x600	600								5x100			
N-2025x700	O-2025x700	700	52	25	28	18	29	2	50	6x100	10	8.5	M10
N-2025x800	O-2025x800	800								7x100			
N-2025x900	O-2025x900	900								8x100			
N-2025x1000	O-2025x1000	1000								9x100			
N-2025x1100	O-2025x1100	1100								10x100			
N-2025x1200	O-2025x1200	1200								11x100			
N-2535x300	O-2535x300	300								2x100			
N-2535x400	O-2535x400	400								3x100			
N-2535x500	O-2535x500	500								4x100			
N-2535x600	O-2535x600	600								5x100			
N-2535x700	O-2535x700	700	62	30	34	22	35	2.5	50	6x100	12	10.3	M12
N-2535x800	O-2535x800	800								7x100			
N-2535x900	O-2535x900	900								8x100			
N-2535x1000	O-2535x1000	1000								9x100			
N-2535x1100	O-2535x1100	1100								10x100			
N-2535x1200	O-2535x1200	1200								11x100			

		End holes						Weight (g)		Type N/O	Accessories
p	r	m1	s	s1	t	u	u1	Type N	Type O		
								897	897	2025x200	
								1366	1346	2025x300	
								1835	1804	2025x400	Cages: HW-15, FF-2025-ZW
								2304	2253	2025x500	
								2762	2701	2025x600	End pieces: GF, GH, GW
13.5	8.3	M6	7	12	12	11	14	3231	3150	2025x700	
								3690	3598	2025x800	Wipers: GH-A, GW-A
								4159	4047	2025x900	
								4618	4506	2025x1000	Attachment screws:
								5056	4954	2025x1100	GD-2025
								5556	5403	2025x1200	
								1906	1967	2535x300	
								2548	2620	2535x400	Cages: HW-20, FF-2535-ZW
								3180	3282	2535x500	
								3812	3935	2535x600	End pieces: GF, GH, GW
16.5	10.2	M6	8	15	12	12	18	4455	4587	2535x700	
								5076	5240	2535x800	Wipers: GH-A, GW-A
								5719	5902	2535x900	
								6351	6646	2535x1000	Attachment screws:
								6993	7207	2535x1100	GD-2025
								7625	7859	2535x1200	

Bold = Short lead time item

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

Units: mm



Rail type		Main dimensions							Mounting holes				
N-Type	O-Type	A	B	C	N	O	O1	D	f	g	h	k	m
N-3045x400	O-3045x400	400								3x100			
N-3045x500	O-3045x500	500								4x100			
N-3045x600	O-3045x600	600								5x100			
N-3045x700	O-3045x700	700								6x100			
N-3045x800	O-3045x800	800	74	35	42.5	25	40	3	50	7x100	14	12.5	M14
N-3045x900	O-3045x900	900								8x100			
N-3045x1000	O-3045x1000	1000								9x100			
N-3045x1100	O-3045x1100	1100								10x100			
N-3045x1200	O-3045x1200	1200								11x100			
N-3555x500	O-3555x500	500								4x100			
N-3555x600	O-3555x600	600								5x100			
N-3555x700	O-3555x700	700								6x100			
N-3555x800	O-3555x800	800	78	45	45	25	45	3.5	50	7x100	14	12.5	M14
N-3555x900	O-3555x900	900								8x100			
N-3555x1000	O-3555x1000	1000								9x100			
N-3555x1100	O-3555x1100	1100								10x100			
N-3555x1200	O-3555x1200	1200								11x100			

		End holes						Weight (g)		Type N/O	Accessories
p	r	m1	s	s1	t	u	u1	Type N	Type O		
18.5	12.5	M6	10	18	12	16	19	3660	3466	3045x400	Cages: HW-25, FF-3045-ZW End pieces: GF, GH, GW Wipers: GH-A, GW-A Attachment screws: GD-3045
								4567	4322	3045x500	
								5494	5138	3045x600	
								6402	6055	3045x700	
								7319	6922	3045x800	
								8236	7778	3045x900	
								9154	8654	3045x1000	
								10061	9511	3045x1100	
								10979	10377	3045x1200	
18.5	12.2	M6	12	18	12	20	29	6177	6106	3555x500	Cages: HW-30, FF-3555-ZW End pieces: GF, GH, GW Wipers: GH-A, GW-A Attachment screws: GD-3555
								7370	7329	3555x600	
								8654	8542	3555x700	
								9888	9766	3555x800	
								11131	10989	3555x900	
								12375	12202	3555x1000	
								13619	13425	3555x1100	
								14852	14648	3555x1200	

Bold = Short lead time item

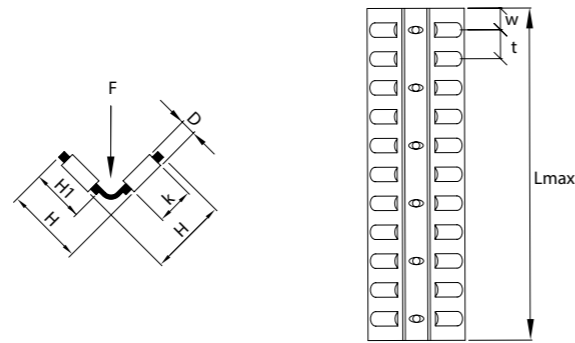
Regular = Long lead time item - please ask us about prices and lead times

Units: mm

ACCESSORIES

Needle cages type HW, size 10 - 30

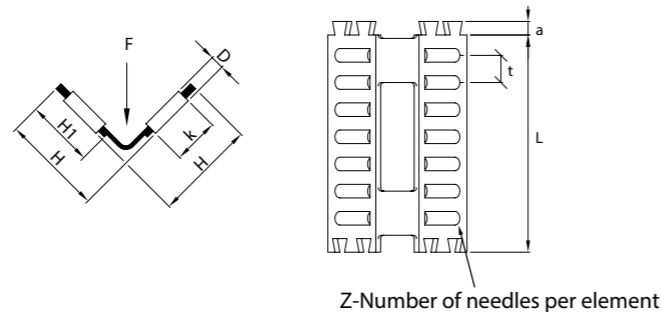
- Needles are retained
- Suitable for horizontal and vertical application
- Material aluminum
- Suitable for protruding cages
- Suitable for temperatures up to 150 °C
- On request we can supply cages in steel or brass



Length tolerance: $L + 0/-t$

Needle cages type FF-ZW, size 2025 - 3555

- Needles are retained
- Suitable for horizontal and vertical application
- Material: plastic
- Suitable for temperatures up to 120 °C



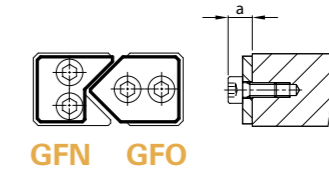
Features dovetail grooves on both sides of the cage elements for an easy connection of any number of elements. To bend the cage, heat the elements to +70 °C to +90 °C and bend to the desired angle.

Cage type		Main dimensions									Load rating		
FF.ZW	HW	D	H	H1	a	k	L	t	w	Lmax	Z	C_{dyn}^1 (N)	C_0 (N)
FF-2025-ZW	HW-10	2	10	8	-	4.8	-	4	3	2000	-	21400	62700
		2	15	10	2	6.8	32	4	-	-	7	25900	87500
FF-2535-ZW	HW-15	2	15	10.5	-	6.8	-	4.5	3.5	2000	-	26200	88900
		2.5	20.5	15	2.4	9.8	45	5	-	-	8	39600	130600
FF-3045-ZW	HW-20	2.5	20	14.3	-	9.8	-	5.5	3.5	2000	-	40300	133500
		3	26	20	3	13.8	60	6	-	-	9	57900	188500
FF-3555-ZW	HW-25	3	25	19	-	13.8	-	6	4.5	2000	-	62900	209400
		3.5	31.5	25	3.2	17.8	75	7	-	-	10	78400	250900
	HW-30	3.5	30	24	-	17.8	-	7	5	2000	-	82700	268700

1) The dynamic load rating C_{dyn} for a theoretical cage length of 100 mm in load direction "F" as shown in the drawings.

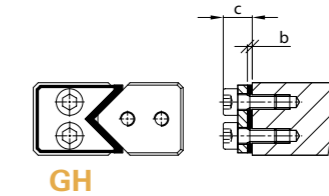
End pieces type GFN and GFO, size 62015 - 3555

- Suitable for horizontal and vertical application



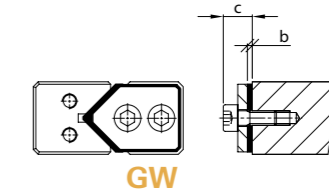
End pieces type GH, size 62015 - 3555

- Suitable for horizontal and vertical application
- Felt wipers type GH-A optionally available



End pieces type GW, size 62015 - 3555

- For horizontal and vertical application
- Application felt wipers type GW-A optionally available

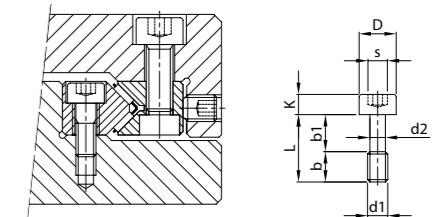


Main dimensions	Rail N/O					
	62015	92025	2025	2535	3045	3555
a	6	7	10	10	10	11
b	3	3	3	3	4	5
c	9.2	10.2	13.2	13.2	13.2	14.2

Order template (adjust as needed): 4 end pieces GFN-2025 and 4 end pieces GFO-2025

Attachment screws type GD, size 6 - 3555

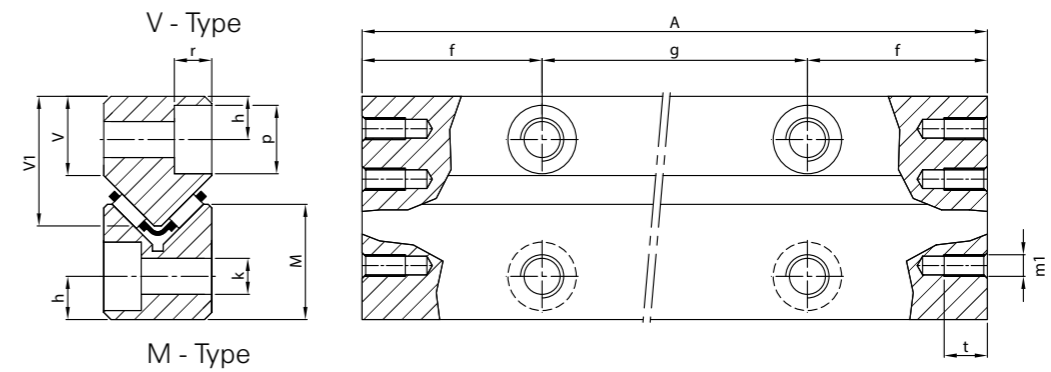
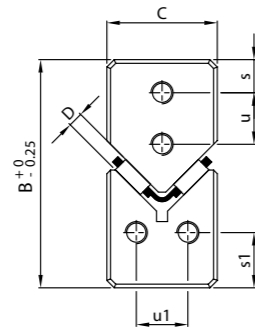
- For compensation of pitch distances between mounting holes
- Also recommended for the installation of the preload rail



Type	Main dimensions								Rail type	Max. tightening torque (Nm) ¹
	L	b	b1	D	d1	d2	K	s		
GD-6	20	8	12	8	M5	3.9	5	4	N/O-62015	4.6
GD-9	30	12	18	8.5	M6	4.6	6	5	N/O-92025	7.3
GD-2025	35	16	19	11.3	M8	6.2	8	6	N/O-2025	19.2
GD-2535	40	18	22	13.9	M10	7.9	10	8	N/O-2535	38.4
GD-3045	50	25	25	15.8	M12	9.6	12	10	N/O-3045	66.4
GD-3555	60	25	35	15.8	M12	9.6	12	10	N/O-3555	66.4

Order template (adjust as needed): 8 pcs. Attachment screws type GD-2025

¹ For strength grade 12.9



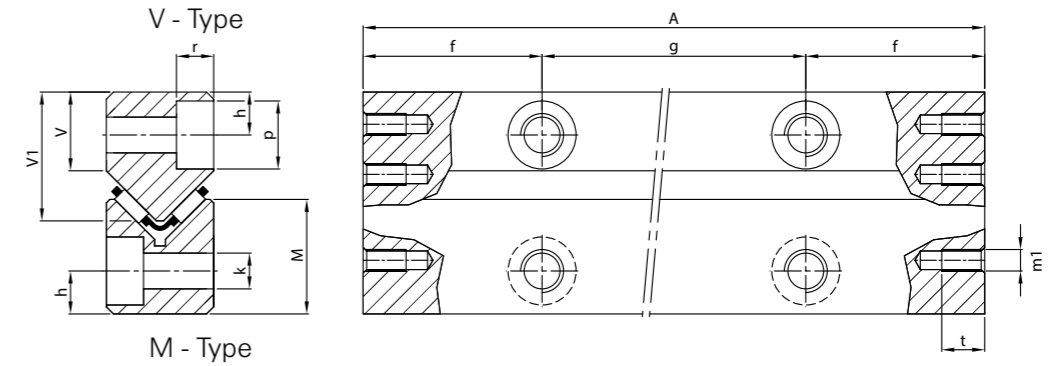
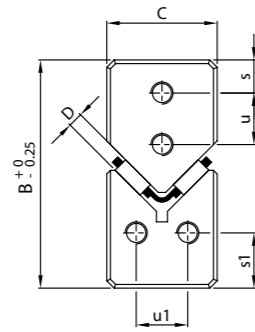
Rail type		Main dimensions							Mounting holes			
M-Type	V-Type	A	B	C	M	V	V1	D	f	g	h	k
M-3015x100	V-3015x100	100							15	2x35		
M-3015x150	V-3015x150	150							15	3x40		
M-3015x200	V-3015x200	200							20	4x40		
M-3015x300	V-3015x300	300							30	6x40		
M-3015x400	V-3015x400	400	30	15	15.5	10.5	17	2	20	9x40	5.3	5.3
M-3015x500	V-3015x500	500							30	11x40		
M-3015x600	V-3015x600	600							20	14x40		
M-3015x700	V-3015x700	700							30	16x40		
M-3015x800	V-3015x800	800							20	19x40		
M-3015x900	V-3015x900	900							30	21x40		
M-3015x1000	V-3015x1000	1000							20	24x40		
M-4020x200	V-4020x200	200							20	2x80		
M-4020x300	V-4020x300	300							30	3x80		
M-4020x400	V-4020x400	400							40	4x80		
M-4020x500	V-4020x500	500							50	5x80		
M-4020x600	V-4020x600	600							20	7x80		
M-4020x700	V-4020x700	700	40	20	22.5	13.5	22	2	30	8x80	7.5	7.5
M-4020x800	V-4020x800	800							40	9x80		
M-4020x900	V-4020x900	900							50	10x80		
M-4020x1000	V-4020x1000	1000							20	12x80		
M-4020x1100	V-4020x1100	1100							30	13x80		
M-4020x1200	V-4020x1200	1200							40	14x80		

		End holes						Weight (g)		Type M/V	Accessories
p	r	m1	s	s1	t	u	u1	Type M	Type V		
								143	161	3015x100	
								215	242	3015x150	Cages: HW-10
								286	322	3015x200	
								429	483	3015x300	End pieces: EM, EV-3015
8.5	4.5	M3	5.5	8	7	7	7	572	644	3015x400	
								715	805	3015x500	Wipers: EAM, EAV-3015
								858	966	3015x600	
								1001	1127	3015x700	Attachment screws: GD-6
								1144	1288	3015x800	
								1287	1445	3015x900	
								1430	1610	3015x1000	
								588	554	4020x200	
								882	831	4020x300	Cages: HW-15, FF-2025-ZW
								1176	1108	4020x400	
								1470	1385	4020x500	End pieces: EM, EV-4020
11.5	6.8	M5	5.5	10	8	10.5	11	1764	1662	4020x600	
								2058	1939	4020x700	Wipers: EAM, EAV-4020
								2352	2216	4020x800	
								2646	2493	4020x900	Attachment screws: GD-4020
								2940	2770	4020x1000	
								3234	3047	4020x1100	
								3528	3324	4020x1200	

Bold = Short lead time item

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

Units: mm



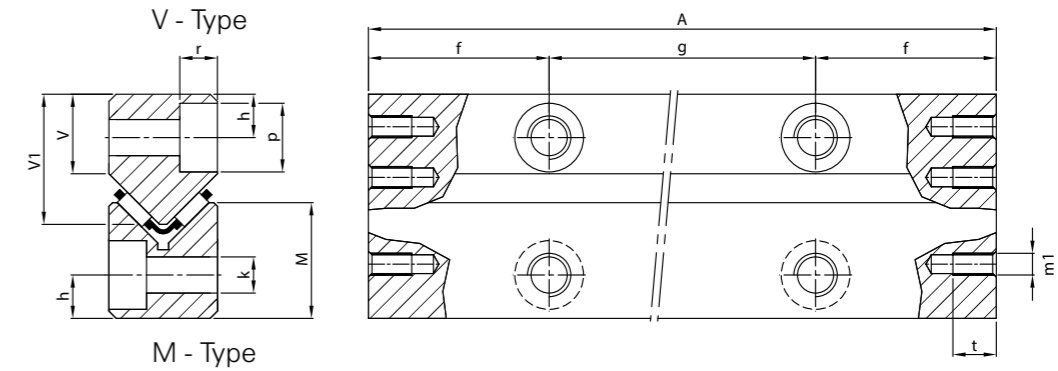
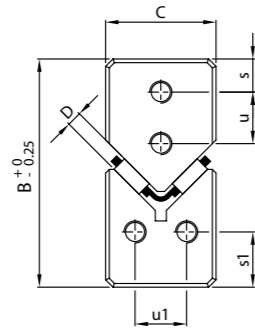
Rail type		Main dimensions							Mounting holes			
M-Type	V-Type	A	B	C	M	V	V1	D	f	g	h	k
M-5025x200	V-5025x200	200							20	2x80		
M-5025x300	V-5025x300	300							30	3x80		
M-5025x400	V-5025x400	400							40	4x80		
M-5025x500	V-5025x500	500							50	5x80		
M-5025x600	V-5025x600	600							20	7x80		
M-5025x700	V-5025x700	700	50	25	28	17	28	2	30	8x80	10	7.5
M-5025x800	V-5025x800	800							40	9x80		
M-5025x900	V-5025x900	900							50	10x80		
M-5025x1000	V-5025x1000	1000							20	12x80		
M-5025x1100	V-5025x1100	1100							30	13x80		
M-5025x1200	V-5025x1200	1200							40	14x80		
M-6035x300	V-6035x300	300							50	2x100		
M-6035x400	V-6035x400	400							50	3x100		
M-6035x500	V-6035x500	500							50	4x100		
M-6035x600	V-6035x600	600							50	5x100		
M-6035x700	V-6035x700	700	60	35	35	20	35.5	2.5	50	6x100	11	10
M-6035x800	V-6035x800	800							50	7x100		
M-6035x900	V-6035x900	900							50	8x100		
M-6035x1000	V-6035x1000	1000							50	9x100		
M-6035x1100	V-6035x1100	1100							50	10x100		
M-6035x1200	V-6035x1200	1200							50	11x100		

p	r	End holes						Weight (g)		Type M/V	Accessories
		m1	s	s1	t	u	u1	Type M	Type V		
								888	882	5025x200	
								1332	1323	5025x300	Cages: HW-15, FF-2025-ZW
								1776	1764	5025x400	
								2220	2205	5025x500	End pieces: EM, EV-5025
								2664	2646	5025x600	
11.5	6.8	M6	7	12	9	13	13	3108	3087	5025x700	Wipers: EAM, EAV-5025
								3552	3528	5025x800	
								3996	3969	5025x900	Attachment screws: GD-5025
								4440	4410	5025x1000	
								4884	4851	5025x1100	
								5328	5292	5025x1200	
								2211	2304	6035x300	
								2948	3072	6035x400	Cages: HW-20, FF-2535-ZW
								3685	3840	6035x500	
								4422	4608	6035x600	End pieces: EM, EV-6035
15	9	M6	8	14	9	18	20	5159	5376	6035x700	
								5859	6144	6035x800	Wipers: EAM, EAV-6035
								6633	6912	6035x900	
								7370	7680	6035x1000	Attachment screws: GD-6035
								8107	8448	6035x1100	
								8844	9216	6035x1200	

Bold = Short lead time item

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

Units: mm



Rail type		Main dimensions							Mounting holes			
M-Type	V-Type	A	B	C	M	V	V1	D	f	g	h	k
M-7040x300	V-7040x300	300							50	2x100		
M-7040x400	V-7040x400	400							50	3x100		
M-7040x500	V-7040x500	500							50	4x100		
M-7040x600	V-7040x600	600							50	5x100		
M-7040x700	V-7040x700	700	70	40	40	24	40	3	50	6x100	13	12.5
M-7040x800	V-7040x800	800							50	7x100		
M-7040x900	V-7040x900	900							50	8x100		
M-7040x1000	V-7040x1000	1000							50	9x100		
M-7040x1100	V-7040x1100	1100							50	10x100		
M-7040x1200	V-7040x1200	1200							50	1x100		
M-8050x300	V-8050x300	300							50	2x100		
M-8050x400	V-8050x400	400							50	3x100		
M-8050x500	V-8050x500	500							50	4x100		
M-8050x600	V-8050x600	600							50	5x100		
M-8050x700	V-8050x700	700	80	50	45	26	48.5	3.5	50	6x100	14	6.8
M-8050x800	V-8050x800	800							50	7x100		
M-8050x900	V-8050x900	900							50	8x100		
M-8050x1000	V-8050x1000	1000							50	9x100		
M-8050x1100	V-8050x1100	1100							50	10x100		
M-8050x1200	V-8050x1200	1200							50	11x100		

End holes		Weight (g)		Type M/V	Accessories							
p	r	Type M	Type V									
18.5	11	M6	10	16	9	20	20	2787	2982	7040x300	Cages: HW-25, FF-3045-ZW End pieces: EM, EV-7040 Wipers: EAM, EAV-7040 Attachment screw: GD-7040	
								3716	3976	7040x400		
								4645	4970	7040x500		
								5574	5964	7040x600		
								6503	6958	7040x700		
								7432	7952	7040x800		
								8361	8946	7040x900		
								9290	9940	7040x1000		
								10219	10934	7040x1100		
								11148	11928	7040x1200		
								3987	4438	8050x300		Cage: HW-30, FF-3555-ZW End pieces: EM, EV-8050 Wipers: EAM, EAV-8050 Attachment screws: GD-8050
								5316	5784	8050x400		
6645	7230	8050x500										
7974	8676	8050x600										
9303	10122	8050x700										
10632	11568	8050x800										
11961	13014	8050x900										
13290	14460	8050x1000										
14619	15906	8050x1100										
15948	17352	8050x1200										

Bold = Short lead time item

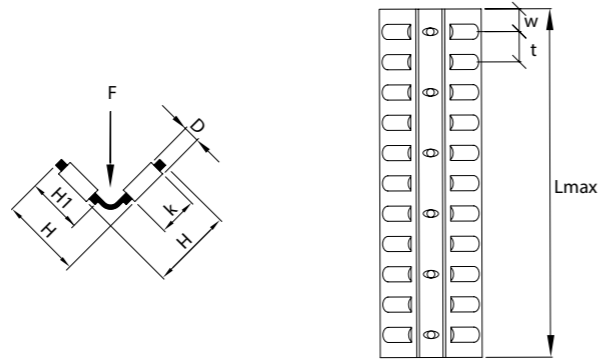
Regular = Long lead time item - please ask us about prices and lead times

Units: mm

ACCESSORIES

Needle cages type HW, size 10 - 30

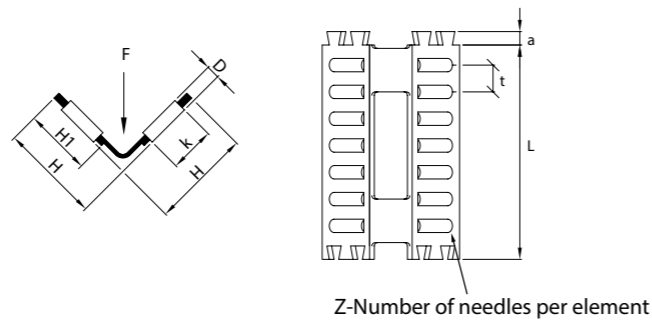
- Needles are retained
- Suitable for horizontal and vertical application
- Material aluminum
- For protruding cages
- Suitable for temperatures up to 150 °C
- On request we can supply cages in steel or brass



Length tolerance: $L + 0/t$

Needle cages type FF-ZW, size 2025 - 3555

- Needles are retained
- Suitable for horizontal and vertical application
- Material plastic
- Suitable for temperatures up to 120 °C



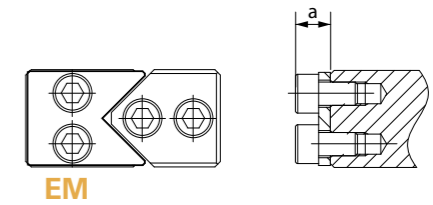
Features dovetail grooves on both sides of the cage elements for an easy connection of any number of elements. To bend the cage, heat the elements to +70 °C to +90 °C and bend to the desired angle.

Cage type	FF.ZW	HW	Main dimensions								Z	Load rating		
			D	H	H1	a	k	L	t	w		Lmax	C_{dyn}^1 (N)	C_0 (N)
FF-2025-ZW	HW-10	2	10	8	-	4.8	-	4	3	2000	-	21400	62700	
		2	15	10	2	6.8	32	4	-	-	7	25900	87500	
FF-2535-ZW	HW-15	2	15	10.5	-	6.8	-	4.5	3.5	2000	-	26200	88900	
		2.5	20.5	15	2.4	9.8	45	5	-	-	8	39600	130600	
FF-3045-ZW	HW-20	2.5	20	14.3	-	9.8	-	5.5	3.5	2000	-	40300	133500	
		3	26	20	3	13.8	60	6	-	-	9	57900	188500	
FF-3555-ZW	HW-25	3	25	19	-	13.8	-	6	4.5	2000	-	62900	209400	
		3.5	31.5	25	3.2	17.8	75	7	-	-	10	78400	250900	
		HW-30	3.5	30	24	-	17.8	-	7	5	2000	-	82700	268700

1) The dynamic load rating C_{dyn} for a theoretical cage length of 100 mm in load direction "F" as shown in the drawings.

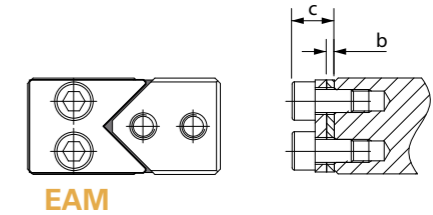
End pieces type EM/EV, size 3015 - 8050

- Suitable for horizontal and vertical application
- Available with felt wiper type EAM and EAV



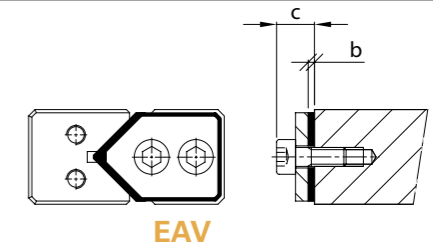
Felt wiper type EAM, size 3015 - 8050

- Suitable for horizontal and vertical application



Felt wiper type EAV, size 3015 - 8050

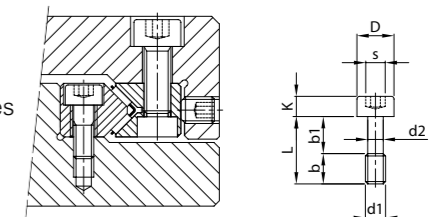
- Suitable for horizontal and vertical application



Main dimensions	Rail M/V					
	M/V 3015	M/V 4020	M/V 5025	M/V 6035	M/V 7040	M/V 8050
a	5	8	9	9	9	9
b	2	2	2	2	2	2
c	7	10	11	11	11	11

Attachment screw type GD, size 6 - 8050

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



Type	Main dimensions								Rail Type	Max. tightening torque (Nm) ¹
	L	b	b1	D	d1	d2	K	s		
GD-6	20	8	12	8	M5	3.9	5	4	M/V-3015	4.6
GD-4020	30	12	18	8.5	M6	4.6	6	5	M/V-4020	7.3
GD-5025	35	16	19	11.3	M8	6.2	8	6	M/V-5025	19.2
GD-6035	40	18	22	13.9	M10	7.9	10	8	M/V-6035	38.4
GD-7040	50	25	25	15.8	M12	9.6	12	10	M/V-7040	66.4
GD-8050	60	25	35	15.8	M12	9.6	12	12	M/V-8050	66.4

¹ For strength grade: 12.9



ANTI CAGE CREEP TECHNOLOGY

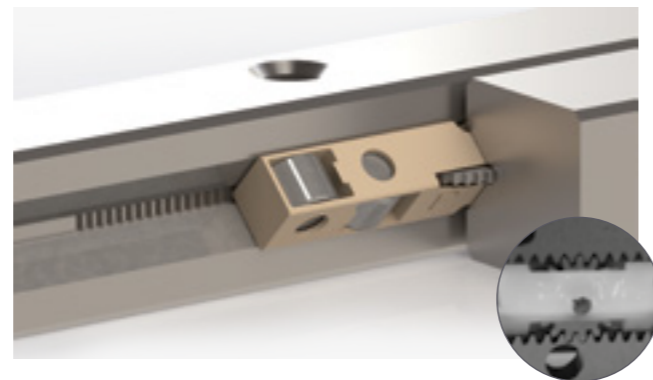
PM Anti Cage Creep (ACC) technology reduces cage creep down to zero.

With high acceleration up to 15G, the design is compact and cost-effective.

ACC is integrated in a crossed roller bearing design. Available also for stainless steel designs with an ECM-machined (Electro-Chemical Machining) integrated rack (ACCI all metal design) and UHV-compatibility.



A robust brass rack is locked in place inside the V-groove.



In its integrated form, anti cage creep (ACCI) is ECM-machined and available for stainless steel rails and selected rail types only.

THE PROBLEM: CAGE CREEP

In the push for faster production times, machine designers are constantly aiming for higher process speed, reduced size and weight of the design, while simultaneously requiring the highest possible machine travel and positioning accuracy.

Cage creep can occur in non-recirculating linear bearings applications where vibrations, improper mounting, very high acceleration and de-acceleration, inadequate tolerances on the mounting surfaces, uneven preloading or moment loading are present.

As the cage creeps out of its original position, increased friction, reduced travel length and premature wear of the linear bearings occur. This shortens the lifetime and can result in premature failures.

OUR SOLUTION: ANTI CAGE CREEP (ACC)

PM engineers have further enhanced the ACC technology making it suitable for high-tech and extremely dynamic applications. For decades, our ACC solution has proven its superior ability to prevent cage creep when applied in the most demanding applications and operating in the most challenging conditions. The ACC system is integrated in the design of the linear bearing without influencing the external boundary or mounting dimensions. This allows for direct replacement of bearings in under-performing applications with the ACC solution.

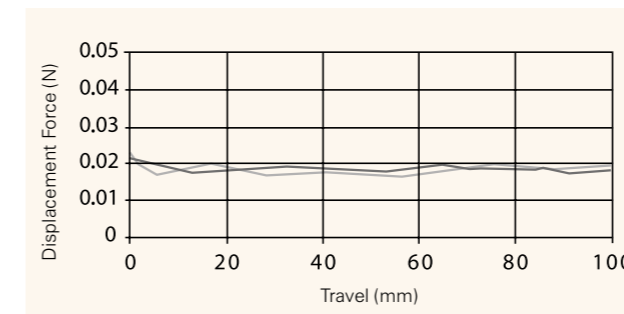
PROVEN RECORD OF RESULTS

- No increase in friction
- No reduction in accuracy
- No adverse influence from lubrication
- Operational lifetime extended to its limit
- Zero cage creeping
- Works with all mounting applications
- Easy to assemble

Our ACC system is the best performing and most cost-effective solution you will find on the market. Currently our precision rails with optional ACC are available to order with the RSDE and RNG series, in all accuracy grades.

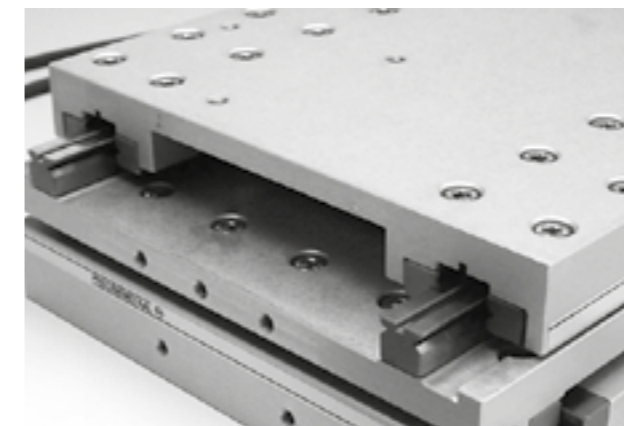
FRICTION FORCE

The ACC solution is the result of a very careful design and manufacturing process. The graph below illustrates the resulting fact that the force to be applied to overcome friction remains virtually unchanged.



APPLICATIONS

The ACC solution is well suited for the high speed, high precision demands of the electronics and semiconductor industry, for applications such as wire bonding stages and pick-and-place units.



OPERATING TEMPERATURE

Linear bearings with ACC solution are capable of operating in temperatures up to +120 °C. This gives ACC a significant advantage over similar systems using plastic components.

ACCELERATION

Max. acceleration 150 m/s² (15G)

A standard linear bearing set with ACC solution consists of:

- 4 pcs. rail type RSDE-ACC
- 2 pcs. roller cages type KRE(V)-ACC (rollers retained)

No end screws are required

Leading global manufacturers have chosen the PM ACC solution as the best solution on the market.

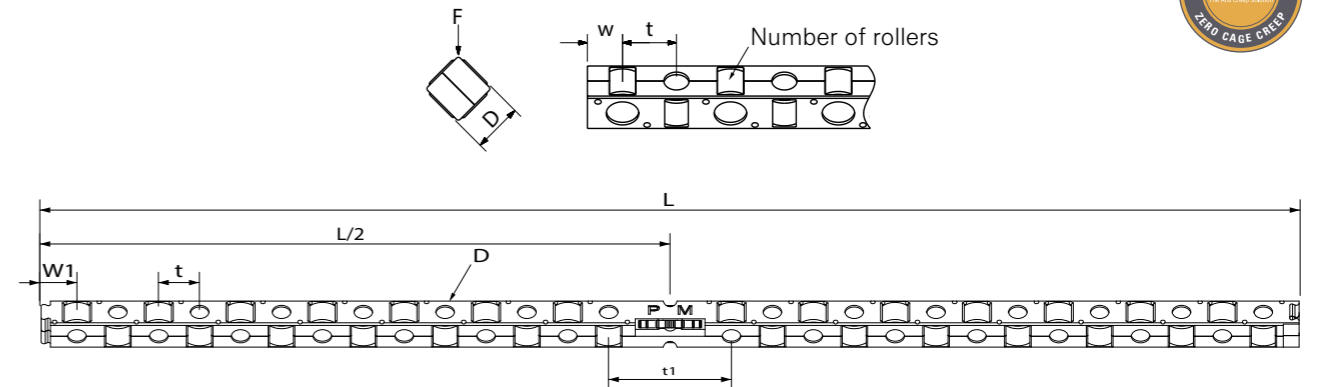
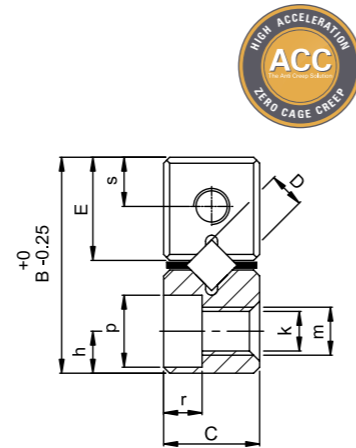
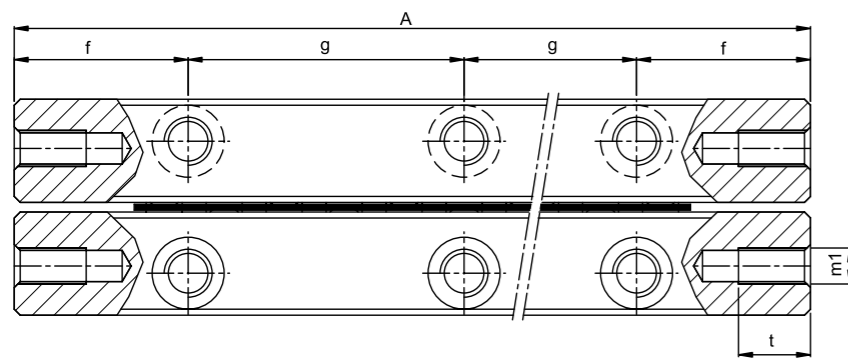
Optional:

End screws type GB and attachment screws type GD.

LINEAR BEARING SETS WITH ACC

Type RSDE-ACC, see from page 86 onwards.

Compact type RNG-ACC, see from page 90 onwards



Snap-on cage

One set consists of: 4 rails + 2 roller cages, both with ACC optional

RSDE-ACC Kit	Main dimensions					Mounting holes							End pieces		
	A	B	C	E	D	f	g	h	k	m	p	r	m1	s	t
RSDE-3050x8KRE-ACC	50						1x25								
RSDE-3075x12KRE-ACC	75						2x25								
RSDE-3100x18KRE-ACC	100						3x25								
RSDE-3125x22KRE-ACC	125						4x25								
RSDE-3150x28KRE-ACC	150						5x25								
RSDE-3175x34KRE-ACC	175	18	8	8.6	3	12.5	6x25	3.5 ^{+0.2}	3.2	M4	6	3.2	M3	4.1	5.5
RSDE-3200x40KRE-ACC	200						7x25								
RSDE-3225x46KRE-ACC	225						8x25								
RSDE-3250x52KRE-ACC	250						9x25								
RSDE-3275x54KRE-ACC	275						10x25								
RSDE-3300x60KRE-ACC	300						11x25								
RSDE-4080x10KRE-ACC	80						1x40								
RSDE-4120x16KRE-ACC	120						2x40								
RSDE-4160x22KRE-ACC	160						3x40								
RSDE-4200x28KRE-ACC	200						4x40								
RSDE-4240x36KRE-ACC	240	22	11	10.6	4	20	5x40	4.5 ^{+0.2}	4.3	M5	7.5	4.1	M3	5	7
RSDE-4280x42KRE-ACC	280						6x40								
RSDE-4320x48KRE-ACC	320						7x40								
RSDE-4360x54KRE-ACC	360						8x40								
RSDE-4400x60KRE-ACC	400						9x40								

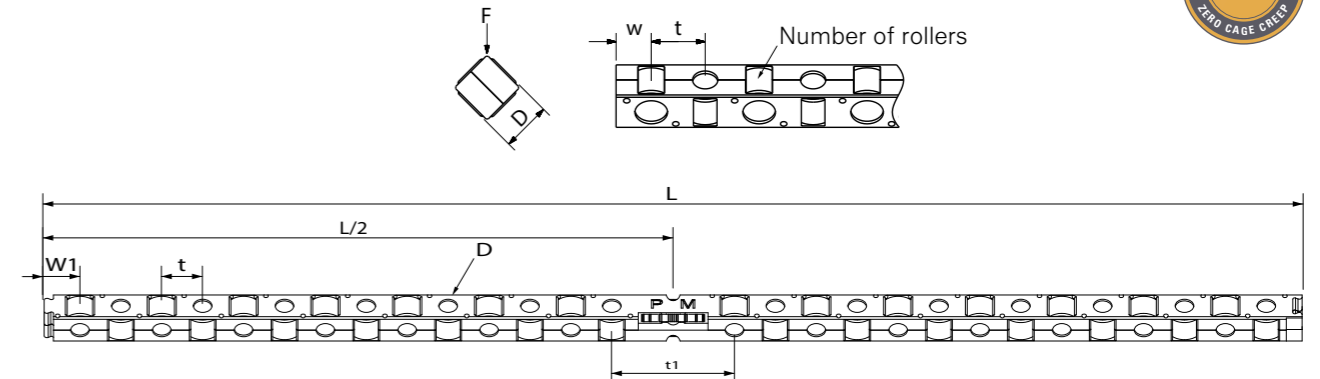
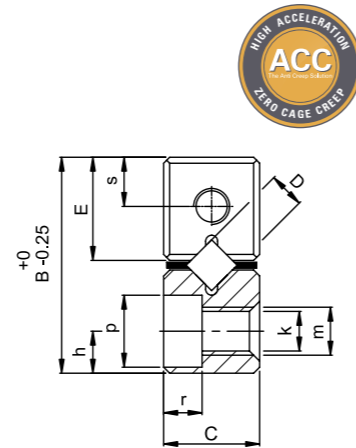
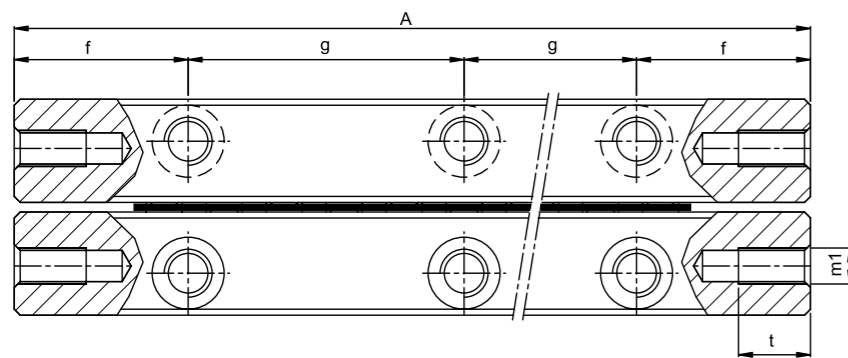
Bold = Short lead time item

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

Weight (g)	C _{dyn} in (N)	Roller cage							Stroke	Type
		D	t	t1	w	w1	Z	L		
116	3136						8	35.1	25	RSDE-3050x10KRE-ACC
161	4704						12	48.3	50	RSDE-3075x12KRE-ACC
210	7056						18	68.1	60	RSDE-3100x18KRE-ACC
259	2744						22	81.3	85	RSDE-3125x22KRE-ACC
310	10976	3	3.3	10.9	2.2	2.95	28	101.1	95	RSDE-3150x28KRE-ACC
365	13328						34	124.6	100	RSDE-3175x34KRE-ACC
405	15680						40	144.4	110	RSDE-3200x40KRE-ACC
457	18032						46	164.2	120	RSDE-3225x46KRE-ACC
507	20384						52	184	130	RSDE-3250x52KRE-ACC
555	21168						54	190.6	160	RSDE-3275x54KRE-ACC
605	23520						60	210.4	175	RSDE-3300x60KRE-ACC
317	7850						10	54	50	RSDE-4080x10KRE-ACC
475	12560						16	80.4	75	RSDE-4120x16KRE-ACC
630	17270						22	106.8	100	RSDE-4160x22KRE-ACC
788	21980						28	133.2	120	RSDE-4200x28KRE-ACC
945	28260	4	4.4	13.2	2.8	3.85	36	173	130	RSDE-4240x36KRE-ACC
1112	32970						42	199.4	160	RSDE-4280x42KRE-ACC
1259	37680						48	225.8	185	RSDE-4320x48KRE-ACC
1416	42390						54	252.8	210	RSDE-4360x54KRE-ACC
1573	47100						60	278.6	240	RSDE-4400x60KRE-ACC

F = For load direction please refer to picture provided

Units: mm



Snap-on cage

One set consists of: 4 rails + 2 roller cages, both with ACC optional

RSDE-ACC Kit	Main dimensions					Mounting holes							End holes		
	A	B	C	E	D	f	g	h	k	m	p	r	m1	s	t
RSDE-6100x8KRE-ACC	100						1x50								
RSDE-6150x14KRE-ACC	150						2x50								
RSDE-6200x16KRE-ACC	200						3x50								
RSDE-6250x22KRE-ACC	250						4x50								
RSDE-6300x28KRE-ACC	300	31	15	14.9	6	25	5x50	6 ^{±0.2}	5.2	M6	9.5	5.2	M5	7	8.5
RSDE-6350x32KRE-ACC	350						6x50								
RSDE-6400x38KRE-ACC	400						7x50								
RSDE-6450x44KRE-ACC	450						8x50								
RSDE-6500x48KRE-ACC	500						9x50								

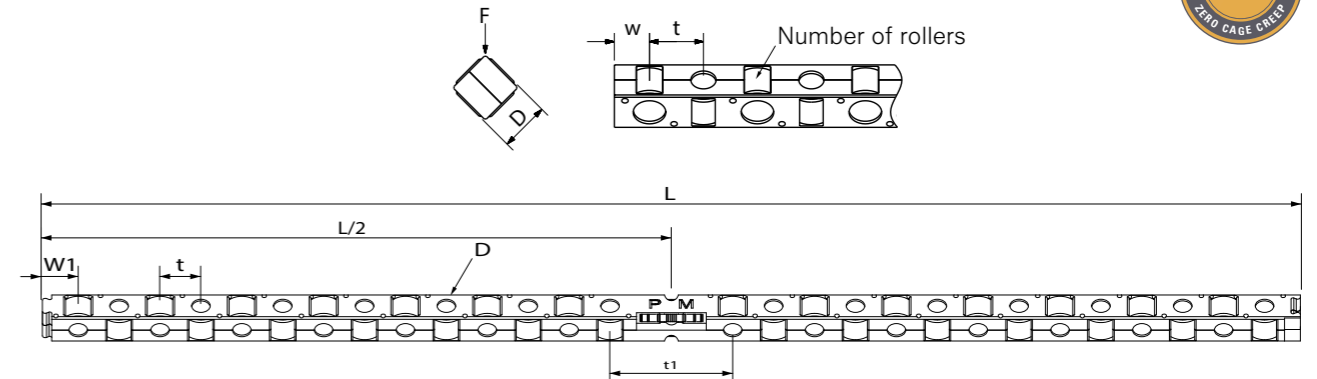
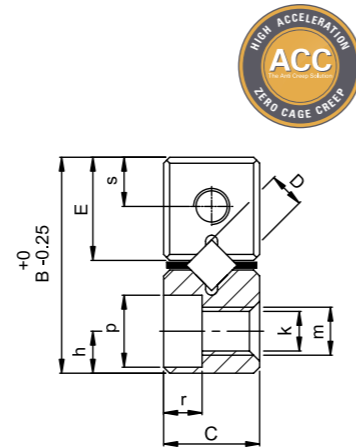
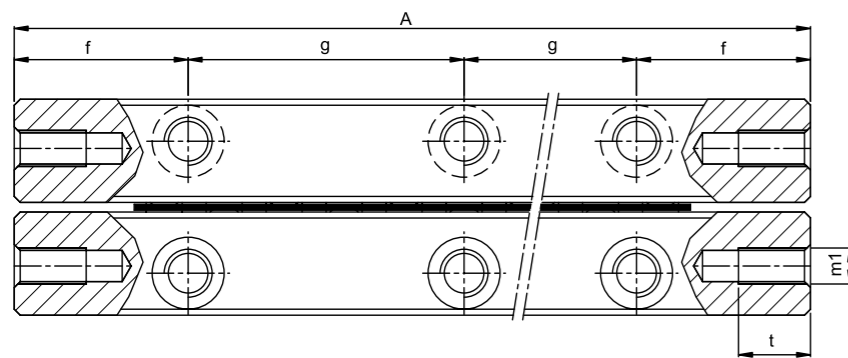
Weight (g)	C _{dyn} in (N)	Roller cage							Stroke	Type
		D	t	t1	w	w1	Z	L		
650	14120						8	68	60	RSDE-6100x8KRE-ACC
968	24710						14	107.6	80	RSDE-6150x14KRE-ACC
1291	28240						16	120.8	150	RSDE-6200x16KRE-ACC
1610	38830						22	160.4	170	RSDE-6250x22KRE-ACC
1936	49448	6	6.7	19.8	4.3	6.3	28	200	200	RSDE-6300x28KRE-ACC
2254	56480						32	234.4	230	RSDE-6350x32KRE-ACC
2578	67070						38	274	250	RSDE-6400x38KRE-ACC
2910	77660						44	313.6	270	RSDE-6450x44KRE-ACC
3218	84720						48	340	310	RSDE-6500x48KRE-ACC

Bold = Short lead time item

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

F = For load direction please refer to picture provided

Units: mm



Snap-on cage

One set consists of: 4 rails + 2 roller cages, both with ACC optional

RNG-ACC Kit	Main dimensions				D	Mounting holes							End holes		
	A	B	C	E		f	g	h	k	m	p	r	m1	s	t
RNG-4050x6KRE-ACC	50					1x25									
RNG-4075x10KRE-ACC	75					2x25									
RNG-4100x14KRE-ACC	100					3x25									
RNG-4125x18KRE-ACC	125					4x25									
RNG-4150x22KRE-ACC	150	19	9	9	4	5x25	3.5±0.2	2.65	M3	5.5	2.7	M3	3.5	6	
RNG-4175x26KRE-ACC	175					6x25									
RNG-4200x28KRE-ACC	200					7x25									
RNG-4225x30KRE-ACC	225					8x25									
RNG-4250x34KRE-ACC	250					9x25									
RNG-6100x8KRE-ACC	100					3x25									
RNG-6150x14KRE-ACC	150					5x25									
RNG-6200x16KRE-ACC	200					7x25									
RNG-6250x22KRE-ACC	250	25	12	12	6	9x25	5±0.2	3.3	M4	7	3.2	M3	3.5	6	
RNG-6300x28KRE-ACC	300					11x25									
RNG-6350x32KRE-ACC	350					13x25									
RNG-6400x38KRE-ACC	400					15x25									

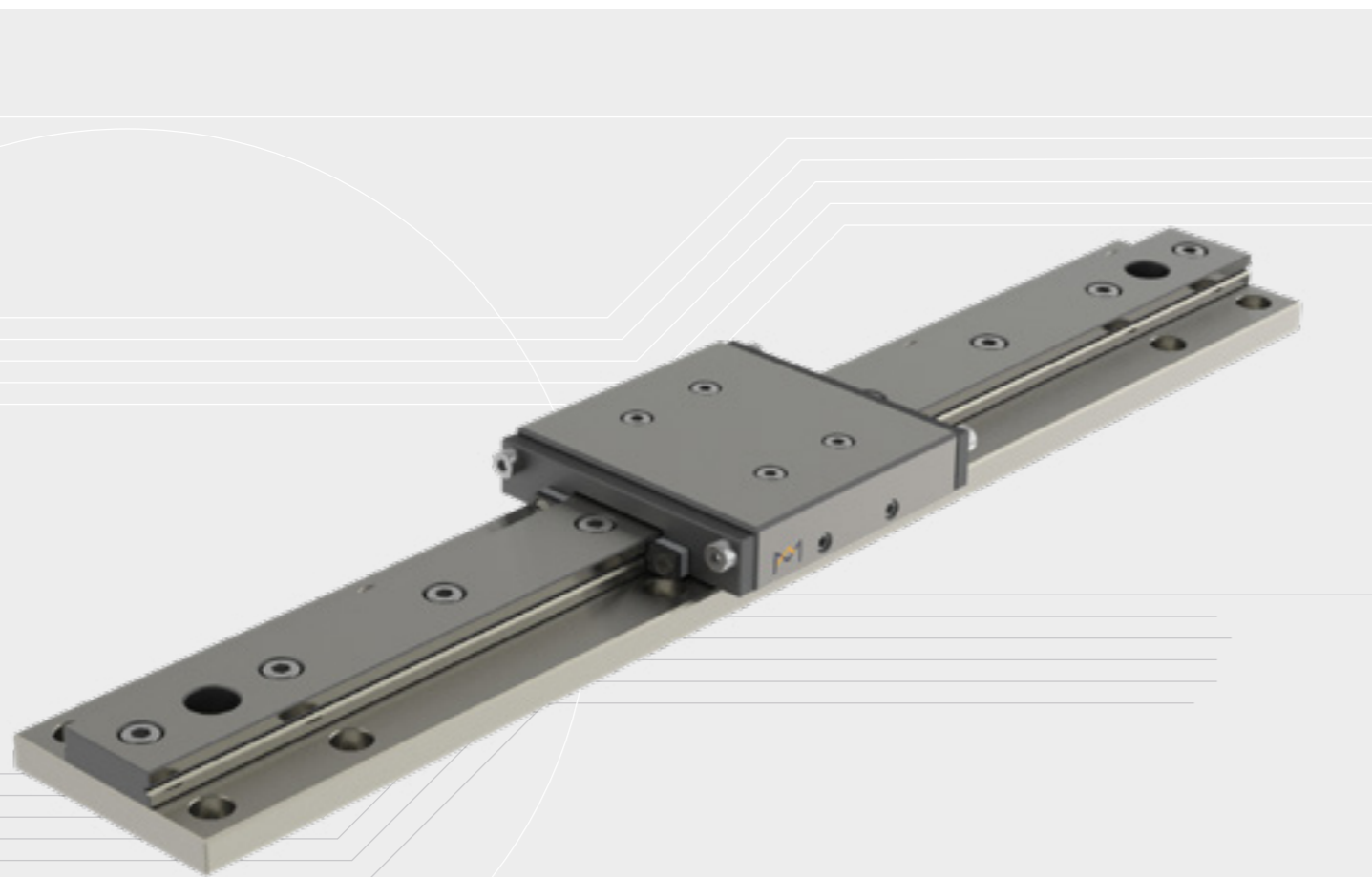
Weight (g)	C _{dyn} in (N)	Roller cage							Stroke	Type
		D	t	t1	w	w1	Z	L		
130	5495						8	36.4	27	RNG-4050x6KRE-ACC
210	8635						14	54.0	40	RNG-4075x10KRE-ACC
280	11775						16	71.6	55	RNG-4100x14KRE-ACC
350	14915						22	89.2	70	RNG-4125x18KRE-ACC
420	18055	4	4.4	13.2	2.8	3.85	28	106.8	85	RNG-4150x22KRE-ACC
490	21195						32	124.4	100	RNG-4175x26KRE-ACC
550	23550						38	133.2	130	RNG-4200x28KRE-ACC
615	25120						44	146.6	155	RNG-4225x30KRE-ACC
690	27475						48	164.2	180	RNG-4250x34KRE-ACC
470	17650						8	68	60	RNG-6100x8KRE-ACC
695	28240						14	107.6	80	RNG-6150x14KRE-ACC
905	35300						16	120.8	150	RNG-6200x16KRE-ACC
1130	44125	6	6.6	19.8	4.3	6.3	22	160.4	170	RNG-6250x22KRE-ACC
1365	54715						28	200	200	RNG-6300x28KRE-ACC
1595	63540						32	234.4	230	RNG-6350x32KRE-ACC
1830	70600						38	274	250	RNG-6400x38KRE-ACC

Bold = Short lead time item

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

F = For load direction please refer to picture provided

Units: mm



DS Double side track rails are designed for use with RSD type linear bearings with cages for space saving solutions and for use with recirculating units UK and UR enable long distance travel and low profile design. Both V-grooves are parallel machined enable precise linear motion and eliminate for installation and machining errors as with the use of two single rails.

STRUCTURE AND FEATURES

Depending on the construction, the rail can be equipped with ball or roller cages in combination with RSD type of rails. Another popular combination is with recirculating units UK and UR for long travel and low profile design. The double prism rails are made of tool steel 1.2842 and through hardened at 58 - 62 HRC, finished by precision grinding. The rail include two dowel pin holes for precise positioning during assembly. No need for reference shoulders.

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

For the attachment of the rails, special type GD screws are available to order separately (see page 35).

As option the rail can be made from stainless steel.

For fitting dimensions of DS with RSD linear bearing type (see page 94), recirculating unit type UK/UR please see page 97.

For RSD bearings and corresponding cages please see pages 23 - 33.

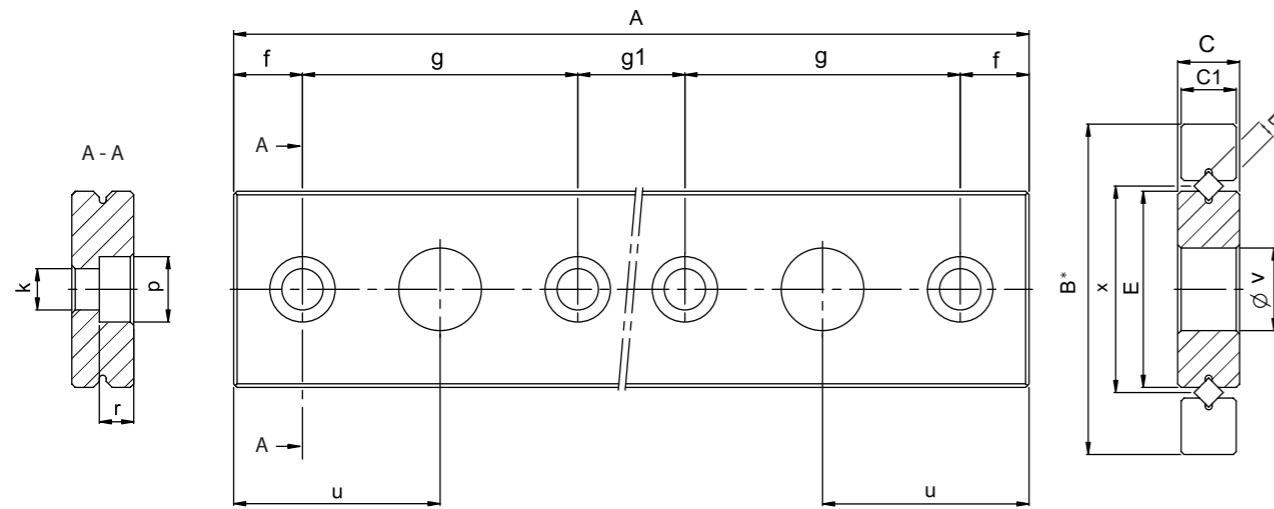
OPTIONAL FEATURES

- Stainless steel version
- Longer lengths as matched pairs
- Quality grades Q4 and Q2
- Special versions

Example:

To order one rail of size 6 mm with 300 mm length, please specify as follows:

- 1 pcs. Rail type DS-6300



Recirculating units UK are single row ball bearings for low to medium loads. For greater load ratings and improved stiffness we offer crossed roller recirculating units UR. The units are designed to function in any spatial orientation. The custom designed return offers extremely smooth running characteristics.

*DS in combination with type RSD rails

Type	Main dimensions															Weight (g)
	B	C	C1	E	D	f	g	g1	k	p	r	u	V ^{H7}	x		
DS-2	30	6.5	6	17	2	10	40 ¹⁾	50	4.8	7.8	4.1	30 ²⁾	8	18	1.80	
DS-3	48	9	8	28.4	3	10	40	50	6	9.5	5.1	30	12	30	3.67	
DS-6	77	16	15	43	6	15	85	100	9	14	8.3	50	15	46	5.02	
DS-9	122	24	22	73.6	9	25	75	100	13	19	12.5	60	15	78	16.83	
DS-12	141	30	28	77	12	25	75	100	13	19	12.5	60	15	83	20.62	
DS-15	174	38	36	96	15	25	75	100	13	19	12.5	60	15	103	31.40	

¹⁾ For length 100 mm: g = 80 mm

²⁾ For length 100 mm: u = 100 mm

STRUCTURE AND FEATURES

Recirculating units are made of high-quality bearing steel 1.2842, through hardened at 58 - 62 HRC and precision ground. Through our unique construction method we achieve return-channels and precision-ground V-grooves that are sized to high levels of accuracy – making these linear bearings mechanisms an excellent choice. The units' openings are designed to retain the balls and rollers. Having thus removed the possibility of balls and rollers dropping out accidentally, installation and exchange of the recirculating unit has been made trouble-free.

The recirculating endcaps are made of aluminium with black anodized finishing. The UK and UR types have identical mounting dimensions and are therefore interchangeable.

Every unit has an central hole for relubrication.

In conditions where dirt can enter the interior of the bearings the use of UK ball units is recommended since these are less sensitive to dirt compared to rollers.

Recirculating units are used in combinations with RSD type rails page 23 - 31 and with double prism rail type DS page 93 and 94.

OPTIONAL FEATURES

- Stainless steel version
- UHV compatible version
- Ceramic rolling elements with damping spacers

Example:

To order two pieces of ball recirculating units size 3 mm with length 75 mm please specify:

- 2 pcs. UK-3075



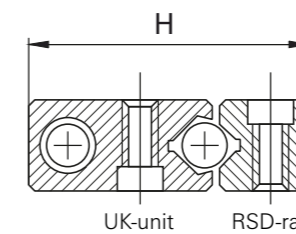
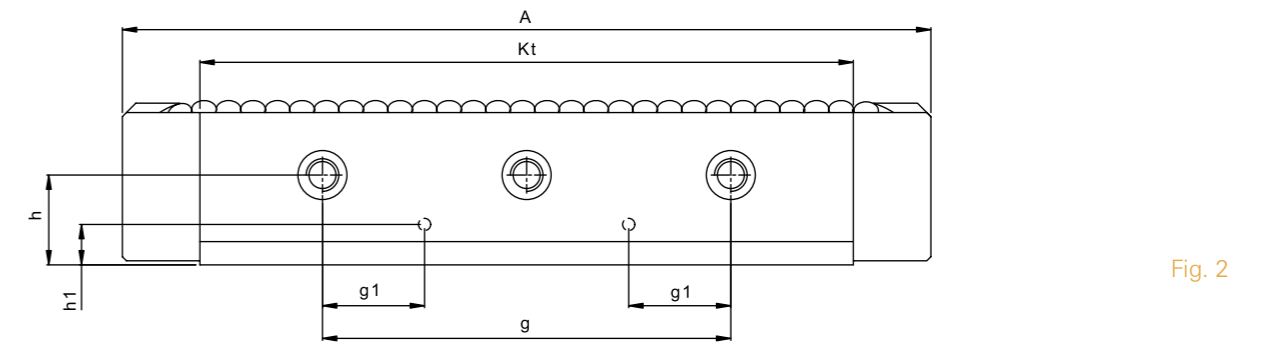
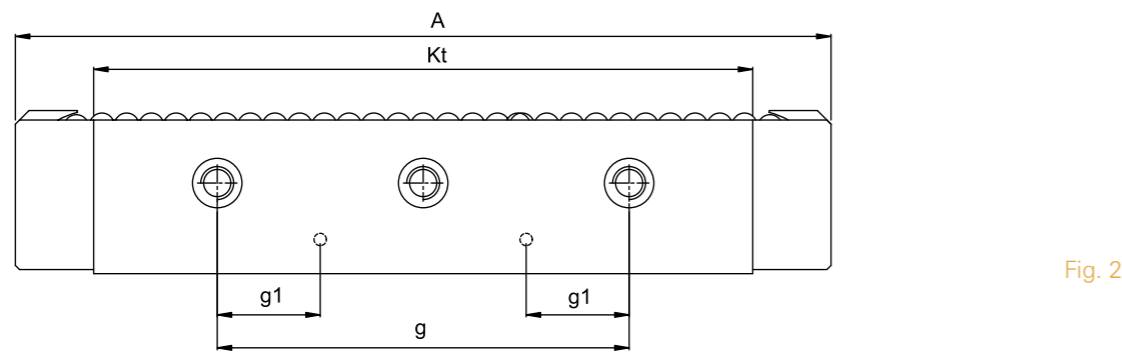
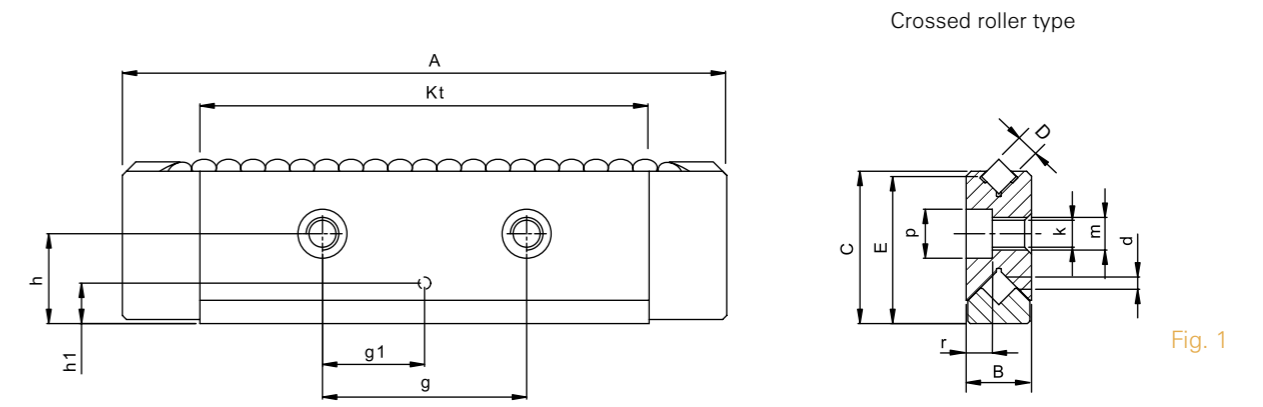
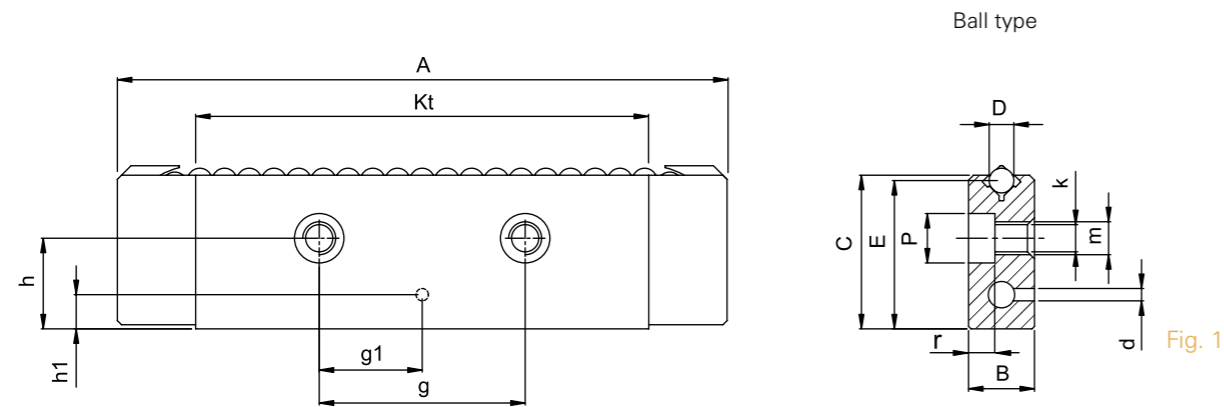
Recirculating units type UR

Type	Standard length A	Accessories
DS-2	100, 150, 200, 300, 400, 500	Cages: AA, KZR, JJ, KKLK
DS-3	200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200	Cages: AA, KZR, JJ, KKLK
DS-6	300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1100, 1200	Cages: AA, AL, KZR, JJ, KKLK
DS-9	400, 500, 600, 700, 800, 900, 1000, 1100, 1200	Cages: AA, AL, KZR, JJ, KKLK
DS-12	500, 600, 700, 800, 900, 1000, 1100, 1200	Cages: AA, AL, JJ, KKLK
DS-15	600, 700, 800, 900, 1000, 1100, 1200	Cages: AA, AL, JJ

Bold = Short lead time item

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

Units: mm



Type	H
UK-2 and RSD-2	16.5
UK/UR-3 and RSD-3	27
UK/UR-6 and RSD-6	45.5
UK/UR-9 and RSD-9	66
UK/UR-12 and RSD-12	89

Type	Main dimensions																C _{dyn} (N)	Weight (g)	Fig.
	A	B	C	D	E	Kt	d	g	g1	h	h1	k	m	p	r				
UK-2040	39	6	11.42	2	11	26	1	1x15	7.5	7	3	2.5	M3	4.3	2.2	294	15	1	
UK-2060	59					46		2x15	7.5							504	25	2	
UK-3075	73	8	18.65	3	18	53	1.5	1x25	12.5	11	4	3.3	M4	6	3.2	540	60	1	
UK-3100	99					78		2x25	12.5							810	85	2	
UK-6100	98.5	15	31.25	6	30	60	2	1x35	17.5	19	8.25	5.2	M6	9.5	5.2	858	220	1	
UK-6175	172					138		2x50	25							1872	490	2	
UK-9150	149.5	22	45.80	9	44	99	3	1x60	30	28	12	6.8	M8	11	6.8	1800	730	1	
UK-9250	248.5					198		2x75	37.5							3450	1520	2	
UK-12200	199	28	62.50	12	60	120	3	1x85	42.5	38	16	8.5	M10	13.5	8.5	2860	1570	1	
UK-12300	299					216		2x90	45							4940	2930	2	
UK-15250	249	36	77.80	15	75	147	3	1x100	50	48	20	10.3	M12	16.5	10.3	4200	3190	1	
UK-15350	349					247		2x100	50							7140	5390	2	

Bold = Short lead time item

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

Units: mm

Type	Main dimensions																C _{dyn} (kN)	Weight (g)	Fig.
	A	B	C	D	E	Kt	d	g	g1	h	h1	k	m	p	r				
UR-3075	74	8	18.65	3	18	53	1.5	1x25	12.5	11	4	3.3	M4	6	3.2	1.2	53	1	
UR-3100	98					78		2x25	12.5							1.8	83	2	
UR-6100	98.5	15	31.25	6	30	61	2	1x35	17.5	19	8.15	5.2	M6	9.5	5.2	5.7	235	1	
UR-6175	172					133		2x50	25							6.2	511	2	
UR-9150	150	22	45.80	9	44	90	3	1x60	30	28	12	6.8	M8	11	6.8	7.4	756	1	
UR-9250	249.9					189		2x75	37.5							14.9	1550	2	
UR-12200	200	28	62.50	12	60	110	3	1x85	42.5	38	16	8.5	M10	13.5	8.5	12.8	1720	1	
UR-12300	296					206		2x90	45							23	3100	2	
UR-15250	244	36	77.80	15	75	140	3	1x100	50	48	20	10.3	M12	16.5	10.3	22.5	3680	1	
UR-15350	349					245		2x100	50							38.3	5600	2	

Bold = Short lead time item

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

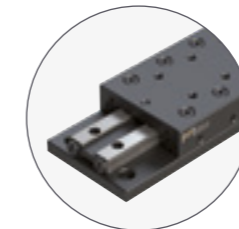
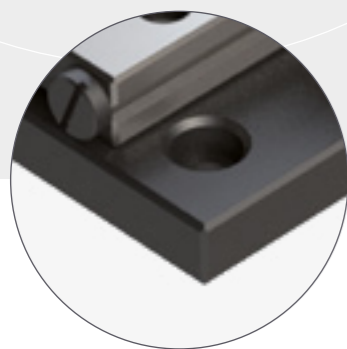
Units: mm



PRODUCT OVERVIEW

PM slides are ready-to-install single axis components with capacity for limited linear movement. These crossed roller slides use PM linear bearings type RSD come factory-preloaded, thus assuring consistently high running accuracies, extremely low uniform friction coefficients and long operating lifetimes. With a variety of models and a wide range of sizes available, the designer is given maximum flexibility to find an appropriate solution for all sorts of applications requiring linear movement.

Each type comes with attachment holes drilled to standard configuration to facilitate quick and easy assembly into your application. Thanks to their excellent running characteristics together with their proven solid reliability, these slides are today's standard for applications in the general machine industry's factory automation, including in high precision equipment. Custom designs can be supplied according to your specifications.



1. CROSSED ROLLER SLIDES TYPE RT

- Stroke lengths of 10 to 950 mm
- For highest accuracy performance
- Normal to high load capacity
- Steel and cast-iron slide bodies
- Available in 6 standard sizes



2. CROSSED ROLLER SLIDES TYPE RTA

- Stroke lengths of 10 to 950 mm
- Extremely low uniform friction coefficient
- Normal to high load capacity
- Aluminium slide bodies
- Available in 6 standard sizes



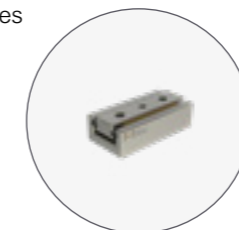
3. DUST-PROTECTED SLIDES TYPE RTNG

- Stroke lengths of 10 to 250 mm
- Protection against dust and dirt
- For highest accuracy performances
- Steel and cast-iron slide bodies
- High rigidity



4. MINIATURE SLIDE TYPE RTS

- Stroke lengths of 12 to 130 mm
- For highest accuracy performance
- Low overall height with high stiffness
- Steel slide bodies
- Available in 3 standard sizes



5. MICRO SLIDES TYPE PMM

- Stroke lengths of 5 to 70 mm
- Ultra-compact and lightweight design
- For rapid and precise movements
- Slide parts made of stainless steel
- Available in standard 3 sizes



6. CROSSED ROLLER MICRO SLIDES TYPE PMMR

- Stroke lengths of 5 to 70 mm
- All parts made of stainless steel
- For highest stiffness and accuracy requirements in the smallest of application spaces
- $V_{max}=2$ m/s, $a_{max}=200$ m/s²
- C_{dyn} up to 1020 N



TECHNICAL DATA

ASSEMBLY

For each type the mounting holes are drilled to standard configuration in the slide top and slide base facilitating quick and easy installation into the application. Threaded holes in the slide parts are according to ISO-standards. Please note that dimensions listed in this catalogue are in mm.

PM linear slides are precision devices; proper mounting is a prerequisite for their performance according to specifications. Slides must be mounted onto rigid, fine-machined (preferably fine-milled or grinded), flat surfaces and must be supported over their entire base length. Specifications as listed are only valid when these conditions are met.

The surface of the side opposite to the preload set screws is ground parallel to the slide axis and can therefore be used as a reference face for mounting the slide into the application.

OPERATING TEMPERATURE

PM slides are capable of operating in a temperature range of -30 °C to +120 °C. For slides which contain plastic components (plastic cages), the operating temperature range is -30 °C to +80 °C.

MAXIMUM VELOCITY AND ACCELERATION RTN / RTL , RTNG and RTS types crossed roller slides

Max. recommended speed $v = 50$ m/min.
Max. acceleration $a = 8$ m/sec².

PMM type ball micro slides

Max. recommended speed $v = 50$ m/min.
Max. acceleration $a = 8$ m/sec².

PMMR type crossed roller micro slides

Max. recommended speed $v = 120$ m/min.
Max. acceleration $a = 200$ m/sec².

DELIVERED CONDITION

PM slides are ready-to-use. The slides are factory preloaded by the use of lateral set screws and free of play. The amount of preload is approximately 10% of the dynamic load capacity. The slides are delivered with a small quantity of oil for lubrication which also protects the rails in the slides against corrosion. The quality grade of the crossed roller linear bearings which are used in the linear slides is in standard accuracy grade Q8.

The slides are free from stick-slip. The coefficient of friction range for slides fitted with balls or cylindrical rollers is 0.0005 to 0.003. PM slides are manufactured according to the best manufacturing standards, offering high smoothness and precision of movement.

PMM and PMMR type of micro slides are factory preloaded by means of geometry pairing.

SERVICE

PM slides are factory-preloaded and don't need readjustment. Depending on the application requirements the linear bearings need re-lubrication. There are no specific calculations to determine the lubrication intervals for linear bearings, thus it must be determined for each application. However, we recommend a small quantity of lubrication at least twice a year for oil and at least once a year for grease.

The lubrication can be applied to the linear bearings using the lateral gap between the rails. If this is not possible cause of the design of the machine we advise the use of special lubrication holes which can be added to the rails. If this is the case for you, please consult a PM advisor.

STORAGE

PM slides are precision components and need to be handled with great care. Slides are delivered in a package, special developed for optimum protection against external vibrations and contamination. For transport and storage use the original package. Slides should be stored at constant room temperature and under clean and dry conditions. Remove the slides from their packaging just before use.

LOADS AND MOMENTS

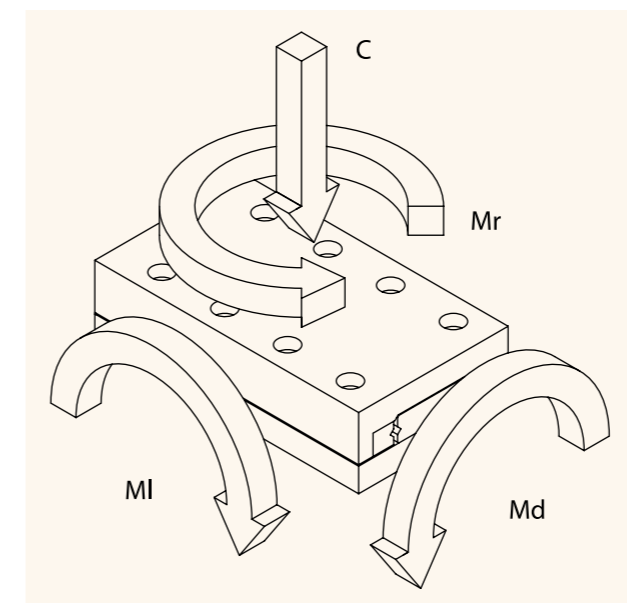
Slides listed in this catalogue are able to carry loads and moments in any direction. Load ratings are compliant with ISO and DIN standards for calculating roller bearings (ISO standard 281, for miniature slide type PMM DIN 636, part 3). To ensure high running accuracy and to prevent the occurrence of play, any vibration and overloading must be avoided.

Load capacity C , defined in ISO76-1987, is the maximum downward load or force located in the center of the upper part in horizontal zero-position.

M_I = Pitch moment: when a load is cantilevered (not symmetrically mounted) off the end of a slide, parallel to the direction of travel.

M_d = Roll moment: when a load is cantilevered off the side of a slide, perpendicular to the direction of travel.

M_r = Yaw moment: when a force causes a rotation moment around the centre of an axis. Exceeding of the listed moment ratings may reduce the lifetime of the bearings and can degrade accuracy. Please feel free to contact one of our product specialists for information.



VACUUM AND CLEANROOM COMPATIBLE SLIDES

The majority of PM slides can be prepared for use in (ultra-high) vacuum or cleanroom environments. Special care has to be taken, for example when selecting low outgassing materials, special lubricants, surface finishings, vented stainless steel fasteners for use in blind tapped holes, special ball- or crossed roller cages as well as switches and wires. Slides are assembled in our modern cleanroom cells certified to ISO/FDIS 14644-1 class 6 with cleanspots class 5.

With over 50 years' experience we are well equipped and capable to fulfil your orders meeting even the most demanding requirements.

Please consult your PM advisor for more information.



50
YEARS

of success



precise
easy installation
ball and crossed
roller



Set Gonio Bearing RGB
and RGBF

Travel range $\pm 5^\circ$ and $\pm 10^\circ$

Key user industries:

- Scanning probe microscopy
- Life science
- Micromanipulators
- Optical
- Biotechnology
- Medical



www.PM.nl



Our type RTN and RTL frictionless precision slides are preloaded linear motion units, ready for mounting. The proven design of this model offers a wide range of benefits including high rigidity, no stick-slip and unprecedented precision in linear movement due to the double-sided rail on the slide base which eliminates machining errors.

SLIDE BODY MATERIALS

1, 2, 3 and 4 mm series are made of black oxide finished steel, while 6 and 9 mm series are available in cast-iron

FEATURES AND SPECIFICATIONS

- Incorporates preloaded linear bearings type RSD and double-sided rail, including roller cages.
- Slide top and slide base have equal lengths
- 2 standard stroke lengths (N and L stroke).
Linear strokes are limited by internal mounted hard end-stops, two in the slide top and one or two in the base-plate, depending on RTL or RTN version.
RTN: for normal stroke/travel, with normal loads
RTL: for longer stroke/travel, with reduced loads
- Suitable for use in horizontal and vertical application
- All mounting surfaces are precision ground.
One flank of the slide (i.e. the side opposite to the adjustment screws) is ground parallel to the linear bearings to serve as a reference face
- The slide top is provided with tapped attachment holes, drilled to standard configuration. The slide base comes equipped with countersunk through holes, which accept socket head screws. Pre-drilled holes enable simple mounting
- The ends of the upper slide comes with tapped holes that permit easy attachment of covers, bellows, or other shields to prevent that contaminants enters the slide and keep the linear bearings clean
- For running accuracies please refer to page 138

OPTIONAL FEATURES

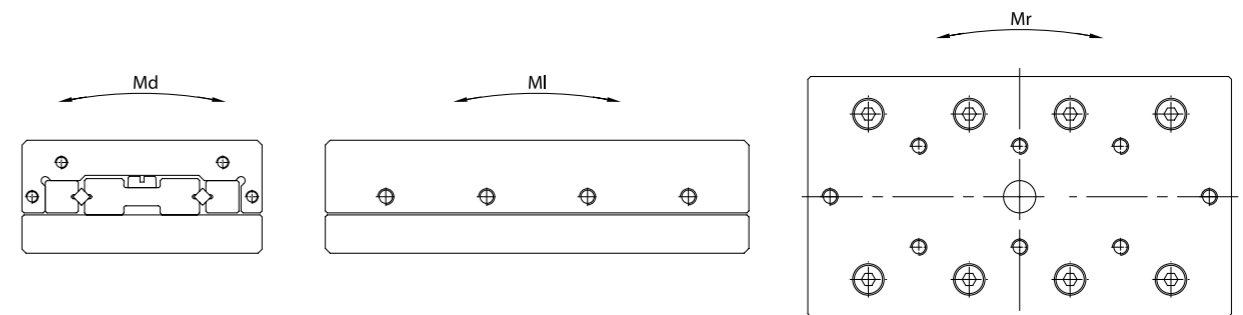
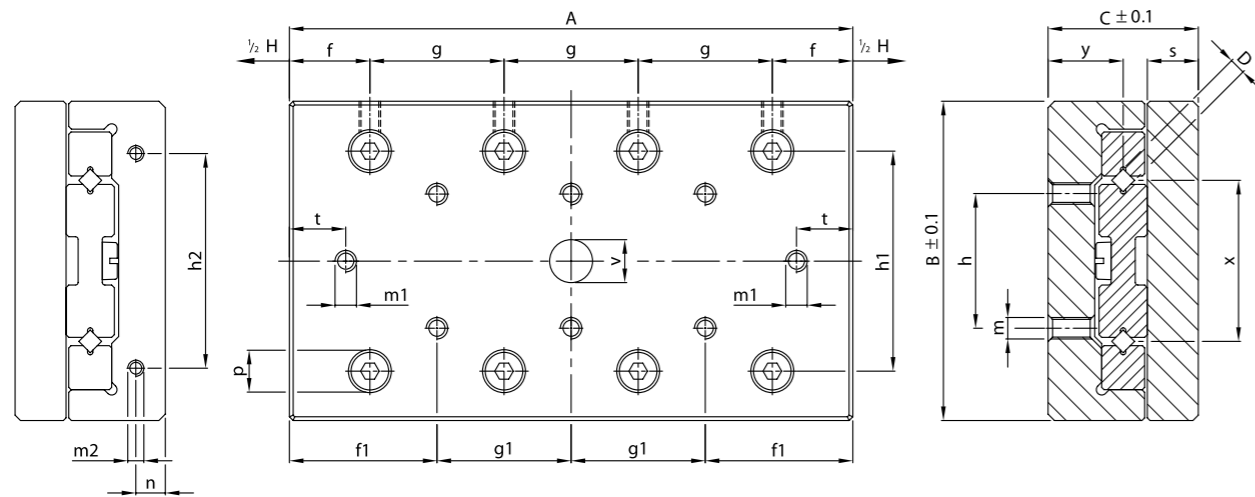
- Selected slides can be supplied with a height tolerance of ± 0.01 mm
- Cages can be replaced by plastic crossed roller type KZR or type KKLK equipped with balls
- Higher accuracy grade slides
- Stainless steel slide parts
- SF finishing for linear bearings offering smooth and ultra-precise operation
- UHV compatible version

ORDER NOTES

Please specify the following in your note:

- Model no. and quantity needed

Example: 1 piece slide type RTN-3100



Please see drawings on page 108-109 for configuration of mounting holes in the slide base.

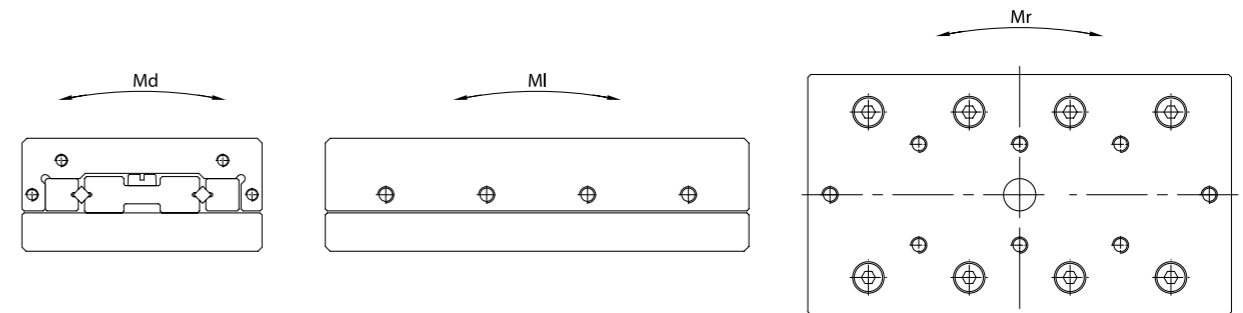
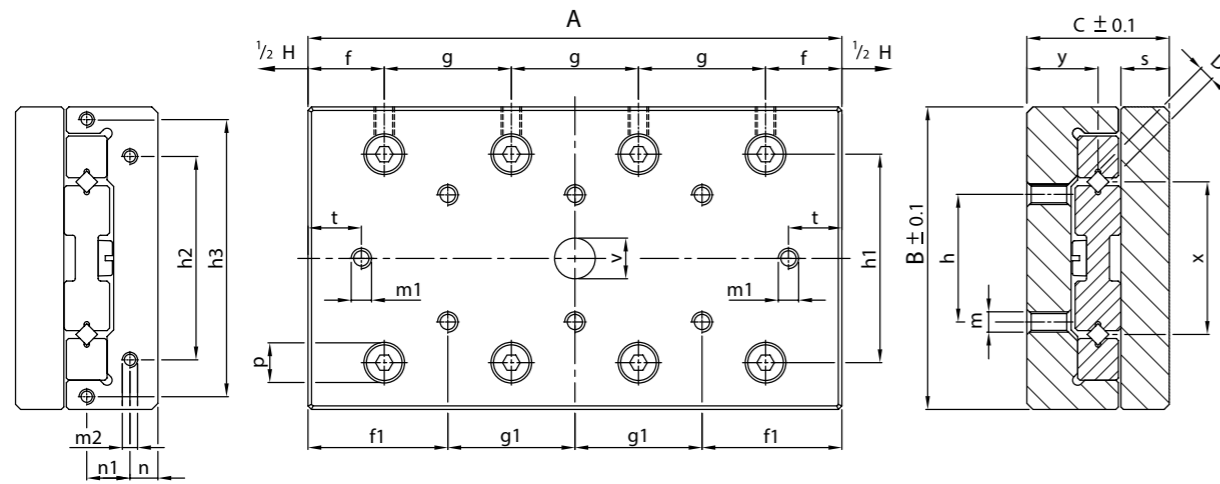
Type	Main dimensions				Stroke H												
	A	B	C	D	RTN	RTL	f	f1	g	g1	h	h1	h2	m	m1	m2	
RT-1520	25				10	-			1x10	-							
RT-1530	35				15	20			2x10	1x10							
RT-1540	45				20	30			3x10	2x10							
RT-1550	55				25	40			4x10	3x10							
RT-1560	65	29.6	17	1.5	30	50	7.5	12.5	5x10	4x10	10	18.4	12	M2.5	M2	M2	
RT-1570	75				35	60			6x10	5x10							
RT-1580	85				40	70			7x10	6x10							
RT-1590	95				45	80			8x10	7x10							
RT-15100	105				50	90			9x10	8x10							
RT-2030	35				15	-			1x15	-							
RT-2045	50				22	30			2x15	1x15							
RT-2060	65				30	45			3x15	2x15							
RT-2075	80				37	60			4x15	3x15							
RT-2090	95	39.6	21	2	45	75	10	17.5	5x15	4x15	15	25	16	M3	M2.5	M2	
RT-2105	110				52	90			6x15	5x15							
RT-2120	125				60	105			7x15	6x15							
RT-2135	140				67	120			8x15	7x15							
RT-2150	155				75	135			9x15	8x15							
RT-3050	55				-	30			1x25	-							
RT-3075	80				37	55			2x25	1x25							
RT-3100	105				50	80			3x25	2x25							
RT-3125	130				62	105			4x25	3x25							
RT-3150	155				75	130			5x25	4x25							
RT-3175	180	59.5	28	3	87	155	15	27.5	6x25	5x25	25	41	40	M4	M4	M3	
RT-3200	205				100	180			7x25	6x25							
RT-3250	255				125	230			9x25	8x25							
RT-3300	305				150	280			11x25	10x25							
RT-3350	355				175	330			13x25	12x25							
RT-3400	405				200	380			15x25	14x25							

Bold = Short lead time item

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

n	p	s	t	v	x	y	C _{dyn} in N		Weight (kg)	Md in Nm		MI in Nm		Mr in Nm	
							RTN	RTL		RTN	RTL	RTN	RTL	RTN	RTL
			2.44				260	-	0.10	1.4	-	1.2	-	1.5	-
							364	312	0.12	2.1	2.1	2.5	1.9	1.9	1.7
							520	416	0.16	3.5	2.8	4.4	3.1	2.6	2.1
							624	520	0.19	4.2	3.5	5.6	4.4	3.1	2.6
2.5	4.6	6	3.7	4.5	13.5	8.75	780	572	0.23	4.9	3.5	7.5	5.0	4.0	2.9
							884	676	0.27	5.6	4.2	8.7	6.2	4.6	3.4
							1040	780	0.30	7.0	4.9	10.6	7.5	5.5	4.0
							1144	832	0.34	7.7	5.6	11.9	8.1	6.1	4.3
							1300	936	0.37	8.4	6.3	13.7	9.4	7.0	4.9
							430	-	0.19	3.1	-	2.8	-	3.4	-
							688	602	0.28	6.2	4.6	6.9	5.5	4.6	4.1
							946	774	0.38	7.7	6.2	11.0	8.3	6.3	5.2
							1204	946	0.47	10.8	7.7	15.1	11.0	8.2	6.3
3.4	6.3	7	5.5	5.5	18	10.75	1376	1118	0.56	12.4	9.3	17.9	13.8	9.5	7.5
							1634	1290	0.65	13.9	10.8	22.0	16.5	11.4	8.8
							1892	1376	0.75	17.0	12.4	26.1	17.9	13.4	9.5
							2150	1548	0.84	18.6	13.9	30.3	20.6	15.4	10.8
							2408	1720	0.93	21.7	15.5	34.4	23.4	17.5	12.1
							-	952	0.64	-	12.2	-	10.9	-	5.4
							1496	1224	0.94	20.4	16.3	21.8	16.3	13.6	11.5
							2040	1632	1.24	28.6	24.5	32.6	24.5	18.2	14.7
							2448	1904	1.55	36.7	28.6	40.8	29.9	22.0	17.0
							2992	2312	1.86	44.9	32.6	51.7	38.1	27.1	20.7
5.5	7.8	9.5	5.5	8	30	14	3536	2584	2.15	53.0	36.7	62.6	43.5	32.3	23.2
							4080	2992	2.46	61.2	44.9	73.4	51.7	37.6	27.1
							5032	3672	3.06	73.4	53.0	92.5	65.3	47.0	33.6
							6120	4352	3.66	89.8	65.3	114.2	78.9	57.7	40.3
							7072	5032	4.27	106.1	73.4	133.3	92.5	67.1	47.0
							8160	5712	4.87	122.4	85.7	155.0	106.1	77.9	53.7

Units: mm



Please see drawings on page 108-109 for configuration of mounting holes in the slide base.

Type	Main dimensions				Stroke H												
	A	B	C	D	RTN	RTL	f	f1	g	g1	h	h1	h2	h3	m	m1	
RT-4080	85				50	-			1x40	-							
RT-4120	125				75	90			2x40	1x40							
RT-4160	165				105	130			3x40	2x40							
RT-4200	205				130	170			4x40	3x40							
RT-4240	245	80	35	4	155	210	22.5	42.5	5x40	4x40	40	53	55	-	M5	M5	
RT-4280	285				185	250			6x40	5x40							
RT-4320	325				210	290			7x40	6x40							
RT-4360	365				235	330			8x40	7x40							
RT-4400	405				265	370			9x40	8x40							
RT-6100	110				50	70			1x50	-							
RT-6150	160				75	120			2x50	1x50							
RT-6200	210				100	170			3x50	2x50							
RT-6250	260				125	220			4x50	3x50							
RT-6300	310				150	270			5x50	4x50							
RT-6350	360	99.5	45	6	175	320	30	55	6x50	5x50	50	65	90	92	M6	M6	
RT-6400	410				200	370			7x50	6x50							
RT-6450	460				225	420			8x50	7x50							
RT-6500	510				250	470			9x50	8x50							
RT-6600	610				300	570			11x50	10x50							
RT-6700	710				350	670			13x50	12x50							
RT-9100	110				50	-	30	55	1x50	-							
RT-9200	210				100	150			1x100	-							
RT-9300	310				150	250			2x100	1x100							
RT-9400	410				200	350			3x100	2x100							
RT-9500	510	148	60	9	250	450	55	105	4x100	3x100	100	104	90	135	M8	M8	
RT-9600	610				300	550			5x100	4x100							
RT-9700	710				350	650			6x100	5x100							
RT-9800	810				400	750			7x100	6x100							
RT-9900	910				450	850			8x100	7x100							
RT-91000	1010				500	950			9x100	8x100							

Bold = Short lead time item

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

m2	n	n1	p	s	t	v	x	y	C _{dyn} in N		Weight (kg)	Md in Nm		MI in Nm		Mr in Nm	
									RTN	RTL		RTN	RTL	RTN	RTL	RTN	RTL
									1855	-	1.70	31.8	-	29.7	-	25.9	-
									2915	2650	2.50	53.0	53.0	59.4	51.9	36.5	33.5
									3710	3445	3.30	74.2	63.6	81.6	74.2	46.0	42.7
									4770	4240	4.10	95.4	84.8	111.3	96.5	59.6	52.7
M3	6.5	-	10	10.5	9	9.5	40	18.5	5830	4770	4.90	116.6	95.4	141.0	111.3	73.6	59.6
									6890	5565	5.70	137.8	106.0	170.7	133.6	87.9	70.1
									7950	6360	6.50	159.0	127.2	200.3	155.8	102.4	80.7
									9010	7155	7.30	180.2	137.8	230.0	178.1	116.9	91.5
									9805	7950	8.10	190.8	159.0	252.3	200.3	127.9	102.4
									4320	3780	3.30	97.2	72.9	97.2	77.8	68.7	62.2
									6480	5400	4.84	145.8	121.5	175.0	136.1	100.1	83.6
									8640	6480	6.37	194.4	145.8	252.7	175.0	135.4	100.1
									10800	8100	7.91	243.0	170.1	330.5	233.3	172.2	126.4
									13500	9720	9.44	291.6	218.7	427.7	291.6	219.3	153.7
M4	8	15	11	14	10	11	46	23	15660	11340	11.00	340.2	243.0	505.4	349.9	257.4	181.6
									17820	12420	12.54	388.8	267.3	583.2	388.8	295.6	200.4
									19980	14040	14.07	437.4	315.9	661.0	447.1	334.0	228.8
									22140	15660	15.60	486.0	340.2	738.7	505.4	372.5	257.4
									27000	18900	18.65	607.5	413.1	913.7	622.1	459.4	314.8
									31320	21600	21.71	704.7	486.0	1069.2	719.3	536.8	362.9
									6750	-	6.50	210.6	-	151.2	-	223.8	-
									13500	10800	12.64	526.5	421.2	529.2	378.0	338.2	283.0
									21600	16200	18.86	842.4	631.8	982.8	680.4	534.6	400.1
									28350	21600	25.08	1053.0	842.4	1360.8	982.8	712.2	534.6
M4	11	20	14	17	17	14	78	31	35100	25650	31.20	1368.9	947.7	1738.8	1209.6	894.5	640.4
									43200	31050	37.41	1684.8	1158.3	2192.4	1512.0	1116.2	784.8
									49950	35100	43.53	1895.4	1368.9	2570.4	1738.8	1302.3	894.5
									56700	40500	49.75	2211.3	1579.5	2948.4	2041.2	1489.2	1042.1
									64800	44550	55.96	2527.2	1684.8	3402.0	2268.0	1714.0	1153.4
									71550	49950	62.08	2737.8	1895.4	3780.0	2570.4	1901.7	1302.3

Units: mm

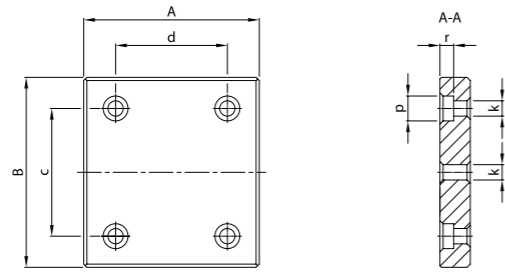


Fig. 1

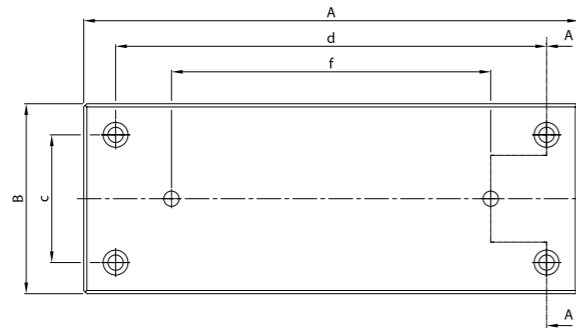


Fig. 2

Configuration of mounting holes in the slide base

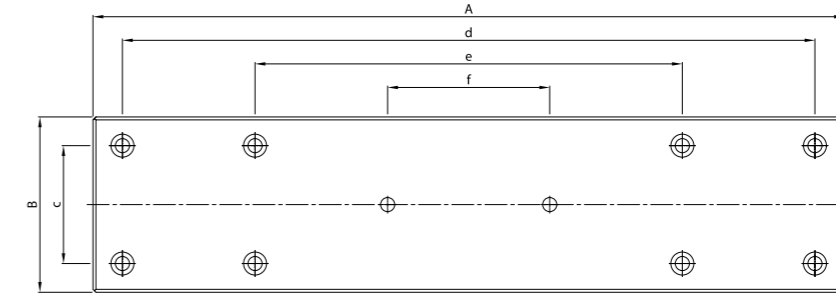


Fig. 3

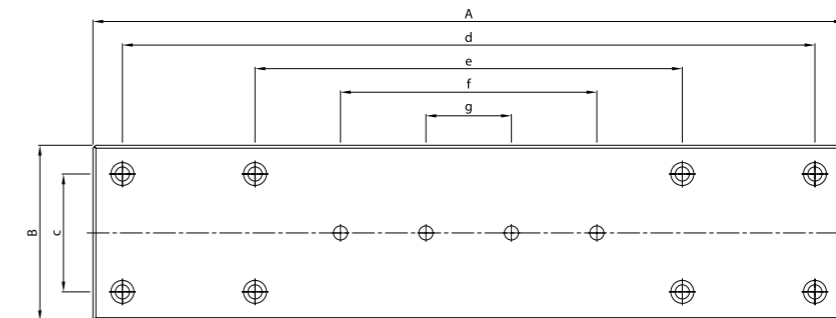


Fig. 4

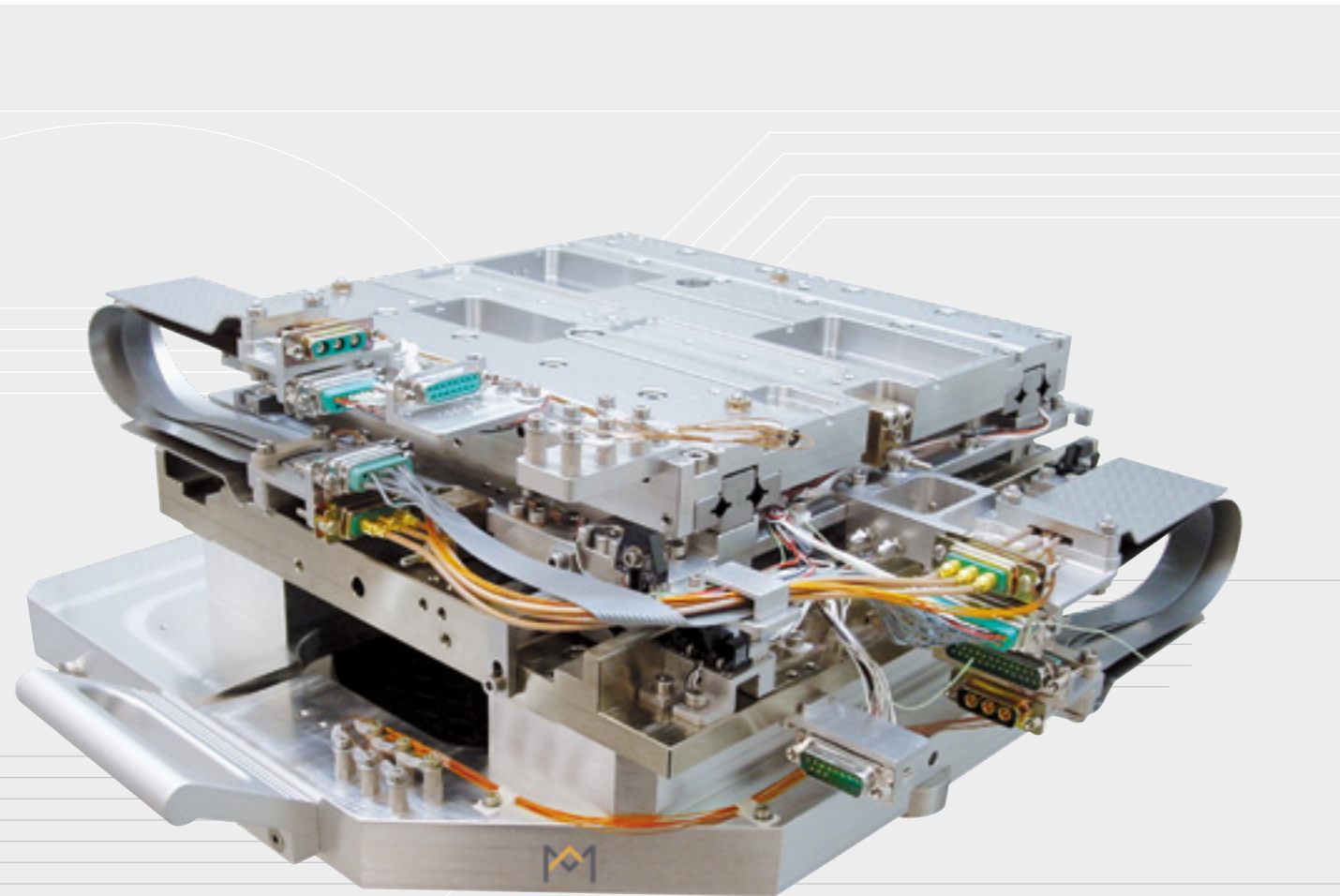
Type	A	B	c	d	e	f	g	k	p	r	Fig.
RT-1520	25			17	-	-	-				1
RT-1530	35			27	-	-	-				1
RT-1540	45			37	-	-	-				1
RT-1550	55			47	-	25	-				2
RT-1560	65	29.6	22	57	-	30	-	3	5	2.5	2
RT-1570	75			67	-	35	-				2
RT-1580	85			77	-	40	-				2
RT-1590	95			87	-	45	-				2
RT-15100	105			97	-	50	-				2
RT-2030	35			25	-	-	-				1
RT-2045	50			40	-	-	-				1
RT-2060	65			55	-	-	-				1
RT-2075	80			70	-	-	-				1
RT-2090	95			85	-	45	-				2
RT-2105	110	39.6	30	100	-	50	-	3.8	6.3	3.3	2
RT-2120	125			115	-	30	-				2
RT-2135	140			130	-	40	-				2
RT-2150	155			145	-	40	-				2
RT-3050	55			35	-	-	-				1
RT-3075	80			60	-	-	-				1
RT-3100	105			85	-	-	-				1
RT-3125	130			110	-	-	-				1
RT-3150	155			135	-	75	-				2
RT-3175	180	59.5	40	160	-	86	-	4.8	7.8	4.3	2
RT-3200	205			185	-	55	-				2
RT-3250	255			235	145	55	-				3
RT-3300	305			285	165	65	-				3
RT-3350	355			335	195	75	-				3
RT-3400	405			385	225	85	-				3

Bold = Short lead time item

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

Type	A	B	c	d	e	f	g	k	p	r	Fig.
RT-4080	85			65	-	-	-				1
RT-4120	125			105	-	-	-				1
RT-4160	165			145	-	-	-				1
RT-4200	205			185	-	105	-				2
RT-4240	245	80	55	225	-	145	-	5.5	10	5.4	2
RT-4280	285			265	-	185	-				2
RT-4320	325			305	145	225	-				3
RT-4360	365			345	185	265	-				3
RT-4400	405			385	225	305	-				3
RT-6100	110			90	-	-	-				1
RT-6150	160			140	-	-	-				1
RT-6200	210			190	-	100	-				2
RT-6250	260			240	-	120	-				2
RT-6300	310			290	-	150	-				2
RT-6350	360	99.5	60	340	200	80	-	6.8	11	6.3	3
RT-6400	410			390	230	90	-				3
RT-6450	460			440	260	100	-				3
RT-6500	510			490	290	110	-				3
RT-6600	610			590	350	210	-				4
RT-6700	710			690	410	250	-				4
RT-9100	110			80	-	-	-				1
RT-9200	210			100	-	-	-				1
RT-9300	310			200	-	-	-				1
RT-9400	410			300	-	180	-				2
RT-9500	510	148	90	400	-	240	-	9	14	8.7	2
RT-9600	610			500	340	120	-				3
RT-9700	710			600	400	140	-				3
RT-9800	810			700	460	280	-				4
RT-9900	910			800	520	320	-				4
RT-91000	1010			900	600	360	-				4

Units: mm



PM's frictionless slides type RTNA and RTLA are high-quality preloaded linear motion units ready for mounting. With aluminium as the main material of this component, this model offers numerous benefits, including its low weight, absence of stick-slip effect and ease of mounting into the application. The slides are designed to meet the demands of the general machine industry as well as those users working with precision equipment.

SLIDE BODY MATERIALS

Aluminium, clear anodised finishing

FEATURES AND SPECIFICATIONS

- Incorporates preloaded linear bearings type RSD and double-sided rail, including roller cages
- The slide top and slide base have equal lengths
- 2 standard stroke lengths (N and L stroke)
Linear strokes are limited by interior-mounted hard end stops, two in the base-plate, depending on **RTLA** or **RTNA** version
RTNA-stroke: for normal stroke/travel, with normal loads
RTLA-stroke: for longer stroke/travel, with reduced loads
- For horizontal and vertical application
- All mounting surfaces are precision ground one flank of the slide (the side opposite to the adjustment screws) is ground parallel to the linear bearings to serve as a reference face
- The slide top is provided with tapped attachment holes, drilled to standard configuration. The slide base is equipped with countersunk through holes, which are compatible with socket head screws. Pre-drilled holes enable easy mounting
- The ends of the upper slide comes with tapped holes that permit easy attachment of covers, bellows, or other shields to prevent that contaminants enters the slide and keep the linear bearings clean
- For running accuracies please refer to page 138

OPTIONAL FEATURES

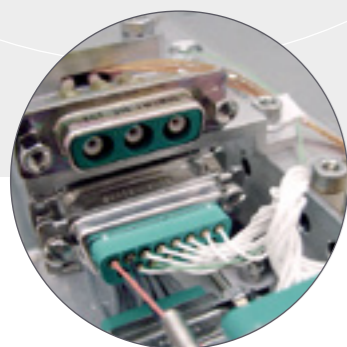
- Slides can be supplied with a height tolerance of ± 0.01 mm
- Cages can be replaced by plastic crossed roller type KZR or type KKLK equipped with balls
- Higher accuracy grade slides
- Stainless steel linear bearings, slide bodies in aluminum with natural or black anodised finishing, all fastening screws stainless steel
- SF finishing for linear bearings offering smooth and ultra-precise operation
- UHV-compatible version

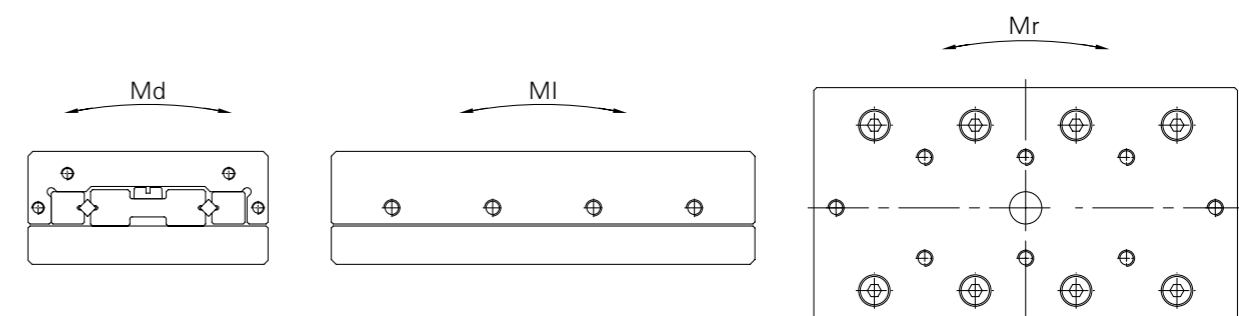
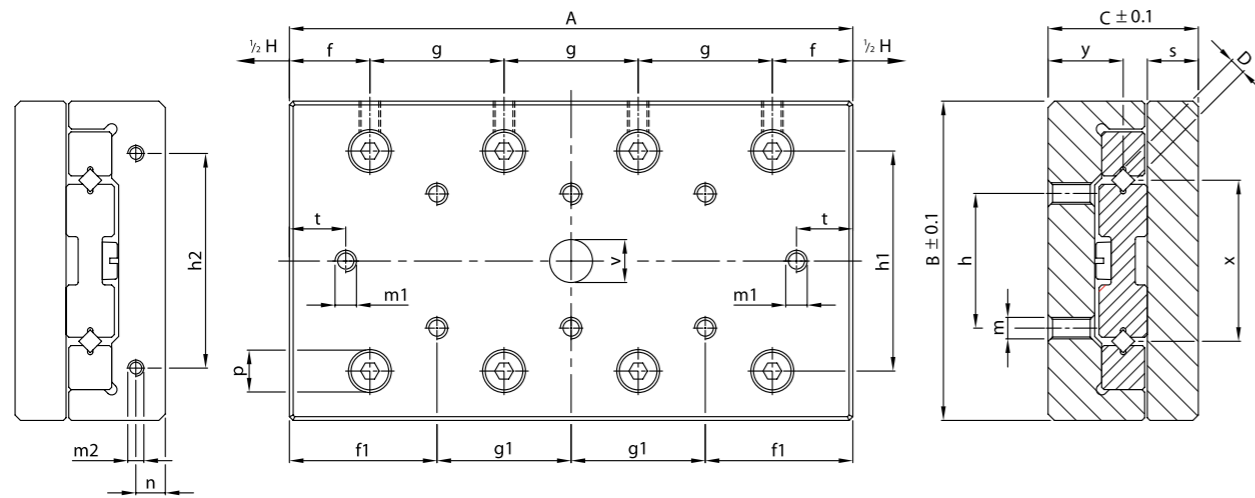
ORDER NOTES

Please specify the following in your order note:

- Model no. and quantity needed

Example: 10 pcs. slide type RTNA-3175.





Please see drawings on page 116 and 117 for configuration of mounting holes in the slide base.

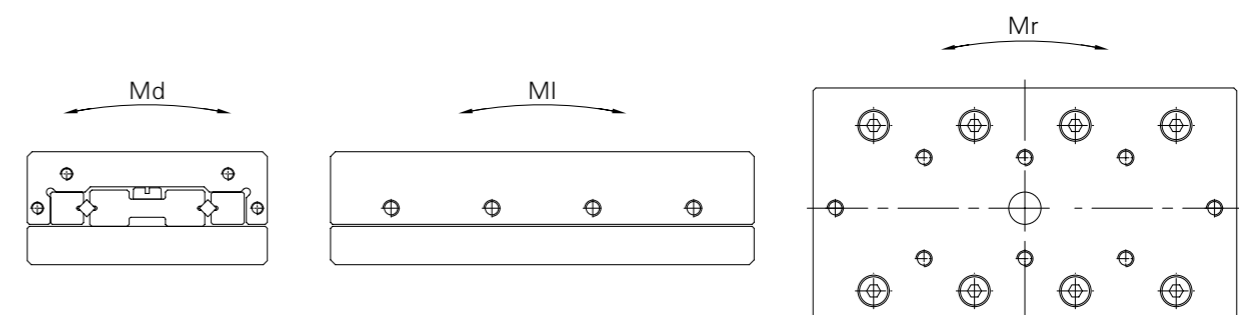
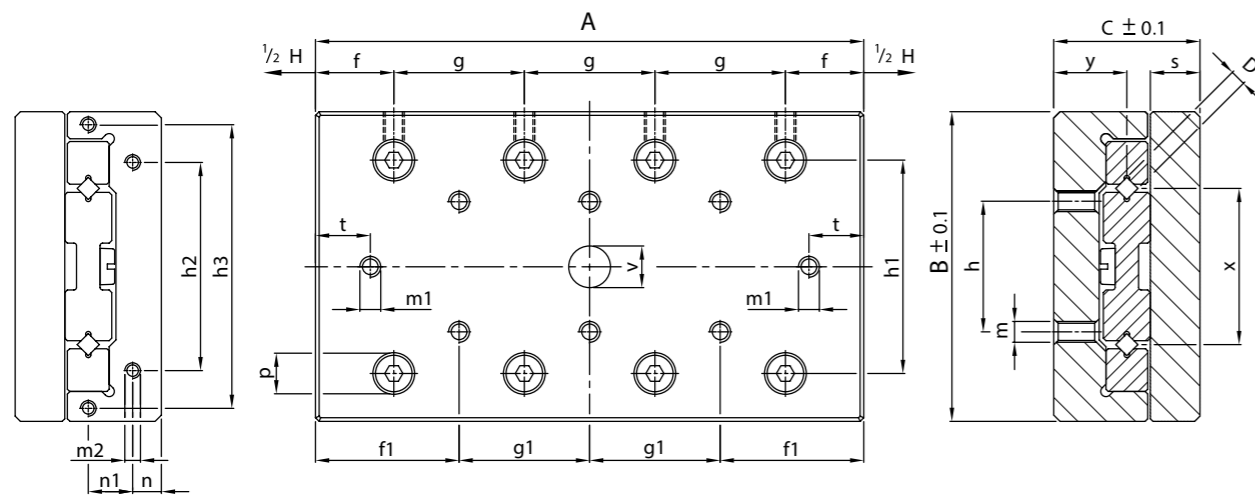
Type	Main dimensions				Stroke H												
	A	B	C	D	RTNA	RTLA	f	f1	g	g1	h	h1	h2	m	m1	m2	
RTA-1520	25				10	-			1x10	-							
RTA-1530	35				15	20			2x10	1x10							
RTA-1540	45				20	30			3x10	2x10							
RTA-1550	55				25	40			4x10	3x10							
RTA-1560	65	30	15	1.5	30	50	7.5	12.5	5x10	4x10	10	18.4	12	M2.5	M2	M2	
RTA-1570	75				35	60			6x10	5x10							
RTA-1580	85				40	70			7x10	6x10							
RTA-1590	95				45	80			8x10	7x10							
RTA-15100	105				50	90			9x10	8x10							
RTA-2030	35				15	-			1x15	-							
RTA-2045	50				22	30			2x15	1x15							
RTA-2060	65				30	45			3x15	2x15							
RTA-2075	80				37	60			4x15	3x15							
RTA-2090	95	40	21	2	45	75	10	17.5	5x15	4x15	15	25	16	M3	M2.5	M2	
RTA-2105	110				52	90			6x15	5x15							
RTA-2120	125				60	105			7x15	6x15							
RTA-2135	140				67	120			8x15	7x15							
RTA-2150	155				75	135			9x15	8x15							
RTA-3050	55				-	30			1x25	-							
RTA-3075	80				37	55			2x25	1x25							
RTA-3100	105				50	80			3x25	2x25							
RTA-3125	130				62	105			4x25	3x25							
RTA-3150	155				75	130			5x25	4x25							
RTA-3175	180	60	25	3	87	155	15	27.5	6x25	5x25	25	41	40	M4	M4	M3	
RTA-3200	205				100	180			7x25	6x25							
RTA-3250	255				125	230			9x25	8x25							
RTA-3300	305				150	280			11x25	10x25							
RTA-3350	355				175	330			13x25	12x25							
RTA-3400	405				200	380			15x25	14x25							

Bold = Short lead time item

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

n	p	s	t	v	x	y	C _{dyn} in N		Weight (kg)	Md in Nm		MI in Nm		Mr in Nm	
							RTNA	RTLA		RTNA	RTLA	RTNA	RTLA	RTNA	RTLA
			2.45				260	-	0.04	1.4	-	1.2	-	1.5	-
							364	312	0.05	2.1	2.1	2.5	1.9	1.9	1.7
							520	416	0.06	3.5	2.8	4.4	3.1	2.6	2.1
							624	520	0.08	4.2	3.5	5.6	4.4	3.1	2.6
2.5	4.6	5.25	3.7	4.5	13.5	7.5	780	572	0.09	4.9	3.5	7.5	5.0	4.0	2.9
							884	676	0.11	5.6	4.2	8.7	6.2	4.6	3.4
							1040	780	0.12	7.0	4.9	10.6	7.5	5.5	4.0
							1144	832	0.13	7.7	5.6	11.9	8.1	6.1	4.3
							1300	936	0.15	8.4	6.3	13.7	9.4	7.0	4.9
							430	-	0.10	3.1	-	2.8	-	3.4	-
							688	602	0.15	6.2	4.6	6.9	5.5	4.6	4.1
							946	774	0.19	7.7	6.2	11.0	8.3	6.3	5.2
							1204	946	0.24	10.8	7.7	15.1	11.0	8.2	6.3
3.4	6.3	7	5.5	5.5	18	10.75	1376	1118	0.28	12.4	9.3	17.9	13.8	9.5	7.5
							1634	1290	0.33	13.9	10.8	22.0	16.5	11.4	8.8
							1892	1376	0.37	17.0	12.4	26.1	17.9	13.4	9.5
							2150	1548	0.42	18.6	13.9	30.3	20.6	15.4	10.8
							2408	1720	0.46	21.7	15.5	34.4	23.4	17.5	12.1
							-	952	0.30	-	12.2	-	10.9	-	5.4
							1496	1224	0.44	20.4	16.3	21.8	16.3	13.6	11.5
							2040	1632	0.58	28.6	24.5	32.6	24.5	18.2	14.7
							2448	1904	0.72	36.7	28.6	40.8	29.9	22.0	17.0
							2992	2312	0.85	44.9	32.6	51.7	38.1	27.1	20.7
5.5	7.8	8.25	5.5	8	30	12.25	3536	2584	0.99	53.0	36.7	62.6	43.5	32.3	23.2
							4080	2992	1.13	61.2	44.9	73.4	51.7	37.6	27.1
							5032	3672	1.41	73.4	53.0	92.5	65.3	47.0	33.6
							6120	4352	1.68	89.8	65.3	114.2	78.9	57.7	40.3
							7072	5032	1.97	106.1	73.4	133.3	92.5	67.1	47.0
							8160	5712	2.15	122.4	85.7	155.0	106.1	77.9	53.7

Units: mm



Please see drawings on page 116 and 117 for configuration of mounting holes in the slide base.

Type	Main dimensions				Stroke H												
	A	B	C	D	RTNA	RTLA	f	f1	g	g1	h	h1	h2	h3	m	m1	
RTA-4080	85				50	-			1x40	-							
RTA-4120	125				75	90			2x40	1x40							
RTA-4160	165				105	130			3x40	2x40							
RTA-4200	205				130	170			4x40	3x40							
RTA-4240	245	80	35	4	155	210	22.5	42.5	5x40	4x40	40	53	55	-	M5	M5	
RTA-4280	285				185	250			6x40	5x40							
RTA-4320	325				210	290			7x40	6x40							
RTA-4360	365				235	330			8x40	7x40							
RTA-4400	405				265	370			9x40	8x40							
RTA-6100	110				50	70			1x50	-							
RTA-6150	160				75	120			2x50	1x50							
RTA-6200	210				100	170			3x50	2x50							
RTA-6250	260				125	220			4x50	3x50							
RTA-6300	310				150	270			5x50	4x50							
RTA-6350	360	100	40	6	175	320	30	55	6x50	5x50	50	65	60	92	M6	M6	
RTA-6400	410				200	370			7x50	6x50							
RTA-6450	460				225	420			8x50	7x50							
RTA-6500	510				250	470			9x50	8x50							
RTA-6600	610				300	570			11x50	10x50							
RTA-6700	710				350	670			13x50	12x50							
RTA-9100	110				50	-	30	55	1x50	-							
RTA-9200	210				100	150			1x100	-							
RTA-9300	310				150	250			2x100	1x100							
RTA-9400	410				200	350			3x100	2x100							
RTA-9500	510	148.4	60	9	250	450	55	105	4x100	3x100	100	104	90	135	M8	M8	
RTA-9600	610				300	550			5x100	4x100							
RTA-9700	710				350	650			6x100	5x100							
RTA-9800	810				400	750			7x100	6x100							
RTA-9900	910				450	850			8x100	7x100							
RTA-91000	1010				500	950			9x100	8x100							

Bold = Short lead time item

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

m2	n	n1	p	s	t	v	x	y	C _{dyn} in N		Weight (kg)	Md in Nm		MI in Nm		Mr in Nm	
									RTNA	RTLA		RTNA	RTLA	RTNA	RTLA	RTNA	RTLA
M3	6.5	-	10	10.5	9	9.5	40	18.5	1855	-	0.78	31.8	-	29.7	-	25.9	-
									2915	2650	1.14	53.0	53.0	59.4	51.9	36.5	33.5
									3710	3445	1.51	74.2	63.6	81.6	74.2	46.0	42.7
									4770	4240	1.87	95.4	84.8	111.3	96.5	59.6	52.7
									5830	4770	2.24	116.6	95.4	141.0	111.3	73.6	59.6
									6890	5565	2.60	137.8	106.0	170.7	133.6	87.9	70.1
									7950	6360	3.00	159.0	127.2	200.3	155.8	102.4	80.7
									9010	7155	3.30	180.2	137.8	230.0	178.1	116.9	91.5
									9805	7950	3.70	190.8	159.0	252.3	200.3	127.9	102.4
									M4	8	15	11	12	10	11	46	20
6480	5400	2.43	145.8	121.5	175.0	136.1	100.1	83.6									
8640	6480	3.20	194.4	145.8	252.7	175.0	135.4	100.1									
10800	8100	3.98	243.0	170.1	330.5	233.3	172.2	126.4									
13500	9720	4.75	291.6	218.7	427.7	291.6	219.3	153.7									
15660	11340	5.52	340.2	243.0	505.4	349.9	257.4	181.6									
17820	12420	6.30	388.8	267.3	583.2	388.8	295.6	200.4									
19980	14040	7.07	437.4	315.9	661.0	447.1	334.0	228.8									
22140	15660	7.86	486.0	340.2	738.7	505.4	372.5	257.4									
27000	18900	9.41	607.5	413.1	913.7	622.1	459.4	314.8									
M4	11	20	14	17	14	14	78	31	6750	-	3.55	210.6	-	151.2	-	223.8	-
									13500	10800	6.92	526.5	421.2	529.2	378.0	338.2	283.0
									21600	16200	10.50	842.4	631.8	982.8	680.4	534.6	400.1
									28350	21600	14.17	1053.0	842.4	1360.8	982.8	712.2	534.6
									35100	25650	17.84	1368.9	947.7	1738.8	1209.6	894.5	640.4
									43200	31050	21.51	1684.8	1158.3	2192.4	1512.0	1116.2	784.8
									49950	35100	25.18	1895.4	1368.9	2570.4	1738.8	1302.3	894.5
									56700	40500	28.95	2211.3	1579.5	2948.4	2041.2	1489.2	1042.1
									64800	44550	32.52	2527.2	1684.8	3402.0	2268.0	1714.0	1153.4
									71550	49950	35.98	2737.8	1895.4	3780.0	2570.4	1901.7	1302.3

Units: mm

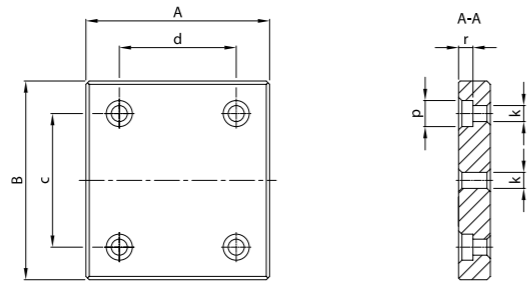


Fig. 1

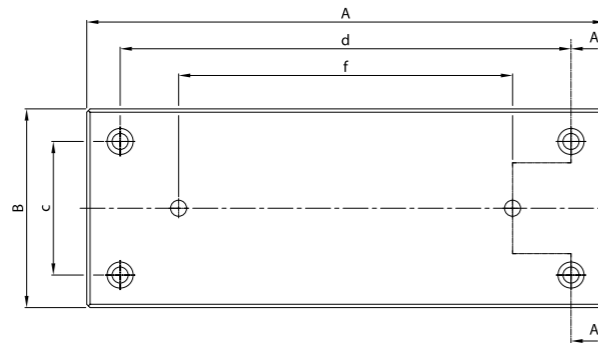


Fig. 2

Configuration of mounting holes in the slide base

Type	A	B	c	d	e	f	g	k	p	r	Fig.
RTA-1520	25			17	-	-	-				1
RTA-1530	35			27	-	-	-				1
RTA-1540	45			37	-	-	-				1
RTA-1550	55			47	-	25	-				2
RTA-1560	65	30	22	57	-	30	-	3	5	2.5	2
RTA-1570	75			67	-	35	-				2
RTA-1580	85			77	-	40	-				2
RTA-1590	95			87	-	45	-				2
RTA-15100	105			97	-	50	-				2
RTA-2030	35			25	-	-	-				1
RTA-2045	50			40	-	-	-				1
RTA-2060	65			55	-	-	-				1
RTA-2075	80			70	-	-	-				1
RTA-2090	95			85	-	45	-				2
RTA-2105	110	40	30	100	-	50	-	3.8	6.3	3.3	2
RTA-2120	125			115	-	30	-				2
RTA-2135	140			130	-	40	-				2
RTA-2150	155			145	-	40	-				2
RTA-3050	55			35	-	-	-				1
RTA-3075	80			60	-	-	-				1
RTA-3100	105			85	-	-	-				1
RTA-3125	130			110	-	-	-				1
RTA-3150	155			135	-	75	-				2
RTA-3175	180	60	40	160	-	86	-	4.8	7.8	4.3	2
RTA-3200	205			185	-	55	-				2
RTA-3250	255			235	145	55	-				3
RTA-3300	305			285	165	65	-				3
RTA-3350	355			335	195	75	-				3
RTA-3400	405			385	225	85	-				3

Bold = Short lead time item

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

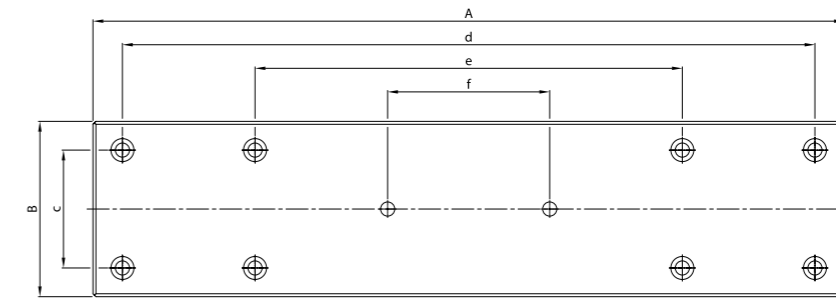


Fig. 3

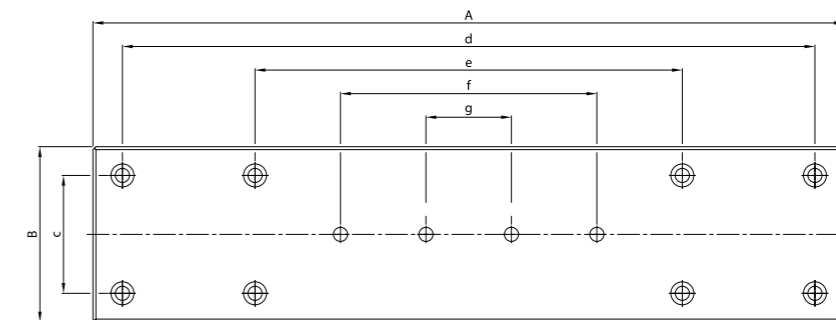
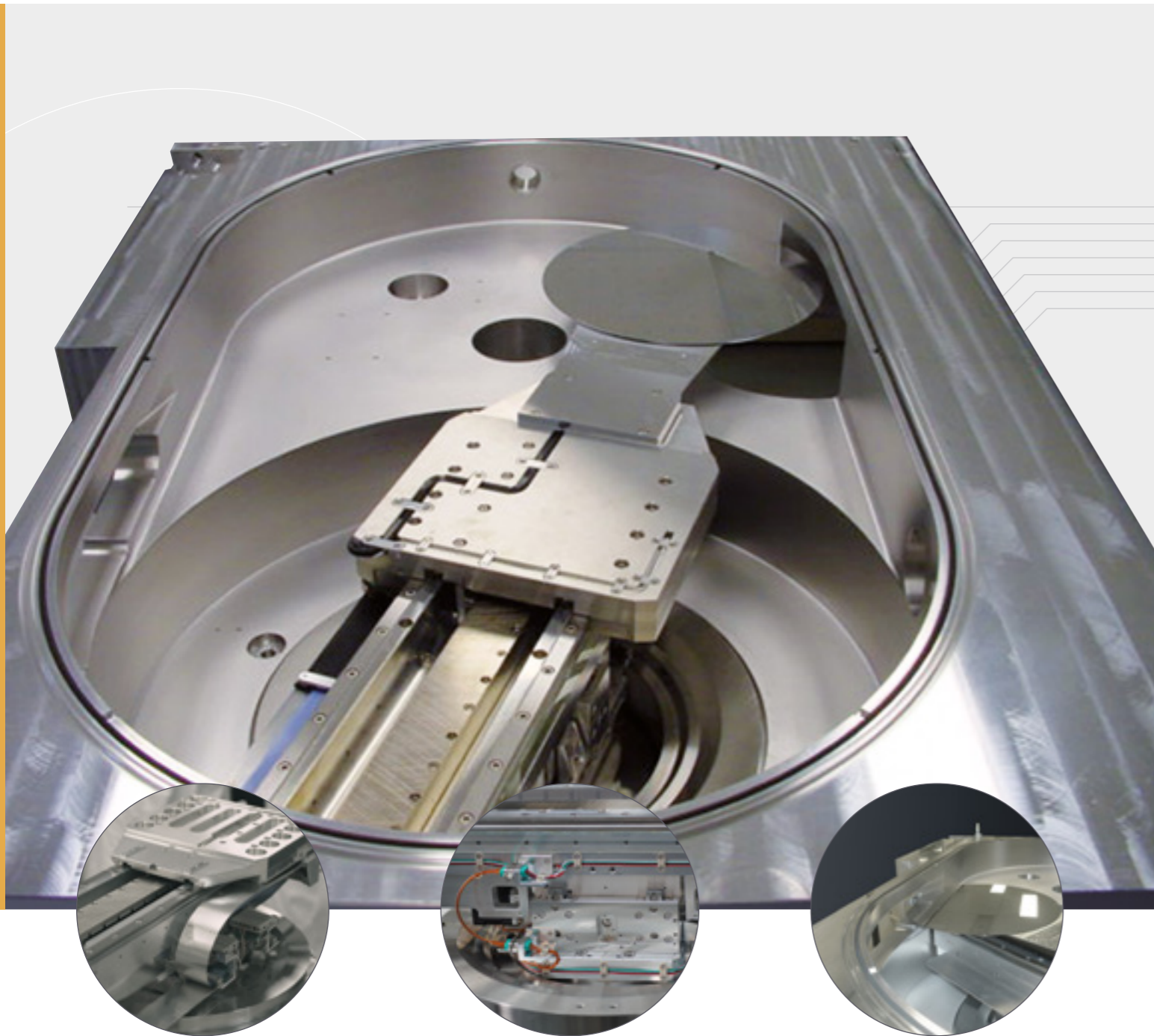


Fig. 4

Type	A	B	c	d	e	f	g	k	p	r	Fig.
RTA-4080	85			65	-	-	-				1
RTA-4120	125			105	-	-	-				1
RTA-4160	165			145	-	-	-				1
RTA-4200	205			185	-	105	-				2
RTA-4240	245	80	55	225	-	145	-	5.5	10	5.4	2
RTA-4280	285			265	-	185	-				2
RTA-4320	325			305	145	225	-				3
RTA-4360	365			345	185	265	-				3
RTA-4400	405			385	225	305	-				3
RTA-6100	110			90	-	-	-				1
RTA-6150	160			140	-	-	-				1
RTA-6200	210			190	-	100	-				2
RTA-6250	260			240	-	120	-				2
RTA-6300	310			290	-	150	-				2
RTA-6350	360	100	60	340	200	80	-	6.8	11	6.3	3
RTA-6400	410			390	230	90	-				3
RTA-6450	460			440	260	100	-				3
RTA-6500	510			490	290	110	-				3
RTA-6600	610			590	350	210	70				4
RTA-6700	710			690	410	250	90				4
RTA-9100	110			80	-	-	-				1
RTA-9200	210			100	-	-	-				1
RTA-9300	310			200	-	-	-				1
RTA-9400	410			300	-	180	-				2
RTA-9500	510	148.4	90	400	-	240	-	9	14	8.7	2
RTA-9600	610			500	340	120	-				3
RTA-9700	710			600	400	140	-				3
RTA-9800	810			700	460	280	100				4
RTA-9900	910			800	520	320	120				4
RTA-91000	1010			900	600	360	120				4

Units: mm



A type RTNG crossed roller slide offers protection against environmental contamination due to the narrow gap between its slide and base. Its other characteristics are similar to type RTN/RTL slides.

SLIDE BODY MATERIALS

Sizes 1.5, 2 and 3 mm: steel with black oxide finish
 Sizes 6 and 9 mm are available in cast-iron

FEATURES AND SPECIFICATIONS

- Incorporates preloaded linear bearings type RSD and double-sided rail, including roller cages
- Linear strokes are limited by the end plates. Please note it is not permitted to use these plates as hard stop / machine stop
- Roller cage material brass
- For horizontal and vertical applications
- The narrow gap between slide and base is approx. 0.08 mm in size
- All mounting surfaces are precision ground. One flank of the slide (the side opposite to the adjustment screws) is ground parallel to the linear bearings to serve as a reference face
- The slide top and base are equipped with tapped attachment holes, drilled to a standard configuration enabling easy mounting
- For running accuracies please refer to page 138

OPTIONAL FEATURES

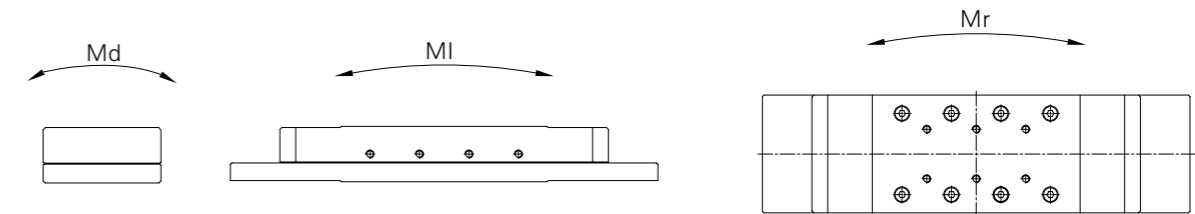
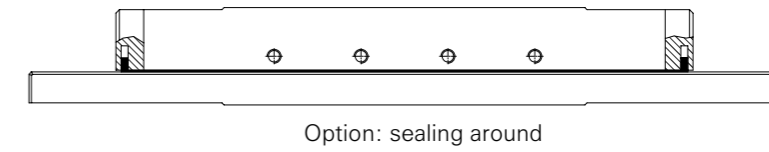
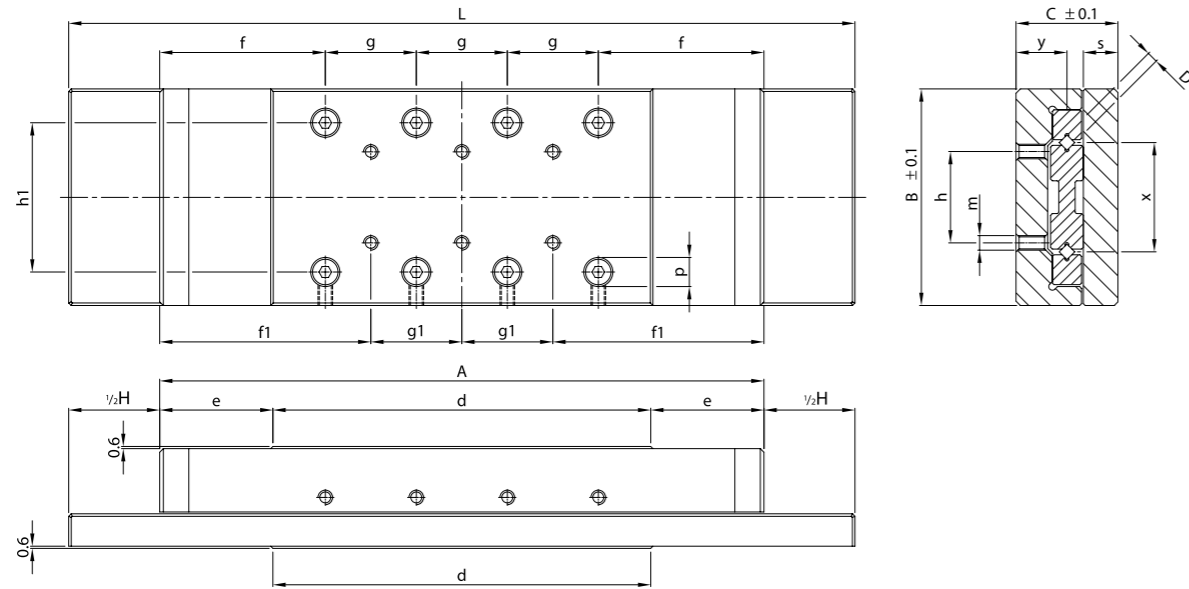
- Diam. 3, 6 and 9 mm can be delivered with dust-protected wipers and seals providing full covering, as shown at the top of page 121 and 123. Friction may be slightly higher as a result
- Selected slides can be supplied with a height tolerance of ± 0.01 mm
- Cages can be replaced by plastic crossed roller type KZR or type KKLK equipped with balls
- Higher accuracy grade slides
- Stainless steel version

ORDER NOTES

Please specify the following in your order note:

- Model no. and quantity needed

Example: 2 pcs. slide type RTNG-6200



Please see drawings on page 124 and 125 for configuration of mounting holes in the slide base.

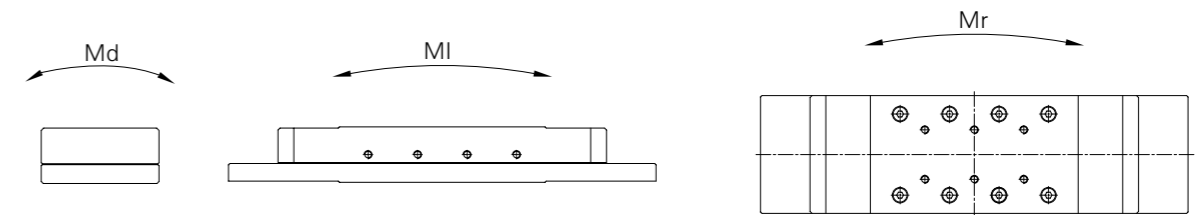
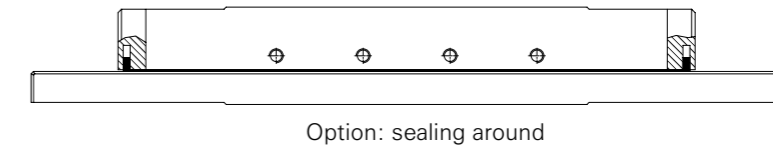
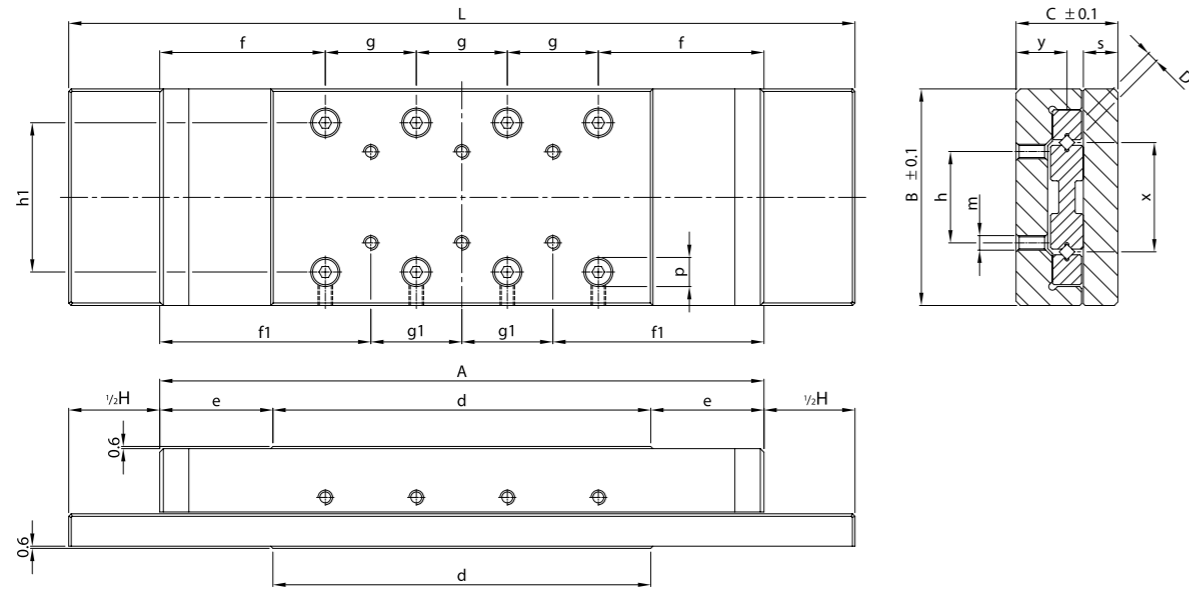
Type	Stroke					d	e	f	f1	g	g1	
	A	B	C	D	L							
RTNG-1520	42				52	10	25	8.5	16	21	1x10	-
RTNG-1530	57				72	15	35	11	18.5	23.5	2x10	1x10
RTNG-1540	72				92	20	45	13.5	21	26	3x10	2x10
RTNG-1550	87				112	25	55	16	23.5	28.5	4x10	3x10
RTNG-1560	102	29.6	17	1.5	132	30	65	18.5	26	31	5x10	4x10
RTNG-1570	117				152	35	75	21	28.5	33.5	6x10	5x10
RTNG-1580	132				172	40	85	23.5	31	36	7x10	6x10
RTNG-1590	147				192	45	95	26	33.5	38.5	8x10	7x10
RTNG-15100	162				212	50	105	28.5	36	41	9x10	8x10
RTNG-2030	60				75	15	35	12.5	22.5	30	1x15	-
RTNG-2045	82				104	22	50	16	26	33.5	2x15	1x15
RTNG-2060	105				135	30	65	20	30	37.5	3x15	2x15
RTNG-2075	127				164	37	80	23.5	33.5	41	4x15	3x15
RTNG-2090	150	39.6	21	2	195	45	95	27.5	37.5	45	5x15	4x15
RTNG-2105	172				224	52	110	31	41	48.5	6x15	5x15
RTNG-2120	195				255	60	125	35	45	52.5	7x15	6x15
RTNG-2135	217				284	67	140	38.5	48.5	56	8x15	7x15
RTNG-2150	240				315	75	155	42.5	52.5	60	9x15	8x15
RTNG-3050	91				116	25	55	18	33	45.5	1x25	-
RTNG-3075	128				165	37	80	24	39	51.5	2x25	1x25
RTNG-3100	166				216	50	105	30.5	45.5	58	3x25	2x25
RTNG-3125	203				265	62	130	36.5	51.5	64	4x25	3x25
RTNG-3150	241				316	75	155	43	58	70.5	5x25	4x25
RTNG-3175	278	59.5	28	3	365	87	180	49	64	76.5	6x25	5x25
RTNG-3200	316				416	100	205	55.5	70.5	83	7x25	6x25
RTNG-3250	391				516	125	255	68	83	95.5	9x25	8x25
RTNG-3300	466				616	150	305	80.5	95.5	108	11x25	10x25
RTNG-3350	541				716	175	355	93	108	120.5	13x25	12x25
RTNG-3400	616				816	200	405	105.5	120.5	133	15x25	14x25

Bold = Short lead time item

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

h	h1	m	p	s	x	y	C _{dyn} in N	Weight (kg)	Md in Nm	MI in Nm	Mr in Nm
							364	0.23	2.1	2.5	1.9
							520	0.29	3.5	4.4	2.6
							624	0.35	4.2	5.6	3.1
							780	0.41	4.9	7.5	4.0
							884	0.47	5.6	8.7	4.6
							1040	0.52	7.0	10.6	5.5
							1144	0.59	7.7	11.9	6.1
							1300	0.65	8.4	13.7	7.0
15	25	M3	6.3	7	18	10.75	430	0.37	3.1	2.8	3.4
							688	0.52	6.2	6.9	4.6
							946	0.63	7.7	11.0	6.3
							1204	0.81	10.8	15.1	8.2
							1376	0.94	12.4	17.9	9.5
							1634	1.10	13.9	22.0	11.4
							1892	1.24	17.0	26.1	13.4
							2150	1.38	18.6	30.3	15.4
							2408	1.52	21.7	34.4	17.5
25	41	M4	7.8	9.5	30	14	952	1.16	12.2	10.9	5.4
							1496	1.68	20.4	21.8	13.6
							2040	2.12	28.6	32.6	18.2
							2448	2.68	36.7	40.8	22.0
							2992	3.13	44.9	51.7	27.1
							3536	3.60	53.0	62.6	32.3
							4080	4.12	61.2	73.4	37.6
							5032	5.09	73.4	92.5	47.0
							6120	6.05	89.8	114.2	57.7
							7072	7.98	106.1	133.3	67.1
							8160	9.90	122.4	155.0	77.9

Units: mm



Please see drawings on page 124 and 125 for configuration of mounting holes in the slide base.

Type	Stroke					d	e	f	f1	g	g1	
	A	B	C	D	L							
RTNG-6100	173				223	50	110	31.5	61.5	86.5	1x50	-
RTNG-6150	248				323	75	160	44	74	99	2x50	1x50
RTNG-6200	323				423	100	210	56.5	86.5	111.5	3x50	2x50
RTNG-6250	398				523	125	260	69	99	124	4x50	3x50
RTNG-6300	473	99.5	45	6	623	150	310	81.5	111.5	136.5	5x50	4x50
RTNG-6350	548				723	175	360	94	124	149	6x50	5x50
RTNG-6400	623				823	200	410	106.5	136.5	161.5	7x50	6x50
RTNG-6450	698				923	225	460	119	149	174	8x50	7x50
RTNG-6500	773				1023	250	510	131.5	161.5	186.5	9x50	8x50
RTNG-9200	329				429	100	210	59.5	114.5	164.5	1x100	-
RTNG-9300	479	148	60	9	629	150	310	84.5	139.5	189.5	2x100	1x100
RTNG-9400	629				829	200	410	109.5	164.5	214.5	3x100	2x100
RTNG-9500	779				1029	250	510	134.5	189.5	239.5	4x100	3x100

Bold = Short lead time item

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

h	h1	m	p	s	x	y	C _{dyn} in N	Weight	Md in Nm	MI in Nm	Mr in Nm
								(kg)			
50	65	M6	11	14	46	23	4320	5.69	97.2	97.2	68.7
							6480	7.96	145.8	175.0	100.1
							8640	10.23	194.4	252.7	135.4
							10800	12.51	243.0	330.5	172.2
							13500	14.78	291.6	427.7	219.3
							15660	17.05	340.2	505.4	257.4
100	104	M8	14	17	78	31	17820	19.33	388.8	583.2	295.6
							19980	21.60	437.4	661.0	334.0
							22140	23.87	486.0	738.7	372.5
							13500	23.30	526.5	529.2	338.2
							21600	34.35	842.4	982.8	534.6
							28350	45.38	1053.0	1360.8	712.2
35100	57.27	1368.9	1738.8	894.5							

Units: mm

Configuration attachment holes in slide base

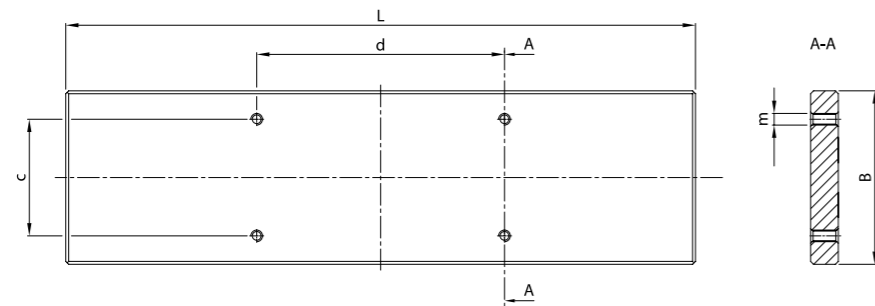


Fig. 1

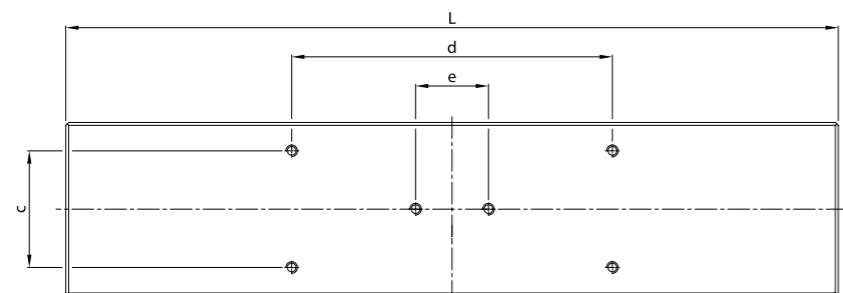


Fig. 2

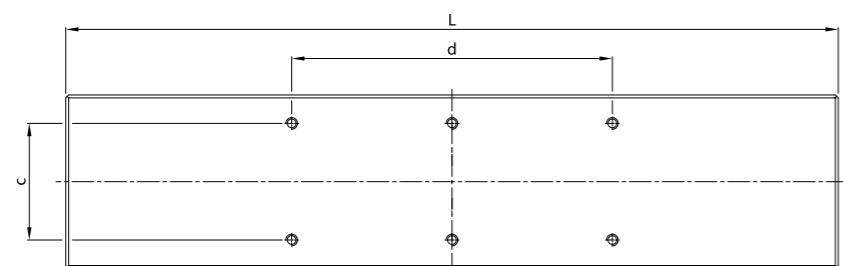


Fig. 3

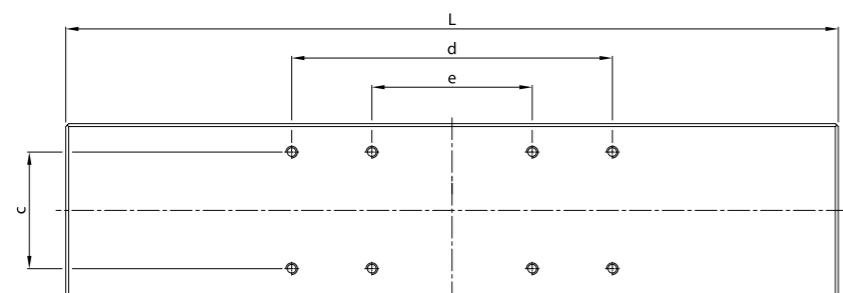


Fig. 4

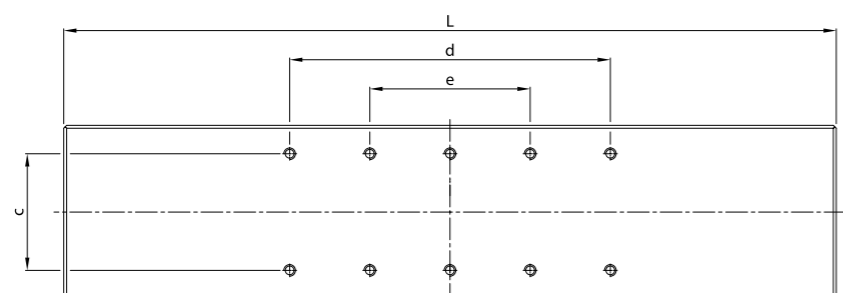


Fig. 5

Type	L	B	c	d	e	m	Fig
RTNG-1520	52			17	-		1
RTNG-1530	72			27	-		1
RTNG-1540	92			37	-		1
RTNG-1550	112			47	25		2
RTNG-1560	132	29.6	22	57	30	M2.5	2
RTNG-1570	152			67	35		2
RTNG-1580	172			77	40		2
RTNG-1590	192			87	45		2
RTNG-15100	212			97	50		2
RTNG-2030	75			25	-		1
RTNG-2045	104			40	-		1
RTNG-2060	135			55	-		1
RTNG-2075	164			70	-		1
RTNG-2090	195	39.6	30	85	45	M3	2
RTNG-2105	224			100	50		2
RTNG-2120	255			115	30		2
RTNG-2135	284			130	40		2
RTNG-2150	315			145	40		2
RTNG-3050	116			35	-		1
RTNG-3075	165			60	-		1
RTNG-3100	216			85	-		1
RTNG-3125	265			110	-		3
RTNG-3150	316			135	-		3
RTNG-3175	365	59.5	40	160	-	M4	3
RTNG-3200	416			185	65		4
RTNG-3250	516			235	85		4
RTNG-3300	616			285	95		4
RTNG-3350	716			335	170		5
RTNG-3400	816			385	195		5
RTNG-6100	223			70	-		1
RTNG-6150	323			120	-		1
RTNG-6200	423			170	-		3
RTNG-6250	523			220	-		3
RTNG-6300	623	99.5	60	270	-	M6	3
RTNG-6350	723			320	110		4
RTNG-6400	823			370	130		4
RTNG-6450	923			420	210		5
RTNG-6500	1023			470	240		5
RTNG-9200	429			160	-		1
RTNG-9300	629	148	100	260	-	M8	1
RTNG-9400	829			360	-		3
RTNG-9500	1029			460	-		3

Bold = Short lead time item

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

Units: mm



Frictionless type RTS low profile slides are high-quality preloaded linear motion units, ready for mounting. This low profile type offers excellent running motion accuracies and is able to carry medium loads and moments in any direction.

SLIDE BODY MATERIALS

Steel with black oxide finish

FEATURES AND SPECIFICATIONS

- Available in 3 sizes
- Incorporates preloaded type RSD linear bearings and centre rail which act as slide base (through hardened), including roller cages
- Slide top and centre rail have equal lengths
- Can be mounted in horizontal and vertical direction
- Roller cage material brass
- All mounting surfaces are precision ground. One flank of the slide (the side opposite to the adjustment screws) is ground parallel to the linear bearings to serve as a reference face
- The slide top and base are equipped with tapped attachment holes, drilled to standard configuration enabling easy mounting
- For running accuracies please refer to page 138

OPTIONAL FEATURES

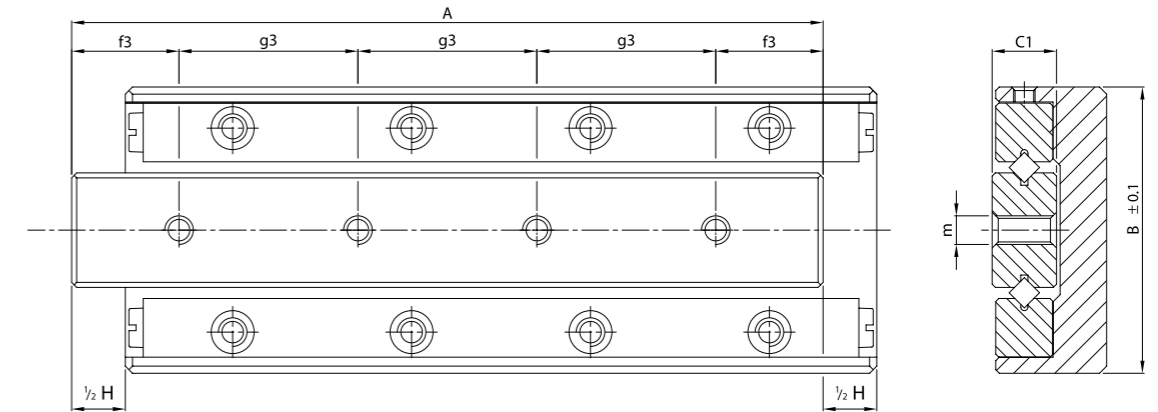
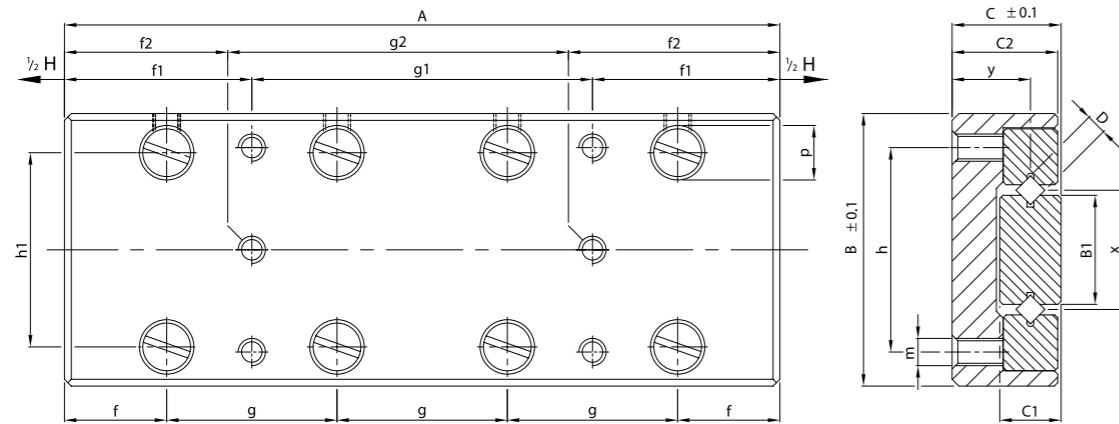
- Selected slides can be supplied with a height tolerance of ± 0.01 mm
- Cages can be replaced by plastic crossed roller type KZR or type KKLK equipped with balls
- Higher accuracy grade bearings
- Stainless steel version
- SF finishing for linear bearings for smooth and ultra-precise operation
- UHV compatible version

ORDER NOTES

Please specify the following in your order note:

- Model no. and quantity needed

Example: 1 piece slide type RTS-2065



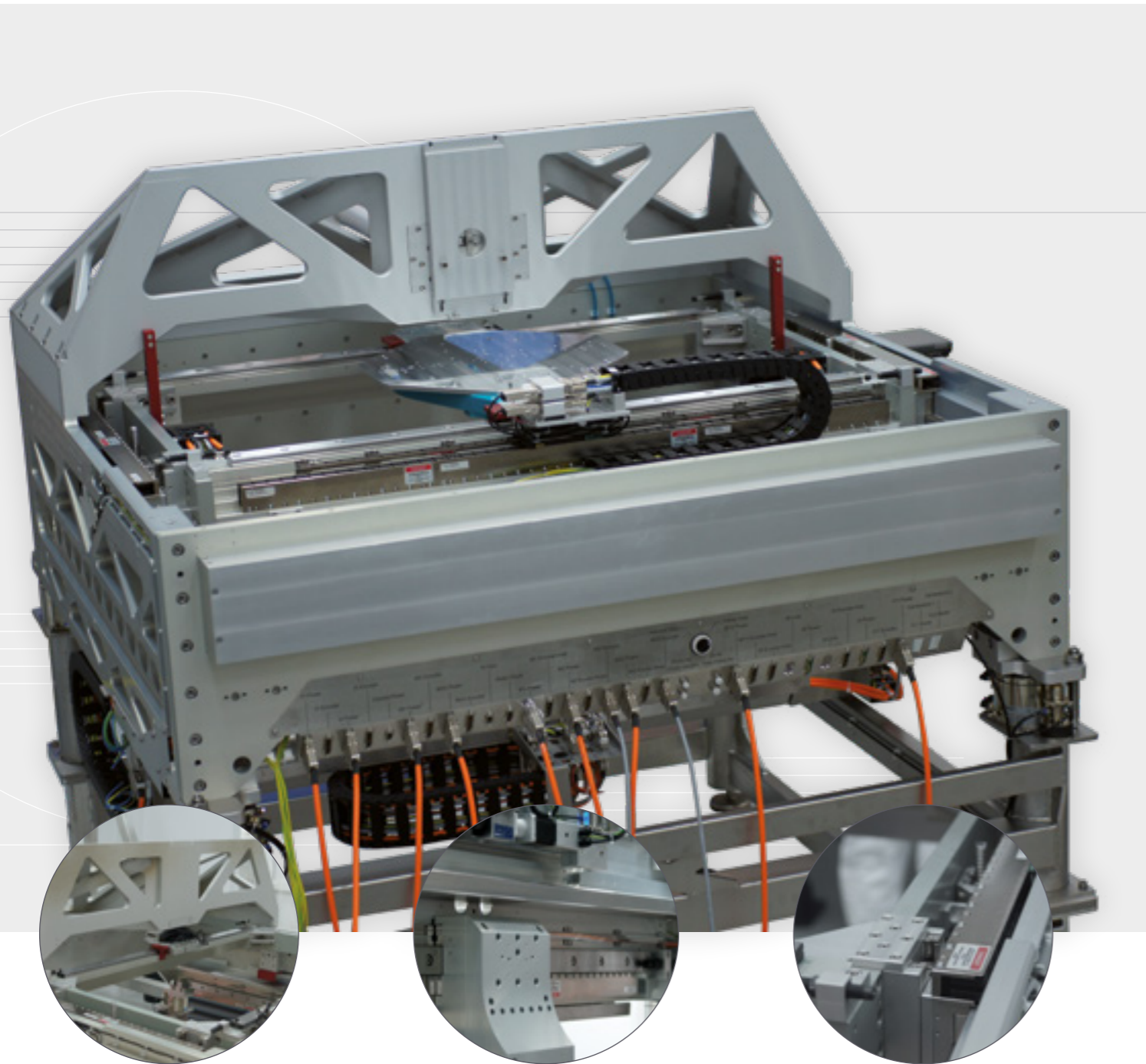
Type	Main dimensions				Stroke H									
	A	B	C	D		B1	C1	C2	f	f1	f2	f3	g	g1
RTS-1525	25				12					3.5	3.5	5	1x10	1x18
RTS-1535	35				18					3.5	7.5		2x10	1x28
RTS-1545	45				25					12.5	8.5		3x10	1x20
RTS-1555	55	20	8	1.5	32	7	5	7.5	7.5	12.5	12.5	7.5	4x10	1x30
RTS-1565	65				40					12.5	-		5x10	2x20
RTS-1575	75				45					22.5	-		6x10	1x30
RTS-1585	85				50					12.5	-		7x10	2x30
RTS-2035	35				18					3.5	-	7.5	1x15	1x28
RTS-2050	50				30					3.5	-		2x15	1x43
RTS-2065	65				40					17.5	-		3x15	1x30
RTS-2080	80	30	12	2	50	12	7	11.5	10	17.5	-	10	4x15	1x45
RTS-2095	95				60					17.5	-		5x15	2x30
RTS-2110	110				70					32.5	-		6x15	1x45
RTS-2125	125				80					17.5	-		7x15	2x45
RTS-3055	55				30					7.5	-	10	1x25	1x40
RTS-3080	80				45					7.5	-		2x25	1x65
RTS-3105	105				60					27.5	-		3x25	1x50
RTS-3130	130	40	16	3	75	16	9	15.5	15	27.5	-	15	4x25	1x75
RTS-3155	155				90					27.5	-		5x25	2x50
RTS-3180	180				105					52.5	-		6x25	1x75
RTS-3205	205				130					27.5	-		7x25	2x75

Bold = Short lead time item

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

g2	g3	h	h1	m	p	x	y	C _{dyn}	Weight	Md in	MI in	Mr in
								in N	(kg)	Nm	Nm	Nm
1x18	2x7.5							208	0.03	0.8	0.6	0.8
1x20	2x10							364	0.04	1.4	2.5	1.5
1x28	3x10							468	0.05	1.8	3.7	2.0
1x30	4x10	14	12.6	M2.5	4.6	7.7	5.5	572	0.06	2.2	5.0	2.6
-	5x10							676	0.07	2.6	6.2	3.2
-	6x10							780	0.08	3.0	7.5	3.8
-	7x10							936	0.09	3.6	8.7	4.7
-	1x20							430	0.10	2.8	2.8	2.6
-	2x15							602	0.12	3.9	5.5	3.5
-	3x15							860	0.16	5.6	9.6	5.3
-	4x15	22	20	M3	6	13	8.5	1032	0.19	6.7	12.4	6.6
-	5x15							1290	0.23	8.4	16.5	8.6
-	6x15							1462	0.26	9.5	19.3	9.8
-	7x15							1720	0.29	11.2	23.4	11.9
-	1x35							952	0.10	8.3	10.9	7.2
-	2x25							1360	0.35	11.9	19.0	10.6
-	3x25							1904	0.47	16.7	29.9	15.7
-	4x25	30	28.5	M4	7.5	17.5	11.5	2312	0.59	20.2	38.1	19.6
-	5x25							2856	0.70	25.0	49.0	24.9
-	6x25							3264	0.82	28.6	57.1	29.0
-	7x25							3672	0.92	32.1	65.3	33.0

Units: mm



With our PMM micro slides we have been at the forefront of the global trend for reduced size and weight. The tiny slides are made of corrosion-resistant steel. This compact model shows a consistently high running motion accuracy and unsurpassed reliability. Due to its innovative design combined with a 4-point ball contact, these slides demonstrate extremely low friction resistance as well as very smooth running qualities and long operating lifetimes.

MATERIALS

Slide parts and balls: stainless steel 1.4034, hardness 54 - 57 HRC. Ball cage brass/ stainless steel

FEATURES AND SPECIFICATION

- Available in 3 sizes
- Can be mounted in horizontal and vertical direction specially designed single piece U-shaped cage prevents creeping of the cage and is limited by using inside screws
- Slide top and slide base have equal lengths
- All mounting surfaces are finished by means of precision grinding
- All slide flanks are ground parallel to the rails and can serve as reference faces
- The slide top and base have tapped attachment holes, drilled to standard configuration enabling easy mounting
- They are factory preloaded by means of geometry pairing
- For running accuracies please refer to page 138

OPTIONAL FEATURES

- Slides can be supplied with a height tolerance of ± 0.01 mm
- Defined push force
- UHV-compatible version
- Full stainless steel version

ORDER NOTES

When ordering, please specify the following:

- Model no. and quantity needed

Example: 1 piece slide type PMM 1-30

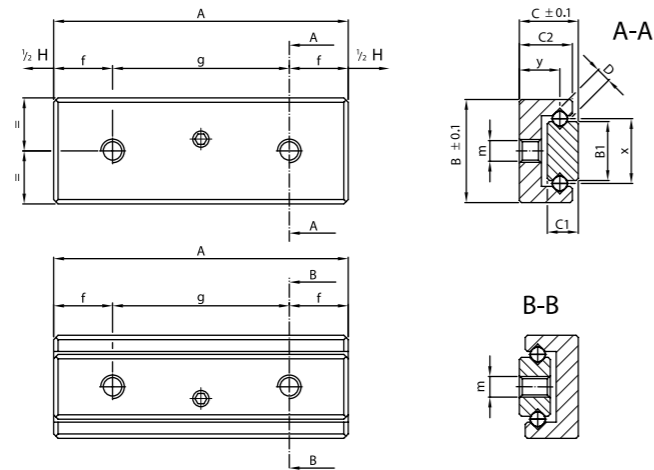


Fig. 1

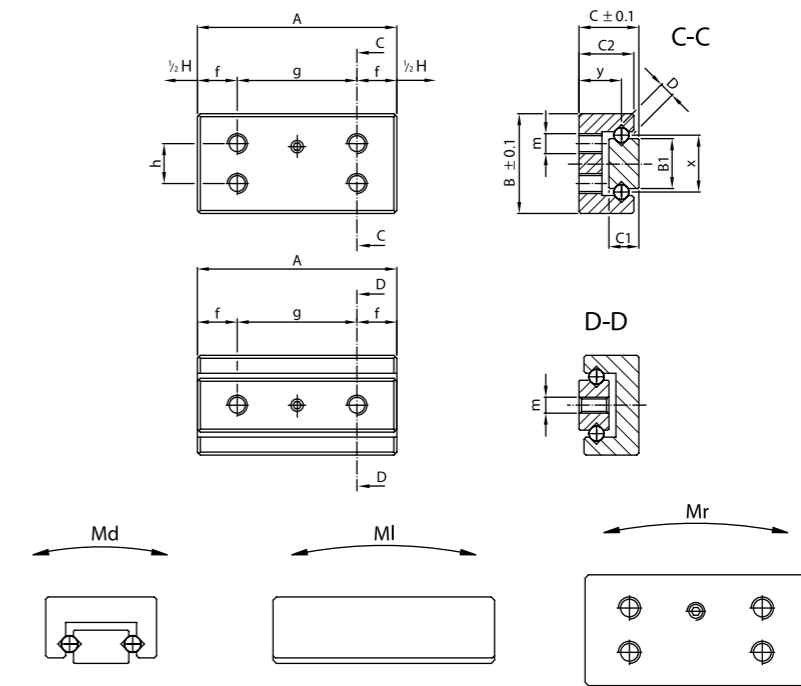


Fig. 2

Type	Main dimensions				Stroke H						
	A	B	C	D		B1	C1	C2	f	g	h
PMM 05-10	10				5				2.5	1x5	
PMM 05-15	15	7	4	1	10	4	2.1	3.6	3.5	1x8	-
PMM 05-20	20				15				4	1x12	
PMM 05-25	25				20				4.5	1x16	
PMM 1-15	15				5				3.5	1x8	
PMM 1-20	20				10				4	1x12	
PMM 1-25	25				15				4.5	1x16	
PMM 1-30	30	10	6	1.5	20	5	3	5.5	5	1x20	4
PMM 1-35	35				25				5.5	1x24	
PMM 1-40	40				30				6	1x28	
PMM 1-45	45				35				6.5	1x32	
PMM 1-50	50				40				7	1x36	
PMM 2-30	30				20				5	1x20	
PMM 2-40	40				30				6	1x28	
PMM 2-50	50	15	8	2.5	40	8	4.5	7.5	7	1x36	7
PMM 2-60	60				50				7.5	3x15	
PMM 2-70	70				60				8	3x18	
PMM 2-80	80				70				10	3x20	

Bold = Short lead time item

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

m	x	y						Fig.
			C_{dyn} in N	Weight (g)	M_d in Ncm	M_I in Ncm	M_r in Ncm	
M1.6	4.4	2.75	23	2	4.5	1.5	3.2	1
			27	3	5.4	2.2	3.8	1
			36	4	7.2	3.4	5.0	1
			45	5	9.0	4.7	6.3	1
M2	5.7	4.25	60	5	15.0	9.0	15.5	2
			70	7	18.7	11.0	19.5	2
			80	10	18.7	11.0	19.5	2
			90	12	22.5	16.0	23.7	2
			105	14	26.2	19.0	28.1	2
			120	17	30.0	22.5	32.4	2
			135	19	33.8	27.0	36.8	2
150	21	37.5	31.5	41.3	2			
M2.5	8.8	5.5	195	28	78.0	40.0	69.8	2
			234	36	95.0	50.0	83.6	2
			273	45	109.2	62.5	98.7	2
			312	54	124.8	80.0	113.5	2
			390	64	156.0	109.2	143.8	2
			429	73	171.6	125.0	159.1	2

Units: mm

50
YEARS

of success



**precise
reliable
customisable**



Micro Slide PMMR

**Travel range 5 – 70 mm
100% stainless steel design**

Key user industries:

- Medical equipment
- High speed component placement
- Laboratory equipment
- Optical devices
- Micro automation
- Use in cleanroom environments

www.PM.nl



Higher speeds, excellent rigidity and durability as well as limited enclosure, these are the challenges of today's industry. With the PMMR we have achieved superior dynamics and precision in the smallest package possible. PMMR is the world's first miniature slide equipped with crossed roller technology.

MATERIALS

Slide parts and balls: stainless steel 1.4034, hardness 54 - 57 HRC. Roller cage made of stainless steel

FEATURES AND SPECIFICATION

- Available in 3 sizes
- All parts are made of stainless steel
- Can be mounted in horizontal and vertical position. Purposely designed single piece U-shaped cage prevents creeping of the cage and is limited by in motion hard stops
- Slide top and slide base have equal lengths
- All mounting surfaces are finished by precision grinding
- All slide flanks are ground parallel to the rails and can serve as reference face
- Slide top and slide base have tapped attachment holes
- Maximum speed 2 m/s
- Maximum acceleration 200 m/s²
- For running accuracies please refer to page 138

OPTIONAL FEATURES

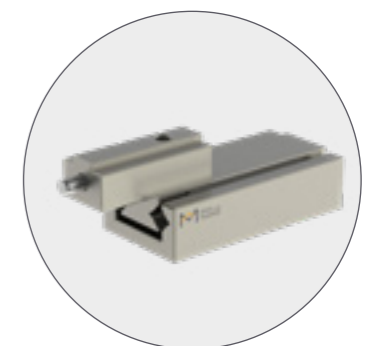
- Slides can be supplied with a height tolerance of ± 0.01 mm
- Defined sliding force
- UHV-compatible version incl. lubricants
- Full stainless steel version
- Special versions
- Higher speeds / accelerations

ORDER NOTES

When ordering, please specify the following:

- Model no. and quantity needed

Example: 1 piece slide type PMMR 1-15



Example of a custom made model

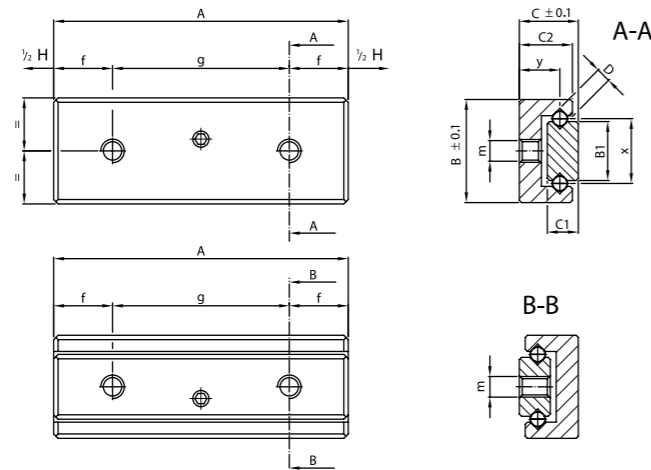


Fig. 1

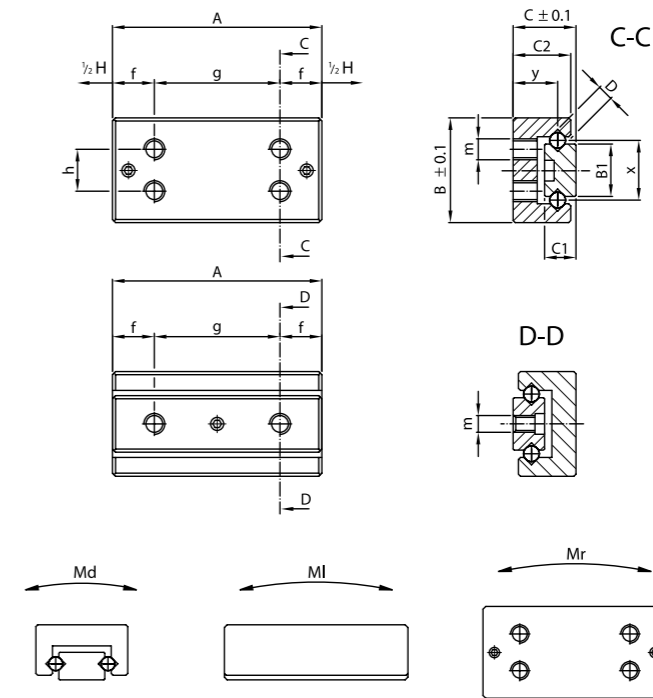


Fig. 2

Type	Main dimensions				Stroke H						
	A	B	C	D		B1	C1	C2	f	g	h
PMMR 05-10	10				5				2.5	1x5	
PMMR 05-15	15	7	4	1	10	4	2.1	3.6	3.5	1x8	-
PMMR 05-20	20				15				4	1x12	
PMMR 05-25	25				20				4.5	1x16	
PMMR 1-15	15				5				3.5	1x8	
PMMR 1-20	20				10				4	1x12	
PMMR 1-25	25				15				4.5	1x16	
PMMR 1-30	30	10	6	1.5	20	5	3	5.5	5	1x20	4
PMMR 1-35	35				25				5.5	1x24	
PMMR 1-40	40				30				6	1x28	
PMMR 1-45	45				35				6.5	1x32	
PMMR 1-50	50				40				7	1x36	
PMMR 2-30	30				20				5	1x20	
PMMR 2-40	40				30				6	1x28	
PMMR 2-50	50	15	8	2.5	40	8	4.5	7.5	7	1x36	7
PMMR 2-60	60				50				7.5	3x15	
PMMR 2-70	70				60				8	3x18	
PMMR 2-80	80				70				10	3x20	

Bold = Short lead time item

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

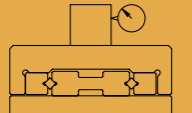
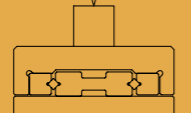
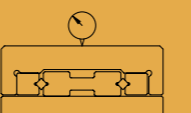
m	x	y			Md in Ncm	MI in Ncm	Mr in Ncm	Fig.
			C in N	Weight (g)				
M1.6	4.4	2.75	156	3	12	65	9	1
			195	4	16	98	12	1
			234	5	20	131	15	1
			273	6	24	163	18	1
M2	5.7	4.25	258	6	67	216	67	2
			322	8	83	288	85	2
			387	11	100	361	110	2
			451	13	117	433	125	2
			516	15	134	505	145	2
			580	18	150	577	165	2
			645	20	167	650	180	2
			709	22	184	722	200	2
M2.5	8.8	5.5	510	30	217	620	180	2
			612	38	260	775	210	2
			714	47	303	930	240	2
			816	56	347	1085	270	2
			918	66	390	1240	295	2
			1020	75	433	1395	325	2

Units: mm

RUNNING ACCURACIES AND TOLERANCES

The table below shows the accuracies for different types of PM slides. Accuracies are checked with the slides being in unloaded horizontal position. Values displayed below are also applicable to 2-axis combinations. Where relevant, please refer to the appropriate stroke lengths.

In more complex cases, for instance involving a combination of axes, please contact us for expert support. On request we are able to deliver the precision slides provided with a certificate of compliance, on the basis of measurement by laser accuracy equipment. Special higher accuracy grade slides are available on request.

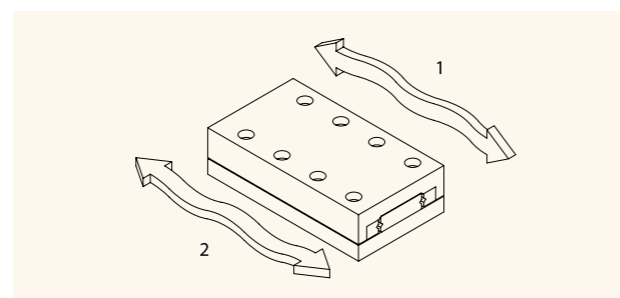
Type	A in mm	 Straight line accuracy in μm over travel length on the side	 Flatness accuracy in μm over travel length on the top	 Parallelism in μm , neutral position on slide top
RT (RTN/RTL)	25-50	2	2	5
	55-95	3	2	6
	105-155	4	3	7
	160-305	4	3	8
	310-510	4	4	10
	510-710	5	4	13
RTA (RTNA/RTLA) Aluminum	25-50	2	2	5
	55-95	3	2	5
	105-155	4	3	8
	160-305	4	3	10
	310-510	4	4	15
	510-710	5	4	20
RTNG	810-1010	5	5	25
	52-91	2	2	5
	106-166	3	2	6
	171-314	3	3	7
	317-517	4	3	10
	524-817	4	4	13
RTS	824-1028	5	5	15
	25-45	3	3	2
	55-95	4	4	4
PMM and PMMR	105-155	5	5	5
	15-30	3	4	5
	35-50	4	4	6
	60-80	5	6	8

Tolerance on the height $+0.03 \text{ mm} / -0.1 \text{ mm}$ | Optional: Slides can be supplied with a height tolerance of $\pm 0.01 \text{ mm}$

1. STRAIGHT LINE ACCURACY: this is the amount of error deviance from the ideal straight line of travel in the vertical plane.

2. FLATNESS ACCURACY: this is the amount of error deviance from the ideal straight line of travel in the horizontal plane.

PARALLISM IN μm , NEUTRAL POSITION ON SLIDE TOP: the parallism of the slide surfaces occurs unloaded on a flat, horizontal surface in zero-position.



Our type MT positioning slides are single-axis micrometer-driven translation slides, designed for microscope-based inspection applications. MT type slides feature crossed roller linear bearings that deliver excellent motion performance in flatness, straightness as well as repeatable positioning accuracy.

MATERIALS

Steel, nickel-plated finishing
Slide base is through-hardened, tool steel 1.2842

FEATURES AND SPECIFICATION

- Incorporates precision crossed roller bearings
- Center driven by metric micrometer, scale 0.01 mm
- No backlash; positive spring-loaded carriage against micrometer tip for excellent repeatability and zero backlash
- For Z-axis applications the spring-load must be taken into account. Please consult PM for expert advise
- Centre-bored hole for through light (not available in model type MT-1525)
- Slide type MT-1525 and MT-1535 are equipped with plastic roller cage type KZR. Other types are equipped with steel roller cage type AA
- All mounting surfaces are precision ground one flank of the slide (the side opposite to the adjustment screws) is ground parallel to the linear bearings to serve as a reference face
- The slide top and base comes with threaded holes, according to a standard configuration
- For running accuracies please refer to page 142

OPTIONAL FEATURES

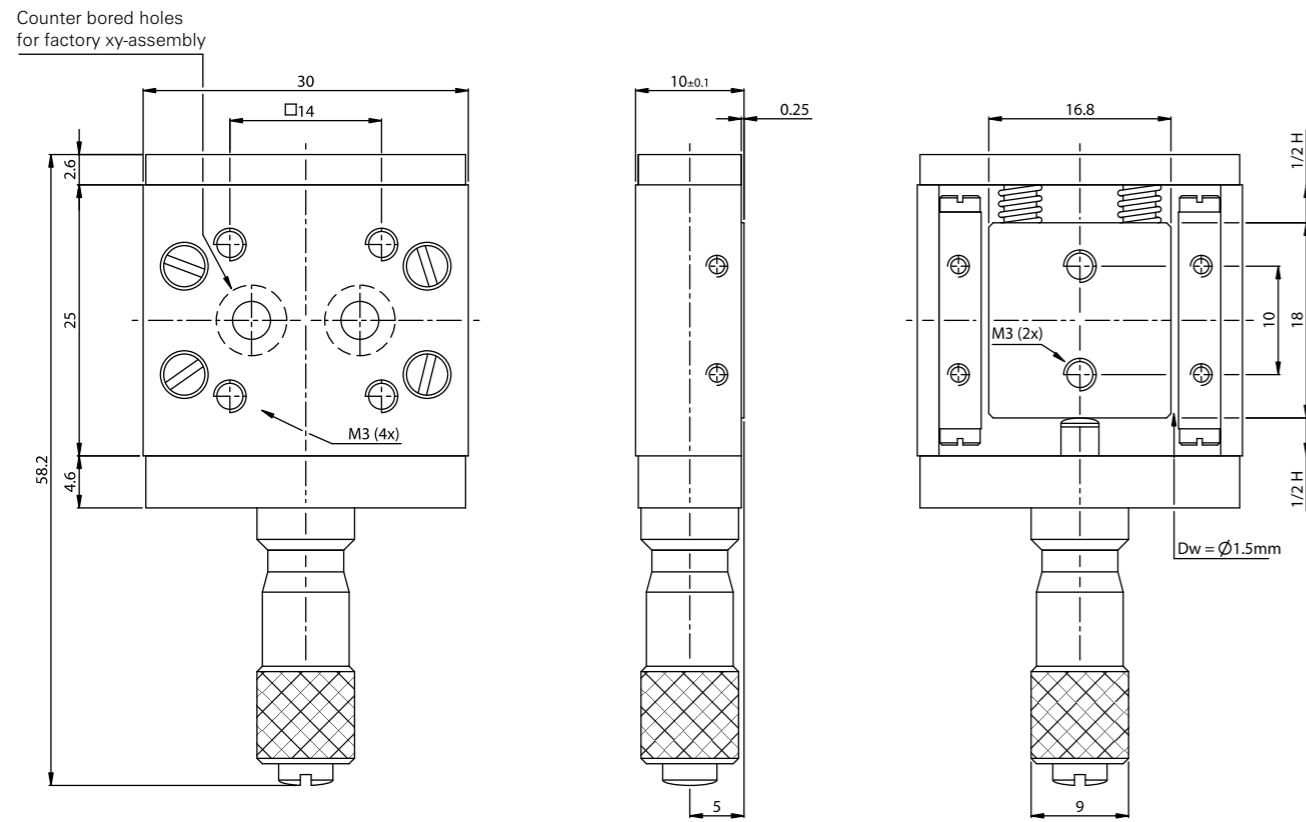
- Micrometers: digital (metric, imperial)
- Lockable micrometer (for type MT-2050 - MT-6150)
- XY assembly is without intermediate plate. Please use model code KMT (example KMT-2050)
- XYZ axis configurations with Z-bracket available
- Customer own design (drawing required)

ORDER NOTES

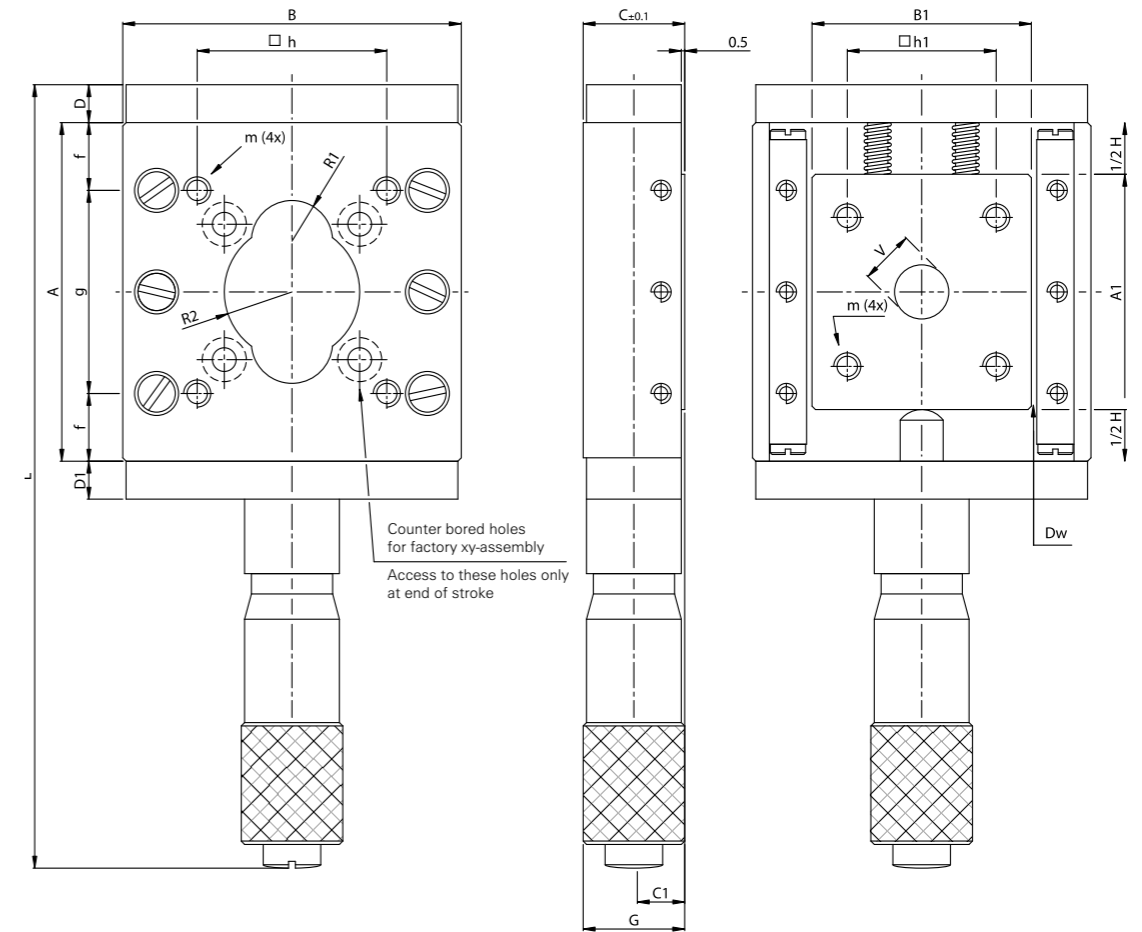
Please specify the following in your order note:

- Model no. and quantity needed

Example: 1 piece slide type MT-1535



Model MT-1525



Type	Main dimensions								Stroke H												
	A	A1	B	B1	C	C1	D	L		D	D1	G	f	g	h	h1	m	V			
MT-1525	see drawing above								1.5	58.2	7	see drawing above									
MT-1535	35	22	40	26.8	13	6.5	1.5	90.5	13	2.6	4.6	15	7.5	2x10	26	17	M3	10			
MT-2050	50	35	50	32	15	7.5	2	122.5	15	3.6	5.6	17	10	2x15	30	22	M3	8			
MT-2065	65	42	60	42	15	7.5	2	166.5	20	3.6	5.6	17	10	3x15	40	30	M3	15			
MT-3080	80	50	80	56	17	8.5	3	175.5	25	3.6	5.6	17	15	2x25	50	32	M4	31			
MT-3105	100	65	100	76	17	8.5	3	266.5	35	5.6	5.6	20	15	3x25	60	44	M4	45			
MT-6150	150	98	150	105	30	15	6	309	50	7.6	11.6	20	25	2x50	100	70	M6	70			

Bold = Short lead time item

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

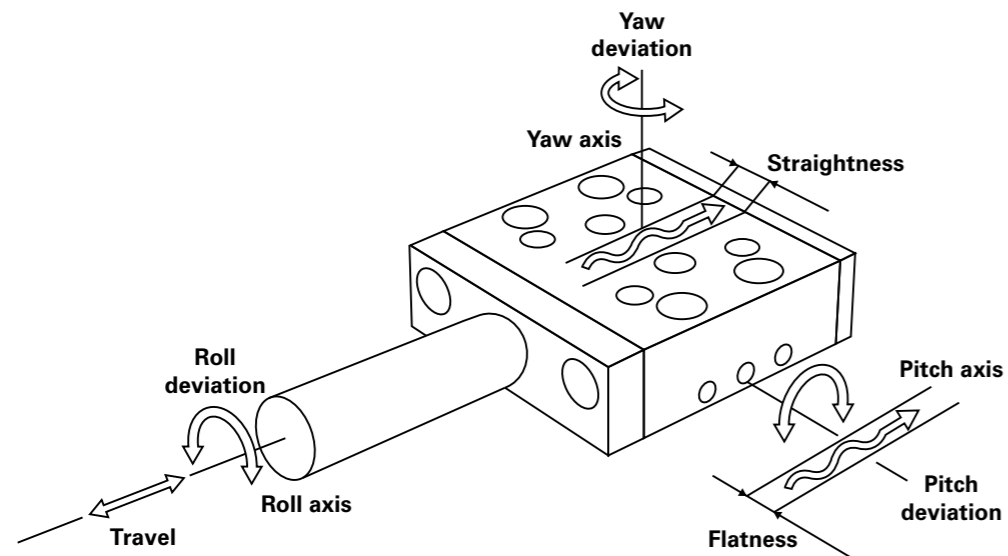
R1	R2	C _{dyn} in N	Weight (kg)	Md in Ncm	MI in Ncm	Mr in Ncm	Without micrometer (suffix -M)	Without micrometer and springs (suffix -M-V)	As XY-assembly (suffix -KMT)
-	-	312	0.09	2.7	1.3	1.9	MT-1525-M	MT-1525-M-V	KMT-1525
4.5	8	364	0.20	5.7	3.1	3.3	MT-1535-M	MT-1535-M-V	KMT-1535
6	10	774	0.43	12.8	8.3	7.0	MT-2050-M	MT-2050-M-V	KMT-2050
8.5	15	860	0.63	22.2	13.8	9.7	MT-2065-M	MT-2065-M-V	KMT-2065
10	17.5	1.360	1.00	46.9	24.5	19.9	MT-3080-M	MT-3080-M-V	KMT-3080
15	25	1.768	1.80	84.3	35.4	27.5	MT-3105-M	MT-3105-M-V	KMT-3105
28	37.5	5.940	5.50	400.7	213.8	156.7	MT-6150-M	MT-6150-M-V	KMT-6150

Units: mm

RUNNING ACCURACIES MT-SLIDES

The table below shows the accuracies for MT slides. Accuracies are checked with the slides being in unloaded horizontal position. Values displayed below are also applicable to 2-axis combinations. Where relevant, please refer to the appropriate stroke lengths.

In more complex cases, for instance involving a combination of axes, please contact us for expert support. On request we are able to deliver the MT slides provided with a certificate of compliance, on the basis of measurement by laser accuracy equipment. Special higher accuracy grade slides are available on request.



	MT-1525	MT-1535	MT-2050	MT-2065	MT-3080	MT-3105	MT-6150
Travel (mm)	7	13	15	20	25	35	50
Straightness μm	2	2	2	2	3	3	4
Flatness μm	2	2	2	2	2	3	3
Pitch deviation (mrad)	0.1						
Roll deviation (mrad)	0.1						
Yaw deviation (mrad)	0.1						

Tolerance on the height: +0.03 mm / -0.1 mm | Optional: MT slides can be supplied with a height tolerance of ± 0.01 mm. Orthogonality xy-assembly < 0.03 mrad. 1 μm = 1 micron is approximately 0.000040 inches.



The precision Flat Mounted table Bearing (FMB) consists of two through hardened standard bearing steel rings and a teflon cage filled with steel balls precision-matched. The custom designed ball-groove increases load capacity and stiffness in moment loading while guaranteeing high precision, longer service life and a very low coefficient of friction. Pre-drilled attachment holes ensure easy installation.

MATERIAL

Rings and balls are made of bearing steel 1.3505, hardness 58 - 62 HRC. Ball cage material teflon

FEATURES AND SPECIFICATION

- Low profile and space saving design
- Simple installation thanks to pre-drilled attachment holes, the bearing can be installed on the mounting surface and tightened down by attachment screws
- Maintenance free teflon ball cage
- High load capacity: the custom developed gothic arc shaped V-groove, by virtue of its geometry, provides a greater contact area and high precision. They are factory preloaded by means of geometry pairing
- FMB bearings operate under different conditions and therefore supplied in two preload classes V0 (0.02C) and V1 (0.08C)
N-class: the industry standard
P-class: only available on request
- Space-saving design: This bearing is a great option for reducing the size of many types of precision rotary bearing systems. The FMB's compact design, as low as 8 mm in height, can replace a double back or face mounted angular contact bearing pair, constituting substantial savings in space and cost

OPTIONAL FEATURES

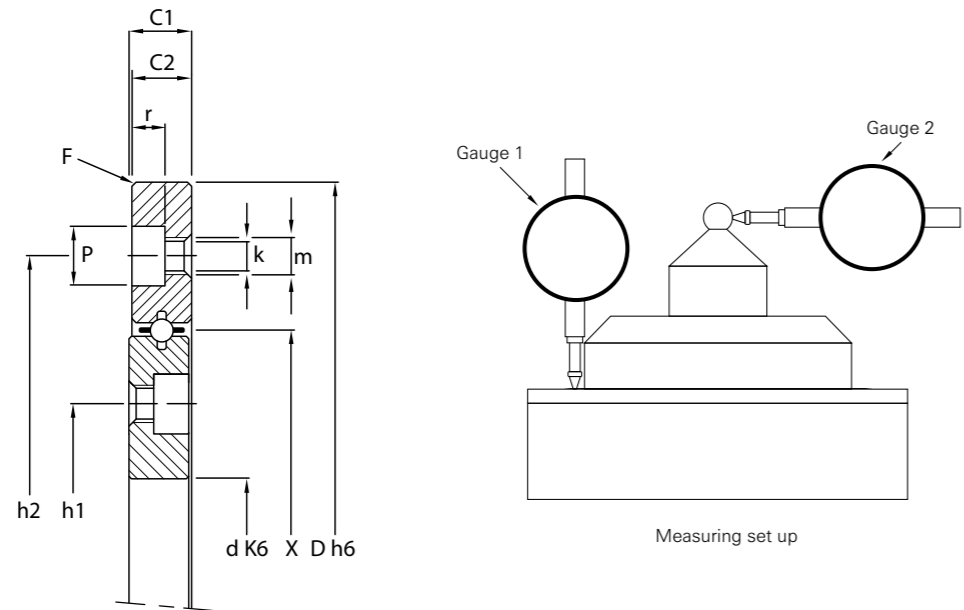
- Defined push force
- Outside diameters up to 500 mm
- Full stainless steel version
- Customised pre-drilled holes
- Crossed roller version
- Double row balls
- Special coatings such as Durni-coat to improve corrosion resistance
- UHV compatible version incl. lubricants
- Cleaning and packaging available according to various ISO cleanroom standards
- Defined preload

ORDER NOTES

Please specify the following in your order note:

- Model no. and quantity needed
- Preload class and precision class

Example: 2 pieces type FMB 60.140.V0.N



CUSTOMISED PRODUCTS

Ball or roller diameter and preloaded precision concentricity guide.
Outer diameter sizes available up to 500 mm!
Please contact us for expert product advice.

Type	Main dimensions				h1	h2	X	m	k	p	r	z ²	C _{dyn} ¹ (N)
	D h6	d K6	C	C1									
FMB 40.120	120	40			60	100	80					8	6070
FMB 60.140	140	60			80	120	100			-		8	7047
FMB 80.160	160	80	8.5	8	100	140	120	M5	4.3	8	4.5	8	8100
FMB 100.180	180	100			120	160	140					12	9153
FMB 120.200	200	120			140	180	160					12	10.125
FMB 140.220	220	140			160	200	180					12	11.178
FMB 150.250	250	150	10.5	10	175	225	200	M6	5.2	9.5	5.5	12	12.717
FMB 200.300	300	200			225	275	250					12	15.228
FMB 250.350	350	250	12.5	12	275	325	300	M6	5.2	9.5	5.5	12	20.331

¹ Load ratings according to ISO 281

Units: mm

² Number of attachment holes per ring

Type	Weight (kg)	Axial runout (µm)		Eccentricity (µm)		Wobble (µm)	
		N Class	P Class	N Class	P Class	N Class	P Class
FMB 40.120	0.57	4	1	3	1	3	2
FMB 60.140	0.72	4	2	3	2	3	3
FMB 80.160	0.90	4	2	4	2	4	3
FMB 100.180	1.00	5	2	5	2	4	4
FMB 120.200	1.15	5	2	5	2	5	4
FMB 140.220	1.30	6	3	6	3	6	4
FMB 150.250	2.30	8	4	8	4	8	6
FMB 200.300	2.90	8	5	8	5	8	6
FMB 250.350	4.15	10	6	10	6	10	6

Axial run-out (gauge 2): maximum axial variation of outer ring in comparison to the centre of rotation.

Eccentricity: also referred to as concentricity, defines the deviation of the centre of rotation from its mean position over one revolution.

Wobble (gauge 1): angular deviation of the axis of rotation over one revolution.

Bold = Short lead time item

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





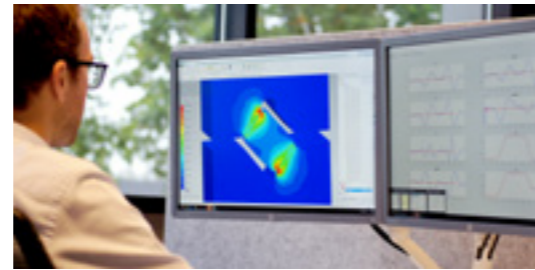
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