

DUST-PROTECTED SLIDE TYPE RTNG



Company's headquarters in Dedemsvaart, Netherlands



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





INTRODUCTION

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

COMPANY

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

NEW PRODUCTS

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

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

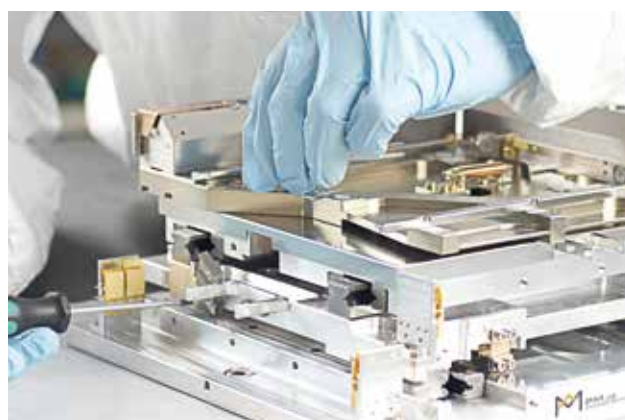
CUSTOMISED PARTS

In addition to offering high-quality standardised products, we design and manufacture engineered linear bearings and positioning systems meeting our clients' application-specific requirements. PM combines the latest knowledge from its in-house R&D department, developments in manufacturing technology

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

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

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



DISCLAIMER

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

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PRODUCT OVERVIEW

PM 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



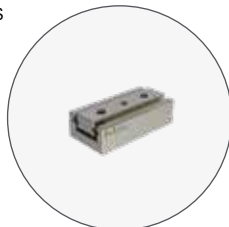
3. DUST-PROTECTED SLIDES TYPE RTNG

- 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. LOW PROFILE 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. MINIATURE BALL 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. MINIATURE CROSSED ROLLER 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
- $V_{\max}=2 \text{ m/s}$, $a_{\max}=200 \text{ m/s}^2$ (20g)
- 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 miniature slides

Max. recommended speed $v = 50$ m/min.

Max. acceleration $a = 8$ m/sec².

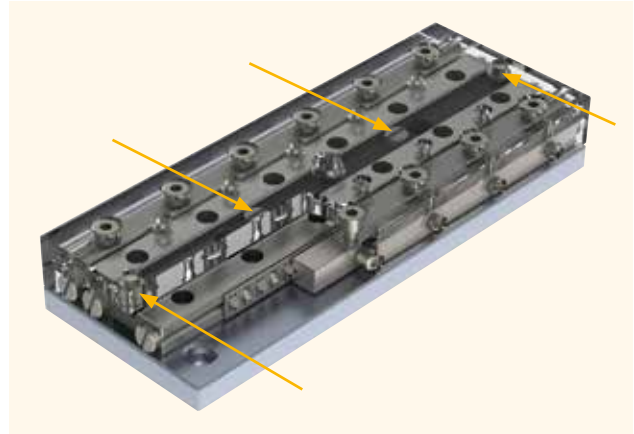
PMMR type crossed roller miniature slides

Max. recommended speed $v = 120$ m/min.

Max. acceleration $a = 200$ m/sec² (20g).

INTERNAL STROKE LIMIT SCREWS

Crossed-roller slides RTN/RTL and RTNA/RTLA have internal stroke limit screws in the center line of the slides. These screws are for emergency use only and may not be used as a regular stroke end stop, as this can cause permanent damage to the linear bearings.



Example of location internal stroke limit screws

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 miniature 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

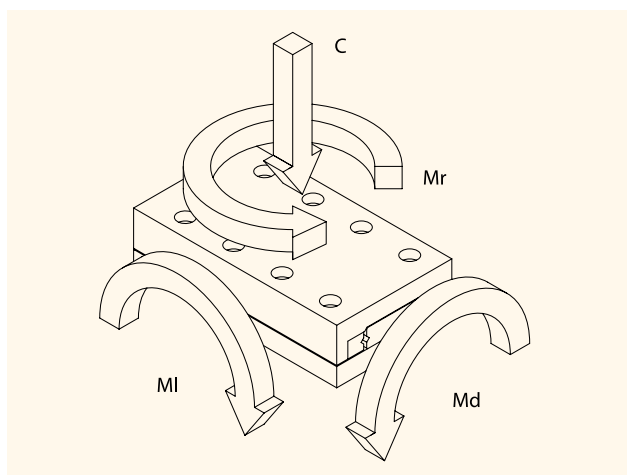
Slides listed in this catalogue are able to carry loads and moments in any direction. Load ratings are compliant with ISO and DIN standards for calculating roller bearings (ISO standard 281, for miniature slide type PMM DIN 636, part 3). To ensure high running accuracy and to prevent the occurrence of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

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.



CUSTOMISED LINEAR SLIDES

In a situation that a standard product does not suit your application we offer customised product service. For example in:

- Special geometry
- Non-standard materials
- Customized cages
- Vacuum and UHV-compatibility
- Low till non-magnetic linear bearings
- Improved raceway surfaces
- Higher load ratings
- Higher speeds / accelerations

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.



Customised miniature slide PMM 2



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 142

OPTIONAL FEATURES

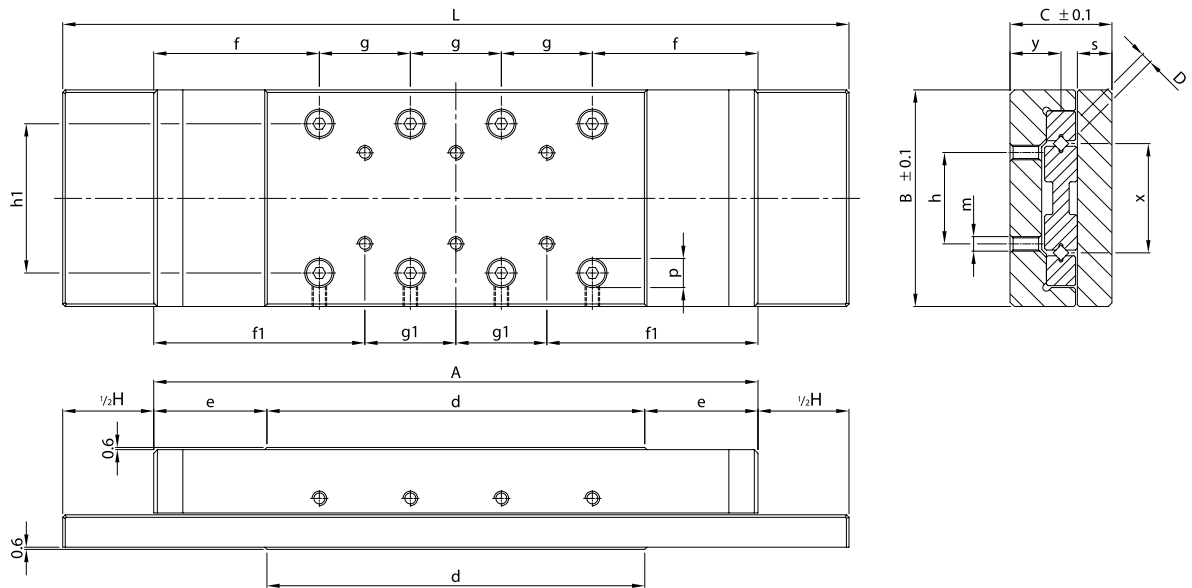
- Diam. 3, 6 and 9 mm can be delivered with dust-protected wipers and seals providing full covering, as shown at the top of page 125 and 127. Friction may be slightly higher as a result
- Selected slides can be supplied with a height tolerance of ± 0.01 mm
- Cages can be replaced by plastic crossed roller 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

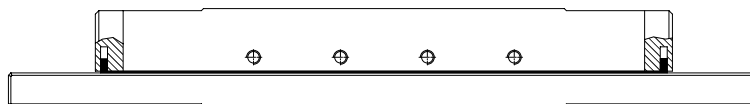


Please see drawings on page 128 and 129 for configuration of mounting holes in the slide base.

Type						Stroke						
	A	B	C	D	L	H	d	e	f	f1	g	g1
RTNG-1520	42	29.6	17	1.5	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				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	39.6	21	2	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				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	59.5	28	3	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				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

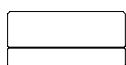
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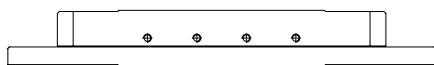


Sealing around for 3, 6, 9 mm (on request)

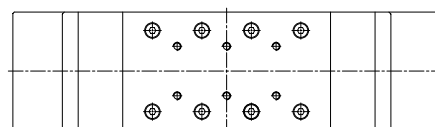
Md



MI

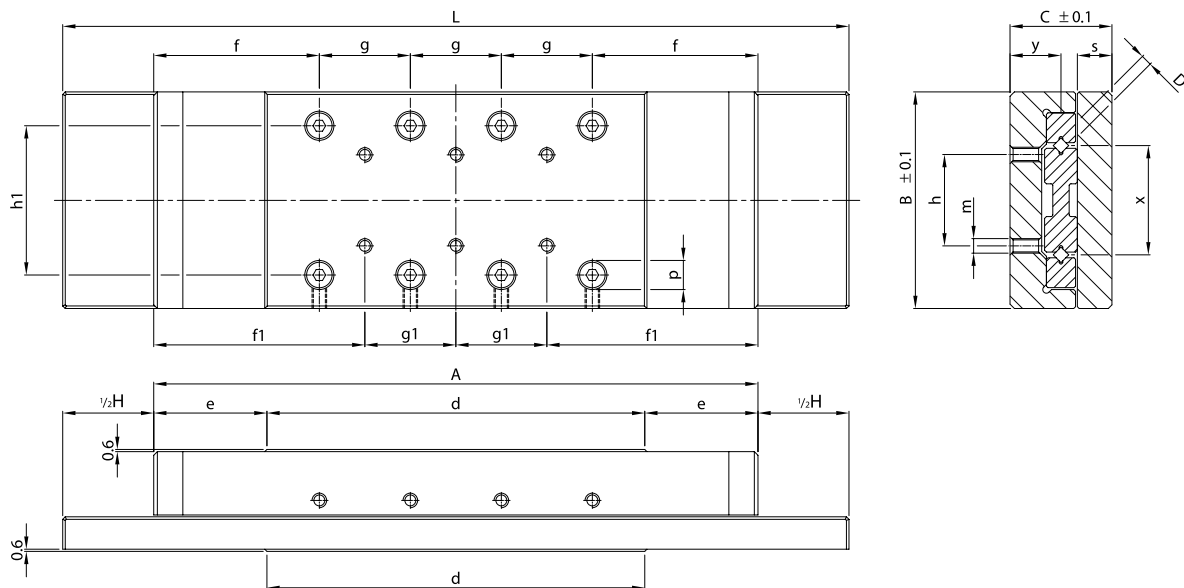


Mr



h	h1	m	p	s	x	y	C _{dyn} in N	Weight (kg)	Md in Nm	MI in Nm	Mr in Nm
10	18.4	M2.5	4.6	6	13.5	8.75	260	0.17	1.4	1.2	1.5
							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
15	25	M3	6.3	7	18	10.75	1300	0.65	8.4	13.7	7.0
							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
25	41	M4	7.8	9.5	30	14	2150	1.38	18.6	30.3	15.4
							2408	1.52	21.7	34.4	17.5
							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

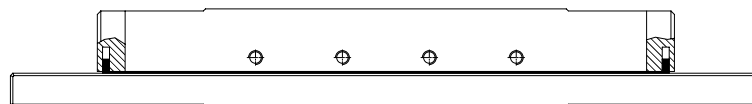


Please see drawings on page 128 and 129 for configuration of mounting holes in the slide base.

Type						Stroke						
	A	B	C	D	L	H	d	e	f	f1	g	g1
RTNG-6100	173	99.5	45	6	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				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	148	60	9	429	100	210	59.5	114.5	164.5	1x100	-
RTNG-9300	479				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

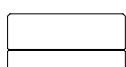
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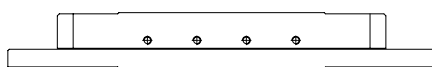


Sealing around for 3, 6, 9 mm (on request)

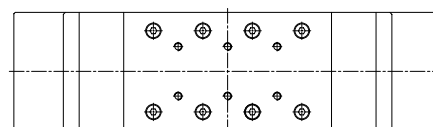
Md



MI



Mr



h	h1	m	p	s	x	y	C_{dyn} in N	Weight (kg)	Md in Nm	MI in Nm	Mr in Nm
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
							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
100	104	M8	14	17	78	31	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 mounting holes in slide base

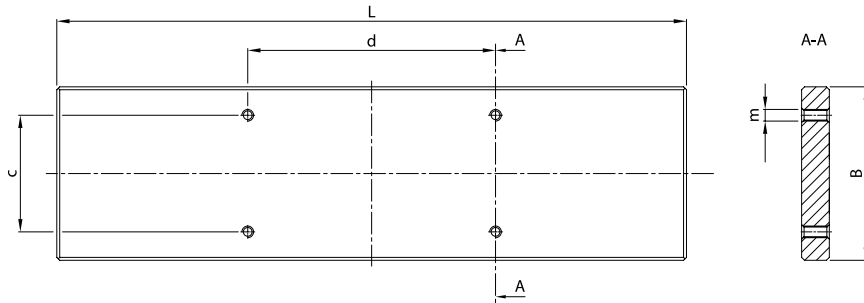


Fig. 1

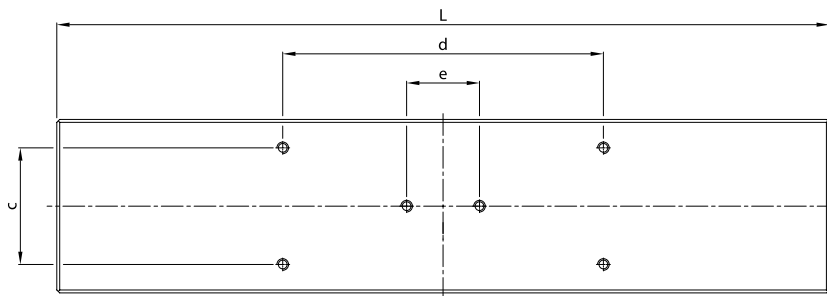


Fig. 2

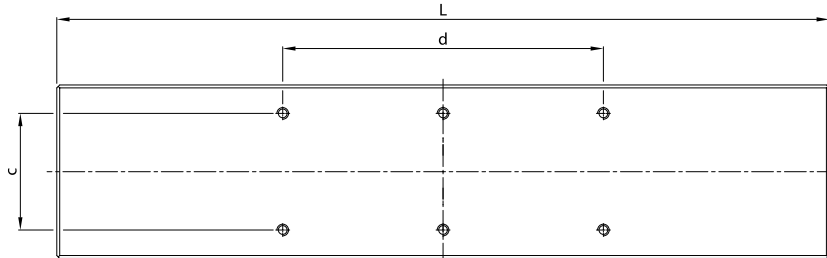


Fig. 3

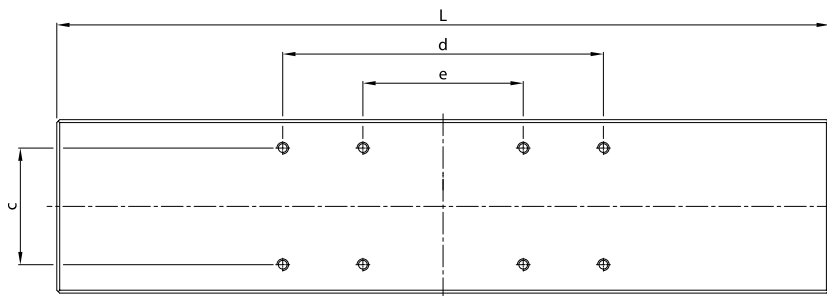


Fig. 4

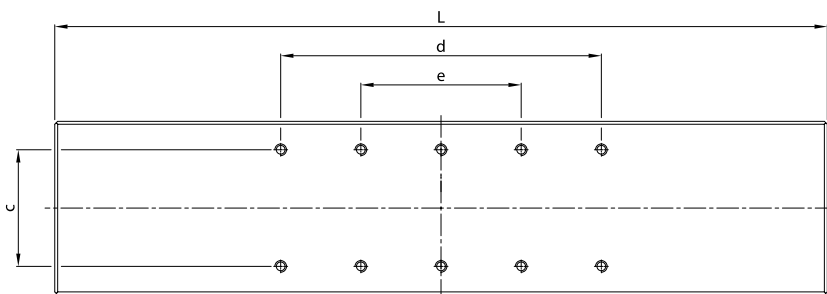


Fig. 5

Type	L	B	c	d	e	m	Fig
RTNG-1520	52	29.6	22	17	-	M2.5	1
RTNG-1530	72			27	-		1
RTNG-1540	92			37	-		1
RTNG-1550	112			47	25		2
RTNG-1560	132			57	30		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	39.6	30	25	-	M3	1
RTNG-2045	104			40	-		1
RTNG-2060	135			55	-		1
RTNG-2075	164			70	-		1
RTNG-2090	195			85	45		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	59.5	40	35	-	M4	1
RTNG-3075	165			60	-		1
RTNG-3100	216			85	-		1
RTNG-3125	265			110	-		3
RTNG-3150	316			135	-		3
RTNG-3175	365			160	-		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	99.5	60	70	-	M6	1
RTNG-6150	323			120	-		1
RTNG-6200	423			170	-		3
RTNG-6250	523			220	-		3
RTNG-6300	623			270	-		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	148	100	160	-	M8	1
RTNG-9300	629			260	-		1
RTNG-9400	829			360	-		3
RTNG-9500	1029			460	-		3

Bold = Short lead time item

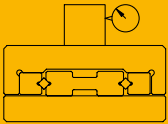
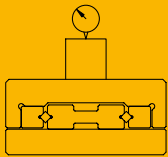
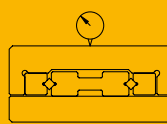
Regular = Long lead time item - please ask us about prices and lead times

Units: mm

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.

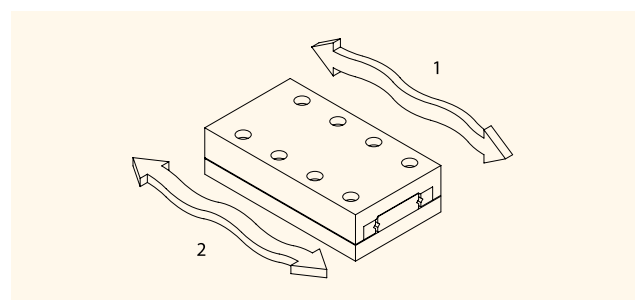
Type	A in mm	 Straight line accuracy in μm over travel length on the side	 Flatness accuracy in μm over travel length on the top	 Parallelism in μm , neutral position on slide top
RT (RTN/RTL)	25-50	2	2	5
	55-95	3	2	6
	105-155	4	3	7
	160-305	4	3	8
	310-510	4	4	10
	510-710	5	4	13
	810-1010	5	5	15
RTA (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
	810-1010	5	5	25
RTNG	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
	824-1028	5	5	15
RTS	25-45	3	3	2
	55-95	4	4	4
	105-155	5	5	5
PMM and PMMR	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.

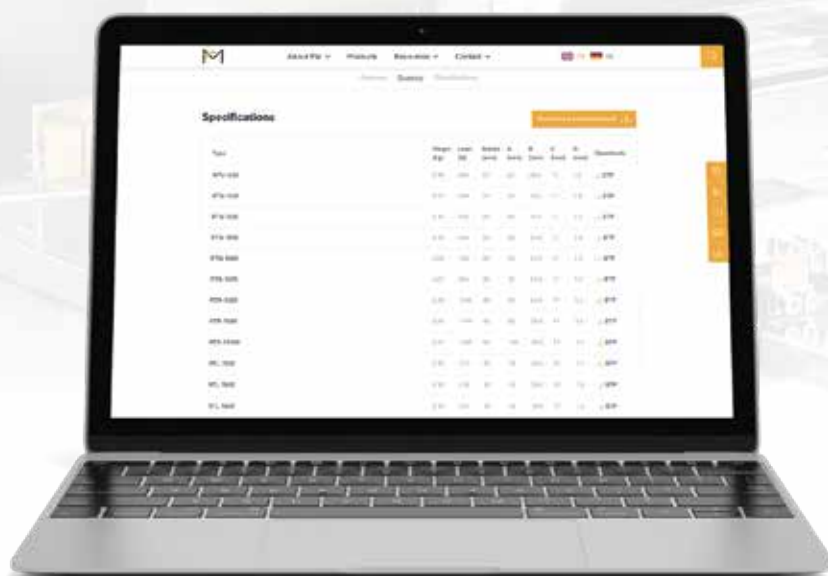
PARALLISM IN μm , NEUTRAL POSITION ON SLIDE TOP: the parallelism of the slide surfaces occurs unloaded on a flat, horizontal surface in zero-position.





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2020