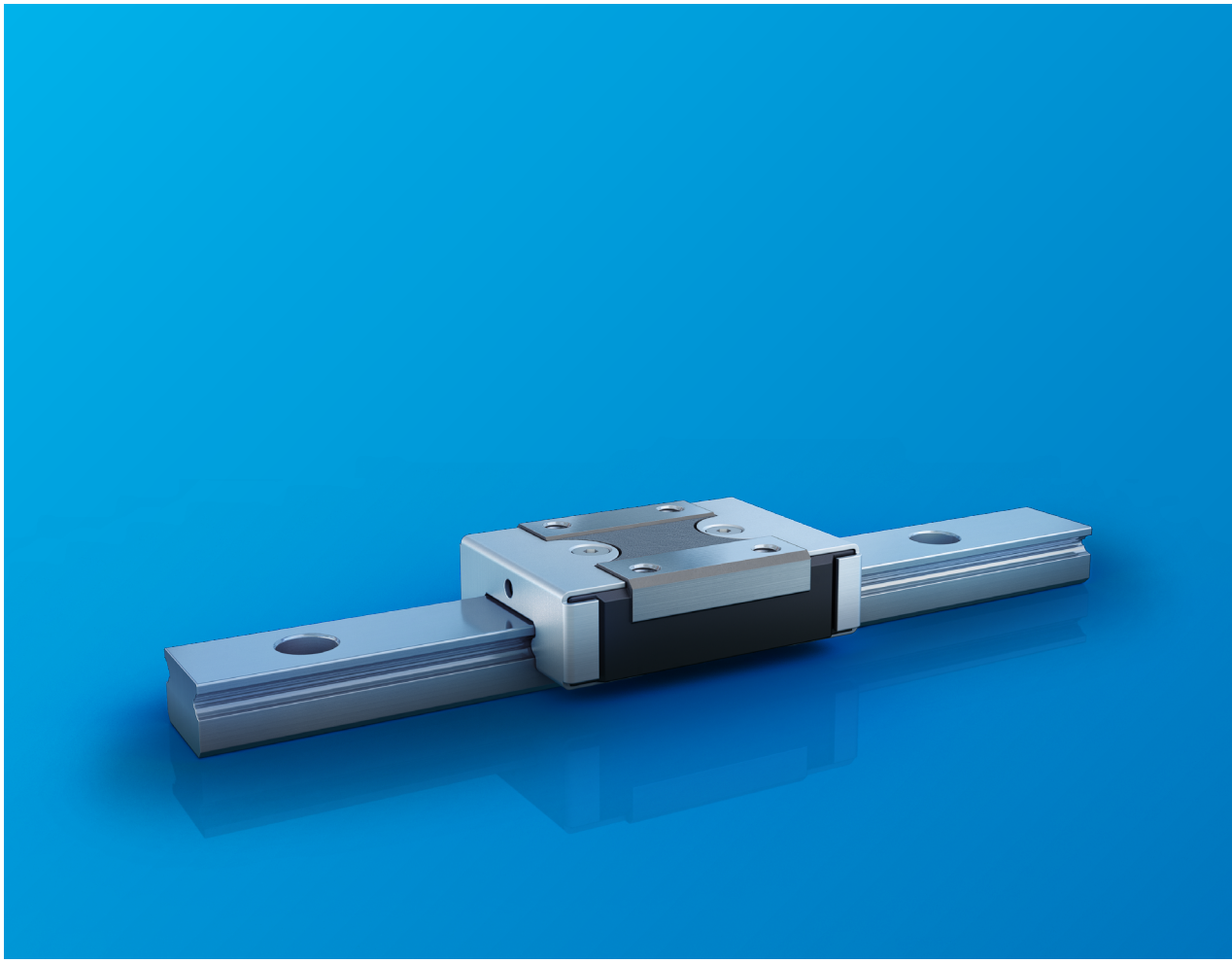
HYPEX

Linear Motion



MR MINIATURE LINEAR GUIDE SERIES

O nas
About Us

Podjetje HYPEX d.o.o. je proizvodno-trgovsko podjetje v zasebni lasti, ustanovljeno leta 1990. Pred leti smo zgradili sodoben poslovno proizvodni center v industrijski coni v Lescah, kjer je poleg poslovnih prostorov tudi veleprodajna trgovina, skladišča ter obrat proizvodnje.

Proizvodno-prodajni program smo v zadnjem času razširili, tako da danes nudimo veliko izbiro elementov industrijske avtomatizacije in industrijske opreme za strojegraditelje, vzdrževalce, inštalaterje in obrtnike tako doma kot v tujini.

Kot dobavitelj komponent ali celih sklopov iz lastne proizvodnje nudimo tudi proizvode drugih znanih in manj znanih proizvajalcev, katerih proizvodi morajo po kvaliteti in standardih ustrezati zahtevam sodobnega trga.

HYPEX d.o.o. is a production and trading company founded in 1990 and since then privately owned. Several years ago we built a modern business manufacturing center in the industrial zone in Lesce, where in addition to commercial premises we include wholesale trade, warehouse and manufacturing plant.

Production and sales program was recently expanded, so today we offer a great selection of elements of industrial automation and industrial equipment for engineers, repairers, installers and tradesmen both at home and abroad.

As a supplier of components or entire sets from our own production, we also offer products of other well-known and lesser-known producers whose products have the quality and standards to meet the requirements of the modern market.

Hypex proizvodi po kvaliteti
in standardih ustrezajo zahtevam
sodobnega trga.

Hypex products have the quality and
standards to meet the requirements
of the modern market.

Hypex prodajni program
Hypex Products

UNI-AIR PRIKLJUČKI
UNI-AIR FITTINGS

PROFILNA TEHNIKA
PROFILE TECHNICS

PROCESNA TEHNIKA
FLUID CONTROL

UNI-AIR PNEVMATIKA
UNI-AIR PNEUMATICS

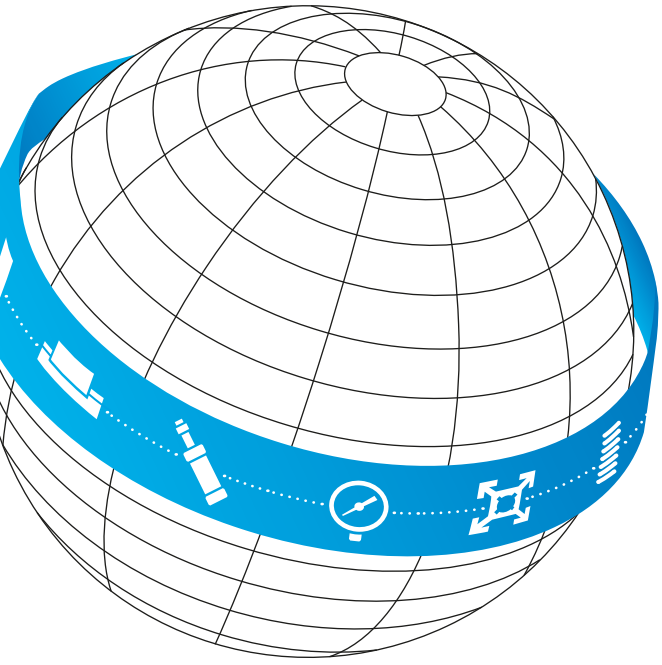
LINEARNA TEHNIKA
LINEAR MOTION TECHNOLOGY

- **TIRNA VODILA**
  LINEAR GUIDES
- **MINI TIRNA VODILA**
  MR MINIATURE LINEAR GUIDE SERIES
- **OKROGLA VODILA**
  ROUND GUIDES
- **VRETENA**
  BALL SCREW DRIVES

UNIMOTION LINEARNE ENOTE
UNIMOTION LINEAR UNITS

UNIMOTION ELEKTRIČNI CILINDRI
UNIMOTION ELECTRIC CYLINDERS

Hypex spletna trgovina
Hypex Online Store



Obiščite našo spletno trgovino: www.hypex.si

Spletna trgovina je jasno urejena in preprosta za uporabo. Vsebuje detajlne informacije, vključno s 3D CAD modeli, posameznih produktov.

Podrobnejše informacije o dostavi in vse ostale informacije so na voljo na spletu.

Visit our online store: www.hypex.si

Online store is clearly arranged and easy to use. It contains detailed product information, including 3D CAD models.

More information about shipping and all other information available on the web.

Kazalo
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Product introduction

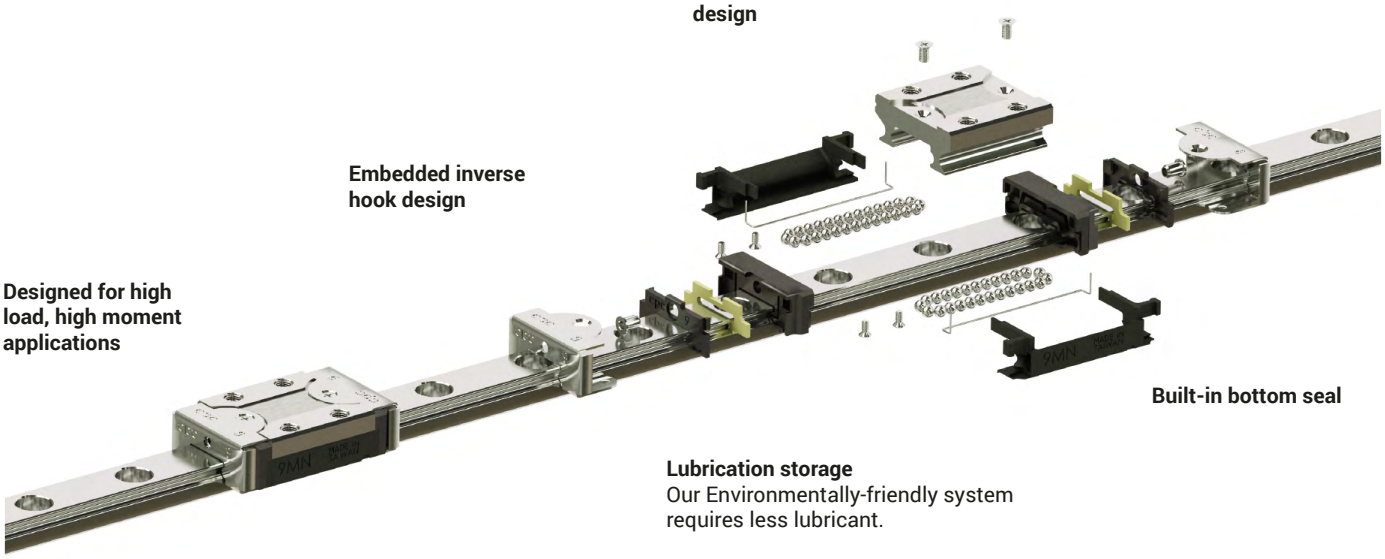
STRUCTURAL DESIGN

Our steel reinforcement plate ensures sturdy assembly and a longer product lifespan

Unique ball re-circulation design

Embedded inverse hook design

Designed for high load, high moment applications



Built-in bottom seal

Lubrication storage
Our Environmentally-friendly system requires less lubricant.

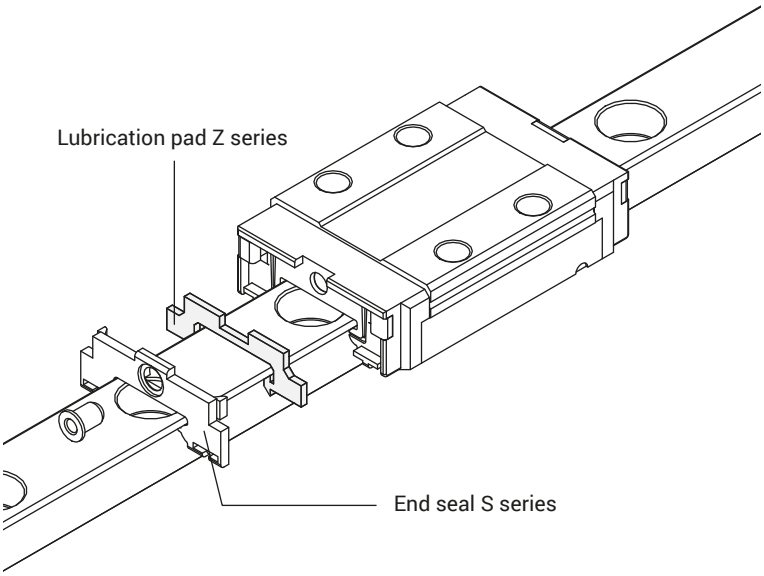
Precision
MR Miniature linear guide series have three accuracy classes for design selections: Precision (P), High (H), Normal (N).

Material
All of our MR miniature linear guide series are made from heat treated stainless steel material.

DUSTPROOF DESIGN

SS series-end seal

The standard end seal design can be hermetically sealed and dustproofed. This extends the product lifespan, reduces lubrication grease consumption, and ensuresa long-lasting lubrication effect. The special seal slip design also ensures a low friction force so as not to affect the product's running smoothness.



ENVIRONMENTALLY FRIENDLY LUBRICATION DESIGN

ZZ series-end seal and lubrication pad

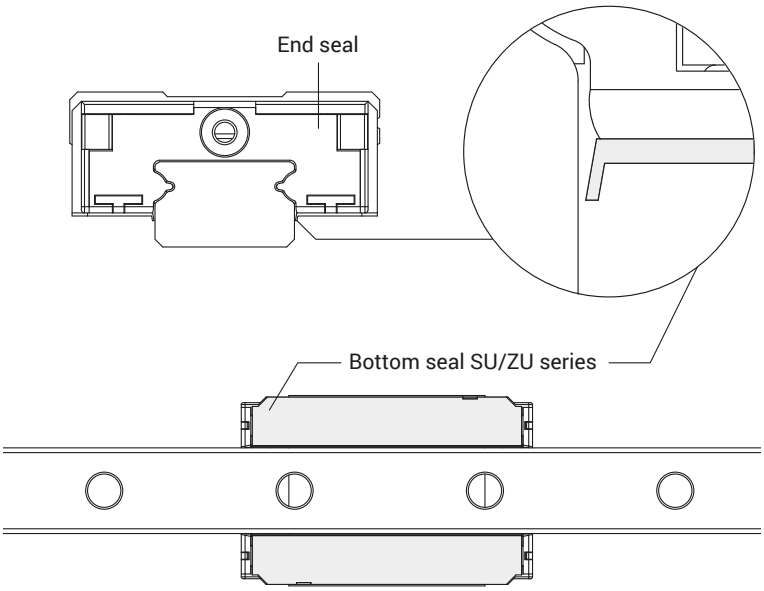
The two ends of the runner block feature a hermetic lubrication grease injection design. This is capable of bringing the lubrication grease to the raceway via continuous steel ball circulation, thereby achieving an effective long-term lubrication effect. A built-in lubrication pad can also be utilized toward prolonging lubrication further for long-term motion, reducing maintenance costs while demonstrating a superior lubrication capability during short stroke motion.

SS and ZZ seal and lubrication type on stock (others on request).

Features: the built-in bottom seal does not affect the friction resistance if a clearance is smaller than 0,1 mm.

SU series – end, bottom seals

In addition to a normally equipped end seal, our newly designed runner block is equipped with an extra bottom seal. This prevents foreign matter from entering via the lower side of the runner block into the running rail, thereby extending the working life of the runner block.



ZU series – end, bottom seals and lubrication pad

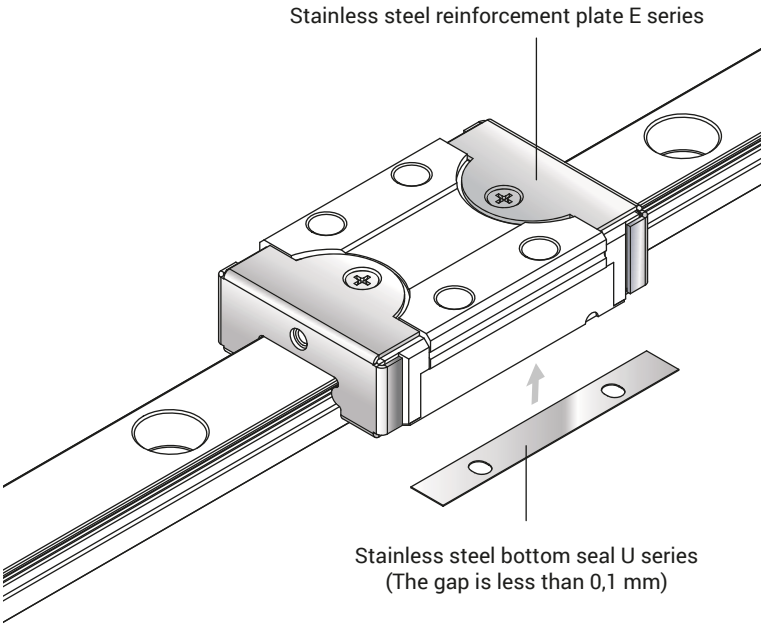
A newly designed bottom seal can prevent lubrication grease from spilling below the runner block. In addition, a built-in mounted lubrication pad further strengthens the series' grease-saving effects while extending its re-greasing interval.

END REINFORCING DESIGN

EE series-end seal and reinforcement plate

This series utilizes two stainless steel reinforcement plates to cover the two plastic ends of the slide block completely and stainless steel screws to secure the upper and lower sides of the runner steel block, thereby strengthening the rigidity and increasing the coverage area of the end cap. This ensures faster running speeds while a gap sealing design between the reinforcement plate and slide rail enables an added wiping function

Running speed V_{max} = 5 m/s, a_{max} = 300 m/s^2
(60 m/s^2 can be reached without prepressing)



EZ series – end seal, reinforcing plate and lubrication pad

The built-in lubrication pads at the two ends of the runner block conform to environmental protection requirements and reduce maintenance costs.

EU series – end seal, stainless steel bottom seal and reinforcement plate

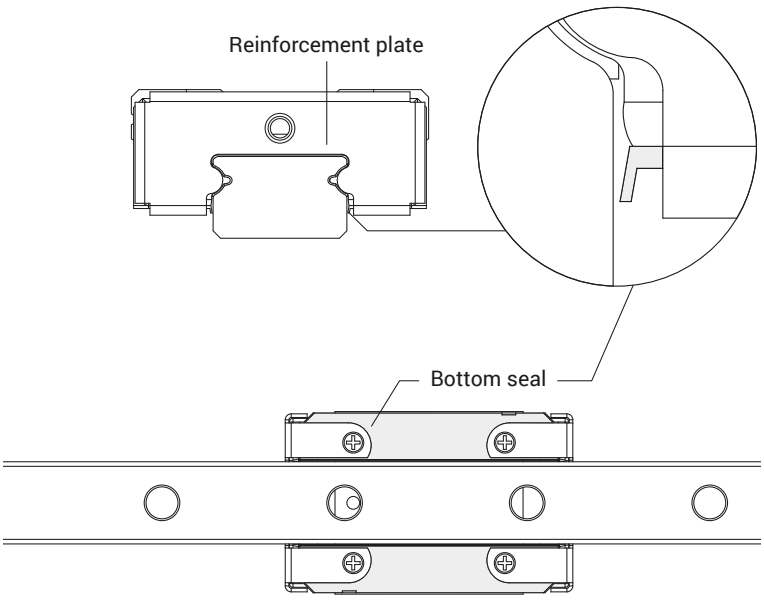
The stainless steel bottom seal protects the runner block from unnecessary damage caused by collision with foreign objects. Due to this runner block series having our strongest protective capability, its use is recommended for environments with many iron scraps around.

UZ series – end seal, stainless steel bottom seal, reinforcement plate and lubrication pad

The lubrication pad can provide highly rigid runner blocks with better lubrication and grease storage capabilities, and reduce re-greasing time.

SUE series – end seal, bottom seal and reinforcement plate

Our new design includes an in-built bottom seal. This strengthens the runner block's bottom dustproofing capability while its stainless steel reinforcement plate prevents hard and rigid objects from striking at the plastic cap from the end position. This is why its dustproofing effect is the strongest among all of our product series.

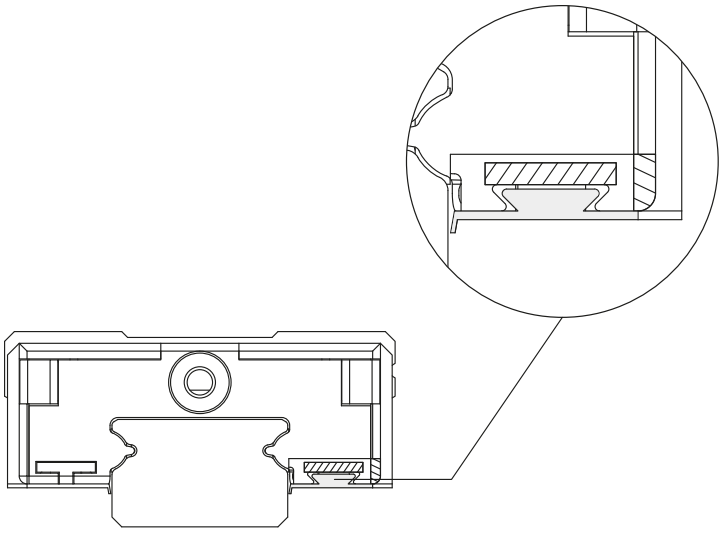


ZUE series – end seal, bottom seal, reinforcing plate and lubrication pad

The newly designed bottom seal protects lubrication grease from spilling below the runner block. with our built-in lubrication pad, an additional grease saving effect is attained, further prolonging prolonging our product's re-lubrication timeframe.

EMBEDDED INVERSE HOOK DESIGN FOR REINFORCED MECHANICAL INTEGRATION

When the runner block is in motion and changing direction, the circulating stainless steel balls inside the raceway generate impact force against the plastic end cap. As the demand for rapid motion in the automation industry has increased, cpc has invented inverse plastic hooks to tightly secure our miniature blocks by effectively distributing the applied stress over a larger area.

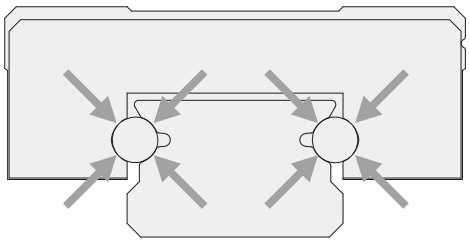


BRAND NEW DESIGN

Suitable for :
– High speed belt driven mechanisms
– High speed carrier designs Automation linkage between stations

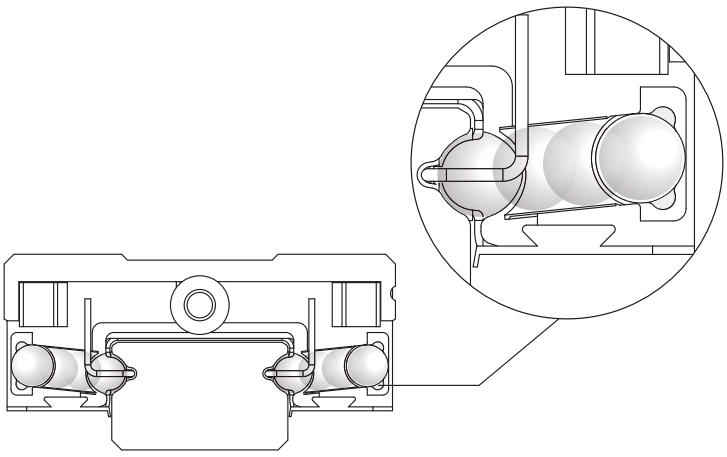
HIGH LOAD AND HIGH MOMENT CAPACITY

The MR Miniature Linear Guide Series is designed using two rows of recirculating balls. The design uses a Gothic profile with a 45º contact angle to achieve an equal load capacity in all directions. Within the restriction of limited space, larger stainless steel balls are used to enhance load and torsion resistance capacity.



DUST PROOF DESIGN

Our standard design comes equipped with an end seal that effectively restricts dust contamination and prolongs lubrication, ensuring longer product life. Our speciallydesigned low friction seal slips do not affect running smoothness.



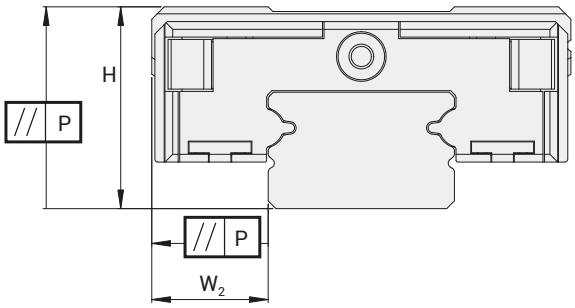
Technical information

PRECISION

MR miniature linear guide series have three accuracy classes (P,H,N) for your choice.

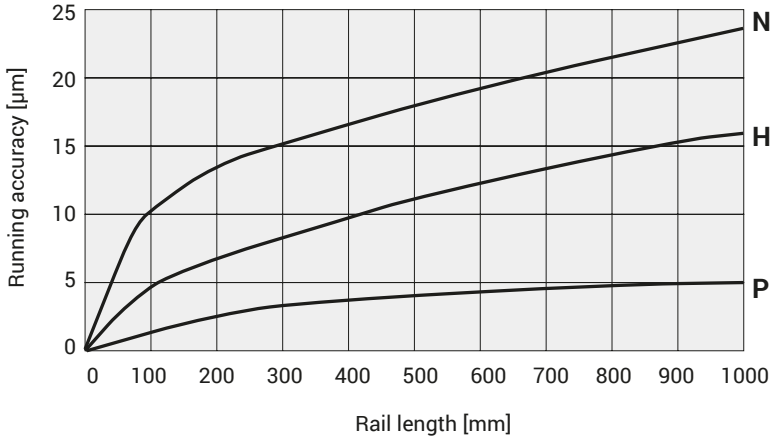
Preload type Z1 on stock (others on request).

Table of accuracy



Accuracy classes [µm]		Precision P	High H	Normal N
Admissible height H dimension tolerance	H	± 10	± 20	± 40
Height variation for different runner blocks on the same rail position	ΔH	7	15	25
Admissible width W dimension tolerance	W_2	± 15	± 25	± 40
Width variation for different runner blocks on the same rail position	ΔW_2	10	20	30

Linear block relative to linear rail, datum plane parallel motion precision



SPEED

The maximum speed for the standard MR-SS/ZZ,SU/ZU type is:
v_{max} = 3 m/s

Maximum acceleration:
a_{max} = 250 m/s²
(If preload is at V0, capability of reaching 40 m/s²)

The maximum speed for the standard MR-EE/EZ,EU/UZ,SUE/ZUE type is:
v_{max} > 5 m/s

Maximum acceleration:
a_{max} = 300 m/s²
(If preload is at V0, capable of reaching 60 m/s²)

PRELOAD

The MR Miniature Linear Guide series has three degrees of preload capacity: V0, VS and V1 (as described in the preload table below.)
Appropriate preload levels can enhance the stiffness, precision and torsion resistance performance of the linear guide. But an inappropriate application thereof can also negatively affect the product life and its motional resistance levels.

Standard preload type on stock (others on request).

Table preload

Preload type	Model code	Clearance [µm]					Application
		5	7	9	12	15	
Clearance	VO	0 ~ +3	0 ~ +4	0 ~ +4	0 ~ +5	0 ~ +6	Very smooth
Standard	VS	0 ~ +1	0 ~ +2	0 ~ +2	0 ~ +2	0 ~ +3	Smooth and high precision
Light preload	V1	-1 ~ 0	-3 ~ 0	-4 ~ 0	-5 ~ 0	-6 ~ 0	High rigidity Minimizes vibration High precision Load balance

OPERATING TEMPERATURE

The MR Miniature Linear Guide can operate in a range of temperatures from -40 ºC ~ + 80 ºC.
For short term operation, it can reach up to +100 ºC.

LUBRICATION

FUNCTION

When operating the linear guide under sufficient lubrication conditions, an one-micron layer of oil forms at the contact zone, separating the loaded rolling components and the raceway.
Sufficient lubrication will:

- Reduce friction
- Reduce wear
- Reduce corrosion
- Dissipate heat and increase service life

LUBRICATION CAUTION

- ZZ/ZU/EZ/UZ/ZUE Lubrication Storage block
  1. The block already contains lubricants which can be directly installed on the machine, without the need for additional washing.
  2. When first washing the blocks, please do not soak them in the lubricant before both the detergent and cleaning naphtha within are totally dry. The block is ready for installation only after the lubrication storage is full of the lubricant.
- The linear guide must be lubricated for protection before first time use. Contaminants of any kind, weather liquid or solid, should be avoided.
- The runner block should be moved back and forth during lubrication.
- The lubricant can be added either manually or automatically directly onto the rail raceway.
- The lubricant can be injected into the lubrication holes on either end of the runner block.
- A thin layer of observable lubricant should be maintained on the surface of the rail .
- Re-lubrication must be completed before contamination or discoloration of the lubricant occurs.
- Please notify us if product is intended for use in acidic, alkaline, or clean room applications.
- Please contact our technical department for lubrication assistance if the runner block is intended for use in a wall mount configuration.
- The re-lubrication interval must be shortened if the travel stroke is < 2 or > 15 times the length of the steel body of the runner block.

GREASE LUBRICATION

When grease lubrication is applied, we recommend synthetic oil-based lithium soap grease with a viscosity between ISO VG32-100.

OIL LUBRICATION

For oil lubrication, we recommend synthetic oils CLP, CGLP (based on DIN 51517) or HLP (based on DIN 51524) with a viscosity range of between ISO VG32-100 and a working temperature range between 0 ºC ~ + 70 ºC (we recommend ISO VG10 for use in lower temperature environments).

RE-LUBRICATION

– Re-lubrication shall be applied before the lubricant in the block is contaminated or changes color.

– The amount of the lubricant applied should be 1/2 of the first lubrication. When applying lubricant, this should be done until it seeps out from the device.

– Re-lubrication shall be applied under steady operating temperature, with the runner block moved back and forth throughout for optimum distribution.

– If the stroke is smaller than twice or greater than 15 times the steel body length of the block, the re-lubrication interval shall be shortened.

Table 1

Model code	First lubrication [cm^3]	Model code	First lubrication [cm^3]
5 MN	0,03	–	–
5 ML	0,04	–	–
7 MN	0,12	7 WN	0,19
7 ML	0,16	7 WL	0,23
9 MN	0,23	9 WN	0,30
9 ML	0,30	9 WL	0,38
12 MN	0,41	12 WN	0,52
12 ML	0,51	12 WL	0,66
15 MN	0,78	15 WN	0,87
15 ML	1,05	15 WL	1,11

RE-LUBRICATION INTERVAL

The re-lubrication interval depends on individual use, as the speed, load, stroke length and operating environment are all factors. Careful observation of rails and blocks is the basis to determine the optimal re-lubrication interval; as a rule of thumb, re-lubricate at least once per year. Do not apply water-based coolant liquid on the linear rails or slide. Inject lubricant through injection holes on both ends of the runner block.

FRICTION

The MR Miniature Linear Guide Series has low-friction characteristics with a stable and minor starting friction.

Friction

$F_m = \mu \times F$ _____ (1)

F Applied load [N]

F_m Friction [N]

The MR Miniature Linear Guide Series friction coefficient is app μ = 0,002 ~ 0,003

SEALING DESIGN

The MR Miniature Linear Guide Series are enclosed by end seals on both ends of the runner block. Optional side seals can also create an all-around sealing system.

Friction of end seal under lubrication

MR size	Friction of end seal according to the rail type [N]	
	M	W
5	0,08	–
7	0,10	0,4
9	0,10	0,8
12	0,40	1,0
15	1,00	1,0

FRICTION FACTORS

- Sealing system.
- Collision between the balls during operation.
- Collision between the balls and the return path.
- Number of balls in the gothic arch load zone.
- Resistance from lubricant to ball pressure.
- Resistance caused by contaminants.

LOAD CAPACITY AND RATING LIFE

STATIC LOAD RATING C_0

When the linear guide is subjected to the excessive load, the groove (track) surfaces and the steel balls can be permanently deformed. At this point the MR Miniature Linear Guide Series will no longer operate smoothly. The static load rating C_0 is defined as the static load which causes a permanent overall deformation of 0,0001 times of the steel ball diameter.

Static load safety factor calculation

$$S_0 = \frac{C_0}{P_0} \quad \text{(11)}$$

$$S_0 = \frac{M_0}{M} \quad \text{(12)}$$

$$P_0 = F_{max} \quad \text{(13)}$$

$$M_0 = M_{max} \quad \text{(14)}$$

Recommended static safety factors S_0

Operation condition	S_0
Normal operation	1 ~ 2
Load with vibration or impact	2 ~ 3
High accuracy and smooth running	≥ 3

S_0 Static load safety factor

C_0 Basic static load in acting direction [N]

P_0 Equivalent static load in acting direction [N]

M_0 Basic static moment in acting direction [Nm]

M Equivalent static moment in acting direction [Nm]

STATIC LOAD P_0 AND MOMENT M_0

The permissible static and applied static load of the MR Miniature Linear Guide Series is limited by:

- The static load of the linear guide.
- The permissible load of fixed screws.
- The permissible load for the connected parts of the mechanism.
- The static load safety factor required for the application.

The equivalent static load and static moment are the largest load and torque, please consult with formulas (13) and (14).

STATIC LOAD SAFETY FACTOR S_0

In order for the linear bearing to permanently withstand potential deformation while delivering a guaranteed accuracy and reliable motion, the static load safety factor S_0 should be calculated with formulas (11) and (12).

DYNAMIC LOAD RATING C_{100B}

For constant sized and directional loads, when the linear bearing is under such a load, the rating life of a linear guide can reach a theoretical travel distance of 100 km. (The above is according to ISO 14728-1)

Rating life calculation

$$C_{50B} = 1{,}26 \times C_{100B} \quad \text{(2)}$$

$$C_{100B} = 0{,}79 \times C_{50B} \quad \text{(3)}$$

$$L = \left(\frac{C_{100B}}{P}\right)^3 \times 10^5 \quad \text{(4)}$$

$$L_h = \frac{L}{2 \times s \times n \times 60} = \frac{L}{v_m \times 60} \quad \text{(5)}$$

L	Rating life [m]
L_h	Rating life in hours [h]
C_{100B}	Dynamic load rating [N]
P	Equivalent load [N]
s	Length of stroke [m]
n	Stroke repetition [min^{-1}]
v_m	Average speed [m/min]

RATING LIFE L

90 % survival rate for an individual linear guide or a batch of identical linear guides in standard product material and operation conditions is calculated as above (according to ISO 14728-1 standards).
When using the 50 km travel standard, the dynamic load rating will exceed the ISO 14728-1 standard value by 20 % or more. Formula (2) describes the relationship between the two load ratings.

CALCULATION OF RATING LIFE

Formulas (4) and (5) can be used when the equivalent dynamic load and the average speeds are constant.

EQUIVALENT DYNAMIC LOAD AND SPEED

If the load and speed are not constant, it is important to take into account the actual load and speed as both will influence life expectancy.

EQUIVALENT DYNAMIC LOAD

If there is a change in load only, the equivalent dynamic load can be calculated according to formula (6).

EQUIVALENT SPEED

If there is a change in speed only, the equivalent speed can be calculated according to formula (7).

CHANGES IN BOTH LOAD AND SPEED

If there are changes in both load and speed, the equivalent dynamic load can be calculated according to formula (8).

Equivalent load capacities and speed calculation

$$P = \sqrt[3]{\frac{q_1 \times F_1^3 + q_2 \times F_2^3 + \ldots + q_n \times F_n^3}{100}} \qquad \text{(6)}$$

$$v_m = \frac{q_1 \times v_1 + q_2 \times v_2 + \ldots + q_n \times v_n}{100} \qquad \text{(7)}$$

$$P = \sqrt[3]{\frac{q_1 \times v_1 \times F_1^3 + q_2 \times v_2 \times F_2^3 + \ldots + q_n \times v_n \times F_n^3}{100\ v_m}} \qquad \text{(8)}$$

$$P = |F_X| + |F_Y| \qquad \text{(9)}$$

$$P = |F| + |M| \times \frac{C_0}{M_0} \qquad \text{(10)}$$

P	Equivalent dynamic load [N]
q_i	Percentage of time [%]
F_i	Discrete load steps [N]
v_m	Average speed [m/min]
v_i	Discrete speed steps [m/min]
F	External dynamic load [N]
F_Y	External dynamic load, vertical [N]
F_X	External dynamic load, horizontal [N]
C_0	Static load rating [N]
M	Static moment [Nm]
M_0	Static moment in direction of action [Nm]

COMBINED EQUIVALENT DYNAMIC LOAD

If the linear guide bears the load from arbitrary angels so that the acting force does not conform to horizontal and vertical directions, its equivalent dynamic load is calculated as shown on formula (9).

UNDER THE CONDITION WITH THE MOMENT

If the linear guide bears the load and the moment simultaneously, its equivalent dynamic load is calculated with formula (10).
According to ISO 14728-1, when equivalent dynamic load tolerance rates below ≦ 0,5·C, a realiable product life value can be calculated.

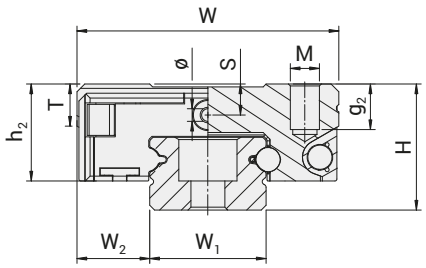
SINGLE BLOCK BEARING THE MOMENT

For a given structure, if the block needs to bear moments from Mp and My directions, the maximum moment that the block can withstand while still maintain smooth running conditions measures at about 0,1 ~ 0,3 times the static moment rating. The higher the preload, the higher the loading value and vice versa.

In the case of any design questions, please contact us.

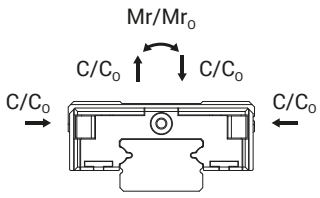
Dimensions and specifications

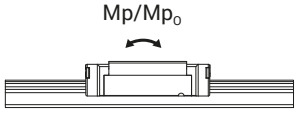
MR-M SERIES (standard type)

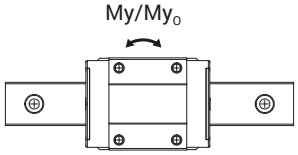


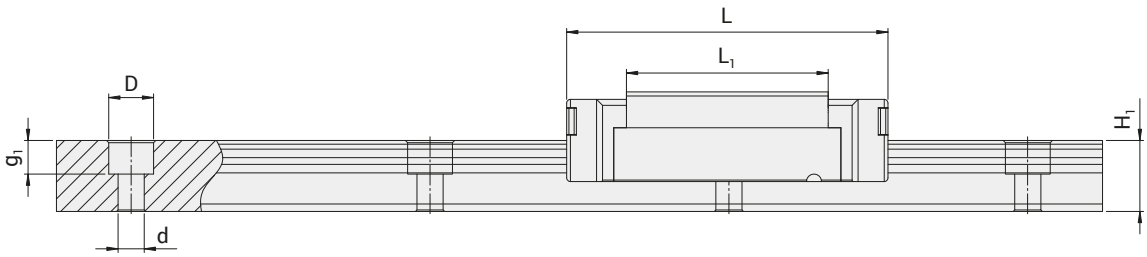
Model Code	Fabricate Dimensions		Rail Dimension [mm]				Block Dimension [mm]					
	H	W_2	W_1	H_1	P	D x d x g_1	W	L	L_1	h_2	P_1	P_2
MR 15ML	16	8,5	15	9,5	40	6 x 3,5 x 4,5	32	60,1	44,0	12,0	25	25
MR 15MN	16	8,5	15	9,5	40	6 x 3,5 x 4,5	32	43,1	27,0	12,0	20	25
MR 12ML	13	7,5	12	7,5	25	6 x 3,5 x 4,5	27	47,6	34,1	10,0	20	20
MR 12MN	13	7,5	12	7,5	25	6 x 3,5 x 4,5	27	35,4	22,0	10,0	15	20
MR 9ML	10	5,5	9	5,5	20	6 x 3,5 x 3,5	20	41,0	30,8	7,8	16	15
MR 9MN	10	5,5	9	5,5	20	6 x 3,5 x 3,5	20	30,8	20,5	7,8	10	15
MR 7ML	8	5,0	7	4,7	15	4,2 x 2,4 x 2,3	17	31,5	21,8	6,5	13	12
MR 7MN	8	5,0	7	4,7	15	4,2 x 2,4 x 2,3	17	24,0	14,3	6,5	8	12
MR 5ML	6	3,5	5	3,5	15	3,5 x 2,4 x 1,0	12	19,6	13,5	4,5	7	-
MR 5MN	6	3,5	5	3,5	15	3,5 x 2,4 x 1,0	12	16,0	10,0	4,5	-	8

Values of L, L_1, h_2 and ø are valid for SS/ZZ seal and lubrication types. For the case of other seal and lubrication type please contact us.



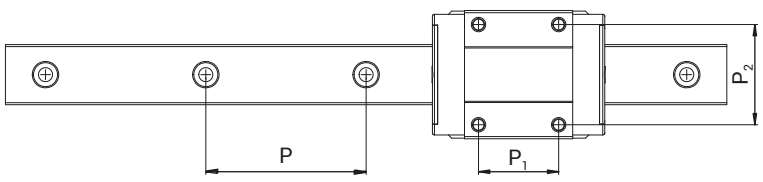




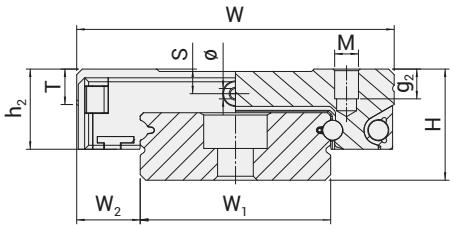


Model Code	Block Dimension [mm]				Load Capacities [N]		Static Moment [Nm]			Weight	
	M x g_2	ø	S	T	C_{100B} (dyn)	C_0 (stat)	Mr_0	Mp_0	My_0	Block [g]	Rail [g/m]
MR 15ML	M3 x 5,5	1,9	3,3	4,3	5350	9080	70,0	63,3	63,3	90	930
MR 15MN	M3 x 5,5	1,9	3,3	4,3	3810	5590	43,6	27,0	27,0	61	930
MR 12ML	M3 x 3,5	1,4	3,2	4,3	3240	5630	34,9	30,2	30,2	51	602
MR 12MN	M3 x 3,5	1,4	3,2	4,3	2308	3465	21,5	12,9	12,9	34	602
MR 9ML	M3 x 3,0	1,3	2,2	3,3	2135	3880	18,2	12,4	12,4	28	301
MR 9MN	M3 x 3,0	1,3	2,2	3,3	1570	2495	11,7	6,4	6,4	18	301
MR 7ML	M2 x 2,5	1,2	1,6	2,8	1310	2440	9,0	7,7	7,7	14	215
MR 7MN	M2 x 2,5	1,2	1,6	2,8	890	1440	5,2	3,3	3,3	8	215
MR 5ML	M2,6 x 2,0	0,7	1,3	2,0	470	900	2,4	2,1	2,1	4	116
MR 5MN	M2 x 1,5	0,7	1,3	2,0	335	550	1,7	1,0	1,0	3,5	116

Load capacities are calculated according to ISO 14728. To compare the rating life definition and the load capacities: C_{50B} = 1,26 x C_{100B}



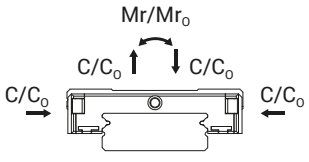
MR-W SERIES (wide type)

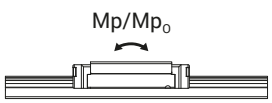


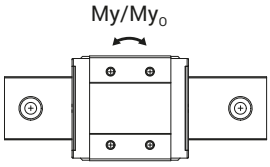
MR 7W-MR 12W

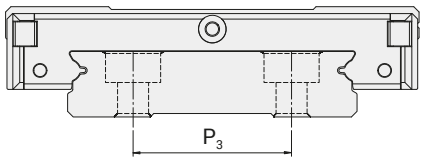
Model Code	Fabricate Dimensions		Rail Dimension [mm]					Block Dimension [mm]					
	H	W_2	W_1	H_1	P	P_3	D x d x g_1	W	L	L_1	h_2	P_1	P_2
MR 15WL	16,0	9,0	42	9,5	40	23	8 x 4,5 x 4,5	60	74,5	57,6	12,0	35	45
MR 15WN	16,0	9,0	42	9,5	40	23	8 x 4,5 x 4,5	60	55,8	38,5	12,0	20	45
MR 12WL	14,0	8,0	24	8,5	40	-	8 x 4,5 x 4,5	40	59,6	46,0	10,1	28	28
MR 12WN	14,0	8,0	24	8,5	40	-	8 x 4,5 x 4,5	40	44,5	31,1	10,1	15	28
MR 9WL	12,0	6,0	18	7,3	30	-	6 x 3,5 x 4,5	30	50,7	39,4	8,6	24	23
MR 9WN	12,0	6,0	18	7,3	30	-	6 x 3,5 x 4,5	30	39,1	27,9	8,6	12	21
MR 7WL	9,0	5,5	14	5,2	30	-	6 x 3,5 x 3,5	25	40,5	30,1	7,0	19	19
MR 7WN	9,0	5,5	14	5,2	30	-	6 x 3,5 x 3,5	25	31,8	21,2	7,0	10	19

Values of L, L_1, h_2 and ø are valid for SS/ZZ seal and lubrication types. For the case of other seal and lubrication type please contact us.

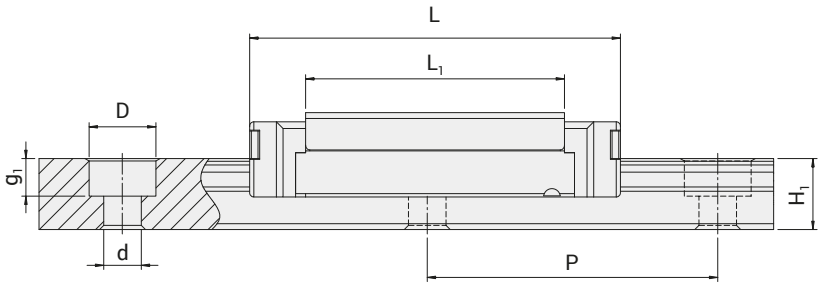






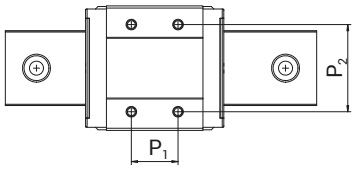


MR 15W



Model Code	Block Dimension [mm]				Load Capacities [N]		Static Moment [Nm]			Weight	
	M x g_2	ø	S	T	C_{100B} (dyn)	C_0 (stat)	Mr_0	Mp_0	My_0	Block [g]	Rail [g/m]
MR 15WL	M4 x 4,5	1,9	3,3	4,5	6725	12580	257,6	93,1	93,1	200	2818
MR 15WN	M4 x 4,5	1,9	3,3	4,5	5065	8385	171,1	45,7	45,7	137	2818
MR 12WL	M3 x 3,5	1,4	3,1	4,5	4070	7800	95,6	56,4	56,4	93	1472
MR 12WN	M3 x 3,5	1,4	3,1	4,5	3065	5200	63,7	26,3	26,3	65	1472
MR 9WL	M3 x 3	1,3	2,6	4,0	2550	4990	45,9	26,7	26,7	51	940
MR 9WN	M3 x 3	1,3	2,6	4,0	2030	3605	33,2	13,7	13,7	37	940
MR 7WL	M3 x 3	1,1	1,9	3,2	1570	3140	22,65	14,9	14,9	27	516
MR 7WN	M3 x 3	1,1	1,9	3,2	1180	2095	15,0	7,3	7,3	19	516

Load capacities are calculated according to ISO 14728. To compare the rating life definition and the load capacities: C_{50B} = 1,26 x C_{100B}



How to order

MR - 9 - M - L - SS - VS - N - 2 - 160 - 8 / G12

Miniature linear guide

Size:
· 5, 7, 9, 12, 15

Rail type:
· **M**: Standard type
· **W**: Wide type

Block type:
· **N**: Standard lenght
· **L**: Long

Seal and lubrication type:
· **SS**: With end seal
· **ZZ**: With end seal + lubrication storage

Preload:
· **VS**: Standard preload

Accuracy class:
· **N**: Normal

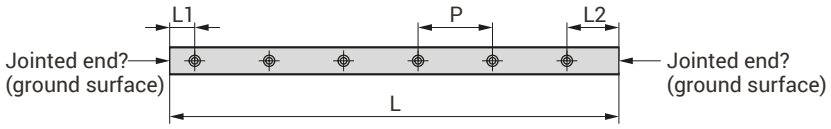
Number of blocks per rail:

Rail length L [mm]

Starting hole pitch L1 [mm]

End hole pitch L2 [mm]
End hole pitch L2 is calculated based on L, L1 and pitch P

Jointed end:
· **Leave blank**: Without jointed end
· **G**: Jointed end (ground surface)



LENGTH OF RAIL

Standard type

Unit: mm

Size	5M	7M	9M	12M	15M
Pitch	15	15	20	25	40
$L1, L2_{min}$	3	3	4	4	4
$L1, L2_{max}$	12	12	16	21	36
L_{max}	985	985	980	1475	960

Wide type

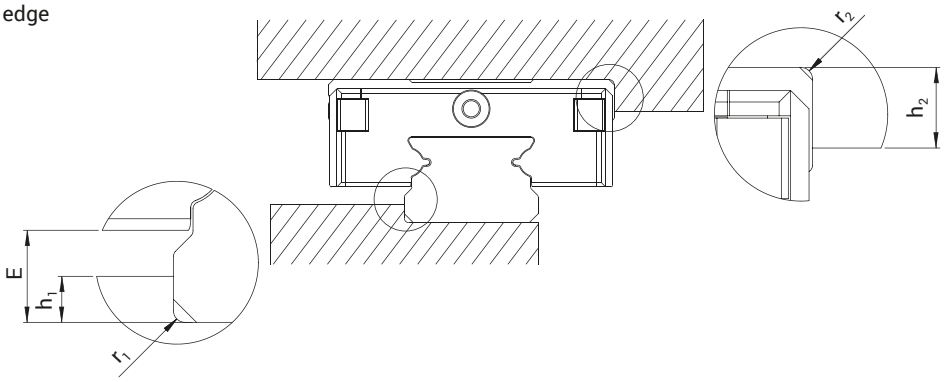
Unit: mm

Size	7W	9W	12W	15W
Pitch	30	30	40	40
$L1, L2_{min}$	4	4	5	5
$L1, L2_{max}$	26	26	35	35
L_{max}	970	970	960	960

Installation illustration

HEIGHT AND CHAMFER OF REFERENCE EDGE

To avoid interference, the corner of the reference edge should have a chamfer. If not, please refer to the following table for the height of the reference edge corner and the height of the reference edge.



Height and chamfer of the reference surface

Dimension	h_2	r_{2max}	r_{1max}	SS/ZZ		SU/ZU		EE/EZ		EU/UZ		SUE/ZUE	
				h_1	E	h_1	E	h_1	E	h_1	E	h_1	E
5M	1,9	0,3	0,2	1,2	1,5	0,9	1,2	0,8	1,1	-	-	0,7	1,0
7M	2,8	0,3	0,2	1,2	1,5	0,8	1,1	-	-	-	-	-	-
9M	3,0	0,3	0,2	1,8	2,2	1,3	1,7	1,3	1,7	1,0	1,4	1,1	1,5
12M	4,0	0,5	0,3	2,6	3,0	2,1	2,5	1,9	2,3	1,6	2,0	1,7	2,1
15M	4,5	0,5	0,3	3,6	4,0	2,7	3,1	2,8	3,2	2,5	2,9	2,4	2,9

Dimension	h_2	r_{2max}	r_{1max}	SS/ZZ		SU/ZU		EE/EZ		EU/UZ		SUE/ZUE	
				h_1	E	h_1	E	h_1	E	h_1	E	h_1	E
7W	2,8	0,3	0,2	1,7	2,0	1,3	1,6	1,2	1,5	-	-	1,1	1,4
9W	3,0	0,3	0,2	3,0	3,4	2,5	2,9	2,4	2,8	2,1	2,5	2,2	2,6
12W	4,0	0,5	0,3	3,5	3,9	2,9	3,3	2,9	3,3	2,4	2,8	2,4	2,8
15W	4,5	0,5	0,3	3,6	4,0	3,0	3,4	2,8	3,2	2,4	2,8	2,4	2,8

Screw tightening torque [Nm]

Screw grade 12.9 Alloy Steel Screw	Steel	Cast Iron	Non Iron Metal
M2	0,6	0,4	0,3
M2,5/M2,6	1,2	0,8	0,6
M3	1,8	1,3	1,0
M4	4,0	2,5	2,0

THE MOUNTING SURFACE

The mounting surface should be ground or fine milled to reach a surface roughness of Ra 1,6 μm.

ISO 3506-1 A2-70 Stainless Screw	Cast Iron
M1,6	0,15
M2	0,3
M2,5/M2,6	0,6
M3	1,1
M4	2,5

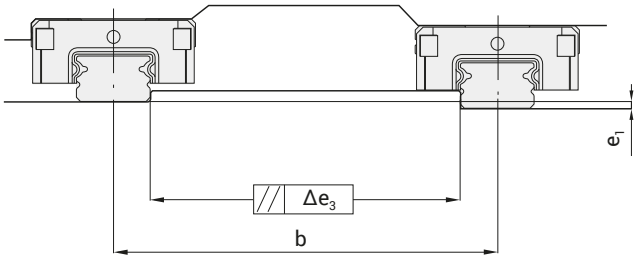
GEOMETRIC AND POSITIONAL ACCURACY OF THE MOUNTING SURFACE

Inaccurate mounting surfaces will affect the operational accuracy of the linear guide when the mounting surface height differential is greater than the values calculated by formulas (15), (16) and (17). The rating lifetime will also be shortened.

e_1 [mm] = b [mm] x f_1 x 10^{-4} _____ (15)

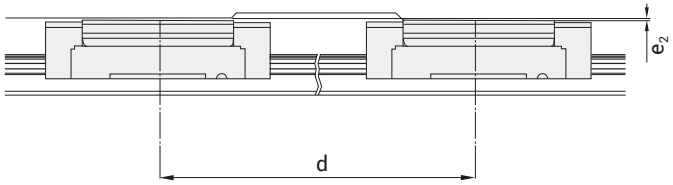
e_2 [mm] = d [mm] x f_2 x 10^{-5} _____ (16)

e_3 [mm] = f_3 x 10^{-3} _____ (17)



REFERENCE EDGE

Rail: Both sides of the track rail can serve as the reference edge without any special marking.
Block: Reference edge is opposite to the groove marking side.

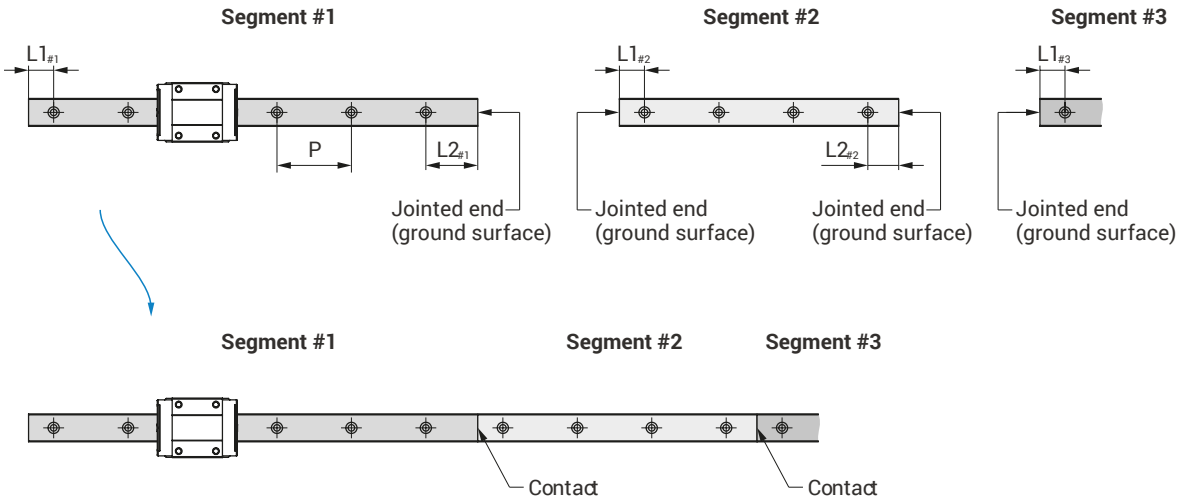


Dimension	VO/VS			V1		
	f_1	f_2	f_3	f_1	f_2	f_3
5MN	4	8	2	2	8	2
7MN	5	11	4	3	10	3
9MN	5	11	6	4	10	4
12MN	6	13	8	4	12	6
15MN	7	11	12	5	10	8
5ML	3	5	2	2	5	1
7ML	4	6	4	3	6	3
9ML	5	7	5	3	7	4
12ML	5	8	8	3	7	5
15ML	7	8	11	4	8	7

Dimension	VO/VS			V1		
	f_1	f_2	f_3	f_1	f_2	f_3
7WN	2	6	4	2	4	3
9WN	2	7	6	2	5	4
12WN	3	8	8	2	5	5
15WN	2	9	11	1	6	7
7WL	2	4	4	1	3	3
9WL	2	5	5	2	3	3
12WL	2	5	7	2	3	5
15WL	2	5	10	1	4	7

JOINTED RAIL

Rails can be assembled by several segments to achieve the desired length. Jointed rails must be assembled correctly, where the contact of ground ends of both jointed rail segments is ensured. In the case of ordering jointed rails each rail segment must be ordered separately, where the jointed segment's end must be clearly specified, please see the following figure and the ordering code.



P	Pitch	[mm]
L1	Starting hole pitch	[mm]
L2	End hole pitch	[mm]

NOTES

NOTES

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