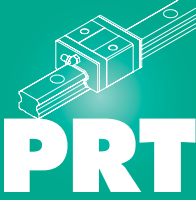
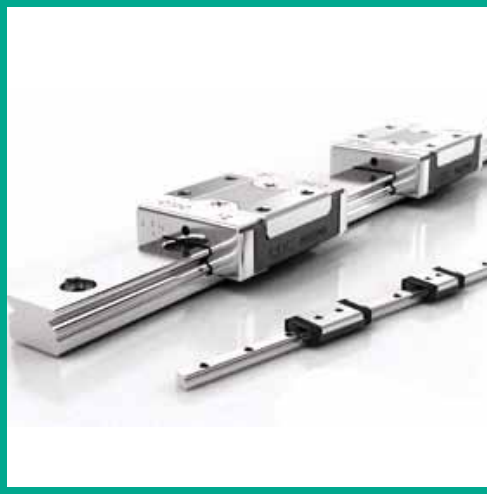


PRT

cpc CHIEFTEK PRECISION CO., LTD.

Miniature Ball Type Linear Guide



PBC LINEAR™

A PACIFIC BEARING CO.

Company Profile

Chieftek Precision has invested enormous resources into the research and development of high performance linear motion products.

cpc miniature linear guide was developed in 2000 as a key component for precision measurement and inspection instruments.

Recently, the semiconductor equipment, electronic and peripheral industries are rising. Product miniaturization with high functionality has become a necessary requirement for these key components.

The **cpc** linear guide is extensively applied the machinery in today's modern technology, such as semiconductor equipment, small machinery, Robotics, fixtures, tools, consumer OA product, and high price computer peripheral equipment fields.

cpc is staffed by talented and experienced professionals. Our longterm goal is to become the market leader in linear motion components.

1998	Establishment
2000	Official production of miniature linear guide
2004	Production of miniature linear guide size MR3M
2005	Establishment of workshop in Tainan Science Park
2007	Production of AR/HR linear guide certified by ISO 9001:2000
2008	Established cpc USA Established cpc KUNSHAN IN CHINA Publication of LM-PC linear motor

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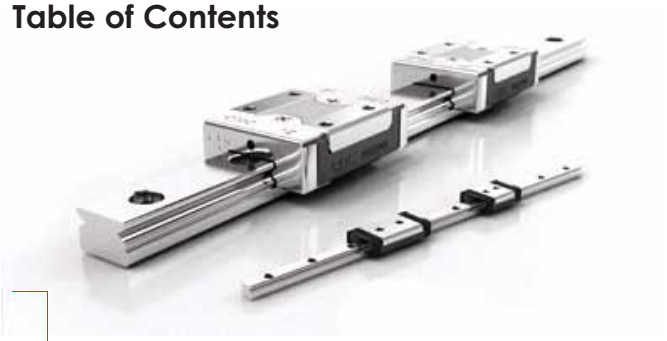


MR Miniature Linear Guide Series

1.1 Product Information

- **Embedded inverse hook design**

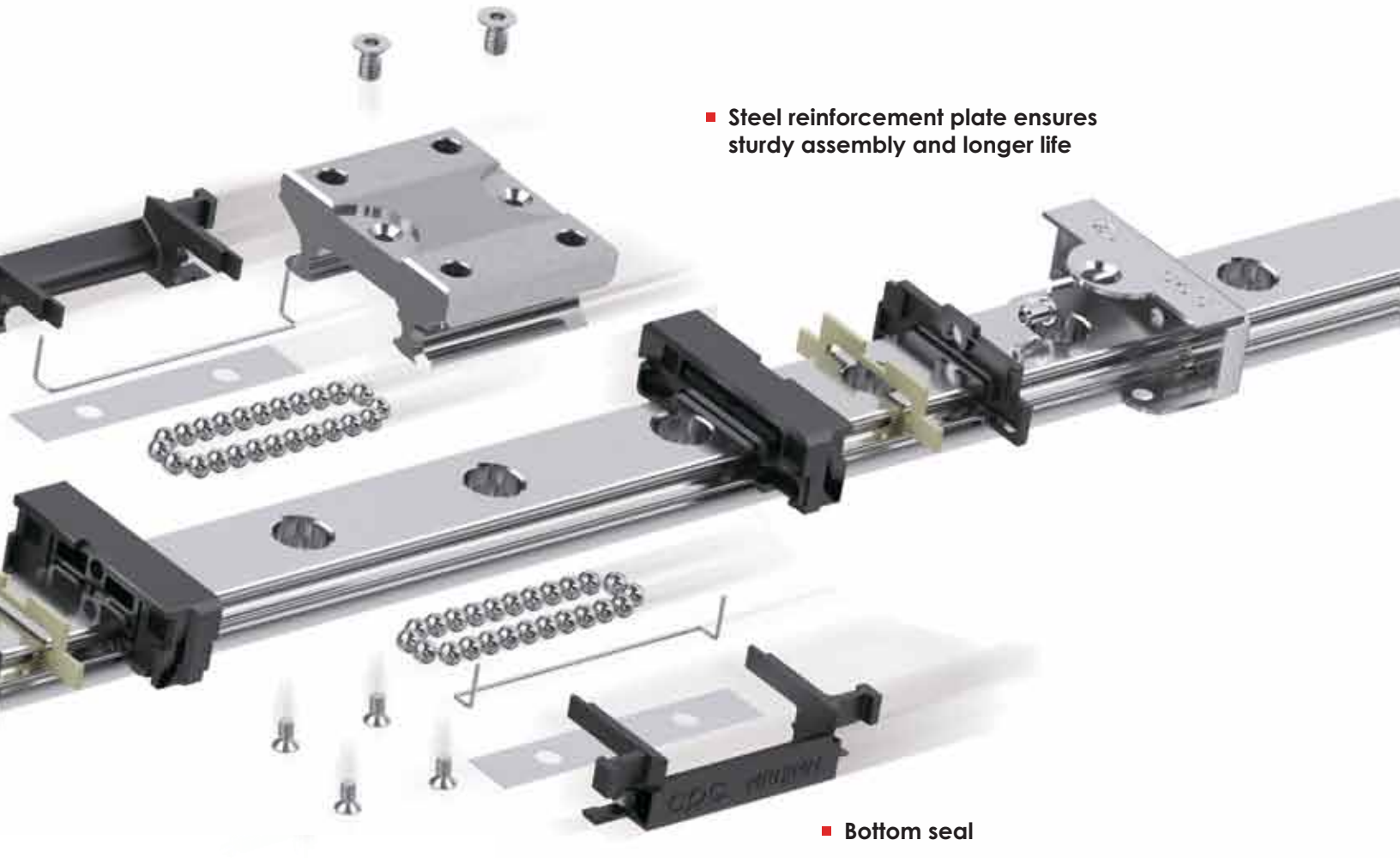
- **Designed for high load, high moment**

- **Precision**

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

- **Unique ball re-circulation design**

- **Steel reinforcement plate ensures sturdy assembly and longer life**



- **Bottom seal**

  Protects runner block from outside contaminants, facilitating dust-proof operation.

- **Lubrication storage design: Ecology System**

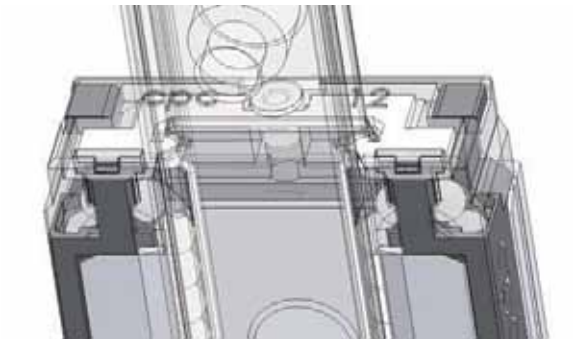
- **Material**

  Regardless of series, MR miniature linear guides use stainless steel processed material.

1.2 New Design

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 a new design to improve the high speed running capability. Plastic inverse hooks for miniature linear blocks tightly secure block components to handle the impact force effectively by distributing the applied stress over a larger area.

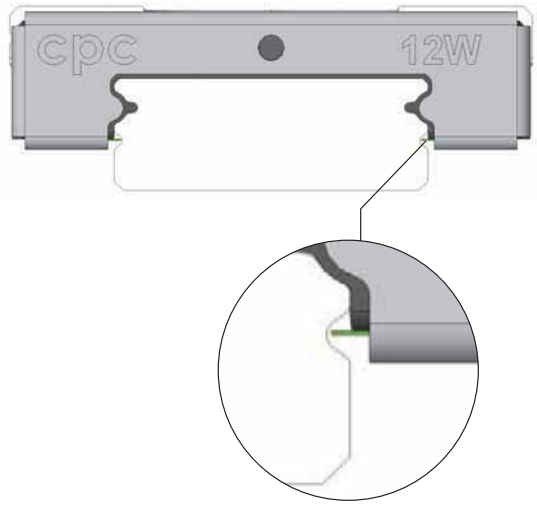


Brand new design

Suitable for :
High speed belt driven mechanism
High speed carrier design
Automation linkage between stations

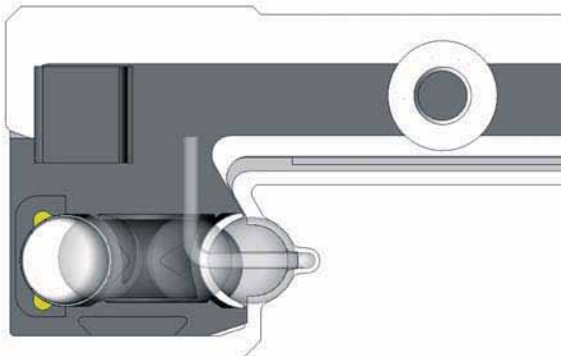
Bottom Seal MR..EU/UZ series (9M/W, 12M/W, 15M/W)

The MR series features a new stainless steel bottom seal that maintains a minimum gap. It effectively stops particle ingress between block and rail surface. The bottom seal can increase block longevity without compromising running smoothness.



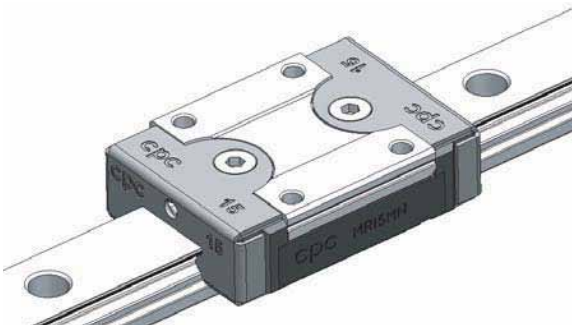
Unique ball re-circulation design

The stainless steel ball re-circulation hole and channel construct are fully sealed by plastic end caps.
This simple structure substantially reduces stainless steel ball and metal surface contact; reducing noise for enhanced performance. Also, an internal lubrication oil storage packet extends life and reduces preventative maintenance.



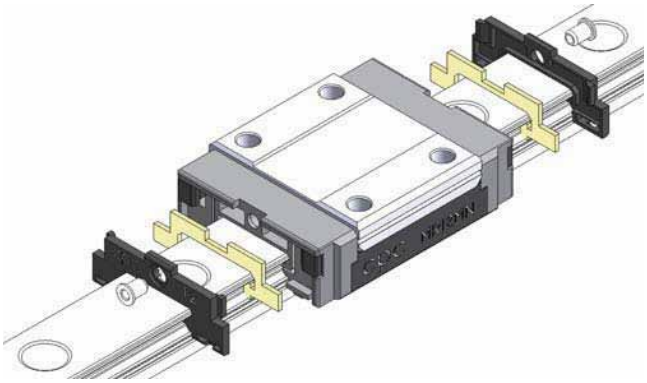
MR..EE series stainless steel reinforced plates ensure high robustness

Runner blocks equipped with two stainless steel plates which re-inforces the end-cap from end to end. This supports higher running speeds because of the sturdier design. The plates can also function as scrapers to facilitate smooth travel.



Lubrication storage pad system

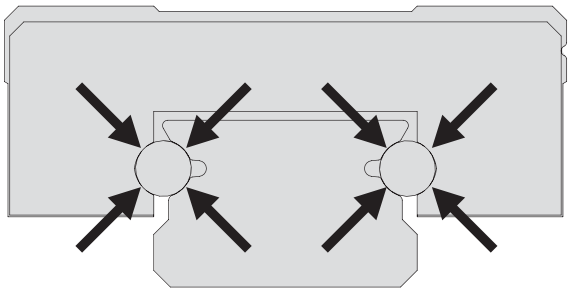
Lubricant injection holes are featured at both ends of the runner block. Via ball circulating movement, stainless steel balls carry lubrication oil to the raceway, thus efficiently lubricating the balls and the oil raceway, achieving long term, maintenance-free linear motion. The design also provides superb lubricating ability for short stroke movement.
A newly invented embedded lubrication pad design supports optional machine design selection. (3M/W,5M/W,7M/W,9M/W,12M/W,15M/W)

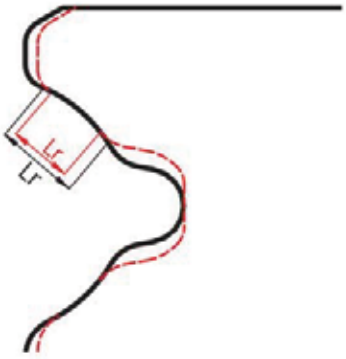


1.2 New Design - continued

High load and high moment capacity

MR Miniature Linear Guide series incorporates the design of two rows of ball re-circulation, (Gothic profile design with 45° contact angle to attain the effect of equal load capacity in all directions.) Under the restriction of limited space, larger stainless steel balls are used to enhance the load and torsion resistance capcity.

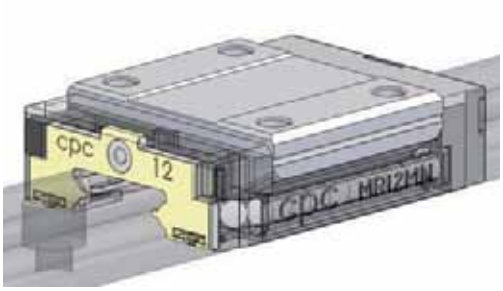




Under the same width of rail, **cpc** linear guides (shown as black full line) have larger contact surface compared to competitors (shown as red dot line).

Dust Proof Design

The standard equipped end seal design effectively restricts dust contamination and prolongs lubrication - ensuring longer product life. Specially designed low friction seal lips do not effect running smoothness



2. Technical Information

2.1 Precision

Accuracy

MR Miniature Linear Guide series have three accuracy grades P,H,N for your choice.

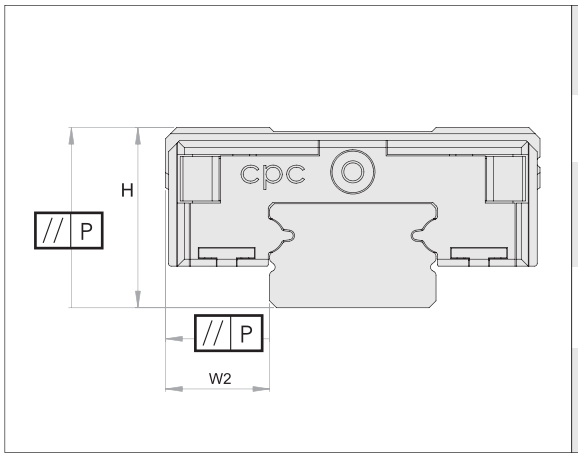


Table of accuracy

Accuracy classes (μm)		Precision P	High H	Normal N
Tolerance of dimension height H	H	±10	±20	±40
Variation of height for different runner Block on the same position of Rail	△H	7	15	25
Tolerance of dimension width W	W_2	±15	±25	±40
Variation of width for different runner Block on same position of Rail	△W_2	10	20	30

Note: PBC Linear offers a FREE upgrade program!1
In order to provide the best possible customer service and quickest delivery, PBC Linear will upgrade, free of charge, an ordered product if the requested product is not in stock and a higher level option is available in stock.

Design Tip:
When specifying this product into a design, include both the desired Accuracy specification as well as the higher specifications. The little bit of extra work now will allow for your company's buyers to take advantage of this free program without having to get permission from Engineering.

Speed

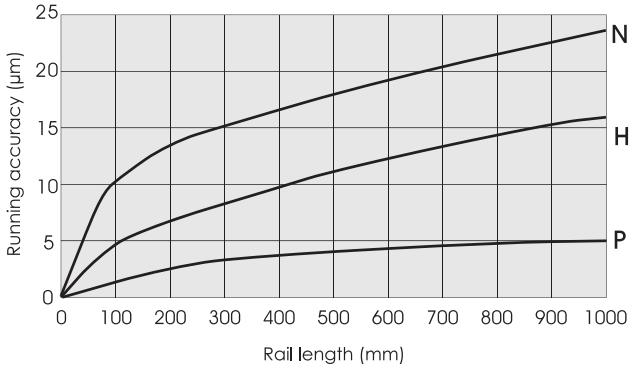
The maximum speed for the standard MR-SS/ZZ type is :
Vmax = 3 m/s

Maximum acceleration
αmax = 250 m/s²
(If preload V0, capable to reach 40m/s²)

The maximum speed for the standard MR-EE/EZ/EU/UZ type is **Vmax > 5 m/s**

Maximum acceleration **αmax = 300 m/s²**
(If preload V0, capable to reach 60m/s²)

Accuracy of the running parallelism



1. Full rules and details of upgrade program can be found at www.pbclinear.com. Details are subject to change with or without notice. Upgrades are offered at the sole discretion of PBC. Not all orders will qualify for upgrade. The program may be canceled or suspended at any time.

2.2 Preload

The MR Miniature Linear Guide series have three degrees of preload: V0, VS and V1 (as described in the table of preload below.) Preload can enhance stiffness, precision, and torsion resistance, but will negatively affect life and friction.

Table of Preload

Preload type	Model code	Clearance (μm)						Application
		3	5	7	9	12	15	
Clearance	V0	+3 – 0	+3 – 0	+4 – 0	+4 – 0	+5 – 0	+6 – 0	Very smooth
Standard	VS	+1 – 0	+1 – 0	+2 – 0	+2 – 0	+2 – 0	+3 – 0	Smooth and precision
Light preload	V1	0 – - 0.5	0 – -1	0 – - 3	0 – - 4	0 – - 5	0 – - 6	High rigidity Minimize vibration High precision Load balance

NOTE: VO & VS are most common. Contact CPC or PBC Linear engineers for help specifying correct preload.

Operation Temperature

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

2.3 Lubrication

Function

The loaded rolling elements and the raceway will be separated at the contact zone by a thin layer of oil. The lubrication will therefore:

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

Lubrication Caution

- The linear guide must be lubricated for protection before first time use, and avoid pollution of any kind.
- The runner block should be moved back and forth during lubrication.
- Generally, the lubricant is added onto rail raceway.
- The lubricant can be injected into the lubrication holes on either end of the runner block.
- A thin layer of lubricant should be maintained on the surface of the rail raceway.
- Re-lubricate before contamination or discoloration of the lubricant occurs.
- Please notify when used in acidic, alkaline or clean room application.
- Contact our technical department for lubrication assistance if the runner block is used 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 used we recommend synthetic oil based lithium-soap grease with a viscosity between ISO VG32-100

Oil lubrication

We recommend the synthetic oil CLP or CGLP based on DIN 51517 or HLP based on DIN 51524 and the viscosity ranges between ISO VG32-100 by the working temperature between 0°C~+70°C are recommended (We recommend ISO VG10 for use in lower temperature environment).

2.3 Lubrication - continued

Re-lubrication

- Re-lubrication shall be applied before the lubricant in the block is contaminated or changes color.
- The amount of the lubricant should be 1/2 of the first lubrication.
- Re-lubrication shall be applied under operating temperature with the runner block moved back and forth.
- If the stroke is smaller than twice or greater than 15 times of the steel body length of the block, the re-lubrication interval shall be shortened.

Table 1

Model code	First lubrication (cm3)	Model code	First lubrication (cm3)
5 MN	0.03	5 WN	0.04
5 ML	0.04	5 WL	0.05
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 speed, load, stroke length and operating environment affect the re-lubrication interval. A safe re-lubrication interval can only be obtained by practical observation; however the re-lubrication interval shall not exceed one year.
Lubrication can be applied through the injection hole on both ends of the runner block by using a special injector offered by cpc.

Lubrication grease

00 for general application
01 for low friction low noise application
02 for clean room application
03 for clean room and vacuum application
04 for high speed application
05 for micro oscillation application

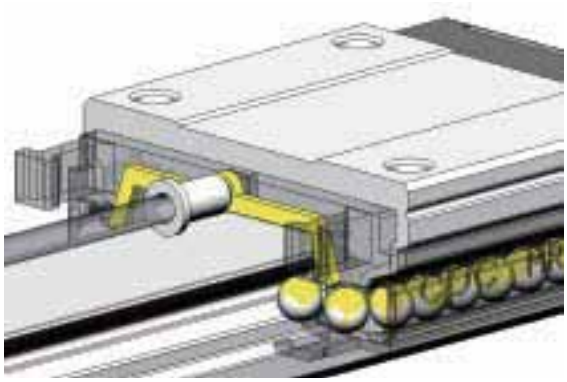
Lubrication oil

11 for general application ISO V32-68

Ordering of the lubrication injector

LUB — 01 — 18G

Lubricant :	Needle model :
00	21G: 5M/5W
01	20G: 7M
02	19G: 7W
03	18G: 9M/9W
04	18G: 12M/12W
05	15G: 15M/15W
11	



Lubricant amount: 10ml

2.4 Friction

Friction

The MR Miniature Linear Guide series has low friction characteristics, with a stable and minor starting friction

Sealing Design

The MR Miniature Linear Guide series are sealed by the end seals on both ends of the runner block. Optional side seals build an all-around closed sealing system.

Friction

$F_{rn} = \mu \cdot F$ ——(1)

F Load (N)

F_{rn} Friction (N)

MR Miniature Linear Guide series friction factor is $\mu = 0.002 \sim 0.003$ approximately

Friction with End Seal under lubrication

MR size	Friction with End Seal (Nmax) (under lubrication)	
	M	W
2	0.08	0.2
3	0.08	0.2
5	0.08	0.2
7	0.1	0.4
9	0.1	0.8
12	0.4	1.0
15	1.0	1.0

Factors of friction

- 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 churning of the lubricant in the runner block.
- Contaminants.

2.5 Load capacity and rating life

Static load rating C_0

The static load traveling along the acting direction; under this load, the maximum calculated stress at the rolling elements and the raceway by a curvature radius ≦ 0.52 is 4200 MP a and by a curvature radius ≦ 0.6 is 4600 MP a.

Note: at this contact point under such stress, a permanent total deformation is generated corresponding to about 0.0001 times the rolling element diameter.
(The above is according to ISO 14728-2)

Static load P_0 and moment M_0

Permissible static load and applying static load of the MR Miniature Linear Guide is limited as follows:

- Static load of the linear guide.
- Permissible load of fixing screws.
- The permissible load of the related 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 moment, referred to formulas (13) and (14).

Static load safety factor S_0

Under the static load safety factor, the linear guide system demonstrates a reliable operation and running accuracy as required in application. The static load safety factor S_0 is calculated by the formulas (11) and (12).

S_0	static load safety factor
C_0	basic static load in action direction N
P_0	equivalent static load in action direction N
M_0	basic static moment in action direction Nm
M	equivalent static moment in action direction Nm

Static load safty factor calculation

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

$$S_0 = M_0 / M \quad \text{——(12)}$$

$$P_0 = F_{max} \quad \text{——(13)}$$

$$M_0 = M_{max} \quad \text{——(14)}$$

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

2.5 Load capacity and rating life - continued

Dynamic load rating C

When the dynamic loads are applied normal to the load zones with constant magnitude and direction, theoretically; the rating life of linear guide can reach 100km of travel distance. (The above is according to ISO 14728-1).

Rating Life L

An individual Linear Guide or a batch of identical Linear Guide under the same running conditions, using common materials with normal manufacturing quality and operating conditions can reach a 90% survival rate at the calculated life. (The above is according to ISO 14728-1) When the standard of 50km travel distance is used, the dynamic load rating will exceed the value based on the standard ISO 14728-1 by 20% or more. The relationship between two load ratings is based on formula (2).

Calculation of rating life

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

Rating life calculation

$$C_{50B} = 1.26 \cdot C_{100B} \quad \text{——(2)}$$

$$C_{100B} = 0.79 \cdot C_{50B} \quad \text{——(3)}$$

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

$$L_h = \frac{L}{2 \cdot s \cdot n \cdot 60} = \frac{L}{v_m} \cdot \left(\frac{C_{100B}}{P}\right)^3 \quad \text{——(5)}$$

L	=	Rating life for travel distance 100,000 meter	(m)
L_h	=	Rating life in hour	(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)

Equivalent dynamic load and speed

If the load and speed are not constant, each actual load and speed must be taken into account and both will influence the life.

Equivalent dynamic load

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

Combined dynamic load

If the Linear Guide takes on load from an arbitrary angle, its equivalent dynamic load rating is calculated using formula (9).

Equivalent speed

If there is a change in speed only, the equivalent speed can be calculated using formula (7).
If there are changes in both of the load and speed, the equivalent dynamic load can be calculated using formula (8).

Combined load in combination with a moment

If both load and moment act on the Linear Guide, the equivalent dynamic load can be calculated by the formula (10).
According to ISO 14728-1, the equivalent load (P) shall not exceed 1/2C.

Equivalent load capacities and speed calculation

$$P = \sqrt[3]{\frac{q_1 \cdot F_1^{\,3} + q_2 \cdot F_2^{\,3} + \cdots + q_n \cdot F_n^{\,3}}{100}} \quad \text{——(6)}$$

$$\overline{v} = \frac{q_1 \cdot v_1 + q_2 \cdot v_2 + \cdots + q_n \cdot v_n}{100} \quad \text{——(7)}$$

$$P = \sqrt[3]{\frac{q_1 \cdot v_1 \cdot F_1^{\,3} + q_2 \cdot v_2 \cdot F_2^{\,3} + \cdots + q_n \cdot v_n \cdot F_n^{\,3}}{100\ \overline{v}}} \quad \text{——(8)}$$

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

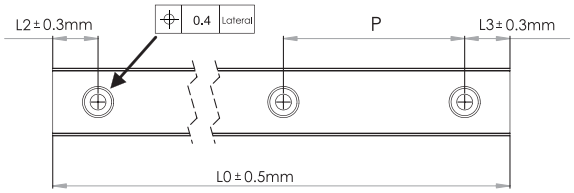
$$P = |F| + |M| \cdot \frac{C_0}{M_0} \quad \text{——(10)}$$

P	=	Equivalent dynamic load	(N)
q	=	Percentage of stroke	(%)
F_1	=	Discrete load steps	(N)
$\overline{v}$	=	Average speed	(m/min)
v	=	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

3. Order Information

Length of Rail

Butt-joining is required when lenths exceed Lmax. (For detailed information please contact PBC Linear or cpc technical support)



Model Code

MR	U	15	M	N	EE	2	V1	P	-310L	-15	-15	II	J

- J — Customization code
- II — Number of Rail on the same moving axis
- -15 — End hole pitch (mm)
- -15 — Starting hole pitch (mm)
- -310L — Rail length (mm)
- P — Accuracy classes : P(Precision) 、H(High) 、N(Normal)
- V1 — Preload classes : V0 : Clearance VS : Standard V1 : Light Preload
- 2 — Block quantity : Quantity of the runner Block
- EE — Seals type SS : With End Seal
  EE : With End Seal plus Reinforcement Plate(available for size 2WL , 5M , 7W , 9M/W,12M/W, 15M/W)
  ZZ : With End Seal plus Lubrication Storage - PBC Recommended (available for size 2WL , 3M/W , 5M/W , 7 M/W, 9M/W, 12M/W, 15M/W)
  EZ : With End Seal plus Lubrication Storage plus Reinforcement Plate - PBC Recommended (available for size 2WL , 5M , 7W , 9M/W, 12M/W, 15M/W)
  EU: With end seal + Reinforcement + Bottom End seal
  UZ: With end seal + Reinforcement + Bottom End seal + Lubrication Storage
- N — Block type : L : Long N : Standard
- M — Rail type : M : Standard W : Wide
- 15 — Rail dimension : The width of Rail ex. : 2、3、5、7、9、12、15
- U — Special Rail U : Tapped from bottom No Mark : Standard Rail
- MR — Product Type: MR: Miniature Linear Guide

Standard type

size	3M	5M	7M	9M	12M	15M
Standard lenght of one Rail (mm)	30	40	40	55	70	70
	40	55	55	75	95	110
	50	70	70	95	120	150
		85	85	115	145	190
		100	100	135	170	230
			130	155	195	270
				175	220	310
				195	245	350
				275	270	390
				375	320	430
					370	470
					470	550
					570	670
						870
Pitch (mm)	10	15	15	20	25	40
L2 , L3min	3	3	3	4	4	4
L2 , L3max	5	10	10	20	20	35
Lmax	300	1000	1000	1000	1000	1000

Wide type

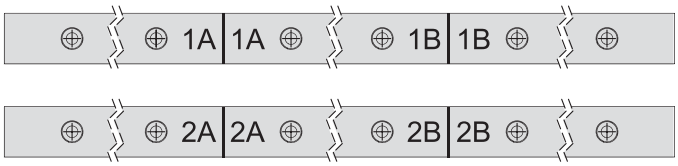
size	2W	3W	5W	7W	9W	12W	15W
Standard lenght of one Rail (mm)	30	40	50	50	50	70	110
	40	55	70	80	80	110	150
	50	70	90	110	110	150	190
			110	140	140	190	230
			130	170	170	230	270
			150	200	200	270	310
			170	260	260	310	430
				290	290	390	550
					320	470	670
						550	790
Pitch (mm)	10	15	20	30	30	40	40
L2 , L3min	3	3	4	3	4	4	4
L2 , L3max	5	10	15	25	25	35	35
Lmax	300	1000	1000	1000	1000	1000	1000

Customization Requirement

The meaning of suffix characters:

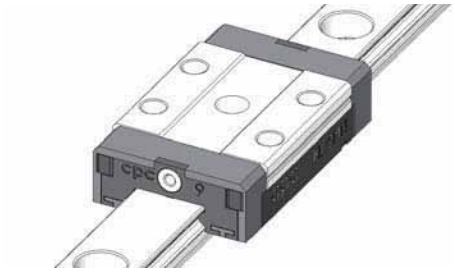
J : Butt-jointing track Rail
G : Customer designate lubricant
I : Inspection report
C3 : Cap M3
C4 : Cap M4

R : Special process for Rail
B : Special process for Block
S : Special straightness for Rail



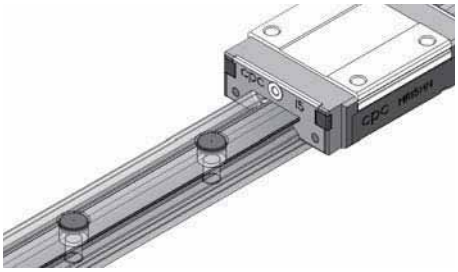
J : Butt-Jointing track Rail

When the length of customer's rail exceeds the maximum length, a butt-joint can be specified. The rail butt-joint indication is marked as illustrated above.



B : Special process for Block

For special process requirement please contact technical service.



C3 CapM3 :

Apply to MR9M. MR12M. MR15M. MR7W & MR9W Rail

C4 CapM4 :

Apply to MR12W . MR15W Rail

R : Special process for Rail

For special process requirement please contact technical service.

S : Special straightness for Rail

The linear guide rail straightness has been specially calibrated by precision fine grinding.

G : Customer designate lubricant

According to application environment.

GN : No lubricant

GC : **low dust generation, suitable for clean room environment**

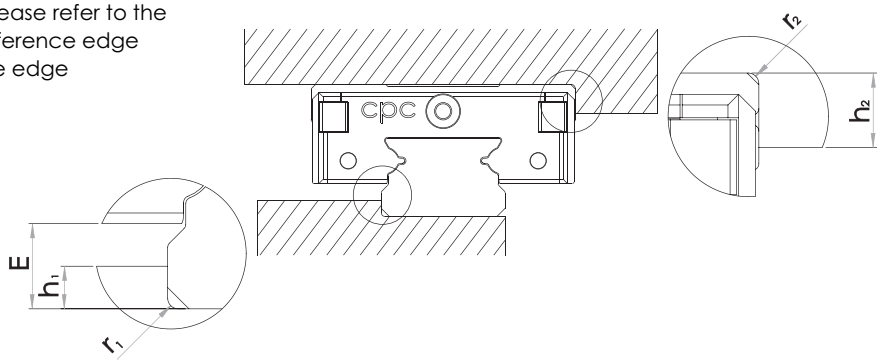
I : Inspection report

Please contact technical department.

4. Installation Illustration

Height and chamfer of reference edge

To avoid any 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 reference surface

Dimension	h_1	r_{1max}	h_2	r_{2max}	E
3M SS	0.5	0.2	1.5	0.3	1
5M SS	1.2	0.2	1.9	0.3	1.5
7M SS/ZZ	1.2	0.3	2.8	0.3	1.5
9M SS/ZZ	1.5	0.3	3	0.3	2.2
12M SS/ZZ	2.5	0.5	4	0.5	3
15M SS/ZZ	2.5	0.5	4.5	0.5	4
5M EE/EZ	0.6	0.2	1.9	0.3	1.1
9M EE/EZ	1.2	0.3	3	0.3	1.7
12M EE/EZ	1.5	0.5	4	0.5	2.3
15M EE/EZ	2.5	0.5	4.5	0.5	3.2
9M EU/UZ	1	0.3	3	0.3	1.4
12M EU/UZ	1.5	0.5	4	0.5	2
15M EU/UZ	2	0.5	4.5	0.5	2.9

Dimension	h_1	r_{1max}	h_2	r_{2max}	E
2WL SS/ZZ	0.5	0.2	1.7	0.3	1
3W SS	0.7	0.2	1.7	0.3	1
5W SS	1	0.2	2	0.3	1.5
7W SS/ZZ	1.5	0.3	2.8	0.3	2
9W SS/ZZ	2.5	0.3	3	0.3	3.4
12W SS/ZZ	2.5	0.5	4	0.5	3.9
15W SS/ZZ	2.5	0.5	4.5	0.5	4
2WL EE/EZ	0.4	0.2	1.5	0.3	0.7
7W EE/EZ	1	0.3	2.8	0.3	1.5
9W EE/EZ	2	0.3	3	0.3	2.8
12W EE/EZ	2.5	0.5	4	0.5	3.3
15W EE/EZ	2.5	0.5	4.5	0.5	3.2
9W EU/UZ	1.5	0.3	3	0.3	2.5
12W EU/UZ	2	0.5	4	0.5	3
15W EU/UZ	2	0.5	4.5	0.5	2.9

The mounting surface

Surface roughness
The mounting surface should be ground or fine milled to reach a surface roughness Ra1.6.

Surface roughness
The mounting surface should be ground or fine milled to reach a srface roughness Ra1.6 μm.

Screw tightening torque (Nm)

Screw grade 12.9	Steel	Cast Iron	Non Iron Metal
M2	0.6	0.4	0.3
M3	1.8	1.3	1
M4	4	2.5	2

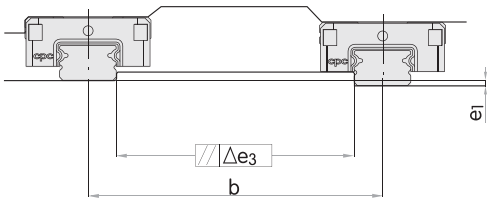
Geometric and positional accuracy of the mounting surface

Inaccurate mounting surfaces will affect the linear guide operation accuracy, when mounting surface height differential is greater than the calculation result (Calculate by formulas (15),(16) and (17). Rating life will be shortened.

$e1\ (mm) = b\ (mm) \cdot f1 \cdot 10^{-4}$ —— (15)

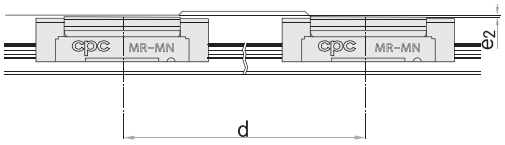
$e2\ (mm) = d\ (mm) \cdot f2 \cdot 10^{-5}$ —— (16)

$e3\ (mm) = f3 \cdot 10^{-3}$ —— (17)



Reference edge

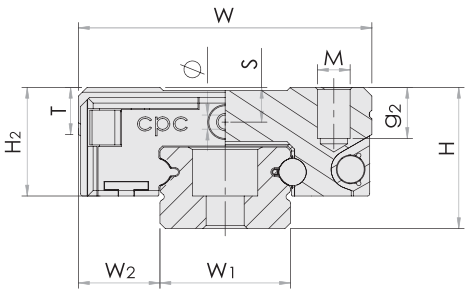
Rail: Both sides of the track rail can be the reference edge without any special marking.
Block: Reference edge is opposite to the groove marking side.



Dimension	V0/VS			V1		
	f1	f2	f3	f1	f2	f3
3MN	4	9	2	3	9	1
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
3ML	4	5	2	3	5	1
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	V0/VS			V1		
	f1	f2	f3	f1	f2	f3
2WL	4	5	2	3	5	1
3WN	2	5	2	4	3	1
5WN	2	5	2	1	3	1
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
3WL	2	3	1	1	2	1
5WL	2	3	2	1	2	1
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

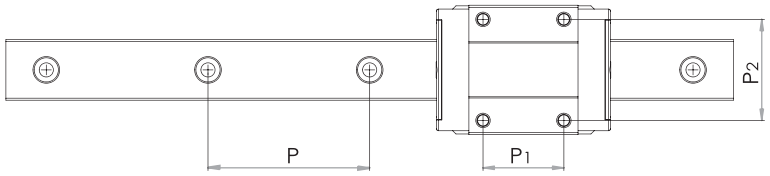
Dimensions and Specification

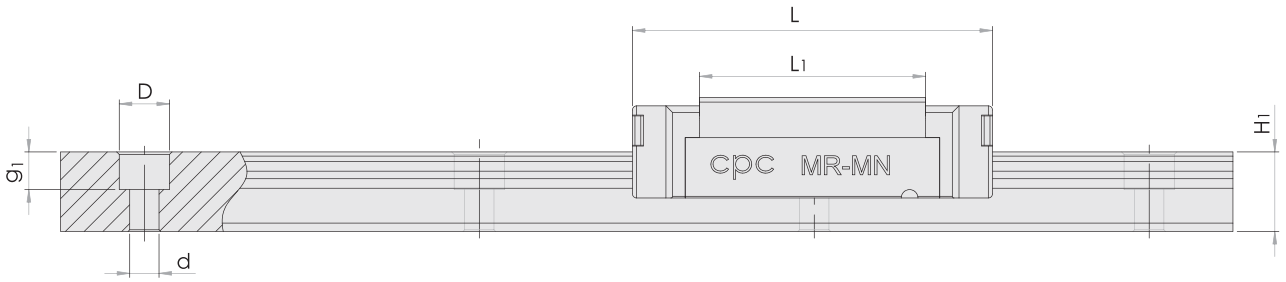


5.1 Standard MR-M SS series

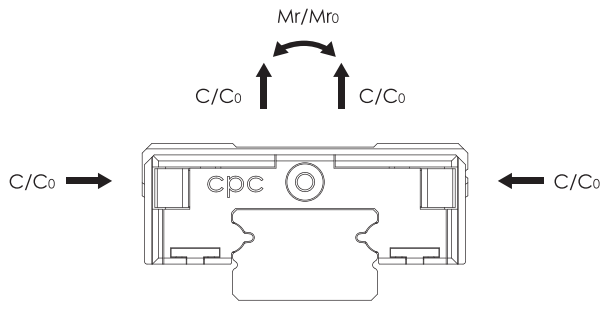
Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML SS	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	60	44	12	25	25
MR 15MN SS	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	43	27	12	20	25
MR 12ML SS	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	47.6	34	10	20	20
MR 12MN SS	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	35.4	22	10	15	20
MR 9ML SS	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	40.9	30.8	7.8	16	15
MR 9MN SS	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	30.6	20.5	7.8	10	15
MR 7ML SS	8	5	7	4.7	15	4.2 x 2.4 x 2.3	17	31.2	21.8	6.5	13	12
MR 7MN SS	8	5	7	4.7	15	4.2 x 2.4 x 2.3	17	23.7	14.3	6.5	8	12
MR 5ML SS	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	19.6	13.5	4.5	7	–
MR 5MN SS	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	16	10	4.5	–	8
MRU 3ML SS	4	2.5	3	2.6	10	M1.6	8	16	11	3	5.5	–
MRU 3MN SS	4	2.5	3	2.6	10	M1.6	8	11.7	6.7	3	3.5	–

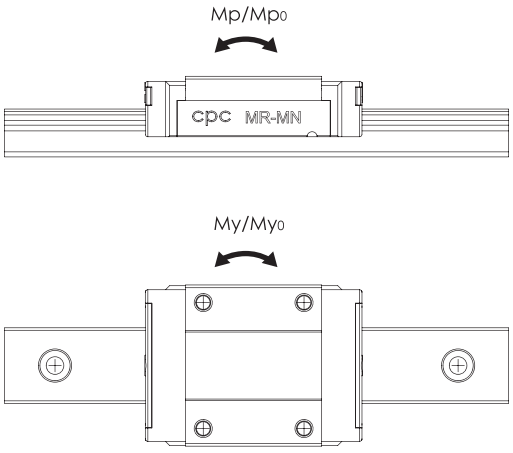
Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}



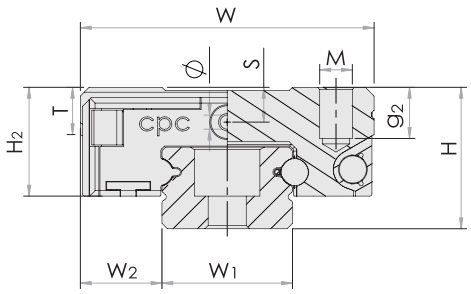


Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	90	930	MR 15ML SS
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	61	930	MR 15MN SS
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	51	602	MR 12ML SS
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	34	602	MR 12MN SS
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML SS
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN SS
M2 x 2.5	1.1	1.6	2.8	1310	2440	9	7.7	7.7	14	215	MR 7ML SS
M2 x 2.5	1.1	1.6	2.8	890	1400	5.2	3.3	3.3	8	215	MR 7MN SS
M2.6 x 2.0	0.7	1.3	2	470	900	2.4	2.1	2.1	4	116	MR 5ML SS
M2 x 1.5	0.7	1.3	2	335	550	1.7	1	1	3.5	116	MR 5MN SS
M2 x 1.1	0.3	0.7	1.5	295	575	0.9	1.1	1.1	1.2	53	MRU 3ML SS
M1.6 x 1.1	0.3	0.7	1.5	190	310	0.6	0.4	0.4	0.9	53	MRU 3MN SS



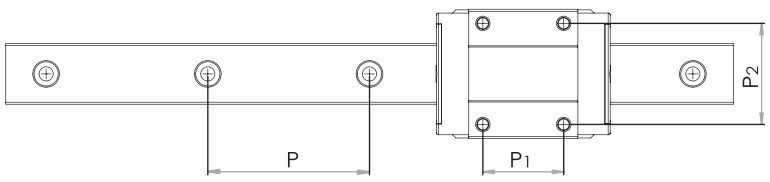


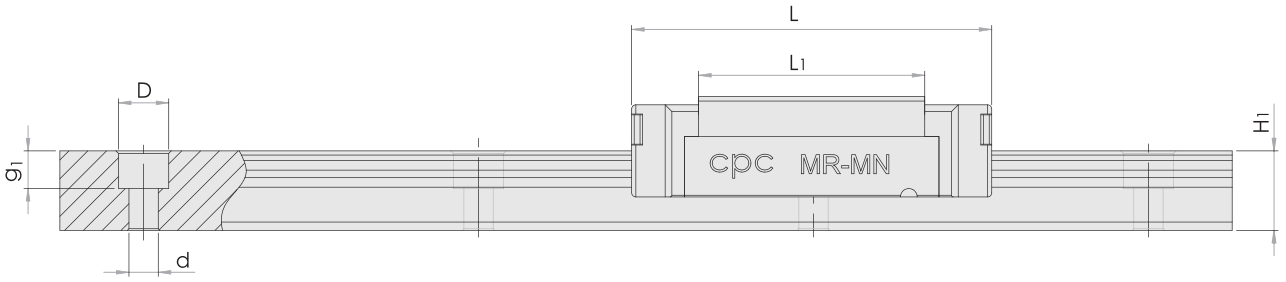
Dimensions and Specification



5.2 Standard MR-M ZZ series

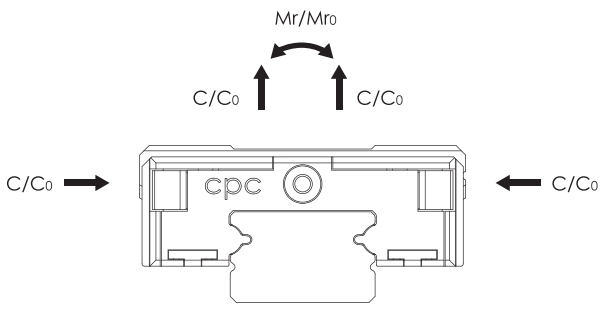
Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML ZZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	60	44	12	25	25
MR 15MN ZZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	43	27	12	20	25
MR 12ML ZZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	47.6	34	10	20	20
MR 12MN ZZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	35.4	22	10	15	20
MR 9ML ZZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	40.9	30.8	7.8	16	15
MR 9MN ZZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	30.6	20.5	7.8	10	15
MR 7ML ZZ	8	5	7	4.7	15	4.2 x 2.4 x 2.3	17	31.2	21.8	6.5	13	12
MR 7MN ZZ	8	5	7	4.7	15	4.2 x 2.4 x 2.3	17	23.7	14.3	6.5	8	12
MR 5ML ZZ	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	19.6	13.5	4.5	7	–
MR 5MN ZZ	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	16	10	4.5	–	8
* MRU 3ML ZZ	4	2.5	3	2.6	10	M1.6	8	16	11	3	5.5	–
* MRU 3MN ZZ	4	2.5	3	2.6	10	M1.6	8	11.7	6.7	3	3.5	–

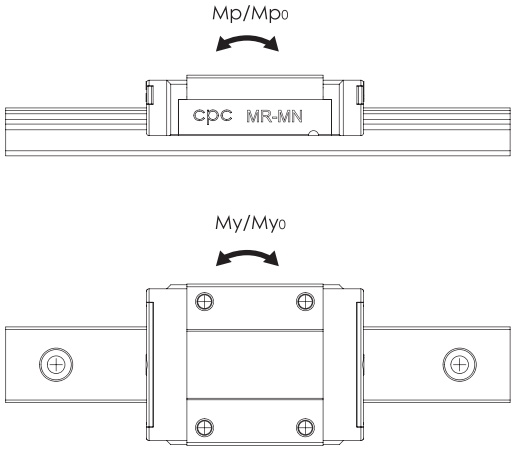




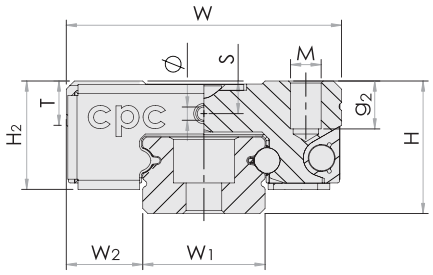
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	90	930	MR 15ML ZZ
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	61	930	MR 15MN ZZ
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	51	602	MR 12ML ZZ
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	34	602	MR 12MN ZZ
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML ZZ
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN ZZ
M2 x 2.5	1.1	1.6	2.8	1310	2440	9	7.7	7.7	14	215	MR 7ML ZZ
M2 x 2.5	1.1	1.6	2.8	890	1400	5.2	3.3	3.3	8	215	MR 7MN ZZ
M2.6 x 2.0	0.7	1.3	2	470	900	2.4	2.1	2.1	4	116	MR 5ML ZZ
M2 x 1.5	0.7	1.3	2	335	550	1.7	1	1	3.5	116	MR 5MN ZZ
M2 x 1.1	0.3	0.7	1.5	295	575	0.9	1.1	1.1	1.2	53	MRU 3ML ZZ
M1.6 x 1.1	0.3	0.7	1.5	190	310	0.6	0.4	0.4	0.9	53	MRU 3MN ZZ

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}





Dimensions and Specification

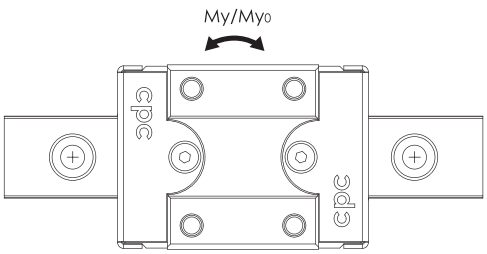


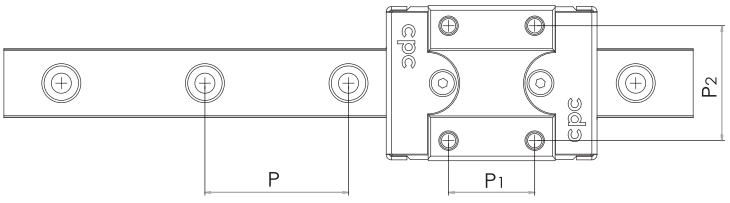
5.3 Standard MR-M EE series

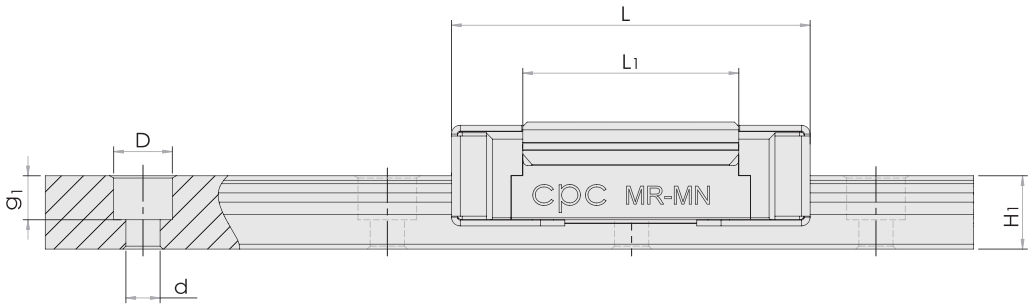
Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML EE	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	61.6	44	12.8	25	25
MR 15MN EE	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	44.6	27	12.8	20	25
MR 12ML EE	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	49	34	10.7	20	20
MR 12MN EE	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	36.8	22	10.7	15	20
MR 9ML EE	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	41.9	30.8	8.3	16	15
MR 9MN EE	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	31.6	20.5	8.3	10	15
MR 5ML EE	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	20.2	13.5	4.9	7	–
MR 5MN EE	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	16.6	10	4.9	–	8

5.4 Standard MR-M EZ series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML EZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	61.6	44	12.8	25	25
MR 15MN EZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	44.6	27	12.8	20	25
MR 12ML EZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	49	34	10.7	20	20
MR 12MN EZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	36.8	22	10.7	15	20
MR 9ML EZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	41.9	30.8	8.3	16	15
MR 9MN EZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	31.6	20.5	8.3	10	15
MR 5ML EZ	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	20.2	13.5	4.9	7	–
MR 5MN EZ	6	3.5	5	3.5	15	3.5 x 2.4 x 1	12	16.6	10	4.9	–	8



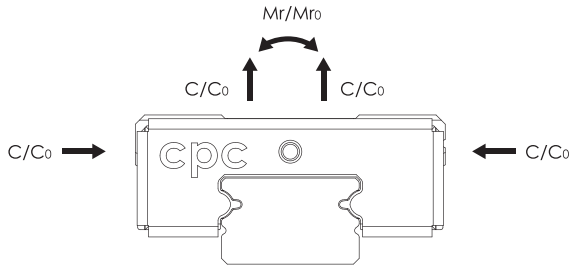


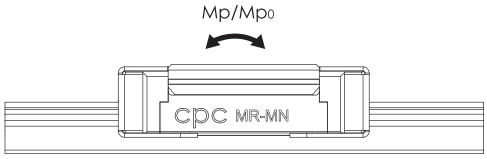


Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	93	930	MR 15ML EE
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	64	930	MR 15MN EE
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	54	602	MR 12ML EE
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	37	602	MR 12MN EE
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML EE
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN EE
M2.6 x 2.0	0.7	1.3	2	470	900	2.4	2.1	2.1	4	116	MR 5ML EE
M2 x 1.5	0.7	1.3	2	335	550	1.7	1	1	3.5	116	MR 5MN EE

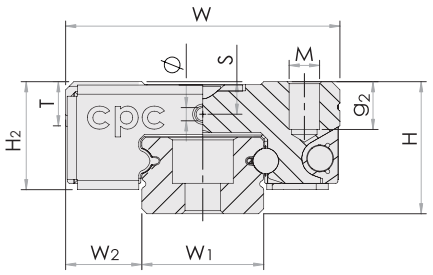
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	93	930	MR 15ML EZ
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	64	930	MR 15MN EZ
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	54	602	MR 12ML EZ
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	37	602	MR 12MN EZ
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML EZ
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN EZ
M2.6 x 2.0	0.7	1.3	2	470	900	2.4	2.1	2.1	4	116	MR 5ML EZ
M2 x 1.5	0.7	1.3	2	335	550	1.7	1	1	3.5	116	MR 5MN EZ

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}





Dimensions and Specification

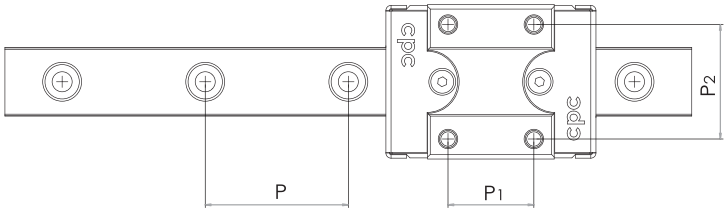


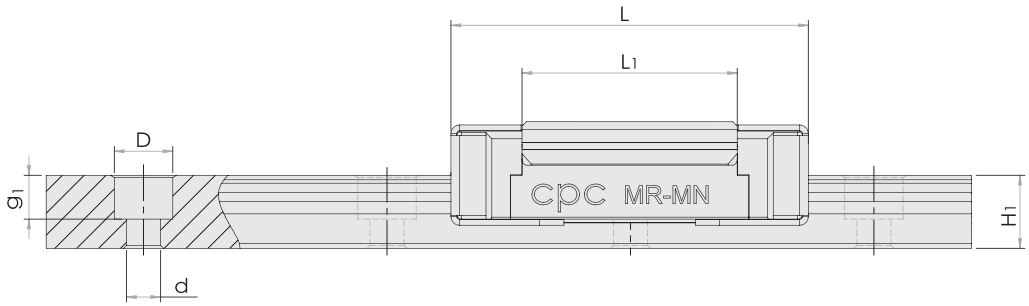
5.5 Standard MR-M EU series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML EU	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	61.6	44	13.1	25	25
MR 15MN EU	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	44.6	27	13.1	20	25
MR 12ML EU	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	49	34	11	20	20
MR 12MN EU	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	36.8	22	11	15	20
MR 9M L EU	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	41.9	30.8	8.6	16	15
MR 9M N EU	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	31.6	20.5	8.6	10	15

5.6 Standard MR-M UZ series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15ML UZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	61.6	44	13.1	25	25
MR 15MN UZ	16	8.5	15	9.5	40	6 x 3.5 x 4.5	32	44.6	27	13.1	20	25
MR 12ML UZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	49	34	11	20	20
MR 12MN UZ	13	7.5	12	7.5	25	6 x 3.5 x 4.5	27	36.8	22	11	15	20
MR 9M L UZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	41.9	30.8	8.6	16	15
MR 9M N UZ	10	5.5	9	5.5	20	6 x 3.5 x 3.5	20	31.6	20.5	8.6	10	15

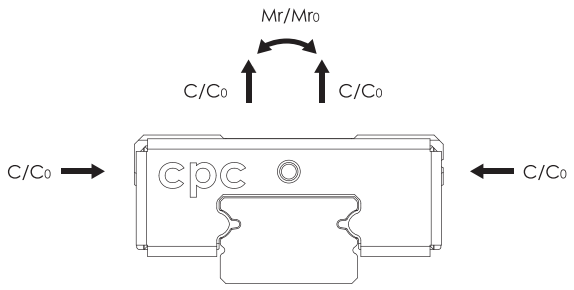


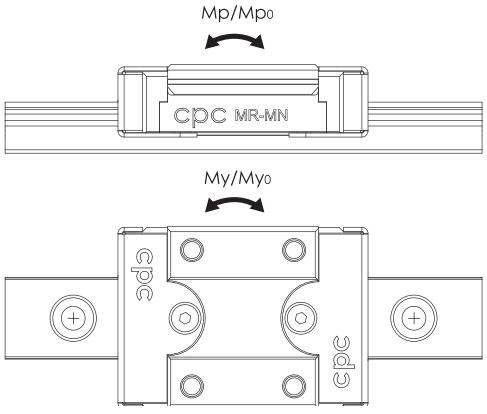


Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	93	930	MR 15ML EU
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	64	930	MR 15MN EU
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	54	602	MR 12ML EU
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	37	602	MR 12MN EU
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML EU
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN EU

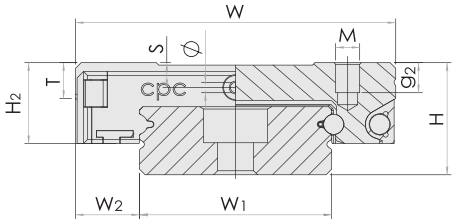
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M3 x 5.5	1.8	3.3	4.3	5350	9080	70	63.3	63.3	93	930	MR 15ML UZ
M3 x 5.5	1.8	3.3	4.3	3810	5590	43.6	27	27	64	930	MR 15MN UZ
M3 x 3.5	1.3	3.2	4.3	3240	5630	34.9	30.2	30.2	54	602	MR 12ML UZ
M3 x 3.5	1.3	3.2	4.3	2308	3465	21.5	12.9	12.9	37	602	MR 12MN UZ
M3 x 3.0	1.3	2.2	3.3	2135	3880	18.2	12.4	12.4	28	301	MR 9ML UZ
M3 x 3.0	1.3	2.2	3.3	1570	2495	11.7	6.4	6.4	18	301	MR 9MN UZ

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}

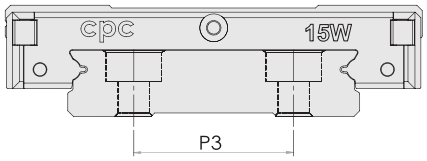




Dimensions and Specification



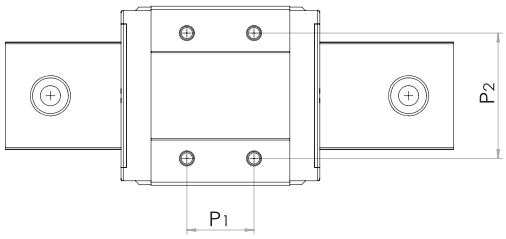
MR 3W-MR 12W

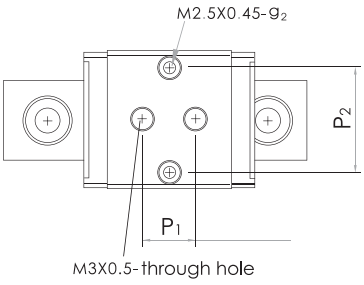


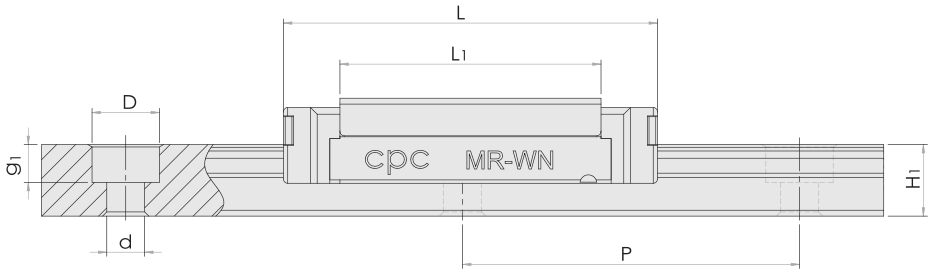
MR 15W

5.7 Wide MR-W SS Series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL SS	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	74.4	57.6	12	35	45
MR 15WN SS	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	55.3	38.5	12	20	45
MR 12WL SS	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	59.4	46	10.1	28	28
MR 12WN SS	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	44.4	31	10.1	15	28
MR 9WL SS	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	50.7	39.5	8.6	24	23
MR 9WN SS	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	39.1	27.9	8.6	12	21
MR 7WL SS	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	40.5	30.1	7	19	19
MR 7WN SS	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	31.6	21.2	7	10	19
MR 5WL SS	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	27.2	21.2	5	11	13
MR 5WLC SS	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	27.2	21.2	5	11	13
MR 5WN SS	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	21.1	15.1	5	6.5	13
MR 5WNC SS	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	21.1	15.1	5	6.5	13
MR 3WL SS	4.5	3	6	2.7	15	–	4 x 2.4 x 1.5	12	20.1	15.1	3.5	8	–
MR 3WN SS	4.5	3	6	2.7	15	–	4 x 2.4 x 1.5	12	15	10	3.5	4.5	–
MR 2WL SS	4	3	4	3	10	–	2.8 x 2.4 x 0.75	10	17	11.9	3	6.5	–

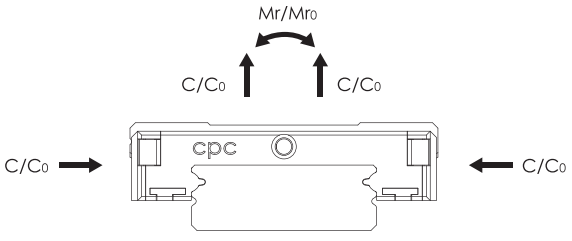


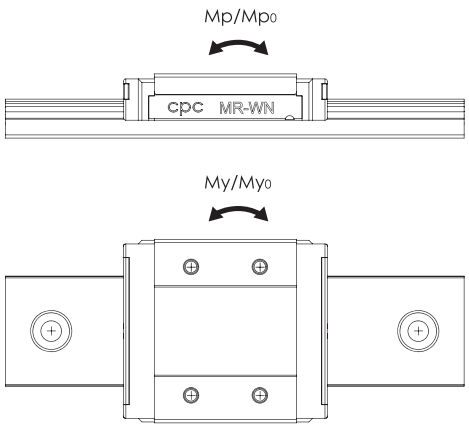




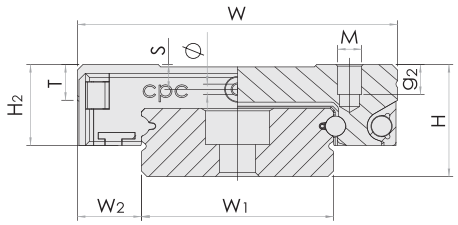
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x 4.5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	200	2818	MR 15WL SS
M4 x 4.5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	137	2818	MR 15WN SS
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	93	1472	MR 12WL SS
M3 x 3.5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	65	1472	MR 12WN SS
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9WL SS
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9WN SS
M3 x 3	1.1	1.9	3.2	1570	3140	22.65	14.9	14.9	27	516	MR 7WL SS
M3 x 3	1.1	1.9	3.2	1180	2095	15	7.3	7.3	19	516	MR 7WN SS
M2.5 x 1.5	0.9	1.2	2.3	615	1315	6.8	4.1	4.1	8	280	MR 5WL SS
M3/M2.5 x 1.5	0.9	1.2	2.3	615	1315	6.8	4.1	4.1	8	280	MR 5WLC SS
M2.5 x 1.5	0.9	1.2	2.3	475	900	4.6	2.2	2.2	6	280	MR 5WN SS
M3/M2.5 x 1.5	0.9	1.2	2.3	475	900	4.6	2.2	2.2	6	280	MR 5WNC SS
M2 x 1.4	0.3	0.8	1.8	370	800	2.5	1.9	1.9	3.4	105	MR 3WL SS
M2 x 1.4	0.3	0.8	1.8	280	530	1.6	0.9	0.9	3.4	105	MR 3WN SS
M2 x 1.3	–	–	1.3	310	625	1.6	1.2	1.2	3.0	69	MR 2WL SS

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}

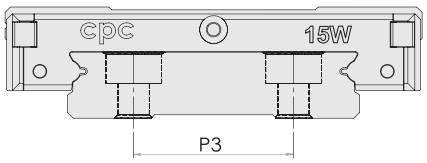




Dimensions and Specification



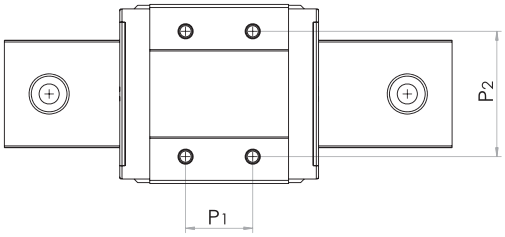
MR 3W-MR 12W

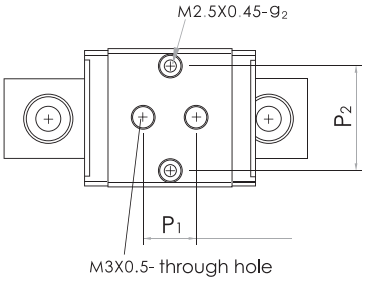


MR 15W

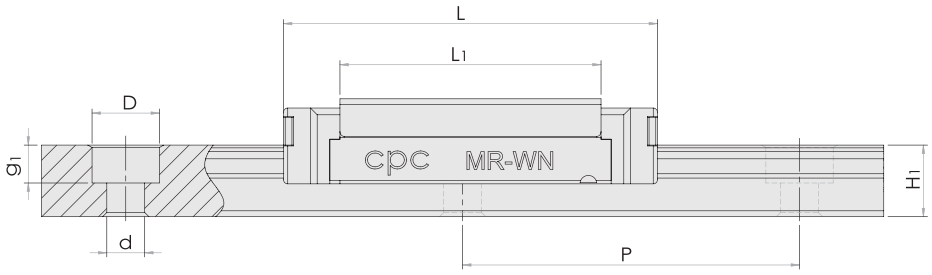
5.8 Wide MR-W ZZ Series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL ZZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	74.4	57.6	12	35	45
MR 15WN ZZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	55.3	38.5	12	20	45
MR 12WL ZZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	59.4	46	10.1	28	28
MR 12WN ZZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	44.4	31	10.1	15	28
MR 9WL ZZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	50.7	39.5	8.6	24	23
MR 9WN ZZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	39.1	27.9	8.6	12	21
MR 7WL ZZ	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	40.5	30.1	7	19	19
MR 7WN ZZ	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	31.6	21.2	7	10	19
*MR 5WL ZZ	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	27.2	21.2	5	11	13
*MR 5WLC ZZ	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	27.2	21.2	5	11	13
*MR 5WN ZZ	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	21.1	15.1	5	6.5	13
*MR 5WNC ZZ	6.5	3.5	10	4	20	–	5.5 x 3 x 1.6	17	21.1	15.1	5	6.5	13
*MR 3WL ZZ	4.5	3	6	2.7	15	–	4 x 2.4 x 1.5	12	20.1	15.1	3.5	8	–
*MR 3WN ZZ	4.5	3	6	2.7	15	–	4 x 2.4 x 1.5	12	15	10	3.5	4.5	–
MR 2WL ZZ	4	3	4	3	10	–	2.8 x 2.4 x 0.75	10	17	11.9	3	6.5	–



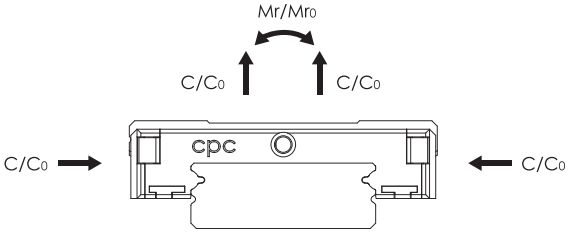


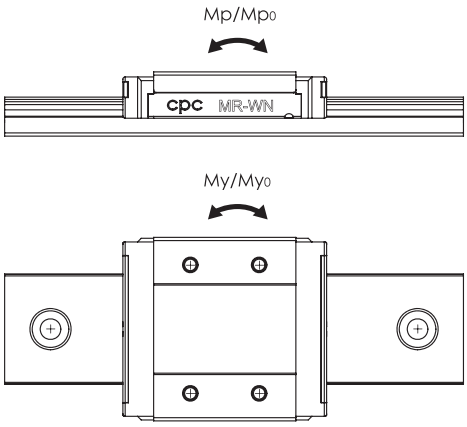
MR5WNC MR5WLC



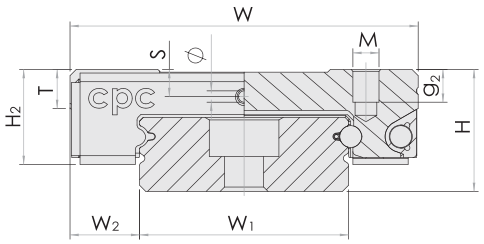
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x 4.5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	200	2818	MR 15WL ZZ
M4 x 4.5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	137	2818	MR 15WN ZZ
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	93	1472	MR 12WL ZZ
M3 x 3.5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	65	1472	MR 12WN ZZ
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9 WL ZZ
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9W N ZZ
M3 x 3	1.1	1.9	3.2	1570	3140	22.65	14.9	14.9	27	516	MR 7 WL ZZ
M3 x 3	1.1	1.9	3.2	1180	2095	15	7.3	7.3	19	516	MR 7W N ZZ
M2.5 x 1.5	0.9	1.2	2.3	615	1315	6.8	4.1	4.1	8	280	MR 5 WL ZZ
M3/M2.5 x 1.5	0.9	1.2	2.3	615	1315	6.8	4.1	4.1	8	280	MR 5WLC ZZ
M2.5 x 1.5	0.9	1.2	2.3	475	900	4.6	2.2	2.2	6	280	MR 5W N ZZ
M3/M2.5 x 1.5	0.9	1.2	2.3	475	900	4.6	2.2	2.2	6	280	MR 5WNC ZZ
M2 x 1.4	0.3	0.8	1.8	370	800	2.5	1.9	1.9	3.4	105	MR 3 WL ZZ
M2 x 1.4	0.3	0.8	1.8	280	530	1.6	0.9	0.9	3.4	105	MR 3W N ZZ
M2 x 1.3	–	–	1.3	310	625	1.6	1.2	1.2	3.0	69	MR 2 WL ZZ

∗ Preparing
Load capacities are calculated according to ISO 14728, Compare the life rating definition and the load capacities: C_{50B}=1.26xC_{100B}

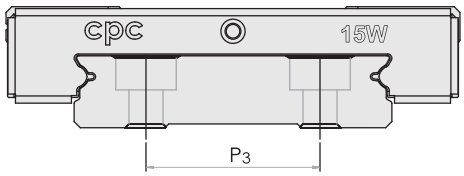




Dimensions and Specification



MR 3W-MR 12W



MR 15W

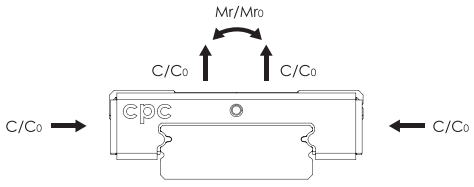
5.9 Wide MR-W EE Series

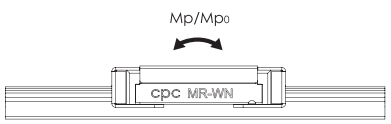
Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL EE	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	76	57.6	12.8	35	45
MR 15WN EE	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	56.9	38.5	12.8	20	45
MR 12WL EE	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	60.8	46	10.7	28	28
MR 12WN EE	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	45.8	31	10.7	15	28
MR 9WL EE	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	51.8	39.5	9.2	24	23
MR 9WN EE	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	40.2	27.9	9.2	12	21
MR 7 WL EE	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	41.5	30.1	7.5	19	19
MR 7 WN EE	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	32.5	21.2	7.5	10	19
MR 2 WL EE	4	3	4	3	10	–	2.8 x 2.4 x 0.75	10	17.5	11.9	3.3	6.5	–

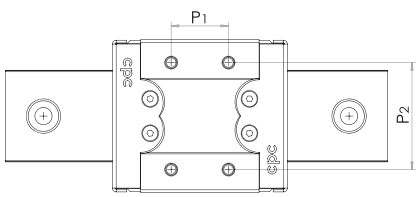
5.10 Wide MR-W EZ Series

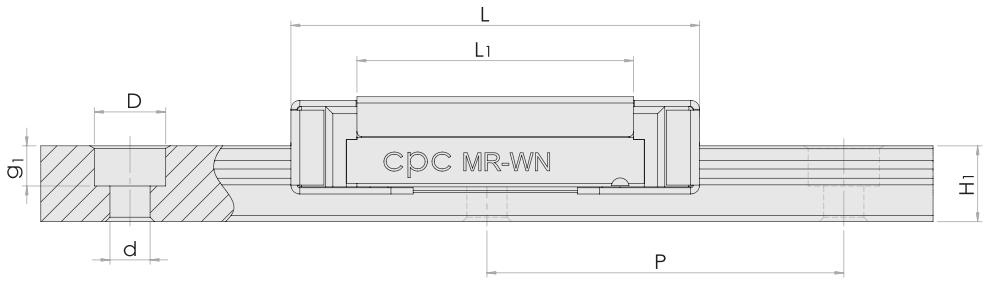
Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL EZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	76	57.6	12.8	35	45
MR 15WN EZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	56.9	38.5	12.8	20	45
MR 12WL EZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	60.8	46	10.7	28	28
MR 12WN EZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	45.8	31	10.7	15	28
MR 9WL EZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	51.8	39.5	9.2	24	23
MR 9WN EZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	40.2	27.9	9.2	12	21
MR 7 WL EZ	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	41.5	30.1	7.5	19	19
MR 7 WN EZ	9	5.5	14	5.2	30	–	6 x 3.5 x 3.5	25	32.5	21.2	7.5	10	19
MR 2 WL EZ	4	3	4	3	10	–	2.8 x 2.4 x 0.75	10	17.5	11.9	3.3	6.5	–

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}



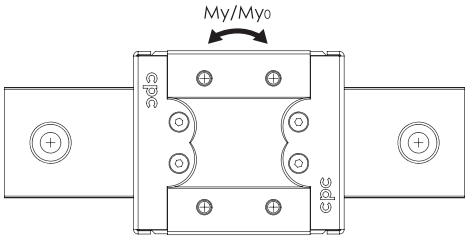




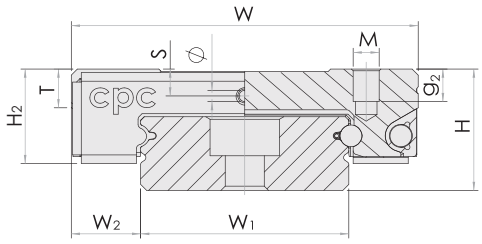


Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x 4.5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	203	2818	MR 15WL EE
M4 x 4.5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	140	2818	MR 15WN EE
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	96	1472	MR 12WL EE
M3 x 3.5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	68	1472	MR 12WN EE
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9WL EE
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9WN EE
M3 x 3	1.1	1.9	3.2	1570	3140	22.65	14.9	14.9	27	516	MR 7W L EE
M3 x 3	1.1	1.9	3.2	1180	2095	15	7.3	7.3	19	516	MR 7WN EE
M2 x 1.3	–	–	1.3	310	625	1.6	1.2	1.2	3.0	69	MR 2W L EE

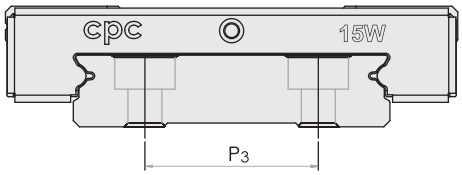
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x 4.5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	203	2818	MR 15WL EZ
M4 x 4.5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	140	2818	MR 15WN EZ
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	96	1472	MR 12WL EZ
M3 x 3.5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	68	1472	MR 12WN EZ
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9 WL EZ
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9 W N EZ
M3 x 3	1.1	1.9	3.2	1570	3140	22.65	14.9	14.9	27	516	MR 7 WL EZ
M3 x 3	1.1	1.9	3.2	1180	2095	15	7.3	7.3	19	516	MR 7 WN EZ
M2 x 1.3	–	–	1.3	310	625	1.6	1.2	1.2	3.0	69	MR 2 WL EZ



Dimensions and Specification



MR 3W-MR 12W



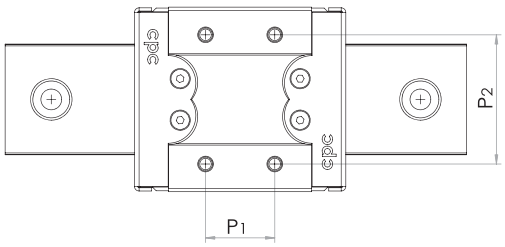
MR 15W

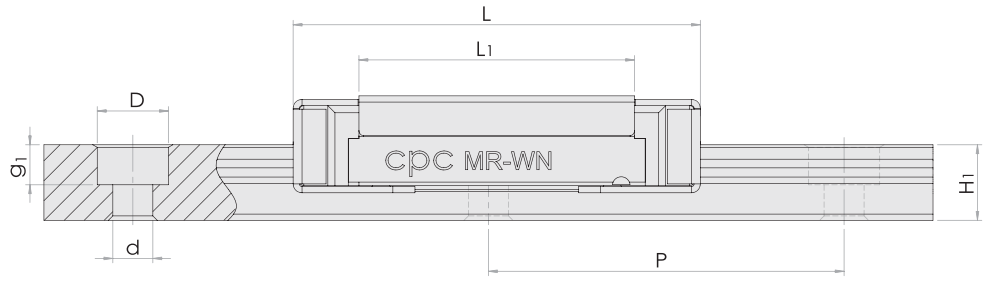
5.11 Wide MR-W EU series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL EU	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	76	57.6	13.1	35	45
MR 15WN EU	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	56.9	38.5	13.1	20	45
MR 12WL EU	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	60.8	46	11	28	28
MR 12WN EU	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	45.8	31	11	15	28
MR 9WL EU	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	51.8	39.5	9.5	24	23
MR 9WN EU	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	40.2	27.9	9.5	12	21

5.12 Wide MR-W UZ series

Model Code	Fabricate Dimensions		Rail Dimensions (mm)					Block Dimensions (mm)					
	H	W_2	W_1	H_1	P	P_3	D×d×g_1	W	L	L_1	H_2	P_1	P_2
MR 15WL UZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	76	57.6	13.1	35	45
MR 15WN UZ	16	9	42	9.5	40	23	8 x 4.5 x 4.5	60	56.9	38.5	13.1	20	45
MR 12WL UZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	60.8	46	11	28	28
MR 12WN UZ	14	8	24	8.5	40	–	8 x 4.5 x 4.5	40	45.8	31	11	15	28
MR 9WL UZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	51.8	39.5	9.5	24	23
MR 9WN UZ	12	6	18	7.3	30	–	6 x 3.5 x 4.5	30	40.2	27.9	9.5	12	21

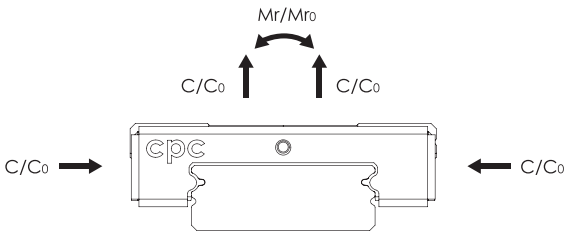


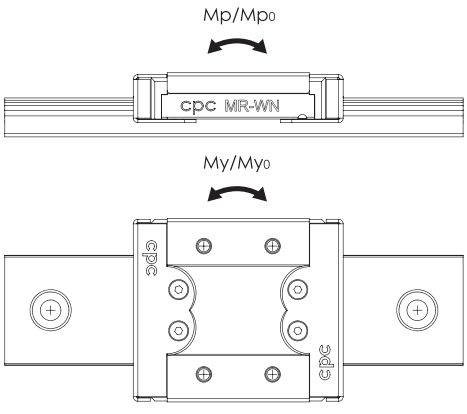


Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x.4 5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	203	2818	MR 15WL EU
M4 x 4.5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	140	2818	MR 15WN EU
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	96	1472	MR 12WL EU
M3 x 3.5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	68	1472	MR 12WN EU
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9WL EU
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9WN EU

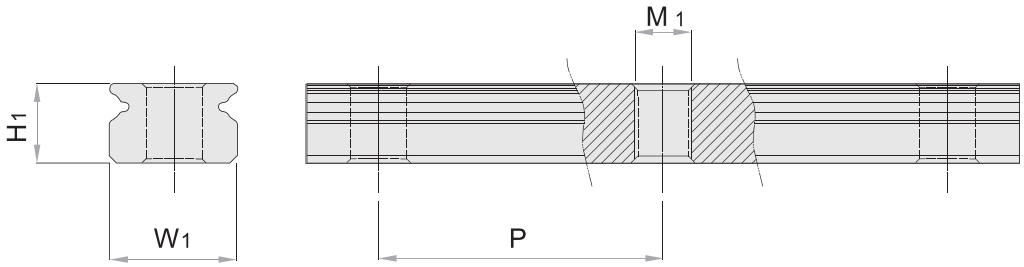
Block Dimensions (mm)				Load Capacities (N)		Static Moment (Nm)			Weight		Model Code
M×g_2	Ø	S	T	C_{100B}(dyn)	C_0(stat)	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
M4 x 4.5	1.8	3.3	4.5	6725	12580	257.6	93.1	93.1	203	2818	MR 15WL UZ
M4 x.4 5	1.8	3.3	4.5	5065	8385	171.7	45.7	45.7	140	2818	MR 15WN UZ
M3 x 3.5	1.3	3.1	4.5	4070	7800	95.6	56.4	56.4	96	1472	MR 12WL UZ
M3 x.3 5	1.3	3.1	4.5	3065	5200	63.7	26.3	26.3	68	1472	MR 12WN UZ
M3 x 3	1.3	2.6	4	2550	4990	45.9	26.7	26.7	51	940	MR 9WL UZ
M3 x 3	1.3	2.6	4	2030	3605	33.2	13.7	13.7	37	940	MR 9WN UZ

Load capacities are calculated according to ISO 14728, Compare the rating life definition and the load capacities: C_{50B}=1.26xC_{100B}





Dimensions and Specification



5.13 Standard MRU-M series - Tapped from bottom

Model Code	Rail Dimensions (mm)			
	H_1	W_1	P	M_1
MRU 15M	9.5	15	40	M4x0.7
MRU 12M	7.5	12	25	M4x0.7
MRU 9M	5.5	9	20	M4x0.7
MRU 7M	4.7	7	15	M3x0.5
MRU 5M	3.5	5	15	M3x0.5
MRU 3M	2.6	3	10	M1.6 x0.35

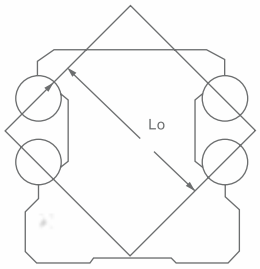
5.14 Wide MRU-W series - Tapped from bottom

Model Code	Rail Dimensions (mm)			
	H_1	W_1	P	M_1
MRU 15W	9.5	42	40	M5x0.8
MRU 12W	8.5	24	40	M5x0.8
MRU 9W	7.3	18	30	M4x0.7
MRU 7W	5.2	14	30	M4x0.7
MRU 5W	4	10	20	M3x0.5
MRU 3W	2.7	6	15	M3x0.5

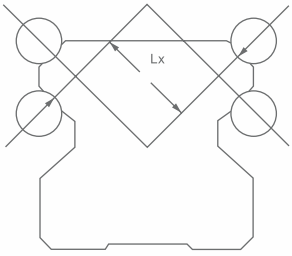
AR/HR Ball Type Linear Guide Series

6.1 Product Introduction

cpc's AR/HR Series design ball type linear guide incorporates four rows of reciurculating balls. An O-shape arrangement with 45 degree contact angle between raceway and steel balls, efficiently increases rigiditiy and torsion resistance (shock absorption)
Although the linear guides' design space has been limited, **cpc** is capable of increasing the number of balls and adopts larger steel balls to enhance load capacity.

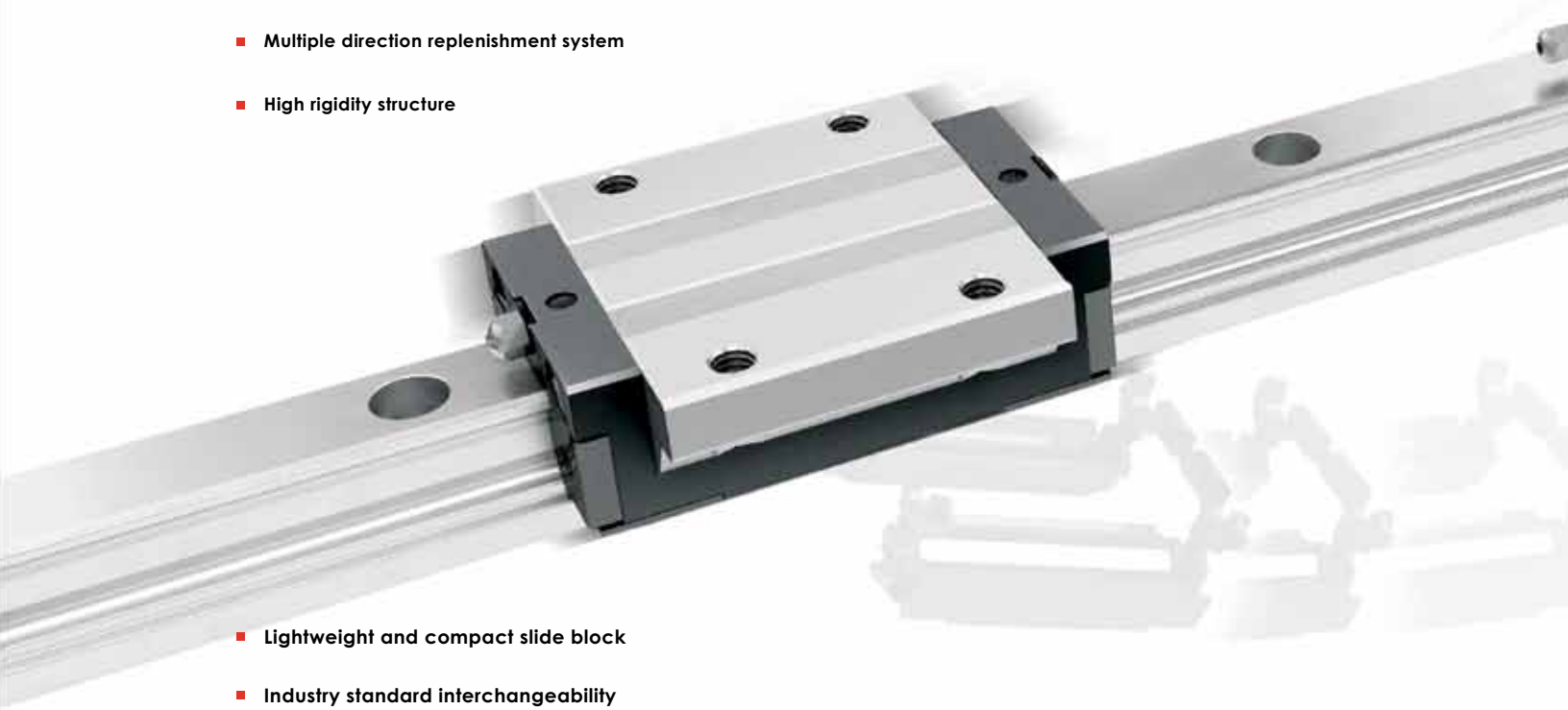


O Type-Arrangement



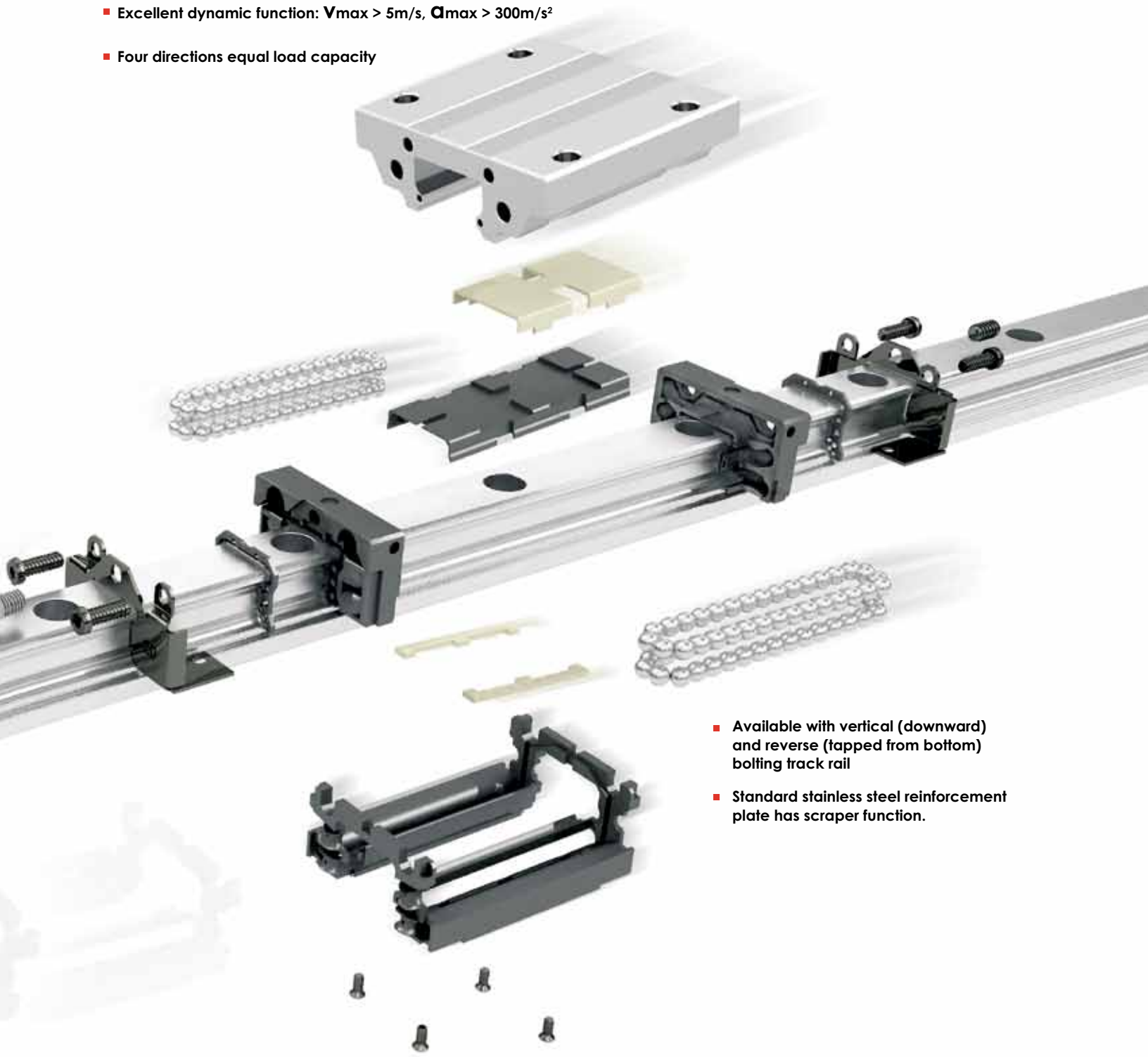
X Type-Arrangement

- **Ecology lubrication design: Long-term low maintenance with minimal lubrication**
- **Multiple direction replenishment system**
- **High rigidity structure**



- **Lightweight and compact slide block**
- **Industry standard interchangeability**

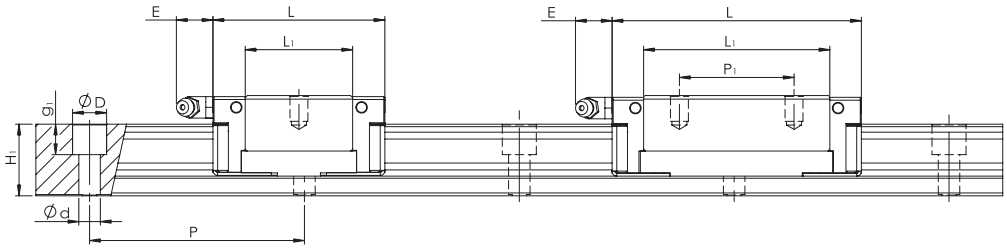
- **Excellent dynamic function: Vmax > 5m/s, amax > 300m/s²**
- **Four directions equal load capacity**



- **Available with vertical (downward) and reverse (tapped from bottom) bolting track rail**
- **Standard stainless steel reinforcement plate has scraper function.**

- **Dust protection of double wipe blade design in the end seal; have standard type and reinforcement type.**
- **Available with special surface treatment.**

Dimensions and Specifications

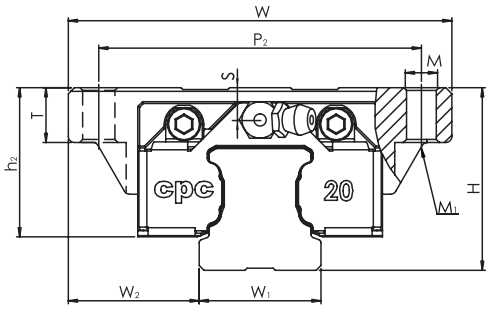


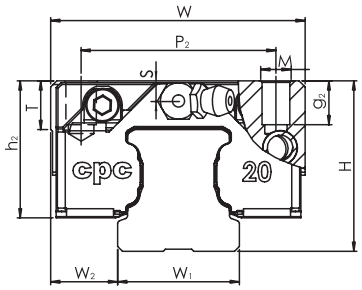
6.2 AR Automation Series

Model Code	Fabrication Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)							
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	h_2	P_1	P_2	E	M×g_2
AR 15 MS	24	9.5	15	15	60	7.5x4.5x5.3 (6x3.5x4.5)	34	40.8	24.2	20.1	-	26	4.5	M4x7
AR 15 MN	24	9.5	15	15	60		34	56.1	39.5	20.1	26	26	4.5	M4x7
AR 15 FS	24	18.5	15	15	60		52	40.8	24.2	20.1	-	41	4.5	M5x7
AR 15 FN	24	18.5	15	15	60		52	56.1	39.5	20.1	26	41	4.5	M5x7
AR 20 MS	28	11	20	20	60	9.5x6x8.5	42	48.2	30	22.5	-	32	12	M5x7
AR 20 MN	28	11	20	20	60		42	70.2	52	22.5	32	32	12	M5x7
AR 20 FS	28	19.5	20	20	60		59	48.2	30	22.5	-	49	12	M6x9
AR 20 FN	28	19.5	20	20	60		59	70.2	52	22.5	32	49	12	M6x9
AR 25 MS	33	12.5	23	23	60	11x7x9	48	57.2	37	26.6	-	35	12	M6x9
AR 25 MN	33	12.5	23	23	60		48	80.2	60	26.6	35	35	12	M6x9
AR 25 FS	33	25	23	23	60		73	57.2	37	26.6	-	60	12	M8x10
AR 25 FN	33	25	23	23	60		73	80.2	60	26.6	35	60	12	M8x10
ARC 30 MN	42	16	28	27	80	14x9x12	60	97.5	71.5	35.4	40	40	12	M8x10
ARC30 FN	42	31	28	27	80		90	97.5	71.5	35.4	40	72	12	M10x12

6.3 HR Heavy Load Series

Model Code	Fabrication Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)							
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	h_2	P_1	P_2	E	M×g_2
HR 15 MN	28	9.5	15	15	60	7.5x4.5x5.3 (6x3.5x4.5)	34	56.1	39.5	24.1	26	26	4.5	M4x7
HR 15 FN	24	16	15	15	60		47	56.1	39.5	20.1	30	38	4.5	M5x9
HR 20 MN	30	12	20	20	60	9.5x6x8.5	44	70.2	52	24.5	36	32	12	M5x8.5
HR 20 ML	30	12	20	20	60		44	90.2	72	24.5	50	32	12	M5x8.5
HR 20 FN	30	21.5	20	20	60		63	70.2	52	24.5	40	53	12	M6x9
HR 20 FL	30	21.5	20	20	60		63	90.2	72	24.5	40	53	12	M6x9
HR 25 MN	40	12.5	23	23	60	11x7x9	48	80.2	60	33.6	35	35	12	M6x9
HR 25 ML	40	12.5	23	23	60		48	100.2	80	33.6	50	35	12	M6x9
HR 25 FN	36	23.5	23	23	60		70	80.2	60	29.6	45	57	12	M8x10
HR 25 FL	36	23.5	23	23	60		70	100.2	80	29.6	45	57	12	M8x10
HRC 30 MN	45	16	28	27	80	14x9x12	60	97.5	71.5	38.4	40	40	12	M8x10
HRC 30 FN	42	31	28	27	80		90	97.5	71.5	35.4	52	72	12	M10x12

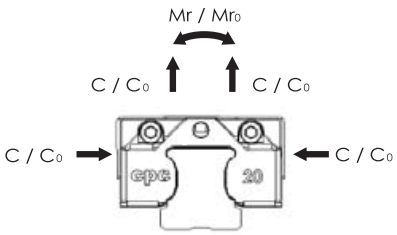


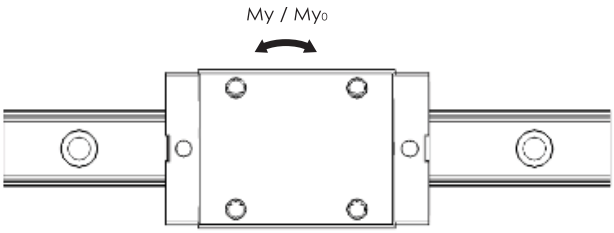


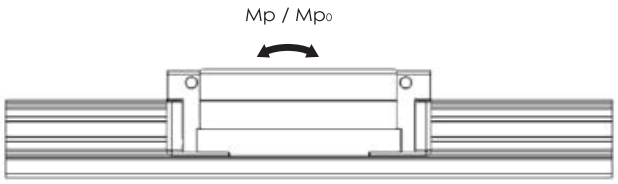
Block Dimensions (mm)			Load Capacities (KN)		Static Moment (Nm)			Weight		Model Code
M1	S	T	C100B	C0	Mr0	Mp0	My0	Block(g)	Rail(g/m)	
	4	6	6.40	10.80	80	40	40	95	1290	AR 15 MS
	4	6	9.00	17.50	140	100	100	140		AR 15 MN
M4	4	7	6.40	10.80	80	40	40	120		AR 15 FS
M4	4	7	9.00	17.50	140	100	100	180		AR 15 FN
	3.5	8	10.90	16.30	170	80	80	170	2280	AR 20 MS
	3.5	8	15.60	29.80	310	220	220	260		AR 20 MN
M5	3.5	9	10.90	16.30	170	80	80	210		AR 20 FS
M5	3.5	9	15.60	29.80	310	220	220	360		AR 20 FN
	5	8	12.30	21.20	220	110	110	285	3020	AR 25 MS
	5	8	18.80	36.40	410	300	300	380		AR 25 MN
M6	5	10	12.30	21.20	220	110	110	325		AR 25 FS
M6	5	10	18.80	36.40	410	300	300	440		AR 25 FN
-	7.5	12	32.70	58.90	770	520	520	800	4380	ARC 30 MN
M8	7.5	12	32.70	58.90	770	520	520	1150		ARC30 FN

Block Dimensions (mm)			Load Capacities (KN)		Static Moment (Nm)			Weight		Model Code
M1	S	T	C100B	C0	Mr0	Mp0	My0	Block(g)	Rail(g/m)	
	8	6	9.00	17.50	140	100	100	185	1290	HR 15 MN
	4	7	9.00	17.50	140	100	100	180		HR 15 FN
	5.5	10	15.60	29.80	310	220	220	310	2280	HR 20 MN
	5.5	10	20.80	43.30	430	420	420	400		HR 20 ML
M5	5.5	9	15.60	29.80	310	220	220	385		HR 20 FN
M5	5.5	9	20.80	43.30	430	420	420	505		HR 20 FL
	12	12	18.80	36.40	410	300	300	530	3020	HR 25 MN
	12	12	23.40	48.50	560	520	520	665		HR 25 ML
M6	8	10	18.80	36.40	410	300	300	470		HR 25 FN
M6	8	10	23.40	48.50	560	520	520	585		HR 25 FL
-	10.5	12	32.70	58.90	770	520	520	890	4380	HRC 30 MN
M8	7.5	12	32.70	58.90	770	520	520	1110		HRC 30 FN

Dimensions and Specifications







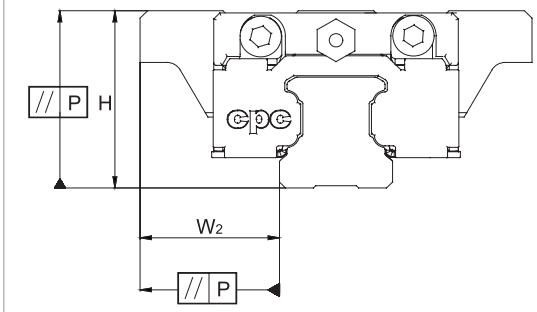
6.4 ER Series

Model Code	Fabrication Dimensions		Rail Dimensions (mm)				Block Dimensions (mm)									
	H	W_2	W_1	H_1	P	D×d×g_1	W	L	L_1	h_2	P_1	P_2	E	M×g_2	S	T
ER 25MN	36	12.5	23	23	60	11x7x9	48	80.2	60	29.6	35	35	12	M6x9	8	8
ER 25ML	36	12.5	23	23	60		48	100.2	80	29.6	50	35	12	M6x9	8	8

Load Capacities (KN)		Static Moment (Nm)			Weight		Model Code
C_{100B}	C_0	Mr_0	Mp_0	My_0	Block(g)	Rail(g/m)	
18.80	36.40	410	300	300	475	3020	ER 25MN
23.40	48.50	560	520	520	550		ER 25ML

The above rating load capacities and static moment are calculated according to ISO14728 standard. The rating life for basic dynamic load rating is defined as the total 100km travel distance that 90% of a group of identical linear guides can be operated individually under the same conditions free from any material damage caused by rolling fatigue. When the standard of 50km travel distance is applied, the above basic dynamic load rating C of ISO14728 should be multiply by 1.26 for conversion.

6.5 Accuracy



Accuracy classes

Accuracy Classes (μm)		Ultra Precision (UP)	Super Precision (SP)	Precision (P)	High (H)	Normal (N)
Tolerance of dimension height	H	±5	±10	±20	±40	±100
Variation of height for different runner block on the same position of track rail	ΔH	3	5	7	15	30
Tolerance of dimension width	W2	±5	±7	±10	±20	±40
Variation of width for different runner block on the same position of track rail	ΔW2	3	5	7	15	30

Accuracy of the running parallelism

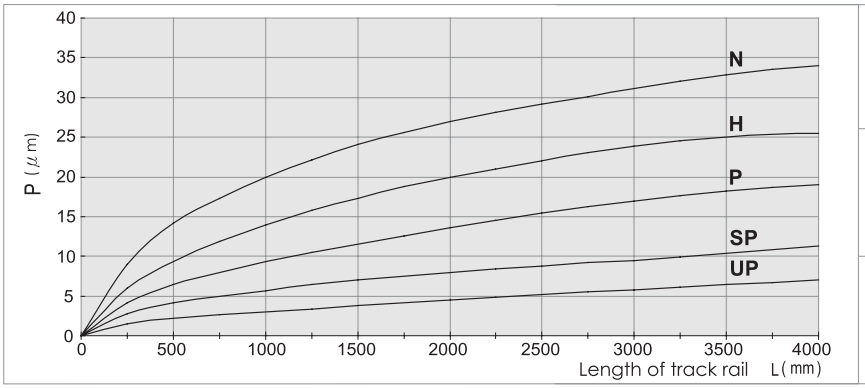


Table of Preload

Preload Classes	V0	V1	V2
AR	0 ∫ 0.02C	0.05C	0.08C
HR	0 ∫ 0.02C	0.08C	0.13C

6.6 Order Information

Model Code

AR(U)	E	15	M	N	B	2	Z	V1	P	-1480L	-20	-20	II	J

- **Customization code**
- **Number of rail on the same moving axis**
- **End hole pitch (mm)**
- **Starting hole pitch (mm)**
- **Rail length (mm)**
- **Accuracy classes** Normal (N), High(H), Precision(P), Super Precision(SP), Ultra Precision(UP)
- **Preload classes** V0 : Standard, V1 : Light Preload, V2 : Medium preload
- **Embedded lubrication storage**
- **Block quantity** Quantity of the runner block
- **End seal type** B : Standard, **S : Reinforcement - PBC Recommended**
- **Block length** L : Long, N : Standard, S : Short
- **Block type** M : Standard, F : Wide
- **Rail size** The code of track rail size : 15 , 20 , 25 , 30
- **E** The track rail size 15 mounting hole 6 x 3.5 x 4.5
- **Product Type –** AR/ARC : automation series , HR/HRC : heavy Load series , U : Tapped from bottom

>> Customization code

The meaning of suffix characters:

J	Butt-jointing track rail
G	Customer designate lubricant
I	Inspection report
C	Chromium surface treatment is applied to the casing and track rail
CR	Chromium surface treatment is applied to the track rail
M	Manganese surface treatment is applied to the block and track rail
MR	Manganese surface treatment is applied to the track rail
R	Special process for track rail
B	Special process for slide block

6.5 Lubrication Testing Report

A linear guide is a category of rolling guidance. By using unlimited recirculating stainless steel balls operating between the raceways of the rail and the runner block, the carriage achieves high precision and low friction linear movement.
If the linear guides do not have sufficient lubrication, rolling friction will increase, causing wear and shortened linear guide life span.

cpc has added and embedded PU lubricant storage pads to prolong the life of the linear guide; the pads directly contact and lubricate the rolling balls. This design supplies sufficient lubrication even in short stroke operations.

cpc's design, due to the embedded pad, absorbtion and retension capabilities, results in a product that features a long operational life and long-term lubrication.

The follwing is the **cpc** in-house test results.

AR15 Lubrication Storage Pad Testing Data

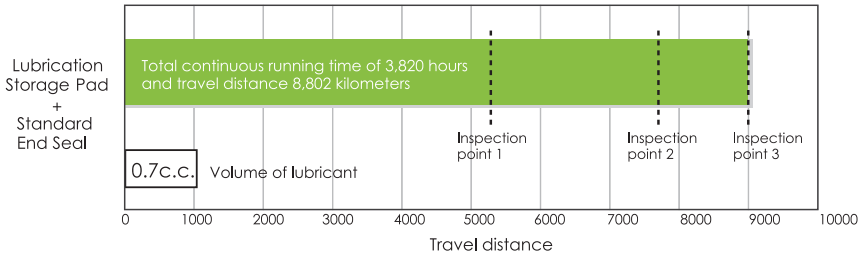
Testing products : AR15-Blocks with Lubrication Storage Pad 8pcs,
AR15-Rail-N-class-L1500mm 4pcs

Testing condition	
Rating load capacities(each Block)	1.8KN(C=9KN、C0=17.5KN)
Stroke	0.96m
Max running speed	1m/s
Lubricant	DAPHNE SUPER MULTI 68 (Viscosity64.32 CST 40OC)
Lubrication period	No lubrication added during testing period

Testing equipment

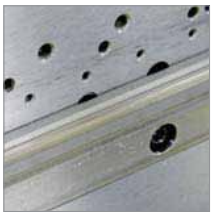
Testing result

Dried lubricant residue started appearing on rail profile, PU pads, and ball retainer of the tested blocks



Testing result of inspection point

Inspection point 1 and 2



No wear on rail profile

Inspection point 3

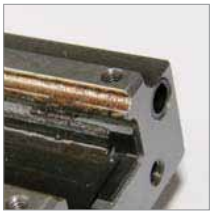
Some rail profiles have dried lubricant residue present

Inspection point 1 and 2 : Lubrication result

- Upward Lubrication Storage Pad in good condition
- lubricant supply in good condition
- Running profile of rail no wear out

- Downward Lubrication Storage Pad in good condition
- lubricant supply in good condition

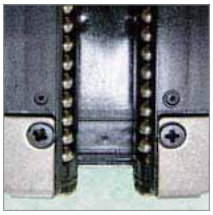
Inspection point 3 : Lubrication result



Dried lubricant residue started appearing broken on upward Lubrication Storage pad of the tested blocks

Dried lubricant residue started appearing broken on downward Lubrication Storage pad of the tested blocks

Plastic parts and end seal in good condition



Plastic parts in good condition

End seal in good condition

Test Summary

Total continuous running time of 3820 hours and travel distance 8802 kilometers.
Out of eight test blocks, dried lubricant residue appeared on 2 blocks and 1 rail. Dried lubricant residue is indicative of a need for re-lubrication.
The test results indicated that the lubrication pad design effectively extends re-lubrication requirement and thus lengthens linear operational life.

ST Miniature Stroke Slide Series

7.1 Product Introduction

High load and high moment capacity

ST Miniature Stroke Slide series incorporates the design of two rows of balls. The ball track has a Gothic profile design with 45 degree contact angle to attain the effect of equal load capacity in a mono block to provide more space for the larger rolling elements, enhancing the load and moment capacity.

Dual plate design

ST Miniature Stroke Slide series adopts a pair of end plates into the design. Both the center rail and bearing block sides have a plate installed that prevents the linear guide from over-stroking.

Easy mounting

The mounting of the ST Miniature Stroke Slide series is accomplished by fitting the fixing screw downward into the count bore of the rail by intersecting the bole pattern on the block and cage within a hole pitch movement of side. The one piece cage therefore does not influence the mounting of the rail. The preload is preset by ball sorting.

Anti-corrosion feature

ST Miniature Stroke Slide series is composed of quenched hardened process stainless steel for the rail, block and steel balls. The block plate and screw are made of stainless steel as well - great for maintenance and inspection applications

High running accuracy and smoothness

The steel balls of ST Miniature Stroke Slide series roll on the rail without recirculation; resulting in excellent running behavior, smoothness, low fiction, and high accuracy, without vibration.

Temperature

ST Miniature Stroke Slide series can stand the temperature up to 150°C. There are two options for higher temperature application:
T1 : 200°C
T2 : 300°C
Treated with higher temperature will reduce the load capacity.

7.2 Technical Information

Accuracy

The ST Miniature Stroke Slide series have three grades for accuracy. Precision (P), High (H) and Normal (N).

Preload

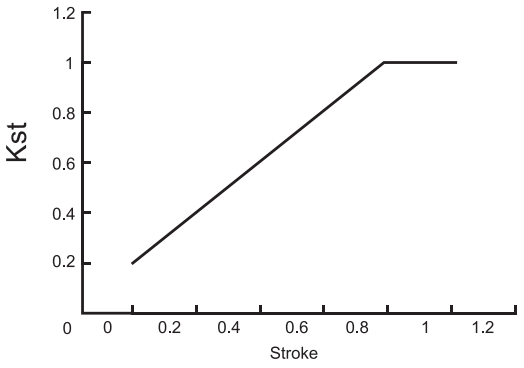
The ST miniature stroke slide series have two classes of preload V0 and V1 as described in the MR miniature linear guide series table of preload.

Rating life calculation

$$L = K_{st} \left(\frac{C_{100B}}{P}\right)^3 \cdot 10^5 \quad \text{——(19)}$$

$$L_h = \frac{L}{2 \cdot s \cdot n \cdot 60} = K_{st} \frac{L}{v_m} \cdot \left(\frac{C_{100B}}{P}\right)^3 \quad \text{——(20)}$$

Short stroke factor diagram



According to ISO14728-1 short stroke factor

Lubrication

The lubrication of ST Miniature Stroke Slide series can be fulfilled by adding the lubricant onto the raceway of the rail.

Rating life L

The rating life of ST miniature stroke slide series can be calculated by the formulas (19) , (20) in accordance with ISO 14728-1.

Geometric and positional accuracy of the mounting surface

The inaccuracy of the mounting surfaces will affect the running accuracy and reduce the operatiing lifetime of the ST Miniature Stroke Slide. If the inaccuracies of the mounting surfaces exceed the values calculated by formulas (15), (21), and (17), the life time will become shortened, as calculated by formulas (19) and (20).

$$e_{1(mm)} = b_{(mm)} \cdot f_1 \cdot 10^{-4} \quad \text{——(15)}$$

$$e_{2(mm)} = \left(\frac{d}{Lc}\frac{(mm)}{(mm)}\right) \cdot f_2 \cdot 10^{-5} \quad \text{——(21)}$$

$$e_{3(mm)} = f_3 \cdot 10^{-3} \quad \text{——(17)}$$

The mounting surface geometric and positional accuracy factor

Size	V0			V1		
	f_1	f_2	f_3	f_1	f_2	f_3
7	5	200	4	3	130	3
9	5	300	6	4	200	4
12	6	380	8	4	250	6
15	7	530	12	5	350	8

Ordering designation

Ordering Designation

ST 7 M V0 P 27 / 30 x 30 T0

- ST: Stroke type
- 7: Size
- M: Standard; W: Wide
- V0: Clearance; V1: Light preload
- P: Precision; H: High; N: Normal
- 27: Max stroke (mm)
- 30: Block L1 length (mm)
- 30: Rail Lr length (mm)
- T0: Max temperature °C; T0:150; T1:200; T2:300

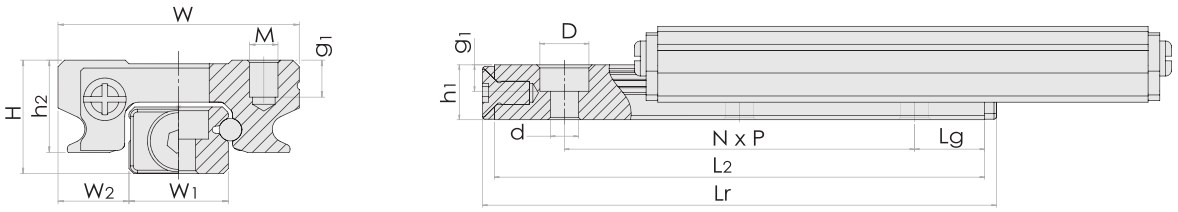
Height and chamfered reference edge

The tables for the chamfered reference edge corner and the height of reference edge shown on MR Miniature Linear Guide series are also suitable for the ST Miniature Stroke Slide series.

7.3 Order Information

An example of the ST miniature stroke slide series parts numbering system is shown in the above ordering designation.

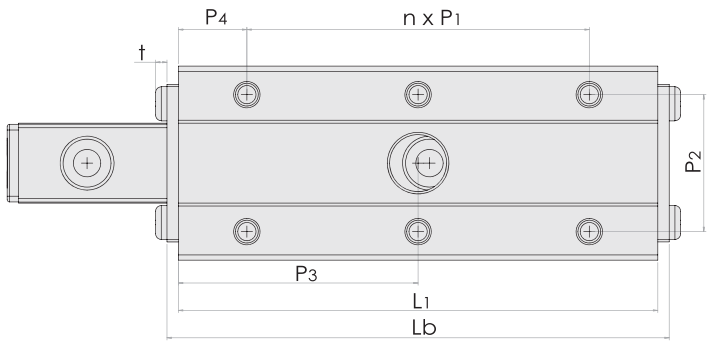
Dimensions and Specifications



7.4 ST Series

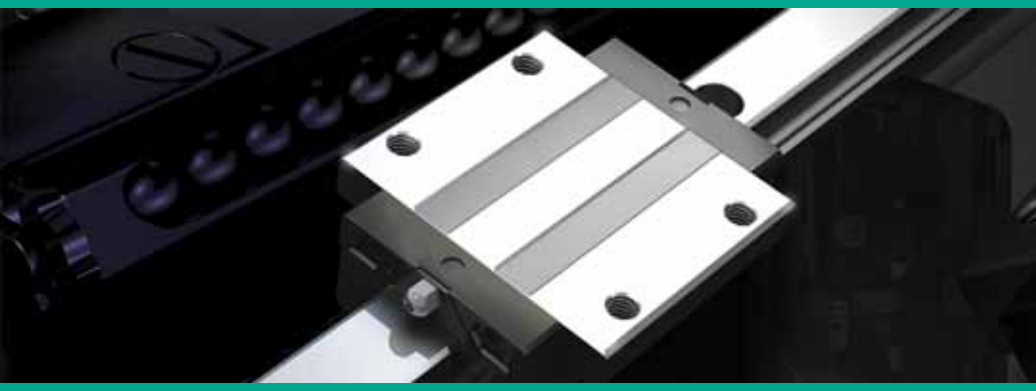
Model Code	Fabricate Dimensions (mm)		Rail Dimensions (mm)			
	H	W_2	P	W_1	h_1	D x d x g_1
ST7M	8	5	15	7	4.7	4.2x2.4x2.3
ST9M	10	5.5	20	9	5.5	6x3.5x3.5
ST12M	13	7.5	25	12	7.5	6x3.5x4.5

Model Code	Max Stroke	Rail Dimensions (mm)				
	Ls	Lr	L_2	Lg	N	Lb
ST7M	27	30	28	6.5	1	30
ST7M	41	45	43	6.5	2	45
ST7M	55	60	58	6.5	3	60
ST9M	38	40	38	9	1	40
ST9M	58	60	58	9	2	60
ST9M	78	80	78	9	3	80
ST12M	44	50	47.4	11.2	1	50
ST12M	69	75	72.4	11.2	2	75
ST12M	94	100	97.4	11.2	3	100



Block Dimensions (mm)						Model Code
P_1	P_2	W	h_2	Mxg_2	t	
15	12	17	6.5	M2x2.5	1	ST7M
20	15	20	7.8	M3x3.0	1.3	ST9M
25	20	27	10	M3x3.5	1.3	ST12M

Block Dimensions (mm)				Load Capacities		Static Moment		
L_1	P_4	n	P_3	C_{100B}(dyn)	C_0(stat)	Mro	Mpo	Myo
28	6.5	1	14	910	1580	5.9	3.4	3.4
43	6.5	2	21.5	1220	2500	9.1	8	8
58	6.5	3	29	1490	3330	12.4	14.6	14.6
38	9	1	19	1590	2773	13.1	6.8	6.8
58	9	2	29	2080	4170	19.7	16	16
78	9	3	39	2520	5547	26.2	29.2	29.2
47.4	11.2	1	23.7	2550	4340	27	16	16
72.4	11.2	2	36.2	3350	6510	40.1	35.6	35.6
97.4	11.2	3	48.7	4050	8670	54	62.8	62.8



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