

Linear Guideways

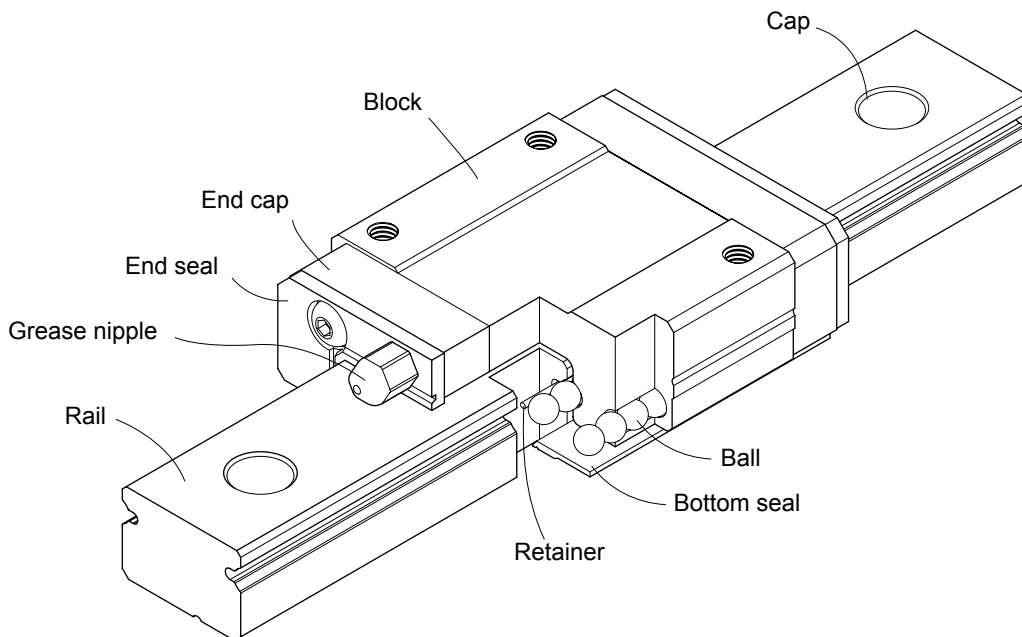
MG Series

2-3 MG Series - Miniature Linear Guideway

2-3-1 Features of MGN Series

1. Tiny and light weight, suitable for miniature equipment.
2. All materials in special grade of stainless steel for anti-corrosion size 9 and 12 are also available in alloy steel.
3. Gothic arch contact design can sustain the load from all directions and offer high rigidity and high accuracy.
4. Steel balls will be held by miniature retainer to avoid the balls from falling out even when the blocks are removed from the rail installation.
5. Interchangeable types are available in certain precision grades.

2-3-2 Construction of MGN Series



- Rolling circulation system: Block, rail, end cap and retainer
- Lubrication system: The grease nipple is available for MGN15, grease gun can be used for lubricating.
- Dust protection system: End seal, bottom seal (optional size 9,12,15), cap (size12,15)

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HIWIN	HIWIN	THK	THK	THK	NSK	NSK	STAR	STAR	IKO
	MGN 7 C	RSR 7Z	RSR 7		LU 07AL		0442-7XX		LWL 7
	MGN 7H								
	MGN 9C	RSR 9Z	RSR 9K		LU 09TL		0442-8XX		LWL 9
	MGN 9H								
	MGN 12C	RSR 12Z	RSR 12V		LU12AL	LU 12TL	0442-2XX		LWL 12
	MGN 12H								LWLG 12
	MGN 15C	RSR 15Z	RSR 15V		LU15AL		0442-5XX		LWL 15
	MGN 15H								LWLG 15
	MGW 7C	RSR 7WZ			LE 07TL				LWLF 14
	MGW 7H								LWLFG 14
	MGW 9C	RSR 9WZ	RSR 9W		LE 09AL		0443-8XX		LWLF 18
	MGW 9H								LWLFG 18
	MGW 12C	RSR 12WZ	RSR 12W		LE 12AL		0443-2XX		LWLF 24
	MGW 12H								LWLFG 24
	MGW 15C	RSR 15WZ	RSR 15W		LE 15AL		0443-5XX		LWLF 42
	MGW 15H								LWLFG 42
HGH 15CA	LGH 15CA	HSR 15R	SHS 15R				1621-1XX		LWHD 15..B
HGH 20CA	LGH 20CA	HSR 20R	SHS 20V		LH 20AN		1622-8XX		LWHS 20..B
HGH 20HA	LGH 20HA	HSR 20LR	SHS 20LV		LH 20BN		1623-8XX		LWHSG 20
HGH 25CA	LGH 25CA	HSR 25R	SHS 25R		LH 25AN		1621-2XX		LWHD 25..B
HGH 25HA	LGH 25HA	HSR 25LR	SHS 25LR		LH 25BN		1624-2XX		LWHDG 25
HGH 30CA	LGH 30CA	HSR 30R	SHS 30R		LH 30AN		1621-7XX		LWHD 30..B
HGH 30HA	LGH 30HA	HSR 30LR	SHS 30LR		LH 30BN		1624-7XX		LWHDG 30
HGH 35CA	LGH 35CA	HSR 35R	SHS 35R		LH 35AN		1621-3XX		LWHD 35..B
HGH 35HA	LGH 35HA	HSR 35LR	SHS 35LR		LH 35BN		1624-3XX		LWHDG 35
HGH 45CA	LGH 45CA	HSR 45R	SHS 45R		LH 45AN		1621-4XX		LWHD 45..B
HGH 45HA	LGH 45HA	HSR 45LR	SHS 45LR		LH 45BN		1624-4XX		LWHDG 45
HGH 55CA	LGH 55CA	HSR 55R	SHS 55R		LH 55AN		1621-5XX		LWHD 55..B
HGH 55HA	LGH 55HA	HSR 55LR	SHS 55LR		LH 55BN		1624-5XX		LWHDG 55
HGH 65CA	LGH 65CA	HSR 65R	SHS 65V		LH 65AN		1622-6XX		LWHD 65..B
HGH 65HA	LGH 65HA	HSR 65LR	SHS 65LV		LH 65BN		1623-6XX		LWHDG 65
HGW 15CC	LGW 15CA	HSR 15A							LWHT 15..B
HGW 15CC	LGW 15CB	HSR 15B							LWH 15..B
HGW 15CC	LGW 15CC	SHS 15C					1651-1XX*		
HGW 20CC	LGW 20CA	HSR 20A	HSR 20CA*		LH 20EL		1651-8XX*		LWHT 20..B
HGW 20CC	LGW 20CB	HSR 20B	HSR 20CB*		LH 20FL		1651-8XX*		LWH 20..B
HGW 20HC	LGW 20HA	HSR 20LA	HSR 20HA*		LH 20GL		1653-8XX*		LWHTG 20
HGW 20HC	LGW 20HB	HSR 20LB	HSR 20HB*		LH 20HL		1653-8XX*		LWHG 20
HGW 25CC	LGW 25CA	HSR 25A	HSR 25CA*		LH 25EL				LWHT 25..B
HGW 25CC	LGW 25CB	HSR 25B	HSR 25CB*		LH 25FL				LWH 25..B
HGW 25CC	LGW 25CC	SHS 25C			LH 25EL-90		1651-2XX*		
HGW 25HC	LGW 25HA	HSR 25LA	HSR 25HA*		LH 25GL				LWHTG 25
HGW 25HC	LGW 25HB	HSR 25LB	HSR 25HB*		LH 25HL				LWHG 25
HGW 25HC	LGW 25HC	SHS 25LC			LH 25GL-90		1653-2XX*		
HGW 30CC	LGW 30CA	HSR 30A	HSR 30CA*		LH 30EL				LWHT 30..B
HGW 30CC	LGW 30CB	HSR 30B	HSR 30CB*		LH30FL				LWH 30..B
HGW 30CC	LGW 30CC	SHS 30C			LH 30EL-90		1651-7XX*		
HGW 30HC	LGW 30HA	HSR 30LA	HSR 30HA*		LH 30GL				LWHTG 30
HGW 30HC	LGW 30HB	HSR 30LB	HSR 30HB*		LH 30HL				LWHG 30
HGW 30HC	LGW 30HC	SHS 30LC			LH 30GL-90		1653-7XX*		
HGW 35CC	LGW 35CA	HSR 35A	HSR 35CA*		LH 35EL				LWHT 35..B

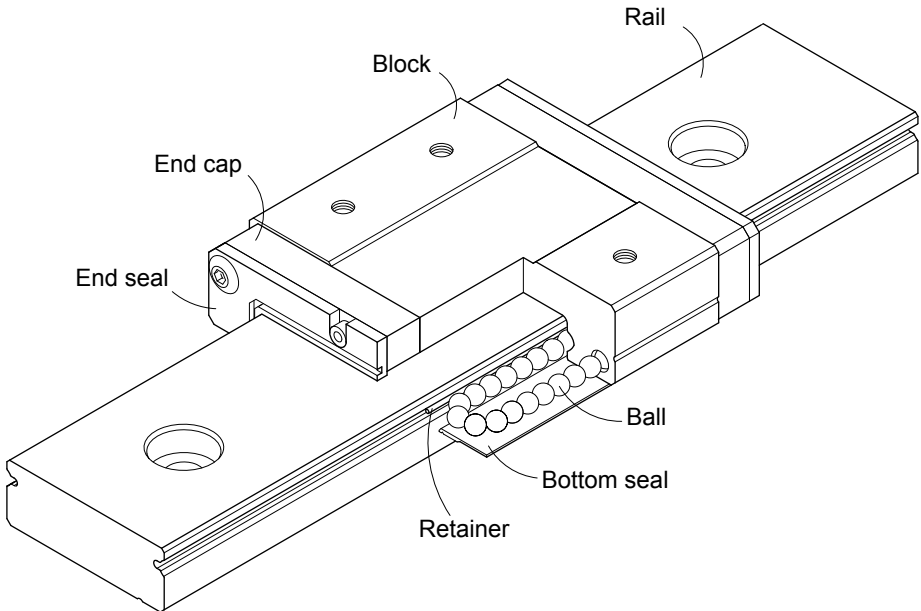


2-3-3 Feature of MGW Series

The design feature of wide type miniature guideway-MGW:

1. The design of enlarged width has increased the capacity of moment load.
2. Gothic arch contact design has high rigidity characteristic in all directions.
3. Steel balls will be held by miniature retainer to avoid the balls from falling out even when the block are removed form the rail installation.
4. All metallic components are made of stainless steel for anti-corrosion purpose.

2-3-4 Configuration of MGW Series



- Rolling circulation system: Block, rail, end cap and retainer
- Lubrication system: The grease nipple is available for MGW15, grease gun can be used for lubricating.
- Dust protection system: End seal, bottom seal (optional size 9,12,15), cap (size12,15)

2-3-5 Application

MGN/MGW series can be used in many fields, such as semiconductor equipment, PCB assembly equipment, medical equipment, robotics, measuring equipment, office automation equipment, and other miniature sliding machinery.

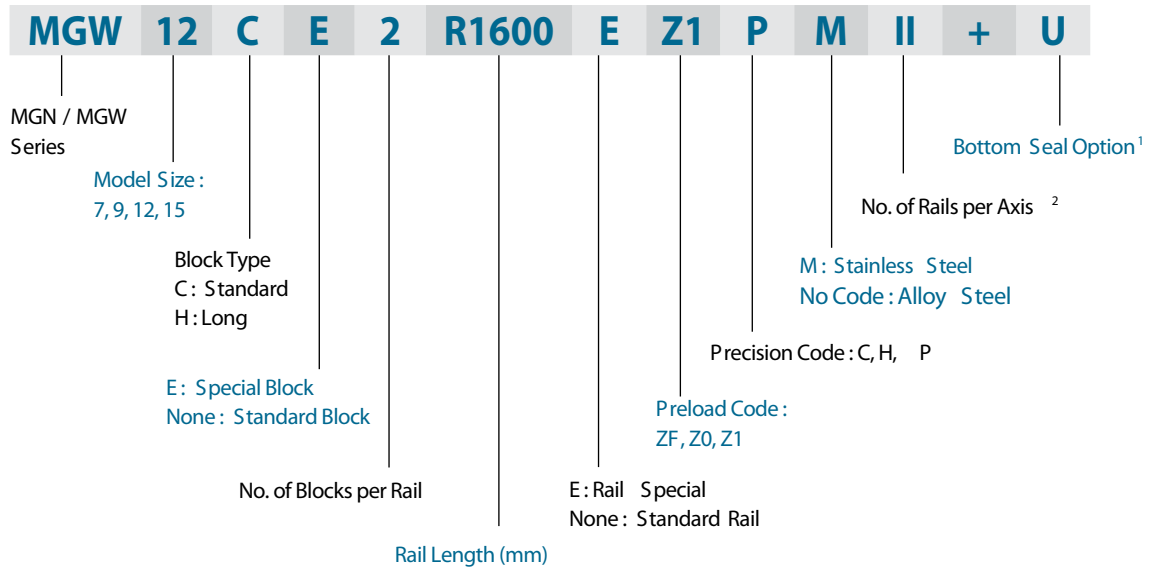
2-3-6 Model Number of MGN/MGW Series

MGN and MGW series linear guideway can be classified into non-interchangeable and interchangeable types. The sizes of two types are same. The interchangeable type is more convenient due to rails can be replaced. However, its precision is less than non-interchangeable type. Because of strict dimensional control, the interchangeable type linear guideway is a smart choice for customers when rails don't need to be paired for an axis. The model number contains the information of the size, type, accuracy class, preload class, and more.

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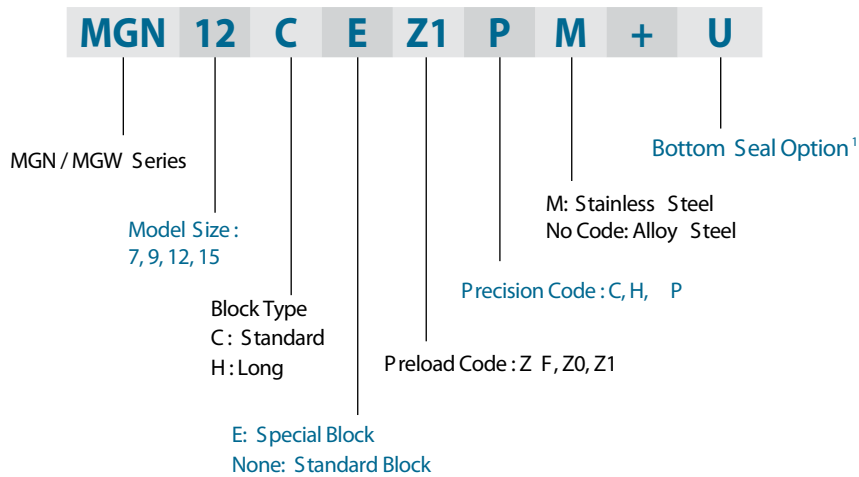
(1) Non-interchangeable type



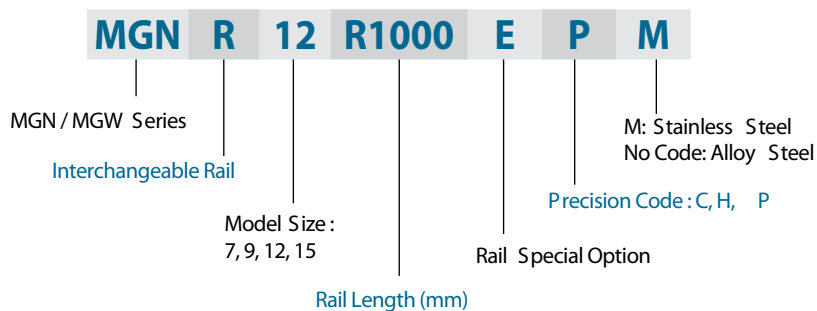
Note: 1. The bottom seal is available for MGN & MGW 9, 12, 15.
2. The roman numerals express the number of rails used in one axis. No symbol indicates single rail in an axis.

(2) Interchangeable type

- Interchangeable Block

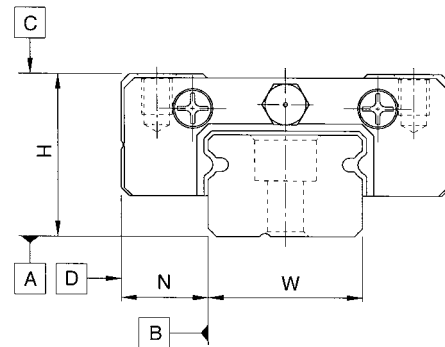


- Interchangeable Rail



2-3-7 Accuracy Classes

The accuracy of MGN/MGW series can be classified into three classes: normal (C), high (H), precision (P), super precision (SP), ultra precision (UP). Customers can select the proper linear guideway by the required accuracy of the application.



(1) Non-interchangeable

The accuracy values are taken at the central part of each block.

Table 2.45 Accuracy Standard of Non-interchangeable Type

Unit: mm

Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.04	± 0.02	± 0.01
Dimensional tolerance of width N	± 0.04	± 0.025	± 0.015
Pair Variation of height H	0.03	0.015	0.007
Pair Variation of width N (Master Rail)	0.03	0.02	0.01
Running parallelism of block surface C to surface A	According to Table 2.47		
Running parallelism of block surface D to surface B	According to Table 2.47		

(2) Interchangeable

Height variation between the interchangeable and non-interchangeable types is minimal.

Table 2.46 Accuracy Standard of Interchangeable Type

Unit: mm

Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	± 0.04	± 0.02	± 0.01
Dimensional tolerance of width N	± 0.04	± 0.025	± 0.015
One Set	Pair Variation of height H	0.03	0.015
	Pair Variation of width N	0.03	0.02
Pair Variation of width N (Master Rail)	0.07	0.04	0.02
Running parallelism of block surface C to surface A	According to Table 2.47		
Running parallelism of block surface D to surface B	According to Table 2.47		

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(3) Accuracy of running parallelism

The running parallelism C to A and D to B are related to the rail length.

Table 2.47 Accuracy of Running Parallelism

Rail Length (mm)	Accuracy (μm)			Rail Length (mm)	Accuracy (μm)		
	(C)	(H)	(P)		(C)	(H)	(P)
50 & under	12	6	2	315 ~ 400	18	11	6
50 ~ 80	13	7	3	400 ~ 500	19	12	6
80 ~ 125	14	8	3.5	500 ~ 630	20	13	7
125 ~ 200	15	9	4	630 ~ 800	22	14	8
200 ~ 250	16	10	5	800 ~ 1,000	23	16	9
250 ~ 315	17	11	5	1,000 ~ 1,200	25	18	11

2-3-8 Preload

MGN/MGW series provide three preload levels for various applications.

Table 2.48 Preload Classes

Class	Code	Preload	Accuracy
Light Clearance	ZF	Clearance 4~10μm	C
Very Light Preload	Z0	0	C~P
Light Preload	Z1	0.02C	C~P

Note: " C " in column preload means basic dynamic load rating.

2-3-9 Dust Proof Accessories

End seals and standard accessories fixed on both sides of the block can prevent dust from entering the block, so the accuracy and service life of a linear guideway can be maintained. Bottom seals are fixed under the skirt portion of the block to prevent dust from entering. Customers can order bottom seals by adding the mark "+U" followed by the model number. Sizes 12 and 15 provide bottom seals as an option, but sizes 7 and 9 do not offer the option due to the space limit of H₁. If the linear guideway is equipped with a bottom seal, the lateral mounting surface of the rail must not exceed H₁.

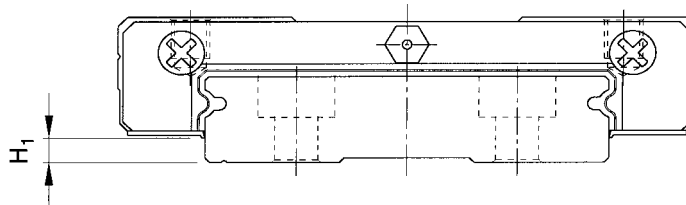


Table 2.49

Size	Bottom seal	H ₁ mm
MGN 7	-	-
MGN 9	-	-
MGN 12		2
MGN 15		3
MGW 7	-	-
MGW 9	-	-
MGW 12		2.6
MGW 15		2.6

2-3-10 Cautions for Installation

- Shoulder heights and fillets

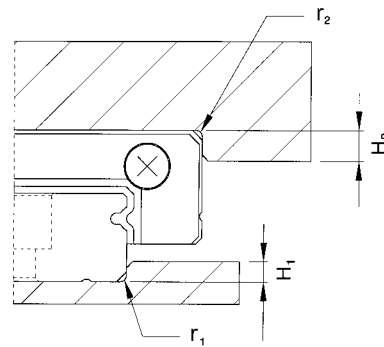


Table 2.50 Shoulder Heights and Fillets

Size	Max. radius of fillets r_1 (mm)	Max. radius of fillets r_2 (mm)	Shoulder height H_1 (mm)	Shoulder height H_2 (mm)
MGN 7	0.2	0.2	1.2	3
MGN 9	0.2	0.3	1.7	3
MGN 12	0.3	0.4	1.7	4
MGN 15	0.5	0.5	2.5	5
MGW 7	0.2	0.2	1.7	3
MGW 9	0.3	0.3	2.5	3
MGW 12	0.4	0.4	3	4
MGW 15	0.4	0.8	3	5

- Tightening torque of bolts for installation

Improperly tightening the rail mounting bolts will seriously affect the accuracy of the linear guideway. The following table lists the recommended tightening torque for the specific sizes of bolts.

Table 2.51 Tightening Torque

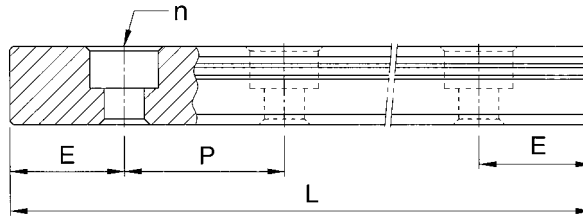
Size	Bolt size	Torque (kgf-cm)
MGN 7	M2	5.9
MGN 9	M3	19
MGN 12	M3	19
MGN 15	M3	19
MGW 7	M3	19
MGW 9	M3	19
MGW 12	M4	40
MGW 15	M4	40

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2-3-11 Standard and Maximum Lengths of Rail

HIWIN stocks standard lengths of rail. If a non-standard length is required, it is recommended to specify the E value to be not greater than 1/2 of the pitch (P) to avoid instability at the end of the rail, and the E value should not be less than E_{min} in order to prevent breaking the end mounting hole.



$$L = (n-1) \cdot P + 2 \cdot E \quad \dots \dots \dots \text{Eq.2.3}$$

- L : Total length of rail (mm)
- n : Number of mounting holes
- P : Distance between any two holes (mm)
- E : Distance from the center of the last hole to the edge (mm)

Table 2.52

unit: mm

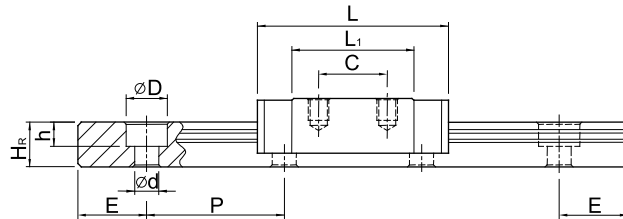
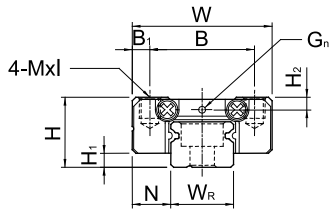
Item	MGNR	MGNR	MGNR	MGNR	MGWR	MGWR	MGWR	MGWR
	7M	9M	12M	15M	7M	9M	12M	15M
Standard Length L(n)	40(3)	55(3)	70(3)	70(2)	80(3)	80(3)	110(3)	110(3)
	55(4)	75(4)	95(4)	110(3)	110(4)	110(4)	150(4)	150(4)
	70(5)	95(5)	120(5)	150(4)	140(5)	140(5)	190(5)	190(5)
	85(6)	115(6)	145(6)	190(5)	170(6)	170(6)	230(6)	230(6)
	100(7)	135(7)	170(7)	230(6)	200(7)	200(7)	270(7)	270(7)
	130(9)	155(8)	195(8)	270(7)	260(9)	230(8)	310(8)	310(8)
			175(9)	220(9)	310(8)		260(9)	350(9)
			195(10)	245(10)	350(9)		290(10)	390(10)
			275(14)	270(11)	390(10)		350(14)	430(11)
			375(19)	320(13)	430(11)		500(19)	510(13)
				370(15)	470(12)		710(24)	590(15)
				470(19)	550(14)		860(29)	750(19)
				570(23)	670(17)			910(23)
			695(28)	870(22)			1070(27)	
Pitch (P)	15	20	25	40	30	30	40	40
Distance to End (E _s)	5	7.5	10	15	10	10	15	15
Max. Standard Length	595(40)	995(40)	995(40)	990(25)	590(20)	980(33)	1150(29)	1150(29)
Max. Length	600	1000	1000	1000	1000	1000	1200	1200

- Note: 1. Tolerance of E value for standard rail is 0.5~0.5 mm. Tolerance of E value for jointed rail is 0~0.3 mm.
- 2. Maximum standard length means the max. rail length with standard E value on both sides.
- 3. The specification with " M" mark are stainless steel and without " M" mark are alloy steel.
- 4. If smaller E value is needed, please contact HIWIN.

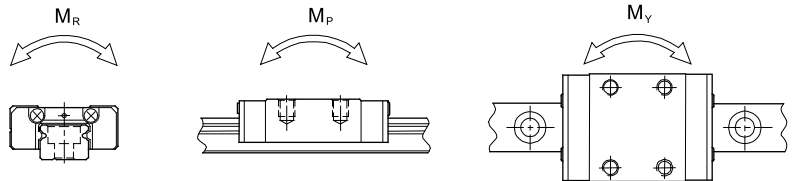
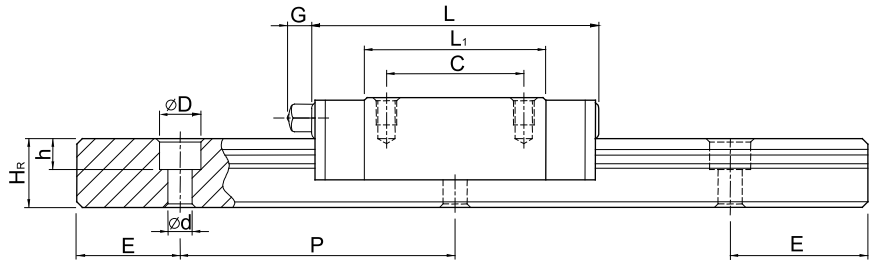
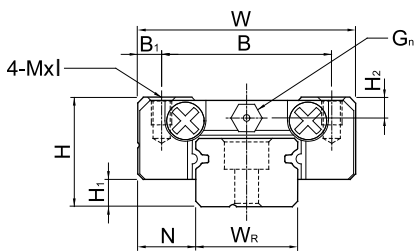
2-3-12 Dimensions for MGN/MGW Series

(1) MGN-C / MGN-H

MGN7, MGN9, MGN12



MGN15



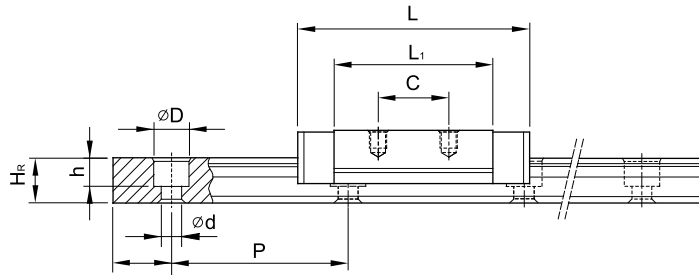
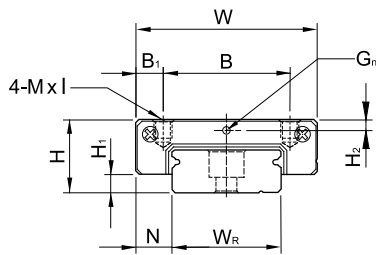
Model No.	Dimensions of Assembly (mm)		Dimensions of Block (mm)										Dimensions of Rail (mm)					Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating C (kgf)	Basic Static Load Rating C ₀ (kgf)	Static Rated Moment			Weight				
	H	H ₁	N	W	B	B ₁	C	L ₁	L	G	G _n	Mxl	H ₂	W _R	H _R	D	h				d	P	E	M _R	M _P	M _Y	Block g	Rail kg/m
	kgf-m	kgf-m	kgf-m	g	kg/m																							
MGN 7C	8	1.5	5	17	12	2.5	8	13.5	22.5	-	Ø1.2	M2x2.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2x6	100	127	0.48	0.29	0.29	10	0.22
MGN 7H							13	21.8	30.8												M2x6	140	200	0.78	0.49	0.49	15	
MGN 9C	10	2	5.5	20	15	2.5	10	18.9	28.9	-	Ø1.2	M3x3	1.8	9	6.5	6	3.5	3.5	20	7.5	M3x8	190	260	1.2	0.75	0.75	16	0.38
MGN 9H							16	29.9	39.9												M3x8	260	410	2	1.9	1.9	26	
MGN 12C	13	3	7.5	27	20	3.5	15	21.7	34.7	-	Ø1.4	M3x3.5	2.5	12	8	6	4.5	3.5	25	10	M3x8	290	400	2.6	1.4	1.4	34	0.65
MGN 12H							20	32.4	45.4												M3x8	380	600	3.9	3.7	3.7	54	
MGN 15C	16	4	8.5	32	25	3.5	20	26.7	42.1	4.5	CN3S	M3x4	3	15	10	6	4.5	3.5	40	15	M3x10	470	570	4.6	2.2	2.2	59	1.06
MGN 15H							25	43.4	58.8												M3x10	650	930	7.5	5.9	5.9	92	

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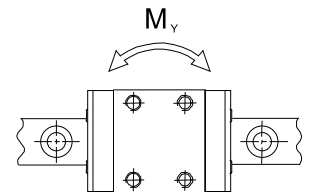
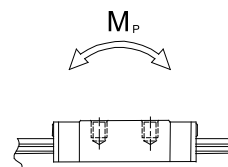
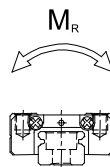
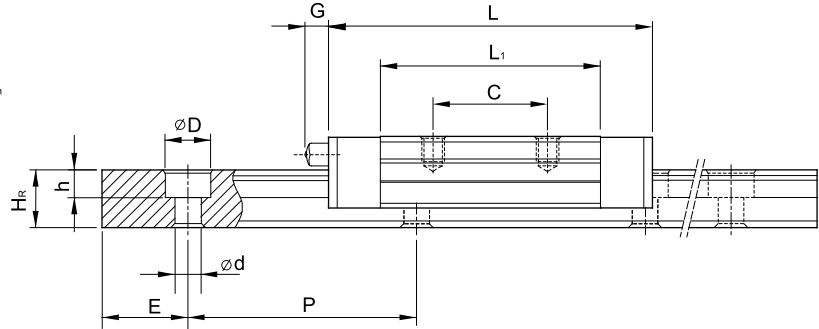
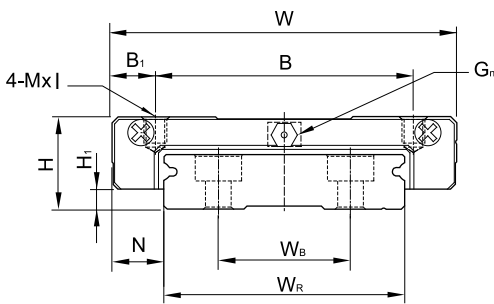
MG Series

(2) MGW-C / MGW-H

MGW7, MGW9, MGW12



MGW15



Model No.	Dimensions of Assembly (mm)		Dimensions of Block (mm)										Dimensions of Rail (mm)					Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating C (kgf)	Basic Static Load Rating Co (kgf)	Static Rated Moment			Weight					
	H	H1	N	W	B	B1	C	L1	L	G	Gn	Mxl	H2	WR	WB	HR	D				h	d	P	E	MR	MP	MY	Block g	Rail kg/m
	kgf-m	kgf-m	kgf-m	g	kg/m																								
MGW 7C	9	1.9	5.5	25	19	3	10	21	31.2	-	Ø1.2	M3x3	1.85	14	-	5.2	6	3.2	3.5	30	10	M3x6	140	210	1.6	0.73	0.73	20	0.51
MGW 7H							19	30.8	41													180	320	2.39	1.58	1.58	29		
MGW 9C	12	2.9	6	30	21	4.5	12	27.5	39.3	-	Ø1.4	M3x3	2.4	18	-	7	6	4.5	3.5	30	10	M3x8	280	420	4.09	1.93	1.93	40	0.91
MGW 9H					23	3.5	24	38.5	50.7													350	600	5.56	3.47	3.47	57		
MGW 12C	14	3.4	8	40	28	6	15	31.3	46.1	-	Ø1.4	M3x3.6	2.8	24	-	8.5	8	4.5	4.5	40	15	M4x8	400	570	7.17	2.83	2.83	71	1.49
MGW 12H							28	45.6	60.4													520	840	10.47	5.85	5.85	103		
MGW 15C	16	3.4	9	60	45	7.5	20	38	54.8	5.2	CN35	M4x4.2	3.2	42	23	9.5	8	4.5	4.5	40	15	M4x10	690	940	20.32	5.78	5.78	143	2.86
MGW 15H							35	57	73.8													910	1410	30.48	12.5	12.5	215		