

Wide Rail, Four-way Equal Load LM Guide Model HRW

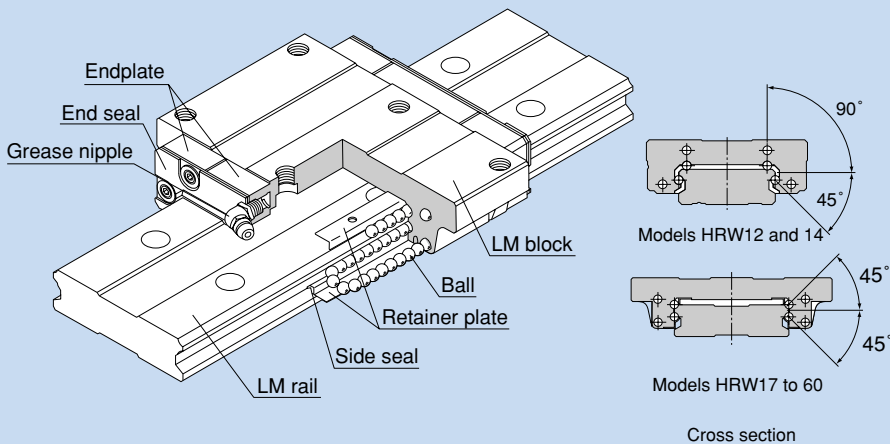


Fig. 1 Structure of Model HRW

● Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and end-plates incorporated in the LM block allow the balls to circulate.

Since retainer plates hold the balls, they do not fall off even if the LM rail is pulled out (except models HRW 12 and 14LR).

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse-radial and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient.

In a low gravitational center structure with a large rail width and a low overall height, this model can be used in places where space saving is required or high rigidity against a moment is required even in a single axis configuration.

● Compact, heavy load

Since the number of effective balls is large, this model is highly rigid in all directions. It can adequately receive a moment even in a single rail configuration.

Additionally, since the second moment of inertia of the rail is large, the rigidity in the lateral directions is also high. Accordingly, it does not need reinforcement such as a side support.

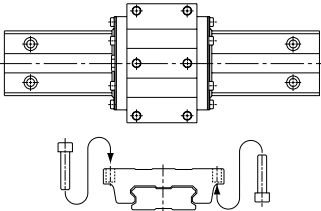
● Self-adjustment capability

The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth linear motion.

Types and Features

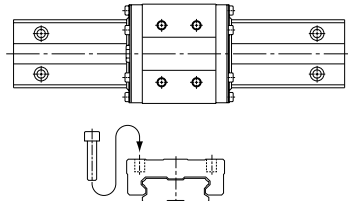
Model HRW-CA

The flange of the LM block has tapped holes.
Can be mounted from the top or the bottom.



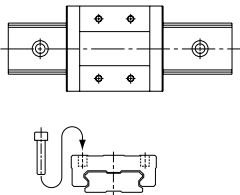
Model HRW-CR

The LM block has tapped holes.



Miniature Type Model HRW-LR

The LM block has tapped holes.



Rated Loads in All Directions

Model HRW is capable of receiving loads in all four directions: radial, reverse-radial and lateral directions.

The basic load ratings of model HRW 17 to 60 are equal in all the four directions (radial, reverse-radial and lateral directions), and their actual values are provided in the dimensional table for HRW. The basic load ratings of models HRW 12 and 14 indicate the values in the radial directions in Fig. 2, and their actual values are provided in the dimensional table for HRW. The values in the reverse-radial and lateral directions are obtained from table 1.

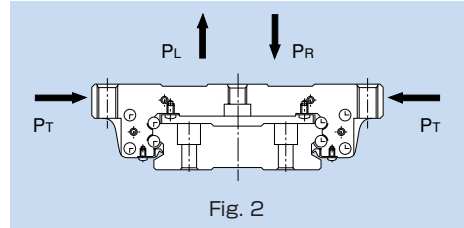


Fig. 2

Table 1 Rated Loads in All Directions with Models HRW 12 and 14

Direction	Basic dynamic load rating	Basic static load rating
Radial direction	C	C ₀
Reverse-radial direction	C _L =0.78C	C _{0L} =0.71C ₀
Lateral direction	C _T =0.48C	C _{0T} =0.35C ₀

Equivalent Load

When the LM block of models HRW 17 to 60 receives loads in the reverse-radial and lateral directions simultaneously, the equivalent load is obtained from the equation below.

$$P_E = P_R (P_L) + P_T$$

where

P_E :Equivalent load (N)
 •Radial direction
 •Reverse-radial direction
 •Lateral direction

P_R :Radial load (N)

P_L :Reverse-radial load (N)

P_T :Lateral load (N)

When the LM block of models HRW 12 and 14 receives loads in the reverse-radial and lateral directions simultaneously, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_L + Y \cdot P_T$$

where

P_E :Equivalent load (N)
 •Reverse-radial direction
 •Lateral direction

P_L :Reverse-radial load (N)

P_T :Lateral load (N)

X/Y axes :Equivalent factor (see table 2)

Table 2 Equivalent Factors of Models HRW 12 and 14

P_E	X	Y
Equivalent load in reverse-radial direction	1	2
Equivalent load in lateral direction	0.5	1

Options

Dust Prevention Accessories

THK offers various dust prevention accessories for model HRW.

When a dust prevention accessory is required, specify the desired item with the corresponding symbol provided in table 3 (for details of dust prevention accessories, see page a-24).

For supported model numbers for dust prevention accessories and overall LM block length with dust prevention accessories attached (dimension L), see page a-368.

Table 3 Symbols of Dust Prevention Accessories for Model HRW

Symbol	Dust prevention accessory
UU	With end seal
SS	With end seal + side seal
DD	With double seals + side seal (note)
ZZ	With end seal + side seal + metal scraper (note)
KK	With double seals + side seal + metal scraper (note)

Note: The side seal is not available for models HRW17 and 21.

Seal resistance value

For the maximum seal resistance value per LM block when a lubricant is applied on seals HRW...UU, refer to the corresponding value provided in table 4.

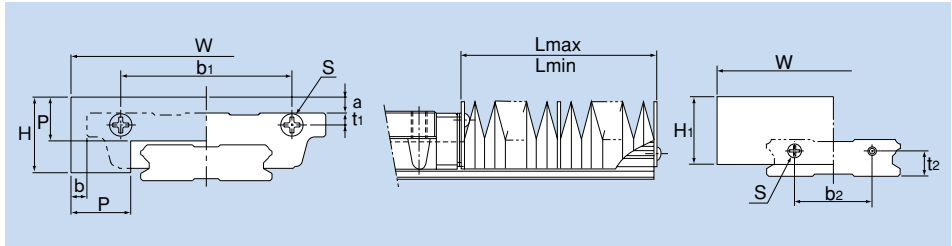
Table 4 Maximum Seal Resistance Value of Seals HRW...UU

Unit: N

Model No.	Seal resistance value
HRW 12	0.2
HRW 14	0.3
HRW 17	2.9
HRW 21	4.9
HRW 27	4.9
HRW 35	9.8
HRW 50	14.7
HRW 60	19.6

● Dedicated Bellows JHRW for Model HRW

The table below shows the dimensions of dedicated bellows JHRW for model HRW. Specify the corresponding model number of the desired bellows from the table.



Unit: mm

Model No.	Major dimensions											Supported model		
	W	H	H ₁	P	b ₁	t ₁	b ₂	t ₂	Mounting bolt S	a	b Type CA Type CR		$\frac{A}{L_{min}}$ L _{max}	
JHRW 17	68	22	23	15	43	3	18	6	*M3×6 ℓ	8	4	9	5	HRW 17
JHRW 21	75	25	26	17	48	3	22	7	M3×6 ℓ	8	3.5	10.5	6	HRW 21
JHRW 27	85	33.5	33.5	20	48	3	20	10	M3×6 ℓ	10	2.5	11.5	7	HRW 27
JHRW 35	120	35	35	20	75	3.5	40	13	M3×6 ℓ	6	0	10	7	HRW 35
JHRW 50	164	42	42	20	100	9	50	16	M4×8 ℓ	-3	1	17	7	HRW 50

Note 1: For model JH17's location marked with "*", mounting bolts are used only on the LM rail side while the LM block side uses M2.5 x 8 (nominal) tapped pins.

Note 2: When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note 3: For lubrication when using the dedicated bellows, contact THK.

Note 4: When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering the LM Guide.

Model number coding **JHRW21-60/360**

1

2

1 Model number...bellows for HRW21

2 Bellows dimensions (length when compressed / length when extended)

Note: The length of the bellows is calculated as follows.

$$L_{min} = \frac{S}{(A-1)} \quad S: \text{Stroke length (mm)}$$

$$L_{max} = L_{min} \cdot A \quad A: \text{Extension rate}$$

● Dedicated Cap C for LM Rail Mounting Holes

If any of the LM rail mounting holes of an LM Guide is filled with cutting chips or foreign matter, they may enter the LM block structure. Entrance of such foreign matter can be prevented by covering each LM rail mounting hole with the dedicated cap so that the top of the mounting holes is on the same level as the LM rail top face.

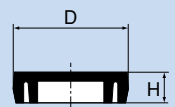
Since the dedicated cap C for LM rail mounting holes uses a special synthetic resin with high oil resistance and high wear resistance, it is highly durable.

When placing an order, specify the desired cap type with the corresponding cap number indicated in table 5.

For the procedure for mounting the cap, see page a-22.

Table 5 Major Dimensions of Dedicated Cap C

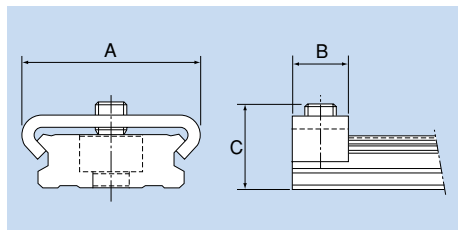
Model No.	Cap C model No.	Bolt used	Major dimensions mm	
			D	H
HRW 14	C 4	M 4	7.8	1.0
HRW 17	C 4	M 4	7.8	1.0
HRW 21	C 4	M 4	7.8	1.0
HRW 27	C 4	M 4	7.8	1.0
HRW 35	C 6	M 6	11.4	2.7
HRW 50	C 8	M 8	14.4	3.7
HRW 60	C10	M10	18.0	3.7



Dedicated Cap C

Stopper

With miniature LM Guide models HRW12 and 14, balls will fall off if the LM block is removed from the LM rail. To prevent the LM block from being pulled out, end pieces are mounted before shipment. If removing the stopper when using the LM Guide, be sure that the LM block will not overrun.



Unit: mm

Model No.	A	B	C
HRW 12	22.0	7.0	10.5
HRW 14	28.6	7.6	11.2

Standard Length and Maximum Length of the LM Rail

Table 6 shows the standard lengths and the maximum lengths of model HRW variations. If the maximum length of the desired LM rail exceeds them, connected rails will be used. Contact THK for details.

For the G dimension when a special length is required, we recommend selecting the corresponding G value from the table. The longer the G dimension is, the less stable the G area may become after installation, thus causing an adverse impact to accuracy.

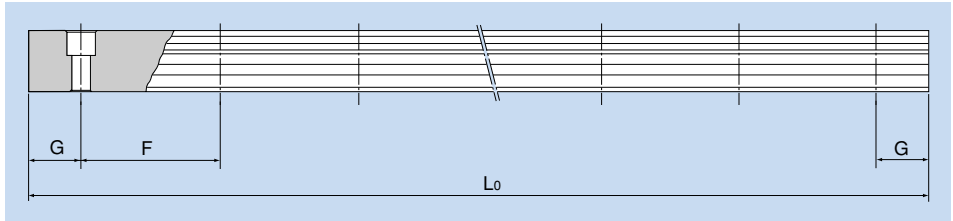


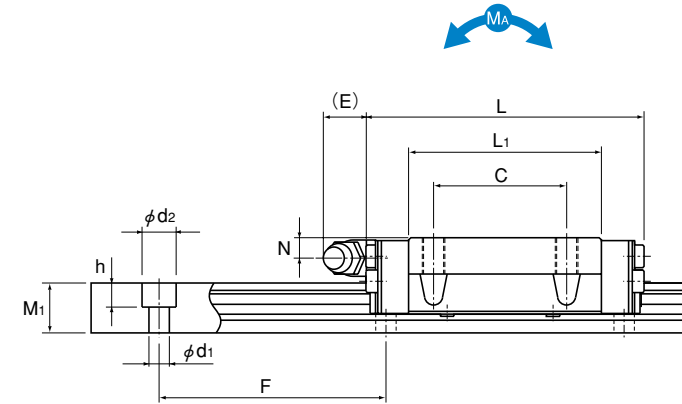
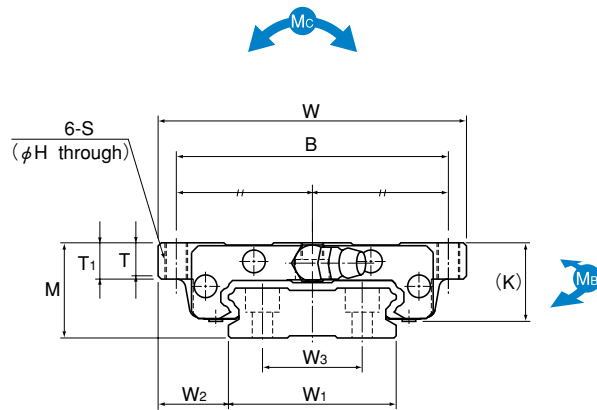
Table 6 Standard Length and Maximum Length of the LM Rail for Model HRW Unit: mm

Model No.	HRW 12	HRW 14	HRW 17	HRW 21	HRW 27	HRW 35	HRW 50	HRW 60
Standard LM rail length (L_0)	70	70	110	130	160	280	280	570
	110	110	190	230	280	440	440	885
	150	150	310	380	340	760	760	1200
	190	190	470	480	460	1000	1000	1620
	230	230	550	580	640	1240	1240	2040
	270	270		780	820	1560	1640	2460
	310	310					2040	
	390	390						
	470	470						
		550	670					
Standard pitch F	40	40	40	50	60	80	80	105
G	15	15	15	15	20	20	20	22.5
Max length	(1000)	(1430)	1900 (800)	1900 (1000)	3000 (1200)	3000	3000	3000

Note 1: The maximum length varies with accuracy grades. Contact THK for details.

Note 2: If connected rails are not allowed and a greater length than the maximum values above is required, contact THK.

Note 3: The figures in the parentheses indicate the maximum lengths of stainless steel made models.



Unit: mm

Model No.	External dimensions			LM block dimensions											Grease nipple	LM rail dimensions					Basic load rating		Static permissible moment kN-m*			Mass			
	Height M	Width W	Length L	B	C	H	S	L ₁	T	T ₁	K	N	E	Width W ₁ ±0.05		W ₂	W ₃	Height M ₁	Pitch F	d ₁ × d ₂ × h	C	C ₀	M _A 1 block	M _B 2 blocks in close contact	M _C 1 block	LM block kg	LM rail kg/m		
HRW 17CA HRW 17CAM	17	60	50.8	53	26	3.3	M4	33.6	5.5	6	14.5	4	2		33	13.5	18	9	40	4.5×7.5×5.3	4.31	8.14	0.0417	0.244	0.0417	0.244	0.128	0.15	2.1
HRW 21CA HRW 21CAM	21	68	58.8	60	29	4.4	M5	40	7.3	8	18	4.5	12		37	15.5	22	11	50	4.5×7.5×5.3	6.18	11.5	0.0701	0.398	0.0701	0.398	0.194	0.25	2.9
HRW 27CA HRW 27CAM	27	80	72.8	70	40	5.3	M6	51.8	9.5	10	24	6	12		42	19	24	15	60	4.5×7.5×5.3	11.5	20.4	0.156	0.874	0.156	0.874	0.398	0.5	4.3
HRW 35CA HRW 35CAM	35	120	106.6	107	60	6.8	M8	77.6	13	14	31	8	12		69	25.5	40	19	80	7×11×9	27.2	45.9	0.529	2.89	0.529	2.89	1.49	1.4	9.9
HRW 50CA	50	162	140.5	144	80	8.6	M10	103.5	16.5	18	46.6	14	16		90	36	60	24	80	9×14×12	50.2	81.5	1.25	6.74	1.25	6.74	3.46	4	14.6
HRW 60CA	60	200	158.9	180	80	10.5	M12	117.5	23.5	25	53.5	15	16		120	40	80	31	105	11×17.5×14	63.8	102	1.76	12.3	1.76	12.3	5.76	5.7	27.8

Note Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistant to corrosion and environment.

Note Static permissible moment* 1 block: static permissible moment value with 1 LM block
2 blocks: static permissible moment value with 2 blocks closely contacting with each other

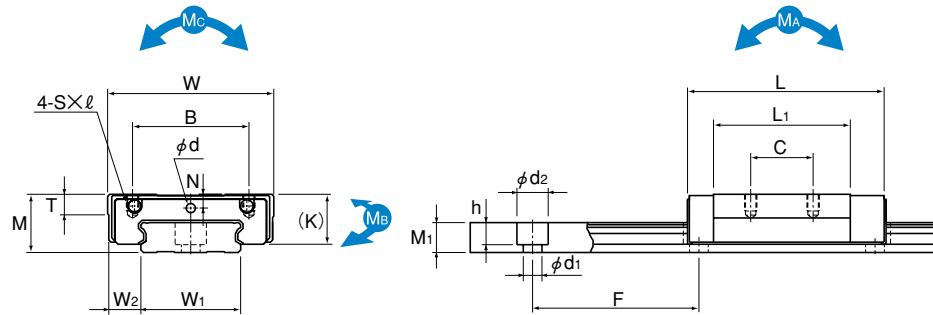
Model number coding

HRW35 CA 2 UU C1 M +1000L P M

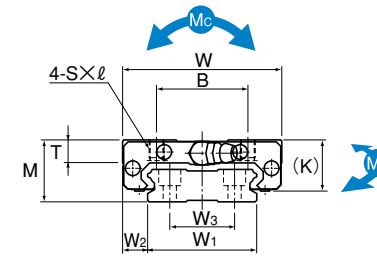
1 2 3 4 5 6 7 8 9

- 1 Model number 2 Type of LM block 3 No. of LM blocks used on the same rail
- 4 Dust prevention accessory symbol (see page a-359) 5 Radial clearance symbol (see page a-34)
- 6 LM block is made of stainless steel 7 LM rail length (in mm) 8 Accuracy symbol (see page a-38)
- 9 LM rail is made of stainless steel

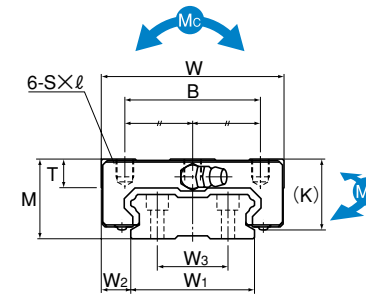
Models HRW-CR | HRW-CRM HRW-LRM



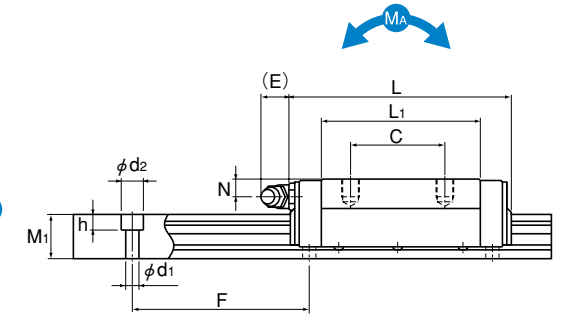
Models HRW12, 14LRM



Models HRW17, 21CR/CRM



Models HRW27 to 50CR/CRM



Unit: mm

Model No.	External dimensions			LM block dimensions										LM rail dimensions					Basic load rating		Static permissible moment kN-m*				Mass			
	Height M	Width W	Length L	B	C	S × ℓ	L ₁	T	K	N	E	Greasing hole d	Grease nipple	Width W ₁ ±0.05	W ₂	W ₃	Height M ₁	Pitch F	d ₁ × d ₂ × h	C kN	C ₀ kN	M _A 1 block	M _B 2 blocks in close contact	M _C 1 block	M _C 2 blocks in close contact	LM block kg	LM rail kg/m	
HRW 12LRM	12	30	37	21	12	M3×3.5	27	4	10	2.8	—	2.2	—	18	6	—	6.5	40	4.5×8×4.5	3.29	7.16	0.0262	0.138	0.013	0.069	0.051	0.045	0.79
HRW 14LRM	14	40	45.5	28	15	M3×4	32.9	5	12	3.3	—	2.2	—	24	8	—	7.2	40	4.5×7.5×5.3	5.38	11.4	0.0499	0.273	0.025	0.137	0.112	0.08	1.2
HRW 17CR HRW 17CRM	17	50	50.8	29	15	M4×5	33.6	6	14.5	4	2	—	PB107	33	8.5	18	9	40	4.5×7.5×5.3	4.31	8.14	0.0417	0.244	0.0417	0.244	0.128	0.12	2.1
HRW 21CR HRW 21CRM	21	54	58.8	31	19	M5×6	40	8	18	4.5	12	—	B-M6F	37	8.5	22	11	50	4.5×7.5×5.3	6.18	11.5	0.0701	0.398	0.0701	0.398	0.194	0.19	2.9
HRW 27CR HRW 27CRM	27	62	72.8	46	32	M6×6	51.8	10	24	6	12	—	B-M6F	42	10	24	15	60	4.5×7.5×5.3	11.5	20.4	0.156	0.874	0.156	0.874	0.398	0.37	4.3
HRW 35CR HRW 35CRM	35	100	106.6	76	50	M8×8	77.6	14	31	8	12	—	B-M6F	69	15.5	40	19	80	7×11×9	27.2	45.9	0.529	2.89	0.529	2.89	1.49	1.2	9.9
HRW 50 CR	50	130	140.5	100	65	M10×15	103.5	18	46.6	14	16	—	B-PT1/8	90	20	60	24	80	9×14×12	50.2	81.5	1.25	6.74	1.25	6.74	3.46	3.2	14.6

Note Since stainless steel is used in the LM block, LM rail and balls, these models are highly resistance to corrosion and environment.

Note Static permissible moment* 1 block: static permissible moment value with 1 LM block
2 blocks: static permissible moment value with 2 blocks closely contacting with each other

Model number coding **HRW27 CR 2 UU C1 M +820L P M**

1 2 3 4 5 6 7 8 9

- 1 Model number
- 2 Type of LM block
- 3 No. of LM blocks used on the same rail
- 4 Dust prevention accessory symbol (see page a-359)
- 5 Radial clearance symbol (see page a-34)
- 6 LM block is made of stainless steel
- 7 LM rail length (in mm)
- 8 Accuracy symbol (see page a-38)
- 9 LM rail is made of stainless steel

Overall LM Block Length with Options

■ Overall LM Block Length (Dimension L) of Model HRW with a Dust Prevention Accessory Attached

Unit: mm

Model No.	UU	SS	DD	ZZ	KK
HRW 12LRM	37	37	—	—	—
HRW 14LRM	45.5	45.5	—	—	—
HRW 17CA/CR	50.8	—	54.8	54.4	60.2
HRW 21CA/CR	58.8	—	64.2	62.8	69
HRW 27CA/CR	72.8	72.8	79	75.6	81.8
HRW 35CA/CR	106.6	106.6	113.8	112	119.2
HRW 50CA/CR	140.5	140.5	147.7	143.3	150.5
HRW 60CA	158.9	158.9	169.7	165.1	175.9

Note: "—" indicates not available.