

Separate Type LM Guide Model HR

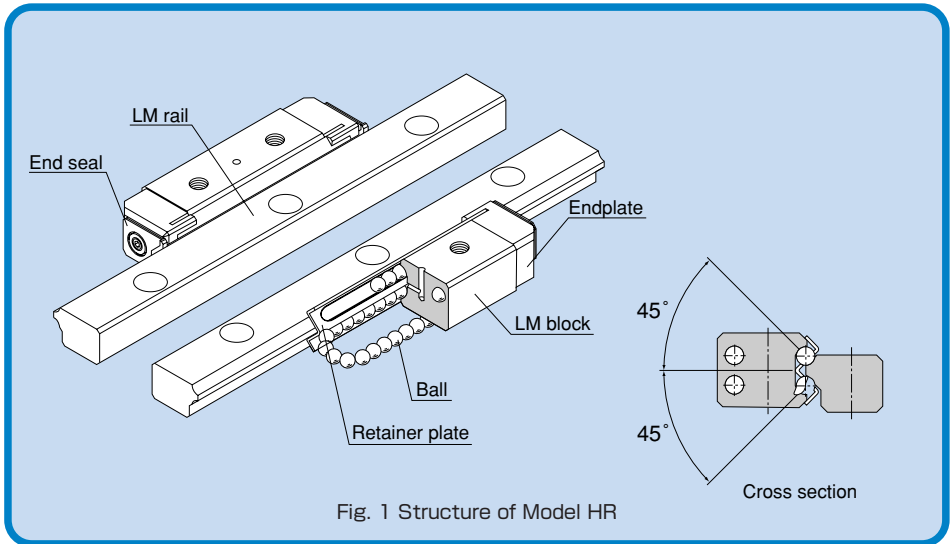


Fig. 1 Structure of Model HR

Structure and Features

Balls roll in two rows of raceways precision-ground on an LM rail and an LM block, and endplates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they do not fall off.

Because of the angular contact structure where two rows of balls rolling on the LM rail each contact the raceway at 45°, the same load can be applied in four directions (radial, reverse-radial and lateral directions) if a set of LM rails and LM block is mounted on the same plane (i.e., when two LM rails are combined with an LM block on the same plane). Furthermore, since the sectional height is low, a compact and stable linear guide mechanism is achieved.

This structure makes clearance adjustment relatively easy, and is highly capable of absorbing a mounting error.

Easy installation

Model HR is easier to adjust a clearance and achieve accuracy than cross-roller guides.

Self-adjustment capability

Even if the parallelism or the level between the two rails is poorly established, 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 and smooth linear motion to be achieved even under a preload.

● 4-way equal load

When the two rails are mounted in parallel, 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 and in extensive applications.

● Sectional dimensions approximate to that of cross-roller guides

Since model HR is an infinite motion type whose retainer plate does not move, it is not associated with cage displacement that occurs with cross-roller guides. In addition, the sectional shape of model HR is approximate to that of cross-roller guides, and therefore, its components are interchangeable with that of cross-roller guides.

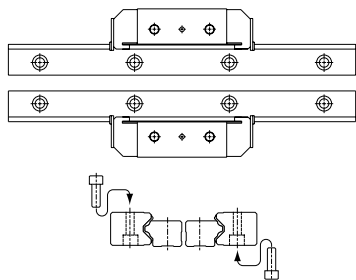
● Stainless steel type also available

A special type whose LM block, LM rail and balls are made of stainless steel is also available.

Types and Features

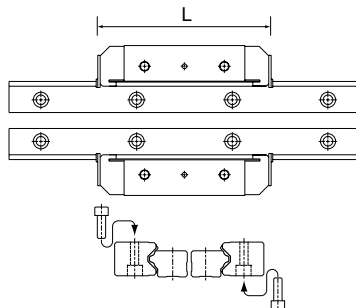
Model HR - Heavy-load Type

The LM blocks can be mounted from the top and the bottom.



Model HR-T-Ultra-heavy Load Type

Has the same sectional shape as model HR, but has a greater overall LM block length (L) and a higher load rating.



Rated Loads in All Directions

When installed, one set of model HR is capable of receiving loads in all four directions: radial, reverse-radial and lateral directions.

The basic load ratings of an installed set of model HR are equal in all four directions (radial, reverse-radial and lateral directions).

The basic load ratings in the dimensional table for model HR indicate the values in the radial direction per LM block as shown in Fig. 2.

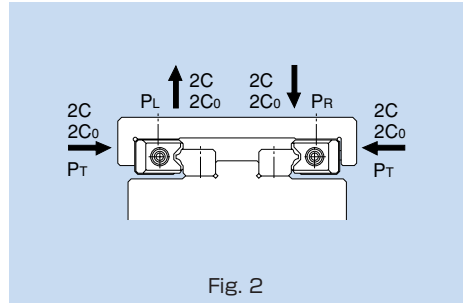


Fig. 2

Equivalent Load

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

$$P_E = P_R (P_L) + \frac{1}{2} P_T$$

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)

Options

Dust Prevention Accessories

THK offers an end seal for model HR as a dust prevention accessory.

(For details of the end seal, see page a-24).

Table 1 Symbol of Dust Prevention Accessory for Model HR

Symbol	Dust prevention accessory
UU	With end seal

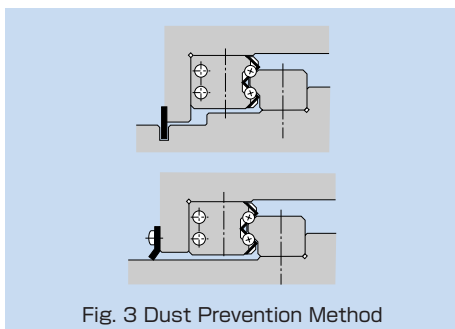


Fig. 3 Dust Prevention Method

Seal resistance value

For the maximum seal resistance value per LM block when a lubricant is applied on seals HR...UU, refer to the corresponding value provided in table 2.

Table 2 Maximum Seal Resistance Value of Seals HR...UU

Unit: N

Model No.	Seal resistance value
HR 918	0.5
HR 1123	0.7
HR 1530	1.0
HR 2042	2.0
HR 2555	2.9
HR 3065	3.4
HR 3575	3.9
HR 4085	4.4
HR 50105	5.9
HR 60125	9.8

●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.

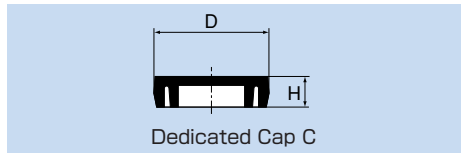
Since the dedicated cap C for LM rail mounting holes uses a special synthetic resin with high oil resistance and high wear resistance, it is highly durable.

When placing an order, specify the desired cap type with the corresponding cap number indicated in table 3.

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

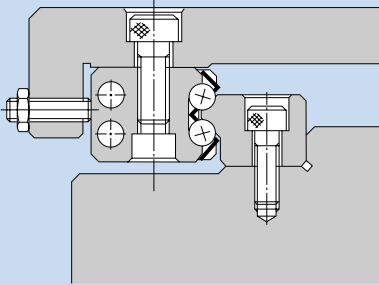
Table 3 Major Dimensions of Dedicated Cap C

Model No.	Cap C model No.	Bolt used	Major dimensions mm	
			D	H
HR 1123	C 3	M 3	6.3	1.2
HR 1530	C 3	M 3	6.3	1.2
HR 2042	C 5	M 5	9.8	2.4
HR 2555	C 8	M 8	14.4	3.7
HR 3065	C 8	M 8	14.4	3.7
HR 3575	C10	M10	18.0	3.7
HR 4085	C12	M12	20.5	4.7
HR 50105	C16	M16	26.5	5.7



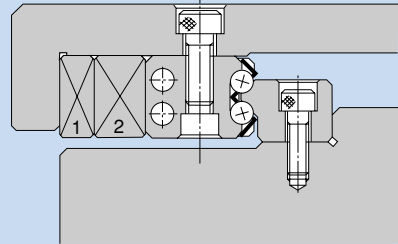
Example of Clearance Adjustment

Design the clearance adjustment screw so that it presses the center of the side face of the LM block.



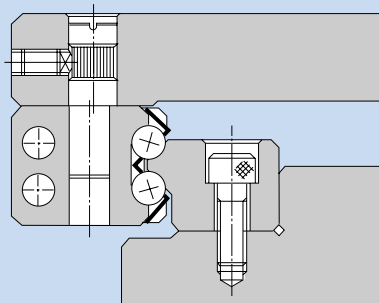
① Using a clearance screw

Normally, press the LM block with an adjusting screw.



② Using tapered gibs

When high accuracy and high rigidity are required, use tapered gibs 1) and 2).



③ Using an eccentric pin

THK manufactures a type whose clearances are adjusted with an eccentric pin.

Fig. 4

Attachment

Dedicated Mounting Bolt

Normally, when mounting the LM block with which to adjust a clearance, use the tapped hole provided on the LM block to secure it as shown in Fig. 5.

In this case, the hole must be machined so that its diameters d_1 and D_1 are larger by the adjustment allowance.

If it is inevitable to use the mounting method as indicated by Fig. 6 for a structural reason, the dedicated mounting bolt as shown in Fig. 7 is required for securing the LM block. Be sure to specify that the dedicated mounting bolt is required when ordering the LM Guide.

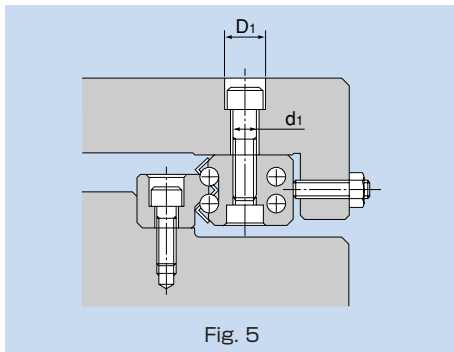


Fig. 5

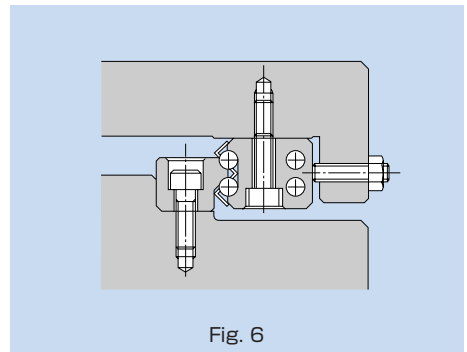


Fig. 6

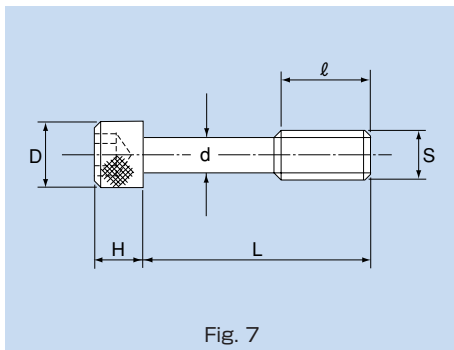


Fig. 7

Table 4 Dedicated Mounting Bolt

Model No.	S	d	D	H	L	l	Unit: mm	
							Supported model	
B 3	M3	2.4	5.5	3	17	5	HR	1530
B 5	M5	4.1	8.5	5	22	7	HR	2042
B 6	M6	4.9	10	6	28	9	HR	2555
B 8	M8	6.6	13	8	34	12	HR	3065
B10	M10	8.3	16	10	39	15	HR	3575
B12	M12	10.1	18	12	45	18	HR	4085
B14	M14	11.8	21	14	55	21	HR	50105
B16	M16	13.8	24	16	66	24	HR	60125

Comparison of Model Numbers with Cross-roller Guides

Each type of LM Guide model HR has sectional dimensions approximate to that of the corresponding cross roller guide model.

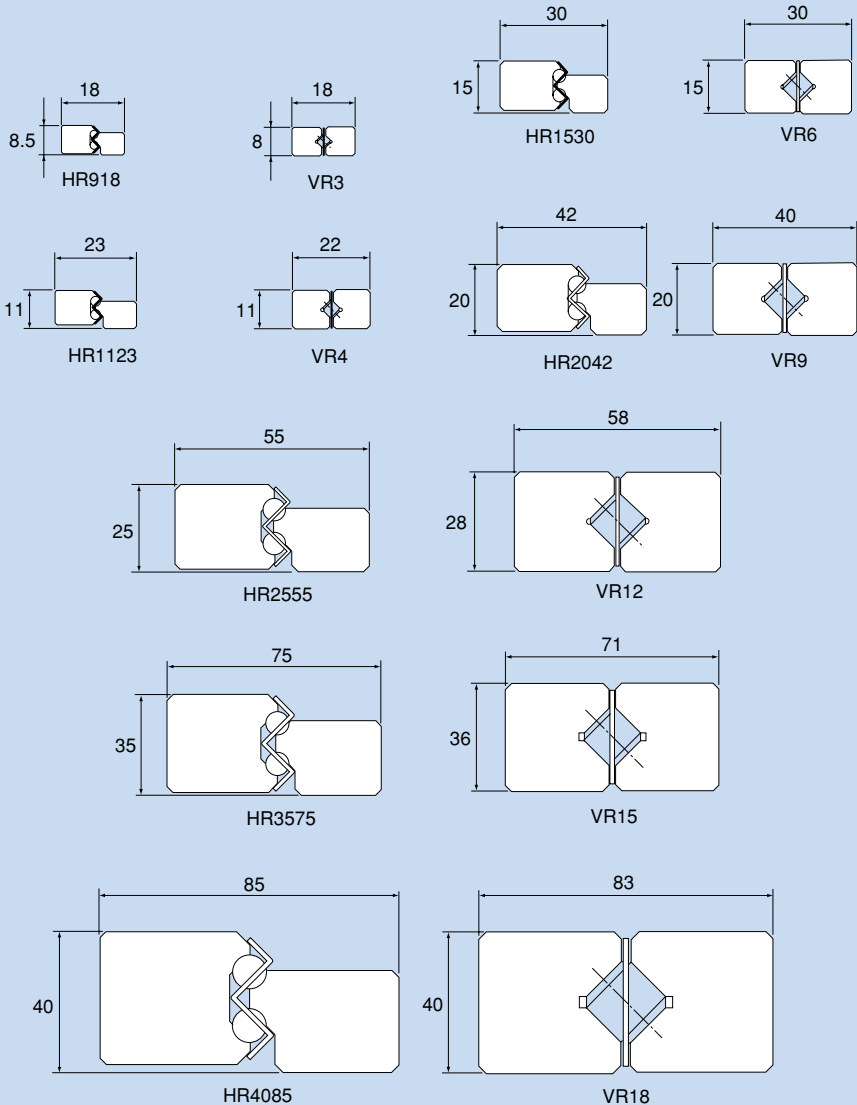


Fig. 8

Lubrication

The LM block has a greasing hole in the center of its top face. To provide lubrication through this hole, the table must be machined to also have a greasing hole as shown in Fig. 9 and attach a grease nipple or the like. When using oil lubrication, it is necessary to identify the lubrication route. Contact **THK** for details.

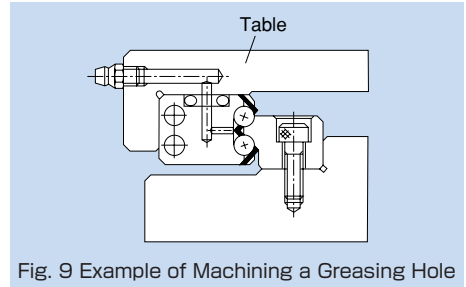


Fig. 9 Example of Machining a Greasing Hole

Standard Length and Maximum Length of the LM Rail

Table 5 shows the standard lengths and the maximum lengths of model HR 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.

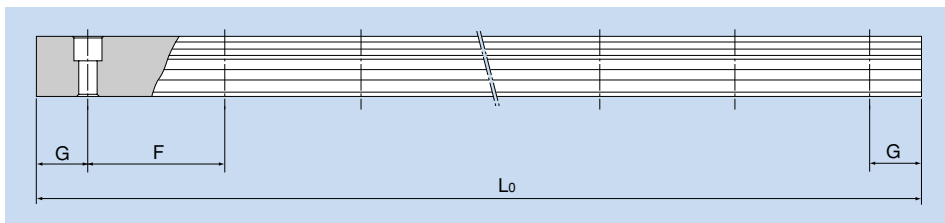
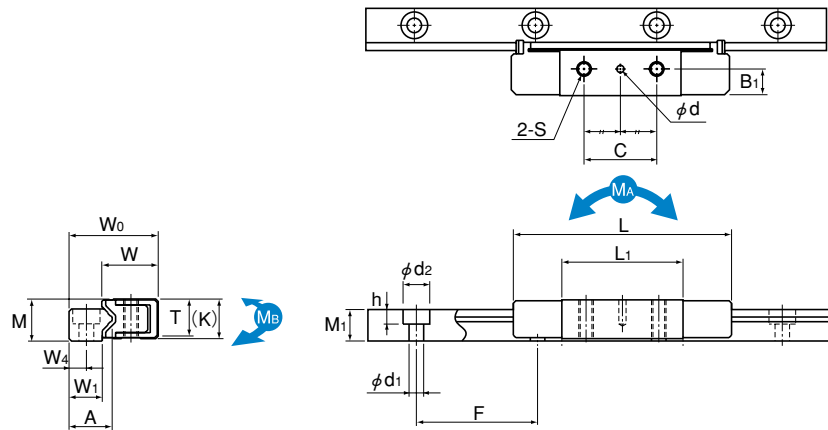


Table 5 Standard Length and Maximum Length of the LM Rail for Model HR Unit: mm

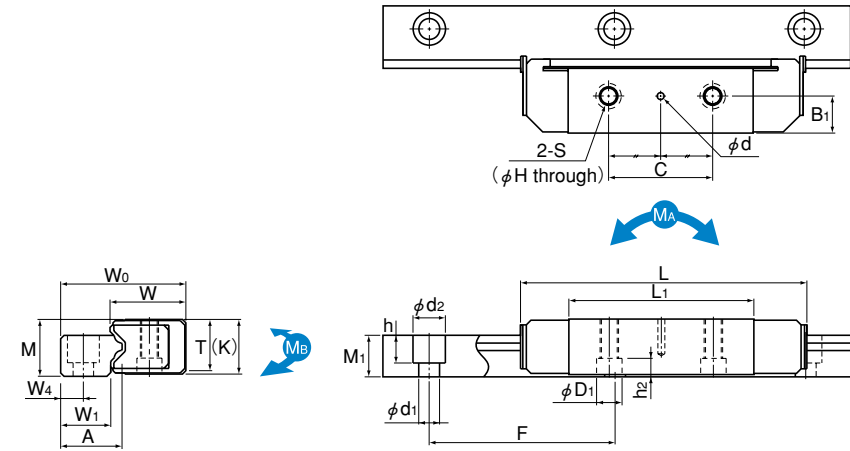
Model No.	HR 918	HR 1123	HR 1530	HR 2042	HR 2555	HR 3065	HR 3575	HR 4085	HR 50105	HR 60125
Standard LM rail length (L_0)	70	110	160	220	280	280	570	780	1270	1530
	120	230	280	280	440	440	885	1020	1570	1890
	220	310	340	340	600	600	1200	1260	2020	2250
	295	390	460	460	760	760	1620	1500	2620	2610
			580	640	1000	1000	2040	1980		
				1240	1240	2460	2580			
Standard pitch F	25	40	60	60	80	80	105	120	150	180
G	10	15	20	20	20	20	22.5	30	35	45
Max length	300	500	1600	2200	2600	3000	3000	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**.



Models HR918, 918M



Model HR1123 to 2555M/T/TM

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	W ₀	Length L	B ₁	C	H	S	h ₂	L ₁	T	K	Greasing hole d	D ₁	Width W ₁	W ₄	A	Height M ₁	Pitch F	d ₁ × d ₂ × h	C	C ₀	M _A	M _B	M _A	M _B	LM block kg	LM rail kg/m
HR 918 HR 918M	8.5	11.4	18	45	5.5	15	—	M3	—	25	7.5	8	1.5	—	6.7	3.5	8.7	6.5	25	3×5.5×3	1.57	3.04	0.0229	0.17	0.0229	0.17	0.01	0.3
HR 1123 HR 1123M	11	13.7	23	52	7	15	2.55	M3	3	30	9.5	10	2	5	9.5	5	11.6	8	40	3.5×6×4.5	2.35	4.31	0.0414	0.272	0.0414	0.272	0.03	0.5
HR 1530 HR 1530M	15	19.2	30	69	10	20	3.3	M4	3.5	40	13	14	2	6.5	10.7	6	13.5	11	60	3.5×6×4.5	4.31	7.65	0.0982	0.641	0.0982	0.641	0.08	1
HR 2042 HR 2042M	20	26.3	42	91.6	13	35	5.3	M6	5.5	56.6	17.5	19	3	10	15.6	8	19.5	14.5	60	6×9.5×8.5	9.9	17.2	0.308	1.91	0.308	1.91	0.13	1.8
HR 2042T HR 2042TM	20	26.3	42	110.7	13	50	5.3	M6	5.5	75.7	17.5	19	3	10	15.6	8	19.5	14.5	60	6×9.5×8.5	13.6	22.9	0.53	2.99	0.53	2.99	0.26	1.8
HR 2555 HR 2555M	25	33.3	55	121	16	45	6.8	M8	7	80	22.5	24	3	11	22	10	27	18	80	9×14×12	18.6	30.5	0.783	4.41	0.783	4.41	0.43	3.2
HR 2555T HR 2555TM	25	33.3	55	146.4	16	72	6.8	M8	7	105.4	22.5	24	3	11	22	10	27	18	80	9×14×12	25.1	40.8	1.33	6.95	1.33	6.95	0.5	3.2

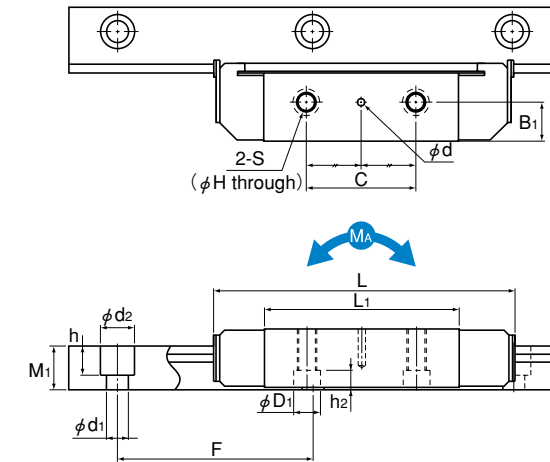
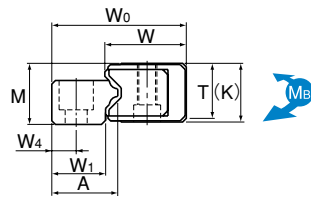
Note Symbol M indicates that stainless steel is used in the LM block, LM rail and balls. Those models marked with this symbol are therefore highly resistant to corrosion and environment.

Note A moment in the direction M_c can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, the moment in the direction M_c is omitted here. Static permissible moment*: Static permissible moment value with one set of model HR

Model number coding
2 HR2555 **UU** **M** +1000L **P** **M**
 1 2 3 4 5 6 7

- 1 No. of LM blocks used on the same rail
- 2 Model number
- 3 Dust prevention accessory symbol (see page a-395)
- 4 LM block is made of stainless steel
- 5 LM rail length (in mm)
- 6 Accuracy symbol (see page a-42)
- 7 LM rail is made of stainless steel

Note One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.



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	W ₀	Length L	B ₁	C	H	S	h ₂	L ₁	T	K	Greasing hole d	D ₁	Width W ₁	W ₄	A	Height M ₁	Pitch F	d ₁ ×d ₂ ×h	C	C ₀	M _A	M _B	M _A	M _B	LM block kg	LM rail kg/m
HR 3065 HR 3065T	30	40.3	65	145 173.5	19	50 80	8.6	M10	9	90 118.5	27.5	29	4	14	25	12	31.5	22.5	80	9×14×12	24.2 32.1	38.6 51.6	1.11 1.89	6.72 10.4	1.11 1.89	6.72 10.4	0.7 0.9	4.6
HR 3575 HR 3575T	35	44.9	75	154.8 182.5	21.5	60 92.5	10.5	M12	12	103.8 131.5	32	34	4	18	30.5	14.5	37	26	105	11×17.5×14	30 40.2	47.8 63.6	1.53 2.59	8.84 13.5	1.53 2.59	8.84 13.5	1.05 1.4	6.4
HR 4085 HR 4085T	40	50.4	85	177.8 215.9	24	70 110	12.5	M14	13	120.8 158.9	36	38	4	20	35	16	42.5	29	120	14×20×17	44.1 59.5	68.6 91.7	2.64 4.48	14.4 23	2.64 4.48	14.4 23	1.53 1.7	8
HR 50105 HR 50105T	50	63.4	105	227 274.5	30	85 130	14.5	M16	15.5	150 197.5	45	48	5	23	42	20	51.5	37	150	18×26×22	70.7 96	107 143	5.15 8.74	28.9 45.7	5.15 8.74	28.9 45.7	3.06 3.5	12.1
HR 60125	60	74.4	125	329	35	160	18	M20	18	236	55	58	5	26	51	25	65	45	180	22×32×25	141	206	14.3	79.6	14.3	79.6	7.5	19.3

Note A moment in the direction M_c can be received if two rails are used in parallel. However, since it depends on the distance between the two rails, the moment in the direction M_c is omitted here. Static permissible moment*: Static permissible moment value with one set of model HR

Model number coding

2 HR4085T UU +1500L P

- 1 No. of LM blocks used on the same rail
- 2 Model number
- 3 Dust prevention accessory symbol (see page a-395)
- 4 LM rail length (in mm)
- 5 Accuracy symbol (see page a-42)

Note One set of model HR means a combination of two LM rails and an LM blocks used on the same plane.

Overall LM Block Length with Options

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

Unit: mm

Model No.	UU
HR 918	45
HR 1123	52
HR 1530	69
HR 2042	91.6
HR 2042T	110.7
HR 2555	121
HR 2555T	146.4
HR 3065	145
HR 3065T	173.5

Model No.	UU
HR 3575	154.8
HR 3575T	182.5
HR 4085	177.8
HR 4085T	215.9
HR 50105	227
HR 50105T	274.5
HR 60125	329