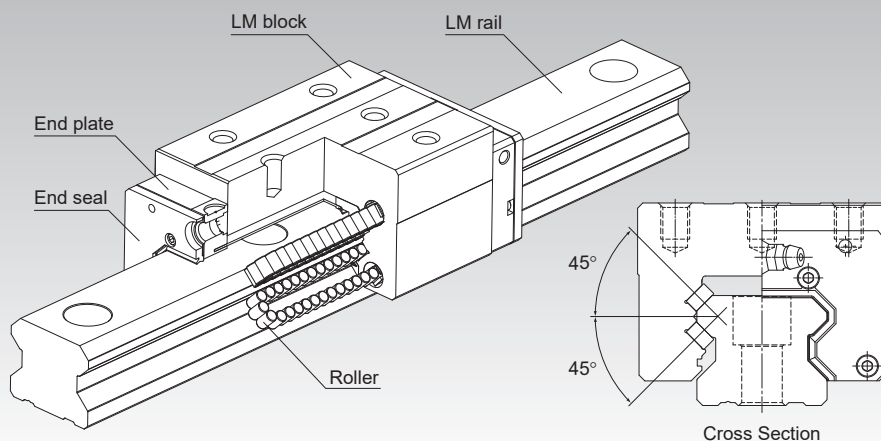


HRX

Super-Rigid Full-Roller LM Guide Model HRX



Selection Criteria **A1-10**

Design Highlights **A1-478**

Options **A1-503**

Model No. **A1-571**

Handling Precautions **A1-577**

Accessories for Lubrication **A24-1**

Mounting Procedure **B1-89**

Equivalent Moment Factor **A1-43**

Rated Loads in All Directions **A1-61**

Equivalent Factor in Each Direction **A1-63**

Radial Clearance **A1-75**

Accuracy Standards **A1-79**

Shoulder Height of the Mounting Base and the Corner Radius **A1-490**

Reference Error Tolerance for the Mounting Surface **A1-468**

Dimensions of Each Model with Options Attached **A1-517**

Structure and Features

Rollers 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 rollers to circulate. Model HRX has a larger mounting surface tolerance than our conventional roller products due to the front-to-front raceways (DF set). Also, the extended length of the metal LM block and increased number of load-bearing rollers achieve an improved static load rating.

Super-High Rigidity

A higher rigidity is achieved by using highly rigid rollers as the rolling elements and having the overall roller length more than 1.5 times greater than the roller diameter.

4-way Equal Load

Each row of rollers is arranged at a 45° contact angle so the LM block will have an equal load rating in all directions: radial, reverse-radial, and horizontal. This ensures high rigidity in all directions.

Smooth Motion through Skewing Prevention

The new guide mechanism prevents skewing as the block enters a loaded area. This minimizes rolling resistance fluctuation and achieves stable, smooth motion.

Global Standard Size

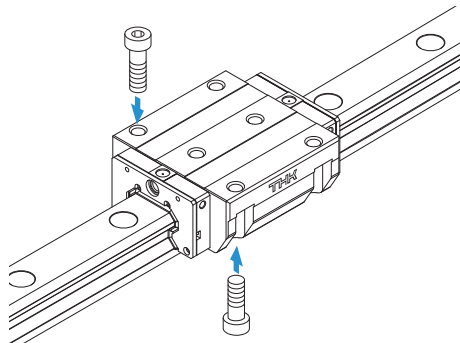
HRX is designed to have dimensions almost the same as that of Full Ball LM Guide model HSR, which THK as a pioneer of the linear motion system has developed and is practically a global standard size.

Types and Features

Model HRX-C

The flange of the LM block has tapped holes.
Can be mounted from the top or the bottom.
Used in places where the table cannot have through holes for mounting bolts.

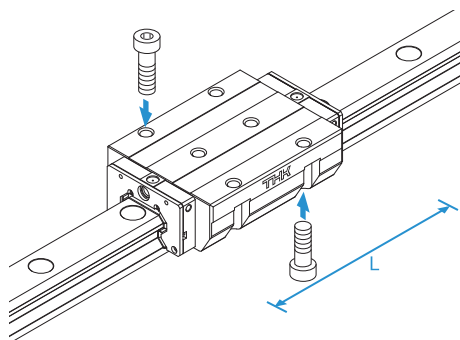
Dimensional Table → [A1-470](#)



Model HRX-LC

The LM block has the same cross-sectional shape as the Model HRX-C, but it has a longer overall LM block length (L) and a greater rated load.

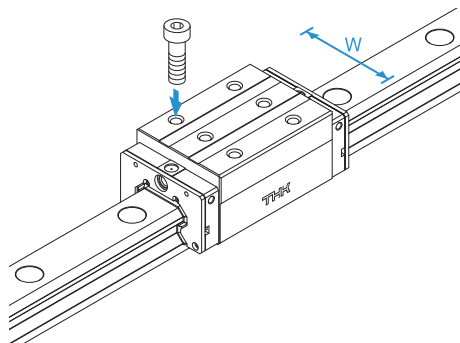
Dimensional Table → [A1-470](#)



Model HRX-R

The LM block has a smaller width (W) and tapped holes.
Used in places where the space for table width is limited.

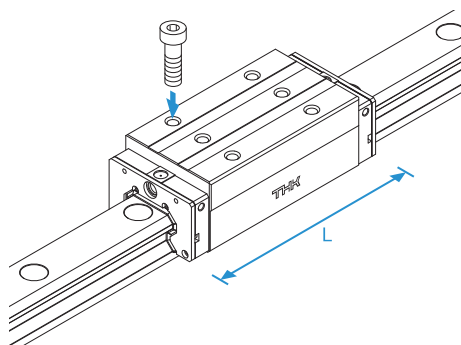
Dimensional Table → [A1-472](#)



Model HRX-LR

The LM block has the same cross-sectional shape as model HRX-R, but has a longer overall LM block length (L) and a greater rated load.

Dimensional Table⇒ **A1-472**



Static safety factor

To calculate a load applied to the LM Guide, the average load required for calculating the service life and the maximum load needed for calculating the static safety factor must be obtained first. In particular, if the system starts and stops frequently, if a cutting load acts on the system, or if a large moment caused by an overhanging load is applied, it may experience an unexpectedly large load. When selecting a model number, make sure that the desired model is capable of supporting the required maximum load (whether stationary or in motion). Table 1 shows reference values for the static safety factor.

Table 1: Reference Values for the (f_s) Static Safety Factor

Machine using the LM Guide	Load conditions	Lower limit of f_s
General industrial machinery	Without vibration or impact	3.0 to 6.0
	With vibration or impact	4.0 to 7.0
Machine tool	Without vibration or impact	3.0 to 6.0
	With vibration or impact	6.0 to 10.0

* The reference values for the static safety factor may vary depending on operating conditions such as the environment, lubrication status, mounting surface accuracy, and/or rigidity.

$$f_s = \frac{C_0}{P_{\max}}$$

f_s : Static safety factor

C_0 : Basic static load rating (N)

P_{\max} : Maximum applied load (N)

Reference Error Tolerance for the Mounting Surface

The Roller Type LM Guide Model HRX features high rigidity because it uses rollers as its rolling element. The new guide mechanism prevents roller skewing. However, high machining accuracy is required in the mounting surface. If the error of the mounting surface is large, it will affect the rolling resistance and the service life. The following shows the reference error tolerance according to the radial clearance.

Table 2: Reference Horizontal Error Tolerance (P) between Two Rails

Unit: μm

Radial Clearance Model No.	C0
HRX25	7
HRX30	8
HRX35	9
HRX45	11
HRX55	13
HRX65	17

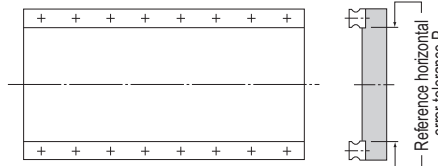


Fig. 1

Table 3: Reference Vertical Error Tolerance (X) between Two Rails

Unit: mm

Radial Clearance	C0
Reference vertical error tolerance X	$0.00014a$

$X = X_1 + X_2$ X_1 : Level difference on the rail mounting surface
 X_2 : Level difference on the block mounting surface

Example of calculation

Rail span when $a = 500 \text{ mm}$
Reference vertical $X = 0.00014 \times 500$
error tolerance $= 0.07$

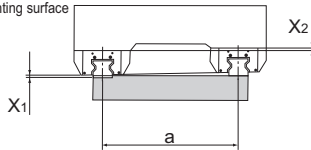


Fig. 2

Table 4: Reference Vertical Error Tolerance (Y) in the Axial Direction

Unit: mm

Reference vertical error tolerance Y	$0.00004b$
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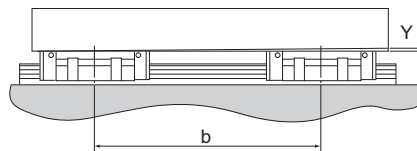
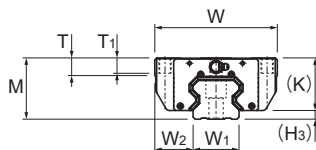


Fig. 3

Models HRX-C and HRX-LC



Model No.	Outer dimensions			LM block dimensions															Grease nipple
	Height	Width	Length	B	C	C ₂	S	H	L ₁	T	T ₁	K	N	E	e ₀	f ₀	D ₀		
	M	W	L																
HRX 25C HRX 25LC	36	70	99.6 116.4	57	45	40	M8	6.8	75.4 92.2	9.5	10	31	5.5	12	6	6.2	5.2	B-M6F	
HRX 30C HRX 30LC	42	90	110.6 135.1	72	52	44	M10	8.5	84 108.5	12	14	37	8.2	12	6.2	9.5	5.2	B-M6F	
HRX 35C HRX 35LC	48	100	123.2 151.2	82	62	52	M10	8.5	92.2 120.2	12	10	41.5	8	12	7.2	9.5	5.2	B-M6F	
HRX 45C HRX 45LC	60	120	150.7 185.7	100	80	60	M12	10.5	115.7 150.7	17.3	15	51.5	8.75	16	7.5	7.8	5.2	B-PT1/8	
HRX 55C HRX 55LC	70	140	180.2 229.7	116	95	70	M14	12.5	143.2 192.7	18.2	18	59	11.2	16	6.8	9.3	5.2	B-PT1/8	
HRX 65C HRX 65LC	90	170	239.1 304.1	142	110	82	M16	14.5	195.7 260.7	22.3	20	78	18	16	8.7	16.6	5.2	B-PT1/8	

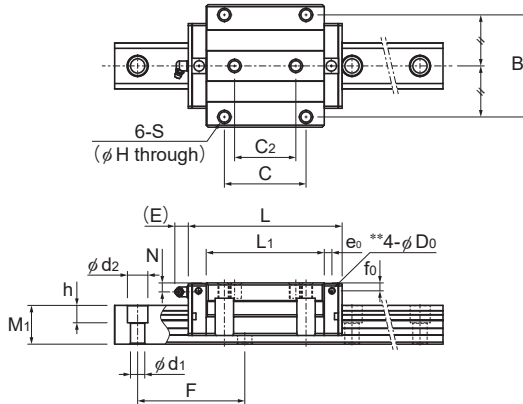
Model number coding

HRX45	LC	2	QZ	SS	C0	+1200L	P	T	-II
Model number	Type of LM block	No. of LM blocks used on the same rail	With QZ Lubricator	Contamination protection accessory symbol (*1)	Radial clearance symbol (*2) Medium preload (C0)	LM rail length (in mm)	Accuracy symbol (*3)	Symbol for LM rail jointed use	Symbol for No. of rails used on the same plane (*4)
									High accuracy grade (H)/Precision grade (P)

(*1) See contamination protection accessory on **A1-543**. (*2) See **A1-75**. (*3) See **A1-79**. (*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

H ₃	LM rail dimensions						Basic load rating ¹⁾		Static permissible moment kN·m [*]					Mass	
	W ₁ 0 -0.05	W ₂	M ₁	F	d ₁ × d ₂ × h	Length [*] Max	C ₁₀₀ kN	C ₀ kN	M _A		M _B		M _C	LM block kg	LM rail kg/m
									1 block	2 blocks	1 block	2 blocks	1 block		
5	23	23.5	21.5	60	7 × 11 × 9	3000	26.3 30.8	73.1 89.3	0.92 1.37	4.84 6.86	0.92 1.37	4.84 6.86	0.57 0.69	0.84 1	3.2
5	28	31	23.5	80	9 × 14 × 12	3000	39.4 48	105 135	1.48 2.44	7.72 12.1	1.48 2.44	7.72 12.1	1.03 1.33	1.4 1.9	4.4
6.5	34	33	29	80	9 × 14 × 12	3000	56 68.9	150 196	2.33 3.92	11.6 18.6	2.33 3.92	11.6 18.6	1.81 2.36	1.9 2.5	6.3
8.5	45	37.5	38	105	14 × 20 × 17	3090	94.3 116	250 327	4.85 8.17	23.9 38.4	4.85 8.17	23.9 38.4	3.84 5.01	3.5 4.6	10.9
11	53	43.5	44	120	16 × 23 × 20	3060	135 170	370 498	8.86 15.9	42.3 72.7	8.86 15.9	42.3 72.7	6.86 9.24	5.8 7.9	15.6
12	63	53.5	53	150	18 × 26 × 22	3000	206 257	567 756	18.4 32	86.5 147	18.4 32	86.5 147	12.3 16.4	13.3 17.9	22.6

Note1) The maximum length under "Length*" indicates the standard maximum length of an LM rail. (See **A1-474**.)

Static permissible moment* 1 block: the static permissible moment with one LM block

2 blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-517** or **A1-539**)

The removing/mounting jig is not provided as standard. Contact THK before use.

** A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-476**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

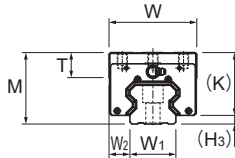
The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C₅₀ : The basic dynamic load rating for a nominal load of 50 km

C : The basic dynamic load rating in the dimensional table

Models HRX-R and HRX-LR



Model No.	Outer dimensions			LM block dimensions											Grease nipple
	Height	Width	Length	B	C	S × ℓ	L ₁	T	K	N	E	e ₀	f ₀	D ₀	
	M	W	L												
HRX 25R HRX 25LR	40	48	99.6 116.4	35	35 50	M6 × 7	75.4 92.2	9	35	9.5	12	6	10.2	5.2	B-M6F
HRX 30R HRX 30LR	45	60	110.6 135.1	40	40 60	M8 × 8	84 108.5	12	40	11.2	12	6.2	12.5	5.2	B-M6F
HRX 35R HRX 35LR	55	70	123.2 151.2	50	50 72	M8 × 10	92.2 120.2	18.5	48.5	15	12	7.2	16.5	5.2	B-M6F
HRX 45R HRX 45LR	70	86	150.7 185.7	60	60 80	M10 × 12.5	115.7 150.7	24.5	61.5	18.75	16	7.5	17.8	5.2	B-PT1/8
HRX 55R HRX 55LR	80	100	180.2 229.7	75	75 95	M12 × 15	143.2 192.7	27.5	69	21.2	16	6.8	19.3	5.2	B-PT1/8
HRX 65R HRX 65LR	100	126	239.1 304.1	76	70 120	M16 × 20	195.7 260.7	29.5	88	28	16	8.7	26.6	5.2	B-PT1/8

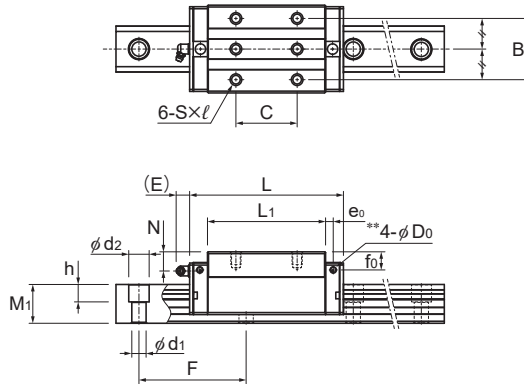
Model number coding

HRX45	LR	2	QZ	SS	C0	+1200L	P	T	-II
Model number	Type of LM block	No. of LM blocks used on the same rail	With QZ Lubricator	Contamination protection accessory symbol (*1)	Radial clearance symbol (*2) Medium preload (C0)	LM rail length (in mm)	Symbol for LM rail jointed use	Accuracy symbol (*3) High accuracy grade (H)/Precision grade (P)	Symbol for No. of rails used on the same plane (*4)

(*1) See contamination protection accessory on **A1-543**. (*2) See **A1-75**. (*3) See **A1-79**. (*4) See **A1-13**.

Note) This model number indicates that a single-rail unit constitutes one set. (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum.)

Those models equipped with QZ Lubricator cannot have a grease nipple. When desiring a grease nipple for a model attached with QZ, contact THK.



Unit: mm

H ₃	LM rail dimensions						Basic load rating [*]		Static permissible moment kN·m [*]					Mass	
	W ₁ 0 -0.05	W ₂	M ₁	F	d ₁ ×d ₂ ×h	Length [*] Max	C ₁₀₀ kN	C ₀ kN	M _A		M _B		M _C	LM block kg	LM rail kg/m
									1 block	2 blocks	1 block	2 blocks			
5	23	12.5	21.5	60	7×11×9	3000	26.3 30.8	73.1 89.3	0.92 1.37	4.84 6.86	0.92 1.37	4.84 6.86	0.57 0.69	0.72 0.86	3.2
5	28	16	23.5	80	9×14×12	3000	39.4 48	105 135	1.48 2.44	7.72 12.1	1.48 2.44	7.72 12.1	1.03 1.33	1.1 1.4	4.4
6.5	34	18	29	80	9×14×12	3000	56 68.9	150 196	2.33 3.92	11.6 18.6	2.33 3.92	11.6 18.6	1.81 2.36	1.7 2.2	6.3
8.5	45	20.5	38	105	14×20×17	3090	94.3 116	250 327	4.85 8.17	23.9 38.4	4.85 8.17	23.9 38.4	3.84 5.01	4.1	10.9
11	53	23.5	44	120	16×23×20	3060	135 170	370 498	8.86 15.9	42.3 72.7	8.86 15.9	42.3 72.7	6.86 9.24	5.3 7.1	15.6
12	63	31.5	53	150	18×26×22	3000	206 257	567 756	18.4 32	86.5 147	18.4 32	86.5 147	12.3 16.4	12 16	22.6

Note1) The maximum length under "Length*" indicates the standard maximum length of an LM rail. (See **A1-474**.)

Static permissible moment* 1 block: the static permissible moment with one LM block

2 blocks: static permissible moment when two LM blocks are in close contact with each other

For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.

(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Total block length L

: The total block length L shown in the table is the length with the dust proof parts, code UU or SS.

If other contamination protection accessories or lubricant equipment are installed, the total block length will increase.

(See **A1-517** or **A1-539**)

The removing/mounting jig is not provided as standard. Contact THK before use.

** A pilot hole for side nipples, when a grease nipple for a model equipped with LaCS or QZ Lubricator is needed.

Pilot holes for side nipples are not drilled through for models other than those stated above.

For grease nipple mount machining, contact THK. (See **A1-476**)

Note2) The basic dynamic load rating of the roller guide is a value based on a nominal life of 100 km.

The conversion to basic dynamic load rating for a nominal life of 50 km can be obtained from the following equation.

$$C_{50} = C \times 1.23$$

C₅₀ : The basic dynamic load rating for a nominal load of 50 km

C : The basic dynamic load rating in the dimensional table

Standard Lengths and Maximum Lengths of LM Rails

Table 5 shows the standard and maximum lengths of the HRX model rail. If a rail length longer than the listed max length is required, rails may be jointed to meet the overall length. Contact THK for details.

For special rail lengths, it is recommended to use a value corresponding to the G,g dimension from the table. As the G,g dimension increases, this portion becomes less stable, and the accuracy performance is severely impacted.

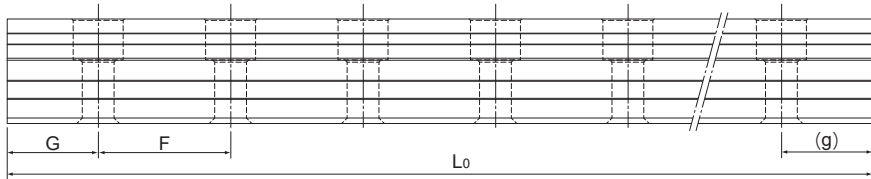


Table 5: Standard Lengths and Maximum Lengths of LM Rails for Model HRX

Unit: mm

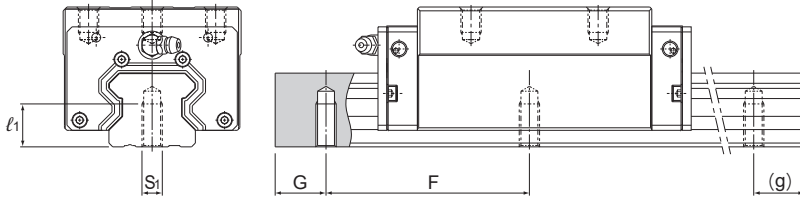
Model No.	HRX 25	HRX 30	HRX 35	HRX 45	HRX 55	HRX 65
LM rail standard length (L_0)	220	280	280	570	780	1270
	280	360	360	675	900	1570
	340	440	440	780	1020	2020
	400	520	520	885	1140	2620
	460	600	600	990	1260	
	520	680	680	1095	1380	
	580	760	760	1200	1500	
	640	840	840	1305	1620	
	700	920	920	1410	1740	
	760	1000	1000	1515	1860	
	820	1080	1080	1620	1980	
	940	1160	1160	1725	2100	
	1000	1240	1240	1830	2220	
	1060	1320	1320	1935	2340	
	1120	1400	1400	2040	2460	
	1180	1480	1480	2145	2580	
	1240	1560	1560	2250	2700	
	1300	1640	1640	2355	2820	
	1360	1720	1720	2460	2940	
	1420	1800	1800	2565	3060	
	1480	1880	1880	2670		
	1540	1960	1960	2775		
	1600	2040	2040	2880		
	1720	2200	2200	2985		
1840	2360	2360	3090			
1960	2520	2520				
2080	2680	2680				
2200	2840	2840				
2320	3000	3000				
2440						
Standard pitch F	60	80	80	105	120	150
G,g	20	20	20	22.5	30	35
Max length	3000	3000	3000	3090	3060	3000

Note1) The maximum length varies with accuracy grades. Contact THK for details.

Note2) If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

Tapped-Hole Type LM Rail

HRX model rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



For standard pitches of the taps and the G and g dimensions, see **A1-474** on Table 5.

Table 6: Dimensions of the LM Rail Tap

Unit: mm

Model No.	S ₁	Effective tap depth l_1
HRX25	M6	12
HRX30	M8	15
HRX35	M8	17
HRX45	M12	24
HRX55	M14	24
HRX65	M20	30

Model number coding

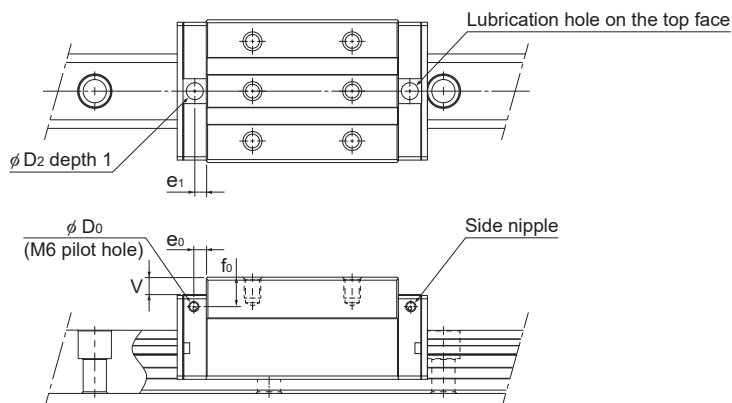
HRX45LR2SS+1200LP K

Symbol for
tapped-hole LM rail type

Lubrication hole

Lubrication Hole for Model HRX

The Model HRX allows lubrication from both the side and top faces of the LM block. In order to prevent foreign material from entering the LM block, lubrication holes are not through holes in blocks with regular specifications. When using the lubrication hole, contact THK.



Unit: mm

Model No.	Pilot hole for side nipple			Applicable nipple	Lubrication hole on the top face				
	e_0	f_0	D_0		D_2	(O-ring)	V	e_1	
HRX	25C 25LC	6	6.2	5.2	M6F	6.2	(P3)	0.3	4.5
	25R 25LR	6	10.2	5.2	M6F	6.2	(P3)	4.3	4.5
	30C 30LC	6.2	9.5	5.2	M6F	6.2	(P3)	0.4	4.5
	30R 30LR	6.2	12.5	5.2	M6F	6.2	(P3)	3.4	4.5
	35C 35LC	7.2	9.5	5.2	M6F	10.2	(P7)	0.4	5.8
	35R 35LR	7.2	16.5	5.2	M6F	10.2	(P7)	7.4	5.8
	45C 45LC	7.5	7.8	5.2	M6F	10.2	(P7)	0.4	6.9
	45R 45LR	7.5	17.8	5.2	M6F	10.2	(P7)	10.4	6.9
	55C 55LC	6.8	9.3	5.2	M6F	10.2	(P7)	0.4	6.8
	55R 55LR	6.8	19.3	5.2	M6F	10.2	(P7)	10.4	6.8
	65C 65LC	8.7	16.6	5.2	M6F	10.2	(P7)	0.4	8.7
	65R 65LR	8.7	26.6	5.2	M6F	10.2	(P7)	10.4	8.7

Note) Upper surface lubrication is oil lubrication only. Contact THK if you are considering using the lubrication hole on the top face for grease lubrication.

