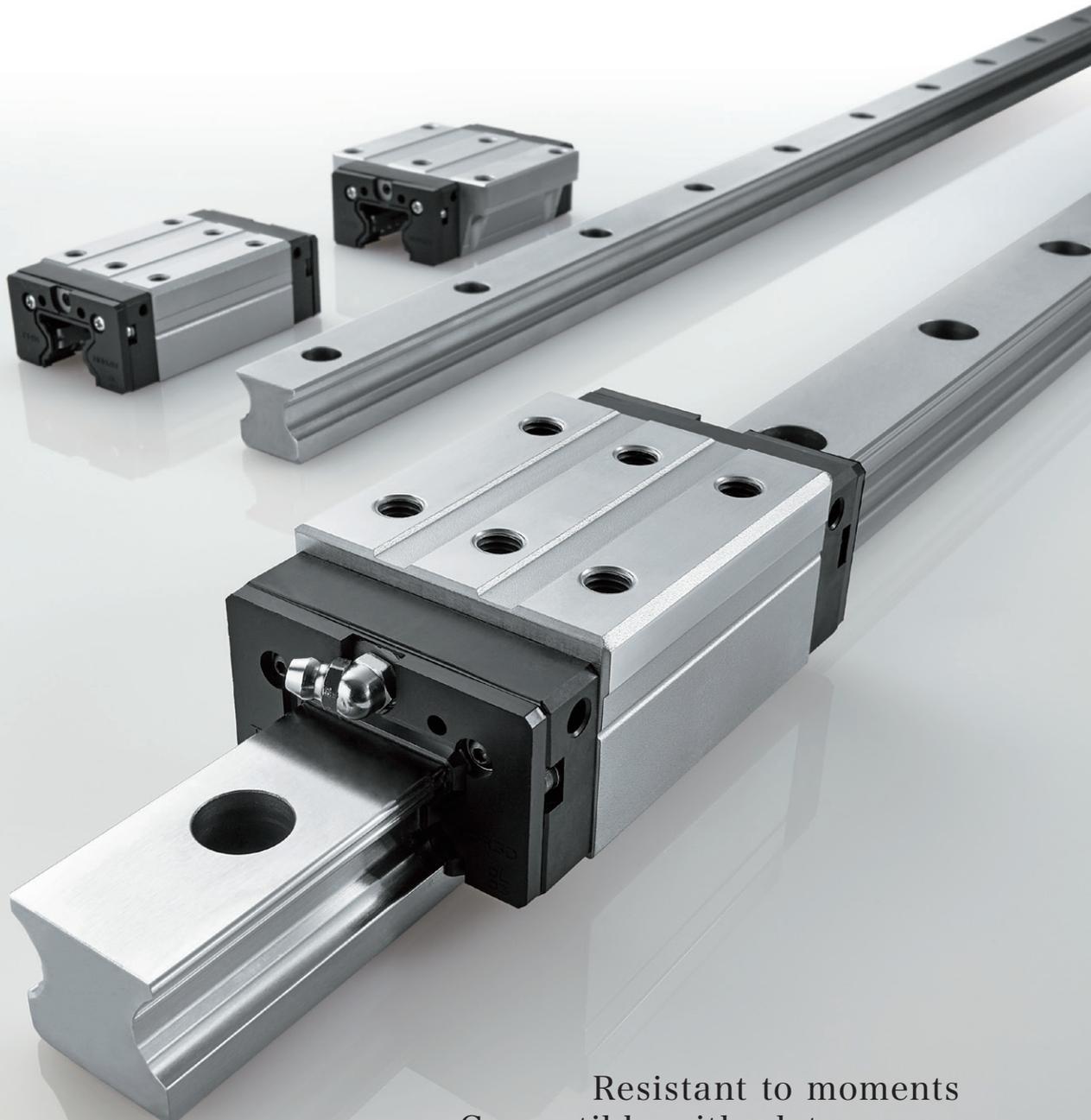


**THK**

**NEW**

Suited for Single Rail Applications

**HDR**



Resistant to moments  
Compatible with plate covers  
Interchangeable



# Model HDR

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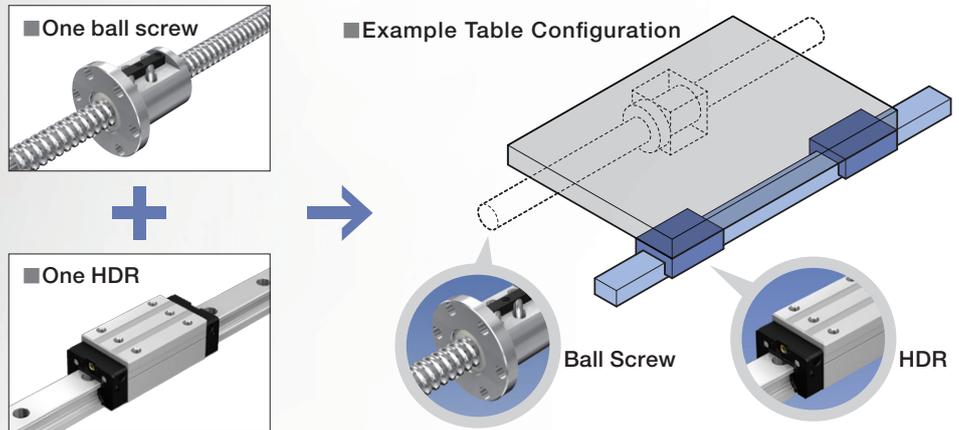
LM Guide

Suited for Single Rail Applications



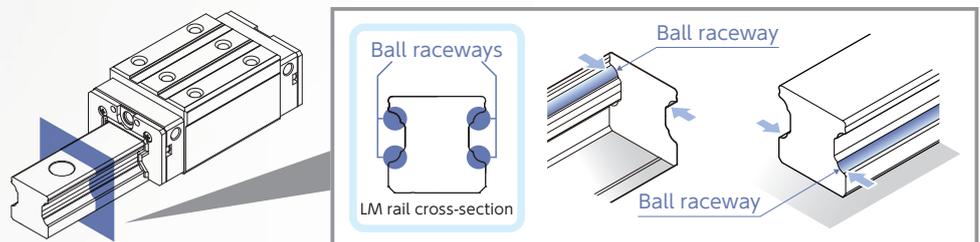
### Feature 1 Suited for Single Rail Applications p. 3

The Model HDR was designed to be used even in tables configured for one LM Guide. It enables single-axis tables to be compact and lightweight.

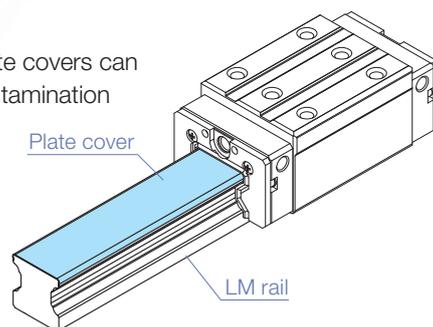


### Feature 2 LM Rail Surface Protected from Foreign Materials p. 4

The ball raceways of the Model HDR are featured on the sides of the LM rail, making it difficult for foreign materials to reach them.



To use the product more safely, plate covers can also be installed to improve the contamination protection performance.



### Feature 3 LM Blocks and LM Rails Available Separately p. 19

The Model HDR features a lineup of interchangeable LM blocks and LM rails that can be combined freely as long as they have the same model number. See p. 19 for details.

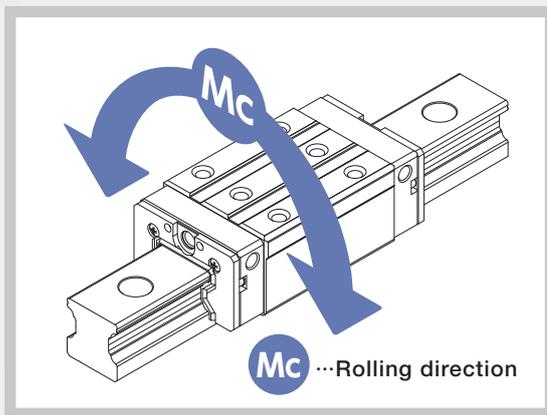


# LM Guide Model HDR

## Feature 1 Suited for Single Rail Applications

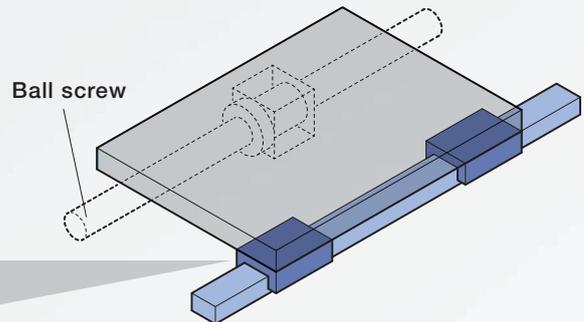
### High Rigidity in the Rolling Direction

The Model HDR features a rigid design that can be used even in tables configured for one LM Guide. It enables single-axis tables to be compact and lightweight.



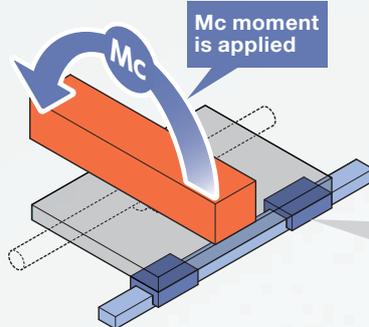
#### Example Table Configuration

One ball screw + One HDR

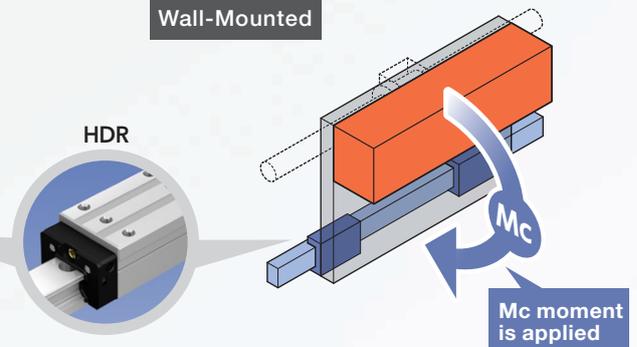


### Ideal Applications

#### Horizontal



#### Wall-Mounted

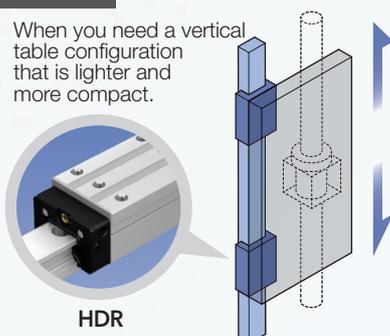


The Model HDR is ideal for applications where a constant  $M_c$  moment will be applied, such as configurations where an object will hang over the side of the table, or where the table is wall-mounted.

### Other Single-Axis Configurations Where the Model HDR Excels

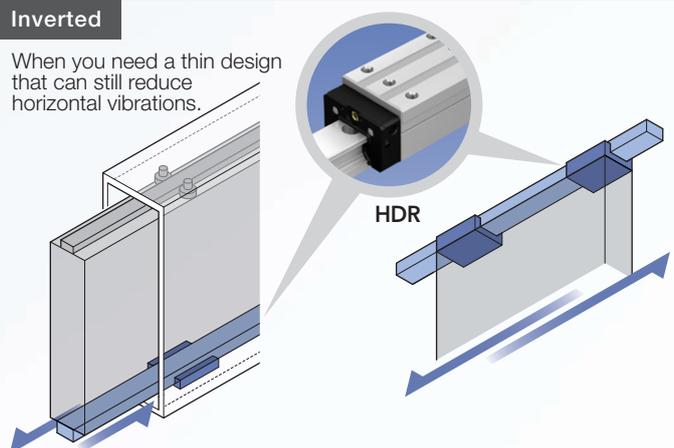
#### Vertical

When you need a vertical table configuration that is lighter and more compact.



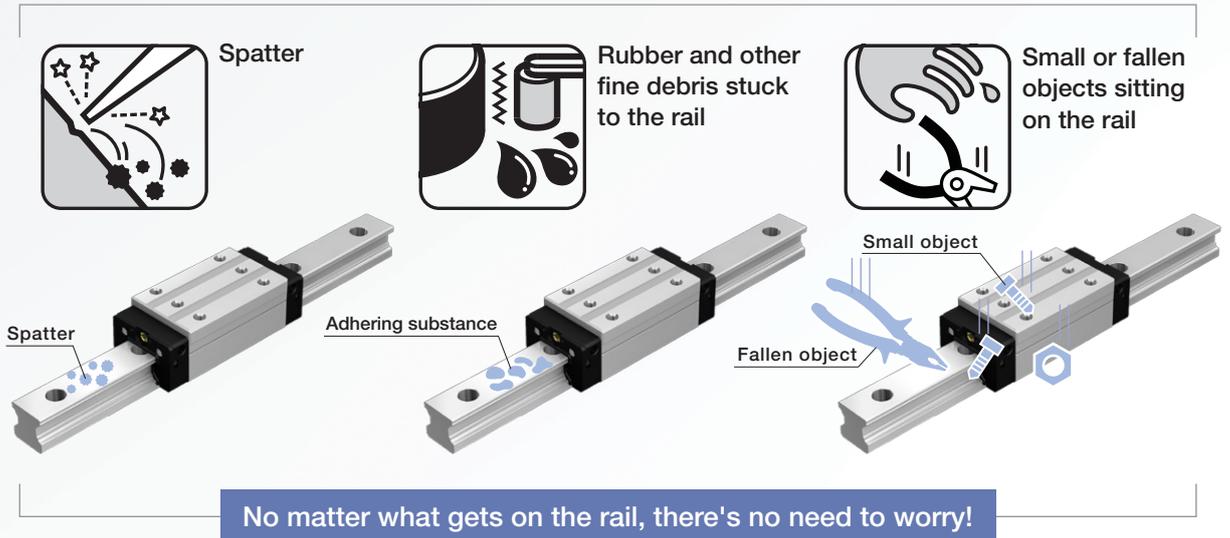
#### Inverted

When you need a thin design that can still reduce horizontal vibrations.



## Feature 2 LM Rail Surface Protected from Foreign Materials

The ball raceways are featured on the sides of the LM rail, making it difficult for foreign materials to reach them.



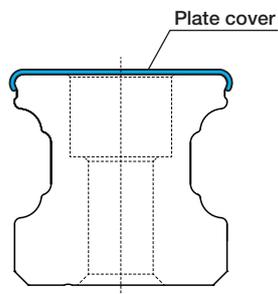
Applications where foreign materials might stick to the LM rail surface:

- ❗ Welders where spatter may occur
- ❗ Tire manufacturing machines where rubber might get on the rail
- ❗ Resin molding machines where resin may get on the rail

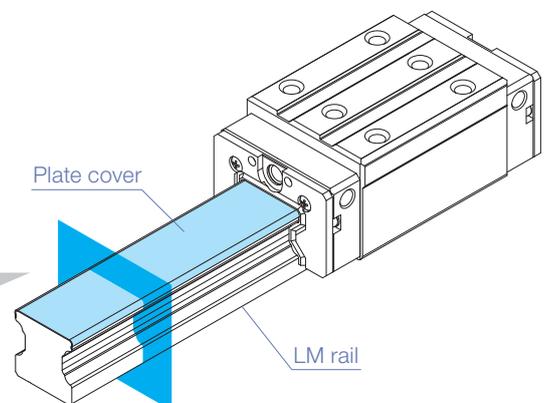
To use the product more safely, plate covers can also be installed to improve the contamination protection performance.

### Plate Cover Installation and Cross-Section

(The image is an illustrative example.)

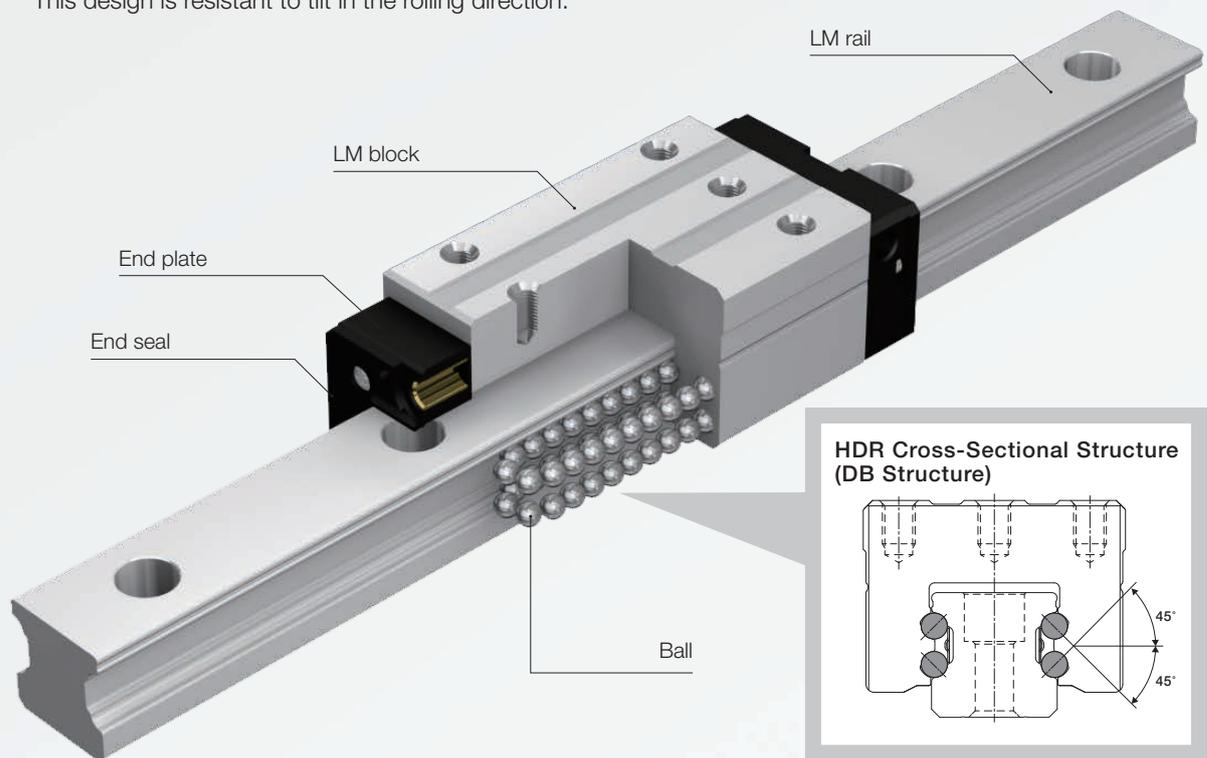


The ultra-thin plate cover placed over the entire upper surface of the LM rail greatly improves seal adhesion and helps prevent foreign materials from getting inside the LM block.



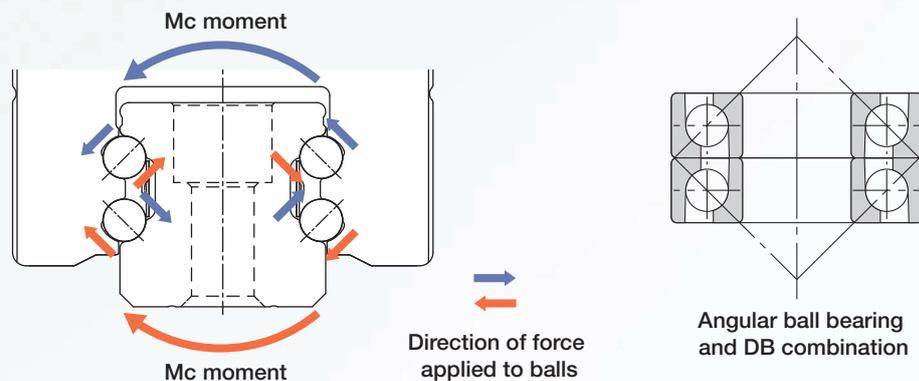
## Structure of the HDR

The Model HDR features raceways on the sides of the LM rail, which come into contact with the balls at a 45° angle. This design is resistant to tilt in the rolling direction.



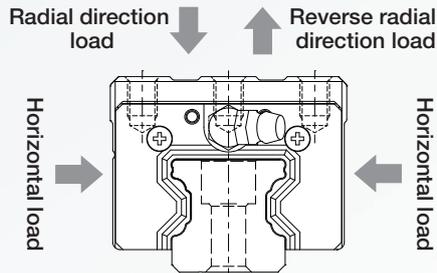
### DB Structure (Back-to-Back)

This contact structure is designed so that the raceways fully support the balls even when an  $M_c$  moment is applied. As a result, this design is highly rigid and resistant to tilt in the rolling direction. It is often used in conjunction with angular ball bearings when the moment load is high.

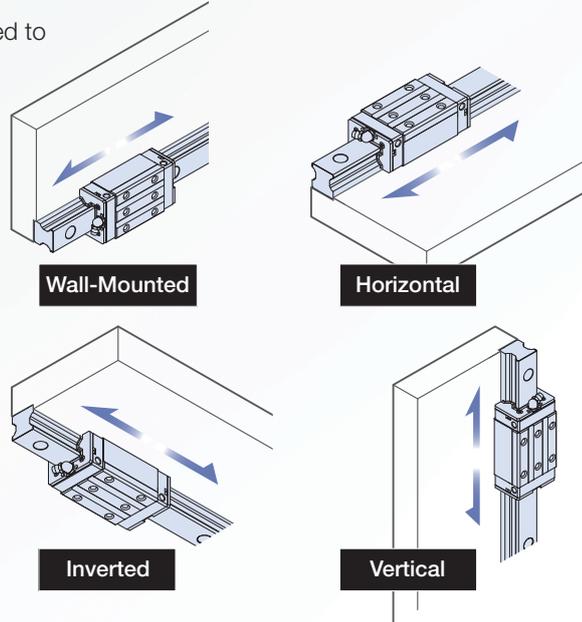


## 4-Way Equal Load

The Model HDR is designed to equally bear loads applied to the LM block from four directions.  
(Four directions: radial, reverse radial, left, and right)  
As a result, this model can be used in any orientation, enabling a wide variety of applications.



The same load can be supported from all four directions.



The Model HDR is equally suited for use in a horizontal orientation and any other orientation. The images are illustrative examples of LM Guide installations.

## Globally Standard Dimensions

The Model HDR's dimensions conform to ISO standards (ISO 12090-1:2011 Rolling Bearings). Three types of ISO-standard LM blocks and two types of LM rails are also available, creating a total lineup of six types.

HDR-C/LC	HDR-R/LR	HDR-V/LV
<p>Standard Type (C)</p> <p>Long Type (LC)</p>	<p>Standard Type (R)</p> <p>Long Type (LR)</p>	<p>Standard Type (V)</p> <p>Long Type (LV)</p>
<p>The flange of this LM block has tapped holes. This type can be mounted from the top or the bottom.</p>	<p>With this type, the LM block has a smaller width (W) and tapped holes. It is ideal for compact designs.</p>	<p>This type has an R/LR block with a shorter height and a more compact design.</p>

The Model HDR's dimensions conform to those of the current Model HSR, including the dimensions for product height (M), LM block width (W), LM rail width (W<sub>r</sub>), LM rail height (M<sub>r</sub>), mounting holes, and mounting hole pitch.

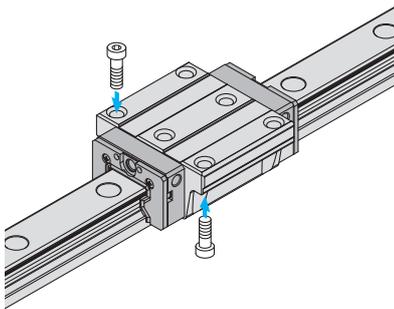
# Lineup

The Model HDR comes in eight sizes ranging from 15 to 65, and a lineup of six block types is available: C/LC, R/LR, and V/LV.

## Lineup

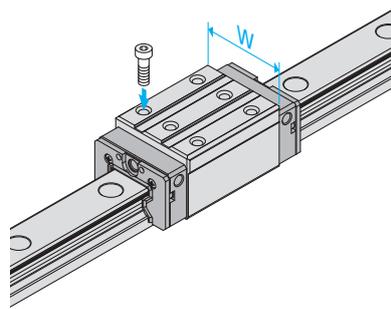
Block types		HDR15	HDR20	HDR25	HDR30	HDR35	HDR45	HDR55	HDR65
Standard type	R	○	○	○	○	○	○	○	○
	C	○	○	○	○	○	○	○	○
	V	○	—	○	○	○	○	○	—
Long type	LR	○	○	○	○	○	○	○	○
	LC	○	○	○	○	○	○	○	○
	LV	○	—	○	○	○	○	○	—

### HDR-C/LC



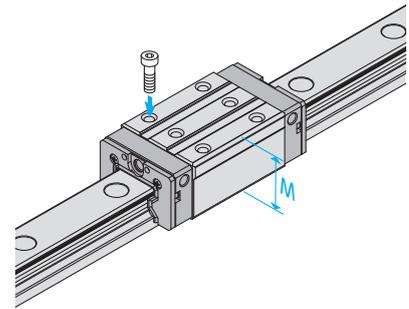
The flange of this LM block has tapped holes. This type can be mounted from the top or the bottom.

### HDR-R/LR



With this type, the LM block has a smaller width (W) and tapped holes. It is ideal for compact designs.

### HDR-V/LV



This type has an R/LR block with a shorter height and a more compact design.

# Contamination Protection Options

It is necessary to prevent foreign materials from getting inside the product, as it will lead to abnormal wear and a shortened service life. If it is likely that foreign materials will get inside, it is important to select an effective sealing or contamination protection device suited to the environmental conditions.

## Seals

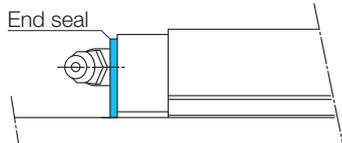
End seals made of a synthetic rubber that are highly resistant to wear and side seals that further improve dust-proofing effectiveness are available. Use the symbols in the table to the right to specify if you need a contamination protection accessory.

## Options

Symbol	Option symbols
UU	End seals
SS	End seals + side seals
DD	Double seals + side seals
ZZ	End seals + side seals + metal scrapers
KK	Double seals + side seals + metal scrapers

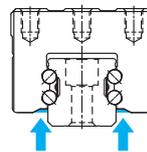
### End Seal

Used in locations exposed to dust



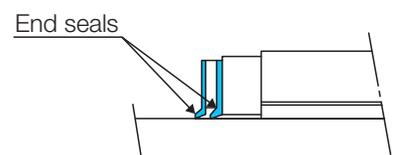
### Side Seal

Used in locations where dust may enter the LM block from the side or bottom surfaces, such as vertical, horizontal, and inverted configurations



### Double Seal

Used in locations exposed to excessive dust or cutting chips



## Seal Resistance Value

See the table below for the maximum seal resistance of SS seals per LM block when the product is lubricated.

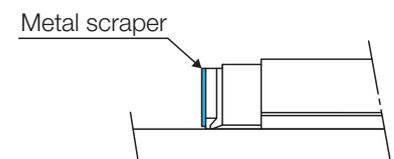
### Maximum Seal Resistance

Unit: N

Model number		Seal symbol	Maximum seal resistance
HDR	15	SS	7.7
	20		10.4
	25		11.7
	30		15.5
	35		19.7
	45		23.7
	55		25.5
	65		30.3

### Metal Scraper (Non-Contact)

Used in locations where welding spatter may adhere to the LM rail

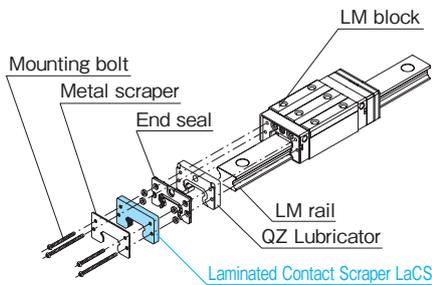


## ■ Laminated Contact Scraper LaCS

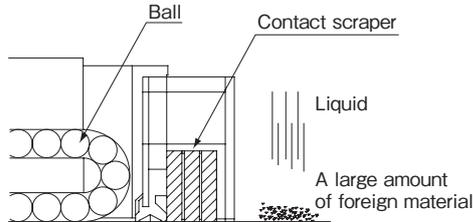
The Laminated Contact Scraper LaCS is available for locations with an adverse environment. With the three-layered laminated contact structure of the LaCS, each layer removes minute foreign material adhering to the LM rail and prevents it from entering the LM block.

### Features

- Because the three layers of scrapers fully contact the LM rail, LaCS is highly capable of removing minute foreign material.
- Low friction resistance is achieved through the use of oil-impregnated, self-lubricating synthetic foam rubber.



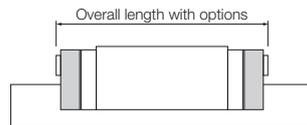
External View



Structural Drawing

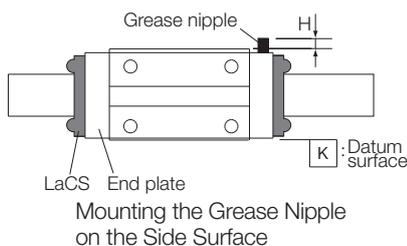
Symbol	Contamination protection accessory
SSHH	End seals + side seals + LaCS
DDHH	Double seals + side seals + LaCS
ZZHH	End seals + side seals + metal scrapers + LaCS
KKHH	Double seals + side seals + metal scrapers + LaCS

## LM Block Dimension (L Dimension) With LaCS and Seals Attached



Model No.	Standard overall length (SS)	UU	DD	ZZ	KK	SSHH	DDHH	ZZHH	KKHH
HDR15	61.4	61.4	65.8	65.2	69.6	77	81.4	78.2	82.6
HDR15L	74.9	74.9	79.3	78.7	83.1	90.5	94.9	91.7	96.1
HDR20	74.9	74.9	80.1	80.7	85.9	91.3	96.5	93.7	98.9
HDR20L	90.7	90.7	95.9	96.5	101.7	107.1	112.3	109.5	114.7
HDR25	87.6	87.6	92.8	93.4	98.6	105	110.2	107.4	112.6
HDR25L	104.5	104.5	109.7	110.3	115.5	121.9	127.1	124.3	129.5
HDR30	102.1	102.1	108.7	107.8	114.4	123.4	130	125.8	132.4
HDR30L	124.1	124.1	130.7	129.8	136.4	145.4	152	147.8	154.4
HDR35	116.5	116.5	123.5	122.2	129.2	137.8	144.8	140.2	147.2
HDR35L	139.5	139.5	146.5	145.2	152.2	160.8	167.8	163.2	170.2
HDR45	145.6	145.6	152.6	153.2	160.2	171.0	178.0	174.2	181.2
HDR45L	177.3	177.3	184.3	184.9	191.9	202.7	209.7	205.9	212.9
HDR55	179.2	179.2	186.2	186.8	193.8	204.6	211.6	207.8	214.8
HDR55L	217.3	217.3	224.3	224.9	231.9	242.7	249.7	245.9	252.9
HDR65	199.2	199.2	206.6	206.8	214.2	228.6	236.0	231.8	239.2
HDR65L	258.8	258.8	266.2	266.4	273.8	288.2	295.6	291.4	298.8

## Incremental Dimension with Grease Nipple



Model	Incremental dimension with grease nipple/mm	
	Side greasing	
	H*	Nipple type
HDR15	4.4	PB107
HDR20	4.3	PB107
HDR25	7.05	A-M6F
HDR30	7.1	A-M6F
HDR35	7.1	A-M6F
HDR45	7.1	A-M6F
HDR55	7.1	A-M6F
HDR65	6.1	A-M6F

\*Applies to R/LR/V/LV only.

## Maximum Resistance with LaCS

Model	Sliding resistance (maximum value)
HDR15	6.2
HDR20	7.9
HDR25	8.7
HDR30	11.9
HDR35	12.5
HDR45	25.9
HDR55	31.3
HDR65	32.7

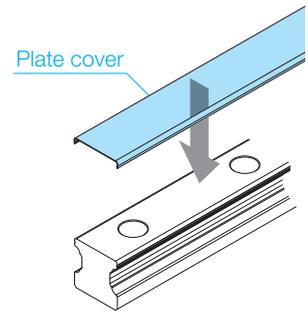
Note) This data represents the resistance with LaCS only. It does not include the sliding resistance of LM blocks or seals.

## ■ Plate Cover

An ultra-thin plate cover is placed over the entire upper surface of the LM rail. This greatly improves seal adhesion and helps prevent foreign materials from getting inside the LM block.

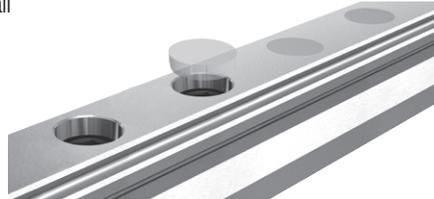
Plate covers are made of stainless steel (SUS304), and they demonstrate superior environmental resistance.

\*Applicable to all models except 15 and 20.



## ■ Dedicated Cap for LM Rail Mounting Holes

Using dedicated caps to cover the LM rail mounting holes helps prevent foreign material from entering the mounting holes and LM block.



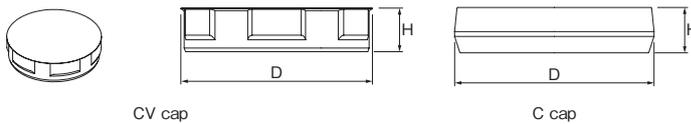
### Option Compatibility

Model	C Cap	CV Cap	GC Cap
15	○	—	—
20	—	○	○
25	—	○	○
30	—	○	○
35	—	○	○
45	—	○	○
55	—	○	○
65	—	○	○

## CV Caps/C Caps

These caps are made of a special synthetic resin.

The CV cap is the successor to the C cap, and its new structure makes it easier to insert.

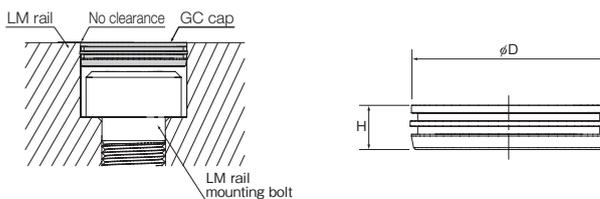


Supported model	Cap model	Bolt	Main dimensions (mm)	
			D	H
15	C4	M4	7.9	1.0
20	CV5	M5	9.8	2.6
25	CV6	M6	11.4	2.6
30	CV8	M8	14.4	3.3
35				
45	CV12	M12	20.4	3.4
55	CV14	M14	23.4	5.5
65	CV16	M16	26.4	5.6

## GC Cap

GC caps are made of metal and are RoHS compliant.

GC caps adhere closer to the counterbore than CV caps and C caps, so there is no clearance once they are inserted.



Supported model	Cap model	Bolt	Main dimensions (mm)	
			D	H
20	GC5	M5	9.86	2.5
25	GC6	M6	11.36	2.5
30	GC8	M8	14.36	3.5
35				
45	GC12	M12	20.36	4.6
55	GC14	M14	23.36	5.0
65	GC16	M16	26.36	5.0

Note 1) GC caps are only sold with LM Guides. They are not sold separately. The LM Guide model number code will have "GC" at the end when it is delivered.

HDR25 LV 2 UU CO + 1200L P GC \_\_\_\_\_ GC caps attached

Note 2) GC caps cannot be used with LM rails that have undergone surface treatment.

Note 3) LM rail mounting holes for GC caps are special. (The mouths are not chamfered.)

Note 4) Be careful not to injure your hand when inserting GC caps.

Note 5) Be sure to make the GC caps level with the upper surface of the LM rail and clean (wipe) that surface after insertion.

Note 6) If this product will be used in special environments, such as in a vacuum or at very low or high temperatures, contact THK.

# Lubrication

## ■ Standard Grease

AFB-LF Grease is a general-purpose grease that provides excellent extreme pressure resistance and mechanical stability through the use of a refined mineral oil base oil and a lithium-based consistency enhancer.

\*Non-standard greases are also available. Contact THK for details.

## AFB-LF Representative Physical Properties

Item	Representative value	Test method
Consistency enhancer	Lithium-based	
Base oil	Refined mineral oil	
Base oil kinematic viscosity: mm <sup>2</sup> /s (40°C)	170	JIS K 2220 23
Worked penetration (25°C, 60 W)	275	JIS K 2220 7
Mixing stability (100,000 W)	345	JIS K 2220 15
Dropping point: °C	193	JIS K 2220 8
Evaporation amount: mass% (99°C, 22 h)	0.4	JIS K 2220 10
Oil separation rate: mass% (100°C, 24 h)	0.6	JIS K 2220 11
Copper plate corrosion (R method, 100°C, 24 h)	Pass	JIS K 2220 9
Low-temperature torque: mN·m (-20°C)	Starting	JIS K 2220 18
	Rotational	
4-ball testing (welding load): N	3089	ASTM D2596
Service temperature range: °C	-15 to 100	
Color	Yellowish brown	

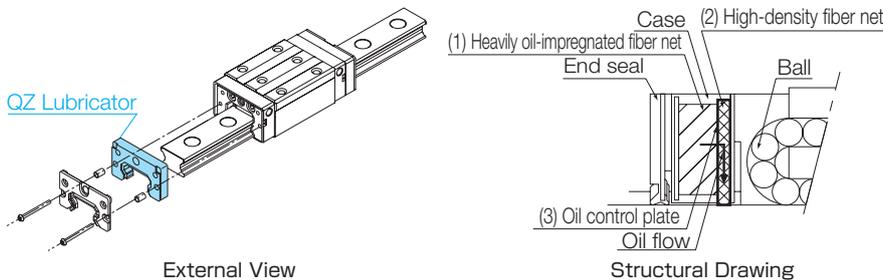
## ■ QZ Lubricator

The QZ Lubricator feeds the right amount of lubricant to the LM rail raceway. This allows an oil film to continuously form between the rolling element and the raceway, and it significantly extends the lubrication and maintenance intervals. The QZ Lubricator is made primarily of three components: (1) a highly oil-impregnated fiber net (which stores lubricant), (2) a high-density fiber net (which applies the lubricant to the raceways), and (3) an oil control plate (which adjusts the amount of oil being applied). The lubricant is supplied from within the QZ Lubricator using the basic principle of capillary action, as used in felt-tip pens.

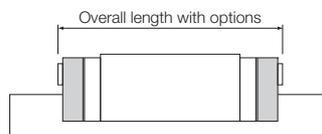
### Features

- Since it compensates for oil loss, the lubrication maintenance interval can be significantly extended.
- It is an eco-friendly lubrication system that does not contaminate the surrounding area, as it feeds the right amount of lubricant to the ball raceway.

Symbol	Contamination protection accessory
QZUU	End seals + QZ
QZSS	End seals + side seals + QZ
QZDD	Double seals + side seals + QZ
QZZZ	End seals + side seals + metal scrapers + QZ
QZKK	Double seals + side seals + metal scrapers + QZ
QZSSHH	End seals + side seals + LaCS + QZ
QZDDHH	Double seals + side seals + LaCS + QZ
QZZZHH	End seals + side seals + metal scrapers + LaCS + QZ
QZKKHH	Double seals + side seals + metal scrapers + LaCS + QZ



## LM Block Dimension (L Dimension) with QZ Attached

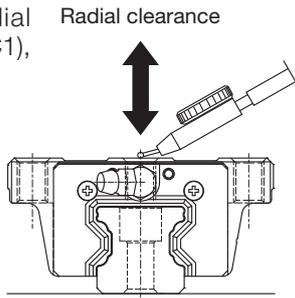


Model No.	Standard overall length (SS)	QZUU	QZSS	QZDD	QZZZ	QZKK	QZSSHH	QZDDHH	QZZZHH	QZKKHH
HDR15	61.4	81.4	81.4	85.8	85.2	89.6	97	101.4	98.2	102.6
HDR15L	74.9	94.9	94.9	99.3	98.7	103.1	110.5	114.9	111.7	116.1
HDR20	74.9	94.9	94.9	100.1	100.7	105.9	111.3	116.5	113.7	118.9
HDR20L	90.7	110.7	110.7	115.9	116.5	121.7	127.1	132.3	129.5	134.7
HDR25	87.6	107.6	107.6	112.8	113.4	118.6	125	130.2	127.4	132.6
HDR25L	104.5	124.5	124.5	129.7	130.3	135.5	141.9	147.1	144.3	149.5
HDR30	102.1	122.1	122.1	128.7	127.8	134.4	143.4	150	145.8	152.4
HDR30L	124.1	144.1	144.1	150.7	149.8	156.4	165.4	172	167.8	174.4
HDR35	116.5	136.5	136.5	143.5	142.2	149.2	157.8	164.8	160.2	167.2
HDR35L	139.5	159.5	159.5	166.5	165.2	172.2	180.8	187.8	183.2	190.2
HDR45	145.6	175.6	175.6	182.6	183.2	190.2	201.0	208.0	204.2	211.2
HDR45L	177.3	207.3	207.3	214.3	214.9	221.9	232.7	239.7	235.9	242.9
HDR55	179.2	209.2	209.2	216.2	216.8	223.8	234.6	241.6	237.8	244.8
HDR55L	217.3	247.3	247.3	254.3	254.9	261.9	272.7	279.7	275.9	282.9
HDR65	199.2	229.2	229.2	236.2	236.8	243.8	254.6	261.6	257.8	264.8
HDR65L	258.8	288.8	288.8	295.8	296.4	303.4	314.2	321.2	317.4	324.4

# Radial Clearance Specifications

The Model HDR has three types of radial clearance (preload): normal, light preload (C1), and medium preload (C0).

The preload significantly affects the running accuracy, load resistance, and rigidity. Therefore, it is necessary to select a clearance that is appropriate for the application. An appropriate radial clearance will prevent vibrations and impacts from occurring when the device is running, as well as improve the service life and accuracy of the LM Guide.



Radial Clearance Specifications Unit:  $\mu\text{m}$

Model	Normal (No symbol)	Light preload (C1)	Medium preload (C0)
15	-6.0 to 0	-10 to -6.0	—
20	-8.0 to 0	-14 to -8.0	-18 to -14
25	-9.0 to 0	-16 to -11	-21 to -16
30	-11 to 0	-18 to -13	-22 to -18
35	-13 to 0	-20 to -15	-25 to -20
45	-18 to 0	-29 to -22	-37 to -29
55	-20 to 0	-34 to -27	-42 to -34
65	-23 to 0	-39 to -28	-49 to -39

# Accuracy Standards

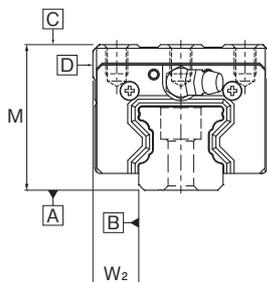
The accuracy of the LM Guide is specified for each model in terms of the dimensional tolerance for height and width, the difference between height and width in a pair, and running parallelism. (Normal grade, high accuracy grade, precision grade, super precision grade, and ultra precision grade)

## Difference in Height M

Indicates the difference between the minimum and maximum values of height M of each of the LM Guides used on the same plane in combination.

## Difference in Width $W_2$

Indicates the difference between the minimum and maximum values of the width  $W_2$  between an LM rail and each of the LM blocks mounted together on the LM rail.

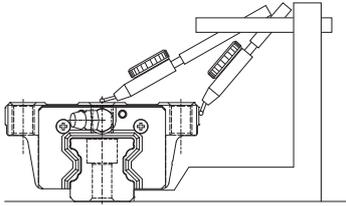


Accuracy Standards Unit: mm

Model	Accuracy (symbol) Item	Normal grade (No symbol)	High accuracy grade (H)	Precision grade (P)	Super precision grade (SP)	Ultra precision grade (UP)
15 20	Dimensional tolerance in height M	$\pm 0.07$	$\pm 0.03$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
	Difference in height M	0.02	0.01	0.006	0.004	0.003
	Dimensional tolerance in width $W_2$	$\pm 0.06$	$\pm 0.03$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.008 \end{matrix}$
	Difference in width $W_2$	0.02	0.01	0.006	0.004	0.003
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
	Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
25 30 35	Dimensional tolerance in height M	$\pm 0.08$	$\pm 0.04$	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.02 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
	Difference in height M	0.02	0.015	0.007	0.005	0.003
	Dimensional tolerance in width $W_2$	$\pm 0.07$	$\pm 0.03$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	$\begin{matrix} 0 \\ -0.01 \end{matrix}$
	Difference in width $W_2$	0.025	0.015	0.007	0.005	0.003
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
	Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
45 55	Dimensional tolerance in height M	$\pm 0.08$	$\pm 0.04$	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$
	Difference in height M	0.025	0.015	0.007	0.005	0.003
	Dimensional tolerance in width $W_2$	$\pm 0.07$	$\pm 0.04$	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.025 \end{matrix}$	$\begin{matrix} 0 \\ -0.015 \end{matrix}$
	Difference in width $W_2$	0.03	0.015	0.007	0.005	0.003
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
	Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
65	Dimensional tolerance in height M	$\pm 0.08$	$\pm 0.04$	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$
	Difference in height M	0.03	0.02	0.01	0.007	0.005
	Dimensional tolerance in width $W_2$	$\pm 0.08$	$\pm 0.04$	$\begin{matrix} 0 \\ -0.05 \end{matrix}$	$\begin{matrix} 0 \\ -0.04 \end{matrix}$	$\begin{matrix} 0 \\ -0.03 \end{matrix}$
	Difference in width $W_2$	0.03	0.02	0.01	0.007	0.005
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				
	Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.				

## Running Parallelism

Running parallelism refers to the tolerance for parallelism between the LM block and LM rail datum surfaces when an LM block travels the whole length of an LM rail bolted to a reference surface.



## LM Rail Length and Running Parallelism by Accuracy Standard

Unit:  $\mu\text{m}$

LM rail length (mm)		Running parallelism values				
Above	Or less	Normal grade	High accuracy grade	Precision grade	Super precision grade	Ultra precision grade
—	50	5	3	2	1.5	1
50	80	5	3	2	1.5	1
80	125	5	3	2	1.5	1
125	200	5	3.5	2	1.5	1
200	250	6	4	2.5	1.5	1
250	315	7	4.5	3	1.5	1
315	400	8	5	3.5	2	1.5
400	500	9	6	4.5	2.5	1.5
500	630	11	7	5	3	2
630	800	12	8.5	6	3.5	2
800	1000	13	9	6.5	4	2.5
1000	1250	15	11	7.5	4.5	3
1250	1600	16	12	8	5	4
1600	2000	18	13	8.5	5.5	4.5
2000	2500	20	14	9.5	6	5
2500	3090	21	16	11	6.5	5.5

## Standard and Maximum Lengths of the LM Rail

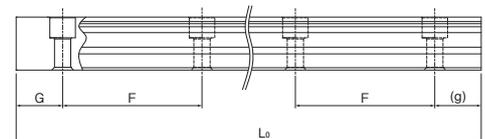
The standard and maximum lengths of Model HDR LM rails are shown in the following table.

If the maximum length of the desired LM rail exceeds these values, joint rails will be used. Contact THK for details.

For special rail lengths, it is recommended to use the G,g dimension values from the table.

As the G,g dimension increases, this portion becomes less stable, and the accuracy may be negatively affected.

\*If joint rails are not allowed, and a length greater than the maximum values is required, contact THK.

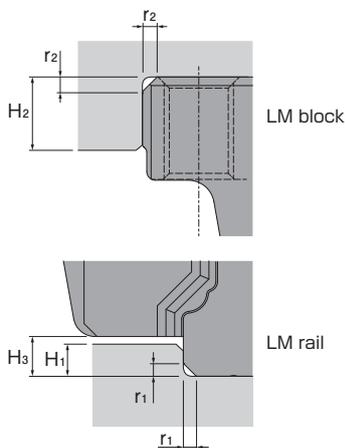


### Standard and Maximum Lengths of the LM Rail

Unit: mm

Model No.	HDR15	HDR20	HDR25	HDR30	HDR35	HDR45	HDR55	HDR65	
Standard length of the LM rail	160	160	220	280	280	570	780	1270	
	220	220	280	360	360	675	900	1570	
	280	280	340	440	440	780	1020	2020	
	340	340	400	520	520	885	1140	2620	
	400	400	460	600	600	990	1260	—	
	460	460	520	680	680	1095	1380	—	
	520	520	580	760	760	1200	1500	—	
	580	580	640	840	840	1305	1620	—	
	640	640	700	920	920	1410	1740	—	
	700	700	760	1000	1000	1515	1860	—	
	760	760	820	1080	1080	1620	1980	—	
	820	820	940	1160	1160	1725	2100	—	
	940	940	1000	1240	1240	1830	2220	—	
	1000	1000	1060	1320	1320	1935	2340	—	
	1060	1060	1120	1400	1400	2040	2460	—	
	1120	1120	1180	1480	1480	2145	2580	—	
	1180	1180	1240	1560	1560	2250	2700	—	
Standard length of the LM rail	1240	1240	1300	1640	1640	2355	2820	—	
	1360	1360	1360	1720	1720	2460	2940	—	
	1480	1480	1420	1800	1800	2565	3060	—	
	1600	1600	1480	1880	1880	2670	—	—	
	—	1720	1540	1960	1960	2775	—	—	
	—	1840	1600	2040	2040	2880	—	—	
	—	1960	1720	2200	2200	2985	—	—	
	—	2080	1840	2360	2360	3090	—	—	
	—	2200	1960	2520	2520	—	—	—	
	—	—	2080	2680	2680	—	—	—	
Standard pitch	60	60	60	80	80	105	120	150	
	G,g dimension	20	20	20	20	20	22.5	30	35
	Max length	3000	3000	3000	3000	3000	3090	3060	3000

## Shoulder Height of the Mounting Base and the Corner Radius



The mounting base for the LM rail and LM block has a reference surface on the side face to allow easy installation.

The height of the datum shoulder varies based on the model. See below for details.

The corner of the mounting shoulder must be machined to have a recess, or machined to be smaller than the corner radius  $r$ , to prevent interference with the chamfer of the LM rail or the LM block.

The corner radius  $r$  varies based on the model. See below for details.

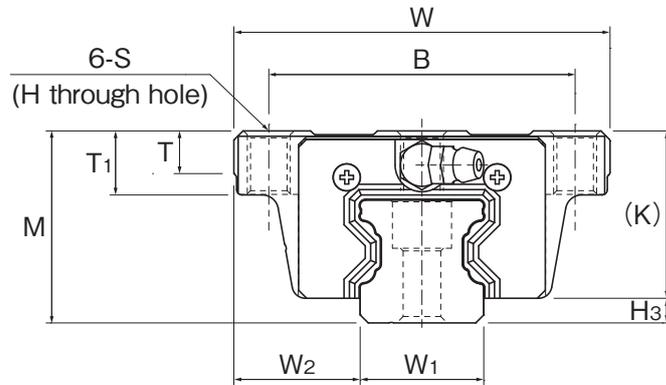
### Shoulder Height of the Mounting Base and the Corner Radius

Unit: mm

Model No.	Corner radius for the LM rail $r_1$ (max)	Corner radius for the LM block $r_2$ (max)	Shoulder height for the LM rail $H_1$	Shoulder height for the LM block $H_2$	$H_3$
HDR15	0.5	0.5	3	4	3.8
HDR20	0.5	0.5	4	5	4.5
HDR25	1	1	4	5	4.6
HDR30	1	1	5	5	5.7
HDR35	1	1	5.5	6	6.2
HDR45	1	1	8	8	9.5
HDR55	1.5	1.5	10	10	12
HDR65	1.5	1.5	10	10	12.7

# Specification Table

## HDR-C/LC



Model		External dimensions				LM block dimensions											Pilot hole for side nipple			
		Height M	Width W	Length L	Pitch B	Pitch C <sub>1</sub>	Pitch C <sub>2</sub>	Mounting hole S	H	L <sub>1</sub>	T	T <sub>1</sub>	K	N	E	Grease nipple	e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	H <sub>3</sub>
HDR15	C	24	47	61.4	38	30	26	M5	4.4	40	5.9	9.9	20.2	3.5	3.4	PB107	3.5	3.6	2.9	3.8
	LC	24	47	74.9	38	30	26	M5	4.4	53.5	5.9	9.9	20.2	3.5	3.4	PB107	3.5	3.6	2.9	3.8
HDR20	C	30	63	74.9	53	40	35	M6	5.4	51.7	7.2	9.9	25.5	4.7	3	PB107	3.0	4.7	2.9	4.5
	LC	30	63	90.7	53	40	35	M6	5.4	67.5	7.2	9.9	25.5	4.7	3	PB107	3.0	4.7	2.9	4.5
HDR25	C	36	70	87.6	57	45	40	M8	6.8	60	8	11.9	31.4	6.4	10	B-M6F	5.1	6.6	5.2	4.6
	LC	36	70	104.5	57	45	40	M8	6.8	76.9	8	11.9	31.4	6.4	10	B-M6F	5.1	6.6	5.2	4.6
HDR30	C	42	90	102.1	72	52	44	M10	8.5	70.5	8	14.9	36.3	7.5	9.5	B-M6F	4.8	7.5	5.2	5.7
	LC	42	90	124.1	72	52	44	M10	8.5	92.5	8	14.9	36.3	7.5	9.5	B-M6F	4.8	7.5	5.2	5.7
HDR35	C	48	100	116.5	82	62	52	M10	8.5	80.5	11.5	14.9	41.8	9.5	9.3	B-M6F	5.6	9.5	5.2	6.2
	LC	48	100	139.5	82	62	52	M10	8.5	103.5	11.5	14.9	41.8	9.5	9.3	B-M6F	5.6	9.5	5.2	6.2
HDR45	C	60	120	145.6	100	80	60	M12	10.5	104.2	14.1	17.9	50.5	10.5	14.3	B-PT1/8	8	10.5	5.2	9.5
	LC	60	120	177.3	100	80	60	M12	10.5	135.9	14.1	17.9	50.5	10.5	14.3	B-PT1/8	8	10.5	5.2	9.5
HDR55	C	70	140	179.2	116	95	70	M14	12.5	134.2	16	20.9	58	12	14.3	B-PT1/8	9	12	5.2	12
	LC	70	140	217.3	116	95	70	M14	12.5	172.3	16	20.9	58	12	14.3	B-PT1/8	9	12	5.2	12
HDR65	C	90	170	199.2	142	110	82	M16	14.5	144.8	18.8	23.9	77.3	19	14.3	B-PT1/8	10	19	5.2	12.7
	LC	90	170	258.8	142	110	82	M16	14.5	204.4	18.8	23.9	77.3	19	14.3	B-PT1/8	10	19	5.2	12.7

## Model Number Coding

Specify the highlighted codes. \*Specify each item for the models in the catalog.

**HDR25** **LC** **2** **UU** **C0** **-OIL** **+1200L** **P** **Z**

Model number

LM block type  
(see p. 7)

Number of LM blocks  
used on a single rail

Contamination protection  
accessory symbol (see p. 7 and 8)  
No symbol: Without seal

LM rail length  
(in mm)

Lubrication symbol

No symbol: Grease lubrication  
-oil: Oil lubrication

Radial clearance symbol

No symbol: Normal  
C1: Light preload  
C0: Medium preload

Plate cover

No symbol: Without plate cover

Accuracy symbol

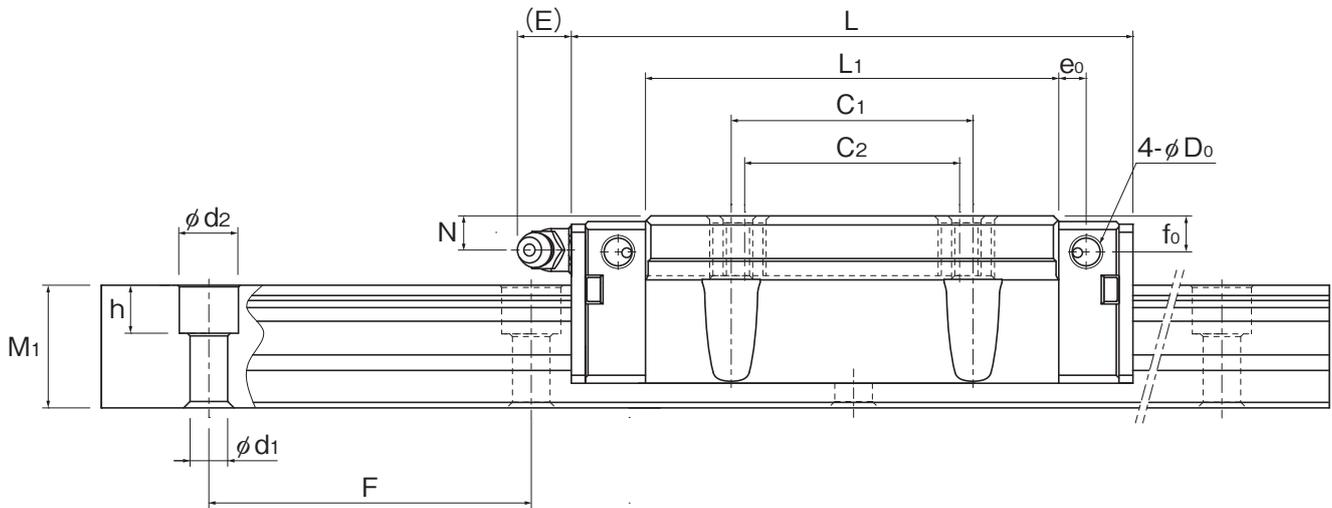
No symbol: Normal grade

H: High accuracy grade

P: Precision grade

SP: Super precision grade

UP: Ultra precision grade



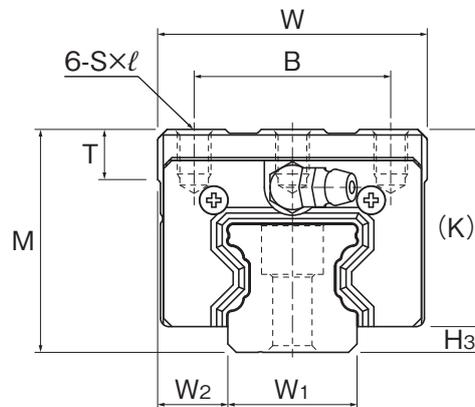
Unit: mm

	LM rail dimensions					Basic load rating (kN)		Static permissible moment (kN·m)*				Mass		
	Width	Height	Pitch	Mounting hole	C	C <sub>0</sub>	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>	LM block (kg)	LM rail (kg/m)	
	W <sub>1</sub> 0 -0.05	W <sub>2</sub>	M <sub>1</sub>	F			d <sub>1</sub> ×d <sub>2</sub> ×h	 One block    Double blocks		 One block    Double blocks				
	15	16	15.6	60	4.5×7.5×5.3	10.9	15.7	0.098	0.601	0.098	0.601	0.155	0.21	1.5
	15	16	15.6	60	4.5×7.5×5.3	13.7	21.7	0.182	0.984	0.182	0.984	0.215	0.28	
	20	21.5	20.1	60	6×9.5×8.5	19.8	27.4	0.227	1.27	0.227	1.27	0.348	0.46	2.5
	20	21.5	20.1	60	6×9.5×8.5	23.9	35.8	0.378	1.97	0.378	1.97	0.456	0.59	
	23	23.5	23	60	7×11×9	29.2	39.5	0.392	2.13	0.392	2.13	0.574	0.71	3.4
	23	23.5	23	60	7×11×9	33.8	48.6	0.582	3.09	0.582	3.09	0.707	0.90	
	28	31	26	80	9×14×12	40.5	53.7	0.623	3.38	0.623	3.38	0.956	1.25	4.8
	28	31	26	80	9×14×12	48.9	70.2	1.04	5.26	1.04	5.26	1.25	1.61	
	34	33	30	80	9×14×12	53.9	70.2	0.93	5.03	0.93	5.03	1.54	1.76	6.5
	34	33	30	80	9×14×12	62.4	86.4	1.38	7.32	1.38	7.32	1.9	2.23	
	45	37.5	37	105	14×20×17	86.9	110	1.82	9.82	1.82	9.82	3	3.08	10.8
	45	37.5	37	105	14×20×17	105	143	3.03	15.3	3.03	15.3	3.93	4.00	
	53	43.5	43	120	16×23×20	135	170	3.61	18.6	3.61	18.6	5.51	5.21	14.8
	53	43.5	43	120	16×23×20	161	219	5.84	28.5	5.84	28.5	7.09	6.66	
	63	53.5	54	150	18×26×22	195	228	5.27	28	5.27	28	8.79	9.38	22.3
	63	53.5	54	150	18×26×22	249	323	10.2	50.3	10.2	50.3	12.5	13.15	

\*Static permissible moment One block: static permissible moment value with one LM block  
 Double blocks: static permissible moment value with two blocks in close contact with each other

# Specification Table

## HDR-R/LR



Model		External dimensions			LM block dimensions							Pilot hole for side nipple					
		Height M	Width W	Length L	Pitch B	Pitch C	Mounting hole S×ℓ	L <sub>1</sub>	T	K	N	E	Grease nipple	e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	H <sub>3</sub>
HDR15	R	28	34	61.4	26	26	M4×5	40	6	24.2	7.5	3.4	PB107	3.5	7.6	2.9	3.8
	LR	28	34	74.9	26	26	M4×5	53.5	6	24.2	7.5	3.4	PB107	3.5	7.6	2.9	3.8
HDR20	R	30	44	74.9	32	36	M5×6	51.7	8	25.5	4.7	3	PB107	3.0	4.7	2.9	4.5
	LR	30	44	90.7	32	50	M5×6	67.5	8	25.5	4.7	3	PB107	3.0	4.7	2.9	4.5
HDR25	R	40	48	87.6	35	35	M6×8	60	9	35.4	10.4	10	B-M6F	5.1	10.6	5.2	4.6
	LR	40	48	104.5	35	50	M6×8	76.9	9	35.4	10.4	10	B-M6F	5.1	10.6	5.2	4.6
HDR30	R	45	60	102.1	40	40	M8×10	70.5	9	39.3	10.5	9.5	B-M6F	4.8	10.5	5.2	5.7
	LR	45	60	124.1	40	60	M8×10	92.5	9	39.3	10.5	9.5	B-M6F	4.8	10.5	5.2	5.7
HDR35	R	55	70	116.5	50	50	M8×12	80.5	11.8	48.8	16.5	9.3	B-M6F	5.6	16.5	5.2	6.2
	LR	55	70	139.5	50	72	M8×12	103.5	11.8	48.8	16.5	9.3	B-M6F	5.6	16.5	5.2	6.2
HDR45	R	70	86	145.6	60	60	M10×17	104.2	15	60.5	20.5	14.3	B-PT1/8	8	20.5	5.2	9.5
	LR	70	86	177.3	60	80	M10×17	135.9	15	60.5	20.5	14.3	B-PT1/8	8	20.5	5.2	9.5
HDR55	R	80	100	179.2	75	75	M12×18	134.2	20.5	68	22	14.3	B-PT1/8	9	22	5.2	12
	LR	80	100	217.3	75	95	M12×18	172.3	20.5	68	22	14.3	B-PT1/8	9	22	5.2	12
HDR65	R	90	126	199.2	76	70	M16×20	144.8	23	77.3	19	14.3	B-PT1/8	10	19	5.2	12.7
	LR	90	126	258.8	76	120	M16×20	204.4	23	77.3	19	14.3	B-PT1/8	10	19	5.2	12.7

## Model Number Coding

Specify the highlighted codes. \*Specify each item for the models in the catalog.

**HDR25** **LR** **2** **UU** **C0** **-OIL** **+1200L** **P** **Z**

Model number

LM block type  
(see p. 7)

Number of LM blocks  
used on a single rail

Contamination protection  
accessory symbol (see p. 7 and 8)  
No symbol: Without seal

LM rail length  
(in mm)

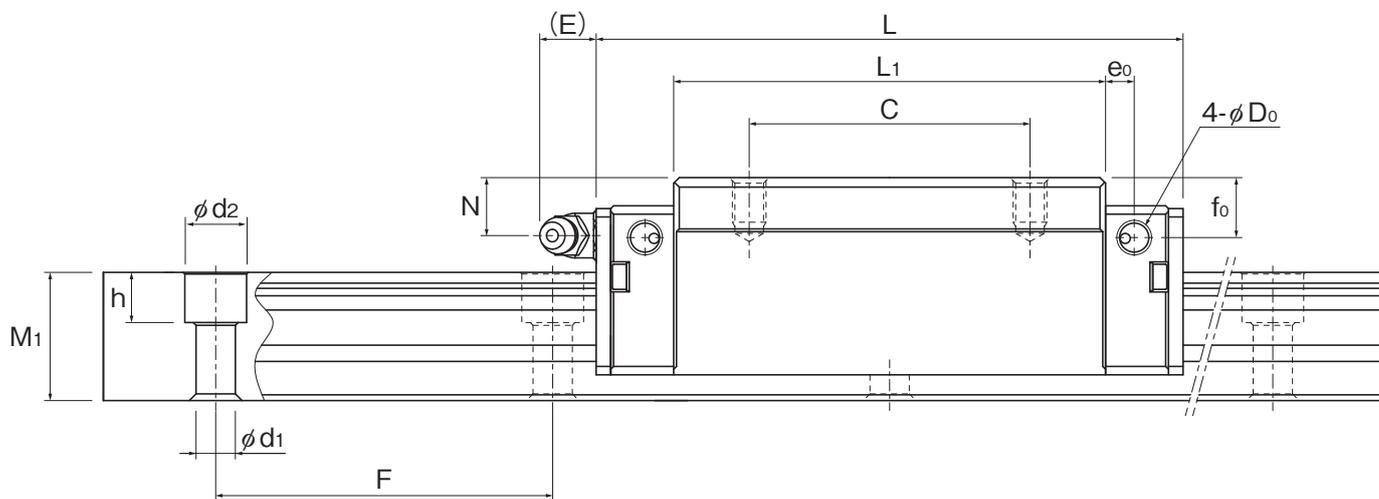
Lubrication symbol  
No symbol: Grease lubrication  
-oil: Oil lubrication

Radial clearance symbol  
No symbol: Normal  
C1: Light preload  
C0: Medium preload

Plate cover  
No symbol: Without plate cover

Accuracy symbol

No symbol: Normal grade  
H: High accuracy grade  
P: Precision grade  
SP: Super precision grade  
UP: Ultra precision grade



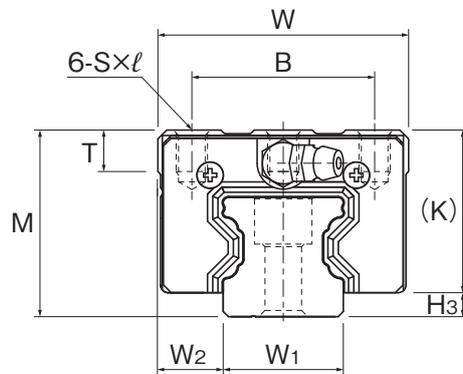
Unit: mm

	LM rail dimensions					Basic load rating (kN)		Static permissible moment (kN·m)*				Mass		
	Width	Height	Pitch	Mounting hole	C	C <sub>0</sub>	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>	LM block (kg)	LM rail (kg/m)	
	W <sub>1</sub> 0 -0.05	W <sub>2</sub>	M <sub>1</sub>	F			d <sub>1</sub> ×d <sub>2</sub> ×h	 One block    Double blocks		 One block    Double blocks				
	15	9.5	15.6	60	4.5×7.5×5.3	10.9	15.7	0.098	0.601	0.098	0.601	0.155	0.19	1.5
	15	9.5	15.6	60	4.5×7.5×5.3	13.7	21.7	0.182	0.984	0.182	0.984	0.215	0.28	
	20	12	20.1	60	6×9.5×8.5	19.8	27.4	0.227	1.27	0.227	1.27	0.348	0.36	2.5
	20	12	20.1	60	6×9.5×8.5	23.9	35.8	0.378	1.97	0.378	1.97	0.456	0.42	
	23	12.5	23	60	7×11×9	29.2	39.5	0.392	2.13	0.392	2.13	0.574	0.64	3.4
	23	12.5	23	60	7×11×9	33.8	48.6	0.582	3.09	0.582	3.09	0.707	0.74	
	28	16	26	80	9×14×12	40.5	53.7	0.623	3.38	0.623	3.38	0.956	1.06	4.8
	28	16	26	80	9×14×12	48.9	70.2	1.04	5.26	1.04	5.26	1.25	1.37	
	34	18	30	80	9×14×12	53.9	70.2	0.93	5.03	0.93	5.03	1.54	1.75	6.5
	34	18	30	80	9×14×12	62.4	86.4	1.38	7.32	1.38	7.32	1.9	2.04	
	45	20.5	37	105	14×20×17	86.9	110	1.82	9.82	1.82	9.82	3	3.16	10.8
	45	20.5	37	105	14×20×17	105	143	3.03	15.3	3.03	15.3	3.93	4.07	
	53	23.5	43	120	16×23×20	135	170	3.61	18.6	3.61	18.6	5.51	5.28	14.8
	53	23.5	43	120	16×23×20	161	219	5.84	28.5	5.84	28.5	7.09	6.72	
	63	31.5	54	150	18×26×22	195	228	5.27	28	5.27	28	8.79	8.03	22.3
	63	31.5	54	150	18×26×22	249	323	10.2	50.3	10.2	50.3	12.5	11.17	

\*Static permissible moment One block: static permissible moment value with one LM block  
 Double blocks: static permissible moment value with two blocks in close contact with each other

# Specification Table

## HDR-V/LV



Model	External dimensions			LM block dimensions								Pilot hole for side nipple					
	Height M	Width W	Length L	Pitch B	Pitch C	Mounting hole S×l	L <sub>1</sub>	T	K	N	E	Grease nipple	e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	H <sub>3</sub>	
HDR15	V	24	34	61.4	26	26	M4×4	40	5.9	20.2	3.5	3.4	PB107	3.5	3.6	2.9	3.8
	LV	24	34	74.9	26	26	M4×4	53.5	5.9	20.2	3.5	3.4	PB107	3.5	3.6	2.9	3.8
HDR25	V	36	48	87.6	35	35	M6×8	60	8	31.4	6.4	10	B-M6F	5.1	6.6	5.2	4.6
	LV	36	48	104.5	35	50	M6×8	76.9	8	31.4	6.4	10	B-M6F	5.1	6.6	5.2	4.6
HDR30	V	42	60	102.1	40	40	M8×10	70.5	8	36.3	7.5	9.5	B-M6F	4.8	7.5	5.2	5.7
	LV	42	60	124.1	40	60	M8×10	92.5	8	36.3	7.5	9.5	B-M6F	4.8	7.5	5.2	5.7
HDR35	V	48	70	116.5	50	50	M8×12	80.5	11.5	41.8	9.5	9.3	B-M6F	5.6	9.5	5.2	6.2
	LV	48	70	139.5	50	72	M8×12	103.5	11.5	41.8	9.5	9.3	B-M6F	5.6	9.5	5.2	6.2
HDR45	V	60	86	145.6	60	60	M10×15	104.2	14.9	50.5	10.5	14.3	B-PT1/8	8	10.5	5.2	9.5
	LV	60	86	177.3	60	80	M10×15	135.9	14.9	50.5	10.5	14.3	B-PT1/8	8	10.5	5.2	9.5
HDR55	V	70	100	179.2	75	75	M12×15	134.2	19.4	58	12	14.3	B-PT1/8	9	12	5.2	12
	LV	70	100	217.3	75	95	M12×15	172.3	19.4	58	12	14.3	B-PT1/8	9	12	5.2	12

## Model Number Coding

Specify the highlighted codes. \*Specify each item for the models in the catalog.

**HDR25** **LV** **2** **UU** **C0** **-OIL** **+1200L** **P** **Z**

Model number

LM block type  
(see p. 7)

Number of LM blocks  
used on a single rail

Contamination protection  
accessory symbol (see p. 7 and 8)  
No symbol: Without seal

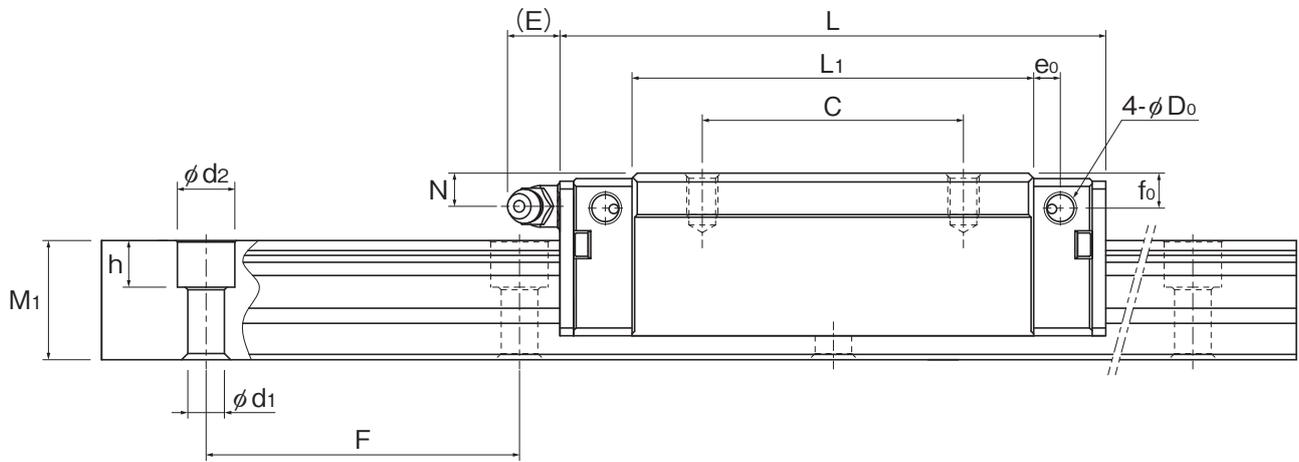
LM rail length  
(in mm)

Lubrication symbol  
No symbol: Grease lubrication  
-oil: Oil lubrication

Radial clearance symbol  
No symbol: Normal  
C1: Light preload  
C0: Medium preload

Plate cover  
No symbol: Without plate cover

Accuracy symbol  
No symbol: Normal grade  
H: High accuracy grade  
P: Precision grade  
SP: Super precision grade  
UP: Ultra precision grade



Unit: mm

	LM rail dimensions					Basic load rating (kN)		Static permissible moment (kN·m)*				Mass		
	Width	Height	Pitch	Mounting hole	C	C <sub>0</sub>	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>	LM block (kg)	LM rail (kg/m)	
	W <sub>1</sub> 0 -0.05	W <sub>2</sub>	M <sub>1</sub>	F			d <sub>1</sub> ×d <sub>2</sub> ×h	 One block    Double blocks		 One block    Double blocks				
	15	9.5	15.6	60	4.5×7.5×5.3	10.9	15.7	0.098	0.601	0.098	0.601	0.155	0.15	1.5
	15	9.5	15.6	60	4.5×7.5×5.3	13.7	21.7	0.182	0.984	0.182	0.984	0.215	0.20	
	23	12.5	23	60	7×11×9	29.2	39.5	0.392	2.13	0.392	2.13	0.574	0.51	3.4
	23	12.5	23	60	7×11×9	33.8	48.6	0.582	3.09	0.582	3.09	0.707	0.62	
	28	16	26	80	9×14×12	40.5	53.7	0.623	3.38	0.623	3.38	0.956	0.74	4.8
	28	16	26	80	9×14×12	48.9	70.2	1.04	5.26	1.04	5.26	1.25	1.00	
	34	18	30	80	9×14×12	53.9	70.2	0.93	5.03	0.93	5.03	1.54	1.34	6.5
	34	18	30	80	9×14×12	62.4	86.4	1.38	7.32	1.38	7.32	1.9	1.65	
	45	20.5	37	105	14×20×17	86.9	110	1.82	9.82	1.82	9.82	3	2.47	10.8
	45	20.5	37	105	14×20×17	105	143	3.03	15.3	3.03	15.3	3.93	3.17	
	53	23.5	43	120	16×23×20	135	170	3.61	18.6	3.61	18.6	5.51	4.25	14.8
	53	23.5	43	120	16×23×20	161	219	5.84	28.5	5.84	28.5	7.09	5.40	

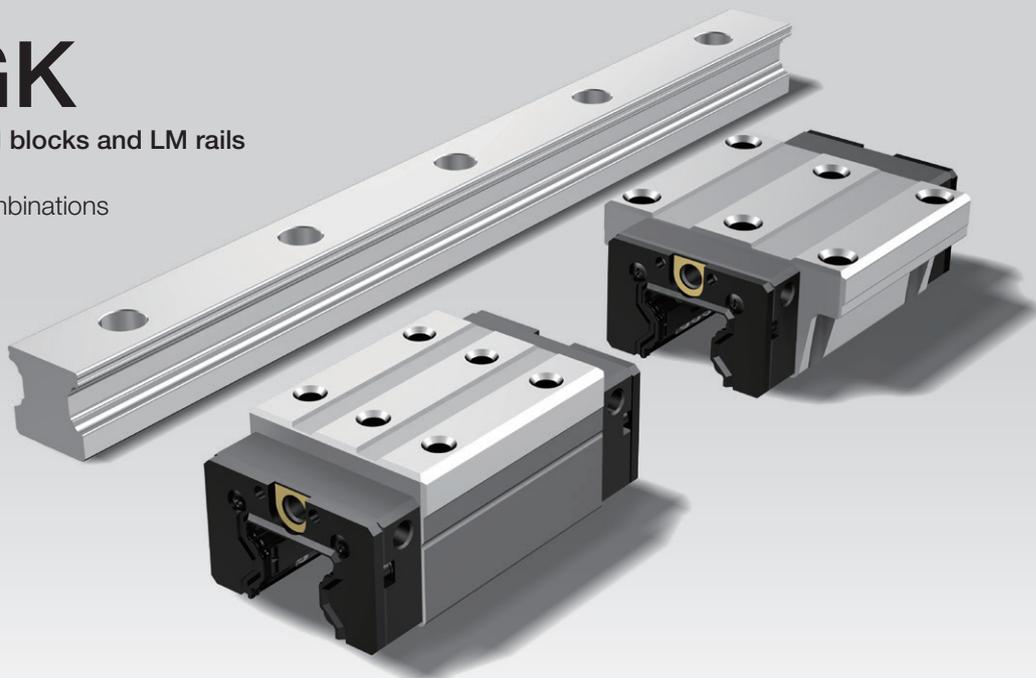
\*Static permissible moment One block: static permissible moment value with one LM block  
 Double blocks: static permissible moment value with two blocks in close contact with each other

## Feature 3 LM Blocks and LM Rails Available Separately

# HDR-GK

Standalone HDR-GK LM blocks and LM rails

Simple, quick, flexible combinations



### Lineup

Block type		HDR15	HDR20	HDR25	HDR30	HDR35	HDR45
Standard type	R	○	○	○	○	○	○
	C	○	○	○	○	○	○
	V	○	—	○	○	○	○
Long type	LR	○	○	○	○	○	○
	LC	○	○	○	○	○	○
	LV	○	—	○	○	○	○

## Model Number Coding

### LM rail

Requires specification (orange box) Cannot be changed (grey box)

**HDR25** - **3000L** **H** **Z** **(GK) RAIL**

Model number

LM rail length

Accuracy symbol

No symbol: Normal grade

H: High accuracy grade

GK series

LM rail symbol

With plate cover

No symbol: Without plate cover

### LM block

**HDR25** **LR** **1** **SS** **C1** **H** **Z** **(GK) BLOCK**

Model number

LM block type

Number of LM blocks (1 only)

Contamination protection accessory symbol (SS only)

Radial clearance symbol

No symbol: Normal preload

C1: Light preload

GK series

LM block symbol

With plate cover

No symbol: Without plate cover

Accuracy symbol

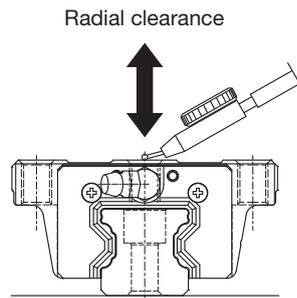
No symbol: Normal grade

H: High accuracy grade

## Radial Clearance Specifications

The Model HDR has two types of radial clearance (preload): normal and light preload (C1).

The preload significantly affects the running accuracy, load resistance, and rigidity. Therefore, it is necessary to select a clearance that is appropriate for the application. An appropriate radial clearance will prevent vibrations and impacts from occurring when the device is running, as well as improve the service life and accuracy of the LM Guide.



Radial Clearance Specifications Unit:  $\mu\text{m}$

Model	Normal (No symbol)	Light preload (C1)
15	-6.0 to 0	-10 to -6.0
20	-8.0 to 0	-14 to -8.0
25	-9.0 to 0	-16 to -11
30	-11 to 0	-18 to -13
35	-13 to 0	-20 to -15
45	-18 to 0	-29 to -22

## Accuracy Standards

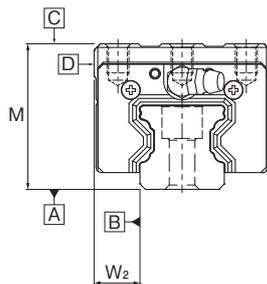
The accuracy of the LM Guide is specified for each model in terms of the dimensional tolerance for height and width, the difference between height and width in a pair, and running parallelism. (Normal grade, high accuracy grade)

### Difference in Height M

Indicates the difference between the minimum and maximum values of height M of each of the LM Guides used on the same plane in combination.

### Difference in Width $W_2$

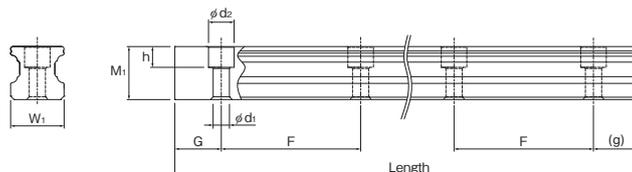
Indicates the difference between the minimum and maximum values of the width  $W_2$  between an LM rail and each of the LM blocks mounted together on the LM rail.



### Accuracy Standards

Unit: mm

Model	Accuracy (symbol) Item	Normal grade (No symbol)	High accuracy grade (H)	
15 20	Dimensional tolerance in height M	$\pm 0.07$	$\pm 0.03$	
	Difference in height M	One rail, multiple blocks (1 set)	0.02	0.01
		Multiple rails, multiple blocks (multiple sets)	0.04	0.035
	Dimensional tolerance in width $W_2$	$\pm 0.06$	$\pm 0.03$	
	Difference in width $W_2$	0.02	0.01	
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.		
25 30 35	Dimensional tolerance in height M	$\pm 0.08$	$\pm 0.04$	
	Difference in height M	One rail, multiple blocks (1 set)	0.02	0.015
		Multiple rails, multiple blocks (multiple sets)	0.04	0.035
	Dimensional tolerance in width $W_2$	$\pm 0.07$	$\pm 0.03$	
	Difference in width $W_2$	0.025	0.015	
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.		
Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.			
45	Dimensional tolerance in height M	$\pm 0.08$	$\pm 0.04$	
	Difference in height M	One rail, multiple blocks (1 set)	0.025	0.015
		Multiple rails, multiple blocks (multiple sets)	0.04	0.035
	Dimensional tolerance in width $W_2$	$\pm 0.07$	$\pm 0.04$	
	Difference in width $W_2$	0.03	0.015	
	Running parallelism of surface C against surface A	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.		
Running parallelism of surface D against surface B	LM Rail Length and Running Parallelism by Accuracy Standard, see p. 12.			



### LM Rail Dimensions

Unit: mm

Model	LM rail dimensions					Mass LM rail (kg/m)
	$W_1$ $\pm 0.05$	$M_1$	F	$d_1 \times d_2 \times h$	Length (G, g)	
15	15	15	60	4.5×7.5×5.3	3000(20,40)	1.5
20	20	18	60	6×9.5×8.5	3000(20,40)	2.5
25	23	22	60	7×11×9	3000(20,40)	3.4
30	28	26	80	9×14×12	3000(20,20)	4.8
35	34	29	80	9×14×12	3000(20,20)	6.5
45	45	38	105	14×20×17	3000(20,40)	10.8

# Calculating the Static Safety Factor and the Nominal Life of HDR and HDR (GK)

## Static Safety Factor

To calculate a load applied to the LM Guide, you must first obtain the average load required to determine the service life and the maximum load needed to determine the static safety factor. In particular, if the system starts and stops frequently, if a cutting load acts on the system, or if a large moment or torque 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). The reference values for the static safety factor are shown in the table to the right.

$$f_s = \frac{C_0}{P_{\max}} \dots\dots (1)$$

$f_s$ : Static safety factor  
 $C_0$ : Standard static load (N)  
 $P_{\max}$ : Maximum load (N)

Reference Values for the Static Safety Factor ( $f_s$ )

Machine type	Load conditions	Lower limit of $f_s$
General industrial machinery	Without vibration or impacts	1.0 to 3.5
	With vibration or impacts	2.0 to 5.0
Machine tool	Without vibration or impacts	1.0 to 4.0
	With vibration or impacts	2.5 to 7.0

\*The standard value of the static safety factor may vary depending on usage conditions such as the environment, lubrication status, mounting accuracy, and/or rigidity.

## Service Life

### ● Nominal Life

The nominal life (L) means the total travel distance that 90% of a group of units can achieve without flaking (scale-like pieces on the metal surface peeling off) after individually running under the same conditions. The nominal life of Model HDR is obtained using equation (2).

$$L = \left( \frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P_C} \right)^3 \times 50 \dots\dots (2)$$

L: Nominal life (km)       $f_H$ : Hardness factor (see general catalog)       $f_C$ : Contact factor (see general catalog)  
 $C$ : Basic dynamic load rating (N)       $f_T$ : Temperature factor (see general catalog)       $f_W$ : Load factor (see general catalog)  
 $P_C$ : Calculated load (N)

\*The basic dynamic load rating (C) indicates the load for which the nominal life (L) is 50 km when a group of identical LM Guides independently operate under that load when it is applied with a constant direction and magnitude.

### ● Service Life

Once the nominal life (L) has been obtained, the service life can be obtained using equation (3) if the stroke length and the number of cycles are constant.

$$L_h = \frac{L \times 10^6}{2 \times \ell_s \times n_i \times 60} \dots\dots (3)$$

$L_h$ : Service life (h)  
 $\ell_s$ : Stroke length (mm)  
 $n_i$ : Number of reciprocations per minute ( $\text{min}^{-1}$ )

## Handling

- (1) Please use at least two people to move any product weighing 20 kg or more, or use a cart or another method of conveyance. Otherwise, it may cause injury or damage the unit.
- (2) Do not disassemble the parts. This will result in loss of functionality.
- (3) Tilting an LM block or LM rail may cause them to fall by their own weight.
- (4) Take care not to drop or strike the LM Guide. Otherwise, it may cause injury or damage the unit. Even if there is no outward indication of damage, a sudden impact could prevent the unit from functioning properly.
- (5) Do not remove the LM block from the LM rail during setup.
- (6) Do not insert hands or fingers into the mounting holes on the LM rail, as they could get caught between the rail and the LM block, resulting in injury.
- (7) When handling the product, wear safety gloves and safety boots, etc., as appropriate to ensure proper protection.

## Precautions on Use

- (1) Prevent foreign materials, such as cutting chips or coolant, from entering the product. Failure to do so could damage the product.
- (2) Prevent foreign materials, such as cutting chips, coolant, corrosive solvents, or water from getting in the product by using a bellows or cover when the product is used in an environment where such a thing is likely.
- (3) Do not use this product if the external temperature exceeds 80°C. If used above this temperature, there is a risk that the resin and rubber parts may deform or become damaged (except for the heat-resistant type).
- (4) If foreign materials such as cutting chips adhere to the product, replenish the lubricant after cleaning the product.
- (5) Micro-strokes can inhibit the formation of an oil film between the raceways and the area of contact for the balls, resulting in fretting. Therefore, be sure to use a type of grease with high fretting resistance. We recommend periodically causing the unit to make a stroke equal to the length of the LM block to help ensure that a film forms between the raceways and balls.
- (6) Do not forcibly drive a pin, key, or any other positioning device into the product. This could create indentations in the raceways and impair the product's function.
- (7) If, for operational reasons, it becomes absolutely necessary to remove the LM block from the LM rail and reattach it, a special mounting jig must be used for this purpose. (The mounting jig is not included with standard versions of the product. To obtain one, please contact THK.)
- (8) Position the mounting jig so that one end fully touches the end of the LM rail. When the rail and the jig are exactly aligned, the LM block can be loaded onto the rail.
- (9) Take care to keep the LM block straight. Loading the block at an angle can introduce foreign matter, damage internal components, or cause balls to fall out.
- (10) The LM block must contain all its internal rolling elements (balls) when mounted on the LM rail. Using a block with any balls removed may result in premature damage.
- (11) If any balls fall out of the LM block, contact THK. Do not use the product in that condition.
- (12) If the LM Guide breaks due to an accident or other cause, the block may come off of the rail and fall. For the safe use of this product, take precautions such as adding a mechanism to prevent the block from falling.
- (13) Insufficient rigidity or accuracy of the mounting surface could cause the bearing load to concentrate on one point, and the bearing performance will drop significantly. Therefore, give sufficient consideration to the rigidity and accuracy of the housing and base as well as the strength of the bolts.
- (14) When removing the LM block from the LM rail and then replacing the block, an LM block mounting/removing jig that facilitates such installation is available. Contact THK for details.

## Lubrication

- (1) Thoroughly wipe off anti-rust oil and feed lubricant before using the product.
- (2) Do not mix different lubricants. Even grease containing the same type of thickening agent may, if mixed, interact negatively due to disparate additives or other ingredients.
- (3) When using the product in locations exposed to constant vibrations or in special environments such as in clean rooms, vacuums, and low/high temperatures, use a lubricant suitable for its use/environment.
- (4) Do not use grease lubrication for products whose model coding specifies "-OIL."
- (5) When lubricating products that do not feature a grease nipple or oil hole, directly coat the raceways with lubricant and perform several warm-up strokes to ensure that the grease permeates the interior.
- (6) Grease viscosity can vary depending on the temperature. Please keep in mind that the sliding resistance of the LM Guide may be affected by changes in viscosity.
- (7) After lubrication, the slide resistance of the LM Guide may increase due to the stirring resistance of grease. Be sure to let the grease spread fully before operating the machine.
- (8) Excess grease may spatter after lubrication. Wipe off spattered grease as necessary.
- (9) Grease deteriorates over time, which decreases the lubricity. It is necessary to inspect and replenish the grease in accordance with the usage frequency.
- (10) The greasing interval varies depending on the usage conditions and environment. We recommend greasing the system approximately every 100 km of travel distance (3 to 6 months). The final greasing interval/amount should be set at the actual machine.
- (11) If the product is mounted in a non-horizontal orientation, the lubricant may not reach the raceway completely.
- (12) When adopting oil lubrication, the lubricant may not be distributed throughout the LM block depending on the mounting orientation of the block. Contact THK in advance for details.

## Storage

When storing the LM Guide, enclose it in the package designated by THK, and store it indoors and in a horizontal orientation while avoiding any high temperatures, low temperatures, or high levels of humidity. Please note that if the product has been kept in storage for an extended period, the lubricant inside may have deteriorated. Please ensure that you replenish the lubricant before using.

## Disposal

The product should be treated as industrial waste and disposed of appropriately.

## Suited for Single Rail Applications HDR

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