

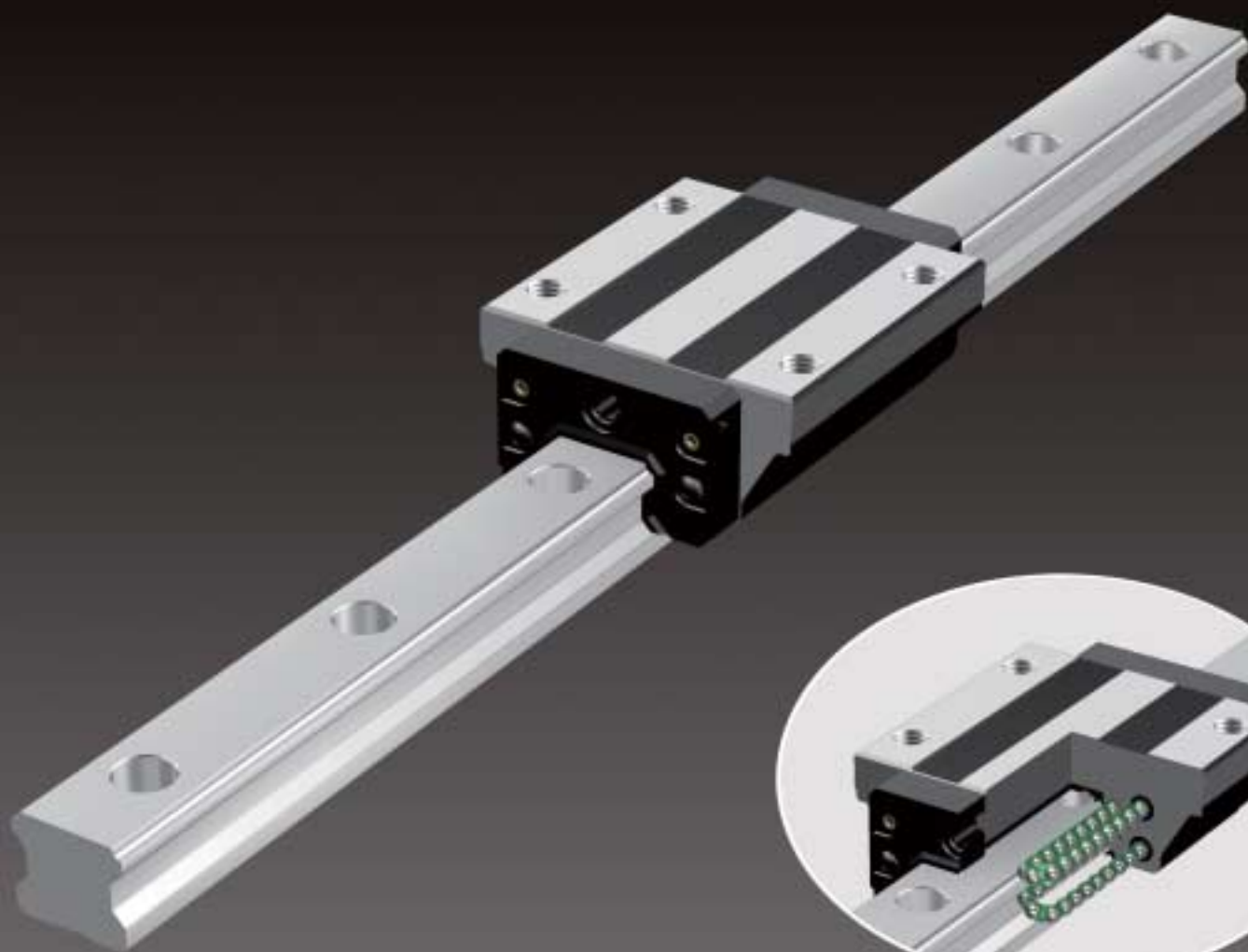


# Caged Ball LM Guide

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Ball Cage Effect  
Global Standard Size

# SHS



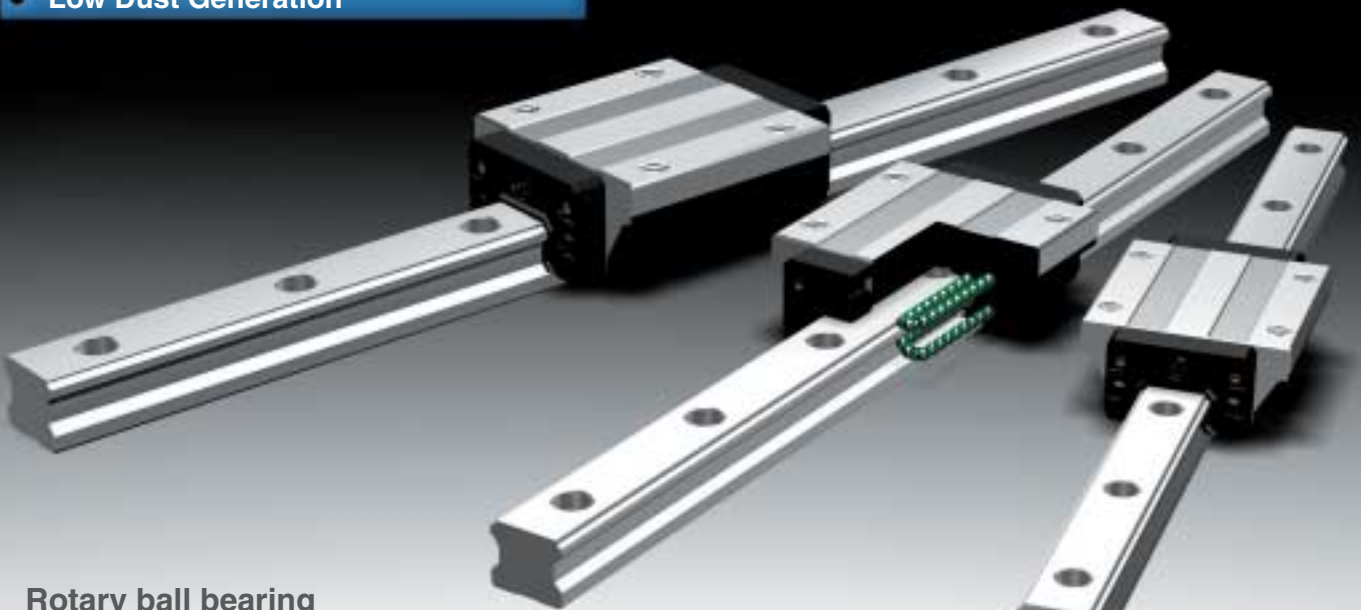
# Ball Cage Effect

The early forms of ball bearings were full-ball types without ball cages. Friction between balls caused loud noise, made high-speed rotation impossible and shortened the service life. Twenty years later, a Caged Ball design was developed for ball bearings. The new design enabled high-speed rotation at a low noise level, and extended the service life despite the reduced number of balls used. It marked a major development in the history of ball bearings.

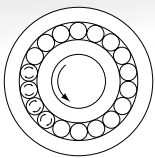
Similarly, the quality of needle bearings was significantly improved by the caged needle structure. With cage-less, full-ball types of ball bearings, balls make metallic contact with one another and produce loud noise. In addition, they rotate in opposite directions, causing the sliding contact between two adjacent balls to occur at a speed twice the ball-spinning rate. It results in severe wear and shortens the service life.

In addition, without a cage, balls make point contact to increase bearing stress, thus facilitating breakage of the oil film. In contrast, each caged ball contacts the cage over a wide area. Therefore, the oil film does not break, the noise level is low and balls can rotate at a high speed, resulting in a long service life.

- Long Service Life and Long-term Maintenance-free Operation
- Superbly High Speed
- Low Noise, Acceptable Running Sound
- Smooth Motion
- Low Dust Generation

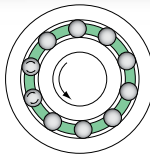


## Rotary ball bearing



### Conventional structure

- Adjacent balls contact each other at a point. As a result, contact stress is high and the oil film breaks due to friction.
- The service life becomes shorter.

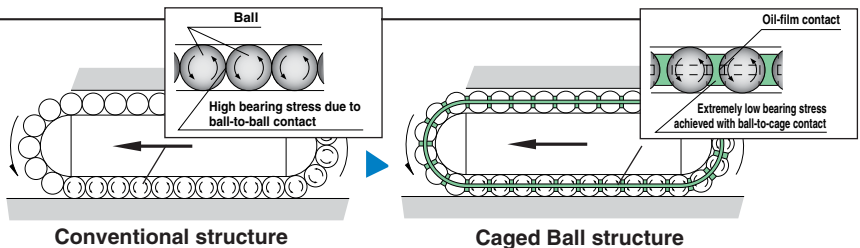


### Caged Ball structure

- The service life is prolonged due to the elimination of wear caused by friction between balls.
- The absence of friction between balls results in reduced heat generation during high-speed rotation.
- The absence of friction between balls eliminates collision noise of the balls.
- The even spacing of the balls enables them to move smoothly.
- Retention of lubricant in the ball cage ensures a long service life.

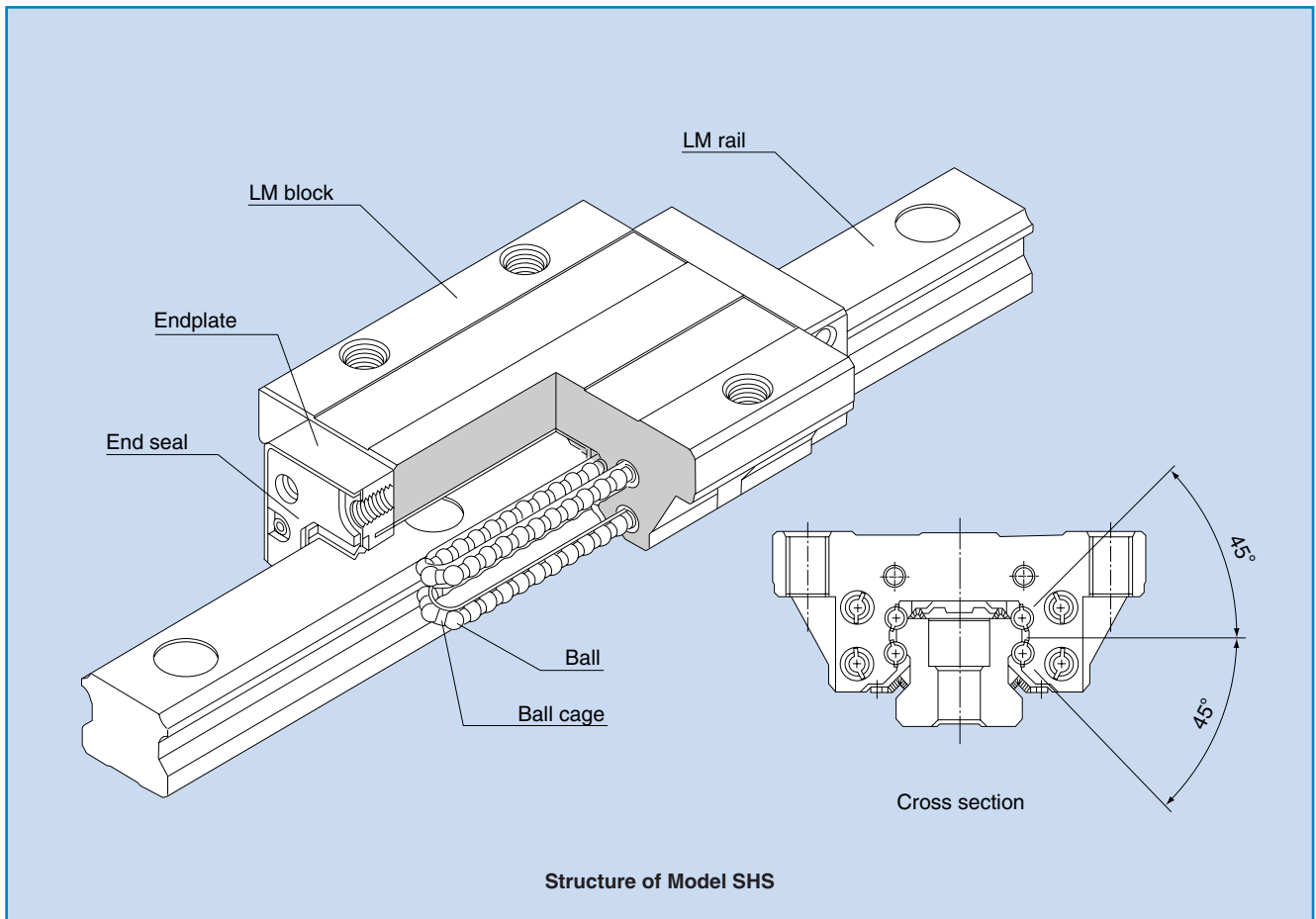
## Caged Ball LM Guide

With the Caged Ball LM Guide, the use of a ball cage allows lines of evenly spaced balls to circulate, thus eliminating friction between the balls. In addition, grease held in a space between the ball circulation path and the ball cage (grease pocket) is applied on the contact surface between each ball and the ball cage as the ball rotates, forming an oil film on the ball surface. This minimizes the risk of oil-film break.



# Global Standard Type Caged Ball LM Guide

# SHS



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

Each row of balls is placed at a contact angle of  $45^\circ$  so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse-radial and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient. With the low sectional height and the high rigidity design of the LM block, SHS achieves highly accurate and stable linear motion.

## ● 4-way equal load

Each row of balls is placed at a contact angle of  $45^\circ$  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.

## ● Self-adjustment capability

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

## ● Global standard size

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

## ● Low center of gravity, high rigidity

As a result of downsizing the LM rail section, the center of gravity is lowered and the rigidity is increased.



# SHS Outline

## Model SHS - Product Overview

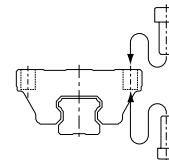
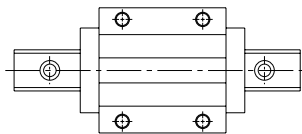
Model SHS has the same dimensions as model HSR, which is the de facto global standard full-ball LM guide, and can be mounted in any orientation since it is 4-way equal load type.

**Major applications** Machining center / NC lathe / drilling machine / electric discharge machine / conveyance system.

### Model SHS-C

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

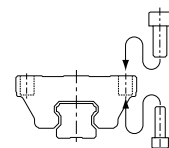
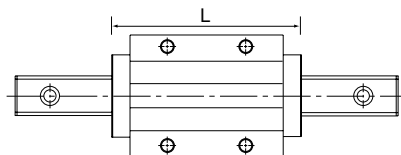
- SHS 15C    ● SHS 35C
- SHS 20C    ● SHS 45C
- SHS 25C    ● SHS 55C
- SHS 30C    ● SHS 65C



### Model SHS-LC

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

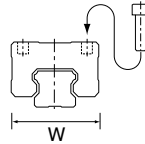
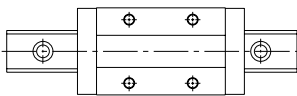
- SHS 15LC    ● SHS 35LC
- SHS 20LC    ● SHS 45LC
- SHS 25LC    ● SHS 55LC
- SHS 30LC    ● SHS 65LC



## Model SHS-V

The LM block has a smaller width (W) and is equipped with tapped holes. It is suitable for places where space for the table width is limited.

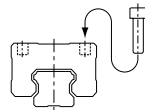
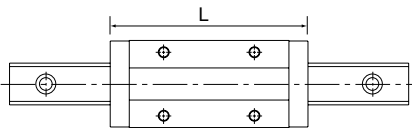
- SHS 15V
- SHS 20V
- SHS 25V
- SHS 30V
- SHS 35V
- SHS 45V
- SHS 55V
- SHS 65V



## Model SHS-LV

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

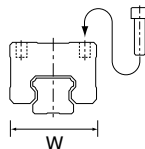
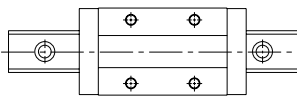
- SHS 15LV
- SHS 20LV
- SHS 25LV
- SHS 30LV
- SHS 35LV
- SHS 45LV
- SHS 55LV
- SHS 65LV



## Model SHS-R

The LM block has a smaller width (W) and the mounting holes are tapped. It succeeds the height dimension of full-ball type LM Guide HSR-R.

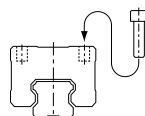
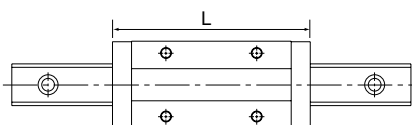
- SHS 15R
- SHS 25R
- SHS 30R
- SHS 35R
- SHS 45R
- SHS 55R



## Model SHS-LR

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

- SHS 25LR
- SHS 30LR
- SHS 35LR
- SHS 45LR
- SHS 55LR



\*1: Dimensional table for model SHS

Model SHS-C / SHS-LC  
→ pages 11-12

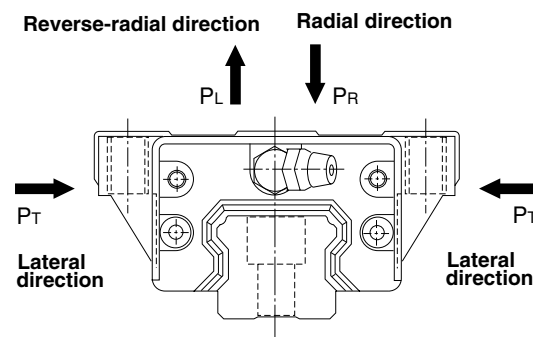
Model SHS-V / SHS-LV  
→ pages 13-14

Model SHS-R / SHS-LR  
→ pages 15-16

## Rated Loads in All Directions

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

The basic load ratings are uniform in the four directions (radial, reverse-radial and lateral directions), and their actual values are provided in the dimensional table\*1 for SHS.



## Equivalent Load

**When the LM block of model SHS receives loads in all directions simultaneously, the equivalent load is obtained from the equation below.**

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

where

$P_E$ : Equivalent load	(N)	$P_R$ : Radial load	(N)
·Radial direction		$P_L$ : Reverse-radial load	(N)
·Reverse-radial direction		$P_T$ : Lateral load	(N)
·Lateral direction			

## Service life

The service life of an LM Guide is subject to variations even under the same operational conditions. Therefore, it is necessary to use the rated life defined below as a reference value for obtaining the service life of the LM Guide.

### Rated life

The rated life means the total travel distance that 90% of a group of units of the same LM Guide model can achieve without flaking (scale-like exfoliation on the metal surface) after individually running under the same conditions.

### Service life time

Once the rated life (L) has been obtained, the service life time can be obtained using the equation on the right if the stroke length and the number of reciprocations are constant.

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

- L : Rated life (km)  
 C : Basic dynamic load rating\*1 (N)  
 P<sub>C</sub> : Calculated load (N)  
 f<sub>H</sub> : Hardness factor (see Fig. 1)  
 f<sub>T</sub> : Temperature factor (see Fig. 2)  
 f<sub>C</sub> : Contact factor (see Table 1)  
 f<sub>W</sub> : Load factor (see Table 2)

$$L_h = \frac{L \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

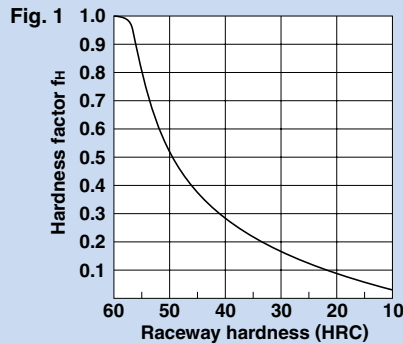
- L<sub>h</sub> : Service life time (h)  
 ℓ<sub>s</sub> : Stroke length (mm)  
 n<sub>1</sub> : No. of reciprocations per min (min<sup>-1</sup>)

\*1: Basic dynamic load rating (C)

It refers to a load with a constant magnitude and direction under which the rated life (L) of a group of identical LM Guide units independently operating is 50 km.

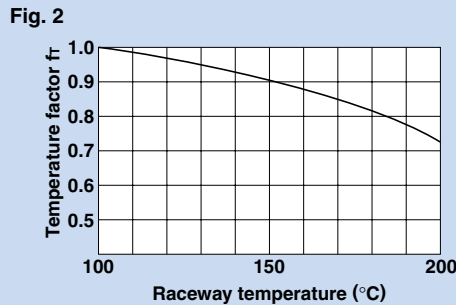
#### f<sub>H</sub> : Hardness factor

To ensure the achievement of the optimum load capacity of the LM Guide, the raceway hardness must be between 58 and 64 HRC. At hardness below this range, the basic dynamic and static load ratings decrease. Therefore, the rating values must be multiplied by the respective hardness factors (f<sub>H</sub>). Since the LM Guide has sufficient hardness, the f<sub>H</sub> value for the LM Guide is normally 1.0 unless otherwise specified.



#### f<sub>T</sub> : Temperature factor

Since the service temperature of Caged Ball LM Guides is normally 80°C or below, the f<sub>T</sub> value is 1.0.



#### f<sub>C</sub> : Contact factor

When multiple LM blocks are used in close contact with each other, it is difficult to achieve uniform load distribution due to moment loads and mounting-surface accuracy. When using multiple blocks in close contact with each other, multiply the basic load rating (C or C<sub>0</sub>) by the corresponding contact factor indicated in Table 1.

Note: When uneven load distribution is expected in a large machine, consider using a contact factor from Table 1.

Table 1 Contact Factor (f<sub>C</sub>)

Number of blocks used in close contact	Contact factor f <sub>C</sub>
2	0.81
3	0.72
4	0.66
5	0.61
6 or more	0.6
Normal use	1

#### f<sub>W</sub> : Load factor

In general, reciprocating machines tend to produce vibrations or impact during operation. It is especially difficult to accurately determine all vibrations generated during high-speed operation and impacts produced each time the machine starts and stops. Therefore, where the effects of speed and vibration are estimated to be significant, divide the basic dynamic load rating (C) by a load factor selected from Table 2, which contains empirically obtained data.

Table 2 Load Factor (f<sub>W</sub>)

Vibration/impact	Speed (V)	f <sub>W</sub>
Faint	Very slow V ≤ 0.25m/s	1 to 1.2
Weak	Slow 0.25 < V ≤ 1m/s	1.2 to 1.5
Moderate	Medium 1 < V ≤ 2m/s	1.5 to 2
Strong	Fast V > 2m/s	2 to 3.5

**\*1: Preload**

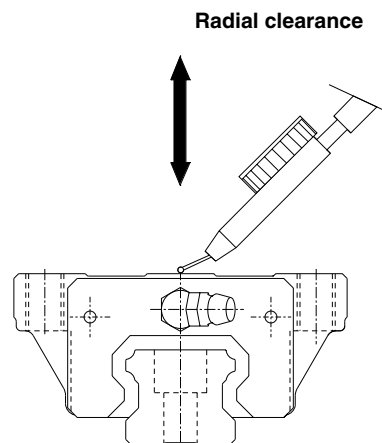
Preload is an internal load applied to the rolling elements (balls) of an LM block in advance in order to increase its rigidity.

The clearance of all model SHS units is adjusted to the designated value before being shipped. Therefore, it is unnecessary to adjust the preload.

## Radial Clearance Standard

Since the radial clearance of an LM Guide greatly affects the running accuracy, load carrying capacity and rigidity of the LM Guide, it is important to select an appropriate clearance according to the application.

In general, selecting a negative clearance (i.e., a preload\*1 is applied) while taking into account possible vibrations and impact generated from reciprocating motion favorably affects the service life and the accuracy.



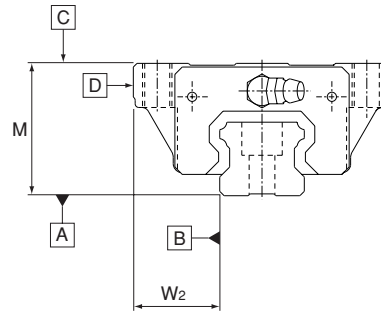
Unit:  $\mu\text{m}$

Model No.	Indication symbol	Normal	Light preload	Moderate preload
	No symbol	No symbol	C1	C0
15		- 5 to 0	-12 to - 5	—
20		- 6 to 0	-12 to - 6	-18 to -12
25		- 8 to 0	-14 to - 8	-20 to -14
30		- 9 to 0	-17 to - 9	-27 to -17
35		-11 to 0	-19 to -11	-29 to -19
45		-12 to 0	-22 to -12	-32 to -22
55		-15 to 0	-28 to -16	-38 to -28
65		-18 to 0	-34 to -22	-45 to -34

## Accuracy Standard

The accuracy of model SHS is specified in terms of running parallelism (\*1), dimensional tolerance for height and width, and height and width difference between a pair (\*2,\*3) when two or more LM blocks are used on one rail or when two or more rails are mounted on the same plane.

The accuracy of model SHS is categorized into Normal grade (no symbol), High-accuracy grade (H), Precision grade (P), Super-precision grade (SP) and Ultra-super-precision grade (UP), as indicated in the table below.



Unit: mm

Model No.	Accuracy standard Item	Normal grade	High-accuracy grade	Precision grade	Super-precision grade	Ultra-super precision grade	
		No symbol	H	P	SP	UP	
15 20	Dimensional tolerance for height M	± 0.1	± 0.03	$0_{-0.03}$	$0_{-0.015}$	$0_{-0.008}$	
	Difference in height M	0.02	0.01	0.006	0.004	0.003	
	Dimensional tolerance for width W <sub>2</sub>	± 0.1	± 0.03	$0_{-0.03}$	$0_{-0.015}$	$0_{-0.008}$	
	Difference in width W <sub>2</sub>	0.02	0.01	0.006	0.004	0.003	
	Running parallelism of surface C against surface A	ΔC (as shown in the figure below)					
	Running parallelism of surface D against surface B	ΔD (as shown in the figure below)					
25 30 35	Dimensional tolerance for height M	± 0.1	± 0.04	$0_{-0.04}$	$0_{-0.02}$	$0_{-0.01}$	
	Difference in height M	0.02	0.015	0.007	0.005	0.003	
	Dimensional tolerance for width W <sub>2</sub>	± 0.1	± 0.04	$0_{-0.04}$	$0_{-0.02}$	$0_{-0.01}$	
	Difference in width W <sub>2</sub>	0.03	0.015	0.007	0.005	0.003	
	Running parallelism of surface C against surface A	ΔC (as shown in the figure below)					
	Running parallelism of surface D against surface B	ΔD (as shown in the figure below)					
45 55	Dimensional tolerance for height M	± 0.1	± 0.05	$0_{-0.05}$	$0_{-0.03}$	$0_{-0.02}$	
	Difference in height M	0.03	0.015	0.007	0.005	0.003	
	Dimensional tolerance for width W <sub>2</sub>	± 0.1	± 0.05	$0_{-0.05}$	$0_{-0.03}$	$0_{-0.02}$	
	Difference in width W <sub>2</sub>	0.03	0.02	0.01	0.007	0.005	
	Running parallelism of surface C against surface A	ΔC (as shown in the figure below)					
	Running parallelism of surface D against surface B	ΔD (as shown in the figure below)					
65	Dimensional tolerance for height M	± 0.1	± 0.07	$0_{-0.07}$	$0_{-0.05}$	$0_{-0.03}$	
	Difference in height M	0.03	0.02	0.01	0.007	0.005	
	Dimensional tolerance for width W <sub>2</sub>	± 0.1	± 0.07	$0_{-0.07}$	$0_{-0.05}$	$0_{-0.03}$	
	Difference in width W <sub>2</sub>	0.03	0.025	0.015	0.01	0.007	
	Running parallelism of surface C against surface A	ΔC (as shown in the figure below)					
	Running parallelism of surface D against surface B	ΔD (as shown in the figure below)					

### \*1: Running parallelism

It refers to the parallelism error between the LM block and the LM rail datum plane when the LM block travels the whole length of the LM rail with the LM rail secured on the reference datum plane using bolts.

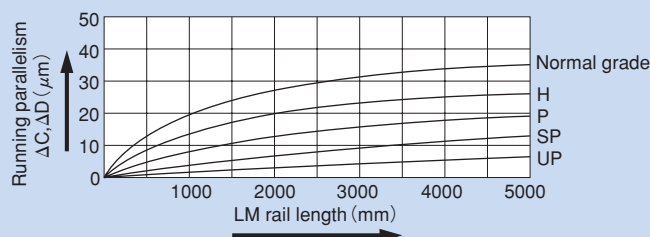
### \*2: Difference in height M

It indicates the difference between the minimum and maximum values of height (M) of each of the LM blocks used on the same plane in combination.

### \*3: Difference in width W<sub>2</sub>

It indicates the difference between the minimum and maximum values of the width (W<sub>2</sub>) between each of the LM blocks, mounted on one LM rail in combination, and the LM rail.

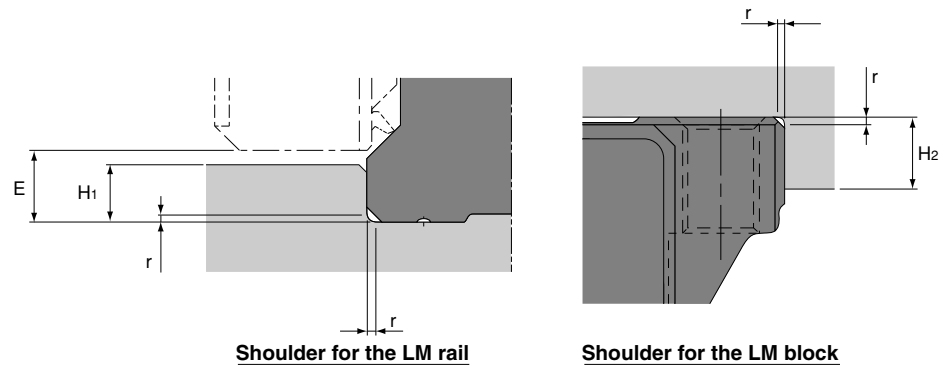
LM Rail Length and Running Parallelism for Model SHS



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

Normally, the mounting base for the LM rail and the LM block has a datum plane on the side face of the shoulder of the base in order to allow easy installation and highly accurate positioning.

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.

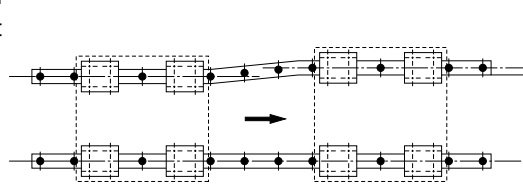


Unit: mm

Model No.	Corner radius $r$ (max)	Shoulder height for the LM rail $H_1$	Shoulder height for the LM block $H_2$	$E$
15	0.5	2.5	4	3
20	0.5	3.5	5	4.6
25	1	5	5	5.8
30	1	5	5	7
35	1	6	6	7.5
45	1	7.5	8	8.9
55	1.5	10	10	12.7
65	1.5	15	10	19

## Error Allowance in the Parallelism Between Two Rails

The following table shows error allowances in parallelism (P) between two rails that will not affect the service life in normal operation.

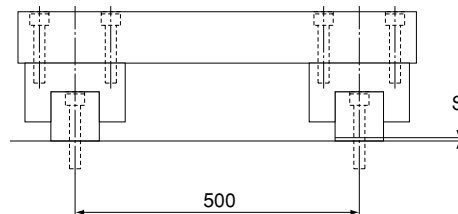


Unit:  $\mu\text{m}$

Model No.	Clearance C0	Clearance C1	Normal clearance
15	—	18	25
20	18	20	25
25	20	22	30
30	27	30	40
35	30	35	50
45	35	40	60
55	45	50	70
65	55	60	80

## Error Allowance in Vertical Level Between Two Rails

The values in the table indicate the error allowance in vertical level between two rails per 500 mm of the axis-to-axis distance, and are proportional to the axis-to-axis distance.

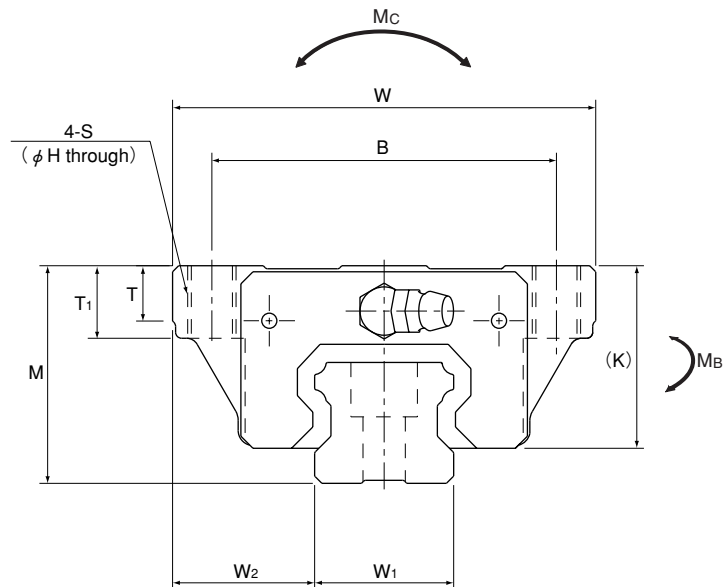


Unit:  $\mu\text{m}$

Model No.	Clearance C0	Clearance C1	Normal clearance
15	—	85	130
20	50	85	130
25	70	85	130
30	90	110	170
35	120	150	210
45	140	170	250
55	170	210	300
65	200	250	350

# Models SHS-C/SHS-LC

## Dimensional Table for Models SHS-C/SHS-LC



Model No.	External dimensions			LM block dimensions											Grease nipple
	Height M	Width W	Length L	B	C	S	H	L <sub>1</sub>	T	T <sub>1</sub>	K	N	E		
SHS 15C SHS 15LC	24	47	64.4 79.4	38	30	M 5	4.4	48 63	5.9	8	21	5.5	5.5	PB1021B	
SHS 20C SHS 20LC	30	63	79 98	53	40	M 6	5.4	59 78	7.2	10	25.4	6.5	12	B-M6F	
SHS 25C SHS 25LC	36	70	92 109	57	45	M 8	6.8	71 88	9.1	12	30.2	7.5	12	B-M6F	
SHS 30C SHS 30LC	42	90	106 131	72	52	M10	8.5	80 105	11.5	15	35	8	12	B-M6F	
SHS 35C SHS 35LC	48	100	122 152	82	62	M10	8.5	93 123	11.5	15	40.5	8	12	B-M6F	
SHS 45C SHS 45LC	60	120	140 174	100	80	M12	10.5	106 140	14.1	18	51.1	10.5	16	B-PT1/8	
SHS 55C SHS 55LC	70	140	171 213	116	95	M14	12.5	131 173	16	21	57.3	11	16	B-PT1/8	
SHS 65C SHS 65LC	90	170	221 272	142	110	M16	14.5	175 226	18.8	24	71	19	16	B-PT1/8	

### ■ Example of model number coding

**SHS25 LC 2 QZ KKH C0 +1200L P Z - II**

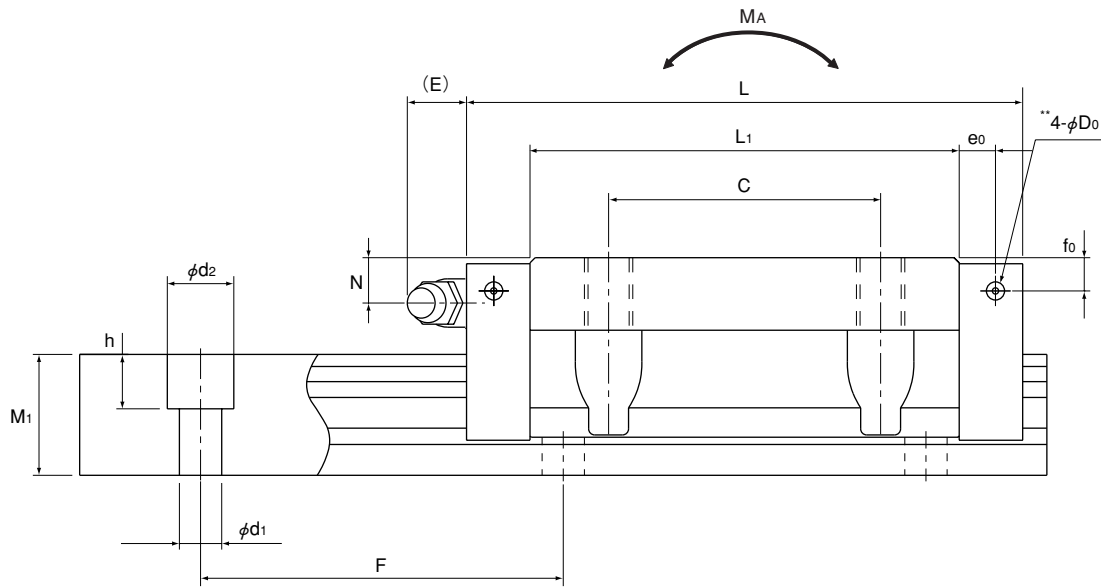
1 2 3 4 5 6 7 8 9 10

1 Model number 2 Type of LM block 3 No. of LM blocks used on the same rail 4 With QZ Lubricator

5 Dust prevention accessory symbol (see page 19) 6 Radial clearance symbol (see page 7)

7 LM rail length (in mm) 8 Accuracy symbol (see page 8) 9 With steel tape 10 No. of rails used on the same plane

**Note** This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2). Those models equipped with QZ Lubricator cannot have a grease nipple.



Unit: mm

Pilot holes for side nipples**			LM rail dimensions						Basic load rating		Static permissible moment kN-m*					Mass	
e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	Width W <sub>1</sub> 0 -0.05	W <sub>2</sub>	Height M <sub>1</sub>	Pitch F	d <sub>1</sub> ×d <sub>2</sub> ×h	C	C <sub>0</sub>	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>	LM block kg	LM rail kg/m	
										1 block	2 blocks in close contact	1 block	2 blocks in close contact				
4	4	3	15	16	13	60	4.5×7.5×5.3	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.23	1.3	
								17.2	31.9	0.296	1.43	0.296	1.43				
4.3	5.3	3	20	21.5	16.5	60	6×9.5×8.5	22.3	38.4	0.334	1.75	0.334	1.75	0.361	0.46	2.3	
								28.1	50.3	0.568	2.8	0.568	2.8				
6	5.5	3	23	23.5	20	60	7×11×9	31.7	52.4	0.566	2.75	0.566	2.75	0.563	0.72	3.2	
								36.8	64.7	0.848	3.98	0.848	3.98				
5.5	6	5.2	28	31	23	80	9×14×12	44.8	66.6	0.786	4.08	0.786	4.08	0.865	1.34	4.5	
								54.2	88.8	1.36	6.6	1.36	6.6				
6.5	5.5	5.2	34	33	26	80	9×14×12	62.3	96.6	1.38	6.76	1.38	6.76	1.53	1.9	6.2	
								72.9	127	2.34	10.9	2.34	10.9				
8	8	5.2	45	37.5	32	105	14×20×17	82.8	126	2.05	10.1	2.05	10.1	2.68	3.24	10.4	
								100	166	3.46	16.3	3.46	16.3				
10	8	5.2	53	43.5	38	120	16×23×20	128	197	3.96	19.3	3.96	19.3	4.9	5.35	14.5	
								161	259	6.68	31.1	6.68	31.1				
10	12	5.2	63	53.5	53	150	18×26×22	205	320	8.26	40.4	8.26	40.4	9.4	10.7	23.7	
								253	408	13.3	62.6	13.3	62.6				

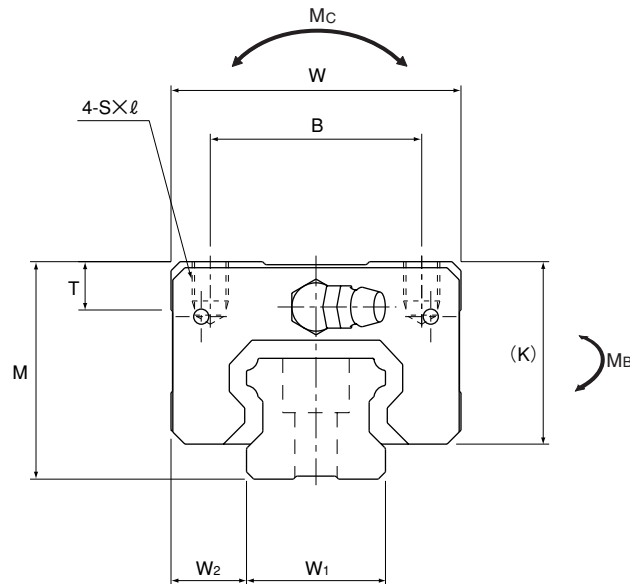
**Note**

Pilot holes for side nipples\*\* are not drilled through in order to prevent foreign matter from entering the product. THK will mount grease nipples per your request. Therefore, do not use the side nipple pilot holes\*\* for purposes other than mounting a grease nipple.

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

# Models SHS-V/SHS-LV

## Dimensional Table for Models SHS-V/SHS-LV



Model No.	External dimensions			LM block dimensions									Grease nipple
	Height M	Width W	Length L	B	C	SX ℓ	L <sub>1</sub>	T	K	N	E		
SHS 15V SHS 15LV	24	34	64.4 79.4	26	26 34	M4×4	48 63	5.9	21	5.5	5.5	PB1021B	
SHS 20V SHS 20LV	30	44	79 98	32	36 50	M5×5	59 78	8	25.4	6.5	12	B-M6F	
SHS 25V SHS 25LV	36	48	92 109	35	35 50	M6×6.5	71 88	8	30.2	7.5	12	B-M6F	
SHS 30V SHS 30LV	42	60	106 131	40	40 60	M8×8	80 105	8	35	8	12	B-M6F	
SHS 35V SHS 35LV	48	70	122 152	50	50 72	M8×10	93 123	14.7	40.5	8	12	B-M6F	
SHS 45V SHS 45LV	60	86	140 174	60	60 80	M10×15	106 140	14.9	51.1	10.5	16	B-PT1/8	
SHS 55V SHS 55LV	70	100	171 213	75	75 95	M12×15	131 173	19.4	57.3	11	16	B-PT1/8	
SHS 65V SHS 65LV	90	126	221 272	76	70 120	M16×20	175 226	19.5	71	19	16	B-PT1/8	

### ■ Example of model number coding

**SHS30 V 2 QZ KKHH C1 +1240L P Z - II**

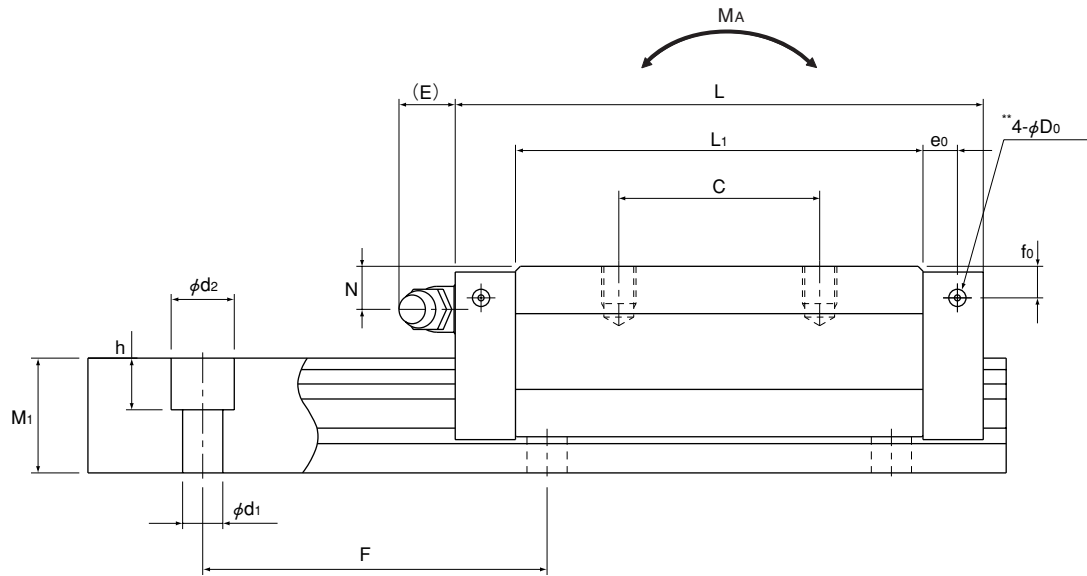
1
2
3
4
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8
9
10

**1** Model number **2** Type of LM block **3** No. of LM blocks used on the same rail **4** With QZ Lubricator

**5** Dust prevention accessory symbol (see page 19) **6** Radial clearance symbol (see page 7)

**7** LM rail length (in mm) **8** Accuracy symbol (see page 8) **9** With steel tape **10** No. of rails used on the same plane

**Note** This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple.



Unit: mm

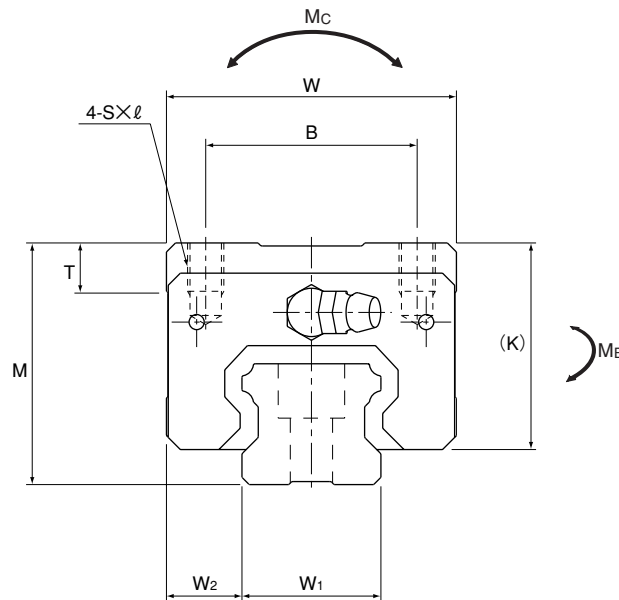
Pilot holes for side nipples**			LM rail dimensions					Basic load rating		Static permissible moment kN-m*					Mass	
e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	Width W <sub>1</sub> 0 -0.05	W <sub>2</sub>	Height M <sub>1</sub>	Pitch F	d <sub>1</sub> ×d <sub>2</sub> ×h	C kN	C <sub>0</sub> kN	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>	LM block kg	LM rail kg/m
										1 block	2 blocks in close contact	1 block	2 blocks in close contact			
4	4	3	15	9.5	13	60	4.5×7.5×5.3	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.19	1.3
								17.2	31.9	0.296	1.43	0.296	1.43			
4.3	5.3	3	20	12	16.5	60	6×9.5×8.5	22.3	38.4	0.334	1.75	0.334	1.75	0.361	0.35	2.3
								28.1	50.3	0.568	2.8	0.568	2.8			
6	5.5	3	23	12.5	20	60	7×11×9	31.7	52.4	0.566	2.75	0.566	2.75	0.563	0.54	3.2
								36.8	64.7	0.848	3.98	0.848	3.98			
5.5	6	5.2	28	16	23	80	9×14×12	44.8	66.6	0.786	4.08	0.786	4.08	0.865	0.94	4.5
								54.2	88.8	1.36	6.6	1.36	6.6			
6.5	5.5	5.2	34	18	26	80	9×14×12	62.3	96.6	1.38	6.76	1.38	6.76	1.53	1.4	6.2
								72.9	127	2.34	10.9	2.34	10.9			
8	8	5.2	45	20.5	32	105	14×20×17	82.8	126	2.05	10.1	2.05	10.1	2.68	2.54	10.4
								100	166	3.46	16.3	3.46	16.3			
10	8	5.2	53	23.5	38	120	16×23×20	128	197	3.96	19.3	3.96	19.3	4.9	4.05	14.5
								161	259	6.68	31.1	6.68	31.1			
10	12	5.2	63	31.5	53	150	18×26×22	205	320	8.26	40.4	8.26	40.4	9.4	8.41	23.7
								253	408	13.3	62.6	13.3	62.6			

**Note** Pilot holes for side nipples\*\* are not drilled through in order to prevent foreign matter from entering the product. THK will mount grease nipples per your request. Therefore, do not use the side nipple pilot holes\*\* for purposes other than mounting a grease nipple.

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

# Models SHS-R/SHS-LR

## Dimensional Table for Models SHS-R/SHS-LR



Model No.	External dimensions			LM block dimensions								
	Height M	Width W	Length L	B	C	Sx ℓ	L <sub>1</sub>	T	K	N	E	Grease nipple
SHS 15R	28	34	64.4	26	26	M4X5	48	5.9	25	9.5	5.5	PB1021B
SHS 25R SHS 25LR	40	48	92 109	35	35 50	M6X8	71 88	8	34.2	11.5	12	B-M6F
SHS 30R SHS 30LR	45	60	106 131	40	40 60	M8X10	80 105	8	38	11	12	B-M6F
SHS 35R SHS 35LR	55	70	122 152	50	50 72	M8X12	93 123	14.7	47.5	15	12	B-M6F
SHS 45R SHS 45LR	70	86	140 174	60	60 80	M10X17	106 140	14.9	61.1	20.5	16	B-PT1/8
SHS 55R SHS 55LR	80	100	171 213	75	75 95	M12X18	131 173	19.4	67.3	21	16	B-PT1/8

### ■ Example of model number coding

**SHS45 LR 2 QZ KKHH C0 +1200L P Z - II**

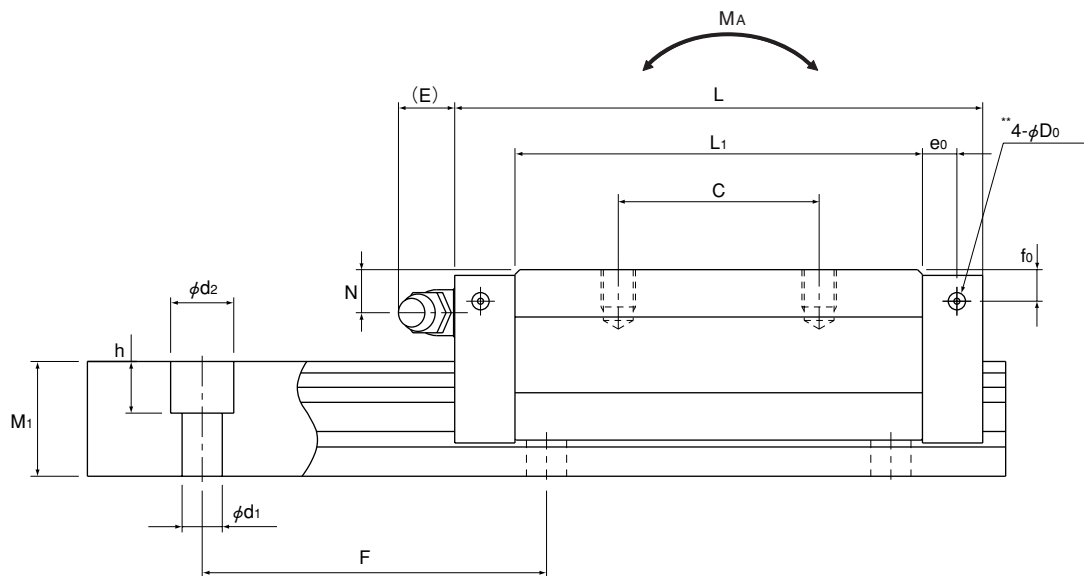
1 2 3 4 5 6 7 8 9 10

1 Model number 2 Type of LM block 3 No. of LM blocks used on the same rail 4 With QZ Lubricator

5 Dust prevention accessory symbol (see page 19) 6 Radial clearance symbol (see page 7)

7 LM rail length (in mm) 8 Accuracy symbol (see page 8) 9 With steel tape 10 No. of rails used on the same plane

**Note** This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).  
Those models equipped with QZ Lubricator cannot have a grease nipple.



Unit: mm

Pilot holes for side nipples**			LM rail dimensions						Basic load rating		Static permissible moment kN-m*					Mass	
e <sub>0</sub>	f <sub>0</sub>	D <sub>0</sub>	Width W <sub>1</sub> 0 -0.05	W <sub>2</sub>	Height M <sub>1</sub>	Pitch F	d <sub>1</sub> ×d <sub>2</sub> ×h	C kN	C <sub>0</sub> kN	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub> 1 block	LM block kg	LM rail kg/m	
										1 block	2 blocks in close contact	1 block	2 blocks in close contact				
4	8	3	15	9.5	13	60	4.5×7.5×5.3	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.22	1.3	
6	9.5	3	23	12.5	20	60	7×11×9	31.7 36.8	52.4 64.7	0.566 0.848	2.75 3.98	0.566 0.848	2.75 3.98	0.563 0.696	0.66 0.8	3.2	
5.5	9	5.2	28	16	23	80	9×14×12	44.8 54.2	66.6 88.8	0.786 1.36	4.08 6.6	0.786 1.36	4.08 6.6	0.865 1.15	1.04 1.36	4.5	
6.5	12.5	5.2	34	18	26	80	9×14×12	62.3 72.9	96.6 127	1.38 2.34	6.76 10.9	1.38 2.34	6.76 10.9	1.53 2.01	1.8 2.34	6.2	
8	18	5.2	45	20.5	32	105	14×20×17	82.8 100	126 166	2.05 3.46	10.1 16.3	2.05 3.46	10.1 16.3	2.68 3.53	3.24 4.19	10.4	
10	18	5.2	53	23.5	38	120	16×23×20	128 161	197 259	3.96 6.68	19.3 31.1	3.96 6.68	19.3 31.1	4.9 6.44	5.05 6.57	14.5	

**Note**

Pilot holes for side nipples\*\* are not drilled through in order to prevent foreign matter from entering the product. THK will mount grease nipples per your request. Therefore, do not use the side nipple pilot holes\*\* for purposes other than mounting a grease nipple.

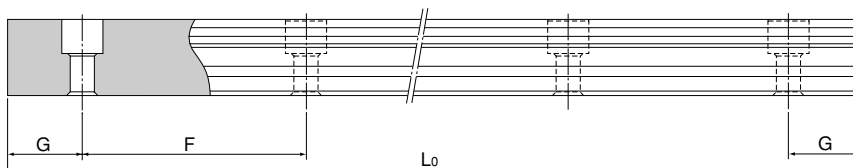
Static permissible moment\*: 1 block: static permissible moment value with 1 LM block  
2 blocks: static permissible moment value with 2 blocks closely contacting with each other

# SHS

## Standard Length and Maximum Length of the LM Rail

The table below shows the standard LM rail lengths and the maximum lengths of model SHS 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 adversely affecting accuracy.



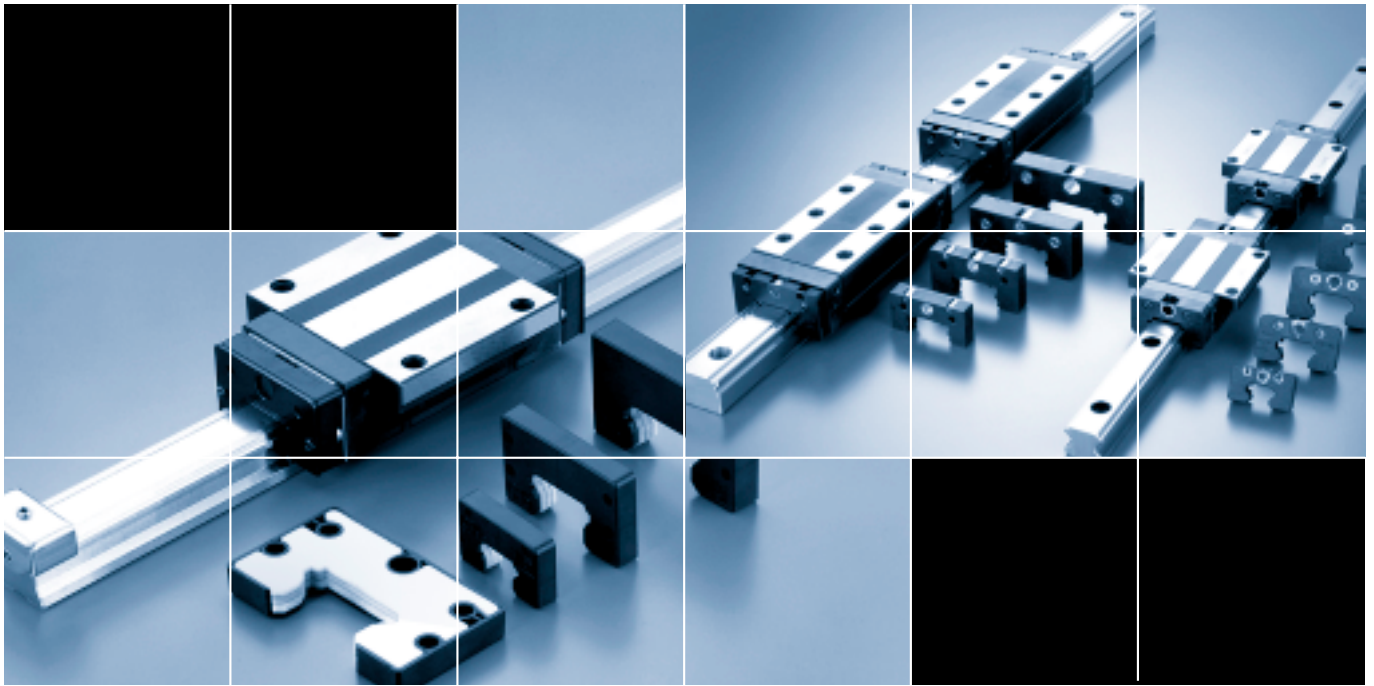
Standard Length and Maximum Length of the LM Rail for Model SHS

Unit: mm

Model No.	SHS 15	SHS 20	SHS 25	SHS 30	SHS 35	SHS 45	SHS 55	SHS 65
Standard LM rail length (L <sub>0</sub> )	160	220	220	280	280	570	780	1270
	220	280	280	360	360	675	900	1570
	280	340	340	440	440	780	1020	2020
	340	400	400	520	520	885	1140	2620
	400	460	460	600	600	990	1260	
	460	520	520	680	680	1095	1380	
	520	580	580	760	760	1200	1500	
	580	640	640	840	840	1305	1620	
	640	700	700	920	920	1410	1740	
	700	760	760	1000	1000	1515	1860	
	760	820	820	1080	1080	1620	1980	
	820	940	940	1160	1160	1725	2100	
	940	1000	1000	1240	1240	1830	2220	
	1000	1060	1060	1320	1320	1935	2340	
	1060	1120	1120	1400	1400	2040	2460	
	1120	1180	1180	1480	1480	2145	2580	
	1180	1240	1240	1560	1560	2250	2700	
	1240	1360	1300	1640	1640	2355	2820	
	1360	1480	1360	1720	1720	2460	2940	
	1480	1600	1420	1800	1800	2565	3060	
1600	1720	1480	1880	1880	2670			
	1840	1540	1960	1960	2775			
	1960	1600	2040	2040	2880			
	2080	1720	2200	2200	2985			
	2200	1840	2360	2360	3090			
		1960	2520	2520				
		2080	2680	2680				
		2200	2840	2840				
		2320	3000	3000				
		2440						
Standard pitch F	60	60	60	80	80	105	120	150
G	20	20	20	20	20	22.5	30	35
Max length	2500	3000	3000	3000	3000	3090	3060	3000

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

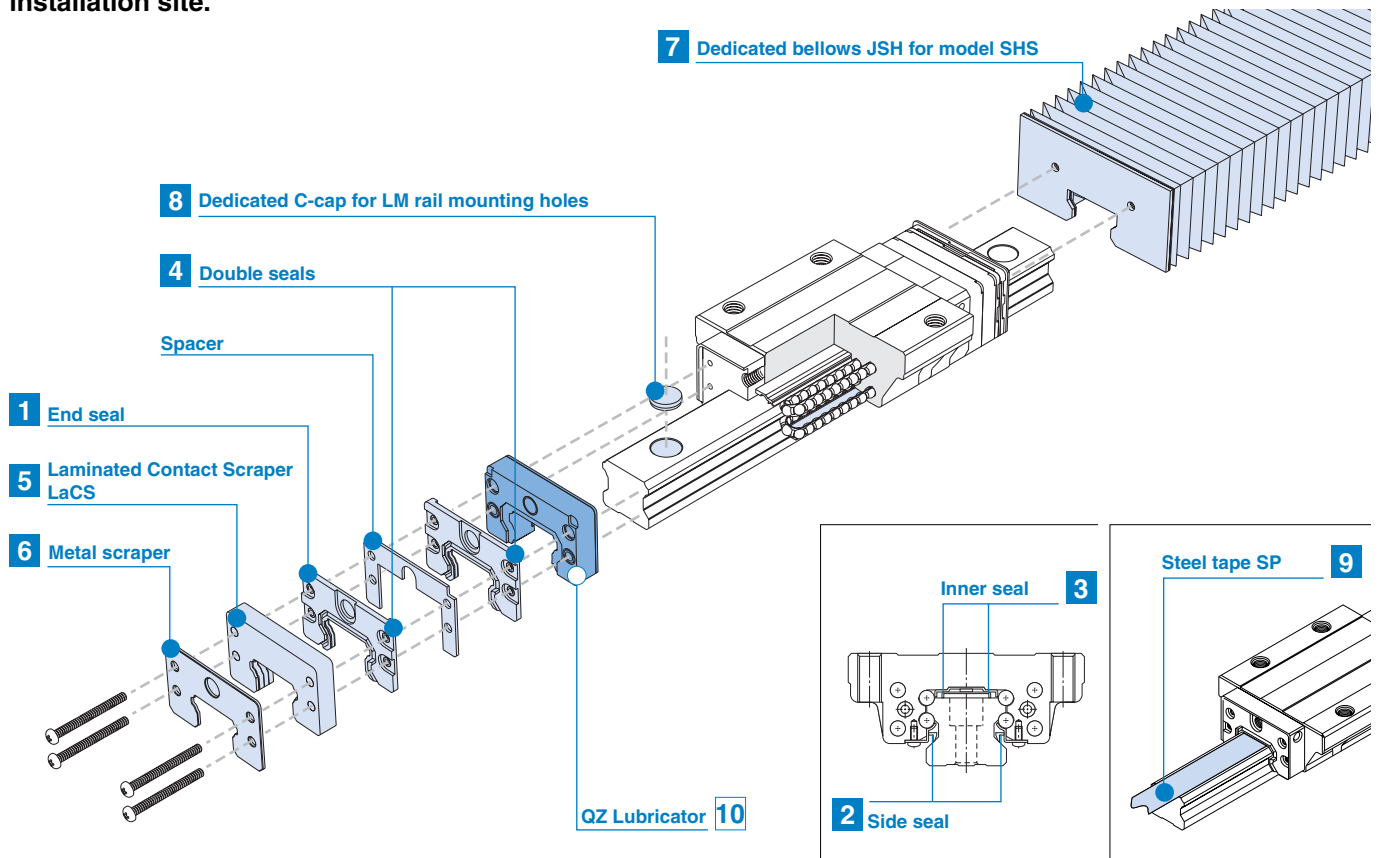
Note 2: If connected rails are not allowed and a greater length than the maximum values above is required, contact THK.



# SHS OPTIONS

## Options

For model SHS, dust-prevention and lubrication accessories are available. Make a selection according to the application and the installation site.

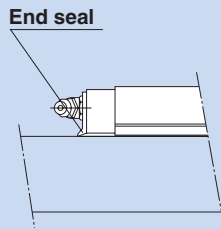


## Dust Prevention Accessories

When foreign matter enters an LM system, it will cause abnormal wear or shorten the service life. It is necessary to prevent foreign matter from entering the system. Therefore, when possible entrance of foreign matter is predicted, it is important to select an effective sealing device or dust-prevention device that meets the working conditions.

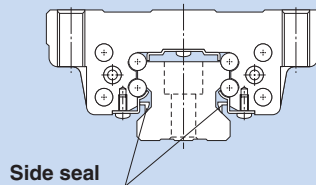
### 1 End seal

Used in locations exposed to dust.



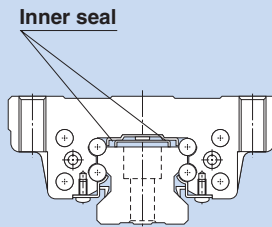
### 2 Side seal

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



### 3 Inner seal

Used in locations severely exposed to dust or cutting chips.



## Seals and Scrapers

### 1 to 4 Seals

Highly wear-resistant end seals made of special resin rubber and side seals for increased dust-prevention effect are available.

If desiring a dust-prevention accessory, specify it with the corresponding symbol indicated in table 3.

For the supported model numbers for dust-prevention accessories and the overall LM block length with a dust-prevention accessory attached (dimension L), see table 4.

### Seal resistance value

For the maximum seal resistance value per LM block when a lubricant is applied on seal SHS ... SS, refer to the corresponding value provided in table 1.

Table 1 Maximum Seal Resistance  
Value of Seal SHS ... SS Unit: N

Model No.	Seal resistance value
15	4.5
20	7.0
25	10.5
30	17.0
35	20.5
45	30.0
55	31.5
65	43.0

### 5 6 Scrapers

#### Laminated Contact Scraper LaCS®

For locations with an even more adverse working conditions, the Laminated Contact Scraper LaCS is available.

LaCS removes minute foreign matter adhering to the LM rail in multiple stages and prevents it from entering the LM block with a laminated contact structure (3-layer scraper).

#### Features

- Since the 3 layers of scrapers fully contact the LM rail, LaCS is highly capable of removing minute foreign matter.
- Since it uses oil-impregnated, foam synthetic rubber with a self-lubricating function, low friction resistance is achieved.

#### Basic Specifications of LaCS

- ① Service temperature range of LaCS: -20°C to +80°C
- ② Resistance of LaCS: indicated in table 2

\*Note that LaCS is not sold alone.

Table 2 Resistance of LaCS Unit: N

Model No.	Resistance of LaCS
15	5.2
20	6.5
25	11.7
30	18.2
35	20.8
45	26.0
55	32.5
65	39.0

Note 1: Each resistance value in the table only consists of that of LaCS, and does not include sliding resistances of seals and other accessories.

Note 2: For the maximum service speed of LaCS, contact THK.

Table 3 Symbols of Dust Prevention Accessories for Model SHS

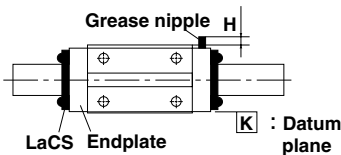
Symbol	Dust prevention accessory
UU	With end seal
SS	With end seal + side seal + inner seal
DD	With double seals + side seal + inner seal
ZZ	With end seal + side seal + inner seal + metal scraper
KK	With double seals + side seal + inner seal + metal scraper
SSHH	With end seal + side seal + inner seal + LaCS
DDHH	With double seals + side seal + inner seal + LaCS
ZZHH	With end seal + side seal + inner seal + metal scraper + LaCS
KKHH	With double seals + side seal + inner seal + metal scraper + LaCS

**When Dust Prevention Accessories SSHH, DDHH, ZZHH or KKHH are Attached**

When dust prevention accessories SSHH, DDHH, ZZHH or KKHH are attached, the grease nipple can be mounted in the location indicated in the figure below. The table on the right shows incremental dimensions with the grease nipple.

Unit: mm

Model No.	Incremental dimension with grease nipple H	Nipple type
15C/LC	—	PB107
15R/V/LV	4.7	PB107
20C/LC	—	PB107
20V/LV	4.5	PB107
25C/LC	—	PB107
25R/LR/V/LV	4.7	PB107
30C/LC	—	A-M6F
30R/LR/V/LV	7.4	A-M6F
35C/LC	—	A-M6F
35R/LR/V/LV	7.4	A-M6F
45C/LC	—	A-M6F
45R/LR/V/LV	7.7	A-M6F
55C/LC	—	A-M6F
55R/LR/V/LV	7.4	A-M6F
65C/LC	—	A-M6F
65V/LV	6.9	A-M6F



Note: When desiring the mounting location for the grease nipple other than the one indicated in the figure above, contact THK.

**When Dust Prevention Accessories DD, ZZ or KK are Attached**

For the mounting location of the grease nipple and its incremental dimension when dust prevention accessories DD, ZZ or KK are attached, contact THK.

Table 4 Overall LM Block Length (Dimension L) of Model SHS with a Dust Prevention Accessory Attached

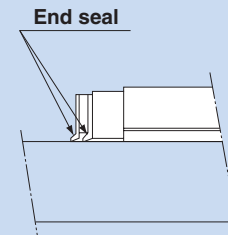
Unit: mm

Model No.	UU	SS	DD	ZZ	KK	SSHH	DDHH	ZZHH	KKHH
15C/V/R	64.4	64.4	69.8	66.8	72.2	78.9	84.4	79.9	85.2
15LC/LV	79.4	79.4	84.8	81.8	87.2	93.9	99.4	94.9	100.2
20C/V	79	79	85.4	83	89.4	94	100	96	102.5
20LC/LV	98	98	104.4	102	108.4	113	119	115	121.5
25C/V/R	92	92	101.6	100.4	107.6	112	119.2	114.4	121.6
25LC/LV/LR	109	109	118.6	117.4	124.6	129	136.2	131.4	138.6
30C/V/R	106	106	116	113.8	122.4	129.4	138	131.8	140.4
30LC/LV/LR	131	131	141	138.8	147.4	154.4	163	156.8	165.4
35C/V/R	122	122	134.8	132.4	142.2	148	157.8	150.4	160.2
35LC/LV/LR	152	152	164.8	162.4	172.2	178	187.8	180.4	190.2
45C/V/R	140	140	152.8	151.2	161	169	178.8	172.2	182
45LC/LV/LR	174	174	186.8	185.2	195	203	212.8	206.2	216
55C/V/R	171	171	186.6	184.2	195.4	202	213.2	205.2	216.4
55LC/LV/LR	213	213	228.6	226.2	237.4	244	255.2	247.2	258.4
65C/V	221	221	238.6	236.2	248.6	258	270.4	261.2	273.6
65LC/LV	272	272	289.6	287.2	299.6	309	321.4	312.2	324.6

**Double seals**

4

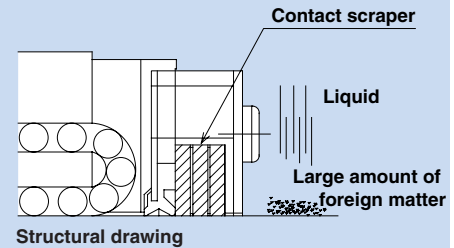
Used in locations exposed to much dust or many cutting chips.



**LaCS**

5

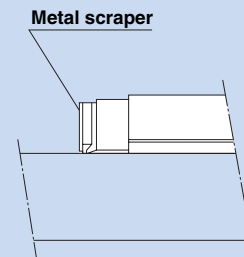
Used in harsh environments exposed to foreign matter such as fine dust and liquids.



**Metal scraper**

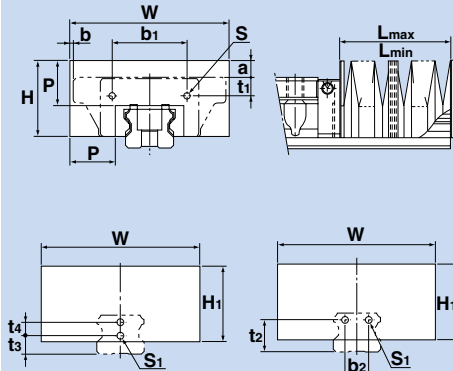
6

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



## 7 Dedicated bellows JSH for model SHS

Used in locations exposed to dust or cutting chips.



Models SHS15 to 30

Models SHS35 to 65

Note 1: When desiring to use the dedicated bellows other than in horizontal mount (i.e., vertical, wall and inverted mount), or when desiring a heat-resistant type of bellows, contact THK.

Note 2: For lubrication when using the dedicated bellows, contact THK.

Note 3: When using the dedicated bellows, the LM block and LM rail need to be machined so that the bellows can be mounted. Be sure to indicate that the dedicated bellows is required when ordering SHS.

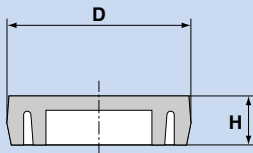
**Note:** The length of the bellows is calculated as follows.

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

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

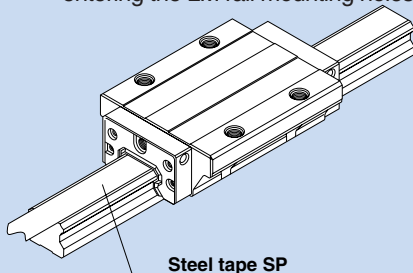
## 8 Dedicated C-cap

It prevents cutting chips from entering the LM rail mounting holes.



## 9 Steel tape SP

It prevents foreign matter, such as cutting chips, dust, or coolant from entering the LM rail mounting holes.



Steel tape SP

## 7 Dedicated Bellows JSH for Model SHS

For locations with an even more adverse working conditions, dedicated bellows are available. The dimensions of the dedicated bellows are provided below. When placing an order, specify the desired bellows type with the corresponding bellows model number indicated below.

Dimensional Table for JSH

Model No.	Major dimensions (mm)												Supported model	
	W	H	H <sub>1</sub>	P	b <sub>1</sub>	t <sub>1</sub>				b <sub>2</sub>	t <sub>2</sub>	t <sub>3</sub>		t <sub>4</sub>
						Type C	Type V	Type R	Type R					
JSH 15	53	26	26	15	22.4	4	4	8	—	—	8	—	SHS 15	
JSH 20	60	30	30	17	27.6	7.5	7.5	—	—	—	8	6	SHS 20	
JSH 25	75	36	36	20	38	9.1	9.1	13.1	—	—	9	7	SHS 25	
JSH 30	80	38	38	20	44	11	11	14	—	—	11	8	SHS 30	
JSH 35	86	40.5	40.5	20	50	11	11	18	20	21.5	—	—	SHS 35	
JSH 45	97	46	46	20	64.6	13.5	13.5	23.5	26	26.5	—	—	SHS 45	
JSH 55	105	48	48	20	68	13	13	23	30	31.5	—	—	SHS 55	
JSH 65	126	63	63	25	80	18	18	—	34	45	—	—	SHS 65	

Supported model	Other dimensions (mm)								A L <sub>max</sub> L <sub>min</sub>
	Mounting bolt		a			b			
	S	S <sub>1</sub>	Type C	Type V	Type R	Type C	Type V	Type R	
SHS 15	M2X8 ℓ	M4X8 ℓ	5	5	1	3	9.5	9.5	5
SHS 20	M2.6X8 ℓ	M3X6 ℓ	5	5	—	- 1.5	8	—	6
SHS 25	M3X8 ℓ	M3X6 ℓ	6	6	2	2.5	13.5	13.5	7
SHS 30	M3X10 ℓ	M3X6 ℓ	3	3	0	- 5	10	10	7
SHS 35	M4X10 ℓ	M4X8 ℓ	0	0	- 7	- 7	8	8	7
SHS 45	M4X12 ℓ	M4X8 ℓ	-5	-5	-15	-11.7	5.5	5.5	7
SHS 55	M5X12 ℓ	M5X10 ℓ	-9	-9	-19	-17.5	2.5	2.5	7
SHS 65	M6X14 ℓ	M6X12 ℓ	-8	-8	—	-22	0	—	9

## Example of model number coding

**JSH35-60/420**

1 Model number ... bellows for SHS35

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

## 8 Dedicated C-cap 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 are on the same level as the LM rail top face.

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

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

Model No.	C-cap model No.	Bolt used	Major dimensions mm	
			D	H
15	C 4	M 4	7.8	1.0
20	C 5	M 5	9.8	2.4
25	C 6	M 6	11.4	2.7
30	C 8	M 8	14.4	3.7
35	C 8	M 8	14.4	3.7
45	C12	M12	20.5	4.7
55	C14	M14	23.5	5.7
65	C16	M16	26.5	5.7

## 9 Steel Tape SP

By covering the LM rail mounting holes with an ultra thin stainless steel (SUS304) plate, the steel tape SP further increases sealability of the end seal, thus preventing foreign matter and water from entering the top face of the LM rail.

Note 1: To mount the steel tape, the LM block needs to be removed from the LM rail. This requires an LM block removing/mounting jig. Contact THK for details.

Note 2: When mounting the steel tape, the LM rail needs to be machined. Indicate that the steel tape is required when ordering the LM Guide.

\*The steel tape is available for models SHS15 to 65.

## Lubrication Accessories

### 10 QZ Lubricator™

The QZ Lubricator feeds the right amount of lubricant to the ball raceway on the LM rail. This allows an oil film to continuously be formed between the balls and the raceway, and drastically extends the lubrication and maintenance intervals.

When the QZ Lubricator is required, specify the desired type with the corresponding symbol indicated in table 1.

For supported LM Guide model numbers for the QZ Lubricator and overall LM block length with the QZ Lubricator attached (dimension L), see table 2.

#### Features

- Supplements lost oil to drastically extend the lubrication/maintenance interval.
- Eco-friendly lubrication system that does not contaminate the surrounding area since it feeds the right amount of lubricant to the ball raceway.
- The user can select a type of lubricant that meets the intended use.

#### Significant Extension of the Maintenance Interval

Attaching the QZ Lubricator helps extend the maintenance interval throughout the whole load range from the light-load area to the heavy-load area.

\*Note that the QZ Lubricator is not sold alone.

\*Those models equipped with the QZ Lubricator cannot have a grease nipple.

When desiring both the QZ Lubricator and a grease nipple to be attached, contact THK.

Table 1 Parts Symbols for Model SHS with the QZ Lubricator Attached

Symbol	Dust prevention accessories for LM Guide with QZ Lubricator attached
QZUU	With end seal + QZ Lubricator
QZSS	With end seal + side seal + inner seal + QZ Lubricator
QZDD	With double seals + side seal + inner seal + QZ Lubricator
QZZZ	With end seal + side seal + inner seal + metal scraper + QZ Lubricator
QZKK	With double seals + side seal + inner seal + metal scraper + QZ Lubricator
QZSSHH	With end seal + side seal + inner seal + LaCS + QZ Lubricator
QZDDHH	With double seals + side seal + inner seal + LaCS + QZ Lubricator
QZZZHH	With end seal + side seal + inner seal + metal scraper + LaCS + QZ Lubricator
QZKKHH	With double seals + side seal + inner seal + metal scraper + LaCS + QZ Lubricator

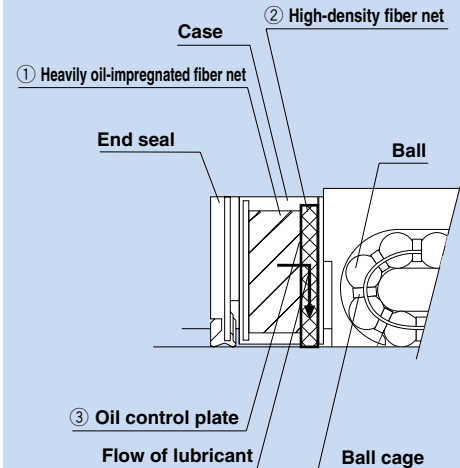
Table 2 Overall LM Block Length (Dimension L) of Model SHS with the QZ Lubricator Attached

Model No.	QZUU	QZSS	QZDD	QZZZ	QZKK	QZSSHH	QZDDHH	QZZZHH	QZKKHH
15C/V/R	84.4	84.4	89.8	86.8	92.2	100.4	105.4	101.4	106.9
15LC/LV	99.4	99.4	104.8	101.8	107.2	115.4	120.4	116.4	121.9
20C/V	99	99	105.4	103	109.4	115.5	122	118	124.5
20LC/LV	118	118	124.4	122	128.4	134.5	141	137	143.5
25C/V/R	114.4	114.4	121.6	120.4	127.6	132	139.2	134.4	141.6
25LC/LV/LR	131.4	131.4	138.6	137.4	144.6	149	156.2	151.4	158.6
30C/V/R	127.4	127.4	136	133.8	142.4	149.4	158	151.8	160.4
30LC/LV/LR	152.4	152.4	161	158.8	167.4	174.4	183	176.8	185.4
35C/V/R	145	145	154.8	152.4	162.2	168	177.8	170.4	180.2
35LC/LV/LR	175	175	184.8	182.4	192.2	198	207.8	200.4	210.2
45C/V/R	173	173	182.8	181.2	191	199	208.8	202.2	212
45LC/LV/LR	207	207	216.8	215.2	225	233	242.8	236.2	246
55C/V/R	205.4	205.4	216.6	214.2	225.4	232	243.2	235.2	246.4
55LC/LV/LR	247.4	247.4	258.6	256.2	267.4	274	285.2	277.2	288.4
65C/V	256.2	256.2	268.6	266.2	278.6	288	300.4	291.2	303.6
65LC/LV	307.2	307.2	319.6	317.2	329.6	339	351.4	342.2	354.6

Unit: mm

### QZ Lubricator

10



The structure of the QZ Lubricator consists of three major components:

- ① a heavy oil-impregnated fiber net (functions to store lubricant).
- ② a high-density fiber net (functions to apply lubricant to the raceway).
- ③ an oil-control plate (functions to adjust oil flow).

The lubricant contained in the QZ Lubricator is fed by the capillary phenomenon, which is used also in felt pens and many other products, as the fundamental principle.

# THK Caged Ball LM Guide Model SHS

## Precautions on use

### ● Handling

- Disassembling components may cause dust to enter the system or degrade mounting accuracy of parts. Do not disassemble the product.
- Tilting an LM block or LM rail may cause them to fall by their own weight.
- Dropping or hitting the LM Guide may damage it. Giving an impact to the LM Guide could also cause damage to its function even if the guide looks intact.

### ● Lubrication

- Thoroughly remove anti-corrosion oil and feed lubricant before using the product.
- Do not mix lubricants of different physical properties.
- In locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, normal lubricants may not be used. Contact THK for details.
- When planning to use a special lubricant, contact THK before using it.
- When adopting oil lubrication, the lubricant may not be distributed throughout the LM system depending on the mounting orientation of the system. Contact THK for details.
- Lubrication interval varies according to the service conditions. Contact THK for details.

### ● Precautions on Use

- Entrance of foreign matter may cause damage to the ball circulating path or functional loss. Prevent foreign matter, such as dust or cutting chips, from entering the system.
- When planning to use the LM system in an environment where coolant penetrates the LM block, it may cause trouble to product functions depending on the type of coolant. Contact THK for details.
- Do not use the LM system at temperature of 80°C or higher. When desiring to use the system at temperature of 80°C or higher, contact THK in advance.
- If foreign matter adheres to the LM system, replenish the lubricant after cleaning the product. For available types of detergent, contact THK.
- When using the LM Guide with an inverted mount, breakage of the endplate due to an accident or the like may cause balls to fall out and the LM block to come off from the LM rail and fall. In these cases, take preventive measures such as adding a safety mechanism for preventing such falls.
- When using the LM system in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, contact THK in advance.
- 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.

### ● Storage

- When storing the LM Guide, enclose it in a package designated by THK and store it in a horizontal orientation while avoiding high temperature, low temperature and high humidity.

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  - The appearance and specifications of the product are subject to change without notice. Contact THK before placing an order.
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