SCR

Caged Ball LM Guide
Cross LM Guide Model SCR

LM rail

End seal
Endplate
Grease nipple
LM block
Ball
Ball cage
Side seal
LM rail

* For the ball cage, see A-130.

THK

LM Guide

Service Life

For details,see A-100.

Radial Clearance Standard

For details,see A-113.

Accuracy Standards

For details,see A-126.

Shoulder Height of the Mounting Base and the Corner Radius

For details,see A-332.

Error Allowance in the Parallelism between Two Rails

For details,see A-334.

Error Allowance in Vertical Level between Two Rails

For details,see A-337.

Flatness of the LM Rail and the LM Block Mounting Surface

The values in Table3 apply when the clearance is a normal clearance. If the clearance is C1 clearance and two rails are used in combination, we recommend using 50% or less of the value in the table.

Note) Since SRS has Gothic-arch grooves, any accuracy error in the mounting surface may negatively affect the operation. Therefore, we recommend using SRS on a highly accurate mounting surface.

Table3 Flatness of the LM Rail and the LM Block Mounting Surface
Unit: mm

Model No.	Flatness error
SRS 7M	0.025/200
SRS 7WM	0.025/200
SRS 9M	0.035/200
SRS 9WM	0.035/200
SRS 12M	0.050/200
SRS 12WM	0.050/200
SRS 15M	0.060/200
SRS 15WM	0.060/200
SRS 20M	0.070/200
SRS 25M	0.070/200

LM Guide

Rated Loads in All Directions

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

Their basic dynamic load ratings are represented by the symbols in the radial direction indicated in Fig.1, and the actual values are provided in the specification table for SRS. The values in the reverse radial and lateral directions are obtained from Table1 below.
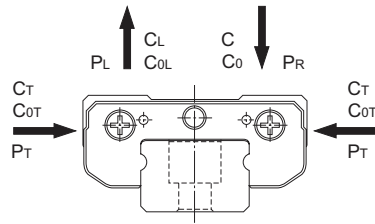

Fig.1

Table1 Rated Loads of Model SRS in All Directions

Direction	Basic dynamic load rating	Basic static load rating
Radial direction	C	C_0
Reverse radial direction	$C_L=C$	$C_{0L}=C_0$
Lateral directions (7M/7WM/ 9M/9WM/20M)	$C_T=1.19C$	$C_{0T}=1.19C_0$
Lateral directions (12M/12WM/ 15M/15WM/25M)	$C_T=C$	$C_{0T}=C_0$

Equivalent Load

When the LM block of model SRS receives a reverse radial load and a lateral load simultaneously, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_R \, (P_L) + Y \cdot P_T$$

P_E : Equivalent load (N)
  : Radial direction
  : Reverse radial direction
  : Lateral direction
P_R : Radial load (N)
P_L : Reverse radial load (N)
P_T : Lateral load (N)
X, Y : Equivalent factor (see Table2)

Table2 Equivalent Factor of Model SRS

| Equivalent Load P_E	Model No.	X	Y
Radial and reverse radial direction	7M/7WM/9M/ 9WM/20M	1	0.839
	12M/12WM/15M/ 15WM/25M	1	1
Lateral directions	7M/7WM/9M/ 9WM/20M	1.192	1
	12M/12WM/15M/ 15WM/25M	1	1

Types and Features

Model SRS-M

A standard type of SRS.

Note) In addition to model SRS-M, a full-ball type without ball cage is also available.If desiring this type, indicate type "SRS-G" when placing an order.However, since SRS-G does not have a ball cage, its dynamic load rating is smaller than SRS-M. See the table of basic load ratings for SRS-G on B-51 for details.
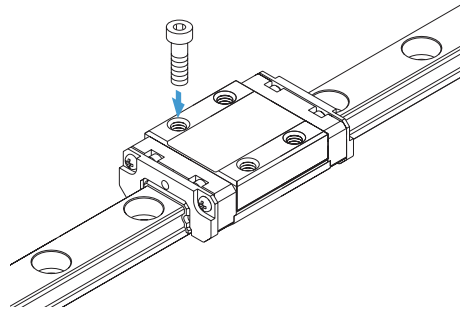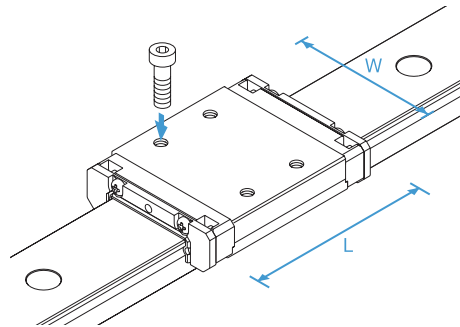
Model SRS-WM

Has a longer overall LM block length (L), a greater width and a larger rated load and permissible moment than SRS-M.

Note) In addition to model SRS-WM, a full-ball type without ball cage is also available.If desiring this type, indicate type "SRS-G" when placing an order.However, since SRS-G does not have a ball cage, its dynamic load rating is smaller than SRS-WM. See the table of basic load ratings for SRS-G on B-53 for details.

Structure and Features

Caged Ball LM Guide model SRS has a structure where two raceways are incorporated into the compact body, enabling the model to receive loads in all directions, and to be used in locations where a moment is applied with a single rail. In addition, use of ball cages eliminates friction between balls, thus achieving high speed, low noise, acceptable running sound, long service life, and long-term maintenance-free operation.

[Low Dust Generation]

Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation. In addition, the LM block and LM rail use stainless steel, which is highly resistant to corrosion.

[4-way Equal Load Type]

Since the right and left rows of balls under a load contact the raceway at 45°, this LM Guide is capable of receiving loads in the radial, reverse radial and lateral directions at equal values and being used in any orientations. With this well-balanced structure, this model can be used in extensive applications.

[Compact]

Since SRS has a compact structure where the rail cross section is designed to be low and that contains only two rows of balls, it can be installed in space-saving locations.
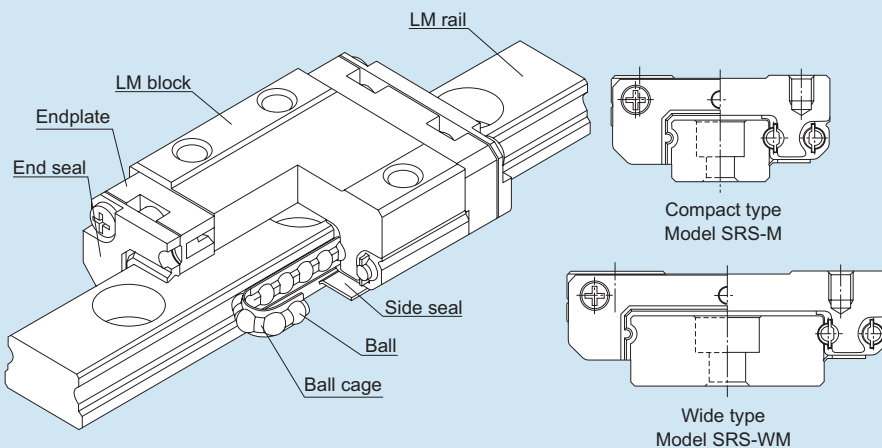
[Lightweight]

Since part of the LM block (e.g., around the ball relief hole) is made of resin and formed through insert molding, SRS is a lightweight, low inertia type of LM Guide.

LM Guide

THK **A-161**

SRS

Caged Ball LM Guide
Miniature Type Model SRS

Compact type
Model SRS-M

Wide type
Model SRS-WM

LM rail
LM block
Endplate
End seal
Side seal
Ball
Ball cage

* For the ball cage, see A-130.

Equivalent Load

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

$$P_E = P_R \left(P_L \right) + P_T$$

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

Service Life

For details,see A-100.

Radial Clearance Standard

For details,see A-113.

Accuracy Standards

For details,see A-119.

Shoulder Height of the Mounting Base and the Corner Radius

For details,see A-330.

Error Allowance in the Parallelism between Two Rails

For details,see A-334.

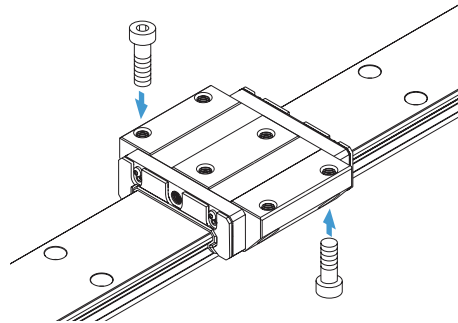## Error Allowance in Vertical Level between Two Rails

For details,see A-337.

Types and Features

Model SHW-CA

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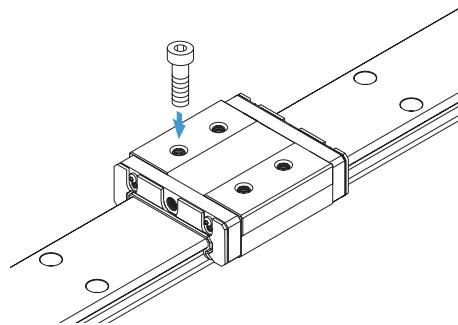Can be mounted from the top or the bottom.

Model SHW-CR

The LM block has tapped holes.

Rated Loads in All Directions

Model SHW is capable of receiving loads in 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 specification table for SHW.
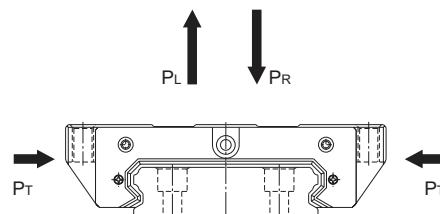
P_L P_R

P_T P_T

Fig.1

Structure and Features

A wide and highly rigid LM Guide that uses ball cages to achieve low noise, long-term maintenance-free operation and high speed.

[Wide, Low Center of Gravity]
Model SHW, which has a wide LM rail and a low center of gravity, is optimal for locations requiring space saving and large M_C moment rigidity.

[4-way Equal Load]
Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

[Self-adjustment Capability]
The self-adjustment capability through front-to-front configuration of THK's unique circular-arc grooves (DF set) enables a mounting error to be absorbed even under a preload, thus to achieve highly accurate, smooth straight motion.
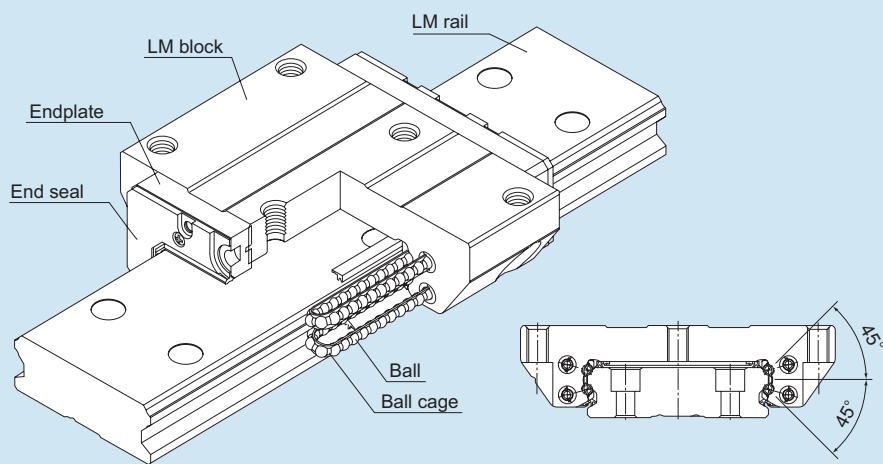
[Low Dust Generation]
Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation.

LM Guide

SHW

**Caged Ball LM Guide
Wide Rail Model SHW**

LM rail
LM block
Endplate
End seal
Ball
Ball cage
45°
45°

* For the ball cage, see A-130.

LM Guide

Service Life

For details,see A-100.

Radial Clearance Standard

For details,see A-113.

Accuracy Standards

For details,see A-119.

Shoulder Height of the Mounting Base and the Corner Radius

For details,see A-327.

Error Allowance in the Parallelism between Two Rails

For details, A-333 and A-334.

Error Allowance in Vertical Level between Two Rails

For details, A-336 and A-337.

LM Guide

Rated Loads in All Directions

Model SNR/SNS is capable of receiving loads in four directions: radial, reverse radial and lateral directions. Their basic dynamic load ratings are represented by the symbols in the radial direction indicated in Fig.1, and the actual values are provided in the specification tables for SNR/SNS. The values in the reverse radial and lateral directions are obtained from Table1 and Table2 below.
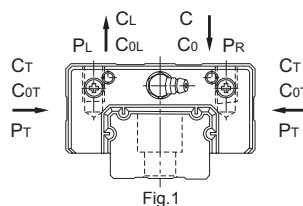
Fig.1

Table1 Basic Load Ratings of Model SNR in All Directions

Direction	SNR	
	Basic dynamic load rating	Basic static load rating
Radial direction	C	C_0
Reverse radial direction	$C_L=0.64C$	$C_{0L}=0.64C_0$
Lateral directions	$C_T=0.47C$	$C_{0T}=0.38C_0$

Table2 Basic Load Ratings of Model SNS in All Directions

Direction	SNS	
	Basic dynamic load rating	Basic static load rating
Radial direction	C	C_0
Reverse radial direction	$C_L=0.84C$	$C_{0L}=0.84C_0$
Lateral directions	$C_T=0.84C$	$C_{0T}=0.84C_0$

Equivalent Load

When the LM block of model SNR receives a reverse radial load and a lateral load simultaneously, the equivalent load is obtained from the equation below.

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

P_E : Equivalent load (N)
　　: Reverse radial direction
　　: Lateral direction
P_L : Reverse radial load (N)
P_T : Lateral load (N)
X, Y : Equivalent factor (see Table3)

Table3 Equivalent Factor of Model SNR

P_E	X	Y
Equivalent load in reverse radial direction	1	1.678
Equivalent load in lateral direction	0.596	1

When the LM block of model SNS receives a radial load and a lateral load, or a reverse radial load and a lateral load, simultaneously, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_R \, (P_L) + Y \cdot P_T$$

P_E : Equivalent load (N)
　　: Radial direction
　　: Reverse radial direction
　　: Lateral direction
P_R : Radial load (N)
P_L : Reverse radial load (N)
P_T : Lateral load (N)
X, Y : Equivalent factor
　　　　(see Table4 and Table5)

Table4 Equivalent Factor of Model SNS
(When radial and lateral loads are applied)

P_E	X	Y
Equivalent load in the radial direction	1	0.935
Equivalent load in lateral direction	1.07	1

Table5 Equivalent Factor of Model SNS
(When reverse radial load and lateral load are applied)

P_E	X	Y
Equivalent load in reverse radial direction	1	1.02
Equivalent load in lateral direction	0.986	1

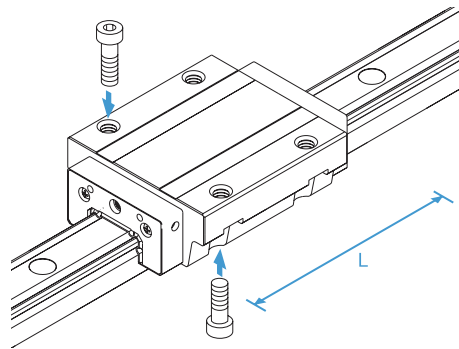## Models SNR-LRH/SNS-LRH (Build to Order)

The LM block has the same cross-sectional shape as models SNR-RH/SNS-RH, but has a longer overall LM block length (L) and a greater rated load.
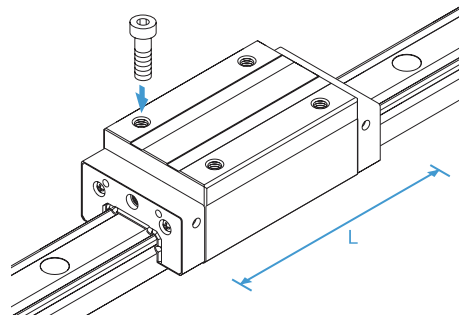
Models SNR-LCH/SNS-LCH (Build to Order)

The LM block has the same cross-sectional shape as models SNR-CH/SNS-CH, but has a longer overall LM block length (L) and a greater rated load.

LM Guide

Models SNR-CH/SNS-CH (Build to Order)   Specification Table⇒B-38/B-40

The dimensions are almost the same as that of LM Guide models SHS and HSR, and the flange of the LM block has tapped holes.
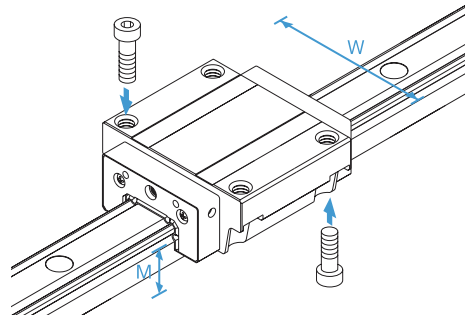
Models SNR-LR/SNS-LR   Specification Table⇒B-26/B-28

The LM block has the same cross-sectional shape as models SNR-R/SNS-R, but has a longer overall LM block length (L) and a greater rated load.
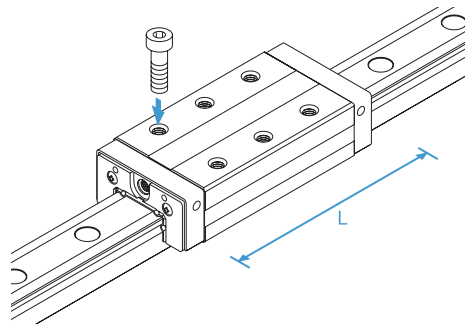
Models SNR-LC/SNS-LC   Specification Table⇒B-30/B-32

The LM block has the same cross-sectional shape as models SNR-C/SNS-C, but has a longer overall LM block length (L) and a greater rated load.

Types and Features

Models SNR-R/SNS-R

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

Models SNR-C/SNS-C

The flange of the LM block has tapped holes.
Can be mounted from the top or the bottom.
Used in places where the table cannot have through holes for mounting bolts.
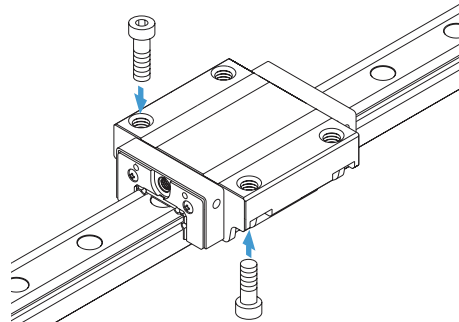
Models SNR-RH/SNS-RH (Build to Order)

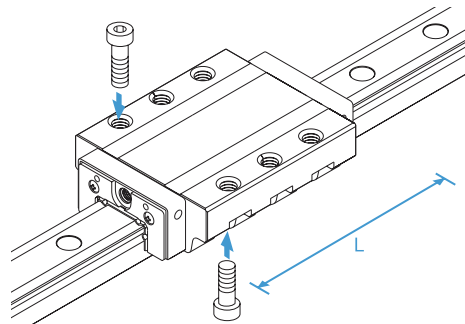The dimensions are almost the same as that of LM Guide models SHS and HSR, and the LM block has tapped holes.

Structure and Features

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. Use of the ball cage eliminates friction between balls and increases grease retention, thus to achieve low noise, high speed and long-term maintenance-free operation.

[High Rigidity]
Models SNR/SNS are the most rigid types among the Caged Ball LM Guide series.
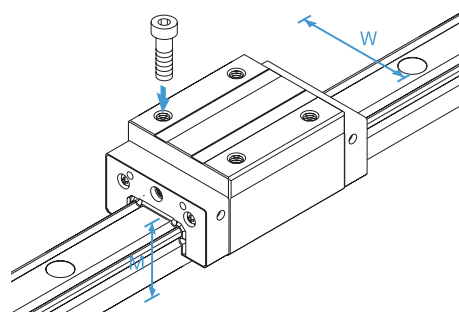Both the radial type SNR and the 4-way equal load type SNS are available for each size variation.
Depending on the intended use, you can select either type.

[Ultra-heavy Load]
Since the curvature of the raceway is approximated to the ball diameter, the ball contact area under a load is increased and the LM Guide is capable of receiving an ultra-heavy load.

[Increased Damping Effect]
In rapid traverse where the LM block travels at high speed, no differential slip occurs and smooth motion is maintained, thus achieving highly accurate positioning. In heavy cutting where the LM block travels at low speed, favorable differential slip according to the cutting load occurs to increase frictional resistance, thus increasing the damping capacity.

LM Guide

SNR/SNS

**Caged Ball LM Guide
Ultra-heavy Load Type Models SNR/SNS**

LM block

Endplate

End seal

LM rail

Ball

Ball cage

Radial type model SNR
Cross section

4-way equal load type model SNS
Cross section

* For the ball cage, see A-130.

LM Guide

Service Life

For details,see A-100.

Radial Clearance Standard

For details,see A-113.

Accuracy Standards

For details,see A-119.

Shoulder Height of the Mounting Base and the Corner Radius

For details,see A-330.

Error Allowance in the Parallelism between Two Rails

For details,see A-333.

Error Allowance in Vertical Level between Two Rails

For details,see A-336.

Rated Loads in All Directions

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

Its basic dynamic load rating is represented by the symbol in the radial direction indicated in Fig.1, and the actual value is provided in the specification table for SSR. The values in the reverse radial and lateral directions are obtained from Table1 below.
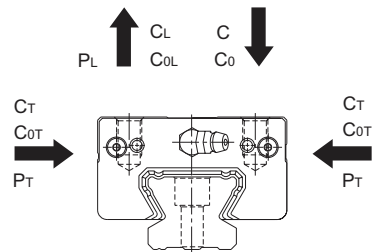
Fig.1

Table1 Rated Load of Model SSR in All Directions

Direction	Basic dynamic load rating	Basic static load rating
Radial direction	C	C_0
Reverse radial direction	$C_L=0.50C$	$C_{0L}=0.50C_0$
Lateral directions	$C_T=0.53C$	$C_{0T}=0.43C_0$

Equivalent Load

When the LM block of model SSR receives a reverse radial direction and a lateral direction simultaneously, the equivalent load is obtained in the equation below.

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

P_E : Equivalent load (N)
   : Reverse radial direction
   : Lateral direction
P_L : Reverse radial load (N)
P_T : Lateral load (N)
X, Y : Equivalent factor (see Table2)

Table2 Equivalent Factor of Model SSR

P_E	X	Y
Equivalent load in reverse radial direction	1	1.155
Equivalent load in lateral direction	0.866	1

LM Guide

THK **A-145**

Types and Features

Model SSR-XW

With this type, the LM block has a smaller width (W) and tapped holes.
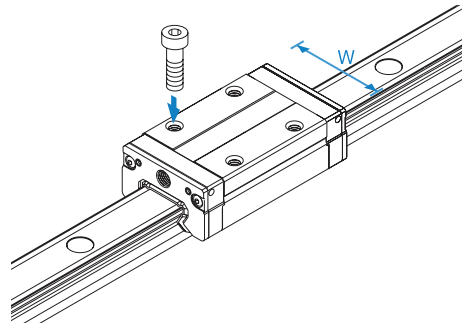
Model SSR-XV

This type has the same cross-sectional shape as SSR-XW but has a shorter overall LM block length (L).

Model SSR-XTB

Since the LM block can be mounted from the bottom, this type is optimal for applications where through holes for mounting bolts cannot be drilled on the table.
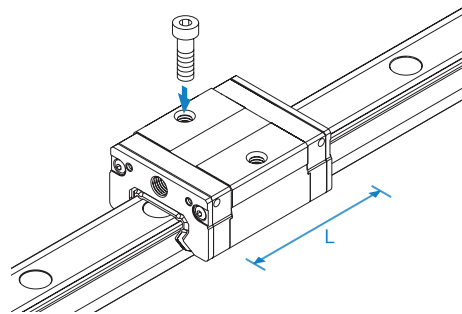
Structure and Features
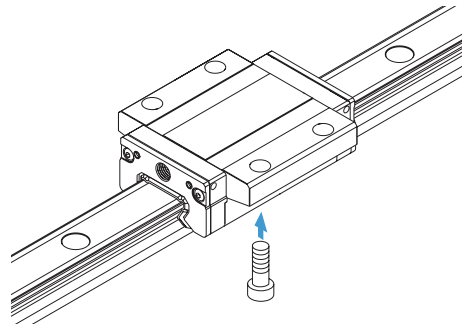
Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and ball cages and endplates incorporated in the LM block allow the balls to circulate.
Use of the ball cage eliminates friction between balls and increases grease retention, thus to achieve low noise, high speed and long-term maintenance-free operation.

[Compact, Radial Type]
The compact design with a low sectional height and the ball contact structure at 90° make SSR an optimal model for horizontal guides.

[Superb Planar Running Accuracy]
Use of a ball contact structure at 90° in the radial direction reduces displacement in the radial direction under a radial load and achieves highly accurate, smooth straight motion.

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

[Stainless Steel Type also Available as Standard]
A stainless steel type with its LM block, LM rail and balls all made of stainless steel, which is superbly corrosion resistant, is also available as standard.

LM Guide

THK **A-143**

Model SCR
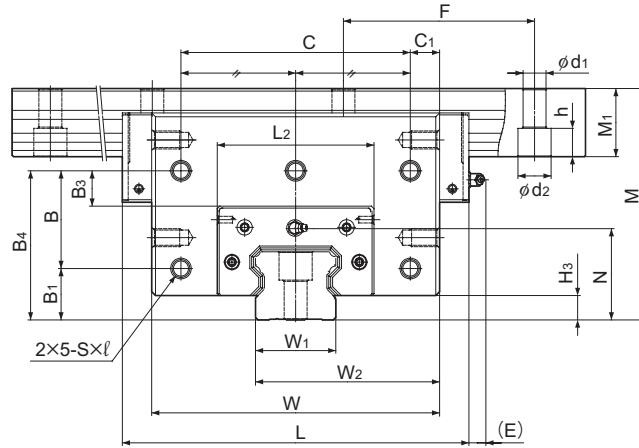
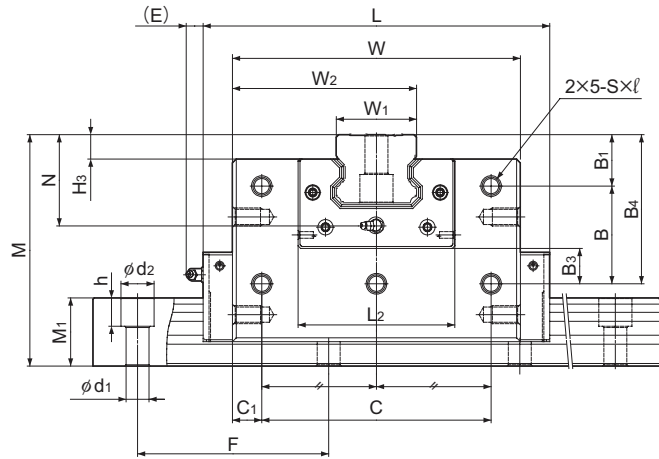| Model No.	Outer dimensions			LM block dimensions											
	Height	Width	Length	B_1	B_3	B_4	B	C	C_1	$S \times \ell$	L_2	H_3	N	E	
	M	W	L												
SCR 15S	47	48	64.4	—	11.3	34.8	—	20	14	M4×6	33.4	3	18.5	5.5	
SCR 20S	57	59	79	—	13	42.5	—	30	14.5	M5×8	43	4.6	23.5	12	
SCR 20	57	78	98	13	7.5	37	24	56	11	M5×8	43	4.6	23.5	12	
SCR 25	70	88	109	18	9	44	26	64	12	M6×10	47.4	5.8	28.5	12	
SCR 30	82	105	131	21	12	53	32	76	14.5	M6×10	58	7	34	12	
SCR 35	95	123	152	24	14	61	37	90	16.5	M8×14	68	7.5	40	12	
SCR 45	118	140	174	30	16.5	75	45	110	15	M10×15	84.6	8.9	49.5	16	
SCR 65	180	226	272	40	27.5	116	76	180	23	M14×22	123	19	71	16	

Model number coding

4 SCR25 QZ KKHH C0 +1200/1000L P

- Model number
- Contamination protection accessory symbol (*1)
- LM rail length on the X axis (in mm)
- LM rail length on the Y axis (in mm)
- Total No. of LM blocks
- With QZ Lubricator
- Radial clearance symbol (*2)
  Normal (No symbol)/Light preload (C1)
  Medium preload (C0)
- Accuracy symbol (*3)
  Precision grade (P)
 Super precision grade (SP)
  Ultra precision grade (UP)

(*1) See contamination protection accessory on A-368. (*2) See A-113. (*3) See A-122.

Unit: mm

		LM rail dimensions					Basic load rating		Static permissible moment		Mass	
	Grease nipple	Width W₁ $\begin{smallmatrix}0\\-0.05\end{smallmatrix}$	W₂	Height M₁	Pitch F	Mounting hole d₁×d₂×h	C kN	C₀ kN	M₀ kN-m	M_B kN-m	LM block kg	LM rail kg/m
	PB-1021B	15	31.5	13	60	4.5×7.5×5.3	14.2	24.2	0.16	0.296	0.54	1.3
	B-M6F	20	39.5	16.5	60	6×9.5×8.5	22.3	38.4	0.361	0.334	0.88	2.3
	B-M6F	20	49	16.5	60	6×9.5×8.5	28.1	50.3	0.473	0.568	1.7	2.3
	B-M6F	23	55.5	20	60	7×11×9	36.8	64.7	0.696	0.85	3.4	3.2
	B-M6F	28	66.5	23	80	9×14×12	54.2	88.8	1.15	1.36	4.6	4.5
	B-M6F	34	78.5	26	80	9×14×12	72.9	127	2.01	2.34	6.8	6.2
	B-PT1/8	45	92.5	32	105	14×20×17	100	166	3.53	3.46	10.8	10.4
	B-PT1/8	63	144.5	53	150	18×26×22	253	408	11.9	13.3	44.5	23.7

M₀

M_B

THK   **B-57**
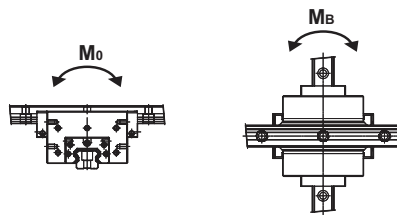
Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model SCR variations. If the maximum length of the desired LM rail exceeds them, jointed rails will be used. Contact THK for details.
For the G dimension when a special length is required, we recommend selecting the corresponding G value from the table.
The longer the G dimension is, the less stable the G area may become after installation, thus causing an adverse impact to accuracy.
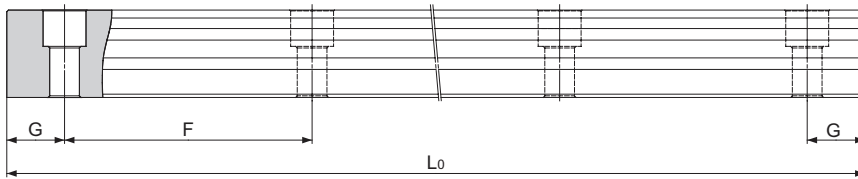

Table1 Standard Length and Maximum Length of the LM Rail for Model SCR   Unit: mm

Model No.	SCR 15	SCR 20	SCR 25	SCR 30	SCR 35	SCR 45	SCR 65
LM rail standard length (L_0)	160 220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600 1720 1840 1960 2080 2200	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540 1600 1720 1840 1960 2080 2200 2320 2440	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	570 675 780 885 990 1095 1200 1305 1410 1515 1620 1725 1830 1935 2040 2145 2250 2355 2460 2565 2670 2775 2880 2985 3090	1270 1570 2020 2620
Standard pitch F	60	60	60	80	80	105	150
G	20	20	20	20	20	22.5	35
Max length	2500	3000	3000	3000	3000	3090	3000

Tapped-hole LM Rail Type of Model SCR

The model SCR variations include a type with its LM rail bottom tapped. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.
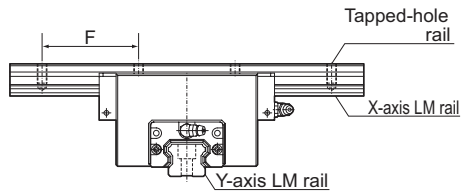
Table2 Dimensions of the LM Rail Tap

Unit: mm

Model No.	Tap diamete	Tap depth
15	M5	8
20	M6	10
25	M6	12
30	M8	15
35	M8	17
45	M12	20
65	M20	30

Model number coding

4 SCR35 KKHH C0 +1000L P K/1000L P

Symbol for
tapped-hole LM rail type