

## LM Guide SRS – Caged Ball, lightweight and compact types

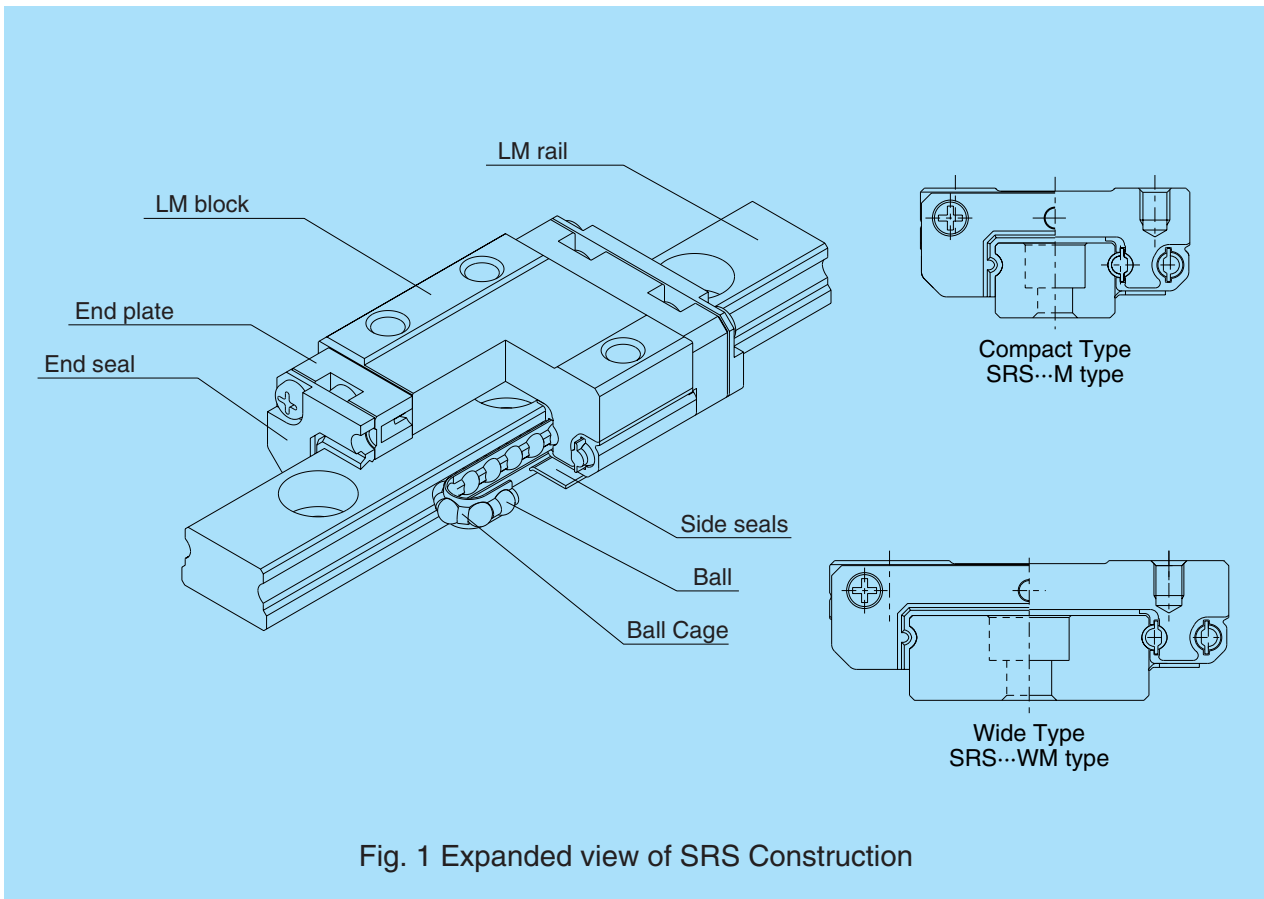


Fig. 1 Expanded view of SRS Construction

### Construction and Features

Caged Ball LM Guide type SRS features a compact body with a construction that uses 2 raceways. This type can be used on a single axis in locations where space is limited, where load is applied in various directions and in locations subject to moment load. The Caged Ball technology eliminates friction between balls to provide low-noise, long-term maintenance-free, and high-speed operation.

#### Low dust generation

The Caged Ball technology used in type SRS eliminates friction between the balls and provides improved grease retention, minimizing dust generation. The use of stainless steel in the construction of the LM Guide also offers excellent rust prevention.

#### Four-way equal load

The raceways are arranged at 45° (in relation to one another, so that each train of balls bears an equal load rating in all four directions: radial, reverse-radial, and two lateral directions). This type can be put to a wide range of applications.

#### Compact

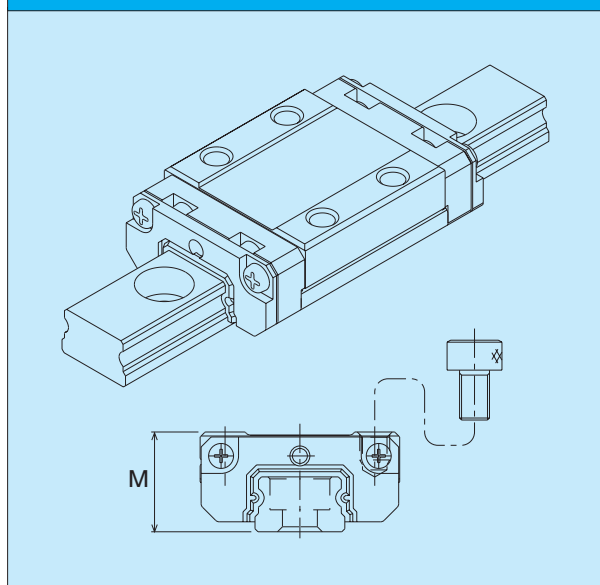
The low cross-section height of SRS and its compact design with a single row of balls allow them to be installed in very limited spaces.

#### Lightweight

Type SRS is a lightweight, low-inertia LM Guide since some parts of the LM block use resin formed using insertion molding (e.g., around the ball channel).

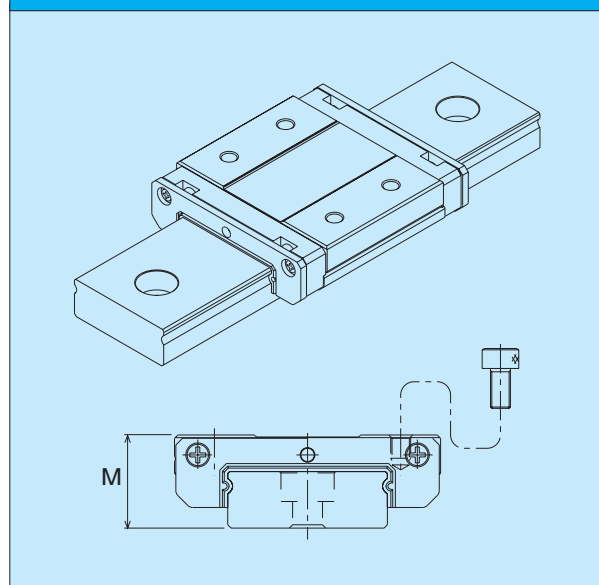
## Types and features

### SRS-M type



Standard SRS type

### SRS-WM type



Overall LM block length of the standard type has been increased and the width has been reduced, thereby increasing rated load and permissible moment.

## Load Rating and Permissible Moment in Each Direction

### Load rating

Type SRS LM Guide can bear loads in all four directions: radial, reverse-radial, and the two lateral directions.

The basic load ratings in the table indicate the load ratings in the radial direction shown in the figure. The load ratings in the reverse-radial and lateral directions can be estimated from the table.

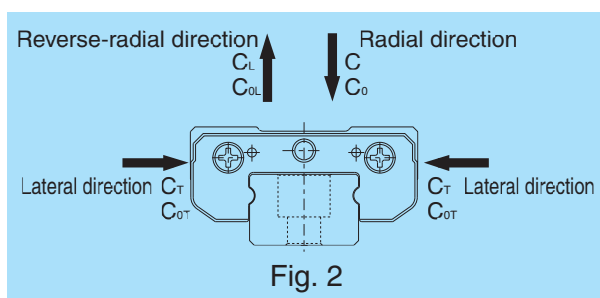


Table 1 Basic Load Ratings in Each Direction

Direction	Type SRS	
	Basic dynamic load rating	Basic static load rating
Radial	C	C <sub>0</sub>
Reverse radial	C <sub>L</sub> =C	C <sub>0L</sub> =C <sub>0</sub>
Lateral(SRS20M)	C <sub>T</sub> =1.13C	C <sub>0T</sub> =1.19C <sub>0</sub>
Lateral(SRS25M)	C <sub>T</sub> =C	C <sub>0T</sub> =C <sub>0</sub>

### Equivalent load

An equivalent load for type SHS when loads in the radial and lateral directions, or in the reverse-radial and lateral directions, are simultaneously exerted on the LM block can be obtained using the following equation:

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

$P_E$  : equivalent load (N)

- in the radial direction
- in the reverse-radial direction
- lateral directions

$P_R$  : radial load (N)

$P_L$  : reverse-radial load (N)

$P_T$  : lateral load (N)

X, Y : equivalence coefficient (Table 2)

Table 2 Equivalence Coefficients for Type SRS

$P_E$	Model No.	X	Y
Radial and reverse-radial equivalent load	SRS 20M	1	0.839
	SRS 25M	1	1
Lateral equivalent load	SRS 20M	1.192	1
	SRS 25M	1	1

## Permissible moment

In type SRS, a single LM block can bear moments in all directions. Table 3 presents the permissible moments in directions MA, MB and MC for a single LM block.

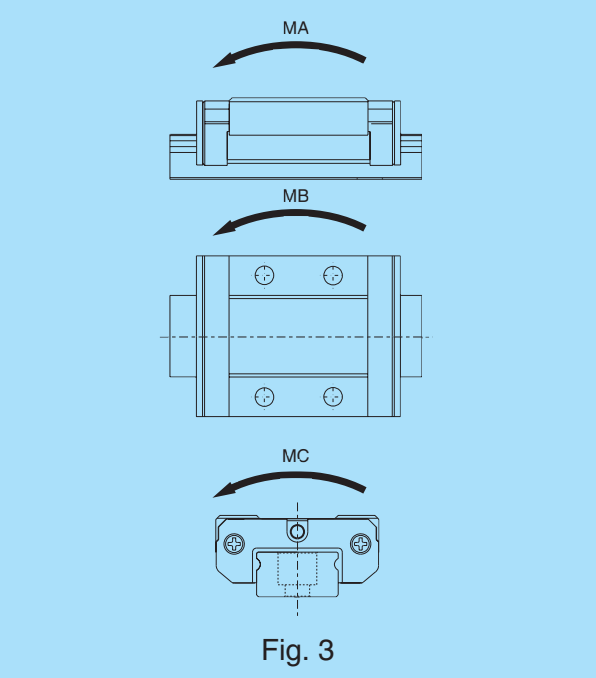


Fig. 3

## Accuracy Standards

Table 4 shows the accuracy standards for types SRS. The accuracy is shown in terms of the parallelism for an LM Guide running the length of the LM rail shown in Fig. 4.

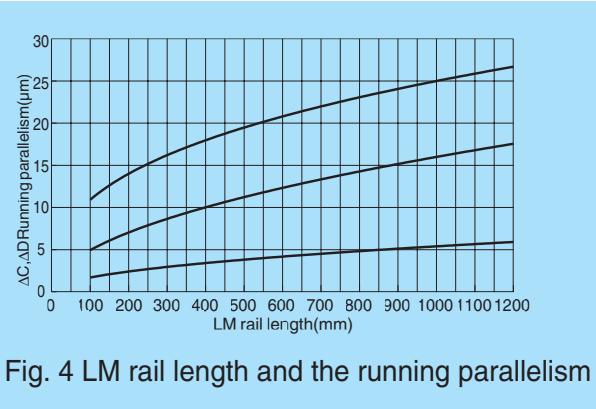


Fig. 4 LM rail length and the running parallelism

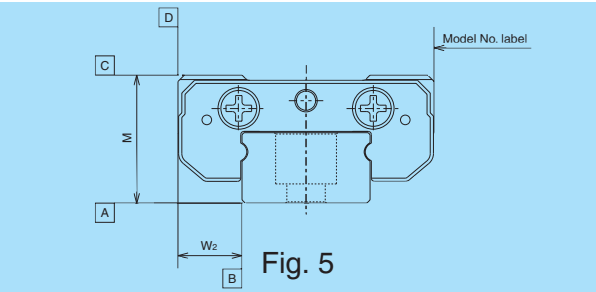


Fig. 5

Table 3 Permissible Static Moment for Type SRS

Unit : N•m

Direction Model No.	M <sub>A</sub>		M <sub>B</sub>		M <sub>C</sub>
	Single block	Double block	Single block	Double block	Single block
SRS 9M	7.82	43.9	9.03	50.8	10.6
SRS 9WM	14	78.6	16.2	91	31.5
SRS 12M	12	78.5	12	78.5	23.1
SRS 12WM	26.4	143	26.4	143	66.5
SRS 15M	26.2	154	26.2	154	40.4
SRS 15WM	51.2	290	51.2	290	176
SRS 20M	54.3	296	62.4	341	104
SRS 25M	177	932	177	932	248

Table 4 Type SRS Accuracy Standards

Unit : mm

Model No.	Accuracy standard	Normal	High	Precision
	Item	No symbol	H	P
SRS 20M SRS 25M	Tolerance of height M	±0.04	±0.02	±0.01
	Difference in height M	0.03	0.015	0.007
	Tolerance of width W <sub>2</sub>	±0.04	±0.025	±0.015
	Difference in width W <sub>2</sub> among LM blocks	0.03	0.02	0.01
	Running parallelism of LM block surface C with respect to surface A	ΔC (see Fig. 13)		
	Running parallelism of LM block surface D with respect to surface B	ΔD (see Fig. 13)		

## Radial Clearance

Table 5 shows the radial clearance for type SRS.

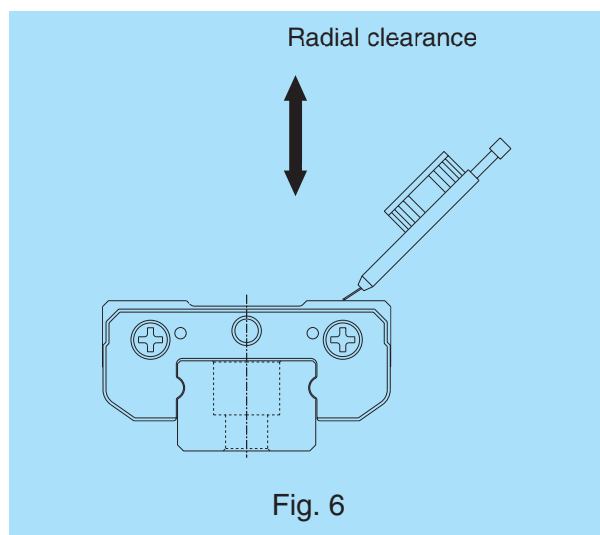


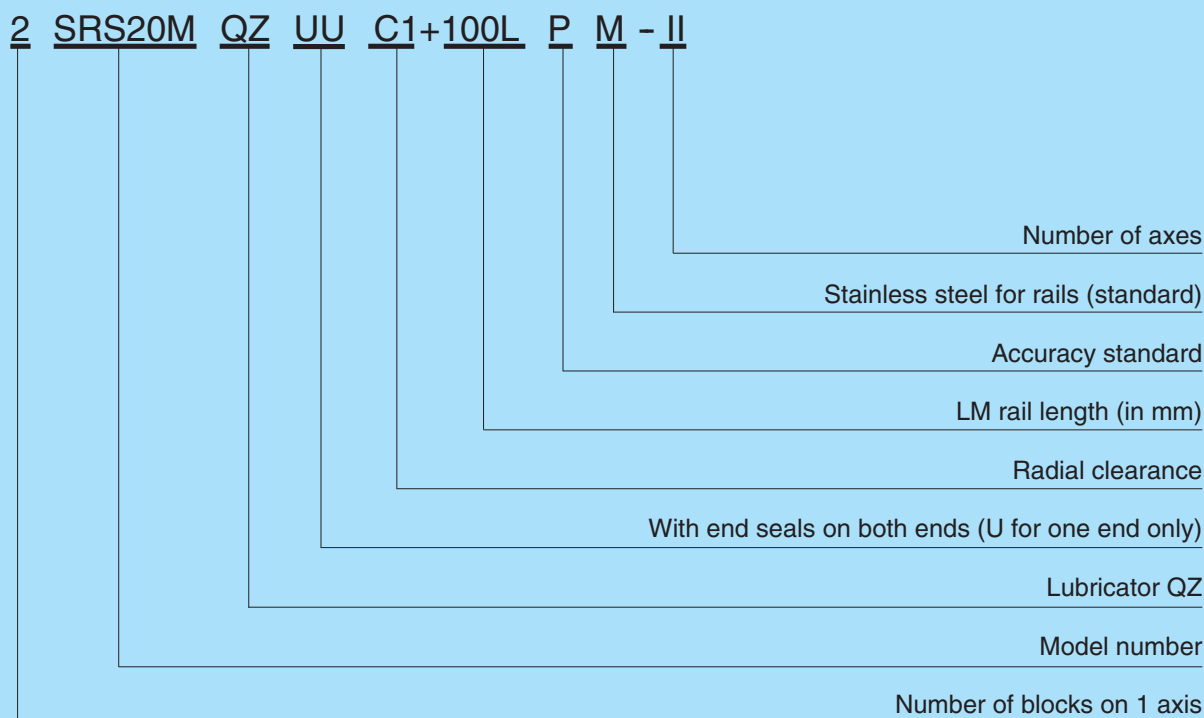
Table 5 Radial Clearance for Type SRS

Unit :  $\mu\text{m}$

Symbol Model No.	Normal No symbol	Light preload C1
SRS 9M,9WM	$\text{Å}2\text{Å} \cdot \text{Å}2$	$\text{Å}4\text{Å} \cdot 0$
SRS 12M,12WM	$\text{Å}3\text{Å} \cdot \text{Å}3$	$\text{Å}6\text{Å} \cdot 0$
SRS 15M,15WM	$\text{Å}5\text{Å} \cdot \text{Å}5$	$\text{Å}10\text{Å} \cdot 0$
SRS 20M	$\text{Å}5\text{Å} \cdot \text{Å}5$	$\text{Å}10\text{Å} \cdot 0$
SRS 25M	$\text{Å}7\text{Å} \cdot \text{Å}7$	$\text{Å}14\text{Å} \cdot 0$

Note: No symbol is given to a normal clearance. C1 clearances should be included in respective model number codes (see Model-number Coding below).

## Model Number Coding



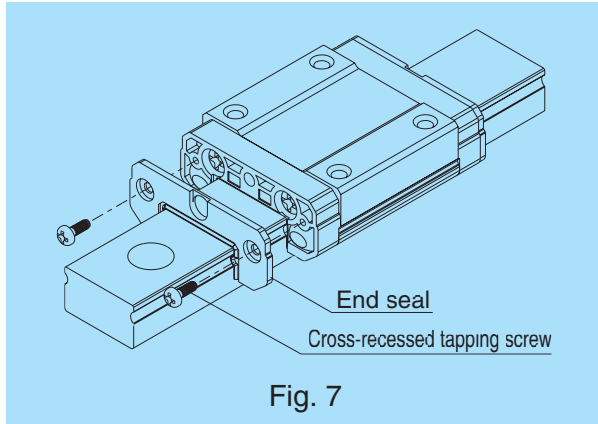
Note:

- This model number applies to 1 set on 1 rail unit (at least 2 sets are required when used on 2 parallel rails).
- For installation of a grease nipple, specify "with grease nipple."
- A grease nipple is not available for types installed with QZ Lubricator.

## Contamination Protection

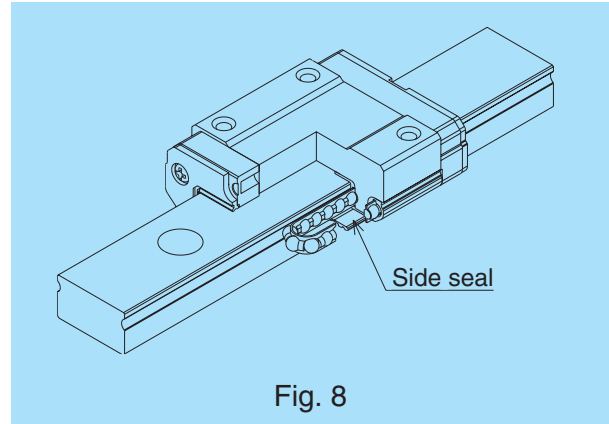
### End seal

For type SRS LM Guide, end seals are installed as a standard item.



### Side seal

For type SRS LM Guide, side seals are installed to prevent contaminants from entering an LM block from its bottom.



### Contamination-protection-accessory symbols

Where a contamination-protection accessory is required, specify the corresponding symbol shown in Table 6.

Table 6 Overall Length of Type SRS with Accessory Attached  
Unit : mm

Model No.	No symbol	UU	SS
<b>SRS 9M</b>	27.8	30.8	30.8
<b>SRS 9WM</b>	36	39	39
<b>SRS 12M</b>	31.4	34.4	34.4
<b>SRS 12WM</b>	41.5	44.5	44.5
<b>SRS 15M</b>	40	43	43
<b>SRS 15WM</b>	52.5	55.5	55.5
<b>SRS 20M</b>	47	50	50
<b>SRS 25M</b>	73	77	77

Table 7 Contamination-protection-accessory Symbols

Symbol	Contamination-protection accessory
<b>UU</b>	With end seal (both ends)
<b>SS</b>	With end seal + side seal

## Grease nipple

Standard-specification LM Guides are not provided with grease nipples. When using them under harsh conditions, select Lubricator QZ\* (optional) or Laminated Contact Scraper LaCS\* (optional). When insufficient lubrication is still assumed even with these options, select those types with grease nipples.

Attaching a grease nipple to an LM block changes the block overall length depending on the block type (for corresponding grease nipple types and their dimensions, see Table 8).

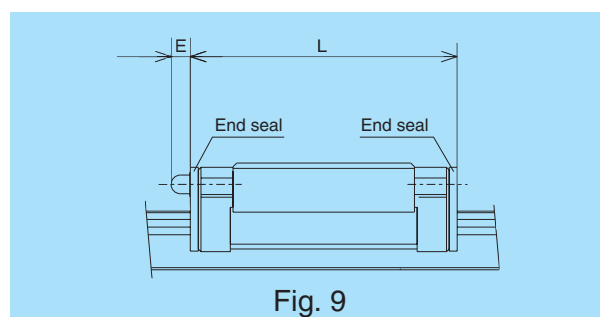
- Note 1: A grease nipple cannot be additionally mounted on standard type LM Guides.
- Note 2: For QZ Lubricator, see P.A-418. For Laminated Contact Scraper LaCS, see P.A-428.
- Note 3: A grease nipple cannot be installed on SRS9M, 9WM, 12M and 12WM. These types can have greasing holes.
- Note 4: Do not use a greasing hole for a purpose other than greasing. It may cause damage to the LM Guide.
- Note 5: A grease nipple is not available for types installed with QZ Lubricator.

Table 8 Grease nipple dimensions

Unit : mm

Model No.	Additional length with grease nipple E	Compatible models
SRS 9M	-	Ø1.5drilled hole
SRS 9WM	-	Ø1.6drilled hole
SRS 12M	-	Ø2.0drilled hole
SRS 12WM	-	Ø2.0drilled hole
SRS 15M	4.0(5.0)	PB107
SRS 15WM	4.0(5.0)	PB107
SRS 20M	3.5(5.0)	PB107
SRS 25M	4.0(5.5)	PB1021B

Note: Figures in parentheses indicate dimensions without seals.



Note: For dimension L, see Table 6 or the dimension table.

## C cap for LM rail mounting holes

If dust or foreign matter enters an LM rail mounting hole on the LM Guide, the contamination could also find its way inside of the block. This can be prevented by covering the mounting holes with the special caps provided and then ensuring that the caps are flush with the upper surface of the LM rail. Type C cap for LM rail mounting holes is made from a special synthetic resin that has excellent oil-proofing and wear-resistance properties, providing a high level of durability. The special caps are kept in stock as standard parts and can be ordered by specifying the model number listed in the table.

To insert a special cap into an LM rail mounting hole, lay a flat metal drift over the cap, as shown in Fig. 10, and then gently tap the drift until the cap is flush with the top of the LM rail.

Table 9 Main Dimensions of the Special Caps

Model No.	C cap No.	Applicable bolt	Dimensions (mm)	
			D	H
SRS 9M	-	-	-	-
SRS 9WM	C3	M3	6.3	1.2
SRS 12M	C3	M3	6.3	1.2
SRS 12WM	-	-	-	-
SRS 15M	C3	M3	6.3	1.2
SRS 15WM	-	-	-	-
SRS 20M	C5	M5	9.8	2.4
SRS 25M	C6	M6	11.4	2.7

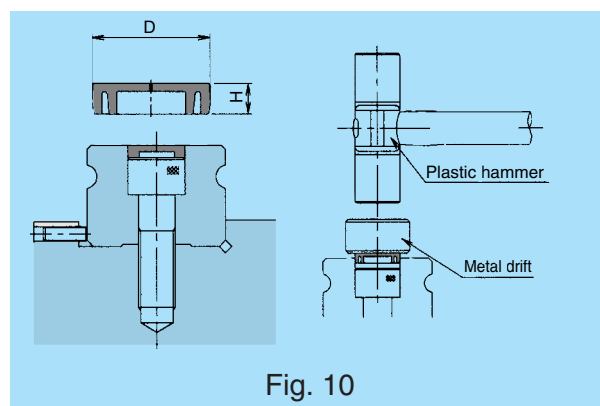


Fig. 10

## Precautions on Use

### Installation surface shoulder heights and bottom corners

Table 10 lists the recommended shoulder heights for installing the LM block and LM rail. To prevent corner beveling or interference between the LM block and LM rail, the corner of the installation surface should have some clearance or should be machined to a radius equal to or less than  $r$  in Table 10.

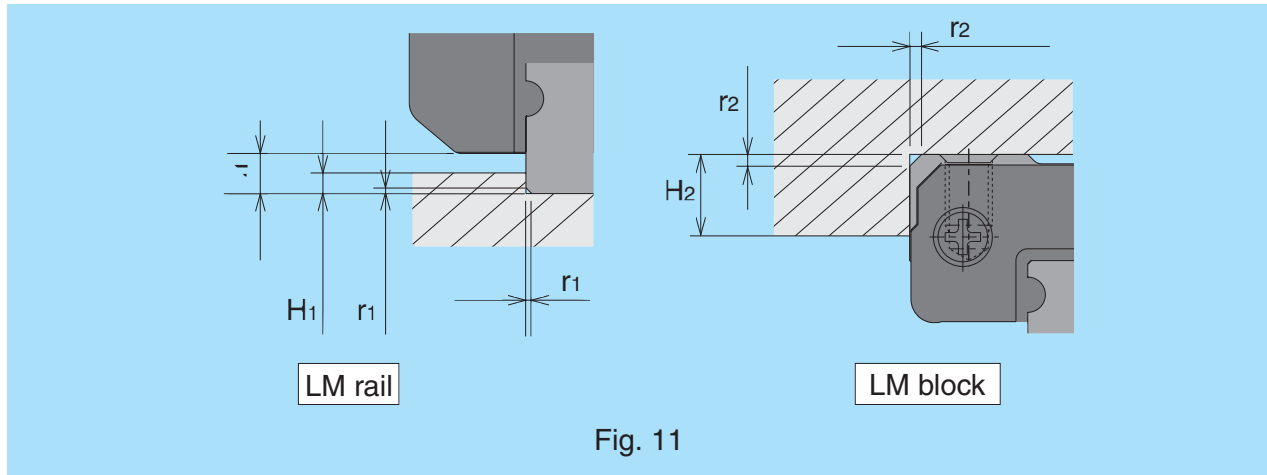


Fig. 11

Table 10 Installation Surface Shoulder Heights and Corner Radius

Unit : mm

Model No.	LM rail corner radius $r_1$ (max.)	LM block corner radius $r_2$ (max.)	LM rail shoulder height $H_1$	LM block shoulder height $H_2$	E
SRS 9M	0.1	0.3	0.5	4.9	0.9
SRS 9WM	0.1	0.5	2.5	4.9	2.9
SRS 12M	0.3	0.2	1.5	5.7	2
SRS 12WM	0.3	0.3	2.5	5.7	3
SRS 15M	0.3	0.4	2.2	6.5	2.7
SRS 15WM	0.3	0.3	2.2	6.5	2.7
SRS 20M	0.3	0.5	3	8.7	3.4
SRS 25M	0.5	0.5	4.5	10.5	5

## Seal resistance

Table 11 shows the maximum values for seal resistance in one LM block when lubricant is applied to type SRS LM Guide with seal (type SS).

Table 11 Seal Resistance

Unit : N

Model No.	Resistance
SRS 9M	0.2
SRS 9WM	1
SRS 12M	0.6
SRS 12WM	1.3
SRS 15M	1
SRS 15WM	1.6
SRS 20M	1.3
SRS 25M	1.6

## Flatness of LM rail and LM block installation surfaces

The values shown in Table 12 can be used as the normal clearance. When C1 is used with two rails, the value shown in the table should be halved.

Table 12 Flatness of LM Rail and LM Block Installation Surfaces

Unit : mm

Model No.	Flatness
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

## Standard and Maximum LM Rail Lengths

Table 13 shows the standard and maximum LM rail lengths for type SRS LM Guide. If the length exceeds the maximum length, the rail will be manufactured in 2 or more sections.

If a special length is required, the G dimension given in the table should be used. If the G dimension is too long, the ends of the rail tend to become unstable after installation, which adversely affects precision. When 2 or more rail sections are to be connected, you must specify the total length required so that **THK** can manufacture the sections using simultaneous machining to ensure that the joints are smooth.

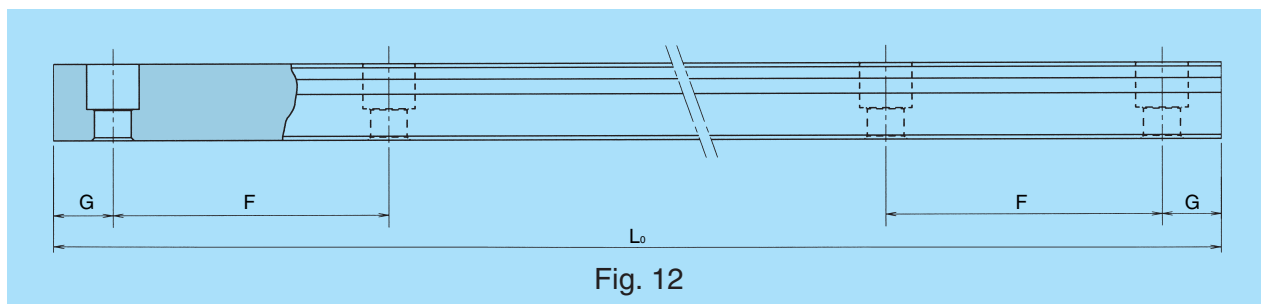


Fig. 12

Table 13 Standard and Maximum Lm Rail Lengths for Type SRS

Unit : mm

Model No.	SRS 9M	SRS 9WM	SRS 12M	SRS 12WM	SRS 15M	SRS 15WM	SRS 20M	SRS 25M
LM-rail standard length ( $L_0$ )	55	50	70	70	70	110	220	220
	75	80	95	110	110	150	280	280
	95	110	120	150	150	190	340	340
	115	140	145	190	190	230	460	460
	135	170	170	230	230	270	640	640
	155	200	195	270	270	310	880	880
	175	260	220	310	310	430	1000	1000
	195	290	245	390	350	550		
	275	320	270	470	390	670		
	375		320	550	430	790		
			370		470			
			470		550			
			570		670			
Standard pitch F	20	30	25	40	40	40	60	60
G	7.5	10	10	15	15	15	20	20
Maximum length	1000	1000	1340	1430	1430	1800	1800	1800

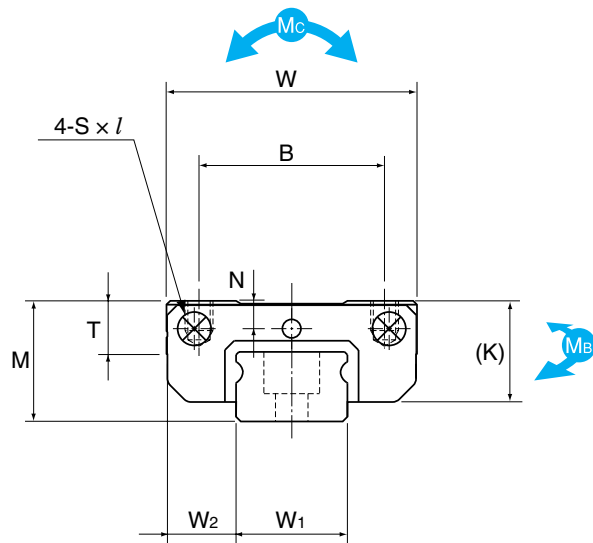
Note 1: The maximum length varies depending on the accuracy class. Be sure to contact **THK**.

Note 2: If the connected method is not available and the maximum length needs to be longer than the above table, contact **THK**.



# SRS-M Type

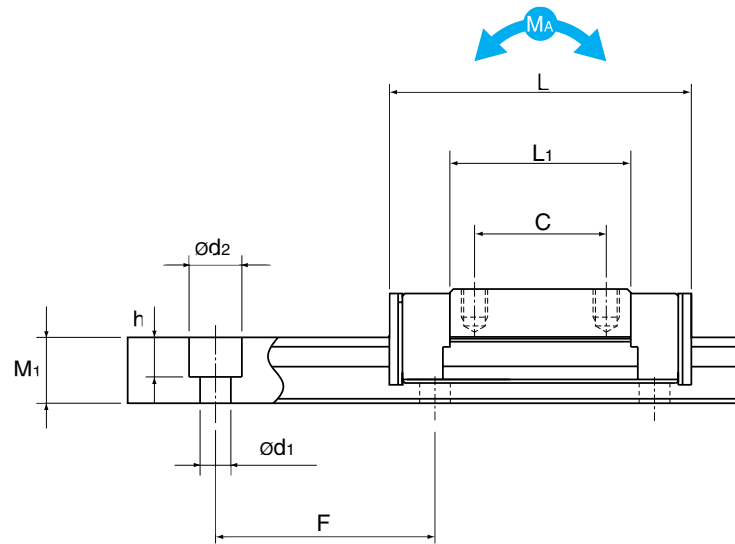
Compact type



Model No.	External dimensions			LM block dimensions						
	Height M	Width W	Length L	B	C	$S \times l$	$L_1$	T	K	N
SRS 9M	10	20	30.8	15	10	M3 × 2.8	19.8	4.9	9.1	2.4
SRS 12M	13	27	34.4	20	15	M3 × 3.2	20.6	5.7	11	3
SRS 15M	16	32	43	25	20	M3 × 3.5	25.7	6.5	13.3	3
SRS 20M	20	40	50	30	25	M4 × 6	34	9	16.6	4
SRS 25M	25	48	77	35	35	M6 × 7	56	11	20	5

Note:

- For standard types, additional machining for grease nipple installation is not available (for details, see page A-203).
- For model number coding, see page A-201.
- For LM rail lengths, see page A-205.
- Symbol M indicates that stainless steel is used as the material for LM block, LM rail and balls and those components are excellent in corrosion resistance and environmental resistance.



Unit : mm

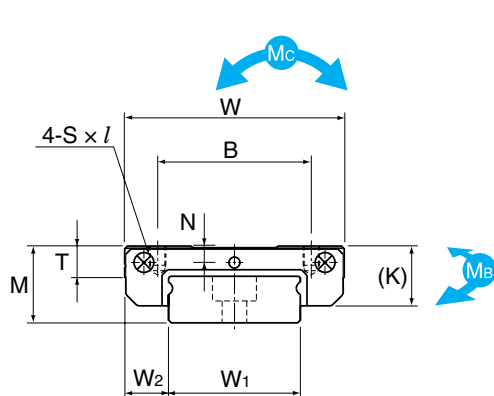
LM rail dimensions					Basic load rating		Mass	
Width $W_1$	$W_2$	Height $M_1$	Pitch $F$	$d_1 \times d_2 \times h$	C kN	$C_0$ kN	LM block kg/unit	LM rail kg/m
$9_{-0.02}^0$	5.5	5.5	20	$3.5 \times 6 \times 3.3$	2.69	2.31	0.016	0.32
$12_{-0.02}^0$	7.5	7.5	25	$3.5 \times 6 \times 4.5$	4	3.53	0.027	0.65
$15_{-0.02}^0$	8.5	9.5	40	$3.5 \times 6 \times 4.5$	6.66	5.7	0.047	0.96
$20_{-0.03}^0$	10	11	60	$6 \times 9.5 \times 8$	7.75	9.77	0.11	1.68
$23_{-0.03}^0$	12.5	15	60	$7 \times 11 \times 9$	16.5	20.2	0.24	2.6

Note:

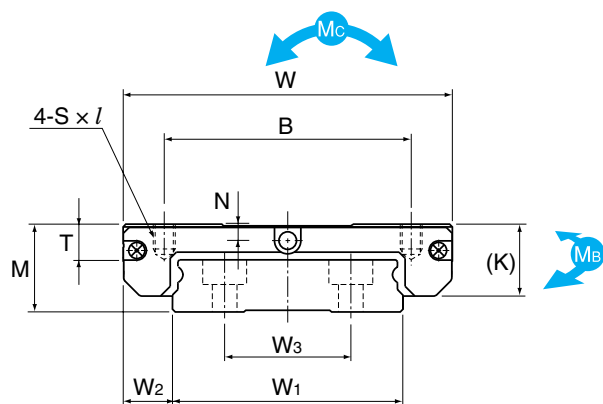
- When a grease nipple is required, indicate: “with grease nipple” (for SRS 15M, 15WM, 20M and 25M).
- When a greasing hole is required, indicate: “with greasing hole” (for SRS 9M, 9WM, 12M and 12WM).
- For static permissible moment values, see P.202.

## SRS-WM Type

Compact type



SRS9WM/12WM

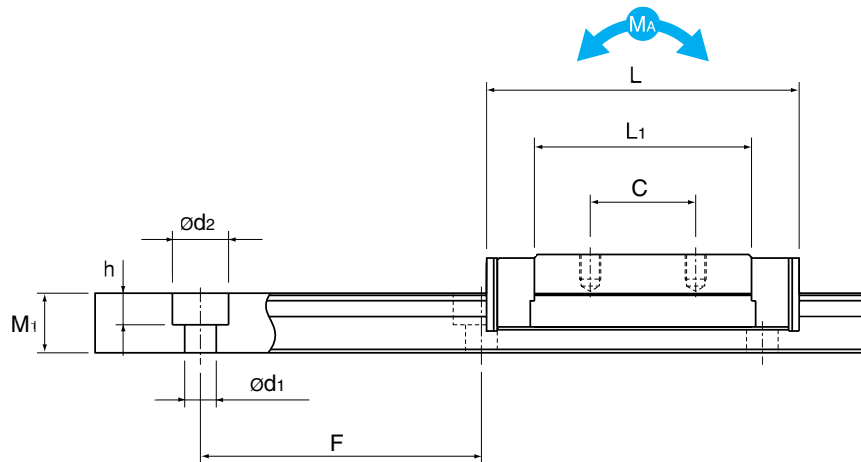


SRS15WM

Model No.	External dimensions			LM Block dimensions						
	Height M	Width W	Length L	B	C	$S \times l$	$L_1$	T	K	N
SRS 9WM	12	30	39	21	12	M3 × 2.8	27	4.9	9.1	2.3
SRS 12WM	14	40	44.5	28	15	M3 × 3.5	30.9	5.7	11	3
SRS 15WM	16	60	55.5	45	20	M4 × 4.5	38.9	6.5	13.3	3

Note:

- For standard types, additional machining for grease nipple installation is not available (for details, see page A-203).
- For model number coding, see page A-201.
- For LM rail lengths, see page A-205.
- Symbol M indicates that stainless steel is used as the material for LM block, LM rail and balls and those components are excellent in corrosion resistance and environmental resistance.



Unit: mm

LM Rail dimensions						Basic load rating		Mass	
Width $W_1$	$W_2$	$W_3$	Height $M_1$	Pitch $F$	$d_1 \times d_2 \times h$	C kN	$C_0$ kN	LM Block kg/unit	LM Rail kg/m
$18_{-0.02}^0$	6	—	7.5	30	$3.5 \times 6 \times 4.5$	3.29	3.34	0.031	1.01
$24_{-0.02}^0$	8	—	8.5	40	$4.5 \times 8 \times 4.5$	5.48	5.3	0.055	1.52
$42_{-0.02}^0$	9	23	9.5	40	$4.5 \times 8 \times 4.5$	9.12	8.55	0.13	2.87

Note:

- When a grease nipple is required, indicate: “with grease nipple” (for SRS 15M, 15WM, 20M and 25M).
- When a greasing hole is required, indicate: “with greasing hole” (for SRS 9M, 9WM, 12M and 12WM).
- For static permissible moment values, see P.202.