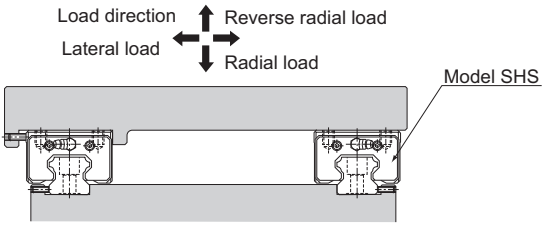
Designing the Guide System

THK offers various types of LM Guides in order to meet diversified conditions. Supporting ordinary horizontal mount, vertical mount, inverted mount, slant mount, wall mount and single-axis mount, the wide array of LM Guide types makes it easy to achieve a linear guide system with a long service life and high rigidity while minimizing the required space for installation.
It is necessary to consider the position in the LM block where the grease nipple or the piping joint should be attached according to the mounting orientation.
If the mounting orientation is other than horizontal use, the lubricant may not reach the raceway completely. Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.
Even with an LM Guide with seals, the internal lubricant gradually seeps out during operation. Therefore, the system needs to be lubricated at an appropriate interval according to the conditions.
For the mounting orientation and the lubrication, see A1-12 and A24-2, respectively.

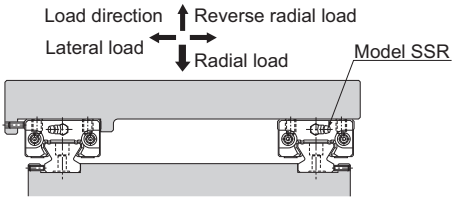
Examples of Arrangements of the Guide System

The following are representative guide systems and arrangements when installing the LM Guide. (For indication of the reference surface, see A1-483.)

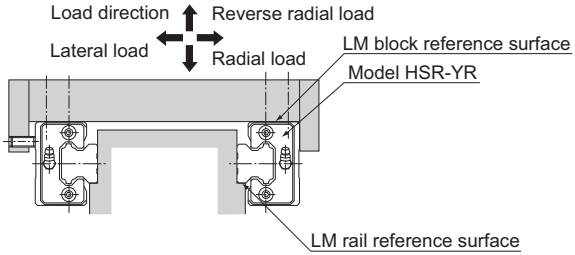
Double-rail configuration when high rigidity is required in all directions



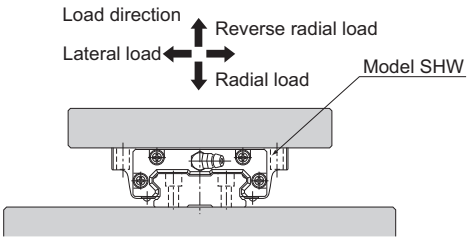
Double-rail configuration when high rigidity is required in the radial direction



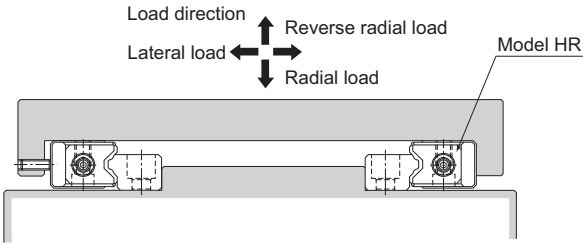
When high rigidity is required in all directions and the installation space is limited in height



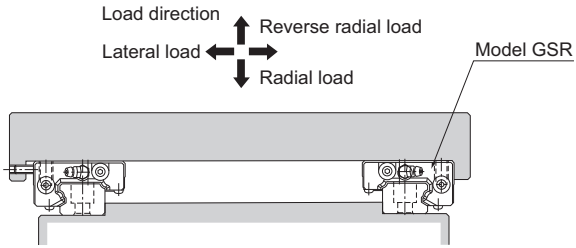
Single-rail configuration

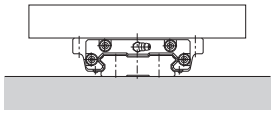
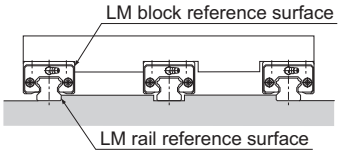


When the minimum possible height of the equipment is allowed (Adjustable preload type)

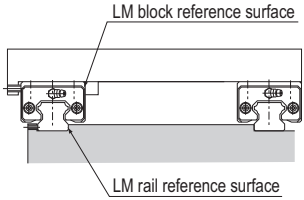


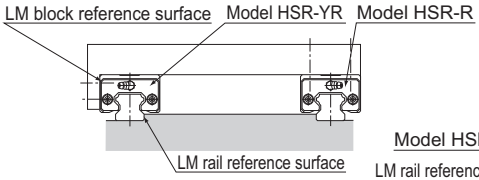
When a medium load is applied and the mounting surface is rough (Preload, self-adjusting type)

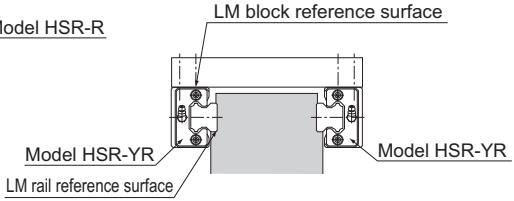


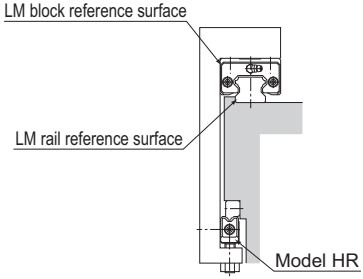
Single-rail configuration	Triple-rail configuration
	

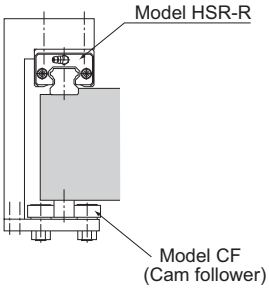
Double-rail configuration

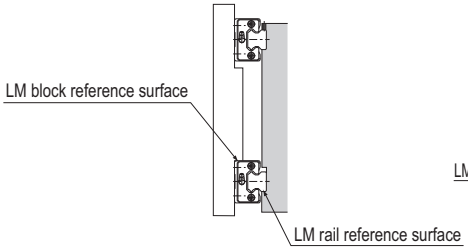


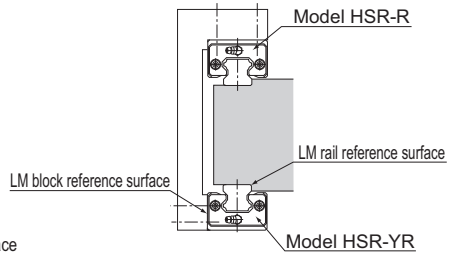




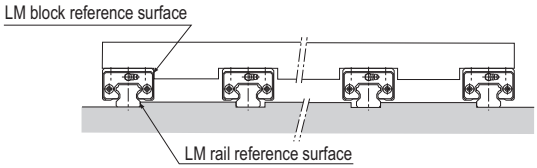


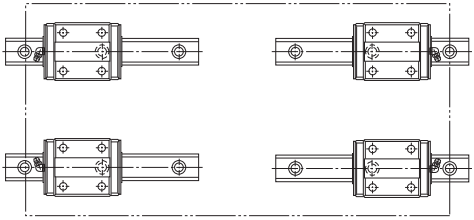


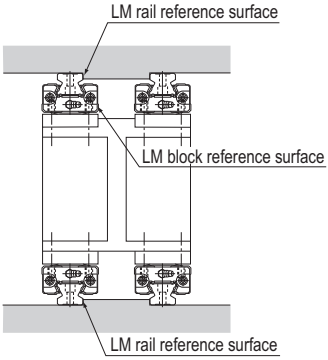


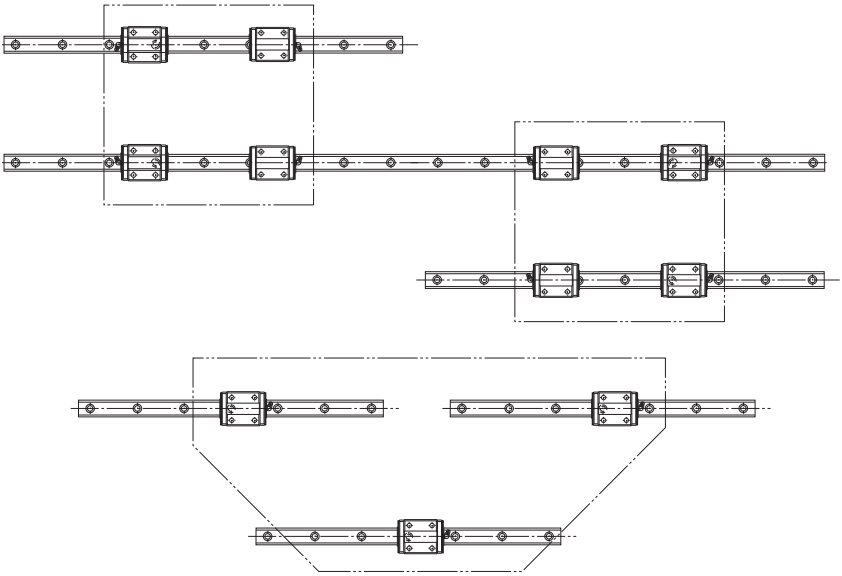


Multi-rail configuration





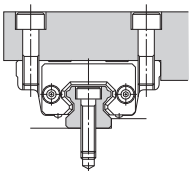
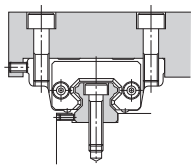


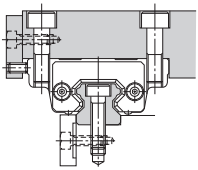
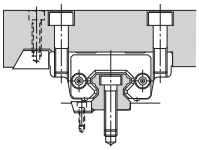


Method for Securing an LM Guide to Meet the Conditions

LM Guides are categorized into groups of types by mounting space and structure: a group of types to be mounted with bolts from the top, and another of types to be mounted from the bottom. LM rails are also divided into types secured with bolts and those secured with clamps (model JR). This wide array of types allows you to make a choice according to the application.
There are several ways of mounting the LM Guide as shown in Table1. When the machine is subject to vibrations that may cause the LM rail(s) or LM blocks to loosen, we recommend the securing method indicated by Fig.1 on A1-466. (If 2 or more rails are used in parallel, only the LM block on the master rail should be secured in the crosswise direction.) If this method is not applicable for a structural reason, hammer in knock pins to secure the LM block(s) as shown in Table2 on A1-466 When using knock pins, machine the top/bottom surfaces of the LM rail by 2 to 3 mm using a carbide end mill before drilling the holes since the surfaces are hardened.

Table1 Major Securing Methods on the Master-rail Side

(a) Secured only with side reference surfaces	(b) Secured with set screws
	

(c) Secured with a presser plate	(d) Secured with tapered gibs
	

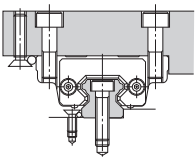
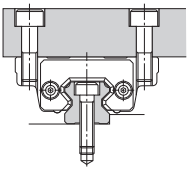
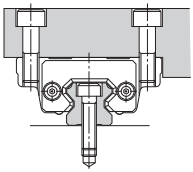
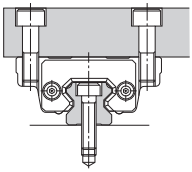
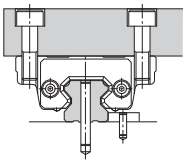
(e) Secured with pins


Table2 Major Securing Methods on the Subsidiary-rail Side

(a) Secured only with the side reference surface of the rail	(b) Secured only with the side reference surface of the block
	
(c) Secured without a side reference surface	**(d) Secured with dowel pins**
	

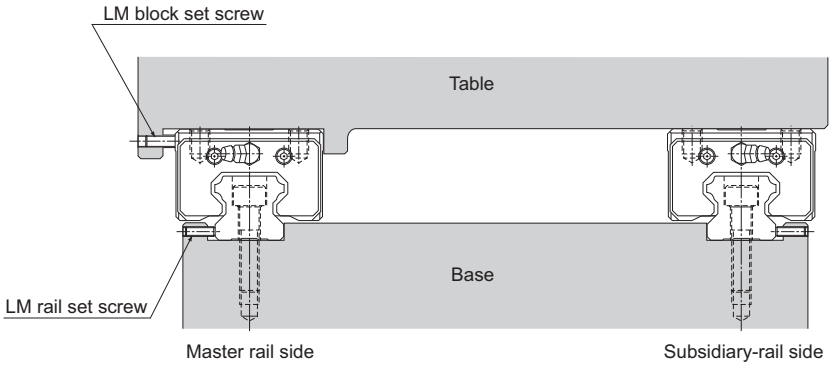
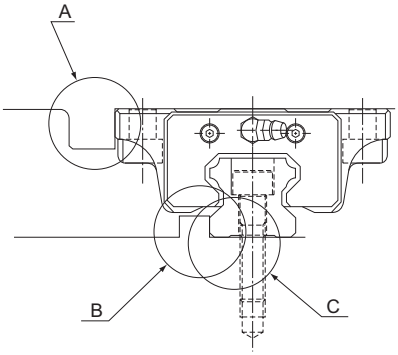


Fig.1 When the Machine Receives Vibrations or Impact

Designing a Mounting Surface

Designing a Mounting Surface

If particularly high accuracy is required for the machine to which an LM Guide is to be mounted, it is necessary to mount the LM rail with high accuracy. To achieve the desired accuracy, be sure to design the mounting surface while taking the following points into account.



[Corner Shape]

If the corner on the surface on which the LM rail or LM block is to be mounted is machined to be shaped R, which is greater than the chamfer dimension of the LM rail or LM block, then the rail or the block may not closely contact its reference surface. Therefore, when designing a mounting surface, it is important to carefully read the description on the “corner shape” of the subject model . (Fig.2)

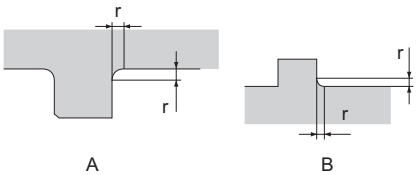


Fig.2

[Perpendicularity with the Reference Surface]

If the perpendicularity between the base mounting surface for the LM rail or the LM block and the reference surface is not accurate, the rail or the block may not closely contact the reference surface. Therefore, it is important to take into account an error of the perpendicularity between the mounting surface and the reference surface . (Fig.3)

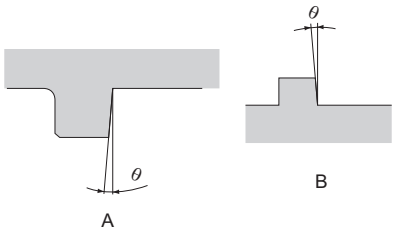


Fig.3

[Dimensions of the Reference Surface]

When designing the reference surface, be sure to take into account the height and the thickness of the datum area. If the datum area is too high, it may interfere with the LM block. If it is too low, the LM rail or the LM block may not closely contact the reference-surface depending on the chamfer of the rail or the block. Additionally, if the datum area is too thin, the desired accuracy may not be obtained due to poor rigidity of the datum area when a lateral load is applied or when performing positioning using a lateral mounting bolt . (Fig.4)

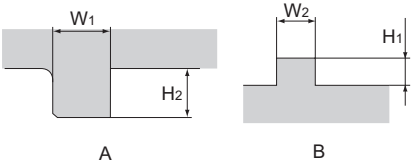


Fig.4

[Dimensional Tolerance between the Reference Surface and the Mounting Hole]

If the dimensional tolerance between the reference surface of the LM rail or the LM block and the mounting hole is too large, the rail or the block may not closely contact the reference surface when mounted on the base.
Normally, the tolerance should be within ±0.1 mm depending on the model. (Fig.5)

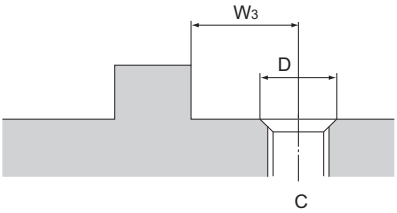


Fig.5

[Chamfer of the Tapped Mounting Hole]

To mount the LM rail, the mounting surface needs to be tapped and the tapped hole has to be chamfered. If the chamfer of the tapped hole is too large or too small, it may affect the accuracy . (Fig.6)

Guidelines for the chamfer dimension:
Chamfer diameter D = nominal diameter of the bolt + pitch

Example: Chamfer diameter D with M6 (pitch):
D = 6 + 1 = 7

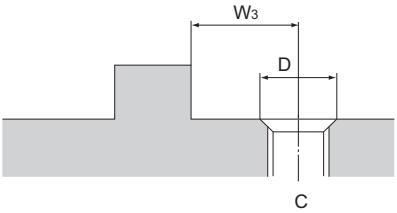
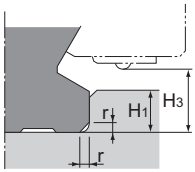


Fig.6

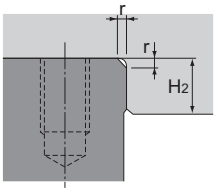
Shoulder Height of the Mounting Base and the Corner Radius

Normally, the mounting base for the LM rail and the LM block has a reference-surface on the side face of the shoulder of the base in order to allow easy installation and highly accurate positioning. The height of the datum shoulder varies with model numbers. See A1-469 to A1-475 for details.

The corner of the mounting shoulder must be machined to have a recess, or machined to be smaller than the corner radius "r," to prevent interference with the chamfer of the LM rail or the LM block. The corner radius varies with model numbers. See A1-469 to A1-475 for details.



Shoulder for the LM Rail



Shoulder for the LM Block (LM casing)

Fig.7

[Models SR, SR-M1]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3
15	0.5	3.8	4	5.8
20	0.5	5	5	6
25	1	5.5	5	7
30	1	8	6	9.5
35	1	9	6	11.5
45	1	10	8	12.5
55	1.5	11	8	13.5
70	1.5	12	10	15
85	1.2	8	12	18.5
100	1.2	10	15	19
120	1.2	12	20	15
150	1.2	12	20	22

[Model JR]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM block H_2
25	1	5
35	1	6
45	1	8
55	1.5	10

[Model CSR]

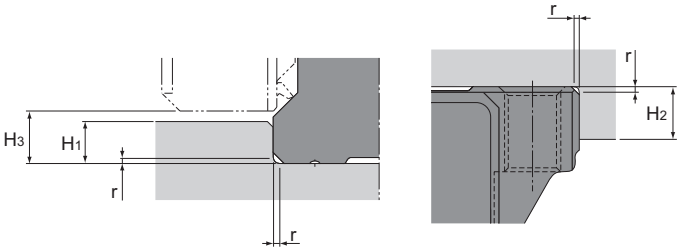
Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	H_3
15	0.5	3	4.7
20	0.5	3.5	4
25	1	5	5.5
30	1	5	7
35	1	6	7.5
45	1	8	10

[Model NSR-TBC]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
20	1	5	5	5.5
25	1	6	6	6.5
30	1	7	6	9
40	1	7	8	10.5
50	1	7	8	8
70	1	7	10	9.5



Shoulder for the LM Rail　　Shoulder for the LM Block

Fig.8

[Model SHS]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
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

[Model SCR]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	H_3
15	0.5	2.5	3
20	0.5	3.5	4.6
25	1	5	5.8
30	1	5	7
35	1	6	7.5
45	1	7.5	8.9
65	1.5	15	19

[Models SVR/SVS and NR-X/NRS-X]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
25	0.5	4	5	5.5
30	1	5	5	7
35	1	6	6	9
45	1	8	8	11.6
55	1.5	10	10	14
65	1.5	10	10	15

Note) If the optional side scraper or protector is attached, dimensions H1 and H3 differ from that without the options. For the dimensions after they are attached, see A1-494 to A1-495.

[Models NR/NRS]

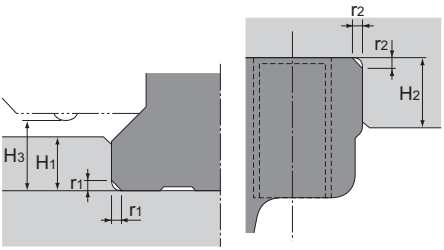
Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
75	1.5	12	12	15
85	1.5	14	14	17
100	2	16	16	20

[Model MX]

Unit: mm

Model No.	Corner radius for the LM rail r(max)	Shoulder height for the LM rail H_1	H_3
5	0.1	1.2	1.5
7W	0.1	1.7	2



Shoulder for the LM Rail　　Shoulder for the LM Block

Fig.9

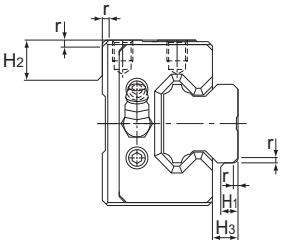


Fig.10

[Models HSR, HSR-M1 and HSR-M2]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
8	0.3	0.5	1.6	6	2.1
10	0.3	0.5	1.7	5	2.2
12	0.8	0.5	2.6	4	3.1
15	0.5	0.5	3	4	4.7
20	0.5	0.5	3.5	5	4
25	1	1	5	5	5.5
30	1	1	5	5	7
35	1	1	6	6	7.5
45	1	1	8	8	10
55	1.5	1.5	10	10	13
65	1.5	1.5	10	10	14
85	1.5	1.5	12	14	16
100	2	2	16	16	20
120	2.5	2.5	17	18	20
150	2.5	2.5	20	20	22

[Model HCR]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3
12	0.8	0.5	2.6	6	3.1
15	0.5	0.5	3	4	4.8
25	1	1	5	5	7
35	1	1	6	6	8.5
45	1	1	8	8	11.5
65	1.5	1.5	10	10	15

[Model HMG]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3
15	0.5	0.5	3	4	3.5
25	1	1	5	5	5.5
35	1	1	6	6	7.5
45	1	1	8	8	11
65	1.5	1.5	10	10	16

[Model EPF]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3
7M	0.2	0.4	1	3	1.5
9M	0.2	0.6	1	5	1.5
12M	0.5	0.6	1.5	6	2
15M	0.5	0.8	2.5	6.8	3

[Model HSR-YR]

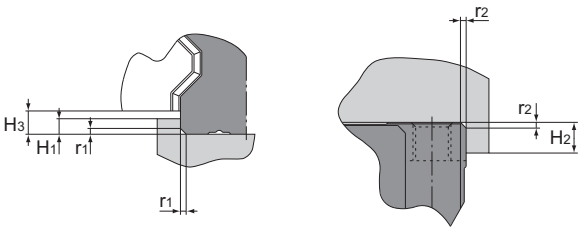
Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
15	0.5	3	4	3.5
20	0.5	3.5	5	4
25	1	5	5	5.5
30	1	5	5	7
35	1	6	6	7.5
45	1	8	8	10
55	1.5	10	10	13
65	1.5	10	10	14

[Model HSR-M1VV]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3
15	0.5	0.5	3	4	4.3



Shoulder for the LM Rail　　Shoulder for the LM Block

Fig.11

[Model SRG]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
15X	0.5	0.5	2.5	4	4
20X	0.5	0.5	3.5	5	4.6
25X	1	1	3.5	5	4.5
30X	1	1	4	5	5
35	1	1	5	6	6
45	1.5	1.5	6	8	8
55	1.5	1.5	8	10	10
65	1.5	2	9	10	11.5
85	1.5	1.5	12	14	16
100	2	2	12	16	16

Note) If the optional side scraper or protector is attached, dimensions H_1 and H_3 differ from that without the options. For the dimensions after they are attached, see **A1-494** to **A1-495.**

[Model SRN]

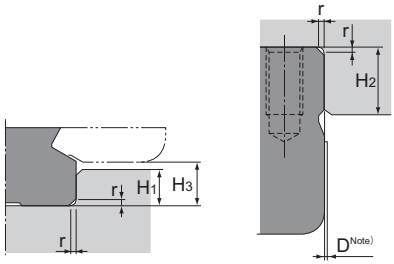
Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
35	1	1	5	6	6
45	1.5	1.5	6	8	7
55	1.5	1.5	8	10	10
65	1.5	2	8	10	10

[Model SRW]

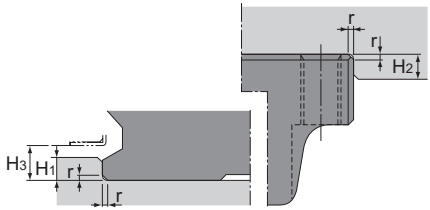
Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
70	1.5	1.5	6	8	8
85	1.5	1.5	8	10	10
100	1.5	2	9	10	11.5
130	1.5	1.5	12	14	16
150	2	2	12	16	16



Shoulder for the LM Rail　　Shoulder for the LM Block

Fig.12



Shoulder for the LM Rail　　Shoulder for the LM Block

Fig.13

[Model SSR]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Maximum shoulder height for the LM block H_2	H_3	D
15 X	0.5	3.8	5.5	4.5	0.3
20 X	0.5	5	7.5	6	0.3
25 X	1	5.5	8	6.8	0.4
30 X	1	8	11.5	9.5	0.4
35 X	1	9	16	11.5	0.4

Note) When closely contacting the LM block with the datum shoulder, the resin layer may stick out from the overall width of the LM block by the dimension D. To avoid this, machine the datum shoulder to have a recess or limit the datum shoulder's height below the dimension H_2.

[Models SHW and HRW]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
12	0.5	1.5	4	2
14	0.5	1.5	5	2
17	0.4	2	4	2.5
21	0.4	2.5	5	3
27	0.4	2.5	5	3
35	0.8	3.5	5	4
50	0.8	3	6	3.4
60	1	5	8	6.5

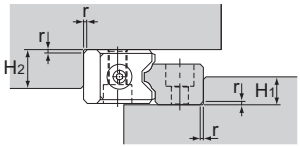


Fig.14

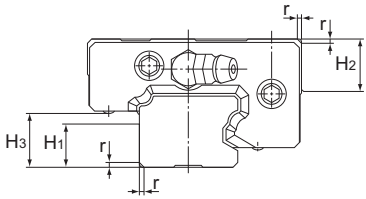


Fig.15

[Model HR]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2
918	0.3	5	6
1123	0.5	6	7
1530	0.5	8	10
2042	0.5	11	15
2555	1	13	18
3065	1	16	20
3575	1	18	26
4085	1.5	21	30
50105	1.5	26	32
60125	1.5	31	40

[Model GSR]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
15	0.6	7	7	8
20	0.8	9	8	10.4
25	0.8	11	11	13.2
30	1.2	11	13	15
35	1.2	13	14	17.5

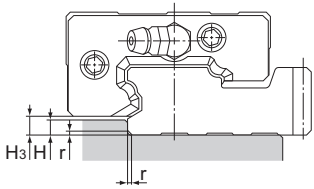
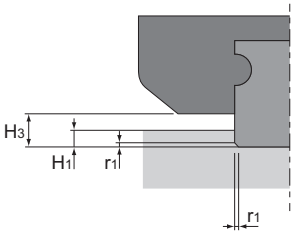


Fig.16

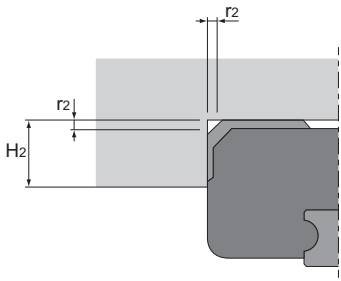
[Model GSR-R]

Unit: mm

Model No.	Corner radius r(max)	Shoulder height for the LM rail H	H_3
25	0.8	4	4.5
30	1.2	4	4.5
35	1.2	4.5	5.5



Shoulder for the LM Rail



Shoulder for the LM Block

Fig.17

[Model SRS]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
5 M/N	0.1	0.3	1.2	2	1.5
5 WM/WN	0.1	0.2	1.2	2.5	1.5
7 S/M/N	0.1	0.2	0.9	3.3	1.3
7 WS/WM/WN	0.1	0.1	1.4	3.8	1.8
9 XS/XM/XN	0.1	0.3	1.1	4.5	1.5
9 WS/WM/WN	0.1	0.5	2.5	4.9	2.9
12 S/M/N	0.3	0.2	1.5	5.7	2.1
12 WS/WM/WN	0.3	0.3	2.5	5.7	3
15 S/M/N	0.3	0.4	2.2	6.5	2.7
15 WS/WM/WN	0.3	0.3	2.2	6.5	2.7
20 M	0.3	0.5	3	8.7	3.4
25 M	0.5	0.5	4.5	10.5	5

[Models RSX and RSX-M1]

Unit: mm

Model No.	Corner radius for the LM rail r_1 (max)	Corner radius for the LM block r_2 (max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
5	0.1	0.3	1.2	2	1.5
5W	0.1	0.2	1.2	2.9	1.5
7	0.1	0.2	0.9	2.4	1.5
7W	0.1	0.1	1.4	2.9	2
9	0.1	0.3	1.1	3.3	2.2
9W	0.1	0.5	2.5	3.3	3.7
12	0.3	0.3	1.5	5.3	3
12W	0.3	0.3	2.5	5.8	4
15	0.3	0.4	2.2	5.8	4
15W	0.3	0.3	2.2	5.7	4

[Model RSR]

Unit: mm

Model No.	Corner radius for the LM rail r_1(max)	Corner radius for the LM block r_2(max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
2 N	0.1	0.3	0.6	2.3	0.7
2 WN	0.1	0.3	0.9	2.9	1
3 M/N/WM/WN	0.1	0.3	0.8	1.2	1
14 WVM	0.3	0.3	3.2	5	3.5

[Model RSR-M1]

Unit: mm

Model No.	Corner radius for the LM rail r_1 (max)	Corner radius for the LM block r_2 (max)	Shoulder height for the LM rail H_1	Shoulder height for the LM block H_2	H_3
9 M1K/M1N	0.3	0.5	1.9	3	2.2
9 M1WV/M1WN	0.1	0.1	3.9	3	4.2
12 M1V/M1N	0.3	0.3	1.4	4	3
12 M1WV/M1WN	0.3	0.3	3.7	4	4
15 M1V/M1N	0.3	0.3	2.3	5	4
15 M1WV/M1WN	0.3	0.3	3.7	5	4
20 M1V/M1N	0.5	0.5	5.5	5	7.5

Reference Error Tolerance for the Mounting Surface

The LM Guide allows smooth straight motion through its self-aligning capability even when there is a slight distortion or error on the mounting surface.

[Reference Horizontal Error Tolerance between Two Rails]

Mounting surface error may affect the service life of the LM Guide. The following tables show the approximate reference horizontal error tolerance (P) between two rails in general use.

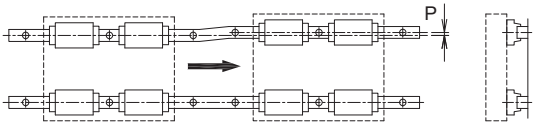


Fig.18 Reference Horizontal Error Tolerance (P) between Two Rails

[Models SHS, SCR, HSR, CSR, HSR-M1, HSR-M2, and HSR-M1VV]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
8	13	10	—
10	16	12	—
12	20	15	—
15	25	18	—
20	25	20	18
25	30	22	20
30	40	30	27
35	50	35	30
45	60	40	35
55	70	50	45
65	80	60	55
85	90	75	70
100	100	90	85
120	120	110	100
150	140	130	115

[Model JR]

Unit: μm

Model No.	—
25	100
35	200
45	300
55	400

[Models SSR, SR, SR-M1]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
15	35	25	—
20	40	30	25
25	50	35	30
30	60	40	35
35	70	50	45
45	80	60	55
55	100	70	65
70	110	80	65
85	120	90	80
100	130	100	90
120	140	110	100
150	150	120	110

[Models SVR, NR-X and NR]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	21	15	14
30	28	21	19
35	35	25	21
45	42	28	25
55	49	35	32
65	56	42	39
75	60	47	44
85	63	53	49
100	70	63	60

[Models SVS, NRS-X and NRS]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	15	11	10
30	20	15	14
35	25	18	15
45	30	20	18
55	35	25	23
65	40	30	28
75	43	34	31
85	45	38	35
100	50	45	43

[Models SHW and HRW]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
12	13	10	—
14	16	12	—
17	20	15	—
21	25	18	—
27	25	20	—
35	30	22	20
50	40	30	27
60	50	35	30

[Models SRS, RSX, RSR, RSX-M1, and RSR-M1]

Unit: μm

Model No.	Normal clearance	Clearance C1
2	2	—
3	2	—
5	2	—
7	3	—
9	4	3
12	9	5
14	10	6
15	10	6
20	13	8
25	15	10

[Model HR]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
918	10	7	—
1123	14	8	—
1530	18	12	—
2042	20	15	14
2555	35	24	20
3065	38	26	22
3575	42	28	24
4085	50	35	30
50105	55	42	38
60125	65	55	50

[Models GSR and GSR-R]

Unit: μm

Model No.	—
15	30
20	40
25	50
30	60
35	70

[Model NSR-TBC]

Unit: μm

Model No.	Normal clearance	Clearance C1
20	50	40
25	70	50
30	80	60
40	90	70
50	110	80
70	130	90

[Flatness of the Mounting Surface]

Mounting surface error may affect the service life of the LM Guide. The reference values for the mounting surface flatness of models SRS, RSR, and RSR-W (for general use) are indicated here. Note that the service life of models not shown here may also be affected if the mounting surface is not flat.

[Model SRS]

Unit: mm

Model No.	Flatness error
5	0.015/200
7	0.025/200
9	0.035/200
12	0.050/200
15	0.060/200
20	0.070/200
25	0.070/200

[Models RSX, RSR, RSX-M1 and RSR-M1]

Unit: mm

Model No.	Flatness error
2	0.012/200
3	0.012/200
5	0.015/200
7	0.025/200
9	0.035/200
12	0.050/200
14	0.060/200
15	0.060/200
20	0.110/200

Note 1) As many factors can affect the mounting precision, we recommend using values 70% or less than those shown.
Note 2) The figures shown apply to normal clearances. When using two or more rails with clearance C1, we recommend using 50% or less of the values shown.

[Reference Vertical Error Tolerance between Two Rails]

Mounting surface error may affect the service life of the LM Guide. A1-479 and A1-480 feature several tables. The values in those tables represent the reference vertical error tolerance between two rails per axis-to-axis distance of 500 mm (200 mm for models SRS and RSR) and are proportionate to the axis-to-axis distance.

$X = X_1 + X_2$

X_1 : Level difference on the rail mounting surface

X_2 : Level difference on the block mounting surface

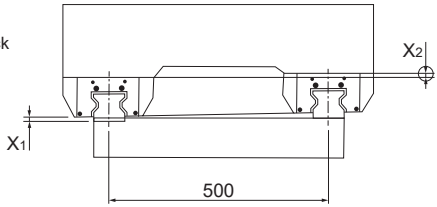


Fig.19 Reference Vertical Error Tolerance (X) between Two Rails

[Models SHS, HSR, SCR, CSR, HSR-M1, HSR-M2 and HSR-M1VV]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
8	150	100	—
10	150	100	—
12	150	100	—
15	300	250	—
20	300	250	200
25	300	250	200
30	300	250	200
35	300	250	200
45	300	250	200
55	300	250	200
65	300	250	200
85	500	450	400
100	500	450	400
120	500	450	400
150	500	450	400

[Models SSR, SR, SR-M1]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
15	400	350	—
20	400	350	300
25	400	350	300
30	400	350	300
35	400	350	300
45	400	350	300
55	400	350	300
70	400	350	300
85	550	500	450
100	550	500	450
120	550	500	450
150	550	500	450

[Models SVR, NR-X and NR]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	190	140	90
30	190	140	90
35	190	140	90
45	190	140	90
55	190	140	90
65	190	140	90
75	225	175	125
85	225	175	125
100	225	175	125

[Model JR]

Unit: μm

Model No.	—
25	1000
35	1000
45	1000
55	1000

[Models SVS, NRS-X and NRS]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	225	175	125
30	225	175	125
35	225	175	125
45	225	175	125
55	225	175	125
65	225	175	125
75	315	265	215
85	315	265	215
100	315	265	215

[Models SRS, RSX, RSR, RSX-M1, and RSR-M1]

Unit: μm

Model No.	Normal clearance	Clearance C1
3	15	—
5	20	—
7	25	—
9	35	6
12	50	12
14	60	20
15	60	20
20	70	30
25	80	40

[Models SHW and HRW]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
12	220	170	—
14	220	170	—
17	220	170	—
21	220	170	—
27	220	170	—
35	220	170	120
50	220	170	120
60	220	170	120

[Model HR]

Unit: μm

Model No.	Normal clearance	Clearance C1	Clearance C0
918	45	15	—
1123	50	20	—
1530	90	60	—
2042	90	60	50
2555	150	100	85
3065	165	110	95
3575	175	120	100
4085	210	150	120
50105	245	175	140
60125	280	200	170

[Models GSR and GSR-R]

Unit: μm

Model No.	—
15	240
20	300
25	360
30	420
35	480

[Model NSR-TBC]

Unit: μm

Model No.	Normal clearance	Clearance C1
20	300	210
25	360	240
30	420	270
40	540	360
50	600	420
70	660	480

[Reference Vertical Error Tolerance in the Axial Direction]

Mounting surface error may affect the service life of the LM Guide. The tables below show the approximate reference vertical error tolerance (Y) in the axial direction under normal use for each model number.

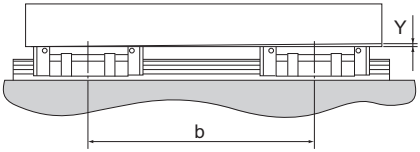


Fig.20 Reference Vertical Error Tolerance (Y) in the Axial Direction

[Models SHS, SCR, HSR, CSR, HSR-M1, HSR-M2, and HSR-M1VV]

Unit: mm

Model No.	Normal clearance	Clearance C1	Clearance C0
8	0.00006b	0.00004b	—
10	0.00006b	0.00004b	—
12	0.00006b	0.00004b	—
15	0.00012b	0.0001b	—
20	0.00012b	0.0001b	0.00008b
25	0.00012b	0.0001b	0.00008b
30	0.00012b	0.0001b	0.00008b
35	0.00012b	0.0001b	0.00008b
45	0.00012b	0.0001b	0.00008b
55	0.00012b	0.0001b	0.00008b
65	0.00012b	0.0001b	0.00008b
85	0.0002b	0.00018b	0.00016b
100	0.0002b	0.00018b	0.00016b
120	0.0002b	0.00018b	0.00016b
150	0.0002b	0.00018b	0.00016b

[Models SSR, SR, and SR-M1]

Unit: mm

Model No.	Normal clearance	Clearance C1	Clearance C0
20	0.00016b	0.00014b	0.00012b
25	0.00016b	0.00014b	0.00012b
30	0.00016b	0.00014b	0.00012b
35	0.00016b	0.00014b	0.00012b
45	0.00016b	0.00014b	0.00012b
55	0.00016b	0.00014b	0.00012b
65	0.00016b	0.00014b	0.00012b
70	0.00016b	0.00014b	0.00012b
85	0.00022b	0.0002b	0.00018b
100	0.00022b	0.0002b	0.00018b
120	0.00022b	0.0002b	0.00018b
150	0.00022b	0.0002b	0.00018b

[Models SVR, NR-X, and NR]

Unit: mm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	0.00004b	0.00004b	0.00004b
30	0.00004b	0.00004b	0.00004b
35	0.00004b	0.00004b	0.00004b
45	0.00004b	0.00004b	0.00004b
55	0.00004b	0.00004b	0.00004b
65	0.00004b	0.00004b	0.00004b
75	0.00005b	0.00005b	0.00005b
85	0.00005b	0.00005b	0.00005b
100	0.00005b	0.00005b	0.00005b

[Models SVS, NRS-X, and NRS]

Unit: mm

Model No.	Normal clearance	Clearance C1	Clearance C0
25	0.00009b	0.00007b	0.00005b
30	0.00009b	0.00007b	0.00005b
35	0.00009b	0.00007b	0.00005b
45	0.00009b	0.00007b	0.00005b
55	0.00009b	0.00007b	0.00005b
65	0.00009b	0.00007b	0.00005b
75	0.00012b	0.0001b	0.00008b
85	0.00012b	0.0001b	0.00008b
100	0.00012b	0.0001b	0.00008b

[Models SHW and HRW]

Unit: mm

Model No.	—
12	0.00009b
14	0.00009b
17	0.00009b
21	0.00009b
27	0.00009b
35	0.00009b
50	0.00009b
60	0.00009b

[Model JR]

Unit: mm

Model No.	—
25	0.00012b
35	0.00012b
45	0.00012b
55	0.00012b
60	0.00012b

Marking on the Master LM Guide and Combined Use

[Marking on the Master LM Guide]

All LM rails mounted on the same plane are marked with the same serial number. The LM rail marked with “KB” after the serial number is the master LM rail. The LM block on the master LM rail has its reference surface finished to a designated precision, allowing it to serve as the positioning reference for tables. (See Fig.21)
Normal grade LM Guides are not marked with “KB.” Therefore, any one of the LM rails having the same serial number can be used as the master LM rail.

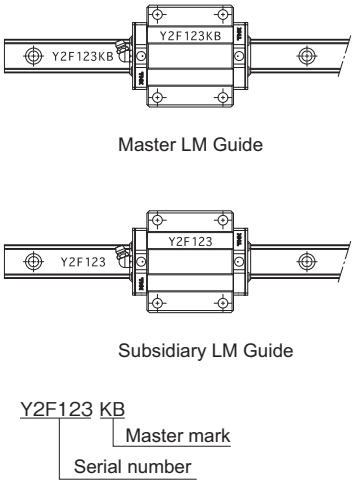


Fig.21 Master and Subsidiary LM Guides (E.g. Model HSR-B)

[Markings on the Reference Surface]

In the LM Guide, the reference surface of the LM block is opposite the surface marked with the THK logo, and that of the LM rail is on the surface marked with a line (see Fig.22). If it is necessary to reverse the reference surface of the LM rail and block, or if the grease nipple must be oriented in the opposite direction, specify it.

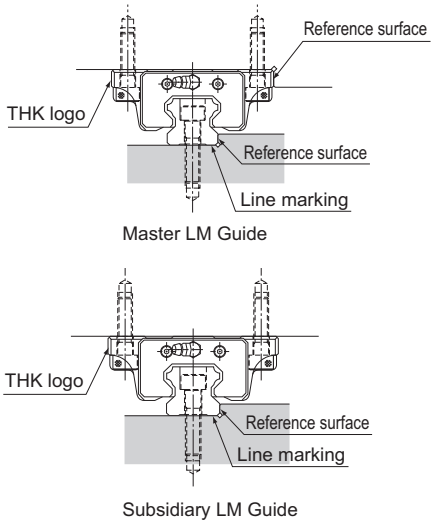


Fig.22 Markings on the Reference Surface

[Serial Number Marking and Combined Use of an LM Rail and LM Blocks]

An LM rail and LM block(s) used in combination must have the same serial number. When removing an LM block from the LM rail and reinstalling the LM block, make sure that they have the same serial number and the numbers are oriented in the same direction. (Fig.23)

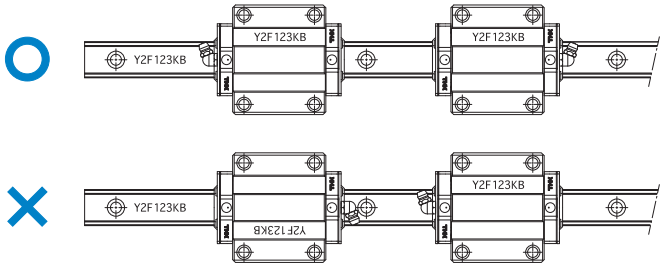


Fig.23 Serial Number Marking and Combined Use of an LM Rail and LM Blocks (E.g. Model HSR-A)

[Use of Jointed Rails]

When a long LM rail is ordered, two or more rails will be jointed together to the desired length. When jointing rails, make sure that the joint match marks shown in Fig.24 are correctly positioned.
When two LM Guides with connected rails are to be arranged in parallel to each other, the two LM Guides will be manufactured so that the two LM Guides are axisymmetrically aligned.

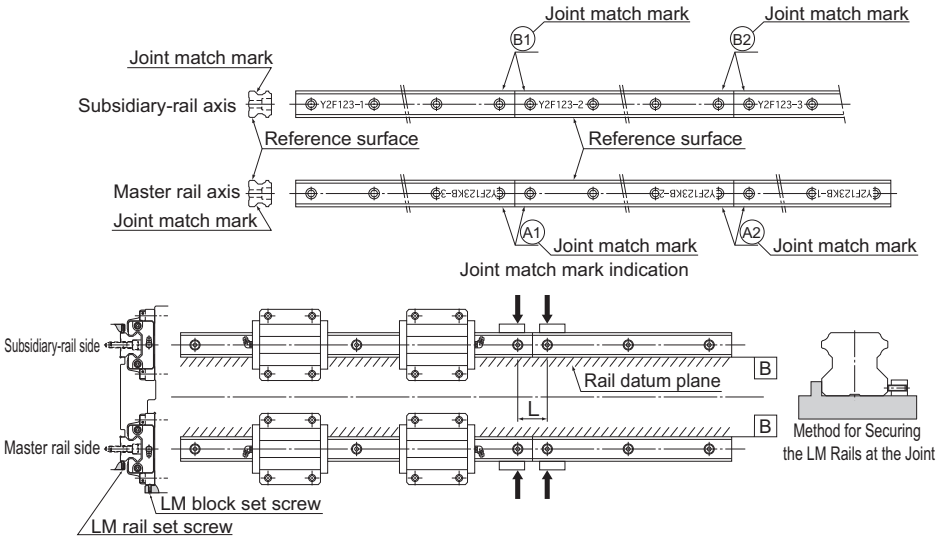


Fig.24 Use of Jointed Rails