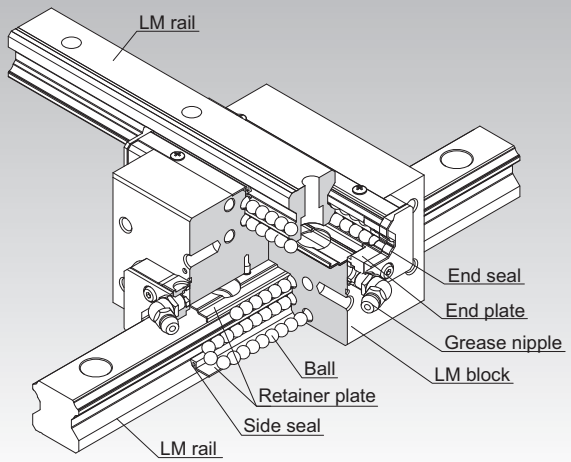
CSR

Cross LM Guide Model CSR



Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and end plates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they will not fall out even if the LM block is removed from the LM rail.
This LM Guide has two rails intersecting at right angles integrated back-to-back into a single block with the same internal structure as the proven LM Guide Model HSR. It is machined with high precision so that the error in the perpendicularity of the six faces of the LM block is within 2 μm per 100 mm. The two rails are also machined with high precision in relative straightness. This results in extremely high orthogonal accuracy. Because an orthogonal LM System can be achieved with the Model CSR alone, conventional saddles are no longer necessary, enabling simplified X-Y motion and a compact structure.

4-Way Equal Load

Each row of balls is placed at a contact angle of 45° so that the load ratings 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.

High Rigidity

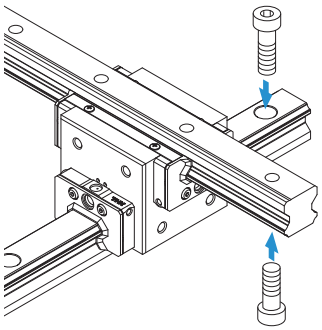
Since the balls are well balanced in four rows, this model is able to withstand moments, and it achieves smooth linear motion even when a preload is applied to increase the rigidity.
The rigidity of the single LM block is 50% higher than that of a combination of two HSR LM blocks secured back-to-back with bolts. That makes this model optimal for building an X-Y table that requires high rigidity.

Types and Features

Model CSR-S

Dimensional Table⇒A1-316

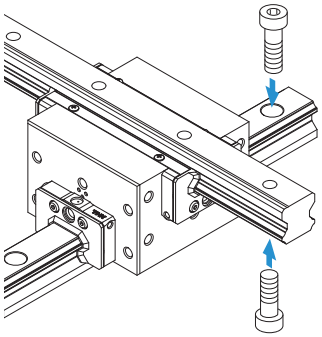
This model is the standard type.



Model CSR

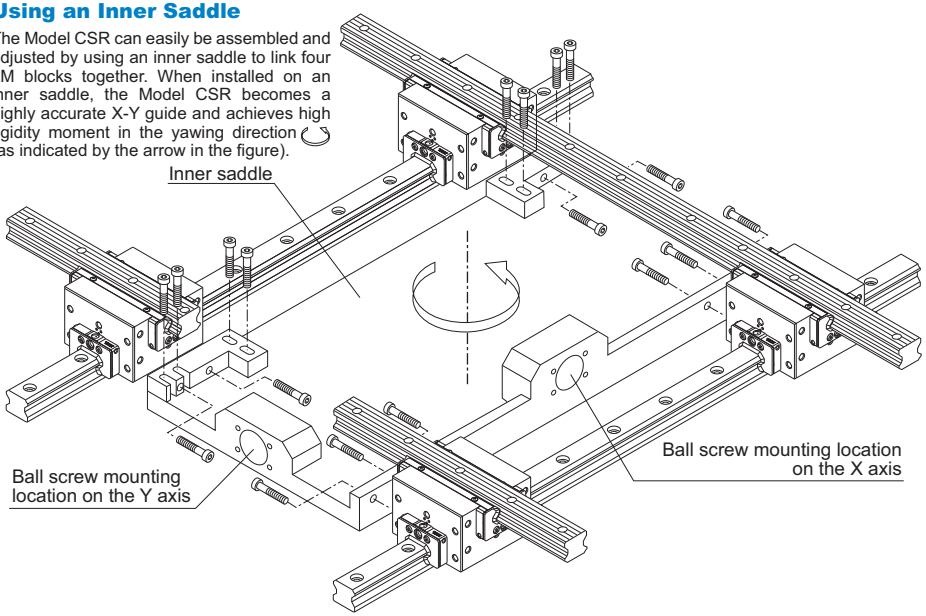
Dimensional Table⇒A1-316

It has a longer overall LM block length (L) and a greater load rating.

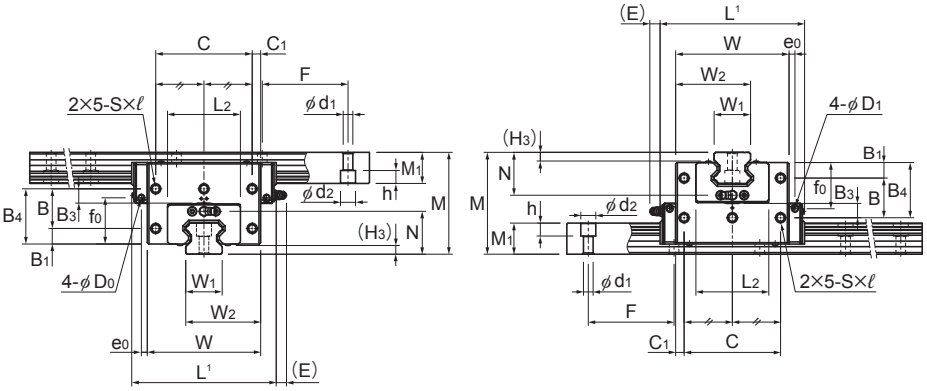


Using an Inner Saddle

The Model CSR can easily be assembled and adjusted by using an inner saddle to link four LM blocks together. When installed on an inner saddle, the Model CSR becomes a highly accurate X-Y guide and achieves high rigidity moment in the yawing direction (as indicated by the arrow in the figure).



Model CSR



Models CSR20 to 45

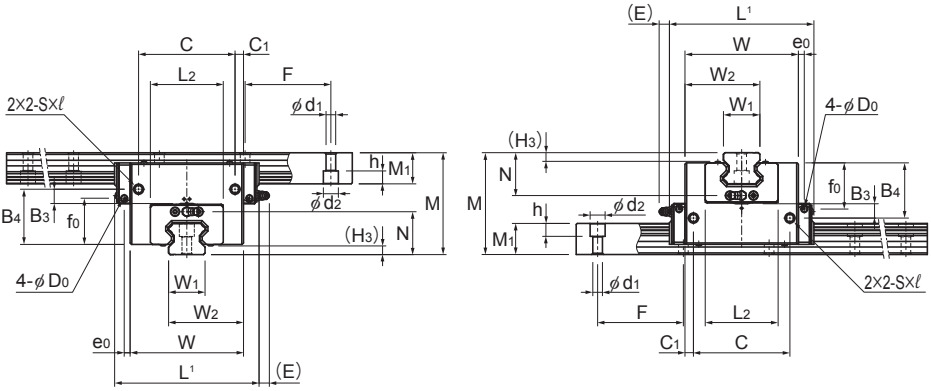
Model No.	Outer dimensions			LM block dimensions													
	Height	Width	Length[1]														Grease nipple
	M	W	L	B_1	B_3	B_4	B	C	C_1	S×ℓ	L_2	N	E	e_0	f_0	D_0	
CSR 15	47	38.8	56.6	—	11.0	34.8	—	20	9.4	M4×6	32	19.7	5.5	3.2	22.1	3	PB1021B
CSR 20S CSR 20	57	50.8 66.8	74 90	— 13	12.7 7.2	42.5 37	— 24	30 56	10.4 5.4	M5×8	42	25	12	3.1	24.8	3	B-M6F
CSR 25S CSR 25	70	59.5 78.6	83.1 102.2	— 18	16.4 8.4	52 44	— 26	34 64	12.75 7.3	M6×10	46	30	12	3.5	30.5	3	B-M6F
CSR 30S CSR 30	82	70.4 93	98 120.6	— 21	19.4 11.4	61 53	— 32	40 76	15.2 8.5	M6×10	58	35	12	5.2	38.2	5.2	B-M6F
CSR 35	95	105.8	134.8	24	13.3	61	37	90	7.9	M8×14	68	40	12	5.5	43.1	5.2	B-M6F
CSR 45	118	129.8	170.8	30	15.4	75	45	110	9.9	M10×15	84	50	16	6.4	53.1	5.2	B-PT1/8

Model number coding

4 CSR25 UU C0 +1240/1000L P

- 4: Total No. of LM blocks
- CSR25: Model number
- UU: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol)/Light preload (C1)/Medium preload (C0)
- +1240/1000L: LM rail length on the X axis (in mm) / LM rail length on the Y axis (in mm)
- P: Accuracy symbol — Precision grade (P)/Super precision grade (SP)/Ultra precision grade (UP)

Notes: See contamination protection accessories on **A1-547**. See **A1-74** for radial clearance symbol. See **A1-82** for accuracy symbol.



Models CSR15, 20S to 30S

Unit: mm

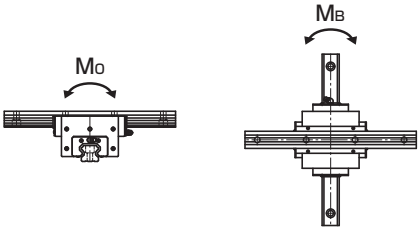
		LM rail dimensions						Basic load rating		Static permissible moment[3]		Mass	
	H_3	Width W_1 ±0.05	W_2	Height M_1	Pitch F	$d_1 \times d_2 \times h$	Length[2] Max	C kN	C_0 kN	M_0 kN·m	M_B kN·m	LM block kg	LM rail kg/m
	4.7	15	26.9	15	60	4.5×7.5×5.3	3000	10.9	15.7	0.0945	0.0945	0.34	1.5
	4	20	35.4 43.4	18	60	6×9.5×8.5	3000	19.8 23.9	27.4 35.8	0.218 0.307	0.218 0.363	0.73 1.3	2.3
	5.5	23	41.25 50.8	22	60	7×11×9	3000	27.6 35.2	36.4 51.6	0.324 0.518	0.324 0.627	1.2 2.2	3.3
	7	28	49.2 60.5	26	80	9×14×12	3000	40.5 48.9	53.7 70.2	0.599 0.852	0.599 0.995	2 3.6	4.8
	7.5	34	69.9	29	80	9×14×12	3000	65	91.7	1.37	1.49	5.3	6.6
	10	45	87.4	38	105	14×20×17	3090	100	135	2.59	2.59	9.8	11

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-521** or **A1-543**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-318**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block

Note: This model is not available with an upper surface lubrication hole.



Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard lengths and the maximum lengths of model CSR variations.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

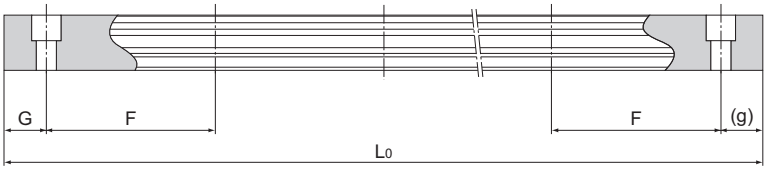


Table 1: Standard Lengths and Maximum Lengths of LM Rails for Model CSR

Unit: mm

Model No.	CSR 15	CSR 20	CSR 25	CSR 30	CSR 35	CSR 45
LM rail standard lengths (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
Standard pitch F	60	60	60	80	80	105
G, g	20	20	20	20	20	22.5
Max length	3000	3000	3000	3000	3000	3090

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

Tapped-Hole Type LM Rail

CSR model rails also include a type where the LM rail is tapped from the bottom. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.

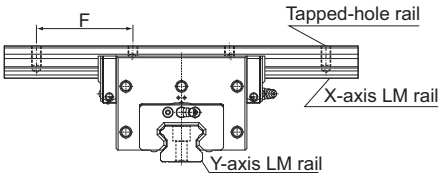


Table 2: Dimensions of the LM Rail Tap Unit: mm

Model No.	S_1	Effective tap depth ℓ_1
15	M5	8
20	M6	10
25	M6	12
30	M8	15
35	M8	17
45	M12	24

Model number coding

4CSR25UUC0+1200LP K /1000LP

Symbol for
tapped-hole LM rail type