POWRÓT DO STRONY GŁÓWNEJ

LM Guide HSR-YR

LM Guide Type HSR-YR Four-way equal-load, sideways-installation type

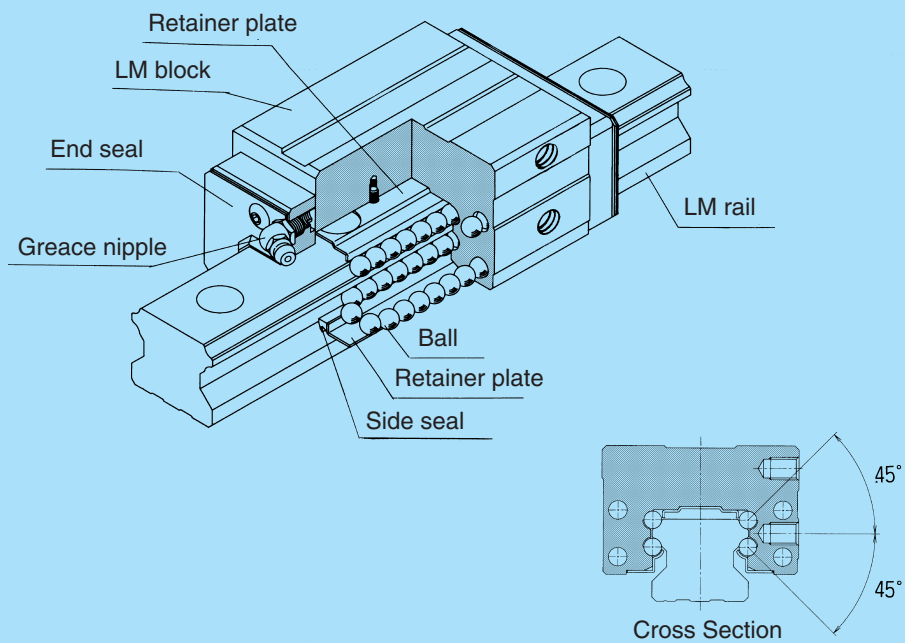


Fig. 1 Construction of Model HSR-YR

Construction and Features

Balls roll in four rows of a precisely-ground raceway on an LM rail and an LM block. The end plate attached to the LM block causes the trains of balls to circulate. As the balls are held in place by the retainer plate, they do not fall off if the LM block is removed from the rail.

The four trains of balls are arranged so that the contact angle is 45°, allowing each train of balls to bear an equal rated load in all four directions: radial, reverse-radial, and the two lateral directions. This type can therefore be used in any installation direction. Moreover, HSR-YR enables the application of a well-balanced preload, making it possible to increase rigidity in the four directions while maintaining a low friction coefficient. The low-profile design and use of high-rigidity LM blocks provide stable, highly accurate linear motion.

The tapped holes provided on the sides of the LM block help mounting in many ways.

Simple installation in the opposed position

In the past, the installation of two LM Guides opposed to one another involved a number of problems – it is time-consuming process, and it is difficult to attain the required accuracy and adjust the clearance.

In type HSR-YR, however, the tapped holes provided in the flange of the LM block to aid in the mounting of a table has simplified construction. This contributes to a substantial reduction in the required man-hours and an improvement in precision.

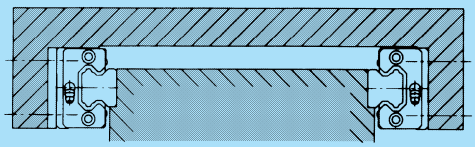


Fig. 2 Conventional Design

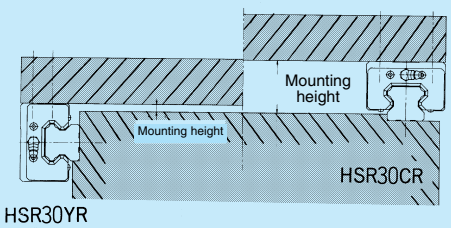


Fig. 3 HSR30YR and CR Installed
(for comparison with other installation styles)

Stainless steel type available

Upon request, we can provide stainless steel LM blocks, rails, and balls.

Low profile

Sideways installation reduces the mounting height or and the spacing between the base and table when the LM Guide is installed. This style of installation is also useful when a wide guide is necessary to obtain greater table rigidity.

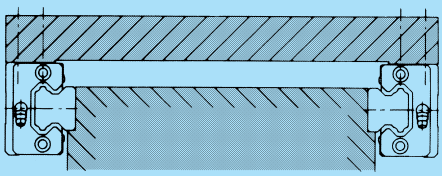


Fig. 4 Type-YR Mounting Structure

Higher rigidity achieved against lateral loads

Type HSR-YR is installed sideways. As a result, loads are exerted on the center line of the train of balls, as shown below. Since the load does not act as a moment, higher rigidity can be obtained.

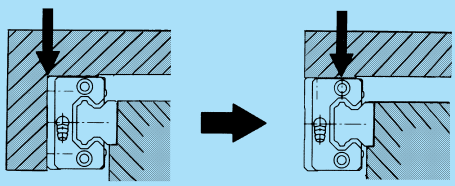
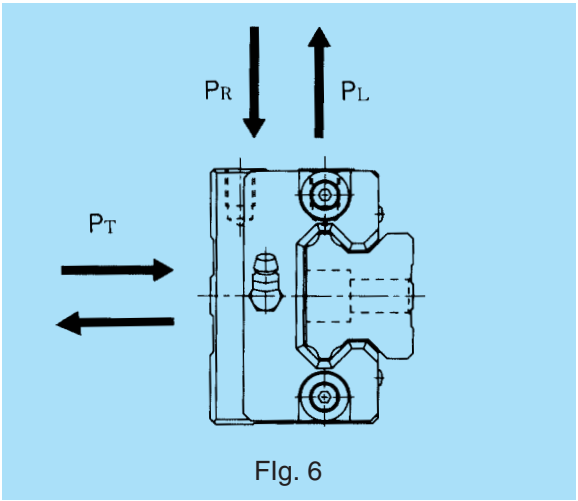


Fig. 5 Conventional Load Exertion Point

Load Exertion Point in YR

Load rating



Flg. 6

Type HSR-YR can bear loads in all four directions: radial, reverse-radial, and two lateral directions.

The basic load ratings of HSR-YR are equivalent to one another in all four directions (radial, reverse-radial and two lateral directions). The values are presented in the corresponding dimension tables.

Equivalent load

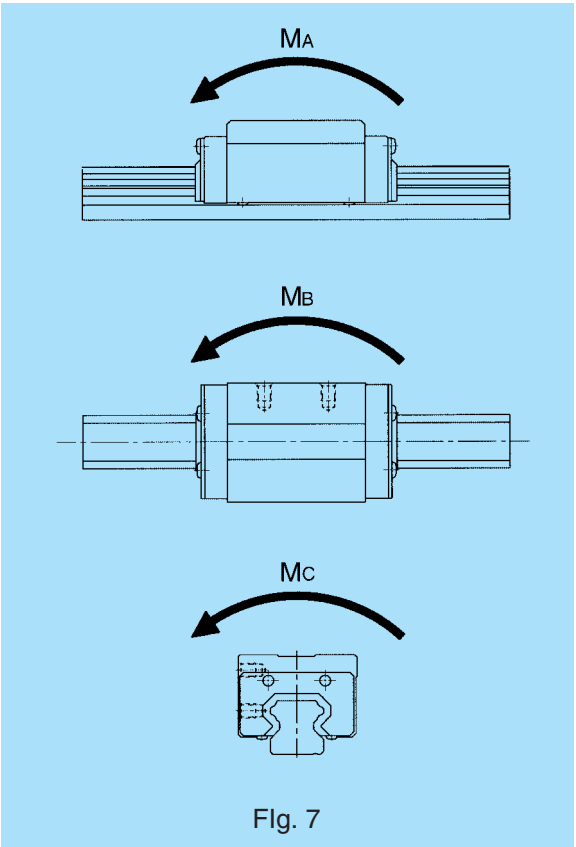
An equivalent load for type HSR-YR when loads in all four directions are exerted on its LM block simultaneously can be obtained using the following equation:

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

P_E : equivalent load (N)
- In the radial direction
- In the reverse-radial direction
- In the lateral direction

P_R : radial load (N)
P_L : reverse-radial load (N)
P_T : lateral load (N)

Permissible moment



Flg. 7

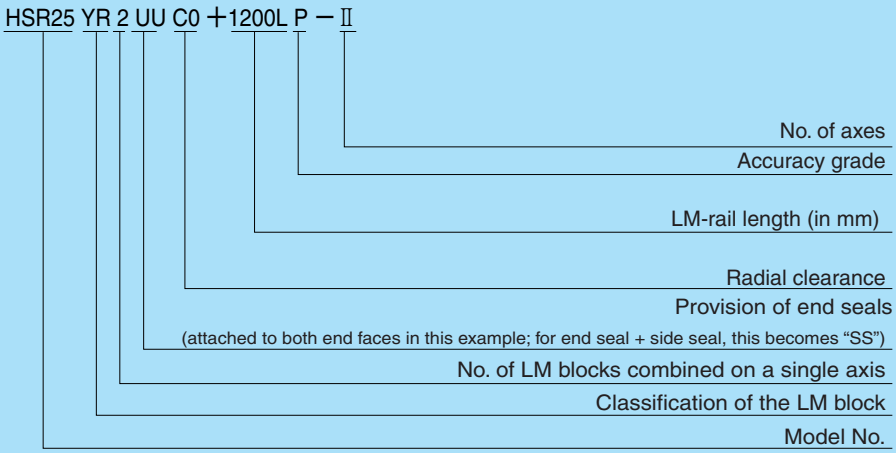
In type HSR-YR, a single LM block can bear moments in all directions. Table 1 presents the permissible moments in directions M_A, M_B, and M_C for a single LM block and two LM blocks laid over one another.

Table 1 Type-HSR-YR
Static Permissible Moment

Unit : kN·m

Model No.	M_A	M_B	M_C
HSR15YR	0.07	0.07	0.10
HSR20YR	0.16	0.16	0.23
HSR25YR	0.27	0.27	0.39
HSR30YR	0.43	0.43	0.65
HSR35YR	0.64	0.64	1.0
HSR45YR	1.3	1.3	2.1
HSR55YR	2.2	2.2	3.6
HSR65YR	4.2	4.2	6.6

Model-number coding



Note: This coding is based on the assumption of one set of code for a one-axis unit.
(A configuration of two axes installed in parallel is given at least two sets of code.)

Radial clearance

Table 2 presents the radial clearances of types HSR-YR.

Table 2 Type-HSR-YR Radial Clearances

Unit : μm

Clearance symbol / Model No.	Nomal	Under a light preload	Medium preload
	No symbol	C1	C0
HSR15YR	– 4～+ 2	– 12～– 4	——
HSR20YR	– 5～+ 2	– 14～– 5	– 23～– 14
HSR25YR	– 6～+ 3	– 16～– 6	– 26～– 16
HSR30YR	– 7～+ 4	– 19～– 7	– 31～– 19
HSR35YR	– 8～+ 4	– 22～– 8	– 35～– 22
HSR45YR	– 10～+ 5	– 25～– 10	– 40～– 25
HSR55YR	– 12～+ 5	– 29～– 12	– 46～– 29
HSR65YR	– 14～+ 7	– 32～– 14	– 50～– 32

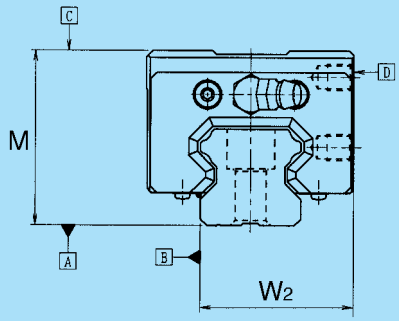


Fig. 8

The accuracy of type HSR-YR is divided into five grades, normal, high, precision, super-precision, and ultra-precision, in accordance with the model numbers shown in Table 3.

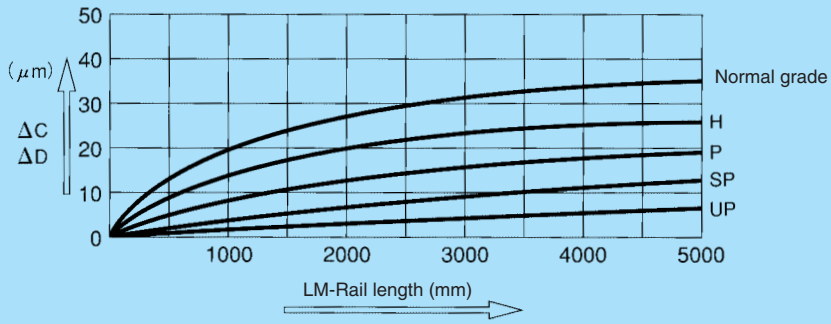


Fig. 5 Relationship Between LM-Rail Length and Running Parallelism

Table 3 Type HSR-YR Accuracy Standard

Unit : mm

Model No.	Accuracy standard	Normal	High	Precision	Super-precisio	Ultra-precision
	Item	No symbol	H	P	SP	UP
HSR15YR HSR20YR	Tolerance for height M	±0.1	±0.03	0 −0.03	0 −0.015	0 −0.008
	Tolerance for the height M difference among LM blocks	0.02	0.01	0.006	0.004	0.003
	Tolerance for rail-to-block lateral distance W_2	±0.1	±0.03	0 −0.03	0 −0.015	0 −0.008
	Tolerance for rail-to-block lateral distance W_2 difference among LM blocks	0.02	0.01	0.006	0.004	0.003
	Running Parallelism of surface C with surface A	ΔC (as per Fig. 9)				
	Running parallelism of surface D with surface B	ΔD (as per Fig. 9)				
HSR25YR HSR30YR HSR35YR	Tolerance for height M	±0.1	±0.04	0 −0.04	0 −0.02	0 −0.01
	Tolerance for the height M difference among LM blocks	0.02	0.015	0.007	0.005	0.003
	Tolerance for rail-to-block lateral distance W_2	±0.1	±0.04	0 −0.04	0 −0.02	0 −0.01
	Tolerance for rail-to-block lateral distance W_2 difference among LM blocks	0.03	0.015	0.007	0.005	0.003
	Running Parallelism of surface C with surface A	ΔC (as per Fig. 9)				
	Running parallelism of surface D with surface B	ΔD (as per Fig. 9)				
HSR45YR HSR55YR	Tolerance for height M	±0.1	±0.05	0 −0.05	0 −0.03	0 −0.02
	Tolerance for the height M difference among LM blocks	0.03	0.015	0.007	0.005	0.003
	Tolerance for rail-to-block lateral distance W_2	±0.1	±0.05	0 −0.05	0 −0.03	0 −0.02
	Tolerance for rail-to-block lateral distance W_2 difference among LM blocks	0.03	0.02	0.01	0.007	0.005
	Running Parallelism of surface C with surface A	ΔC (as per Fig. 9)				
	Running parallelism of surface D with surface B	ΔD (as per Fig. 9)				
HSR65YR	Tolerance for height M	±0.1	±0.07	0 −0.07	0 −0.05	0 −0.03
	Tolerance for the height M difference among LM blocks	0.03	0.02	0.01	0.007	0.005
	Tolerance for rail-to-block lateral distance W_2	±0.1	±0.07	0 −0.07	0 −0.05	0 −0.03
	Tolerance for rail-to-block lateral distance W_2 difference among LM blocks	0.03	0.025	0.015	0.010	0.007
	Running Parallelism of surface C with surface A	ΔC (as per Fig. 9)				
	Running parallelism of surface D with surface B	ΔD (as per Fig. 9)				

Contamination Protection

From our wide variety of products for type HSR-YR, you can select the best one for your situation. (For details on seals, see “Contamination Protection” for type HSR on page A-269.)

If your choice is applicable to your system, please note that in some models, attachment of a contamination-protection accessory to an LM block changes the block’s overall length. To dimension L, add the increment specified in the corresponding dimension table.

Table 4 Type HSR-YR：LM Block Overall Length with a Contamination-protection Accessory Attached

Unit : mm

Model. No.	UU		SS		DD		ZZ		KK		LL		RR	
HSR15YR/YRM	○	56.6	○	56.6	○	61.8	△	58.2	△	63.4	○	56.6	○	56.6
HSR20YR/YRM	○	74	○	74	○	80.6	○	76.6	○	83.2	○	74	○	74
HSR25YR/YRM	○	83.1	○	83.1	○	90.7	○	86.7	○	94.3	○	83.1	○	83.1
HSR30YR/YRM	○	98	○	98	○	105.6	○	101.6	○	109.2	○	98	○	98
HSR35YR/YRM	○	109.4	○	109.4	○	117	○	113	○	120.6	○	109.4	○	109.4
HSR45YR	○	139	○	139	○	146.2	○	144.2	○	151.4	○	139	○	139
HSR55YR	○	163	○	163	○	170.2	○	168.2	○	175.4	○	163	○	163
HSR65YR	○	186	○	186	○	193.2	○	191.2	○	198.4	○	186	○	186

Note: ○ = Applicable

△ = Applicable, but a grease nipple cannot be attached; contact us

Seal resistance value

For the maximum value of seal resistance of Seals Type HSR-YR...UU per LM block in which grease is applied, see Table 5.

Table 5 Type HSR-YR Seal resistance

Unit : N

Model No.	Resistance
HSR15YR	2.0
HSR20YR	2.5
HSR25YR	3.9
HSR30YR	7.8
HSR35YR	11.8
HSR45YR	19.6
HSR55YR	19.6
HSR65YR	34.3

Bellows for Type HSR-YR

The bellows for type HSR-YR is identical to that for HSR. See the description of the dedicated bellows for type HSR on pages A-272 through 274.

Precautions on Use

Mounting-Surface Height and Corner Profile

Normally, mounting surfaces for LM blocks and rails have lateral reference surfaces to aid in positioning rails and blocks with a high degree of accuracy.

For the reference-surface shoulder height, see Table 6.

Furthermore, provide enough space to the corner profile of a mounting surface so that the corner does not interfere with chamfers made on the LM blocks or rails, or provide the corner with a radius smaller than corner radius r specified in Table 6.

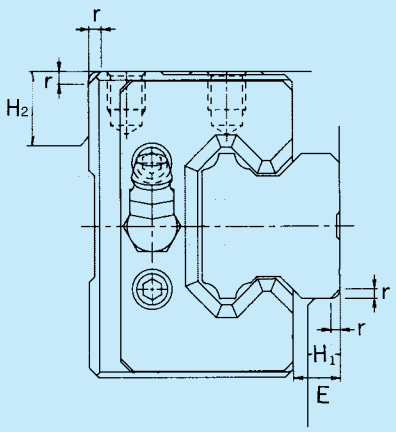


Fig. 10

LM-Rail Standard and Maximum Lengths

For the LM-rail standard and maximum lengths of type HSR-YR, see "LM-Rail Standard and Maximum Lengths" for HSR on page A-276. If your maximum length is not within the range specified in the table on that page, we will provide special LM rails intended for connected use.

For dimension G, when it is necessary to specify a special length, we recommend the use of those specified in the same table. A longer dimension G tends to reduce the stability of the rail at the rail ends following installation, which may degrade accuracy.

For connected use, we provide LM rails that eliminate level differences at joints. When placing an order, specify the overall length of the rail.

Tapped-hole rail models are also available. For details, see "Tapped-Hole Rail Models for Type HSR" on page A-277.

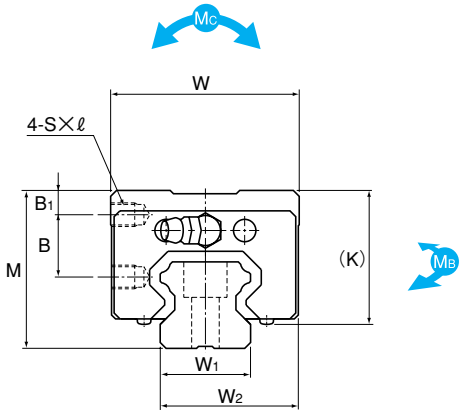
Table 6 Mounting-Surface Shoulder Height and Corner Radius

Unit : mm

Model No.	Corner radius r (Max.)	LM-rail shoulder height H_1	LM-block shoulder height H_2	E
HSR15	0.5	3	4	3.5
HSR20	0.5	3.5	5	4
HSR25	1.0	5	5	5.5
HSR30	1.0	5	5	7
HSR35	1.0	6	6	7.5
HSR45	1.0	8	8	10
HSR55	1.5	10	10	13
HSR65	1.5	10	10	14

HSR-YR Type

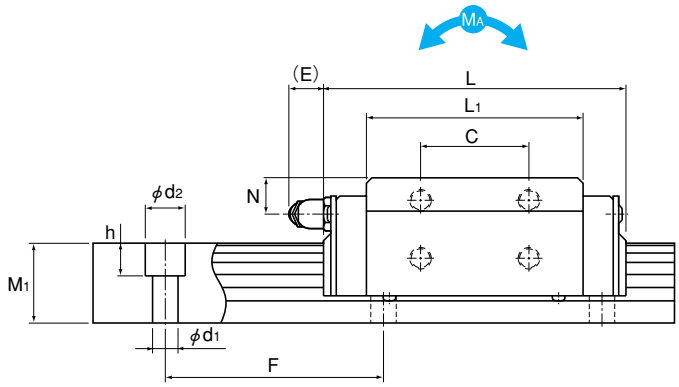
Standard type



Model No.	External dimensions			LM-block dimensions							
	Height M	Width W	Length L	B_1	B	C	S× ℓ	L_1	K	N	E
HSR 15YR HSR 15YRM	28	33.5	56.6	4.3	11.5	18	M4×5	38.8	23.3	8.3	5.5
HSR 20YR HSR 20YRM	30	43.5	74	4	11.5	25	M5×6	50.8	26	5	12
HSR 25YR HSR 25YRM	40	47.5	83.1	6	16	30	M6×6	59.5	34.5	10	12
HSR 30YR HSR 30YRM	45	59.5	98	8	16	40	M6×9	70.4	38	10	12
HSR 35YR HSR 35YRM	55	69.5	109.4	8	23	43	M8×10	80.4	47	15	12
HSR 45YR	70	85.5	139	10	30	55	M10×14	98	60	20	16
HSR 55YR	80	99.5	163	12	32	70	M12×15	118	67	21	16
HSR 65YR	90	124.5	186	12	35	85	M16×22	147	76	19	16

Notes:

- For permissible static moments M_A, M_B, and M_C, see page A-290.
- For model-number coding, see page A-291.



Unit : mm

Grease nipple	LM-rail dimensions					Basic load rating		Mass	
	Width W_1 ±0.05	W_2	Height M_1	Pitch F	$d_1 \times d_2 \times h$	C kN	C_0 kN	LM block kg	LM rail kg/m
PB1021B	15	24	15	60	4.5×7.5×5.3	8.33	13.5	0.18	1.5
B-M6F	20	31.5	18	60	6×9.5×8.5	13.8	23.8	0.25	2.3
B-M6F	23	35	22	60	7×11×9	19.9	34.4	0.54	3.3
B-M6F	28	43.5	26	80	9×14×12	28	46.8	0.9	4.8
B-M6F	34	51.5	29	80	9×14×12	37.3	61.1	1.5	6.6
B-PT1/8	45	65	38	105	14×20×17	60	95.6	2.6	11
B-PT1/8	53	76	44	120	16×23×20	88.5	137	4.3	15.1
B-PT1/8	63	93	53	150	18×26×22	141	215	7.3	22.5

Note:
- For the LM-rail standard length, see “LM-Rail Standard and Maximum Lengths” on page A-276.