

LM Guide NR and NRS — Ultra-Heavy-Load, High-Rigidity Type

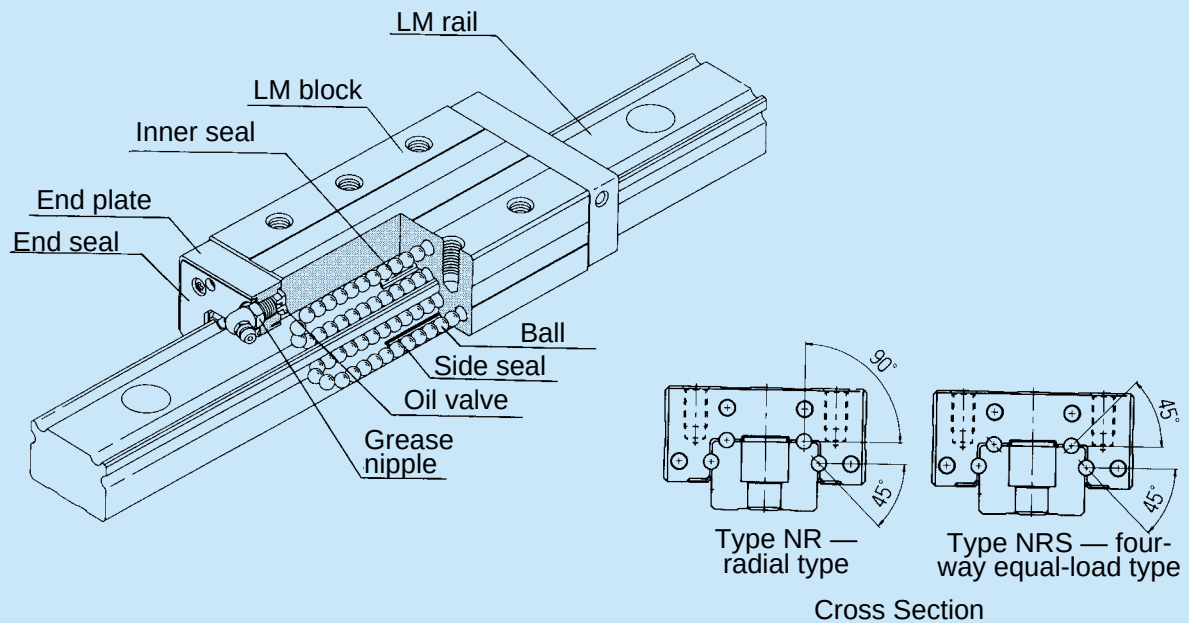


Fig. 1 Construction of Model NR•NRS

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. The raceways are cut into deep grooves that have a radius closer to that of the balls than in the conventional design, using special equipment and an

Improved damping capacity

When cutting is not being performed, the LM block moves as smoothly and lively as normal. During cutting, the block receives a cutting load and the contact area between the balls and the raceway expands, producing appropriate roll-and-slide motion where both rolling and sliding occur. This increases frictional resistance, resulting in increased damping ability.

Since the absolute amount of sliding is slight, very little wear results and the service life is not affected.

Highly rational LM Guide

The excessive differential sliding seen with the Gothic-arch groove does not occur with the LM Guide. The motion during fast feeding is smooth, and the positioning accuracy remains high. During cutting,

extremely advanced cutting technique. This design provides high vibration and impact resistance, and the high damping capacity required for machine tools, making types NR and NRS capable of bearing ultra-heavy loads greater than those that can be borne by the roller type.

however, appropriate differential sliding occurs in proportion to the cutting load, resulting in increased rolling resistance and damping capacity, and improved cutting performance. Types NR and NRS are thus highly rational linear-motion guides.

High rigidity

If an LM block and rail are not sufficiently rigid, the system itself will lack rigidity in the reverse-radial and lateral directions. To increase the rigidity of LM blocks and rails, we have created the optimum design within the given dimensions, taking advantage of the FEM technique.

For radial-type NR and four-way equal-load-type NRS, we offer two different models with the same dimensions but different characteristics. Select the model best suited for your specifications.

Ultra-heavy load

The radius of the raceways is approximately the same as the ball radius. This makes it possible for the ball contact area to be made equal to or greater than the roller contact area, thus ensuring a load-bearing capacity superior to that of the roller type.

This raceway design is free from the various problems seen with the roller type, including locking due to

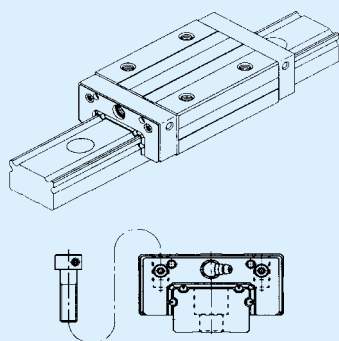
skewed rollers; the inability to ensure smooth motion as a result of the application of a preload to increase rigidity, giving rise to the extraordinary fluctuations in resistance that occur as rollers enter a loaded area; and deterioration of the load-bearing capacity due to uneven contact between rollers due to accuracy errors in the mounting surface. While maintaining the ease of use of other types of LM Guides, types NR and NRS are also capable of withstanding heavy loads.

Types and Features

For heavy loads

Types NR and NRS-R

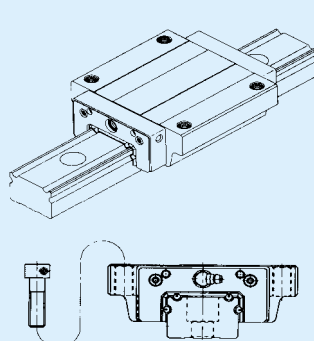
Compact type



The LM blocks of types NR and NRS-R have the smallest width of any models in this series, and are provided with tapped holes. Useful where space for the table is limited.

Types NR and NRS-A

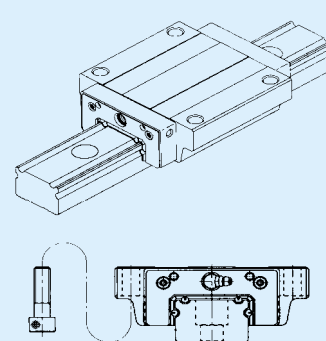
Tapped-hole flange type



The flange of the LM block is provided with tapped holes to allow simple assembly, making it suitable for use in build-up systems.

Types NR and NRS-B

Through-hole flange type

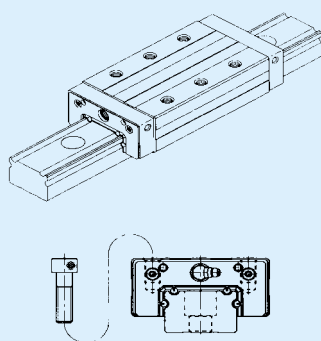


The flange of the LM block is provided with through holes, making it useful where the table cannot be drilled for mounting-bolt through holes.

For ultra-heavy loads

Types NR and NRS-LR

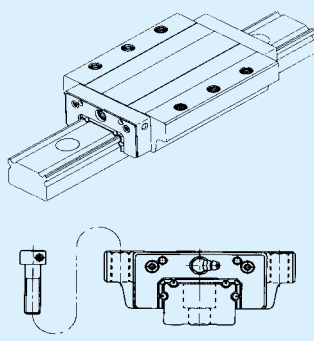
Compact type



While they have the same cross-sectional shapes as types NR and NRS-R, these ultra-heavy-load types are provided with extra load-bearing balls to increase their load rating.

Types NR and NRS-LA

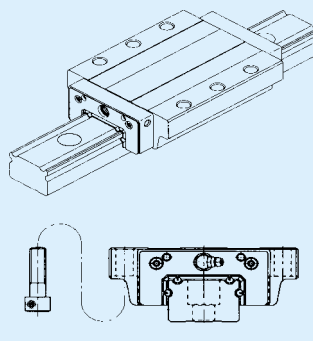
Tapped-hole flange type



While they have the same cross-sectional shapes as types NR and NRS-A, these ultra-heavy-load types are provided with extra load-bearing balls to increase their load rating.

Types NR and NRS-LB

Through-hole flange type

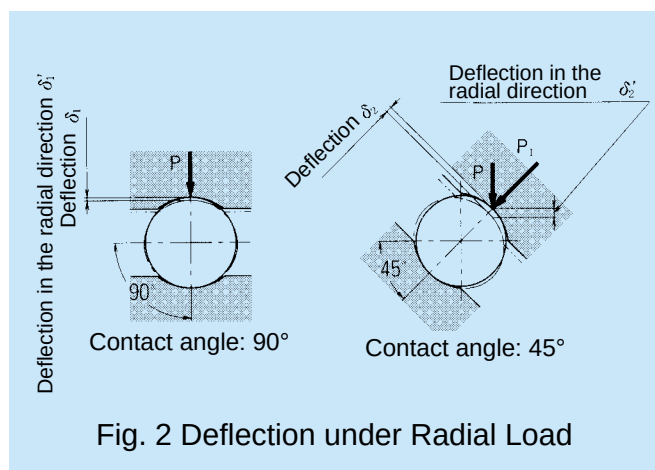


While they have the same cross-sectional shapes as types NR and NRS-B, these ultra-heavy-load types are provided with extra load-bearing balls to increase their load rating.

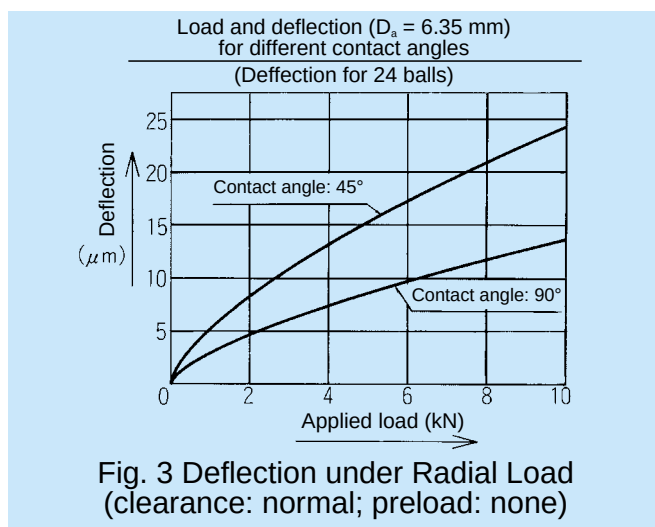
Characteristics of Types NR and NRS

Rigidity Up 200% Against Main Loads

The 90° contact design adopted in type NR results in a difference in rigidity from the 45° contact design. Under radial load P , deflection in the radial direction is 44% less with type NR than with 45° contact types.



The relationship between radial load and deflection is illustrated below. As shown, where rigidity in the radial direction is a requirement, type NR is advantageous over 45° contact types.

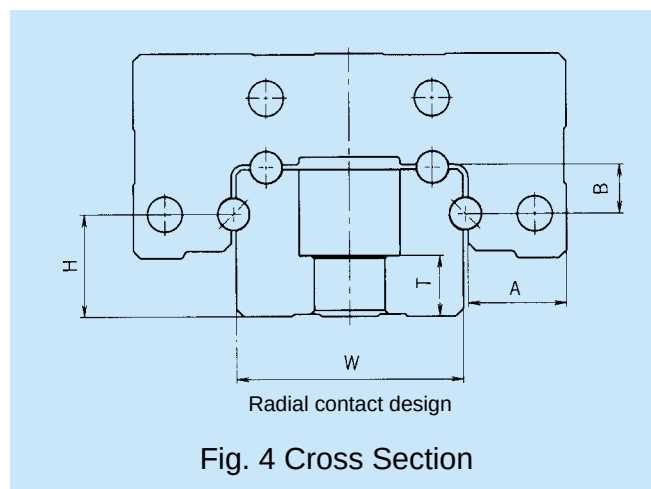


Rigidity Up 200% Against Lateral and Reverse-Radial Loads

Since the distance H from the LM rail bottom surface to the bottom groove balls (which are subjected to lateral loads) is short in LM Guide NR, the ratio of LM-rail width W to H is small. In addition the distance T from the LM-rail mounting-bolt seat to the rail bottom surface is short. Thus, under lateral loads, the LM rail undergoes only a limited amount of deflection, enabling the rail to maintain high rigidity against such loads.

Moreover, now that length B has been decreased and thickness A has been increased, the strength of the LM block can be increased against the reverse-radial and lateral loads that act to open the block. Thus, the 90° contact design improves rigidity against reverse-radial loads.

Compared with conventional equivalent models manufactured by THK, the balls are smaller and the number of effective balls is approximately 1.3 times greater, thereby increasing static rigidity.



Comparison of Contact Surface and Internal Stress among Different Contact Designs

The dimensions of the contact area and the magnitude of the internal stress of a ball vary greatly depending on the shape of the contact surface. The actual contact surface, will not be as large as it appears, because the

retainer holds the roller, reducing its effective length. In addition, mounting errors may influence the stress distribution around the contact area, significantly affecting the amount of differential slip.

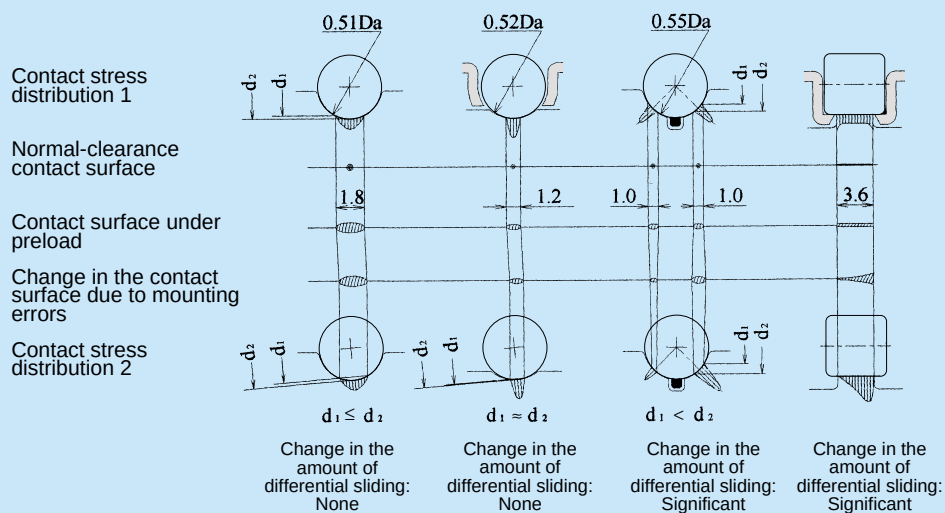
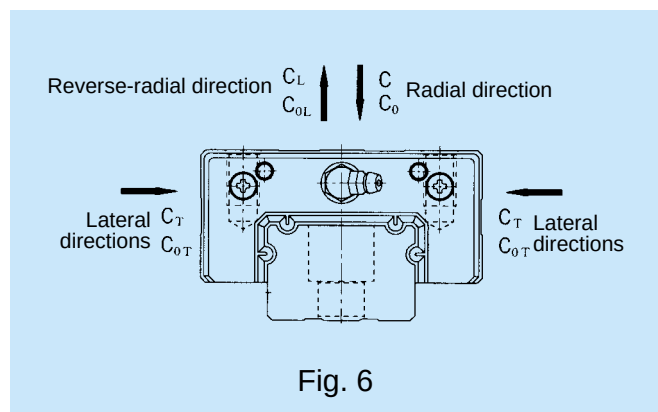


Fig. 5 Comparison of Contact Surfaces (ball: ø6.350; roller: ø6 x 6l)

Load rating



Types NR and NRS can bear loads in all four directions: radial, reverse-radial, and the two lateral directions.

The basic load ratings of types NR and NRS are in the radial direction indicated in Fig. 6. The values are presented in the corresponding dimension tables. Values in the reverse-radial and lateral directions can be obtained from Table 1.

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

Table 1 Type NR Basic Load Ratings in Various Directions

Direction	Basic dynamic-load rating	Basic static-load rating
Radial direction	C	C_O
Reverse-radial direction	$C_L=0.78C$	$C_{OL}=0.71C_O$
Lateral directions	$C_T=0.48C$	$C_{OT}=0.45C_O$

Equivalent load

An equivalent load for type NR when reverse-radial and lateral loads are exerted on its LM block simultaneously can be obtained using the following equation:

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

where

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

P_L : reverse-radial load (N)

P_T : lateral load (N)

X and Y : equivalent factor (see Table 2)

Table 2 Type NR Equivalent Factor

P_E	X	Y
Equivalent load in the reverse-radial direction	1	2
Equivalent load in the lateral directions	0.5	1

An equivalent load for type NRS when reverse-radial and lateral loads are exerted on its LM block simultaneously can be obtained using the following equation:

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

where

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

P_R : radial load (N)

P_L : reverse-radial load (N)

P_T : lateral load (N)

Permissible moment

In types NR and NRS, a single LM block can bear moments in all directions. Table 3 and Table 4 present the permissible moments in directions M_A , M_B , and M_C for a single LM block and double LM blocks laid over one another (no data for direction M_C).

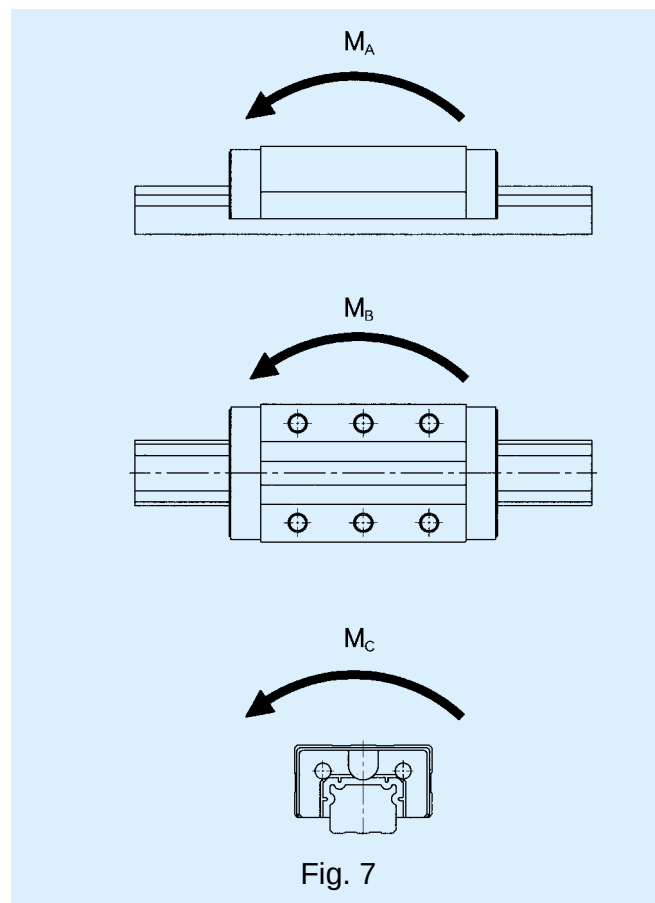


Fig. 7

Table 3 Type-NR Static Permissible Moment

Unit : kNm

Direction Model No.	M_A		M_B		M_C
	Single block	Double block	Single block	Double block	Single block
NR 25X	0.49	2.9	0.31	1.8	0.58
NR 25XL	0.88	4.7	0.55	3.0	0.79
NR 30	0.96	5.1	0.61	3.3	1.1
NR 30L	1.7	8.3	1.1	5.2	1.5
NR 35	1.4	7.4	0.85	4.7	1.7
NR 35L	2.4	12.1	1.5	7.6	2.3
NR 45	2.6	13.8	1.7	8.8	3.3
NR 45L	4.4	22.0	2.8	13.9	4.4
NR 55	4.2	21.7	2.6	13.8	5.2
NR 55L	6.8	34.1	4.3	21.6	6.8
NR 65	6.8	34.9	4.3	22.1	8.7
NR 65L	12.5	62.5	7.9	39.7	11.9
NR 75	11.2	57.0	7.1	36.2	14.4
NR 75L	18.8	92.8	11.9	58.9	18.9
NR 85	15.7	79.5	9.9	50.4	20.0
NR 85L	25.8	124	16.3	78.9	25.9
NR100	24.9	132	15.8	83.6	32.5
NR100L	38.3	184	24.3	117	40.7

Table 4 Type-NRS Static Permissible Moment

Unit : kNm

Direction Model No.	M_A		M_B		M_C
	Single block	Double block	Single block	Double block	Single block
NRS 25X	0.49	2.9	0.49	2.9	0.58
NRS 25XL	0.88	4.7	0.88	4.7	0.79
NRS 30	0.96	5.1	0.96	5.1	1.1
NRS 30L	1.7	8.3	1.7	8.3	1.5
NRS 35	1.4	7.4	1.4	7.4	1.7
NRS 35L	2.4	12.1	2.4	12.1	2.3
NRS 45	2.6	13.8	2.6	13.8	3.3
NRS 45L	4.4	22.0	4.4	22.0	4.4
NRS 55	4.2	21.7	4.2	21.7	5.2
NRS 55L	6.8	34.1	6.8	34.1	6.8
NRS 65	6.8	34.9	6.8	34.9	8.7
NRS 65L	12.5	62.5	12.5	62.5	11.9
NRS 75	11.2	57.0	11.2	57.0	14.4
NRS 75L	18.8	92.8	18.8	92.8	18.9
NRS 85	15.7	79.5	15.7	79.5	20.0
NRS 85L	25.8	124	25.8	124	25.9
NRS100	24.9	132	24.9	132	32.5
NRS100L	38.3	184	38.3	184	40.7

Accuracy Standards

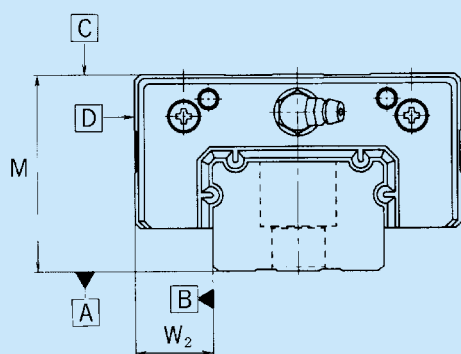


Fig. 8

The accuracy of types NR and NRS are divided into five grades, normal, high, precision, super-precision, and ultra-precision, in accordance with the model numbers shown in Table 5.

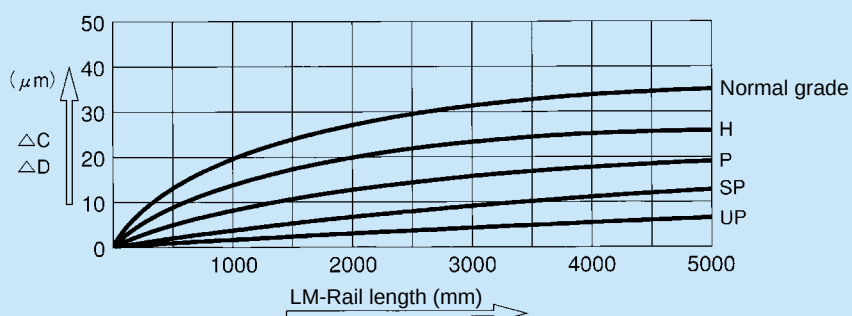


Fig. 9 Relationship Between LM-Rail Length and Running Parallelism

Table 5 Accuracy Standard

Unit : mm

Model No.	Accuracy standard	Normal	High	Precision	Super-precision	Ultra-precision
	Item	No symbol	H	P	SP	UP
NR/NRS25X NR/NRS 30 NR/NRS 35	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 LM-block surface C with respect to surface A	C (as per Fig. 9)				
	Running parallelism of LM-block surface D with respect to surface B	D (as per Fig. 9)				
NR/NRS 45 NR/NRS 55	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 LM-block surface C with respect to surface A	C (as per Fig. 9)				
	Running parallelism of LM-block surface D with respect to surface B	D (as per Fig. 9)				
NR/NRS 65 NR/NRS 75 NR/NRS 85 NR/NRS100	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 LM-block surface C with respect to surface A	C (as per Fig. 9)				
	Running parallelism of LM-block surface D with respect to surface B	D (as per Fig. 9)				

Radial clearance

Table 6 presents the radial clearances of types NR and NRS.

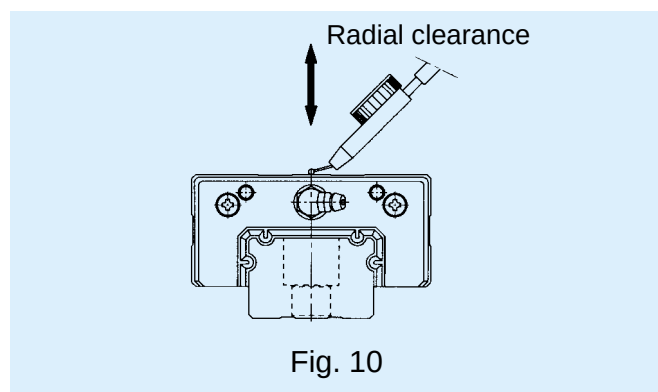
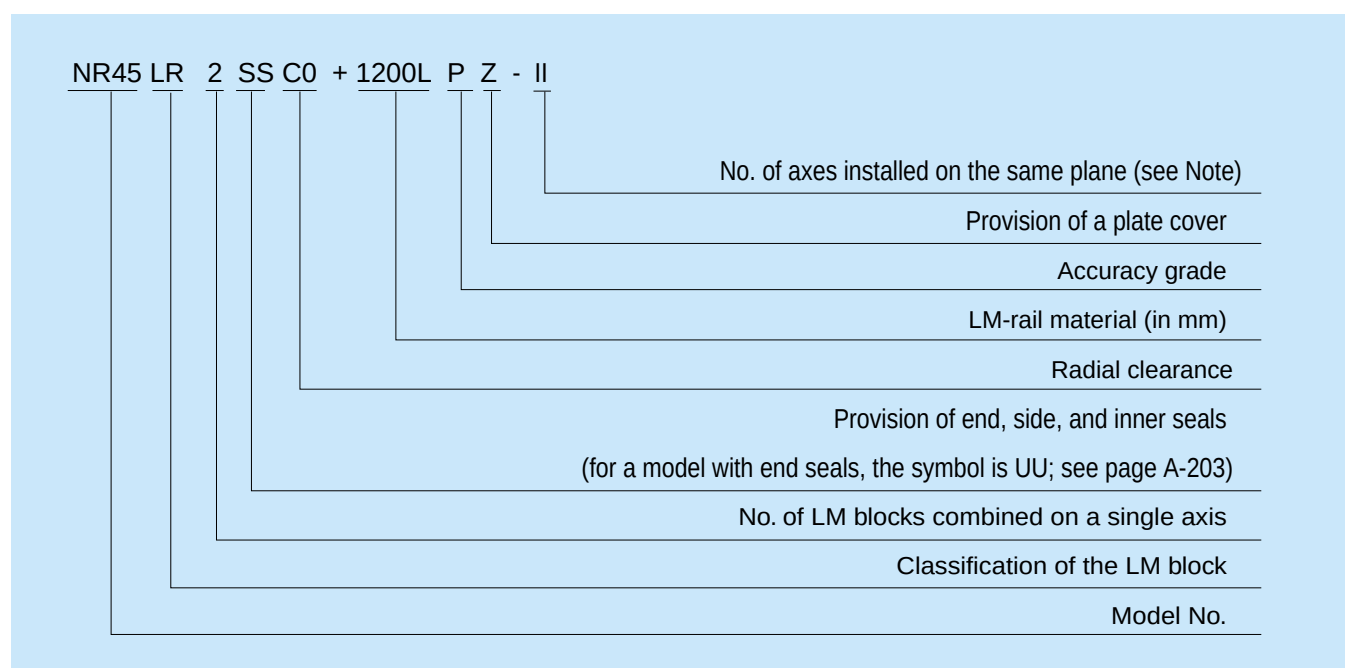


Table 6 Type NR/NRS Radial Clearances

		Unit : μm	
Model No.	Clearance symbol	Normal	Under a light preload
	No symbol	C1	Medium preload
NR/NRS 25X	- 3 ~ +2	- 6 ~ -3	-9 ~ - 6
NR/NRS 30	- 4 ~ +2	- 8 ~ -4	- 12 ~ - 8
NR/NRS 35	- 4 ~ +2	- 8 ~ -4	- 12 ~ - 8
NR/NRS 45	- 5 ~ +3	-10 ~ -5	- 15 ~ -10
NR/NRS 55	- 6 ~ +3	-11 ~ -6	- 16 ~ - 11
NR/NRS 65	- 8 ~ +3	-14 ~ -8	- 20 ~ - 14
NR/NRS 75	-10 ~ +4	-17 ~ -10	- 24 ~ - 17
NR/NRS 85	-13 ~ +4	-20 ~ -13	- 27 ~ - 20
NR/NRS100	-14 ~ +4	-24 ~ -14	- 34 ~ - 24

Model-number coding



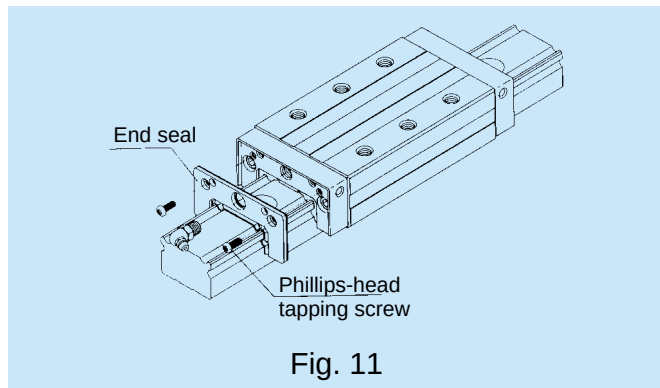
Note: This coding is based on the assumption of one set of code for a one-axis unit.
(A configuration of two axes installed in parallel is given at least two sets of code.)

Contamination Protection

Types NR and NRS are provided with end and side seals as standard contamination-protection accessories.

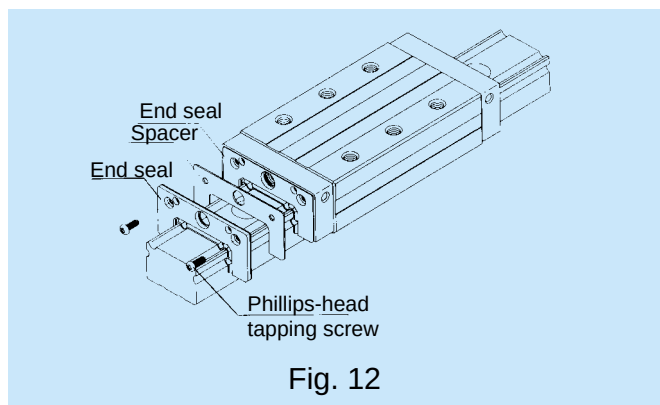
End seal

Standard accessory



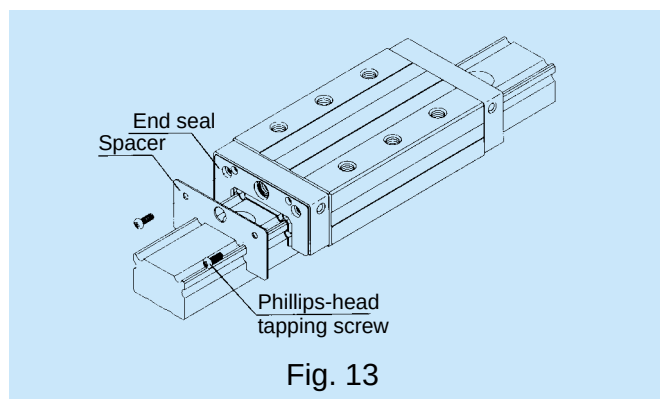
Double seal

Use two end seals to enhance the contamination-protection capacity.



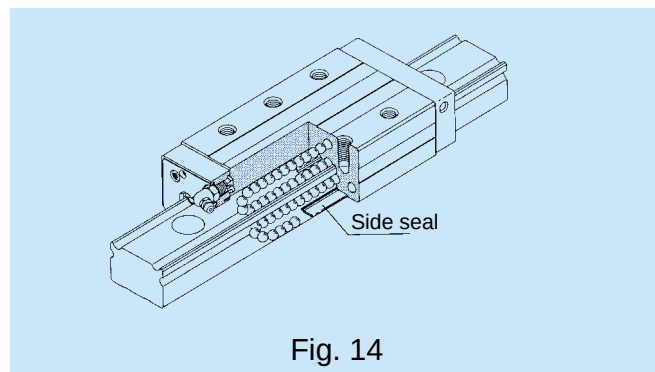
Scraper

Removes spatters and similar large foreign matter.



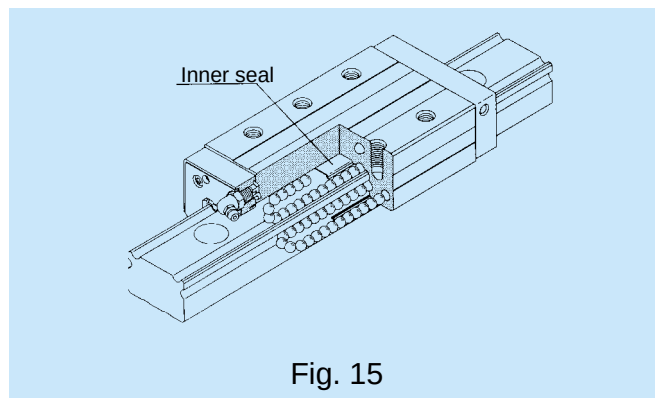
Side seal

Prevents contaminants from entering an LM block from below.



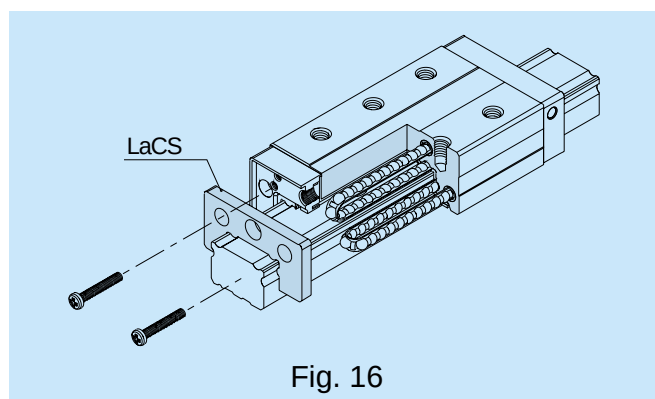
Inner seal

Installed in a LM block.



LaCS (laminated contact scraper)

Unlike metal scrapers, the LaCS surface-contacts the LM rail and is capable of removing foreign objects. The LaCS is provided as an option that is highly contamination-protective against minute foreign objects that have been difficult to remove with conventional metal scrapers.



Contamination-protection-accessory symbol

Where a contamination-protection accessory is required, specify the corresponding symbol shown below.

Attaching a contamination-protection accessory to an LM block changes the block overall length depending on the block type (see Table 7).

Contamination-protection accessory	Symbol
End seal (on both end faces)	UU
End seal + side seal + inner seal	SS
End seal + side seal + inner seal + scraper	ZZ
Double seal + side seal + inner seal	DD
Double seal + side seal + inner seal + scraper	KK
End seals + side seal + inner seal + metal scraper + LaCS	ZZHH
Double seal + side seal + inner seal + metal scraper + LaCS	KKHH

Table 7 Type NR/NRS: LM Block Overall Length with a contamination-protection Accessory Attached

Unit : mm

Model. No.	No symbol	UU	SS	DD	ZZ	KK	ZZHH	KKHH
NR/NRS 25XA/XR NR/NRS 25XLA/XLR	O 81.8 100.8	O 83 102	O 83 102	O 90.4 109.4	O 89.2 108.2	O 96.8 115.8	O 106.5 125.5	O 114.5 133.5
NR/NRS 30A/R NR/NRS 30LA/LR	O 97.1 119.6	O 98 120.5	O 98 120.5	O 107 129.5	O 104.4 126.9	O 113.4 135.9	O 124.5 147	O 133.5 156
NR/NRS 35A/R NR/NRS 35LA/LR	O 108.5 134	O 109.5 135	O 109.5 135	O 119.7 145.2	O 117.1 142.6	O 127.3 152.8	O 138.5 164	O 148.5 174
NR/NRS 45A/R NR/NRS 45LLA/LR	O 138 170	O 139 171	O 139 171	O 149.2 181.2	O 147.4 179.4	O 157.6 189.6	O 172 204	O 182.5 214.5
NR/NRS 55A/R NR/NRS 55LA/LR	O 160.6 198.1	O 163 200.5	O 163 200.5	O 173 210.5	O 171.4 208.9	O 181.6 219.1	O 198.5 236	O 208.5 246
NR/NRS 65A/R NR/NRS 65LA/LR	O 183.4 243.4	O 186 246	O 186 246	O 196.6 256.6	O 194.2 254.2	O 204.8 264.8	O 225 285	O 235.5 295.5
NR/NRS 75A/R NR/NRS 75LA/LR	O 214.6 270.6	O 218 274	O 218 274	O 229 285	O 226.6 282.6	O 237.6 293.6	× —	× —
NR/NRS 85A/R NR/NRS 85LA/LR	O 247.4 303.4	O 248.5 304.5	O 248.5 304.5	O 264.4 320.4	O 260.2 316.2	O 273.8 329.8	× —	× —
NR/NRS 100A/R NR/NRS 100LA/LR	O 287.4 327.4	O 294 334	O 294 334	O 311.2 351.2	O 304.4 344.4	O 321.6 361.6	× —	× —

Note: O = Applicable

× = Not Applicable

Seal resistance value

For the maximum value of seal resistance of seals types NR and NRS...UU per LM block in which grease is applied see Table 8.

Table 8 Maximum Resistance Value of Seals to Types NR/NRS

Unit : N

Model No.	Seal resistance value
NR/NRS 25X	15
NR/NRS 30	17
NR/NRS 35	23
NR/NRS 45	24
NR/NRS 55	29
NR/NRS 65	42
NR/NRS 75	42
NR/NRS 85	42
NR/NRS 100	51

Steel tape type SP (patent pending)

A special steel tape is available for types NR and NRS. With machine tools, contamination protection measures are essential. This steel tape, consisting of ultra-thin-sheet stainless steel (SUS304), covers the rail-mounting holes and thereby reinforces the sealability of the seal in use. This prevents the entry of coolant and chips from above the rails, which could not be prevented by the conventional means. (An end piece of type EP is used to install the steel tape.)

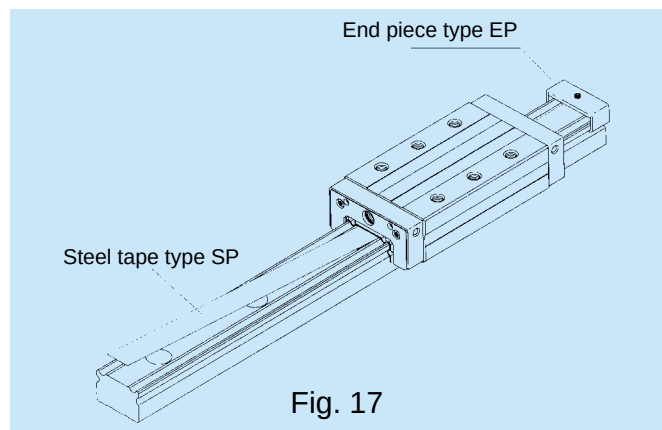
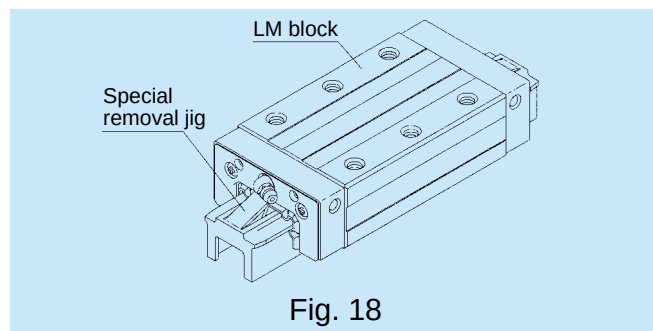


Fig. 17

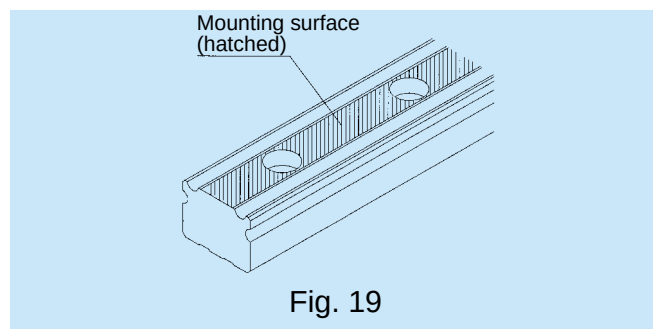
Mounting procedures

Fasten using adhesive tape and the end pieces.

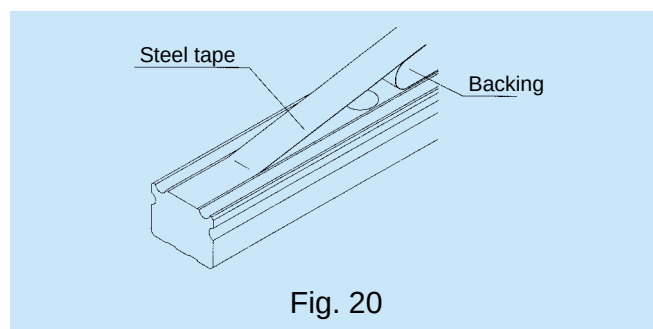
1. Using a special removal jig (page A-163), remove the LM block from the LM rail.



2. Completely remove grease and oil from the LM-rail top surface, to which the steel tape is adhered. Clean the surface well. Use a highly volatile agent (e.g., industrial alcohol) to remove grease and oil.

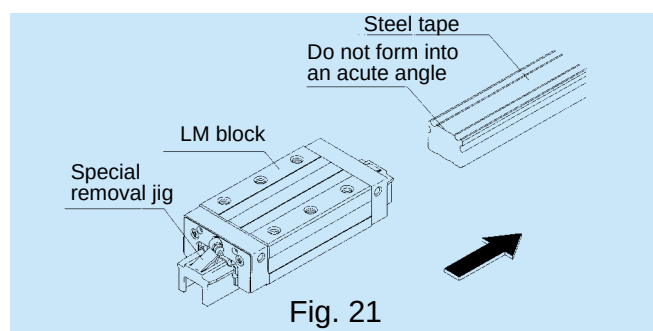


3. While gradually peeling off the steel-tape backing, adhere it to the surface while keeping it taut and straight.

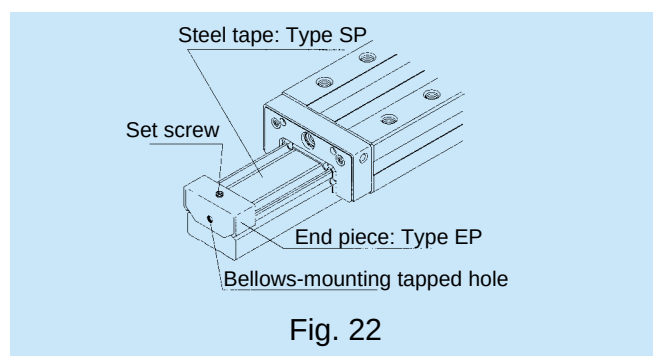


4. Rub the tape against the rail surface until it attains close contact. Although the bonding strength is increased as time elapses, the tape can be peeled from the rail by pulling it upward.

5. Insert an LM block into the LM rail.



6. Attach end pieces to both ends of the LM rail, and securely attach the steel tape to the rail. Fasten the set screws on the top side only. A tapped hole is provided on each end piece for the attachment of a bellows.

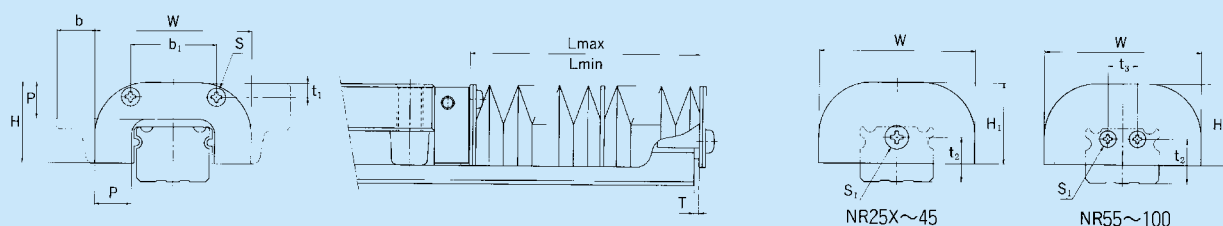


- Notes: 1. The set screws at both ends are provided to lightly hold folded-over steel-tape ends in place. Stop tightening a set screw when you feel it reach the rail surface. Be sure not to overtighten it.
2. The steel tape is made of thin sheet steel. Mishandling of the tape may result in an injury such as a cut on the hand. Therefore, when handling a steel tape, wear rubber gloves or the like to ensure safety.

Simple bellows

Simple bellows are available for types NR and NRS. They should be installed where a coolant is likely to enter. As shown in Fig. 23, installing a telescopic

cover over the bellows ensures a greater contamination-protection effect.



Unit : mm

Model No.	Boundary dimensions								LM block side Mounting bolt	LM rail side Mounting bolt	b A, LA B, LB	T	$\frac{A}{L_{max}} \frac{L_{min}}$	Applicable LM-Guide model
	W	H	H ₁	P	b ₁	t ₁	t ₂	t ₃						
JN 25	48	25.5	25.5	10	26.6	4.6	13	-	M3 × 0.5 × 5I	M4 × 0.7 × 4I	11	1.5	7	NR/NRS 25X
JN 30	60	31	31	14	34	5.5	17	-	M4 × 0.7 × 8I	M4 × 0.7 × 4I	15	1.5	9	NR/NRS 30
JN 35	70	35	35	15	36	6	20.5	-	M4 × 0.7 × 8I	M5 × 0.8 × 4I	15	2	10	NR/NRS 35
JN 45	86	40.5	40.5	17	47	6.5	24	-	M5 × 0.8 × 10I	M5 × 0.8 × 4I	17	2	10	NR/NRS 45
JN 55	100	49	49	20	54	10	29.5	18	M5 × 0.8 × 10I	M5 × 0.8 × 4I	20	2	13	NR/NRS 55
JN 65	126	57.5	57.5	20	64	13.5	36.2	20	M6 × 12I	M6 × 5I	22	3.2	13	NR/NRS 65
JN 75	145	64	64	30	80	10.5	34.2	26	M6 × 12I	M6 × 5I	25	3.2	20	NR/NRS 75
JN 85	156	70.5	70.5	30	110	15.5	39.5	28	M6 × 12I	M6 × 5I	39.5	3.2	20	NR/NRS 85
JN 100	200	82	82	30	140	15	40	34	M8 × 16I	M6 × 5I	30	3.2	20	NR/NRS100

Model-number coding

JN25 - 60/420

Bellows dimensions $\left(\frac{\text{length when compressed}}{\text{length when expanded}} \right)$

Model No. (bellows for types NR-NRS 25X in this example)

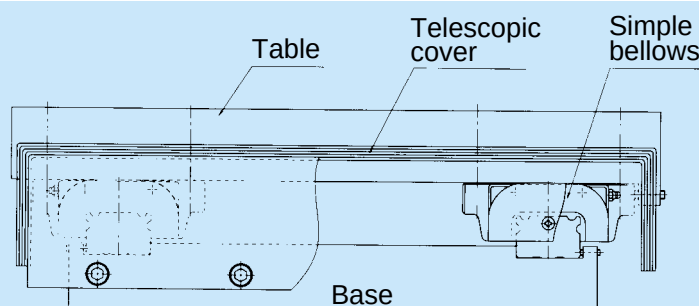


Fig. 23 Sample Installation of a Simple Bellows

Precautions on Use

Mounting-Surface Height and Corner Profile

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

For the reference-section shoulder height, see Table 9.

Provide enough space for the corner profile of a mounting surface so that the corner does not interfere with chamfers made on the LM blocks and rails, or provide the corner with a radius smaller than corner radius r specified in Table 9.

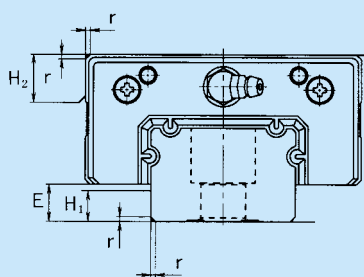


Fig. 24

Table 9 Mounting-Surface Shoulder Height and Corner Radius

Unit : mm

Model No.	Corner radius r (max.)	LM-rail shoulder height H_1	LM-block shoulder max. height H_2	E
NR/NRS25X	0.5	5	5	5.5
NR/NRS30	1.0	5	5	7
NR/NRS35	1.0	6	6	9
NR/NRS45	1.0	8	8	11.5
NR/NRS55	1.5	10	10	14
NR/NRS65	1.5	10	10	15
NR/NRS75	1.5	12	12	15
NR/NRS85	1.5	14	14	17
NR/NRS100	2.0	16	16	20

Special removal jig

In types NR and NRS, when the LM block is removed from the LM rail, the balls may fall off and cause an accident. Therefore, to remove the LM block from the LM rail, always use the special removal jig.

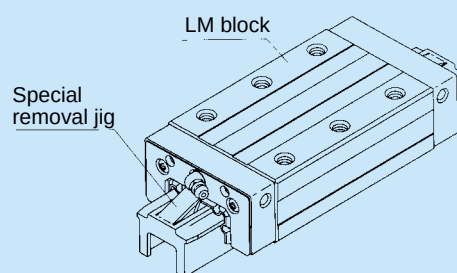


Fig. 25

End piece type EP

In types NR and NRS, when an LM block is removed from an LM rail, the balls may fall off and cause an accident. Therefore, these types are delivered with end pieces installed, in order to prevent the LM blocks from detaching.

If the LM Guide is used without the end pieces, be sure the LM block is not allowed to overrun.

The end piece can be used to fasten a steel tape in place and is applicable to LM rails types SSR, SR, and HSR.

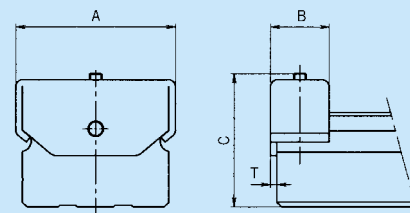


Fig. 26 End Piece Type EP for Types NR and NRS

Table 10 Dimensions of NR and NRS End Piece Type EP

Unit : mm

Model . No.	A	B	C	T
NR/NRS 25X	26	14	25	1.5
NR/NRS 30	31	14	31	1.5
NR/NRS 35	38	16	32.5	2
NR/NRS 45	49	18	41	2
NR/NRS 55	57	20	46.5	2
NR/NRS 65	69.4	22	59	3.2
NR/NRS 75	81.7	28	56	3.2
NR/NRS 85	91.4	22	68	3.2
NR/NRS 100X	106.4	25	73	3.2

Lubrication adaptor

For types NR and NRS, lubrication adaptors specifically for oil lubrication are available.

Even in wall-hung, inverted, and other installations in which oil lubrication is difficult, the adaptor provides lubricant feed to all four rows of a raceway at a given rate.

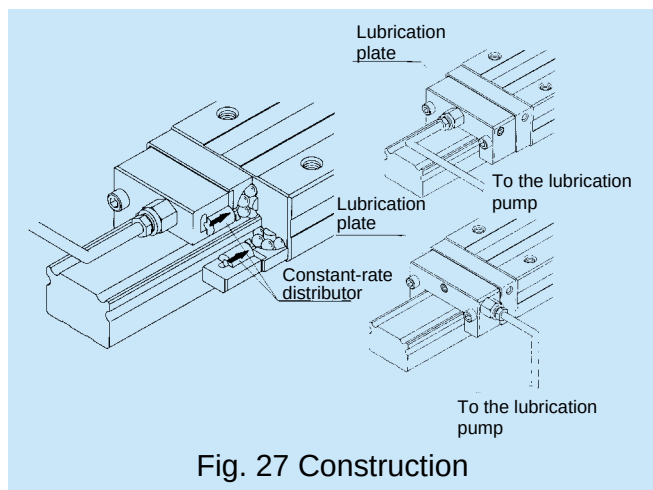


Fig. 27 Construction

Specifications

Viscosity range of the lubricant used	32 to 64 cSt recommended
Discharge rate	0.03 x 4 or 0.06 x 4 cc/shot
Connected pipe diameter	Ø4 or Ø6
Material	Aluminum alloy

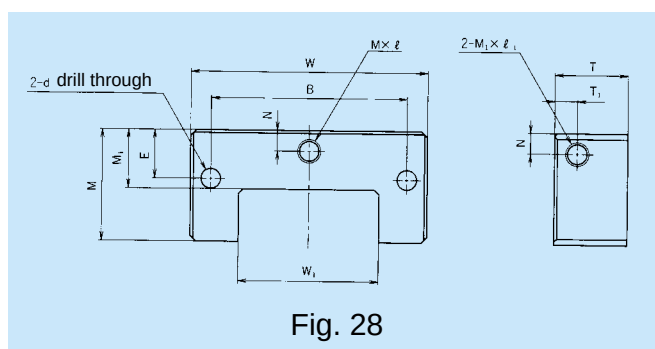


Fig. 28

Table 11 Dimensions of the Lubrication Adaptor

Unit : mm

Model No.	Width W	Height M	T	W ₁	M ₁	B	E	N	T ₁	d	M × l	M ₁ × l ₁	cc/shot
A30N	56	29	25	29	14.5	46	14	5.3	5.3	3.5	M8 × 8	M8 × 8	0.03 × 4
A35N	66	33	25	35	17	54	16.5	6	5.3	4.5	M8 × 8	M8 × 8	
A45N	81	38	25	48	20	67	16.5	7	7.8	6.6	M8 × 8	M8 × 8	
A55N	94	45.5	25	56	22	76	20.5	7	7.8	6.6	M8 × 8	M8 × 8	0.06 × 4
A65N	119	55.5	25	67	26.3	92	25.5	11.5	7.8	9	M8 × 8	M8 × 8	
A85N	147	68.5	25	92	34	114	32	15.5	7.8	9	M8 × 8	M8 × 8	

Features

As a result of the incorporation of a constant-rate distributor, the lubrication adaptor specifically for types NR and NRS can reliably feed a given amount of lubricant to all raceways.

It is economical to feed the optimum amount of lubricant at all times, thus eliminating waste.

For piping, simply connect an intermittent lubrication pump (the type used for general machine tools and the like) to the feed holes (M8) provided on the adaptor front and side panels.

LM-Rail Standard and Maximum Lengths

Table 12 presents the standard and maximum lengths of LM rails for types NR and NRS. If your maximum length is not within the range of this table, we offer special LM rails intended for connected use.

For dimension G when a special length is specified, we recommend those listed in Table 10. A large

dimension G tends to reduce stability at the rail ends, which may degrade accuracy.

For connected use, we offer LM rails that ensure the elimination of level differences at joints. Therefore, when placing an order, please specify the overall length of the LM rails you require.

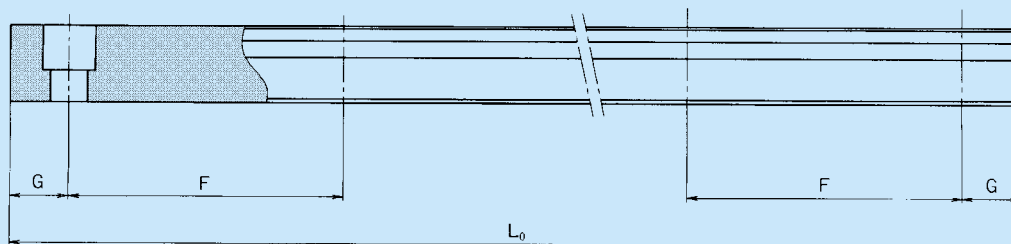


Table 12 Type NR and type NRS LM-Rail Standard and Maximum Lengths

Unit : mm

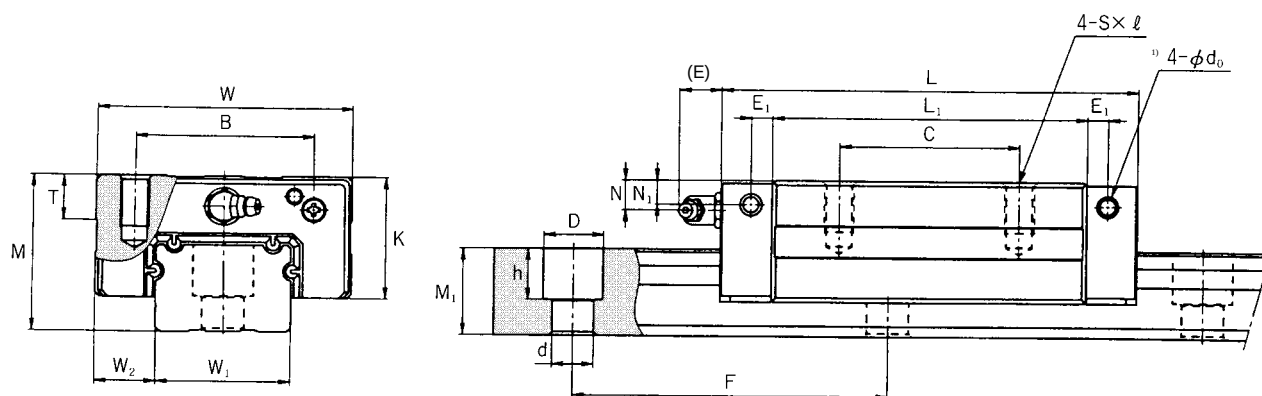
Model No.	NR/NRS25X	NR/NRS30	NR/NRS35	NR/NRS45	NR/NRS55	NR/NRS65	NR/NRS75	NR/NRS85	NR/NRS100
LM-rail standard length (L ₀)	230	280	280	570	780	1270	1280	1530	1340
	270	360	360	675	900	1570	1580	1890	1760
	350	440	440	780	1020	2020	2030	2250	2180
	390	520	520	885	1140	2620	2630	2610	2600
	470	600	600	990	1260				
	510	680	680	1095	1380				
	590	760	760	1200	1500				
	630	840	840	1305	1620				
	710	920	920	1410	1740				
	750	1000	1000	1515	1860				
	830	1080	1080	1620	1980				
	950	1160	1160	1725	2100				
	990	1240	1240	1830	2220				
	1070	1320	1320	1935	2340				
	1110	1400	1400	2040	2460				
	1190	1480	1480	2145	2580				
	1230	1560	1560	2250	2700				
	1310	1640	1640	2355	2820				
	1350	1720	1720	2460	2940				
	1430	1800	1800	2565	3060				
	1470	1880	1880	2670					
	1550	1960	1960	2775					
	1590	2040	2040	2880					
	1710	2200	2200	2985					
	1830	2360	2360	3090					
	1950	2520	2520						
	2070	2680	2680						
	2190	2840	2840						
	2310	3000	3000						
	2430								
	2470								
Standard pitch F	40	80	80	105	120	150	150	180	210
G	15	20	20	22.5	30	35	40	45	40
Max. length	3000	3000	3000	3000	3000	3000	3000	3000	3000

Notes : • The maximum length varies by accuracy grade. For questions regarding the maximum length, please contact us.

- If connected use is impossible but a rail longer than the maximum length specified in the table is required, please contact us.

NR•NRS-R Type (Heavy-load type)
NR•NRS-LR Type (Ultra-heavy-load type)

Compact type

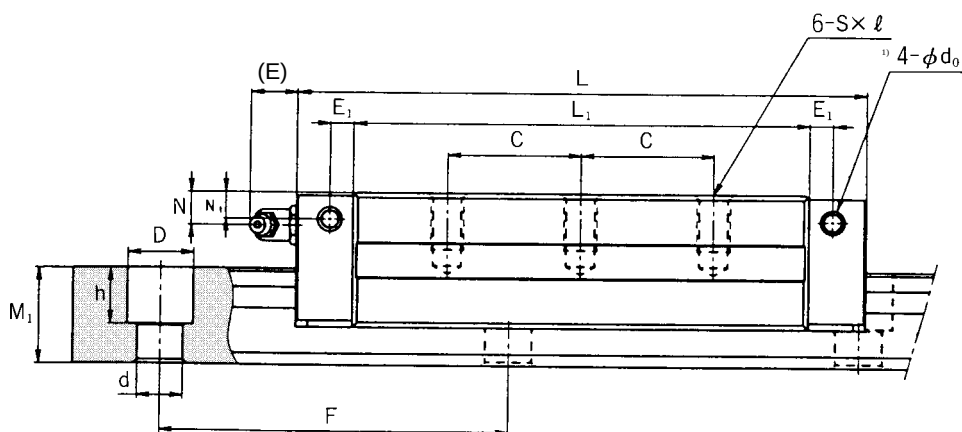


NR • NRS-R

Model No.	External dimensions			LM-block dimensions						
	Height M	Width W	Length L	B	C	$S \times l$	L_1	T	K	N
NR/NRS 25XR NR/NRS 25XLR	31	50	83 102	32	35 25	M6 × 8	62.4 81.6	10	25.5	7
NR/NRS 30R NR/NRS 30LR	38	60	98 120.5	40	40 30	M8 × 10	70.9 93.4	10	31	7
NR/NRS 35R NR/NRS 35LR	44	70	109.5 135	50	50 36	M8 × 12	77.9 103.4	12	35	8
NR/NRS 45R NR/NRS 45LR	52	86	139 171	60	60 40	M10 × 17	105 137	15	40.5	10
NR/NRS 55R NR/NRS 55LR	63	100	163 200.5	65	75 47.5	M12 × 18	123.6 160.8	18	49	11
NR/NRS 65R NR/NRS 65LR	75	126	186 246	76	70 55	M16 × 20	143.6 203.6	22	60	16
NR/NRS 75R NR/NRS 75LR	83	145	218 274	95	80 65	M18 × 25	170.2 226.2	26	68	18
NR/NRS 85R NR/NRS 85LR	90	156	248.5 304.5	100	80 70	M18 × 25	194.9 251	28	73	20
NR/NRS 100R NR/NRS 100LR	105	200	294 334	130	150 100	M18 × 27	223.4 263.4	35	85	23

Notes:

- For permissible static moments M_A , M_B , and M_C , see page A-255.
- For standard LM-rail lengths, see page A-235.
- For model-number coding, see page A-228.



NR • NRS-LR

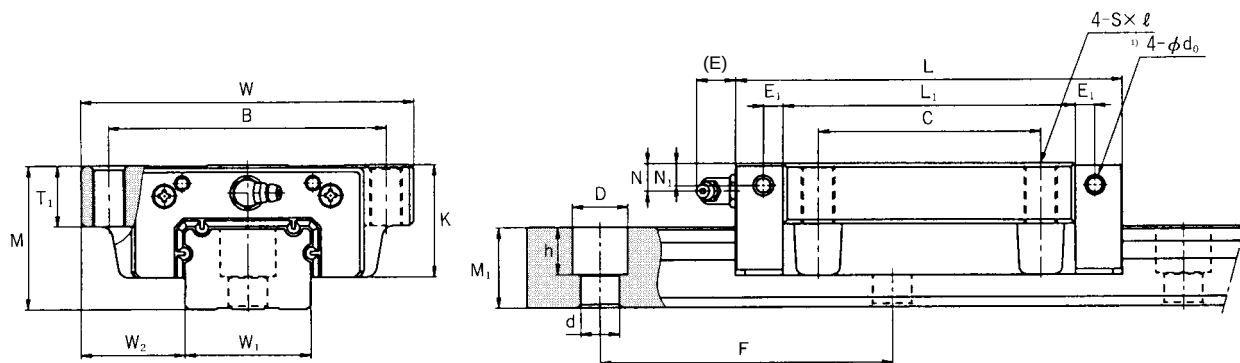
Unit : mm

N ₁	E	E ₁	d ₀	Grease nipple	LM-rail dimensions					Basic load rating				Mass	
					Width W ₁ 0 -0.05	W ₂	Height M ₁	Pitch F	d × D × h	NR Type C kN	NR Type C ₀ kN	NRS Type C kN	NRS Type C ₀ kN	LM block kg	LM rail kg/m
7	10	4	3.9	B-M6F	25	12.5	17	40	6 × 9.5 × 8.5	33.0 44.0	84.6 113	25.9 34.5	59.8 79.7	0.43 0.55	3.1
7	9.5	5	3.9	B-M6F	28	16	21	80	7 × 11 × 9	48.7 64.9	122 162	38.2 51.0	86.1 115	0.74 1.0	4.3
8	9	6	5.2	B-M6F	34	18	24.5	80	9 × 14 × 12	63.1 85.7	155 210	49.5 67.2	109 148	1.1 1.4	6.2
8	14	7	5.2	B-PT1/8	45	20.5	29	105	14 × 20 × 17	96.0 126	231 303	75.3 98.8	163 214	2.0 2.8	9.8
10	13.5	8	5.2	B-PT1/8	53	23.5	36.5	120	16 × 23 × 20	131 170	310 402	103 133	220 284	3.3 4.3	14.5
15	13.5	9	8.2	B-PT1/8	63	31.5	43	150	18 × 26 × 22	189 260	436 600	148 204	309 425	6.0 8.7	20.3
17	13	9	8.2	B-PT1/8	75	35	44	150	22 × 32 × 26	271 355	610 800	212 278	431 566	8.7 11.6	24.6
20	13	10	8.2	B-PT1/8	85	35.5	48	180	24 × 35 × 28	336 435	751 972	264 342	531 687	12.3 15.8	30.5
23	10	12	8.2	B-PT1/4	100	50	57	210	26 × 39 × 32	479 599	1040 1300	376 470	737 920	21.8 26.1	42.6

Notes: ¹⁾Pilot holes for side nipples are not drilled through so as to prevent the entry of foreign matter.
If a side nipple hole is required, contact us.

NR•NRS-A Type (Heavy-load type)
NR•NRS-LA Type (Ultra-heavy-load type)

Tapped-hole flange type

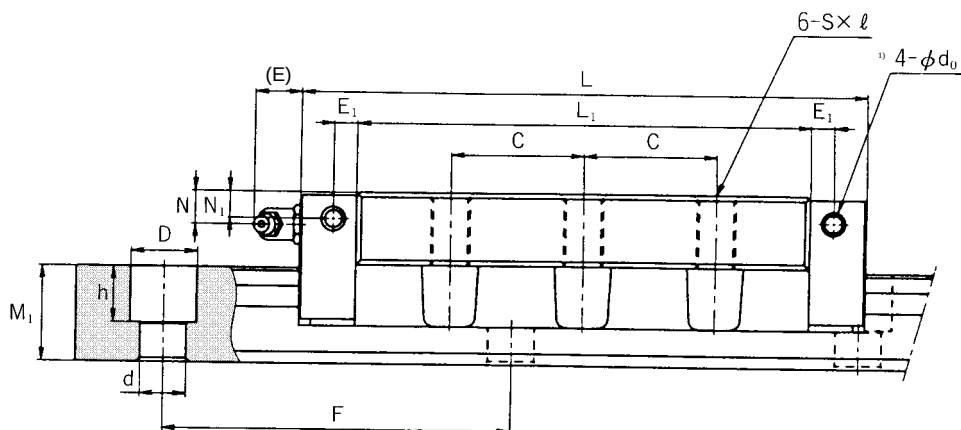


NR • NRS-A

Model No.	External dimensions			LM-block dimensions							
	Height M	Width W	Length L	B	C	S × I	L ₁	T ₁	K	N	
NR/NRS 25XA NR/NRS 25XLA	31	72	83 102	59	45 22.5	M8 × 16	62.4 81.6	16	25.5	7	
NR/NRS 30A NR/NRS 30LA	38	90	98 120.5	72	52 26	M10 × 18	70.9 93.4	18	31	7	
NR/NRS 35A NR/NRS 35LA	44	100	109.5 135	82	62 31	M10 × 20	77.9 103.4	20	35	8	
NR/NRS 45A NR/NRS 45LA	52	120	139 171	100	80 40	M12 × 22	105 137	22	40.5	10	
NR/NRS 55A NR/NRS 55LA	63	140	163 200.5	116	95 47.5	M14 × 24	123.6 160.8	24	49	11	
NR/NRS 65A NR/NRS 65LA	75	170	186 246	142	110 55	M16 × 28	143.6 203.6	28	60	16	
NR/NRS 75A NR/NRS 75LA	83	195	218 274	165	130 65	M18 × 30	170.2 226.2	30	68	18	
NR/NRS 85A NR/NRS 85LA	90	215	248.5 304.5	185	140 70	M20 × 34	194.9 251	34	73	20	
NR/NRS 100A NR/NRS 100LA	105	260	294 334	220	150 100	M20 × 38	223.4 263.4	38	85	23	

Notes:

- For permissible static moments M_A , M_B , and M_C , see page A-225.
- For standard LM-rail lengths, see page A-235.
- For model-number coding, see page A-228.



NR • NRS-LA

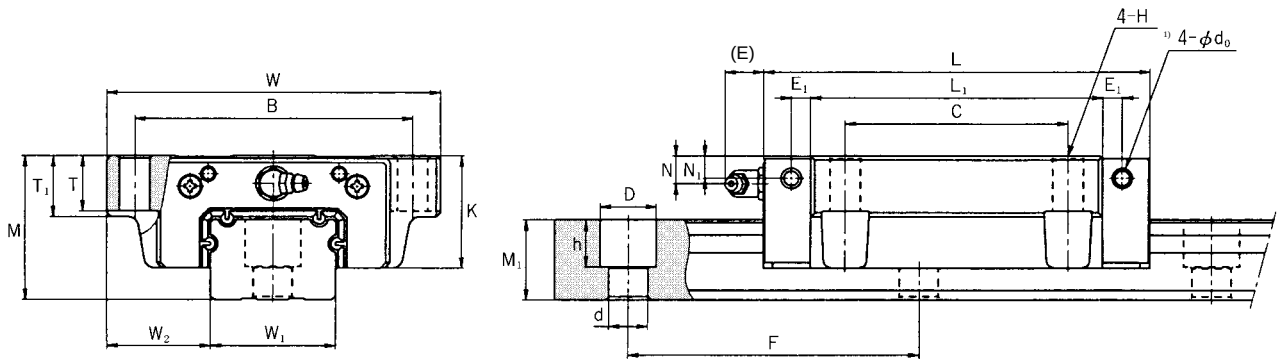
Unit : mm

					LM rail dimensions					Basic load rating				Mass	
N ₁	E	E ₁	d ₀	Grease nipple	Width W ₁ 0 -0.05	W ₂	Height M ₁	Pitch F	d × D × h	NR Type C kN	NR Type C ₀ kN	NRS Type C kN	NRS Type C ₀ kN	LM block kg	LM rail kg/m
7	10	4	3.9	B-M6F	25	23.5	17	40	6 × 9.5 × 8.5	33.0 44.0	84.6 113	25.9 34.5	59.8 79.7	0.58 0.77	3.1
7	9.5	5	3.9	B-M6F	28	31	21	80	7 × 11 × 9	48.7 64.9	122 162	38.2 51.0	86.1 115	1.1 1.4	4.3
8	9	6	5.2	B-M6F	34	33	24.5	80	9 × 14 × 12	63.1 85.7	155 210	49.5 67.2	109 148	1.5 1.9	6.2
8	14	7	5.2	B-PT1/8	45	37.5	29	105	14 × 20 × 17	96.0 126	231 303	75.3 98.8	163 214	2.7 3.5	9.8
10	13.5	8	5.2	B-PT1/8	53	43.5	36.5	120	16 × 23 × 20	131 170	310 402	103 133	220 284	4.4 5.7	14.5
15	13.5	9	8.2	B-PT1/8	63	53.5	43	150	18 × 26 × 22	189 260	436 600	148 204	309 425	7.6 10.9	20.3
17	13	9	8.2	B-PT1/8	75	60	44	150	22 × 32 × 26	271 355	610 800	212 278	431 566	11.3 15.0	24.6
20	13	10	8.2	B-PT1/8	85	65	48	180	24 × 35 × 28	336 435	751 972	264 342	531 687	16.2 20.7	30.5
23	10	12	8.2	B-PT1/4	100	80	57	210	26 × 39 × 32	479 599	1040 1300	376 470	737 920	26.7 31.2	42.6

Notes: ¹⁾Pilot holes for side nipples are not drilled through so as to prevent the entry of foreign matter.
If a side nipple hole is required, contact us.

NR•NRS-B Type (Heavy-load type)
NR•NRS-LB Type (Ultra-heavy-load type)

Through-hole flange type

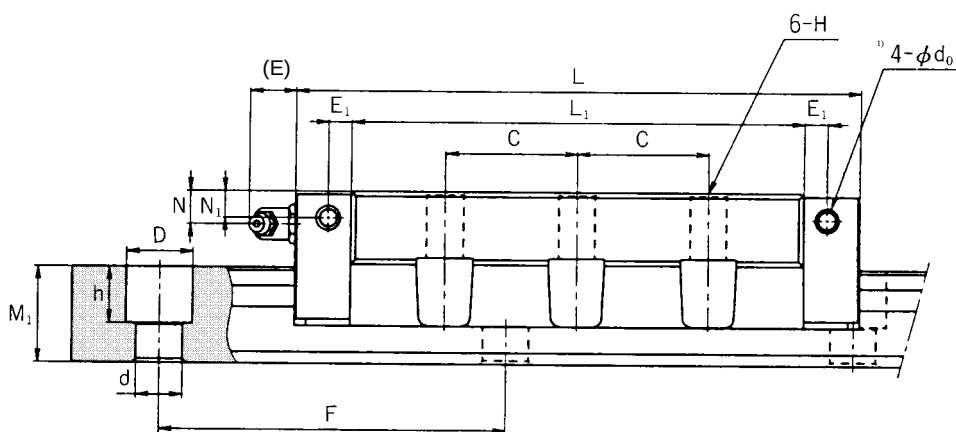


NR • NRS-B

Model No.	External dimensions			LM-block dimensions								
	Height M	Width W	Length L	B	C	H	L ₁	T	T ₁	K	N	
NR/NRS 25XB NR/NRS 25XLB	31	72	83 102	59	45 22.5	7	62.4 81.6	12	16	25.5	7	
NR/NRS 30B NR/NRS 30LB	38	90	98 120.5	72	52 26	9	70.9 93.4	14	18	31	7	
NR/NRS 35B NR/NRS 35LB	44	100	109.5 135	82	62 31	9	77.9 103.4	16	20	35	8	
NR/NRS 45B NR/NRS 45LB	52	120	139 171	100	80 40	11	105 137	20	22	40.5	10	
NR/NRS 55B NR/NRS 55LB	63	140	163 200.5	116	95 47.5	14	123.6 160.8	22	24	49	11	
NR/NRS 65B NR/NRS 65LB	75	170	186 246	142	110 55	16	143.6 203.6	25	28	60	16	
NR/NRS 75B NR/NRS 75LB	83	195	218 274	165	130 65	18	170.2 226.2	26	30	68	18	
NR/NRS 85B NR/NRS 85LB	90	215	248.5 304.5	185	140 70	18	194.9 251	28	34	73	20	
NR/NRS 100B NR/NRS 100LB	105	260	294 334	220	150 100	20	223.4 263.4	32	38	85	23	

Notes:

- For permissible static moments M_A , M_B , and M_C , see page A-225.
- For standard LM-rail lengths, see page A-235.
- For model-number coding, see page A-228.



NR · NRS-LB

Unit : mm

					LM-rail dimensions					Basic load rating				Mass	
N ₁	E	E ₁	d ₀	Grease nipple	Width W ₁ 0 -0.05	W ₂	Height M ₁	Pitch F	d × D × h	NR Type C kN	NR Type C ₀ kN	NRS Type C kN	NRS Type C ₀ kN	LM block kg	LM rail kg/m
7	10	4	3.9	B-M6F	25	23.5	17	40	6 × 9.5 × 8.5	33.0 44.0	84.6 113	25.9 34.5	59.8 79.7	0.58 0.77	3.1
7	9.5	5	3.9	B-M6F	28	31	21	80	7 × 11 × 9	48.7 64.9	122 162	38.2 51.0	86.1 115	1.1 1.4	4.3
8	9	6	5.2	B-M6F	34	33	24.5	80	9 × 14 × 12	63.1 85.7	155 210	49.5 67.2	109 148	1.5 1.9	6.2
8	14	7	5.2	B-PT1/8	45	37.5	29	105	14 × 20 × 17	96.0 126	231 303	75.3 98.8	163 214	2.7 3.5	9.8
10	13.5	8	5.2	B-PT1/8	53	43.5	36.5	120	16 × 23 × 20	131 170	310 402	103 133	220 284	4.4 5.7	14.5
15	13.5	9	8.2	B-PT1/8	63	53.5	43	150	18 × 26 × 22	189 260	436 600	148 204	309 425	7.6 10.9	20.3
17	13	9	8.2	B-PT1/8	75	60	44	150	22 × 32 × 26	271 355	610 800	212 278	431 566	11.3 15.0	24.6
20	13	10	8.2	B-PT1/8	85	65	48	180	24 × 35 × 28	336 435	751 972	264 342	531 687	16.2 20.7	30.5
23	10	12	8.2	B-PT1/4	100	80	57	210	26 × 39 × 32	479 599	1040 1300	376 470	737 920	26.7 31.2	42.6

Notes: ¹⁾Pilot holes for side nipples are not drilled through so as to prevent the entry of foreign matter.
If a side nipple hole is required, contact us.