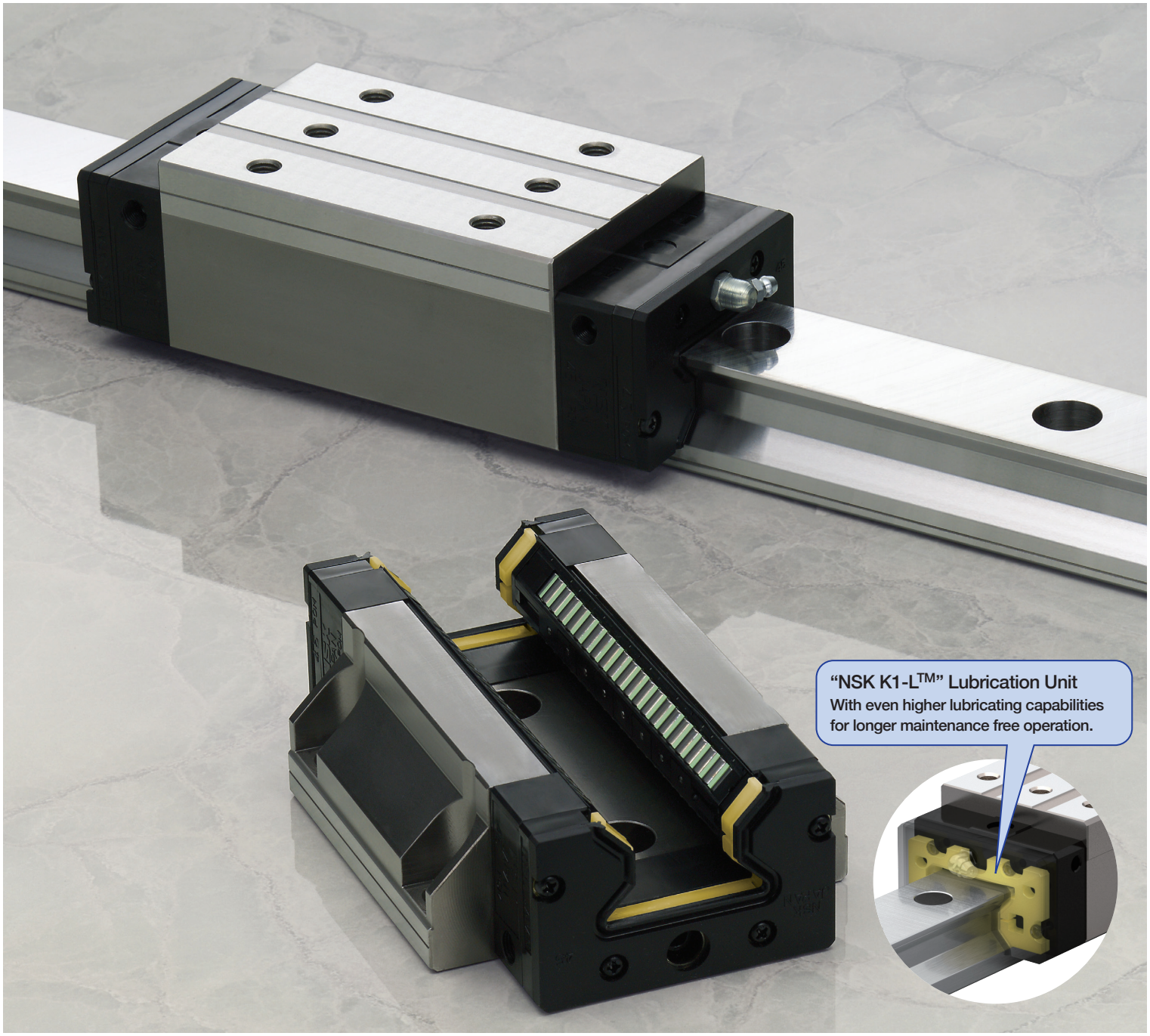
MOTION & CONTROL™

NSK

NSK Linear Guides™

High-Rigidity Series
RA/RB Model Roller Guides

Thanks to NSK's advanced analysis technologies, RA/RB roller guides realize super-high load capacity and rigidity.
Various options such as Highly Dust-Resistant V1 Seals and NSK K1-L™ lubrication units enable maintenance-free operation even in harsh environments. RA models support interchangeable slides/rails, while RB models with low mounting height facilitate compact machine design.

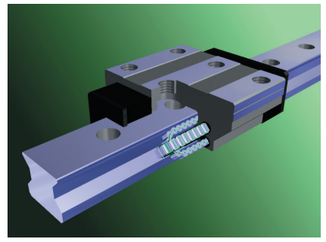


The fruits of NSK's comprehensive technologies: RA/RB roller guides suit a wide range of applications

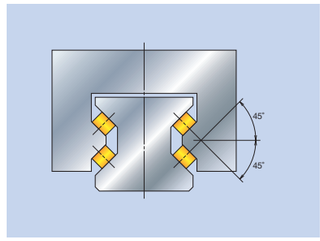
RA/RB roller guides represent the culmination of NSK's extensive experience in roller bearings and linear guide technologies.
Their optimized designs take full advantage of our unique expertise to realize smooth motion and super-high load capacity, rigidity, and motion accuracy. With their capacity to handle a variety of applications, RA/RB models help support higher machine performance to meet your needs.

Optimal Design

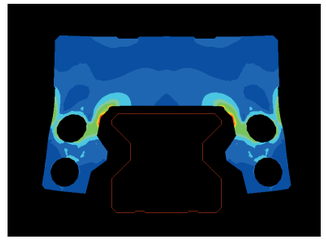
NSK conducts comprehensive and detailed performance simulations of roller guides by combining analysis and tribology technologies cultivated over many years of experience. These advancements have allowed us to attain thoroughly optimized designs down to the dimensions and shapes of the guide components.



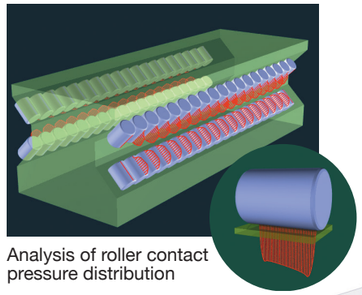
Smooth motion by use of retaining pieces



Balanced four-directional equal load specification

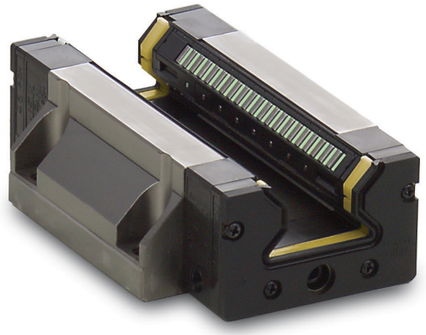


Roller slide deformation analysis



Analysis of roller contact pressure distribution

Helping to achieve higher machine performance: Features of RA/RB roller guides



Super-Long Life

Super-high load capacity
RA/RB roller guides are among the best in the world–with unprecedented operating life thanks to their high load capacity.

Various dustproofing specifications
Options such as highly dust-resistant V1 seals, V1 bottom seals, and rail covers can be installed to help prevent contaminants from entering the slide, maintaining performance over time.

Advance High-Precision Manufacturing

Super-high rigidity
Super-high rigidity provides high-precision manufacturing.

Super-high motion accuracy
Coupled with NSK's unique design approach, the vibration caused by roller passage has been substantially reduced. This helps improve the quality of machined surfaces.

Smooth motion
The installation of a retaining piece achieves smooth motion, resulting in stable positioning accuracy.

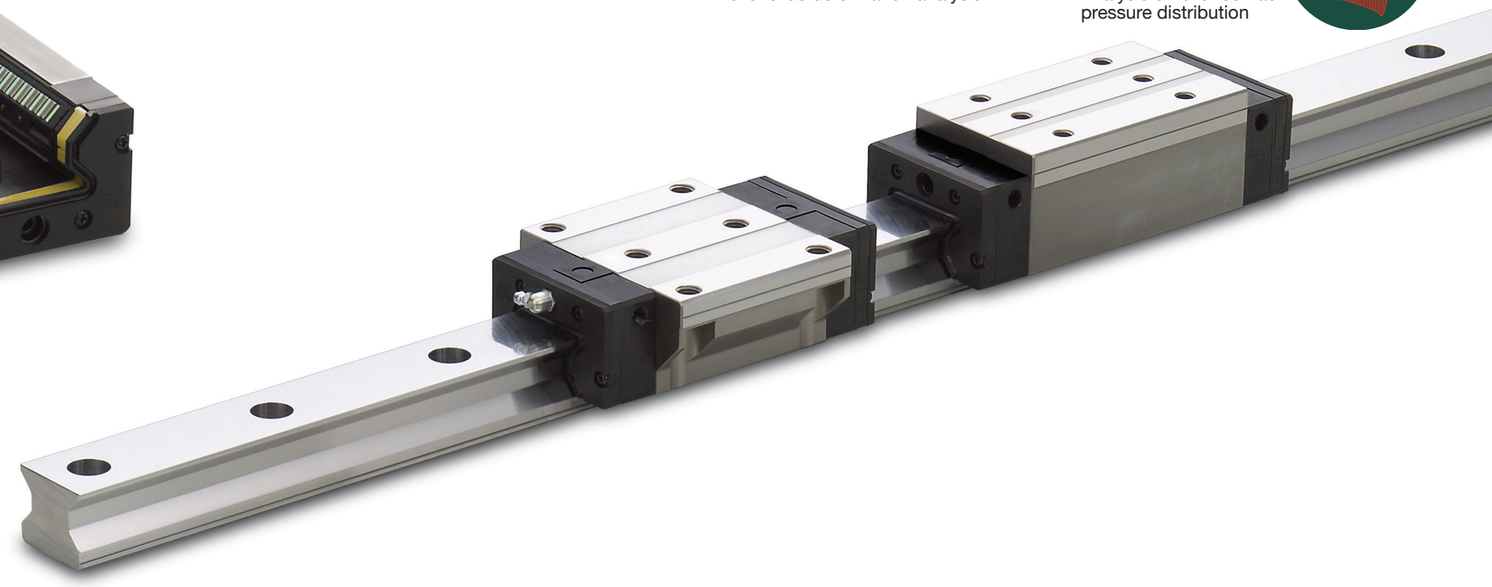
Proven Across Fields

Complete lineup
A wide lineup of sizes, including low-profile varieties, are available to match your application needs.

Standardized mounting dimensions
Outside dimensions and mounting dimensions conform to commonly used standards, allowing RA roller guides to be used without design changes (See p. 18 for details on mounting surface shoulder height and corner radius).

Super low-profile RB model
With a low mounting height, the RB model supports compact machines and equipment downsizing.

Low friction
Using rollers for rolling elements suppresses dynamic friction.

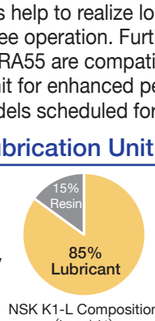


Long-term maintenance-free

NSK K1™ lubrication units help to realize longer periods of maintenance-free operation. Furthermore, models RA35, RA45, and RA55 are compatible with our NSK K1-L™ lubrication unit for enhanced performance, with support for other models scheduled for release.

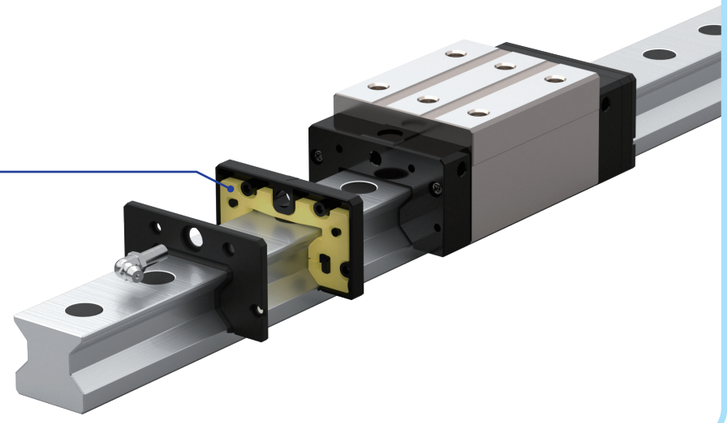
NSK K1-L™ Lubrication Unit

- About 85% lubricant by weight
- Lubricating oil supply Pereod nearly doubled[1)]



NSK K1-L Composition (by weight)

1) Compared with the conventional NSK K1 unit.
Note that lubrication performance is influenced significantly by the operating environment. There is no guarantee of values/performance in actual equipment.



Interchangeable Types

RA25, 30, 35, 45, 55, 65

Freely Match Rails and Roller Slides

Custom matching
Rails and roller slides can be freely matched to suit the application.

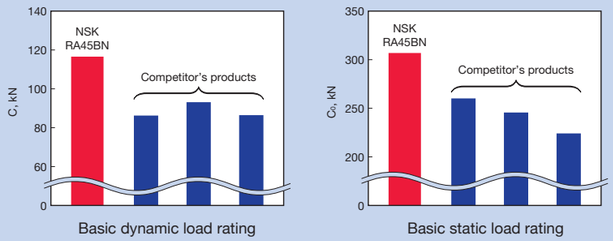
Accuracy interchangeability
High-precision (PH) grade running parallelism is maintained even with custom combinations of rails and roller slides.

Preload interchangeability
Custom combinations of interchangeable roller slides and rails provide the proper preload to maintain rigidity.

Features

1. Super-high load capacity

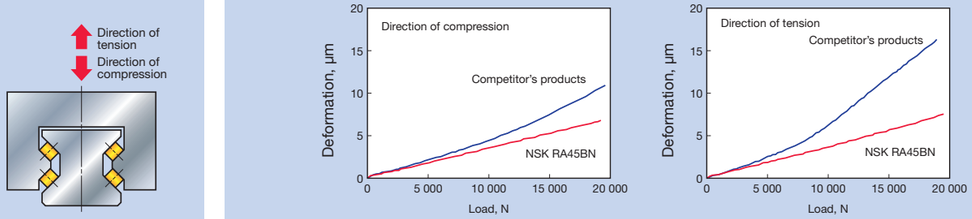
Using NSK-exclusive analysis technology, RA/RB model roller guides offer super-high load capacity with rollers arranged in an optimized layout using the largest possible diameter and length within standard cross-section dimensions. This design helps ensure exceptional life and resistance to impact loads.



The basic load rating shown in the figures complies with ISO standards.
Standards for basic dynamic load rating: ISO14728-1
Standards for basic static load rating: ISO14728-2

2. Super-high rigidity

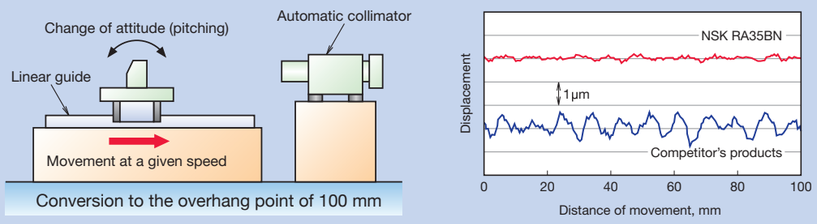
By further leveraging advanced analysis technologies to optimize designs down to the finest details of the slides and rails, RA/RB model guides offer unmatched rigidity.



Comparison of measured rigidity

3. Super-high motion accuracy

Using a proprietary method to simulate vibration from rolling element passage, RA/RB models are designed with enhanced slide motion accuracy and damping specifications.



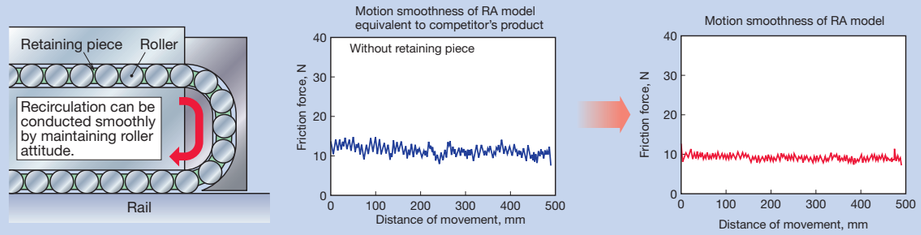
Comparison of measured motion accuracy

4. Standardized mounting dimensions

Outside dimensions and mounting dimensions conform to international standards, allowing RA roller guides to be used without design changes (See p. 18 for details on mounting surface shoulder height and corner radius.)

5. Smooth motion

A retaining piece between the rollers controls skew and keeps motion smooth. With less frictional variation, RA/RB models deliver stable movement even under complex operation patterns.

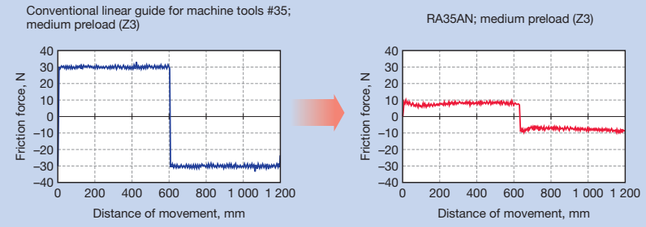


Measured motion smoothness

6. Low friction

Using rollers for rolling elements helps minimize dynamic friction.

Measurement conditions
- Lubrication: Oil (VG68)
- Feeding speed: 1 m/min

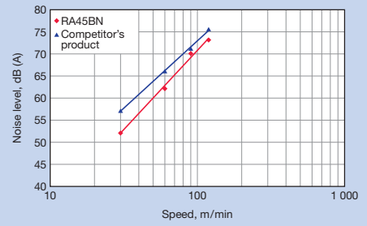


Comparison of measured dynamic friction force

7. Low noise

A retaining piece is provided between rollers to prevent collisions and minimize noise.

Microphone position: 500 mm above rail
Lubrication: Oil (VG68)



Example measurement from noise test

8. Highly dust-resistant, maintenance-free operation

Various seals, rail mounting hole caps, and rail covers are available as options for higher dust resistance.
In particular, highly dust-resistant V1 seals and V1 bottom seals are extremely effective at preventing foreign matter from entering the slide and are recommended to boost dustproofing performance.
Field-proven NSK K1™ and NSK K1-L™ units are also available to keep guides lubricated, allowing maintenance-free operation long-term.
Full details on dust-resistant specifications and compatible sizes can be found later in this catalog (p. 13~).

Specifications

1. Roller Slide Types and Shapes

- Roller slides are available in square, flanged, and low-profile types. Compact RB models come in low-profile and flanged types, offering even lower height than RA models.
- The mounting holes of the flanged type have a tapped part used to fix the roller slide from the top surface and a tapped minor diameter section for use as bolt holes from the bottom. This allows for mounting from either the top or bottom.
- Roller slide length can be specified as the high load/standard type or the super-high load/long type.

RA model

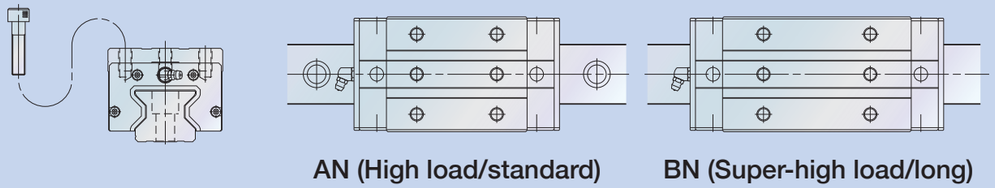


Fig. 1 Square type

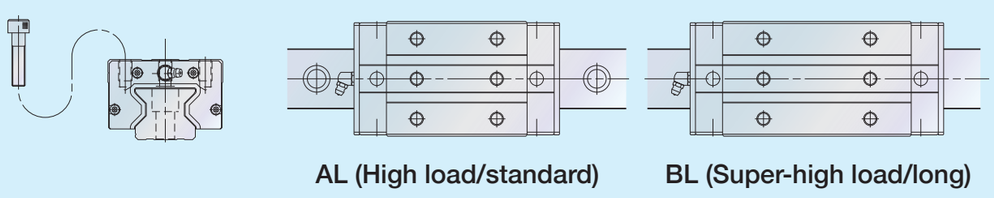


Fig. 2 Low-profile type

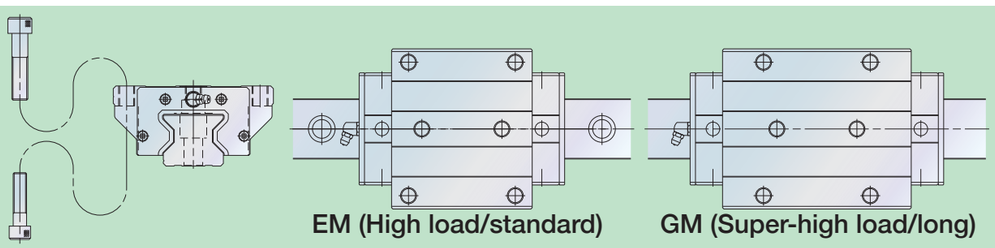


Fig. 3 Flanged type

RB model

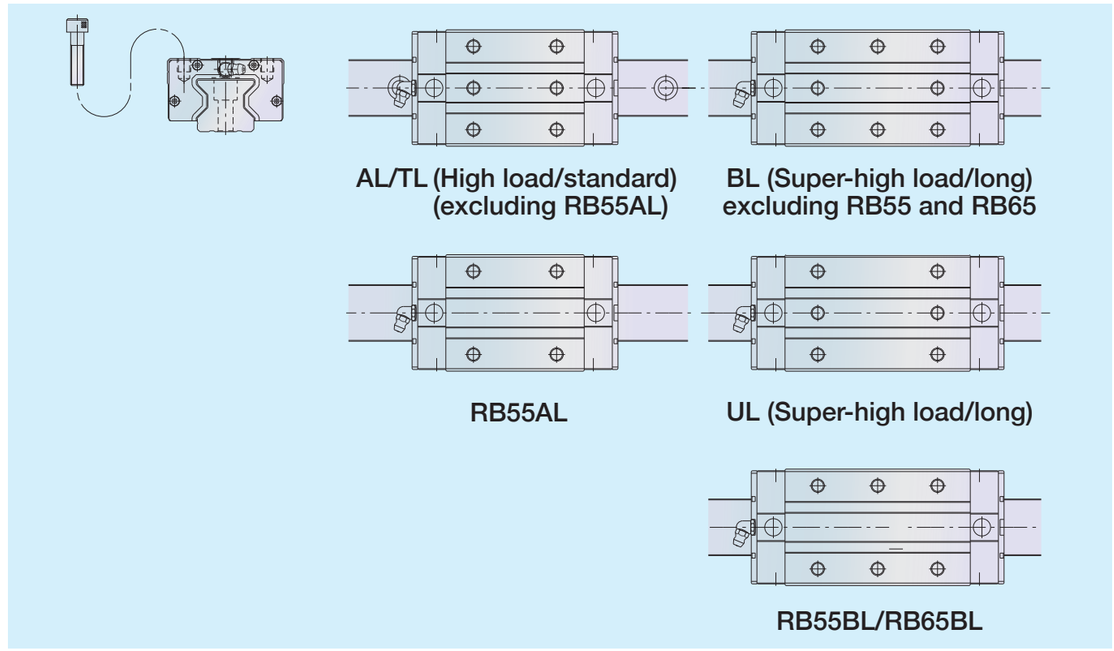


Fig. 4 Low-profile type

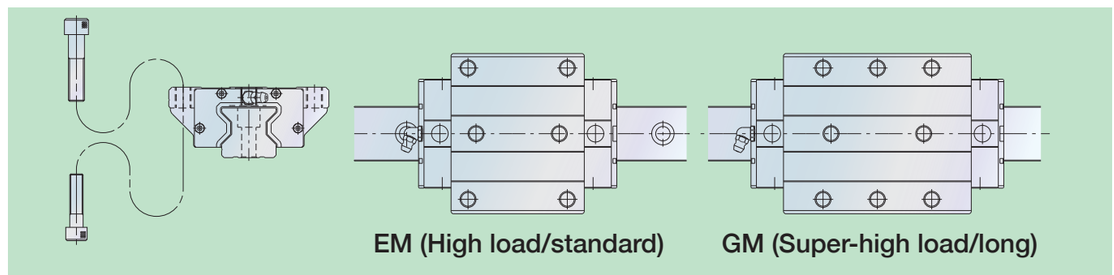


Fig. 5 Flanged type

2. Accuracy

Four accuracy grades are available for preloaded assemblies: Ultra precision P3, Super precision P4, High precision P5, and Precision P6. RA model interchangeable types offer High precision PH grade only.

Table 1 Tolerance of preloaded assembly

Unit: μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6
Mounting height H Variation of H (All roller slides on a set of rails)	±8 3	±10 5	±20 7	±40 15
Mounting width W_2 or W_3 Variation of W_2 or W_3 (All roller slides on reference rail)	±10 3	±15 7	±25 10	±50 20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See Table 3 and Fig. 6			

Table 2 Tolerance of interchangeable type Unit: μm

Characteristics \ Accuracy grade	High precision PH
Mounting height *H*	±20
Variation of mounting height *H*	15 ①
	25 ②
Mounting width W_2 or W_3	±25
Variation of mounting width W_2 or W_3	20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See Table 3 and Fig. 6

Note: ① Variation on the same rail ② Variation on multiple rails

Table 3 Running parallelism Unit: μm

Rail length (mm)	Ultra precision P3	Super precision P4	High precision P5, PH	Precision grade P6
over - 50 or less	2	2	2	4
50 - 80	2	2	3	4
80 - 125	2	2	3	4
125 - 200	2	2	3.5	5
200 - 250	2	2.5	4.5	6
250 - 315	2	2.5	5	6.5
315 - 400	2	3	5.5	7
400 - 500	2	3	6	7.5
500 - 630	2	3.5	6.5	8.5
630 - 800	2	4	7	9.5
800 - 1 000	2.5	4.5	7.5	10
1 000 - 1 250	3	5	8.5	12
1 250 - 1 600	3.5	5.5	9.5	13
1 600 - 2 000	4	6.5	11	14
2 000 - 2 500	4.5	7.5	12	16
2 500 - 3 150	5.5	8.5	13	18
3 150 - 4 000	6	9.5	14	19

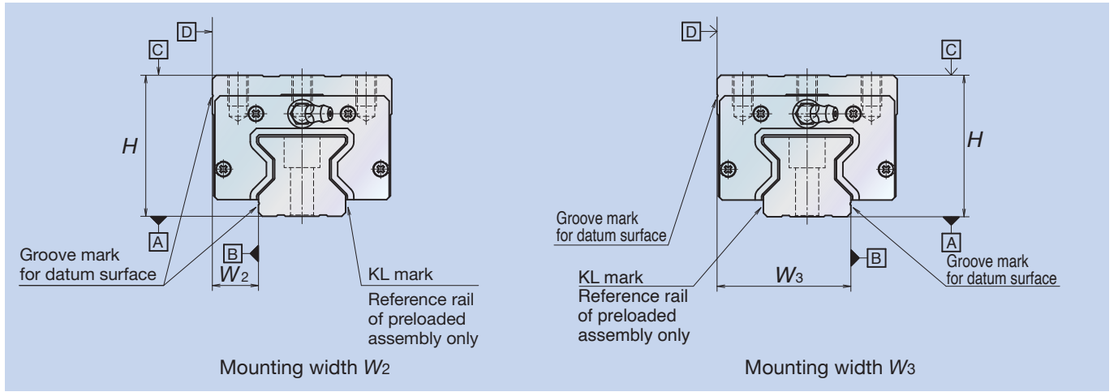


Fig. 6 Accuracy specifications

3. Preload and Rigidity

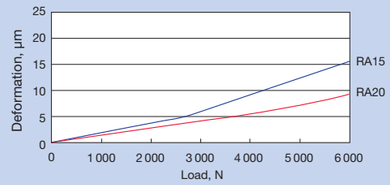
Medium preload Z3 is available for preloaded assemblies, with slight preload Z1 also available for the RA model only. Medium preload ZH and slight preload ZZ are available for the interchangeable RA model. Typical data for preload and rigidity are shown below.

Table 4 RA model: Preload Unit: N

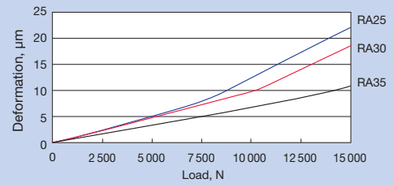
Model No.	High-load		Super-high-load	
	Slight preload (Z1)	Medium preload (Z3)	Slight preload (Z1)	Medium preload (Z3)
RA15	520	1 030	650	1 300
RA20	960	1 920	1 200	2 400
RA25	880	2 920	1 060	3 540
RA30	1 170	3 890	1 430	4 760
RA35	1 600	5 330	2 020	6 740
RA45	2 780	9 280	3 500	11 600
RA55	3 800	12 900	5 000	16 800
RA65	6 500	21 000	8 500	28 800

Table 5 RB model: Preload Unit: N

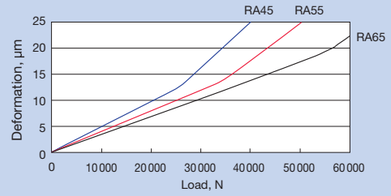
Model No.	High-load	Super-high-load
	Medium preload (Z3)	Medium preload (Z3)
RB30	3 890	4 760
RB35	5 330	6 740
RB45	9 280	11 600
RB55	12 900	16 800
RB65	21 000	28 800



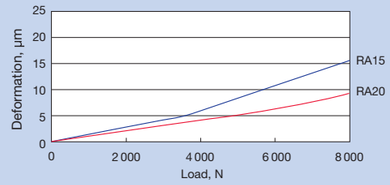
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



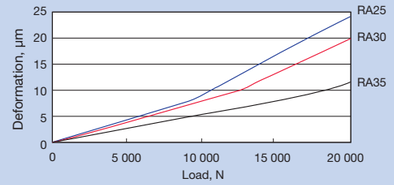
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



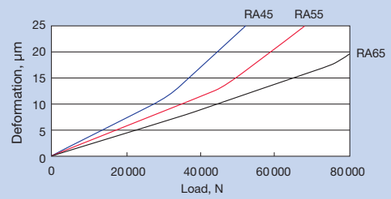
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



Vertical direction rigidity: Super-high-load type/long
(Roller slide shape: BN, BL, GM)



Vertical direction rigidity: Super-high-load type/long
(Roller slide shape: BN, BL, GM)



Vertical direction rigidity: Super-high-load type/long
(Roller slide shape: BN, BL, GM)

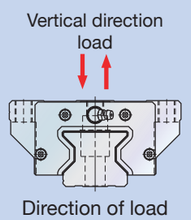
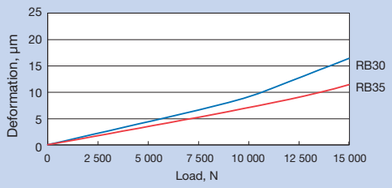
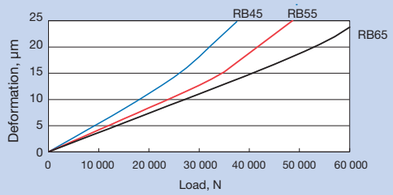


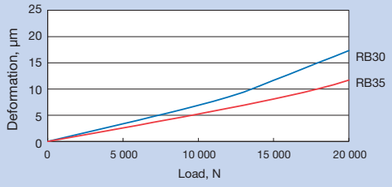
Fig. 7 RA model: Theoretical vertical direction rigidity



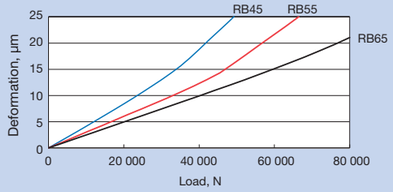
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AL, TL, EM)



Vertical direction rigidity: High-load type/standard
(Roller slide shape: AL, TL, EM)



Vertical direction rigidity: Super-high-load type/long
(Roller slide shape: BL, UL, GM)



Vertical direction rigidity: Super-high-load type/long
(Roller slide shape: BL, UL, GM)

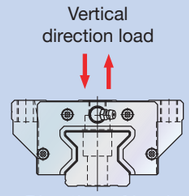


Fig. 8 RB model: Theoretical vertical direction rigidity

4. Basic Load Rating and Rated Life

The basic dynamic load rating used to express the load capacity of a linear guide is determined by ISO standards (ISO 14728-1), with the load specified to not change in amount or direction so that the rating fatigue life is 100 km.
The basic load ratings of NSK Linear Guides are based on ISO standards.
RA/RB models feature 4-way equal load specifications, making their dynamic load ratings the same in both vertical and lateral directions.
The slide's rated fatigue life L can be calculated using the following equation where load F is applied to the roller slide in only one vertical or horizontal direction.

- This life formula is different from that for linear guides with balls as the rolling elements.
- f_w refers to a load factor. Select the appropriate load factor shown in Table 6 based on vibration and impacts on the machine where the linear guide will be used.

$$L = 100 \times \left(\frac{C}{f_w \cdot F} \right)^{\frac{10}{3}} \text{(km)}$$

Table 6 Load factor f_w

Impact and/or vibration	Load factor
No impacts or vibration from the outside	1.0 – 1.5
With impacts and/or vibration from the outside	1.5 – 2.0
With heavy impacts and/or vibration	2.0 – 3.0

Various loads may be applied to the linear guide (i.e., roller slide loads), including vertical loads, lateral loads, and moment loads. Sometimes, more than one type of load will be applied simultaneously or the amount and direction of the load may vary.

Variable loads cannot be used for life calculations of linear guides as they are. Therefore, it is necessary to use an applied hypothetical constant load that would generate a fatigue life equivalent to the actual fatigue life. This is called the dynamic equivalent load. To calculate dynamic equivalent load, use the values provided in Table 7.

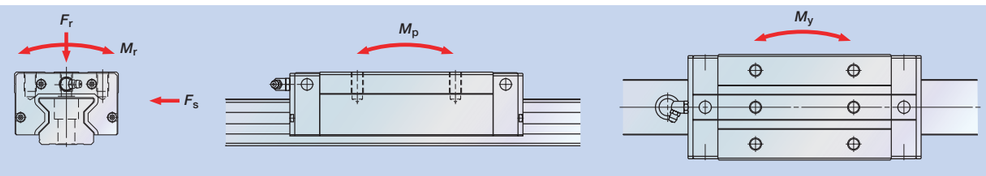
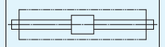
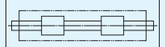
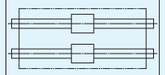
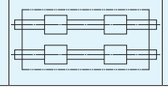


Fig. 9 Direction of load

Table 7 Loads by arrangement of linear guide

Pattern	Arrangement of linear guide	Loads necessary to calculate dynamic equivalent load					Dynamic equivalent load
		Load		Moment load			
		Up/down (vertical)	Right/left (lateral)	Rolling	Pitching	Yawing	
1		F_r	F_s	M_r	M_p	M_y	$F_r = F_r$ $F_{se} = F_s \cdot \tan\alpha$ $F_{re} = \varepsilon_r \cdot M_r$ $F_{pe} = \varepsilon_p \cdot M_p$ $F_{ye} = \varepsilon_y \cdot M_y$ α : Contact angle (=45°) Dynamic equivalent coefficient ε_r : Rolling direction ε_p : Pitching direction ε_y : Yawing direction
2		F_r	F_s	M_r			
3		F_r	F_s		M_p	M_y	
4		F_r	F_s				

After obtaining the dynamic equivalent coefficient in Table 8 or 9, the full dynamic equivalent load can be obtained using the appropriate equation below as determined by the magnitude of the load:

- When F_r is the largest load: $F_e = F_r + 0.5F_{se} + 0.5F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When F_{se} is the largest load: $F_e = 0.5F_r + F_{se} + 0.5F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When F_{re} is the largest load: $F_e = 0.5F_r + 0.5F_{se} + F_{re} + 0.5F_{pe} + 0.5F_{ye}$
- When F_{pe} is the largest load: $F_e = 0.5F_r + 0.5F_{se} + 0.5F_{re} + F_{pe} + 0.5F_{ye}$
- When F_{ye} is the largest load: $F_e = 0.5F_r + 0.5F_{se} + 0.5F_{re} + 0.5F_{pe} + F_{ye}$

The values for dynamic equivalent load in the formulas above should be absolute values that disregard load directions.

Table 8 RA model: Dynamic equivalent coefficient

Model No.	Dynamic equivalent coefficient (1/m)		
	ε_r	ε_p	ε_y
RA15 High load type	105	95	95
RA15 Super-high load type	105	70	70
RA20 High load type	79	74	74
RA20 Super-high load type	79	55	55
RA25 High load type	71	64	64
RA25 Super-high load type	71	50	50
RA30 High load type	56	58	58
RA30 Super-high load type	56	44	44
RA35 High load type	46	52	52
RA35 Super-high load type	46	39	39
RA45 High load type	37	40	40
RA45 Super-high load type	37	30	30
RA55 High load type	32	33	33
RA55 Super-high load type	32	24	24
RA65 High load type	26	28	28
RA65 Super-high load type	26	19	19

Table 9 RB model: Dynamic equivalent coefficient

Model No.	Dynamic equivalent coefficient (1/m)		
	ε_r	ε_p	ε_y
RB30 High load type	56	58	58
RB30 Super-high load type	56	44	44
RB35 High load type	46	52	52
RB35 Super-high load type	46	39	39
RB45 High load type	37	40	40
RB45 Super-high load type	37	30	30
RB55 High load type	32	33	33
RB55 Super-high load type	32	24	24
RB65 High load type	26	28	28
RB65 Super-high load type	26	19	19

5. Lubrication Specifications

(1) Types of lubrication accessories

- Fig. 12 and Tables 11.1 and 11.2 show details on grease fittings and tube fittings.

(2) Mounting positions for lubrication accessories

- The standard position for grease fittings and tube fittings is on the end face of the roller slide. We can mount them on the side of the end cap as an option (Fig. 10). Please consult NSK to install grease or tube fittings to the roller slide body or to the side of an end cap.
- A lubrication hole can also be provided on top of the end cap. In this case, an O ring will be necessary. Fig. 11 and Tables 10.1-10.3 show mounting positions. Some AN/BN slides require spacers, which are available from NSK.
- When using a piping unit with a thread of M6 × 1, a connector is required to connect the piping unit to a grease fitting mounting hole with M6 × 0.75. Connectors are available from NSK.

(3) Oil lubrication precautions

- When oil lubrication is used, the oil may not reach the rolling surface under some roller slide mounting conditions (upside down, wall mountings, etc.) Please consult with NSK before use in these situations.
- When using an oil mist lubricating system, please confirm that a sufficient amount of oil reaches each outlet port.

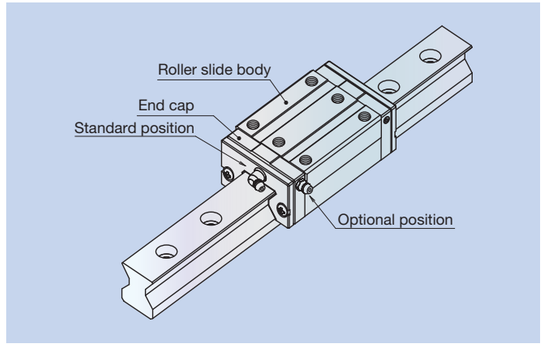


Fig. 10 Mounting positions for lubrication accessories

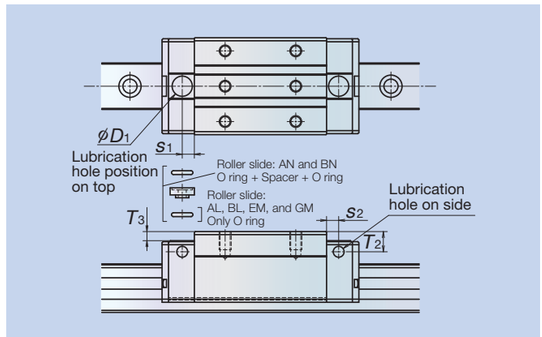


Fig. 11 Top and side lubrication hole positions

Table 10.1 RA model: Top and side lubrication hole positions

Unit: mm

Model No.	Roller slide shape code	Grease fitting size	s_2	T_2	O ring (JIS)	Spacer	D_1	s_1	T_3
RA15	AN, BN	ϕ3	4	7	P5	Necessary	8.2	4.4	4.2
RA20		ϕ3	4	4	P6	–	9.2	5.4	0.2
RA25		M6×0.75	6	10	P7	Necessary	10	6	4.5
RA30		M6×0.75	5	10	P7+P5	Necessary	10.4	6	3.5
RA35		M6×0.75	5.5	15	P7+P5	Necessary	10.4	7	7.4
RA45		Rc 1/8	7.2	20	P7+P5	Necessary	10.4	7.2	10.4
RA55		Rc 1/8	7.2	21	P7+P5	Necessary	10.4	7.2	10.4
RA65		Rc 1/8	7.2	19	P7	–	10.4	7.2	0.4

Note: Grease fittings and tube fittings cannot be mounted on the top of the end cap.

Table 10.2 RA model: Top and side lubrication hole positions

Unit: mm

Model No.	Roller slide shape code	Grease fitting size	s_2	T_2	O ring (JIS)	D_1	s_1	T_3
RA15	AL, BL, EM, GM	ϕ3	4	3	P5	8.2	4.4	0.2
RA20	EM, GM	ϕ3	4	4	P6	9.2	5.4	0.2
RA25	AL, BL, EM, GM	M6×0.75	6	6	P7	10	6	0.5
RA30		M6×0.75	5	7	P7	10.4	6	0.5
RA35		M6×0.75	5.5	8	P7	10.4	7	0.4
RA45		Rc 1/8	7.2	10	P7	10.4	7.2	0.4
RA55		Rc 1/8	7.2	11	P7	10.4	7.2	0.4
RA65	EM, GM	Rc 1/8	7.2	19	P7	10.4	7.2	0.4

Note: Grease fittings and tube fittings cannot be mounted on the top of the end cap.

Table 10.3 RB model: Top and side lubrication hole positions

Unit: mm

Model No.	Grease fitting size	s_2	T_2	O ring (JIS)	D_1	s_1	T_3
RB30	M6x0.75	5	6.5	P7	10.4	6	0.5
RB35	M6x0.75	5.5	6.5	P7	10.4	7	0.4
RB45	M6x0.75	7.2	6.5	P7	10.4	7.2	0.4
RB55	M6x0.75	7.2	8	P7	10.4	7.2	0.4
RB65	M6x0.75	7.2	10	P7	10.4	7.2	0.4

Note: Grease fittings and tube fittings cannot be mounted on the top of the end cap.

Table 11.1 RA model: Lubrication accessory thread length

Unit: mm

Model No.	Dust-resistant specification	Dimension L		
		Grease fitting / Drive-in type	Tube fitting	
			SF type	LF type
RA15	Standard	5	-	-
	With NSK K1	10	-	-
	Double seal	8	-	-
	Protector	8	-	-
RA20	Standard	5	-	-
	With NSK K1	10	-	-
	Double seal	8	-	-
	Protector	10	-	-
RA25	Standard	5	5	5
	With NSK K1	12	12	12
	Double seal	10	9	9
	Protector	10	9	9
RA30	Standard	5	6	6
	With NSK K1	14	14	15
	Double seal	12	12	11
	Protector	12	10	11
RA35	Standard	5	6	6
	With NSK K1-L[1)]	14	14	15
	Double seal	12	12	11
	Protector	12	10	11
RA45	Standard	8	13.5	17
	With NSK K1-L[1)]	18	20	21.5
	Double seal	14	16	17
	Protector	14	16	17
RA55	Standard	8	13.5	17
	With NSK K1-L[1)]	18	20	21.5
	Double seal	14	16	17
	Protector	14	16	17
RA65	Standard	8	13.5	17
	With NSK K1	20	20	20
	Double seal	14	18	17
	Protector	14	16	17

Note: [1)] NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

Table 11.2 RB model: Lubrication accessory thread length

Unit: mm

Model No.	Dust-resistant specification	Dimension L		
		Grease fitting / Drive-in type	Tube fitting	
			SF type	LF type
RB30	Standard	5	-	-
	With NSK K1	10	-	-
	Double seal	8	-	-
	Protector	8	-	-
RB35	Standard	5	5	5
	With NSK K1	14	15	16
	Double seal	12	12	12
	Protector	12	12	12
RB45	Standard	5	5	5
	With NSK K1	14	15	16
	Double seal	12	12	12
	Protector	12	12	12
RB55	Standard	8	13.5	17
	With NSK K1	18	20	21.5
	Double seal	14	16	17
	Protector	14	16	17
RB65	Standard	8	13.5	17
	With NSK K1	20	20	20
	Double seal	14	18	17
	Protector	14	16	17

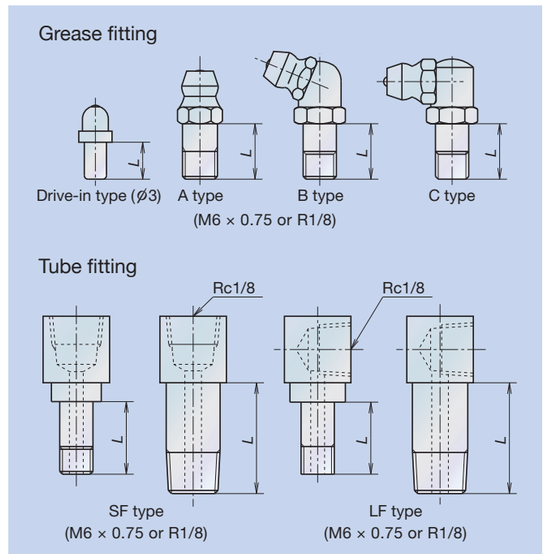


Fig.12 Grease fittings and tube fittings

6. Dust-resistant specifications

(1) Standard specification

RA and RB models are equipped with end, inner[1)], and bottom seals to prevent foreign matter from entering the inside of the roller slide. Under normal applications, RA and RB models can be used without modification. For severe usage conditions, optional dust-resistant specifications such as rail covers, highly dust-resistant V1 seals, and V1 bottom seals are available-contact NSK for full details and mounting instructions.

1) Inner seals for models RA15 and RA20 are available as an option.

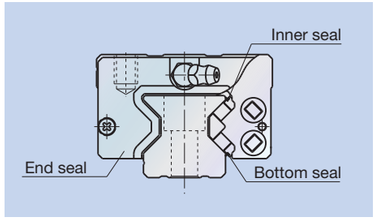


Fig. 13 View of roller slide equipped with dust-resistant parts

Table 12 Optional parts for dust resistance

Name	Purpose
NSK K1™/NSK K1-L™ lubrication unit [1)]	Made of oil-impregnated resin. Enhances lubrication.
Double seal	Combines two end seals for enhanced seal effectiveness.
Protector	Protects the end seal from hot and hard contaminants.
Rail cap	Prevents foreign matter, such as swarf generated in cutting, from clogging the rail-mounting holes.
Rail cover [2)]	Covers the rail top surface, and prevents foreign matter, such as cutting dust, from collecting in the rail mounting holes.
Highly dust-resistant V1 seals [3)]	Installed in place of standard end seals to further enhance dust resistance.
Highly dust-resistant V1 bottom seals [3)]	Installed outside standard bottom seals to prevent foreign matter entry from underneath the slide.

1) NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.
2) Rail covers are available for models RA25 to RA65.
3) Models RA25 to RA65 support V1 seals, and RA35 to RA65 support V1 bottom seals.

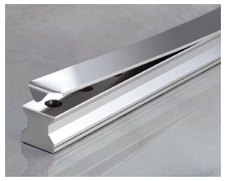


Fig. 14 Rail cover

(2) NSK K1™ and NSK K1-L™ lubrication units

NSK K1 lubrication units feature a porous resin containing a large amount of lubricating oil. Mounted inside the end seal, NSK K1 units supply lubricant to the raceway over a long period.
Enhanced NSK K1-L lubrication units offer significantly improved lubricant supply over conventional NSK K1 units, allowing longer periods of maintenance-free operation with select models.
Tables 13 and 14 show slide lengths with NSK K1/K1-L units installed.

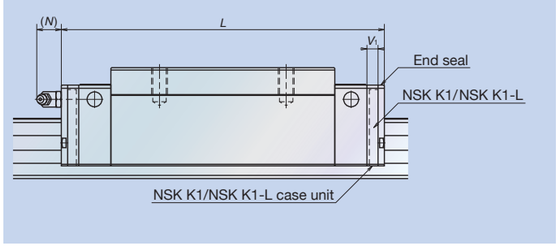


Fig. 15 Slide equipped with NSK K1/K1-L unit

Table 13 RA Model: Slide lengths with NSK K1/K1-L units [1)]

Unit: mm

Model No.	Roller slide length	Roller slide shape code	Standard roller slide length	Roller slide length with two NSK K1/K1-L installed L	Thickness of single NSK K1/K1-L V_1	Protrusion of grease fitting N
RA15	Standard	AN, AL, EM	70	79	4.5	(3)
	Long	BN, BL, GM	85.4	94.4		
RA20	Standard	AN, EM	86.5	95.5	4.5	(3)
	Long	BN, GM	106.3	115.3		
RA25	Standard	AN, AL, EM	97.5	107.5	5	(11)
	Long	BN, BL, GM	115.5	125.5		
RA30	Standard	AN, AL, EM	110.8	122.8	6	(11)
	Long	BN, BL, GM	135.4	147.4		
RA35	Standard	AN, AL, EM	123.8	136.8	6.5	(11)
	Long	BN, BL, GM	152	165		
RA45	Standard	AN, AL, EM	154	168	7	(14)
	Long	BN, BL, GM	190	204		
RA55	Standard	AN, AL, EM	184	198	7	(14)
	Long	BN, BL, GM	234	248		
RA65	Standard	AN, EM	228.4	243.4	7.5	(14)
	Long	BN, GM	302.5	317.5		

Note: Roller slide length when equipped with NSK K1/NSK K1-L = (standard roller slide length) + (V_1 thickness of single NSK K1/NSK K1-L unit) × (number of NSK K1/NSK K1-L units).
1) NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

Table 14 RB Model: Slide lengths with NSK K1

Unit: mm

Model No.	Roller slide length	Roller slide shape code	Standard roller slide length	Roller slide length with two NSK K1 installed L	Thickness of single NSK K1 V_1	Protrusion of grease fitting N
RB30	Standard	AL, EM	110.8	122.8	6	(3)
	Long	BL, GM	135.4	147.4		
RB35	Standard	AL, EM	123.8	136.8	6.5	(11)
	Long	BL, GM	152	165		
RB45	Standard	AL, EM	154	168	7	(11)
	Long	BL, GM	190	204		
RB55	Standard	AL, TL, EM	184	198	7	(14)
	Long	BL, UL, GM	234	248		
RB65	Standard	AL, EM	228.4	243.4	7.5	(14)
	Long	BL, UL, GM	302.5	317.5		

Note: Roller slide length when equipped with NSK K1 = (standard roller slide length) + (V_1 thickness of single NSK K1 unit) × (number of K1 units).

(3) Double seals and protectors

Double seals and protectors for RA/RB models can only be installed before shipping from the factory. Tables 15 and 16 show the increased thickness of end seals and protectors.

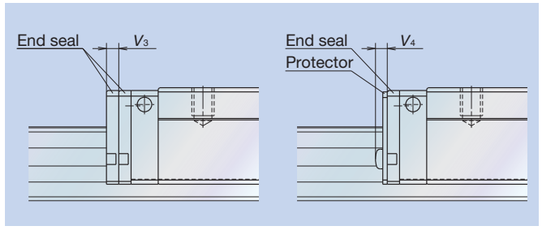


Fig. 16 Slide with end seal/protector

Table 15 Increased thickness of RA model options

Unit: mm

Model No.	Thickness of end seal V_3	Thickness of protector V_4
RA15	3	2.7
RA20	3	3.3
RA25	3.2	3.3
RA30	3.4	3.6
RA35	3.4	3.6
RA45	4	4.2
RA55	4	4.2
RA65	5	5.5

Table 16 Increased thickness of RB model options

Unit: mm

Model No.	Thickness of end seal V_3	Thickness of protector V_4
RB30	3.4	3.6
RB35	3.4	3.6
RB45	4	4.2
RB55	4	4.2
RB65	5	5.5

(4) Rail covers

Use a cover bracket to fix the rail cover when installing. Fig. 17 shows cover bracket dimensions. The protrusion from the end of the rail will be:
Inside: 10.5 mm or less
Outside: 4 mm or less (models RA25 to RA65)
Please confirm the stroke and space at the rail end in your machine.
Table 17 shows rail height when a rail cover is installed.

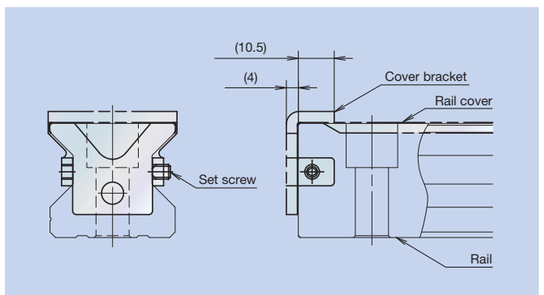


Fig. 17 End configuration of rail equipped with rail cover

Table 17 Height of rails equipped with rail cover

Unit: mm

Model No.	Standard rail height H_1	Rail height installed with rail cover
RA25	24	24.2
RA30	28	28.2
RA35	31	31.25
RA45	38	38.3
RA55	43.5	43.8
RA65	55	55.3

(5) Caps to plug rail mounting bolt holes

Bolt sizes for rail mounting and cap reference numbers are shown in Tables 18 and 19.

Table 18 RA model: Caps for rail mounting holes

Model No.	Bolt to secure rail	Cap reference No.	Quantity/case
RA15	M4	LG-CAP/M4	20
RA20	M5	LG-CAP/M5	
RA25	M6	LG-CAP/M6	
RA30, RA35	M8	LG-CAP/M8	
RA45	M12	LG-CAP/M12	
RA55	M14	LG-CAP/M14	
RA65	M16	LG-CAP/M16	

Table 19 RB model: Caps for rail mounting holes

Model No.	Bolt to secure rail	Cap reference No.	Quantity/case
RB30, RB35	M8	LG-CAP/M8	20
RB45	M12	LG-CAP/M12	
RB55	M14	LG-CAP/M14	
RB65	M16	LG-CAP/M16	

(6) Specification with highly dust-resistant V1 seals and V1 bottom seals

Specifications with dust-resistant V1 end seals are available for RA25 to RA65. V1 seals feature new materials and a shape optimized for abrasion resistance, helping prevent foreign matter entry over the long term. For even higher durability, add the outstanding lubricating effects of NSK K1/K1-L lubrication units and dust-resistant V1 bottom seals (for RA35 to RA65) to match your application.
Specialized bolt hole caps with an improved shape help to stop contaminants from building up in and around the rail mounting holes, further protecting against foreign matter entry.
A rail cover with increased dust resistance can also be used (See p. 14 for details).

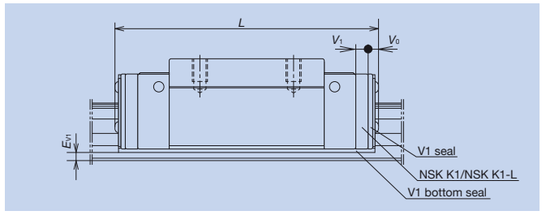


Fig. 18 Guide with V1 seals and V1 bottom seals

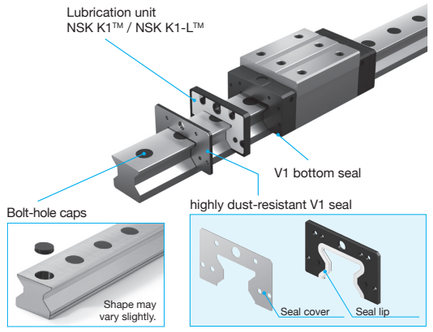


Table 20 Dimensions when equipped V1 seals and V1 bottom seals

Unit: mm

Model No.	Roller slide length	Roller slide shape code	Standard roller slide length *L*	Roller slide length equipped with V1 seal and NSK K1/NSK K1-L *L*	Slide bottom face height equipped with V1 bottom seal E_{V1}	Thickness of V1 seal V_0	Thickness of K1 case unit V_1
RA25	Standard	AN, AL, EM	97.5	111.3	–	5.1	5
	Long	BN, BL, GM	115.5	129.3			
RA30	Standard	AN, AL, EM	110.8	126.8	–	5.4	6
	Long	BN, BL, GM	135.4	151.4			
RA35	Standard	AN, AL, EM	123.8	140.8	min. 3.7	5.4	6.5
	Long	BN, BL, GM	152	169			
RA45	Standard	AN, AL, EM	154	173.2	min. 5.2	6.6	7
	Long	BN, BL, GM	190	209.2			
RA55	Standard	AN, AL, EM	184	203.2	min. 6.2	8.9	7
	Long	BN, BL, GM	234	253.2			
RA65	Standard	AN, EM	228.4	251.2	min. 10.2	8.9	7.5
	Long	BN, GM	302.5	325.3			

Precautions for highly dust-resistant V1 bottom seals

V1 bottom seals are installed on the bottom face of the slide. Take care to avoid interference with any shoulder on the machine base.

Table 21 Dimensions with V1 bottom seals Unit: mm

	RA35	RA45	RA55	RA65
Shoulder height H_{V1}	3	4.5	5.5	9.5
Rail mounting corner radius r_a	max. 1	max. 1.5	max. 1.5	max. 1.5
Slide bottom face height E_{V1}	min. 3.7	min. 5.2	min. 6.2	min. 10.2
Slide main body bottom face height *E*	6.5	8	9	13

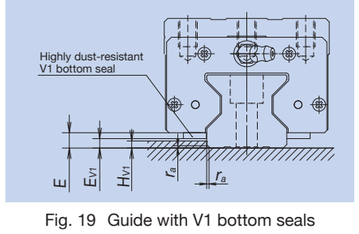


Fig. 19 Guide with V1 bottom seals

Use in contaminated environments

- Contaminants have serious effects on lubrication conditions and roller guide durability. We recommend performing evaluation tests for your specific application.
- If expecting use in a contaminated environment, consult NSK for expert guidance using the relevant Technical Data Sheet.

(7) Bellows

Bellows are accordion-like covers that protect the entire guide from contaminants and are an option for higher dust resistance with RA models.

To Mount Bellows to the Slide:
Remove the two machine screws that secure the end seal. (For RA15, hold the end cap by hand or the end cap may detach from the slide and the rollers may fall out.)
Place a spacer ring on the mounting hole of the end seal and fasten the mounting plate at the end of the bellows using a slightly longer machine screw. (For RA15, place a spacer plate between the end seal and the mounting plate at the end of the bellows.)

To Mount Bellows to the Rail:
First, make tap holes on the rail end surface. Fix the bellows mounting plate to the rail end surface with machine screws through these tap holes. NSK processes tap holes on the rail end surface when a linear guide and bellows are ordered as a set.

Bellows Calculations:
Use the following formulas to calculate the lengths of end bellows:

$S_t = L_{max} - L_{min}$
Length when stretched to the maximum
$L_{max} = f_b \cdot P \times$ Number of folds
Length when contracted to the minimum
$L_{min} = 2.5 \times$ Number of folds + 3

Bellows reference number

J A R 35 N

- Bellows
  - A: End bellows
  - B: Middle bellows
- R: Bellows for RA model
- 35: Size of linear guide
- N: High type L: Low type

For inquiries, please have the ref. no. and stroke ready.

Values for f_b and *P* are listed in Table 20. The number of folds can be obtained from the following:

$$\text{Number of folds} = \frac{S_t - 3}{f_b \cdot P - 2.5}$$

Round up the calculated value so that the number of folds will be $n + 0.5$ (*n*: a natural number).
Please contact NSK for the length of middle bellows, or if considering bellows for the RB model.

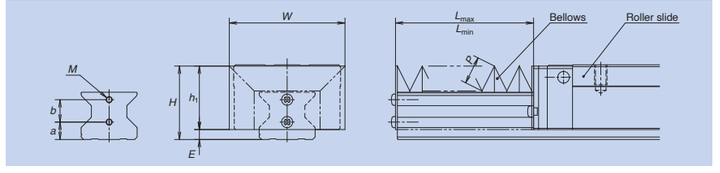


Fig. 20 Bellows dimensions

Table 22 Bellows dimensions

Unit: mm (excluding f_b)

Model No.	*H*	h_1	*E*	*W*	*P*	f_b	*a*	*b*	Tap *M* × depth
JAR15L	23.5	19.5	4	33	7	1.2	7	6.3	M3x5
JAR15N	27	23		39	10	1.3			
JAR20N	29	24	5	43	8	1.3	8.5	9	M3x5
JAR25L	35	30	5	51	10	1.3	8.5	12	M3x5
JAR25N	39	34		61	14	1.4			
JAR30L	41	34.5	6.5	60	12	1.3	11	12.5	M4x6
JAR30N	44	37.5		66	15	1.4			
JAR35L	47	40.5	6.5	72	15	1.4	11	15	M4x6
JAR35N	54	47.5		82	20	1.5			
JAR45L	59	51	8	93	20	1.5	14	18	M5x8
JAR45N	69	61		113	30	1.5			
JAR55L	69	60	9	101	20	1.5	15	22	M5x8
JAR55N	79	70		121	30	1.5			
JAR65N	89	76	13	131	30	1.5	21	26	M6x10

Note: f_b is a dimensionless number.

7. Rust prevention

Surface treatments

NSK recommends low-temperature chrome plating or fluoride low-temperature chrome plating surface treatments. For other surface treatments, please consult NSK.

Table 23 RA models: Material/surface treatment codes

Code	Description
C	Special high carbon steel (NSK standard)
D	Special high carbon steel with surface treatment
P	Special high carbon steel with V1 seal
R	Special high carbon steel with surface treatment and V1 seal
Z	Other, special

Table 24 RB models: Material/surface treatment codes

Code	Description
C	Special high carbon steel (NSK standard)
D	Special high carbon steel with surface treatment
Z	Other, special

Note : P and R are not available for interchangeable slides and rails.

8. Maximum rail length

Tables 25 and 26 show rail length limits (maximum lengths) for a single rail in the RA/RB models; however, note that limits vary by accuracy grade.

Table 25 RA model: Rail length limits

Unit: mm

Size	RA15	RA20	RA25	RA30	RA35	RA45	RA55	RA65
Maximum length	2 000	3 000	3 900	3 900	3 900	3 650	3 600	3 600

Table 26 RB model: Rail length limits

Unit: mm

Size	RB30	RB35	RB45	RB55	RB65
Maximum length	3 900	3 900	3 650	3 600	3 600

Note: Rails can be butted if user requirements exceed the rail length shown in the table. Please consult NSK for details.

9. Installation

(1) Permissible mounting error

Improper mounting results in harmful effects such as shortened operating life, deterioration of motion accuracy, and friction variation.
NSK places a strong focus on operating life–we set permissible mounting error to values where the operating life will be calculated to exceed 10 000 km assuming the following conditions:

- The load per roller slide is 10% of basic dynamic load rating *C*.
- The rigidity of machine is infinite.

Permissible mounting error is shown in Table 27 and 28 using the representative error shown in Fig. 21.

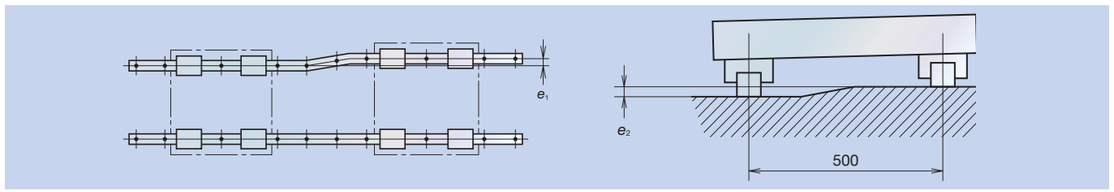


Fig. 21 Permissible mounting error

Table 27 RA model: Permissible mounting error

Unit: μm

Value	Preload	Model No.							
		RA15	RA20	RA25	RA30	RA35	RA45	RA55	RA65
Permissible values for parallelism error of two rails e_1	Z1, ZZ	7	10	14	18	21	27	31	49
	Z3, ZH	5	7	9	11	13	17	19	30
Permissible values for height error of two rails e_2	Z1, ZZ	290μm/500mm							
	Z3, ZH	150μm/500mm							

Table 28 RB model: Permissible mounting error

Unit: μm

Value	Preload	Model No.				
		RB30	RB35	RB45	RB55	RB65
Permissible values for parallelism error of two rails e_1	Z3	11	13	17	19	30
Permissible values for height error of two rails e_2	Z3	150μm/500mm				

(2) Shoulder height and corner radius of mounting surface

Fig. 22 and Tables 29 and 30 show shoulder height and corner radius of the mounting surface when the rail or slide is pressed against the shoulder of the machine base or table (the raised section of the mounting surface) and fixed horizontally.

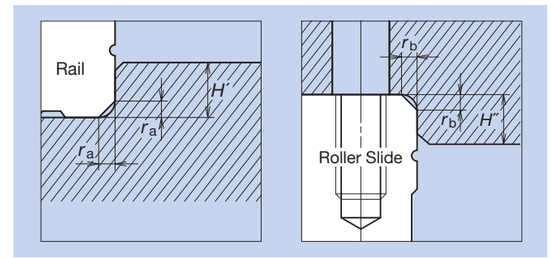


Fig. 22 Datum faces of roller guide and shoulder

Table 29 RA model: Shoulder height and corner radius of the mounting surface

Unit: mm

Model No.	Shoulder height		Corner radius (maximum)	
	H'	H''	r_a	r_b
RA15	3	4	0.5	0.5
RA20	4	5	0.5	0.5
RA25	4	5	0.5	1
RA30	5	6	1	1
RA35	5	6	1	1
RA45	6	8	1.5	1
RA55	7	10	1.5	1.5
RA65	11	11	1.5	1.5

Table 30 RB model: Shoulder height and corner radius of the mounting surface

Unit: mm

Model No.	Shoulder height		Corner radius (maximum)	
	H'	H''	r_a	r_b
RB30	5	6	1	1
RB35	5	6	1	1
RB45	6	8	1.5	1
RB55	7	10	1.5	1.5
RB65	8	11	1.5	1.5

10. Dynamic friction force

Tables 31 and 32 indicate dynamic friction force values by slide and component.
Values for standard products are based on actual usage conditions with standard dust-resistant specifications (two end seals, inner seals, and bottom seals each) and standard (AS2) grease. However, as inner seals are optional for RA15 and RA20, values for these models do not include inner seals.
If using optional components, add the dynamic friction force for that part to the value for standard products and subtract the portion for standard seals if necessary (e.g if using V1 seals).
Note that dynamic friction force varies depending on the type of grease used.

Table 31 RA models: Dynamic friction forces

Unit: N

Model No.	Roller slide		Of standard products (when packed with AS2 grease)		Of V1 seals	Of V1 bottom seals	Of NSK K1 or K1-L Units [3]
	Rating	Shape code		Portion from standard seals			
RA15	High load type	AN, AL, EM	21	3	–	–	3
	Super-high load type	BN, BL, GM	24				
RA20	High load type	AN, EM	22	3.5	–	–	3
	Super-high load type	BN, GM	28				
RA25	High load type	AN, AL, EM	27	5	6	–	4
	Super-high load type	BN, BL, GM	34				
RA30	High load type	AN, AL, EM	33	5	8	–	4
	Super-high load type	BN, BL, GM	42				
RA35	High load type	AN, AL, EM	42	6	10	17	5
	Super-high load type	BN, BL, GM	53			21	
RA45	High load type	AN, AL, EM	56	8	15	21	7
	Super-high load type	BN, BL, GM	69			26	
RA55	High load type	AN, AL, EM	80	8	20	25	8
	Super-high load type	BN, BL, GM	95			32	
RA65	High load type	AN, EM	120	14	25	31	8
	Super-high load type	BN, GM	138			41	

Notes: 1) Values are based on a slide fitted with two of the components listed.
2) Values shown are estimates and should be used as a reference.
3) NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

Table 32 RB models: Dynamic friction forces

Unit: N

Model No.	Roller slide		Of standard products (when packed with AS2 grease)		NSK K1
	Rating	Shape code		Portion from standard seals	
RB30	High load type	AL, EM	33	5	4
	Super-high load type	BL, GM	42		
RB35	High load type	AL, EM	42	6	5
	Super-high load type	BL, GM	53		
RB45	High load type	AL, EM	56	8	7
	Super-high load type	BL, GM	69		
RB55	High load type	AL, TL, EM	80	8	8
	Super-high load type	BL, UL, GM	95		
RB65	High load type	AL, EM	120	14	8
	Super-high load type	BL, UL, GM	138		

Notes: 1) Values are based on a slide fitted with two of the components listed.
2) Values shown are estimates and should be used as a reference.

Handling Precautions

① Operating temperature limits should normally be less than 80˚C.

② If using NSK K1™/NSK K1-L™, service temperature should not exceed 50˚C (or 80˚C momentarily). Make sure the unit does not come in contact with organic solvents that can be used for degreasing. Do not place the unit in a location exposed to white kerosene or rust prevention oil containing white kerosene.

③ To transfer a slide onto/from a rail, please note the following:
- Do not remove the roller slide from the rail unless absolutely necessary.
- When moving the roller slide onto or off of a rail, use the provided provisional rail to prevent dents and scratches on the raceways from excessive force and to prevent the rollers from falling out.
- Ensure that the bottom and side of the provisional rail are aligned to the rail that the slide will be transferred onto/from and move the slide while butting the end faces of the rails.
- Use a clean provisional rail. Do not use with a rail that is contaminated with foreign matter or that uses a different type of lubricant.

Square type (tapped mounting holes)
RA–AN (High load/standard), RA–BN (Super-high load/long)

(1) Reference number for preloaded assembly

RA 35 1000 AN C 2 - P6 3**

- Model name: RA
- Size: 35
- Rail length (mm): 1000
- Roller slide shape code: AN, BN: AN
- Material/surface treatment code (See p. 17, Table 23.): C
  - C: Special high carbon steel (NSK standard)
- Number of roller slides per rail: 2
- Design serial number: -
  - Added to the reference number.
- Accuracy code: P6
  - (Without NSK K1): P3, P4, P5, P6, PH
  - (With NSK K1): K3, K4, K5, K6, KH [1)]
  - (With NSK K1-L): L3, L4, L5, L6, LH [1)]
- Preload code: 3
  - 1: Z1, 3: Z3, Z: ZZ, H: ZH

(2) Reference number for interchangeable type

Roller slide: RAA 35 AN PH H -F

- Interchangeable roller slide model code: RAA
  - RAA: RA Model interchangeable roller slide
- Size: 35
- Roller slide shape code: AN, BN: AN
- Accuracy code: PH
  - PH: High-precision grade interchangeable type (Without NSK K1)
  - KH: High-precision grade interchangeable type (With NSK K1) [1)]
  - LH: High-precision grade interchangeable type (With NSK K1-L) [1)]
- Preload code: H
  - Z: Slight preload, H: Medium preload
- Option code: -F
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover
  - -CF: Fluoride low temperature chrome plating + Rail cover

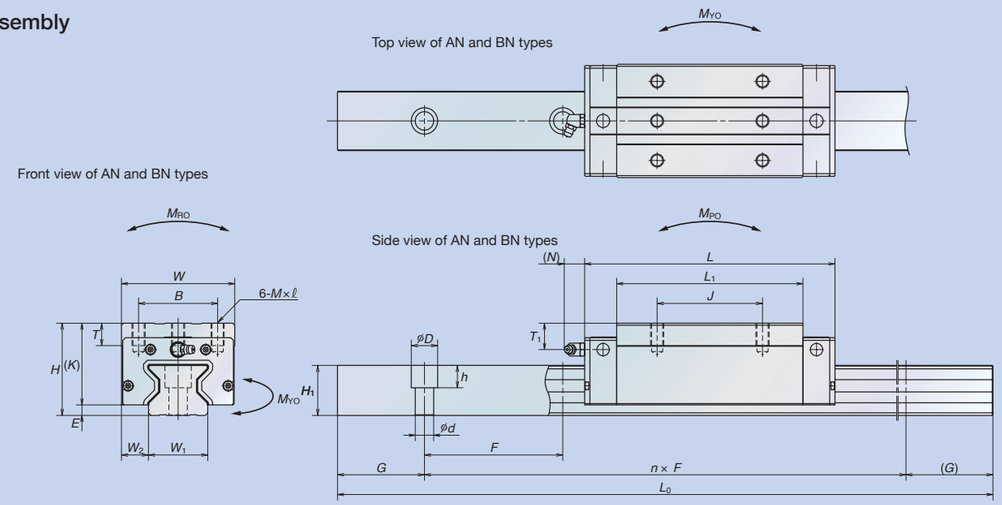
Rail: R1A 35 1000 L C N - PH Z**

- Interchangeable rail model code: R1A
  - R1A: RA Model interchangeable rail
- Size: 35
- Rail length (mm): 1000
- Rail shape code: L: L
  - L: Standard
- Material/surface treatment code (See p. 17, Table 23.): C
- *Butting rail specification: N
  - N: Non-butting. L: Butting specification
  - *Please consult with NSK for butting rail specifications.
- Design serial number: -
  - Added to the reference number.
- Accuracy code: PH
  - PH: High-precision grade interchangeable type
- Preload code: Z
  - Z: Common for slight and medium preload

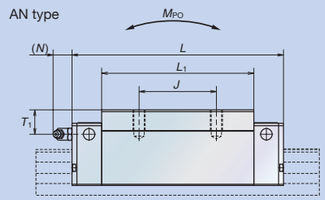
[1)] NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

The Click!Speedy™ NSK Linear Guide Quick Delivery System uses a different numbering system.
For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

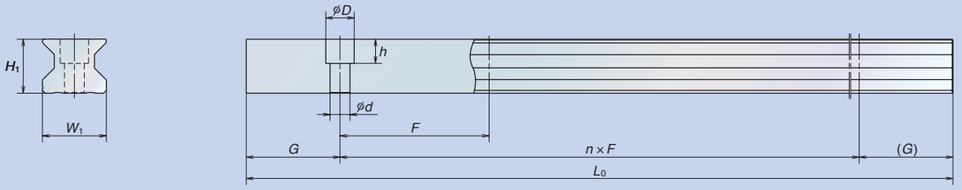
Assembly



Interchangeable roller slide



Interchangeable rail



Unit: mm

Model No.	Assembly Height H	E	W2	Roller slide Width W	Length L	Mounting hole B	J	M ×pitch× ℓ	L1	K	T	Grease fitting Hole size	T1	N	Rail Width W1	Height H1	Pitch F	Mounting bolt hole d×D×h	G (reference)	Maximum length L0max	Basic load ratings 3) Dynamic [50km] C50 (N)	[100km] C100 (N)	Static C0 (N)	Static moment (N·m) MR0	MP0 One slide	MP0 Two slides	MY0 One slide	MY0 Two slides	Weight Roller slide (kg)	Rail (kg/m)
RA15AN	28	4	9.5	34	70	26	26	M4×0.7×6	44.8	24	8	φ3	8	3	15	16.3	60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.21	1.6
RA15BN					85.4				60.2								(30)				16 000	13 000	37 000	350	375	2 130	375	2 130	0.30	
RA20AN	30	5	12	44	86.5	32	36	M5×0.8×6	57.5	25	12	φ3	4	3	20	20.8	60	6×9.5×8.5	20	3 000	23 600	19 200	52 500	665	505	3 100	505	3 100	0.38	2.6
RA20BN					106.3		50		77.3								(30)				29 500	24 000	70 000	890	900	5 000	900	5 000	0.50	
RA25AN	40	5	12.5	48	97.5	35	35	M6×1×9	65.5	35	12	M6×0.75	10	11	23	24	30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.60	3.4
RA25BN					115.5		50		83.5								(60)				43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.91	
RA30AN	45	6.5	16	60	110.8	40	40	M8×1.25×11	74	38.5	14	M6×0.75	10	11	28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.0	4.9
RA30BN					135.4		60		98.6								(80)				58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.3	
RA35AN	55	6.5	18	70	123.8	50	50	M8×1.25×12	83.2	48.5	15	M6×0.75	15	11	34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.6	6.8
RA35BN					152		72		111.4								(80)				82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.1	
RA45AN	70	8	20.5	86	154	60	60	M10×1.5×17	105.4	62	17	R_C1/8	20	14	45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	3.0	10.9
RA45BN					190		80		141.4								(105)				143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	4.1	
RA55AN	80	9	23.5	100	184	75	75	M12×1.75×18	128	71	18	R_C1/8	21	14	53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	4.9	14.6
RA55BN					234		95		178								(120)				207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	6.7	
RA65AN	90	13	31.5	126	228.4	76	70	M16×2×20	155.4	77	22	R_C1/8	19	14	63	55	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	9.3	22.0
RA65BN					302.5		120		229.5								(150)				355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	12.2	

Notes: 1) Select either the standard dimension for pitch *F* as shown without parentheses, or the semi-standard dimension as shown inside parentheses. If not specified, the standard dimension for *F* will be applied.

2) The interchangeable type is available for models RA25 to RA65.
3) Basic load ratings comply with ISO standards (ISO 14728-1,14728-2).
C_{50}: Basic dynamic load rating for 50 km rated fatigue life C_{100}: Basic dynamic load rating for 100 km rated fatigue life

Low profile type (tapped mounting holes)
RA–AL (High load/standard), RA–BL (Super-high load/long)

(1) Reference number for preloaded assembly

RA 35 1000 AL C 2 - P6 3**

- Model name: RA
- Size: 35
- Rail length (mm): 1000
- Roller slide shape code: AL, BL
- Material/surface treatment code (See p. 17, Table 23.): C
  - C: Special high carbon steel (NSK standard)
- Number of roller slides per rail: 2
- Design serial number: -
  - Added to the reference number.
- Accuracy code: P6
  - (Without NSK K1): P3, P4, P5, P6, PH
  - (With NSK K1): K3, K4, K5, K6, KH [1]
  - (With NSK K1-L): L3, L4, L5, L6, LH [1]
- Preload code: 3
  - 1: Z1, 3: Z3, Z: ZZ, H: ZH

(2) Reference number for interchangeable type

Roller slide: **RAA 35 AL PH H -F**

- Interchangeable roller slide model code: RAA
  - RAA: RA Model interchangeable roller slide
- Size: 35
- Roller slide shape code: AL, BL
- Accuracy code: PH
  - PH: High-precision grade interchangeable type (Without NSK K1)
  - KH: High-precision grade interchangeable type (With NSK K1) [1]
  - LH: High-precision grade interchangeable type (With NSK K1-L) [1]
- Preload code: H
  - Z: Slight preload, H: Medium preload
- Option code: -F
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover
  - -CF: Fluoride low temperature chrome plating + Rail cover

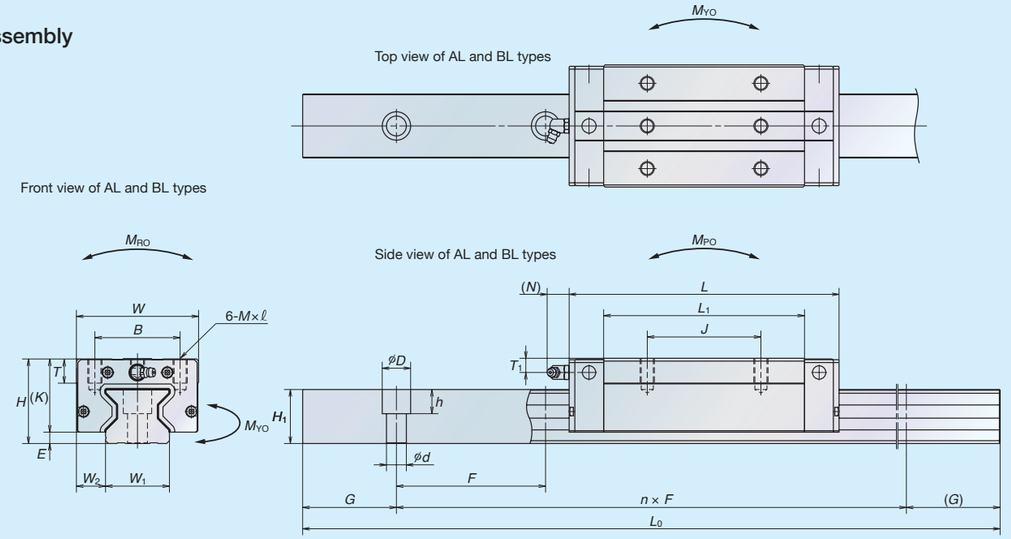
Rail: **R1A 35 1000 L C N -** PH Z**

- Interchangeable rail model code: R1A
  - R1A: RA Model interchangeable rail
- Size: 35
- Rail length (mm): 1000
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See p. 17, Table 23.): C
- Number of roller slides per rail: N
- *Butting rail specification: -
  - N: Non-butting. L: Butting specification
  - *Please consult with NSK for butting rail specifications.
- Accuracy code: PH
  - PH: High-precision grade interchangeable type
- Preload code: Z
  - Z: Common for slight and medium preload

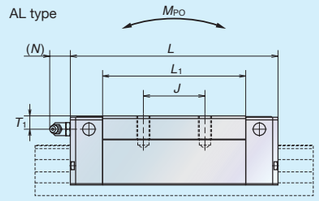
[1] NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

The Click!Speedy™ NSK Linear Guide Quick Delivery System uses a different numbering system.
For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Assembly



Interchangeable roller slide



Interchangeable rail

Unit: mm

Model No.	Assembly Height H	E	W2	Roller slide Width W	Length L	Mounting hole B	J	M×pitch×ℓ	L1	K	T	Grease fitting Hole size	T1	N	Rail Width W1	Height H1	Pitch F	Mounting bolt hole d×D×h	G (reference)	Maximum length L0max	Basic load ratings [3] Dynamic [50km] C50 (N)	[100km] C100 (N)	Static C0 (N)	Static moment (N·m) MR0	MP0 One slide	MP0 Two slides	MY0 One slide	MY0 Two slides	Weight Roller slide (kg)	Rail (kg/m)
RA15AL	24	4	9.5	34	70	26	26	M4×0.7×5.5	44.8	20	8	φ3	4	3	15	16.3	60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.17	1.6
RA15BL					85.4				60.2								(30)				16 000	13 000	37 000	350	375	2 130	375	2 130	0.25	
RA25AL	36	5	12.5	48	97.5	35	35	M6×1×8	65.5	31	12	M6×0.75	6	11	23	24	30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.45	3.4
RA25BL					115.5		50		83.5								(60)				43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.80	
RA30AL	42	6.5	16	60	110.8	40	40	M8×1.25×11	74	35.5	14	M6×0.75	7	11	28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	0.85	4.9
RA30BL					135.4		60		98.6								(80)				58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.1	
RA35AL	48	6.5	18	70	123.8	50	50	M8×1.25×12	83.2	41.5	15	M6×0.75	8	11	34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.2	6.8
RA35BL					152		72		111.4								(80)				82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	1.7	
RA45AL	60	8	20.5	86	154	60	60	M10×1.5×16	105.4	52	17	RC1/8	10	14	45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	2.5	10.9
RA45BL					190		80		141.4								(105)				143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	3.4	
RA55AL	70	9	23.5	100	184	75	75	M12×1.75×18	128	61	18	RC1/8	11	14	53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	4.1	14.6
RA55BL					234		95		178								(120)				207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	5.7	

Notes: 1) Select either the standard dimension for pitch *F* as shown without parentheses, or the semi-standard dimension as shown inside parentheses. If not specified, the standard dimension for *F* will be applied.

2) The interchangeable type is available for models RA25 to RA65.
3) Basic load ratings comply with ISO standards (ISO 14728-1,14728-2).
C_{50}: Basic dynamic load rating for 50 km rated fatigue life C_{100}: Basic dynamic load rating for 100 km rated fatigue life

Flanged type (for both tapped and bolt mounting holes)
RA–EM (High load/standard), RA–GM (Super-high load/long)

(1) Reference number for preloaded assembly

RA 35 1000 EM C 2 - ** **P6 3**

- Model name: RA
- Size: 35
- Rail length (mm): 1000
- Roller slide shape code: EM, GM
- Material/surface treatment code (See p. 17, Table 23.): C
  - C: Special high carbon steel (NSK standard)
- Number of roller slides per rail: 2
- Design serial number: -**
  - Added to the reference number.
- Accuracy code: P6
  - (Without NSK K1): P3, P4, P5, P6, PH
  - (With NSK K1): K3, K4, K5, K6, KH [1)]
  - (With NSK K1-L): L3, L4, L5, L6, LH [1)]
- Preload code: 3
  - 1: Z1, 3: Z3, Z: ZZ, H: ZH

(2) Reference number for interchangeable type

Roller slide: **RAA 35 EM PH H -F**

- Interchangeable roller slide model code: RAA
  - RAA: RA Model interchangeable roller slide
- Size: 35
- Roller slide shape code: EM, GM
- Accuracy code: PH
  - PH: High-precision grade interchangeable type (Without NSK K1)
  - KH: High-precision grade interchangeable type (With NSK K1) [1)]
  - LH: High-precision grade interchangeable type (With NSK K1-L) [1)]
- Preload code: H
  - Z: Slight preload, H: Medium preload
- Option code: -F
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover
  - -CF: Fluoride low temperature chrome plating + Rail cover

Rail: **R1A 35 1000 L C N -** ** **PH Z**

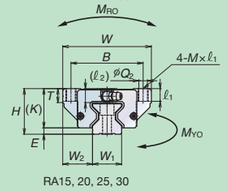
- Interchangeable rail model code: R1A
  - R1A: RA Model interchangeable rail
- Size: 35
- Rail length (mm): 1000
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See p. 17, Table 23.): C
- *Butting rail specification: N
  - N: Non-butting. L: Butting specification
  - *Please consult with NSK for butting rail specifications.
- Design serial number: -**
  - Added to the reference number.
- Accuracy code: PH
  - PH: High-precision grade interchangeable type
- Preload code: Z
  - Z: Common for slight and medium preload

[1)] NSK K1-L is available for models RA35 to RA55, and NSK K1 for all others.

The Click!Speedy™ NSK Linear Guide Quick Delivery System uses a different numbering system.
For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

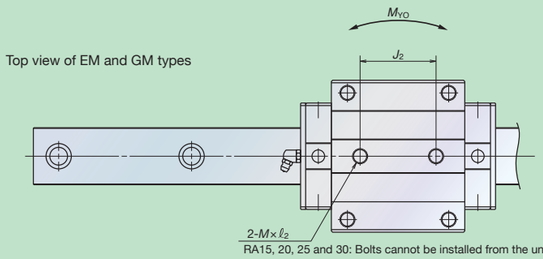
Assembly

Front view of EM and GM types

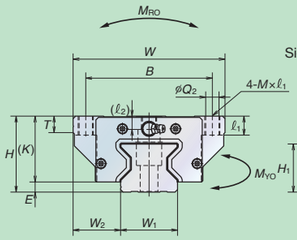


RA15, 20, 25, 30

Top view of EM and GM types

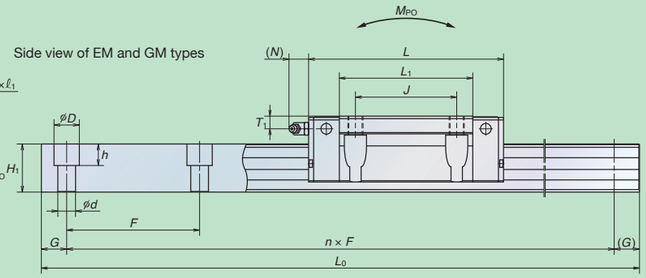


RA15, 20, 25 and 30: Bolts cannot be installed from the underside.



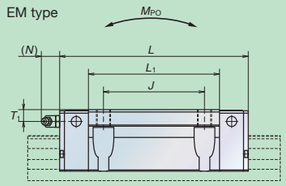
RA35, 45, 55, 65

Side view of EM and GM types

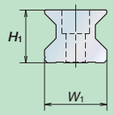


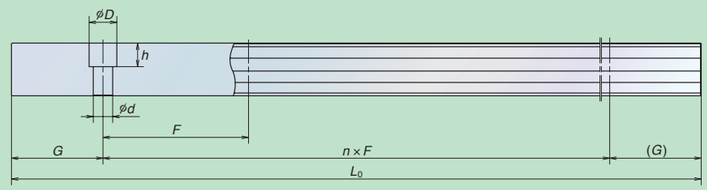
Interchangeable roller slide

EM type



Interchangeable rail





Unit: mm

Model No.	Assembly Height H	E	W2	Roller slide Width W	Length L	Mounting hole B	J	J2	M ×pitch× ℓ1(ℓ2)	Q2	L1	K	T	Grease fitting Hole size	T1	N	Rail Width W1	Height H1	Pitch F	Mounting bolt hole d×D×h	G (reference)	Maximum length L0max	Basic load ratings 3) Dynamic [50km] C50 (N)	[100km] C100 (N)	Static C0 (N)	Static moment (N·m) MR0	MP0 One slide	MP0 Two slides	MY0 One slide	MY0 Two slides	Weight Roller slide (kg)	Rail (kg/m)
RA15EM	24	4	16	47	70	38	30	26	M5×0.8×8.5 (6.5)	4.4	44.8	20	8	φ3	4	3	15	16.3	60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.21	1.6
RA15GM					85.4						60.2								(30)				16 000	13 000	37 000	350	375	2 130	375	2 130	0.28	
RA20EM	30	5	21.5	63	86.5	53	40	35	M6×1×9.5 (8)	5.3	57.5	25	10	φ3	4	3	20	20.8	60	6×9.5×8.5	20	3 000	23 600	19 200	52 500	665	505	3 100	505	3 100	0.45	2.6
RA20GM					106.3						77.3								(30)				29 500	24 000	70 000	890	900	5 000	900	5 000	0.65	
RA25EM	36	5	23.5	70	97.5	57	45	40	M8×1.25×10 (11)	6.8	65.5	31	11	M6×0.75	6	11	23	24	30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.80	3.4
RA25GM					115.5						83.5								(60)				43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	1.1	
RA30EM	42	6.5	31	90	110.8	72	52	44	M10×1.5×12 (12.5)	8.6	74	35.5	11	M6×0.75	7	11	28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.3	4.9
RA30GM					135.4						98.6								(80)				58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.7	
RA35EM	48	6.5	33	100	123.8	82	62	52	M10×1.5×13 (7)	8.6	83.2	41.5	12	M6×0.75	8	11	34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.7	6.8
RA35GM					152						111.4								(80)				82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.3	
RA45EM	60	8	37.5	120	154	100	80	60	M12×1.75×15 (10.5)	10.5	105.4	52	13	R_C1/8	10	14	45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	3.2	10.9
RA45GM					190						141.4								(105)				143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	4.3	
RA55EM	70	9	43.5	140	184	116	95	70	M14×2×18 (13)	12.5	128	61	15	R_C1/8	11	14	53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	5.4	14.6
RA55GM					234						178								(120)				207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	7.5	
RA65EM	90	13	53.5	170	228.4	142	110	82	M16×2×24 (18.5)	14.6	155.4	77	22	R_C1/8	19	14	63	55	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	12.2	22.0
RA65GM					302.5						229.5								(150)				355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	16.5	

Notes: 1) Select either the standard dimension for pitch *F* as shown without parentheses, or the semi-standard dimension as shown inside parentheses. If not specified, the standard dimension for *F* will be applied.

2) The interchangeable type is available for models RA25 to RA65.
3) Basic load ratings comply with ISO standards (ISO 14728-1,14728-2).
C_{50}: Basic dynamic load rating for 50 km rated fatigue life C_{100}: Basic dynamic load rating for 100 km rated fatigue life

Low profile type (tapped mounting holes)
RB–AL·TL (High load/standard), RB–BL·UL (Super-high load/long)

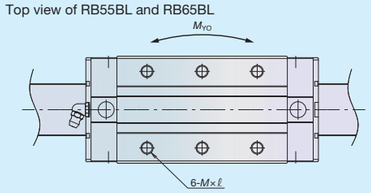
Reference number for preloaded assembly

RB 35 1000 AL C 2 - P6 3**

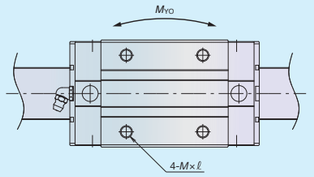
- Model name: RB
- Size: 35
- Rail length (mm): 1000
- Roller slide shape code: AL, TL, BL, UL: AL
- Material/surface treatment code (See p. 17, Table 24.): C
  C: Special high carbon steel (NSK standard)
- Number of roller slides per rail: 2
- Design serial number: -**
  Added to the reference number.
- Accuracy code: P6
  (Without NSK K1): P3, P4, P5, P6
  (With NSK K1): K3, K4, K5, K6
- Preload code: 3
  3: Z3

☆RB30 uses a drive-in grease fitting

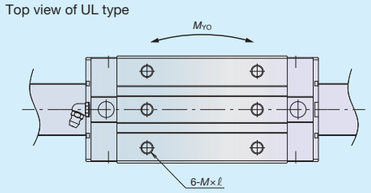
Top view of RB55BL and RB65BL



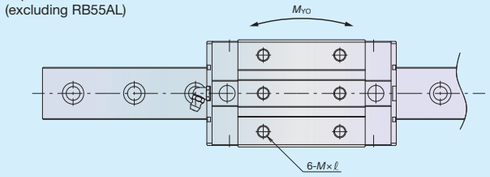
Top view of RB55AL



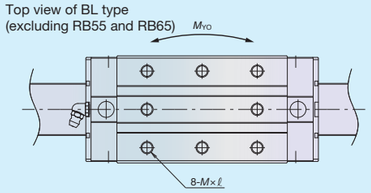
Top view of UL type



Top view of AL and TL (excluding RB55AL)



Top view of BL type (excluding RB55 and RB65)



Front view

Side view of AL and TL types

Side view of BL type

Unit: mm

Model No.	Assembly Height H	E	W_2	Roller slide Width W	Length L	Mounting hole B	J	Number of holes	M×pitch×ℓ	L_1	K	T	Grease fitting Hole size	T_1	N	Rail Width W_1	Height H_1	Pitch F	Mounting bolt hole d×D×h	G (reference)	Maximum length L_{0max}	Basic load ratings 2) Dynamic [50km] C_{50} (N)	[100km] C_{100} (N)	Static C_0 (N)	Static moment (N·m) M_{R0}	M_{P0} One slide	M_{P0} Two slides	M_{Y0} One slide	M_{Y0} Two slides	Weight Roller slide (kg)	Rail (kg/m)
RB30AL	38	6.5	16	60	110.8	40	40	6	M8×1.25×7	74	31.5	14	φ3	5	2.6	28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	0.71	4.9
RB30BL					135.4		60	8		98.6								(80)				58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	0.91	
RB35AL	44	6.5	18	70	123.8	50	50	6	M8×1.25×8	83.2	37.5	15	M6×0.75	6.5	11	34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.0	6.8
RB35BL					152		72	8		111.4								(80)				82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	1.5	
RB45AL	52	8	20.5	86	154	60	60	6	M10×1.5×10	105.4	44	17	M6×0.75	6.5	14	45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	1.9	10.9
RB45BL					190		80	8		141.4								(105)				143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	2.6	
RB55AL	63	9	23.5	100	184	65	75	4	M12×1.75×12	128	54	18	R_C1/8	8.5	14	53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	3.4	14.6
RB55TL						75												(120)													
RB55BL					234	65	95	6		178												207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	4.7	
RB55UL						75																									
RB65AL	75	10	31.5	126	228.4	76	70	6	M16×2×16	155.4	65	22	R_C1/8	10	14	63	52	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	7.2	20.5
RB65BL					302.5		110			229.5								(150)				355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	9.5	
RB65UL							120																								

Notes: 1) Select either the standard dimension for pitch *F* as shown without parentheses, or the semi-standard dimension as shown inside parentheses.
If not specified, the standard dimension for *F* will be applied.

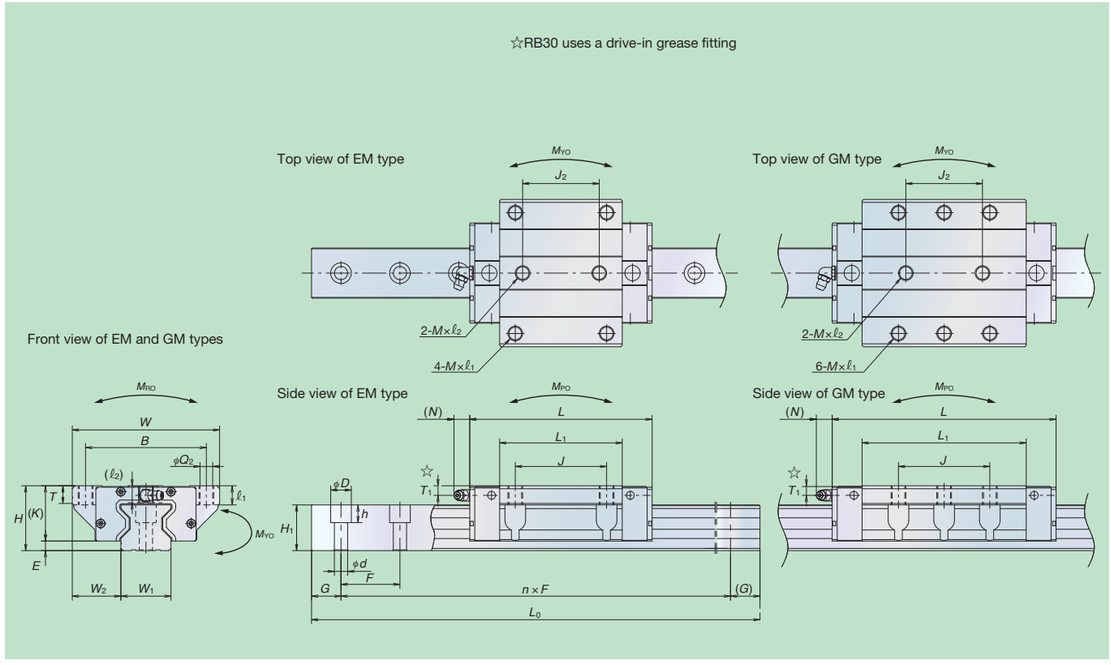
2) Basic load ratings comply with ISO standards (ISO 14728-1,14728-2):
C_{50}: Basic dynamic load rating for 50 km rated fatigue life C_{100}: Basic dynamic load rating for 100 km rated fatigue life

Flanged type (for both tapped and bolt mounting holes)
RB–EM (High load/standard), RB–GM (Super-high load/long)

Reference number for preloaded assembly

RB 35 1000 EM C 2 - P6 3**

- Model name
- Size
- Rail length (mm)
- Roller slide shape code: EM, GM
- Material/surface treatment code (See p. 17, Table 24.)
  C: Special high carbon steel (NSK standard)
- Number of roller slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code
  (Without NSK K1): P3, P4, P5, P6
  (With NSK K1): K3, K4, K5, K6
- Preload code
  3: Z3



Unit: mm

Model No.	Assembly			Roller slide													Rail						Basic load ratings								Weight	
	Height			Width	Length	Mounting hole								Grease fitting			Width	Height	Pitch	Mounting bolt hole	G	Maximum length	2) Dynamic		Static	Static moment (N·m)					Roller slide	Rail
									Number of holes														[50km]	[100km]								
	H	E	W_2	W	L	B	J	J_2		M×pitch×$\ell_1(\ell_2)$	Q_2	L_1	K	T	Hole size	T_1	N	W_1	H_1	F	d×D×h	(reference)	L_{0max}	C_{50} (N)	C_{100} (N)	C_0 (N)	M_{R0}	M_{P0} One slide	M_{P0} Two slides	M_{Y0} One slide	M_{Y0} Two slides	(kg)	(kg/m)
RB30EM	38	6.5	31	90	110.8	72	52	44	6	M10×1.5×12 (8.5)	8.6	74	31.5	11	ϕ3	5	2.6	28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.1	4.9
RB30GM					135.4				8			98.6								(80)			58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.5	
RB35EM	44	6.5	33	100	123.8	82	62	52	6	M10×1.5×13 (11.5)	8.6	83.2	37.5	12	M6×0.75	6.5	11	34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.5	6.8
RB35GM					152				8			111.4								(80)			82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.0	
RB45EM	52	8	37.5	120	154	100	80	60	6	M12×1.75×15 (12.5)	10.5	105.4	44	13	M6×0.75	6.5	14	45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	2.5	10.9
RB45GM					190				8			141.4								(105)			143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	3.4	
RB55EM	63	9	43.5	140	184	116	95	70	6	M14×2×18 (18)	12.5	128	54	15	R_C1/8	8.5	14	53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	4.7	14.6
RB55GM					234				8			178								(120)			207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	6.6	
RB65EM	75	10	53.5	170	228.4	142	110	82	6	M16×2×24 (21)	14.6	155.4	65	15	R_C1/8	10	14	63	52	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	9.7	20.5
RB65GM					302.5				8			229.5								(150)			355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	13.2	

Notes: 1) Select either the standard dimension for pitch *F* as shown without parentheses or the semi-standard dimension as shown inside parentheses.
If not specified, the standard dimension for *F* will be applied.

2) Basic load ratings comply with ISO standards (ISO 14728-1,14728-2):
C_{50}: Basic dynamic load rating for 50 km rated fatigue life C_{100}: Basic dynamic load rating for 100 km rated fatigue life

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NSK

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