

LINEAR GUIDE

ROLLER GUIDE RA SERIES



As one of the world's leading manufacturers of rolling bearings, linear technology components and steering systems, we can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



The NSK company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context, we develop technologies in the fields of rolling bearings, linear systems, components for the automotive industry and mechatronic systems. Our research and production facilities in Europe, Americas and Asia are linked together in a global technology

network. Here we concentrate not only on the development of new technologies, but also on the continuous optimisation of quality – at every process stage.

Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

The fruits of comprehensive technology of NSK. RA series roller guides handle a diversity of applications

The RA series of roller guides is the product of a combination of NSK's extensive experience in roller bearings and linear guide technologies. The result is an optimal design that takes full advantage of NSK's unique expertise to realize super-high load capacity, rigidity and motion accuracy, plus smooth motion. Capable of handling a variety of applications, the RA series supports high machine performance.

RA series features support high machine performance

Super-long Life

Super-high load capacity

NSK has realized super-high load capacity, now the highest performance in the world, and achieved unprecedented operating life.

Maintenance-free

Installing an NSK K1 lubrication unit assures long-term, maintenance-free operation.

Highly dust-proof

The high performance seals as standard equipment completely block the entry of foreign matter and maintain primary performance over the long term.

Contribution to 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 will greatly contribute to improve machining quality.

Smooth motion

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

The RA series is available in eight models:

RA15, 20, 25, 30, 35, 45, 55 and 65.

Used in Many Fields

Complete series

Series includes a full lineup from small to large, including low-profile sizes. You can choose the model according to the application.

Interchangeable mounting dimensions

Outside dimensions and mounting dimensions conform to standard dimensions for the market, so RA series roller guides can be used without having to alter machine design. (See page 13 for mounting surface dimensions)

Low friction

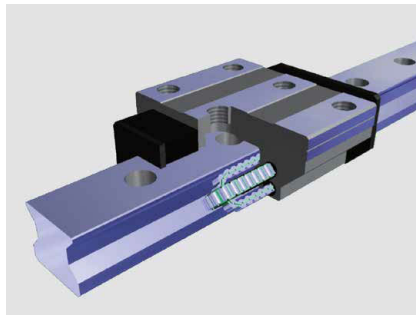
Uses rollers for rolling elements to hold down dynamic friction.

Roller Guide RA Series

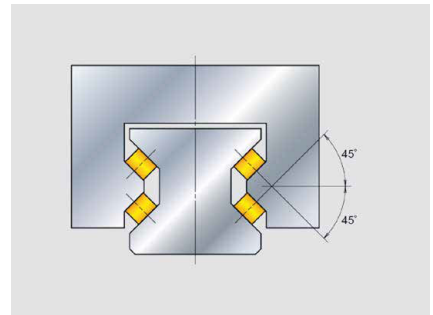
Optimal Design

NSK executed a comprehensive, detailed performance simulation of roller guides by integrating its analysis technology and the tribology technology that the company had been developing over many years.

Down to the dimensions and shapes of component details, we have attained an optimal design completely



Smooth motion by use of retaining pieces



Balanced four-directional iso-load specifications

Random-matching Type RA25, 30, 35, 45, 55, 65 Random matching of rails and roller slides

Accuracy compatibility

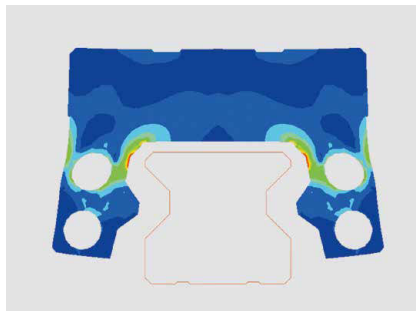
The random combinations of roller slide and rail achieve high precision grade (PH) running parallelism.

Random matching with preload

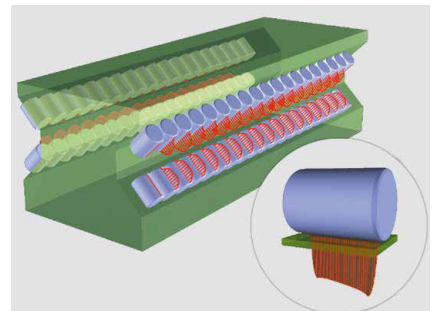
The random combinations of roller slide and rail provide the constant rigidity with an adequate preload.

Random matching

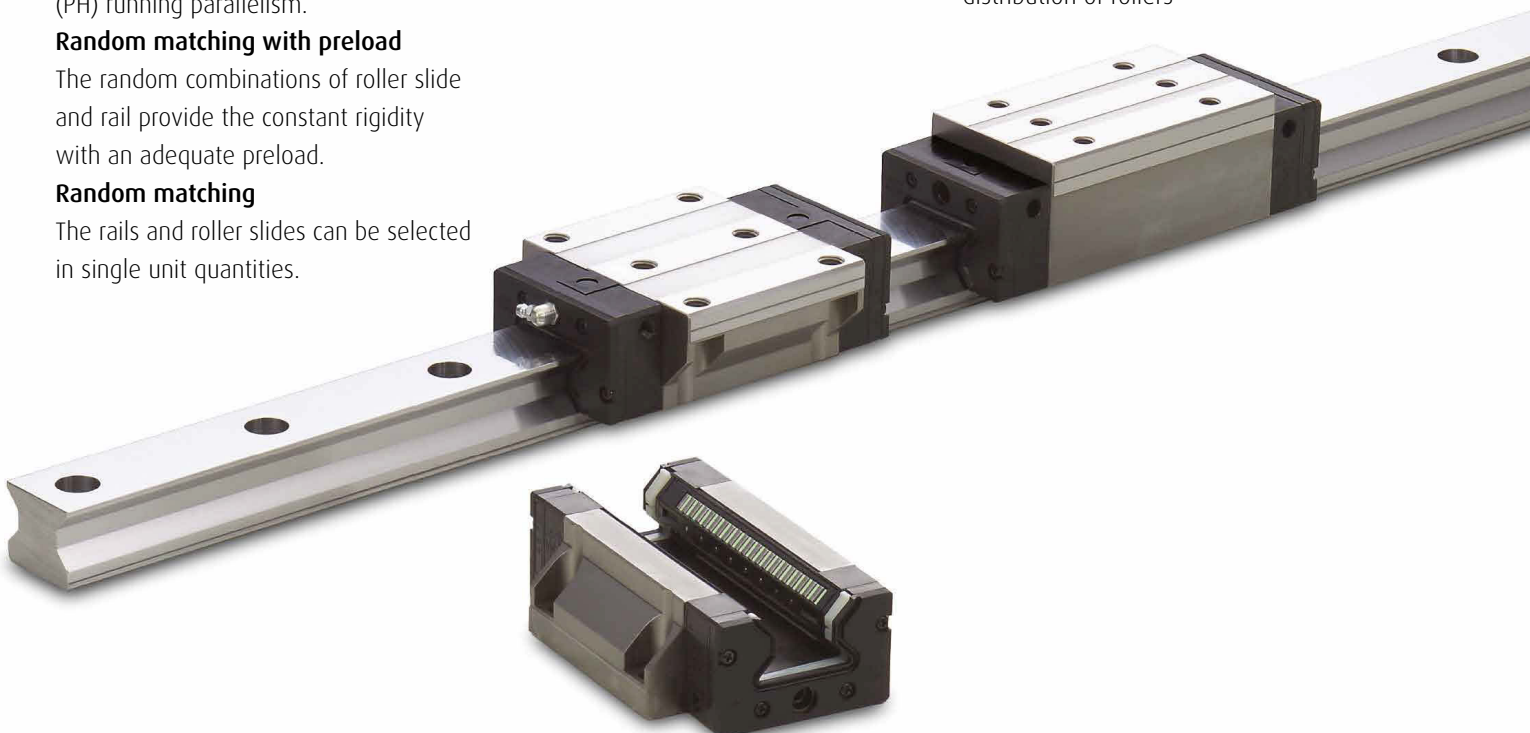
The rails and roller slides can be selected in single unit quantities.



Example of roller slide deformation analysis



Analysis example of contact pressure distribution of rollers



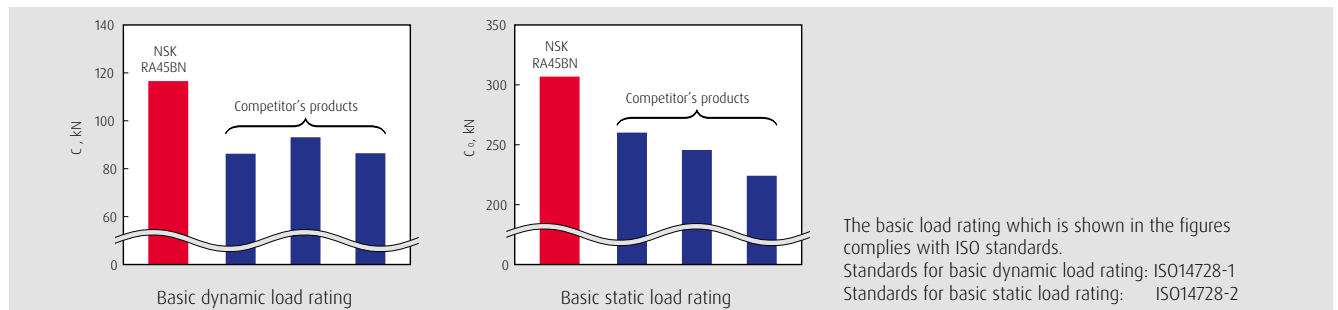
A variety of contributions to improve the performance of machine

Features

1. Super-high load capacity

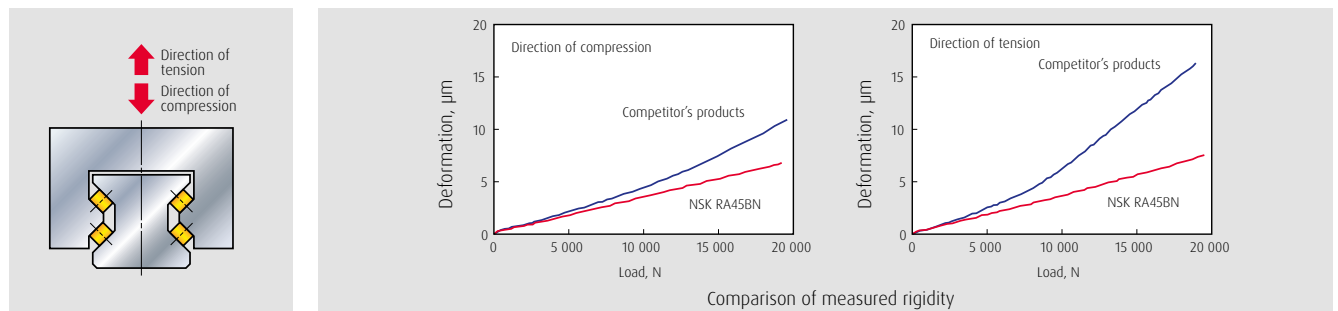
By installing rollers that are the largest possible diameter and length within the existing standard cross-section dimension in a rational layout based on analysis technology, we have realized the world's highest load capacity*, far superior to conventional roller guides. Super-long life is achieved and impact load can be sufficiently handled.

* Compared with products of the same size, as of September 1, 2003, researched by NSK.



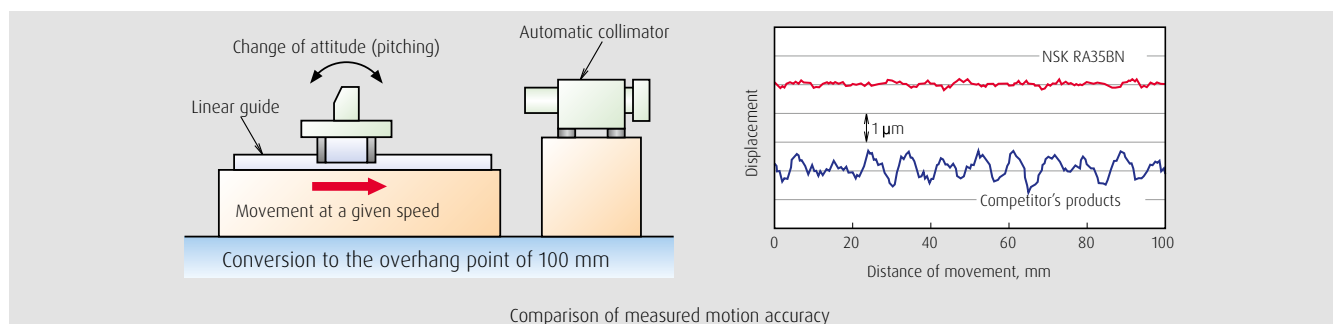
2. Super-high rigidity

Using NSK's advanced analysis technology, we pursued a complete, optimal design, down to the detailed shape of roller slides and rails, thereby realizing super-high rigidity superior to that of competitor's roller guides.



3. Super-high motion accuracy

NSK has developed its own unique method of simulating rolling element passage vibration and method of designing optimal roller slide specifications for damping roller passage vibration. These developments have dramatically enhanced roller slide motion accuracy for the RA series.



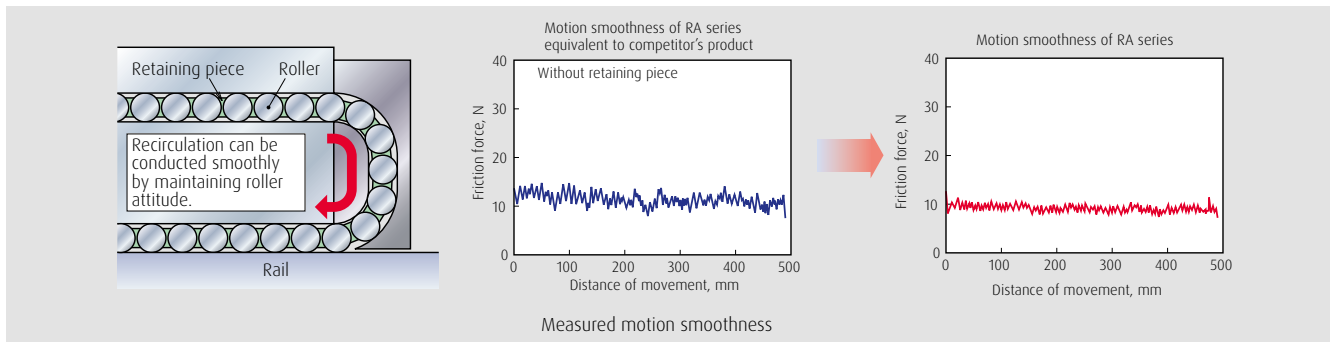
4. Mounting dimensions compatibility

The outer and mounting dimensions of RA series are based on market standards. RA series can be replaced without altering equipment design. (See page 13 for mounting surface dimensions)

Roller Guide RA Series

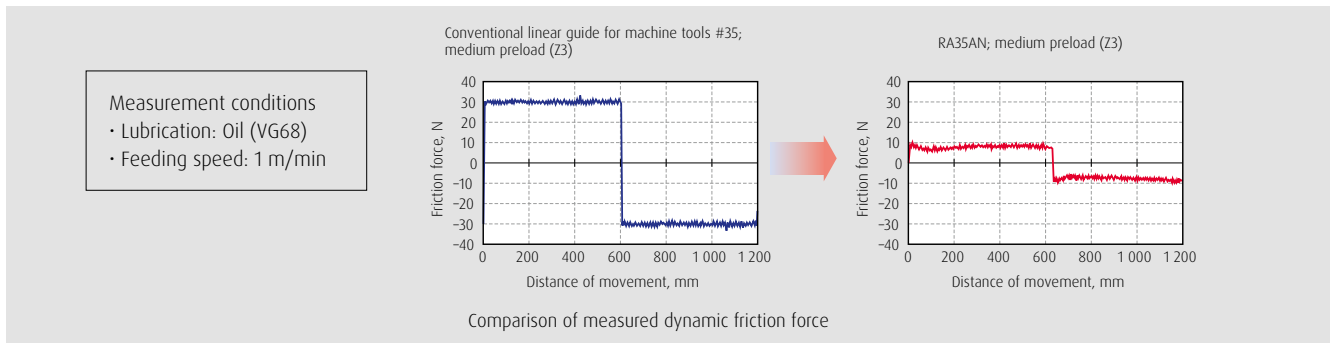
5. Smooth motion

Installing a retaining piece between rollers and restraining the skew peculiar to roller bearings achieve smooth motion. The reduction of friction variation provides stable tracking in the complicated trajectory control.



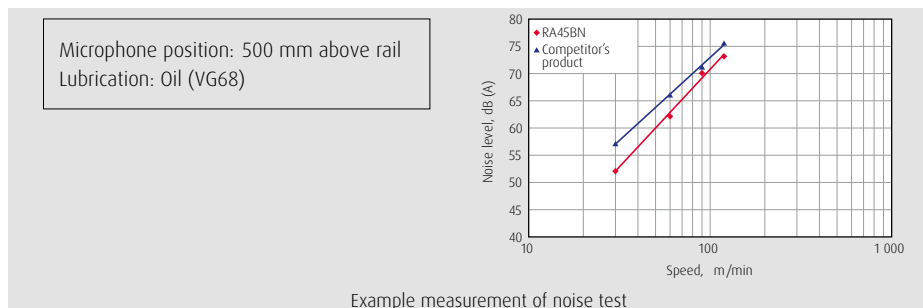
6. Low friction

Using rollers for rolling elements helps minimize dynamic friction.



7. Low noise

A retaining piece is provided between rollers to prevent collision of rollers to minimize noise.



8. Highly dust-proof and maintenance-free operation

Various seals of roller slide, bolt-hole cap, and rail cover are available as options. Highly dustproof V1 seal and V1 bottom seal with excellent dustproof performance are also available. The highly regarded NSK K1 lubrication unit is also available to satisfy customer needs for long-term, maintenance-free operation. (Availability of some options depends on size. Please confirm details of dustproof specifications on page 11.)

Abundant variations to meet a wide variety of needs

Specifications

1. Roller Slide Types and Shapes

- › Two types of roller slides are available in this series: one with a mounting flange and a square type with tapped with holes and no flange.
- › A compact, low-profile square type is now available.
- › On the mounting hole of the flange type, the tapped part is used to fix the roller slide from the top surface, and the minor diameter can be used as a bolt hole from the bottom. This provides mounting from both directions, top and bottom.
- › Roller slide length can be specified by standard high load type or special long, super-high load type.

Fig. 1 Square type

Roller slide shape code

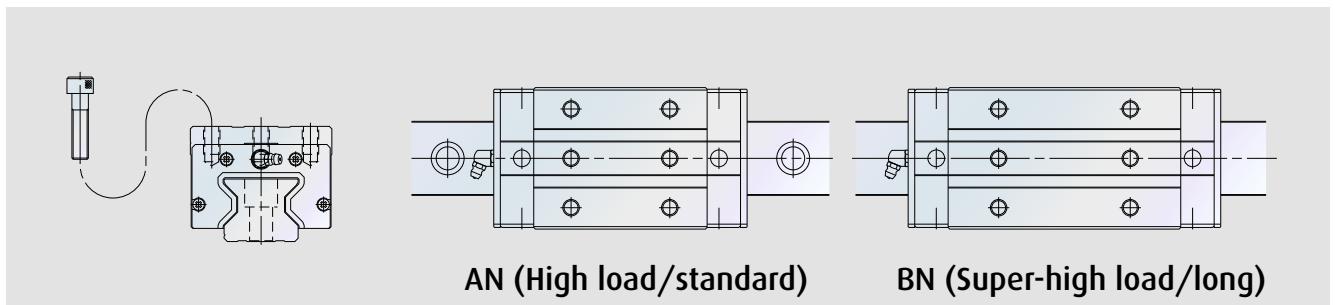


Fig. 2 Low-profile type

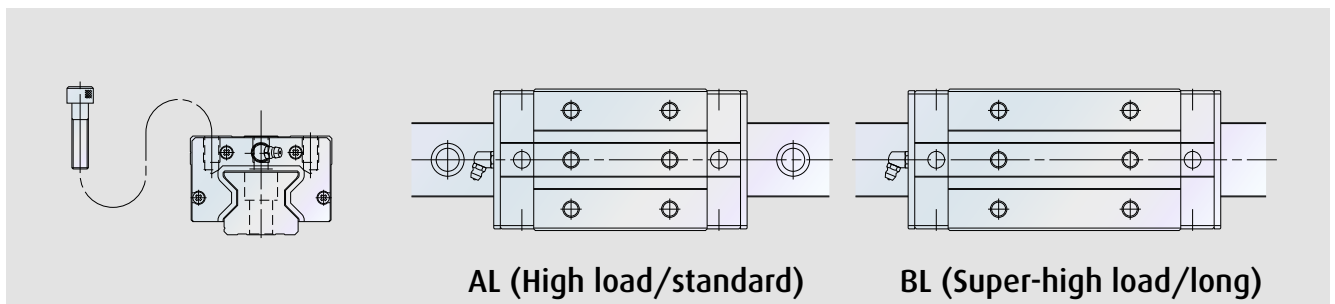
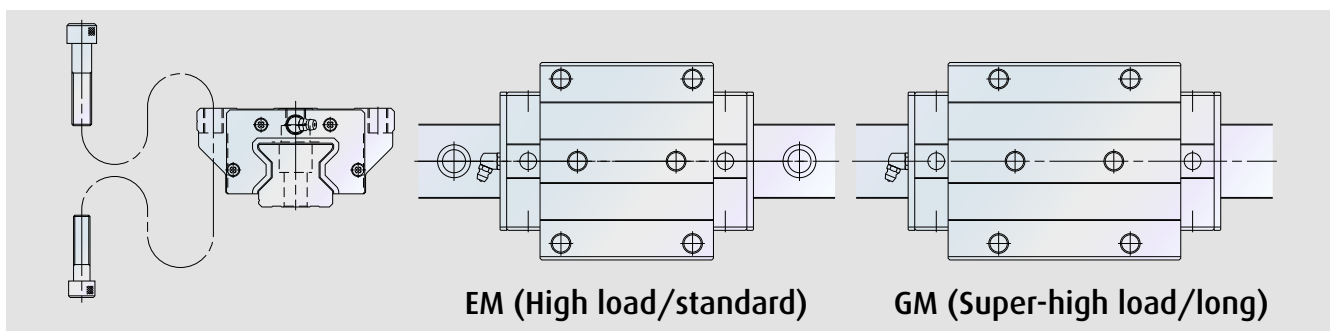


Fig. 3 Flange type



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2. Accuracy

The preloaded assembly has four accuracy grades; Ultra precision P3, Super precision P4, High precision P5, and Precision P6 grades, while the random-matching type has 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. 4 | | | |

Table 2 Tolerance of random-matching 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 ② |
| Variation of mounting height H | ± 25 |
| Running parallelism of surface C to surface A Running parallelism of surface D to surface B | See Table 3 and Fig. 4 |

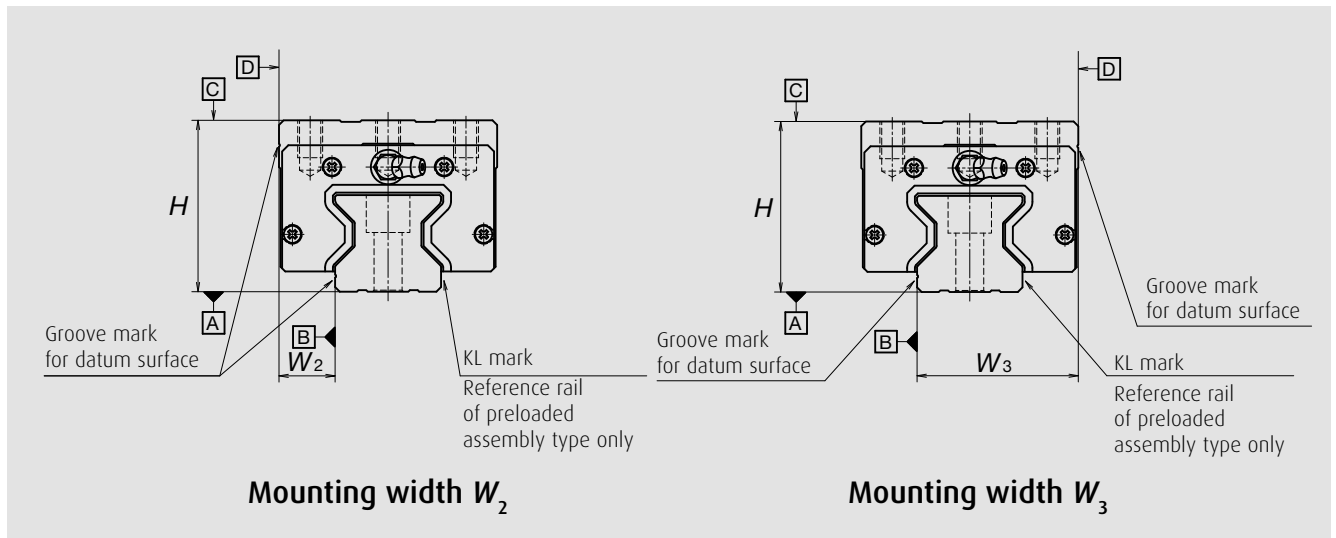
Note: " Variation on the same rail # Variation on multiple rails

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 - 3 500 | 6 | 9.5 | 14 | 19 |

Fig. 4 Specifications of accuracy



3. Preload and Rigidity

Medium preload Z3 and slight preload Z1 are available for preloaded assembly. Medium preload ZH and slight preload ZZ are available for random-matching type. Typical measurement data of preload and rigidity are shown below.

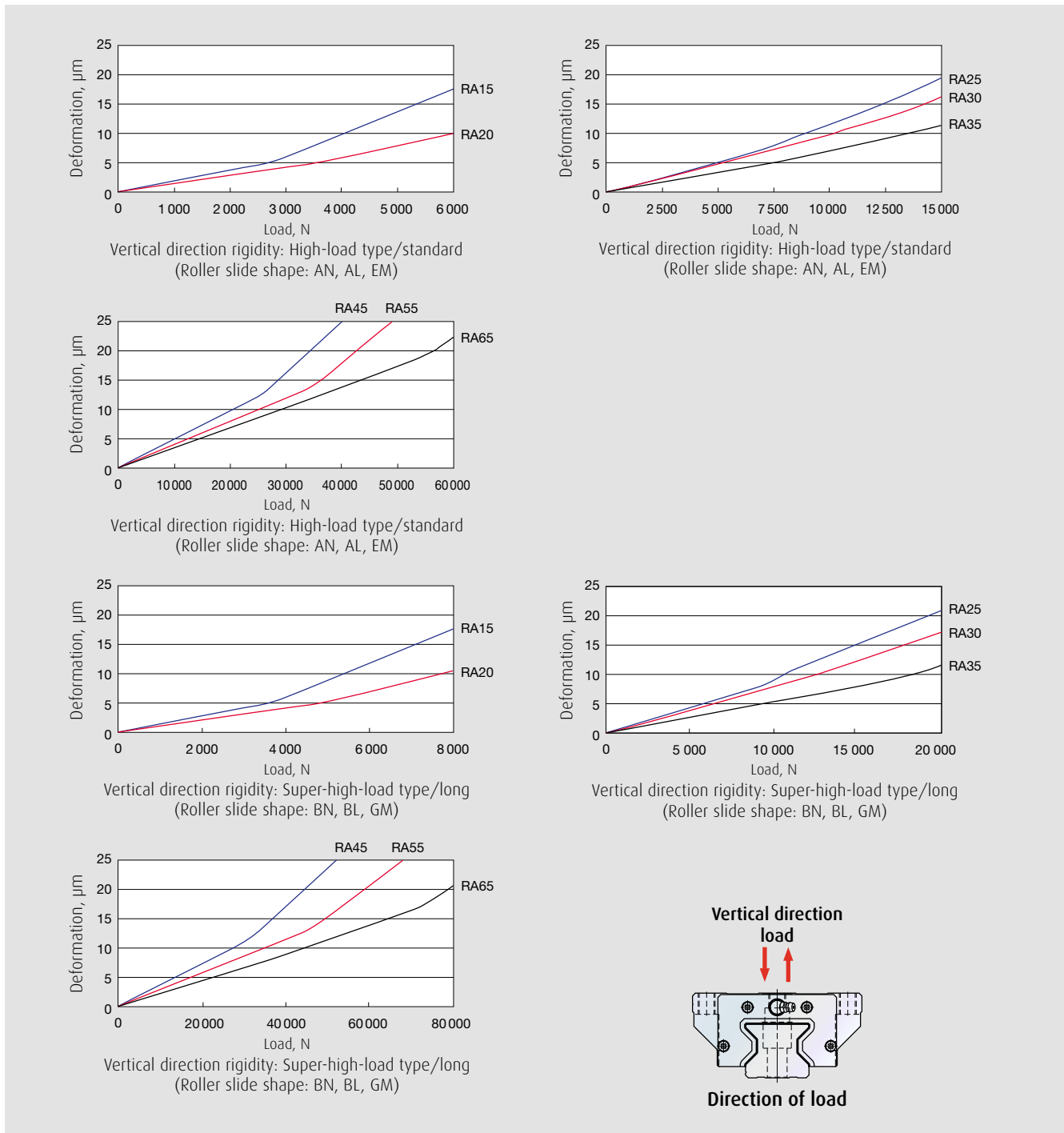
Table 4 Preload

Unit: N

| Model No. | High-load type | | Super-high-load type | |
|-----------|---------------------|---------------------|----------------------|---------------------|
| | Slight preload (Z1) | Medium preload (Z3) | Slight preload (Z1) | Medium preload (Z3) |
| RA15 | - | 1 030 | - | 1 300 |
| RA20 | - | 1 920 | - | 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 |

Roller Guide RA Series

Fig. 5 Vertical direction theoretical rigidity line



4. Basic Load Rating and Rated Life

Basic dynamic load rating that expresses load capacity is established by ISO standards (ISO14728-1) for linear guides. With basic dynamic load rating, direction and size do not fluctuate so that rated fatigue life is 100 km. Load rating for NSK Linear Guide complies with ISO standards. With the RA series, dynamic load rating is the same in both the vertical and horizontal directions (4-way equal load specs.). Rated fatigue life L is calculated by the following formula when load F is applied to the roller slide in the horizontal or vertical direction only.

- › This life formula is different from that for linear guides with ball rolling elements.
- › f_w is load factor. Refer to the respective value from the following table 4 as a guideline according to potential vibration and the impact of the machine in which the linear guide is used, and select the load factor.

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

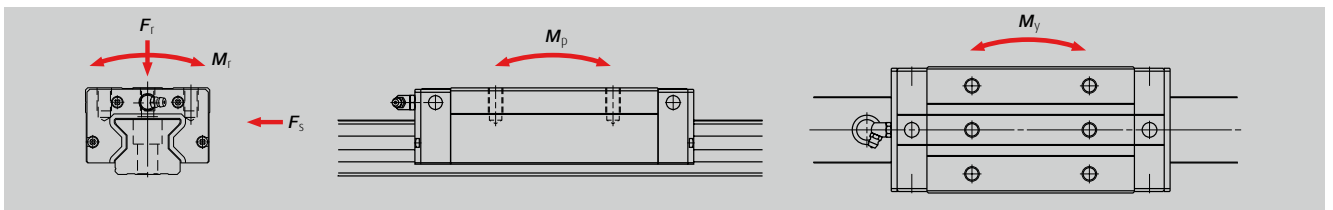
Table 5 Load factor f_w

| Impact and/or vibration | Load factor |
|---|-------------|
| No impact and vibration from the outside | 1.0 - 1.5 |
| With impact and/or vibration from the outside | 1.5 - 2.0 |
| With heavy impact and/or vibration from the outside | 2.0 - 3.0 |

Load applied to the linear guide (ball slide load) comes from various directions up/down and right/left directions and/or as moment load. Sometimes more than one type of load is applied simultaneously. Sometimes volume and direction of the load may change.

Varying load cannot be used as it is to calculate life of linear guide. Therefore, it is necessary to use a hypothetical load to ball slide with a constant volume, which would generate a value equivalent to an actual fatigue life. This is called "dynamic equivalent load." For actual calculation, use the loads of Table 6.

Fig. 6 Direction of load



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Table 6 Loads in the 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 | $F_r = F_r$ $F_{se} = F_s \tan \alpha$ $F_{re} = \epsilon_r M_r$ $F_{pe} = \epsilon_p M_p$ $F_{ye} = \epsilon_y M_y$ 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 | | | | |

Table 7 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 |

Formula is determined by the relationship of loads in terms of volume. Full dynamic equivalent load can be easily obtained by using each coefficient.

After obtaining the dynamic equivalent of the necessary load directions from Table 6, use the formulas below to calculate full dynamic equivalent loads.

- 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: $F_e = 0.5F_r + 0.5F_{se} + 0.5F_{re} + 0.5F_{pe} + F_{ye}$

For the values of each dynamic equivalent load in the formulas above, disregard load directions and take the absolute value.

5. Lubrication Specifications

(1) Types of lubrication accessories

- › Fig. 9 and Table 9 show grease fittings and tube fittings.

(2) Mounting position of lubrication accessories

- › The standard position of grease fittings and tube fittings is the end face of roller slide. We can mount them on a side of end cap for an option. (Fig. 7) Please consult NSK for installation of grease or tube fittings to the roller slide body or the side of end cap.
- › A lubrication hole can also be provided on the top of the end cap. Fig. 8 and Table 8 show the mounting position. A spacer is required for AN and BN shape roller slides. The spacers are available from NSK.
- › When using a piping unit with a thread of $M6 \times 1$, a connector is required to connect the piping unit to a grease fitting mounting hole with $M6 \times 0.75$. Connectors are available from NSK.

(3) Mounting position of lubrication accessories

- › If oil lubrication is used, the oil may not pervade the rolling surface in accordance with the roller slide mounting conditions such as upside down mounting and wall mounting. In these situations, consult with NSK.
- › When using an oil mist lubricating system, please confirm how much oil is needed for each outlet port.

Fig. 7 Mounting position of lubrication accessories

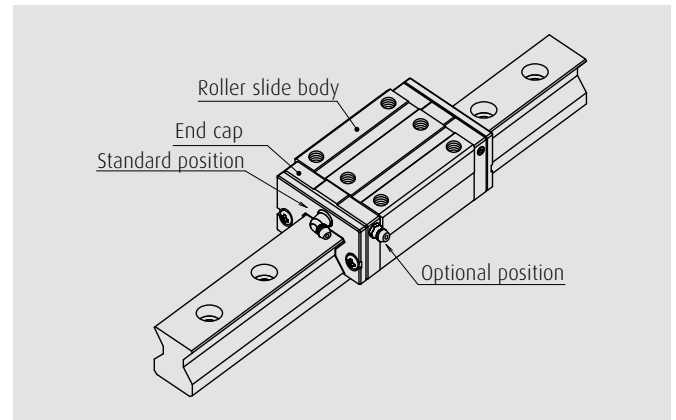


Fig. 8 Top and side lubrication hole positions

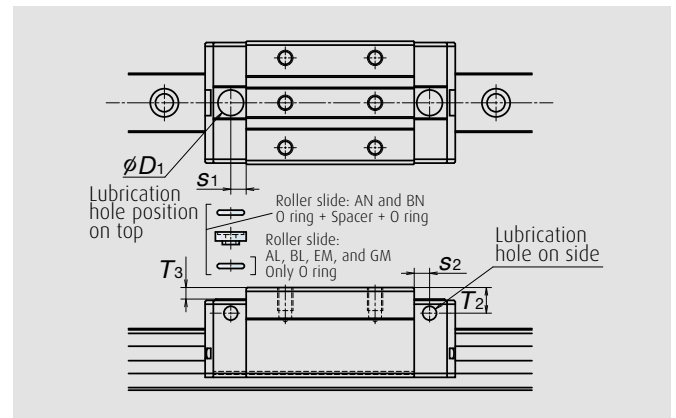


Table 8.1 Top and side lubrication hole position

Unit: mm

| Model No. | Roller slide model | Grease fitting size | s_2 | T_1 | O ring (JIS) | Spacer | D_1 | s_1 | T_2 |
|-----------|--------------------|---------------------|-------|-------|--------------|----------|-------|-------|-------|
| RA15 | AN, BN | $\phi 3$ | 4 | 7 | P5 | Required | 8.2 | 4.4 | 4.2 |
| RA20 | | $\phi 3$ | 4 | 4 | P6 | - | 9.2 | 5.4 | 0.2 |
| RA25 | | $M6 \times 0.75$ | 6 | 10 | P7 | Required | 10.2 | 6 | 4.5 |
| RA30 | | $M6 \times 0.75$ | 5 | 10 | P7+P5 | Required | 10.2 | 6 | 3.5 |
| RA35 | | $M6 \times 0.75$ | 5.5 | 15 | P7+P5 | Required | 10.2 | 7 | 7.4 |
| RA45 | | Rc 1/8 | 7.2 | 20 | P7+P5 | Required | 10.2 | 7.2 | 10.4 |
| RA55 | | Rc 1/8 | 7.2 | 21 | P7+P5 | Required | 10.2 | 7.2 | 10.4 |
| RA65 | | Rc 1/8 | 7.2 | 19 | P7 | - | 10.2 | 7.2 | 0.4 |

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

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Table 8.2 Top and side lubrication hole position

Unit: mm

| Model No. | Roller slide model | Grease fitting size | s ₂ | T ₁ | D ₁ | s ₁ | T ₂ |
|-----------|--------------------|---------------------|----------------|----------------|----------------|----------------|----------------|
| RA15 | AL, BL, EM, GM | ∅ 3 | 4 | 3 | 8.2 | 4.4 | 0.2 |
| RA20 | EM, GM | ∅ 3 | 4 | 4 | 9.2 | 5.4 | 0.2 |
| RA25 | AL, BL, EM, GM | M6×0.75 | 6 | 6 | 10.2 | 6 | 0.4 |
| RA30 | | M6×0.75 | 5 | 7 | 10.2 | 6 | 0.4 |
| RA35 | | M6×0.75 | 5.5 | 8 | 10.2 | 7 | 0.4 |
| RA45 | | Rc 1/8 | 7.2 | 10 | 10.2 | 7.2 | 0.4 |
| RA55 | | Rc 1/8 | 7.2 | 11 | 10.2 | 7.2 | 0.4 |
| RA65 | | EM, GM | Rc 1/8 | 7.2 | 19 | 10.2 | 7.2 |

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

Fig. 9 Grease fitting and Tube fitting

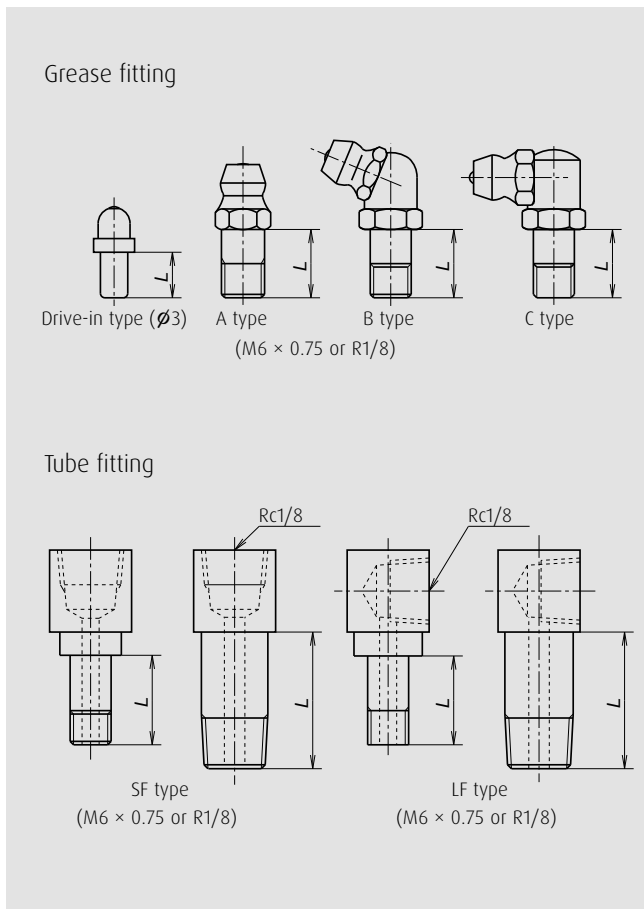


Table 9

Unit: mm

| Model No. | Dust-proof 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 | 14 | 14 | 15 |
| | Double seal | 12 | 12 | 11 |
| | Protector | 12 | 10 | 11 |
| RA45 | Standard | 8 | 13.5 | 17 |
| | With NSK K1 | 18 | 20 | 21.5 |
| | Double seal | 14 | 16 | 17 |
| | Protector | 14 | 16 | 17 |
| RA55 | Standard | 8 | 13.5 | 17 |
| | With NSK K1 | 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 |

6. Dust-proof

(1) Standard specification

The RA series is equipped with end, inner¹⁾ and bottom seals to prevent foreign matter from entering the inside of the roller slide. Under normal applications, the RA series can be used without modification.

For severe usage conditions, optional rail covers and highly dustproof V1 seal are available.

Contact NSK for information on how to mount the cover.

Fig. 10 View of the roller slide equipped with the dust-proof parts

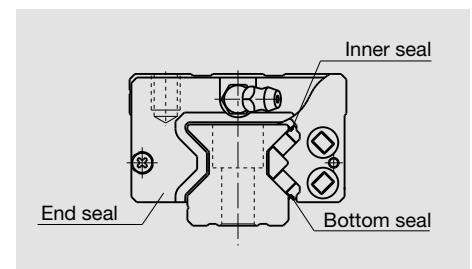


Table 10 Optional parts for dustproof

| Name | Purpose |
|--|--|
| NSK K1 lubrication unit | Made of oil impregnated resin. Enhances lubricating functions. |
| Double seal | It combines two end seals for enhancing sealing function. |
| Protector | Protect the end seal from hot and hard contaminants. |
| Rail cap | Prevents foreign matters, such as swarf generated in cutting operation from clogging the rail-mounting holes. |
| Rail cover ²⁾ | Covers the rail top surface, and prevents foreign matters, such as cutting dust, from collecting in the rail mounting holes. |
| Highly dustproof V1 seal ³⁾ | An end seal that improves wear resistance maintains highly dustproof performance over a long period of time. |
| V1 bottom seal ⁴⁾ | A bottom seal exhibits the high dustproof performance same as the highly dustproof V1 seal. |

Fig. 11 Rail cover



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

²⁾ Rail cover is available for the models of RA25 to RA65.

³⁾ Highly dustproof V1 seal is available for the models of RA25 to RA65.

⁴⁾ V1 bottom seal is available for the models of RA35 to RA65.

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(2) NSK K1 lubrication unit

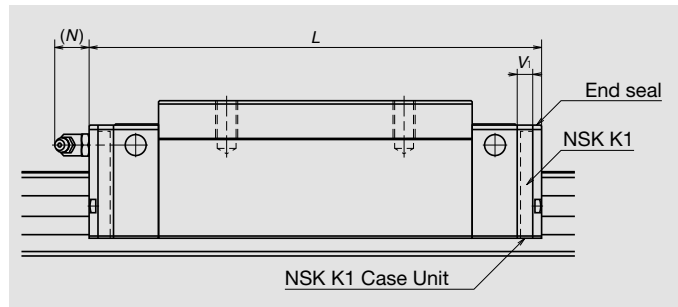
Table 11 shows the dimension of linear guides equipped with the NSK K1 lubrication unit.

Table 11

Unit: mm

| Model No. | Roller slide length | Roller slide model | Standard roller slide length | With two NSK K1 | Thickness of NSK K1 V_1 | Protruding area of the 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 equipped with NSK K1 = (Standard roller slide length) + (Thickness of NSK K1 Case Unit × Number of NSK K1 Case Unit)



(3) Double seal and protector

For RA Series, double seal and protector can be installed only before shipping from the factory.

Table 12 shows the increased thickness when end seal and protector are installed.

Fig. 12

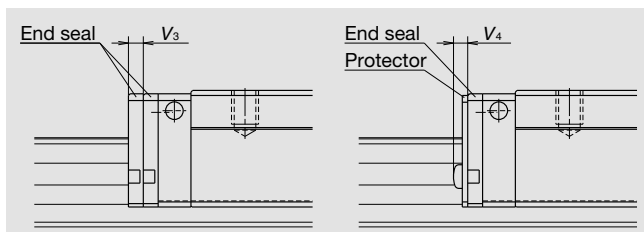


Table 12

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 |

(4) Rail cover

When the rail cover is used, use the cover bracket to secure the rail cover. Fig. 13 shows the dimensions for the cover bracket. The required room at the end of the rail is:

- › Inside: 10.5 mm or less
- › Outside: 4 mm or less (Common to the models of RA25 to RA65)

Please confirm the interference with your machine at the stroke end.

- › Machine stroke
- › Room for the end of the rail

The height of the rail with the rail cover is shown in Table 13.

Fig. 13 End configuration of rail equipped with the rail cover

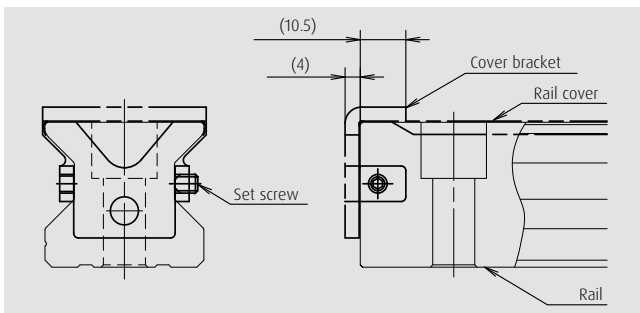


Table 13 Height of rails equipped with rail cover

Unit: mm

| Model No. | Standard rail height H_1 | Rail height installed with rail cover |
|-----------|----------------------------|---------------------------------------|
| RA25 | 24 | 24.25 |
| RA30 | 28 | 28.25 |
| RA35 | 31 | 31.25 |
| RA45 | 38 | 38.3 |
| RA55 | 43.5 | 43.8 |
| RA65 | 55 | 55.3 |

(5) Cap to plug the rail mounting bolt hole

Table 14 Cap to plug rail mounting bolt hole

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

Bolt size for rail mounting and cap reference number are shown in Table 14.

Roller Guide RA Series

(6) Specification with highly dustproof V1 seal and V1 bottom seal

RA25, RA30, RA35, RA45, RA55, and RA65 also have the specification with newly developed, highly dustproof V1 seal which is the end seal with enhanced abrasion resistance. Highly dustproof V1 seal made of new materials and in a new shape for better abrasion resistance prevents foreign matter getting into the roller slide for a long period.

RA35, RA45, RA55, and RA65 also have prepared highly dustproof V1 bottom seal. In addition, outstanding lubrication effects by NSK K1 further improves the durability.

High dustproof V1 bottom seal and NSK K1 can be selected individually according to the application.

The bolt hole caps whose shape is partly changed eliminate building up of foreign matter in and around the rail mounting holes and prevent foreign matter from entering into the roller slide. Otherwise, the rail cover with higher dustproofness can be selected.

Table 15 shows the dimensions of roller slides equipped with V1 seal and V1 bottom seal.

Fig. 14

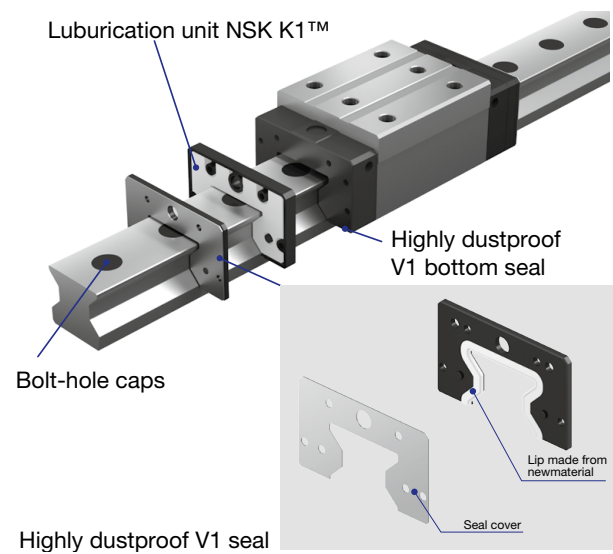


Table 15

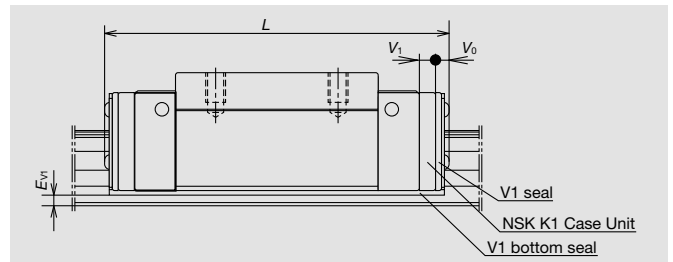
Unit: mm

| Model No. | Roller slide length | Roller slide type | Standard roller slide length L | Roller slide length equipped with V1 seal and NSK K1 L | Slide bottom face height equipped with V1 bottom seal E V1 | Thickness of V1 seal V0 | Thickness of K1 case unit V1 |
|-----------|---------------------|-------------------|--------------------------------|--|--|-------------------------|------------------------------|
| 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 | 6.6 | 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 | | | |

The detailed contents of the high dustproof V1 seal and V1 bottom seal are introduced in the catalog "CAT No. 3334" of NSK Linear Guide Roller Guides with highly dustproof V1 seal and V1 bottom seals.

Use of linear guides in a contaminated environment

- (1) Using a linear guide in a contaminated environment has serious effects on lubrication condition and durability of the linear guide. We recommend evaluation tests with your specific application.
- (2) If use in a contaminated environment is expected, fill in the technical data sheet for linear guides in contaminated environments.
(Please consult NSK for the details of the technical data sheet.)



(7) Maximum rail length

Table 16 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grades.

Table 16 Length limitation of rails

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 |

Note: Rails can be butted if user requirement exceeds the rail length shown in the table.
Please consult NSK.

Roller Guide RA Series

8. Installation

(1) Mounting tolerance

Mounting tolerance results in harmful effects such as shortened operating life, deterioration in motion accuracy, and friction variation.

NSK particularly focuses on operating life, and sets an operating life value of more than 10 000 km calculated under the following conditions as mounting tolerance:

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

The tolerance in Fig. 15 is shown in the Table 17 as typical tolerance.

Fig. 15 Mounting tolerance

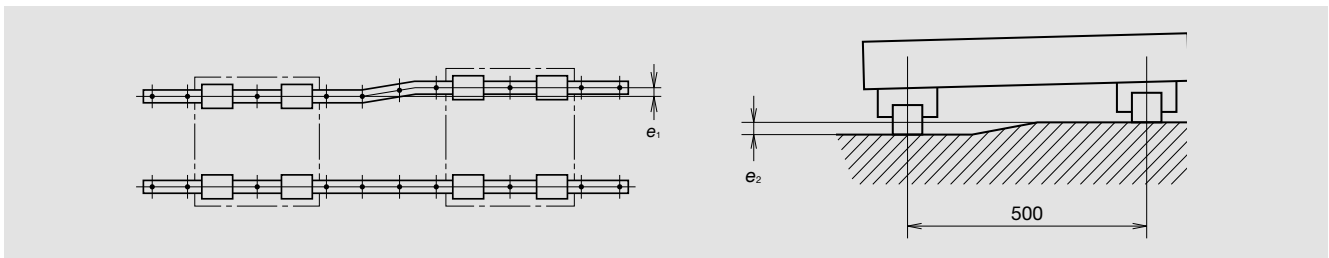


Table 17 Mounting tolerance

Unit: μm

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

(2) Shoulder height and corner radius of mounting surface

Fig. 16 and Table 18 show shoulder height and corner radius of the mounting surface, when the rail or the roller slide is pressed to the shoulder of the machine base or table (the raised section from where the mounting surface begins) and fixed horizontally.

Fig. 16 Datum face of roller guide and shoulder

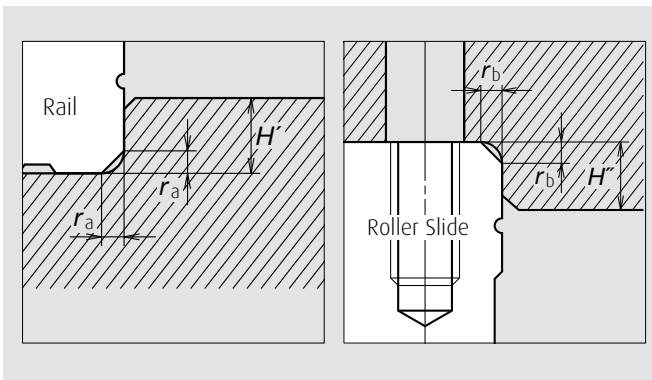


Table 18 Shoulder height and corner radius of attachment

Unit: mm

| Model No. | Shoulder Height | | Chamfer (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 | 1.0 |
| RA30 | 5 | 6 | 1.0 | 1.0 |
| RA35 | 5 | 6 | 1.0 | 1.0 |
| RA45 | 6 | 8 | 1.5 | 1.0 |
| RA55 | 7 | 10 | 1.5 | 1.5 |
| RA65 | 11 | 11 | 1.5 | 1.5 |

Handling Precautions

- ① Operating temperature limits should normally be less than 80°C.
- ② If using NSK K1, service temperature should not exceed 50°C (or 80°C instantaneously). Make sure the unit does not come in contact with organic solvents with 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 When transferring the roller slide onto the rail, or vice versa:
 - › Do not remove an unnecessary roller slide from the rail as much as you can.
 - › Use the provided provisional rail to prevent dents or scratches on the raceways caused by the roller slide that is jammed into the one from the other. It also prevents the rollers from dropping.
 - › When transferring the roller slide onto the rail, or vice versa, butt the provisional rail up against the rail and slide it directly from one onto the other.
 - › Use a clean provisional rail. Do not use the provisional rail that is contaminated with particles or uses different grease from that of the relevant roller slide.

RA Series dimension table

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

(1) Reference number for preloaded assembly

RA 35 1000 AN C 2 - ※ P6 3

Series name: RA
 Size: 35
 Rail length (mm): 1000
 Roller slide shape code AN, BN: AN
 Material and surface treatment code: C
 C: Special high carbon steel (NSK standard)

Preload code: 2
 Accuracy code: ※
 Design serial number: P6
 Number of roller slides per rail: 3

Preload code: Z: Z1, 3: Z3, Z: ZZ, H: ZH
 Accuracy code: (Without NSK K1): P3, P4, P5, P6, PH (With NSK K1): K3, K4, K5, K6, KH

(2) Reference number for random-matching type

Roller slide: RAA 35 AN PH H -F

Random-matching roller slide series code: RAA
 Size: 35
 Roller slide shape code AN, BN: AN

Option code: PH, H, -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

Preload code: H: Medium preload
 Accuracy code: PH, KH: High-precision grade random-matching type

Rail: R1A 35 1000 L C N - ※ PH Z

Random-matching roller slide series code: R1A
 Size: 35
 Rail length (mm): 1000
 Rail shape code L: L
 Material and surface treatment code: C

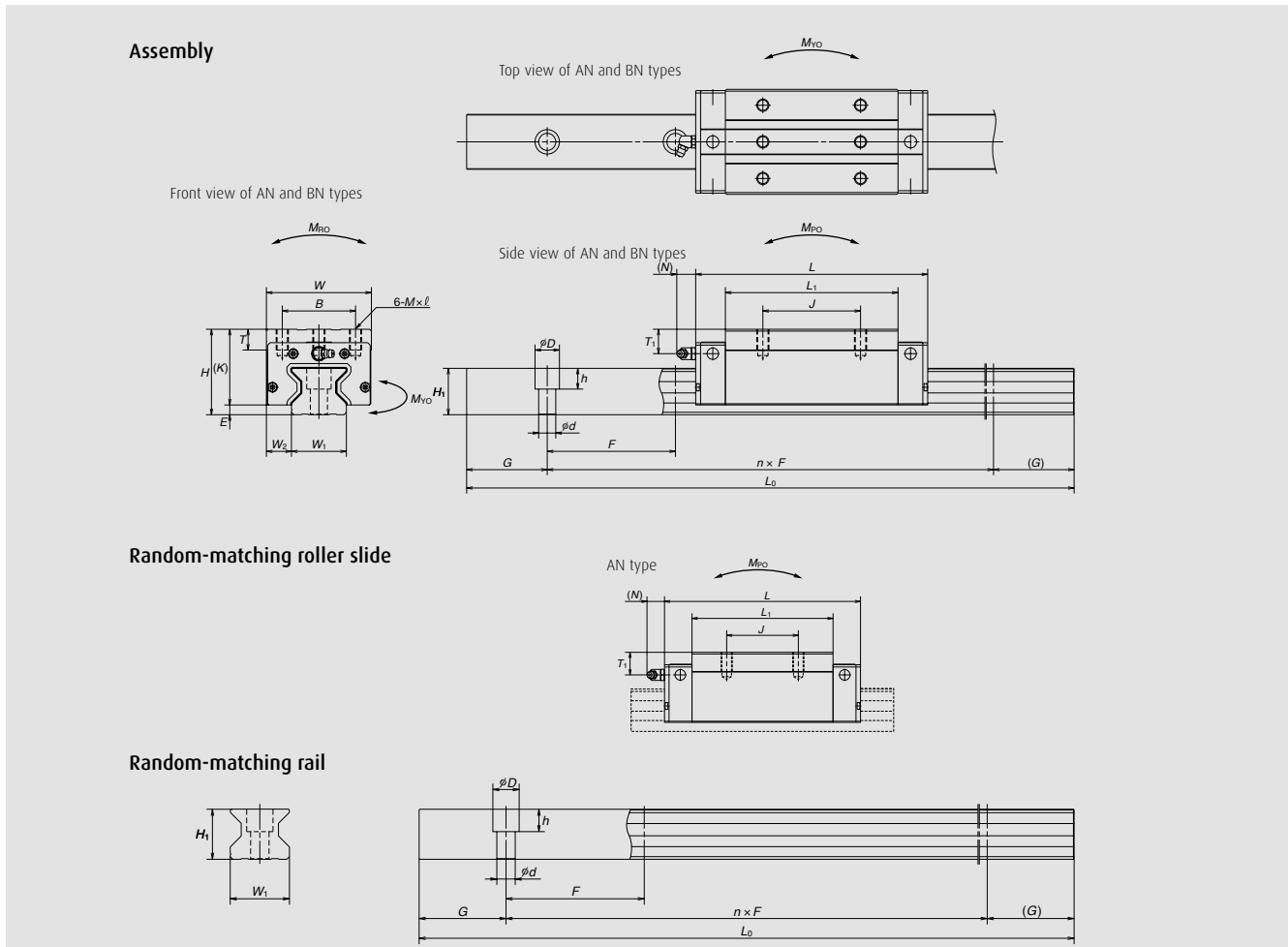
Preload code: N
 Accuracy code: ※
 Design serial number: PH
 Added to the reference number: Z

*Butting rail specification
 N: Non-butting, L: Butting specification
 *Please consult with NSK for butting rail specification.

| Model No. | Assembly | | | Roller slide | | | | | | | | | | | Width | Height | | |
|------------------|----------|-----|----------------|--------------|----------------|---------------|-----------|---------------|----------------|------|----|--------------------|----------------|----|-------|--------|----------------|----------------|
| | Height | E | W ₂ | Width | Length | Mounting hole | | | L ₁ | K | T | Grease fitting | | | | | W ₁ | H ₁ |
| | | | | | | B | J | M × pitch × ℓ | | | | Hole size | T ₁ | N | | | | |
| RA15AN RA15BN | 28 | 4 | 9.5 | 34 | 70 85.4 | 26 | 26 | M4×0.7×6 | 44.8 60.2 | 24 | 8 | φ3 | 8 | 3 | 15 | 16.3 | | |
| RA20AN RA20BN | 30 | 5 | 12 | 44 | 86.5 106.3 | 32 | 36 50 | M5×0.8×6 | 57.5 77.3 | 25 | 12 | φ3 | 4 | 3 | 20 | 20.8 | | |
| RA25AN RA25BN | 40 | 5 | 12.5 | 48 | 97.5 115.5 | 35 | 35 50 | M6×1×9 | 65.5 83.5 | 35 | 12 | M6×0.75 | 10 | 11 | 23 | 24 | | |
| RA30AN RA30BN | 45 | 6.5 | 16 | 60 | 110.8 135.4 | 40 | 40 60 | M8×1.25×11 | 74 98.6 | 38.5 | 14 | M6×0.75 | 10 | 11 | 28 | 28 | | |
| RA35AN RA35BN | 55 | 6.5 | 18 | 70 | 123.8 152 | 50 | 50 72 | M8×1.25×12 | 83.2 111.4 | 48.5 | 15 | M6×0.75 | 15 | 11 | 34 | 31 | | |
| RA45AN RA45BN | 70 | 8 | 20.5 | 86 | 154 190 | 60 | 60 80 | M10×1.5×17 | 105.4 141.4 | 62 | 17 | R _c 1/8 | 20 | 14 | 45 | 38 | | |
| RA55AN RA55BN | 80 | 9 | 23.5 | 100 | 184 234 | 75 | 75 95 | M12×1.75×18 | 128 178 | 71 | 18 | R _c 1/8 | 21 | 14 | 53 | 43.5 | | |
| RA65AN RA65BN | 90 | 13 | 31.5 | 126 | 228.4 302.5 | 76 | 70 120 | M16×2×20 | 155.4 229.5 | 77 | 22 | R _c 1/8 | 19 | 14 | 63 | 55 | | |

Notes: 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Roller Guide RA Series



Unit: mm

| Rail | | G (reference) | Maximum length L_{0max} | Basic load rating | | | | | | | | Weight | |
|---------------|--|------------------|---------------------------------|------------------------|--------------------------|------------------------|------------------|---------------------|-------------------|------------------|-------------------|-------------------------|----------------|
| Pitch F | Mounting bolt hole $d \times D \times h$ | | | 3) Dynamic | | Static C_0 (N) | M_{R0} | Static moment (N·m) | | | | Roller slide (kg) | Rail (kg/m) |
| | | | | [50km] C_{50} (N) | [100km] C_{100} (N) | | | M_{p0} | | M_{y0} | | | |
| | | | | | | One slide | Two slides | One slide | Two slides | | | | |
| 60 (30) | 4.5×7.5×5.3 | 20 | 2 000 | 12 600 16 000 | 10 300 13 000 | 27 500 37 000 | 260 350 | 210 375 | 1 320 2 130 | 210 375 | 1 320 2 130 | 0.21 0.30 | 1.6 |
| 60 (30) | 6×9.5×8.5 | 20 | 3 000 | 23 600 29 500 | 19 200 24 000 | 52 500 70 000 | 665 890 | 505 900 | 3 100 5 000 | 505 900 | 3 100 5 000 | 0.38 0.50 | |
| 30 (60) | 7×11×9 | 20 | 3 900 | 36 000 43 500 | 29 200 35 400 | 72 700 92 900 | 970 1 240 | 760 1 240 | 4 850 7 200 | 760 1 240 | 4 850 7 200 | 0.60 0.91 | 3.4 |
| 40 (80) | 9×14×12 | 20 | 3 900 | 47 800 58 500 | 38 900 47 600 | 93 500 121 000 | 1 670 2 170 | 1 140 1 950 | 7 100 11 500 | 1 140 1 950 | 7 100 11 500 | 1.0 1.3 | |
| 40 (80) | 9×14×12 | 20 | 3 900 | 65 500 82 900 | 53 300 67 400 | 129 000 175 000 | 2 810 3 810 | 1 800 3 250 | 11 000 17 800 | 1 800 3 250 | 11 000 17 800 | 1.6 2.1 | 6.8 |
| 52.5 (105) | 14×20×17 | 22.5 | 3 650 | 114 000 143 000 | 92 800 116 000 | 229 000 305 000 | 6 180 8 240 | 4 080 7 150 | 24 000 39 000 | 4 080 7 150 | 24 000 39 000 | 3.0 4.1 | |
| 60 (120) | 16×23×20 | 30 | 3 600 | 159 000 207 000 | 129 000 168 000 | 330 000 462 000 | 10 200 14 300 | 7 060 13 600 | 41 000 72 000 | 7 060 13 600 | 41 000 72 000 | 4.9 6.7 | 14.6 |
| 75 (150) | 18×26×22 | 35 | 3 600 | 259 000 355 000 | 210 000 288 000 | 504 000 756 000 | 19 200 28 700 | 12 700 28 600 | 78 500 153 000 | 12 700 28 600 | 78 500 153 000 | 9.3 12.2 | |

2) The random-matching type is available for the models of RA25 to RA65.
 3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
 C_{50} : the basic dynamic load rating for 50 km rated fatigue life
 C_{100} : the basic dynamic load rating for 100 km rated fatigue life

RA Series dimension table

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

(1) Reference number for preloaded assembly

Series name: RA, Size: 35, Rail length (mm): 1000, Roller slide shape code AL, BL: AL, Material and surface treatment code: C, Accuracy code: 2, Design serial number: ※, Preload code: P6, Number of roller slides per rail: 3

Preload code: 1: Z1, 3: Z3, Z: ZZ, H: ZH
 Accuracy code: (Without NSK K1): P3, P4, P5, P6, PH (With NSK K1): K3, K4, K5, K6, KH
 Design serial number: ※
 Number of roller slides per rail: 3

(2) Reference number for random-matching type

Roller slide: RAA, Size: 35, Roller slide shape code AL, BL: AL, Accuracy code: PH, H, Option code: -F

Random-matching roller slide series code: RAA: RA Series random-matching roller slide
 Size: 35
 Roller slide shape code AL, BL: AL
 Option code: 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
 Preload code: Z: Slight preload, H: Medium preload
 Accuracy code: PH, KH: High-precision grade random-matching type

Rail: R1A, Size: 35, Rail length (mm): 1000, Rail shape code L: L, Material and surface treatment code: C, Accuracy code: N, Design serial number: ※, Preload code: PH, Z

Random-matching roller slide series code: RAA: RA Series random-matching roller slide
 Size: 35
 Rail length (mm): 1000
 Rail shape code L: L: Standard
 Material and surface treatment code: C
 Accuracy code: N: Non-butting, L: Butting specification
 Design serial number: ※
 Preload code: Z: Common for slight and medium preload
 Accuracy code: PH: High-precision grade random-matching
 Design serial number: Added to the reference number.
 *Butting rail specification
 N: Non-butting, L: Butting specification

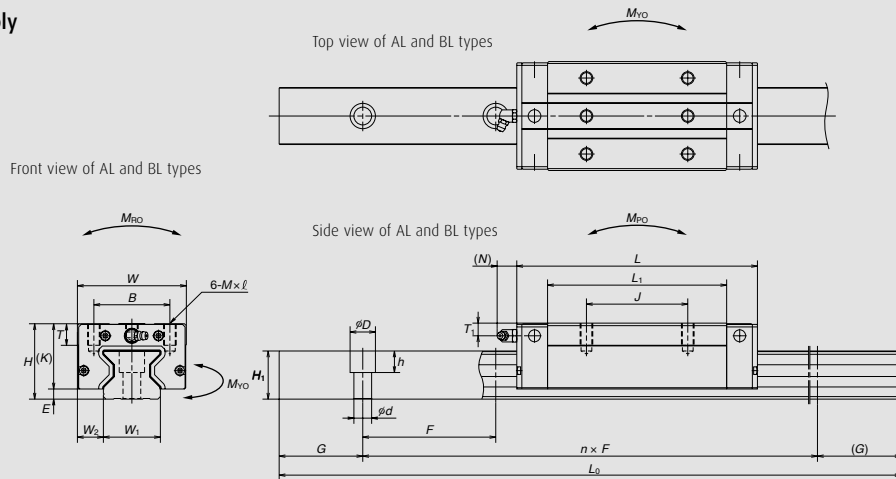
*Please consult with NSK for butting rail specification.

| Model No. | Assembly | | | Roller slide | | | | | | | | | | | Width | Height | | |
|------------------|----------|-----|----------------|--------------|----------------|---------------|----------|---------------|----------------|------|----|--------------------|----------------|----|-------|--------|----------------|----------------|
| | Height | E | W ₂ | Width | Length | Mounting hole | | | L ₁ | K | T | Grease fitting | | | | | W ₁ | H ₁ |
| | | | | | | B | J | M × pitch × ℓ | | | | Hole size | T ₁ | N | | | | |
| RA15AL RA15BL | 24 | 4 | 9.5 | 34 | 70 85.4 | 26 | 26 | M4×0.7×5.5 | 44.8 60.2 | 20 | 8 | φ3 | 4 | 3 | 15 | 16.3 | | |
| RA25AL RA25BL | 36 | 5 | 12.5 | 48 | 97.5 115.5 | 35 | 35 50 | M6×1×8 | 65.5 83.5 | 31 | 12 | M6×0.75 | 6 | 11 | 23 | 24 | | |
| RA30AL RA30BL | 42 | 6.5 | 16 | 60 | 110.8 135.4 | 40 | 40 60 | M8×1.25×11 | 74 98.6 | 35.5 | 14 | M6×0.75 | 7 | 11 | 28 | 28 | | |
| RA35AL RA35BL | 48 | 6.5 | 18 | 70 | 123.8 152 | 50 | 50 72 | M8×1.25×12 | 83.2 111.4 | 41.5 | 15 | M6×0.75 | 8 | 11 | 34 | 31 | | |
| RA45AL RA45BL | 60 | 8 | 20.5 | 86 | 154 190 | 60 | 60 80 | M10×1.5×16 | 105.4 141.4 | 52 | 17 | R _c 1/8 | 10 | 14 | 45 | 38 | | |
| RA55AL RA55BL | 70 | 9 | 23.5 | 100 | 184 234 | 75 | 75 95 | M12×1.75×18 | 128 178 | 61 | 18 | R _c 1/8 | 11 | 14 | 53 | 43.5 | | |

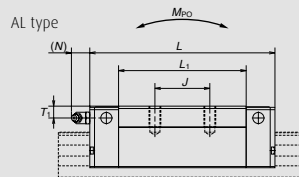
Notes: 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Roller Guide RA Series

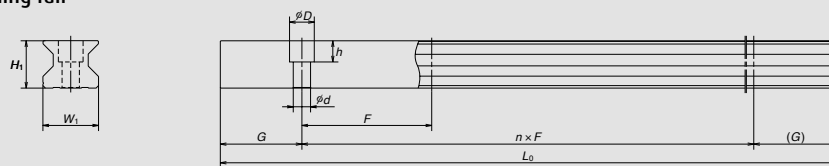
Assembly



Random-matching roller slide



Random-matching rail



Unit: mm

| Rail | | G (reference) | Maximum length L_{0max} | Basic load rating | | | | | | | | Weight | |
|---------------|--|------------------|---------------------------------|------------------------|--------------------------|------------------------|------------------|---------------------|------------------|-----------------|------------------|-------------------------|----------------|
| Pitch F | Mounting bolt hole $d \times D \times h$ | | | 3) Dynamic | | Static C_0 (N) | M_{R0} | Static moment (N·m) | | | | Roller slide (kg) | Rail (kg/m) |
| | | | | [50km] C_{50} (N) | [100km] C_{100} (N) | | | M_{P0} | | M_{Y0} | | | |
| | | | | | | One slide | Two slides | One slide | Two slides | | | | |
| 60 (30) | 4.5×7.5×5.3 | 20 | 2 000 | 12 600 16 000 | 10 300 13 000 | 27 500 37 000 | 260 350 | 210 375 | 1 320 2 130 | 210 375 | 1 320 2 130 | 0.17 0.25 | 1.6 |
| 30 (60) | 7×11×9 | 20 | 3 900 | 36 000 43 500 | 29 200 35 400 | 72 700 92 900 | 970 1 240 | 760 1 240 | 4 850 7 200 | 760 1 240 | 4 850 7 200 | 0.45 0.80 | |
| 40 (80) | 9×14×12 | 20 | 3 900 | 47 800 58 500 | 38 900 47 600 | 93 500 121 000 | 1 670 2 170 | 1 140 1 950 | 7 100 11 500 | 1 140 1 950 | 7 100 11 500 | 0.85 1.1 | 4.9 |
| 40 (80) | 9×14×12 | 20 | 3 900 | 65 500 82 900 | 53 300 67 400 | 129 000 175 000 | 2 810 3 810 | 1 800 3 250 | 11 000 17 800 | 1 800 3 250 | 11 000 17 800 | 1.2 1.7 | |
| 52.5 (105) | 14×20×17 | 22.5 | 3 650 | 114 000 143 000 | 92 800 116 000 | 229 000 305 000 | 6 180 8 240 | 4 080 7 150 | 24 000 39 000 | 4 080 7 150 | 24 000 39 000 | 2.5 3.4 | 10.9 |
| 60 (120) | 16×23×20 | 30 | 3 600 | 159 000 207 000 | 129 000 168 000 | 330 000 462 000 | 10 200 14 300 | 7 060 13 600 | 41 000 72 000 | 7 060 13 600 | 41 000 72 000 | 4.1 5.7 | |

2) The random-matching type is available for the models of RA25 to RA65.
 3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
 C_{50} : the basic dynamic load rating for 50 km rated fatigue life
 C_{100} : the basic dynamic load rating for 100 km rated fatigue life

RA Series dimension table

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

(1) Reference number for preloaded assembly

RA 35 1000 EM C 2 - ※ P6 3

Series name: RA
 Size: 35
 Rail length (mm): 1000
 Roller slide shape code EM, GM: EM
 Material and surface treatment code: C
 C: Special high carbon steel (NSK standard)

Preload code: 2
 Accuracy code: ※
 Design serial number: P6
 Number of roller slides per rail: 3

Preload code: 1: Z1, 3: Z3, Z: ZZ, H: ZH
 Accuracy code: (Without NSK K1): P3, P4, P5, P6, PH (With NSK K1): K3, K4, K5, K6, KH

(2) Reference number for random-matching type

Roller slide: RAA 35 EM PH H -F

Random-matching roller slide series code: RAA
 RAA: RA Series random-matching roller slide
 Size: 35
 Roller slide shape code EM, GM: EM

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

Preload code: PH, H
 Accuracy code: H
 Z: Slight preload, H: Medium preload
 PH, KH: High-precision grade random-matching type

Rail: R1A 35 1000 L C N - ※ PH Z

Random-matching roller slide series code: R1A
 RAA: RA Series random-matching roller slide
 Size: 35
 Rail length (mm): 1000
 Rail shape code L: L
 L: Standard
 Material and surface treatment code: C

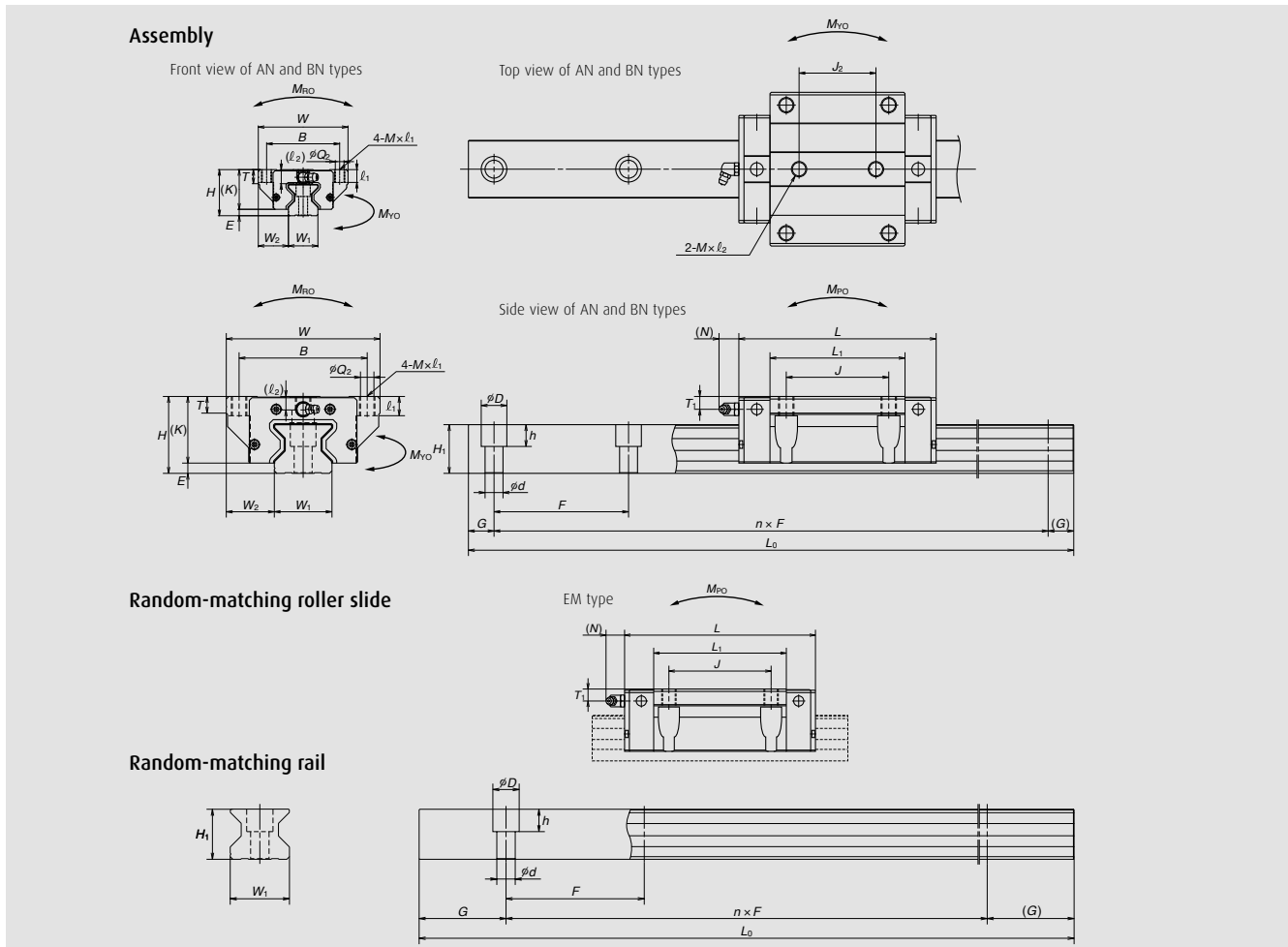
Preload code: N
 Accuracy code: ※
 Design serial number: PH
 Added to the reference number: Z
 *Butting rail specification: Z
 N: Non-butting, L: Butting specification

*Please consult with NSK for butting rail specification.

| Model No. | Assembly | | | Roller slide | | | | | | | | | | | | | Width | Height | |
|------------------|----------|-----|----------------|--------------|----------------|---------------|-----|----------------|--------------------|----------------|------|----|--------------------|----------------|----|----------------|-------|--------|----------------|
| | Height | E | W ₂ | Width | Length | Mounting hole | | | | L ₁ | K | T | Grease fitting | | | W ₁ | | | H ₁ |
| | | | | | | B | J | J ₂ | M × pitch × ℓ | | | | Hole size | T ₁ | N | | | | |
| RA15EM RA15GM | 24 | 4 | 16 | 47 | 70 85.4 | 38 | 30 | 26 | M5×0.8×8.5 (6.5) | 44.8 60.2 | 20 | 8 | φ3 | 4 | 3 | 15 | 16.3 | | |
| RA20EM RA20GM | 30 | 5 | 21.5 | 63 | 86.5 106.3 | 53 | 40 | 35 | M6×1×9.5 (8) | 57.5 77.3 | 25 | 10 | φ3 | 4 | 3 | 20 | 20.8 | | |
| RA25EM RA25GM | 36 | 5 | 23.5 | 70 | 97.5 115.5 | 57 | 45 | 40 | M8×1.25×10 (11) | 65.5 83.5 | 31 | 11 | M6×0.75 | 6 | 11 | 23 | 24 | | |
| RA30EM RA30GM | 42 | 6.5 | 31 | 90 | 110.8 135.4 | 72 | 52 | 44 | M10×1.5×12 (12.5) | 74 98.6 | 35.5 | 11 | M6×0.75 | 7 | 11 | 28 | 28 | | |
| RA35EM RA35GM | 48 | 6.5 | 33 | 100 | 123.8 152 | 82 | 62 | 52 | M10×1.5×13 (7) | 83.2 111.4 | 41.5 | 12 | M6×0.75 | 8 | 11 | 34 | 31 | | |
| RA45EM RA45GM | 60 | 8 | 37.5 | 120 | 154 190 | 100 | 80 | 60 | M12×1.75×15 (10.5) | 105.4 141.4 | 52 | 13 | R _c 1/8 | 10 | 14 | 45 | 38 | | |
| RA55EM RA55GM | 70 | 9 | 43.5 | 140 | 184 234 | 116 | 95 | 70 | M14×2×18 (13) | 128 178 | 61 | 15 | R _c 1/8 | 11 | 14 | 53 | 43.5 | | |
| RA65EM RA65GM | 90 | 13 | 53.5 | 170 | 228.4 302.5 | 142 | 110 | 82 | M16×2×24 (18.5) | 155.4 229.5 | 77 | 22 | R _c 1/8 | 19 | 14 | 63 | 55 | | |

Notes: 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Roller Guide RA Series



Unit: mm

| Rail | | G (reference) | Maximum length L_{0max} | Basic load rating | | | | | | | | Weight | |
|---------------|--|------------------|---------------------------------|------------------------|--------------------------|------------------------|------------------|---------------------|-------------------|------------------|-------------------|-------------------------|----------------|
| Pitch F | Mounting bolt hole $d \times D \times h$ | | | 3) Dynamic | | Static C_0 (N) | M_{R0} | Static moment (N·m) | | | | Roller slide (kg) | Rail (kg/m) |
| | | | | [50km] C_{50} (N) | [100km] C_{100} (N) | | | M_{p0} | | M_{y0} | | | |
| | | | | | | One slide | Two slides | One slide | Two slides | | | | |
| 60 (30) | 4.5×7.5×5.3 | 20 | 2 000 | 12 600 16 000 | 10 300 13 000 | 27 500 37 000 | 260 350 | 210 375 | 1 320 2 130 | 210 375 | 1 320 2 130 | 0.21 0.28 | 1.6 |
| 60 (30) | 6×9.5×8.5 | 20 | 3 000 | 23 600 29 500 | 19 200 24 000 | 52 500 70 000 | 665 890 | 505 900 | 3 100 5 000 | 505 900 | 3 100 5 000 | 0.45 0.65 | |
| 30 (60) | 7×11×9 | 20 | 3 900 | 36 000 43 500 | 29 200 35 400 | 72 700 92 900 | 970 1 240 | 760 1 240 | 4 850 7 200 | 760 1 240 | 4 850 7 200 | 0.80 1.1 | 3.4 |
| 40 (80) | 9×14×12 | 20 | 3 900 | 47 800 58 500 | 38 900 47 600 | 93 500 121 000 | 1 670 2 170 | 1 140 1 950 | 7 100 11 500 | 1 140 1 950 | 7 100 11 500 | 1.3 1.7 | |
| 40 (80) | 9×14×12 | 20 | 3 900 | 65 500 82 900 | 53 300 67 400 | 129 000 175 000 | 2 810 3 810 | 1 800 3 250 | 11 000 17 800 | 1 800 3 250 | 11 000 17 800 | 1.7 2.3 | 6.8 |
| 52.5 (105) | 14×20×17 | 22.5 | 3 650 | 114 000 143 000 | 92 800 116 000 | 229 000 305 000 | 6 180 8 240 | 4 080 7 150 | 24 000 39 000 | 4 080 7 150 | 24 000 39 000 | 3.2 4.3 | |
| 60 (120) | 16×23×20 | 30 | 3 600 | 159 000 207 000 | 129 000 168 000 | 330 000 462 000 | 10 200 14 300 | 7 060 13 600 | 41 000 72 000 | 7 060 13 600 | 41 000 72 000 | 5.4 7.5 | 14.6 |
| 75 (150) | 18×26×22 | 35 | 3 600 | 259 000 355 000 | 210 000 288 000 | 504 000 756 000 | 19 200 28 700 | 12 700 28 600 | 78 500 153 000 | 12 700 28 600 | 78 500 153 000 | 12.2 16.5 | |

2) The random-matching type is available for the models of RA25 to RA65.
 3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
 C_{50} : the basic dynamic load rating for 50 km rated fatigue life
 C_{100} : the basic dynamic load rating for 100 km rated fatigue life

