A-5-3.1 Roller Guide RA Series

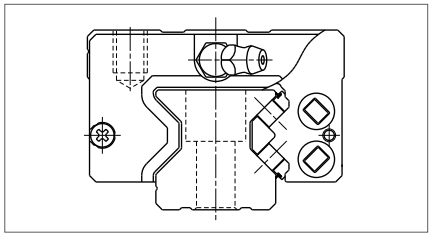


Fig. 1 RA Series

1. 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 our advanced 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.

* As of September 1, 2003; NSK's reserch and comparison on the existing products of the same sizes.

(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) Smooth motion

Installation of a retaining piece between rollers restrains the roller skew peculiar to roller slides, thereby achieving smooth motion.

(5) Low friction

Using rollers for rolling elements helps minimize dynamic friction.

(6) Random matching

Random-matching of rails and roller slides are available. (RA25 to RA65)

(7) Specification with highly dustproof V1 seal

Specification with newly developed, highly dustproof V1 seal which is the end seal with enhanced abrasion resistance is also available. (RA35 – 55)

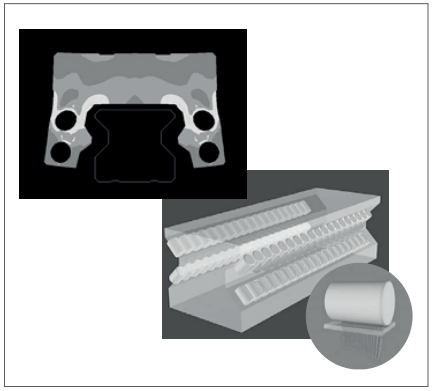


Fig. 2 Analysis example

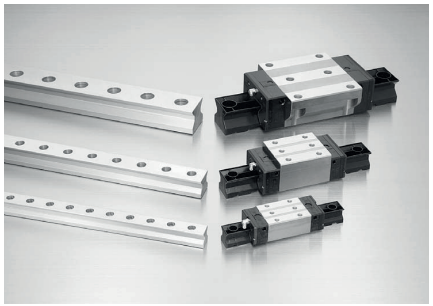


Fig. 3 Random-matching type

2. Roller slide shape

Roller slide model	Shape/installation method	Type (Upper row, Rating: Lower row, Roller slide length)	
		High-load type	Super-high-load type
		Standard	Long
AN BN		AN	BN
AL BL		AL	BL
EM GM		EM	GM

3. Accuracy and preload

(1) Running parallelism of roller slide

Table 1

Unit: μm

Rail length (mm)	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6
	Preloaded assembly	Preloaded assembly	Preloaded assembly Random-matching type	Preloaded assembly
– 50	2	2	2	4.5
50 – 80	2	2	3	5
80 – 125	2	2	3.5	5.5
125 – 200	2	2	4	6
200 – 250	2	2.5	5	7
250 – 315	2	2.5	5	8
315 – 400	2	3	6	9
400 – 500	2	3	6	10
500 – 630	2	3.5	7	12
630 – 800	2	4	8	14
800 – 1 000	2.5	4.5	9	16
1 000 – 1 250	3	5	10	17
1 250 – 1 600	4	6	11	19
1 600 – 2 000	4.5	7	13	21
2 000 – 2 500	5	8	15	22
2 500 – 3 150	6	9.5	17	25
3 150 – 3 500	9	16	23	30

(2) Accuracy standard

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.

› Tolerance of preloaded assembly

Table 2

Unit: μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6
Mounting height H Variation of H (All ball 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 ball 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	Shown in **Table 1** and **Fig. 4**			

› Tolerance of random-matching type

Table 3

Unit: μm

Characteristics \ Accuracy grade	High precision PH
Mounting height H	±20
Variation of mounting height H	15① 25②
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 1** and **Fig. 4**

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

(3) Combination of accuracy and preload

Table 4

		Accuracy grade				
		Ultra precision	Super precision	High precision	Precision grade	High precision
Without NSK K1 lubrication unit		P3	P4	P5	P6	PH
With NSK K1 lubrication unit		K3	K4	K5	K6	KH
Preload	Slight preload Z1	○	○	○	○	—
	Medium preload Z3	○	○	○	○	—
	Random-matching type with slight preload ZZ	—	—	—	—	○
	Random-matching type with medium preload ZH	—	—	—	—	○

(4) Assembled accuracy

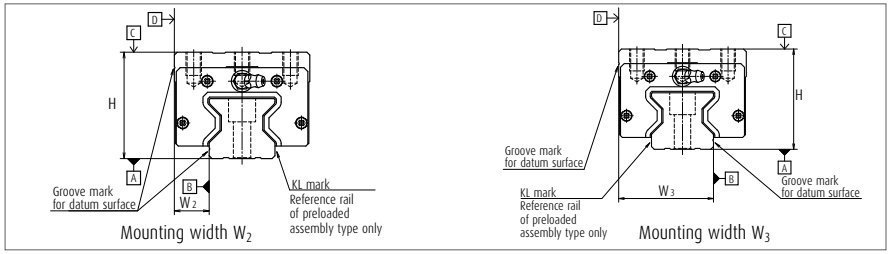


Fig. 3

(5) Preload and rigidity

Four types of preload are available: Medium preload Z3 and Slight preload Z1 for preloaded assembly, and Medium preload ZH and slight preload ZZ for Random-matching type.

› Preload of preloaded assembly

Table 5

	Model No.	Preload (N) Slight preload (Z1)	Preload (N) Medium preload (Z3)
High-load type	RA15 AN, AL, EM	—	1 030
	RA20 AN, EM	—	1 920
	RA25 AN, AL, EM	880	2 920
	RA30 AN, AL, EM	1 170	3 890
	RA35 AN, AL, EM	1 600	5 330
	RA45 AN, AL, EM	2 780	9 280
	RA55 AN, AL, EM	3 870	12 900
	RA65 AN, EM	6 300	21 000
Super-high-load type	RA15 BN, BL, GM	—	1 300
	RA20 BN, GM	—	2 400
	RA25 BN, BL, GM	1 060	3 540
	RA30 BN, BL, GM	1 430	4 760
	RA35 BN, BL, GM	2 020	6 740
	RA45 BN, BL, GM	3 480	11 600
	RA55 BN, BL, GM	5 040	16 800
	RA65 BN, GM	8 640	28 800

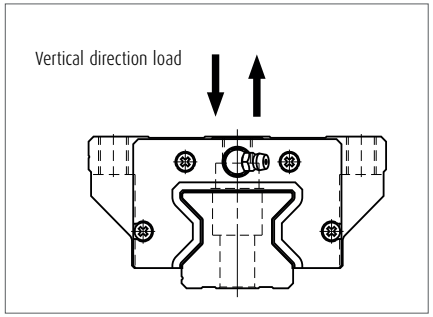
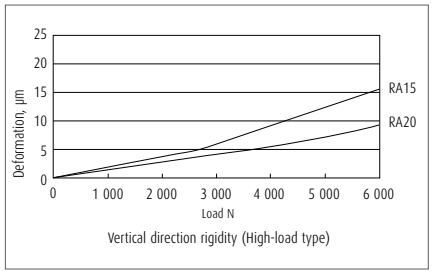
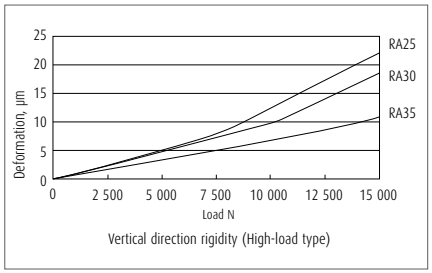


Fig. 5 Direction of load

› **Rigidity of medium preload**





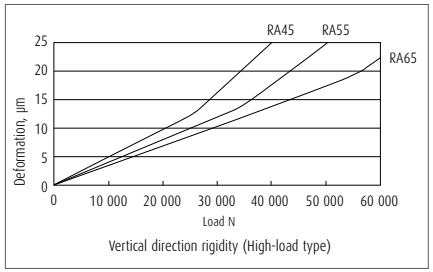
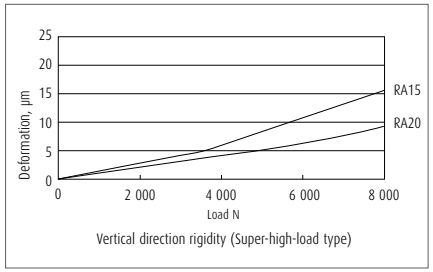
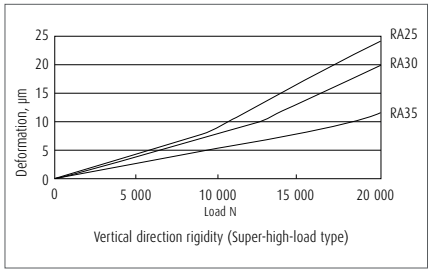


Fig. 6 Vertical direction theoretical rigidity line: High-load type (Roller slide shape: AN, AL, EM)





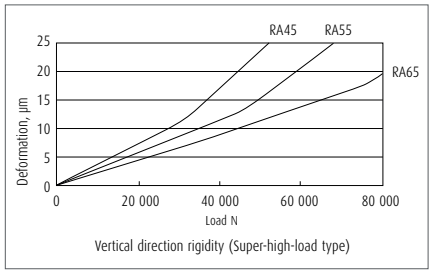


Fig. 7 Vertical direction theoretical rigidity line: Super-high-load type (Roller slide shape: BN, BL, GM)

4. Maximum rail length

Table 5 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grades.

Table 6 Length limitation of rails

Unit: mm

Series \ Size	15	20	25	30	35	45	55	65
RA	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.

5. Installation

(1) Permissible values of mounting error

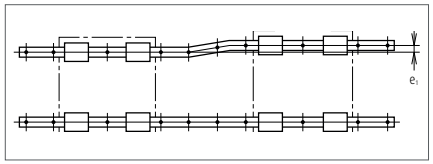


Fig. 8

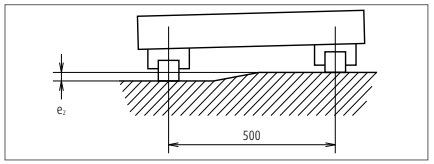


Fig. 9

Table 7

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 / 500 mm					
	Z3 , ZH	150 µm / 500 mm							

(2) Shoulder height of the mounting surface and corner radius r

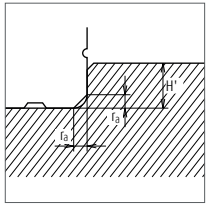


Fig. 10 Shoulder for the rail datum surface

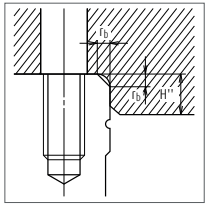


Fig. 11 Shoulder for the roller slide datum surface

Table 8

Unit : mm

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

6. Lubrication components

Refer to pages A38 and D13 for the lubrication of linear guides.

(1) Types of lubrication accessories

Fig. 14 and **Table 11** 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. 12**) 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.13, Table 9** and **Table 10** 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 thread of M6 × 1, you require a connector to connect it to a grease fitting mounting hole with M6 × 0.75. The connectors are available from NSK.

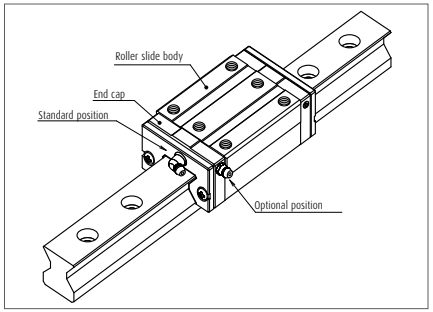


Fig. 12 Mounting position of lubrication accessories

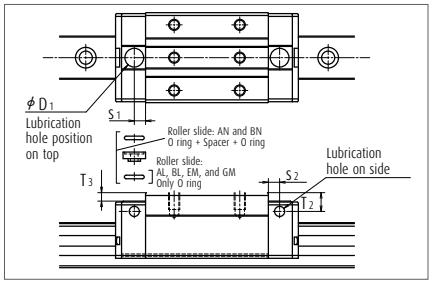


Fig.13 Top and side lubrication hole positions

Table 9 Top and side lubrication hole positions

Unit : mm

Model No.	Roller slide model	Grease fitting size	s_2	T_2	O ring (JIS)	Spacer	D_1	s_1	T_3
RA15	AN, BN	ϕ 3	4	7	P5	Necessary	8.2	4.4	4.2
RA20	AN, BN	ϕ 3	4	4	P6	—	9.2	5.4	0.2
RA25	AN, BN	M6×0.75	6	10	P7	Necessary	10.2	6	4.5
RA30	AN, BN	M6×0.75	5	10	P7	Necessary	10.2	6	3.5
RA35	AN, BN	M6×0.75	5.5	15	P7	Necessary	10.2	7	7.4
RA45	AN, BN	Rc 1/8	7.2	20	P7	Necessary	10.2	7.2	10.4
RA55	AN, BN	Rc 1/8	7.2	21	P7	Necessary	10.2	7.2	10.4
RA65	AN, BN	Rc 1/8	7.2	19	P7	—	10.2	7.2	0.4

Table 10 Top and side lubrication hole positions

Unit : mm

Model No.	Roller slide model	Grease fitting size	s_2	T_2	O ring (JIS)	D_1	s_1	T_3
RA15	AL, BL, EM, GM	ϕ 3	4	3	P5	8.2	4.4	0.2
RA20	EM, GM	ϕ 3	4	4	P6	9.2	5.4	0.2
RA25	AL, BL, EM, GM	M6×0.75	6	6	P7	10.2	6	0.4
RA30	AL, BL, EM, GM	M6×0.75	5	7	P7	10.2	6	0.4
RA35	AL, BL, EM, GM	M6×0.75	5.5	8	P7	10.2	7	0.4
RA45	AL, BL, EM, GM	Rc 1/8	7.2	10	P7	10.2	7.2	0.4
RA55	AL, BL, EM, GM	Rc 1/8	7.2	11	P7	10.2	7.2	0.4
RA65	EM, GM	Rc 1/8	7.2	19	P7	10.2	7.2	0.4

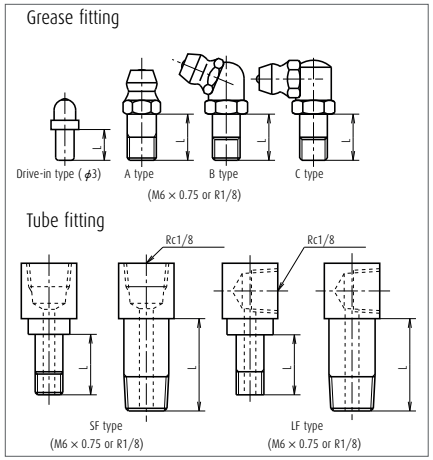


Fig. 14 Grease fitting and tube fitting

7. Dust-proof components

(1) Standard specification

The RA series is equipped with end, inner* 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** are available. Contact NSK for information on how to mount the cover.

*) Inner seals for the models of RA15 and RA20 are available as options.
**) The rail cover is available to the models of RA25 to RA65.

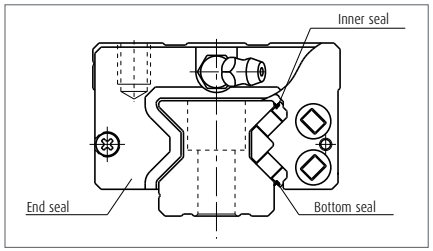


Fig. 15

Table 11

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

Fig. 16 Rail cover

Table 12 Seal friction per roller side (maximum value)

Unit: mm

Series \ Size	15	20	25	30	35	45	55	65
RA	4	5.5	5	5	6	8	8	14

(2) NSK K1 lubrication unit

Table 12 shows the dimension of linear guides equipped with the NSK K1 lubrication unit.

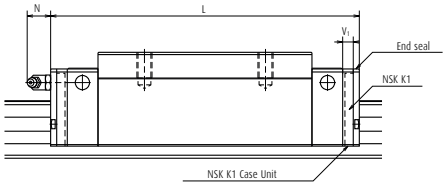


Table 13

Unit: mm

Model No.	Roller slide length	Roller slide model	Standard roller slide length	With two NSK K1	Thickness of NSK K1 V1	Protruding area of the grease fitting N
RA15	Standard	AN, AL, EM	70	79	4.5	(3)
RA15	Long	BN, BL, GM	85.4	94.4	4.5	(3)
RA20	Standard	AN, EM	86.5	95.5	4.5	(3)
RA20	Long	BN, GM	106.3	115.3	4.5	(3)
RA25	Standard	AN, AL, EM	97.5	107.5	5	(11)
RA25	Long	BN, BL, GM	115.5	125.5	5	(11)
RA30	Standard	AN, AL, EM	110.8	122.8	6	(11)
RA30	Long	BN, BL, GM	135.4	147.4	6	(11)
RA35	Standard	AN, AL, EM	123.8	136.8	6.5	(11)
RA35	Long	BN, BL, GM	152	165	6.5	(11)
RA45	Standard	AN, AL, EM	154	168	7	(14)
RA45	Long	BN, BL, GM	190	204	7	(14)
RA55	Standard	AN, AL, EM	184	198	7	(14)
RA55	Long	BN, BL, GM	234	248	7	(14)
RA65	Standard	AN, EM	228.4	243.4	7.5	(14)
RA65	Long	BN, GM	302.5	317.5	7.5	(14)

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

Table 14

Unit: mm

Modell 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

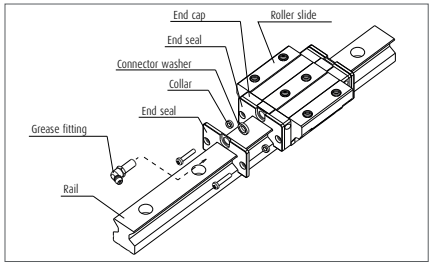


Fig. 17 Double seal

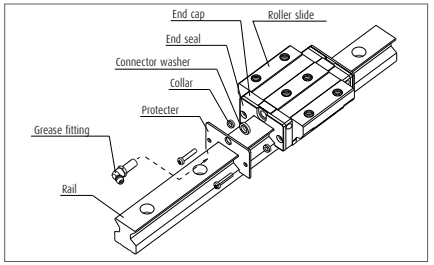


Fig. 18 Protector

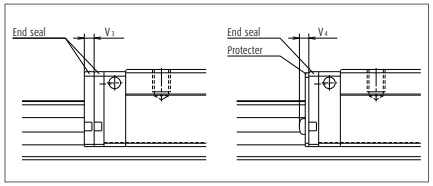


Fig. 19

(4) Rail cover

When the rail cover is used, use the cover bracket to secure the rail cover. **Fig.20** 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 15**.

Table 15 Height of rails equipped with rail cover

Unit: mm

Modell No.	Standard height H1	Cover installation
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

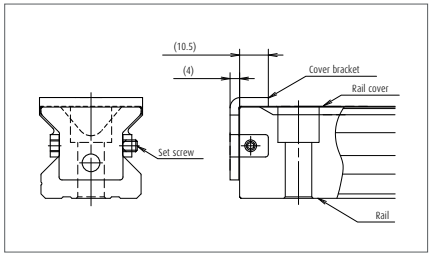


Fig. 20 End configuration of rail equipped with the rail cover

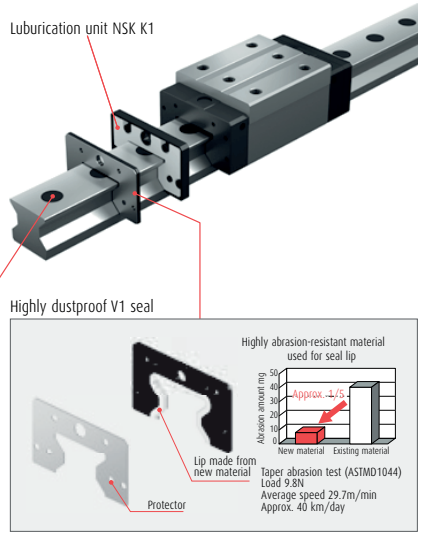
(5) Cap to plug the rail mounting bolt hole

Table 16 Caps to plug rail bolt hole

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

(6) Specification with highly dustproof V1 seal

RA35, RA45, and RA55 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. Inner seal and bottom seal are equipped as standard. In addition, outstanding lubrication effects by NSK K1 further improves the durability. 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. See A262 for the details of the rail cover.



› Durability test under extreme conditions - no

With this new material, even if lubrication is poor, damage such as roughening of surfaces will not occur.
Test sample: RA35
Operation without lubrication on the seal
Feed speed: 500 mm/sec

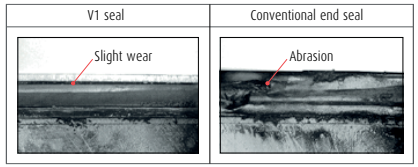
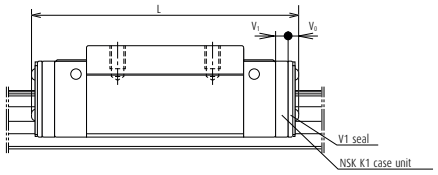


Table 17 shows the dimension for roller slide with V1 seal.



Since the sealing property (resistance to foreign matter) is affected by usage or the lubrication environment, please conduct an evaluation test for your particular application.

Table 17

Unit: mm

Modell No.	Roller slide length	Roller slide type	Standard roller slide length L	Roller slide length equipped with V1 seal L	Roller slide length equipped with V1 seal and NSK K1 L	Thickness of V1 seal V_0	Thickness of K1 case unit V_1
RA35	Standard	AN, AL, EM	123.8	127.8	140.8	3.4	6.5
	Long	BN, BL, GM	152	156	169		
RA45	Standard	AN, AL, EM	154	159.2	173.2	4	7
	Long	BN, BL, GM	190	195.2	209.2		
RA55	Standard	AN, AL, EM	184	189.2	203.2	4	7
	Long	BN, BL, GM	234	239.2	253.2		

(7) Dynamic friction

› Dynamic friction indications per roller slide are shown in table 18.
› These values are assumed under actual condition with standard specification (two end seals, inner seal and bottom seal equipped) packed with standard grease (NSK Grease AS2)
› Dynamic friction varies with grease.

Table 18 Dynamic friction

Unit: N

Modell No.	High-load type	Super-high-load type
RA15	21	24
RA20	22	28
RA25	27	34
RA30	33	42
RA35	42	53
RA45	56	69
RA55	80	95
RA65	120	138

Note Values in Table 18 are indications. Please refer to them.

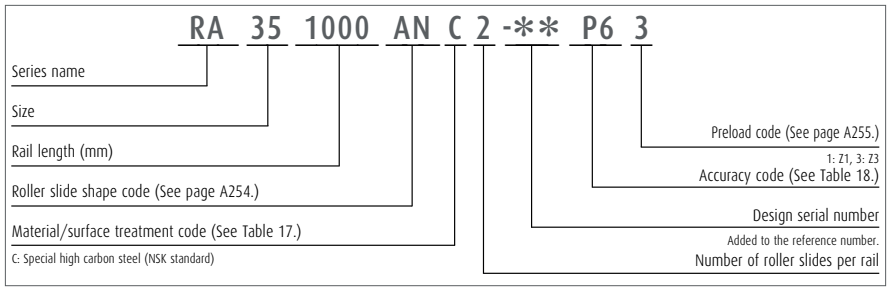
A-5-3.1 Roller Guide RA Series

9. Reference number

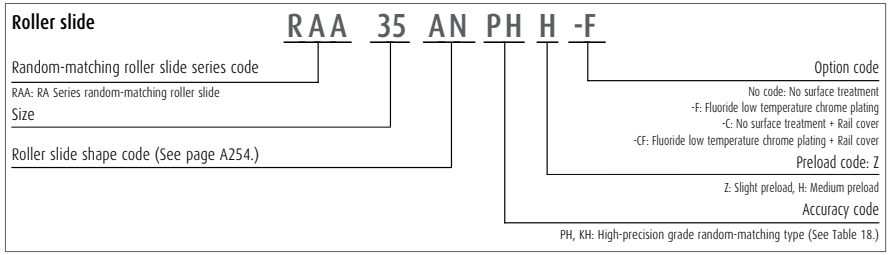
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

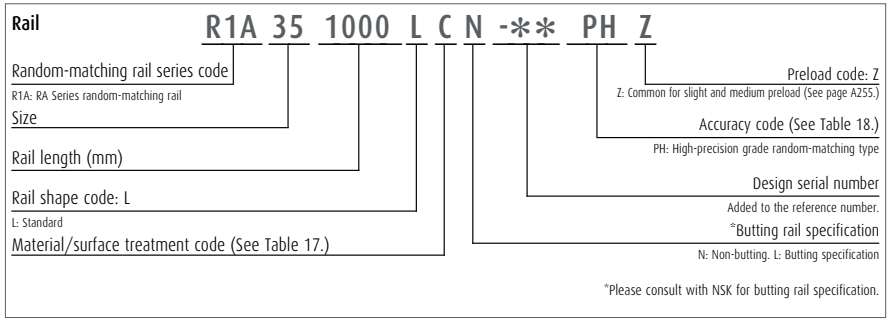
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type





The reference number coding for the assembly of random-matching type is the same as that of the preloaded assembly. However, the applicable preload codes are "slight preload Z" and "medium preload H". (See page A255.)

Table 19 Material/surface treatment code

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

Note P and R are not available for randommatching slides and rails.

Table 20 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1
Ultra precision grade	P3	K3
Super precision grade	P4	K4
High precision grade	P5	K5
Precision grade	P6	K6
High precision grade (random-matching type)	PH	KH

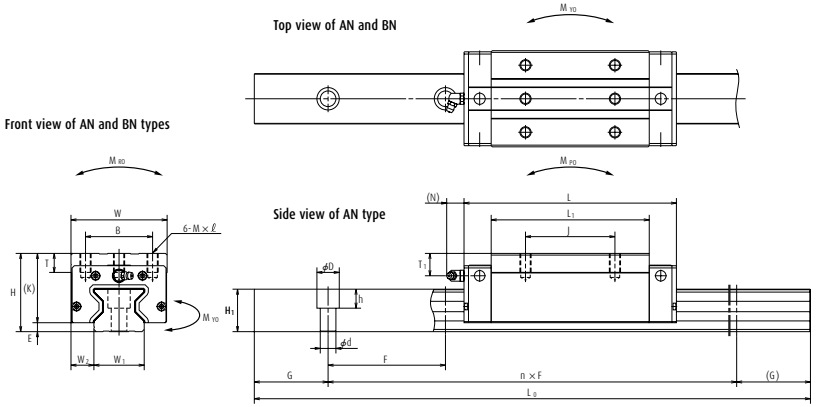
Note Refer to pages A38 for NSK K1 lubrication unit.

10. Dimensions

RA-AN (High-load type / Standard)
RA-BN (Super-high-load type / Long)

RA 35 1000 AN C 2 -** PH H

- Series name
- Size
- Rail length (mm)
- Roller slide shape code (See page A254.)
- Material/surface treatment code (See Table 19.)
  - C: Special high carbon steel (NSK standard)
- Number of ball slides per rail
- Design serial number
  - Added to the reference number.
- Accuracy code (See Table 20.)
- Preload code (See page A255)
  - 1: Z1, 3: Z3, Z: ZZ, H: ZH



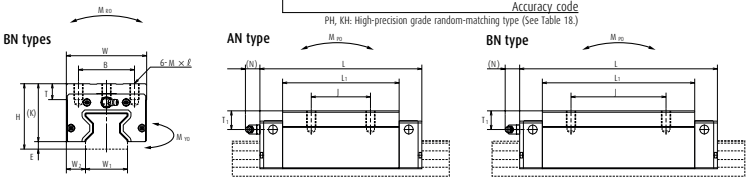
Model No.	Assembly			Ball slide											Width	Height
	Height			Width	Length	Mounting hole						Grease fitting				
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
RA15AN	28	4	9.5	34	70	26	26	M4×0.7×6	44.8	24	8	ϕ 3	8	3	15	16.3
RA15BN	28	4	9.5	34	85.4	26	26	M4×0.7×6	60.2	24	8	ϕ 3	8	3	15	16.3
RA20AN	30	5	12	44	86.5	32	36	M5×0.8×6	57.5	25	12	ϕ 3	4	3	20	20.8
RA20BN	30	5	12	44	106.3	32	50	M5×0.8×6	77.3	25	12	ϕ 3	4	3	20	20.8
RA25AN	40	5	12.5	48	97.5	35	35	M6×1×9	65.5	35	12	M6×0.75	10	11	23	24
RA25BN	40	5	12.5	48	115.5	35	50	M6×1×9	83.5	35	12	M6×0.75	10	11	23	24
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
RA30BN	45	6.5	16	60	135.4	40	60	M8×1.25×11	98.6	38.5	14	M6×0.75	10	11	28	28
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
RA35BN	55	6.5	18	70	152	50	72	M8×1.25×12	111.4	48.5	15	M6×0.75	15	11	34	31
RA45AN	70	8	20.5	86	154	60	60	M10×1.5×17	105.4	62	17	Rc1/8	20	14	45	38
RA45BN	70	8	20.5	86	190	60	80	M10×1.5×17	141.4	62	17	Rc1/8	20	14	45	38
RA55AN	80	9	23.5	100	184	75	75	M12×1.75×18	128	71	18	Rc1/8	21	14	53	43.5
RA55BN	80	9	23.5	100	234	75	95	M12×1.75×18	178	71	18	Rc1/8	21	14	53	43.5
RA65AN	90	13	31.5	126	228.4	76	70	M16×2×20	155.4	77	22	Rc1/8	19	14	63	55
RA65BN	90	13	31.5	126	302.5	76	120	M16×2×20	229.5	77	22	Rc1/8	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.

Reference number for roller slide of random-matching type

Ball slide: RAA 35 AN PH H -F

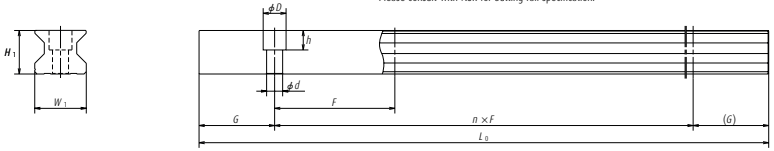
- Random-matching roller slide series code
  - RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page A254.)
- Option code
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover‡
  - -CF:Fluoride low temperature chrome plating + Rail cover‡
- Preload code: Z
  - Z: Slight preload, H: Medium preload
- Accuracy code
  - PH, KH: High-precision grade random-matching type (See Table 18.)



Reference number for rail of random-matching type

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

- Random-matching rail series code
  - R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See Table 19.)
- *Butting rail specification
  - N: Non-butting, L: Butting specification
  - *Please consult with NSK for butting rail specification.
- Design serial number
  - Added to the reference number.
- Accuracy code
  - PH: High-precision grade random-matching type
- Preload code: Z
  - Z: Common for slight and medium preload (See A255.)



Unit: mm

Pitch	Rail: Mounting bolt hole	Rail: G	Rail: Maximum length	Basic load rating: 3) Dynamic		Basic load rating: Static	Basic load rating: Static moment (N·m)					Weight	
								M_{PO}		M_{YO}		Ball slide	Rail
F	d × D × h	(reference)	L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
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
(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130	0.30	1.6
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
(30)	6×9.5×8.5	20	3 000	29 500	24 000	70 000	890	900	5 000	900	5 000	0.50	2.6
30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.60	3.4
(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.91	3.4
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
(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.3	4.9
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
(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.1	6.8
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
(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	4.1	10.9
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
(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	6.7	14.6
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
(150)	18×26×22	35	3 600	355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	12.2	22.0

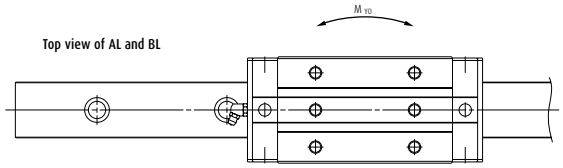
2) The random-matching type is available for the models of RA25 to RA65.
3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}: the basic dynamic load rating for 50 km rated fatigue life
C_{100}: the basic dynamic load rating for 100 km rated fatigue life

RA-AL (High-load type / Standard)
RA-BL (Super-high-load type / Long)

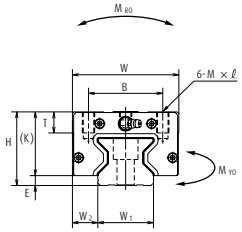
RA 35 1000 AL C 2 -** PH H

- Series name
- Size
- Rail length (mm)
- Roller slide shape code (See page A254.)
- Material/surface treatment code (See Table 19.)
  C: Special high carbon steel (NSK standard)
- Number of roller slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 20.)
- Preload code (See page A255.)
  1: Z1, 3: Z3, Z: ZZ, H: ZH

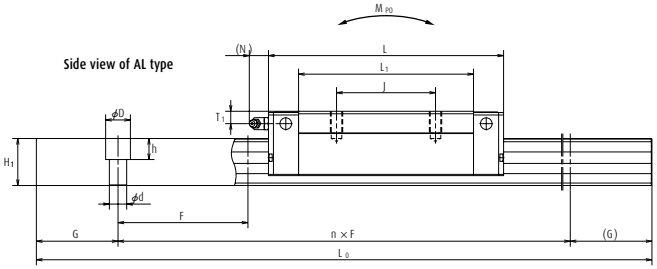
Top view of AL and BL



Front view of AL and BL types



Side view of AL type



Model No.	Assembly Height H	E	W_2	Ball slide Width W	Length L	Mounting hole B	J	M × pitch × ℓ	L_1	K	T	Grease fitting Hole size	T_1	N	Width W_1	Height H_1
RA15AL	24	4	9.5	34	70	26	26	M4×0.7×5.5	44.8	20	8	φ 3	4	3	15	16.3
RA15BL	24	4	9.5	34	85.4	26	26	M4×0.7×5.5	60.2	20	8	φ 3	4	3	15	16.3
RA25AL	36	5	12.5	48	97.5	35	35	M6×1×8	65.5	31	12	M6×0.75	6	11	23	24
RA25BL	36	5	12.5	48	115.5	35	50	M6×1×8	83.5	31	12	M6×0.75	6	11	23	24
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
RA30BL	42	6.5	16	60	135.4	40	60	M8×1.25×11	98.6	35.5	14	M6×0.75	7	11	28	28
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
RA35BL	48	6.5	18	70	152	50	72	M8×1.25×12	111.4	41.5	15	M6×0.75	8	11	34	31
RA45AL	60	8	20.5	86	154	60	60	M10×1.5×16	105.4	52	17	Rc1/8	10	14	45	38
RA45BL	60	8	20.5	86	190	60	80	M10×1.5×16	141.4	52	17	Rc1/8	10	14	45	38
RA55AL	70	9	23.5	100	184	75	75	M12×1.75×18	128	61	18	Rc1/8	11	14	53	43.5
RA55BL	70	9	23.5	100	234	75	95	M12×1.75×18	178	61	18	Rc1/8	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.

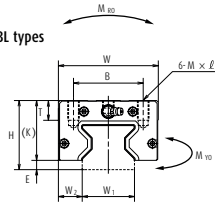
Reference number for roller slide of random-matching type

Ball slide

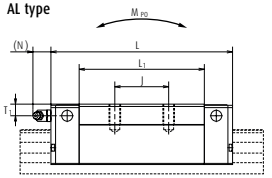
RAA 35 AL PH H -F

- Random-matching roller slide series code
  RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page A254.)
- 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
  Z: Slight preload, H: Medium preload
- Accuracy code
  PH, KH: High-precision grade random-matching type (See Table 20.)

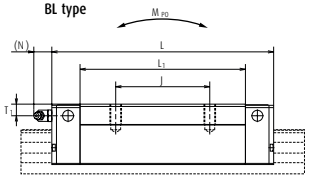
AL and BL types



AL type



BL type



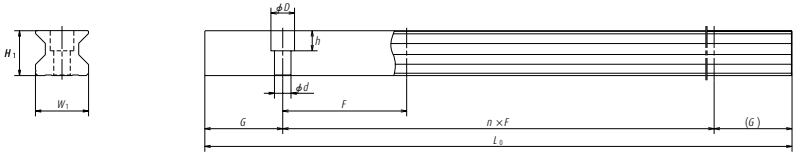
Reference number for rail of random-matching type

Rail

R1A 35 1000 L C N -** PH Z

- Random-matching rail series code
  R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  L: Standard
- Material/surface treatment code (See Table 19.)
- Preload code: Z
  Z: Common for slight and medium preload (See A255.)
- Accuracy code
  PH: High-precision grade random-matching type.
- 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.



Unit: mm

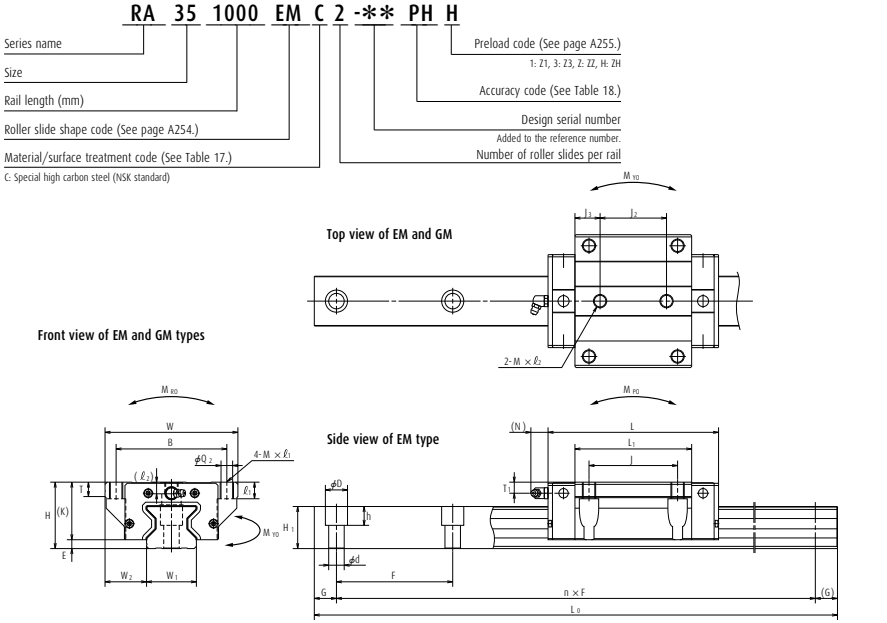
Rail Pitch F	Mounting bolt hole d × D × h	G (reference)	Maximum length L_{0max}	Basic load rating 3) Dynamic [50km] C_{50}(N)	[100km] C_{100}(N)	Static C_0 (N)	Static moment (N·m) M_{RO}	M_{PO} One slide	M_{PO} Two slides	M_{YO} One slide	M_{YO} Two slides	Weight Ball slide (kg)	Rail (kg/m)
60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.17	1.6
(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130	0.25	1.6
30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.45	3.4
(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.80	3.4
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
(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.1	4.9
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
(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	1.7	6.8
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
(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	3.4	10.9
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
(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	5.7	14.6

2) The random-matching type is available for the models of RA25 to RA55.
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-EM (High-load type / Standard)
RA-GM (Super-high-load type / Long)

RA 35 1000 EM C 2 -** PH H

- Series name
- Size
- Rail length (mm)
- Roller slide shape code (See page A254.)
- Material/surface treatment code (See Table 17.)
  C: Special high carbon steel (NSK standard)
- Number of roller slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 18.)
- Preload code (See page A255.)
  1: Z1, 3: Z3, Z: ZZ, H: ZH



Model No.	Assembly			Ball slide														Grease fitting		
	Height			Width	Length	Mounting hole					L_1	K	T	Hole size	T_1	N				
	H	E	W_2	W	L	B	J	J_2	M × pitch × $\ell_1(\ell_2)$	O_2										
RA15EM	24	4	16	47	70	38	30	26	M5×0.8×8.5 (6.5)	4.4	44.8	20	8	ϕ 3	4	3				
RA15GM	24	4	16	47	85.4	38	30	26	M5×0.8×8.5 (6.5)	4.4	60.2	20	8	ϕ 3	4	3				
RA20EM	30	5	21.5	63	86.5	53	40	35	M6×1×9.5 (8)	5.3	57.5	25	10	ϕ 3	4	3				
RA20GM	30	5	21.5	63	106.3	53	40	35	M6×1×9.5 (8)	5.3	77.3	25	10	ϕ 3	4	3				
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				
RA25GM	36	5	23.5	70	115.5	57	45	40	M8×1.25×10 (11)	6.8	83.5	31	11	M6×0.75	6	11				
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				
RA30GM	42	6.5	31	90	135.4	72	52	44	M10×1.5×12 (12.5)	8.6	98.6	35.5	11	M6×0.75	7	11				
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				
RA35GM	48	6.5	33	100	152	82	62	52	M10×1.5×13 (7)	8.6	111.4	41.5	12	M6×0.75	8	11				
RA45EM	60	8	37.5	120	154	100	80	60	M12×1.75×15 (10.5)	10.5	105.4	52	13	Rc1/8	10	14				
RA45GM	60	8	37.5	120	190	100	80	60	M12×1.75×15 (10.5)	10.5	141.4	52	13	Rc1/8	10	14				
RA55EM	70	9	43.5	140	184	116	95	70	M14×2×18 (13)	12.5	128	61	15	Rc1/8	11	14				
RA55GM	70	9	43.5	140	234	116	95	70	M14×2×18 (13)	12.5	178	61	15	Rc1/8	11	14				
RA65EM	90	13	53.5	170	228.4	142	110	82	M16×2×24 (18.5)	14.6	155.4	77	22	Rc1/8	19	14				
RA65GM	90	13	53.5	170	302.5	142	110	82	M16×2×24 (18.5)	14.6	229.5	77	22	Rc1/8	19	14				

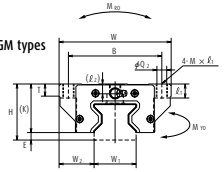
Notes 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Reference number for roller slide of random-matching type

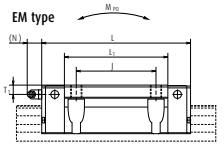
Ball slide RAA 35 EM PH H -F

- Random-matching roller slide series code
  RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page A254.)
- 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
  Z: Slight preload, H: Medium preload.
- Accuracy code
  PH, KH: High-precision grade random-matching type (See table 18.)

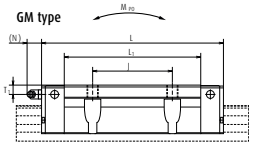
EM and GM types



EM type



GM type

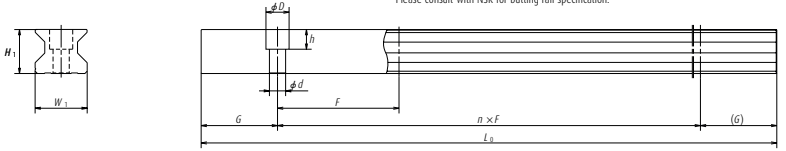


Reference number for rail of random-matching type

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

- Random-matching rail series code
  R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  L: Standard
- Material/surface treatment code (See Table 19.)
- *Butting rail specification
  N: Non-butting, L: Butting specification
- Design serial number
  Added to the reference number.
- Accuracy code
  PH: High-precision grade random-matching type.
- Preload code: Z
  Z: Common for slight and medium preload (See A255)

*Please consult with NSK for butting rail specification.



Unit: mm

Rail							Basic load rating								Weight	
Width	Height	Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)						Ball slide	Rail
W_1	H_1	F	d × D × h	(reference)	L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	M_{PO}		M_{YO}			(kg)	(kg/m)
										One slide	Two slides	One slide	Two slides			
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
15	16.3	(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130		0.28	1.6
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
20	20.8	(30)	6×9.5×8.5	20	3 000	29 500	24 000	70 000	890	900	5 000	900	5 000		0.65	2.6
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
23	24	(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200		1.1	3.4
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
28	28	(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500		1.7	4.9
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
34	31	(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800		2.3	6.8
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
45	38	(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000		4.3	10.9
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
53	43.5	(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000		7.5	14.6
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
63	55	(150)	18×26×22	35	3 600	355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000		16.5	22.0

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