AVA
LINEAR SYSTEM

Guias de Rolos Modelo RA

MOTION & CONTROL™
NSK

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 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

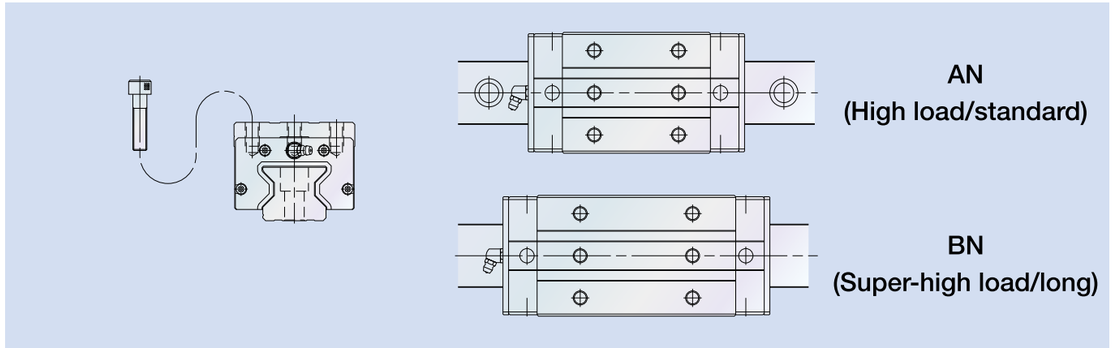


Fig. 2 Low-profile type

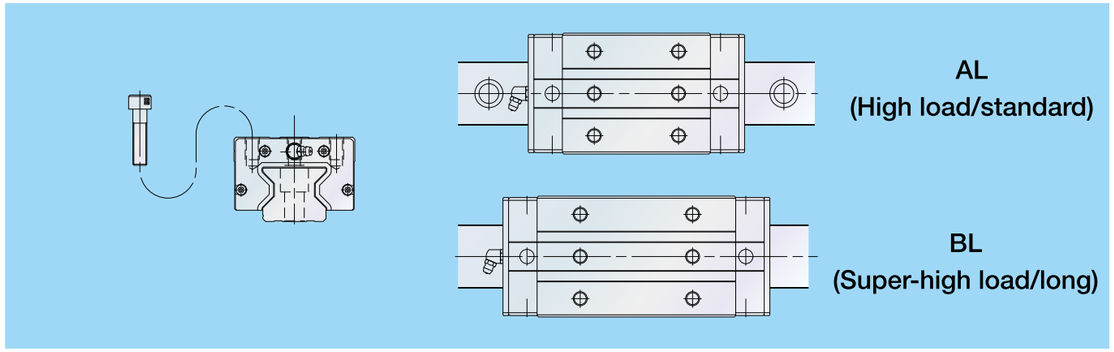
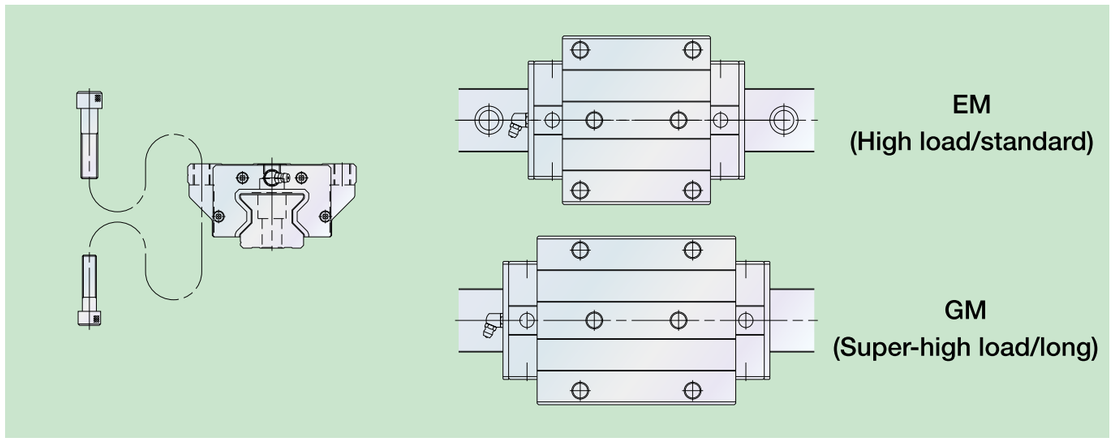


Fig. 3 Flange type



2. Accuracy

Four accuracy grades are available: ultra super precision P3, super precision P4, high precision P5, and precision P6.

Table 1 Accuracy standards — Unit: mm

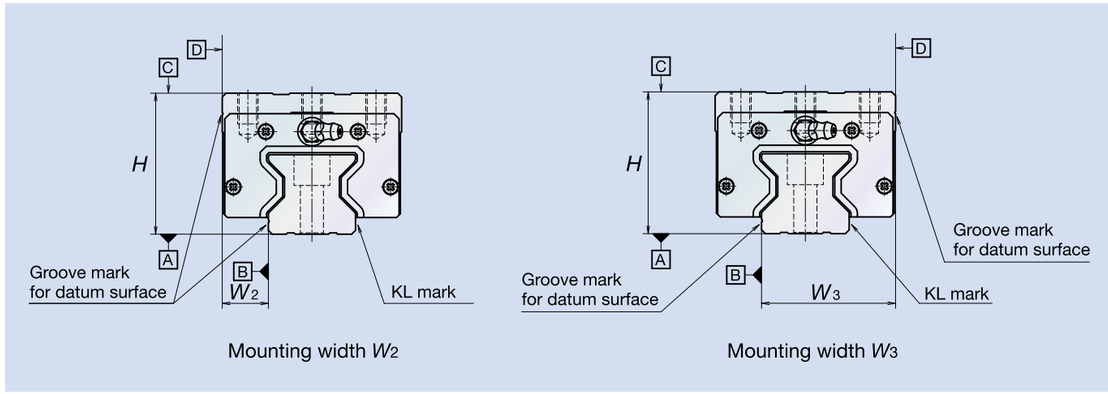
Accuracy standards	Accuracy grades				
	Ultra super precision P3	Super precision P4	High precision P5	Precision P6	Random-matching Precision P6
Mounting height: Dimensions in mounting height *H*	±0.008	±0.010	±0.020	±0.040	±0.020
Mounting width: Dimensions in mounting width W_2 or W_3	±0.010	±0.015	±0.025	±0.050	±0.025
Variation of mounting height dimension *H*	0.003	0.005	0.007	0.015	0.015
Variation of mounting width dimension W_2 or W_3*	0.003	0.007	0.010	0.020	0.020
Running parallelism of face C against face A Running parallelism of face D against face B	Refer to Table 2				

* Difference in roller slides on the reference side roller guide.

Table 2 Running parallelism — Unit: μm

Rail length (mm)	Ultra super precision P3	Super precision P4	High precision P5	Precision P6
Over – 50 or less	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 – 3 000	6	9.5	17	25
3 150 – 3 500	9	16	23	30

Fig. 4 Specifications of accuracy



3. Preload and Rigidity

We offer two levels of preload: Medium preload Z3 and Slight preload Z1.

Table 3 Preload

Unit: N

	Model No.	Slight preload (Z1)	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

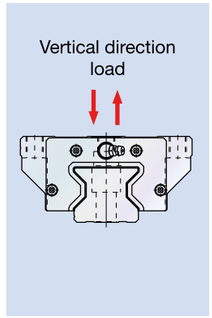
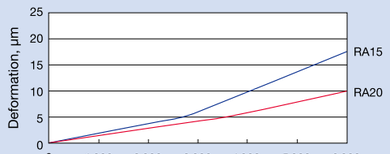
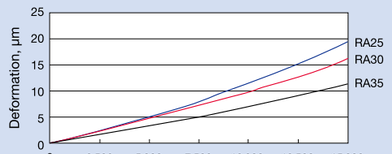


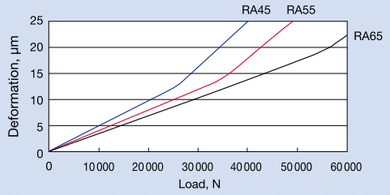
Fig. 6 Rigidity measurement data



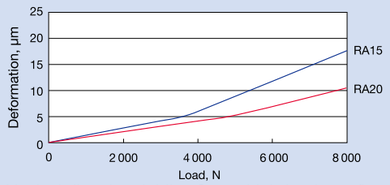
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



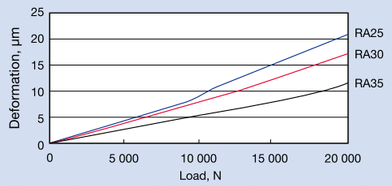
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



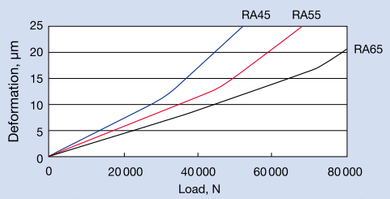
Vertical direction rigidity: High-load type/standard
(Roller slide shape: AN, AL, EM)



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



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



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

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 Guides 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.
- fw 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.

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

Table 4 Load factor fw

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 5.

Fig. 7 Direction of load

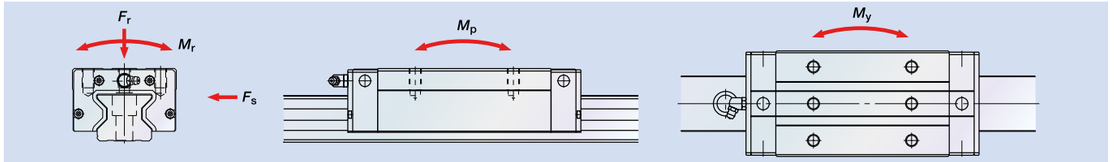


Table 5 Loads in the arrangement of linear guide

Pattern	Arrangement of linear guide	Loads necessary to calcurate 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	$F_r = F_r$ $F_{se} = F_s \tan\alpha$ $F_{re} = \varepsilon_r M_r$ $F_{pe} = \varepsilon_p M_p$ $F_{ye} = \varepsilon_y M_y$ 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 6 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	53	53
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	33	34	34
RA55 Super-high load type	33	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) Mounting position of lubrication accessories

- The standard position of grease fittings and tube fittings is the end face of the roller slide. (Fig. 8) A lubrication hole can be provided on the side or the top face of the end cap or roller slide. Mounting positions are shown in the Figs. 8 and 9, and Tables 7.1 and 7.2.
- For mounting on top of the face of end cap, an O ring is required. For the model AN and BN, two O rings as well as spacers are required.
- When using a piping unit with a thread of M6 × 1, a connector is required to connect the piping unit to a grease fitting mounting hole with M6 × 7.5. Connectors are available from NSK.

(2) Cautions for oil lubrication

- 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. 8 Mounting position of lubrication accessories

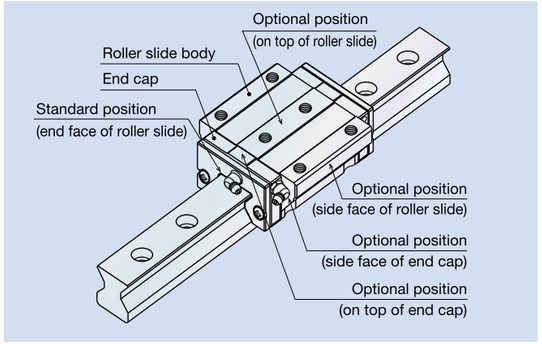


Fig. 9 Top and side lubrication hole positions

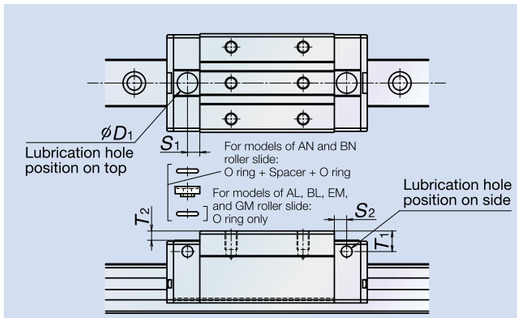


Table 7.1 Lubrication hole positions

Unit: mm

Model No.	Roller slide shape code	Grease nipple size	s_2	T_1	Spacer	D_1	s_1	T_2
RA15	AN, BN	ϕ3	4	7	Necessory	8.2	4.4	4.2
RA20		ϕ3	4	4	–	9.2	5.4	0.2
RA25		M6×0.75	6	10	Necessory	10.2	6	4.5
RA30		M6×0.75	5	10	Necessory	10.2	6	3.5
RA35		M6×0.75	5.5	15	Necessory	10.2	7	7.4
RA45		Rc 1/8	7.2	20	Necessory	10.2	7.2	10.4
RA55		Rc 1/8	7.2	21	Necessory	10.2	7.2	10.4
RA65		Rc 1/8	7.2	19	–	10.2	7.2	0.4

Table 7.2 Lubrication hole positions

Unit: mm

Model No.	Roller slide shape code	Grease nipple size	s_2	T_1	D_1	s_1	T_2
RA15	AL, BL, EM, GM	ϕ3	4	3	8.2	4.4	0.2
RA20	EM, GM	ϕ3	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	0.4

Fig. 10 Grease fitting and Tube fitting

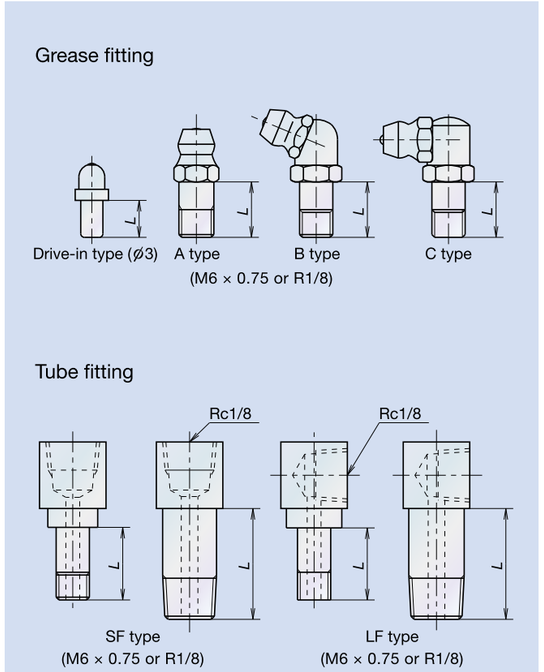


Table 8

Unit: mm

Model No.	Dust-proof specification	Grease fitting Drive-in type: Thread body length L	Tube fitting: Thread body length L
RA15	Standard	5	–
	With NSK K1	10	–
	Double seal	8	–
	Protector	8	–
RA20	Standard	5	–
	With NSK K1	10	–
	Double seal	8	–
	Protector	8	–
RA25	Standard	5	5
	With NSK K1	12	12
	Double seal	10	9
	Protector	10	9
RA30	Standard	5	6
	With NSK K1	14	15
	Double seal	12	11
	Protector	12	11
RA35	Standard	5	6
	With NSK K1	14	15
	Double seal	12	11
	Protector	12	11
RA45	Standard	8	17
	With NSK K1	18	21.5
	Double seal	14	17
	Protector	14	17
RA55	Standard	8	17
	With NSK K1	18	21.5
	Double seal	14	17
	Protector	14	17
RA65	Standard	8	17
	With NSK K1	20	20
	Double seal	14	17
	Protector	14	17

6. Dust-proof

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. The linear guide can also be equipped with a lubrication unit NSK K1 that has already proven its effectiveness with other NSK Linear Guides.

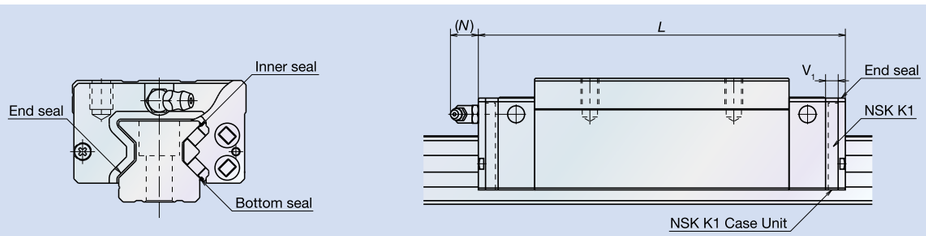
Table 9 Optional parts for dust-proofing

Name	Objective
NSK K1	Porous part containing oil enhances lubrication function.
Double seal	Sealing effect is enhanced by using pairs of side seals.
Protector	Removes large dust particles and protects side seals from hot and hard dust particles.
Rail cover**	Covers top of rail to prevent foreign matter from getting in the rail mounting holes.
Bolt hole cap	Prevents foreign matter such as cutting dust from collecting in the rail mounting holes.

* Inner seals for RA15 and RA20 are available as options. ** Rail cover is applicable to RA25 to RA65.

Fig. 11 Rail cover

Fig. 12 View of the roller slide equipped with the dust-proof parts



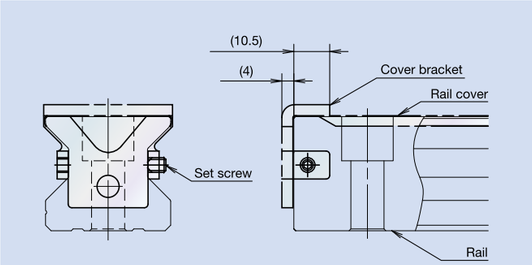
Installed with NSK K1

Table 10 Dimensions of roller slide assembly equipped with the optional parts Unit: mm

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

Above dimensions are for the assembly length of a roller slide equipped with one of the optional dust-proof parts on each end. Please consult with NSK for the dimensions when more than one kind of optional parts are used.

Fig. 13 End configuration of rail equipped with the 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

Table 11 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

The height of the rail with the rail cover is shown in Table 11.

Table 12 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 12.

7. 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. 14 is shown in the Table 13 as typical tolerance.

Fig. 14 Mounting tolerance

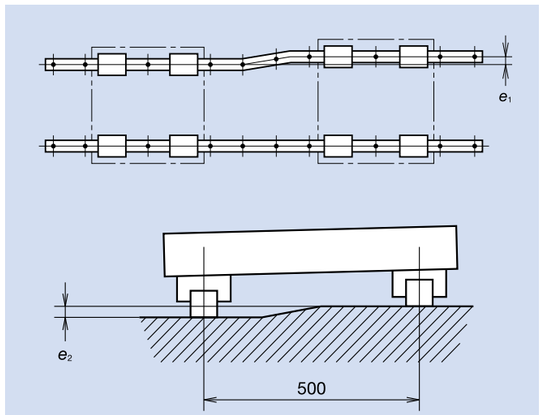


Table 13 Mounting tolerance of RA series

Unit: μm

Model No.	Parallelism tolerance of two roller guides e_1		Height tolerance of two roller guides e_2	
	Z1	Z3, ZZ	Z1	Z3, ZZ
RA15	–	5	–	150 μm / 500 mm
RA20	–	7		
RA25	14	9	290 μm / 500 mm	
RA30	18	11		
RA35	21	13		
RA45	27	17		
RA55	31	19		
RA65	49	30		

(2) Shoulder height and corner radius of mounting surface

When using the shoulders, which rise perpendicularly to the mounting surface, for accurate installation of a roller guide, refer to Fig. 15 and Table 14 for the dimensions.

Fig. 15 Datum face of roller guide and shoulder

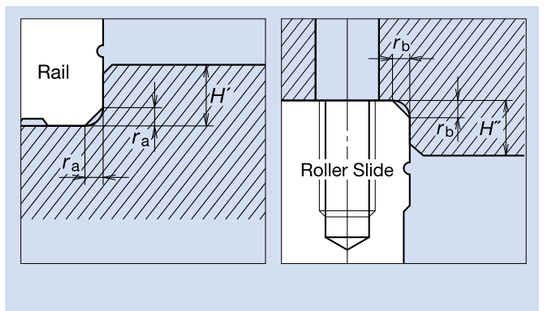


Table 14 Shoulder height and corner radius of attachment

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

8. Maximum rail length

Table15 shows the limitations of rail length. However, the limitations vary by accuracy grades.

Table 15 Length limitation of rails

Unit: mm

Size	RA15	RA20	RA25	RA30	RA35	RA45	RA55	RA65
Length	2 000	3 000	3 000	3 500	3 500	3 500	3 500	3 500

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

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.

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

Assembly

Example of specification number: RA 35 1000 AN C 2 - ** P6 Z

- RA: Series code
- 35: Size No.
- 1000: Rail length (mm)
- AN: Roller slide shape code AN, BN
- C: Material and surface treatment code, C: Special high carbon steel (NSK standard)
- 2: Number of roller slides per rail
- **: Design serial number
- P6: Accuracy grade*1 (Without NSK K1): P3, P4, P5, P6 (With NSK K1): K3, K4, K5, K6
- Z: Preload code 1: Z1 Slight preload, 3: Z3 Medium preload, Z: Random matching with preload

*1 Only P6 and K6 grades are available for the random-matching type.

Random-matching rail

Example of specification number: R1A 35 1000 L C N - ** P6 Z

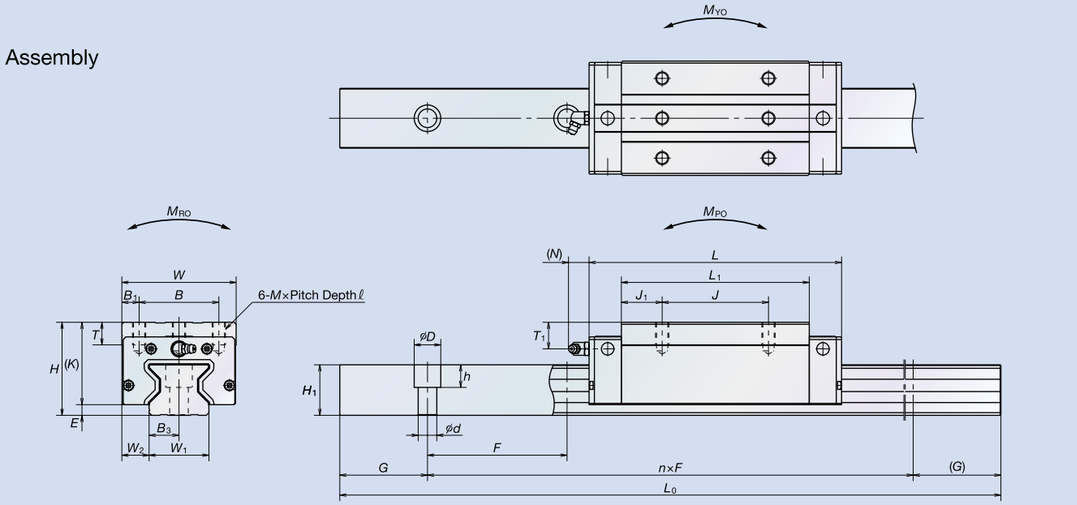
- R1A: RA Series random-matching rail code
- 35: Size No.
- 1000: Rail length (mm)
- L: Rail shape code L: Standard
- C: Material and surface treatment code, C: Special high carbon steel (NSK standard)
- N: Butting specification N: Non-butting specification L: Butting specification
- **: Design serial number
- P6: Accuracy grade P6: Precision
- Z: Preload code Z: Random matching with preload

Random-matching roller slide

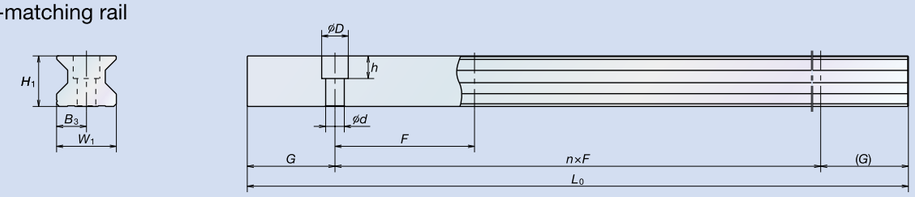
Example of specification number: RAA 35 AN P6 Z - F

- RAA: RA Series random-matching roller slide code
- 35: Size No.
- AN: Roller slide shape code AN, BN
- P6: Accuracy grade P6: Precision
- Z: Random matching with preload
- F: 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

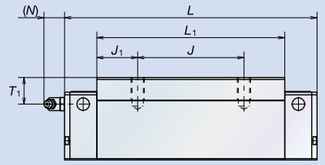
Assembly



Random-matching rail



Random-matching roller slide



Unit: mm

Model No.	Assembly			Roller slide												Rail							Basic load rating					Weight	
	Height			Width	Length	Mounting hole							Grease fitting			Rail width	Rail height	Bolt pitch	Bolt hole		G	Maximum length	Dynamic	Static	Static moment (N·m)			Roller slide	Rail
	H	E	W_2	W	L	B	J	M×Pitch×ℓ	B_1	L_1	J_1	K	T	Mounting hole	T_1	N	W_1	H_1	F	d×D×h	B_3	(recommended)	L_{0max}	C (N)	C_0 (N)	M_{R0}	M_{P0}	M_{Y0}	(kg)	(kg/m)
RA15AN	28	4	9.5	34	70	26	26	M4×0.7×6	4	44.8	9.4	24	8	ϕ3	8	3	15	16.3	60	4.5×7.5×5.3	7.5	20	2 000	10 300	27 500	260	210	210	0.21	1.6
RA15BN					85.4					60.2	17.1								(30)					13 000	37 000	350	375	375	0.30	
RA20AN	30	5	12	44	86.5	32	36	M5×0.8×6	6	57.5	10.75	25	12	ϕ3	4	3	20	20.8	60	6×9.5×8.5	10	20	3 000	19 200	52 500	665	505	505	0.38	2.6
RA20BN					106.3		50			77.3	13.65								(30)					24 000	70 000	890	900	900	0.50	
RA25AN	40	5	12.5	48	97.5	35	35	M6×1×9	6.5	65.5	15.25	35	12	M6×0.75	10	11	23	24	30	7×11×9	11.5	20	3 000	29 200	72 700	970	760	760	0.60	3.4
RA25BN					115.5		50			83.5	16.75													35 400	92 900	1 240	1 240	1 240	0.91	
RA30AN	45	6.5	16	60	110.8	40	40	M8×1.25×11	10	74	17	38.5	14	M6×0.75	10	11	28	28	40	9×14×12	14	20	3 500	38 900	93 500	1 670	1 140	1 140	1.0	4.9
RA30BN					135.4		60			98.6	19.3													47 600	121 000	2 170	1 950	1 950	1.3	
RA35AN	55	6.5	18	70	123.8	50	50	M8×1.25×12	10	83.2	16.6	48.5	15	M6×0.75	15	11	34	31	40	9×14×12	17	20	3 500	53 300	129 000	2 810	1 800	1 800	1.6	6.8
RA35BN					152		72			111.4	19.7													67 400	175 000	3 810	3 250	3 250	2.1	
RA45AN	70	8	20.5	86	154	60	60	M10×1.5×17	13	105.4	22.7	62	17	R_C1/8	20	14	45	38	52.5	14×20×17	22.5	22.5	3 500	92 800	229 000	6 180	4 080	4 080	3.0	10.9
RA45BN					190		80			141.4	30.7													116 000	305 000	8 240	7 150	7 150	4.1	
RA55AN	80	9	23.5	100	184	75	75	M12×1.75×18	12.5	128	26.5	71	18	R_C1/8	21	14	53	43.5	60	16×23×20	26.5	30	3 500	129 000	330 000	10 200	7 060	7 060	4.9	14.6
RA55BN					234		95			178	41.5													168 000	462 000	14 300	13 600	13 600	6.7	
RA65AN	90	13	31.5	126	228.4	76	70	M16×2×20	25	155.4	42.7	77	22	R_C1/8	19	14	63	55	75	18×26×22	31.5	35	3 500	210 000	504 000	19 200	12 700	12 700	9.3	22.0
RA65BN					302.5		120			229.5	54.75													288 000	756 000	28 700	28 600	28 600	12.2	

* Select either one of two F dimensions, the standard or the parenthesized semi-standard dimensions, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.
* The random-matching type is available for the model of RA25 to RA65.

* The basic load rating complies with ISO standards (ISO14728-1, ISO14728-2). If the above basic dynamic load rating (100 km rating) is converted into 50 km rating, use the following formula: $C_{50\ km} = 1.23 \times C_{100\ km}$

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

Assembly

Example of specification number: RA 35 1000 AL C 2 - ** P6 Z

- Series code: RA
- Size No.: 35
- Rail length (mm): 1000
- Roller slide shape code AL, BL: AL
- Material and surface treatment code, C: Special high carbon steel (NSK standard): C
- Number of roller slides per rail: 2
- Design serial number: **
- Accuracy grade*2 (Without NSK K1): P3, P4, P5, P6 (With NSK K1): K3, K4, K5, K6: P6
- Preload code 1: Z1 Slight preload, 3: Z3 Medium preload, Z: Random matching with preload: Z

*1 Only P6 and K6 grades are available for the random-matching type.

Random-matching rail

Example of specification number: R1A 35 1000 L C N - ** P6 Z

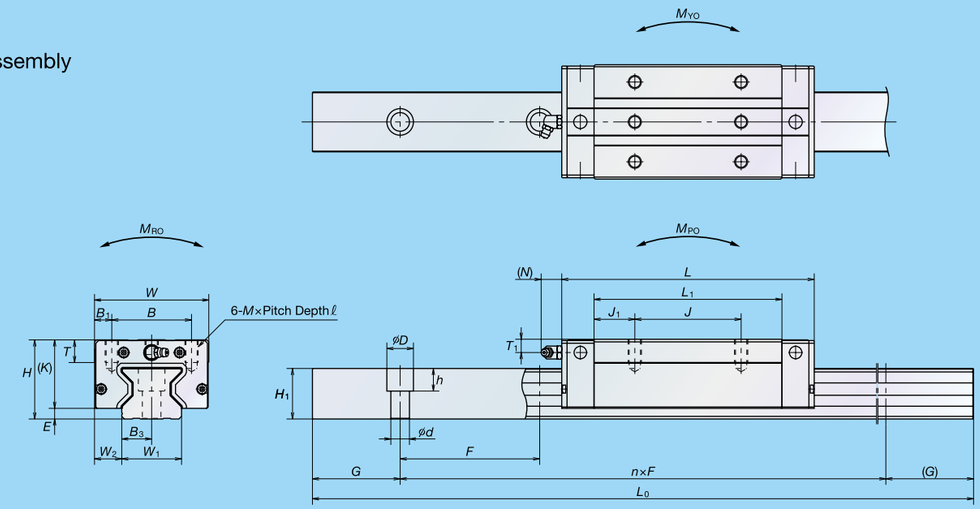
- RA Series random-matching rail code: R1A
- Size No.: 35
- Rail length (mm): 1000
- Rail shape code L: Standard: L
- Material and surface treatment code, C: Special high carbon steel (NSK standard): C
- Butting specification N: Non-butting specification L: Butting specification: N
- Design serial number: **
- Accuracy grade P6: Precision: P6
- Preload code Z: Random matching with preload: Z

Random-matching roller slide

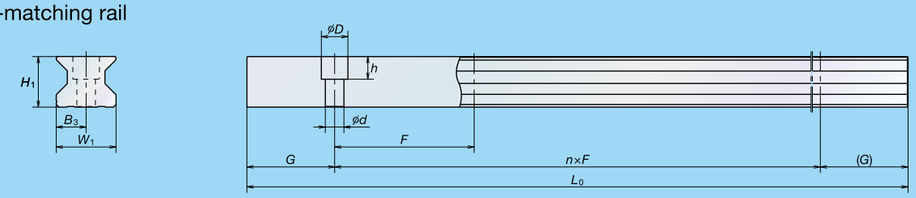
Example of specification number: RAA 35 AL P6 Z - F

- RA Series random-matching roller slide code: RAA
- Size No.: 35
- Roller slide shape code AL, BL: AL
- Accuracy grade P6: Precision: P6
- Z: Random matching with preload: Z
- 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: F

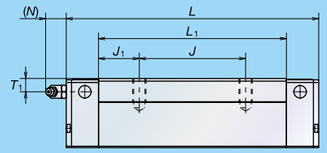
Assembly



Random-matching rail



Random-matching roller slide



Unit: mm

Model No.	Assembly			Roller slide												Rail							Basic load rating					Weight	
	Height			Width	Length	Mounting hole			B_1	L_1	J_1	K	T	Grease fitting			Rail width	Rail height	Bolt pitch	Bolt hole	B_3	G	Maximum length	Dynamic	Static	Static moment (N·m)			Roller slide	Rail
	H	E	W_2	W	L	B	J	M×Pitch×ℓ						Mounting hole	T_1	N	W_1	H_1	F	d×D×h		(recommended)	L_{0max}	C (N)	C_0 (N)	M_{R0}	M_{P0}	M_{Y0}	(kg)	(kg/m)
RA15AL	24	4	9.5	34	70	26	26	M4×0.7×5.5	4	44.8	9.4	20	8	ϕ3	4	3	15	16.3	60	4.5×7.5×5.3	7.5	20	2 000	10 300	27 500	260	210	210	0.17	1.6
RA15BL					85.4					60.2	17.1								(30)					13 000	37 000	350	375	375	0.25	
RA25AL	36	5	12.5	48	97.5	35	35	M6×1×8	6.5	65.5	15.25	31	12	M6×0.75	6	11	23	24	30	7×11×9	11.5	20	3 000	29 200	72 700	970	760	760	0.45	3.4
RA25BL					115.5		50			83.5	16.75													35 400	92 900	1 240	1 240	1 240	0.80	
RA30AL	42	6.5	16	60	110.8	40	40	M8×1.25×11	10	74	17	35.5	14	M6×0.75	7	11	28	28	40	9×14×12	14	20	3 500	38 900	93 500	1 670	1 140	1 140	0.85	4.9
RA30BL					135.4		60			98.6	19.3													47 600	121 000	2 170	1 950	1 950	1.1	
RA35AL	48	6.5	18	70	123.8	50	50	M8×1.25×12	10	83.2	16.6	41.5	15	M6×0.75	8	11	34	31	40	9×14×12	17	20	3 500	53 300	129 000	2 810	1 800	1 800	1.2	6.8
RA35BL					152		72			111.4	19.7													67 400	175 000	3 810	3 250	3 250	1.7	
RA45AL	60	8	20.5	86	154	60	60	M10×1.5×16	13	105.4	22.7	52	17	R_C1/8	10	14	45	38	52.5	14×20×17	22.5	22.5	3 500	92 800	229 000	6 180	4 080	4 080	2.5	10.9
RA45BL					190		80			141.4	30.7													116 000	305 000	8 240	7 150	7 150	3.4	
RA55AL	70	9	23.5	100	184	75	75	M12×1.75×18	12.5	128	26.5	61	18	R_C1/8	11	14	53	43.5	60	16×23×20	26.5	30	3 500	129 000	330 000	10 200	7 060	7 060	4.1	14.6
RA55BL					234		95			178	41.5													168 000	462 000	14 300	13 600	13 600	5.7	

* Select either one of two F dimensions, the standard or the parenthesized semi-standard dimensions, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.
* The random-matching type is available for the model of RA25 to RA65.

* The basic load rating complies with ISO standards (ISO14728-1, ISO14728-2). If the above basic dynamic load rating (100 km rating) is converted into 50 km rating, use the following formula: $C_{50\,km} = 1.23 \times C_{100\,km}$

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

Assembly

Example of specification number: **RA 35 1000 EM C 2 - ✻✻ P6 Z**

- RA: Series code
- 35: Size No.
- 1000: Rail length (mm)
- EM: Roller slide shape code EM, GM
- C: Material and surface treatment code, C: Special high carbon steel (NSK standard)
- 2: Number of roller slides per rail
- ✻✻: Design serial number
- P6: Accuracy grade*2 (Without NSK K1): P3, P4, P5, P6 (With NSK K1): K3, K4, K5, K6
- Z: Preload code 1: Z1 Slight preload, 3: Z3 Medium preload, Z: Random matching with preload

*1 Only P6 and K6 grades are available for the random-matching type.

Random-matching rail

Example of specification number: **R1A 35 1000 L C N - ✻✻ P6 Z**

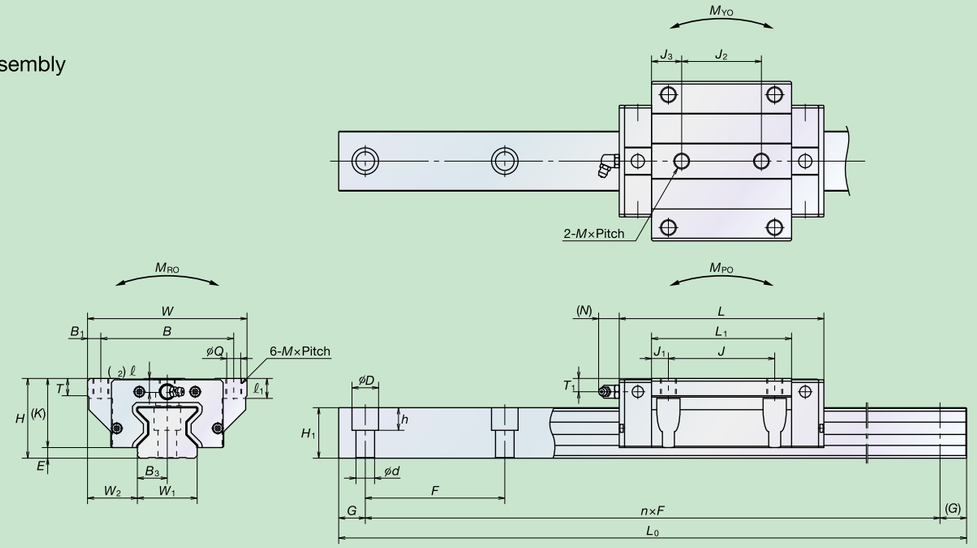
- R1A: RA Series random-matching rail code
- 35: Size No.
- 1000: Rail length (mm)
- L: Rail shape code L: Standard
- C: Material and surface treatment code, C: Special high carbon steel (NSK standard)
- N: Butting specification N: Non-butting specification L: Butting specification
- ✻✻: Design serial number
- P6: Accuracy grade P6: Precision
- Z: Preload code Z: Random matching with preload

Random-matching roller slide

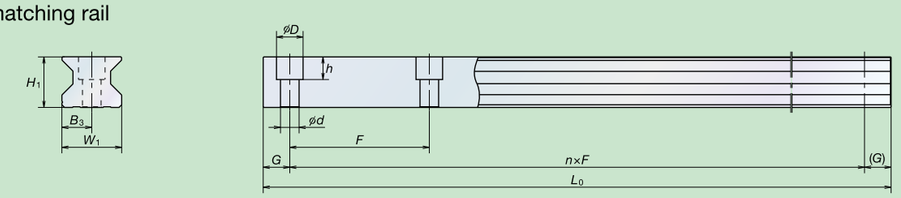
Example of specification number: **RAA 35 EM P6 Z - F**

- RAA: RA Series random-matching roller slide code
- 35: Size No.
- EM: Roller slide shape code EM, GM
- P6: Accuracy grade P6: Precision
- Z: Random matching with preload
- F: 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

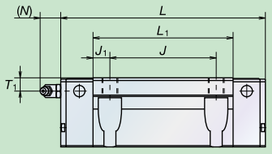
Assembly



Random-matching rail



Random-matching roller slide



Unit: mm

Model No.	Assembly			Roller slide														Rail								Basic load rating				Weight	
	Height			Width	Length	Mounting hole					B_1	L_1	J_1	J_3	K	T	Grease fitting	T_1	N	Rail width	Rail height	Bolt pitch	Bolt hole	B_3	G	Maximum length	Dynamic	Static	Static moment (N·m)			Roller slide	Rail
	H	E	W_2	W	L	B	J	J_2	M×Pitch×ℓ_1(ℓ_2)	Q×ℓ_1(ℓ_2)							Mounting hole			W_1	H_1	F	d×D×h		(recommended)	L_{0max}	C (N)	C_0 (N)	M_{R0}	M_{P0}	M_{Y0}	(kg)	(kg/m)
RA15EM	24	4	16	47	70	38	30	26	M5×0.8×8.5 (6.5)	4.4×8.5 (6.5)	4.5	44.8	7.4	9.4	20	8	ϕ3	4	3	15	16.3	60	4.5×7.5×5.3	7.5	20	2 000	10 300	27 500	260	210	210	0.21	1.6
RA15GM					85.4							60.2	15.1	17.1								(30)					13 000	37 000	350	375	375	0.28	
RA20EM	30	5	21.5	63	86.5	53	40	35	M6×1×9.5 (8)	5.3×9.5 (8)	5	57.5	8.75	11.25	25	10	ϕ3	4	3	20	20.8	60	6×9.5×8.5	10	20	3 000	19 200	52 500	665	505	505	0.45	2.6
RA20GM					106.3							77.3	18.65	21.15								(30)					24 000	70 000	890	900	900	0.65	
RA25EM	36	5	23.5	70	97.5	57	45	40	M8×1.25×10 (11)	6.8×10 (11)	6.5	65.5	10.25	12.75	31	11	M6×0.75	6	11	23	24	30	7×11×9	11.5	20	3 000	29 200	72 700	970	760	760	0.80	3.4
RA25GM					115.5							83.5	19.25	21.75													35 400	92 900	1 240	1 240	1 240	1.1	
RA30EM	42	6.5	31	90	110.8	72	52	44	M10×1.5×12 (12.5)	8.6×12 (12.5)	9	74	11	15	35.5	11	M6×0.75	7	11	28	28	40	9×14×12	14	20	3 500	38 900	93 500	1 670	1 140	1 140	1.3	4.9
RA30GM					135.4							98.6	23.3	27.3													47 600	121 000	2 170	1 950	1 950	1.7	
RA35EM	48	6.5	33	100	123.8	82	62	52	M10×1.5×13 (7)	8.6×13 (7)	9	83.2	10.6	15.6	41.5	12	M6×0.75	8	11	34	31	40	9×14×12	17	20	3 500	53 300	129 000	2 810	1 800	1 800	1.7	6.8
RA35GM					152							111.4	24.7	29.7													67 400	175 000	3 810	3 250	3 250	2.3	
RA45EM	60	8	37.5	120	154	100	80	60	M12×1.75×15 (10.5)	10.5×15 (10.5)	10	105.4	12.7	22.7	52	13	R_C1/8	10	14	45	38	52.5	14×20×17	22.5	22.5	3 500	92 800	229 000	6 180	4 080	4 080	3.2	10.9
RA45GM					190							141.4	30.7	40.7													116 000	305 000	8 240	7 150	7 150	4.3	
RA55EM	70	9	43.5	140	184	116	95	70	M14×2×18 (13)	12.5×18 (13)	12	128	16.5	29	61	15	R_C1/8	11	14	53	43.5	60	16×23×20	26.5	30	3 500	129 000	330 000	10 200	7 060	7 060	5.4	14.6
RA55GM					234							178	41.5	54													168 000	462 000	14 300	13 600	13 600	7.5	
RA65EM	90	13	53.5	170	228.4	142	110	82	M16×2×24 (18.5)	14.6×24 (18.5)	14	155.4	22.7	36.7	77	22	R_C1/8	19	14	63	55	75	18×26×22	31.5	35	3 500	210 000	504 000	19 200	12 700	12 700	12.2	22.0
RA65GM					302.5							229.5	59.75	73.75													288 000	756 000	28 700	28 600	28 600	16.5	

* Select either one of two F dimensions, the standard or the parenthesized semi-standard dimensions, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.
* The random-matching type is available for the model of RA25 to RA65.

* The basic load rating complies with ISO standards (ISO14728-1, ISO14728-2). If the above basic dynamic load rating (100 km rating) is converted into 50 km rating, use the following formula: $C_{50\,km} = 1.23 \times C_{100\,km}$