

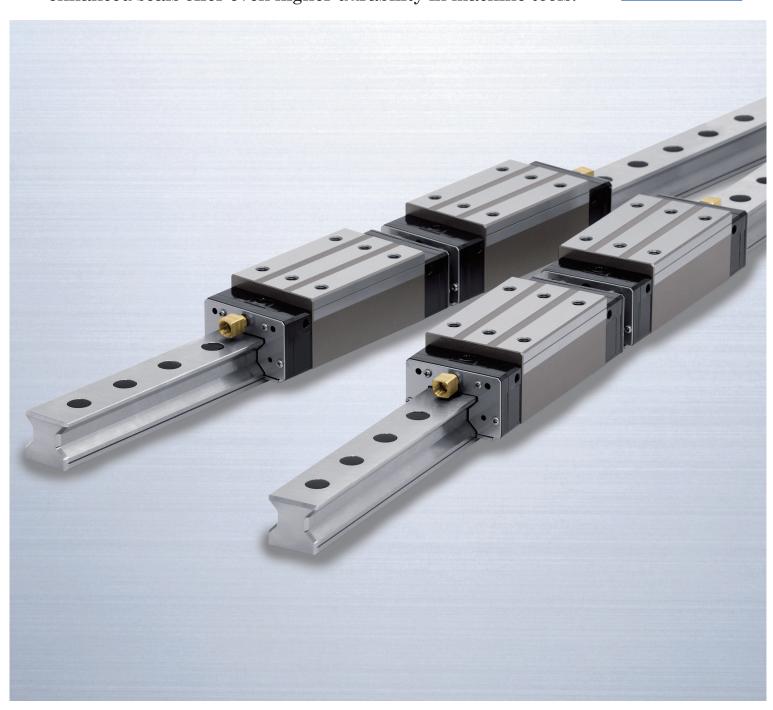
NSK Linear Guides™

Roller Guides with highly dust-resistant V1 seals and V1 bottom seals

Achieve longer life with highly dust-resistant V1 seals and V1 bottom seals for RA model linear guides.

When combined with the NSK K1[™] lubrication unit, these enhanced seals offer even higher durability in machine tools.

Patented



Adding highly dust-resistant V1 seals and V1 bottom seals to our proven RA models realizes a wide product lineup that stands up to contaminated environments with excellent dust resistance.

Highly dust-resistant V1 seal (end seal)

For RA25, 30, 35, 45, 55 and 65 (Installed in place of standard end seals)

Features

■ Excellent dust resistance

Achieves excellent resistance to dust and low frictional force by optimizing the seal lip shape and amount of contact.

■ Maintains dust resistance over a long period

Uses a seal material with high abrasion resistance (one-fifth that of conventional materials in a ASTM D1044 taper test) for long-term performance.

Highly dust-resistant V1 bottom seal

For RA35, 45, 55 and 65 (Installed outside standard bottom seals)

Features

With the same lip shape and material as the highly dust-resistant V1 seal, the V1 bottom seal maintains highly excellent resistance to dust over a long period. Foreign matter often enters the slide in certain installation arrangements. Covering the whole bottom base of the slide significantly reduces the risk of this ingress.

Generally, V1 bottom seals are used along with dust-resistant V1 seals.

Protector

For RA25, 30, 35, 45, 55 and 65 (Installed outside dust-resistant V1 seals)

Features

A steel plate installed outside of the dust-resistant V1 seal repels large foreign particles and protects the V1 seal from hot and hard contaminants.

Rail mounting hole caps

For RA25, 30, 35, 45, 55 and 65

Features

The supplied rail mounting hole caps help to prevent contaminants from accumulating in the holes and entering the slide. Caps with a flatter top and stronger resistance to sinking from external forces are also available for some models (RA35, 45, 55, and 65).

More and more machine tools use simplified covers and support a wide variety of workpieces, increasing cases where parts are exposed to contaminants.

We respond to these changes with a combination of highly dust-resistant V1 seals, V1 bottom seals, and other options (rail mounting hole caps, covers for the top of the rail surface, and protectors) for roller guides to achieve excellent resistance to dust in all directions.

When combined with the lubrication support of the NSK K1[™] lubrication unit, NSK linear guides realize even longer life and increased reliability.

NSK K1™ lubrication unit

For RA25, 30, 35, 45, 55 and 65

Features

Highly dust-resistant V1 seal

Seal cover

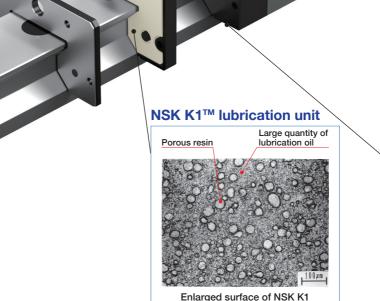
Rail mounting

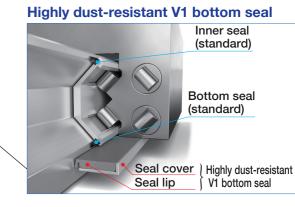
Sink-resistant caps

(Available for BA 35, 45, 55, and 65)

hole caps

The NSK K1 lubrication unit features a porous resin containing a large amount of lubrication oil. As the unit contacts the raceway surface, it supplies it with fresh lubricant. Linear guides require a consistent supply of lubricant such as grease. In contaminated environments, foreign particles absorb lubricants and deteriorate lubrication conditions. NSK K1 responds with excellent lubrication support that improves linear guide durability. We recommend using highly dust-resistant V1 seals with NSK K1 unless an automatic lubricator is used.





Rail cover

For RA25, 30, 35, 45, 55 and 65

Features

Covers the top surface of the rails to completely prevent foreign matter from accumulating in the rail mounting bolt holes. This maximizes the dust resistance of V1 seals

Rail cover



1 NSK

NSK's Advanced Dust Resistance Technology Highly dust-resistant V1 seals and V1 bottom seals prevent contaminants from entering the slide, extending operating life.

*Acceleration tests shown below were conducted to demonstrate seal performance. Please note that seal performance and durability depend on the type of foreign matter and lubrication conditions.

Significantly improved durability with new seal lip material

A seal's wear resistance is vital for maintaining seal performance. The seal lips for highly dust-resistant V1 seals and V1 bottom seals feature a material with excellent wear resistance.

This wear resistance, together with the optimized shape of the seal lip, greatly improves seal lip durability.

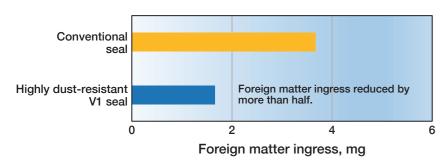
Evaluation method	Checked lip condition after run with unlubricated seal
Sample	RA35 (with rail cover)
Condition	Travel speed: 30 m/min Travel distance: 40 km
Lubrication	No lubrication (on seal)

Highly dust-resistant V1 seal Conventional seal Slight wear Abrasion

Greatly reduced foreign matter entry

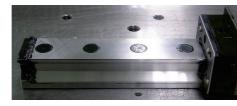
Microscopic foreign matter enters the slide, prevents roller circulation, and reduces the operating life of the roller guide. Installing dust-resistant V1 seals reduces the amount of contaminants that enter the slide by more than half.

Evaluation method	Applied foreign matter to rail and measured ingress after seal passage
Sample	RA35 (with rail mounting hole caps)
Condition	10 cycles at the travel speed of 1 m/min (stroke: 150 mm)
Lubrication	Grease mixed with graphite powder (average grain size: 37 µm) (grease and foreign matter weight ratio: 10:3)





Before passage (Heavily contaminated with foreign matter)

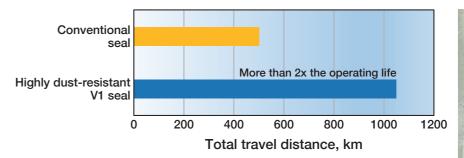


After passage (Foreign matter has been scraped off)

More than double the operating life

Foreign matter such as graphite and wood chips absorb lubrication oil and thus negatively affect the operating life of roller guides. Installing highly dust-resistant V1 seals extends the operating life of roller guides to more than double that with conventional seals.

Evaluation method	Checked total travel distance of roller guides with seals installed in an environment contaminated with foreign matter
Sample	RA35 (with rail mounting hole caps)
Travel speed	60 m/min.
Lubrication	AS2 Grease + NSK K1 lubrication unit
Foreign matter	Graphite powder (average grain size: 37 μm)



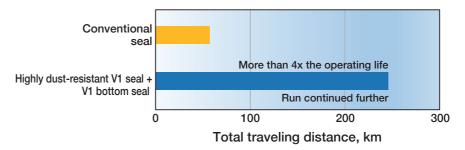


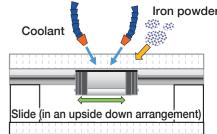
Graphite powder

Over 4 times longer life when upside down

In certain installation arrangements (mounted to a ceiling, hanging on a wall), foreign matter can enter from the bottom face of the slide. Installing highly dust-resistant V1 seals and V1 bottom seals substantially reduces foreign matter ingress and provides more than 4x the operating life of conventional seals.

Evaluation method	Checked total travel distance of roller guides with seals installed in an environment contaminated with foreign matter
Sample	RA35 (with rail mounting hole caps)
Condition	Travel speed 30 m/min., stroke: 300 mm
Lubrication	AS2 Grease + NSK K1 lubrication unit
	[Coolant 0.2 liter + iron powder/day
Foreign matter	Iron powder grain size: 150 μm or below
	At the start of the test, the total amount for one month was added.







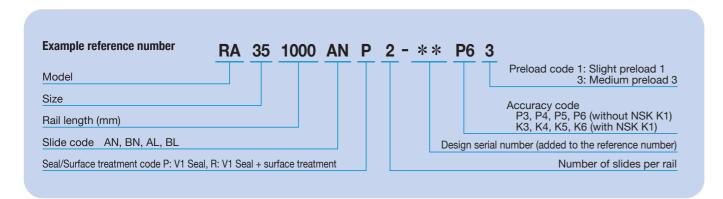
Fitted with Highly dust-resistant V1 bottom seal

Use of linear guides in a contaminated environment

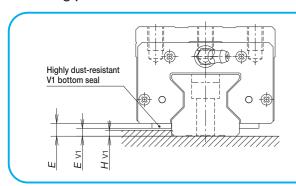
- (1) Using a linear guide in a contaminated environment has serious effects on lubrication conditions and the durability of the linear guide. We recommend performing evaluation tests for your specific application.
- (2) If expecting use in a contaminated environment, fill in the Technical Data Sheet for linear guides in contaminated environments and consult NSK for expert guidance.

3 **NSK**

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



Mounting precautions

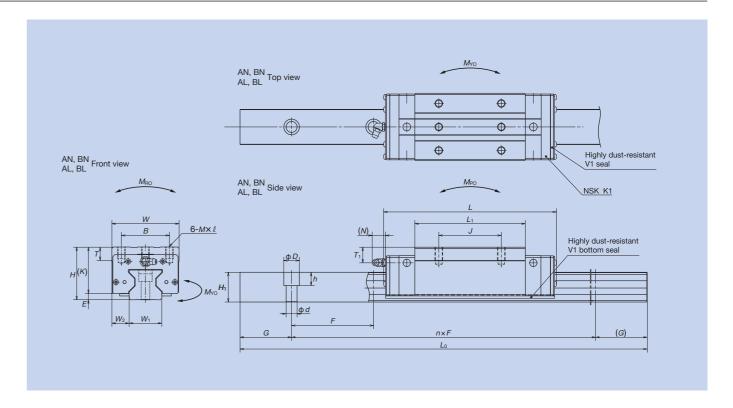


Highly dust-resistant V1 bottom seals are installed on the bottom face of the slide. Take care to avoid interference with any shoulder on the machine base.

	RA35	RA45	RA55	RA65
Shoulder height H _{V1}	3	4.5	5.5	9.5
Slide bottom face height E_{V1}	min. 3.7	min. 5.2	min. 6.2	min. 10.2
Slide main body bottom face height E	6.5	8	9	13

		1	Assembl	У							Slide										
Mada	l Nio	Height			Width	n ²⁾ Length <u>L</u> Mounting hole								Greas	se fitting						
Model No.		Н	E	W ₂	W	Standard Spec.	V1 +K1 Spec.	V1 Spec.	В	J	M x Pitch x ℓ	L ₁	К	T	Hole size	<i>T</i> ₁	N				
	AN	40				97.5	111.3	101.3		35		65.5	35			10					
RA25	AL	36	5	12.5	48	97.5	111.3	101.3	35	33	M6x1x9 -	Mevavo	00.0	31	12	M6×0.75	6	11			
NAZJ	BN	40	3	12.0	40	115.5	129.3	119.3	33	50	IVIONING	83.5	35	12	1010×0.73	10	11				
	BL	36				110.0	123.0	113.0		30		00.0	31			6					
	AN	45				110.8	126.8	114.8		40		74	38.5			10					
RA30	AL	42	6.5	16	60	110.0	120.0	114.0	40		M8x1 25x11	M8×1.25×11	, -	35.5	14	M6×0.75	7	11			
111100	BN	45	0.0	10		135.4	151.4	139.4	10	60	100-11.20-11	98.6	38.5		1410.0.70	10					
	BL	42				.00	.0					00.0	35.5			7					
	AN	55				123.8	140.8	127.8		50		83.2	48.5			15					
RA35	AL	48	¹⁾ 6.5	18	18	18	70	.20.0	0.0	.2.10	50		M8×1.25×12	00.2	41.5	15	M6×0.75	8	11		
	BN	55	- 0.0 10	'	152	169	156		72		111.4	48.5			15						
	BL	48											41.5			8					
	AN	70				154	173.2	159.2		60		105.4	62			20					
RA45	AL	60	¹⁾ 8	20.5	86				60		M10×1.5×17	M10×1.5×17	M10×1.5×17	M10×1.5×17	M10x1.5x17	M10×1.5×17	52	17	Rc1/8	10	14
	BN	70				190	209.2	195.2		80		141.4	62			20					
	BL	60											52			10					
	AN	80				184	203.2	189.2		75		128	71			21					
RA55	AL	70	¹⁾ 9	23.5	100				75		M12×1.75×18		61	18	Rc1/8	11	14				
HADD	BN	80				234	253.2	239.2		95		178	71			21					
	BL	70				000.4	0510	0000		70			61			11					
RA65	AN	90	13	31.5	126	228.4	251.2	236.2	76	70	M16x2x20	155.4	77	22	Rc1/8	19	14				
	BN	90				302.5	325.3	310.3		120		229.5	77			19					

Notes 1) When highly dust-resistant V1 bottom seals are installed, the height of the slide bottom face refers to mounted dimensions. See the precautions above.



Highly dust-resistant V1 seals and V1 bottom seals are not available as standalone items for slides.

*For details on the RA Model, such as accuracy, preload, grease fitting, etc., please refer to the NSK Precision Machine Components Catalog CAT. No.E3162 and RA Model Roller Guide Catalog CAT. No. E3328. For other details, please consult NSK.

														١	unit : mm								
			Rail					E	Basic Loa	d Ratings				We	ight								
Width	Height	Pitch	Mounting bolt	G	Max.	4) Dynamic		Static		Stati	c moment	(N·m)		Slide	Rail								
*******	1.0.9.10		holes		length	[50 km]	[50 km] $ [100 \text{ km}] C_0 $		MRO				1 YO	0									
W_1	H ₁	³⁾ F	dxDxh	(Reference)	L_{0max}	C ₅₀ (N)	C ₁₀₀ (N)	(N)		One slide	Two slides	One slide	Two slides	(kg)	(kg/m)								
						36 000	29 200	72 700	970	760	4 850	760	4 850	0.60									
23	24	30	7x11x9	20	3 900	30 000	29 200	72 700	310	700	4 000	700	4 000	0.45	3.4								
20	24	(60)	771173	20	3 300	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.91	0.4								
						40 000	33 400	32 300	1 240	1 240	7 200	1 240	7 200	0.80									
						47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.0									
28	28	40	9x14x12	20	3 900	47 000	00 000	30 000	1070	1 140	7 100	1 140	7 100	0.85	4.9								
20	20	(80)	9/14/12	20	0 300	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.3	4.5								
						00 000	17 000	121 000	2 170	1 000	11000	1 000	11 000	1.1									
						65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.6									
34	31	40					40 (80)					20	3 900	00 000	00 000	120 000	2010	1 000	11 000	1 000	11 000	1.2	6.8
01		(80)	3/14/12	3/14/12	3/14/12	3/14/12	9/14/12	9/14/12	3/14/12	3/14/12	20	0 300	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.1	0.0	
						02 000	07 100	170 000	0010	0 200	17 000	0 200	17 000	1.7									
						114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	3.0									
45	38	52.5	14×20×17	22.5	3 650		02 000		0 .00			. 000	2.000	2.5	10.9								
.0		(105)	20		0 000	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	4.1									
						110000		000 000	02.0			1 100	00 000	3.4									
						159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	4.9									
53	43.5	60	16×23×20	30	3 600									4.1	14.6								
	10.0	(120)	10 20 20			207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	6.7									
														5.7									
63	55	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	9.3	22.0								
		(150)	13 -3 -5			355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	12.2									

³⁾ Pitch F of the rail mounting bolt holes have standard dimensions (without parentheses) and semi-standard dimensions (with parentheses)

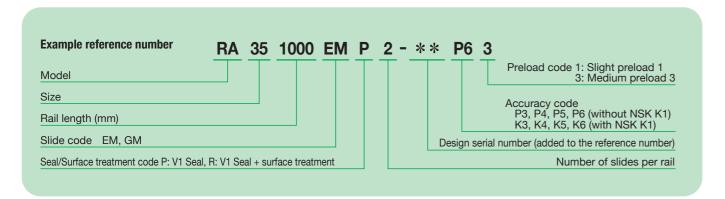
5 NSK NSK 6

²⁾ Slide length L indicates length for the specification when mounted. For standard specifications: One standard side seal is attached to each end of the slide.

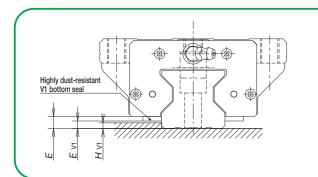
For V1+K1: One V1 seal and NSK K1 unit are attached to each end of the slide. For V1: One V1 seal is attached to each end of the slide.

Please select one. If no selection is made, standard dimensions will be applied 4) Basic load ratings comply with ISO standards (ISO 14728-1, 14728-2). C₅₀: basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: basic dynamic load rating for 100 km rated fatigue life

RA-EM (High-load type/Standard), RA-GM (Super high-load type/Long)



Mounting precautions



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

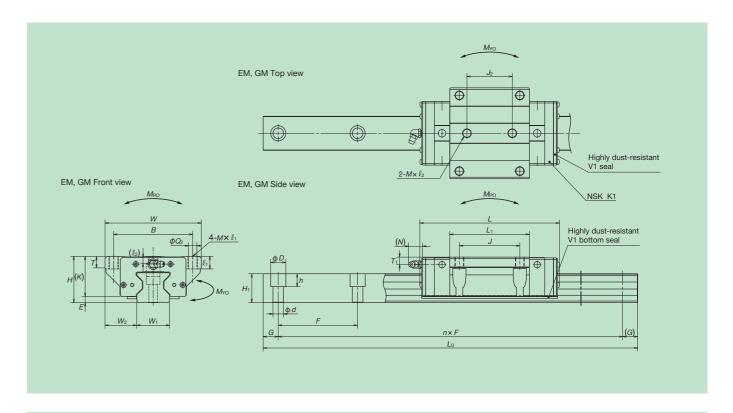
	RA35	RA45	RA55	RA65
Shoulder height H _{V1}	3	4.5	5.5	9.5
Slide bottom face height E _{V1}	min. 3.7	min. 5.2	min. 6.2	min. 10.2
Slide main body bottom face height E	6.5	8	9	13

		l A	Assemb	ly								Slide										
Mode	l NIo	Height			Width	²⁾ Length <i>L</i>			Mounting hole								Grease	fitting	l			
Mode	I INO.	Н	E	W ₂	W	Standard Spec.	V1 +K1 Spec.	V1 Spec.	В	J	J_2	M x Pitch x ℓ 1 (ℓ 2)	Q ₂	L ₁	K	Т	Hole size	T ₁	N			
RA25	EM	36	5	23.5	70	97.5	111.3	101.3	57	45 40		M8×1.25×10(11)	6.8	65.5	31	11	M6×0.75	6	11			
nazo	GM	30	5	23.5	70	115.5	129.3	119.3	37	45	40	IVIO ~ 1.25 ~ 10(11)	0.0	83.5	31	11	C1.UADIVI	O	11			
RA30	EM	42	6.5	31	90	110.8	126.8	114.8	72	52	44	M10×1.5×12(12.5)	8.6	74	35.5	11	M6×0.75	7	11			
nasu	GM	42	0.5	31	90	135.4	151.4	139.4	12	52	44	10110.41.5.412(12.5)	0.0	98.6	33.3	11	1010^0.75	_ ′	L.,			
RA35	EM	48	¹⁾ 6.5	33	100	123.8	140.8	127.8	82	62	52	M10×1.5×13(7)	8.6	83.2	41.5	12	M6×0.75	8	11			
nASS	GM	40	0.5	33	100	152	169	156	02	02	52	2 10110×1.5×15(7)		10110×1.0×10(1) 0.0		111.4	41.5	12	1010/0.75	0		
RA45	EM	60	¹⁾ 8	37.5	120	154	173.2	159.2	100	80	60	M12×1.75×15(10.5)	10.5	105.4	52	13	Rc1/8	10	14			
na45	GM	00	0	37.5	120	190	209.2	195.2	100	00	00	W112×1.75×15(10.5) 10.3		141.4	52	13	NC1/0	10	14			
RA55	EM	70	¹⁾ 9	43.5	140	184	203.2	189.2	116	95	70	M4 4×0×40(40)	M4 4v0v4 0/4 0\	M4 4yOy4 0/4 0\	M4 4×0×4 0(4 0)	12.5	128	61	15	Rc1/8	11	14
nASS	GM	10	9	43.5	140	234	253.2	239.2	110	95	70	M14×2×18(13)	12.5	178	01	13	nc1/6	11	14			
RA65	EM	90	13	52.5	170	228.4	251.2	236.2	142	110	02	M16y0y04/19 5)	116	155.4	77	22	Do1/0	10	11			
HAUD	GM	1 90	13	53.5	170		310.3	142	110	0 82	32 M16×2×24(18.5)	14.6	229.5	11	22	2 Rc1/8	19	14				

Notes 1) When highly dust-resistant V1 bottom seals are installed, the height of the slide bottom face refers to mounted dimensions. See the precautions above.

Slide length L indicates length for the specification when mounted. For standard specifications: One standard side seal is attached to each end of the slide.
 For V1+K1: One V1 seal and NSK K1 unit are attached to each end of the slide.

For V1: One V1 seal is attached to each end of the slide.



Highly dust-resistant V1 seals and V1 bottom seals are not available as standalone items for slides.

*For details on the RA Model, such as accuracy, preload, grease fitting, etc., please refer to the NSK Precision Machine Components Catalog CAT. No.E3162 and RA Model Roller Guide Catalog CAT. No.E3328. For other details, please consult NSK.

unit: mm

			Rail				Basic Load Ratings								ight
Width	Height	Pitch	Mounting bolt	G	Max.		namic	Static		Stati	c moment	(N·m)		Slide	Rail
vviditi			holes	G	length	[50 km]	[100 km]	C ₀	MRO	M	1 PO	M	ľγo	Silde	naii
W_1	H ₁	³⁾ F	dxDxh	(Reference)	L _{0max}	C ₅₀ (N)	C ₁₀₀ (N)	(N)		One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
23	24	30	7x11x9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.80	3.4
20	24	(60)	771179	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	1.1	0.4
28	28	40	9x14x12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.3	4.9
28	20	(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	9x14x12	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	0.0
45	38	52.5	1400047	00.5	0.050	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	3.2	100
43	30	(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	40.5	60	1000000	30	0.000	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	5.4	14.0
55	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
		75	10000000	05	0.000	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	12.2	00.0
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

³⁾ Pitch F of the rail mounting bolt holes have standard dimensions (without parentheses) and semi-standard dimensions (with parentheses).

Please select one. If no selection is made, standard dimensions will be applied.

4) Basic load ratings comply with ISO standards (ISO 14728-1, 14728-2). C₅₀: basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: basic dynamic load rating for 100 km rated fatigue life

Increase in slide length with dust resistant options

To further improve dust resistance, additional highly dustresistant V1 seals and NSK K1 units can be fitted on the slide. The table on the right shows how slide length increases with such additions. Note that friction force also increases with additional components.

When a protector is fitted on the outside of a highly dustresistant V1 seal, the slide length increases by 1.6 mm for each protector.

Increase in sl	Increase in slide length Unit: mr										
Model	Highly dust-resistant V1 seal	NSK K1	Protector								
RA25	3.4	5	1.6								
RA30	3.4	6	1.6								
RA35	3.4	6.5	1.6								
RA45	4	7	1.6								
RA55	4	7	1.6								
RA65	5	7.5	1.6								

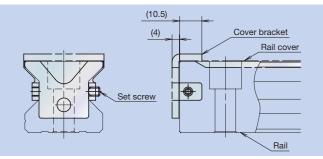
^{*}Reflects dimensional increases for each additional NSK K1 lubrication unit, dust-resistant V1 seal, or protector.

Dimensions when rail cover is used

Rail covers are available for extreme usage conditions.

The table on the right shows standard rail heights and those when a rail cover is used.

Please consult NSK for instructions on installing rail covers.



End of rail with rail cover installed

Rail height with rail cover

rian rieignit w	itii itali covci	Offic. Hilli
Model	Standard height H ₁	With rail cover
RA25	24	24.2
RA30	28	28.2
RA35	31	31.25
RA45	38	38.3
RA55	43.5	43.8
RA65	55	55.3

Dynamic friction force of seals and NSK K1™ lubrication units

- · The table below indicates dynamic friction force per slide.
- · Dynamic friction force is estimated based on actual usage conditions. The force shown is for standard specifications (with two end, inner, and bottom seals each) with standard grease packed within (AS2 grease).
- · When using optional components, add the dynamic friction force for that part to the value for standard products (after subtracting the portion for standard end seals if using dust-resistant V1 seals).

Dynamic friction force	Linit: N
DVNamic inchor loce	Unit: N

Model		Standard products (sealed with packed AS2 grease)* Standard side seal portion*		Highly dust-resistant V1 seals*	Highly dust-resistant V1 bottom seals*	NSK K1 lubrication units*	
RA25	AN, AL, EM	27	- 5	6	_	4	
	BN, BL, GM	34					
RA30	AN, AL, EM	33	- 5	8	_	4	
	BN, BL, GM	42					
RA35	AN, AL, EM	42	- 6	10	17	· 5	
	BN, BL, GM	53			21		
RA45	AN, AL, EM	56	- 8	8 15	21	. 7	
	BN, BL, GM	69			26		
RA55	AN, AL, EM	80	- 8	0	20	25	- 8
	BN, BL, GM	95		20	32	0	
RA65	AN, EM	120	- 14	4.4	O.F.	31	8
	BN, GM	138		25	41	0	

*Values are based on a slide fitted with two of the components listed.

9 **NSK**

Handling Precautions

- ① The maximum operating temperature for roller guides with dust-resistant V1 seals is 50°C (momentary maximum temperature: 80°C). Avoid contact with organic solvents that remove oil, such as hexane. Do not leave in kerosene or anticorrosives containing kerosene.
- 2 Use a flat dolly block to insert caps into rail mounting bolt holes. Hit the cap gradually until its height becomes flush with the top surface of the rail. Keeping the rail in a high-temperature environment after inserting the caps may cause the caps to sink.
- 3 Notes on moving slides onto or from the rail:
 - Avoid removing slides from the rail during assembly whenever possible.
- When moving slides onto or from the rail, use the temporary rail supplied. This prevents unnecessary force on the seal lip and slide and helps avoid dents, scratches, and falls.
- When using the temporary rail to insert or remove a slide, align the guide rail with the temporary rail at the bottom and side faces, press the end face of the temporary rail against the end face of the guide rail, then move the slide carefully.
- Use a clean temporary rail. Do not use a temporary rail treated with a different lubricant or that is contaminated with dirt or other foreign matter.









With highly dust-resistant V1 seals and V1 bottom seals

NSK 10



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