

NSK Linear Guides™

NH/NS Models

NH/NS models have a proven record of unmatched durability and ease of use. All guides in this standard lineup support interchangeable slides/rails and NSK K1-L™ lubrication units, with an optional smooth motion specification available for even higher performance.

Patented



Integrating NSK technologies in design and tribology, NH/NS models define the modern standard.

Recognized for outstanding durability, NSK's standard lineup of NH/NS models can be customized to match countless applications. Interchangeable rails and slides contribute to the reduction of delivery time, NSK K1-L lubrication units keep guides lubricated long-term, and the smooth motion specification delivers smooth motion for measuring instruments and other high-performance needs.

Features of NH and NS Models

Excellent durability

Long-life design

A new ball groove shape utilizes the latest in NSK tribology and analysis technology. By optimizing contact surface pressure, the rating life has been dramatically improved to industry-leading levels. Since launching in 2014, this high-durability design has been proven in a large number of applications.

Circulation structure for high speeds

A linear guide moves by the recirculation of balls within the slide. This ball circulation path has been optimized so that balls can move more smoothly, reducing noise and allowing for high-speed operation.

Long-term, maintenance-free operation

The optional NSK K1-L lubrication unit keeps the guide lubricated, allowing maintenance-free operation over long periods. This helps to lower maintenance costs, keep environments clean, and reduce waste.

A user-friendly standard

Interchangeable lineup

Rails and ball slides for the entire lineup can be freely matched to suit the application. Interchangeable rails and slides can be delivered quickly, all while maintaining proper accuracy and preload when combined.

Support for Click!Speedy system

NH/NS models (excluding special specifications) can be delivered with a short lead time using the quick delivery system for linear motion products. (See the Click!Speedy™ catalog (Cat. E3191) for more details.)

Robust design that absorbs mounting errors

Thanks to a similar contact structure as DF arrangements of rolling bearings, the contact lines converge inward to reduce moment rigidity (Fig. 1).

This increases the capacity of the guides to compensate for errors in installation and makes it easy for users to mount the guides for best performance.

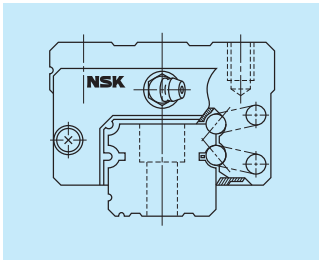


Fig. 1 Guide structure

Abundant options

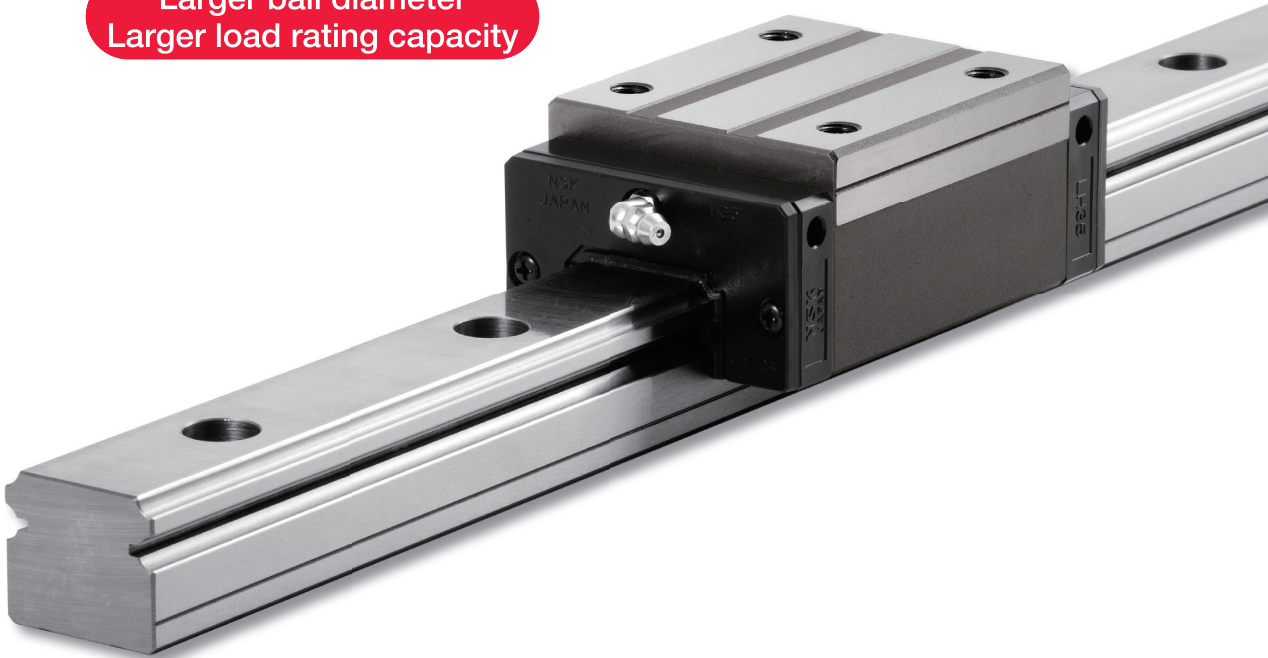
With various options available, including NSK K1-L lubrication units, double seals, protectors, specialized surface treatments, and more, we can offer the configuration best suited to your needs.

ISO external dimensions and accuracy

NH models conform to ISO standards for running parallelism and mounting dimensions including assembled height and width, mounting hole screw diameter and pitch, and other assembled product dimensions.

NH Model

Larger ball diameter
Larger load rating capacity



NS Model

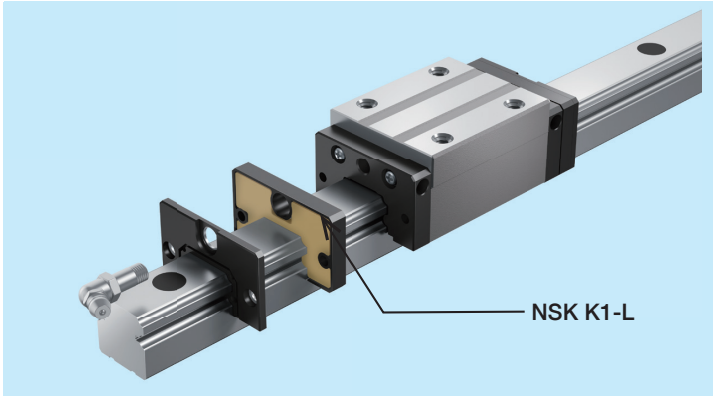
Compact, low-profile shape



Extensive Options

NSK K1-L™ Lubrication Unit

Supported by all NH/NS models, NSK K1-L lubrication units feature a porous resin containing a large amount of lubricating oil. As the slide moves, NSK K1-L units make contact near the raceway surface, ensuring that fresh lubricating oil is continuously supplied. (Please see the "NSK K1-L Lubrication Unit" catalog (Cat. E3335) for more details.)

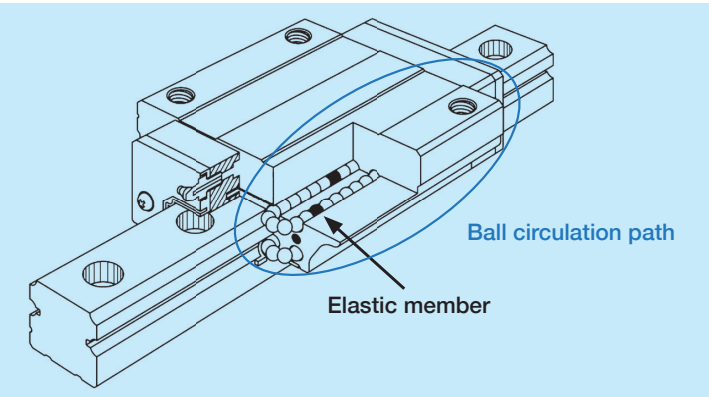


NSK K1-L Lubrication unit (Structure)

Smooth Motion Specification

Linear guides contain numerous steel balls packed into a circuit called the circulation path. Curved sections within the circulation path cause the balls to become crowded as they travel, impacting operational characteristics. This conflict can be relieved significantly by placing elastic components (members) in the path, realizing higher performance. The following models support the smooth motion specification:

- NH: NH15, NH20, and NH25
- NS: NS15, NS20, NS25, and NS30



Smooth motion specification (Structure)

Additional Options

Let our linear motion specialists help you find the optimal specifications for your application. A wide range of additional options, including double seals, protectors, stainless steel materials, and surface treatments, are available to suit your needs. Specialized guides such as the VH model with highly dust-resistant seals and DH/DS models with twice the life of standard guides are offered with same mounting dimensions as NH/NS models for easy replacement. (Please see the Precision Machine Components (Cat. E3162) and Long Life Series DH/DS Models (Cat. E3336) catalogs for more details.)

Specifications

1. Ball Slide Shape

- Two types of ball slides are available: A square type with tapped holes and a flanged type for ease of mounting.
- A compact, low-profile square model is also available.
- Flanged types with mounting holes may be mounted from either the top or bottom. The holes consist of a tapped section used for fixing the ball slide from the top and a minor diameter section for bolt hole mounting from the bottom.
- Three ball slide lengths are available: standard/high load, long/super-high load, and short/medium load. The ball slide length that may be used differs depending on the type. Please refer to the dimension tables for details.

Ball slide shape code	Shape/installation method	Type (Upper row: Rating; Lower row: Ball slide length)		
		High-load	Super-high-load	Medium-load
		Standard	Long	Short
AN BN		AN 	BN 	
AL BL CL		AL 	BL 	CL
EM GM JM		EM 	GM 	JM

Fig. 2 Ball slide shape

2. Maximum Rail Length

- Table 1 shows the limitations of rail length (maximum length).
- Depending on the required accuracy grade, the available maximum rail length might be shorter than shown in Table 1.

Table 1 Length limitations of rails									Unit: mm
Model	Size	15	20	25	30	35	45	55	65
	Material								
NH	Special high carbon steel	2 980	3 960	3 960	4 000	4 000	3 990	3 960	3 900
	Stainless steel	1 800	3 500	3 500	3 500				
NS	Special high carbon steel	2 920	3 960	3 960	4 000	4 000			
	Stainless steel	1 800	3 500	3 500	3 500	3 500			

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

3. Accuracy

- The preloaded assembly has five accuracy grades; Ultra precision P3, Super precision P4, High precision P5, Precision P6 and Normal PN grades, while the interchangeable type has High precision PH and Normal PC grades.

Table 2 Tolerance of preloaded assembly						Unit: μm
Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	
Mounting height H Variation of H (All ball slides on a set of rails)	±8 3	±10 5	±20 7	±40 15	±80 25	
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	±100 30	
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Refer to Fig. 3 and Table 4.					

Table 3 Tolerance of interchangeable type					Unit: μm
Characteristics	Accuracy grade	High precision grade PH		Normal grade PC	
	Model No.	NH15,20,25,30,35 NS15,20,25,30,35	NH45,55,65	NH15,20,25,30,35 NS15,20,25,30,35	NH45,55,65
Mounting height H		±20	±30	±20	±30
Variation of mounting height H		15	20	15	20
Mounting width W ₂ or W ₃		±30	±35	±30	±35
Variation of mounting width W ₂ or W ₃		20	20	25	30
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Refer to Fig. 3 and Table 4.				

Note: Variation in interchangeable types refers to the variation among values taken at the same position on the same rail.

Table 4 Running parallelism of ball slide							
Unit: μm							
Rail length (mm)	Preloaded assembly					Interchangeable type	
	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	High precision PH	Normal grade PC
Over - 50 or less	2	2	2	4	5	2	5
50 - 80	2	2	3	4	5	3	5
80 - 125	2	2	3	4	5	3	5
125 - 200	2	2	3.5	5	6	3.5	6
200 - 250	2	2.5	4.5	6	7.5	4.5	7.5
250 - 315	2	2.5	5	6.5	8.5	5	8.5
315 - 400	2	3	5.5	7	9.5	5.5	9.5
400 - 500	2	3	6	7.5	11	6	11
500 - 630	2	3.5	6.5	8.5	12	6.5	12
630 - 800	2	4	7	9.5	13	7	13
800 - 1 000	2.5	4.5	7.5	10	15	7.5	15
1 000 - 1 250	3	5	8.5	12	16	8.5	16
1 250 - 1 600	3.5	5.5	9.5	13	17	9.5	17
1 600 - 2 000	4	6.5	11	14	19	11	19
2 000 - 2 500	4.5	7.5	12	16	21	12	21
2 500 - 3 150	5.5	8.5	13	18	23	13	23
3 150 - 4 000	6	9.5	14	19	25	14	25

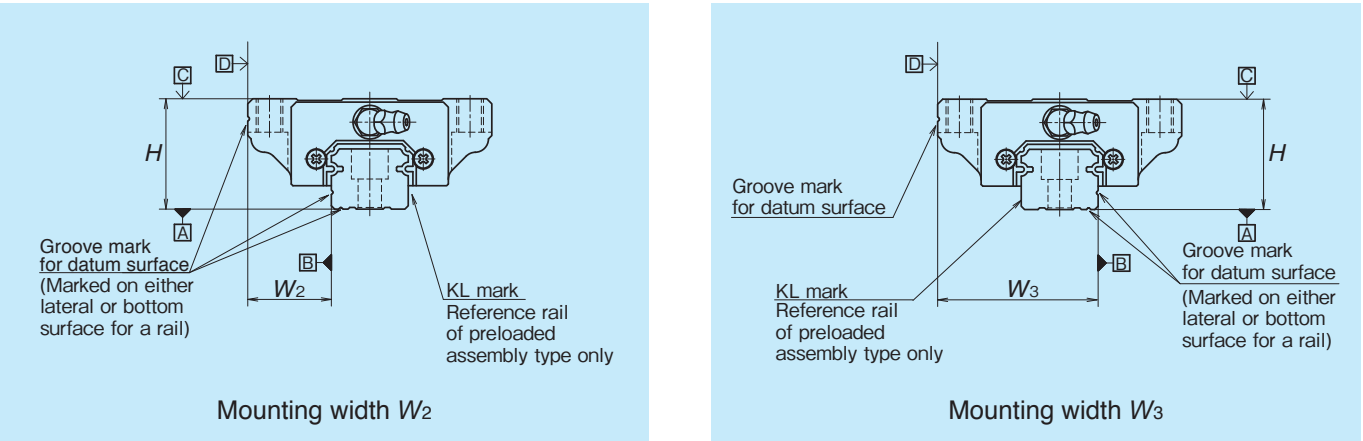


Fig. 3 Accuracy specifications

4. Preload and Rigidity

- Slight preload Z1, Medium preload Z3, and Fine clearance Z0 are available for preloaded types, while interchangeable types offer Medium preload ZH, Slight preload ZZ, and Fine clearance ZT.
- Possible combinations of accuracy and preload grades are shown in Table 9.

Table 5 Preload and rigidity of preloaded assembly						
(1) NH Model						
Model No.	Preload (N)		Rigidity (N/μm)			
			Vertical direction		Lateral direction	
	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3
NH15 AN, EM	78	490	137	226	98	186
NH20 AN, EM	147	835	186	335	137	245
NH25 AL, AN, EM	196	1 270	206	380	147	284
NH30 AL, AN	245	1 570	216	400	157	294
NH30 EM	294	1 770	265	480	186	355
NH35 AL, AN, EM	390	2 350	305	560	216	390
NH45 AL, AN, EM	635	3 900	400	745	284	540
NH55 AL, AN, EM	980	5 900	490	910	345	645
NH65 AN, EM	1 470	8 900	580	1 070	400	755
NH15 BN, GM	98	685	196	345	137	284
NH20 BN, GM	196	1 080	265	480	196	355
NH25 BL, BN, GM	245	1 570	294	560	216	400
NH30 BL, BN, GM	390	2 260	360	665	265	480
NH35 BL, BN, GM	490	2 940	430	795	305	570
NH45 BL, BN, GM	785	4 800	520	960	370	695
NH55 BL, BN, GM	1 180	7 050	635	1 170	440	835
NH65 BN, GM	1 860	11 300	805	1 480	550	1 040

Notes: 1) The clearance of Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero. However, when using PN grade with Z0, the clearance becomes 0 to 15 μm.
2) When using the optional smooth motion specification, preload and rigidity are as shown in Table 17.

Table 7 Preload and rigidity of preloaded assembly						
(2) NS Model						
Model No.	Preload (N)		Rigidity (N/μm)			
			Vertical direction		Lateral direction	
	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3
NS15 AL, EM	69	390	127	226	88	167
NS20 AL, EM	88	540	147	284	108	206
NS25 AL, EM	147	880	206	370	147	275
NS30 AL, EM	245	1 370	255	460	186	345
NS35 AL, EM	345	1 960	305	550	216	400
NS15 CL, JM	49	294	78	147	59	108
NS20 CL, JM	69	390	108	186	78	137
NS25 CL, JM	98	635	127	235	88	177
NS30 CL, JM	147	980	147	275	108	206
NS35 CL, JM	245	1 370	186	335	137	245

Notes: 1) The clearance of Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero. However, when using PN grade with Z0, the clearance becomes 0 to 15 μm.
2) When using the optional smooth motion specification, preload and rigidity are as shown in Table 17.

Table 9 Combinations of accuracy and preload								
		Accuracy grade						
		Preloaded assembly					Interchangeable type	
		Ultra precision	Super precision	High precision	Precision grade	Normal grade	High precision	Normal grade
Without NSK K1-L lubrication unit		P3	P4	P5	P6	PN	PH	PC
With NSK K1-L lubrication unit		L3	L4	L5	L6	LN	LH	LC
With NSK K1 for food and medical equipment		F3	F4	F5	F6	FN	FH	FC
With smooth motion specification		S3	S4	S5	S6	SN	SH	SC
With smooth motion specification and NSK K1-L lubrication unit		T3	T4	T5	T6	TN	TH	TC
Preload	Fine clearance Z0	○	○	○	○	○	—	—
	Slight preload Z1	○	○	○	○	○	—	—
	Medium preload Z3	○	○	○	○	—	—	—
	Interchangeable type with fine clearance ZT	—	—	—	—	—	—	○
	Interchangeable type with slight preload ZZ	—	—	—	—	—	○	○
	Interchangeable type with medium preload ZH	—	—	—	—	—	○	○

Note: Stainless steel products are not offered in high-precision grade and medium preload interchangeable types.

Table 6 Clearance and preload of interchangeable type			
(1) NH Model			
Model No.	Fine clearance ZT	Slight preload ZZ	Medium preload ZH
NH15	−4 to 15	−4 to 0	−7 to −3
NH20	−5 to 15	−5 to 0	−8 to −3
NH25		−5 to 0	−9 to −4
NH30		−7 to 0	−12 to −5
NH35		−7 to 0	−12 to −5
NH45		−7 to 0	−14 to −7
NH55		−9 to 0	−18 to −9
NH65		−9 to 0	−19 to −10

Note: Negative numbers denote preload (elastic deformation of balls).

Table 8 Clearance and preload of interchangeable type			
(2) NS Model			
Model No.	Fine clearance ZT	Slight preload ZZ	Medium preload ZH
NS15	−4 to 15	−4 to 0	−7 to −3
NS20	−4 to 15	−4 to 0	−7 to −3
NS25	−5 to 15	−5 to 0	−9 to −4
NS30	−5 to 15	−5 to 0	−9 to −4
NS35	−5 to 15	−6 to 0	−10 to −4

Note: Negative numbers denote preload (elastic deformation of balls).

5. Basic Load Rating and Rating Life

The basic load rating used to express the load capacity of linear guides is determined by ISO standards (ISO 14728-1, 14728-2). Load ratings for NSK Linear Guides are based on these ISO standards.

The basic dynamic load rating refers to a non-fluctuating load that acts on the center of the ball slide from above so that the rated fatigue life is 100 km or 50 km. When the ball slide receives only load F in a vertical direction, the slide's rated fatigue life L can be calculated using the following equation where C₁₀₀ refers to the basic dynamic load rating for 100 km rated fatigue life and C₅₀ refers to the basic dynamic load rating for 50 km rated fatigue life.

The basic static load rating refers to a static load that generates a contact stress of 4 200 MPa at the center of the contact area between the rolling element subjected to the maximum stress and the raceway surface. In this most heavily stressed contact area, the sum of the permanent deformation of the rolling element and that of the raceway is nearly 0.0001 times the rolling element's diameter.

Values for basic load ratings are listed in the dimension tables. In NH/NS models, the contact angle is set at 50 degrees, thus increasing load carrying capacity in the upward direction. Basic load ratings by direction are shown in Table 11.

- Please note that the equation used here for calculating life differs from that used for linear guides with rollers as the rolling elements.
- The load factor is expressed as f_w. Select the most suitable load factor from the values given in Table 10 according to potential vibration or impact loads on the machine onto which the linear guide will be mounted.

$$L = 100 \times \left(\frac{C_{100}}{f_w \cdot F} \right)^3 \quad \text{or} \quad L = 50 \times \left(\frac{C_{50}}{f_w \cdot F} \right)^3 \quad [\text{km}]$$

Various loads may be applied to the linear guide (i.e., ball slide loads), including vertical, lateral, and moment loads. Sometimes, more than one type of load will be applied simultaneously or the volume and direction of the load may vary. Variable loads cannot be used for life calculations of linear guides as they are. Therefore, it is necessary to use an applied hypothetical constant load that would generate a fatigue life equivalent to the actual fatigue life. This is called the dynamic equivalent load. To calculate dynamic equivalent load, use the values provided in Table 12.

Table 12 Loads by linear guide arrangement						
Pattern	Arrangement of linear guide	Loads necessary to calculate dynamic equivalent load				
		Load		Moment load		
		Up/down (vertical)	Right/left (lateral)	Rolling	Pitching	Yawing
1		Fr	Fs	Mr	Mp	My
2		Fr	Fs	Mr		
3		Fr	Fs		Mp	My
4		Fr	Fs			

Full dynamic equivalent load can be obtained using the proper coefficients. These formulas are determined by the relationship of load to volume. After obtaining the dynamic equivalent coefficient in Table 9, the full dynamic equivalent load can be calculated using the appropriate equation below as determined by the magnitude of the load:

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

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

Table 10 Load factor f _w	
Impact/vibration	Load factor
No external impact/vibration	1.0 to 1.5
There is impact/vibration from outside.	1.5 to 2.0
There is significant impact/vibration.	2.0 to 3.0

Table 11 Basic load rating by load direction			
Load rating \ Direction	Downward	Upward	Lateral
Basic dynamic load rating	C	C	0.84C
Basic static load rating	C ₀	0.78C ₀	0.65C ₀

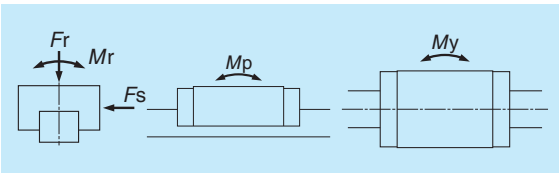


Fig. 4 Load directions

Table 13 Dynamic equivalent coefficients			
Model	Dynamic equivalent coefficients (1/m)		
	ε _r	ε _p	ε _y
NH15AN, EM	188	111	132
NH15BN, GM	188	72	86
NH20AN, EM	142	81	97
NH20BN, GM	142	57	68
NH25AL, AN, EM	123	68	81
NH25BL, BN, GM	123	51	61
NH30AL, AN	98	70	83
NH30EM	98	58	69
NH30BL, BN, GM	98	44	52
NH35AL, AN, EM	78	51	61
NH35BL, BN, GM	78	36	43
NH45AL, AN, EM	60	38	45
NH45BL, BN, GM	60	30	36
NH55AL, AN, EM	51	31	37
NH55BL, BN, GM	51	25	30
NH65AN, EM	43	27	32
NH65BN, GM	43	20	24
NS15AL, EM	177	116	138
NS15CL, JM	177	174	208
NS20AL, EM	127	94	112
NS20CL, JM	127	136	162
NS25AL, EM	111	70	83
NS25CL, JM	111	108	129
NS30AL, EM	94	63	75
NS30CL, JM	94	102	121
NS35AL, EM	76	54	64
NS35CL, JM	76	87	104

6. Dust-Resistant Components

(1) Standard specification

Under normal applications, NH/NS models can be used without modification thanks to their dust resistance. These ball slides come standard with an end seal on both ends, and bottom seals underneath (Fig. 5).

Table 14 Seal friction per ball slide (maximum value)									Unit: N
Model\Size	15	20	25	30	35	45	55	65	
NH	8	9	10	10	12	17	22	29	
NS	8	9	9	9	10	—	—	—	

(2) Options for higher dust resistance

Table 15 shows options available for higher dust resistance. Several options are available to suit your operation environment.

Table 15 Optional parts for dust resistance	
Name	Purpose
Double seal	A combination of two end seals to increase seal effectiveness (Fig. 6). When installed, the end seal section becomes thicker than standard; note the increase in slide length when designing mounting dimensions and the table stroke. A double seal set for later application to assembled products is also available.
Protector	Installed outside the end seal to protect the slide from hot or hard contaminants, such as welding spatter (Fig. 7). Note the increase in slide length when designing mounting dimensions and the table stroke. A protector set for later application to assembled products is also available.
Bolt-hole cap	Prevents foreign matter from accumulating around mounting holes and entering the slide. (Fig. 8) Made of a synthetic resin with excellent resistance to oil and wear.
Inner seal	Installed within a slide to prevent contaminants that pass the end seals from reaching the rolling contact surface. Available for NH20-NH65 only.
Bellows	Covers that can protect the entire linear guide in environments with many contaminants. Specialized middle and end bellows are available for all models, with high or low types available for NH models depending on the slide shape (high for AN or BN, low for EM, GM, AL, or BL).

Note: Please contact NSK for more details on optional components.

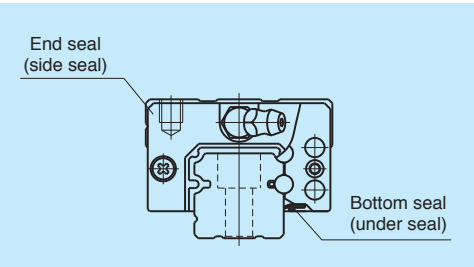


Fig. 5 Standard seals

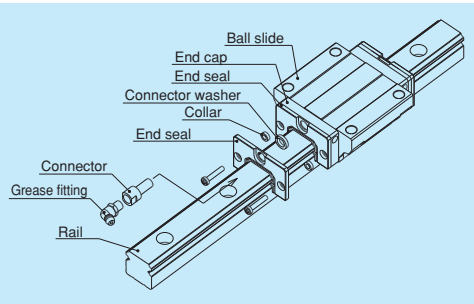


Fig. 6 Double seal

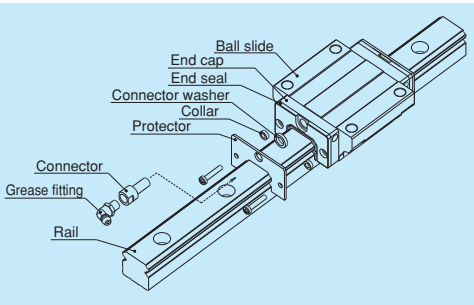


Fig. 7 Protector

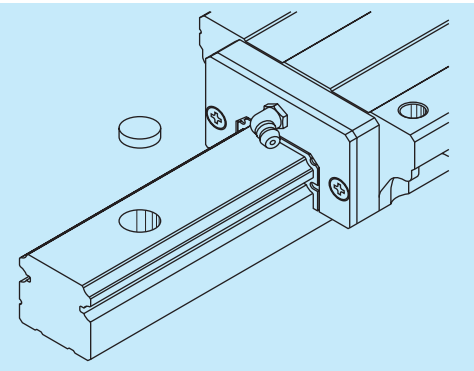


Fig. 8 Bolt-hole caps

7. NSK K1-L Lubrication Unit/ NSK K1 for Food Processing/Medical Equipment

NSK K1/K1-L lubrication units are installed on the inner side of the end seal and contain a porous synthetic resin with abundant lubricating oil. The oil gradually seeps out from the resin to lubricate the linear guide over a long period. Table 16 shows dimensions when equipped to linear guides.

Table 16 Dimensions of linear guides equipped with NSK K1-L/NSK K1 for food processing/medical equipment.

Table 16 Dimensions of linear guides equipped with NSK K1-L/NSK K1 for food processing/medical equipment Unit: mm

Model No.		Standard ball slide length	Ball slide length with two NSK K1-L or NSK K1 for food processing/medical equipment L	NSK K1-L			Protrusion of grease fitting N
				Thickness of single NSK K1-L unit V ₁	Thickness of single NSK K1 unit V ₂	Thickness of protective cover V ₃	
NH15	AN, EM	55	65.6	5.3	4.5	0.8	(5)
	BN, GM	74	84.6				
NH20	AN, EM	69.8	80.4	5.3	4.5	0.8	(14)
	BN, GM	91.8	102.4				
NH25	AL, AN, EM	79	90.6	5.8	5	0.8	(14)
	BL, BN, GM	107	118.6				
NH30	EM	98.6	110.6	6	5	1	(14)
	BL, BN, GM	124.6	136.6				
NH35	AL, AN, EM	109	122	6.5	5.5	1	(14)
	BL, BN, GM	143	156				
NH45	AL, AN, EM	139	154	7.5	—	—	(15)
	BL, BN, GM	171	186				
NH55	AL, AN, EM	163	178	7.5	—	—	(15)
	BL, BN, GM	201	216				
NH65	AN, EM	193	211	9	—	—	(16)
	BN, GM	253	271				
NS15	AL, EM	56.8	66.4	4.8	4	0.8	(5)
	CL, JM	40.4	50				
NS20	AL, EM	65.2	75.8	5.3	4.5	0.8	(14)
	CL, JM	47.2	57.8				
NS25	AL, EM	81.6	92.2	5.3	4.5	0.8	(14)
	CL, JM	59.6	70.2				
NS30	AL, EM	96.4	108.4	6	5	1	(14)
	CL, JM	67.4	79.4				
NS35	AL, EM	108	121	6.5	5.5	1	(14)
	CL, JM	77	90				

Notes:
1) Slide length when equipped with NSK K1-L = (standard ball slide length) + (V₁ thickness of single NSK K1-L unit) × (number of K1-L units).
2) NSK K1 lubrication units for food processing machinery/medical equipment are available for NH15 to NH 35 and NS 15 to NS35.
When using these NSK K1 units, the slide length = (standard ball slide length) + (V₂ thickness of single NSK K1 unit × number of K1 units) + (V₃ thickness of protective cover × 2).

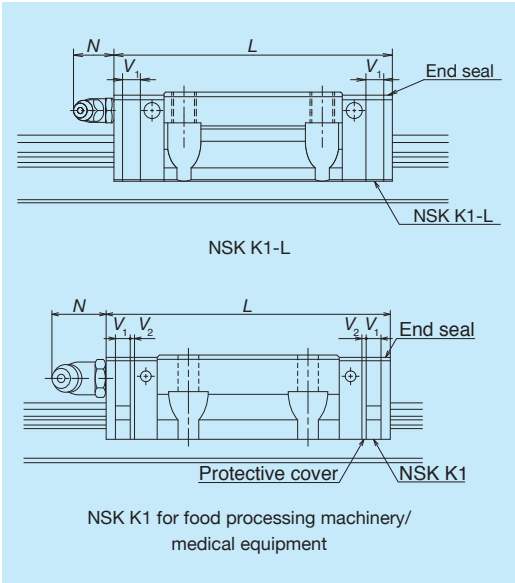


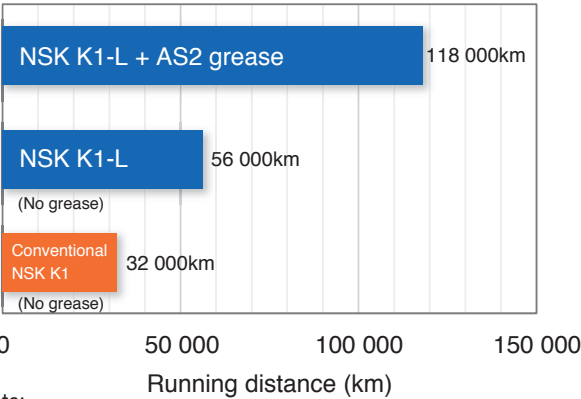
Fig. 9 Dimensions when equipped with NSK K1-L/NSK K1 for food processing machinery/medical equipment

Realize extended maintenance-free operation with the optional NSK K1-L lubrication unit*1

The NSK K1-L unit alone achieves a running distance over 50 000 km—nearly double that of the NSK K1. When used with an initial grease fill, the running distance soars to well over 100 000 km—all the while with no need for lubrication maintenance.

Endurance test

Model : NH25
Preload : Slight preload
Feed speed : 3.2 m/s
External load : None
Lubrication : Lubrication unit (two per slide)



Note:
*1 Assuming a light load application in a normal environment. Lubrication performance is influenced significantly by the operating environment. There is no guarantee of values/performance in actual equipment. Note that using a NSK K1-L unit alone (without grease or oil) is not possible in normal operation.

8. Optional Smooth Motion Specification

This optional specification greatly suppresses fluctuations in friction, supporting equipment that requires particularly smooth operation such as measuring instruments. It also delivers in applications where operating characteristics often deteriorate, such as wall-mounted or vertical installations (Fig. 10).

(1) Mechanism

As shown in Fig. 11, linear guides contain numerous steel balls inside a circuit called the circulation path. Curved sections in the path cause the balls to become crowded as they travel, impacting operating characteristics. Elastic members added between the balls help to relieve this conflict and realize smoother motion.

(2) Supported models

- 7 models supported:
 - NH15, NH20, and NH25.
 - NS15, NS20, NS25, and NS30.
- Mounting dimensions such as assembly height, assembly width, and screw diameter/pitch of mounting holes are identical to standard specifications.
- Can be combined with various options, including NSK K1-L lubrication units, stainless steel specifications, surface treatments, interchangeable slides/rails, etc.

(3) Precautions

- Preload and rigidity may differ from standard when the smooth motion specification is applied; see Table 17 for details. Basic load ratings are shown in Table 18.
- The maximum allowable speed with the smooth motion specification is 100 m/min, regardless of size.
- Use a provisional rail (installation tool) when transferring a slide onto/from a rail.

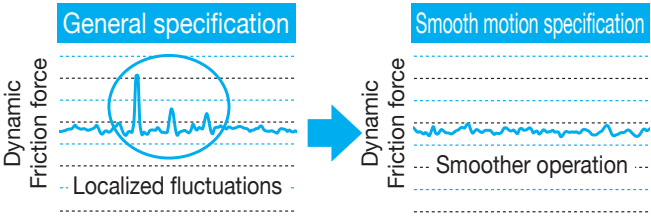


Fig. 10 Dynamic friction force of slide

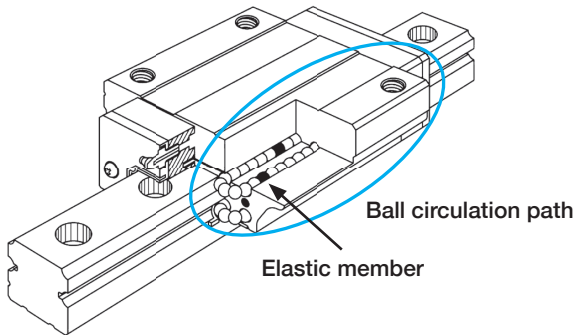


Fig. 11 Mechanism (structure)

Table 17 Preload and rigidity for smooth motion specification

Model No.	Preload (N)		Rigidity (N/μm)			
			Vertical direction		Lateral direction	
	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3
NH15 AN, EM	78	490	122	201	87	166
NH20 AN, EM	147	835	165	298	121	218
NH25 AL, AN, EM	196	1 270	181	334	130	251
NH15 BN, GM	98	685	182	318	127	262
NH20 BN, GM	196	1 080	244	442	181	328
NH25 BL, BN, GM	245	1 570	271	517	199	370
NS15 AL, EM	69	390	114	202	79	149
NS20 AL, EM	88	540	133	257	98	187
NS25 AL, EM	147	880	186	335	134	250
NS30 AL, EM	245	1 370	228	412	167	311
NS15 CL, JM	49	294	70	132	54	98
NS20 CL, JM	69	390	100	170	71	126
NS25 CL, JM	98	635	116	215	81	162
NS30 CL, JM	147	980	133	249	98	187

Table 18 Basic load ratings for smooth motion specification

Model No.	Basic load rating						
	Dynamic		Static	Static moment (N·m)			
	[50km] C ₅₀ (N)	[100km] C ₁₀₀ (N)	C ₀ (N)	M _{RO}	M _{PO}		M _{YO}
					One slide	Two slides	
NH15 AN, EM	13 400	10 600	18 800	98	79	530	66.5
NH20 AN, EM	22 300	17 700	29 600	199	155	1 060	130
NH25 AL, AN, EM	31 500	25 200	41 500	325	267	1 700	224
NH15 BN, GM	17 400	13 800	30 000	157	192	1 090	161
NH20 BN, GM	29 000	23 000	47 500	320	375	2 120	315
NH25 BL, BN, GM	44 000	35 000	66 500	525	645	3 550	545
NS15 AL, EM	10 600	8 400	15 600	78	66.5	445	55.5
NS20 AL, EM	14 900	11 800	21 800	149	115	710	96.5
NS25 AL, EM	24 800	19 700	33 500	266	224	1 380	188
NS30 AL, EM	36 000	28 600	50 500	480	375	2 480	315
NS15 CL, JM	6 550	5 200	7 800	39	18.6	175	15.6
NS20 CL, JM	9 700	7 700	11 800	80	36.5	300	30.5
NS25 CL, JM	16 200	12 800	18 200	143	71	590	59.5
NS30 CL, JM	22 300	17 700	25 400	241	105	960	88

9. Lubrication Accessories

(1) Types

Fig. 12 shows available grease fittings and tube fittings. Lubrication accessories with extended thread body length (L) are available to support dust-resistant components such as NSK K1-L lubrication units, double seals, and protectors. We can also provide suitable lubrication accessories for special dust-resistant requirements or ease of replenishment upon request. Please contact NSK if stainless lubrication accessories are required.

(2) Mounting positions

The standard position for grease fittings is at the end face of the ball slide, but they can be mounted on the side of the end cap as an option (Fig. 13). Please consult NSK for the installation of grease or tube fittings to the ball slide body.

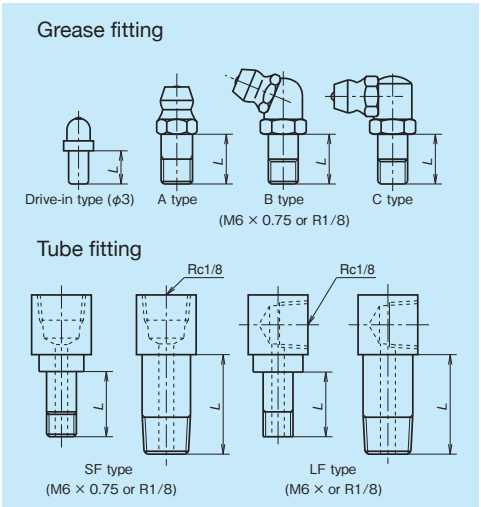


Fig. 12 Grease fittings and tube fittings

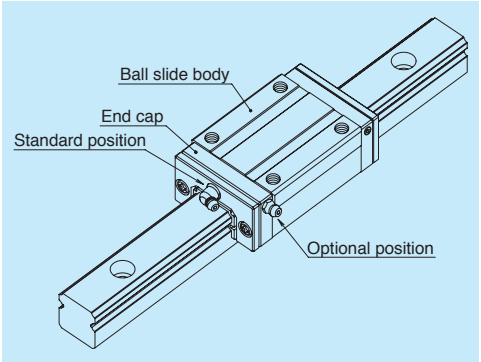


Fig. 13 Mounting positions for lubrication accessories

10. Rust Prevention

(1) Stainless steel

For improved rust prevention, stainless steel is available for parts typically made of carbon steel in models NH15 to NS30 and NS15 to NS35. However, interchangeable types with high precision (PH) accuracy and medium preload (ZH) cannot use stainless steel.

(2) Surface treatment

NSK recommends low-temperature chrome plating or fluoride low-temperature chrome plating as the surface treatment. Please consult NSK regarding other surface treatments.

Table 19 Material/surface treatment code

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

11. Installation

(1) Permissible values of mounting error

Improper mounting results in harmful effects such as shortened operating life, deterioration of motion accuracy, and friction variation. Permissible mounting error is shown in Tables 20 and 21, with representative errors shown in Figs. 14 and 15.

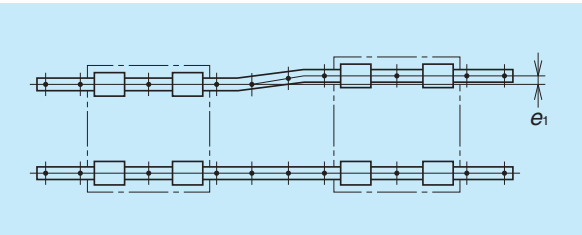


Fig. 14

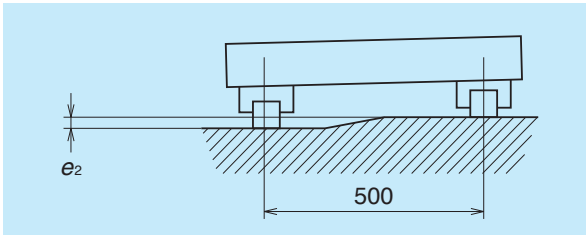


Fig. 15

Table 20

Unit: μm

Value	Preload	Model No.							
		NH15	NH20	NH25	NH30	NH35	NH45	NH55	NH65
Permissible values for parallelism error of two rails e_1	Z0, ZT	22	30	40	45	55	65	80	110
	Z1, ZZ	18	20	25	30	35	45	55	70
	Z3, ZH	13	15	20	25	30	40	45	60
Permissible values for height error of two rails e_2	Z0, ZT	375 μm /500mm							
	Z1, ZZ, Z3, ZH	330 μm /500mm							

Table 21

Unit: μm

Value	Preload	Model No.				
		NS15	NS20	NS25	NS30	NS35
Permissible values for parallelism error of two rails e_1	Z0, ZT	20	22	30	35	40
	Z1, ZZ	15	17	20	25	30
	Z3, ZH	12	15	15	20	25
Permissible values for height error of two rails e_2	Z0, ZT	375 μm /500mm				
	Z1, ZZ, Z3, ZH	330 μm /500mm				

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

When horizontally fixing a rail or ball slide by pushing it onto the shoulder (the risen portion of the mounting surface) of the bed or table, refer to the shoulder height and corner radius specified in Figs. 16 and 17 and Table 22.

Shoulder height of the mounting surface and corner radius r

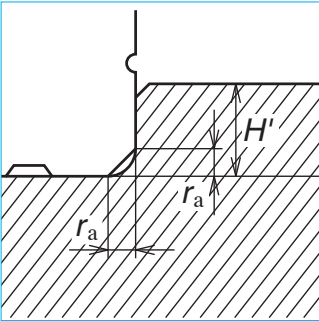


Fig. 16 Shoulder for the rail datum surface

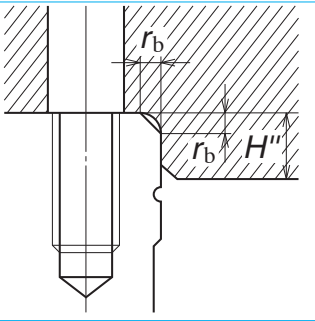


Fig. 17 Shoulder for the ball slide datum surface

Table 22

Unit: mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H''
NH15	0.5	0.5	4	4
NH20	0.5	0.5	4.5	5
NH25	0.5	0.5	5	5
NH30	0.5	0.5	6	6
NH35	0.5	0.5	6	6
NH45	0.7	0.7	8	8
NH55	0.7	0.7	10	10
NH65	1	1	11	11
NS15	0.5	0.5	4	4
NS20	0.5	0.5	4.5	5
NS25	0.5	0.5	5	5
NS30	0.5	0.5	6	6
NS35	0.5	0.5	6	6

12. Maximum allowable speed

Table 23 shows the standard maximum allowable speed for 10 000 km operation under normal conditions. However, the maximum allowable speed can be affected by the accuracy of the installation, operating temperature, external load, etc. If operation will exceed the permissible distance and speed, please contact NSK.

Table 23 Maximum allowable speed

Unit: m/min

Model	Size	15	20	25	30	35	45	55	65
NH				300				200	150
NS				300				—	—

Note: When using the smooth motion specification, the maximum allowable speed for any model is 100 m/min.

13. Handling Precautions

- (1) Bumping or hitting the slide may cause damage.
- (2) If rust preventive oil has been applied, thoroughly remove it and put lubricant inside the slide before use. For seal lubrication, put lubricant on the rail.
- (3) The operating temperature should be less than 80°C. If this temperature is exceeded, plastic parts may be damaged.
- (4) If using NSK K1-L or NSK K1 lubrication units for food processing machinery/medical equipment, the maximum operating temperature is 50°C (momentary maximum temperature: 80°C). Do not leave lubrication units in white kerosene or rust preventive oil that contains white kerosene.
- (5) Note the following regarding interchangeable slides:
 - (a) Interchangeable slides are delivered on a provisional rail (an installation tool).
 - (b) Always use the provisional rail when transferring interchangeable slides onto/from a rail.
 - (c) Do not remove the slide from the provisional rail except when transferring to a rail.

For handling linear guides, please also refer to the NSK Linear Guides Handling Instructions (CAT. No. 9008).

13. Dimensions

NH-AN (High-load/Standard, square type)
NH-BN (Super-high-load/Long, square type)

(1) Reference number for assembly (Preloaded assembly or assembled interchangeable slide/rail)

NH 30 1200 ANC 2 -** P5 3

Model

Size

Rail length (mm)

Ball slide shape code (refer to Fig. 2 on page 3)

Material/surface treatment code (refer to Table 19 on page 10)
C: Special high carbon steel (NSK standard); K: Stainless steel

Preload code (refer to Table 9 on page 5)
0 : Z0, 1 : Z1, 3 : Z3, T : ZT, Z : ZZ, H : ZH

Accuracy code (refer to Table 9 on page 5)

Design serial number
Added to the reference number

Number of ball slides per rail

(2) Reference number for interchangeable type

NAH 30 AN S Z -L

Ball slide

Interchangeable ball slide model code
NAH: NH model interchangeable ball slide

Size

Ball slide shape code (refer to Fig. 2 on page 3)

Option code
No code: No options
-L: Equipped with NSK K1-L
-F: Fluoride low temperature chrome plating + AS2 grease
-F50: Fluoride low temperature chrome plating + LG2 grease

Preload code
No code: Fine clearance, Z: Slight preload, H: Medium preload

Material code
No code: Special high carbon steel (NSK standard), S: Stainless steel

N1H 30 1200 LCN -** PC Z

Rail

Interchangeable rail model code
N1H: NH model interchangeable rail

Size

Rail length (mm)

Rail shape code: L
L: Standard

Material/surface treatment code (refer to Table 19 on page 10)

Preload code (refer to Table 9 on page 5)
T: Fine clearance,
Z: Slight preload (common rail for slight or medium preload)

Accuracy code
PH: High precision grade interchangeable type
PC: Normal grade interchangeable type

Design serial number
Added to the reference number

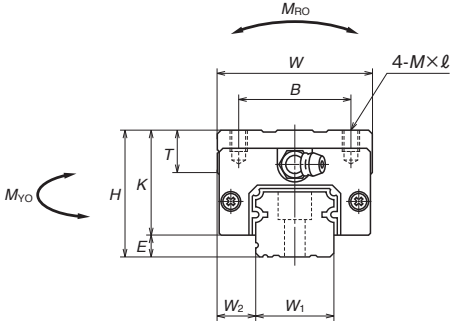
Butting rail specification*
N: Non-butting; L: Butting specification
*Please consult with NSK for butting rail specification.

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

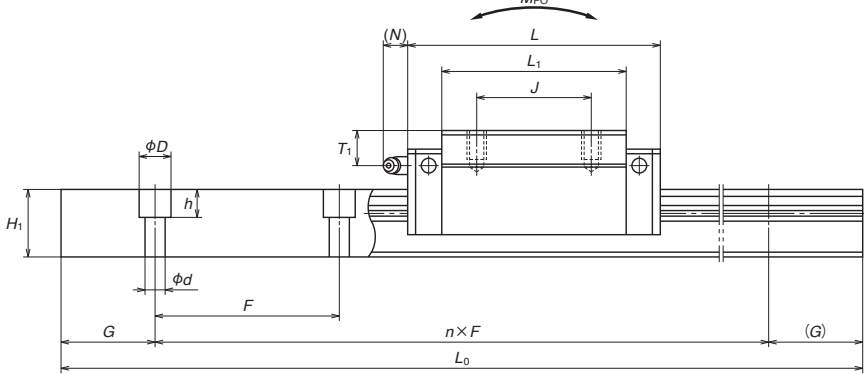
Model No.	Assembly			Ball slide												
	Height			Width	Length	Mounting hole						Grease fitting			Width	Height
												Hole size				
	<i>H</i>	<i>E</i>	<i>W₂</i>	<i>W</i>	<i>L</i>	<i>B</i>	<i>J</i>	<i>M</i> ×Pitch× <i>ℓ</i>	<i>L₁</i>	<i>K</i>	<i>T</i>		<i>T₁</i>	<i>N</i>	<i>W₁</i>	<i>H₁</i>
NH15AN NH15BN	28	4.6	9.5	34	55 74	26	26	M4×0.7×6	39 58	23.4	8	φ3	8.5	3.3	15	15
NH20AN NH20BN	30	5	12	44	69.8 91.8	32	36 50	M5×0.8×6	50 72	25	12	M6×0.75	5	11	20	18
NH25AN NH25BN	40	7	12.5	48	79 107	35	35 50	M6×1×9	58 86	33	12	M6×0.75	10	11	23	22
NH30AN NH30BN	45	9	16	60	85.6 124.6	40	40 60	M8×1.25×10	59 98	36	14	M6×0.75	10	11	28	26
NH35AN NH35BN	55	9.5	18	70	109 143	50	50 72	M8×1.25×12	80 114	45.5	15	M6×0.75	15	11	34	29
NH45AN NH45BN	70	14	20.5	86	139 171	60	60 80	M10×1.5×17	105 137	56	17	Rc1/8	20	13	45	38
NH55AN NH55BN	80	15	23.5	100	163 201	75	75 95	M12×1.75×18	126 164	65	18	Rc1/8	21	13	53	44
NH65AN NH65BN	90	16	31.5	126	193 253	76	70 120	M16×2×20	147 207	74	23	Rc1/8	19	13	63	53

Notes: 1) The external appearance of stainless steel ball slides differs slightly from that of carbon steel ball slides.

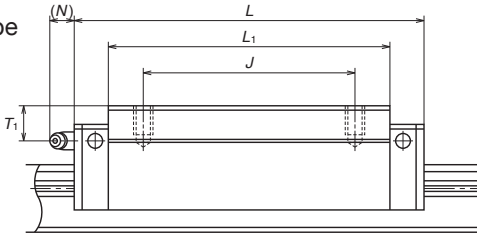
Assembly (Preloaded assembly or assembled interchangeable slide/rail)
Front view of AN and BN types



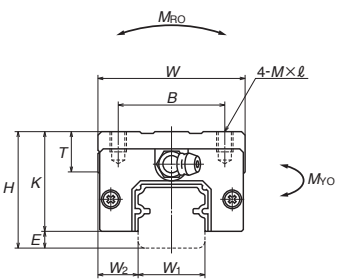
Side view of AN type



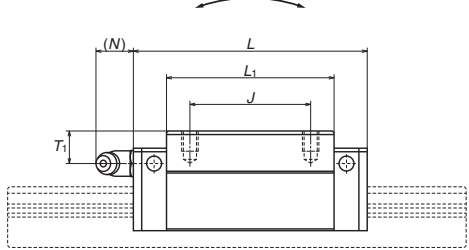
Side view of BN type



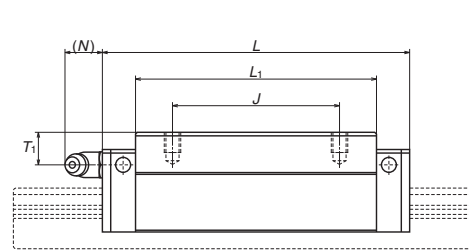
Ball slide of interchangeable type
AN and BN types



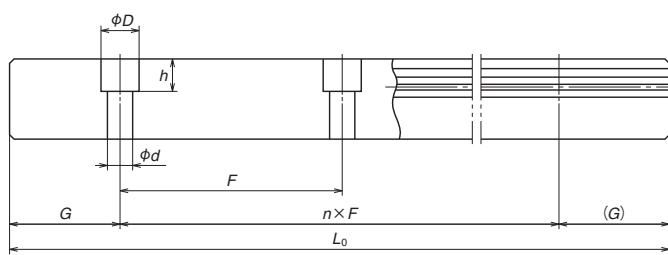
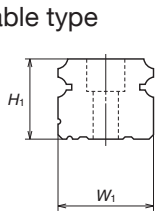
AN type



BN type



Rail of interchangeable type



Unit: mm													
Rail				Basic load ratings								Weight	
Pitch <i>F</i>	Mounting bolt hole <i>d</i> × <i>D</i> × <i>h</i>	G (reference)	Max. length <i>L</i> _{0max} () for stainless	2) Dynamic		Static <i>C</i> ₀ (N)	<i>M</i> _{RO}	Static moment (N·m)				Ball slide (kg)	Rail (kg/m)
				[50km] <i>C</i> ₅₀ (N)	[100km] <i>C</i> ₁₀₀ (N)			<i>M</i> _{PO}		<i>M</i> _{YO}			
								One slide	Two slides	One slide	Two slides		
60	4.5×7.5×5.3	20	2 980 (1 800)	14 200 18 100	11 300 14 400	20 700 32 000	108 166	94.5 216	575 1 150	79.5 181	480 965	0.18 0.26	1.6
60	6×9.5×8.5	20	3 960 (3 500)	23 700 30 000	18 800 24 000	32 500 50 500	219 340	185 420	1 140 2 230	155 355	955 1 870	0.33 0.48	2.6
60	7×11×9	20	3 960 (3 500)	33 500 45 500	26 800 36 500	46 000 71 000	360 555	320 725	1 840 3 700	267 610	1 540 3 100	0.55 0.82	3.6
80	9×14×12	20	4 000 (3 500)	41 000 61 000	32 500 48 500	51 500 91 500	490 870	350 1 030	2 290 5 600	292 865	1 920 4 700	0.77 1.3	5.2
80	9×14×12	20	4 000	62 500 81 000	49 500 64 500	80 500 117 000	950 1 380	755 1 530	4 500 8 350	630 1 280	3 800 7 000	1.5 2.1	7.2
105	14×20×17	22.5	3 990	107 000 131 000	84 500 104 000	140 000 187 000	2 140 2 860	1 740 3 000	9 750 15 600	1 460 2 520	8 150 13 100	3.0 3.9	12.3
120	16×23×20	30	3 960	158 000 193 000	125 000 153 000	198 000 264 000	3 600 4 850	3 000 5 150	16 300 26 300	2 510 4 350	13 700 22 100	4.7 6.1	16.9
150	18×26×22	35	3 900	239 000 310 000	190 000 246 000	281 000 410 000	6 150 8 950	4 950 10 100	27 900 51 500	4 150 8 450	23 400 43 500	7.7 10.8	24.3

2) Basic load ratings comply with ISO standards. (ISO14728-1 and ISO14728-2)
C₅₀: Basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: Basic dynamic load rating for 100 km rated fatigue life.
Basic load ratings for the smooth motion specification are listed in Table 18.

NH-AL (High-load/Standard, square low-profile type)
NH-BL (Super-high-load/Long, square low-profile type)

(1) Reference number for assembly (Preloaded assembly or assembled interchangeable slide/rail)

NH 30 1200 AL C 2 -** P5 3

Model

Size

Rail length (mm)

Ball slide shape code (refer to Fig. 2 on page 3)

Material/surface treatment code (refer to Table 19 on page 10)
C: Special high carbon steel (NSK standard); K: Stainless steel

Preload code (refer to Table 9 on page 5)
0 : Z0, 1 : Z1, 3 : Z3, T : ZT, Z : ZZ, H : ZH

Accuracy code (refer to Table 9 on page 5)

Design serial number
Added to the reference number

Number of ball slides per rail

(2) Reference number for interchangeable type

Ball slide

NAH 30 AL S Z -L

Interchangeable ball slide model code
NAH: NH model interchangeable ball slide

Size

Ball slide shape code (refer to Fig. 2 on page 3)

Option code
No code: No options
-L: Equipped with NSK K1-L
-F: Fluoride low temperature chrome plating + AS2 grease
-F50: Fluoride low temperature chrome plating + LG2 grease

Preload code
No code: Fine clearance, Z: Slight preload, H: Medium preload

Material code
No code: Special high carbon steel (NSK standard), S: Stainless steel

Rail

N1H 30 1200 L CN -** PC Z

Interchangeable rail model code
N1H: NH model interchangeable rail

Size

Rail length (mm)

Rail shape code: L
L: Standard

Material/surface treatment code (refer to Table 19 on page 10)

Preload code (refer to Table 9 on page 5)
T: Fine clearance,
Z: Slight preload (common rail for slight or medium preload)

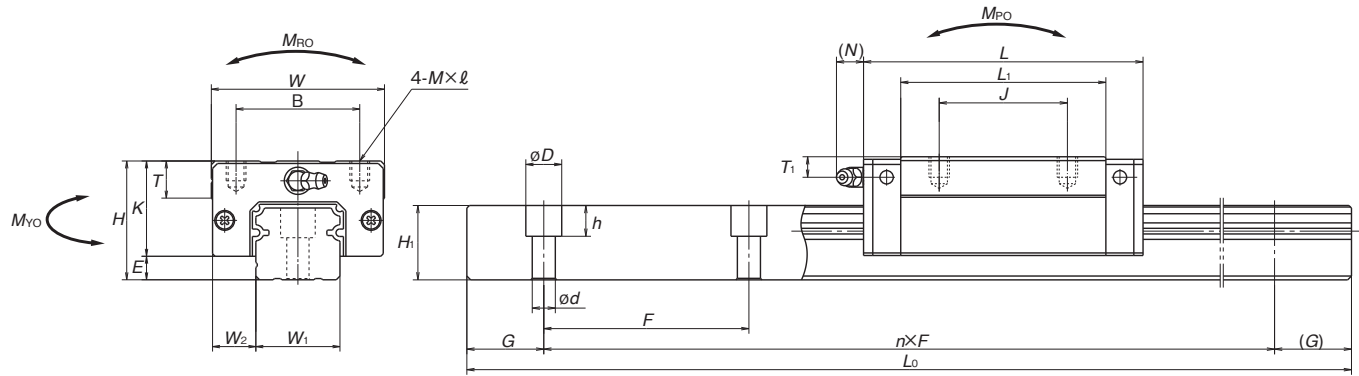
Accuracy code
PH: High precision grade interchangeable type
PC: Normal grade interchangeable type

Design serial number
Added to the reference number

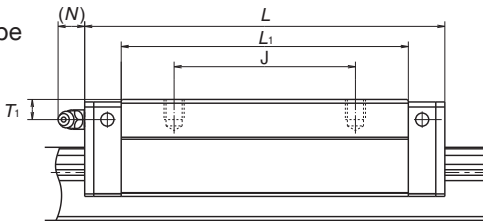
Butting rail specification*
N: Non-butting; L: Butting specification
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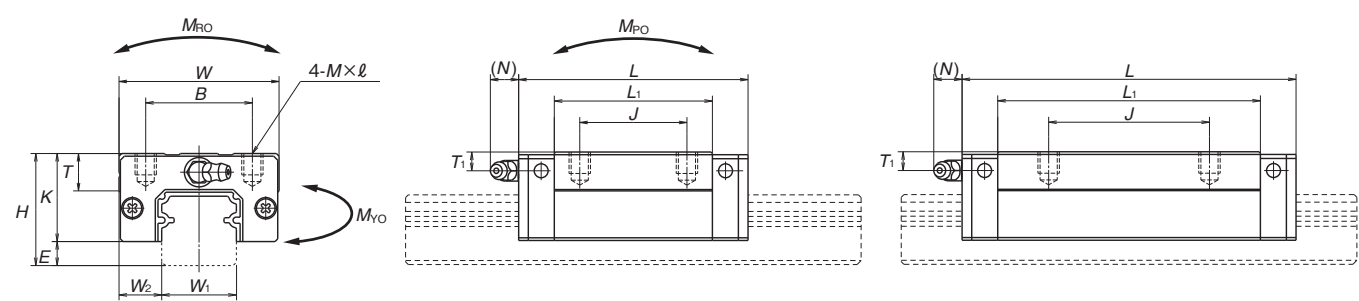
Assembly (Preloaded assembly or assembled interchangeable slide/rail)
Front view of AL and BL types



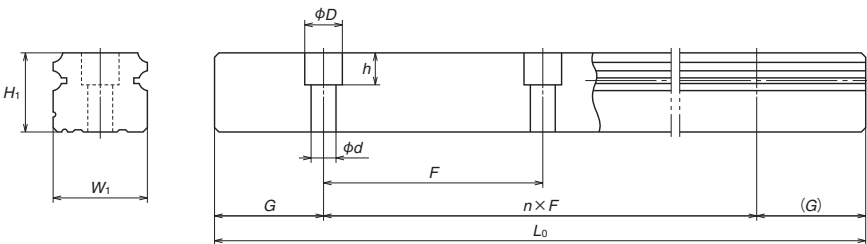
Side view of BL type



Ball slide of interchangeable type
AL and BL types



Rail of interchangeable type



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
NH25AL NH25BL	36	7	12.5	48	79 107	35	35 50	M6×1×6	58 86	29	12	M6×0.75	6	11	23	22
NH30AL NH30BL	42	9	16	60	85.6 124.6	40	40 60	M8×1.25×8	59 98	33	14	M6×0.75	7	11	28	26
NH35AL NH35BL	48	9.5	18	70	109 143	50	50 72	M8×1.25×8	80 114	38.5	15	M6×0.75	8	11	34	29
NH45AL NH45BL	60	14	20.5	86	139 171	60	60 80	M10×1.5×10	105 137	46	17	Rc1/8	10	13	45	38
NH55AL NH55BL	70	15	23.5	100	163 201	75	75 95	M12×1.75×13	126 164	55	15	Rc1/8	11	13	53	44

Notes: 1) The external appearance of stainless steel ball slides differs slightly from that of carbon steel ball slides.

Unit: mm														
Rail				Basic load ratings								Weight		
Pitch	Mounting bolt hole $d \times D \times h$	G	Max. length L_{0max} () for stainless	2) Dynamic		Static	Static moment (N·m)						Ball slide (kg)	Rail (kg/m)
F				[50km] C_{50} (N)	[100km] C_{100} (N)	C_0 (N)	M_{RO}	M_{PO}		M_{YO}				
								One slide	Two slides	One slide	Two slides			
60	7×11×9	20	3 960 (3 500)	33 500 45 500	26 800 36 500	46 000 71 000	360 555	320 725	1 840 3 700	267 610	1 540 3 100	0.46 0.69	3.6	
80	9×14×12	20	4 000 (3 500)	41 000 61 000	32 500 48 500	51 500 91 500	490 870	350 1 030	2 290 5 600	292 865	1 920 4 700	0.69 1.16	5.2	
80	9×14×12	20	4 000	62 500 81 000	49 500 64 500	80 500 117 000	950 1 380	755 1 530	4 500 8 350	630 1 280	3 800 7 000	1.2 1.7	7.2	
105	14×20×17	22.5	3 990	107 000 131 000	84 500 104 000	140 000 187 000	2 140 2 860	1 740 3 000	9 750 15 600	1 460 2 520	8 150 13 100	2.2 2.9	12.3	
120	16×23×20	30	3 960	158 000 193 000	125 000 153 000	198 000 264 000	3 600 4 850	3 000 5 150	16 300 26 300	2 510 4 350	13 700 22 100	3.7 4.7	16.9	

2) Basic load ratings comply with ISO standards. (ISO14728-1 and ISO14728-2)
C₅₀: Basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: Basic dynamic load rating for 100 km rated fatigue life.
Basic load ratings for the smooth motion specification are listed in Table 18.

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

(1) Reference number for assembly (Preloaded assembly or assembled interchangeable slide/rail)

NH 30 1200 EMC 2 -** P5 3

Model

Size

Rail length (mm)

Ball slide shape code (refer to Fig. 2 on page 3)

Material/surface treatment code (refer to Table 19 on page 10)
C: Special high carbon steel (NSK standard); K: Stainless steel

Preload code (refer to Table 9 on page 5)
0 : Z0, 1 : Z1, 3 : Z3, T : ZT, Z : ZZ, H : ZH

Accuracy code (refer to Table 9 on page 5)

Design serial number
Added to the reference number

Number of ball slides per rail

(2) Reference number for interchangeable type

NAH 30 EM S Z -L

Ball slide

Interchangeable ball slide model code
NAH: NH model interchangeable ball slide

Size

Ball slide shape code (refer to Fig. 2 on page 3)

Option code
No code: No options
-L: Equipped with NSK K1-L
-F: Fluoride low temperature chrome plating + AS2 grease
-F50: Fluoride low temperature chrome plating + LG2 grease

Preload code
No code: Fine clearance, Z: Slight preload, H: Medium preload

Material code
No code: Special high carbon steel (NSK standard), S: Stainless steel

N1H 30 1200 L CN -** PC Z

Rail

Interchangeable rail model code
N1H: NH model interchangeable rail

Size

Rail length (mm)

Rail shape code: L
L: Standard

Material/surface treatment code (refer to Table 19 on page 10)

Preload code (refer to Table 9 on page 5)
T: Fine clearance,
Z: Slight preload (common rail for slight or medium preload)

Accuracy code
PH: High precision grade interchangeable type
PC: Normal grade interchangeable type

Design serial number
Added to the reference number

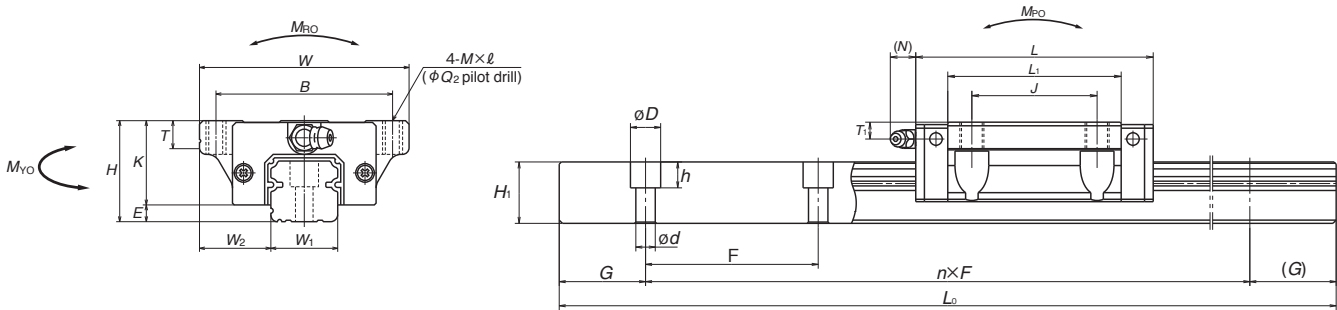
Butting rail specification*
N: Non-butting; L: Butting specification
*Please consult with NSK for butting rail specification.

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

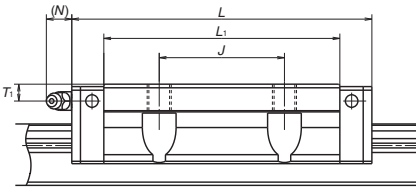
Model No.	Assembly			Ball slide												Width		Height
	Height			Width	Length	Mounting hole							Grease fitting					
													Hole size					
	<i>H</i>	<i>E</i>	<i>W₂</i>	<i>W</i>	<i>L</i>	<i>B</i>	<i>J</i>	<i>M</i> × <i>Pitch</i> × <i>ℓ</i>	<i>Q₂</i>	<i>L₁</i>	<i>K</i>	<i>T</i>		<i>T₁</i>	<i>N</i>	<i>W₁</i>	<i>H₁</i>	
NH15EM NH15GM	24	4.6	16	47	55 74	38	30	M5×0.8×7	4.4	39 58	19.4	8	φ3	4.5	3.3	15	15	
NH20EM NH20GM	30	5	21.5	63	69.8 91.8	53	40	M6×1×9.5	5.3	50 72	25	10	M6×0.75	5	11	20	18	
NH25EM NH25GM	36	7	23.5	70	79 107	57	45	M8×1.25×10 (M8×1.25×11.5)	6.8	58 86	29	11 (12)	M6×0.75	6	11	23	22	
NH30EM NH30GM	42	9	31	90	98.6 124.6	72	52	M10×1.5×12 (M10×1.5×14.5)	8.6	72 98	33	11 (15)	M6×0.75	7	11	28	26	
NH35EM NH35GM	48	9.5	33	100	109 143	82	62	M10×1.5×13	8.6	80 114	38.5	12	M6×0.75	8	11	34	29	
NH45EM NH45GM	60	14	37.5	120	139 171	100	80	M12×1.75×15	10.5	105 137	46	13	Rc1/8	10	13	45	38	
NH55EM NH55GM	70	15	43.5	140	163 201	116	95	M14×2×18	12.5	126 164	55	15	Rc1/8	11	13	53	44	
NH65EM NH65GM	90	16	53.5	170	193 253	142	110	M16×2×24	14.6	147 207	74	23	Rc1/8	19	13	63	53	

Notes: 1) Parenthesized dimensions are for items made of stainless steel.
2) The external appearance of stainless steel ball slides differs slightly from that of carbon steel ball slides.

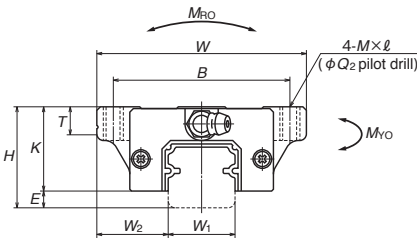
Assembly (Preloaded assembly or assembled interchangeable slide/rail)
Front view of EM and GM types Side view of EM type



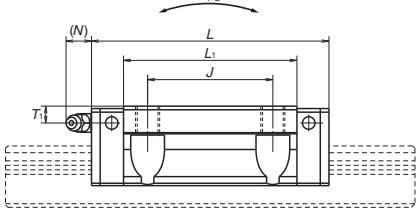
Side view of GM type



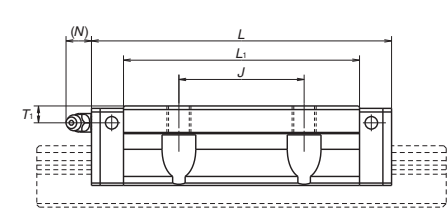
Ball slide of interchangeable type
EM and GM types



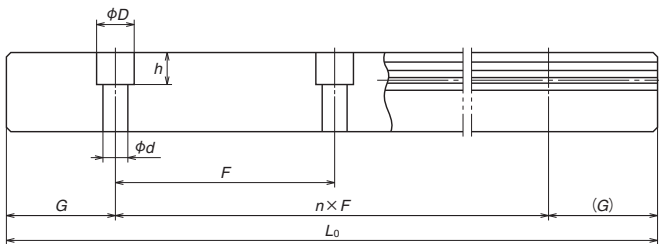
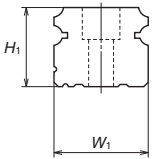
EM type



GM type



Rail of interchangeable type



Unit: mm															
Rail		Basic load ratings										Weight			
Pitch	Mounting bolt hole	G	Max. length	3) Dynamic		Static	Static moment (N·m)				Ball slide (kg)	Rail (kg/m)			
F	d×D×h	(reference)	L _{0max} () for stainless	[50km] C ₅₀ (N)	[100km] C ₁₀₀ (N)	C ₀ (N)	M _{RO}	M _{FO}		M _{YO}					
								One slide	Two slides	One slide	Two slides				
60	4.5×7.5×5.3	20	2 980 (1 800)	14 200 18 100	11 300 14 400	20 700 32 000	108 166	94.5 216	575 1 150	79.5 181	480 965	0.17 0.25			
60	6×9.5×8.5	20	3 960 (3 500)	23 700 30 000	18 800 24 000	32 500 50 500	219 340	185 420	1 140 2 230	155 355	955 1 870	0.45 0.65			
60	7×11×9	20	3 960 (3 500)	33 500 45 500	26 800 36 500	46 000 71 000	360 555	320 725	1 840 3 700	267 610	1 540 3 100	0.63 0.93			
80	9×14×12	20	4 000 (3 500)	47 000 61 000	37 500 48 500	63 000 91 500	600 870	505 1 030	3 150 5 600	425 865	2 650 4 700	1.2 1.6			
80	9×14×12	20	4 000	62 500 81 000	49 500 64 500	80 500 117 000	950 1 380	755 1 530	4 500 8 350	630 1 280	3 800 7 000	1.7 2.4			
105	14×20×17	22.5	3 990	107 000 131 000	84 500 104 000	140 000 187 000	2 140 2 860	1 740 3 000	9 750 15 600	1 460 2 520	8 150 13 100	3 3.9			
120	16×23×20	30	3 960	158 000 193 000	125 000 153 000	198 000 264 000	3 600 4 850	3 000 5 150	16 300 26 300	2 510 4 350	13 700 22 100	5 6.5			
150	18×26×22	35	3 900	239 000 310 000	190 000 246 000	281 000 410 000	6 150 8 950	4 950 10 100	27 900 51 500	4 150 8 450	23 400 43 500	10 14.1			

3) Basic load ratings comply with ISO standards. (ISO14728-1 and ISO14728-2)
C₅₀: Basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: Basic dynamic load rating for 100 km rated fatigue life.
Basic load ratings for the smooth motion specification are listed in Table 18.

NS-CL (Medium-load/Short, square low-profile type)
NS-AL (High-load/Standard, square low-profile type)

(1) Reference number for assembly (Preloaded assembly or assembled interchangeable slide/rail)

NS 30 1200 AL C 2 -** P5 3														
Model				Preload code (refer to Table 9 on page 5)										
Size				0 : Z0, 1 : Z1, 3 : Z3, T : ZT, Z : ZZ, H : ZH										
Rail length (mm)				Accuracy code (refer to Table 9 on page 5)										
Ball slide shape code (refer to Fig. 2 on page 3)				Design serial number Added to the reference number										
Material/surface treatment code (refer to Table 19 on page 10)				Number of ball slides per rail										
C: Special high carbon steel (NSK standard); K: Stainless steel														

(2) Reference number for interchangeable type

NAS 30 AL S Z -L														
Ball slide				Option code										
Interchangeable ball slide model code				No code: No options										
Size				-L: Equipped with NSK K1-L										
Ball slide shape code (refer to Fig. 2 on page 3)				-F: Fluoride low temperature chrome plating + AS2 grease										
				-F50: Fluoride low temperature chrome plating + LG2 grease										
				Preload code										
				No code: Fine clearance, Z: Slight preload, H: Medium preload										
				Material code										
				No code: Special high carbon steel (NSK standard), S: Stainless steel										

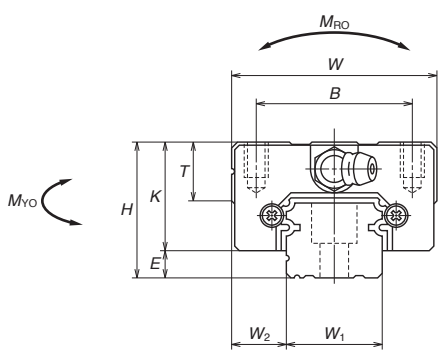
Rail															N1S 30 1200 L CN -** PC Z														
Interchangeable rail model code										Preload code (refer to Table 9 on page 5)																			
N1S: NS model interchangeable rail										T: Fine clearance, Z: Slight preload (common rail for slight or medium preload)																			
Size										Accuracy code																			
Rail length (mm)										PH: High precision grade interchangeable type PC: Normal grade interchangeable type																			
Rail shape code: L										Design serial number																			
L: Standard										Added to the reference number																			
Material/surface treatment code (refer to Table 19 on page 10)										Butting rail specification*																			
										N: Non-butting; L: Butting specification																			
															*Please consult with NSK for butting rail specification.														

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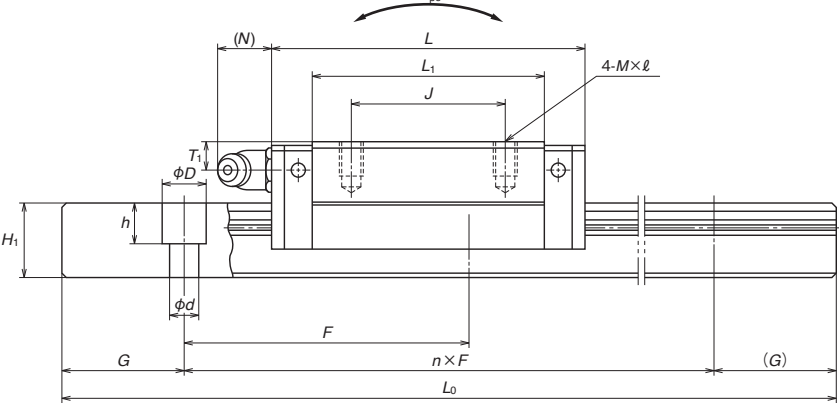
Model No.	Assembly			Ball slide												
	Height			Width	Length	Mounting hole						Grease fitting				
	H					W_2	W	L				B	J	$M \times \text{Pitch} \times \ell$	L_1	K
NS15CL NS15AL	24	4.6	9.5	34	40.4 56.8	26	— 26	M4×0.7×6	23.6 40	19.4	10	φ3	6	3	15	12.5
NS20CL NS20AL	28	6	11	42	47.2 65.2	32	— 32	M5×0.8×7	30 48	22	12	M6×0.75	5.5	11	20	15.5
NS25CL NS25AL	33	7	12.5	48	59.6 81.6	35	— 35	M6×1×9	38 60	26	12	M6×0.75	7	11	23	18
NS30CL NS30AL	42	9	16	60	67.4 96.4	40	— 40	M8×1.25×12	42 71	33	13	M6×0.75	8	11	28	23
NS35CL NS35AL	48	10.5	18	70	77 108	50	— 50	M8×1.25×12	49 80	37.5	14	M6×0.75	8.5	11	34	27.5

Notes: 1) The external appearance of stainless steel ball slides differs slightly from of carbon steel ball slides.

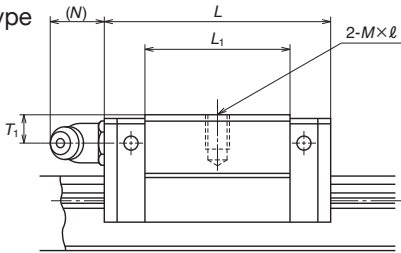
Assembly (Preloaded assembly or assembled interchangeable slide/rail)
Front view of AL and CL types



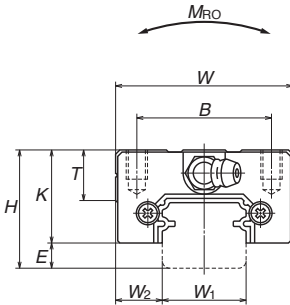
Side view of AL type



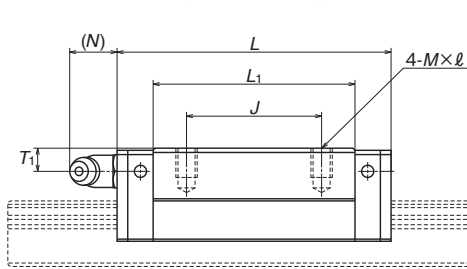
Side view of CL type



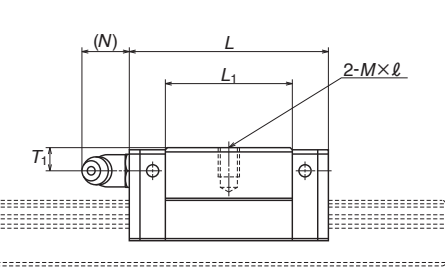
Ball slide of interchangeable type
AL and CL types



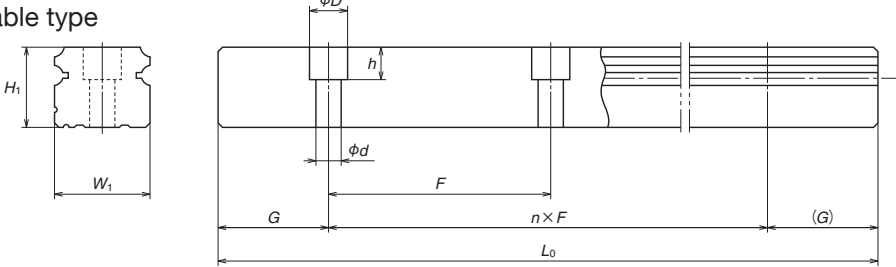
AL type



CL type



Rail of interchangeable type



Unit: mm													
Rail				Basic load ratings								Weight	
Pitch <i>F</i>	Mounting bolt hole <i>d</i> × <i>D</i> × <i>h</i>	G (reference)	Max. length <i>L</i> _{0max} (<i>l</i>) for stainless	2) Dynamic		Static	Static moment (N·m)				Ball slide (kg)	Rail (kg/m)	
				[50km] <i>C</i> ₅₀ (N)	[100km] <i>C</i> ₁₀₀ (N)	<i>C</i> ₀ (N)	<i>M</i> _{RO}	<i>M</i> _{PO}		<i>M</i> _{YO}			
								One slide	Two slides	One slide	Two slides		
60	*4.5×7.5×5.3 3.5×6×4.5	20	2 920 (1 800)	7 250 11 200	5 750 8 850	9 100 16 900	45.5 84.5	24.5 77	196 470	20.5 64.5	165 395	0.14 0.20	1.4
60	6×9.5×8.5	20	3 960 (3 500)	10 600 15 600	8 400 12 400	13 400 23 500	91.5 160	46.5 133	330 755	39 111	279 630	0.19 0.28	2.3
60	7×11×9	20	3 960 (3 500)	17 700 26 100	14 000 20 700	20 800 36 500	164 286	91 258	655 1 470	76 217	550 1 230	0.34 0.51	3.1
80	7×11×9	20	4 000 (3 500)	24 700 38 000	19 600 30 000	29 600 55 000	282 520	139 435	1 080 2 650	116 365	905 2 220	0.58 0.85	4.8
80	9×14×12	20	4 000 (3 500)	34 500 52 500	27 300 42 000	40 000 74 500	465 865	220 695	1 670 4 000	185 580	1 400 3 350	0.86 1.3	7.0

2) The basic load ratings comply with ISO standards. (ISO14728-1 and ISO14728-2)
C₅₀: Basic dynamic load rating for 50 km rated fatigue life, C₁₀₀: Basic dynamic load rating for 100 km rated fatigue life
Basic load ratings for the smooth motion specification are listed in Table 18.
*) For NS15, M4 (4.5 x 7.5 x 5.3) rail mounting bolt holes are standard. Please contact NSK to request M3 holes (3.5 x 6 x 4.5).

NS-JM (Medium-load/Short, flanged type)
NS-EM (High-load/Standard, flanged type)

(1) Reference number for assembly (Preloaded assembly or assembled interchangeable slide/rail)

NS 30 1200 EMC 2 -** P5 3															
Model				Preload code (refer to Table 9 on page 5)											
Size				0 : Z0, 1 : Z1, 3 : Z3, T : ZT, Z : ZZ, H : ZH											
Rail length (mm)				Accuracy code (refer to Table 9 on page 5)											
Ball slide shape code (refer to Fig. 2 on page 3)				Design serial number											
Material/surface treatment code (refer to Table 19 on page 10)				Added to the reference number											
C: Special high carbon steel (NSK standard); K: Stainless steel				Number of ball slides per rail											

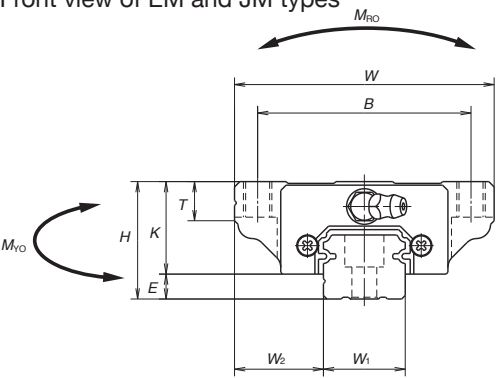
(2) Reference number for interchangeable type

NAS 30 EM S Z -L															
Ball slide				Option code											
Interchangeable ball slide model code				No code: No options											
NAS: NS model interchangeable ball slide				-L: Equipped with NSK K1-L											
Size				-F: Fluoride low temperature chrome plating + AS2 grease											
Ball slide shape code (refer to Fig. 2 on page 3)				-F50: Fluoride low temperature chrome plating + LG2 grease											
				Preload code											
				No code: Fine clearance, Z: Slight preload, H: Medium preload											
				Material code											
				No code: Special high carbon steel (NSK standard), S: Stainless steel											

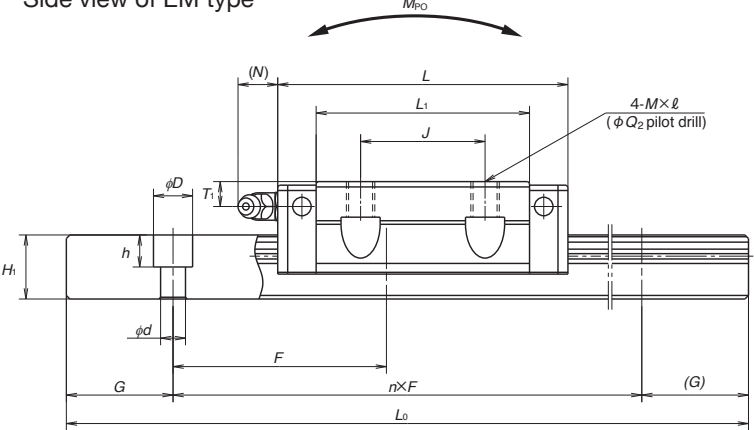
N1S 30 1200 L CN -** PC Z															
Rail				Preload code (refer to Table 9 on page 5)											
Interchangeable rail model code				T: Fine clearance, Z: Slight preload (common rail for slight or medium preload)											
Size				Accuracy code											
Rail length (mm)				PH: High precision grade interchangeable type											
Rail shape code: L				PC: Normal grade interchangeable type											
Material/surface treatment code (refer to Table 19 on page 10)				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.											

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For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

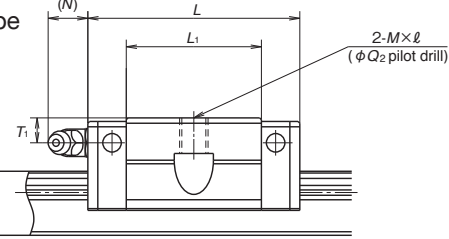
Assembly (Preloaded assembly or assembled interchangeable slide/rail)
Front view of EM and JM types



Side view of EM type

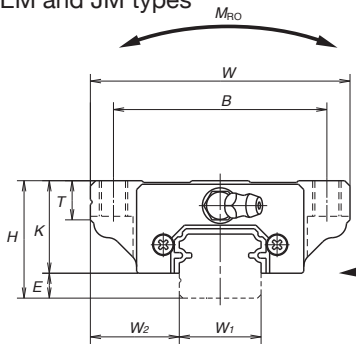


Side view of JM type

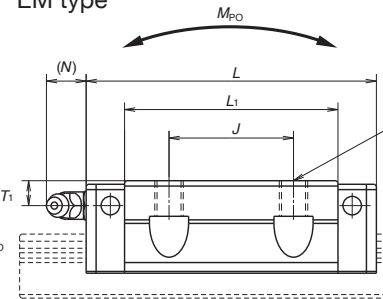


Ball slide of interchangeable type

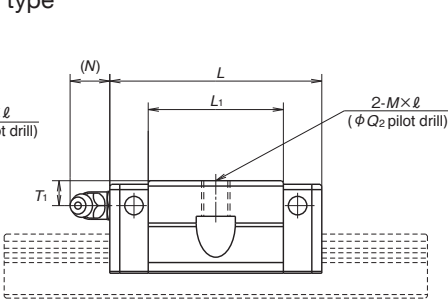
EM and JM types



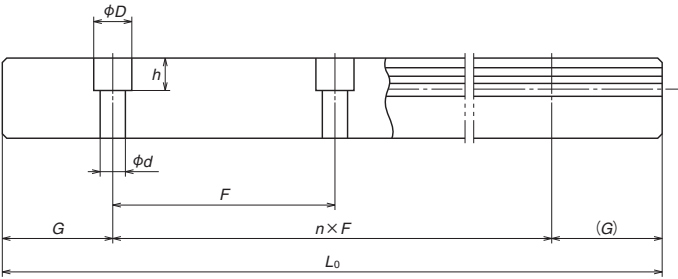
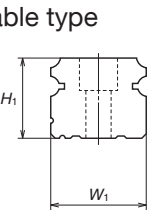
EM type



JM type



Rail of interchangeable type



Model No.	Assembly			Ball slide												Width		Height
	Height			Width	Length	Mounting hole							Grease fitting					
													Hole size					
<i>H</i>	<i>E</i>	<i>W</i> ₂	<i>W</i>	<i>L</i>	<i>B</i>	<i>J</i>	<i>M</i> ×Pitch× <i>ℓ</i>	<i>Q</i> ₂	<i>L</i> ₁	<i>K</i>	<i>T</i>		<i>T</i> ₁	<i>N</i>	<i>W</i> ₁	<i>H</i> ₁		
NS15JM NS15EM	24	4.6	18.5	52	40.4 56.8	41	— 26	M5×0.8×7	4.4	23.6 40	19.4	8	∅3	6	3	15	12.5	
NS20JM NS20EM	28	6	19.5	59	47.2 65.2	49	— 32	M6×1×9 (M6×1×9.5)	5.3	30 48	22	10	M6×0.75	5.5	11	20	15.5	
NS25JM NS25EM	33	7	25	73	59.6 81.6	60	— 35	M8×1.25×10 (M8×1.25×11.5)	6.8	38 60	26	11 (12)	M6×0.75	7	11	23	18	
NS30JM NS30EM	42	9	31	90	67.4 96.4	72	— 40	M10×1.5×12 (M10×1.5×14.5)	8.6	42 71	33	11 (15)	M6×0.75	8	11	28	23	
NS35JM NS35EM	48	10.5	33	100	77 108	82	— 50	M10×1.5×13 (M10×1.5×14.5)	8.6	49 80	37.5	12 (15)	M6×0.75	8.5	11	34	27.5	

Notes: 1) The external appearance of stainless steel ball slides differs slightly from of carbon steel ball slides.
2) Parenthesized dimensions are for items made of stainless steel.

Unit: mm													
Rail				Basic load ratings								Weight	
Pitch	Mounting bolt hole $d \times D \times h$	G	Max. length L_{Dmax} () for stainless	3) Dynamic		Static C_0 (N)	Static moment (N·m)					Ball slide (kg)	Rail (kg/m)
				[50km] $C_{50}(\text{N})$	[100km] $C_{100}(\text{N})$		M_{RO}	M_{PO}		M_{YO}			
F		(reference)						One slide	Two slides	One slide	Two slides		
60	*4.5×7.5×5.3 3.5×6×4.5	20	2 920 (1 800)	7 250 11 200	5 750 8 850	9 100 16 900	45.5 84.5	24.5 77	196 470	20.5 64.5	165 395	0.17 0.26	1.4
60	6×9.5×8.5	20	3 960 (3 500)	10 600 15 600	8 400 12 400	13 400 23 500	91.5 160	46.5 133	330 755	39 111	279 630	0.24 0.35	2.3
60	7×11×9	20	3 960 (3 500)	17 700 26 100	14 000 20 700	20 800 36 500	164 286	91 258	655 1 470	76 217	550 1 230	0.44 0.66	3.1
80	7×11×9	20	4 000 (3 500)	24 700 38 000	19 600 30 000	29 600 55 000	282 520	139 435	1 080 2 650	116 365	905 2 220	0.76 1.2	4.8
80	9×14×12	20	4 000 (3 500)	34 500 52 500	27 300 42 000	40 000 74 500	465 865	220 695	1 670 4 000	185 580	1 400 3 350	1.2 1.7	7

3) The basic load ratings comply with ISO standards. (ISO14728-1 and ISO14728-2)
C50: Basic dynamic load rated for 50 km rating fatigue life, C100: Basic dynamic load rating for 100 km rated fatigue life.
*) For NS15, M4 (4.5 x 7.5 x 5.3) rail mounting bolt holes are standard. Please contact NSK to request M3 holes (3.5 x 6 x 4.5).

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