Linear Motion

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Linear Guides

Linear Guides are designed for high precision motion and control applications. They provide greater rigidity and higher load capacity than shaft and bushing designs.

Some of the industries served - machine tool, robotics, medical and aerospace - require smooth travel and high accuracy.

Applications

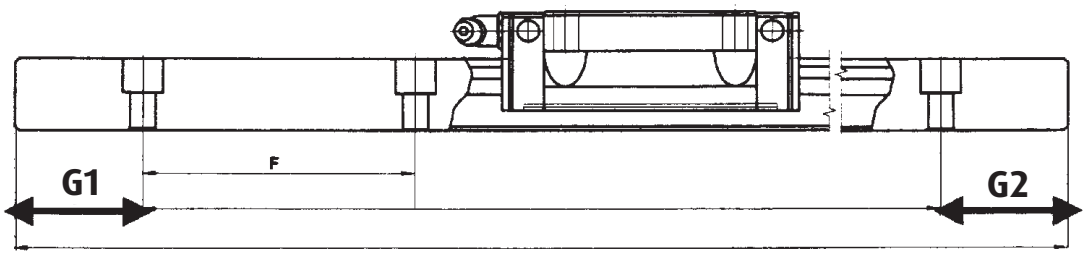
› Machine Tool (CNC, EDM, Laser Cutting, Water Jet, Lathes) › Woodworking (Routers) › Glasscutting › Testing Equipment
› Medical (Diagnostic Equipment, Lab Automation, Genomics, Biotechnology) › CMM › Factory Automation
› Semiconductor (Wafer Handling, PCB Drilling, LCD Etching, Testing Equipment)

Linear Guide Product Selection Tips

To help in the selection of linear guides, NSK has come up with a series of questions that need to be asked in order to determine the appropriate NSK product.

- What is the application?
- What is the NSK or competitor parts number?
- What type of carriage or bearing style is needed for this application: Tapped or Through Hole, Square or Flange style?
- What is the rail length required for this application?
- How many carriages or bearings are needed per rail?
- Are there any special accuracy and preload requirements?
- What are the loading conditions of the application? Please provide both Static & Dynamic loads.
- What are the delivery requirements?
- Can you provide us with a drawing of the part to be purchased?
- Lubrication Method - Is the K1 lubrication system of interest for this application?
- What is the G dimension of rail?

G Dimension Information: A G dimension is required to assure proper mounting to existing application. The G dimension is the measurement from start of the rail to the center of the first bolt hole. In instances where rail will be butted together, please contact NSK for assistance.



Linear Guides Interchange

Description	Interchange																							
	NSK					THK				THOMSON					SKF									
Carriage Part Number	LAH	20	AN	Z		HSR	20	R	C1	511	H	20	C	1	LLRHC	20	A-	T1						
	1	2	3	7		1	2	3	7	1	6	2	3	7	1	2	3	7						
Rail Part Number	L1H	20	XXXX	Z		HSR	20+	XXXXL		521	H	20	A	+XXXX	LLRHR	20x	XXXX	P5						
	1	2	4	7		1	2	4	6	1	6	2		4	1	2	4	6						
Assembly Part Number	LH	25	XXXX	AN	C	X	PC	Z	HSR	20	R	2	SS	C1	+XXXXL									
	1	2	3	4	5	6	7	8	1	2	3	5	8	7	4	6								
																	LLRHS	20	A	2	T1	XXXX	P5	
																	1	2	3	5	7	4	6	

The competitive manufacturers are provided for a convenient source of unit substitution. They can be considered interchangeable in most instances, but for special applications, please consult NSK Engineering. NSK assumes no liability with respect to errors or omissions.

1 - Linear Guide Series

NSK	THK	THOMSON		SKF
		Old	New	
LH	HSR	CG	511	LLRHS/LLTHS
SH	SHS			
LS	SR			LLRHS
SS	SSR			
LW	HRW			
PU	RSR	CD	TSR-Z	LLMHS
PE	RSR W	LLMWS	TSR-WZ	LLMWS

2 - Linear Guide Series (rail width)

NSK	THK	THOMSON	SKF
Number indicated rail width	Same as NSK	Same as NSK with the exception of the CD series	Same as NSK

3 - Linear Guide Carriage Styles ## = size (rail width)

NSK	THK		THOMSON		SKF
	Common	Less Common	Old	New	
LAH##AN	HSR##R	HSR##TR/TRX/CR	CG##CE	511H##E	LLRHC##R/U (20,45)
LAH##BN	HSR##LR	HSR##HTR/HR	CG##DE	511H##F	LLRHC##LR
LAH##EM	HSR##A/B/CA/CB	HSR##TA	CG##AA	511H##A	LLRHC##A
LAH##GM	HSR##HA/LA/HB/LB	HSR##HTA/HTB	CG##BA	511H##B	LLRHC##LA
LAH##AL				511H##C (25,30,35)	LLRHC##U (25,30,35)
LAH##BL				511H##D (25,30,35)	
SAH##AN	SHS##R/V (20,45,55,65)				
SAH##AL	SHS##V (15,25,30,35)				
SAH##BN	SHS##LR/LV (20,45,55,65)				
SAH##BL	SHS##LV (25,30,35)				
SAH##EM	SHS##C				
SAH##GM	SHS##LC				
LAS##FL		SR##TBY			
LAS##EM	SR##TB				
LAS##AL	SR##W	SR##TX/WY			LLRHC15U
LAS##AN	SR##W (45,55)				
LAS##KL/JM	SR##SB	SR##SBY			
LAS##CL	SR##V	SR##SX/VY			LLRHC##SU (15,30,35)
SAS##AL	SSR##XW	SSR##XWY			
SAS##CL	SSR##XV	SSR##XVY			
SAS##FL		SSR##XTBY/TBY			
SAS##EM	SSR##XTB				
LAW##EL	HRW##CA/CR				
PAU##AR	RSR07M/RSR07N				LLMHC##TA
PAU##TR	RSR05M/##N (5,9)	RSR09KM/RSR12VM			LLMHC##TA
PAU##UR	RSR12N				
PAU##AL	RSR15VM				
PAE##AR	RSR05WM/##WN (5,12,15)	RSR12WVM/RSR15WVN			LLMWC##TA
PAE##TR	RSR07WM/##WN (7,9)	RSR09WVM			LLMWC##TA

4 - Linear Guide Rail Length (mm) ## = size (rail width) XXXX = length

NSK	THK	THOMSON		SKF
		Old	New	
L1H##XXXXZ	HSR##+XXXXL	RG##NLXXXX	521H##A+XXXX	LLRHR##xXXXXP5
L1H##XXXXZ (For SH series)	HSR##+XXXXL			
L1S##XXXXZ	SR##+XXXXL			LLRHR##xXXXXP5
L1S##XXXXZ (For SS series)	SR##+XXXXL			
L1W##XXXXZ	HRW##+XXXXL			
P1U##XXXXZ	RSR##+XXXXL	RD##HLXXXX	TSR##Z+XXXX	LLMHR##xXXXXP5
P1E##XXXXZ	RSR##W+XXXXL		TSR##WZ+XXXX	LLMWR##xXXXXP5

5 - Carriages

The number following the carriage style equals the number of carriages per rail.

6 - Accuracy Class

NSK	THK	THOMSON	SKF
PC (interchangeable)	BLANK	N	P5
P6	H	H	P3
P5	P	P	P1
P4	SP	S	P01
P3	UP	U	P001

7 - Preload

NSK (Matched Assembly)	THK	THOMSON		SKF
		Old	New	
T or (0)	BLANK	A	0	T0
Z or (1)	C1	B	1	T1
(2)	C1	B	1	T1
H or (3)	C0	C	2	T2
(4)	C0	C	3	T3

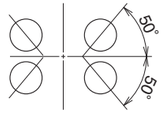
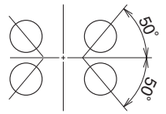
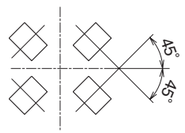
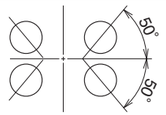
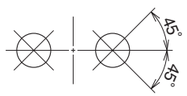
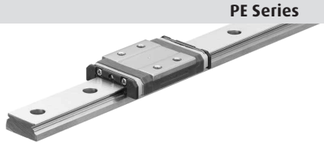
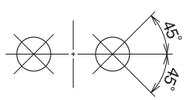
8 - Seals

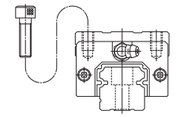
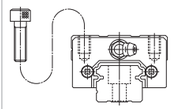
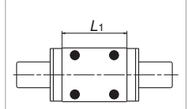
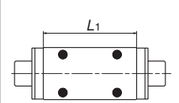
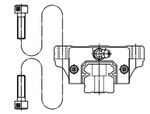
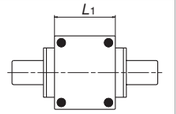
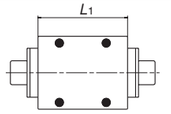
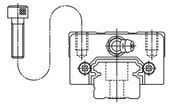
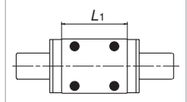
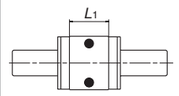
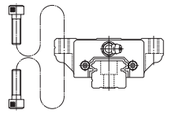
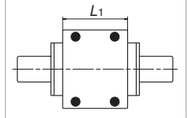
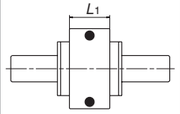
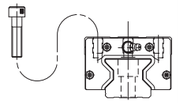
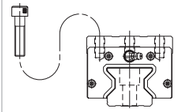
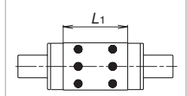
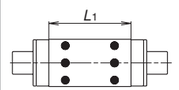
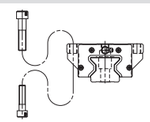
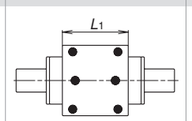
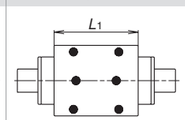
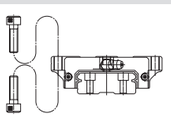
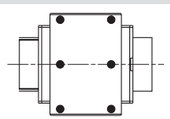
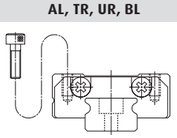
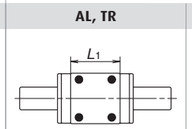
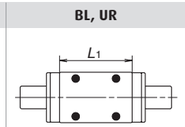
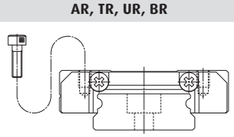
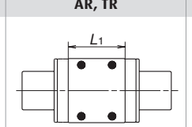
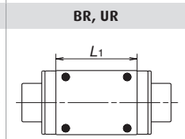
NSK	THK	THOMSON		SKF
		Old	New	
Standard (End Seals)	UU-End Seals		Standard	Standard
Standard (Side Seals)	SS-Side Seals+End Seals	LDS	Standard	Standard
-P (Protector/Scraper)	ZZ-End, Side, Inner Seals and Scraper	ZZ	Z	S1
-D (Double End Seals)	DD-Double End, Side, and Inner Seals	DD	W	S2
-DP (Double End Seals, Protector)	KK-Double End, Side, Inner Seals and Scraper	KK	WZ	S3

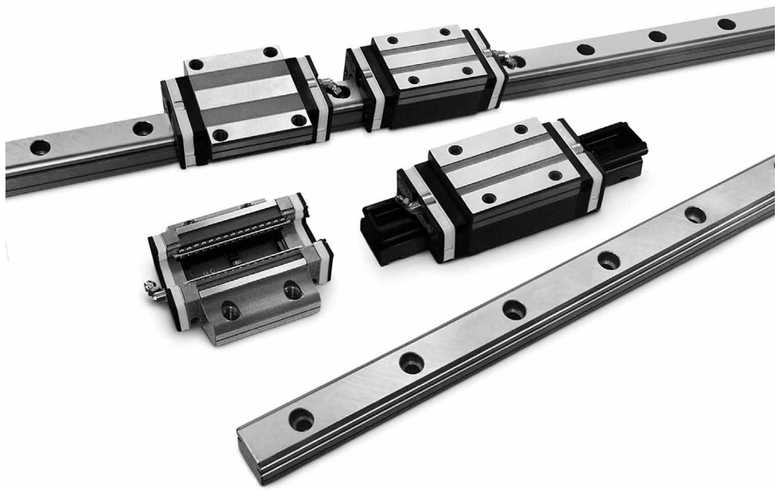
Lubrication Systems

NSK	THK	THOMSON	SKF
-K1 External to the Carriage	QZ External to the Carriage	LL External to the Carriage	Standard Internal Foam Insert

Types of Linear Guides

Series		Features
LH/SH Series		
		LH Series · NSK basic series · General versatility for heavy-duty applications · Large load carrying capacity against vertical direction Stainless steel is available (#15–30). SH Series · Silent and smooth featured LH incorporated with retainer piece
LS/SS Series		
		LS Series · Compact designed NSK basic series · General versatility for fine application · Large load carrying capacity against vertical direction Stainless steel is available (#15–35). SS Series · Silent and smooth featured LS incorporated with retainer piece
RA Series		
		· A roller guide with super high load capacity and rigidity · Super high accuracy and smooth motion · Highly dust proof and maintenance free
LW Series		
		· Wide rail type linear guide · Ideal for use of single rail · Large load carrying capacity against vertical direction
PU Series		
		· Lightweight designed miniature linear guide · Reduced noise and smooth motion · High corrosion resistance (stainless steel)
PE Series		
		· Lightweight designed wide rail miniature linear guide · Ideal for use of single rail · Reduced noise and smooth motion · High corrosion resistance (stainless steel)

Ball Slide Model				Size & Preload		Dimension Table
AN, BN	**AL, BL**	**AN, AL**	**BN, BL**	**Size**	**Preload**	
				LH/SH15 LH/SH20 LH/SH25 LH/SH30 LH/SH35 LH/SH45 LH/SH55 LH65	Slight preload ZZ	Page I-9 - I-12
EM, GM		**EM**	**GM**			
						
AL, CL		**AL**	**CL**	**Size**	**Preload**	
				LS/SS15 LS/SS20 LS/SS25 LS/SS30 LS/SS35	Slight preload ZZ	Page I-15 - I-18
EM, JM		**EM**	**JM**			
						
AL , BL	**AN, BN**	**AL, AN**	**BN, BL**	**Size**	**Preload**	
				RA15 RA20 RA25 RA30 RA35 RA45 RA55 RA65	Medium preload Z	Page I-33 - I-38
EM, GM		**EM**	**GM**			
						
EL		**EL**		**Size**	**Preload**	
				LW17 LW21 LW27 LW35 LW50	Slight preload ZZ	Page I-29 - I-30
AL, TR, UR, BL		**AL, TR**	**BL, UR**	**Size**	**Preload**	
				PU05 PU07 PU09 PU12 PU15	Maximum clearance 3 μm ZT	Page I-21 - I-22
AR, TR, UR, BR		**AR, TR**	**BR, UR**	**Size**	**Preload**	
				PE05 PE07 PE09 PE12 PE15	Maximum clearance 3 μm ZT	Page I-25 - I-26



Part Number Example for Ball Slide Only

Random-Matching Ball Slide — **LAH**

Size — **25**

Shape / Height — **AN**

S: Stainless Steel (LH15 to LH30 only)
No code: Carbon Steel

Preload
Z: Slight Preload (standard)
No Code: Slight Clearance

Accessories
K: With NSK K1
F: Fluoride Low-Temperature Chrome Plating + AS2 Grease
F50: Fluoride Low-Temperature Chrome Plating + LG2 Grease

Reference Part Number for Rail Only

Random-Matching Rail — **L1H**

Size — **25**

Rail Length (mm) — **1000**

Shape
L: Standard

Material / Surface Treatment — **C**

Butting Rail Specification
N: Non-butting
L: Butting

NSK Control Number
(*** is required when making inquiries) — ***

Accuracy
PC: Only PC Grade is Available

Z: Standard

Reference Part Number for Interchangeable Assembly (Ball Slide + Rail)

Series — **LH**

Size — **25**

Rail Length (mm) — **1000**

Shape / Height — **AN**

Material / SurfaceTreatment — **C**
C: Carbon Steel (NSK standard)
K: Stainless Steel
D: Carbon Steel + Surface Treatment
H: Stainless Steel + Surface Treatment

Number of Ball Slides Per Rail — **2**

NSK Control Number
(*** is required when making inquiries) — ***

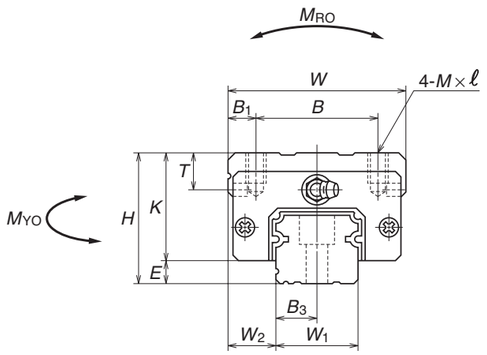
Accuracy
PC: Only PC Grade is Available
KC: With NSK K1

Preload
Z: Slight Preload (standard)
No Code: Slight Clearance

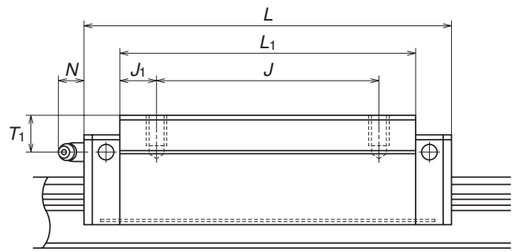
Linear Guides: LH Series

Ball Slide Models: AL, AN, BL, BN

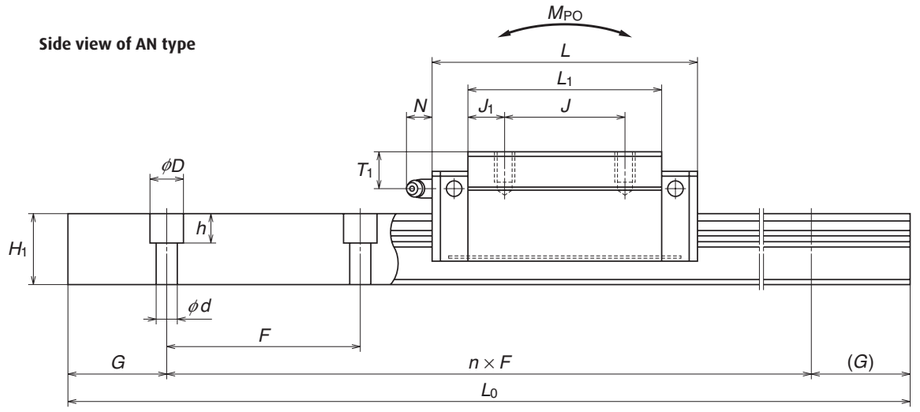
Front View of AL and AN, BL and BN Types



Side View of BN Type



Side view of AN type



n = (number of holes)-1

Unit: mm

Model No.	Assembly			Ball Slide												Rail							Basic Load Rating					Ball Diameter	Weight	
	Height			Width	Length	Mounting Hole								Grease Fitting			Width	Height	Pitch	Mounting Bolt Hole			Max. Length (Single Rail)	Dynamic	Static	Static Moment				Ball Slide	Rail
	H	E	W_2	W	L	B	J	M × pitch × ℓ	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N	W_1	H_1	F	d × D × h	B_3	G	L_{0max} ( ) for stainless	C (N)	C_0 (N)	M_{RO} (N·m)	M_{PO} (N·m)	M_{YO} (N·m)	D_W	(kg)	(kg/m)
LH15AN LH15BN	28	4.6	9.5	34	55.0 74.0	26	26	M4×0.7×6	4.0	39 58	6.5 16.0	23.4	8	ϕ3	8.5	3.3	15	15	60	4.5×7.5×5.3	7.5	20.0	2 000 (1 800)	10 800 14 600	20 700 32 000	108 166	95 216	80 181	3.175	0.18 0.26	1.6
LH20AN LH20BN	30	5.0	12.0	44	69.8 91.8	32	36 50	M5×0.8×6	6.0	50 72	7.0 11.0	25.0	12	M6×0.75	5.0	11.0	20	18	60	6×9.5×8.5	10.0	20.0	3 960 (3 500)	17 400 23 500	32 500 50 500	219 340	185 420	155 355	3.968	0.33 0.48	2.6
LH25AL LH25AN LH25BL LH25BN	36 40 36 40	7.0	12.5	48	79.0 107.0	35	35 50	M6×1×6 M6×1×9 M6×1×6 M6×1×9	6.5	58 86	11.5 18.0	29.0 33.0 29.0 33.0	12	M6×0.75	6.0 10.0 6.0 10.0	11.0	23	22	60	7×11×9	11.5	20.0	3 960 (3 500)	25 600 34 500	46 000 71 000	360 555	320 725	267 610	4.762	0.46 0.55 0.69 0.82	3.6
LH30AL LH30AN LH30BL LH30BN	42 45 42 45	9.0	16.0	60	85.6 124.6	40	40 60	M8×1.25×8 M8×1.25×10 M8×1.25×8 M8×1.25×10	10.0	59 98	9.5 19.0	33.0 36.0 33.0 36.0	14	M6×0.75	7.0 10.0 7.0 10.0	11.0	28	26	80	9×14×12	14.0	20.0	4 000 (3 500)	31 000 46 000	51 500 91 500	490 870	350 1 030	292 865	5.556	0.69 0.77 1.16 1.30	5.2
LH35AL LH35AN LH35BL LH35BN	48 55 48 55	9.5	18.0	70	109.0 143.0	50	50 72	M8×1.25×8 M8×1.25×12 M8×1.25×8 M8×1.25×12	10.0	80 114	15.0 21.0	38.5 45.5 38.5 45.5	15	M6×0.75	8.0 15.0 8.0 15.0	11.0	34	29	80	9×14×12	17.0	20.0	4 000	47 500 61 500	80 500 117 000	950 1 380	755 1 530	630 1 280	6.350	1.20 1.50 1.70 2.10	7.2
LH45AN LH45BN	70	14.0	20.5	86	139.0 171.0	60	60 80	M10×1.5×17	13.0	105 137	22.5 28.5	56.0	17	Rc1/8	20.0	13.0	45	38	105	14×20×17	22.5	22.5	3 990	81 000 99 000	140 000 187 000	2 140 2 860	1 740 3 000	1 460 2 520	7.937	3.00 3.90	12.3
LH55AN LH55BN	80	15.0	23.5	100	163.0 201.0	75	75 95	M12×1.75×18	12.5	126 164	25.5 34.5	65.0	18	Rc1/8	21.0	13.0	53	44	120	16×23×20	26.5	30.0	3 960	119 000 146 000	198 000 264 000	3 600 4 850	3 000 5 150	2 510 4 350	9.525	4.70 6.10	16.9
LH65AN LH65BN	90	16.0	31.5	126	193.0 253.0	76	70 120	M16×2×20	25.0	147 207	38.5 43.5	74.0	23	Rc1/8	19.0	13.0	63	53	150	18×26×22	31.5	35.0	3 900	181 000 235 000	281 000 410 000	6 150 8 950	4 950 10 100	4 150 8 450	11.906	7.70 10.80	24.3

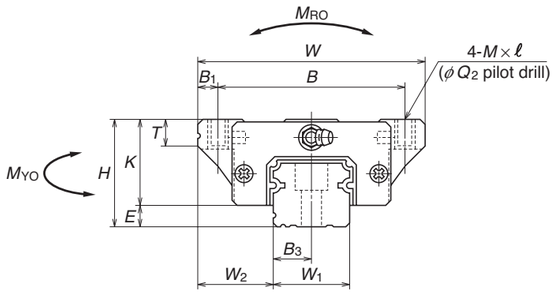
Note 1: External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Note 2: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.

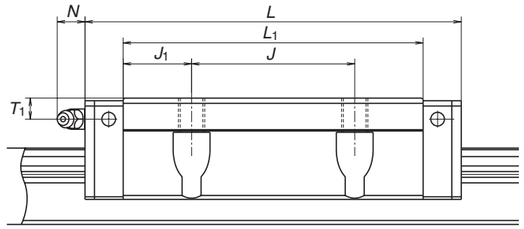
Linear Guides: LH Series

Ball Slide Models: EM, GM

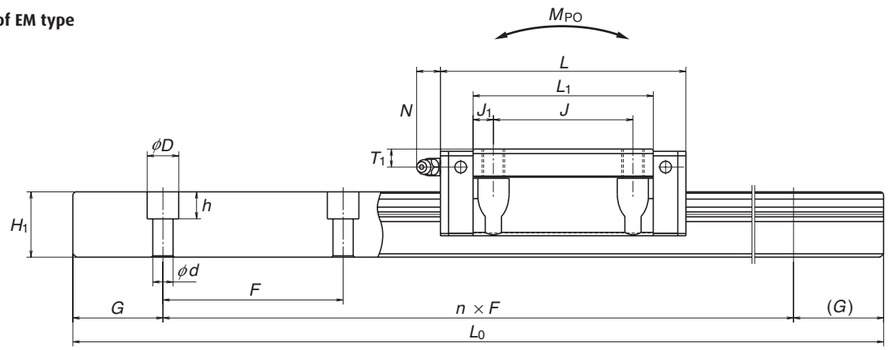
Front View of EM and GM Types



Side View of GM Type



Side view of EM type



n = (number of holes)-1

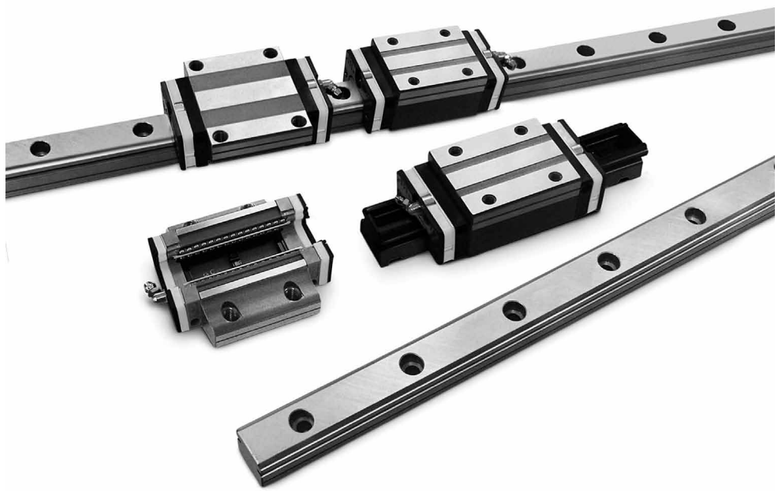
Unit: mm

Model No.	Assembly			Ball Slide															Rail							Basic Load Rating					Ball Diameter	Weight	
	Height			Width	Length	Mounting Hole									Grease Fitting			Width	Height	Pitch	Mounting Bolt Hole d x D x h			Max Length (Single Rail)	Dynamic	Static	Static Moment					
	H	E	W_2	W	L	B	J	Q_1 x ℓ M x pitch x ℓ	Q_2	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N	W_1	H_1	F		B_3	G	L_{0max} ( ) for stainless	C (N)	C_0 (N)	M_{R0} (N•m)	M_{P0} (N•m)	M_{Y0} (N•m)	D_w	Ball Slide (kg)	Rail (kg/m)
LH15EM	24	4.6	16	47	55.0	38	30	M5×0.8×7	4.4	4.5	39	4.5	19.4	8	φ3	4.5	3.3	15	15	60	4.5×7.5×5.3	7.5	20.0	2000	10800	20700	108	94.5	79.5	3.175	0.17	1.6
LH15GM					74.0						58	14.0												(1800)	14600	32000	166	216.0	181.0		0.25	
LH20EM	30	5.0	21.5	63	69.8	53	40	M6×1×9.5	5.3	5.0	50	5.0	25.0	10	M6×0.75	5.0	11.0	20	18	60	6×9.5×8.5	10.0	20.0	3960	17400	32500	219	185.0	155.0	3.968	0.45	2.6
LH20GM					91.8						72	16.0												(3500)	23500	50500	340	420.0	355.0		0.65	
LH25EM	36	7.0	23.5	70	79.0	57	45	M8×1.25×10	6.8	6.5	58	6.5	29.0	11	M6×0.75	6.0	11.0	23	22	60	7×11×9	11.5	20.0	3960	25600	46000	360	320.0	267.0	4.762	0.63	3.6
LH25GM					107.0			(M8×1.25×11.5)			86	20.5		(12)										(3500)	34500	71000	555	725.0	610.0		0.93	
LH30EM	42	9.0	31	90	98.6	72	52	M10×1.5×12	8.6	9.0	72	10.0	33.0	11	M6×0.75	7.0	11.0	28	26	80	9×14×12	14.0	20.0	4000	35500	63000	600	505.0	425.0	5.556	1.20	5.2
LH30GM					124.6			(M10×1.5×14.5)			98	23.0		(15)										(3500)	46000	91500	870	1030.0	865.0		1.60	
LH35EM	48	9.5	33	100	109.0	82	62	M10×1.5×13	8.6	9.0	80	9.0	38.5	12	M6×0.75	8.0	11.0	34	29	80	9×14×12	17.0	20.0	4000	47500	80500	950	755.0	630.0	6.350	1.70	7.2
LH35GM					143.0						114	26.0													61500	117000	1380	1530.0	1280.0		2.40	
LH45EM	60	14.0	37.5	120	139.0	100	80	M12×1.75×15	10.5	10.0	105	12.5	46.0	13	Rc1/8	10.0	13.0	45	38	105	14×20×17	22.5	22.5	3990	81000	140000	2140	1740.0	1460.0	7.937	3.00	12.3
LH45GM					171.0						137	28.5													99000	187000	2860	3000.0	2520.0		3.90	
LH55EM	70	15.0	43.5	140	163.0	116	95	M14×2×18	12.5	12.0	16	15.5	55.0	15	Rc1/8	11.0	13.0	53	44	120	16×23×20	26.5	30.0	3990	119000	198000	3600	3000.0	2510.0	9.525	5.00	16.9
LH55GM					201.0						164	34.5													146000	264000	4850	5150.0	4350.0		6.50	
LH65EM	90	16.0	53.5	170	193.0	142	110	M16×2×24	14.6	14.0	147	18.5	74.0	23	Rc1/8	19.0	13.0	63	53	150	18×26×22	31.5	35.0	3900	181000	281000	6150	4950.0	4150.0	11.906	10.00	24.3
LH65GM					253.0						207	48.5													235000	410000	8950	10100.0	8450.0		14.10	

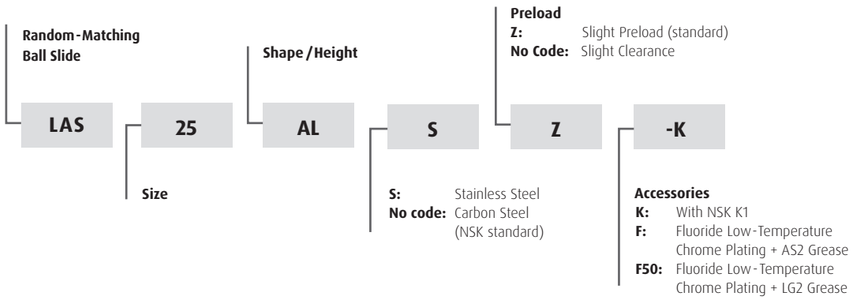
Note 1: Parenthesized dimensions are for items made of stainless steel.

Note 2: External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

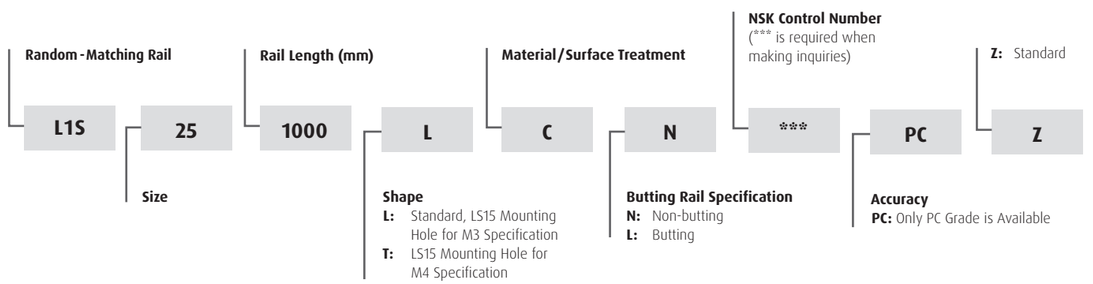
Note 3: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.



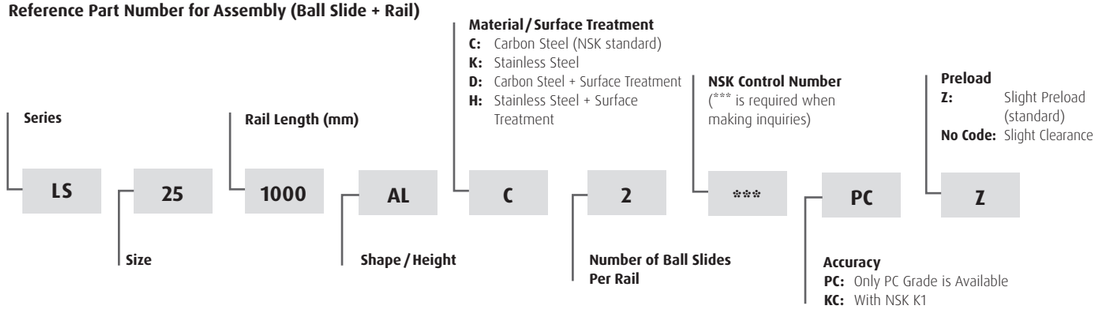
Part Number Example for Ball Slide Only



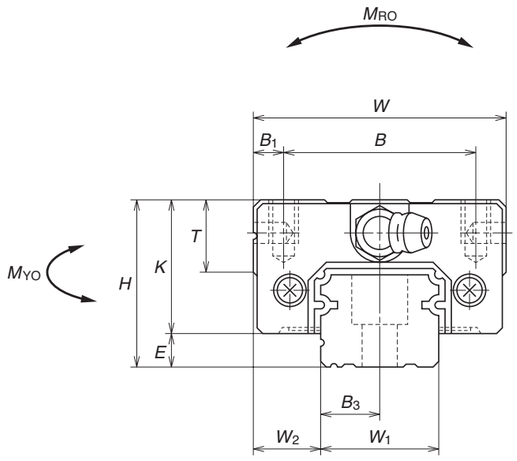
Reference Part Number for Rail Only



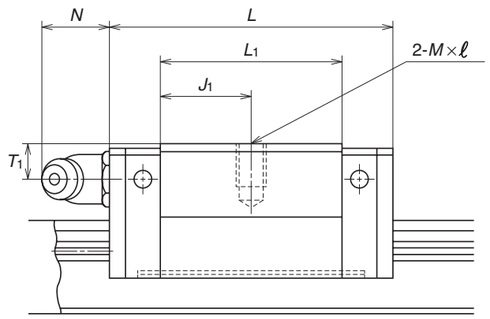
Reference Part Number for Assembly (Ball Slide + Rail)



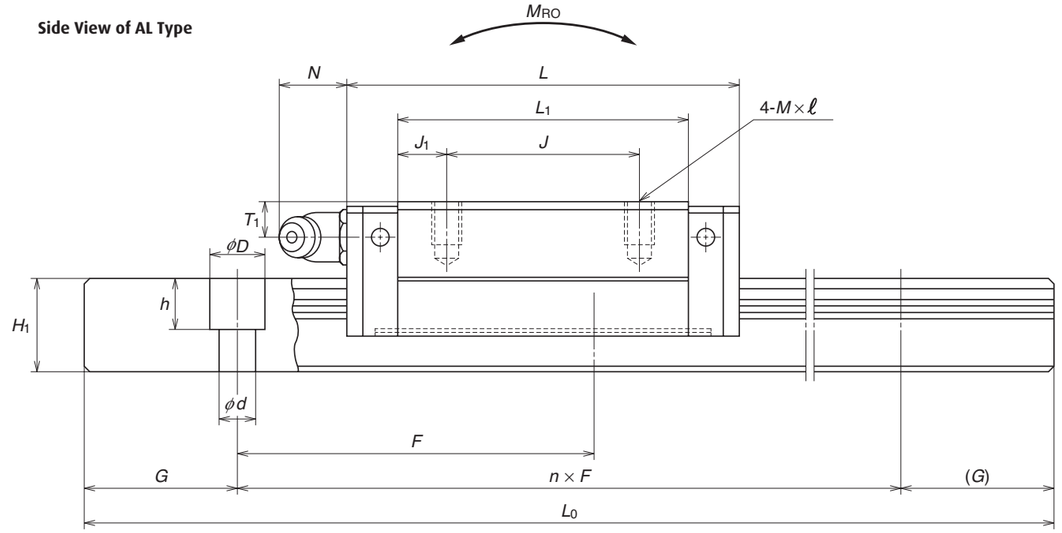
Front View of AL and CL Types



Side View of CL Type



Side View of AL Type



n = (number of holes)-1

Unit: mm

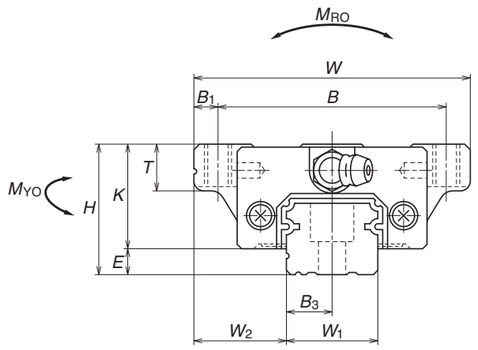
Model No.	Assembly			Ball Slide											
	Height			Width	Length	Mounting Hole							Grease Fitting		
	H	E	W_2	W	L	B	J	M x pitch x ℓ	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N
LS15CL	24	4.6	9.5	34	40.4	26	—	M4×0.7×6	4.0	23.6	11.8	19.4	10	ϕ3	6.0	3
LS15AL					56.8		26			40.0	7.0					
LS20CL	28	6.0	11.0	42	47.2	32	—	M5×0.8×7	5.0	30.0	15.0	22.0	12	M6×0.75	5.5	11
LS20AL					65.2		32			48.0	8.0					
LS25CL	33	7.0	12.5	48	59.6	35	—	M6×1×9	6.5	38.0	19.0	26.0	12	M6×0.75	7.0	11
LS25AL					81.6		35			60.0	12.5					
LS30CL	42	9.0	16.0	60	67.4	40	—	M8×1.25×12	10.0	42.0	21.0	33.0	13	M6×0.75	8.0	11
LS30AL					96.4		40			71.0	15.5					
LS35CL	48	10.5	18.0	70	77.0	50	—	M8×1.25×12	10.0	49.0	24.5	37.5	14	M6×0.75	8.5	11
LS35AL					108.0		50			80.0	15.0					

Note 1: External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

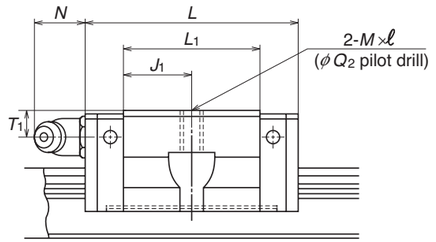
Rail							Basic Load Rating					Ball Diameter	Weight	
Width	Height	Pitch	Mounting Bolt Hole d x D x h			Max Length (Single rail) L_{0max} ( ) for stainless	Dynamic	Static	Static Moment					
W_1	H_1	F		B_3	G		C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)	D_w	Ball Slide (kg)	Rail (kg/m)
15	12.5	60	*3.5×6×4.5 4.5×7.5×5.3	7.5	20	2000 (1700)	5400 8350	9100 16900	45.5 84.5	24.5 77.0	20.5 64.5	2.778	0.14 0.20	1.4
20	15.5	60	6×9.5×8.5	10.0	20	3960 (3500)	7900 11700	13400 23500	91.5 160.0	46.5 133.0	39.0 111.0	3.175	0.19 0.28	2.3
23	18.0	60	7×11×9	11.5	20	3960 (3500)	12700 18800	20800 36500	164.0 286.0	91.0 258.0	76.0 217.0	3.968	0.34 0.51	3.1
28	23.0	80	7×11×9	14.0	20	4000 (3500)	18700 28800	29600 55000	282.0 520.0	139.0 435.0	116.0 365.0	4.762	0.58 0.85	4.8
34	27.5	80	9×14×12	17.0	20	4000 (3500)	26000 40000	40000 74500	465.0 865.0	220.0 695.0	185.0 580.0	5.556	0.86 1.30	7.0

Note 2: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.
*Standard mounting hole of LS15 rail is for M3 bolts (Hole size: 3.5×6×4.5).
If you require mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify when ordering.

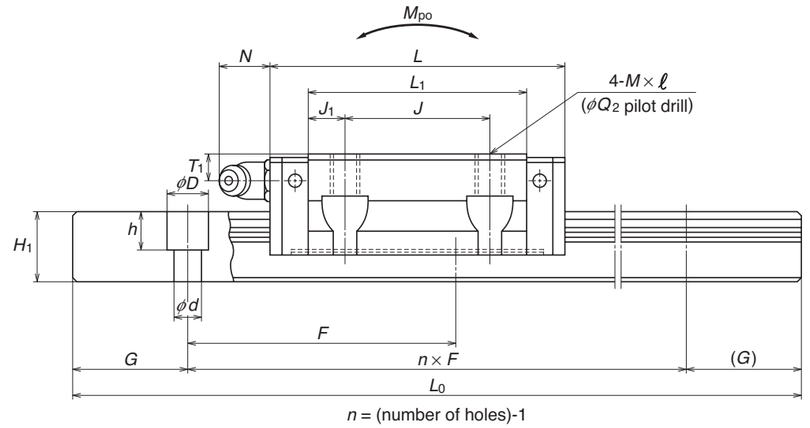
Front View of JM and EM Types



Side View of JM Type



Side View of EM Type



n = (number of holes)-1

Unit: mm

Model No.	Assembly			Ball Slide														
	Height			Width	Length	Mounting Hole									Grease Fitting			
	H	E	W_2	W	L	B	J	Q_1 x ℓ	Q_2	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N	
LS15JM LS15EM	24	4.6	18.5	52	40.4 56.8	41	— 26	M5×0.8×7	4.4	5.5	23.6 40.0	11.8 7.0	19.4	8	ϕ3	6.0	3	
LS20JM LS20EM	28	6.0	19.5	59	47.2 65.2	49	— 32	M6×1×9 (M6×1×9.5)	5.3	5.0	30.0 48.0	15.0 8.0	22.0	10	M6×0.75	5.5	11	
LS25JM LS25EM	33	7.0	25.0	73	59.6 81.6	60	— 35	M8×1.25×10 (M8×1.25×11.5)	6.8	6.5	38.0 60.0	19.0 12.5	26.0	11 (12)	M6×0.75	7.0	11	
LS30JM LS30EM	42	9.0	31.0	90	67.4 96.4	72	— 40	M10×1.5×12 (M10×1.5×14.5)	8.6	9.0	42.0 71.0	21.0 15.5	33.0	11 (15)	M6×0.75	8.0	11	
LS35JM LS35EM	48	10.5	33.0	100	77.0 108.0	82	— 50	M10×1.5×13 (M10×1.5×14.5)	8.6	9.0	49.0 80.0	24.5 15.0	37.5	12 (15)	M6×0.75	8.5	11	

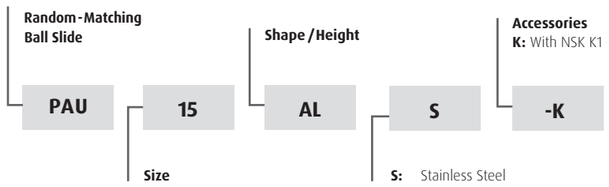
Note 1: Parenthesized dimensions are for items made of stainless steel.
Note 2: External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Rail						Basic Load Rating			Ball Diameter	Weight	
Width	Height	Pitch	Mounting Bolt Hole d x D x h	B_3	G	Max Length (Single rail) L_{0max} ( ) for stainless	Dynamic	Static	Static Moment					
W_1	H_1	F					C (N)	C_0 (N)	M_{R0} (N•m)	M_{P0} (N•m)	M_{Y0} (N•m)	D_w	Ball slide (kg)	Rail (kg/m)
15	12.5	60	*3.5×6×4.5 4.5×7.5×5.3	7.5	20	2000 (1700)	5400 8350	9100 16900	45.5 84.5	24.5 77.0	20.5 64.5	2.778	0.17 0.26	1.4
20	15.5	60	6×9.5×8.5	10.0	20	3960 (3500)	7900 11700	13400 23500	91.5 160.0	46.5 133.0	39.0 111.0	3.175	0.24 0.35	2.3
23	18.0	60	7×11×9	11.5	20	3960 (3500)	12700 18800	20800 36500	164.0 286.0	91.0 258.0	76.0 217.0	3.968	0.44 0.66	3.1
28	23.0	80	7×11×9	14.0	20	4000 (3500)	18700 28800	29600 55000	282.0 520.0	139.0 435.0	116.0 365.0	4.762	0.76 1.20	4.8
34	27.5	80	9×14×12	17.0	20	4000 (3500)	26000 40000	40000 74500	465.0 865.0	220.0 695.0	185.0 580.0	5.556	1.20 1.70	7.0

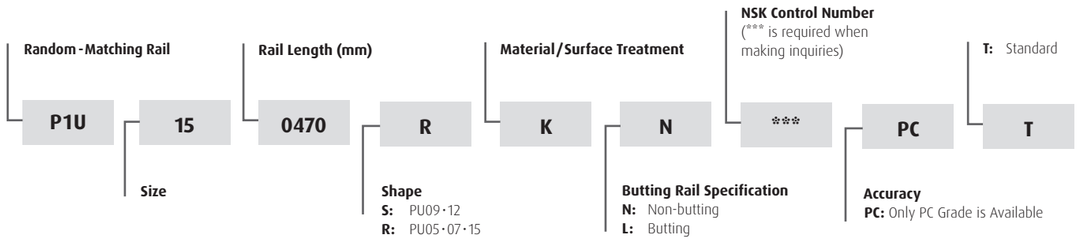
Note 3: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.
*Standard mounting hole of LS15 rail is for M3 bolts (Hole size: 3.5×6×4.5). If you require mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify when ordering.

Linear Guides: PU Series

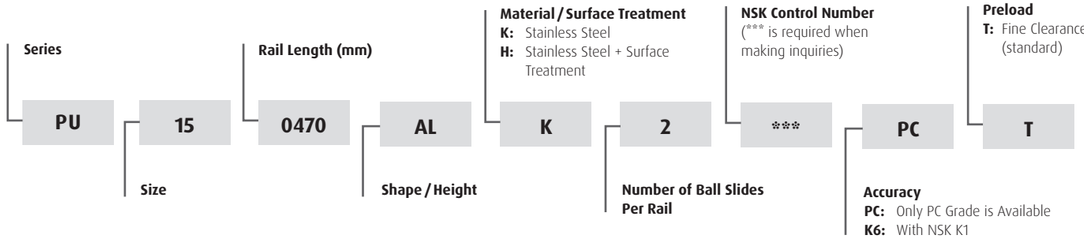
Part Number Example for Ball Slide Only



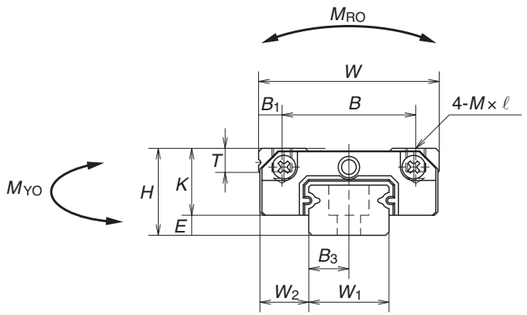
Reference Part Number for Rail Only



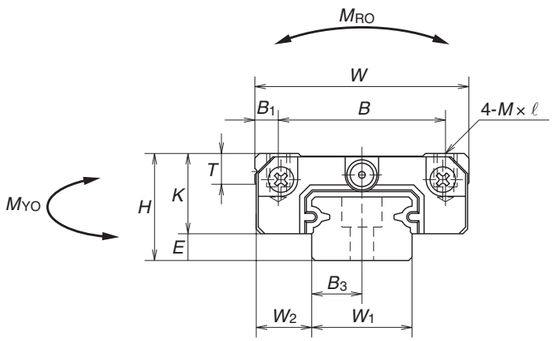
Reference Part Number for Assembly (Ball Slide + Rail)



Front View

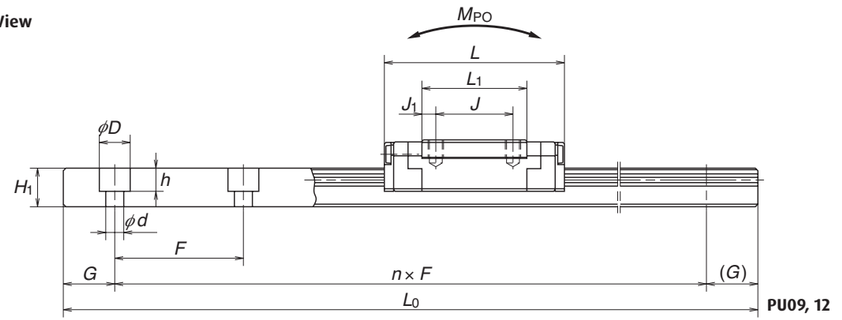


PU09, 12

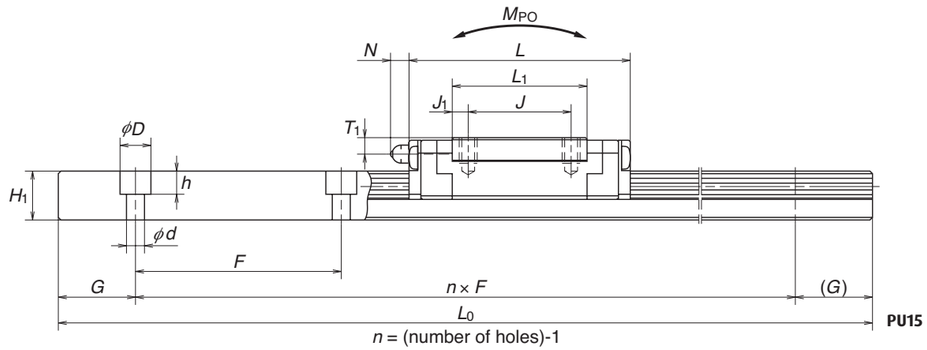


PU15

Side View



PU09, 12



PU15

n = (number of holes)-1

Unit: mm

Model No.	Assembly			Ball Slide												
	Height			Width	Length	Mounting Hole								Grease Fitting		
	H	E	W_2	W	L	B	J	M x pitch x ℓ	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N
PU09TR PU09UR	10	2.2	5.5	20	30.0 41.0	15	10 16	M3×0.5×3	2.5	19.6 30.6	4.8 7.3	7.8	2.6	—	—	—
PU12TR PU12UR	13	3.0	7.5	27	35.0 48.7	20	15 20	M3×0.5×3.5	3.5	20.4 34.1	2.7 7.1	10.0	3.4	—	—	—
PU15AL PU15BL	16	4.0	8.5	32	43.0 61.0	25	20 25	M3×0.5×5	3.5	26.2 44.2	3.1 9.6	12.0	4.4	ϕ3	3.2	(3.6)

Rail							Basic Load Rating					Ball Diameter	Weight	
Width	Height	Pitch	Mounting Bolt Hole d x D x h			Max Length (Single Rail)	Dynamic	Static	Static Moment					
W_1	H_1	F		B_3	G	L_{0max}	C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)	D_w	Ball Slide (g)	Rail (g/100 mm)
9	5.5	20	3.5×6×4.5	4.5	7.5	600	1490 2100	2150 3500	10.0 16.4	6.1 15.6	6.1 15.6	1.5875	16 25	35
12	7.5	25	3.5×6×4.5	6.0	10.0	800	2830 4000	3500 5700	21.7 35.0	11.4 28.3	11.4 28.3	2.3812	32 53	65
15	9.5	40	3.5×6×4.5	7.5	15.0	1000	5550 8100	6600 11300	49.5 54.5	25.6 69.5	25.6 69.5	3.1750	59 100	105

Note: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.

Linear Guides: PE Series

Part Number Example for Ball Slide Only

Random-Matching Ball Slide	Size	Shape / Height		Accessories
PAE	15	AL	S	-K
			S: Stainless Steel	**K:** With NSK K1

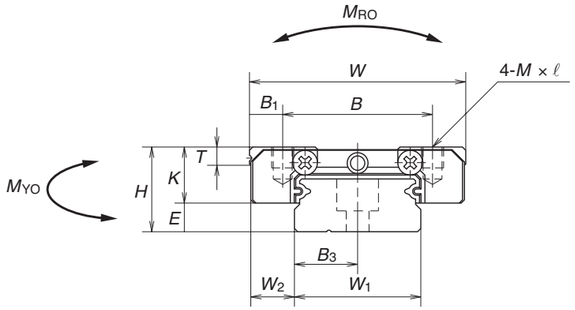
Reference Part Number for Rail Only

Random-Matching Rail	Size	Rail Length (mm)	Shape	Material / Surface Treatment	Butting Rail Specification	NSK Control Number (*** is required when making inquiries)	Accuracy	
P1E	15	0470	R	K	N	***	PC	T
			S: PE05・07・09・12 **R:** PE15		**N:** Non-butting **L:** Butting		**PC:** Only PC Grade is Available	**Z:** Standard

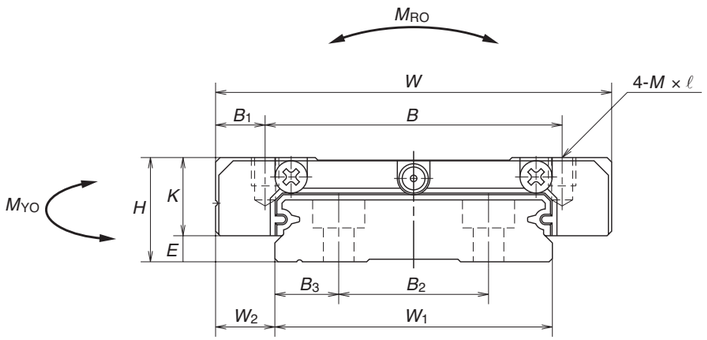
Reference Part Number for Assembly (Ball Slide + Rail)

Series	Size	Rail Length (mm)	Shape / Height	Material / Surface Treatment	Number of Ball Slides Per Rail	NSK Control Number (*** is required when making inquiries)	Accuracy	Preload
PE	15	0470	AL	K	2	***	PC	T
				K: Stainless Steel **H:** Stainless Steel + Surface Treatment			**PC:** Only PC Grade is Available **KC:** With NSK K1	**T:** Fine Clearance (standard)

Front View

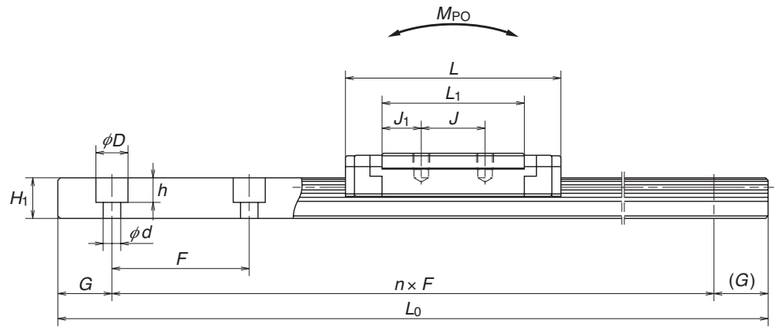


PE09, 12

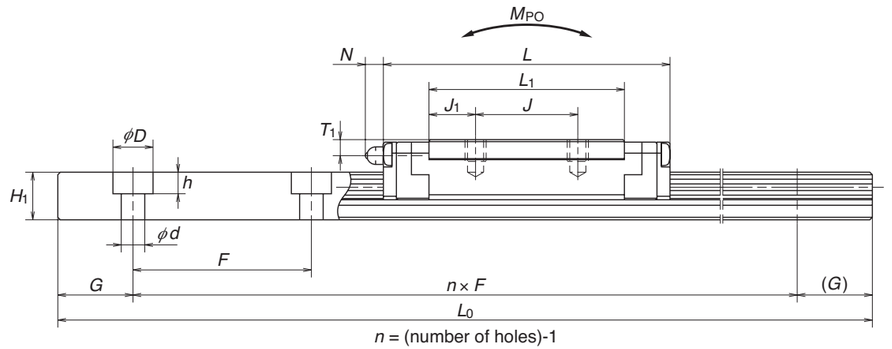


PE15

Side View



PE09, 12



PE15

n = (number of holes)-1

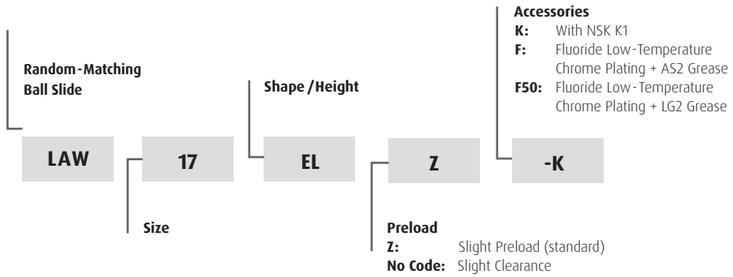
Unit: mm

Model No.	Assembly			Ball Slide												
	Height			Width	Length	Mounting Hole								Grease Fitting		
	H	E	W_2	W	L	B	J	M x pitch x ℓ	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N
PE09TR PE09UR	12	4	6	30	39.8 51.2	21 23	12 24	M3×0.5×3	4.5 3.5	26.6 38.0	7.3 7.0	8.0	2.8	—	—	—
PE12AR PE12BR	14	4	8	40	45.0 60.0	28	15 28	M3×0.5×4	6.0	31.0 46.0	8.0 9.0	10.0	3.2	—	—	—
PE15AR PE15BR	16	4	9	60	56.6 76.0	45	20 35	M4×0.7×4.5	7.5	38.4 57.8	9.2 11.4	12.0	4.1	ϕ3	3.2	(3.3)

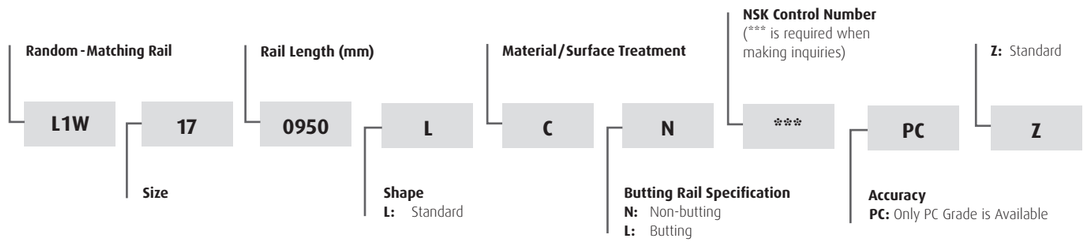
Rail								Basic Load Rating					Ball Diameter	Weight	
Width	Height		Pitch	Mounting Bolt Hole d x D x h			Max Length (Single Rail)	Dynamic	Static	Static Moment					
W_1	H_1	B_2	F		B_3	G	L_{0max}	C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)	D_w	Ball Slide (g)	Rail (g/100m)
18	7.5	—	30	3.5×6×4.5	9.0	10	800	3000 4000	4500 6700	36.5 54.5	17.3 37.5	17.3 37.5	2.000	35 50	95
24	8.5	—	40	4.5×8×4.5	12.0	15	1000	4350 5800	6350 9550	70.5 106.0	29.3 63.5	29.3 63.5	2.381	66 98	140
42	9.5	23	40	4.5×8×4.5	9.5	15	1200	7600 10300	10400 16000	207.0 320.0	59.0 135.0	59.0 135.0	3.175	140 211	275

Note: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.
To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.

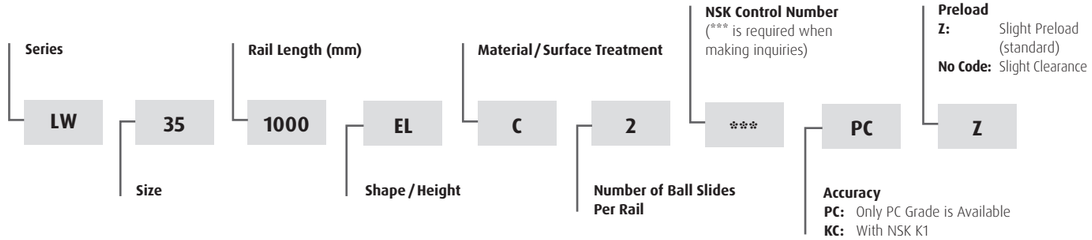
Part Number Example for Ball Slide Only



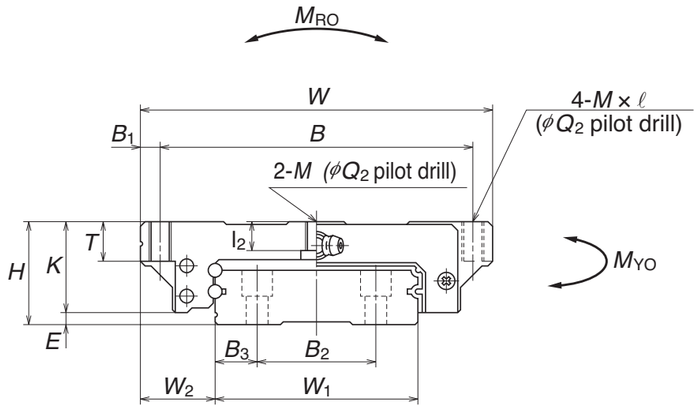
Reference Part Number for Rail Only



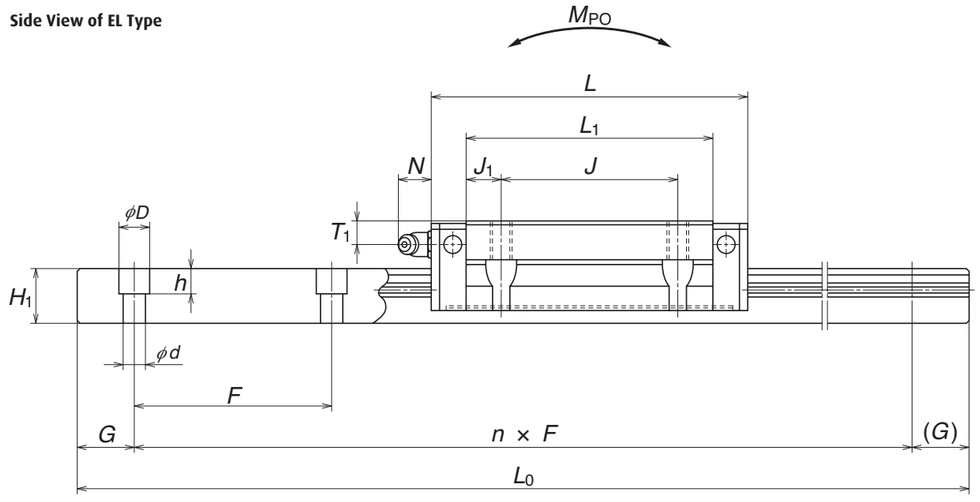
Reference Part Number for Assembly (Ball Slide + Rail)



Front View of EL Type



Side View of EL Type



n = (number of holes)-1

Unit: mm

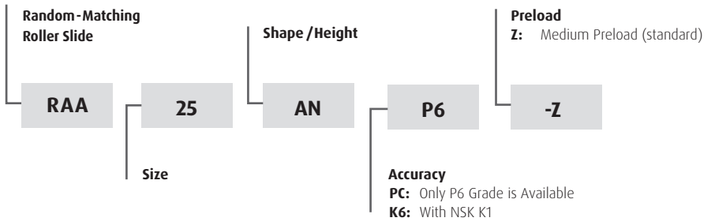
Model No.	Assembly			Ball Slide													
	Height			Width	Length	Mounting Hole										Grease Fitting	
	H	E	W_2	W	L	B	J	M x pitch x ℓ	ℓ_2	Q_2	B_1	L_1	J_1	K	T	Hole Size	T_1	N
LW17EL	17	2.5	13.5	60	51.4	53	26	M4×0.7×6	3.2	3.3	3.5	35	4.5	14.5	6	φ3	4.0	3
LW21EL	21	3.0	15.5	68	58.8	60	29	M5×0.8×8	3.7	4.4	4.0	41	6.0	18.0	8	M6×0.75	4.5	11
LW27EL	27	4.0	19.0	80	74.0	70	40	M6×1×10	6.0	5.3	5.0	56	8.0	23.0	10	M6×0.75	6.0	11
LW35EL	35	4.0	25.5	120	108.0	107	60	M8×1.25×14	9.0	6.8	6.5	84	12.0	31.0	14	M6×0.75	8.0	11
LW50EL	50	4.5	36.0	162	140.6	144	80	M10×1.5×18	14.0	8.6	9.0	108	14.0	45.5	18	Rc1/8	14.0	14

Rail								Basic Load Rating					Ball Diameter	Weight	
Width	Height		Pitch	Mounting Bolt Hole d x D x h		G (recommended)	Max length (Single Rail)	Dynamic	Static	Static Moment				Ball Slide (kg)	Rail (kg/m)
W_1	H_1	B_2	F		B_3		L_{0max}	C (N)	C_0 (N)	M_{R0} (N•m)	M_{P0} (N•m)	M_{Y0} (N•m)	D_w		
33	8.7	18	40	4.5×7.5×5.3	7.5	15	1000	5600	11300	135	44.0	37	2.381	0.2	2.1
37	10.5	22	50	4.5×7.5×5.3	7.5	15	1600	6450	13900	185	65.5	55	2.381	0.3	2.9
42	15.0	24	60	4.5×7.5×5.3	9.0	20	2000	12800	26900	400	171.0	143	3.175	0.5	4.7
69	19.0	40	80	7×11×9	14.5	20	2400	33000	66500	1690	645.0	545	4.762	1.5	9.6
90	24.0	60	80	9×14×12	15.0	20	3000	61500	117000	1530	1530.0	1280	6.350	4.0	15.8

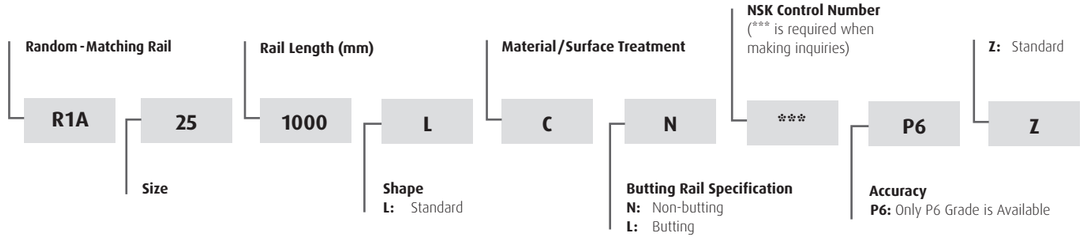
Note: Basic dynamic load rating C is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.

To convert C to C_{100} for a 100-km fatigue life, divide C by 1.26.

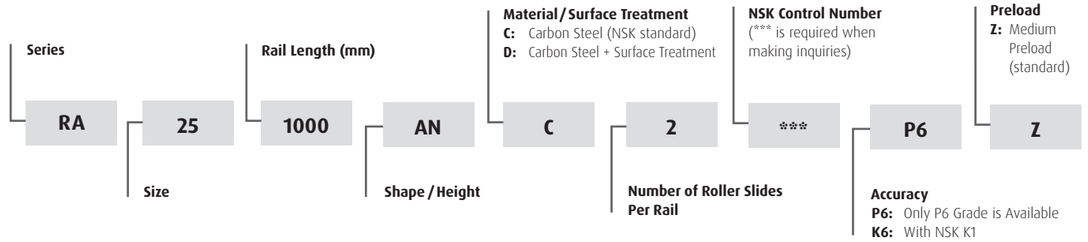
Part Number Example for Roller Slide Only



Reference Part Number for Rail Only



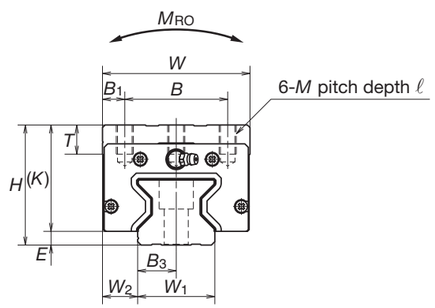
Reference Part Number for Assembly (Roller Slide + Rail)



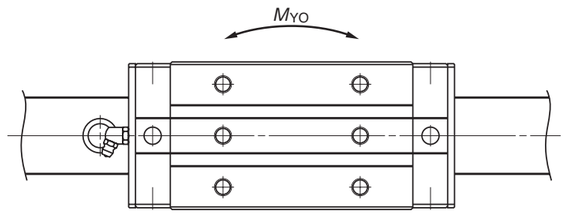
Linear Guides: RA Series

Roller Slide Models: AN, BN

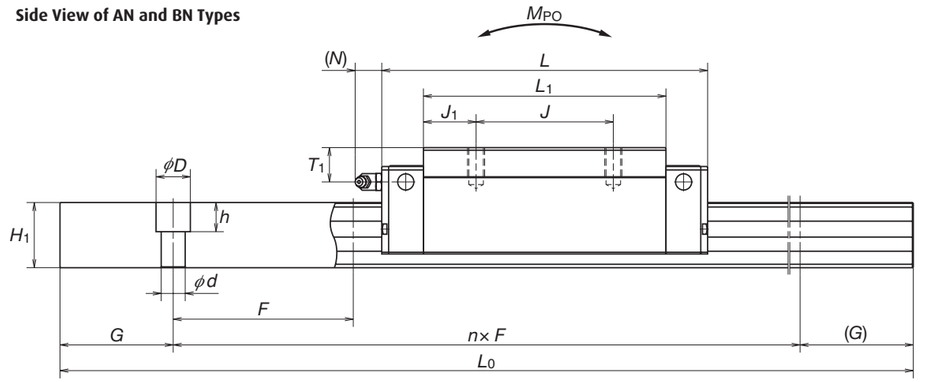
Front View of AN and BN Types



Upper View of AN and BN Types



Side View of AN and BN Types



n = (number of holes)-1

Unit: mm

Model No.	Assembly			Roller Slide													Rail							Basic Load Rating					Weight	
	Height			Width	Length	Mounting Hole							Grease Fitting			Width	Height	Pitch	Mounting Bolt Hole			Max Length (Single Rail)	Dynamic	Static	Static Moment			Roller Slide	Rail
	H	E	W_2	W	L	B	J	M x pitch x ℓ	B_1	L_1	J_1	K	T	Mounting Hole Size	T_1	N	W_1	H_1	F	d x D x h	B_3	G	L_{0max}	C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)	(kg)	(kg/m)
RA25AN RA25BN	40	5.0	12.5	48	97.5 115.5	35	35 50	M6×1×9	6.5	65.5 83.5	15.25 16.75	35	12	M6×0.75	10	11	23	24.0	30.0	7×11×9	11.5	20.0	3000	29200 35400	72700 92900	970 1240	760 1240	760 1240	0.60 0.91	3.4
RA30AN RA30BN	45	6.5	16.0	60	110.8 135.4	40	40 60	M8×1.25×11	10.0	74.0 98.6	17.00 19.30	39	14	M6×0.75	10	11	28	28.0	40.0	9×14×12	14.0	20.0	3500	38900 47600	93500 12000	1670 2170	1140 1950	1140 1950	1.00 1.30	4.9
RA35AN RA35BN	55	6.5	18.0	70	123.8 152.0	50	50 72	M8×1.25×12	10.0	83.2 111.4	16.60 19.70	49	15	M6×0.75	15	11	34	31.0	40.0	9×14×12	17.0	20.0	3500	53300 67400	129000 175000	2810 3810	1800 3250	1800 3250	1.60 2.10	6.8
RA45AN RA45BN	70	8.0	20.5	86	154.0 190.0	60	60 80	M10×1.5×17	13.0	105.4 141.4	22.70 30.70	62	17	Rc1/8	14	14	45	38.0	52.5	14×20×17	22.5	22.5	3500	92800 116000	229000 305000	6180 8240	4080 7150	4080 7150	3.00 4.10	10.9
RA55AN RA55BN	80	9.0	23.5	100	184.0 234.0	75	75 95	M12×1.75×18	12.5	128.0 178.0	26.50 41.50	71	18	Rc1/8	21	14	53	43.5	60.0	16×23×20	26.5	30.0	3500	129000 168000	330000 462000	10200 14300	7060 13600	7060 13600	4.90 6.70	14.6
RA65AN RA65BN	90	13.0	31.5	126	228.4 302.5	76	70 120	M16×2×20	25.0	155.4 229.5	42.70 54.75	77	22	Rc1/8	19	14	63	55.0	75.0	18×26×22	31.5	35.0	3500	210000 288000	50000 756000	19200 28700	12700 28600	12700 28600	9.30 12.20	22.0

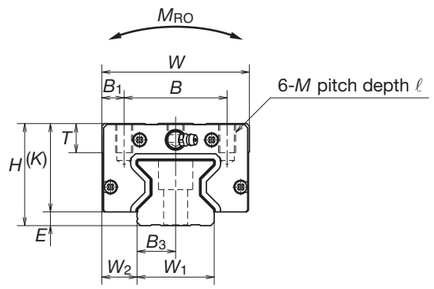
Note: Basic load rating complies with ISO standards (ISO14728-1, ISO14728-2).

If above basic dynamic load rating (100-km rating) is converted into 50-km rating, use the following formula: $C_{50\ km} = 1.23 \times C_{100\ km}$.

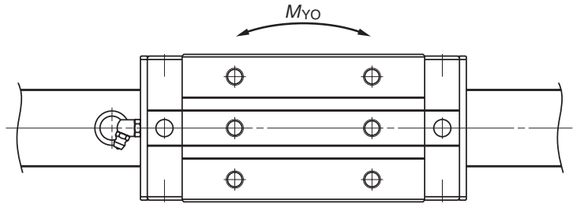
Linear Guides: RA Series

Roller Slide Models: AL, BL

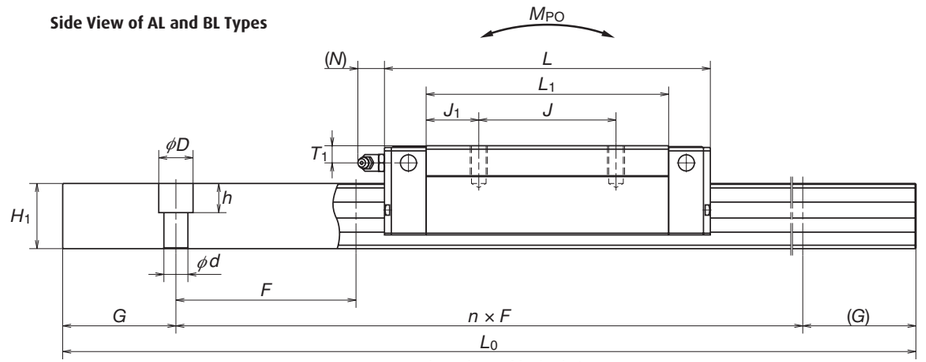
Front View of AL and BL Types



Upper View of AL and BL Types



Side View of AL and BL Types



n = (number of holes)-1

Unit: mm

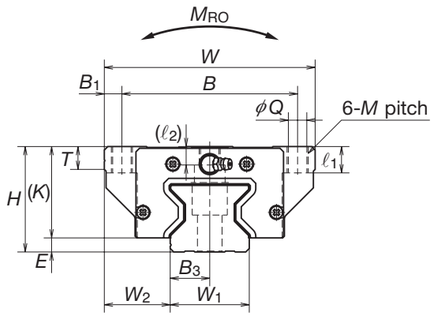
Model No.	Assembly			Roller Slide												
	Height			Width	Length	Mounting Hole			B_1	L_1	J_1	K	T	Grease Fitting		
	H	E	W_2	W	L	B	J	M x pitch x ℓ						Mounting Hole Size	T_1	N
RA25AL RA25BL	36	5.0	12.5	48	97.5 115.5	35	35 50	M6×1×8	6.5	65.5 83.5	15.25 16.75	31	12	M6×0.75	6	11
RA30AL RA30BL	42	6.5	16.0	60	110.8 135.4	40	40 60	M8×1.25×11	10.0	74.0 98.6	17.00 19.30	36	14	M6×0.75	7	11
RA35AL RA35BL	48	6.5	18.0	70	123.8 152.0	50	50 72	M8×1.25×12	10.0	83.2 111.4	16.60 19.70	42	15	M6×0.75	8	11
RA45AL RA45BL	60	8.0	20.5	86	154.0 190.0	60	60 80	M10×1.5×16	13.0	105.4 141.4	22.70 30.70	52	17	Rc1/8	10	14
RA55AL RA55BL	70	9.0	23.5	100	184.0 234.0	75	75 95	M12×1.75×18	12.5	128.0 178.0	26.50 41.50	61	18	Rc1/8	11	14

Rail							Basic Load Rating					Weight	
Width	Height	Pitch	Mounting Bolt Hole			Max Length (Single Rail)	Dynamic	Static	Static Moment				
W_1	H_1	F	d x D x h	B_3	G	L_{0max}	C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)	Roller slide (kg)	Rail (kg/m)
23	24	30.0	7×11×9	11.5	20.0	3000	29200 35400	72700 92900	970 1240	760 1240	760 1240	0.45 0.80	3.4
28	28	40.0	9×14×12	14.0	20.0	3500	38900 47600	93500 121000	1670 2170	1140 1950	1140 1950	0.85 1.10	4.9
34	31	40.0	9×14×12	17.0	20.0	3500	53300 67400	129000 175000	2810 3810	1800 3250	1800 3250	1.20 1.70	6.8
45	38	52.5	14×20×17	22.5	22.5	3500	92800 116000	229000 305000	6180 8240	4080 7150	4080 7150	2.50 3.40	10.9
53	43.5	60.0	16×23×20	26.5	30.0	3500	129000 168000	330000 462000	10200 14300	7060 13600	7060 13600	4.10 5.70	14.6

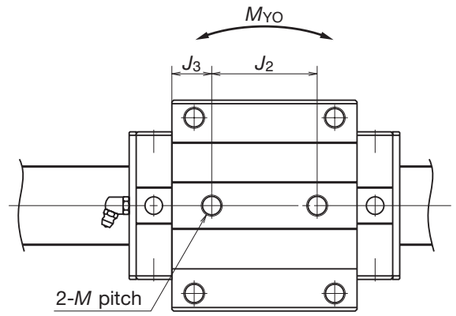
Note: Basic load rating complies with ISO standards (ISO14728-1, ISO14728-2).

If above basic dynamic load rating (100-km rating) is converted into 50-km rating, use the following formula: $C_{50\ km} = 1.23 \times C_{100\ km}$.

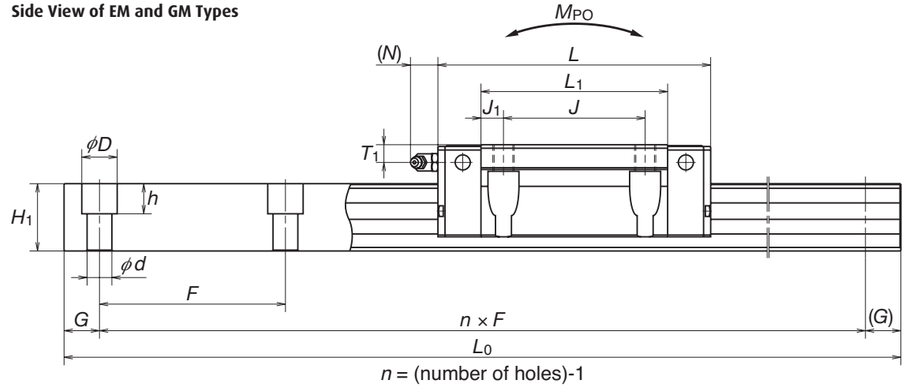
Front View of EM and GM Types



Upper View of EM and GM Types



Side View of EM and GM Types



Unit: mm

Model No.	Assembly			Roller Slide																Rail							Basic Load Rating					Weight	
	Height			Width	Length	Mounting Hole											Grease Fitting			Width	Height	Pitch	Mounting Bolt Hole			Max Length (Single Rail)	Dynamic	Static	Static Moment			Roller slide (kg)	Rail (kg/m)
	H	E	W_2	W	L	B	J	J_2	M x pitch x ℓ_1 (ℓ_2)	Q x ℓ_1 (ℓ_2)	B_1	L_1	J_1	J_3	K	T	Mounting Hole Size	T_1	N	W_1	H_1	F	d x D x h	B_3	G	L_{0max}	C (N)	C_0 (N)	M_{RO} (N•m)	M_{PO} (N•m)	M_{YO} (N•m)		
RA25EM	36	5.0	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	24.0	30.0	7×11×9	11.5	20.0	3000	29200	72700	970	760	760	0.80	3.4
RA25GM					115.5							83.5	19.25	21.75													35400	92900	1240	1240	1240	1.10	
RA30EM	42	6.5	31.0	90	110.8	72	52	44	M10×1.5×12 (12.5)	8.6×12 (12.5)	9.0	74.0	11.00	15.00	36	11	M6×0.75	7	11	28	28.0	40.0	9×14×12	14.0	20.0	3500	38900	93500	1670	1140	1140	1.30	4.9
RA30GM					135.4							98.6	23.30	27.30													47600	121000	2170	1950	1950	1.70	
RA35EM	48	6.5	33.0	100	123.8	82	62	52	M10×1.5×13 (7)	8.6×13 (7)	9.0	83.2	10.60	15.60	42	12	M6×0.75	8	11	34	31.0	40.0	9×14×12	17.0	20.0	3500	53300	129000	2810	1800	1800	1.70	6.8
RA35GM					152.0							111.4	24.70	29.70													67400	175000	3810	3250	3250	2.30	
RA45EM	60	8.0	37.5	120	154.0	100	80	60	M12×1.75×15 (10.5)	10.5×15 (10.5)	10.0	105.4	12.70	22.70	52	13	Rc1/8	10	14	45	38.0	52.5	14×20×17	22.5	22.5	3500	92800	229000	6180	4080	4080	3.20	10.9
RA45GM					190.0							141.4	30.70	40.70													116000	305000	8240	7150	7150	4.30	
RA55EM	70	9.0	43.5	140	184.0	116	95	70	M14×2×18 (13)	12.5×18 (13)	12.0	128.0	16.50	29.00	61	15	Rc1/8	11	14	53	43.5	60.0	16×23×20	26.5	30.0	3500	129000	330000	10200	7060	7060	5.40	14.6
RA55GM					234.0							178.0	41.50	54.00													168000	462000	14300	13600	13600	7.50	
RA65EM	90	13.0	53.5	170	228.4	142	110	82	M16×2×24 (13)	14.6×24 (13)	14.0	155.4	22.70	36.70	77	22	Rc1/8	19	14	63	55.0	75.0	18×26×22	31.5	35.0	3500	210000	504000	19200	12700	12700	12.20	22.0
RA65GM					302.5							229.5	59.75	73.75													288000	756000	28700	28600	28600	16.50	

Note: Basic load rating complies with ISO standards (ISO14728-1, ISO14728-2).

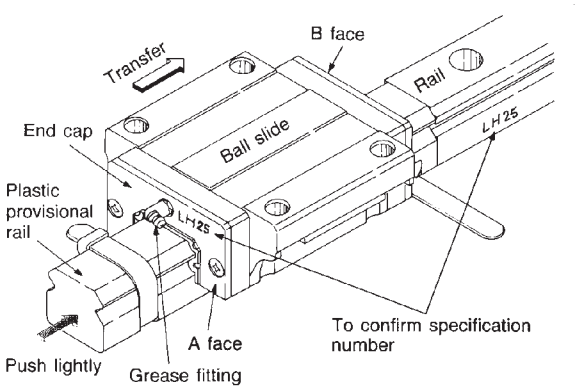
If above basic dynamic load rating (100-km rating) is converted into 50-km rating, use the following formula: $C_{50\ km} = 1.23 \times C_{100\ km}$.

Assembly

Interchangeable ball slides are shipped on (disposable) plastic provisional rails as shown in Fig I.1.

1. Wipe off anticorrosive oil from the rail.
2. All NSK slides come prepacked with Alvania 2 (AS2) grease for quick installation.
3. Align the rail with the bottom and side faces of the provisional rail while pushing the provisional rail lightly against the rail, slide the ball slide on the rail (Fig I.1).

Fig I.1 Assembly of Ball Slide with Rail



Mounting Method

Shoulder Height and Corner Shape at Mounting Face

When utilizing the reference surface to secure rail or ball slides to machine components the components must have the mounting face height (H', H") and corner chamfer (r) dimensions as listed in table below and illustrated in Figs. I.2 and I.3, to avoid interference.

Shoulder Height and Corner Shape at Mounting Face

Product No.	Radius of corner r (max)	Shoulder Height of Rail H′	Shoulder Height of Ball Slide H″
15	0.5	4.0	4.5
20	0.5	4.5	5.0
25	0.5	5.0	5.0
30	0.5	6.0	6.0
35	0.5	6.0	6.0
45	0.7	8.0	8.0
55	0.7	10.0	10.0
65	1.0	11.0	11.0

Fig I.2 Rail Datum Face Mounting Part

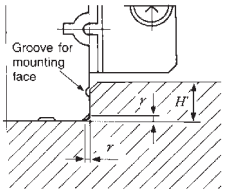
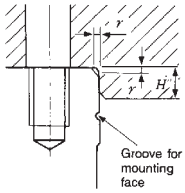


Fig I.3 Ball Slide Datum Face Mounting Part

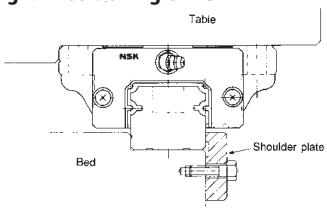


Mounting Procedure

For Cases where Datum Surface Exists on the Bed

1. Lightly tighten the rail mounting bolts and then use the shoulder plate to secure rail datum surface against bed mounting surface (See Fig. I.4).
2. Tighten rail mounting bolts to their recommended torque value (see table below). Tighten the bolts in an order which enables the wrench to help push the rail against the mounting surface (see Fig. I.5 for example).

Fig I.4 Positioning of Rail



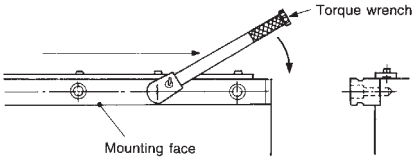
Recommended Torque for Rail Mounting Bolt (Case of Thermally Refined Bolt)

unit: kgf • cm

Bolt Nominal No.	Torque	Bolt Nominal No.	Torque
M3	10.8	M10	440
M4	25.0	M12	770
M5	52.0	M14	1240
M6	88.0	M16	2000
M8	220.0	--	--

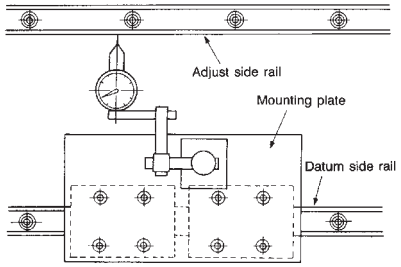
[1 kg • cm=0.8681 lb in]

Fig I.5 Tightening Direction



3. Mount the adjust side rail, as shown in Fig. I.6, while checking rail parallelism. For the jig shown in Fig. I.6, stability will be improved by mounting it to a ball slide.

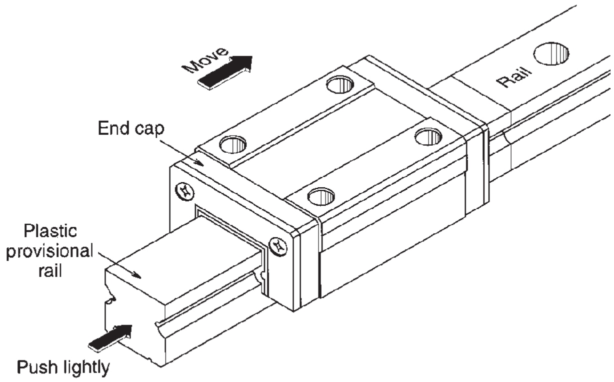
Fig I.6 Parallelism Measurement with Jigs



4. If dowel pins are being used they should be installed at this step.
5. Position the ball slides at specified intervals and mount the table gently.
6. Tighten ball slide mounting bolts of datum side while pushing the table so that the table and ball slide mounting reference surfaces are in contact.

Indication of Installed Standard Side

The datum face of each rail is indicated by a groove in the datum face or by an arrow mark on the end or top surface of the rail.



Lubrication

Grease Lubrication

NSK linear guides are packed with Alvania 2 (AS2) grease and can be used as delivered. The replenishment frequency is recommended to be once a year, but adjust the interval depending on the operational conditions.

To Change Direction of Grease Fitting

1. Remove the grease fitting with a wrench.
2. Wind some sealing tape on the thread of the fitting, then insert it and tighten. Be careful not to over torque when tightening into the side of the plastic bearing end cap.

Change of Fitting Position in Front/Back Direction

1. Remove the plug from the grease fitting mounting hole face B shown in Fig. I.1 with a hexagonal wrench.
2. Remove the grease fitting from face A and screw into hole face B.
3. In place of the removed fitting, insert the plug into the hole in the face A.

Change Grease Fitting Position to Side Surface

To mount the grease fitting on the end cap side face, or on the ball slide face, please consult NSK.

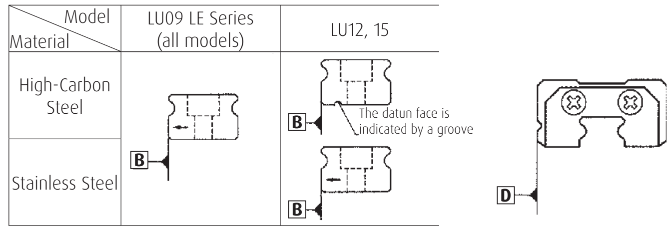
Oil Lubrication

Oil piping can be connected to the tapped hole from where the grease fitting was removed. The recommended lubrication oil supply quantity per ball slide per hour Q is given by the following formula, where N is the rail width number.

$$Q = \frac{N}{150} \text{ (ml/hr)} \quad \dots\dots (5)$$

Using LH45 as an example, N=45, and

$$Q = \frac{45}{150} = 0.3 \text{(ml/hr)}$$



Notes on Usage

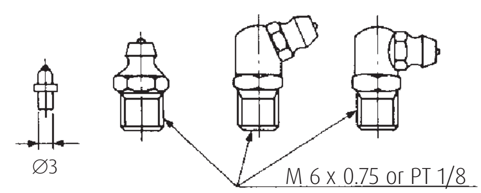
Separately packaged ball slide is mounted on a plastic temporary axis (disposable) as shown at left.

1. Wipe rust preventative oil from the rail.
2. Product is ready for immediate use. Comes prepacked with Alvania 2 (AS2) grease.
3. Note the groove mark which identifies the datum faces of ball slide and rail above.
4. Align the rail with the bottom and side faces of the provisional rail while pushing the provisional rail lightly against the rail, slide the ball slide on the rail (Fig I.1).

Grease Fittings for NSK Ball Slides

Type	Linear Guide Model #	Grease Fitting Part #	Thread Spec.
Drive	LH15, LS15, LW17	L50010000-301	Dia. 3mm
A	LS, LS 20, 25, 30, 25	L50000000-001	M6X0.75MM
B	LS, LS 20, 25, 30, 25	L50100000-001	M6X0.75MM
C	LS, LS 20, 25, 30, 25 LW 21, 27, 35	L50200000-001	M6X0.75MM
A	LH 45, 55, 65	L50003000-001	PT 1/8
B	LH 45, 55, 65	L50103000-001	PT 1/8
C	LH 45, 55, 65, LW 50	L50203000-001	PT 1/8

Shape of Grease Fitting



(1) Drive-in type   A type   B type   C type

(1) Applies only to model No. LH15, LS15 and LW17.

NSK Grease Unit

Replenish grease to NSK linear guides and ball screws by a manual type hand grease pump. Install the grease in bellows tube to the pump. Several types of grease (80 g) are available.

Grease in a bellows tube

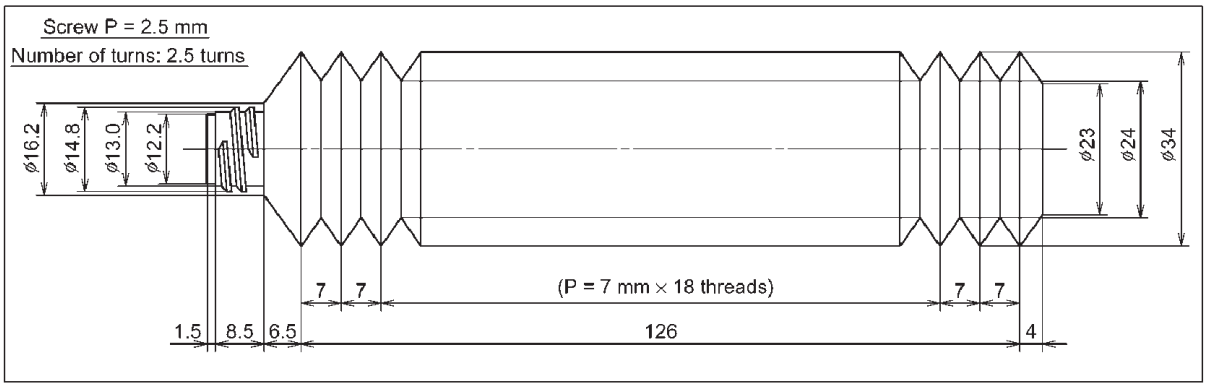
Composition of NSK Grease Unit

Components and grease types are shown below.

	Name	(tube type)	Reference Number
NSK Grease (80 g in a bellows tube)	NSK Grease AS2	(Brown)	NSK GRS AS2
	NSK Grease PS2	(Orange)	NSK GRS PS2
	NSK Grease LR3	(Green)	NSK GRS LR3
	NSK Grease LG2	(Blue)	NSK GRS LG2
NSK Hand Grease Pump Unit			
NSK Hand Grease Pump Straight nozzle NSK HGP NZ1 -- One nozzle is provided with the hand pump.)			NSK HGP
Grease nozzle (used with the hand grease pump)	NSK straight nozzle		NSK HGP NZ1
	NSK chuck nozzle		NSK HGP NZ2
	NSK drive fitting nozzle		NSK HGP NZ3
	NSK point nozzle		NSK HGP NZ4
	NSK flexible nozzle		NSK HGP NZ5
	NSK flexible extension pipe		NSK HGP NZ6
	NSK straight extension pipe		NSK HGP NZ7

NSK Greases (80 g in a bellows tube)

Bellows tube



NSK manual Grease Pump Unit

NSK Hand Grease Pump Unit
(Reference number: NSK HGP)

Features

- Light-weight ..... Can be operated by one hand yet there is no worry of making a mistake.
- Inserting by high pressure ..... Insert at 15 Mpa.
- No leaking ..... Does not leak when held upside down.
- Easy to change grease ..... Simply attach the grease in bellows tube.
- Remaining grease .... Can be confirmed through slit on the tube.
- Several nozzles ..... Five types of nozzles to choose from.

Specifications

- Spout volume..... 0.35 g/stroke
- Mass of main body..... 393 g
- Overall length ..... About 200 mm
- Overall width ..... About 200 mm
- Grease tube outer diameter ø38.1
- Accessory..... Several nozzles for a unique application can be attached

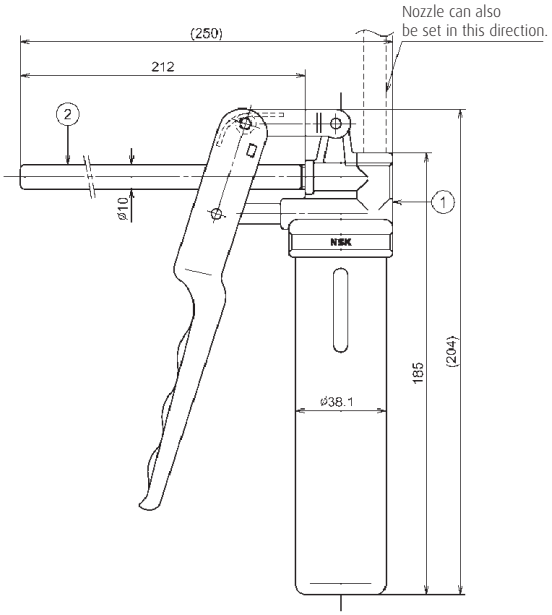
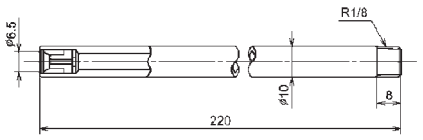
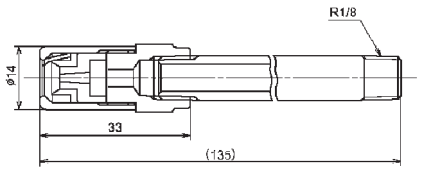
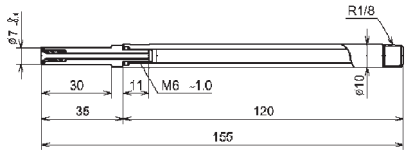
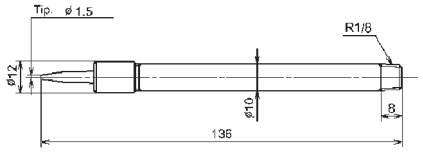
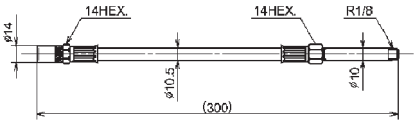
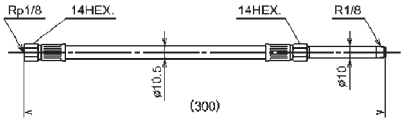
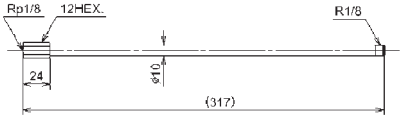


Fig I.7 NSK Hand Grease Pump with NSK straight nozzle

Nozzles

Nozzles that can be attached to NSK Hand Grease Pump

Name	Designation Code	Use	Dimensions
NSK straight nozzle	NSK HGP NZ1	Can be used with grease fitting A, B, and C under JIS B1575 standard.	
NSK chuck nozzle	NSK HGP NZ2	Can be used with grease fitting A, B, and C under JIS B1575 standard.	
NSK fitting nozzle	NSK HGP NZ3	Dedicated for the -f3 drive-in grease fitting.	
NSK point nozzle	NSK HGP NZ4	Used for linear guides and ball screws which do not have grease fitting. Used to supply grease directly to the ball grooves, or through the opening of ball slide or ball slide to inside.	
NSK flexible nozzle	NSK HGP NZ5	Tip of nozzle is flexible to supply grease in the areas where hand cannot reach.	
NSK flexible extension pipe	NSK HGP NZ6	Flexible extension pipe connects the grease pump and the nozzle.	
NSK straight extension pipe	NSK HGP NZ7	Straight extension pipe connects the grease pump and the nozzle.	

Grease Lubricant for Linear Guides and Ball Screws

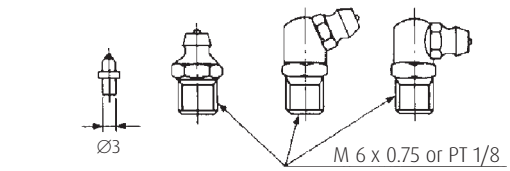
Type	Thickener	Base Oil	Base Oil Kinematic Viscosity cSt (40°C)	Range of use Temperature (°C)	Purpose
AS2	Lithium type	Mineral oil	130	-10 ~110	For general use at high load.
PS2	Lithium type	Synthetic oil + mineral oil	15	-50 ~110	For low temperature and high frequency operation.
LR3	Lithium type	Synthetic oil	30	-30 ~130	For ball screws at high speed, medium load.
LG2	Lithium type	Mineral oil + synthetic hydrocarbon oil	30	-20~70	For clean environment.
NF2	Urea composite type	Synthetic oil + mineral oil	27	-40~100	For fretting resistance.

Grease Nozzle used for NSK Linear Guide

Linear Guide Model	Tap Hole for Grease Fitting	Standard Grease Fitting	Straight Nozzle NZ1	Chuck Nozzles (two) NZ	Drive-in Nipple Nozzles NZ3	Point Nozzle NZ4	Flexible Nozzle NZ5
LS15	ø 3	Drive-in type			o		
LS20~35	M6 x 0.75	B type	o	o			o
LH15	ø 3	Drive-in type			o		
LH20~35	M6 x 0.75	B type	o	o			o
LH45~85	PT1 / 8	B type	o	o			o
LW17	ø 3	Drive-in type			o		
LW21~35	M6 x 0.75	B type	o	o			
LW50	PT/18	B type	o	o			o
LU09~15	-	None (1)				o (2)	o
LE09~15	-	None (1)				o (2)	

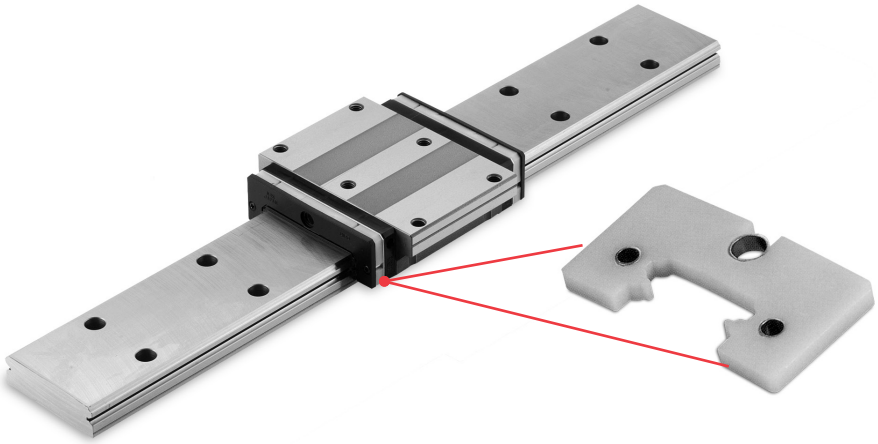
1) LU and LE Series: Apply grease directly to ball groove, etc. using a point nozzle.
2) LS20, LS25, LH20: Use straight nozzle. (Point nozzle tip cannot be used because it interferes wth the rail top surface).

Figures of Grease Fittings



K1 Maintenance-Free Lubrication System

K1 Maintenance-Free Lubrication System



K1 Identification Number

Refer to the following numbering system when ordering.

Example:

Interchangeable Ball Slide		Size Number		Preload Code	
LA	H	30	AN	Z	-K
	Series Code		Z: In case of a light preload Ball slide shape code		NSK K1 Equipped

The NSK K1's distinctive capabilities as a compact and efficient oil-impregnated lubrication unit greatly increases the performance of the Linear Guide. The K1 Lubrication Unit is available in two types, one for industrial applications and one for food and medical devices where cleanliness and safety are paramount.

Features:

Long-term, Maintenance-Free Usage.
In mechanical environments where lubrication is difficult to apply, long-term running efficiency is maintained by using the NSK K1 in combination with grease.

Prevention of Oil-Related Environmental Pollution.
In locations where oil greatly affects the environment, or in mechanisms with severe hygiene restrictions, sufficient lubrication is provided using the NSK K1 in combination with grease.

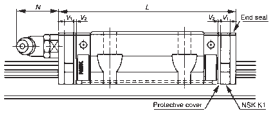
Effective in Environments where the Lubricant is Washed Away.
In facilities where mechanisms are washed down with water, or subject to severe weather conditions, long service life is ensured by using the NSK K1 in combination with grease. Especially effective under hygienic conditions where oil must not be dispersed.

Maintains Efficiency in Dusty Environments.
In environments where oil and grease-absorbing dust is produced, long-term efficiency is maintained by using the NSK K1 in combination with grease.

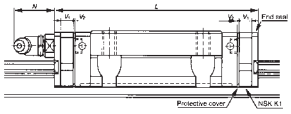
Interchangeable Linear Guide Dimensions - LH, LS, LW Series

Unit: mm

LH, LS Series



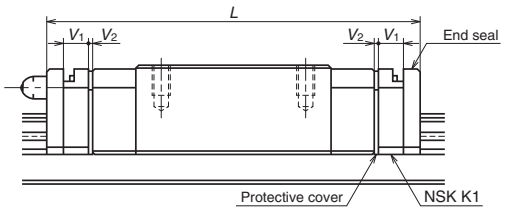
LW Series



Interchangeable Ball Slide Size Code	Ball Slide Form			Standard Ball Slide Length	Ball Slide Length with two NSK K1 L	Thickness of NSK K1 V_1	Thickness of Protective Cover V_2	Grease Fitting Projection N (mm)
LAH15	AN	EM		55.0	65.6	4.5	0.8	(5)
		GM		74.0	84.6			
LAH20	AN	EM		69.8	80.4	4.5	0.8	(14)
	BN	GM		91.8	102.4			
LAH25	AN	EM		79.0	90.6	5.0	0.8	(14)
	BN	GM		107.0	118.6			
LAH30	AN			85.6	97.6	5.0	1.0	(14)
		EM		98.6	110.6			
	BN	GM		124.6	136.6			
LAH35	AN	EM		109.0	122.0	5.5	1.0	(14)
	BN	GM		143.0	156.0			
LAH45	AN	EM		139.0	154.0	6.5	1.0	(15)
	BN	GM		171.0	186.0			
LAH55	AN	EM		163.0	178.0	6.5	1.0	(15)
	BN	GM		201.0	216.0			
LAH65*	AN	EM		193.0	211.0	8.0	1.0	(16)
	BN	GM		253.0	271.0			
LAS15	AL	EL	FL	56.8	66.4	4.0	0.8	(5)
	CL		KL	40.4	50.0			
LAS20	AL	EL	FL	65.2	75.8	4.5	0.8	(14)
	CL		KL	47.2	57.8			
LAS25	AL	EL	FL	81.4	92.0	4.5	0.8	(14)
	CL		KL	59.4	70.0			
LAS30	AL	EL	FL	96.4	108.4	5.0	1.0	(14)
	CL		KL	67.4	79.4			
LAS35	AL	EL	FL	108.0	121.0	5.5	1.0	(14)
	CL		KL	77.0	90.0			
LAW17	EL			51.4	61.6	4.5	0.6	(5)
LAW21	EL			58.8	71.4	5.5	0.8	(13)
LAW27	EL			74.0	86.6	5.5	0.8	(13)
LAW35	EL			108.0	123.0	6.5	1.0	(13)
LAW50	EL			140.6	155.6	6.5	1.0	(14)

*Contact NSK for information on assembly instructions.
Note: Can be used on PU/PE and RA. Contact NSK for availability.

K1 Maintenance-Free Lubrication System (cont.)



Dimension of PU Series Linear Guides Equipped with the NSK K1 Lubrication Unit

Unit: mm

Model No.	Ball Slide Length	Ball Slide Model	Standard Ball Slide Length	Ball Slide Length Equipped with Two NSK K1 L	Thickness of NSK K1, V_1	Thickness of Protective Cover, V_2	Grease Fitting Projection
PU05	Standard	TR	19.4	24.4	2.0	0.5	--
PU07	Standard	AR	23.4	29.4	2.5	0.5	--
PU09	Standard	TR	30.0	36.4	2.7	0.5	--
	Long	UR	41.0	47.4			
PU12	Standard	TR	35.0	42.0	3.0	0.5	--
	Long	UR	48.7	55.7			
PU15	Standard	AL	43.0	51.2	3.5	0.6	3.6
	Long	BL	61.0	69.2			

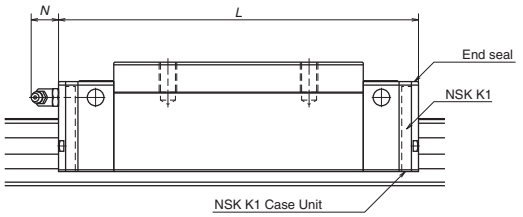
Note: Ball slide length equipped with NSK K1 = (Standard ball slide length) + (Thickness of NSK K1, V_1 × Number of NSK K1) (Thickness of the protective cover V_2 × 2)

Dimension of PE Series Linear Guides Equipped with the NSK K1 Lubrication Unit

Unit: mm

Model No.	Ball Slide Length	Ball Slide Model	Standard Ball Slide Length	Ball Slide Length Equipped with Two NSK K1 L	Thickness of NSK K1, V_1	Thickness of Protective Cover, V_2	Grease Fitting Projection
PE05	Standard	AR	24.1	28.9	2.0	0.4	--
PE07	Standard	TR	31.1	37.1	2.5	0.5	--
PE09	Standard	TR	39.8	46.8	3.0	0.5	--
	Long	UR	51.2	58.2			
PE12	Standard	AR	45.0	53.0	3.5	0.5	--
	Long	BR	60.0	68.0			
PE15	Standard	AR	56.6	66.2	4.0	0.8	3.3
	Long	BR	76.0	85.6			

Note: Ball slide length equipped with NSK K1 = (Standard ball slide length) + (Thickness of NSK K1, V_1 × Number of NSK K1) + (Thickness of the protective cover V_2 × 2)



Dimension of RA Series Linear Guides Equipped with the NSK K1 Lubrication Unit

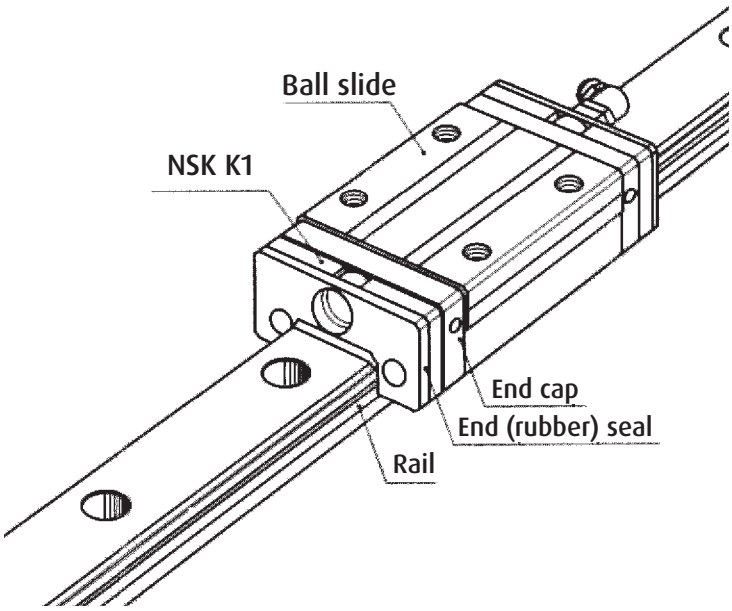
Unit: mm

Model No.	Roller Slide Length	Roller Slide Model	Roller Slide Length L				Protruding Area of the Grease Fitting N
			Standard	With NSK K1	Double Seal	Protector	
RA15	Standard	AN, AL, EM	70.0	79.0	76.0	75.4	(3)
	Long	BN, BL, GM	85.4	94.4	91.4	90.8	
RA20	Standard	AN, EM	86.5	95.5	92.5	93.1	(3)
	Long	BN, GM	106.3	115.3	112.3	112.9	
RA25	Standard	AN, AL, EM	97.5	107.5	103.9	104.1	(11)
	Long	BN, BL, GM	115.5	125.5	121.9	122.1	
RA30	Standard	AN, AL, EM	110.8	122.8	117.6	118.0	(11)
	Long	BN, BL, GM	135.4	147.4	142.2	142.6	
RA35	Standard	AN, AL, EM	123.8	136.8	130.6	131.0	(11)
	Long	BN, BL, GM	152.0	165.0	158.8	159.2	
RA45	Standard	AN, AL, EM	154.0	168.0	162.0	162.4	(14)
	Long	BN, BL, GM	190.0	204.0	198.0	198.4	
RA55	Standard	AN, AL, EM	184.0	198.0	192.0	192.4	(14)
	Long	BN, BL, GM	234.0	248.0	242.0	242.4	
RA65	Standard	AN, EM	228.4	243.4	238.4	239.4	(14)
	Long	BN, GM	302.5	317.5	312.5	313.5	

Note: Roller slide length equipped with NSK K1 = (Standard roller slide length) + (Thickness of NSK K1 Case Unit × Number of NSK K1 Case Unit)

K1 Maintenance-Free Lubrication System (cont.)

K1 Lubrication Unit Handling and Assembly Instructions



Handling Instructions

To maintain the NSK K1 unit's high efficiency over a long period of time, please follow these instructions:

1. Permissible temperature range Max. operating temperature: 50°C (122°F) Max. peak temperature: 80°C (176°F). If not installed immediately, they should be kept refrigerated. Avoid storage in direct sunlight.

2. Never leave the linear guide in close proximity to grease-removing organic solvents such as hexane, thinners, etc.

   Never immerse the linear guide in kerosene or rust preventative oils which contain kerosene.

Note

Other oils such as: water-based cutting oil, oil-based cutting oil, grease (mineral oil-AS2, ester-PS2) present no problems to the K1 lubricating unit's performance.

Assembly Instructions for the K1 Lubricating Unit for Linear Guides

1. Slide linear bearing on to the linear rail, using the plastic provisional rail supplied.
2. Remove the grease fitting from the end of the bearing.
3. Remove the Phillips screws (2 pieces).
4. Remove the end seal from end of bearing.
5. Install threaded plug from K1 kit (or see option 9 and 10 depending on application).
6. Install the cover plate from the K1 kit, to the end of bearing, against the end cap.
7. Install K1 lubricating unit without fixing rings, so it can be expanded over the rail.
8 Put the three (3) fixing rings in position on the K1 lubricating unit.
9. Replace the end seal, in front of the K1 lubricating unit.
10. Install connector screw for grease fitting.
11. Replace the grease fitting in connector screw.
12. Install the **extension** Phillips screws (2 pieces, supplied with the K1 unit kit).

Note: The K1 lubricating unit has a shelf life. They should be installed immediately upon receipt. It is important to avoid direct sun light and extreme heat conditions.

Unit Conversions

To convert

From	To	Multiply By
daN	N	10.000
kgf	N	9.810
kgf	lbf	2.205
kgf.cm	lbf.in	0.868
kgf.cm	ozf.in	13.890
kgf.m	lbf.ft	7.234
kgf.m	lbf.in	86.811
N.m	lbf.ft	0.738
mm	inch	0.03900
inch	mm	25.400

Precision Ground Ball Screw

Precision Ground Ball Screws are designed to ensure smooth, precise travel, reduced wear and longer life. NSK is the leading producer of these precision products. Custom designs can be ordered for demanding applications.

Ball Screw Code — **W**

Shaft Diameter (mm) — **16**

Approx. Effective Threaded Length (Unit: X100mm) — **03**

A-Series: MA, FA, SA
S-Series: MS, FS, SS — **FA-**

Serial No. of Design — **7**

Preload Type
P: Oversized Ball
D: Double Nut
Z: Offset Lead — **P**

Recirculation Code
No Code: Tube
Y: Deflector
G: End Cap — **G**

Special Style — **X**

Accuracy Grade Code
C0: Highest Accuracy
C1:
C2:
C3:
C5:
C7:
C10: Lowest Accuracy — **C5-**

Axial Clearance Code
Z: No Axial Clearance (preload)
T: Fine Clearance, <5µm Clearance — **Z**

Lead (mm) — **32**

- In addition to standard ground Ball Screws, NSK offers a complete line of custom Precision Ground Ball Screws.
- NSK also offers a wide variety of either Flange or Square style Ball Screw Support Unit kits.

Custom Part:

Ball Screw Code — **W**

Shaft Diameter (mm) — **16**

Approx. Effective Threaded Length (Unit: X100mm) — **02**

Franklin Indiana Plant — **WF-**

Serial No. of Design — **90**

Preload Code
P: Oversized Ball
Z: Offset Lead
No Code: Clearance
D: Double Nut — **P**

Recirculation Code
No Code: Tube
Y: Deflector
G: End Cap
SS: Internal Recirculating (tangential pick-up) — **G**

Material Code — **S1**

Accuracy Grade Code
C0: Highest Accuracy
C1:
C2:
C3:
C5:
C7:
C10: Lowest Accuracy — **C3-**

Axial Clearance
Z: No Axial Clearance (preload)
T: Fine Clearance, <5µm Clearance
S: <20µm Clearance
N: <50µm Clearance
L: Largest Clearance, based on Ball Size — **Z**

Lead (mm) — **5.08**

Plant Code — **E**

- NSK offers a wide variety of standard "off the shelf" ball screw support unit kits.
- NSK's standard line of both metric and inch series precision ground ball screws are manufactured to either a C3 or C5 accuracy grade.

Ball Screw Specification Sheet For New Applications

Detailed data is required in order for NSK to properly provide a ball screw specification. Please utilize the below sheet for gathering ball screw data. Page can be photocopied and faxed to NSK with details.

Customer Name: _____ Date: _____

Customer POC: _____ PO Number: _____

Customer Phone: _____ Customer E-mail: _____

Application: _____ ex: machine tool, transport, etc.

Speed and Travel:

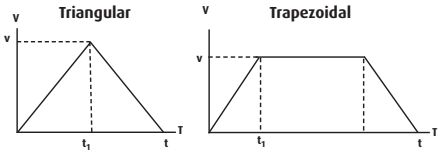
Stroke: _____ mm

Stroke Time (t): _____ sec

Ramp Time (t1): _____ sec

Acceleration: _____ m/s^2

Deceleration: _____ m/s^2

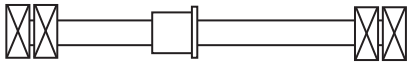


Orientation:

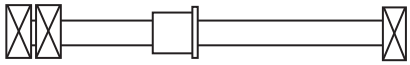
Mounting Orientation: (Horizontal/Vertical) _____

Support Method

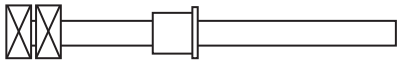
○ Fixed-Fixed



○ Fixed -Simple



○ Fixed-Free



Accuracy/Repeatability Requirements:

_____ _____

_____

_____

_____

Application Details (Please enter any other special considerations not covered)**:**

_____

_____

_____

_____

Environment:

Temperature Range:

deg C

_____ deg F

- ❑ General Industry
- ❑ Wash Down
- ❑ Clean Room
- ❑ Vacuum
- ❑ Outside Use
- ❑ Splash
- ❑ Corrosive
- ❑ High Humidity
- ❑ Contaminated
- ❑ Food/Medical

Additional Comments:

_____

_____

_____

Load Conditions:

Moving Mass: _____ kg

External Axial Force: _____ N

Maximum Load: _____ N

Maximum RPM: _____ rpm

Mass Supported by Linear Guides?

_____ Yes _____ No

Position of Ball Screw Relative to COG

X-coord: _____ (mm) (Horizontal Distance)

Y-coord: _____ (mm) (Vertical Distance)

Duty Cycle:

Life Expectation: _____ (Years)

Cycles Per Hour: _____

Operating Hours: _____ (Per Day)

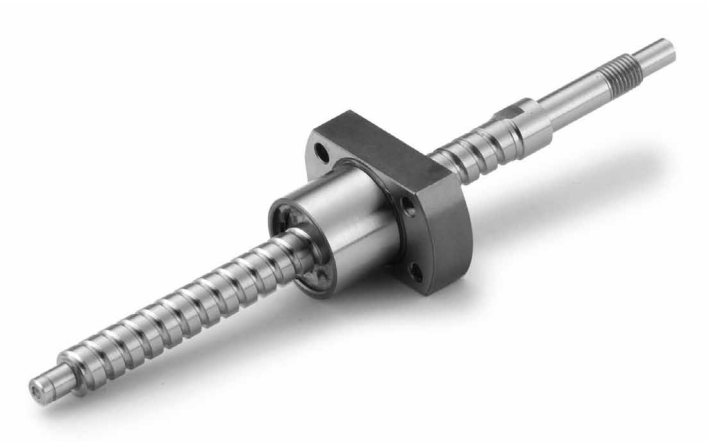
Operating Days: _____ (Per Years)

NSK Precision America, Inc.

Phone: 1-800-255-4773

Fax: (317) 738-5050

Compact FA Quickship Ball Screws



Compact FA Series ball screws incorporate NSK's internal ball recirculation system and offer quiet, high-speed performance. In order to respond quickly to a wide range of needs, NSK offers four-week delivery on common sizes. These high-performing ball screws are ready for use in a variety of industries including: semiconductor manufacturing, food, medical equipment, factory automation and general industrial use.

Features

Quick Delivery
Manufacturing in the USA and comprehensive stocking program ensure four-week delivery and reduced shipping costs.

Compact Ball Screw
The outside diameter of the ball nut is as much as 30% smaller than those of existing NSK products. Compact size enables equipment and devices, such as linear stages, to be smaller. NSK has also designed low profile support units, specific for the Compact FA series, enabling a unique space-saving design.

Example of Standard Part Reference Number

Compact FA series Accuracy Grade: C5	Screw Shaft Diameter (mm)	Lead (mm)	NSK Control Number	Ball Screw Overall Shaft Length (mm)
PSS	15	10	N1D	1179

Quiet Operation
The noise level of ball screws has been reduced by 6 dB, about half of what is sensed by the ear. Ball screws subsequently produce a quieter and gentler sound.

High-Speed Operation
They handle speeds up to 5000 RPM. This capability dramatically expands the range of service conditions.

Grease Fitting provided as Standard Equipment
The new ball screws are equipped with a grease fitting (M5 × 0.8). Lubrication ports are provided in two locations to facilitate maintenance. The ball screws can be easily connected to an integrated lubrication system.

Contact Seal
Compact, thin plastic seal is available and helps to reduce entry of contamination, and minimize grease dispersion, maintaining a clean work environment.

Application: Combination of Shaft Diameter and Lead

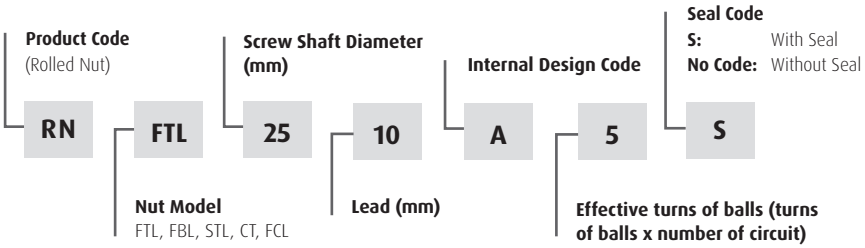
Shaft Diameter	Lead	Stroke														Recommended Support Unit	
		50	100	150	200	300	400	500	600	700	800	1000	1200	1600	2000	Fixed Side Support Unit	Simple Side Support Unit
10	5	•	•		•	•	•									WBK08-01B	WBK08S-01B
	10		•		•	•	•										
12	5	•	•		•	•	•	•								WBK08-01B	WBK08S-01B
	10		•		•	•	•	•									
	20		▲		▲	▲	▲	▲									
	30		▲		▲	▲	▲	▲									
15	5	•	•		•	•	•	•	•							WBK12-01B	WBK12S-01B
	10		•		•	•	•	•	•	•	•	•					
	20		▲		▲	▲	▲	▲	▲	▲	▲	▲					
	30		▲		▲	▲	▲	▲	▲	▲	▲	▲					
20	5			•	•	•	•	•	•	•	•					WBK15-01B	WBK15S-01B
	10				•	•	•	•	•	•	•	•	•				
	20					▲	▲	▲	▲	▲	▲	▲	▲	▲			
	30				▲	▲	▲	▲	▲	▲	▲	▲	▲				
	40						▲	▲	▲	▲	▲	▲	▲	▲	▲		
	60						▲	▲	▲	▲	▲	▲	▲	▲	▲		
25	5			•	•	•	•	•		•	•	•				WBK20-01	WBK20S-01
	10					•	•	•	•	•	•	•		•			
	20							•	•	•	•	•	•	•	•		
	25							•	•	•	•	•	•	•	•		
	30							▲	▲	▲	▲	▲	▲	▲	▲		
	50							▲	▲	▲	▲	▲	▲	▲	▲		

• Four week delivery ▲ Made to order

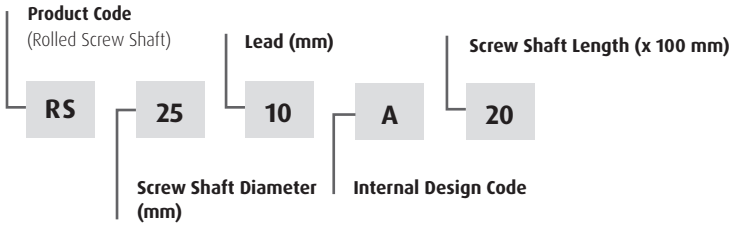
Reference Number

Reference number of rolled ball screw is described below. Please use reference number to order, or for a price inquiry

Nut Assembly (example)



Screw Shaft (example)



Product classification

NSK rolled ball screws are classified by nut model as shown in table below.

Classification of Rolled Ball Screws

Nut Model	Nut Shape		Recirculation System	Lead Classification
RNFTL		Flanged, Tube projecting type	Return tube type	Fine, medium lead High helix lead
RNFBL		Flanged Circular	Return tube type	Fine, medium lead
RNCT		V-thread (no flange) Projecting tube type	Return tube type	Fine lead
RNSTL		Square type	Return tube type	Small, medium lead
RNFCL		Flanged Circular	End cap type	High helix lead Ultra high helix lead

Features

- Short delivery time: R Series is standardized, and available in stock.
- Interchangeable screw shaft and ball nut: Screw shaft and nut assembly components are sold separately, and randomly matched. The maximum axial play after assembly is shown in the dimension tables.
- Low prices: Screw shaft is processed by rolling. This is why prices are lower than those of precision types.
- Abundant series: There are 128 types of nut assembly combinations in the series. Each combination has two to three different lengths in screw shaft.

Accuracy

- Lead accuracy: Ct10 grade (u_{300}=0.210). Refer to "Technical Description: Lead Accuracy" for details.
- Axial play: Varies with internal specification. Refer to the dimension tables.
- Run out of screw shaft center: Ct10 grade

Nut installation

Refer to "Technical Description: Installation".

Shaft End Machining

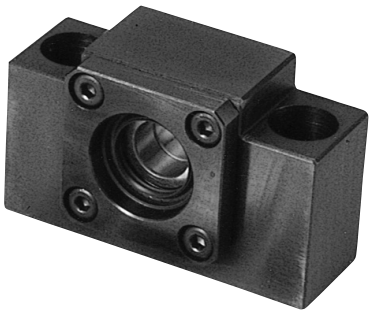
It is necessary to machine screw shaft end of the rolled ball screw.

Refer to "Configuration of rolled ball screw shaft end" if you use standard support unit. Refer to "Technical Description: Shaft end machining" for procedures and precautions.

Rust Prevention

Rust prevention agent is applied at time of delivery. But special surface treatment is not given to these ball screws. NSK furnishes treatment such as phosphate coating or electrolysis low temperature chrome plating on request.

Ball Screw Support Units



Reference number and applicable ball screw

For Light Load

Support Side Code
No code: Fixed Support Side
S: Simple Support Side
SF: Simple Support Side (for FSS and VFA)
R: Fixed Support Side (support kit)

Support Unit Product Code

WBK	08	S	01

Nominal Size

01: Square Type
11: Round Type

For Heavy Load

Bearing Combination
DF: Duplex (face to face)
DFD: Triplex (face to face)
DFF: Quadruple (face to face)

Support Unit Product Code

WBK	25	DF	31

Nominal Size

Design Serial Number

Support units

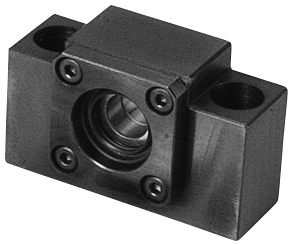
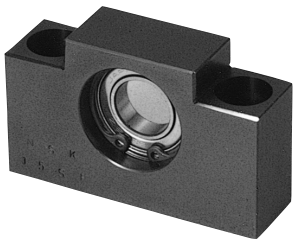
Classification

Ball Screw support units are categorized by their shape. Select the type that is appropriate for you to use.

Features

- NSK Bearings Inside:
  - General Use: Fixed support side units use Angular Contact Ball Bearings for rigidity and low friction torque.
  - Heavy Load/Machine Tool: Fixed support side units use Thrust Angular Contact bearings for greater rigidity and load capacity.
- Low Friction Torque: To minimize friction torque a deep groove ball bearing with a shield on both sides is used on the simple support side.
- High Dust Prevention: Oil seal is installed in small clearance on the fixed support side.
- Lock Nut: A fine grade lock nut is provided to fix bearing with high precision.
- Short Delivery Time: Standard items in stock.

Support Unit Categories

Application		Shape	Support Side	Bearing in Use	Bearing Bore Bearing Seat Diameter
Small equipment, light load	Square	WBK**-01* 	Fixed support side	Angular contact ball bearing	ϕ6 - ϕ25
		WBK**S-01* 	Simple support side	Deep groove ball bearing	ϕ6 - ϕ25
		WBK**SF-01* 		Deep groove ball bearing	ϕ12, ϕ15 (FSS type or VFA type)
Small equipment, light load	Round	WBK**R-11 (support kit) 	Fixed support side	Deep groove ball bearing (arranged to have angular contact)	ϕ4, ϕ6 (exclusive for RMA and RMS types)
		WBK**-11* 		Angular contact ball bearing	ϕ6 - ϕ25
Machine tools, heavy load	Round	WBK**DF*-31 	Fixed support side	Thrust angular contact ball bearing	ϕ17 - ϕ40

Ball Screw Support Units (cont.)

Tables below show "shaft diameter/lead combinations" of standard ball screws that are applicable to support units.

Support Units for Light Load and Applicable "Screw Shaft Diameter/Lead Combinations"

Light Load/Small Equipment

Support unit/reference number			"Screw Shaft Diameter/Lead Combinations" of Standard Ball Screws that are Applicable to Support Unit (mm)
Square		Round	
Fixed Support Side (Driving Motor Side)	Simple Support Side (Opposite to Driving Motor)	Fixed Support Side	
WBK06-01A	—	WBK06-11	φ4x1, φ6x1
WBK08-01A	WBK08S-01	WBK08-11	φ8x1, φ8x1.5, φ8x2, φ10x2, φ10x2.5
WBK10-01A	WBK10S-01	WBK10-11	φ10x4, φ12x2, φ12x2.5, φ12x5, φ12x10
WBK12-01A	WBK12S-01	WBK12-11	φ14x5, φ14x8, φ15x10, φ15x20, φ16x2 φ16x2.5, φ16x5, φ16x16, φ16x32
WBK15-01A	WBK15S-01	WBK15-11	φ20x4, φ20x5, φ20x10, φ20x20, φ20x40
WBK20-01	WBK20S-01	WBK20-11	φ25x4, φ25x5, φ25x6, φ25x10, φ25x20 φ25x25, φ25x50, φ28x5, φ28x6
WBK25-01	WBK25S-01	WBK25-11	φ32x5, φ32x6, φ32x8, φ32x10 φ32x25, φ32x32

Notes: 1. Reference number is based on the bearing bore on the fixed support side.
2. Please note that the reference numbers 12 or below on the simple-side support do not match the bore of the deep-groove ball bearing in use.

Support Units for Heavy Load and Applicable "Screw Shaft Diameter/Lead Combinations"

Heavy Load/Machine Tools

Support Unit/Reference Number		"Screw Shaft Diameter/Lead Combinations" of Standard Ball Screws that are Applicable to the Support Unit (mm)
Fixed Support Side (Drive Motor Side)	Fixed Support Side (Opposite to Drive Motor)	
WBK30DF-31	WBK25DF-31	φ36x10
WBK30DFD-31	WBK25DFD-31	φ36x10, φ40x10
WBK30DF-31	WBK30DF-31	φ40x5, φ40x8, φ40x10, φ40x12
WBK30DFD-31	WBK30DFD-31	φ40x12
WBK35DF-31	WBK35DF-31	φ45x10
WBK40DF-31	WBK40DF-31	φ50x10
WBK40DFD-31	WBK40DFD-31	φ50x10

Support Units for Light Load and Small Equipment

Fixed Support Side Support Unit						Simple Support Side Support Unit		
Reference No.	Use	Axial Direction			Maximum Starting Torque [N•cm]	Reference No.	Bearing Reference No.	Radial Direction Basic Dynamic Load Rating C [N]
		Basic Dynamic Load Rating Ca [N]	Load Limit [N]	Rigidity [N/μm]				
WBK06-01A	General	2670	1040	28.0	0.49	—	—	—
WBK06-11	General	2670	1040	28.0	0.49	—	—	—
WBK08-01A	General	4400	1450	49.0	0.88	WBK08S-01	606ZZ	2260
WBK08-01B	Low type	6600	2730	94.0	1.90	WBK08S-01B	606ZZ	2260
						WBK12SF-01B*1	6801ZZ	1920
WBK08-01C	Clean environment	3100	1100	36.0	0.52	WBK08S-01C	606VV	2260
WBK08-11	General	4400	1450	49.0	0.88	WBK08S-01	606ZZ	2260
WBK08-11B	Low type	6600	2730	94.0	1.90	—	606ZZ	2260
WBK08-11C	Clean environment	3100	1100	36.0	0.52	WBK08S-01C	606VV	2260
WBK10-01A	General	6600	2730	94.0	1.90	WBK10S-01	608ZZ	3300
						WBK12SF-01*2	6001ZZ	5100
WBK10-01B	Low type	6600	2730	94.0	1.90	—	608ZZ	3300
WBK10-01C	Clean environment	4250	1364	50.0	1.10	WBK10S-01C	608VV	3300
WBK10-11	General	6600	2730	94.0	1.90	WBK10S-01	608ZZ	3300
WBK10-11C	Clean environment	4250	1364	50.0	1.10	WBK10S-01C	608VV	3300
WBK12-01A	General	7100	3040	104.0	2.10	WBK12S-01	6000ZZ	4550
						WBK15SF-01*2	6902ZZ	4350
WBK12-01B	Low type	7100	3040	104.0	2.10	WBK12S-01B	6000ZZ	4550
						WBK15SF-01B*1	6902ZZ	4350
WBK12-01C	Clean environment	4700	2443	57.0	1.20	WBK12S-01C	6000VV	4550
WBK12-11	General	7100	3040	104.0	2.10	WBK12S-01	6000ZZ	4550
WBK12-11C	Clean environment	4700	2443	57.0	1.20	WBK12S-01C	6000VV	4550
WBK15-01A	General	7600	3380	113.0	2.40	WBK15S-01	6002ZZ	5600
WBK15-01B	Low type	7600	3380	113.0	2.40	WBK15S-01B	6002ZZ	5600
						WBK20SF-01B*1	6804ZZ	4000
WBK15-01C	Clean environment	5100	2757	63.0	1.30	WBK15S-01C	6002VV	5600
WBK15-11	General	7600	3380	113.0	2.40	WBK15S-01	6002ZZ	5600
WBK15-11C	Clean environment	5100	2757	63.0	1.30	WBK15S-01C	6002VV	5600
WBK17-01A	General	13400	5800	120.0	3.50	WBK17S-01	6203ZZ	9550
WBK20-01	General	17900	8240	155.0	6.20	WBK20S-01	6204ZZ	12800
						WBK25SF-01*1	6005ZZ	10100
WBK20-11	General	17900	8240	155.0	6.20	WBK20S-01	6204ZZ	12800
WBK25-01	General	20200	10000	192.0	7.20	WBK25S-01	6205ZZ	14000
WBK25-11	General	20200	10000	192.0	7.20	WBK25S-01	6205ZZ	14000
WBK04R-11	General	615	490	6.5	0.59	—	—	—
WBK06R-11	General	1280	930	9.0	0.59	—	—	—

*1: Exclusive for FSS type.
*2: Exclusive for VFA type.

Monocarrier®

Features

NSK's Monocarrier is the culmination of technology and innovation in linear motion. This lightweight, compact single axis linear actuator integrates quality NSK ball screw, linear guide and support bearings into one unit.

1 Light Weight, Compact Design

- Available in two different shapes of cross-section, depending on application.
  Light weight type: MCM Series
  Rigid type: MCH Series

2 All -In-One Structure

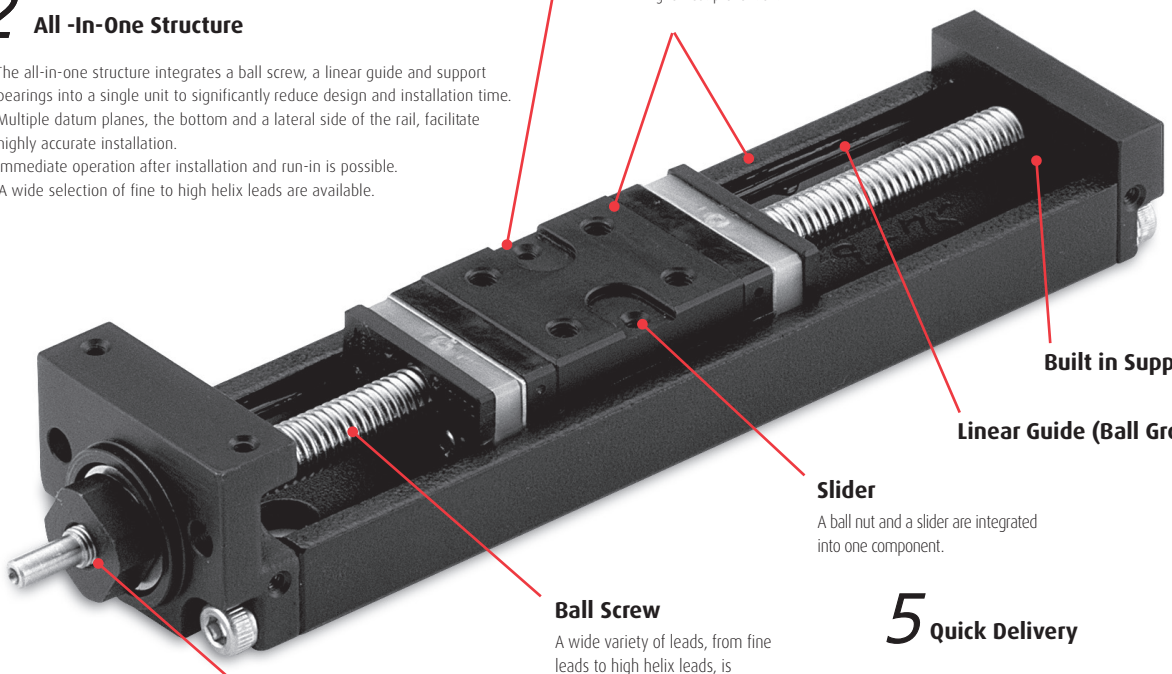
- The all-in-one structure integrates a ball screw, a linear guide and support bearings into a single unit to significantly reduce design and installation time.
- Multiple datum planes, the bottom and a lateral side of the rail, facilitate highly accurate installation.
- Immediate operation after installation and run-in is possible.
- A wide selection of fine to high helix leads are available.

3 Superb Antirust Capability

- Low temperature chrome plating is a standard feature for the bodies and sliders to control rusting in normal operating and storing environments. Fluoride low temperature chrome plating is optionally available for much higher rust prevention.

4 Long Term Maintenance Free

- Use of NSK K1 Lubrication Units and grease maintains a smooth lubricating performance for long periods in mechanical environments where lubrication is difficult to apply, where use of oil is not permitted because of hygienic issues, or where the mechanical equipment is subjected to frequent wash downs.
- NSK K1 lubrication unit is available for food processing machines and medical equipment.
- Grease for clean environments and for general machinery is available.



Built in Support Bearings

Linear Guide (Ball Groove)

Slider
A ball nut and a slider are integrated into one component.

Ball Screw
A wide variety of leads, from fine leads to high helix leads, is available.

Built in Support Bearings

5 Quick Delivery

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

A monocarrier is a single axis unit that combines a ball screw, a linear guide, and a support bearing unit, for ease of design and assembly on a machine. Both MCM and MCH type Monocarriers, equiped with NSK K1 lubrication unit, (which enables long term maintenance free operation) are a standard feature.

Applications

› **Automotive Manufacturing Equipment** › **Manufacturing Machine for Semiconductors and Liquid Crystal Displays**
› **Food Processing / Medical Equipment** › **Optical / Glass Working Equipment** › **Telecommunication Manufacturing Equipment**

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCM Series Monocarrier®

MCM Series Reference Number Coding

Monocarrier		Nominal Size Rail width, Unit: 10mm		Accuracy Grade H: High Grade P: Precision Grade		Slider Specification K: Single Slider D: Double Slider		NSK Management Number
MC	M	08	040	H	10	K	0	0
	M Type: MCM Series		**Stroke Unit: 10mm**		**Ball Screw lead (mm)**		**Grease Specification** **0:** Standard AS2 **Clean Grease Specification** **B:** LG2	

With Optional Accessories

	E: With Optional Accessories									Sensor Unit		Motor Bracket
MC	E	08	040	H	10	K	0	0	K	0	0	0
									NSK Management Number		**Cover Unit**	

Monocarrier is suitable for a vertical axis of a material handling robot.

Applications

› Equipment that Needs to Reduce the Weight › Substitution for Pneumatic Actuator › Robots › Transporting Equipment › Measuring Machine › Equipment for Factory Automation

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

Accuracy Grade and Limitations of MCM Series

The accuracy grade of Monocarrier standard inventories is high grade (H), except for lead 1 and 2 of MCM02 and MCM03. When you require strokes longer than 1,200mm, please consult NSK about the accuracy grade.

Accuracy Grade

Unit: μm

Grade	High Grade			Precision			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash	Repeatability	Positioning Accuracy	Running Parallelism (vertical)	Backlash
~200	±10	14	20 or less	±3	20	8	3 or less
~400		16			25	10	
~600		20			30	12	
~700		23			30	15	
~1,000		23			35	15	
~1,200		30			40	20	

Limitations

Model No.		Lead (mm)	Slider	Stroke (mm)
MCM Series	MCM02	1,2	Single	150
	MCM03	1,2	Single	150
		10,12	Single	350
	MCM05	5,10,20,30*	Single	900
			Double	810
	MCM06	5,10,20	Single	1000
			Double	910
	MCM08	5,10,20,30*	Single	1000
			Double	880
	MCM10	10,20,30*	Single	1800
			Double	1670

* Applicable only to single slider.

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCM Series Standard Combinations of Stroke and Ball Screw Lead

Single Slider

Unit: mm

Model No.	MCM02		MCM03				MCM05				MCM06			MCM08				MCM10		
Stroke \ Lead	1	2	1	2	10	12	5	10	20	30	5	10	20	5	10	20	30	10	20	30
50	•	•	•	•	•	•	•	•	•		•	•	•	•	•					
100	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	
150	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•		•	•	
200					•	•	•	•	•		•	•	•	•	•	•		•	•	
250					•	•	•	•	•		•	•	•	•	•	•		•	•	
300							•	•	•	•	•	•	•	•	•	•		•	•	
400							•	•	•	•	•	•	•	•	•	•	•	•	•	
500							•	•	•	•	•	•	•	•	•	•	•	•	•	•
600							•	•	•	•	•	•	•	•	•	•	•	•	•	•
700											•	•	•	•	•	•	•	•	•	•
800											•	•	•	•	•	•		•	•	•
900																		•	•	
1000																		•	•	

Double Slider

• Mark: Standard Product

Unit: mm

Nominal Size	MCM05		MCM06			MCM08		MCM10	
Stroke \ Lead	10	20	5	10	20	10	20	10	20
60	•								
70								•	
80						•			
110	•		•	•					
160	•								
170								•	•
180						•	•		
210	•	•	•	•	•				
270								•	•
280						•	•		
310	•	•	•	•	•				
370								•	•
380						•	•		
410	•	•	•	•	•				
470								•	•
480						•	•		
510	•	•		•	•				
570								•	•
580						•	•		
610				•	•				
670								•	•
680						•	•		
710				•	•				
870								•	•

Please consult NSK about double slider of MCM02 and MCM03.

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCM Series Basic Load Rating

Basic Load Rating

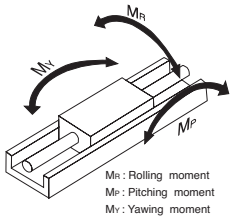
Nominal Size	Lead ℓ (mm)	Shaft Dia d (mm)	Basic Dynamic Load Rating (N)				Basic Static Load Rating (N)		Support Unit Limit Load (N)
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Rated Running Distance L_a (km)	Ball Screw C_{oa}	Linear Guide C_o	
MCM02	1	ø6	340 (High grade)	4,910	615	1	555 (High grade)	2,120	490
			405 (Precision)				615 (Precision)		
	2		340 (High grade)	3,900		2	555 (High grade)		
			405 (Precision)				615 (Precision)		
MCM03	1	ø6	735	10,900	2,670	1	1,230	4,900	1,040
	2		735	8,650		2			
	10	ø8	1,230	6,250		10	1,690	6,620	
	12		1,230	5,880		12			
MCM05	5	ø12	3,760	15,600	4400	5	6,310	10,900	1,450
	10		2,260	12,400		10	3,780		
	20		2,260	9,850		20	3,780		
	30		3,260	8,600	6550	30	5,400		2,730
MCM06	5	ø16	7,310	25,200	6,550	5	13,500	17,000	2,730
	10	ø15	7,060	20,000		10	12,700		
	20		4,560	15,900		20	7,750		
MCM08	5	ø16	7,310	30,800	7,100	5	13,500	22,800	3,040
	10	ø15	7,060	24,400		10	12,700		
	20		4,560	19,400		20	7,750		
	30		5,070	16,930		30	8,730		
MCM10	10	ø20	10,900	33,500	7,600	10	21,700	29,400	3,380
	20		7,060	26,600		20	12,700		
	30		11,700	23,200		30	22,700		

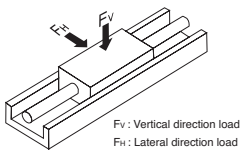
Notes: • Basic dynamic and static load ratings indicate values for one slider. • Basic dynamic load rating of linear guide is load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate "Rated running distance" in table, that is equivalent to 1 million revolutions of ball screw and support unit under the same conditions without causing flaking by rolling contact fatigue. • Basic dynamic load rating of ball screw is load in the axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. • Basic dynamic load rating of support unit is constant load in the axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. • Basic static load rating is load that results in combined permanent deformations at contact points of balls and ball grooves of respective parts at a diameter of 0.01%.

Basic Static Moment Load of Linear Guide

Model No.	Lead (mm)	Slider	Basic Static Moment (N•m)		
			Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
MCM02	1,2	Single	24	8	8
MCM03	1,2		68	28	28
	10,12		92	51	51
MCM05	5,10,20,30*	Single	229	89	89
		Double	455	765	765
MCM06	5,10,20	Single	415	174	174
		Double	825	1,220	1,220
MCM08	5,10,20,30*	Single	770	300	300
		Double	1,540	2,050	2,050
MCM10	10,20,30*	Single	1,170	425	425
		Double	2,340	2,940	2,940

• Basic static moment of double slider is a value when two sliders equipped with NSK K1™ are butted against each other.
• Basic static moment is the value when a rolling contact pressure of balls exceeds 4,000N/mm2.
• If extremely heavy load is required, please consult NSK for estimation of fatigue life.
*Applicable only to single slider.





Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCH Series Monocarrier®

MCH Series Reference Number Coding

* These two code fields shall be added when non-standard grease is used. The coding of a MCH Monocarrier with standard grease shall have 12 characters as shown above.

Monocarrier		Nominal Size Rail width, Unit: 10mm		Accuracy Grade H: High Grade P: Precision Grade		Slider Specification K: Single Slider D: Double Slider		Special Specification
MC	H	06	040	H	10	K	B*	0*

- **H Type:** MCH Series
- **L Type:** MCH Series Low Profile Rail (only for 06 size)

Stroke Unit: 10mm

Grease Specification
B: LG2

With Optional Accessories

S: With MCH Optional Components
R: With MCL Optional Components

MC	S	06	040	H	10	K	0	0	K	0	0	0

- **K:** NSK Management Number
- **Sensor Unit**
- **Cover Unit**
- **Intermediate plate for motor bracket**

Note: Optional components are available separately.

Monocarrier is stiff rail, which can be a beam on its own.

Applications

› Equipment that Needs to Reduce the Weight › Substitution for Pneumatic Actuator › Robots › Transporting Equipment › Measuring Machine › Equipment for Factory Automation

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

Accuracy Grade and Limitations of MCH Series

The accuracy grade of Monocarrier standard inventories is high grade (H), except for lead 1 and 2 of MCM02 and MCM03. When you require strokes longer than 1,200mm, please consult NSK about the accuracy grade.

Accuracy Grade

Unit: μm

Grade	High Grade			Precision			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash	Repeatability	Positioning Accuracy	Running Parallelism (vertical)	Backlash
~200	±10	14	20 or less	±3	20	8	3 or less
~400		16			25	10	
~600		20			30	12	
~700		23			30	15	
~1,000		23			35	15	
~1,200		30			40	20	

Limitations

Nominal Size		Lead (mm)	Slider	Stroke (mm)
MCH Series	MCH06	5,10,20	Single	600
			Double	500
	MCH09	5,10,20	Single	1,000
			Double	850
	MCH10	10,20	Single	1,800
			Double	1,650
	MCL06	5,10,20	Single	500

Note: Optional components are available separately.

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCH Series Standard Combinations of Stroke and Ball Screw Lead

Single Slider

• Mark: Standard Product **Unit: mm**

Nominal Size	MCH06			MCH09			MCH10	
Stroke \ Lead	5	10	20	5	10	20	10	20
50	•	•	•					
100	•	•	•	•	•	•	•	•
200	•	•	•	•	•	•	•	•
300	•	•	•	•	•	•	•	•
400	•	•	•	•	•	•	•	•
500	•	•	•	•	•	•	•	•
600				•	•	•	•	•
700				•	•	•	•	•
800				•	•	•	•	•
900							•	•
1000							•	•
1100							•	•
1200							•	•

Double Slider

• Mark: Standard Product **Unit: mm**

Nominal Size	MCH06			MCH09			MCH10	
Stroke \ Lead	5	10	20	5	10	20	10	20
100	•	•						
150				•	•			
200	•	•						
250				•	•		•	•
300	•	•						
350				•	•		•	•
400		•	•					
450					•	•	•	•
550							•	•
650					•	•	•	•
750								•
850								•
950								•
1050								•

Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

MCH Series Basic Load Rating

Basic Load Rating

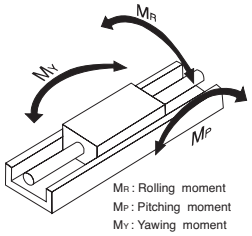
Nominal Size	Lead ℓ (mm)	Shaft Dia d (mm)	Basic Dynamic Load Rating (N)				Basic Static Load Rating (N)		Support Unit Limit Load (N)
			Ball Screw C_a	Linear Guide C	Support Unit C_a	Rated Running Distance L_a (km)	Ball Screw C_{oa}	Linear Guide C_o	
MCH06 (MCL06)	5	ø12	3,000 (High Grade)	22,800	4,400	5	5,410 (High Grade)	16,300	1,450
			3,760 (Precision)				6,310 (Precision)		
	10		1,930 (High Grade)	18,100		10	3,160 (High Grade)		
			2,260 (Precision)				3,780 (Precision)		
	20		1,930 (High Grade)	14,400		20	3,160 (High Grade)		
			2,260 (Precision)				3,780 (Precision)		
MCH09	5	ø15	6,820 (High Grade)	40,600	7,100	5	13,200 (High Grade)	30,500	3,040
			7,100 (Precision)				13,000 (Precision)		
	10		5,110 (High Grade)	32,200		10	9,290 (High Grade)		
			7,060 (Precision)				12,700 (Precision)		
	20		3,290 (High Grade)	25,500		20	5,620 (High Grade)		
			4,560 (Precision)				7,750 (Precision)		
MCH10	10	ø20	8,230 (High Grade)	44,600	7,600	10	17,100 (High Grade)	42,000	3,380
			10,900 (Precision)				21,700 (Precision)		
	20		5,300 (High Grade)	35,400		20	10,300 (High Grade)		
			7,060 (Precision)				12,700 (Precision)		

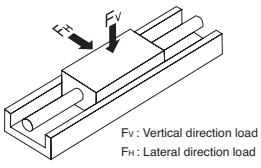
Notes
- Basic dynamic and static load ratings indicate the values for one slider.
- Basic dynamic load rating of the linear guide is the load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate, "Rated running distance" in the table, that is equivalent to 1 million revolutions of the ball screw and the support unit under the same condition without causing flaking by rolling contact fatigue.
- Basic dynamic load rating of the ball screw is a load-to-axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue.
- Basic dynamic load rating of the support unit is a constant load-to-axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue.
- Basic static load rating is a load that results in combined permanent deformations at the contact points of balls and ball grooves of respective part, which is 0.01% of the diameter.

Basic Static Moment Load of Linear Guide

Nominal size	Slider	Basic Static Moment (N•m)		
		Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
MCH06 (MCL06)	Single	335	133	133
	Double	770	730	730
MCH09	Single	890	385	385
	Double	1,780	2,070	2,070
MCH10	Single	1,460	610	610
	Double	2,920	3,430	3,430

- Basic static moment of double slider is a value when two sliders equipped with NSK K1™ Lubrication Units are butted against each other.
- The basic static moment is the value when a rolling contact pressure of balls exceeds 4,000N/mm².
- If operating under extreme load conditions, please consult NSK for estimation of fatigue life.





Please see NSK's Monocarrier™ catalog for more detailed information on monocarriers.

Notes