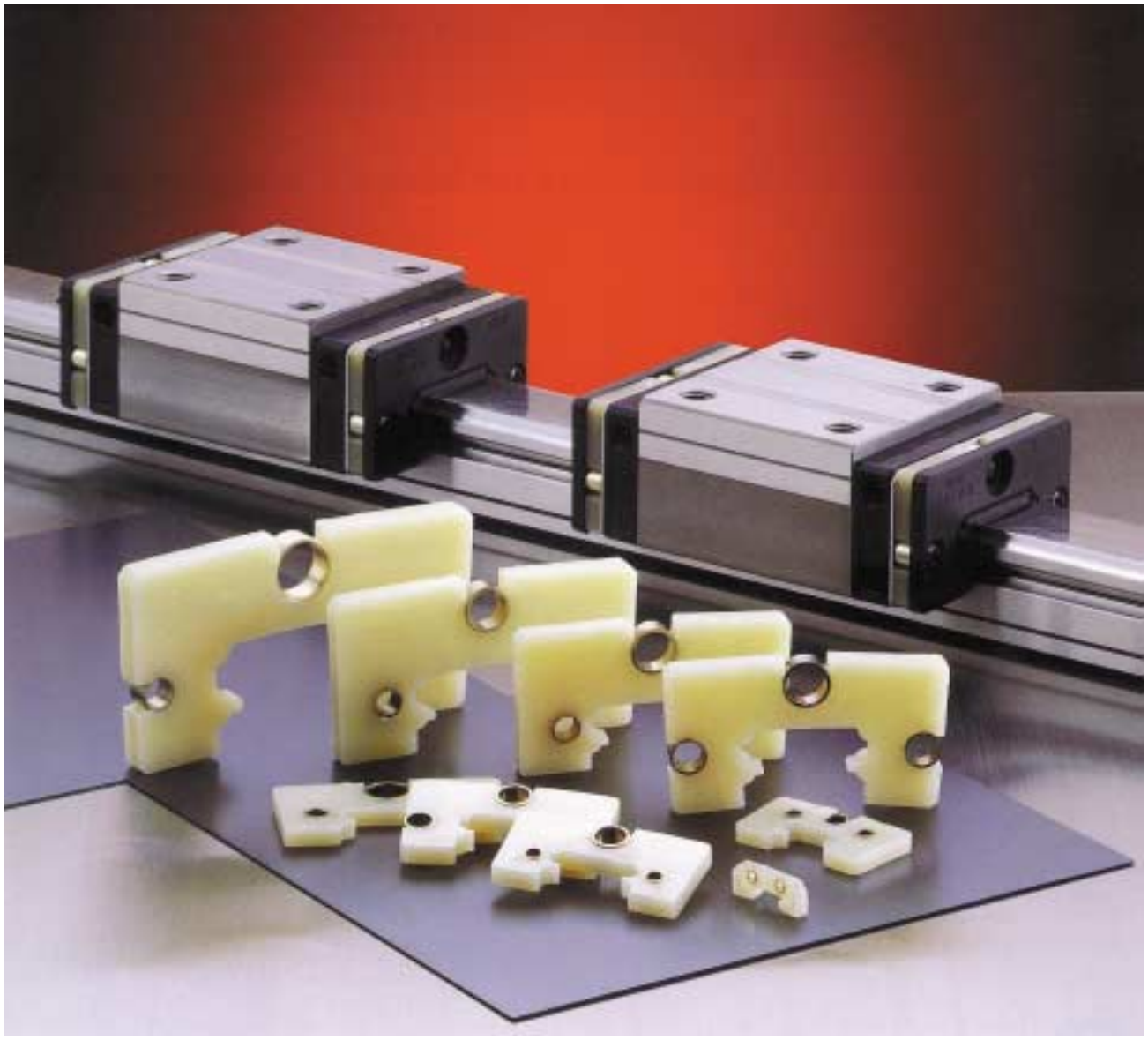
NSK

NSK LINEAR GUIDES FOR INDUSTRIAL AUTOMATION AND EQUIPMENT



- **Five Types available in Commercial Grade**
- **LE Series Miniature - Wide Type**
- **LH Series for High Load Capacity Applications**
- **LS Series for Compact Low Profile Space Saving Conditions**
- **LU Series Miniature Type**
- **LW Series Wide Type**
- **Interchangeable Rails and Ball Slides**
- **Preload and Clearance Types available**
- **Fluoride Black Chrome Plated Rails and Ball Slides**
- **Large Inventory for Prompt Delivery**

CONTENTS

CAD DRAWING DATA

For LE/LH/LS/LU & LW-Series go to the toolkit page of the NSK website www.ca.nsk.com.

For 3D IGES files on CD-ROM of LH/LS-Series Linear Guides email marketing@ca.nsk.com.

Note: CAD DXF drawing files are also available for other linear motion products. Contact NSK.

HOW TO USE THIS GUIDE

Use this guide to select the linear guide ball slides, rails and accessories that you need for your application.
Pages 4, 14, 22, 23, 24 and 33 provide identification numbers that you will need to order the components for your application.
If you have any uncertainties, or would like more detailed information about any aspect of linear guides, please contact your NSK representative at one of our locations listed on the back cover.

FEATURES

Interchangeability of Rail and Ball Slide
One important feature of the Gothic arch is its ability to make high accuracy measurements on both the ball slide and rail, allowing for their interchangeability. This means that additions and/or replacement of ball slides is easily done.

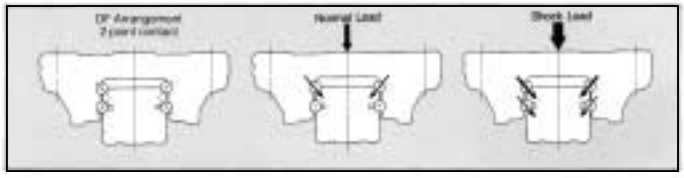
High Load Capacity and Long Life
NSK has developed an infinite ball recirculating type linear guide with the largest load capacity available (comparing equal size ball slides). This high load capability helps to ensure long life.

Compact Low profile Type
To minimize space, NSK has developed low profile linear guides to handle various applications.

Miniature and Miniature Wide Type Stainless Steel
If light loads and corrosive conditions are present for your application needs, NSK can supply a miniature and miniature wide type linear guide in stainless steel. NSK's built-in ball retainer system allows for easy installation and removal of ball slides.

Wide Type
If your application requires low profile combined with high load, NSK offers the wide series linear guides.

Shock Resistant Design
Another design feature of the Gothic arch is its ability to absorb vertical shock loads from above using four-row groove configuration. This design is favourable in case of unexpected accidents during installation, or the operation of equipment. The ball groove is designed to avoid edge loading under extreme loads, extending the life of the unit.



Normal load is carried on the top two grooves.
Shock load is carried by all four grooves.

Universal Slider
NSK has incorporated both thru and tapped holes into one flanged slider for a combination of mounting applications.

Ability to Butt Rails
Tolerance of ball grooves on the ball slides and rails are controlled to allow for butting, giving you the flexibility of unlimited lengths. We can offer a stocked linear guide rail with versatility in assembling preloaded or clearance type ball slides.

K1 Maintenance Free Lubrication System
NSK has the K1 for all five series of interchangeable linear guides. These lubricating units are all available from stock.

Maximum Rail Length in one section available up to 4,000 mm.

Short Delivery Time
We can ship from our large inventory, both standard and custom cut-to-length linear rails.

Fluoride Black Chrome Plating
NSK has a black chromium plating for linear bearings and rails to cover conditions requiring wet, corrosive and clean room applications. These are available from stock.

LH Series

Identification Number Ball Slide

Refer to following numbering system when ordering.
Refer to Page 12 for Rail Identification Number.

NOTE:
Single seal installed each side as standard. All slides come with a grease fitting. A brass extension connector is installed with K1 Lubrication Units to accept the grease fitting.

Ball Slide (Stocked item)

LAH 25 AN Z - K2P

Ball Slide Type

Size No.

AN: Square - Standard
BN: Square - Long
FL: Flanged (Thru hole) Standard
HL: Flanged (Thru hole) Long
EM: Flanged (Tapped & Thru hole) Standard
GM: Flanged (Tapped & Thru hole) Long
EL: Flanged (Tapped hole) Standard
GL: Flanged (Tapped hole) Long

No code: No special accessories and fluoride black chrome plating
K: One K1 Lubrication Unit each side
K2: Two K1 Lubrication Units each side
D: Double Seals each side
P: Protector Plate each side
DP: Double Seals + Protector Plate each side
KD: One K1 Unit + Double Seals each side
K2D: Two K1 Units + Double Seals each side
KP: One K1 Unit + Protector Plate each side
K2P: Two K1 Units + Protector Plate each side
F: Fluoride Black Chrome Plating
FK: Fluoride Black Chrome Plating + One K1 Unit
FK2: Fluoride Black Chrome Plating + Two K1 Units
FKD: Fluoride Black Chrome Plating + One K1 Unit + Double Seals each side
FKDP: Fluoride Black Chrome Plating + One K1 Unit + Double Seals each side + Protector Plate each side
FD: Fluoride Black Chrome Plating + Double Seals each side

No code: Clearance type
Z: Preloaded type

Flanged Type	Low Height Type	with Tapped & Thru Holes	EM (High Load), GM (Ultra High Load)
		with Tapped Holes	LH-EL (High Load), LH-GL (Ultra High Load)
		with Thru Holes	LH-FL (High Load), LH-HL (Ultra High Load)
Square Type	High Type		LH-AN (High Load), LH-BN (Ultra High Load)

Fig.-1 LH-AN, LH-BN TYPE

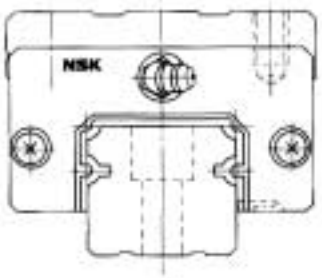


Fig.-2 LH-EL, LH-GL TYPE LH-FL, LH-HL TYPE

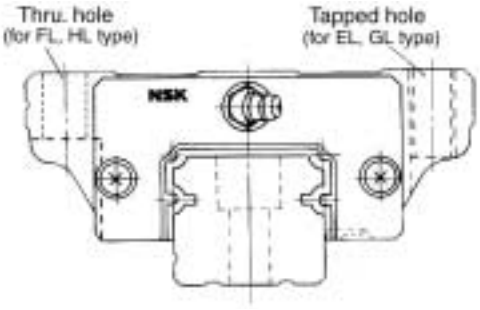
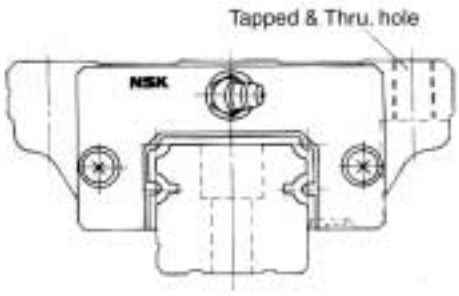


Fig.-3 LH-EM, LH-GM TYPE



Internal Clearance and Preload

The internal clearance refers to the amount of movement of the ball slide, when moved up and down with the rail fixed. The amount of preload is specified by size as follows.

Table 1 **Unit: μm**

Size	#15	#20 #25	#30 #35 #45	#55 #65
Clearance	15~–4	15~–5		
Preloaded	0~–4	0~–5	0~–7	0~–9

Accuracy Standard

The accuracy standard of the NSK “High Load Capacity LH-Series” is shown in Table 1. With high-accuracy control of individual rail size and interchangeability, the accuracy of Table 1 can be maintained sufficiently even after addition or replacement of the ball slide.

Table 1 Tolerances **Unit : μm**

Tolerances (See Fig. 4 for Symbols)		Model No. LH	
		15, 20, 25, 30, 35	45,55,65
Clearance Type	Overall Height, H	±20	±30
	Lateral Width, W_2	±30	±35
Preload Type	Overall Height, H	±20	±30
	Lateral Width, W_2	±30	±35
Running Parallelism of Face C to Face A Running Parallelism of Face D to Face B		Refer to Fig. 4	

W_2 is applicable to the reference side only. Note: during installation the reference side is indicated by a line provided on the side of ball slide and rail. (See Fig. 4)

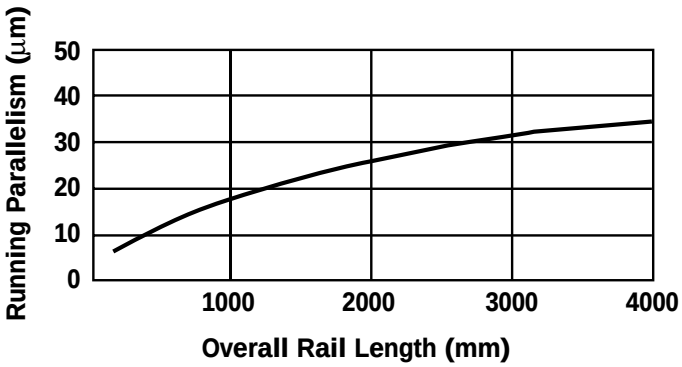


Fig. 3 Running Parallelism

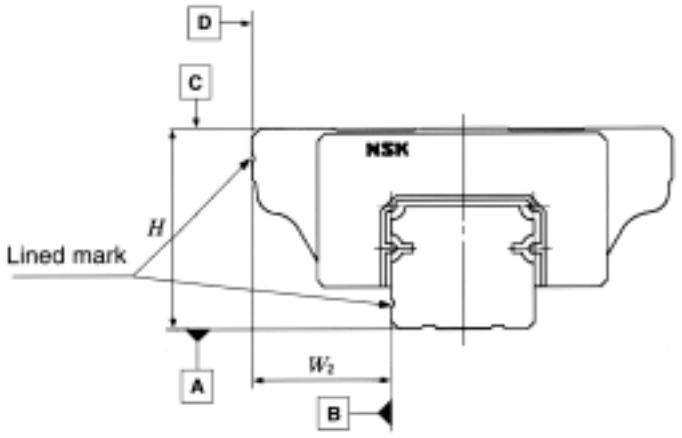


Fig. 4 Accuracy Standard

Load Rating and Life

The LH-Series is based on a design applying load from above. Therefore the dimension table shows the basic dynamic load rating C and basic static load rating C_0 for the downward direction. If the load is applied laterally or upward refer to values in Table 2.

Table 2 Basic Load Rating Correction for Direction

Load Direction	Basic Dynamic Load Rating	Basic Static Load Rating
Downward	C	C_0
Upward	C	$0.75C_0$
Laterally	0.88C	$0.63C_0$

Estimate the life of linear guides using the equation below.

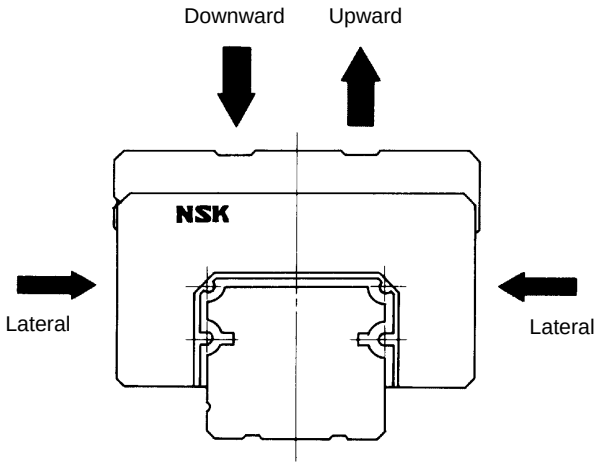


Fig. 5

$$L = 50\left(\frac{C}{f_W \cdot F}\right)^3$$

where, L : Rated fatigue life(km)

C : Basic dynamic load rating (kgf)

F : Load to a ball slide (kgf)
(Dynamic equivalent load)

f_W : Load factor

f_W =1.0 ~ 1.2 (Smooth condition)

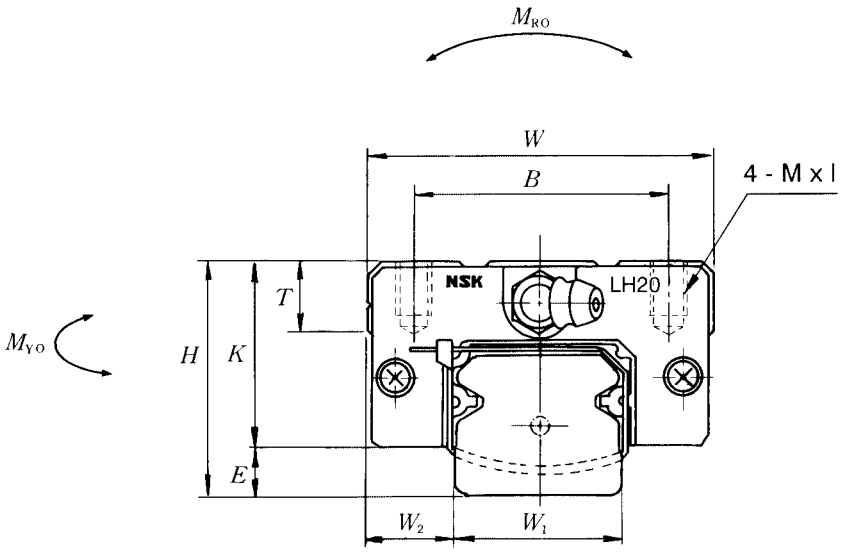
f_W =1.2 ~ 1.5 (Normal condition)

f_W =1.5 ~ 3.0 (With shock or vibration)

LH Series Ball Slide Dimension Table

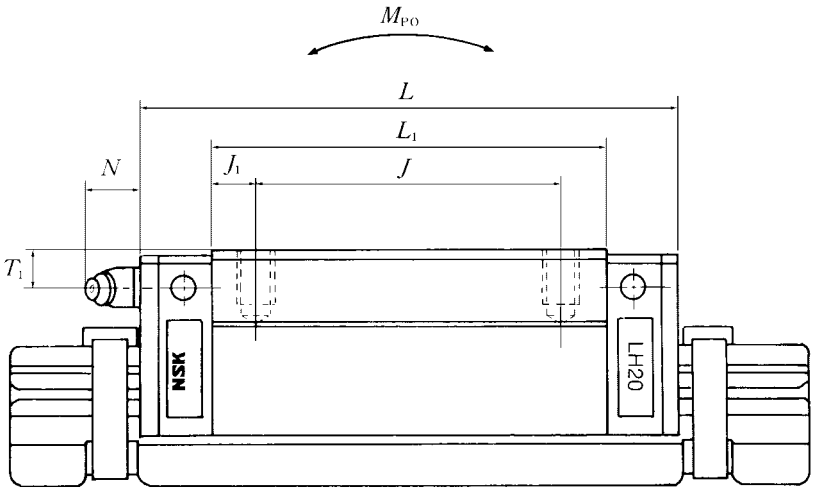
Square Type

LAH-AN/ANZ
LAH-BN/BNZ



Model No.	Ass'y Dimensions			Ball Slide Dimensions								
	H	*E*	W_2	*W*	*B*	*L*	L_1	*J*	J_1	*K*	*T*	*M* x *l*
LAH15 AN/ANZ	28	4.6	9.5	34	26	55	39	26	6.5	23.4	8	M 4 x 6
LAH20 AN/ANZ **LAH20 BN/BNZ**	30	5	12	44	32	69.8 91.8	50 72	36 50	7 11	25	12	M 5 x 6
LAH25 AN/ANZ **LAH25 BN/BNZ**	40	7	12.5	48	35	79 107	58 86	35 50	11.5 18	33	12	M 6 x 9
LAH30 AN/ANZ **LAH30 BN/BNZ**	45	9	16	60	40	85.6 124.6	59 98	40 60	9.5 19	36	14	M 8 x 10
LAH35 AN/ANZ **LAH35 BN/BNZ**	55	9.5	18	70	50	109 143	80 114	50 72	15 21	45.5	15	M 8 x 12
LAH45 AN/ANZ **LAH45 BN/BNZ**	70	14	20.5	86	60	139 171	105 137	60 80	22.5 28.5	56	17	M10 x 17
LAH55 AN/ANZ **LAH55 BN/BNZ**	80	15	23.5	100	75	163 201	126 164	75 95	25.5 34.5	65	18	M12 x 18
LAH65 AN/ANZ **LAH65 BN/BNZ**	90	16	31.5	126	76	193 253	147 207	70 120	38.5 48.5	74	23	M16 x 20

Note: W_1 rail dimensions are on Page 12.



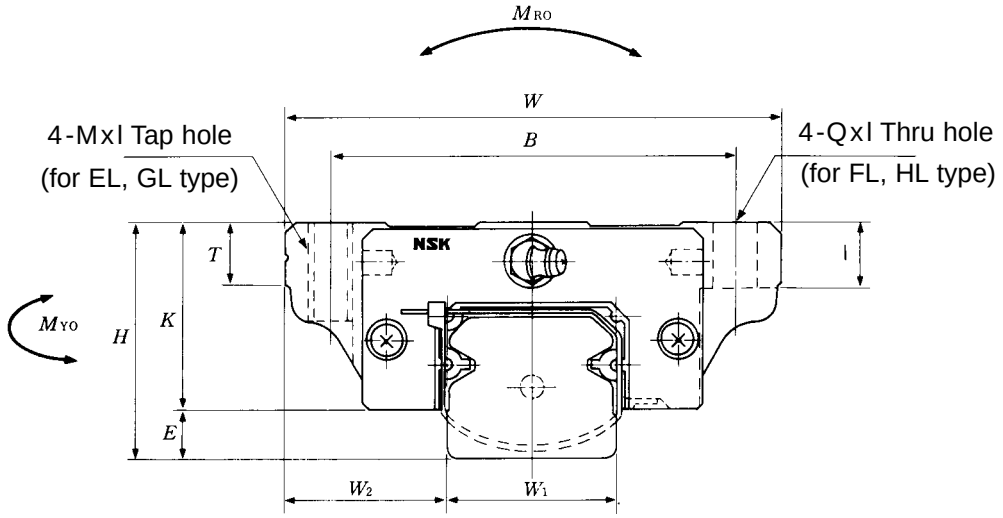
Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kgf)	Model No.
Mounting Hole Thread Spec.	T_1	N	*Dynamic* C (kgf)	*Static* C_0 (kgf)	*Static Moment (kgf•m)* M_{RO}	M_{PO}	M_{YO}		
Ø3 (thru hole)	8.5	3.3	850	1650	10	8	8	0.18	**LAH15 AN/ANZ**
M6x0.75	5	11	1450 1860	2560 4020	22 31	18 35	18 35	0.33 0.48	**LAH20 AN/ANZ** **LAH20 BN/BNZ**
M6x0.75	10	11	2140 2740	4000 5340	36 48	32 54	31 53	0.55 0.82	**LAH25 AN/ANZ** **LAH25 BN/BNZ**
M6x0.75	10	11	2620 3800	4570 7310	50 80	36 86	36 85	0.77 1.3	**LAH30 AN/ANZ** **LAH30 BN/BNZ**
M6x0.75	15	11	3960 5060	7010 9930	96 136	75 144	73 141	1.5 2.1	**LAH35 AN/ANZ** **LAH35 BN/BNZ**
PT1/8	20	13	6740 8130	12100 14900	216 264	170 251	168 248	3 3.9	**LAH45 AN/ANZ** **LAH45 BN/BNZ**
PT1/8	21	13	9940 12000	17100 21100	367 449	293 435	288 426	4.7 6.1	**LAH55 AN/ANZ** **LAH55 BN/BNZ**
PT1/8	19	13	15100 19300	24500 32700	629 834	495 850	484 830	7.7 10.8	**LAH65 AN/ANZ** **LAH65 BN/BNZ**

LH Series Ball Slide Dimension Table

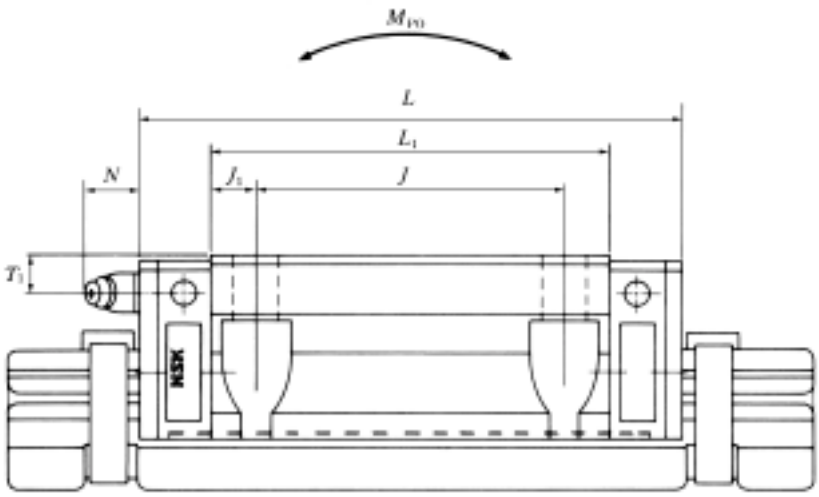
Flange Type

LAH-EL/ELZ
LAH-FL/FLZ



Model No.	Ass'y Dimensions			Ball Slide Dimensions									
	H	*E*	W_2	*W*	*B*	*L*	L_1	*J*	J_1	*K*	*T*	*M* x *l* *Q* x *l*	Bolt Size Thru Hole Q
LAH20 EL/ELZ FL/FLZ **LAH20 GL/GLZ HL/HLZ**	30	5	21.5	63	53	69.8 91.8	50 72	40	5 16	25	10	M 6 x 10 6 x 10	M5
LAH25 EL/ELZ FL/FLZ **LAH25 GL/GLZ HL/HLZ**	36	7	23.5	70	57	79 107	58 86	45	6.5 20.5	29	11	M 8 x 16 7 x 10	M6
LAH30 EL/ELZ FL/FLZ **LAH30 GL/GLZ HL/HLZ**	42	9	31	90	72	98.6 124.6	72 98	52	10 23	33	11	M10 x 18 9 x 12	M8
LAH35 EL/ELZ FL/FLZ **LAH35 GL/GLZ HL/HLZ**	48	9.5	33	100	82	109 143	80 114	62	9 26	38.5	12	M10 x 20 9 x 13	M8
LAH45 EL/ELZ FL/FLZ **LAH45 GL/GLZ HL/HLZ**	60	14	37.5	120	100	139 171	105 137	80	12.5 28.5	46	13	M12 x 24 11 x 15	M10
LAH55 EL/ELZ FL/FLZ **LAH55 GL/GLZ HL/HLZ**	70	15	43.5	140	116	163 201	126 164	95	15.5 34.5	55	15	M14 x 28 14 x 18	M12
LAH65 EL/ELZ FL/FLZ **LAH65 GL/GLZ HL/HLZ**	90	16	53.5	170	142	193 253	147 207	110	18.5 48.5	74	23	M16 x 24 16 x 24	M14

Note : W_1 rail dimensions are on Page 12.



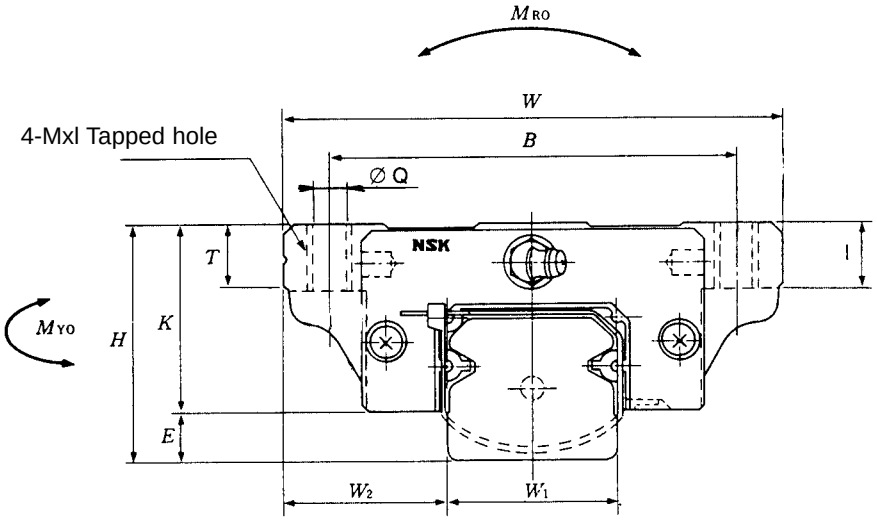
Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kgf)	Model No.	
Mounting Hole Thread Spec.	T_1	N	*Dynamic* C (kgf)	*Static* C_0 (kgf)	*Static Moment (kgf•m)*					
					M_{RO}	M_{PO}	M_{YO}			
M6x0.75	5	11	1450	2560	22	18	18	0.45	**LAH20**	**EL/ELZ FL/FLZ**
			1860	4020	31	35	35	0.65	**LAH20**	**GL/GLZ HL/HLZ**
M6x0.75	6	11	2140	4000	36	32	31	0.63	**LAH25**	**EL/ELZ FL/FLZ**
			2740	5340	48	54	53	0.93	**LAH25**	**GL/GLZ HL/HLZ**
M6x0.75	7	11	2980	5490	60	50	49	1.2	**LAH30**	**EL/ELZ FL/FLZ**
			3800	7310	80	86	85	1.6	**LAH30**	**GL/GLZ HL/HLZ**
M6x0.75	8	11	3960	7010	96	75	73	1.7	**LAH35**	**EL/ELZ FL/FLZ**
			5060	9930	136	144	141	2.4	**LAH35**	**GL/GLZ HL/HLZ**
PT1/8	10	13	6740	12100	216	170	168	3	**LAH45**	**EL/ELZ FL/FLZ**
			8130	14900	264	251	248	3.9	**LAH45**	**GL/GLZ HL/HLZ**
PT1/8	11	13	9940	17100	367	293	288	5	**LAH55**	**EL/ELZ FL/FLZ**
			12000	21100	449	435	426	6.5	**LAH55**	**GL/GLZ HL/HLZ**
PT1/8	19	13	15100	24500	629	495	484	10	**LAH65**	**EL/ELZ FL/FLZ**
			19300	32700	834	850	830	14.1	**LAH65**	**GL/GLZ HL/HLZ**

LH Series Ball Slide Dimension Table

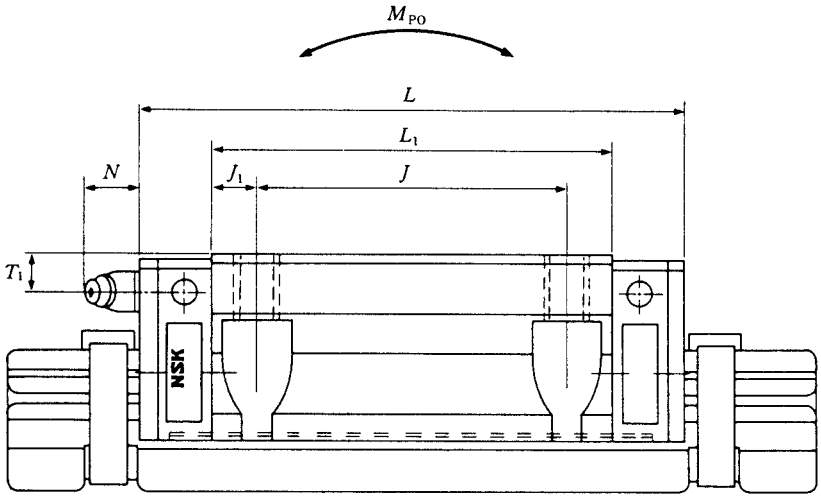
Flange Type

LAH-EM/EMZ
(formerly EL-ELZ-90)
LAH-GM/GMZ
(formerly GL-GLZ-90)



Model No.		Ass'y Dimensions			Ball Slide Dimensions									
		H	*E*	W_2	*W*	*B X J*	*L*	L_1	J_1	*K*	*T*	*M* x *l*	*Ø Q x l*	Bolt Size Thru Hole Q
LAH15	**EM/EMZ** **GM/GMZ**	24	4.6	16	47	38 x 30	55 74	39 58	4.5 14	19.4	8	M5 x 8	Ø4.4 x 8	M4
LAH20	**EM/EMZ** **GM/GMZ**	30	5	21.5	63	53 x 40	69.8 91.8	50 72	5 16	25	10	M6 x 10	Ø5.3 x 10	M5
LAH25	**EM/EMZ** **GM/GMZ**	36	7	23.5	70	57 x 45	79 107	58 86	6.5 20.5	29	11	M8 x 10	Ø6.8 x 10	M6
LAH30	**EM/EMZ** **GM/GMZ**	42	9	31	90	72 x 52	98.6 124.6	72 98	10 23	33	11	M10 x 12	Ø8.6 x 12	M8
LAH35	**EM/EMZ** **GM/GMZ**	48	9.5	33	100	82 x 62	109 143	80 114	9 26	38.5	12	M10 x 13	Ø8.6 x 13	M8
LAH45	**EM/EMZ** **GM/GMZ**	60	14	37.5	120	100 x 80	139 171	105 137	12.5 28.5	46	13	M12 x 15	Ø10.5 x 15	M10
LAH55	**EM/EMZ** **GM/GMZ**	70	15	43.5	140	116 x 95	163 201	126 164	15.5 34.5	55	15	M14 x 18	Ø12.5 x 18	M12
LAH65	**EM/EMZ** **GM/GMZ**	90	16	53.5	170	142 x 110	193 253	147 207	18.5 48.5	74	23	M16 x 24	Ø14.6 x 24	M14

Note : W_1 rail dimensions are on Page 12.



Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kgf)	Model No.	
Mounting Hole Thread Spec.	T_1	N	*Dynamic* C (kgf)	*Static* C_0 (kgf)	*Static Moment (kgf•m)*					
					M_{RO}	M_{PO}	M_{YO}			
Ø3 (thru hole)	4.5	3.3	850 1140	1650 2550	10 15	8 18	8 18	0.17 0.25	**LAH15**	**EM/EMZ** **GM/GMZ**
M6x0.75	5	11	1450 1860	2560 4020	22 31	18 35	18 35	0.45 0.65	**LAH20**	**EM/EMZ** **GM/GMZ**
M6x0.75	6	11	2140 2740	4000 5340	36 48	32 54	31 53	0.63 0.93	**LAH25**	**EM/EMZ** **GM/GMZ**
M6x0.75	7	11	2980 3800	5490 7310	60 80	50 86	49 85	1.2 1.6	**LAH30**	**EM/EMZ** **GM/GMZ**
M6x0.75	8	11.5	3960 5060	7010 9930	96 136	75 144	73 141	1.7 2.4	**LAH35**	**EM/EMZ** **GM/GMZ**
PT1/8	10	13	6740 8130	12100 14900	216 264	170 251	168 248	3 3.9	**LAH45**	**EM/EMZ** **GM/GMZ**
PT1/8	11	13	9940 12000	17100 21100	367 449	293 435	288 426	5 6.5	**LAH55**	**EM/EMZ** **GM/GMZ**
PT1/8	19	13	15100 19300	24500 32700	629 834	495 850	484 830	10 14.1	**LAH65**	**EM/EMZ** **GM/GMZ**

LH Series Rail Dimension Table

Separately Sold Rail for NSK Linear Guide

LH series Standard Rail

L1H : Clearance Interchangeable Type

L1H-Z : Preloaded Interchangeable Type

LH series Butting Rail

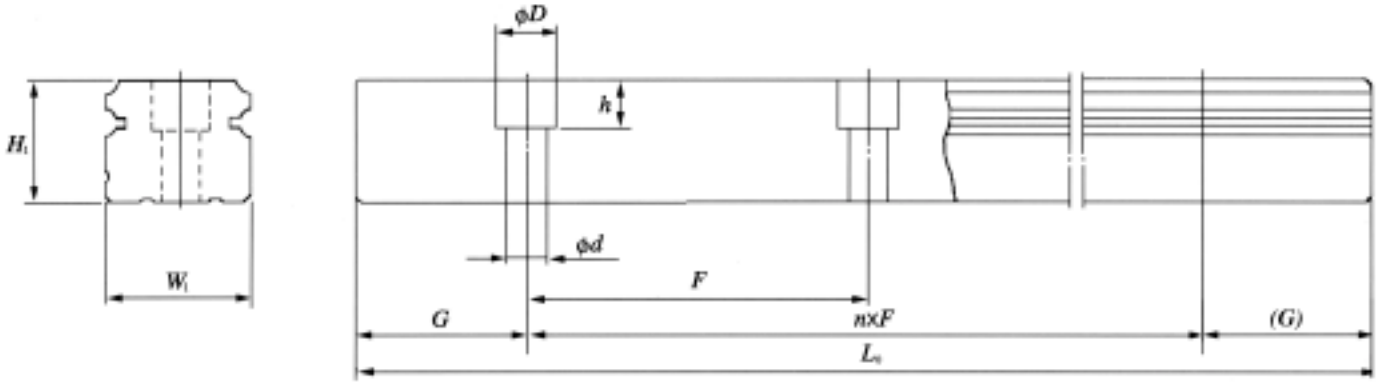
L1H-01 : Clearance Interchangeable Type

L1H-01Z : Preloaded Interchangeable Type

LH series butting rail features higher precision tolerances for L_0 and G dimensions.

L1H 25 1200 - 01 Z F

- Rail Type
- Size No.
- Rail Length (mm)
- No Code: Standard / 01: Butting Rail
- No Code: Clearance Type / Z: Preloaded Type
- No Code: Standard / F: Fluoride Black Chrome Plating



1 mm = 3.937 x 10^{-2} inch

1kgf/m = 6,721 x 10^{-1} Ft/Lb

Rail Dimensions Table Unit: mm

Model No.		Max. length L_0	W_1	H_1	F	d x D x h	Rail Butting G $^{0}_{-0.5}$	Rail Weight (kgf/m)
Standard	Butting	Standard L_0 $^{-2}_{-4}$ Butting L_0 $^{0}_{-1}$						
L1H15 L1H15-Z	**L1H15-01 L1H15-01Z**	1440	15	15	60	4.5 x 7.5 x 5.3	30	1.6
L1H20 L1H20-Z	**L1H20-01 L1H20-01Z**	3960	20	18	60	6 x 9.5 x 8.5	30	2.6
L1H25 L1H25-Z	**L1H25-01 L1H25-01Z**	3960	23	22	60	7 x 11 x 9	30	3.6
L1H30 L1H30-Z	**L1H30-01 L1H30-01Z**	4000	28	26	80	9 x 14 x 12	40	5.2
L1H35 L1H35-Z	**L1H35-01 L1H35-01Z**	4000	34	29	80	9 x 14 x 12	40	7.2
L1H45 L1H45-Z	**L1H45-01 L1H45-01Z**	3990	45	38	105	14 x 20 x 17	52.5	12.3
L1H55 L1H55-Z	**L1H55-01 L1H55-01Z**	3960	53	44	120	16 x 23 x 20	60	16.9
L1H65 L1H65-Z	**L1H65-01 L1H65-01Z**	3900	63	53	150	18 x 26 x 22	75	24.3

Cut to length rails G = F/2 ($^{+0}_{-4mm}$)

LH Series Accessories

Protector and Double Seal

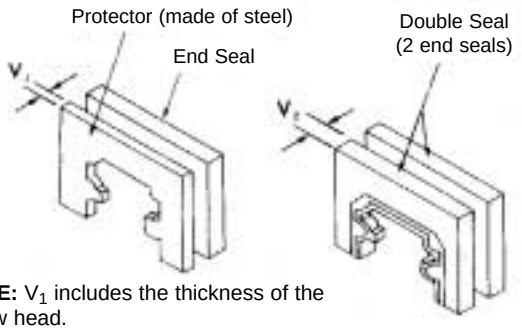
Travel length is reduced by the thickness of the end seal on the ball slide. Consider the value of *V* in the table below when calculating the travel length.

Protector Seal Unit : mm

Linear Guide Model No.	Protector No. Plug End	Protector No. Grease Fitting End	Increased Thickness V1
LH15	LH15PT-01	LH15PTC-01	2.7
LH20	LH20PT-01	LH20PTC-01	2.9
LH25	LH25PT-01	LH25PTC-01	3.2
LH30	LH30PT-01	LH30PTC-01	4.2
LH35	LH35PT-01	LH35PTC-01	4.2
LH45	LH45PT-01	LH45PTC-01	4.9
LH55	LH55PT-01	LH55PTC-01	4.9
LH65	LH65PT-01	LH65PTC-01	5.5

One of each PT and PTC is required to do one linear bearing.

Fig. 8 **Protector and Double Seal**



NOTE: V_1 includes the thickness of the screw head.

Double Seal Unit : mm

Linear Guide Model No.	Double Seal No. Plug End	Double Seal No. Grease Fitting End	Increased Thickness V2
LH15	LH15WS-01	LH15WSC-01	2.5
LH20	LH20WS-01	LH20WSC-01	2.5
LH25	LH25WS-01	LH25WSC-01	2.8
LH30	LH30WS-01	LH30WSC-01	3.6
LH35	LH35WS-01	LH35WSC-01	3.6
LH45	LH45WS-01	LH45WSC-01	4.3
LH55	LH55WS-01	LH55WSC-01	4.3
LH65	LH65WS-01	LH65WSC-01	4.9

One of each WS and WSC is required to do one linear bearing.

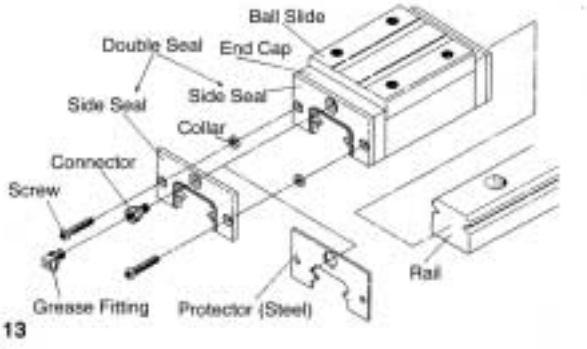


Fig. 13

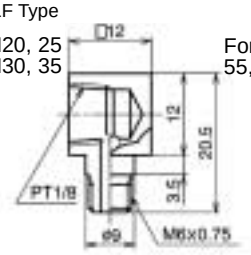
***NOTE:** - The protector (steel) is always ahead of the side or double seal.

Adapters

These parts connect piping to the tapped hole when the grease fitting is removed.

Fig. 6 LF Type

For LH20, 25 LH30, 35



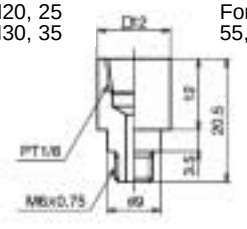
Reference No.:
L80206021-301

For LH45, 55, 65

Reference No.:
L80200029-302

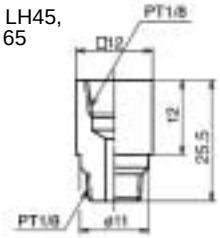
Fig. 7 SF Type

For LH20, 25 LH30, 35



Reference No.:
L80106021-301

For LH45, 55, 65



Reference No.:
L80100025-301

Plastic Cap for Rail Mounting Hole

Linear Guide Model No.	Rail Mounting Bolt Size	Cap. No. for Rail Mounting Hole
LH15	M4	L45800004-003
LH20	M5	L45800005-003
LH25	M6	L45800006-003
LH30	M8	L45800008-003
LH35		
LH45	M12	L45800012-003
LH55	M14	L45800014-003
LH65	M16	L45800016-003

Brass Cap for Rail Mounting Hole

Linear Guide Model No.	Rail Mounting Bolt Size	Cap. No. for Rail Mounting Hole
LH20	M5	L45800005-004
LH25	M6	L45800006-004
LH30	M8	L45800008-004
LH35		
LH45	M12	L45800012-004

LS Series
Identification Number

Refer to the following numbering system when ordering.

Ball Slide (Stocked item)

LAS 25 AL S Z- K2P

- LAS: Ball slide
- 25: Size No.
- AL: Ball slide Shape code
- S: * Stainless steel
- Z: Light preload; No code: Clearance
- K2P: Refer to page 4

Rail (Stocked item)

L1S 25 3960 S Z

- L1S: Rail
- 25: Size No.
- 3960: Rail length (mm)
- S: *Stainless steel
- Z: Light preload; No code: Clearance

Flanged Type
- LS-EL (High Load) with 4 Tapped Holes
- LS-FL (High Load) with 4 Thru Holes
- LS-KL (Medium Load) with 2 Thru Holes

Square Type
- LS-AL (High Load) with 4 Tapped Holes
- LS-CL (Medium Load) with 2 Tapped Holes

Both types have stainless steel series.

Fig.-1 LS-AL, LS-CL

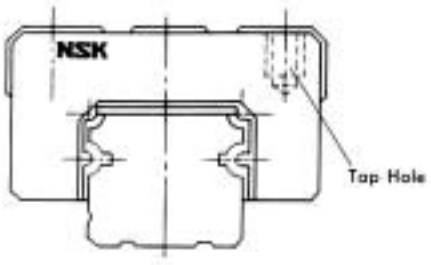
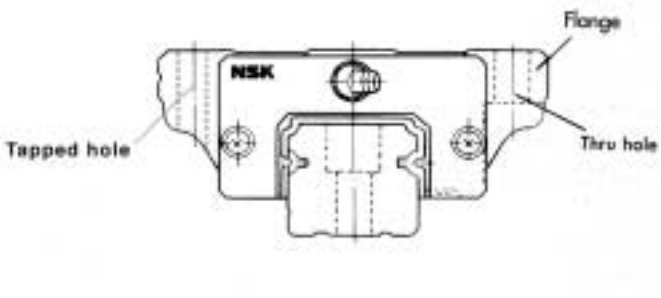


Fig.-2 LS-EL, LS-FL, LS-KL



Radial Clearance and Preload

The clearance when interchangeable rail and ball slide components are combined is as listed in Table 2. Minus symbol indicates the preload.

Table 2 Clearance of Interchangeable Linear Guide Unit: μm

Model No.	Clearance	Light Preload Z
LS15	15~−4	0~−4
LS20	15~−4	0~−4
LS25	15~−5	0~−5
LS30	15~−5	0~−5
LS35	15~−5	0~−6

*Consult NSK for price and delivery.

Accuracy Standard

The accuracy standard of the NSK “Compact Low Profile LS-Series” is shown in Table 1. With high-accuracy control of individual rail size and interchangeability, the accuracy of Table 1 can be maintained sufficiently even after addition or replacement of the ball slide.

Table 1 Tolerances **Unit : μm**

Tolerances (See Fig. 4 for Symbols)		Model No. LS
		15, 20, 25, 30, 35
Clearance Type	Overall Height, *H*	±20
	Lateral Width, W_2	±30
Preload Type	Overall Height, *H*	±20
	Lateral Width, W_2	±30
Running Parallelism of Face C to Face A Running Parallelism of Face D to Face B		Refer to Fig. 4

W_2 is applicable to the reference side only. Note during installation the reference side is indicated by a line provided on the side of ball slide and rail. (See Fig. 4)

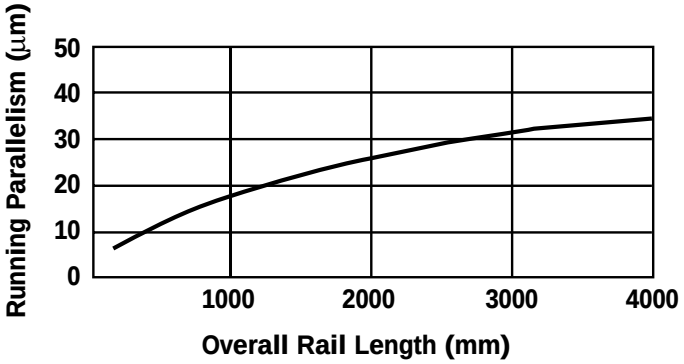


Fig. 3 Running Parallelism

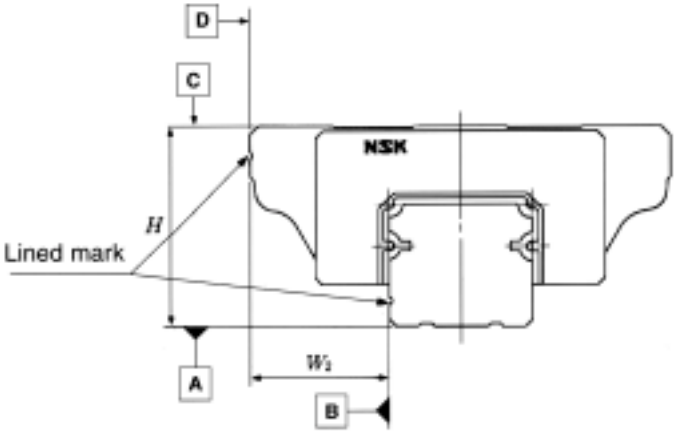


Fig. 4 Accuracy Standard

Load Rating and Life

The LS-Series is based on a design applying load from above. Therefore the dimension table shows the basic dynamic load rating C and basic static load rating C_0 for the downward direction. If the load is applied laterally or upward refer to values in Table 2.

Table 2 Basic Load Rating Correction for Direction

Load Direction	Basic Dynamic Load Rating	Basic Static Load Rating
Downward	C	C_0
Upward	C	$0.75C_0$
Laterally	0.88C	$0.63C_0$

Estimate the life of linear guides using the equation below.

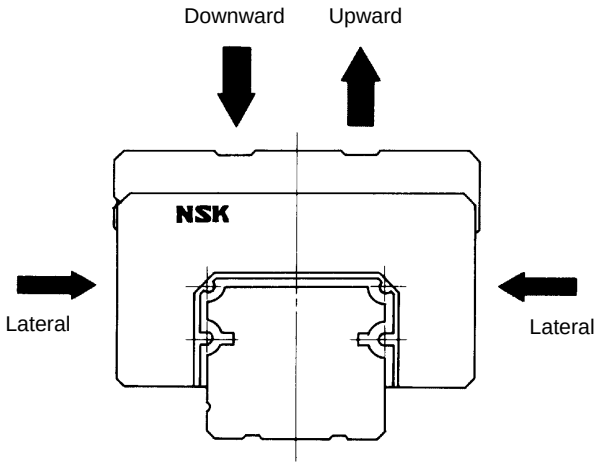


Fig. 5

$$L = 50\left(\frac{C}{f_W \cdot F}\right)^3$$

where, *L* : Rated fatigue life(km)

C : Basic dynamic load rating (kgf)

F : Load to a ball slide (kgf)
(Dynamic equivalent load)

f_W : Load factor

f_W =1.0 ~ 1.2 (Smooth condition)

f_W =1.2 ~ 1.5 (Normal condition)

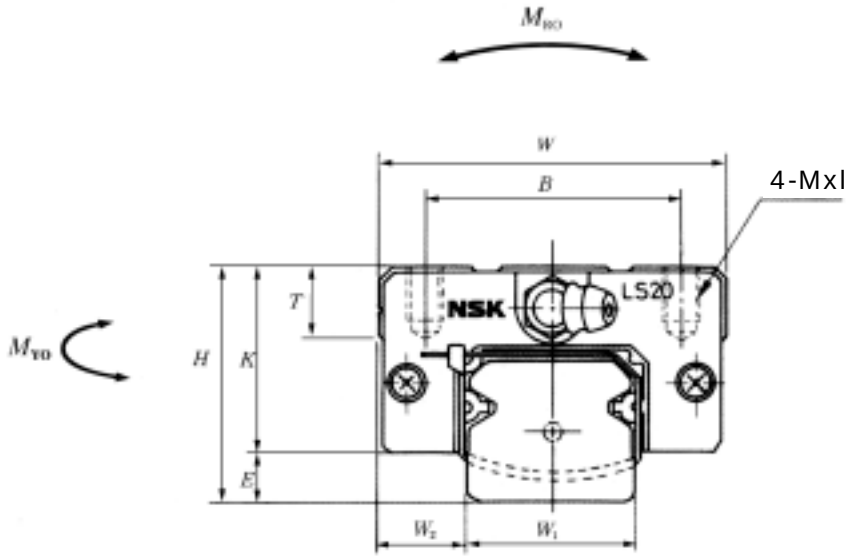
f_W =1.5 ~ 3.0 (With shock or vibration)

LS Series Ball Slide Dimension Table

Square Type

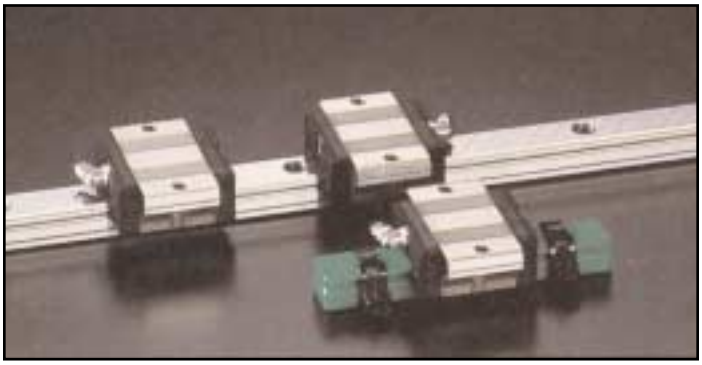
LAS-CL (Z) : Standard Steel
LAS-AL (Z) :
LAS-CLS (Z) : Stainless Steel
LAS-ALS (Z) :

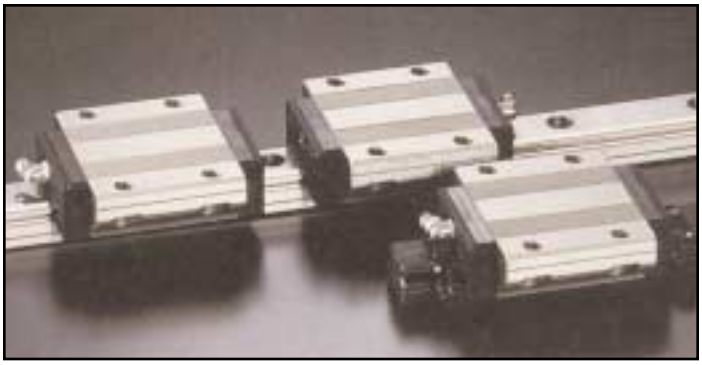
Note: Consult NSK for price and delivery on stainlees steel.

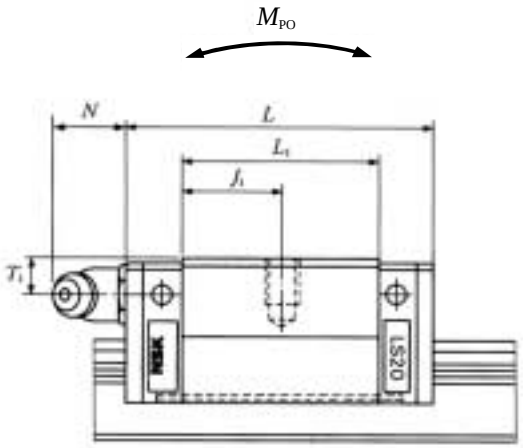


Model No.	Ass'y Dimensions			Ball Slide Dimensions								
	H	*E*	W_2	*W*	*B*	*L*	L_1	*J*	J_1	*K*	*T*	*M* x *l*
LAS15 CL/CLZ **LAS15 AL/ALZ**	24	4.6	9.5	34	26	40.4 56.8	23.6 40	— 26	11.8 7	19.4	10	M 4 x 6
LAS20 CL/CLZ **LAS20 AL/ALZ**	28	6	11	42	32	47.2 65.2	30 48	— 32	15 8	22	12	M 5 x 7
LAS25 CL/CLZ **LAS25 AL/ALZ**	33	7	12.5	48	35	59.6 81.6	38 60	— 35	19 12.5	26	12	M 6 x 9
LAS30 CL/CLZ **LAS30 AL/ALZ**	42	9	16	60	40	67.4 96.4	42 71	— 40	21 15.5	33	13	M 8 x 12
LAS35 CL/CLZ **LAS35 AL/ALZ**	48	10.5	18	70	50	77 108	49 80	— 50	24.5 15	37.5	14	M 8 x 12

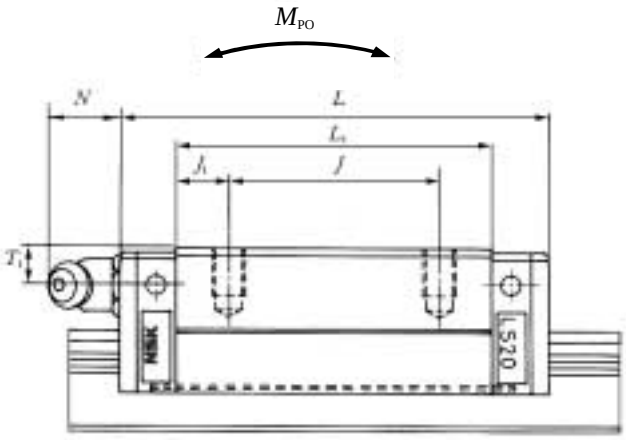
Note: W_1 rail dimensions are on Page 20.







LAS-CL/CLZ



LAS-AL/ALZ

Unit : mm

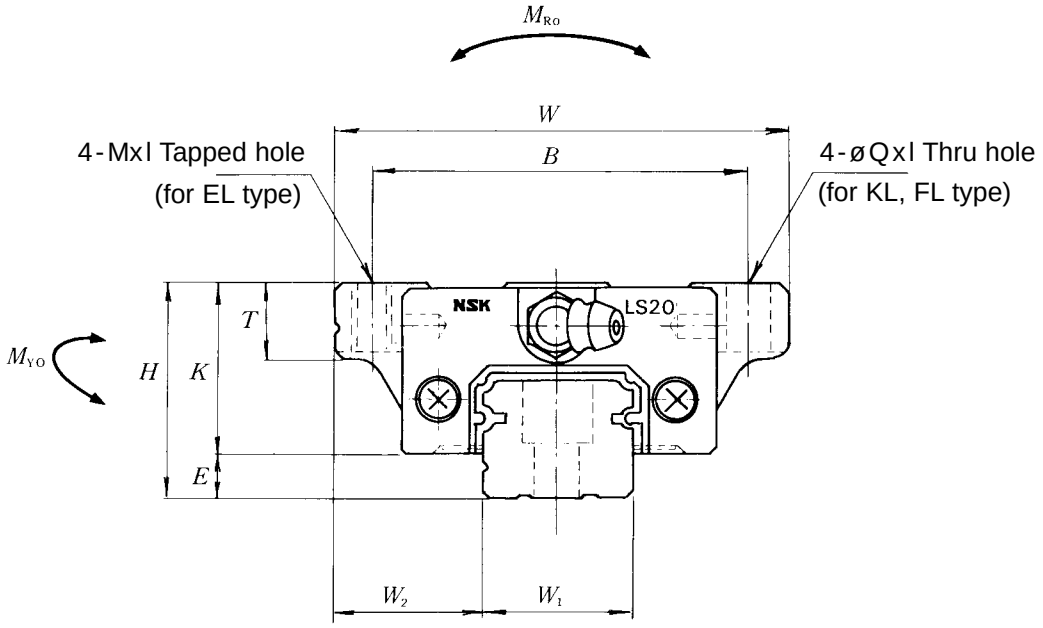
Grease Fitting			Basic Load Ratings					Weight (kgf)	Model No.
Mounting Hole Thread Spec.	T_1	N	*Dynamic* C (kgf)	*Static* C_0 (kgf)	*Static Moment (kgf•m)* M_{RO}	M_{PO}	M_{YO}		
Ø3 (Thru Hole)	6	3	465 685	845 1270	4 7	2 5	2 5	0.14 0.20	**LAS15 CL/CLZ** **LAS15 AL/ALZ**
M6x0.75	5.5	11	670 910	1240 1780	9 13	4 9	4 9	0.19 0.28	**LAS20 CL/CLZ** **LAS20 AL/ALZ**
M6x0.75	7	11	1080 1470	1900 2970	14 25	7 21	7 20	0.34 0.51	**LAS25 CL/CLZ** **LAS25 AL/ALZ**
M6x0.75	8	11	1620 2390	2700 4400	25 48	11 36	11 36	0.58 0.85	**LAS30 CL/CLZ** **LAS30 AL/ALZ**
M6x0.75	8.5	11	2250 3320	3650 5940	42 79	18 58	18 57	0.86 1.25	**LAS35 CL/CLZ** **LAS35 AL/ALZ**

LS Series Ball Slide Dimension Table

Flange Type

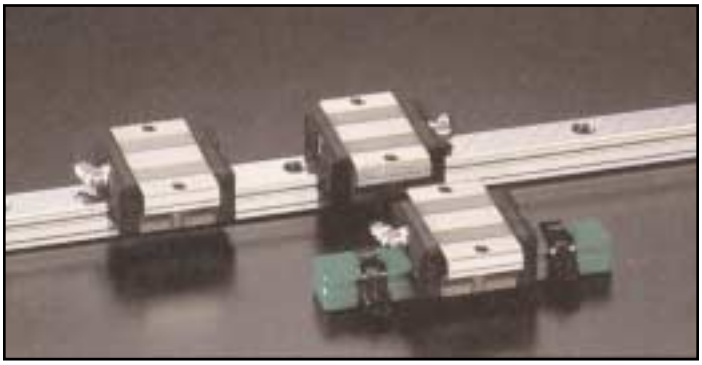
LAS-KL (Z) : Standard Steel
LAS-FL (Z) :
LAS-EL (Z) :
LAS-KLS (Z) : Stainless Steel
LAS-KLS (Z) :

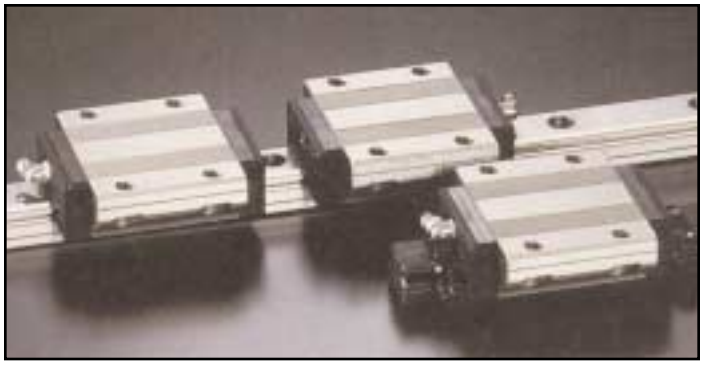
Note: Consult NSK for price and delivery on stainless steel.

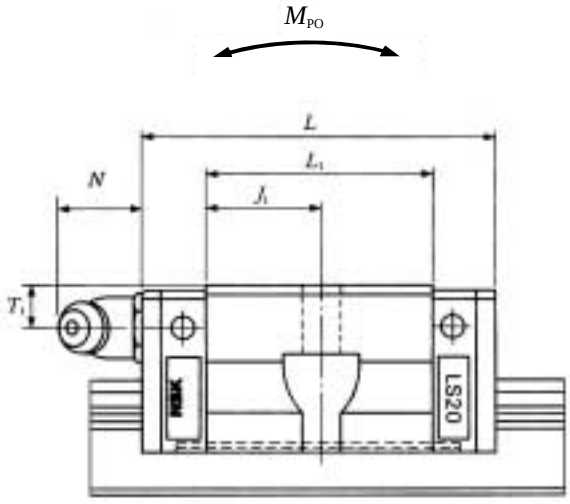


Model No.	Ass'y Dimensions			Ball Slide Dimensions									
	H	*E*	W_2	*W*	*B x J*	*L*	L_1	J_1	*K*	*T*	Q x I	M x I	Bolt Size Thru Hole Q
LAS15 KL/KLZ	24	4.6	18.5	52	41	40.4	23.6	11.8	19.4	8	4.5 x 7	M 5 x 8	M4
LAS15 FL/FLZ					41 x 26	56.8	40	7			4.5 x 7		M4
LAS15 EL/ELZ					41 x 26	56.8	40	7					
LAS20 KL/KLZ	28	6	19.5	59	49	47.2	30	15	22	10	5.5 x 9	M 6 x 10	M5
LAS20 FL/FLZ					49 x 32	65.2	48	8			5.5 x 9		M5
LAS20 EL/ELZ					49 x 32	65.2	48	8					
LAS25 KL/KLZ	33	7	25	73	60	59.6	38	19	26	11	7 x 10	M 8 x 12	M6
LAS25 FL/FLZ					60 x 35	81.6	60	12.5			7 x 10		M6
LAS25 EL/ELZ					60 x 35	81.6	60	12.5					
LAS30 KL/KLZ	42	9	31	90	72	67.4	42	21	33	11	9 x 12	M 10 x 18	M8
LAS30 FL/FLZ					72 x 40	96.4	71	15.5			9 x 12		M8
LAS30 EL/ELZ					72 x 40	96.4	71	15.5					
LAS35 KL/KLZ	48	10.5	33	100	80	77	49	24.5	37.5	12	9 x 13	M 10 x 20	M8
LAS35 FL/FLZ					82 x 50	108	80	15			9 x 13		M8
LAS35 EL/ELZ					82 x 50	108	80	15					

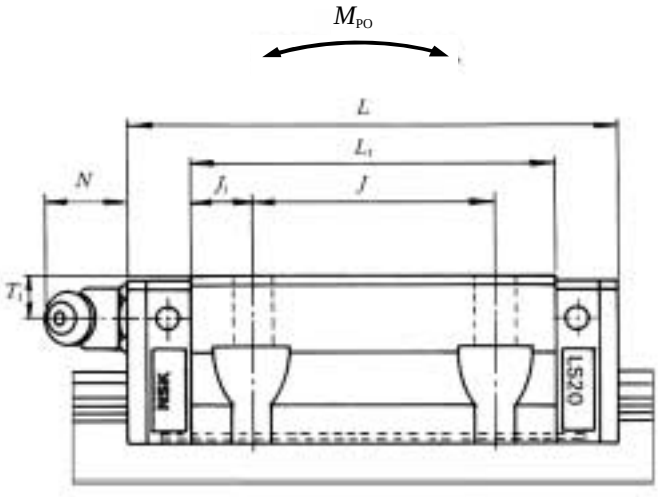
Note: W_1 rail dimensions are on Page 20.







LAS-KL/KLZ



LAS-FL/FLZ
LAS-EL/ELZ

Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kgf)	Model No.
Mounting Hole Thread Spec.	T_1	N	*Dynamic* C (kgf)	*Static* C_0 (kgf)	*Static Moment (kgf•m)* M_{RO}	M_{PO}	M_{YO}		
Ø3 (Thru Hole)	6	3	465 685 685	845 1270 1270	4 7 7	2 5 5	2 5 5	0.17 0.26 0.26	**LAS15 KL/KLZ** **LAS15 FL/FLZ** **LAS15 EL/ELZ**
M6x0.75	5.5	11	670 910 910	1240 1780 1780	9 13 13	4 9 9	4 9 9	0.24 0.35 0.35	**LAS20 KL/KLZ** **LAS20 FL/FLZ** **LAS20 EL/ELZ**
M6x0.75	7	11	1080 1470 1470	1900 2970 2970	14 25 25	7 21 21	7 20 20	0.44 0.66 0.66	**LAS25 KL/KLZ** **LAS25 FL/FLZ** **LAS25 EL/ELZ**
M6x0.75	8	11	1620 2390 2390	2700 4400 4400	25 48 48	11 36 36	11 36 36	0.76 1.2 1.2	**LAS30 KL/KLZ** **LAS30 FL/FLZ** **LAS30 EL/ELZ**
M6x0.75	8.5	11	2250 3320 3320	3650 5940 5940	42 79 79	18 58 58	18 57 57	1.2 1.7 1.7	**LAS35 KL/KLZ** **LAS35 FL/FLZ** **LAS35 EL/ELZ**

LS Series Rail Dimension Table

Separately Sold Rail for NSK Linear Guide

LS series Standard Rail

L1S : Clearance Interchangeable Type

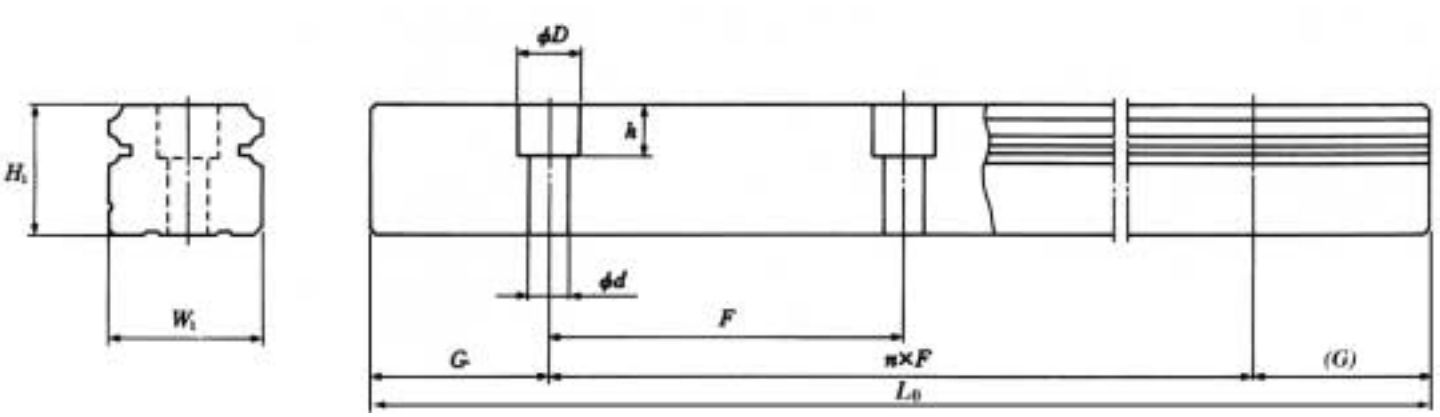
L1S-Z : Preloaded Interchangeable Type

Identification Number

Rail

L1S 25 3960 T S Z

- Type Code
- Size No.
- Rail Length (mm)
- Preload Code — No Code : Non-Preload; Z: Preload (Table 2)
- Material Code — No Code : Standard Steel; S: Stainless Steel – *
- For L1S15 Rail Size Only: No code: Counterbore hole in rail for M3; T: Counterbore hole in rail for M4



Model No.	Rail Dimensions						
	Weight W_1	H_1	Pitch F	Bolt Hole d x D x H	G Recommended	Max. rail length L_0 max. ( ) indicates Stainless Steel	Weight Rail (kgf/m)
L1S15	15	12.5	60	3.5x6x4.5	20	1600 (1000)	1.4
L1S15T	15	12.5	60	4.5x7.5x5.3	20	1600 (1000)	1.4
L1S20	20	15.5	60	6x9.5x8.5	30	3960 (3500)	2.3
L1S25	23	18	60	7x11x9	30	3960 (3500)	3.1
L1S30	28	23	80	7x11x9	40	4000 (3500)	4.8
L1S35	34	27.5	80	9x14x12	40	4000 (3500)	7.0

Cut to length rails G = F/2 ($^{+0}_{-4mm}$)

* Consult NSK for price and delivery.

LS Series Accessories

Protector and Double Seal

Travel length is reduced by the thickness of the end seal on the ball slide. Consider the value of *V* in the table below when calculating the travel length.

Protector Seal Unit : mm

Linear Guide Model No.	Protector No. Plug End	Protector No. Grease Fitting End	Increased Thickness V1
LS15	LS15PT-01	LS15PTC-01	3.0
LS20	LS20PT-01	LS20PTC-01	2.7
LS25	LS25PT-01	LS25PTC-01	3.2
LS30	LS30PT-01	LS30PTC-01	4.2
LS35	LS35PT-01	LS35PTC-01	4.2

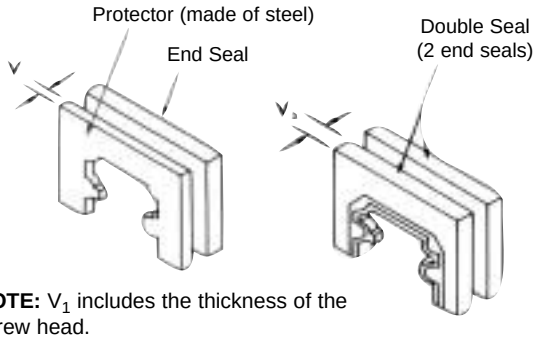
One of each PT and PTC is required to do one linear bearing.

Double Seal Unit : mm

Linear Guide Model No.	Double Seal No. Plug End	Double Seal No. Grease Fitting End	Increased Thickness V2
LS15	LS15WS-01	LS15WSC-01	2.8
LS20	LS20WS-01	LS20WSC-01	2.5
LS25	LS25WS-01	LS25WSC-01	2.8
LS30	LS30WS-01	LS30WSC-01	3.6
LS35	LS35WS-01	LS35WSC-01	3.6

One of each WS and WSC is required to do one linear bearing.

Fig. 7 **Protector and Double Seal**



NOTE: V_1 includes the thickness of the screw head.

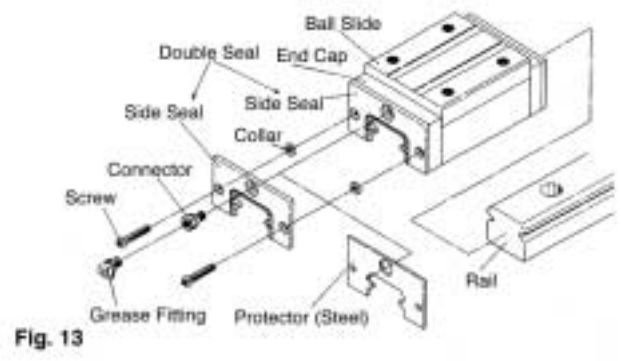


Fig. 13

***NOTE:** - The protector (steel) is always ahead of the side or double seal.

Adapter

These parts connect piping to the tapped hole when the grease fitting is removed.

Fig. 5 LF Type Adapter No. L80206021-301

For LS20, 25
LS30, 35

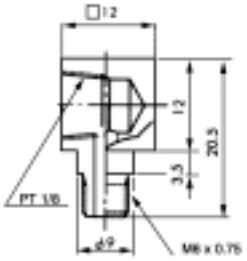


Fig. 6 SF Type Adapter No. L80106021-301

For LS20, 25
LS30, 35

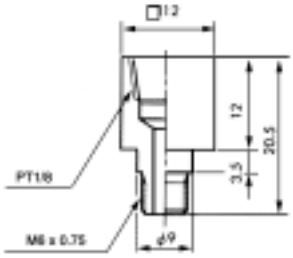


Table 12 Cap for Rail Mounting Hole

Linear Guide Model No.	Rail Mounting Bolt Size	Cap. No. for Rail Mounting Hole
LS15	M3	L45800003-003
LS20	M5	L45800005-003
LS25	M6	L45800006-003
LS30		
LS35	M8	L45800008-003

Brass Cap for Rail Mounting Hole

Linear Guide Model No.	Rail Mounting Bolt Size	Cap. No. for Rail Mounting Hole
LS20	M5	L45800005-004
LS25	M6	L45800006-004
LS30		
LS35	M8	L45800008-004

LU Series

Identification Number

Refer to the following numbering system when ordering.

Ball Slide (Stocked item)

LAU 12 AR S

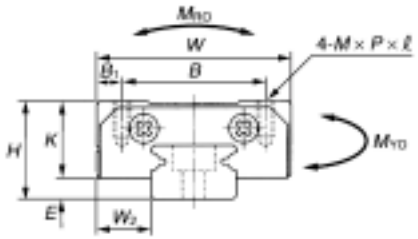
- S: No code: Clearance type; S: Stainless Steel
- AR: Square; TR: Square (Large Tapped hole)
- Size No.
- Interchangeable Ball Slide Type

Rail (Stocked item)

L1U 12 0120 T S

- S: Stainless Steel, no code: standard
- T: Bolt hole large, no code: standard
- Rail length (mm)
- Size No.
- Rail Type

Ball Slide

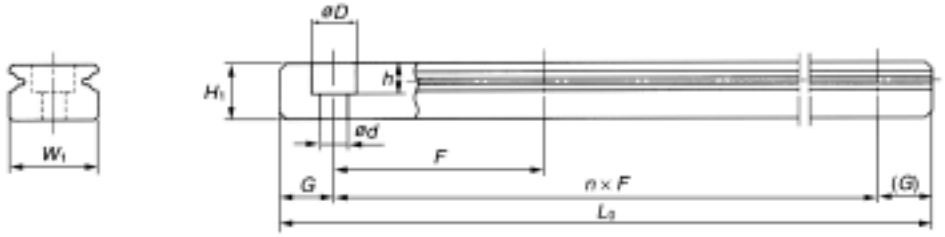


LU series ball slide dimension

Unit: mm

Model No.	Assembly Dimension			Ball Slide Dimensions									Basic Load Rating					Weight
	Height		Width	Length			Tapped Hole						Dynamic	Static	Static Moment (kgf•m)			
								Thread					C	C_0				
	H	E	W_2	W	L	B	J	M x P x l	B_1	L_1	J_1	K	(kgf)	(kgf)	M_{RO}	M_{PO}	M_{YO}	(gf)
LAU09ARS **LAU09TRS**	10	2.2	5.5	20	30	15	13 10	M2 x 0.4 x 2.5 M3 x 0.5 x 3	2.5	20	3.5 5	7.8	120	180	0.9	0.5	0.5	19
LAU12ARS **LAU12TRS**	13	3	7.5	27	35.2	20	15	M2.5 x 0.45 x 3 M3 x 0.5 x 3.5	3.5	21.8	3.4	10	220	250	2.2	1.2	38	38
LAU15ALS	16	4	8.5	32	43.6	25	20	M3 x 0.5 x 4	3.5	27	3.5	12	440	460	4.3	2.2	2.2	70

Rail



LU series rail dimension

Unit: mm

Model No.	Standard Length (in stock)				Rail Dimension						Weight
					Width	Length	Bolt pitch	Bolt hole	G	Rail length	
					W_1	H_1	F	d x D x h	(Standard)	$L_{0\ max}$	(gf/100mm)
L1U09*S **L1U09*TS**	115	195	275		9	5.5	20	2.6 x 4.5 x 3 3.5 x 6 x 4.5	7.5	275	35
L1U12*S **L1U12*TS**	170	270	470	800	12	7.5	25	3 x 5.5 x 3.5 3.5 x 6 x 4.5	10	800	65
L1U15*S	230	430	670	990	15	9.5	40	3.5 x 6 x 4.5	15	1000 (Stainless: 670)	105

*Stainless Steel

LE Series

Identification Number

Refer to the following numbering system when ordering.

Ball Slide (Stocked item)

LAE 12 AR S

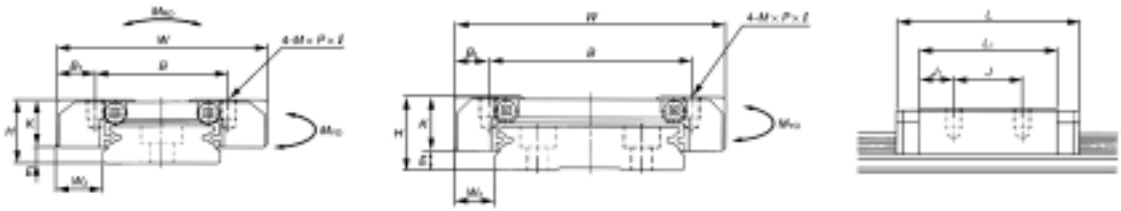
- No code: Clearance type
  S: Stainless Steel
- AR: Square
  TR: Square (Large Tapped hole)
- Size No.
- Interchangeable Ball Slide Type

Rail (Stocked item)

L1E 12 0120 S

- S: Stainless Steel
- Rail length (mm)
- Size No.
- Rail Type

Ball Slide

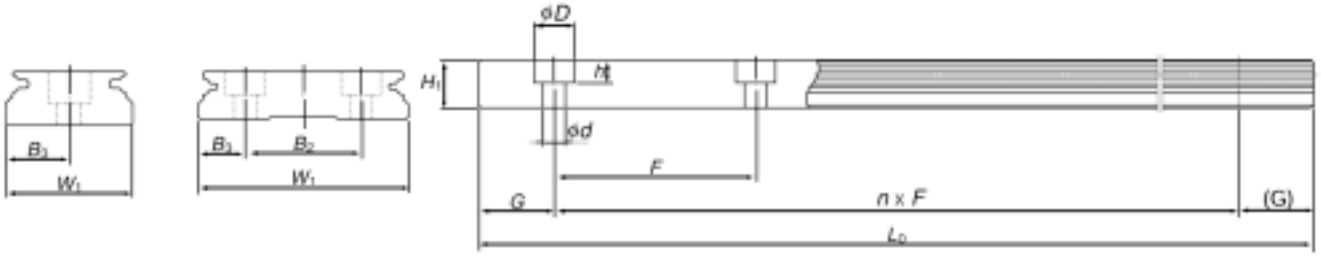


LE series ball slide dimension

Unit: mm

Model No.	Assembly Dimension			Ball Slide Dimensions									Basic Load Rating					Weight
	Height			Width	Length		Tapped Hole						Dynamic	Static	Static Moment (kgf•m)			
								Thread					C	C_0				
	H	E	W_2	W	L	B	J	M x P x l	B_1	L_1	J_1	K	(kgf)	(kgf)	M_{RO}	M_{PO}	M_{YO}	(gf)
LAE09ARS **LAE09TRS**	12	4	6	30	39.8	21	12	M2.6 x 0.45 x 3 M3 x 0.5 x 3	4.5	27.6	7.8	8	250	380	3.3	1.7	1.7	40
LAE12ARS	14	4	8	40	45	28	15	M3 x 0.5 x 4	6.0	31	8	10	360	540	6.0	2.4	2.4	75
LAE15ARS	16	4	9	60	56.6	45	20	M4 x 0.7 x 4.5	7.5	38.4	9.2	12	630	890	17.7	4.9	4.9	150

Rail



LE series rail dimension

Unit: mm

Model No.	Standard Length (in stock)				Rail Dimension								Weight
					Width	Length	Bolt pitch			Bolt hole	G hole	Rail length	
					W_1	H_1	F	B_2	B_3	d x D x h	(Standard)	$L_{0\ max}$	(gf/100mm)
L1E09*S	110	200	290	380	18	7.5	30	–	9	3.5 x 6 x 4.5	10	400	95
L1E12*S	150	310	470	790	24	8.5	40	–	12	4.5 x 8 x 4.5	15	800	140
L1E15*S	230	430	670	990	42	9.5	40	23	9.5	4.5 x 8 x 4.5	15	1000	275

*Stainless Steel

LW Series

Identification Number

Refer to the following numbering system when ordering.

Ball Slide (Stocked item)

LAW 27 EL Z

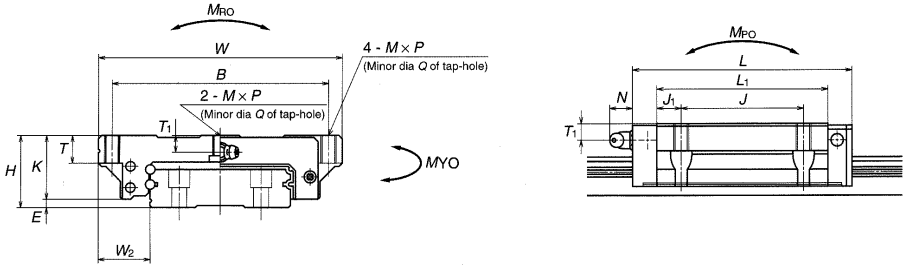
- Z: Light Preload / No Code : Clearance
- EL: Flanged (Tapped hole)
- Size No.
- Interchangeable Ball Slide Type

Rail (Stocked item)

L1W 27 0820 Z

- Z: Light Preload / No Code : Clearance
- Rail length (mm)
- Size No.
- Rail Type

Ball Slide

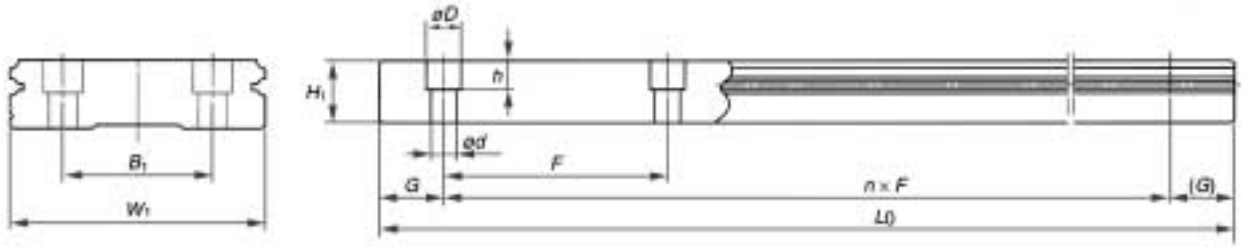


LW series ball slide dimension

Unit: mm

Model No.	Assembly Dimension					Ball Slide Dimensions											Basic Load Rating					Weight
						Tapped Hole								Grease fitting					Static Moment (kgf•m)			
	Height			Width	Length		Thread										Dynamic	Static				
	H	*E*	W_2	*W*	*L*	*B* x *J*	*M* x P	T_1	*Q*	L_1	J_1	*K*	*T*	*Thread*	T_1	*N*	*C*(kgf)	C_0(kgf)	M_{RO}	M_{PO}	M_{YO}	(kgf)
LAW17EL/ELZ	17	2.5	13.5	60	51.4	53 x 26	M4 x 0.7	3.2	3.3	35	4.5	14.5	6	ø3 thru hole	4	3	430	930	11.6	3.7	3.4	0.2
LAW21EL/ELZ	21	3	15.5	68	58.8	60 x 29	M5 x 0.8	3.7	4.4	41	6	18	8	M6 x 0.75	4.5	11	480	1080	15.0	4.8	4.5	0.3
LAW27EL/ELZ	27	4	19	80	74	70 x 40	M6 x 1	6	5.3	56	8	23	10	M6 x 0.75	6	11	1000	2200	35.6	14.3	13.8	0.5
LAW35EL/ELZ	35	4	25.5	120	108	107 x 60	M8 x 1.25	8	6.8	84	12	31	14	M6 x 0.75	8	11	2620	5340	149.5	54.4	53.3	1.5
LAW50EL/ELZ	50	4.5	36	162	140.6	144 x 80	M10 x 1.5	14	8.6	108	14	45.5	18	PT 1/8	14	14	4840	9350	347.0	128.9	126.2	4.0

Rail



LW series rail dimension

Unit: mm

Model No.	Standard Length (in stock)					Rail Dimension						Weight
						Width W_1	Height H_1	Bolt pitch *F*	B_1	Bolt hole *d* x D x *h*	G (Standard)	Rail length $L_{0\ max}$	(kgf/m)
L1W17	430	670	990			33	8.7	40	18	4.5 x 7.5 x 5.3	15	1000	2.1
L1W21	430	680	980			37	10.5	50	22	4.5 x 7.5 x 5.3	15	1600	2.9
L1W27	460	640	820	1000		42	15	60	24	4.5 x 7.5 x 5.3	20	2000	4.7
L1W35	440	600	760	1000	1240	69	19	80	40	7 x 11 x 9	20	2400	9.6
L1W50	440	600	760	1000	1240	90	24	80	60	9 x 14 x 12	20	3000	15.8

Assembly

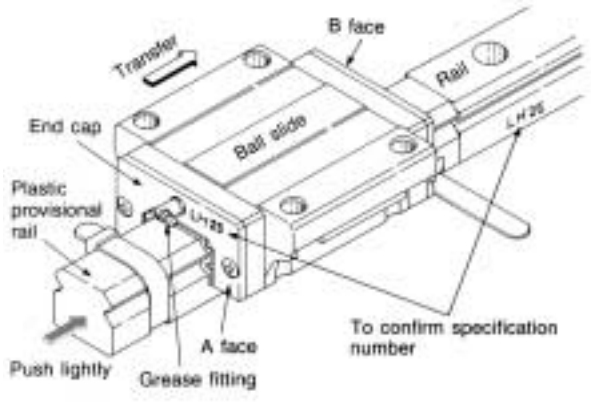
Interchangeable ball slides are shipped on (disposable) plastic provisional rails as shown in Fig.-9.

① Wipe off anticorrosive oil from the rail.

② Since Alvania (AV2) grease is packed in the ball slide, you can use it as delivered.

③ Align the rail with bottom and side faces of provisional rail and while pushing the provisional rail lightly against the rail, slide the ball slide on to the rail (Fig.-9).

Fig. -9 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 6 and illustrated in Figs. 10 and 11, to avoid interference.

Table 6 Shoulder height and corner shape at mounting face (LH, LS Series) **Unit : mm**

Product No.	Radius of corner *r* (max.)	Shoulder Height of Rail *H'*	Shoulder Height of Ball Slide *H"*
15	0.5	4.0	4
20	0.5	4.5	5
25	0.5	5	5
30	0.5	6	6
35	0.5	6	6
45	0.7	8	8
55	0.7	10	10
65	1.0	11	11

Fig. -10 Rail Datum Face Mounting Part

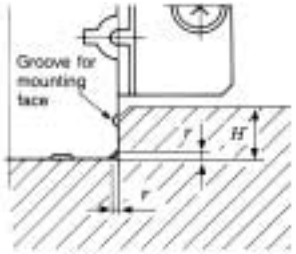
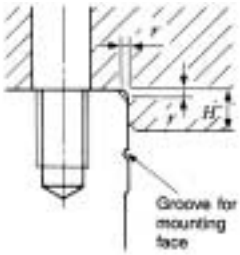


Fig. -11 Ball Slide Datum Face Mounting Part



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. 12).

② Tighten rail mounting bolts to their recommended torques (Table 7). Tighten the bolts in an order which enables the wrench to help push the rail against the mounting surface (see Fig. 13 for example).

Fig. -12 Positioning of Rail

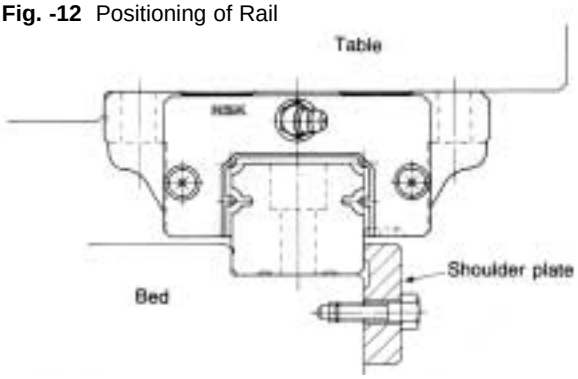
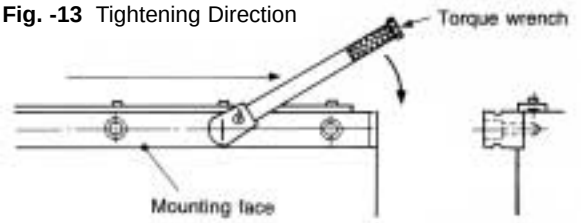


Table 7 Recommended Torque for Rail Mounting Bolt (case of thermally refined bolt) Unit : kgf•cm

Bolt Nominal No.	Torque	Bolt Nominal No.	Torque
M3	10.8	**M10**	440
M4	25	**M12**	770
M5	52	**M14**	1240
M6	88	**M16**	2000
M8	220		

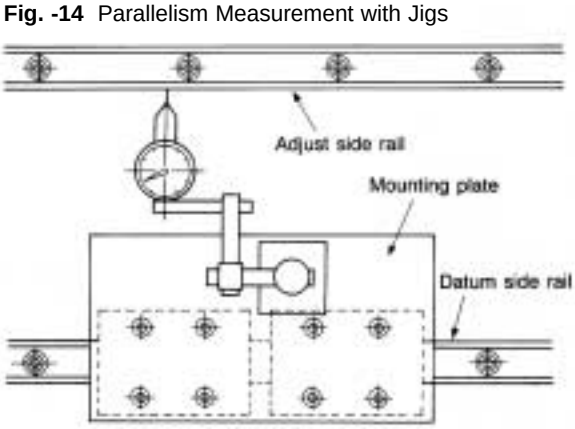
[1 kg•cm=0.8681 Lb in]

Fig. -13 Tightening Direction



③ Mount the adjust side rail, as shown in Fig.-14, while checking rail parallelism. For the jig shown in Fig.-14, stability will be improved by mounting it on 2 ball slide.

Fig. -14 Parallelism Measurement with Jigs



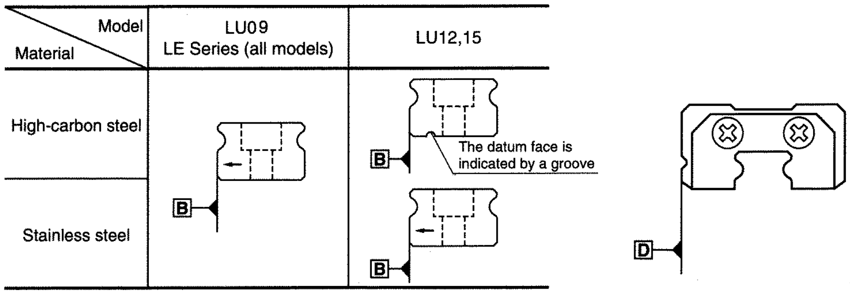
④ If dowel pins are being used they should be installed at this step.

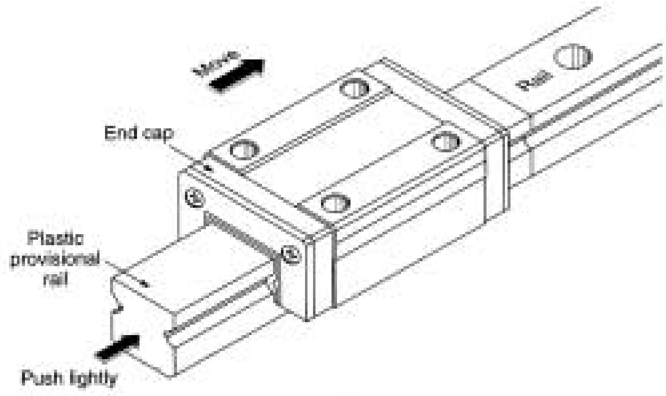
⑤ Position the ball slides at specified intervals and mount the table gently.

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.





Notes on Usage

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

(1) Wipe anti-rust oil from the rail.

(2) Product is ready for use as is since Alvania 2 grease is sealed inside the ball slide.

(3) Note the groove mark which identifies the datum faces of ball slide and rail above.

(4) Move the ball slide, matching and slightly pushing the base and the side of provisional rail to the rail as in drawing at left.

Lubrication

Grease Lubrication

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

(1) 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.

(2) Change of Fitting Position in Front/Back Direction

① Remove the plug from the grease fitting mounting hole face B shown in Fig.-9 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.

(3) 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. Piping joints are listed on page 13 and page 21. 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.

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

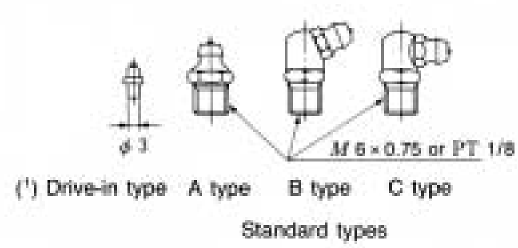
Using LH45 as an example, N = 45, and

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

GREASE FITTINGS FOR NSK BALL SLIDES

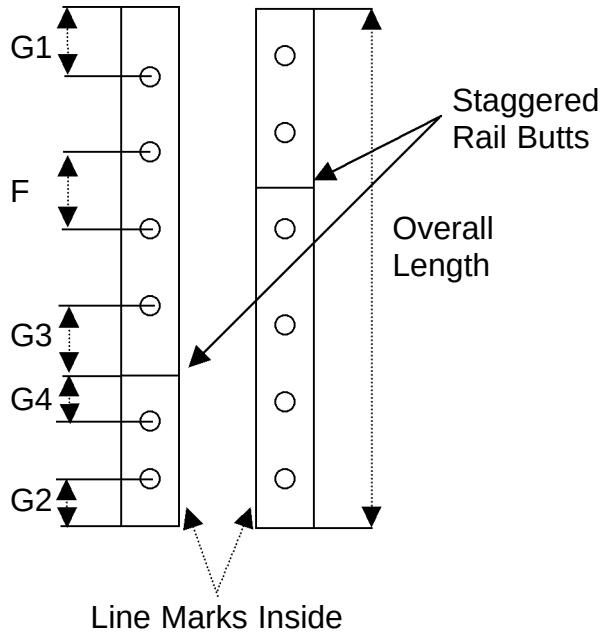
TYPE	LINEAR GUIDE MODEL #	GREASE FITTING PART #	THREAD SPEC.
DRIVE	LH15, LS15, LW17	L50010000-301	DIA. 3MM
A	LH,LS 20,25,30,35	L50000000-001	M6X0.75MM
B	SAME	L50100000-001	M6X0.75MM
C	SAME PLUS LW21, 27, 35	L50200000-001	M6X0.75MM
A	LH 45, 55, 65	L50003000-001	PT 1/8
B	SAME	L50103000-001	PT 1/8
C	SAME PLUS LW50	L50203000-001	PT 1/8

Fig. -15 Shape of Grease Fitting



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

Application Sheet
Linear Guides – Rail Butting



In order to determine rail butting configuration, please photocopy and complete this form from our catalogue and fax back to NSK. An electronic copy is available please contact our customer service.

Quantity _____ Rail Number: _____

_____

G1 Dimension: _____ mm G2 Dimension: _____ mm

F Dimension: _____ mm

Note: Make sure line marks are inside for Rail Butting.

Consists of _____ G1= _____ G3= _____

_____ G2= _____ G4= _____

_____

Company: _____

Contact Name: _____

Telephone: _____ Fax: _____

Date: _____ E-Mail: _____

Remarks: _____

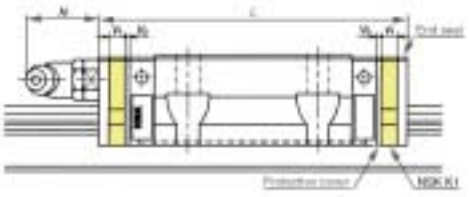
K1 Identification Number

Refer to the following numbering system when ordering.

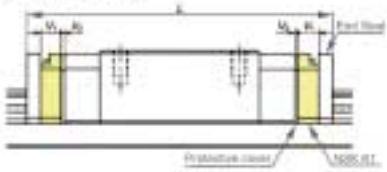
Example: **LA H 30 AN Z - K**

- LA — Interchangeable ball slide
- H — Series code
- 30 — Size number
- AN — Ball slide shape code
- Z — Preload code (Z: in case of a light preload)
- K — NSK K1 equipped

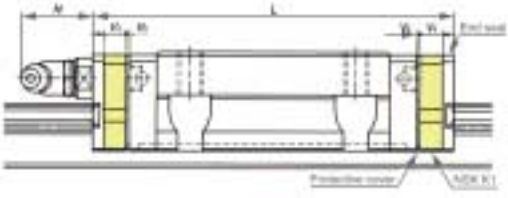
LH, LS Series



LU, LE Series



LW Series



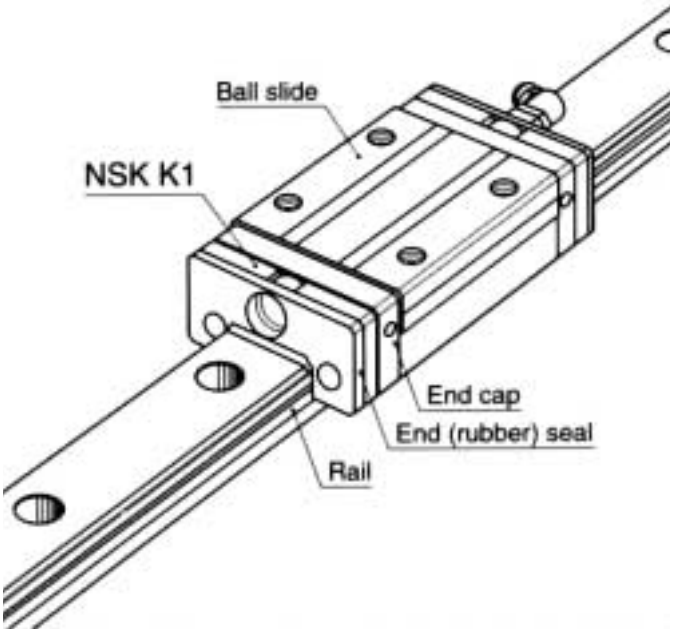
Note: For more bearing seal options see page 4.

Interchangeable Linear Guide Dimensions – LH, LS, LW, LU, LE Series Unit: mm

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 GM		55 74	65.6 84.6	4.5	0.8	(5)
LAH20	AN BN	EL GL	FL HL	69.8 91.8	80.4 102.4	4.5	0.8	(14)
LAH25	AN BN	EL GL	FL HL	79 107	90.6 118.6	5.0	0.8	(14)
LAH30	AN BN	 EL GL	 FL HL	85.6 98.6 124.6	97.6 110.6 136.6	5.0	1.0	(14)
LAH35	AN BN	EL GL	FL HL	109 143	122 156	5.5	1.0	(14)
LAH45	AN BN	EL GL	FL HL	139 171	154 186	6.5	1.0	(15)
LAH55	AN BN	EL GL	FL HL	163 201	178 216	6.5	1.0	(15)
LAH65**	AN BN	EL GL	FL HL	193 253	211 271	8.0	1.0	(16)
LAS15	AL CL	EL	FL KL	56.8 40.4	66.4 50	4.0	0.8	(5)
LAS20	AL CL	EL	FL KL	65.2 47.2	75.8 57.8	4.5	0.8	(14)
LAS25	AL CL	EL	FL KL	81.4 59.4	92 70	4.5	0.8	(14)
LAS30	AL CL	EL	FL KL	96.4 67.4	108.4 79.4	5.0	1.0	(14)
LAS35	AL CL	EL	FL KL	108 77	121 90	5.5	1.0	(14)
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	86.6	5.5	0.8	(13)
LAW35	EL			108	123	6.5	1.0	(13)
LAW50	EL			140.6	155.6	6.5	1.0	(14)
LAU09	AR	TR		30	36.4	2.7	0.5	–
LAU12	AR	TR		35.2	42.2	3.0	0.5	–
LAU15			AL	43.6	51.8	3.5	0.6	–
LAE09	AR	TR		39.8	46.8	3.0	0.5	–
LAE12	AR			45	53	3.5	0.5	–
LAE15	AR			56.6	66.2	4.0	0.8	–

* For Protector and Double Seal Information for LH Series please see page 14.
For Protector and Double Seal Information for LS Series please see page 22.
**Contact NSK for information on assembly instructions.

K1 Lubrication Unit Handling and Assembly Instructions



Handling Instructions

To maintain the NSK K1 Seal'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-AV2, ester-PS2) present no problems to the K1 lubricating units 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 seal 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	9.81
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	0.03937
inch	mm	25.4