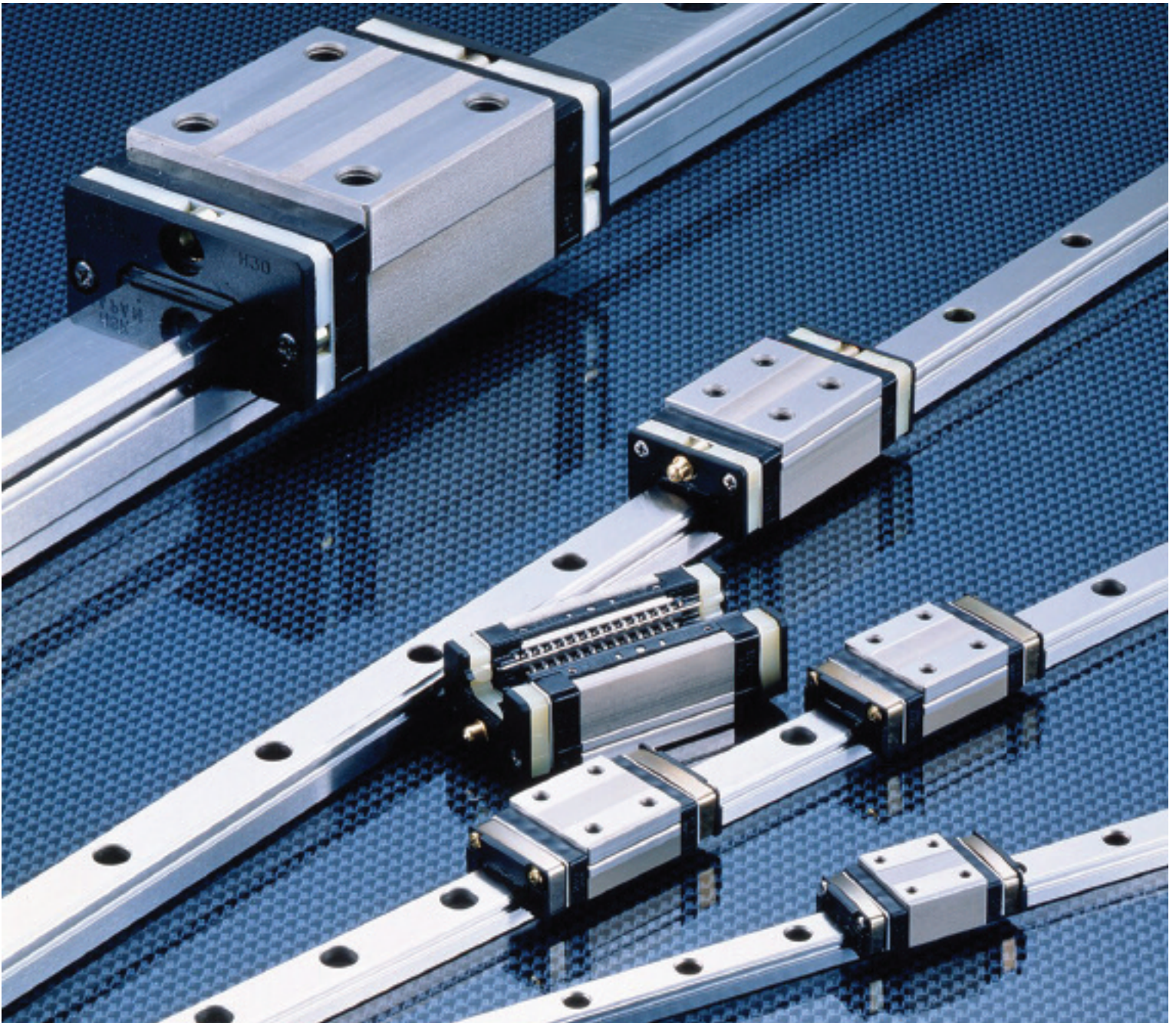


NSK Linear Guides

Interchangeable Series for Automotive Assembly Equipment

Ball slides and rails are sold separately for maximum flexibility.
Standard stock ensures short delivery time.



- **LH Series for High Load Capacity Applications**
- **Interchangeable Rails and Ball Slides**
- **Universal Flanged Sliders for Flexible Mounting Options**
- **Large Inventory for Prompt Delivery**

CONTENTS

	PAGE
Features and Benefits	3
LH Series Slider Types	4
Accuracy Standards – LH Series Load Rating and Life Calculation.	5
Dimensional Tables – LH Series AN, ANZ, BN, BNZ Square Ball Slides.	6, 7
Dimensional Tables – LH Series EM, EMZ, GM, GMZ Universal, Flanged Ball Slides	8, 9
Dimensional Tables – LH Series Rails	10
Accessories – LH Series.	11
Application Sheet – Rail Butting	12
K1 Maintenance Free Lubrication System	13
K1 Lubrication Unit Dimensions	14
K1 Handling and Assembly Instructions	15
Linear Guides Equipped with High Performance Seal	16, 17
Linear Guide Interchange	18
NSK Interchangeable Part Numbering System: LH Sliders	19
NSK Interchangeable Part Numbering System: LH Rail.	20
NSK Interchangeable Part Numbering System: LH Assemblies.	21
NSK Dowel Hole Design Standard for LH Linear Guides.	22, 23, 24, 25
Unit Conversion Chart.	26
NSK Precision America, Inc. Overview	27

CAD DRAWING DATA

For 2D DXF files, go to NSK Precision America’s website by visiting www.nskprecision.com. Click on “Downloads” in the left-hand navigation bar to access 2D DXF files.



To obtain 3D file downloads for components shown in this catalog, NSK Precision America, Inc. offers these products in native and natural 3D CAD formats utilizing the latest technology from PARTsolutions. Downloading NSK’s native files via the web saves time by allowing our components to be placed directly into your designs quickly and easily. Through PARTsolutions’ PARTserver, you can add accessories to either assemblies or the interchangeable components and generate custom-configured drawings as well as the actual part number for the final products.

To access NSK linear guides on PARTsolutions, click on the “Powered by PARTsolutions” logo from our website.

FEATURES and BENEFITS

Interchangeability of Rail and Ball Slide

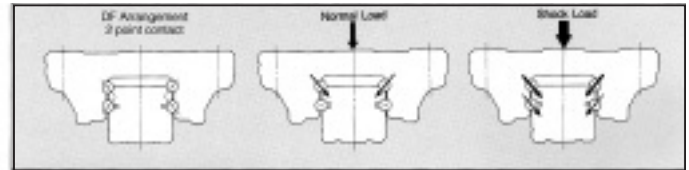
One important feature of the Gothic arch is its ability to make high accuracy measurements on both the ball slide and rail, allowing for their interchangeability. This means that replacement ball slides and/or rail can be purchased individually or as assemblies.

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.

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 Sliders EM and GM

NSK has incorporated both through and tapped holes into one flanged slider for a combination of mounting applications. EM sliders are flanged standard length blocks, and the GM sliders are flanged long blocks.

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.

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

K1 Maintenance Free Lubrication System

NSK's patented K1 Lubrication Units are available with our interchangeable linear guides. K1 lubrication units are available from stock and provide long-term maintenance free operation. For lubrication intense applications, multiple K1 Lubrication Units can be added for extended maintenance free operation. Contact NSK for details.

High Performance (HP) Seal for Improved dust-proofing and enhanced durability

NSK's new triple-lip seal dramatically reduces contaminants from entering the slider and ensures higher grease retention. In conjunction with our K1 Lubrication unit, the HP seal reduces contamination to less than 1/10 of standard linear guide side seals.

Short Delivery Time

We can ship from our large inventory, both standard and custom cut-to-length linear rails. NSK Precision America also produces linear guides at our ISO9002 manufacturing facility in Franklin, Indiana.

Armoly Corrosion-Resistant Coatings

NSK uses industry acceptable Armoly coatings upon request. Please contact NSK Precision America for details.

Rail Modifications

NSK can modify rail ends to your specifications for bellows clip attachment.

Dowel Holes

NSK can modify rails and/or sliders with locating dowel holes to industry specifications.

Scrapers

NSK sliders can be custom configured to include an optional scraper to remove debris like weld flash from the rail and prevent contamination from entering the slider.

Rail Caps

NSK offers plastic or brass rail caps to prevent debris build-up in the rail mounting holes.

NSK LH Series Linear Guides now in the GM Standards Library.

3D models of the LH Series are available in your format through PARTsolutions. See page 2 for more information.

LH Series Slider Types AN/BN EM/GM

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

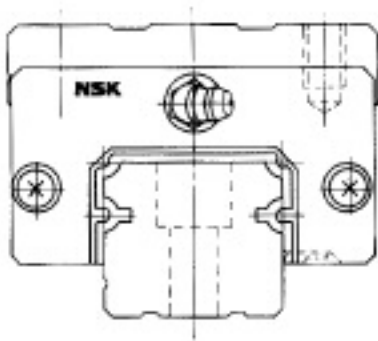
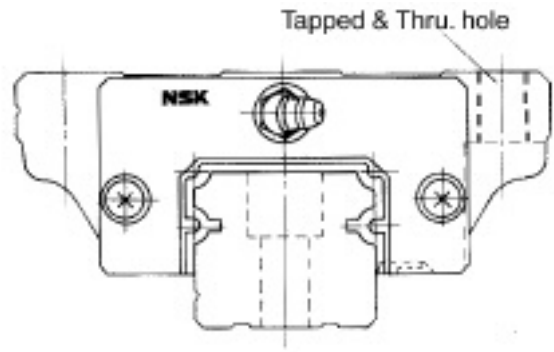


Fig.-2 LH-EM, LH-GM TYPE



Internal Clearance and Preload

The following table shows the maximum allowable clearance and preload amounts in microns for the corresponding LH sizes.

Table 1 **Unit: μm**

LH 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 (For Clearance Preload Type) **Unit : μm**

Tolerances (See Fig. 4 for Symbols)	Model No. LH	
	15, 20, 25, 30, 35	45,55,65
Mounting Height, H	± 20	± 30
Variation of Mounting Height, H	15 ⁽¹⁾ 30 ⁽²⁾	20 ⁽¹⁾ 35 ⁽²⁾
Mounting Width, W_2 or W_2	± 30	± 30
Variation of Mounting Width, W_2 or W_2	± 25	± 30
Running Parallelism of Face C to Face A Running Parallelism of Face D to Face B	Refer to Fig. 3	

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)

1. Variation on the same rail.
2. Variation on multiple rails.

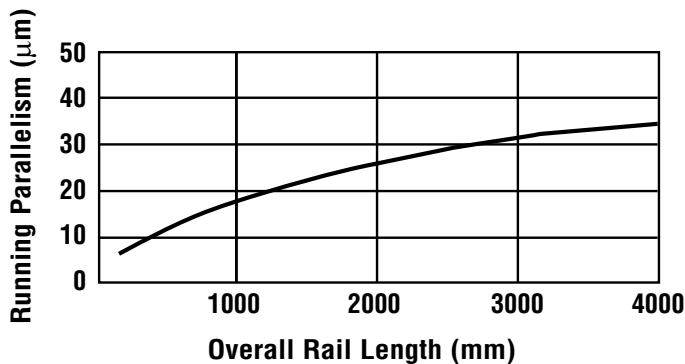


Fig. 3 Running Parallelism

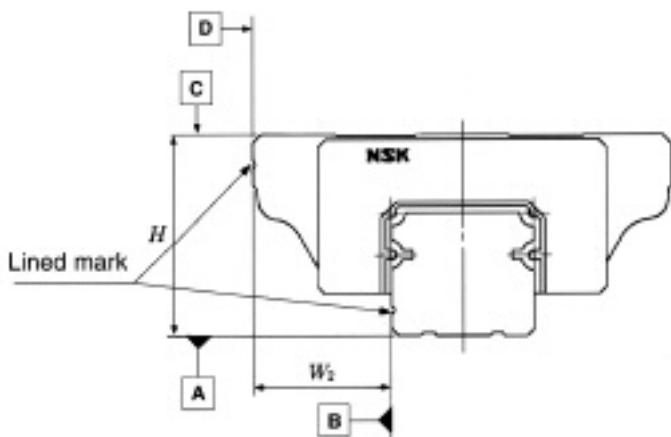


Fig. 4 Accuracy Standard

Load Rating and Life

Load ratings shown for LH-Series assume vertical radial loads. The following table demonstrates how to factor lateral loading.

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.

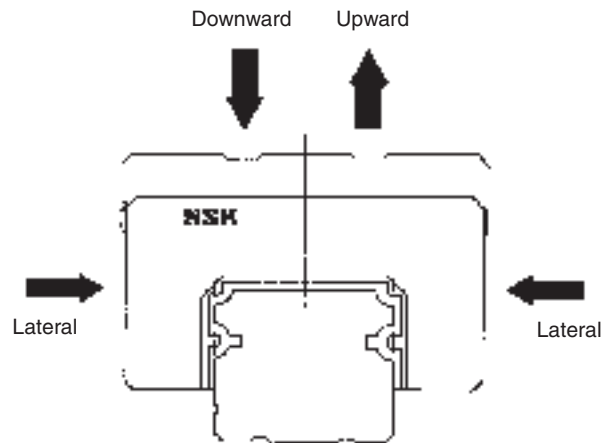


Fig. 5

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

where, L : Rated fatigue life(km)

C : Basic dynamic load rating (N)

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

f_w : Load factor

$f_w = 1.0 \sim 1.2$ (Smooth condition)

$f_w = 1.2 \sim 1.5$ (Normal condition)

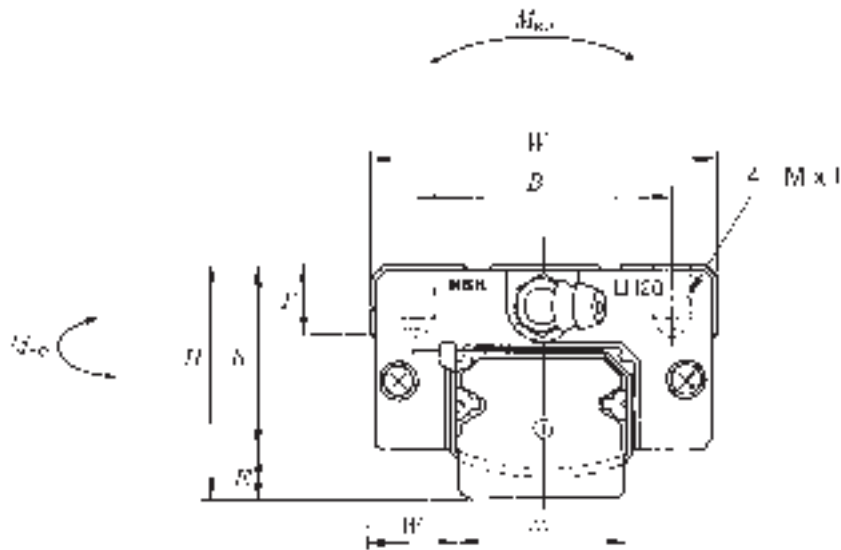
$f_w = 1.5 \sim 3.0$ (With shock or vibration)

LH Series Ball Slide Dimension Table

**REFER TO
PAGES 13 TO 15
REGARDING TECHNICAL
INFORMATION FOR THE
K1 MAINTENANCE-FREE
LUBRICATION SYSTEM**

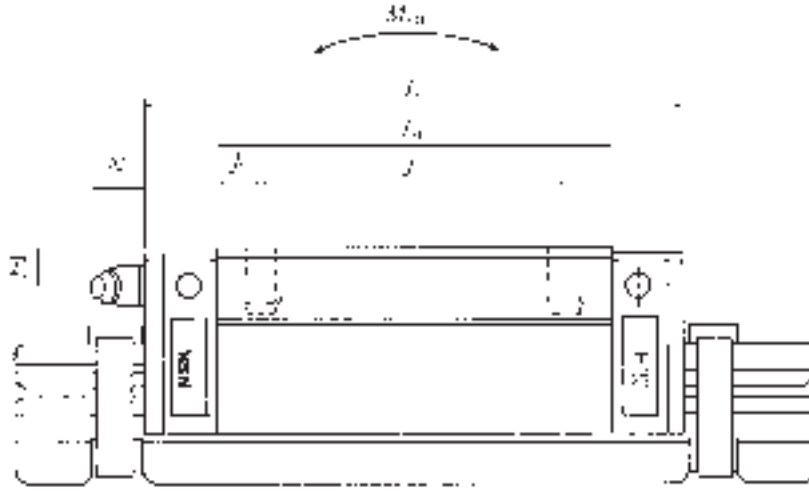
Square Type

**LAH-AN (Clearance), LAH-ANZ (Preload) Standard Length
LAH-BN (Clearance), LAH-BNZ (Preload) Long Block**



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 LAH15 BN/BNZ	28	4.6	9.5	34	26	55 74	39 58	26	6.5 16	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: W₁ rail dimensions are on Page 10.



Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kg)	Model No.
Mounting Hole Thread Spec.	T_1	N	Dynamic C (N)	Static C_0 (N)	Static Moment (N-m)				
					M_{RO}	M_{PO}	M_{VO}		
Ø3 (thru hole)	8.5	3.3	10800	20700	108	95	80	0.18	LAH15 AN/ANZ LAH15 BN/BNZ
			14600	32000	166	216	181	0.26	
M6x0.75	5	11	17400	32500	219	185	155	0.33	LAH20 AN/ANZ LAH20 BN/BNZ
			23500	50500	340	420	355	0.48	
M6x0.75	10	11	25600	46000	360	320	267	0.55	LAH25 AN/ANZ LAH25 BN/BNZ
			34500	71000	555	725	610	0.82	
M6x0.75	10	11	31000	51500	490	350	292	0.77	LAH30 AN/ANZ LAH30 BN/BNZ
			46000	91500	870	1030	865	1.3	
M6x0.75	15	11	47500	80500	950	755	630	1.5	LAH35 AN/ANZ LAH35 BN/BNZ
			61500	117000	1380	1530	1280	2.1	
PT1/8	20	13	81000	140000	2140	1740	1460	3	LAH45 AN/ANZ LAH45 BN/BNZ
			99000	187000	2860	3000	2520	3.9	
PT1/8	21	13	119000	198000	3600	3000	2510	4.7	LAH55 AN/ANZ LAH55 BN/BNZ
			146000	264000	4850	5150	4350	6.1	
PT1/8	19	13	181000	281000	6150	4950	4150	7.7	LAH65 AN/ANZ LAH65 BN/BNZ
			235000	410000	8950	10100	8450	10.8	

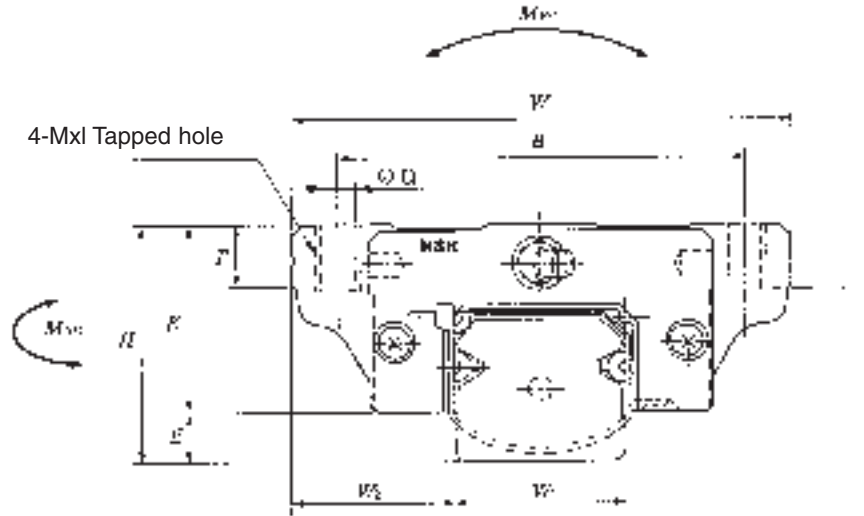


LH Series Ball Slide Dimension Table

**REFER TO
PAGES 13 TO 15
REGARDING TECHNICAL
INFORMATION FOR THE
K1 MAINTENANCE-FREE
LUBRICATION SYSTEM**

Universal Block Flange Type

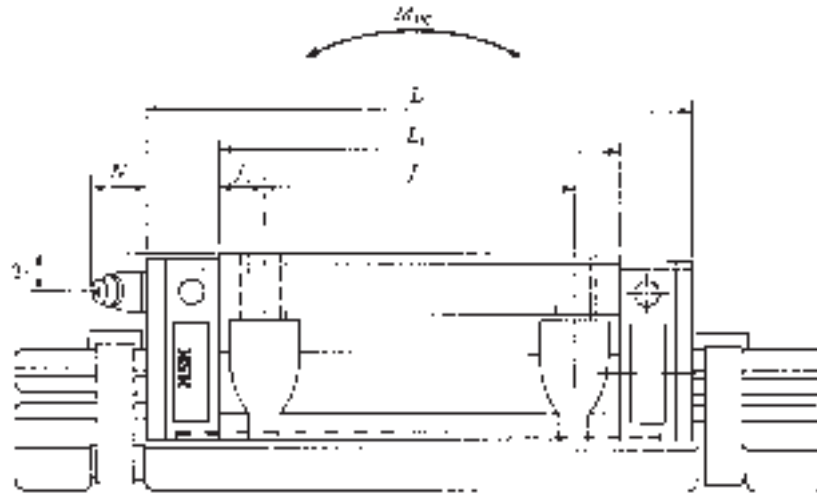
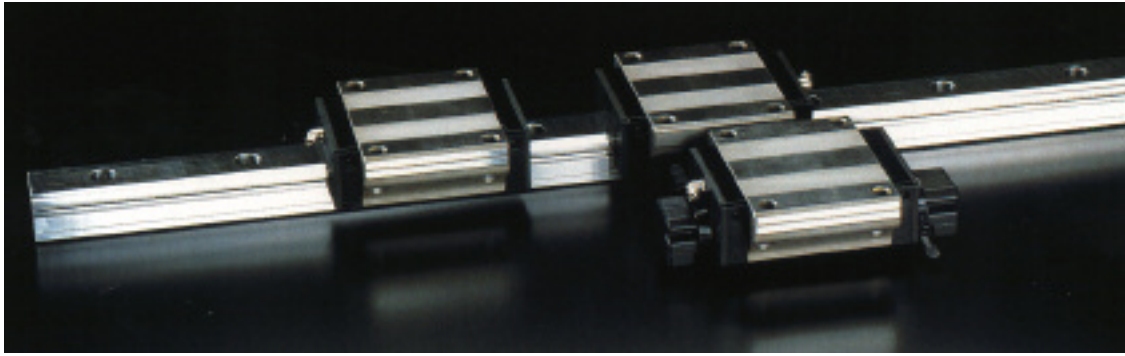
LAH-EM (Clearance), LAH-EMZ (Preload) Standard Length
 (formerly LAH-EL-90, LAH-ELZ-90)
LAH-GM (Clearance), LAH-GMZ (Preload) Long Block
 (formerly LAH-GL-90, LAH-GLZ-90)



Note: EM/EMZ and GM/GMZ is a combination of Tapped hole and Thru hole.

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 : W₁ rail dimensions are on Page 10.



Unit : mm

Grease Fitting			Basic Load Ratings					Weight (kg)	Model No.	
Mounting Hole Thread Spec.	T_1	N	Dynamic C (N)	Static C_0 (N)	Static Moment (N-m)					
					M_{RO}	M_{PO}	M_{YO}			
Ø3 (thru hole)	4.5	3.3	10800	20700	108	95	80	0.17	LAH15	EM/EMZ GM/GMZ
			14600	32000	166	216	181			
M6x0.75	5	11	17400	32500	219	185	155	0.45	LAH20	EM/EMZ GM/GMZ
			23500	50500	340	420	355			
M6x0.75	6	11	25600	46000	360	320	267	0.63	LAH25	EM/EMZ GM/GMZ
			34500	71000	555	725	610			
M6x0.75	7	11	35500	63000	600	350	292	1.2	LAH30	EM/EMZ GM/GMZ
			46000	91500	870	1030	865			
M6x0.75	8	11.5	47500	80500	950	755	630	1.7	LAH35	EM/EMZ GM/GMZ
			61500	117000	1380	1530	1280			
PT1/8	10	13	81000	140000	2140	1740	1460	3	LAH45	EM/EMZ GM/GMZ
			99000	187000	2860	3000	2520			
PT1/8	11	13	119000	198000	3600	3000	2510	5	LAH55	EM/EMZ GM/GMZ
			146000	264000	4850	5150	4350			
PT1/8	19	13	181000	281000	6150	4950	4150	10	LAH65	EM/EMZ GM/GMZ
			235000	410000	8950	10100	8450			

LH Series Rail Dimension Table

Separately Sold Rail for NSK Linear Guide

LH series Standard Rail

L1H-Z: Preloaded Interchangeable Type

LH series Butting Rail

L1H-01Z: Preloaded Interchangeable Type

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

See page 20 for rail part numbering.

L1H 25 1200 - 01 Z

Rail Type

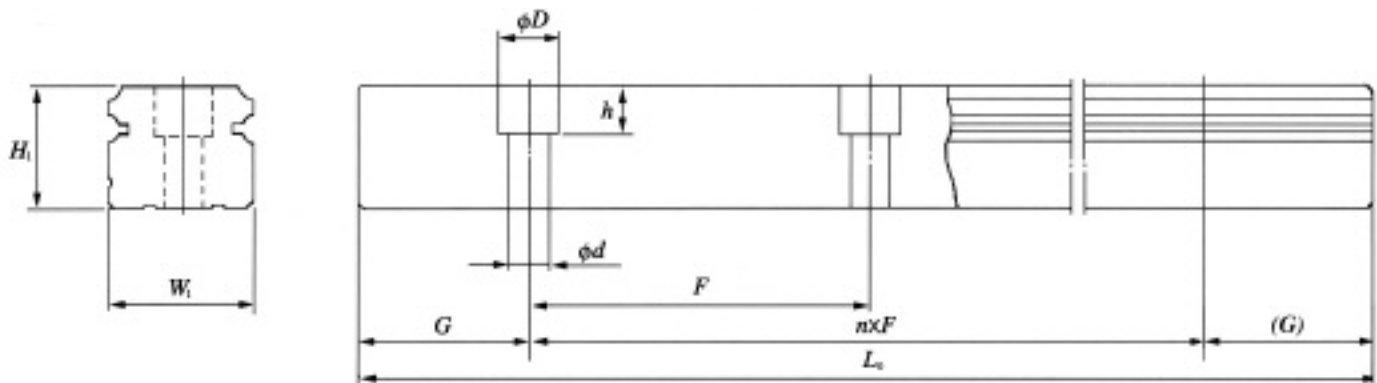
Size No.

Rail Length (mm)

Z: Preloaded Type

No Code: Standard

01: Butting Rail



Rail Dimensions Table

Unit: mm

Model No.		Max. rail length L_0 max. () indicates Stainless Steel	W_1	H_1	F	$d \times D \times h$	Rail Butting $G_{-0.5}^0$	G in mm	Rail Weight (kg/m)
Standard	Butting								
L1H15-Z	L1H15-01Z	2000 (1800)	15	15	60	4.5 x 7.5 x 5.3	30	Specify	1.6
L1H20-Z	L1H20-01Z	3960 (3500)	20	18	60	6 x 9.5 x 8.5	30	Specify	2.6
L1H25-Z	L1H25-01Z	3960 (3500)	23	22	60	7 x 11 x 9	30	Specify	3.6
L1H30-Z	L1H30-01Z	4000 (3500)	28	26	80	9 x 14 x 12	40	Specify	5.2
L1H35-Z	L1H35-01Z	4000	34	29	80	9 x 14 x 12	40	Specify	7.2
L1H45-Z	L1H45-01Z	3990	45	38	105	14 x 20 x 17	52.5	Specify	12.3
L1H55-Z	L1H55-01Z	3960	53	44	120	16 x 23 x 20	60	Specify	16.9
L1H65-Z	L1H65-01Z	3900	63	53	150	18 x 26 x 22	75	Specify	24.3

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

LH Series Accessories (Use Part Numbers listed below only if ordering separately)

Scraper and Double Seal (Specify in Slider Part Number by following pages 19 or 21)

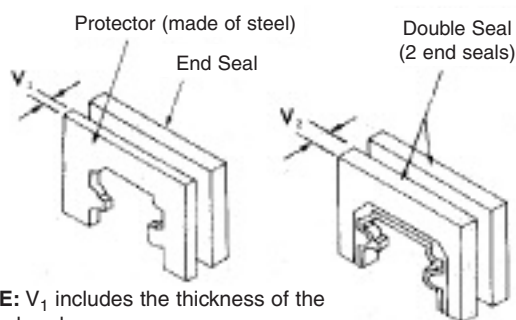
Travel length is reduced by the thickness of the end seal on the ball slide. Consider the value of V in the table below when calculating the travel length.

Scraper/Protector Unit : mm

Linear Guide Model No.	Protector No. Plug End	Protector No. Grease Fitting End	Increased Thickness V_1
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 V_2
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.

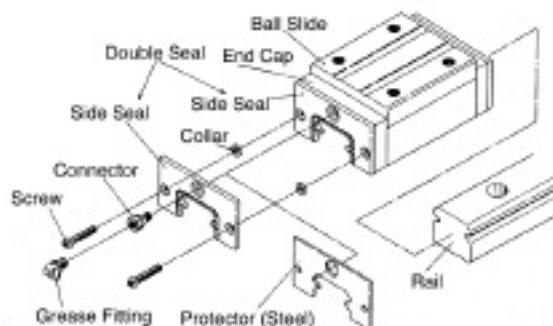


Fig. 13

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

Plastic Cap for Rail Mounting Hole

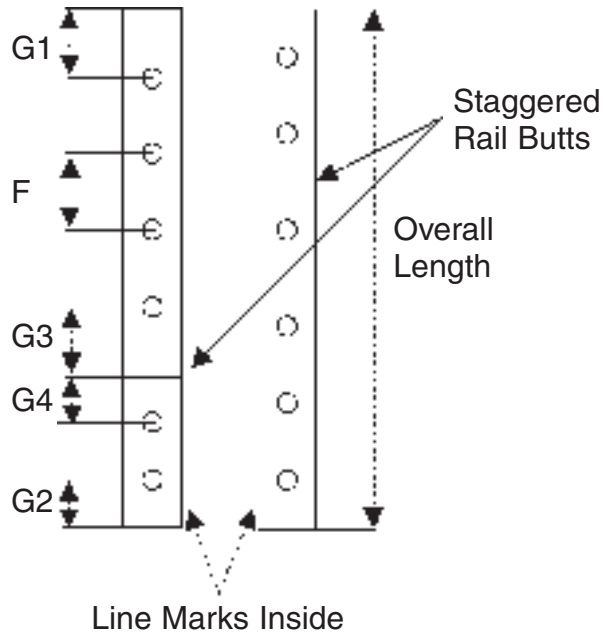
Linear Guide Model No.	Rail Mounting Bolt Size	Cap. No. for Rail Mounting Hole
LH15	M4	L45800004-003
LH20	M5	L45800005-003
LH25	M6	L45800006-003
LH30	M8	L45800008-003
LH35		
LH45	M12	L45800012-003
LH55	M14	L45800014-003
LH65	M16	L45800016-003

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



Application Sheet Linear Guides – Rail Butting



In order to determine rail butting configuration, please photocopy and complete this form from our catalog and fax back to NSK customer service at 630-620-8555.

Quantity _____ Rail Number: _____

G1 Dimension: _____ mm G2 Dimension: _____ mm

F Dimension: _____ mm (F dimension is fixed per series. See page 10.)

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

Consists of _____ G1= _____ G3= _____

_____ G2= _____ G4= _____

Company: _____

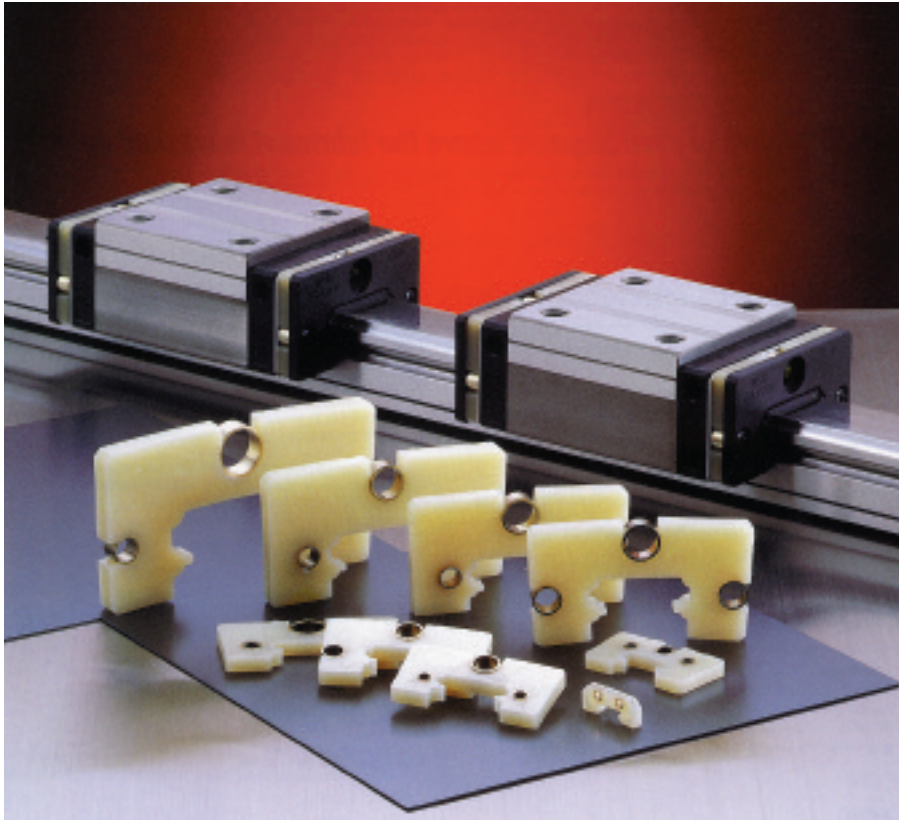
Contact Name: _____

Telephone: _____ Fax: _____

Date: _____ E-Mail: _____

Remarks: _____

K1 Maintenance-Free Lubrication System



The NSK K1's distinctive capabilities as a compact and efficient oil-impregnated lubrication unit as well as a seal, 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:

1: 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. Linear guides with NSK K1 Lubrication Units will not require operational maintenance for five (5) years or 10,000 km.

2: 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.

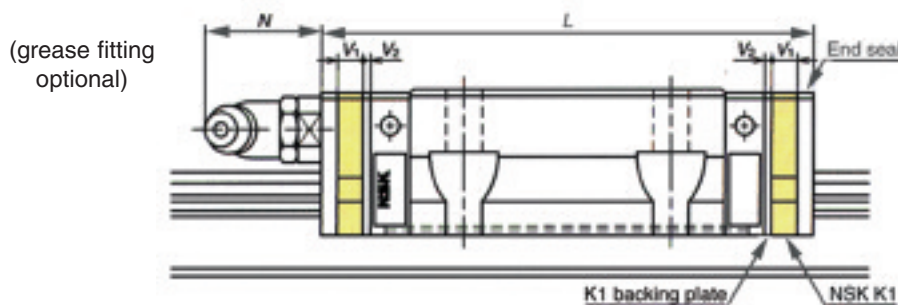
3: EFFECTIVE IN ENVIRONMENTS WHERE THE LUBRICANT IS WASHED AWAY.

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.

4: 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.

K1 Lubrication Unit Dimensions



Interchangeable Linear Guide Dimensions – LH Series

Unit: mm

Interchangeable Ball Slide size code	Ball slide form		Standard Ball Slide length	Ball slide length with two NSK K1 <i>L</i>	Thickness of NSK K1 <i>V</i> ₁	Thickness of K1 backing plate <i>V</i> ₂	Grease fitting projection <i>N</i> (mm)
	AN	EM GM					
LAH15	AN	EM	55	65.6	4.5	0.8	(5)
	BN	GM	74	84.6			
LAH20	AN	EM	69.8	80.4	4.5	0.8	(14)
	BN	GM	91.8	102.4			
LAH25	AN	EM	79	90.6	5.0	0.8	(14)
	BN	GM	107	118.6			
LAH30	AN	EM	85.6	97.6	5.0	1.0	(14)
	BN	GM	98.6 124.6	110.6 136.6			
LAH35	AN	EM	109	122	5.5	1.0	(14)
	BN	GM	143	156			
LAH45	AN	EM	139	154	6.5	1.0	(15)
	BN	GM	171	186			
LAH55	AN	EM	163	178	6.5	1.0	(15)
	BN	GM	201	216			
LAH65**	AN	EM	193	211	8.0	1.0	(16)
	BN	GM	253	271			

A grease fitting is shown in the above drawing but is removed and replaced by a plug when NSK's Lubrication Units are added to the linear guide sliders. The grease fitting is still shipped for user preference.

NSK K1 Lubrication Units provide long life and maintenance free operation. When added to our linear guides, operational maintenance will not be required for five (5) years or 10,000 km. Another substantial benefit of NSK K1 is the elimination of lubrication system costs including system design, parts (pipes and lubrication equipment), system installation time, materials and grease, maintenance personnel and industrial waste disposal.

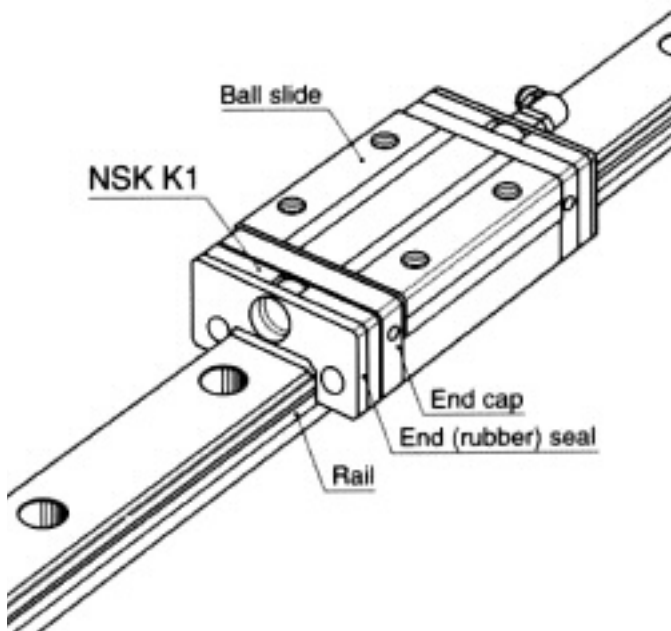
* For Scraper and Double Seal Information for LH Series please see page 11.

**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) (1 hour or less)
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 or AS2, ester-PS2) present no problems to the K1 lubricating units performance.

Please Note: A grease fitting is shown in the above drawing but is removed and replaced by a plug when NSK's K1 Lubrication Units are added to the linear guide sliders. The grease fitting is still shipped for user preference.

Assembly Instructions for the K1 Lubricating Unit for Linear Guides

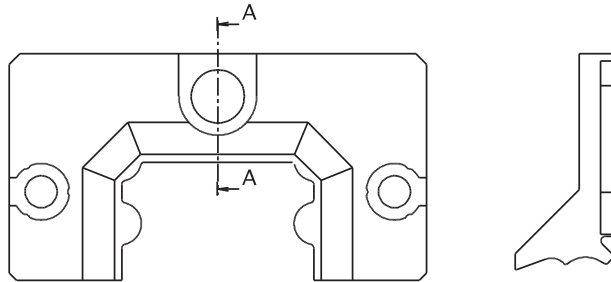
1. Using the plastic provisional rail supplied, slide linear bearing on to the linear rail.
2. Remove the grease fitting from the end of the bearing.
3. Remove the Phillips screws (2 pieces).
4. Remove the end seal from end of bearing.
5. Install threaded plug from K1 kit (or see option 9 and 10 depending 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.

Linear Guides Equipped with High Performance Seal

Overview and Features

- The configuration of the new High Performance Seal substantially improves dust-proofing performance by preventing contaminants from entering the ball slide and ensuring higher grease retention.
- Standard specifications for the NSK K1™ Lubrication Unit, in conjunction with the High Performance Seal, achieve advanced sealing performance and durability.



High Dust-Proofing Performance

- The new seal configuration reduces the entry of contaminants to less than 1/10 that of conventional standard, single-side seals. (Fig. 1)

Enhanced Durability

- High dust-proofing performance enhances durability of linear guides under highly contaminated conditions.
- Durability testing in a severe environment of rubber fragments demonstrates durability more than five times that of standard, single-side seals. (Fig. 2)



Linear Guides Equipped with High Performance Seal

Fig. 1 Decreases contamination volume to less than 1/10!!

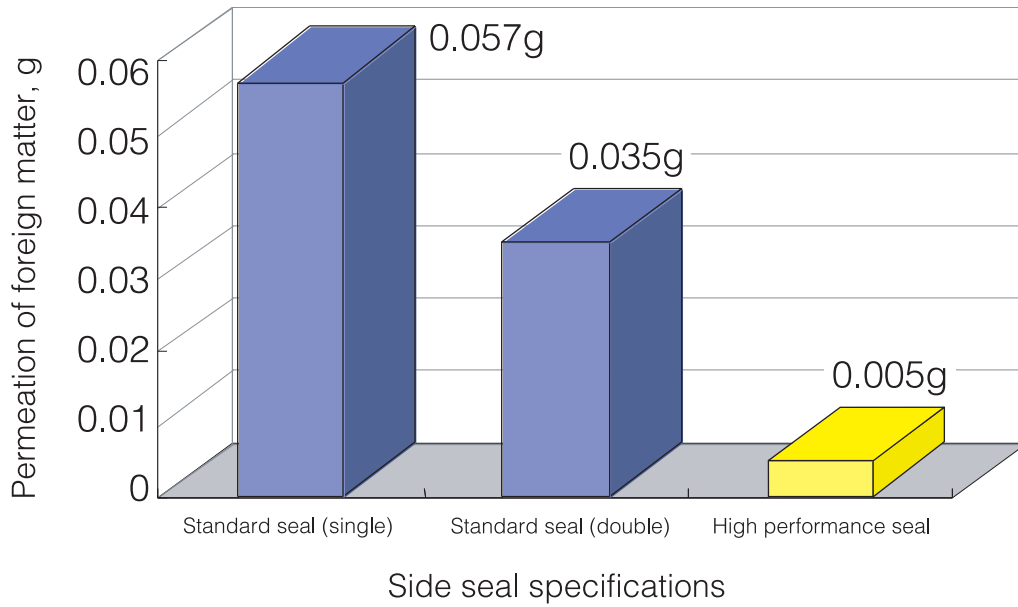
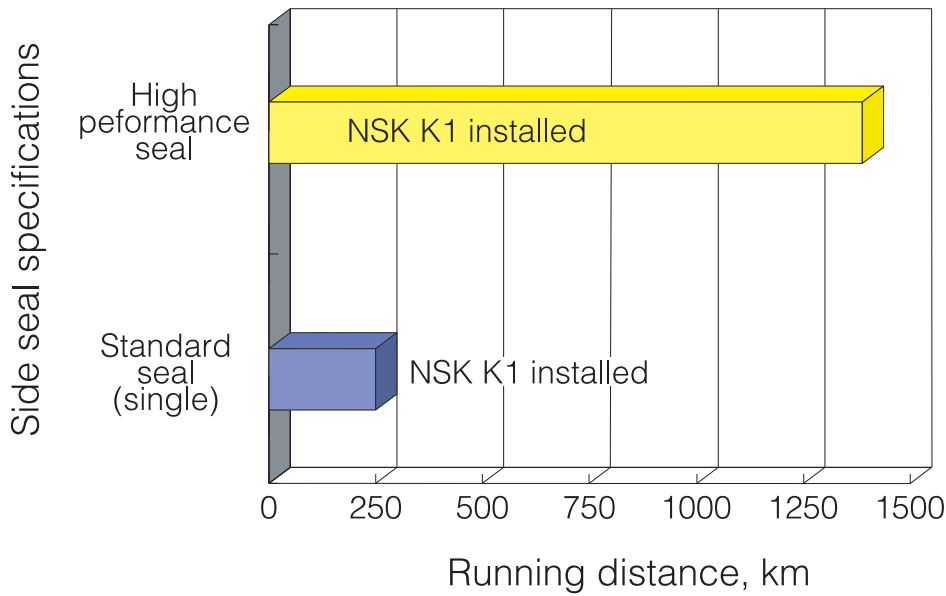


Fig. 2 Fivefold increase in durability!!



Linear Guide Interchange

Linear Guide Series

NSK	THK	Thomson
LH	HSR	CG

Linear Guide Sizes

NSK	THK	Thomson
LH15	HSR15	
LH20	HSR20	CG20
LH25	HSR25	CG25
LH30	HSR30	CG30
LH35	HSR35	CG35
LH45	HSR45	CG45
LH55	HSR55	CG55
LH65	HSR65	

Linear Guide Slider Styles

Slider Shape	Slider Length	NSK	THK	Thomson*
Square	Standard	LAH##AN	HSR##TR/TRX/CR/R	CG##CE
Square	Long Block	LAH##BN	HSR##HTR/HR/LR	CG##DE
Flanged	Standard	LAH##EM	HSR##TA/CA/A HSR##TB/CB/B	CG##AA
Flanged	Long Block	LAH##GM	HSR##HTA/HA/LA HSR##HTB/HB/LB	CG##BA

##refers to the appropriate Linear Guide Size

*Thomson not dimensionally equivalent and may require shims

Linear Guide Rail Length in mm

NSK	THK	Thomson
L1H##XXXX	HSR##+XXXXL	RG##NLXXXX

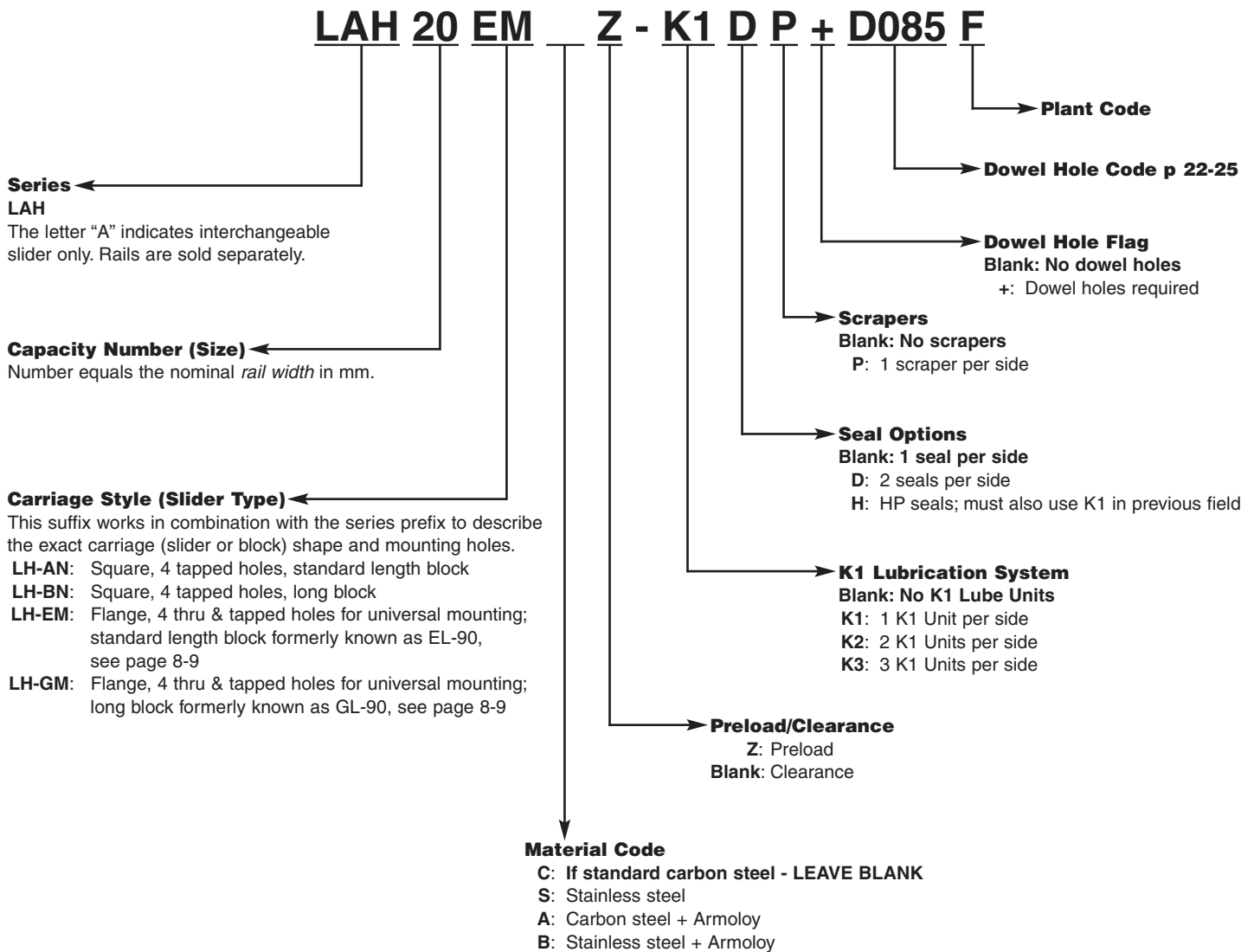
##refers to the appropriate Linear Guide Size

XXXX refers to rail length in mm

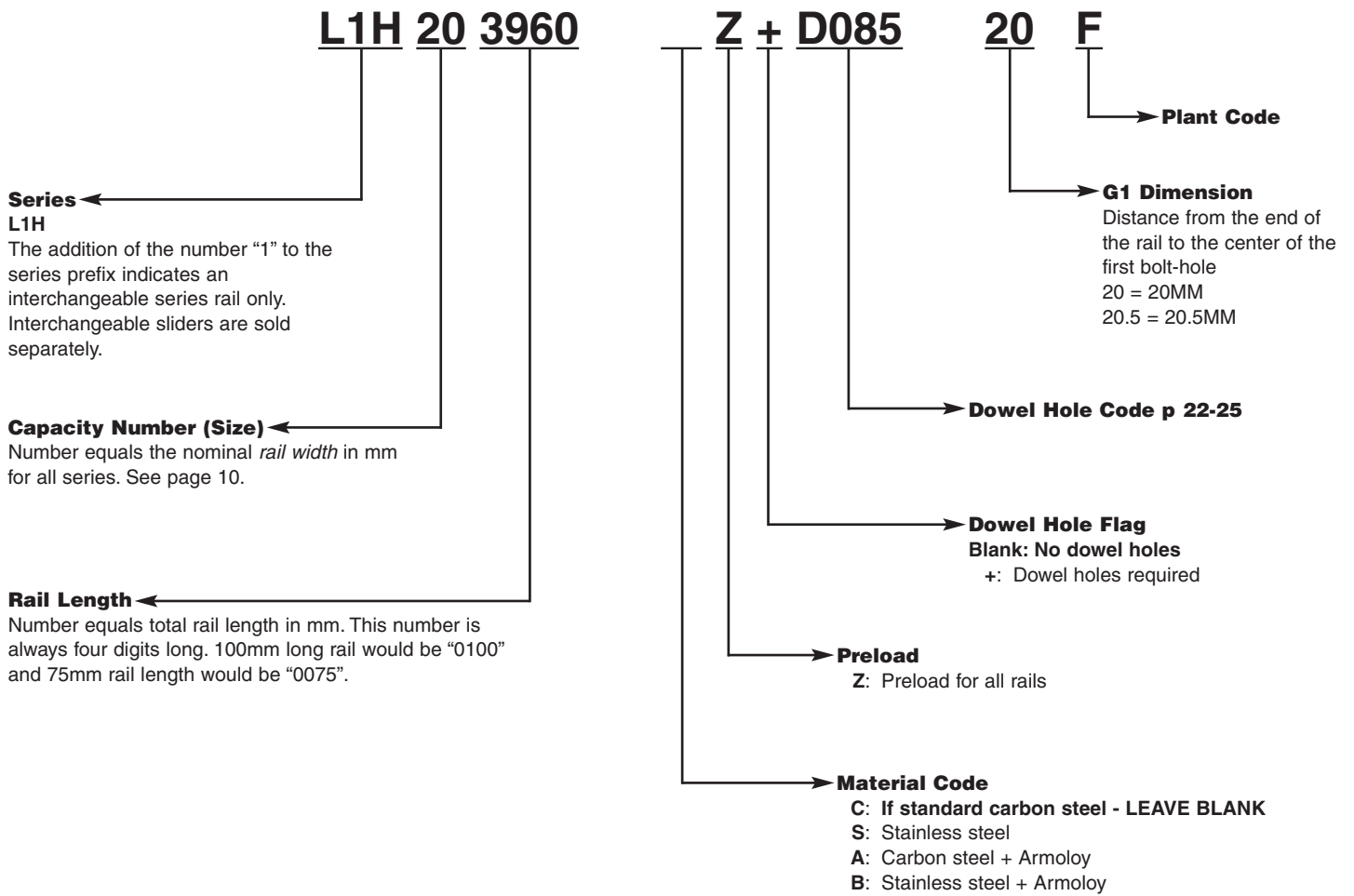
Linear Guide Accuracy Class, Preload, Seals & Scrapers

	NSK	THK	Thomson
Interchangeable Accuracy	PC		N
Clearance (No Preload)	T		A
Preload	Z	C1	B
Seals	Standard with side and bottom seals	SS-end/bottom UU-end	LDS
Scraper	P	ZZ-end/bottom/scraper	ZZ
Double Seals	D	DD-double/bottom	DD
Double Scraper	DP	KK-double/bottom/scraper	KK

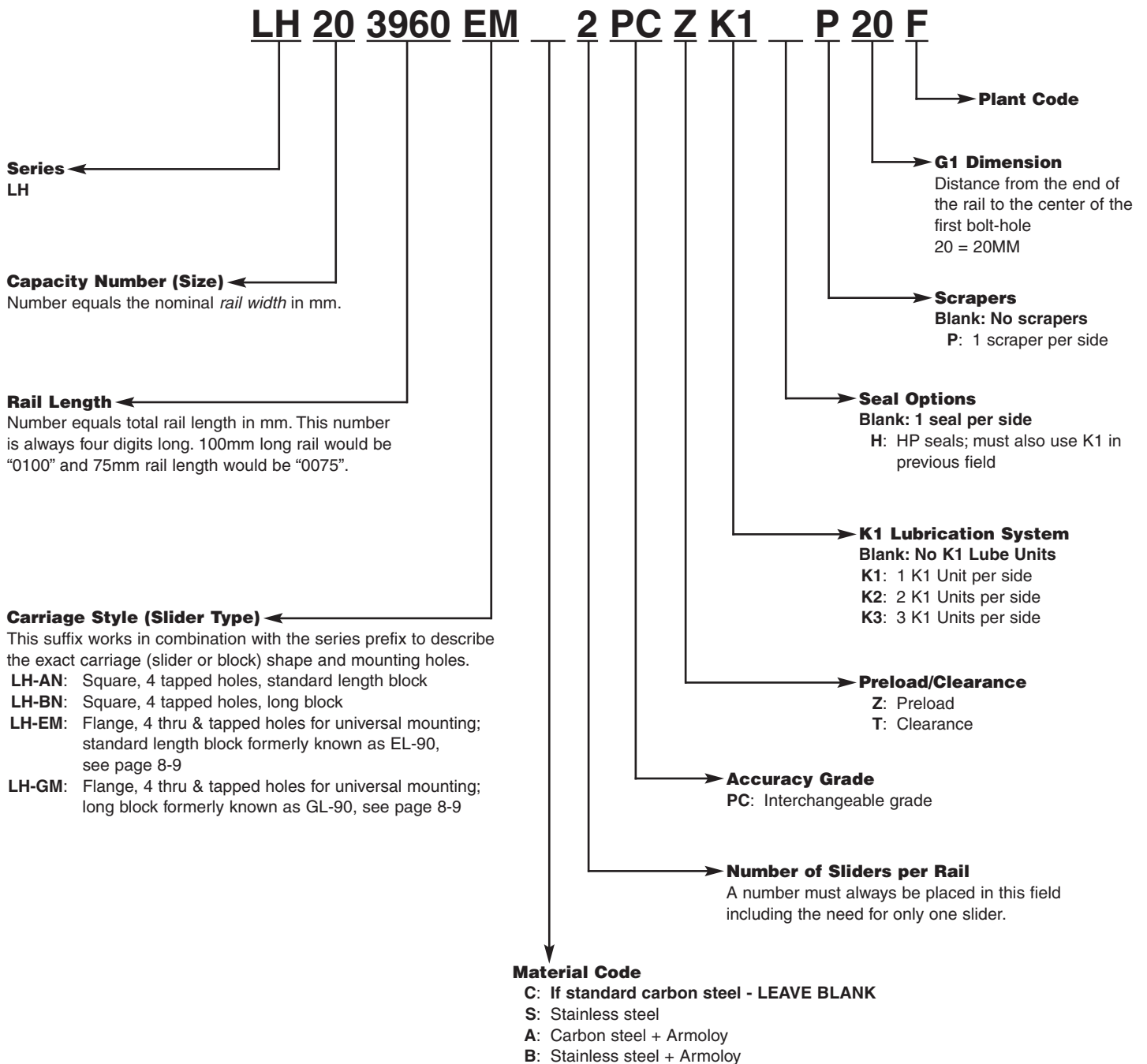
Interchangeable Linear Guide P/N System: LH Series – Sliders Only



Interchangeable Linear Guide P/N System: LH Series – Rail Only



Interchangeable Linear Guide P/N System: LH Series – Assemblies - Rail & Slider



Standard Dowel Hole Options for NSK LH Linear Guides Slider Modifications; Reference Table 1 and Illustration 1, page 23

Code	Sizes	Description
D035	20,25	Slider with 6mm slip fit dowel hole located centrally in line with bolt holes on reference side of slider.
D065	30~65	Slider with 10mm s/f dowel hole located centrally in line with bolt holes on reference side of slider.
D047	25~65	Slider with M6X.75 side lube port located centrally in line with bolt holes on non-reference side of slider.
D086	25	Slider with 6mm s/f dowel hole located centrally in line with bolt holes on reference side of slider and M6X.75 lube port located centrally in line with bolt holes on non-reference side of slider.(D035+D047)
D087	25	Slider with 6mm s/f dowel hole located centrally in line with bolt holes on reference side and 1/16NPT lube port located centrally in line with bolt holes on non-reference side of slider.(D035+M047)
D088	30~65	Slider with 10mm s/f dowel hole located centrally in line with bolt holes on reference side and M6X.75 lube port located centrally in line with bolt holes on non-reference side of slider.(D065+D047)
D089	30~65	Slider with 10mm s/f dowel hole located centrally in line with bolt holes on reference side and 1/16NPT lube port located centrally in line with bolt holes on non-reference side of slider.(D065+M047)
D075	20,25	Slider with two 6mm slip fit dowel holes located centrally in line with bolt holes on both sides of slider.
D095	30~65	Slider with two 10mm s/f dowel holes located centrally in line with bolt holes on both sides of slider.
D100	30~65	Slider with two 10mm s/f dowel holes located centrally in line with bolt holes on both sides of slider and M6X.75 lube port 25% of the bolt span from G1 side of bolt on non-reference surface.
M035	20,25	Slider with 1/4" dowel hole located centrally in line with bolt holes on reference side.
M065	30~65	Slider with 3/8" dowel hole located centrally in line with bolt holes on reference side.
M047	25~65	Slider with 1/16 NPT side lube port option located centrally in line with bolt holes on non-reference side of slider.
M087	25	Slider with 1/4" s/f dowel hole located centrally in line with bolt holes on reference side of slider and a 1/16NPT lube port located centrally in line with bolt holes on non-reference side of slider.(M035+M047)
M089	30~65	Slider with 3/8" s/f dowel hole located centrally in line with bolt holes on reference side of slider and a 1/16NPT lube port located centrally in line with bolt holes on non-reference side of slider.(M065+M047)
M075	20,25	Slider with 1/4" dowel hole located centrally in line with bolt holes on both sides.
M095	30~65	Slider with 3/8" s/f dowel hole located centrally in line with bolt holes on both sides.
M100	30~65	Slider with 3/8" s/f dowel hole located centrally in line with bolt holes on both sides of slider and M6X.75 lube port 25% of the bolt span from G1 side of bolt on non-reference surface.
W31	20~65	Oil port with plug in non-reference side of slider, centrally located between bolt holes. Oil port size as follows: Size 20=M6X.75, Sizes 25~65=1/8NPT

Illustration 1 – Slider Modifications

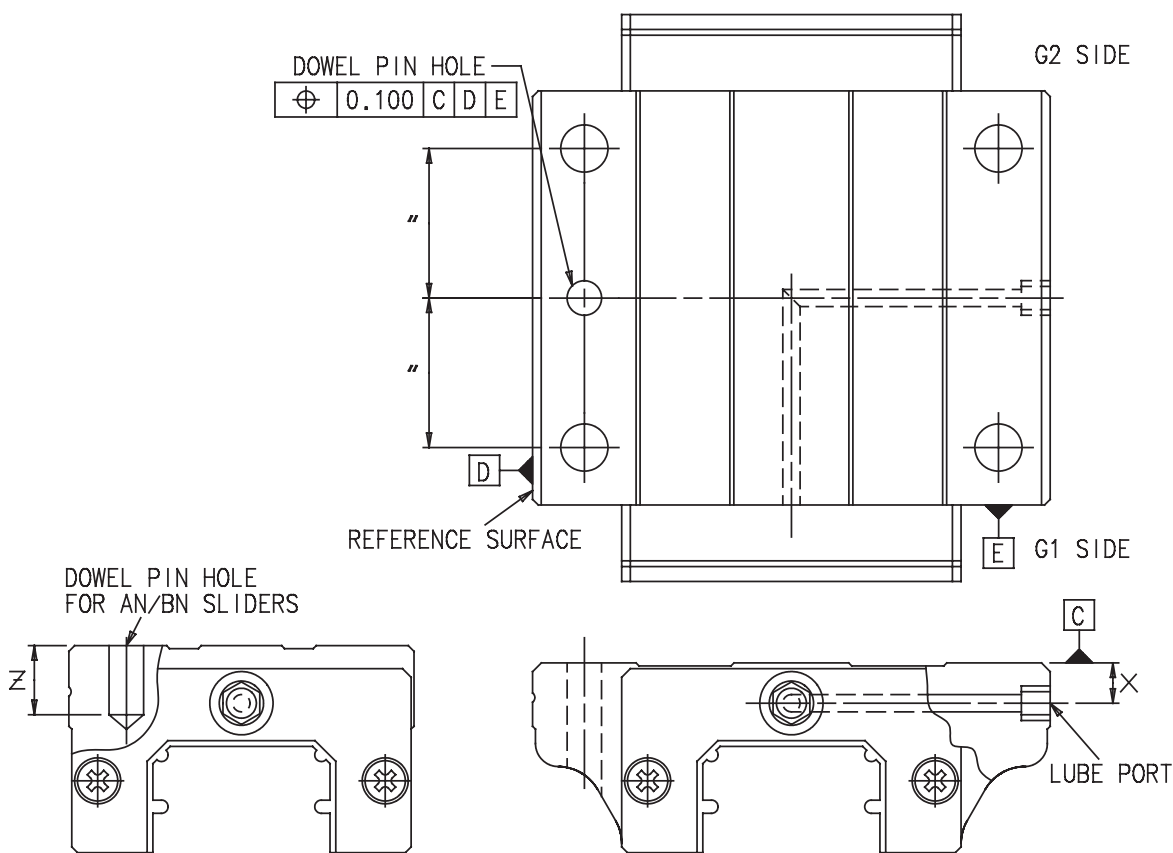


Table 1

Size	Related Stds.	Dowel 1 Dia	Dowel Pin Depth "Z" AN/BN	Lube Port Depth "X" EL/FL/GL/HL 1/16NPT M6		Lube Port Depth "X" AN/BN Sliders 1/16NPT M6	
20	D/M035, D/M075	6mm (1/4")	6				
25	D/M035, D/M047, D/M075, D/M087, D086	6mm (1/4")	9	6	6	8	10
30	D/M047, D/M065, D/M089, D/M095, D/M100, D088	10mm (3/8")	12	7	7	8	10
35	D/M047, D/M065, D/M089, D/M095, D/M100, D088	10mm (3/8")	13	8	8	8	15
45	D/M047, D/M065, D/M089, D/M095, D/M100, D088	10mm (3/8")	18	9	9	8	19
55	D/M047, D/M065, D/M089, D/M095, D/M100, D088	10mm (3/8")	19	10	10	8	20
65	D/M047, D/M065, D/M089, D/M095, D/M100, D088	10mm (3/8")	20	19	19	8	19

Notes:

Tolerance for metric dowel holes = 6mm ^{+0.025/+0.0} and 10mm ^{+0.025/+0.0}.

Tolerance for inch dowel holes = 1/4 in ^{+0.001/+0.0} and 3/8 in ^{+0.001/+0.0}.

Dowel holes for EM and GM sliders have thru dowel holes, AN, BN sliders have dowel depth "Z" shown in table.



Rail Modifications Reference Table 2 and Illustration 2, page 25

Code	Sizes	Description
D080	20	Rail with 6mm slot located 30mm inside of last bolt hole on G1 side and a 6mm s/f dowel thru hole located 30mm inside last bolt hole on G2 end.
D085	25-65	Rail with 10mm slot located 30mm inside last bolt hole on G1 end and a 10mm s/f dowel thru hole located 30mm inside last bolt hole on G2 end.
D110	20-65	M5X.8, 10mm deep, tapped hole located at center point of both ends of rail for Bellows attachment per table 2.
D185	20-65	Rail with thru dowel hole and slot per D080 and D085 with both ends prepped for bellows per R2R2.
M080	20	Rail with 1/4" slot located 30mm inside last bolt hole on G1 end and a 1/4" s/f dowel thru hole located 30mm inside last bolt hole on G2 side.
M085	25-65	Rail with 3/8" slot located 30mm inside last bolt hole on G1 side and a s/f dowel thru hole located 30mm inside last bolt hole on G2 side.
M110	25-65	Rail with 10-32 UNF, .5 inch deep, tapped hole located at center point of both ends of rail for bellows attachment.
M185	20-65	Rail with dowel hole and slot per M080 or M085 with both ends prepped for bellows per R2R2.

Misc. Codes

Code	Sizes	Description
R2R2	20-65	Rail with both ends prepped for bellows per Table 2.
R2	20-65	Rail with G1 rail end prepped for bellows per Table 2.

Illustration 2 – Rail Modifications

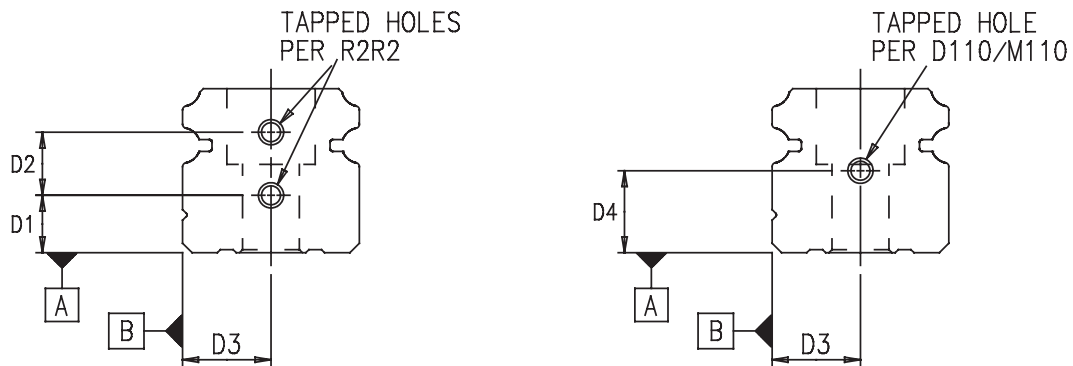
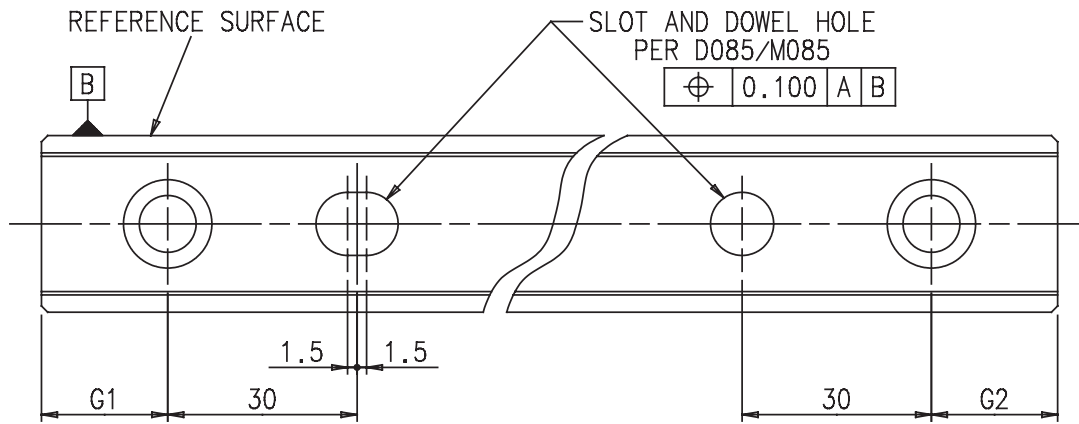


Table 2, R2R2 and M110/D110 Rail end preparations for bellows

Size	Dowel Hole	d1	d2	d3	Thread Spec for R2R2	d4 for D110 and M110
20	D080-6mm M080-1/4"	5mm	8mm	10mm	M3X.5	9
25	D085-10mm M085-3/8"	7.25mm	10mm	11.5mm	M4X.7	11
30	D085-10mm M085-3/8"	9.1mm	10mm	14mm	M4X.7	13
35	D085-10mm M085-3/8"	11mm	10mm	17mm	M4X.7	15
45	D085-10mm M085-3/8"	15mm	10mm	22.5mm	M4X.7	19
55	D085-10mm M085-3/8"	18mm	23.9mm	26.5mm	M4X.7	22
65	D085-10mm M085-3/8"	18mm	23.9mm	26.5mm	M4X.7	26

Tolerance for metric dowel holes and slots = 6mm $+0.025/+0.0$ and 10mm $+0.025/+0.0$.

Tolerance for inch dowel holes and slots = 1/4 in $+0.001/+0.0$ and 3/8 in $+0.001/+0.0$.

**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

NOTES



Worldwide Sales Offices

NSK Ltd.–Headquarters, Tokyo, Japan	www.nsk.com	New Zealand:	www.nsk.co.nz	Switzerland:	
Americas & Europe Department	tel: 03-3779-7120	NSK New Zealand Ltd.		Waelzlager Industriewerke Bulle AG (W.I.B.)	
Asia Marketing & Sales Department	tel: 03-3779-7121	Auckland	tel: (09) 276-4992	Bulle	tel: 026-9191100
Africa		Philippines:		Turkey:	
South Africa:		NSK representative office		NSK Bearings Middle East Trading Co., Ltd.	
NSK South Africa (Pty) Ltd.		Manila	tel: 02-759-6246	Istanbul	tel: 90-216-442-7106
Johannesburg	tel: (011) 458 3600	Singapore:		United Kingdom:	
Asia and Oceania		NSK International (Singapore) Pte Ltd.		NSK Bearings Europe Ltd.	
Australia:	www.nskaustralia.com.au	Singapore	tel: (65) 273 0357	Peterlee, England	tel: 0191-586-6111
NSK Australia Pty. Ltd.		NSK Singapore (Pte) Ltd.		NSK European Technology Co., Ltd.	
Melbourne	tel: (03) 9764-8302	Singapore	tel: (65) 278 1711	Ruddington, England	tel: 0115-940-5409
China:		Taiwan:		NSK UK Ltd.	
NSK Hong Kong Ltd.		Taiwan NSK Precision Co., Ltd.	tel: 02-2591-0656	Newark, England	tel: 0163-660-5123
Hong Kong	tel: 2739-9933	Taipei		NSK Steering Systems Europe Ltd.	
Kunshan NSK Co., Ltd.	tel: 0520-7305654	Thailand:		Coventry, England	tel: 024-76-588588
Kunshan		NSK Bearings (Thailand) Co., Ltd.		North and South America	www.am.nsk.com
Guizhou HS NSK Bearings Co., Ltd.	tel: 0853-3521505	Bangkok	tel: 02-6412150-58	NSK Americas, Inc. (American Headquarters)	
Anshun	tel: 0853-3521505	NSK Safety Technology (Thailand) Co., Ltd.	tel: (038) 214-317-8	Ann Arbor, Michigan, U.S.A.	tel: 734-913-7500
NSK (Shanghai) Trading Co., Ltd.	tel: 021-62099051	Chonburi		Argentina:	
Shanghai		Siam NASTECH Co., Ltd.		NSK Argentina SRL	
NSK representative office		Chachoengsao	tel: (038) 522-343-350	Buenos Aires	tel: 011-4762-6556
Beijing	tel: 010-6590-8161	Europe		Brazil:	
NSK representative office		NSK Europe Ltd. (European Headquarters)	www.eu.nsk.com	NSK Brasil Ltda.	www.br.nsk.com
Shanghai	tel: 21-6209-9051	Maidenhead, England	tel: 0162-850-9800	São Paulo	tel: 011-3269-4700
NSK representative office		France:		Canada:	
Guangzhou	tel: 020-8732-0583	NSK France S.A.		NSK Canada Inc.	www.ca.nsk.com
NSK representative office		Paris	tel: 01 30 57 39 39	Toronto	tel: 905-890-0740
Anshun	tel: 0853-3522522	Germany:		Mexico:	
India:		NSK Deutschland Gmbh		NSK Rodamientos Mexicana, S.A. de C.V.	
Rane NASTECH Ltd.		Düsseldorf	tel: 02102-481-0	Mexico City	tel: 5-301-2741
Chennai	tel: 04114-65313, 65314, 65365, 66002	NSK Steering Systems Europe Ltd.	tel: 0771-79082-277	United States of America:	www.us.nsk.com
NSK representative office		Stuttgart		NSK Corporation	
Chennai	tel: 044-4334732	Neuweg Fertigung Gmbh	tel: 07393-540	Ann Arbor, Michigan	tel: 734-913-7500
Indonesia:		Munderkingen		Sales Offices:	
P.T. NSK Bearings Manufacturing Indonesia		Italy:		Ann Arbor, Michigan	tel: 734-913-7500
Jakarta	tel: 021-898-0155	NSK Italia S.P.A.		Cerritos, California	tel: 562-926-2975
Korea:		Milano	tel: 02-995-191	NSK American Technical Center	
NSK Korea Co., Ltd.		Poland:		Ann Arbor, Michigan	tel: 734-913-7500
Seoul	tel: 02-3287-0300	NSK Europe Ltd. Warsaw Liaison Office	tel: 48-22-645-1525, 1526	NSK Precision America, Inc.	www.npa.nsk.com
NSK Korea Co., Ltd., Changwon Plant		Warsaw		Addison, Illinois	tel: 630-620-8500
Changwon	tel: 0551-287-6001	NSK Iskra S.A.	tel: 48-41-366-6111	NASTECH	
Malaysia:		Kielce		Bennington, Vermont	tel: 802-442-5448
NSK Bearings (Malaysia) Sdn. Bhd.		Spain:		NSK Latin America Inc.	www.la.nsk.com
Kuala Lumpur	tel: 03-7958-4396	NSK Spain S.A.		Miami, Florida	tel: (305) 477-0605
NSK Micro Precision (M) Sdn. Bhd.		Barcelona	tel: 93-575-4041		
Kuala Lumpur	tel: 03-961-6288				

NSK Ltd. has a basic policy not to export any products or technology designated as controlled items by export-related laws. When exporting the products in this brochure, the laws of the exporting country must be observed. Specifications are subject to change without notice and without any obligation on the part of the manufacturer. Every care has been taken to ensure the accuracy of the data contained in this brochure, but no liability can be accepted for any loss or damage suffered through errors or omissions. We will gratefully acknowledge any additions or corrections.