

NSK Linear Guide Interchangeable Miniature Series

LU and LE series of NSK linear guides are miniature linear guides. The LU and LE series were originally designed to cater to the needs of industries involved in semiconductor fabrication and the liquid crystal display manufacturing equipment, but later their application spread to other fields.

As the applications expanded, this series was refined to become easier-to-handle and the lead-time for delivery was shortened.

To satisfy the various demands, NSK developed the LU-series and LE-series interchangeable miniature linear guides (Photo 1). Let's introduce some of the details of these series.

1. Features

Major features of this series include the following:

- (1) Highly accurate dimensional control enables random matching of the rails and sliders. In other words, rails and sliders are interchangeable. Also, the sliders have been designed to be easier-to-handle.
- (2) These linear guides are easier to handle since users don't have to worry about the balls slipping-out because a retainer is used.
- (3) In response to greater demands for rust-prevention, stainless steel had been adopted. Also, if even higher rust preventive capability is needed, then special surface treatment (such as electrolytic anti-corrosive phosphate surface treatment) can be executed.
- (4) Short lead time deliveries can be accomplished, since individual inventories of the interchangeable rails and bearings exist.

Moreover, NSK has developed the clean grease LG2, which is a low-dust emission grease, especially for clean rooms.

Also, NSK has developed the K1-seal (refer to NSK Technical Journal "Motion & Control" No. 2). Assembled linear guides are fitted with the K1-seal to approach the ideal of maintenance-free operation.

2. Specifications and Boundary Dimensions of Standard Linear Guides

Interchangeable miniature series are available in model numbers 09, 12 and 15 for both LU and LE type.

Principal specifications include:

- (1) Accuracy standard and running parallelism tolerance are of the PC class.
- (2) Specification on clearance interchangeability sets the clearance at less than 15 μm .

The standard dimensions of this series are shown in Figs. 1 and 2. For further details on accuracy grades and other items, please consult NSK catalogs.

3. Conclusion

Demands for miniature linear guides have become more diversified in line with the recent trend of downsizing.

As one of its responses to this trend, NSK designed and created the LU and LE series of miniature linear guides to be interchangeable. This will enable linear guides to be supplied more promptly. This availability is expected to widen the number of applications of linear guides as they become a more mainstream product.

Also, NSK has prepared an abundant assortment of ball retainer type interchangeable miniature linear guides to respond to the demands for preloaded linear guides and high accuracy linear guides (LU: P4~PN, LE: P5~PN). Therefore, NSK is confident that it has a suitable linear guide for almost every application.



Photo 1 NSK linear guide interchangeable miniature series

Rail

Specification number:

L1 U 12 0120 T S

Interchangeable rail

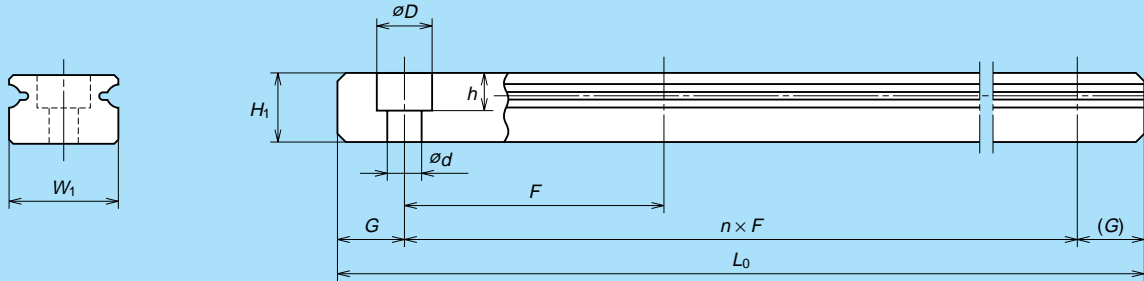
Series code (LU)

S: Stainless, no code: standard

T: Bolt hole, no code: standard

Rail length (mm)

Size number



Unit: mm

Model No.	Standard length (in stock)			Width W_1	Height H_1	Bolt pitch F	Rail dimension			Weight (gf/100mm)
							Bolt hole $d \times D \times h$	G (Standard)	Rail length $L_0 \text{ max}$	
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	12	7.5	25	3 x 5.5 x 3.5 3.5 x 6 x 4.5	10	470	65
L1U15	230	430	670 990	15	9.5	40	3.5 x 6 x 4.5	15	1000 (Stainless: 670)	105

Ball slide

Specification number:

LA U 12 AR S

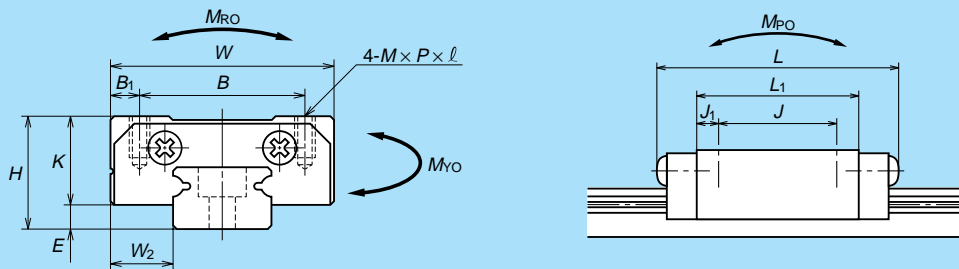
Interchangeable ball slide

Series code (LU)

S: Stainless, no code: standard

Ball slide shape code

Size number



Unit: mm

Model No.	Assembly dimension			Ball slide dimension									Basic load rating			Weight (gf)		
	Height H	E	Width W_2	Length W	L	B	Tapped hole			L_1	J_1	K	Dynamic C (kgf)	Static C_0 (kgf)	Static moment (kgf·m)			
							J	Thread $M \times P \times \ell$	B_1						M_{RO}		M_{PO}	M_{YO}
	H	E	W_2	W	L	B	J	$M \times P \times \ell$	B_1	L_1	J_1	K	C (kgf)	C_0 (kgf)	M_{RO}		M_{PO}	M_{YO}
LAU09AR LAU09TR	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
LAU12AR LAU12TR	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	1.2	38
LAU15AL	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

Fig. 1 LU interchangeable series dimension

Rail

Specification number:

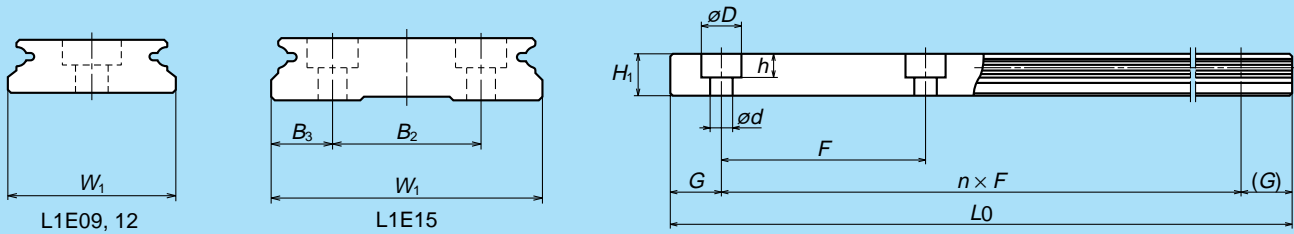
L1 E 12 0120

Interchangeable rail

Rail length (mm)

Series code (LU)

Size number



Unit: mm

Model No.	Standard length (in stock)				Rail dimension									Weight (gf/100mm)
					Width W_1	Length H_1	Bolt pitch F	B_2	B_3	Bolt hole $d \times D \times h$	G hole (Standard)	Rail length $L_0 \text{ max}$		
L1E09	110	200	290	380	18	7.5	30	—	—	3.5 × 6 × 4.5	10	400	95	
L1E12	150	310	470	790	24	8.5	40	—	—	4.5 × 8 × 4.5	15	800	140	
L1E15	230	430	670	990	42	9.5	40	23	9.5	4.5 × 8 × 4.5	15	1000	275	

Ball slide

Specification number:

LA E 12 AR S

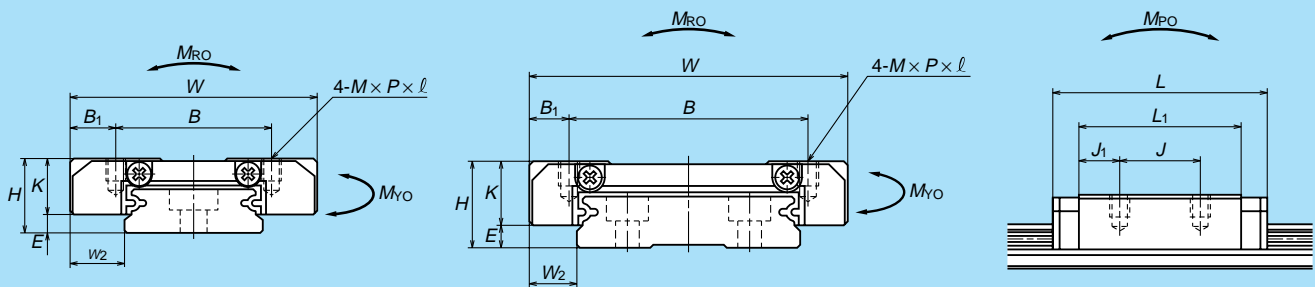
Interchangeable ball slide

Stainless

Series code (LE)

Ball slide shape code

Size number



Unit: mm

Model No.	Assembly dimension			Ball slide dimension										Basic load rating			Weight (gf)		
	Height H	E	W_2	Width W	Length L	B	J	Tapped hole			L_1	J_1	K	Dynamic C (kgf)	Static C_0 (kgf)	Static moment (kgf·m)			
								Thread $M \times P \times \ell$	B_1	L_1						M_{RO}		M_{PO}	M_{YO}
LAE09AR LAE09TR	12	4	6	30	39.8	21	12	M2.6 × 0.45 × 3 M3 × 0.5 × 3	4.5	27.6	7.8	8	250	380	3.3	1.7	1.7	40	
LAE12AR	14	4	8	40	45	28	15	M3 × 0.5 × 4	6.0	31	8	10	360	540	6.0	2.4	2.4	75	
LAE15AR	16	4	9	60	56.6	45	20	M4 × 0.7 × 4.5	7.5	38.4	9.2	12	630	890	17.7	4.9	4.9	150	

Fig. 2 LE interchangeable series dimension