

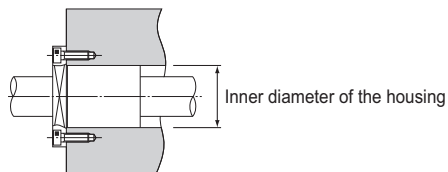
Assembling the Linear Bushing

[Inner Diameter of the Housing]

Table1 shows recommended housing inner-diameter tolerance for the Linear Bushing. When fitting the Linear Bushing with the housing, loose fit is normally recommended. If the clearance needs to be smaller, provide transition fit.

Table1 Housing Inner-diameter Tolerance

Type		Housing	
Model No.	Accuracy	Loose fit	Transition fit
LM	High accuracy grade (no symbol)	H7	J7
	Precision Grade (P)	H6	J6
LME	—	H7	K6, J6
LMF	High accuracy grade (no symbol)	H7	J7
LMK			
LMH			
LM-L			
LMF-L			
LMK-L			
LMH-L			
LMIF			
LMIK			
LMIH			
LMIF-L			
LMIK-L			
LMIH-L			
LMCF-L			
LMCK-L			
LMCH-L			



[Clearance between the Nut and the LM Shaft]

When using the Linear Bushing in combination with an LM shaft, use normal clearance in ordinary use and small gap if the clearance is to be minimized.

Note1) If the clearance after installation is to be negative, it is preferable not to exceed the radial clearance tolerance indicated in the specification table.

Note2) The shaft tolerance for Linear Bushing models SC, SL SH and SH-L falls under high accuracy grade (no symbol).

Table2 Shaft Outer-diameter Tolerance

Type		LM Shaft	
Model No.	Accuracy	Normal clearance	Small gap
LM	High accuracy grade (no symbol)	f6, g6	h6
	Precision Grade (P)	f5, g5	h5
LME	—	h7	k6
LMF	High accuracy grade (no symbol)	f6, g6	h6
LMK			
LMH			
LM-L			
LMF-L			
LMK-L			
LMH-L			
LMIF			
LMIK			
LMIH			
LMIF-L			
LMIK-L			
LMIH-L			
LMCF-L			
LMCK-L			
LMCH-L			

[Mounting the Nut]

Although the Linear Bushing does not require a large amount of strength for securing it in the axial direction, do not rely only on a press fit to support the nut. For the housing inner-diameter tolerance, see Table1 on **B 4-39**.

● Mounting a Standard Linear Bushing

Example mountings are shown in Fig. 1 and Fig. 2. Use snap rings or stopper plates to secure linear bushings.

Securing the nut by pressing against the outer surface with one set screw as shown in Fig. 3 will cause the nut to be deformed.

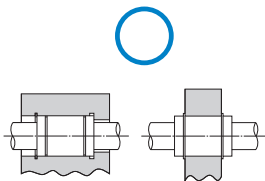


Fig. 1 Secured by snap ring

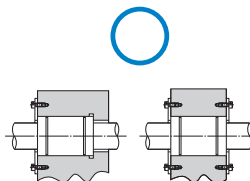


Fig. 2 Secured by stopper plate

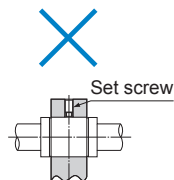


Fig. 3

Mounting Procedure and Maintenance

Assembling the Linear Bushing

■ Snap Ring for Installation

The snap ring types shown in Table 3 can be used for securing the standard Model LM.

Note 1) For models indicated with parentheses, use C-shape concentric snap rings.

Note 2) Table 3 commonly applies to models LM, LM-GA, LM-MG and LM-L.

Table 3 Types of Snap Rings

Model No.	Snap ring			
	For outer surface		For inner surface	
	Needle snap	C-shape snap	Needle snap	C-shape snap
LM 3	—	—	AR 7	—
LM 4	—	—	8	—
LM 5	WR 10	10	10	10
LM 6	12	12	12	12
LM 8	—	15	15	15
LM 8S	—	15	15	15
LM 10	19	19	19	19
LM 12	21	21	21	21
LM 13	23	22	23	—
LM 16	28	—	28	28
LM 20	32	—	32	32
LM 25	40	40	40	40
LM 30	45	45	45	45
LM 35	52	52	52	52
LM 38	—	56•58	57	—
LM 40	—	60	60	60
LM 50	—	80	80	80
LM 60	—	90	90	90
LM 80A	—	120	120	120
LM 100A	—	(150)	150	—
LM 120A	—	(180)	180	—

[Inserting the Nut]

When inserting the standard linear bushing into a housing, do not directly hit the seal or side plate. Use a jig to evenly drive in the nut, or place a flatter piece of metal on the nut and gently hit that. (See Fig. 4)

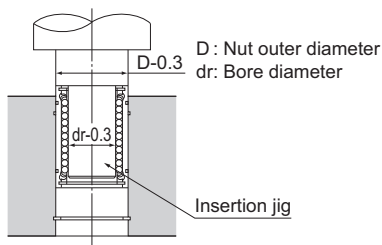


Fig. 4

● Installing a Clearance-adjustable Type

To adjust the clearance of a clearance-adjustable type (-AJ), use a housing that allows adjustment of the nut outer diameter so as to facilitate the adjustment of the clearance between the Linear Bushing and the LM shaft. Positioning the slit of the Linear Bushing at an angle of 90° with the housing's slit will provide uniform deformation in the circumferential direction. (See Fig.5 .)

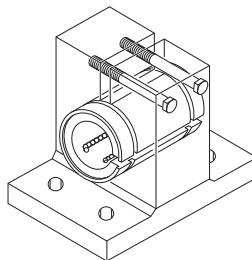


Fig.5

● Mounting an Open Type

For an open type (-OP), also use a housing that allows adjustment of the nut outer diameter as shown in Fig.6 .

Open types are normally used with a light preload. Be sure not to give an excessive preload.

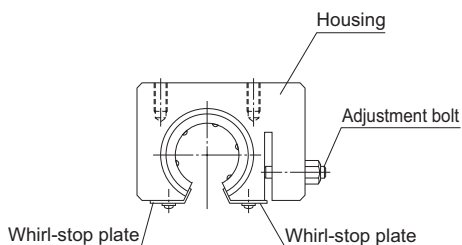


Fig.6

[Precautions on Installing an Open Three-ball-row Type Linear Bushing]

When installing an open three-ball-row type Linear Bushing, mount it while taking into account the load distribution as indicated in Fig.7 .

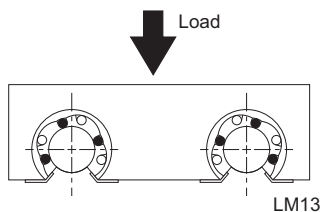


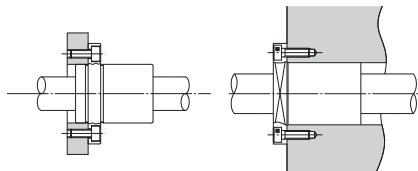
Fig.7

Mounting Procedure and Maintenance

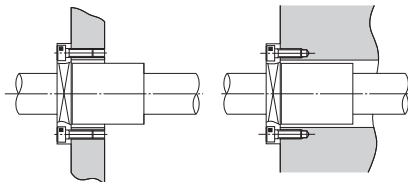
Assembling the Linear Bushing

● Installing the Flanged Type

With models LMF, LMK, LMH, LMIF, LMCF, LMIK, LMCK, LMIH, and LMCH, the nut is integrated with a flange. Therefore, the linear bushing can be mounted only via the flange.

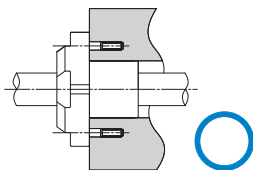


Mounted via spigot and socket joint

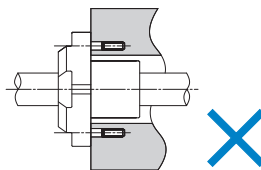


Mounted via flange only

However, the Model LMJK must be mounted via a spigot and socket joint. Please do not mount using just the flange.



Mounted via spigot and socket joint



Mounted via flange only

[Installing the LM Case Unit]

● Attaching Model SC (SL)

Models SC and SL can be affixed from either above or below using bolts. (See Fig. 8)

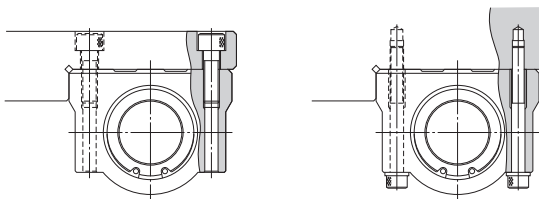
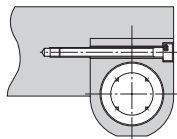


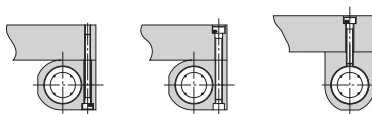
Fig. 8

● Attaching the Model SH (SH-L)

Models SH and SH-L can be affixed in any direction using bolts. (See Fig. 9)



Basic installation

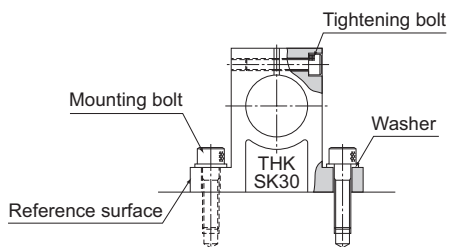


Alternative installations

Fig. 9

[Mounting the Shaft End Support]

Shaft end support model SK can easily be secured to the table using mounting bolts. Model SK enables the LM shaft to firmly be secured using tightening bolts.



[Inserting the LM Shaft]

When inserting the LM shaft into the Linear Bushing, align the center of the shaft with that of the nut and gently insert the shaft straightforward into the nut. If the shaft is slanted while it is inserted, balls may fall off or the retainer may be deformed. (See Fig.10 .)

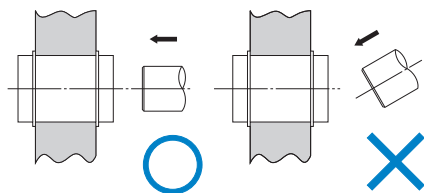


Fig.10

[When Under a Moment Load]

When using the Linear Bushing, make sure the load is evenly distributed on the whole ball raceway. In particular, if a moment load is applied, use two or more Linear Bushing units on the same LM shaft and secure an adequately large distance between the units.

If using the Linear Bushing under a moment load, also calculate the equivalent radial load and identify the correct model number. (See [B4-37](#) .)

Mounting Procedure and Maintenance

Assembling the Linear Bushing

[Rotational Use Not Allowed]

The Linear Bushing is not suitable for rotational use for a structural reason. (See Fig.11 .)

Forcibly rotating it may cause an unexpected accident.

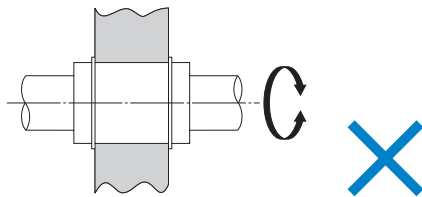


Fig.11

[Attaching Felt Seal Model FLM]

The felt seal can be press-fit into a housing finished to H7, but cannot be used as a stopper for preventing the Linear Bushing from coming off. Be sure to use the felt seal by attaching it as indicated in the Fig.12 .

Also make sure to impregnate the felt with sufficient lubricant before attaching it.

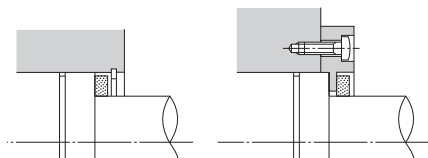


Fig.12