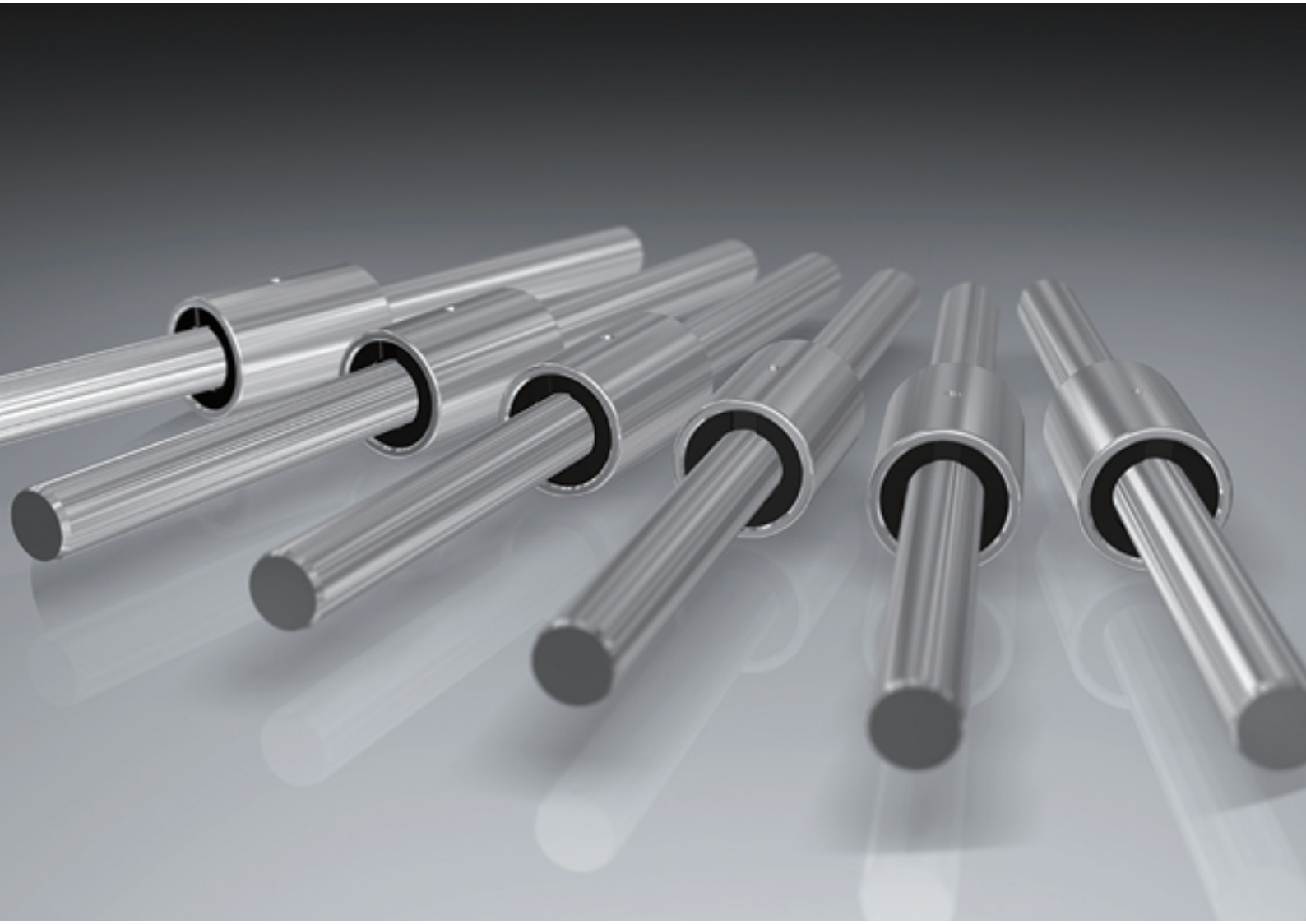
NEW

Guide Ball Bushing

Contributes to compact the system

Achieves load rating more than twice the Linear Bushing with the same dimensions (model LG-S)
Various combinations of nut and shaft are available (any combination is allowed)
A rotation stopper is unnecessary due to 4-groove structure

LG

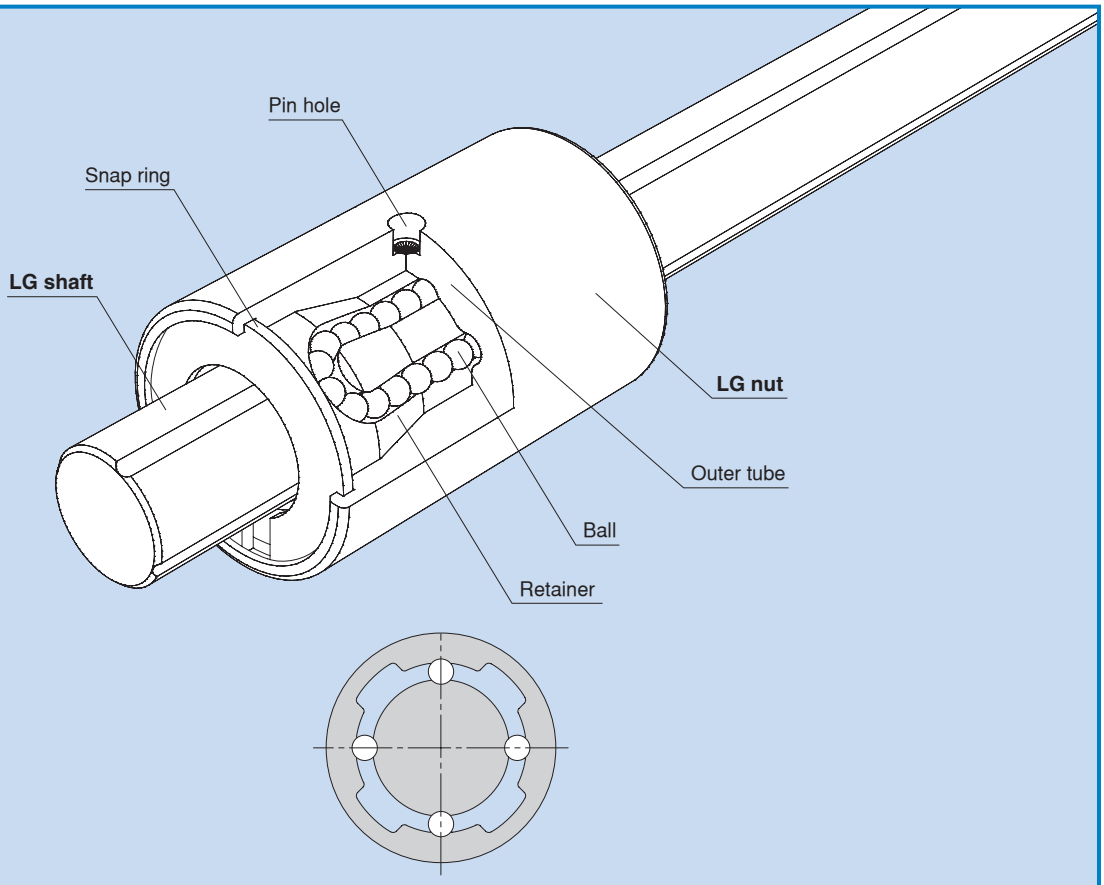


THK CO., LTD.
TOKYO. JAPAN

CATALOG No. 350E

Guide Ball Bushing

LG



Structure of Model LG

Structure and Features

Since model LG has 4 rows of circular arc grooves (raceways), it does not need a mechanism to prevent the outer tube from rotating. In addition, its load rating is much larger than Linear Bushing model LM with the same dimensions. Therefore, replacing the Linear Bushing with the Guide Ball Bushing will reduce the size and cost of the guide unit and extend the service life.

Higher load rating than the Linear Bushing

Since model LG ensures an R contact through the use of circular arc grooves for ball contact, it achieves a load rating more than twice that of point-contact Linear Bushing model LM with the same size.

Interchangeable in dimensions with Linear Bushing model LM

Since the outer tube of model LG has the same outer diameter and length as that of Linear Bushing model, LM, it is possible to replace Linear Bushing model LM with Guide Ball Bushing model LG as assemblies.

A rotation stopper is unnecessary because of raceways

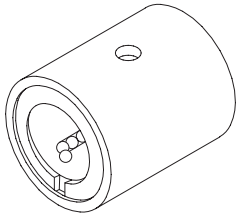
Since model LG has circular arc grooves, it does not need a rotation stopper required for Linear Bushing model LM, and allows the machine design to be compact.

Various combinations of nut and shaft are available (any combination is allowed)

As with the Linear Bushing, any combination of the LG nut and the LG shaft of model LG is allowed.

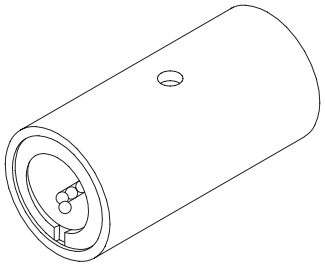
Model LG-S

In this type, the diameter and the length of the LG nut are the same as that of Linear Bushing model LM. This type is dimensionally interchangeable with model LM.



Model LG-L

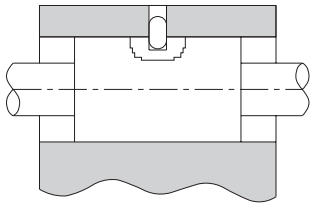
Model LG-L is a long type in which the overall length of the LG nut is longer than that of model LG-S to increase the load carrying capacity.



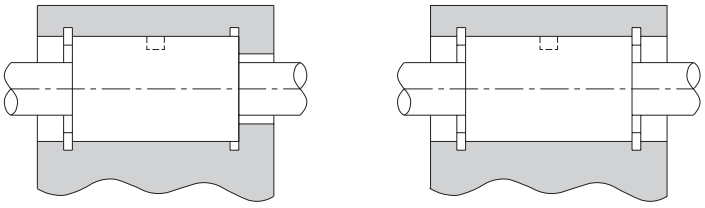
Mounting Method

To mount model LG, use a pin hole machined on the LG nut.
As with the conventional Linear Bushing, model LG can be mounted using snap rings and/or stopper plates.

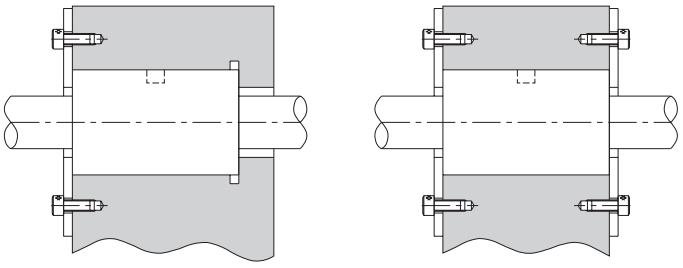
●Mounting model LG using a pin



●Mounting model LG as with the conventional Linear Bushing



Snap rings



Stopper plates

Precautions To Be Taken if an Eccentric Load Is Applied

Model LG achieves a much higher load-carrying capacity in receiving the eccentric load (moment and torque) than Linear Bushing model LM because of 4 rows of raceways. However, under conditions where the eccentric load is larger, the product may result in poor operation or early failure. In such cases, we recommend using Ball Spline model LBS or LT, both of which have larger load-carrying capacities (see THK General Catalog).

Examples of Changing the Linear Bushing to the Guide Ball Bushing

Advantage of using the Guide Ball Bushing 1: Longer service life

Since model LG has a rated load more than 2.4 times the Linear Bushing with the same dimensions, replacing the Linear Bushing with model LG will increase the service life by more than 13.8 times.

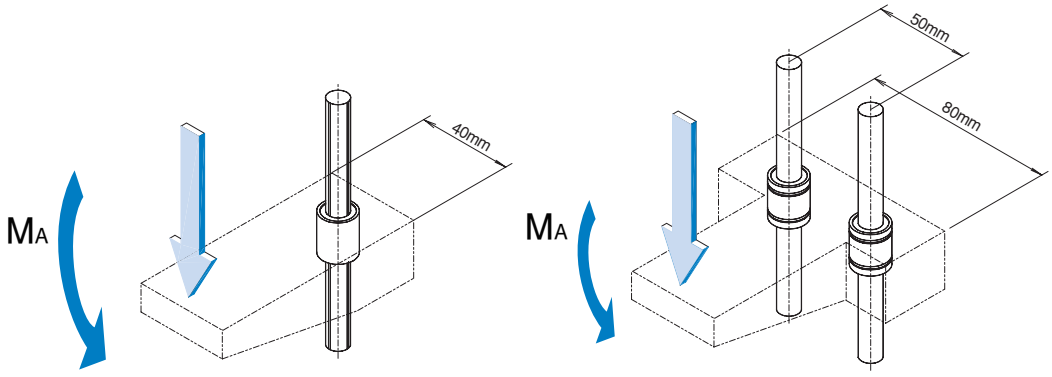
Comparison of the service life between Guide Ball Bushing mode LG and Linear Bushing model LM

Model number	Basic dynamic load rating: C [N]	Rated load ratio	Service life ratio
LG4S	335	3.8 times	54.8 times
LM4	88.2		
LG6S	494	2.4 times	13.8 times
LM6	206		
LG8S	796	3.0 times	27.0 times
LM8	265		

Advantage of using the Guide Ball Bushing 2: Smaller machine size

Since the Linear Bushing is not suitable for applications where a load in the rotational direction is applied, it is necessary to use two or more Linear Bushing units in parallel or have a rotation stopper mechanism even under conditions where a torque is not applied. In contrast, the Guide Ball Bushing, which has a structure containing four rows of circular arc grooves, is operable with a single shaft and therefore contributes to downsizing the machine, unless an excessive load is applied.

Achieves a load carrying capacity approximately three times the Linear Bushing in a half space



* A rotation stopper mechanism using a pin is provided

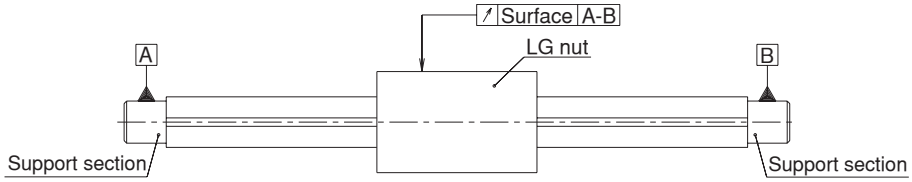
One unit of Guide Ball Bushing model LG8S is used

Two units of Linear Bushing model LM8 are used

Comparison of the permissible moment between Guide Ball Bushing mode LG and Linear Bushing model LM

Model number	Permissible moment: M_A [N-m]
One unit of LG8S is used	1.46
Two units of LM8 are used	0.45

Accuracy Standard



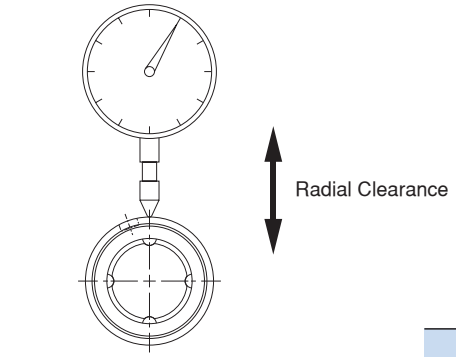
Run-out of the outer diameter of the nut relative to the support section of the shaft

Unit: μm

Overall shaft length (mm)		Run-out (max)*
—	200 or less	72
Above 200	250 or less	133

*: The value if the radial clearance is zero

Radial Clearance



Measurement of radial clearance

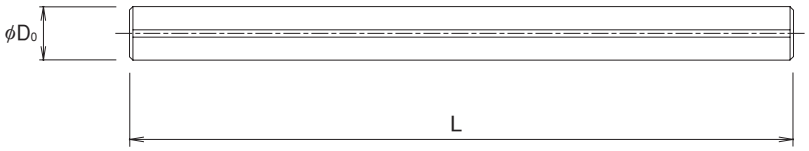
Radial Clearance

Unit: μm

Normal clearance
0 to +10

LG Shaft

Material: SUJ2
Hardness: 56 to 64 HRC



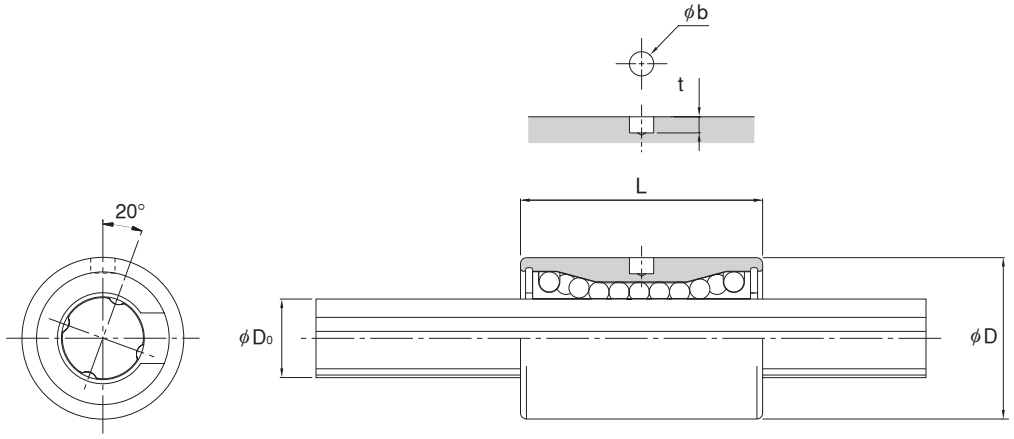
LG shaft dimensions

Unit: mm

Model number	Shaft diameter D_0 h7	Standard length L				Maximum manufacturable length	Mass [g/m]
LG4	4	100	150	—	—	150	95
LG6	6	100	150	200	—	200	220
LG8	8	100	150	200	250	250	390

Model LG

Dimensional Table of Model LG



Unit: mm

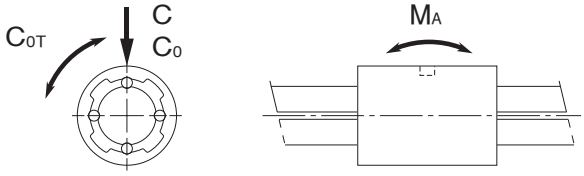
Model number	Shaft diameter D_0 h7	Nut dimensions						Basic load rating*1 (radial)		Permissible torque*2	Permissible moment*3	Mass [g]
		Outer diameter		Length		Pin hole						
		D	Tolerance	L	Tolerance	b +0.05 0	t +0.08 −0.02	C [N]	C_0 [N]	C_{0T} [N・m]	M_A [N・m]	
LG4S	4	8	0 −0.009	12	0 −0.12	1.2	0.8	335	473	0.066	0.33	2.5
LG4L		8		19	0 −0.2	1.2	0.8	466	757	0.105	0.71	4.0
LG6S	6	12	0 −0.011	19		1.5	1.2	494	681	0.241	0.74	10.5
LG6L		12		27		1.5	1.2	860	1499	0.530	1.71	14.0
LG8S	8	15		24		2	1.5	796	1065	0.838	1.46	16.5
LG8L		15		30		2	1.5	1203	1916	1.509	2.66	22.0

Note

*1: Value when a row of balls under a load are directly beneath the load.

*2: Reference value when the radial clearnace is at a maximum (+10 μm).

*3: Reference value when the radial clearnace is at a maximum (+10 μm) with a row of balls under a load being directly beneath the load.



Example of model number coding

(1) LG shaft only

LG4 − 100L

- 100L: Overall length of the LG shaft
- LG4: Model number of the LG shaft

(2) LG nut only

LG4S

- LG4S: Model number of the LG nut

(3) Set consisting of LG shaft + LG nut

2 LG4S + 100L

- 100L: Overall length of the LG shaft
- LG4S: Model number of the LG nut
- 2: Number of LG nuts installed on one shaft (blank if the number is 1)

In principle, we support estimates and orders by the LG shaft (1) or the LG nut (2).
We also support a set consisting of LG shaft and LG nut (3) at your request.

We can manufacture a type with a special radial clearance, apply specified grease (only anticorrosive oil is applied as standard), and provide surface treatment (THK AP-C treatment, THK AP-CF treatment, THK AP-HC treatment).
Fore details, contact THK.

Precautions on Use

● Assembling the LG nut with the LG shaft

- When assembling the LG nut with the LG shaft, match the positions of balls inside the LG nut with the grooves on the LG shaft, and then insert the LG shaft into the LG nut straight and gradually. If the LG shaft is not inserted straight, balls may fall out or the circulating part may be damaged.
- If the LG shaft sticks while you are inserting it, do not force it into the nut, but pull it out first, re-check the positions of the balls with the positions of the LG shaft grooves, and then re-insert the shaft straight and gradually.
- When the LG nut has been assembled with the LG shaft, check whether the LG nut or the LG shaft moves smoothly. If you forced the shaft into the nut, some of the functions may have been lost even if the product looks intact.

● Handling

- Do not disassemble the parts. Doing so may let dust enter the product or lower the assembly accuracy of the parts.
- If you tilt the LG nut or the LG shaft assembled with each other, it may fall by its own weight.
- Do not drop or hit the Guide Ball Bushing. Doing so may damage the product. If you apply an impact to it, some of the functions may be lost even if it looks intact.

● Lubrication

- Thoroughly wipe off the anticorrosive oil and apply a lubricant before using the product.
- Do not mix lubricants with different properties.
- If you plan to use the product in places subject to constant vibrations or special environments such as a clean room, vacuum, low temperature or high temperature, normal lubricants may not be used. Contact THK.
- If you plan to use a special lubricant, contact THK in advance.
- If adopting oil lubricant, the lubricant may not be distributed throughout the product depending on the mounting orientation of the LG nut. Contact THK for details.
- The lubrication interval varies according to the service conditions. Contact THK for details.

● Precautions on use

- Entrance of foreign material into the product will damage the ball circulating part or lose some of the functions. Take a measure to prevent foreign material such as dust and cutting chips from entering the product.
- If you plan to use the product in an environment where the coolant penetrates the LG nut, it may disrupt product functions depending on the type of the coolant. Contact THK for details.
- Do not use the product at temperature above 80°C. If desiring to use it at temperature above 80°C, contact THK in advance.
- If foreign material such as dust and cutting chips adheres to the product, replenish the lubricant after cleaning the product. For the type of the cleaning fluid to be used, contact THK.
- If you plan to use the product in places subject to constant vibrations or special environments such as a clean room, vacuum, low temperature or high temperature, contact THK in advance.
- If you remove the LG nut from the LG shaft and then re-attach the nut onto the shaft, balls may fall. Take much care in handling the product.

● Storage

- When storing the Guide Ball Bushing, enclose it in our package and store it in a horizontal orientation while avoiding high temperature, low temperature and high humidity.

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