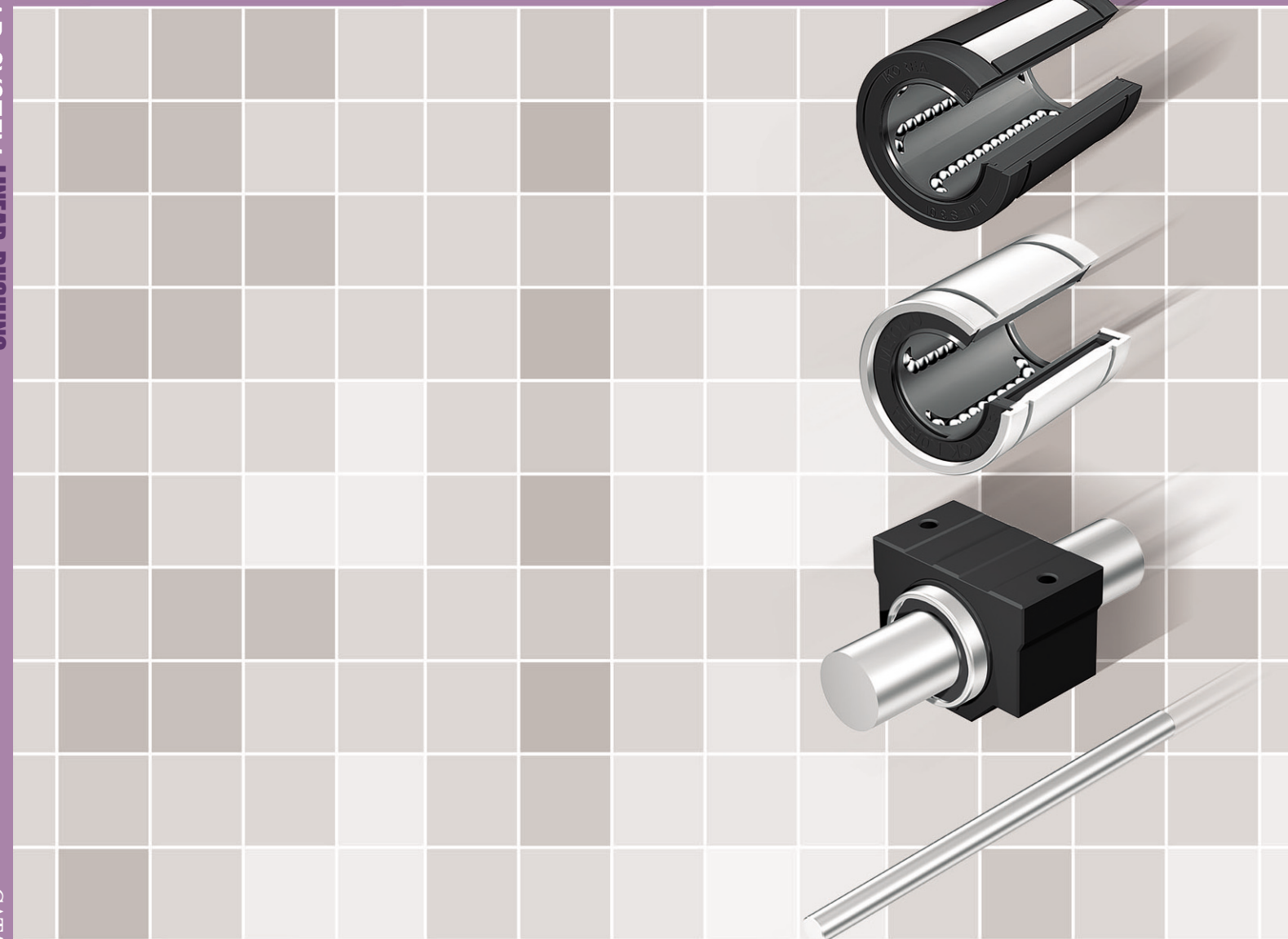


THE PRINCIPLE OF LINEAR SYSTEM

LINEAR BUSHING

by SAMICK the Linear Instinct



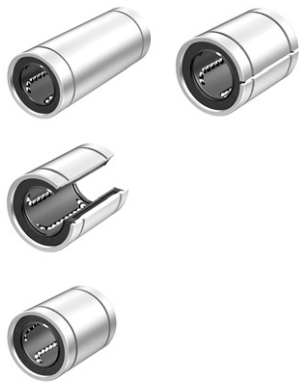
CATALOG NO. 0801E



Self-Aligning Linear Bushing

- Up to 3 times higher load capacity and 27 times longer travel life compared to a standard linear bushing
- Interchangeable with standard linear bushing
- Travel speeds up to 10t/s (3m/s)
- Smooth operation and reduced maintenance as a result of self-aligning Ball plates ($\pm 0.5^\circ$)
- Anti-Rusting: Nickel or Chrome plating, Raydent treatment of ball plate, Stainless-steel ball plate (Under LMES12, LMBS8), Stainless-steel ball

LMES, LMES_OP: European standard(mm), p29
LMBS, LMBS_OP: American standard(inch), p31



Standard Linear Bushing

- Allowed Max. 7650N the basic dynamic load rating
- Shaft diameter from 60mm to 5mm
- Provide low friction on high-speed movement
- Can be selected resin retainer (standard), and steel retainer (for high temperature & vacuum)
- Corrosion-resisting: the nickel-plated, Raydent treatment of Outer-sleeves, stainless steel ball

LM, LM_OP, LM_AJ, LM_L: Asian standard, p46
LME, LME_OP, LME_AJ, LME_L: European standard, p66



Flanged type Linear Bushing

- With a variety of design and ease of installation
- Used in case of passing the load of moving body directly to the Linear Bushing
- Installed without housing
- Can be selected resin retainer (standard), and steel retainer (for high temperature & vacuum)
- Corrosion-resisting: the nickel-plated, Raydent treatment of Outer-sleeves, stainless steel ball

LMF_(L), LMK_(L), LMH_(L): Asian standard, p50
LMEF_(L), LMEK_(L): European standard, p70



Pilot Flanged type Linear Bushing

- With a variety of design and ease of installation
- When the load of moving body passed directly to the Linear Bushing, the Pilot Flange can get more stable movement and being the most suitable for moment load
- Installed without housing
- Can be selected resin retainer (standard), and steel retainer (for high temperature & vacuum)
- Corrosion-resisting: the nickel-plated, Raydent treatment of Outer-sleeves, stainless steel ball

LMFP_(L), LMK_P(L), LMHP_(L): Asian standard, p56
LMEFP_(L), LMEK_P(L): European standard, p70



Middle Pilot Flanged type Linear Bushing

- With a variety of design and ease of installation
- When the load of moving body passed directly to the Linear Bushing, the Pilot Flange can get more stable movement and being the most suitable for moment load
- Installed without housing
- Can be selected resin retainer (standard), and steel retainer (for high temperature & vacuum)
- Corrosion-resisting: the nickel-plated, Raydent treatment of Outer-sleeves, stainless steel ball

LMFM, LMKM, LMHM: Asian standard, p62
LMEFM, LMEKM: European standard, p78



Aluminum Case Unit

- Combination product with Aluminum housing and standard or Self-Aligning linear bushing
- Aluminum housing with a high precision and lightweight
- Abnormal variant does not occur within reasonable load
- Minimized surface scratch

SC, SC_V, SC-W, SCJ: Asian standard, p82
SCE, SCE_V, SCE_W: European standard, p89



Aluminum Case Unit (Open type)

- Integration of open type aluminum housing and open type linear bushing
- Aluminum housing with a high hardness and lightweight
- Combined with support rail

SBR, TBR: Asian, European standard, p87



Shaft Rail Unit

- Integration of aluminum rail and shaft
- Combined with open type Aluminum Case Unit

SBS, TBS: Asian, European standard, p96



Shaft / Shaft Support

- High carbon bearing steel shaft (Surface treatment and chamfering is possible)
- Aluminum shaft support

SF: Shaft, Asian, European standard, p98
SK: Shaft support, Asian, European standard, p98



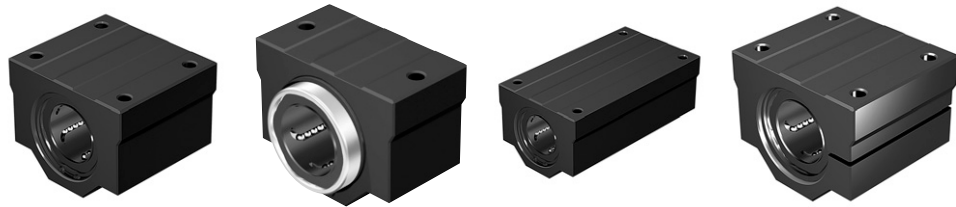
| PART NUMBER NOTATION |

Self-Aligning Linear Bushing	LM	ES	16	UU	OP	-	N	S
Samick Linear Bushing								
Standards	Metric series (mm) : ES Inch series (inch) : BS							
Nominal Shaft Diameter	Metric (mm) : 10~50mm Inch Series : #4~#32							
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU							
Type	Standard type : Blank Open type (for support rail) : OP							
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Stainless steel ball plating : M Ball plate Chrome plating : C							
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S							



| PART NUMBER NOTATION |

Linear Bushing	LM	E	F	P	20	L	UU	OP	-	A	N	S
Samick Linear Bushing												
Standards(Asia, Europe)	Asian Standard : Blank / European Standard : E											
Flange option	Standard : Blank Circular type : F Square type : K Oval type : H											
Flange Location	Standard : Blank Pilot : P Middle : M											
Nominal Shaft Diameter	Standard : 5 ~ 60mm Flange type : 6 ~ 60mm											
Length	Standard : Blank Long : L											
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU											
Sloting Type	Standard type : Blank Open type : OP Adjustable type : AJ											
Retainer (by application temperature)	Resin retainer (Standard) : Blank Steel retainer(High temperature) : A											
Outer-sleeves (by corrosion resistance)	No plating(Standard) : Blank Electroless nickel plating : N Raydent treatment : R											
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S											



| PART NUMBER NOTATION |

Aluminum Case Unit	SC	E	J	20	W	UU	-	A	N	S
Samick Aluminum Case Unit (with Standard Linear Bushing)										
Standards (Asia, Europe)										
Asian Standard : blank European Standard : E										
Clearance adjustable type*										
Standard : blank Clearance adjustable type (Asian standard only) : J										
Nominal Shaft Diameter										
Metric series (mm) : 8~50mm										
Case unit length										
Standard : blank Compact type : V Long type : W										
Seal										
No Seal : Blank One Side Seal : U Both Side Seal : UU										
Retainer (by application temperature)**										
Resin retainer (Standard) : Blank Steel retainer(High temperature) : A										
Outer-sleeves (by corrosion resistance)										
No plating(Standard) : Blank Electroless nickel plating : N Raydent treatment : R										
Ball type (by corrosion resistance)										
High carbon bearing steel ball (standard) : Blank Stainless steel ball : S										

* Clearance adjustable type aluminum housing unit applies only to the Asian standard and the Nominal Shaft Diameter Selection is possible between 10mm to 50mm
 ** Steel retainer applies only to Asian standard and European standard
 *** It can combine with self-aligning linear bushing (SCE type)

| PART NUMBER NOTATION |

Aluminum Case Unit (Open type)	SBR	20	UU	-	A	N	S
Samick open type Aluminum Case Unit							
Open type Aluminum Case Unit(Standard type) : SBR Open type Aluminum Case Unit(Clearance adjustable type) : TBR							
Nominal Shaft Diameter*							
16~50mm							
Seal							
No Seal : Blank One Side Seal : U Both Side Seal : UU							
Retainer (by application temperature)**							
Resin retainer (Standard) : Blank Steel retainer(High temperature) : A							
Outer-sleeves (by corrosion resistance)							
No plating(Standard) : Blank Electroless nickel plating : N Raydent treatment : R							
Ball type (by corrosion resistance)							
High carbon bearing steel ball (standard) : Blank Stainless steel ball : S							

* SBR's nominal shaft diameter: 16~50mm, TBR's nominal shaft diameter: 16~50mm
 ** By default, open type case unit cannot combine with a self-aligning linear bushing but some of the model is available with self-aligning linear bushing. Please contact Samick.



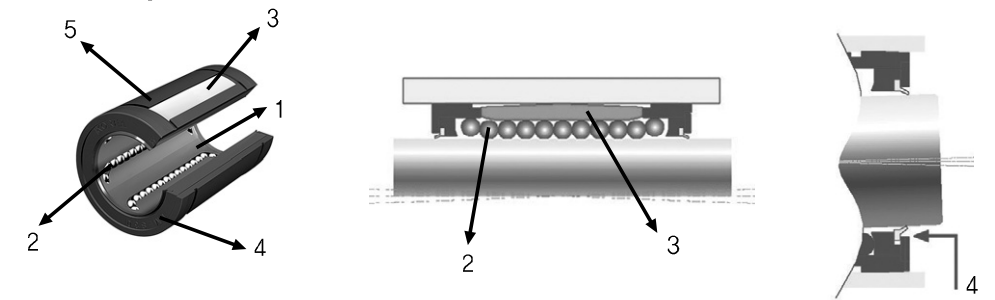
| PART NUMBER NOTATION |

Support Rail Unit	SBS	C	g6	30	-	1000	L
Samick Support Rail Unit							
Support Rail Unit for SBR : SBS Support Rail Unit for TBR : TBS							
Shaft (by corrosion resistance)							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance shaft : blank European standard h6 tolerance shaft : h6							
Shaft Diameter							
Shaft Length 100~3000mm							

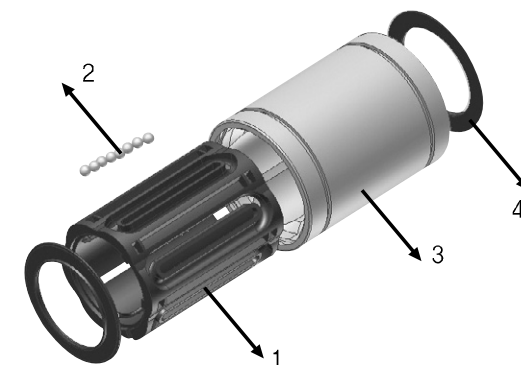
Shaft	SF	C	g6	30	-	1000	L
Samick LM Shaft							
Corrosion resistance treatment							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft (Length Max 1m) : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance : Blank European standard h6 tolerance : h6							
Shaft Diameter 5~80mm							
Shaft Length 100~3000mm							

Shaft Support	SK	20
Samick Shaft Support (Aluminum)		
Shaft Diameter	6~40mm	

| Structure and Special Feature |



Part	Material	Special features and function
1 Retainer	- POM	- Guide ball's Motion - An essential element of unlimited linear stroke
2 Ball	- High carbon bearing steel - Stainless steel - Ceramic	- the support of the load by direct contact between shaft and ball plate - An essential element for low friction, high load capacity, high precision and high speed stroke
3 Ball plate	- High carbon bearing steel - Stainless steel * available Corrosion resistance plating	- Direct contact with the ball to hold the load - Stand on a high load with the specially designed ball groove. - A key part of the self-aligning
4 Rubber Seal	- NBR * optional item	- Direct contact with shaft - Blocking a foreign substance from outside - Blocking outflow of lubricant by sealing linear bushing - An floating seal to facilitate self-aligning
5 Outer Sleeve	- POM	- Support ball plate - Possible to run with highspeed and reduce the inertia force & noise because of low friction with lightweight



Part	Material	Special features and function
1 Retainer	- POM - Stainless Steel	- Guide ball's Motion - An essential element of unlimited linear stroke
2 Ball	- High carbon bearing steel - Stainless steel - Ceramic	- the support of the load by direct contact between shaft and ball plate - An essential element for low friction, high load capacity, high precision and high speed stroke
3 Outer Sleeve	- High carbon bearing steel - Stainless steel * available Corrosion resistance plating	- Direct contact with the ball to the receiving portion of the load - Direct contact part to housing - An essential element for high load capacity - Interchangeability
4 Rubber Seal	- NBR * optional item	- Blocking a foreign substance from outside - Blocking outflow of lubricant by sealing linear bushing

∴ Load Rating and Service Life of Linear Motion System

When determine a model that would best suit for service conditions of a linear motion system, the load rating and travel life of the model must be considered. To consider the load rating, you should know the static safety factor of the model, which is calculated based on the basic static load rating. The service life can be assessed by calculating the nominal life, based on the basic dynamic load rating, and you need to check if the values thus obtained meet your requirements.

Basic static load rating

There are two basic load ratings of a linear motion system: basic static load rating (C₀), which sets the static load allowance limit, and basic dynamic load rating(C), which is using for calculating travel life.

Basic Static Load Rating (C₀)

If a linear motion system, whether at rest or in motion, receives an excessive load or large impact, a local permanent deformation develops the raceway and rolling elements. And if the magnitude of the permanent deformation exceeds a certain limit, it hinders the smooth motion of the linear motion system. The basic static load rating refers to a static load in a given direction with given magnitude, which total permanent deformation of rolling elements and raceway at the contact area is approximately 0.0001 of the rolling element diameter. In a linear motion system, the basic static load rating is defined as the radial load. Thus, the limit of static load allowance is the basic static load rating. For the rating values of individual linear motion systems, see the respective specification table in this catalog.

Static Safety Factor (f_s)

A linear motion system may possibly receive an unpredictable external force due to the vibration or impact while it is at rest or in motion, or inertia as a result of starting and stopping. It is, therefore, necessary to consider the static safety factor against operating loads. The static safety factor(f_s) indicates the ratio of a linear motion system load carrying capacity (basic static load rating, C₀) to the load exerted there on.

$$f_s = \frac{C_0}{P} \quad \text{or} \quad f_s = \frac{M_b}{M}$$

f_s : Static safety factor
 C₀ : Basic static load rating (N)
 M_b : Static permissible moment (N · mm)
 P : Calculated load (N)
 M : Calculated moment (N · mm)

To calculate a load exerted on the linear motion system, the mean load for calculating the service life and the maximum load for calculating the static safety factor must be obtained in advance. A system can receive unexpected excessive load when it is subject to frequent starts and stops, placed under machining loads, or when the severe moment is applied by overhanging loads. When selecting the correct type of a linear motion system for your application, be sure that the type you are considering can bear the maximum possible load when stopped and in operation. The table below specifies the standard values for the static safety factors.

Machine used	Loading conditions	f _s lower limit
Ordinary Industrial Machine	Receives no vibration or impact	1.0 ~ 1.3
	Receives vibration or impact	2.0 ~ 3.0
Machine tool	Receives no vibration or impact	1.0 ~ 1.5
	Receives vibration or impact	2.5 ~ 7.0

For large radial loads	$\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P} \geq f_s$
------------------------	--

C ₀ : Basic static load rating (N)	P : Calculated load (N)
f _H : Hardness factor	f _T : Temperature factor
f _C : Contact factor	

Basic Dynamic Load Rating (C)

The basic dynamic load rating (C) refers to a load in a given direction with given magnitude such that when identical linear motion systems in a group are interlocked with one another under the same conditions, the nominal life (L) of the systems is 50km (L=50km) if the systems use balls, and 100km(L=100km) if they use rollers. The basic dynamic load rating (C) is used to calculate the service life of a set of linear motion systems, which are interlocked with one another in response to a load. For rating values of individual linear motion systems, see the respective specification tables in this catalog.

Nominal Life

The service lives of linear motion systems more or less vary from system to system even if they are manufactured to the same specifications and remain in service under the same operating conditions. Hence a guideline for determining the service life of a linear motion system is given based on nominal life, which is defined as follows. The nominal life refers to the total running distance that 90% of identical linear motion systems in a group, when interlocked with one another under the same conditions, can achieve without flaking develops. The nominal life (L) of a linear motion system can be obtained from the basic dynamic load rating (C) and load imposed (P) using the following equations.

For linear motion system with balls	For a linear motion system with rollers
$L = \left(\frac{C}{P}\right)^3 \times 50$	$L = \left(\frac{C}{P}\right)^3 \times 100$
$L_{100} = \left(\frac{C_{100}}{P}\right)^3 \times 100$	
$\ast C_{100} = \left(\frac{C}{1.26}\right)$	
L : Nominal life of 50km L ₁₀₀ : Nominal life of 100km C : Basic dynamic load rating of 50km C ₁₀₀ : Basic dynamic load rating of 100km P : Applied load	L : Nominal life of 100km

The travel life of the Linear Bushing can be obtained using the following equation

$$L = \left(\frac{f_H \times f_T \times f_c}{f_w} \times \frac{C}{P} \right)^3 \times 50$$

$$L_{100} = \left(\frac{f_H \times f_T \times f_c}{f_w} \times \frac{C_{100}}{P} \right)^3 \times 100$$

L : Nominal life of 50km **L₁₀₀** : Nominal life of 100km
C : Basic dynamic load rating of 50km **C₁₀₀** : Basic dynamic load rating of 100km
P : Applied load **f_H** : Hardness factor (see Fig 1)
f_T : Temperature (see Fig 2) **f_c** : Contact factor (see Table)
f_w : Load factor (see Table)

Once nominal life L is obtained using this equation, the Linear Bushing service life can be calculated using the following equation, if the stroke length and the number of reciprocating cycles are constant

$$L_h = \frac{L \times 10^6}{2 \times l_s \times N_s \times 60}$$

L_h : Travel life in hours **l_s** : Stroke
N_s : Number of strokes per minute

Factors that affect the travel life

Hardness factor (f_H)

To ensure achievement of the optimum load rating of the Linear Bushing, the raceway hardness must be 58 to 64 H_{RC}. At hardness below this range, the basic dynamic and static load ratings decrease. The ratings must therefore be multiplied by the respective hardness factors (f_H).

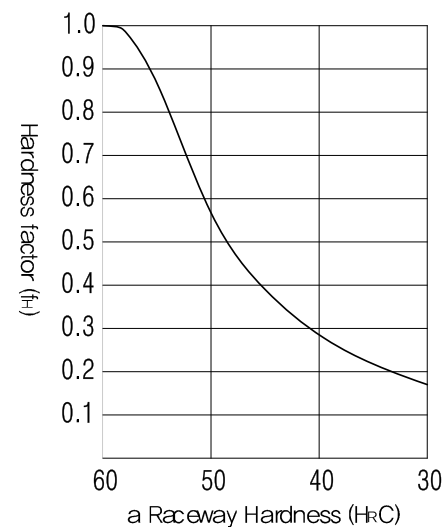


Fig1 Hardness factor (f_H)

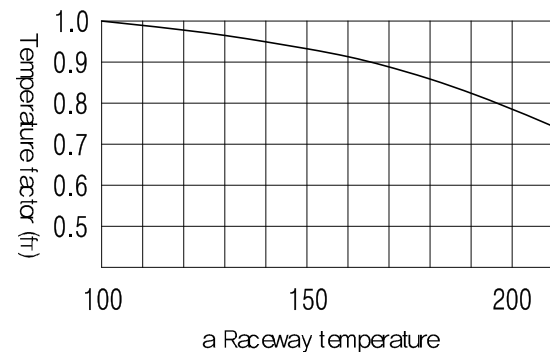


Fig2 Temperature factor (f_T)

Temperature factor (f_T)

For Linear Bushings used at ambient temperatures over 100°C, a temperature factor corresponding to the ambient temperature, selected from the diagram, must be taken into consideration. For higher than 80°C application, the seals, end plates and retainer must be changed for high temperature specifications (Temperature range: 20°C ~ 80°C). In addition, please note that the selected Linear Bushing itself must be a model with high-temperature specifications.

Contact factor (f_c)

When multiple Linear Bushings are used laid over one another, moments and mounting-surface precision will affect operation, making it difficult to achieve uniform load distribution. For Linear Bushings used laid over one another, multiply the basic load rating (C or C₀) by a contact factor selected from the table below.

Number of linear bushings on a shaft	Contact factor (f _c)
2	0.81
3	0.72
4	0.66
5	0.61
Over 6	0.60
In normal use	1.0

Load factor (f_w)

In general, machines in reciprocal motion are likely to cause vibration and impact during operation, and it is particularly difficult to determine the magnitude of vibration that develops during high-speed operation, as well as that of impact during repeated starting and stopping in normal use. Therefore, where the effects of speed and vibration are estimated to be significant, divide the basic dynamic load rating (C) by a load factor selected from the table below.

Operating conditions		Load factor (f _w)
Load conditions	Speed	
No impact and vibration	Under 15m/min	1.0~1.5
Slight impact and vibration	Under 60m/min	1.5~2.0
Considerable impact and vibration	Over 60m/min	2.0~4.0

∴ Load Consideration

When designing a linear motion system, it is necessary to consider how the variables of operation will affect performance. The following examples demonstrate how the position of the load and the center of gravity can influence the product selection. When evaluating your application, review each of the forces acting on your system and determine the product best for your needs.

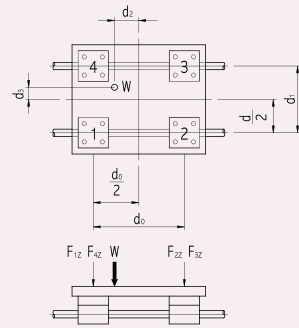
Horizontal Application | At the time of movement with uniform velocity or at the time of stop

$$F_{1z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{2z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{3z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{4z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$



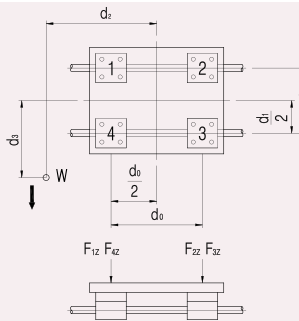
Horizontal Application | At the time of movement with uniform velocity or at the time of stop

$$F_{1z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{2z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{3z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{4z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

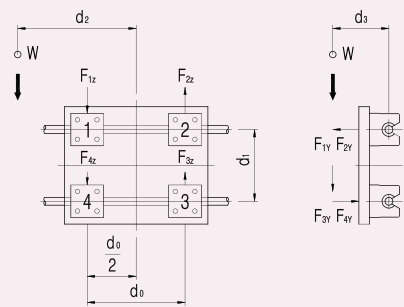


Side Mounted Application | At the time of movement with uniform velocity or at the time of stop

$$F_{1Y} \sim F_{3Y} = \frac{W}{2} \cdot \frac{d_3}{d_0}$$

$$F_{1z} = F_{3z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right)$$

$$F_{2z} = F_{4z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right)$$



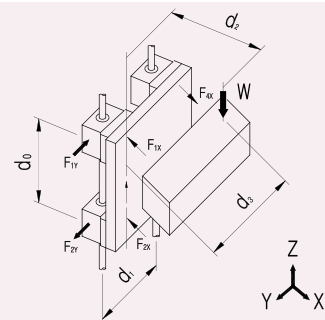
Vertical Application | At the time of movement with uniform velocity or at the time of stop.
At the time of start and stop, the load varies because of inertia

$$F_{1X} \sim F_{3X} = \frac{W}{2} \cdot \frac{d_2}{d_0}$$

$$F_{1Y} \sim F_{3Y} = \frac{W}{2} \cdot \frac{d_3}{d_0}$$

$$F_{1X} + F_{3X} \sim F_{2X} + F_{4X}$$

$$F_{1Y} + F_{3Y} \sim F_{2Y} + F_{4Y}$$



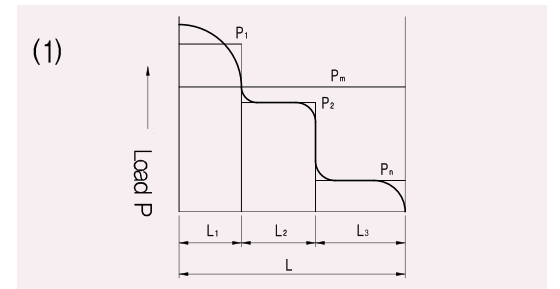
∴ Mean Effective Load at Varying Load

The load acting on a linear system changes depending on the application, for example, when the linear system starts or stops reciprocating motion, while it is operating at a fixed speed, and according to whether the linear system carries work or not. For a fluctuating load, it is important to obtain the mean effective load.

For stepped load according to the travelling distance

$$P_m = \sqrt{\frac{1}{L} (P_1^3 \cdot L_1 + P_2^3 \cdot L_2 + \dots + P_n^3 \cdot L_n)} \quad \dots \dots \dots (1)$$

- P_m : mean effective load in fluctuation (N)
- P_n : floating load (N)
- L : Total traveling distance (mm)
- L_n : Traveling distance with carrying P_n (mm)

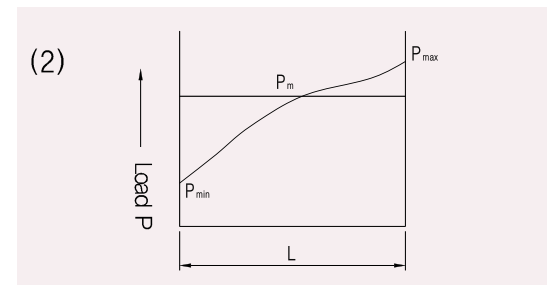


For loads that changes step wisely

For almost linearly varying load

$$P_m \cong \frac{1}{3} (P_{min} + 2 \cdot P_{max}) \quad \dots \dots \dots (2)$$

- P_m : mean effective load in fluctuation (N)
- P_{min} : Minimum value of fluctuating load (N)
- P_{max} : Maximum value of fluctuating load (N)

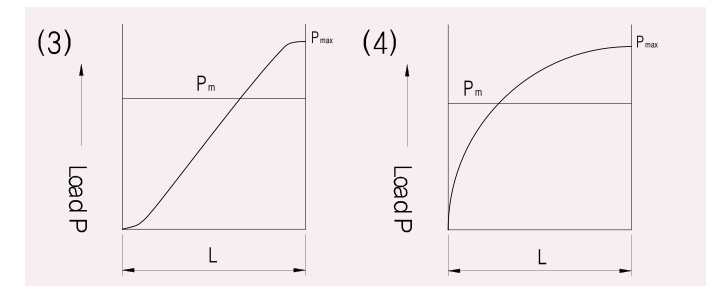


For loads that changes monotonously

When the load draws a sine curve

$$P_m \cong 0.65 P_{max} \quad \dots \dots \dots (3)$$

$$P_m \cong 0.75 P_{max} \quad \dots \dots \dots (4)$$



For loads that changes sinusoid ally

High Capacity Self-Aligning Linear Bushing - SUPERBALL

Higher Load Ratings and Travel Life

Specially designed ball plate is made of Hardened steel, and the precisely ground groove is slightly larger than the ball size, which provides greater contact area between the ball and the ball plate. In addition, this design provides 3 times higher load ratings and 27 times longer travel life compared to conventional Linear Bushing.

Self-Alignment

Ball plate has a convex shape to provide a pivot point at the center, which allows Self Alignment up to 0.5°. This Self Alignment capability eliminates any possibility of edge pressure caused by inaccurate machining, errors on mounting, or shaft deflection. Moreover, it obtains uniform load distribution and low friction motion.

Smooth and Silent Running

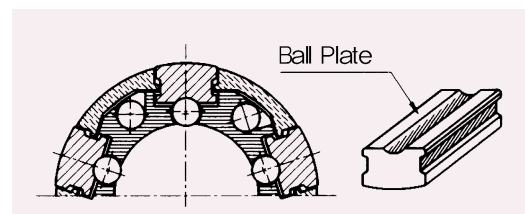
SUPERBALL has extremely smooth running due to the uniquely designed ball retainer and the outer sleeve. They are made of Engineering Polymer, which has light weight, low friction, and high wear-resistance. Due to them, the smooth and silent running can be obtained.

Clearance Adjustment

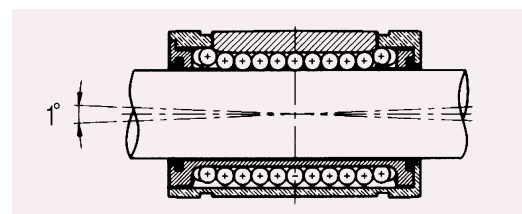
SUPERBALL's ball plates are designed to float in the outer sleeve. This allows clearance between the balls and shaft to be adjusted for the best application environment by using with the housing.

Interchangeability

SUPERBALL is designed to be fully Interchangeable with conventional linear bushing.



Cross-section of SUPERBALL



SUPERBALL's self-alignment feature

Cost Effectiveness

Lower cost on installation

Self-Alignment feature can compensate the inaccurate machining of the base, so less installation time and cost can be obtained.

Higher load rating and longer travel life

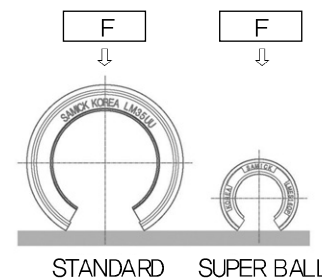
Compared to the same size conventional linear bushings, SUPERBALL will offer higher load rating and longer travel life.

Reduction of material cost

SUPERBALL's higher load rating enables the use of smaller components, and reducing material cost.

Energy saving

SUPERBALL is designed with lightweight, lower inertia, and low friction, so it enables the moving parts to have rapid motion with lower driving power.



STANDARD SUPER BALL

Load Ratings and Travel Life

SUPERBALL's load ratings give an influence to travel life with load direction, ball circuit orientation, and hardness of the shaft.

No. of Ball Row	Orientation of Balls		
	4 Row	5 Row	6 Row
Max. Load			
Equation	$F = 1.41 \times C$	$F = 1.46 \times C$	$F = 1.26 \times C$
Min. Load			
Equation	$F = C$	$F = C$	$F = C$

Basic Dynamic load rating(C) and travel life

The travel life of a Linear Bushing is determined largely by the quality of the shaft. The Basic Dynamic load rating is maximum continuous load that can be applied to the Linear Bushing with 90% of reliability achieving after 50km operation under normal conditions. The nominal travel life can be calculated by follow equation.

$$L = \left[\frac{C}{P} \right]^3 \times 50$$

$$L_{100} = \left[\frac{C_{100}}{P} \right]^3 \times 100$$

L : Nominal life(basis:50km, unit: Km)

L₁₀₀ : Nominal life(basis:100km, unit: Km)

C : Basic dynamic load rating(basis:50km, unit: N)

C₁₀₀ : Basic dynamic load rating(basis:100km, unit: N)

P : Applied load

Practically, other factors will affect the life as follows

$$L = \left[\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C}{P} \right]^3 \times 50$$

$$L_{100} = \left[\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C_{100}}{P} \right]^3 \times 100$$

f_w : Load factor

f_H : Hardness factor

f_T : Temperature factor

f_C : Contact factor

From the above equations, the stroke and frequency are constant, the Travel Life can be calculated by following equation

$$L_h = \frac{L \times 10^6}{2 \times l_s \times N_k \times 60}$$

L_h : Travel life (hour)
 l_s : Stroke (mm)
 N_k : Number of strokes per minute (cpm)

Examples of Calculation and Choosing a proper SUPERBALL

The Maximum applied load and the travel life are the most important factor for choosing a proper Linear Bushing size. Below are the sample calculation of the expecting travel life and choosing of proper Linear Bushing size.

〈Working conditions〉			
- Applied load	: 250N(P)	- Stroke	: 250mm (l _s)
- Number of strokes per minutes	: 60(N _k)	- Shaft Hardness	: HRC60 (f _H = 1.0)
- Operating speed	: 30m/min		

$$\begin{aligned} \text{Operating Speed } V &= 2 \times l_s \times N_k \\ &= 2 \times 250 \times 60 \\ &= 30000 \text{ mm/min } (f_w = 1.6) \end{aligned}$$

Other factors (f_c, f_r) are considered as 1.0

Calculation of expected travel life

Since, basic dynamic load rating is based on travel life of 50km and assuming all other factors as 1.0, you can choose the Linear Bushing size that you can expected Travel life. Let's try LMES20UU with the above working conditions

$$L = \left[\frac{1.0 \times 1.0 \times 1.0}{1.6} \times \frac{2,580}{250} \right]^3 \times 50$$

$$L_h = \frac{13,417 \times 10^6}{2 \times 0.250 \times 60 \times 60} = 7,454 \text{ hours}$$

Choosing proper Linear Bushing

Let's assume our design travel life is 15,000hours,

$$L = 15,000 \times 2 \times 250 \times 10^{-6} \times 60 \times 60 = 27,000 \text{ km}$$

$$C = \frac{250 \times 1.6}{1.0 \times 1.0 \times 1.0} \times \sqrt[3]{\frac{27,000}{50}} = 3,257 \text{ N}$$

Therefore, the proper SUPERBALL for above condition is LMES25UU which has 3800N as the Basic dynamic load rating.

Housing and Shaft

Housing

For SUPERBALL's application, Housing is required. Tolerance of Housing bore will affect the life and the accuracy of application. See the below Table However, if the tolerance of housing is H7, tight fitting can be occurred at both ends of outer- sleeves in case of LMES type

Table9. Housing and tight fitting

Part number(mm)	LMES10	LMES12	LMES16	LMES20	LMES25	LMES30	LMES40	LMES50	
Inner diameter(mm)	19	22	26	32	40	47	62	75	
Tolerance(H7)		+0.021 0			+0.025 0		+0.030 0		
Part number(Inch)	LMBS4	LMBS6	LMBS8	LMBS10	LMBS12	LMBS16	LMBS20	LMBS24	LMBS32
Inner diameter(Inch)	0.5	0.625	0.875	1.125	1.25	1.5625	2	2.375	3
Tolerance(H7)	0 +0.007	0 +0.007	0 +0.008	0 +0.008	0 +0.010	0 +0.010	0 +0.012	0 +0.012	0 +0.012

Shaft

Because the balls in SAMICK SUPERBALL as rolling elements are running directly on the shaft surface, the hardness, surface finish, and tolerance of shaft will largely affect on the traveling performance of SUPERBALL. The shaft must be manufactured with following conditions:

1) Hardness

The hardness must be HRC 58 to 64. The shaft with hardness less than HRC58 will lead decreasing of travel life and permissible load.

2) Surface Finishing

The surface finishing must be 1.6S or better for smooth operation.

3) Tolerance

The correct tolerance of the shaft diameter is recommended. See the below table.

Table10. Shaft and tight fitting

Part number(mm)	LMES10	LMES12	LMES16	LMES20	LMES25	LMES30	LMES40	LMES50	
diameter(mm)	10	12	16	20	25	30	40	50	
Tolerance(h6)	0 -0.009	0 -0.011	0 -0.011	0 -0.013	0 -0.013	0 -0.013	0 -0.016	0 -0.016	
Part number(Inch)	LMBS4	LMBS6	LMBS8	LMBS10	LMBS12	LMBS16	LMBS20	LMBS24	LMBS32
diameter(Inch)	0.25	0.375	0.500	0.625	0.750	1.000	1.250	1.500	2.000
Part number(g6)	-0.0002 -0.0006	-0.0002 -0.0006	-0.0002 -0.0007	-0.0002 -0.0007	-0.0003 -0.0008	-0.0003 -0.0008	-0.0004 -0.0010	-0.0004 -0.0010	-0.0004 -0.0012

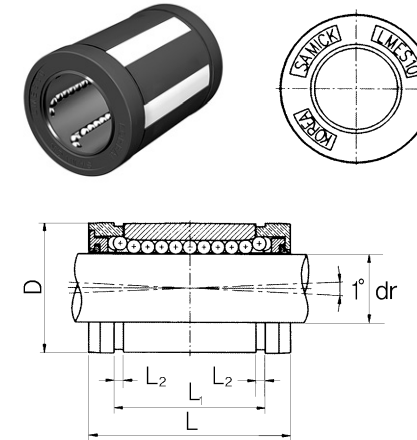


Part Number Notation

Self-Aligning Linear Bushing	LM	ES	16	UU	OP	-	N	S
Samick Linear Bushing								
Standards	Metric series (mm) : ES Inch series (inch) : BS							
Nominal Shaft Diameter	Metric series (mm) : 10~50mm Inch Series : #4~#32							
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU							
Type	Standard type : Blank Open type (for support rail) : OP							
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Stainless steel ball plate : M* Ball plate Chrome plating : C							
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S							

* LMES10, LMES12 and LMBS4, LMBS6, LMBS8 only with stainless steel ball plate

LMES Self-Aligning Linear Bushing



Self-Aligning linear Bushing	LMES	20	UU	-	N	S
Nominal Shaft Diameter						
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU					
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Ball plate Chrome plating : C Stainless steel ball plate : M****					
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S					

PART NUMBER	DIAMETER		D*	L ±0.2	L ₁ ±0.2	L ₂ min	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
	dr.	TOLERANCE					DYNAMIC**C	STATIC**C ₀		
LMES10	10	+0.008	19	29	21.7	1.35	750	550	5	17
LMES12	12	0	22	32	22.7	1.35	1230	1100	5	23
LMES16	16	+0.009	26	36	24.7	1.35	1550	1250	5	28
LMES20	20	+0.001	32	45	31.3	1.65	2580	1670	6	61
LMES25	25	+0.011	40	58	43.8	1.9	3800	2750	6	122
LMES30	30	+0.001	47	68	51.8	1.9	4710	2800	6	185
LMES40	40	+0.013	62	80	60.4	2.2	6500	5720	6	360
LMES50	50	+0.002	75	100	77.4	2.7	11460	7940	6	580

* Based on nominal housing bore
 ** Dynamic load rating is based on the nominal life of 50km. In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12 s 50km basis dynamic load rating C = 410N
 LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 *** Dimension : mm
 **** LMES10, LMES12 only with stainless steel ball plate

:: SAMICK LINEAR BUSHING

SAMICK Linear Bushing, LM type is the linear motion system with unlimited stroke by applying with LM shaft. Because of the point contact between Balls and LM shaft, minimum friction can be acquired and that can give you the high precision motion. SAMICK Linear Bushing serves the alignment of the balls toward the LM Shaft by the single Retainer and cylindrical shape of Raceway. Outer Sleeve is made of high-carbon Chromium Bearing Steel, and inner and outer grinding processes are applied after Heat treatment.

Interchangeability

The Dimensions of SAMICK Linear Bushing are standardized to have full interchangeability. LM shaft is provided with the cylindrical grinding to have high precision fitting clearance.

Rigid Outer Sleeve

Hardened and Precisely ground Outer Sleeve is made of Bearing steel, and can be direct assembled with the needle bearing on outer surface.

High precision Retainer

The single body retainer guides 4~6 ball circuits, and it makes the precision guiding against the balls moving direction and smooth motion.

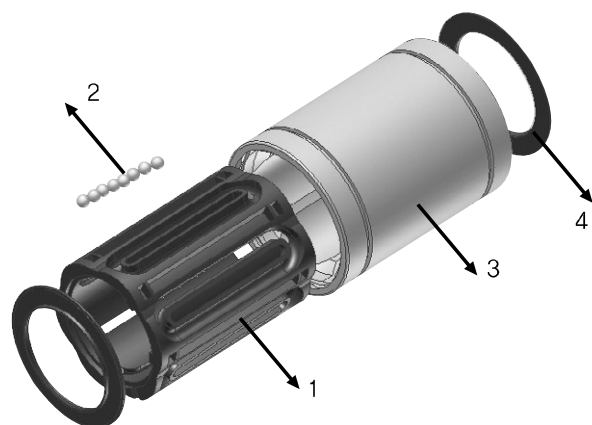
LM Case Unit

LM Case Unit, SC type is consist of the light Aluminum case and LM type Linear Bushing, so the assembly can be finished by simple bolting. Longer life can be obtained by adjusting the Ball circuit orientation of Linear Bushing against the direction of load.

Application

SAMICK Linear Bushing are widely used in Precision equipments: Computer and peripheral equipments, Measuring equipments, Auto recording equipments, and 3D measuring equipments, and Linear Motion systems in Machine for Mass Production: Multi-Axis Drilling machines, Punching Press, Tool Grinders, Auto-Gas cutters, printing machines, card selectors, food packing machines, and etc.

:: Structure



part	Material
1 Retainer	- POM - Stainless Steel
2 Ball	- High carbon bearing steel - Stainless steel - Ceramic
3 Outer-sleeve	- High carbon bearing steel ※ available Corrosion resistance plating
4 Rubber Seal	- NBR (Acrylonitrile Butadiene Rubber)* ※ optional item



| PART NUMBER NOTATION |

Linear Bushing	LM	E	F	P	20	L	UU	OP	-	A	N	S
Samick Linear Bushing												
Standards(Asia, Europe)												
Asian Standard : Blank / European Standard : E												
Flange option												
Standard : Blank Circular type : F Square type : K Oval type : H												
Flange Location												
Standard : Blank Pilot : P Middle : M												
Nominal Shaft Diameter												
Standard : 5 ~ 60mm Flange type : 6 ~ 60mm												
Length												
Standard : Blank Long : L												
Seal												
No Seal : Blank One Side Seal : U Both Side Seal : UU												
Sloting Type												
Standard type : Blank Open type : OP Adjustable type : AJ												
Retainer (by application temperature)												
Resin retainer (Standard) : Blank Steel retainer(High temperature) : A												
Outer-sleeves (by corrosion resistance)												
No plating(Standard) : Blank Electroless nickel plating : N Raydent treatment : R												
Ball type (by corrosion resistance)												
High carbon bearing steel ball (standard) : Blank Stainless steel ball : S												

∴ Load rating and Travel Life

The Load rating of SAMICK Linear Bushing can be affected by the balls orientation against the Load. The Basic Load rating in the table is the Load rating of Linear Bushing when 1 (one) Ball circuit are just beneath the load. As shown in Table, if the Ball are located on symmetrical position against the Load, the Load rating will be increased and the travel life will be extended.

Load ratings and Orientation of Bals

No. of Ball Row	Orientation of Bals		
	4 Row	5 Row	6 Row
Max. Load			
Equation	$F = 1.41 \times C$	$F = 1.46 \times C$	$F = 1.26 \times C$
Min. Load			
Equation	$F = C$	$F = C$	$F = C$

Basic Dynamic load rating(C) and travel life

The travel life of a Linear Bushing is determined largely by the quality of the shaft. The Basic Dynamic load rating is maximum continuous load that can be applied to the Linear Bushing with 90% of reliability achieving after 50km traveling under normal conditions. The nominal travel life can be calculated by follow equation.

$L = \left[\frac{C}{P}\right]^3 \times 50$	L : Nominal life (basis:50km, unit: Km)
$L_{100} = \left[\frac{C_{100}}{P}\right]^3 \times 100$	L ₁₀₀ : Nominal life (basis:50km, unit: Km)
	C : Basic dynamic load rating(basis:50km, unit: N)
	C ₁₀₀ : Basic dynamic load rating(basis:10km, unit: N)
	P : Applied load

Practically, other factors (Hardness factor, Load factor, Contact factor, etc) will affect the life as follows

$L = \left[\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C}{P}\right]^3 \times 50$	f _w : Load factor
$L_{100} = \left[\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C_{100}}{P}\right]^3 \times 100$	f _H : Hardness factor
	f _T : Temperature factor
	f _C : Contact factor

Equivalent factor and Travel life

If a Linear Bushing or two Linear Bushings laid beside one another on one shaft, and the moment load is applied, calculate the Equivalent load.

$P_U \cong K \cdot M$	P _U : Equivalent Load when the moment applied
	K : Equivalent factor(see Table below)
	M : Applied Moment where P _v should be up to Basic load rating(C ₀)

If the moment load and the radial load are applied, the travel life can be calculated by the sum of the moment load and the radial load. From the above equations, the stroke and frequency are constant; the travel life can be calculated by following equation

$L_h = \left[\frac{L \times 10^6}{2 \times l_s \times N_s \times 60}\right]$	L _h : travel life (hr)
	l _s : Stroke(mm)
	N _s : Number of stroke per minute (cpm)

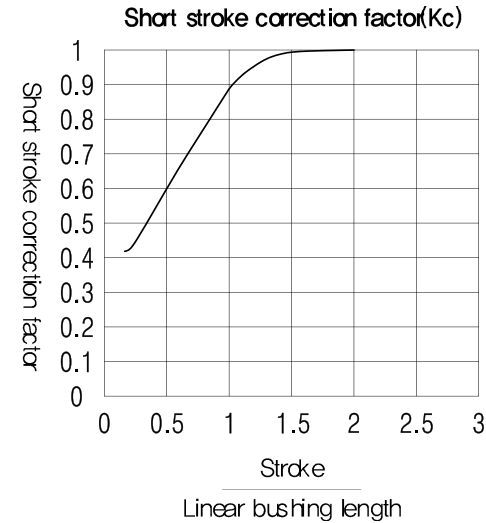
Equivalent factor for Linear Bushing

Equivalent factor (K)							
P/N	1EA	2EA	P/N	1EA	P/N	1EA	2EA
LM 5	1.253	0.178	LM 5L	0.223	LME 5	0.669	0.123
LM 6	0.553	0.162	LM 6L	0.201	LME 8	0.514	0.116
LM 8S	0.708	0.166	LM 8L	0.151	LME 12	0.389	0.090
LM 8	0.442	0.128	LM 10L	0.118	LME 16	0.343	0.081
LM 10	0.389	0.101	LM 12L	0.113	LME 20	0.291	0.063
LM 12	0.389	0.097	LM 13L	0.107	LME 25	0.209	0.052
LM 13	0.343	0.093	LM 16L	0.096	LME 30	0.167	0.045
LM 16	0.279	0.084	LM 20L	0.082	LME 40	0.127	0.039
LM 20	0.257	0.071	LM 25L	0.060	LME 50	0.105	0.031
LM 25	0.163	0.054	LM 30L	0.053	LME 60	0.098	0.024
LM 30	0.153	0.049	LM 35L	0.050			
LM 35	0.143	0.045	LM 40L	0.043			
LM 40	0.117	0.040	LM 50L	0.034			
LM 50	0.096	0.032	LM 60L	0.031			
LM 60	0.098	0.028					

Note 1) The equivalent factor for LMF/K/H, LMFP/KP/H and SC types are same as LM type.
 Note 2) The equivalent factor for LMF-L, LMK-L, LMH-L and SCW types are same as LM-L type.
 Note 3) The equivalent factor for LMEF/K/H and SCE types are same as LME type.

Short stroke Applications

In applications when the stroke is short, the life of the shaft is shorter than that of the Linear Bushing. In short stroke applications, the required dynamic load rating must be multiplied by the shot stroke correction factor (Kc) found on Fig right side.



❖ Lubrication and Friction

Linear Bushing is used with grease lubrication or oil lubrication but in some case, it is used without any lubrication.

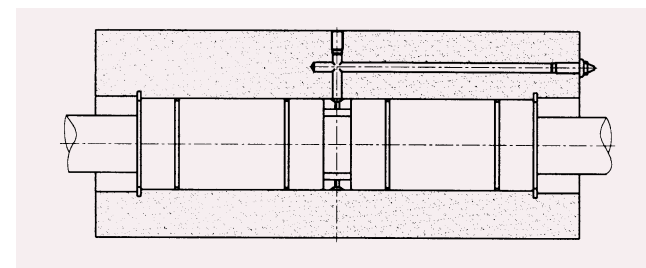
Grease Lubrication

Before applying the grease, the anticorrosive oil must be removed by kerosene or organic solvent, and applying the grease after drying. Must Applying grease directly on the ball for both side sealed type (UU), and applying same as above or applying on the shaft for without sealed type. Lithium soap radical of viscosity mark (JIS No. 2) is recommended for use.

Oil Lubrication

Operating Temp.	Viscosity
-30°C ~ 50°C	VG 15 ~ 46
50°C ~ 80°C	VG 46 ~ 100

There is no need to remove anticorrosive oil when oil is used for lubrication. ISO viscosity grade VG15~100 oil is usually used according to the temperature. The turbine oil, machine oil, and spindle oil are usually used as lubrication oil. Drop the oil on the shaft for lubrication, or supply it through an oil hole provided on the housing (Fig 6). However, dropping lubrication is not used in both seal type because the seal remove oil, because. Contact SAMICK for Linear Bushing with lubrication hole for user's demands.



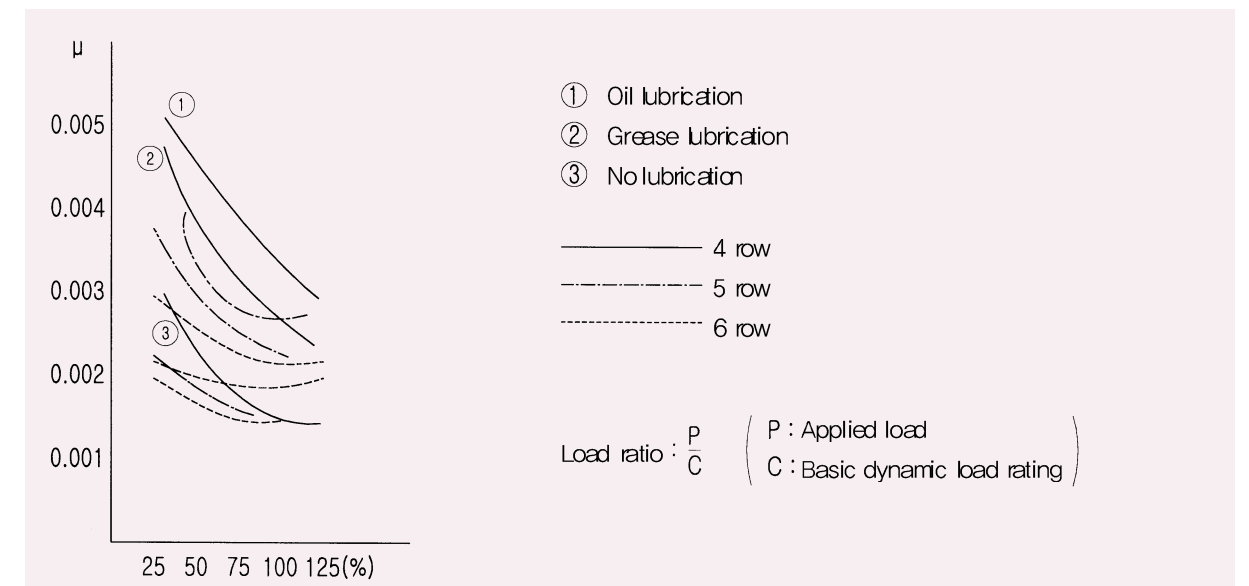
Coefficient of Friction

Linear Bushing has balls as rolling elements, so it gives rise to reduces the frictional resistance. Static friction, in particular, is very low, and there is just little difference between static and dynamic friction, so, that stick-slip does not occur. Such low friction makes submicron feeding possible. The normal friction coefficient is on Fig below, and the Friction resistance can be calculated by following equation.

$$F = \mu \cdot P + f_s$$

	F	: Friction resistance force	(N)
	f_s	: Resistant of Seal (0.3 ~ 2.4N)	
	P	: Applied External load (Perpendicular Load against shaft core)	(N)
	μ	: Friction Coefficient(Static or Dynamic)	

Coefficient of Kinetic Friction



Coefficient of Kinetic Friction

Installation Guide

Recommended Tolerance of Housing bore for SAMICK Linear Bushing are in Table. Normal fit is standard, but for without clearance, pressed fit is also available.

Type		Case	
Part number	Grade	Normal fit	Pressed fit
LM	Higher(H)	H7	J7
LME	-	H7	K6, J6
LMF / FP LMK / KP LMH / HP LM_L LMF / FP_L LMK / KP_L LMH / HP_L LMFM	-	H7	J7

Clearance of Outer sleeve and Shaft

Normal fit is standard for using of Linear Bushing with LM shaft. And, for without clearance, tight fit is available. Next table shows outer diameter tolerance of shaft.

Type		LM Shaft	
Part number	Grade	Normal fit	Tight fit
LM	Higher(H)	f6, g6	h6
LME	-	h7	K6
LMF / FP LMK / KP LMH / HP LM_L LMF / FP_L LMK / KP_L LMH / HP_L LMFM	-	f6, g6	h6

Negative diametric clearance should not exceed what is specified in the dimension table.

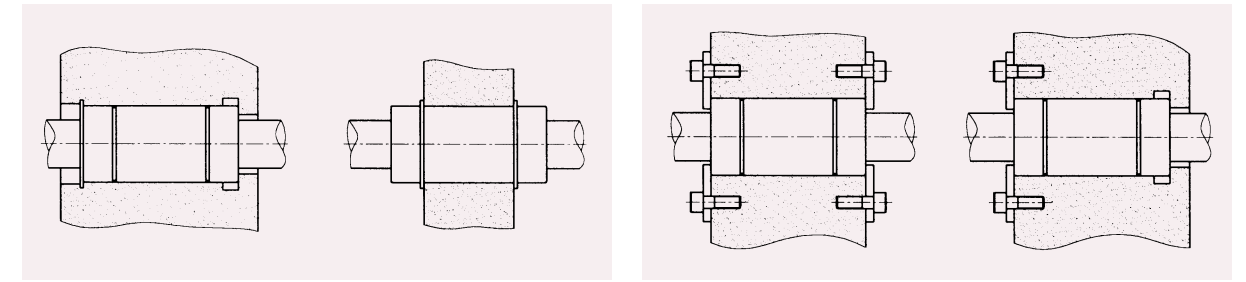
Radical Clearance(μm)															
Type \ Dr.	5	6	8S	8	10	12	13	16	20	25	30	35	40	50	60
LM(μm)	-3	-5	-5	-5	-5	-5	-7	-7	-9	-9	-9	-13	-13	-13	-16
LME(μm)	-5			-5		-7		-7	-9	-9	-9		-13	-13	-16

Mounting

High holding strength toward LM shaft direction is not required, but just press fit only for mounting is not recommended.

Standard type

Feasible mounting methods are illustrated in Fig 8 and Fig 9. At this moment, fix the linear bushing with retaining rings and cover plates



Mounting with retaining rings

Mounting with cover plates

Retaining ring for Mounting

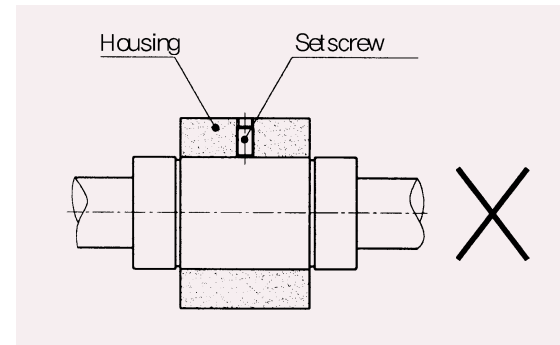
Retaining ring for LM type SAMICK Linear Bushing are used for mounting as shown in the table below

Part number	Retaining ring(mm)			
	External (for Shaft)		Internal(for Bore)	
	C type	Needle type	C type	Needle type
LM 5	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 40	-	60	60	60
LM 50	-	80	80	80
LM 60	-	90	90	90

Note) The information in the table are common for LM and LM-L type

Setscrew mounting prohibited

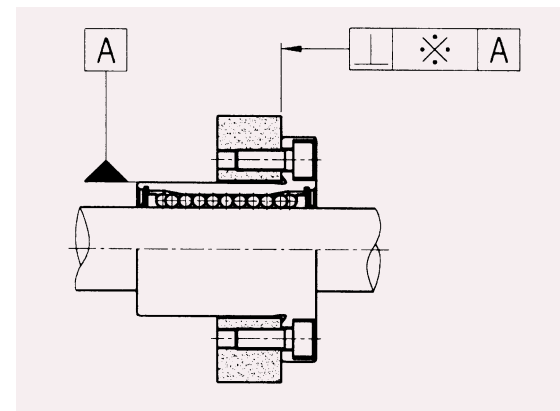
Mounting a Linear Bushing with a set screw as show in Figure will cause deformation of the outer sleeve and should be avoided.



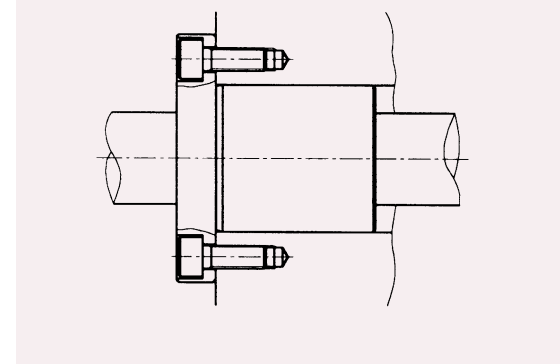
Mounting with setscrew

Flanged type

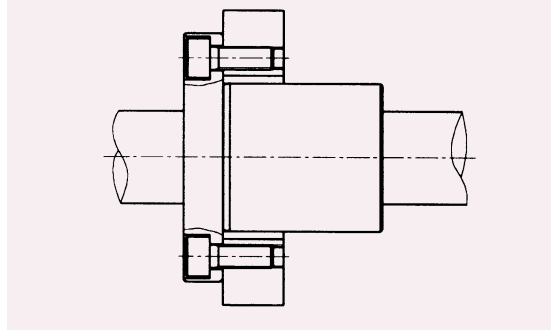
Mounting for LMF, LMK, LMH (included long type), only mounting the flange with mounting bolt can be all of mounting because of its single body shape. Geometric Dimensional Tolerance should be considered when the Outer Sleeve is the datum for installation.



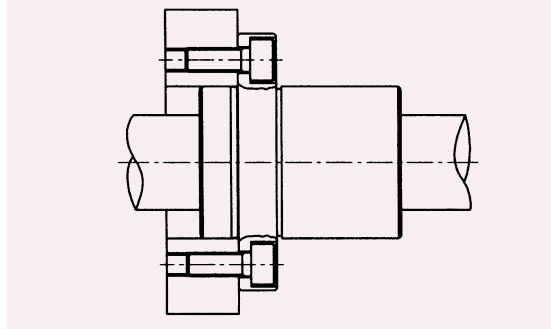
• Mounting with datum from Outer Sleeve



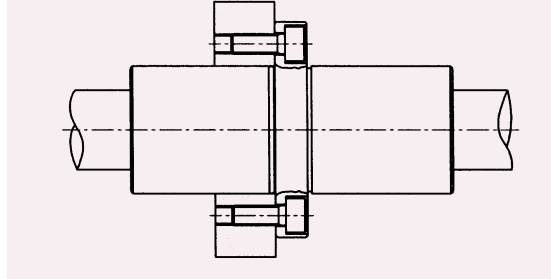
• Mounting of Flange with mounting bolt



• Mounting of Pilot flanged type



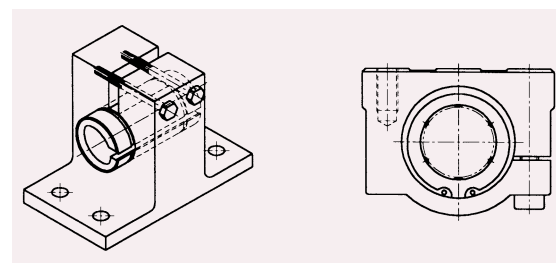
• Mounting of Middle flanged type



Flanged type mounting

Mounting of Adjustable type

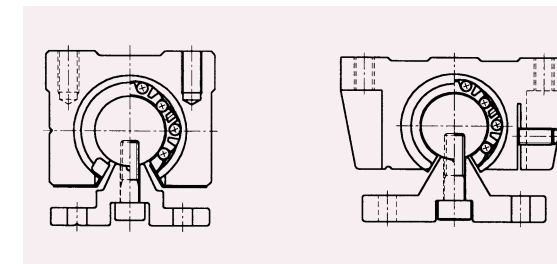
Adjustment of clearance for Adjustable type (AJ) and LM shaft can be obtained by assembling with the adjustable type Housing. In this case, the slotted side of Linear Bushing should be located at 90° of open side of Housing for equivalent deformation against radial direction.



Mounting of adjustable type

Mounting of Open type

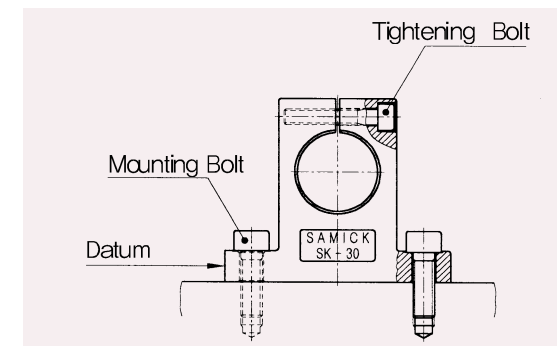
Open type(...OP) also can be used with clearance adjustable housing as shown on Figure. Light pre-load is applied for normal using, but heavy pre-load should be avoided.



Mounting of Open type

Mounting of Shaft support

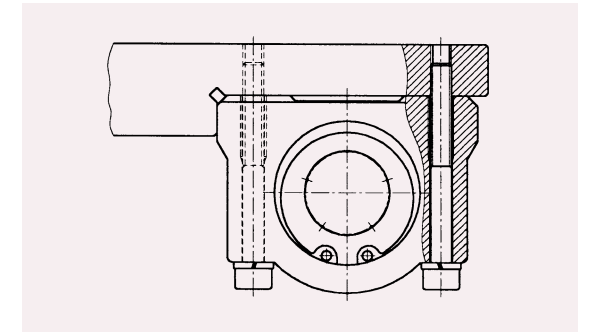
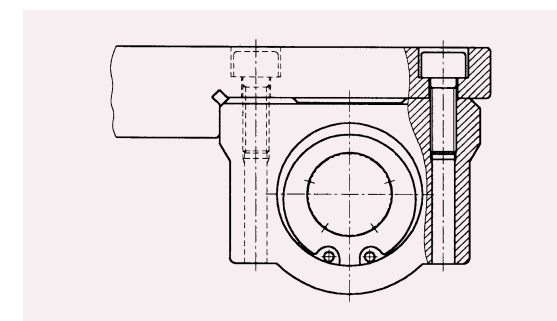
Shaft support, SK can be mounted with mounting bolt for table, and LM shaft can be mounted with tightening bolt



Mounting of Shaft support

Mounting of LM Case Unit

Mounting of SC type Both side mounting of SC(E), SC(E)_W, SC(E)_V type from the top and the bottom side with mounting bolt are both available, and it gives you minimum mounting time.

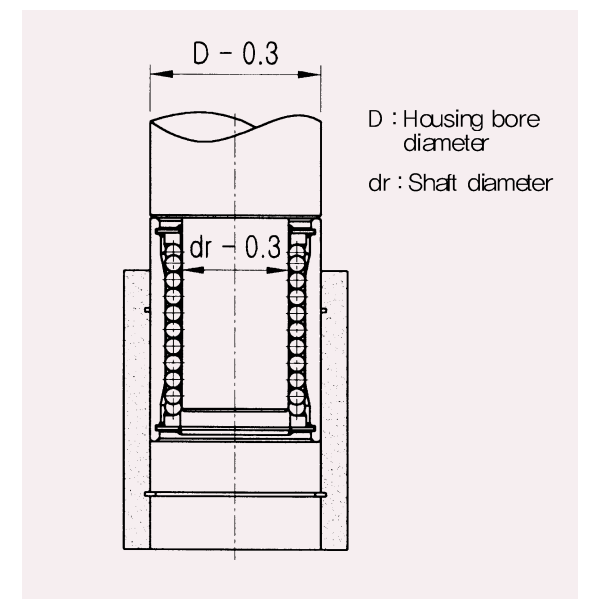


Mounting of Case unit

Application Tips

Mounting of Linear Bushing

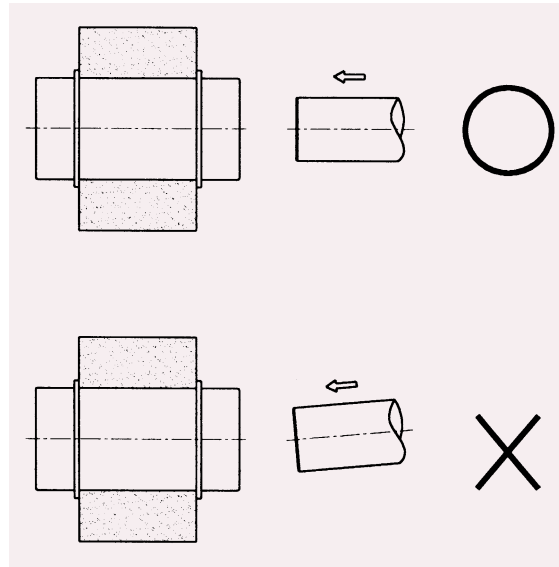
For mounting of standard type SAMICK Linear Bushing into the Housing, a jig should be used to avoid direct hitting on the outer sleeve or seal when installing. See Below.



Mounting into housing

Insertion of Shaft

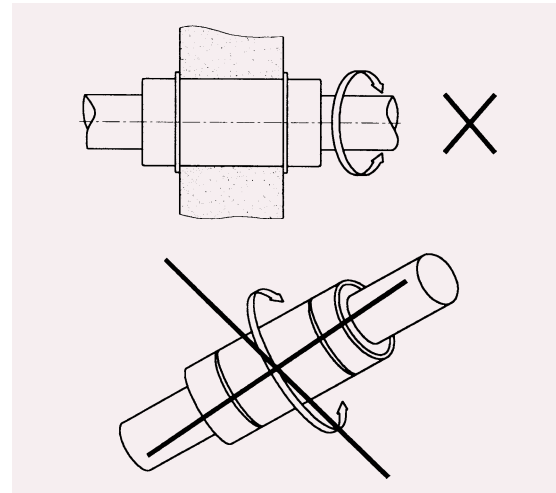
Care must be taken to align the bushing and the shaft when inserting a shaft into a linear bushing. If the shaft is inserted with slanted, balls may depart from the damaged or deformed retainer.



Insertion of shaft into Linear Bearing

The Rotational Motion Prohibited

Linear Bushing is not suitable for rotational motion. If the Linear Bushing is exposed to rotational motion it may lead unexpected accidents.



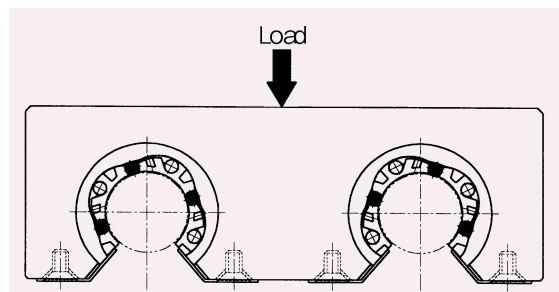
The Rotational Motion Prohibited

When Moment loads applied

External loads should be distributed uniformly on a Linear Bushing. When moment loads are applied, two or more Linear Bushings should be used on one LM shaft, and the distance between two Linear Bushings should have enough distance. When the moment loads are applied, calculate the equivalent load and choose the proper Linear Bushing.

Mounting of open type Linear Bushing with three ball rows

Please mount the open type Linear Bushings with three ball circuit as same as Figure for considering of load distribution.



Installation example of LM12, LM13

:: SAMICK Support Rail Unit

SAMICK Support Rail Unit is assembled of Support Rail, LM Shaft, and Open type Linear Bushing Case. All components are standardized for providing interchangeability, and less cost and designing time.



Support Rail Unit	SBS	C	h6	30	-	1000	L
SAMICK Support Rail Unit							
Support Rail Unit for SBR : SBS Support Rail Unit for TBR : TBS							
Shaft(by corrosion resistance)							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance shaft : blank European standard h6 tolerance shaft : h6							
Shaft Diameter							
16~50mm							
Shaft Length							
100~3000mm							

:: SAMICK LM Shaft

SAMICK supply precision LM shaft for SAMICK Linear Bushing. The hardness, surface finishing, and tolerance of shaft must be considered for choosing the proper shaft because the balls are running directly on the shaft surface. Shaft dimensions are as follows

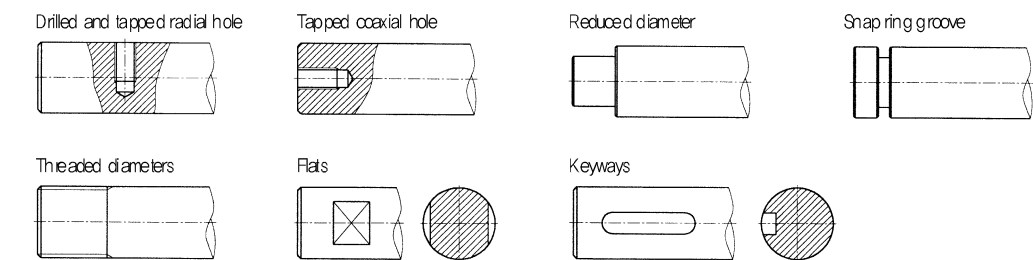
- Material : High carbon chromium bearing steel
- Hardness : Hrc58 ~ 64
- Hardened depth : 0.8 ~ 2.5mm
- Surface finishing : 0.8S ~ 1.6S
- Straightness : 0.05mm / 300mm

LM Shaft	SF	C	h6	30	-	1000	L
SAMICK Support Rail Unit							
Shaft(by corrosion resistance)							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance shaft : blank European standard h6 tolerance shaft : h6							
Shaft Diameter							
5~80mm							
Shaft Length							
100~3000mm							

Shaft Special Machining

SAMICK also supply specially machined shaft as shown in the below figure. The drilled and tapped holes on LM shaft for mounting on the Support Rail are also available.

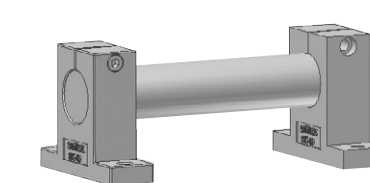
(Example of machining)



:: SAMICK Shaft Support

Support for Shaft ends, SAMICK Shaft Support is made of aluminum with compact design, and able to fix the LM shaft by tightening bolt at the axial direction slot.

Shaft Support	SK	20
SAMICK Shaft Support (Aluminum)		
LM Shaft diameter		
6~40mm		



Hardness Conversion Table

Rockwell C Scale H _C	Vickers' Hardness Hv	Brinell Hardness H _B		Rockwell Hardness		Shore Hardness Hs
		Standard Ball	Tungsten Carbon Ball	H _A A Scale	H _B B Scale	
68	940	-	-	85.6	-	97
67	900	-	-	85.0	-	95
66	865	-	-	84.5	-	92
65	832	-	739	83.9	-	91
64	800	-	722	83.4	-	88
63	772	-	705	82.8	-	87
62	746	-	688	82.3	-	85
61	720	-	670	81.8	-	83
60	697	-	654	81.2	-	81
59	674	-	634	80.7	-	80
58	653	-	615	80.1	-	78
57	633	-	595	79.6	-	76
56	613	-	577	79.0	-	75
55	595	-	560	78.5	-	74
54	577	-	543	78.0	-	72
53	560	-	525	77.4	-	71
52	544	500	512	76.8	-	69
51	528	487	496	76.3	-	68
50	513	475	481	75.9	-	67
49	498	464	469	75.2	-	66
48	484	451	455	74.7	-	64
47	471	442	443	74.1	-	63
46	458	432	432	73.6	-	62
45	446	421	421	73.0	-	60
44	434	409	409	72.5	-	58
43	423	400	400	72.0	-	57
42	412	390	390	71.5	-	56
41	402	381	381	70.9	-	55
40	392	371	371	70.4	-	54
39	382	362	362	69.9	-	52
38	372	353	353	69.4	-	51
37	363	344	344	68.9	-	50
36	354	336	336	68.4	(109.0)	49
35	345	327	327	67.9	108.5	48
34	336	319	319	67.4	108.0	47
33	327	311	311	66.8	107.5	46
32	318	301	301	66.3	107.0	44
31	310	294	294	65.8	106.0	43
30	302	286	286	65.3	105.5	42
29	294	279	279	64.7	104.5	41
28	286	271	271	64.3	104.0	41
27	279	264	264	63.8	103.0	40
26	272	258	258	63.3	102.5	38
25	266	253	253	62.8	101.5	38
24	260	247	247	62.4	101.0	37
23	254	243	243	62.0	100.0	36
22	248	237	237	61.5	99.0	35
21	243	231	231	61.0	98.5	35
20	238	226	226	60.5	97.8	34
(18)	230	219	219	-	96.7	33
(16)	222	212	212	-	95.5	32
(14)	213	203	203	-	93.9	31
(12)	204	194	194	-	92.3	29
(10)	196	187	187	-	90.7	28
(8)	188	179	179	-	89.5	27
(6)	180	171	171	-	87.1	26
(4)	173	165	165	-	85.5	25
(2)	166	158	158	-	83.5	24
0	160	152	152	-	81.7	24

Fitting Tolerances for Shaft and Housing Bore Diameter (Metric Series)

Nominal Diameter (mm)	Tolerance of Shaft Diameter																Tolerance of Housing Bore Diameter																												
	f				g				h				js				j				k				H				JS				J				K				M				
	f5	f6	f7	f8	g5	g6	g7	g8	h5	h6	h7	h8	js5	js6	js7	js8	j5	j6	j7	j8	k5	k6	k7	k8	H5	H6	H7	H8	JS5	JS6	JS7	JS8	J5	J6	J7	J8	K5	K6	K7	K8	M5	M6	M7	M8	
3	-6	-10	-12	-16	-2	-6	-12	0	-4	-6	-10	-14	±2	±3	±5	±2	+2	+4	+6	+8	+4	+6	+10	+14	+4	+6	+10	+14	±2	±3	±5	±2	+2	+4	+6	+8	0	0	0	0	-2	-2	-2	-2	
6	-10	-15	-18	-22	-4	-8	-12	0	-5	-8	-12	-18	±2.5	±4	±5	±2.5	+3	+6	+8	+10	+6	+9	+13	+18	+5	+8	+12	+16	±2.5	±4	±6	±2.5	+3	+6	+8	+10	+6	+9	+12	+16	-1	-1	-1	-1	
10	-15	-19	-22	-28	-5	-11	-14	-20	-6	-9	-15	-22	±3	±4.5	±7	±3	+4	+7	+10	+16	+7	+10	+16	+22	+6	+9	+15	+22	±3	±4.5	±7	±3	+4	+7	+10	+16	+7	+10	+16	+22	-3	-3	-3	-3	
14	-16	-21	-24	-34	-6	-14	-17	-24	0	-8	-11	-18	-27	±4	±5.5	±9	±4	+5	+8	+12	+19	+9	+12	+19	+27	+8	+11	+18	+27	±4	±5.5	±9	±4	+5	+8	+12	+19	+8	+11	+18	+27	-4	-4	-4	-4
18	-20	-24	-29	-41	-7	-16	-20	-28	0	-9	-13	-21	-33	±4.5	±6.5	±10	±4.5	+5	+9	+13	+23	+9	+13	+23	+33	+9	+13	+21	+33	±4.5	±6.5	±10	±4.5	+5	+9	+13	+23	+9	+13	+23	+33	-4	-4	-4	-4
30	-25	-36	-41	-50	-9	-20	-25	-34	0	-11	-16	-25	-39	±5.5	±8	±12	±5.5	+6	+11	+15	+27	+11	+16	+27	+39	+11	+16	+25	+39	±5.5	±8	±12	±5.5	+6	+11	+15	+27	+10	+14	+24	+34	-4	-4	-4	-4
50	-30	-43	-49	-60	-10	-23	-29	-40	0	-13	-19	-30	-46	±6.5	±9.5	±15	±6.5	+6	+12	+18	+32	+13	+19	+30	+46	+13	+19	+30	+46	±6.5	±9.5	±15	±6.5	+6	+12	+18	+32	+13	+18	+28	+44	-5	-5	-5	-5
80	-36	-51	-58	-71	-12	-27	-34	-47	0	-15	-22	-35	-54	±7.5	±11	±17	±7.5	+6	+13	+20	+38	+15	+22	+35	+54	+15	+22	+35	+54	±7.5	±11	±17	±7.5	+6	+13	+20	+38	+16	+22	+34	+54	-6	-6	-6	-6
120	-43	-61	-68	-83	-14	-32	-39	-54	0	-18	-25	-40	-63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+25	+40	+63	+18	+25	+40	+63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+26	+41	+63	-7	-7	-7	-7
160	-43	-61	-68	-83	-14	-32	-39	-54	0	-18	-25	-40	-63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+25	+40	+63	+18	+25	+40	+63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+26	+41	+63	-7	-7	-7	-7
180	-43	-61	-68	-83	-14	-32	-39	-54	0	-18	-25	-40	-63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+25	+40	+63	+18	+25	+40	+63	±9	±12.5	±20	±9	+7	+14	+22	+43	+18	+26	+41	+63	-7	-7	-7	-7

Fitting Tolerances for Shaft and Housing Bore Diameter (Inch Series)

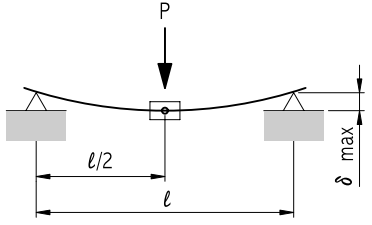
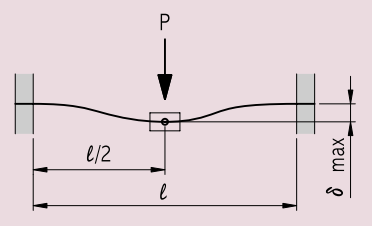
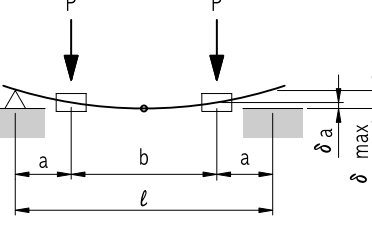
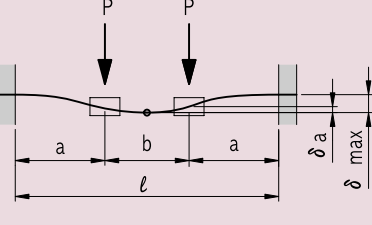
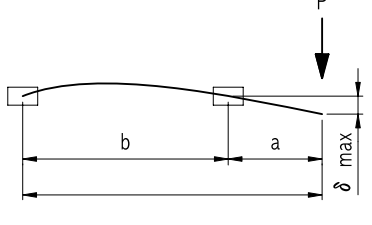
●● Tolerance of housing bore

	SIZE		H5		H6		H7		H8	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
OVER BELOW	0.1181 0.2362	3 6	0.0002 0	0.005 0	0.0003 0	0.008 0	0.0004 0	0.012 0	0.0007 0	0.018 0
OVER BELOW	0.2362 0.3937	6 10	0.0002 0	0.006 0	0.0003 0	0.009 0	0.0003 0	0.015 0	0.0008 0	0.022 0
OVER BELOW	0.3937 0.7087	10 18	0.0003 0	0.008 0	0.004 0	0.011 0	0.0007 0	0.018 0	0.0010 0	0.027 0
OVER BELOW	0.7087 1.1811	18 30	0.0003 0	0.009 0	0.0005 0	0.013 0	0.0008 0	0.021 0	0.0013 0	0.033 0
OVER BELOW	1.1811 1.9685	30 50	0.0004 0	0.011 0	0.0006 0	0.016 0	0.0009 0	0.025 0	0.0015 0	0.039 0
OVER BELOW	1.9685 3.1496	50 80	0.0005 0	0.013 0	0.007 0	0.019 0	0.0011 0	0.030 0	0.0018 0	0.046 0
OVER BELOW	3.1496 4.7244	80 120	0.0005 0	0.015 0	0.008 0	0.022 0	0.0013 0	0.035 0	0.0021 0	0.054 0

●● Tolerance of shaft

	SIZE		g5		g6		g7		h5		h6		h7	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
OVER BELOW	0.1181 0.2362	3 6	-0.0001 -0.0003	-0.004 -0.009	-0.0001 -0.0004	-0.004 -0.012	-0.0001 -0.0006	-0.004 -0.016	0 -0.0002	0 -0.005	0 -0.0003	0 -0.008	0 -0.0004	0 -0.012
OVER BELOW	0.2362 0.3937	6 10	-0.0002 -0.0004	-0.005 -0.011	-0.0002 -0.0005	-0.005 -0.014	-0.0002 -0.0007	-0.005 -0.020	0 -0.0002	0 -0.006	0 -0.0003	0 -0.009	0 -0.0006	0 -0.015
OVER BELOW	0.3937 0.7087	10 18	-0.0002 -0.0005	-0.006 -0.014	-0.0002 -0.0006	-0.006 -0.017	-0.0002 -0.0009	-0.006 -0.024	0 -0.0003	0 -0.008	0 -0.0004	0 -0.011	0 -0.0007	0 -0.018
OVER BELOW	0.7087 1.1811	18 30	-0.0002 -0.0006	-0.007 -0.016	-0.0002 -0.0007	-0.007 -0.020	-0.0002 -0.0011	-0.007 -0.028	0 -0.0003	0 -0.009	0 -0.0005	0 -0.013	0 -0.0008	0 -0.021
OVER BELOW	1.1811 1.9685	30 50	-0.0003 -0.0007	-0.009 -0.020	-0.0003 -0.0009	-0.009 -0.025	-0.0003 -0.0013	-0.009 -0.034	0 -0.0004	0 -0.011	0 -0.0006	0 -0.016	0 -0.0009	0 -0.025
OVER BELOW	1.9685 3.1496	50 80	-0.0004 -0.0009	-0.010 -0.023	-0.0004 -0.0011	-0.010 -0.029	-0.0004 -0.0015	-0.010 -0.04	0 -0.0005	0 -0.013	0 -0.0007	0 -0.019	0 -0.011	0 -0.030
OVER BELOW	3.1496 4.7244	80 120	-0.0004 -0.0010	-0.012 -0.027	-0.0004 -0.0013	-0.012 -0.034	-0.0004 -0.0018	-0.012 -0.047	0 -0.0006	0 -0.015	0 -0.0008	0 -0.022	0 -0.013	0 -0.035

●● Equations for shaft deflection amount calculation

Variations of support and Load	Equation for Deflection Amount (mm)
	$\delta_{\max} = \frac{P \cdot l^3}{48 \cdot E \cdot I} = 2.021 \times 10^{-6} \frac{P \cdot l^3}{d^4}$
	$\delta_{\max} = \frac{P \cdot l^3}{192 \cdot E \cdot I} = 5.053 \times 10^{-6} \frac{P \cdot l^3}{d^4}$
	$\delta_a = \frac{P \cdot a^2}{6 \cdot E \cdot I} (2a+3b) = 1.617 \times 10^{-4} \frac{P \cdot a^2(2a+3b)}{d^4}$ $\delta_{\max} = \frac{P \cdot a^2}{24 \cdot E \cdot I} (3l-4a^2) = 4.042 \times 10^{-5} \frac{P \cdot a \cdot (3l-4a^2)}{d^4}$
	$\delta_a = \frac{P \cdot a^3}{6 \cdot E \cdot I} (2 - \frac{3a}{l}) = 1.617 \times 10^{-4} \frac{P \cdot a^3}{d^4} (2 - \frac{3a}{l})$ $\delta_{\max} = \frac{P \cdot a^2}{24 \cdot E \cdot I} (2a+3b) = 4.042 \times 10^{-5} \frac{P \cdot a^2(2a+3b)}{d^4}$
	$\delta_{\max} = \frac{P \cdot a^2 l}{3 \cdot E \cdot I} = 3.234 \times 10^{-4} \frac{P \cdot a^2 l}{d^4}$

E : Modulus of Longitudinal Elasticity 2.1×10^4 (kgf/mm²)
 P : Applying Load (kgf)
 I : Geometrical Moment of Inertia(mm⁴) ; I = $\pi d^4 / 64$, Hallow shaft : I = $\pi (d^4 - d_i^4) / 64$
 d_i : Shaft inner-diameter(mm), d : Shaft Outer-diameter (mm)

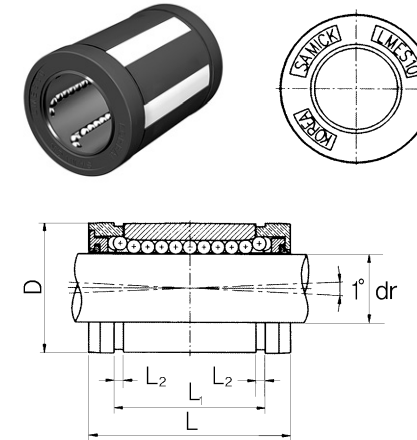


Part Number Notation

Self-Aligning Linear Bushing	LM	ES	16	UU	OP	-	N	S
Samick Linear Bushing								
Standards	Metric series (mm) : ES Inch series (inch) : BS							
Nominal Shaft Diameter	Metric series (mm) : 10~50mm Inch Series : #4~#32							
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU							
Type	Standard type : Blank Open type (for support rail) : OP							
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Stainless steel ball plate : M* Ball plate Chrome plating : C							
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S							

* LMES10, LMES12 and LMBS4, LMBS6, LMBS8 only with stainless steel ball plate

LMES Self-Aligning Linear Bushing



Self-Aligning linear Bushing	LMES	20	UU	-	N	S
Nominal Shaft Diameter						
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU					
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Ball plate Chrome plating : C Stainless steel ball plate : M****					
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S					

PART NUMBER	DIAMETER		D*	L ±0.2	L ₁ ±0.2	L ₂ mm	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
	dr.	TOLERANCE					DYNAMIC**C	STATIC**C ₀		
LMES10	10	+0.008	19	29	21.7	1.35	750	550	5	17
LMES12	12	0	22	32	22.7	1.35	1230	1100	5	23
LMES16	16	+0.009	26	36	24.7	1.35	1550	1250	5	28
LMES20	20	+0.001	32	45	31.3	1.65	2580	1670	6	61
LMES25	25	+0.011	40	58	43.8	1.9	3800	2750	6	122
LMES30	30	+0.001	47	68	51.8	1.9	4710	2800	6	185
LMES40	40	+0.013	62	80	60.4	2.2	6500	5720	6	360
LMES50	50	+0.002	75	100	77.4	2.7	11460	7940	6	580

* Based on nominal housing bore

** Dynamic load rating is based on the nominal life of 50km. In case of 100km, C on the table need to be divided by 1.26

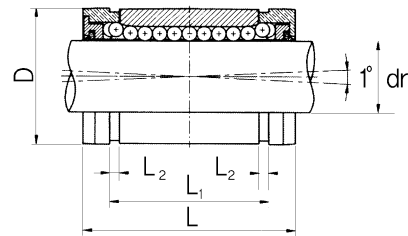
Ex) LM12 s 50km basis dynamic load rating C = 410N

LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

*** Dimension : mm

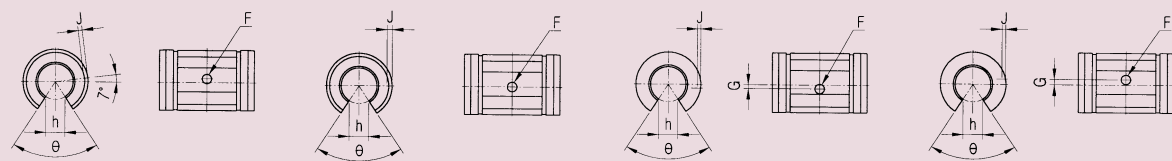
**** LMES10, LMES12 only with stainless steel ball plate

LMES_OP Self-Aligning Linear Bushing



Self-Aligning linear Bushing	LMES	20	UU	OP	-	N	S
Nominal Shaft Diameter							
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU						
Open type linear bushing							
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Ball plate Chrome plating : C Stainless steel ball plate : M****						
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S						

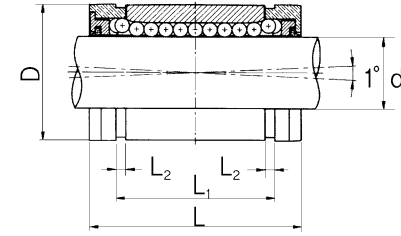
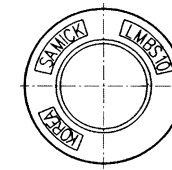
PART NUMBER	DIA METER dr.	TOLERANCE	D*	L ±0.2	L ₁ ±0.2	L ₂ min	h	θ	F	G	J	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
												DYNA M(C)	STAT(Co)		
LMES12 OP	12	$^{+0.003}_0$	22	32	22.7	1.35	6.5	66	3	-	0.7	1290	1260	4	18
LMES16 OP	16	$^{+0.009}_0$	26	36	24.7	1.35	9	68	3	-	0.7	1640	1320	4	22
LMES20 OP	20	$^{+0.001}_0$	32	45	31.3	1.65	9	55	3	-	0.9	2630	1720	5	51
LMES25 OP	25	$^{+0.011}_0$	40	58	43.8	1.9	11.5	57	3	1.5	1.4	3910	2850	5	102
LMES30 OP	30	$^{+0.001}_0$	47	68	51.8	1.9	14	57	3	2	2.2	4850	2900	5	155
LMES40 OP	40	$^{+0.013}_0$	62	80	60.4	2.2	19.5	56	3	1.5	2.7	8700	5900	5	300
LMES50 OP	50	$^{+0.001}_0$	75	100	77.4	2.7	22.5	54	5	2.5	2.3	11700	8100	5	480



LMES12-OP LMES16-OP, LMES20-OP LMES25-OP LMES30-OP, LMES40-OP, LMES50-OP

* Based on nominal housing bore
 ** Dynamic load rating is based on the nominal life of 50km. In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12 s 50km basis dynamic load rating C = 410N
 LM12 s 100km basis dynamic load rating $C_{100} = 410 / 1.26 = 325.40N$
 *** Dimension : mm
 **** LMES12 only with stainless steel ball plate

LMBS Self-Aligning Linear Bushing

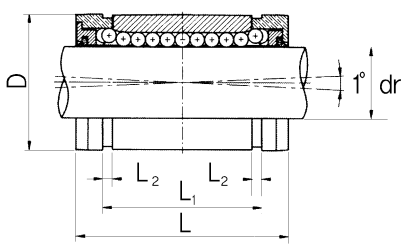


Self-Aligning linear Bushing	LMBS	20	UU	-	N	S
Nominal Shaft Diameter						
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU					
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Ball plate Chrome plating : C Stainless steel ball plate : M****					
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S					

PART NUMBER	DIA METER dr.	TOLERANCE	D*	L	L ₁	L ₂ min	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
							DYNA M(C)	STAT(Co)		
LMBS4	0.2500	$^{+0.0005}_0$	0.5000	0.750/0.735	0.511/0.501	0.039	57	49	4	0.01
LMBS6	0.3750	$^{+0.0005}_0$	0.6250	0.875/0.860	0.699/0.689	0.039	78	66	4	0.02
LMBS8	0.5000	$^{+0.0005}_0$	0.8750	1.250/1.230	1.032/1.012	0.050	210	190	4	0.05
LMBS10	0.6250	$^{+0.0005}_0$	1.1250	1.500/1.480	1.105/1.095	0.056	290	340	5	0.08
LMBS12	0.7500	$^{+0.0005}_0$	1.2500	1.625/1.605	1.270/1.250	0.056	500	430	6	0.14
LMBS16	1.0000	$^{+0.0005}_0$	1.5625	2.250/2.230	1.884/1.864	0.070	820	780	6	0.29
LMBS20	1.2500	$^{+0.0005}_0$	2.0000	2.625/2.600	2.004/1.984	0.068	1240	1270	6	0.40
LMBS24	1.5000	$^{+0.0005}_0$	2.3750	3.000/2.970	2.410/2.390	0.086	1510	1540	6	0.80
LMBS32	2.0000	$^{+0.0005}_0$	3.0000	4.000/3.960	3.193/3.163	0.105	2230	2580	6	1.38

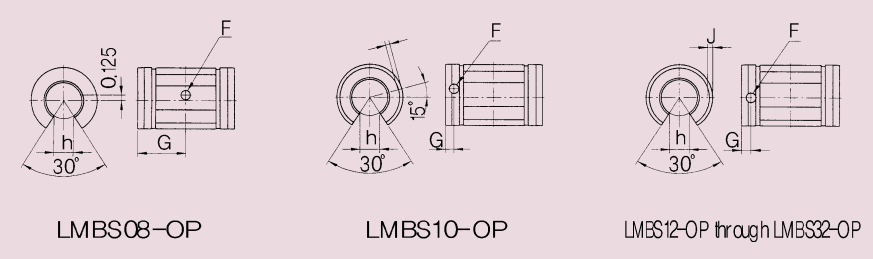
* Based on nominal housing bore
 ** Dynamic load rating is based on the nominal life of 50km. In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12 s 50km basis dynamic load rating C = 410N
 LM12 s 100km basis dynamic load rating $C_{100} = 410 / 1.26 = 325.40N$
 *** Dimension : inch
 **** LMBS4, 6, 8 only with stainless steel ball plate

LMBS_OP Self-Aligning Linear Bushing



Self-Aligning linear Bushing LMBS	20	UU	OP	-	N	S
Nominal Shaft Diameter						
Seal	No Seal : Blank One Side Seal : U Both Side Seal : UU					
Open type linear bushing						
Corrosion resistance type	No-plating (Standard) : Blank Ball plate nickel plating : N Ball plate Chrome plating : C Stainless steel ball plate : M****					
Ball type (by corrosion resistance)	High carbon bearing steel ball (standard) : Blank Stainless steel ball : S					

PART NUMBER	DIAMETER		D*	L	L ₁	F	G	J	L ₂ min	h	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (lb)
	dr.	TOLERANCE									DYNAMIC(lb)	STATIC d(lb)		
LMBS8 OP	8		0.8750	1.250/1.230	1.032	0.14	0.63	Thru	0.050	0.32	210	190	3	0.03
LMBS10 OP	10	₀	1.1250	1.500/1.480	1.105	0.11	0.13	0.039	0.056	0.38	320	340	4	0.06
LMBS12 OP	12	_{-0.0005}	1.2500	1.625/1.605	1.270	0.14	0.13	0.059	0.056	0.43	510	430	5	0.11
LMBS16 OP	16		1.5625	2.250/2.230	1.884	0.14	0.13	0.047	0.070	0.56	830	780	5	0.21
LMBS20 OP	20	₀	2.0000	2.625/2.600	2.004	0.20	0.19	0.090	0.068	0.63	1250	1270	5	0.35
LMBS24 OP	24	_{-0.0005}	2.3750	3.000/2.970	2.410	0.20	0.19	0.090	0.086	0.75	1520	1540	5	0.67
LMBS32 OP	32	_{-0.0005}	3.0000	4.000/3.960	3.193	0.27	0.31	Thru	0.105	1.00	2250	2580	5	1.10



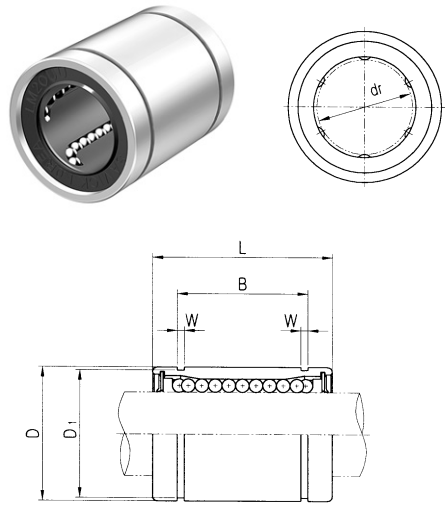
* Based on nominal housing bore
 ** Dynamic load rating is based on the nominal life of 50km. In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12 s 50km basis dynamic load rating C = 410N
 LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 *** Dimension : inch
 **** LMBS8OP only with stainless steel ball plate



Wonna be supported?
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SAMICK Linear Bushing

LM CLOSED LINEAR BUSHING

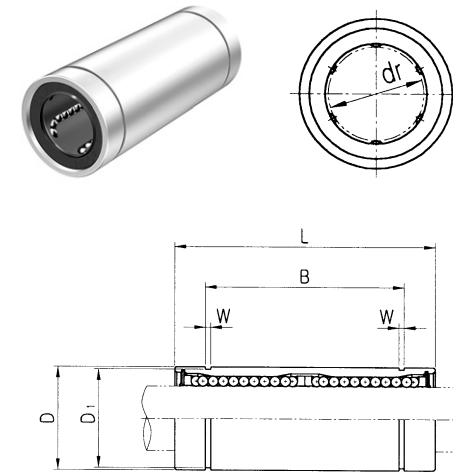


Samick Linear Bushing	LM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER	Resin	Steel	DIAMETER		OUTER DIAMETER		L	B	W	D _i	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
			dr.	TOLERANCE	D	TOLERANCE					DYNAMIC(C)	STATIC(C ₀)		
LM5	LM5-A	5	-0.008	10	-0.008	15	10.2	1.1	9.6	167	206	4	4	
LM6	LM6-A	6	-0.008	12	-0.008	19	13.5	1.1	11.5	200	260	4	8	
LM8S	LM8S-A	8	-0.008	15	-0.011	17	11.5	1.1	14.3	170	220	4	11	
LM8	LM8-A	8	-0.008	15	-0.011	24	17.5	1.1	14.3	260	400	4	16	
LM10	LM10-A	10	-0.009	19	-0.011	29	22.0	1.3	18	370	540	4	30	
LM12	LM12-A	12	-0.009	21	-0.013	30	23.0	1.3	20	410	590	4	31.5	
LM13	LM13-A	13	-0.009	23	-0.013	32	23.0	1.3	22	500	770	4	43	
LM16	LM16-A	16	-0.009	28	-0.016	37	26.5	1.6	27	770	1170	5	69	
LM20	LM20-A	20	-0.009	32	-0.016	42	30.5	1.6	30.5	860	1370	5	87	
LM25	LM25-A	25	-0.010	40	-0.016	59	41.0	1.85	38	980	1560	6	220	
LM30		30	-0.010	45	-0.016	64	44.5	1.85	43	1560	2740	6	250	
LM35		35	-0.010	52	-0.016	70	49.5	2.1	49	1660	3130	6	390	
LM40		40	-0.012	60	-0.019	80	60.5	2.1	57	2150	4010	6	585	
LM50		50	-0.012	80	-0.022	100	74.0	2.6	76.5	3820	7930	6	1580	
LM60		60	-0.015	90	-0.022	110	85.0	3.15	86.5	4700	9990	6	2000	

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LM_L LONG LINEAR BUSHING

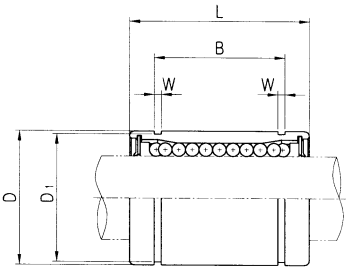
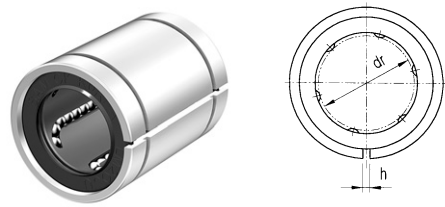


Samick Linear Bushing	LM	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type (for high load)								
Seal								
Blank : No Seal U : One Side Seal UU : Both Side Seal								
Retainer								
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)								
Outer-sleeves (by corrosion resistance type)								
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment								
Ball type (by corrosion resistance)								
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball								

PART NUMBER	Resin	Steel	DIAMETER		OUTER DIAMETER		L	B	W	D _i	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
			dr.	TOLERANCE	D	TOLERANCE					DYNAMIC(C)	STATIC(C ₀)		
LM6L	LM6L-A	6	-0.008	12	0	35	27	1.1	11.5	320	520	4	16	
LM8L	LM8L-A	8	-0.008	15	-0.013	45	35	1.1	14.3	430	780	4	31	
LM10L	LM10L-A	10	-0.008	19	-0.010	55	44	1.3	18	580	1100	4	62	
LM12L	LM12L-A	12	-0.009	21	-0.010	57	46	1.3	20	650	1200	4	80	
LM13L	LM13L-A	13	-0.009	23	-0.016	61	46	1.3	22	810	1570	4	90	
LM16L	LM16L-A	16	-0.009	28	-0.016	70	53	1.6	27	1230	2350	5	145	
LM20L	LM20L-A	20	-0.009	32	-0.016	80	61	1.6	30.5	1400	2750	5	180	
LM25L	LM25L-A	25	-0.012	40	-0.019	112	82	1.85	38	1560	3140	6	440	
LM30L		30	-0.012	45	-0.019	123	89	1.85	43	2490	5490	6	580	
LM35L		35	-0.012	52	-0.022	135	99	2.1	49	2650	6470	6	795	
LM40L		40	-0.015	60	-0.022	154	121	2.1	57	3430	8040	6	1170	
LM50L		50	-0.015	80	-0.025	192	148	2.6	76.5	6080	15900	6	3100	
LM60L		60	-0.020	90	-0.025	211	170	3.15	86.5	7650	20000	6	3500	

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LM_AJ ADJUSTABLE LINEAR BUSHING

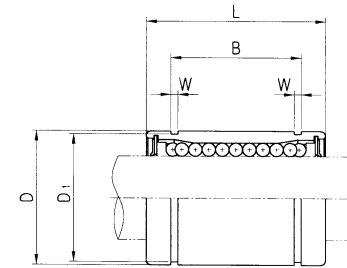
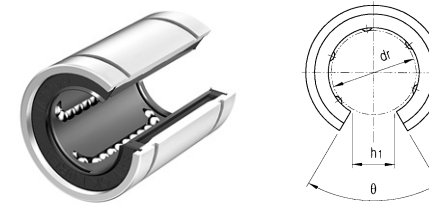


Samick Linear Bushing		LM	20	UU	AJ	-	A	N	S
Nominal Shaft Diameter									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Linear Bushing Adjustable type									
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER dr.	TOLERANCE	OUTER DIAMETER D	L	B	W	h	D ₁	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
Resin	Steel									DYNAMIC(C)	STATIC(C ₀)		
LM6 AJ	LM6 AJ-A	6		12	19	13.5	1.1	1	11.5	200	260	4	8
LM8S AJ	LM8S AJ-A	8		15	17	11.5	1.1	1	14.3	170	220	4	11
LM8 AJ	LM8 AJ-A	8		15	24	17.5	1.1	1	14.3	260	400	4	16
LM10 AJ	LM10 AJ-A	10	-0.009	19	29	22.0	1.3	1	18	370	540	4	30
LM12 AJ	LM12 AJ-A	12		21	30	23.0	1.3	1.5	20	410	590	4	31.5
LM13 AJ	LM13 AJ-A	13		23	32	23.0	1.3	1.5	22	500	770	4	43
LM16 AJ	LM16 AJ-A	16		28	37	26.5	1.6	1.5	27	770	1170	5	69
LM20 AJ	LM20 AJ-A	20		32	42	30.5	1.6	1.5	30.5	860	1370	5	87
LM25 AJ	LM25 AJ-A	25	-0.010	40	59	41.0	1.85	2	38	980	1560	6	220
LM30 AJ	LM30 AJ-A	30		45	64	44.5	1.85	2.5	43	1560	2740	6	250
LM35 AJ	LM35 AJ-A	35		52	70	49.5	2.1	2.5	49	1660	3130	6	390
LM40 AJ	LM40 AJ-A	40	-0.012	60	80	60.5	2.1	3	57	2150	4010	6	585
LM50 AJ	LM50 AJ-A	50		80	100	74.0	2.6	3	76.5	3820	7930	6	1580
LM60 AJ	LM60 AJ-A	60	-0.015	90	110	85.0	3.15	3	86.5	4700	9990	6	2000

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm
Note 4) Outer diameter is the obtained value before the slotting process.

LM_OP OPEN LINEAR BUSHING

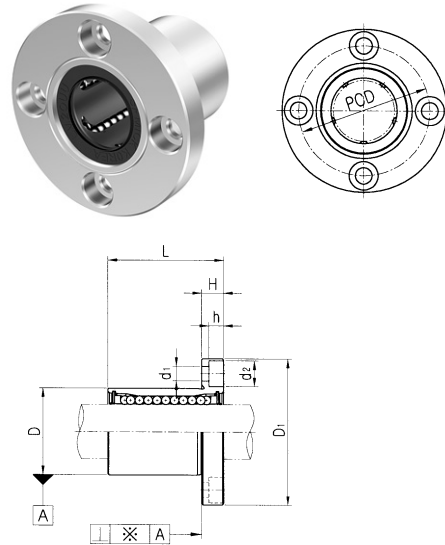


Samick Linear Bushing		LM	20	UU	OP	-	A	N	S
Nominal Shaft Diameter									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Linear Bushing Open type									
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER dr.	TOLERANCE	D	L	B	W	h ₁	θ	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
Resin	Steel									DYNAMIC(C)	STATIC(C ₀)		
LM12 OP		12		21	30	23.0	1.3	8	80	410	590	3	31.5
LM13 OP		13	-0.009	23	32	23.0	1.3	9	80	500	770	3	43
LM16 OP		16		28	37	26.5	1.6	11	80	770	1170	4	69
LM20 OP		20		32	42	30.5	1.6	11	60	860	1370	4	87
LM25 OP		25	-0.010	40	59	41.0	1.85	12	50	980	1560	5	220
LM30 OP		30		45	64	44.5	1.85	15	50	1560	2740	5	250
LM35 OP		35		52	70	49.5	2.1	17	50	1660	3130	5	390
LM40 OP		40	-0.012	60	80	60.5	2.1	20	50	2150	4010	5	585
LM50 OP		50		80	100	74.0	2.6	25	50	3820	7930	5	1580
LM60 OP		60	-0.015	90	110	85.0	3.15	30	50	4700	9990	5	2000

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm
Note 4) Outer diameter is the obtained value before the slotting process.

LMF FLANGED LINEAR BUSHING

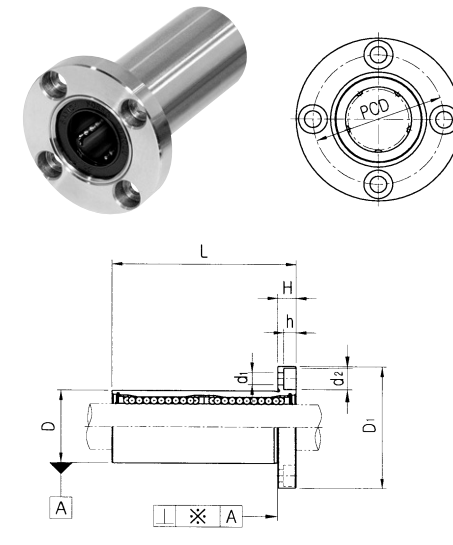


Samick Circular Flanged Linear Bushing	LMF	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER	Resin	Steel	DIAMETER		L	D ₁	H	PCD	d ₁	d ₂	h	SQUARENESS *(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)
			dr.	TOLERANCE									D TOLERANCE	DYNAMIC(C)		
LMF 6		LMF6-A	6	12	19	28	5	20	3.4	6.5	3.3	12	200	260	4	26.5
LMF 8S		LMF8S-A	8	15 ⁰ _{-0.011}	17	32	5	24	3.4	6.5	3.3	12	170	220	4	34
LMF 8		LMF8-A	8	15	24	32	5	24	3.4	6.5	3.3	12	260	400	4	40
LMF 10		LMF10-A	10	19 ⁰ _{-0.009}	29	40	6	29	4.5	8.0	4.4	12	370	540	4	78
LMF 12		LMF12-A	12	21 ⁰ _{-0.013}	30	42	6	32	4.5	8.0	4.4	12	410	590	4	76
LMF 13		LMF13-A	13	23 ⁰ _{-0.013}	32	43	6	33	4.5	8.0	4.4	12	500	770	4	94
LMF 16		LMF16-A	16	28	37	48	6	38	4.5	8.0	4.4	12	770	1170	5	134
LMF 20		LMF20-A	20	32	42	54	8	43	5.5	9.5	5.4	15	860	1370	5	180
LMF 25		LMF25-A	25	40 ⁰ _{-0.010}	59	62	8	51	5.5	9.5	5.4	15	980	1560	6	340
LMF 30			30	45	64	74	10	60	6.6	11.0	6.5	15	1560	2740	6	460
LMF 35			35	52	70	82	10	67	6.6	11.0	6.5	20	1660	3130	6	795
LMF 40			40	60 ⁰ _{-0.012}	80	96	13	78	9.0	14.0	8.6	20	2150	4010	6	1054
LMF 50			50	80	100	116	13	98	9.0	14.0	8.6	20	3820	7930	6	2200
LMF 60			60	90 ⁰ _{-0.015}	110	134	18	112	11.0	17.5	10.8	25	4700	9990	6	2960

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMF_L FLANGED LINEAR BUSHING LONG

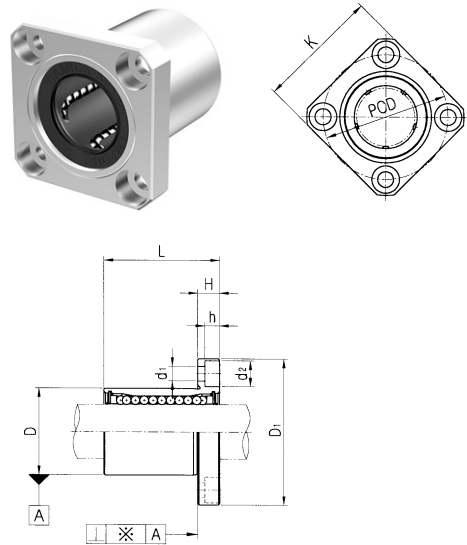


Samick Circular Flanged Linear Bushing	LMF	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type (for high load)								
Seal								
Blank : No Seal U : One Side Seal UU : Both Side Seal								
Retainer								
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)								
Outer-sleeves (by corrosion resistance type)								
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment								
Ball type (by corrosion resistance)								
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball								

PART NUMBER	Resin	Steel	DIAMETER D		L	D ₁	H	PCD	d ₁	d ₂	h	SQUARENESS *(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)
			dr.	TOLERANCE									D TOLERANCE	DYNAMIC(C)		
LMF6 L		LMF6L-A	6	12 ⁰ _{-0.013}	35	28	5	20	3.4	6.5	3.3	15	320	520	4	31
LMF8 L		LMF8L-A	8	15 ⁰ _{-0.013}	45	32	5	24	3.4	6.5	3.3	15	430	780	4	53
LMF10 L		LMF10L-A	10	19 ⁰ _{-0.010}	55	40	6	29	4.5	8.0	4.4	15	580	1100	4	105
LMF12 L		LMF12L-A	12	21 ⁰ _{-0.016}	57	42	6	32	4.5	8.0	4.4	15	650	1200	4	100
LMF13 L		LMF13L-A	13	23 ⁰ _{-0.016}	61	43	6	33	4.5	8.0	4.4	15	810	1570	4	130
LMF16 L		LMF16L-A	16	28	70	48	6	38	4.5	8.0	4.4	15	1230	2350	5	187
LMF20 L		LMF20L-A	20	32	80	54	8	43	5.5	9.5	5.4	20	1400	2750	5	260
LMF25 L		LMF25L-A	25	40 ⁰ _{-0.012}	112	62	8	51	5.5	9.5	5.4	20	1560	3140	6	515
LMF30 L			30	45	123	74	10	60	6.6	11.0	6.5	20	2490	5490	6	655
LMF35 L			35	52	135	82	10	67	6.6	11.0	6.5	25	2650	6470	6	970
LMF40 L			40	60 ⁰ _{-0.015}	154	96	13	78	9.0	14.0	8.6	25	3430	8040	6	1560
LMF50 L			50	80 ⁰ _{-0.022}	192	116	13	98	9.0	14.0	8.6	25	6080	15900	6	3500
LMF60 L			60	90 ⁰ _{-0.020}	211	134	18	112	11.0	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMK FLANGED LINEAR BUSHING

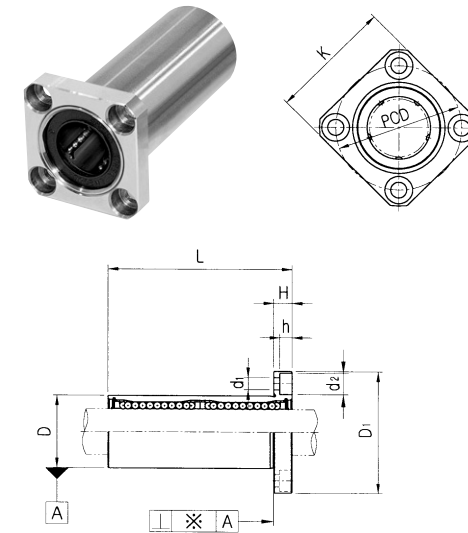


Samick Square Flanged Linear Bushing	LMK	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER	Resin	Steel	DIAMETER		L	D ₁	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
			dr.	TOLERANCE										TOLERANCE	DYNAMIC(C)		
LMK6	LMK6-A	6	12		19	28	5	20	22	3.4	6.5	3.3	12	200	260	4	26.5
LMK8S	LMK8S-A	8	15	⁰ / _{-0.011}	17	32	5	24	25	3.4	6.5	3.3	12	170	220	4	34
LMK8	LMK8-A	8	15		24	32	5	24	25	3.4	6.5	3.3	12	260	400	4	40
LMK10	LMK10-A	10	19	⁰ / _{-0.009}	29	40	6	29	30	4.5	8.0	4.4	12	370	540	4	78
LMK12	LMK12-A	12	21	⁰ / _{-0.013}	30	42	6	32	32	4.5	8.0	4.4	12	410	590	4	76
LMK13	LMK13-A	13	23	⁰ / _{-0.013}	32	43	6	33	34	4.5	8.0	4.4	12	500	770	4	94
LMK16	LMK16-A	16	28		37	48	6	38	37	4.5	8.0	4.4	12	770	1170	5	134
LMK20	LMK20-A	20	32		42	54	8	43	42	5.5	9.5	5.4	15	860	1370	5	180
LMK25	LMK25-A	25	40	⁰ / _{-0.010}	59	62	8	51	50	5.5	9.5	5.4	15	980	1560	6	340
LMK30		30	45	⁰ / _{-0.016}	64	74	10	60	58	6.6	11.0	6.5	15	1560	2740	6	460
LMK35		35	52	⁰ / _{-0.013}	70	82	10	67	64	6.6	11.0	6.5	20	1660	3130	6	795
LMK40		40	60	⁰ / _{-0.012}	80	96	13	78	75	9.0	14.0	8.6	20	2150	4010	6	1054
LMK50		50	80	⁰ / _{-0.019}	100	116	13	98	92	9.0	14.0	8.6	20	3820	7930	6	2200
LMK60		60	90	⁰ / _{-0.015}	110	134	18	112	106	11.0	17.5	10.8	25	4700	9990	6	2960

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMK_L FLANGED LINEAR BUSHING LONG

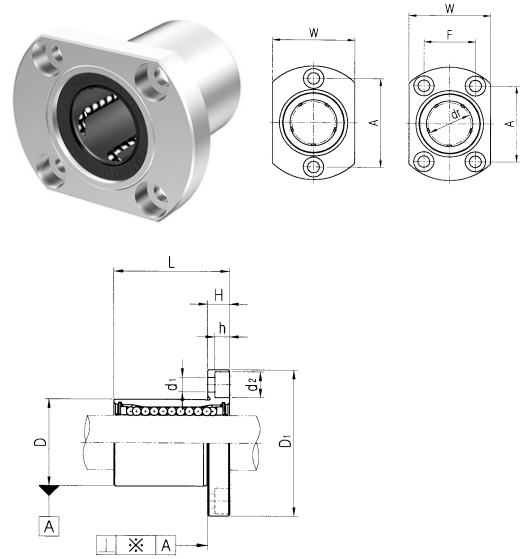


Samick Square Flanged Linear Bushing	LMK	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type (for high load)								
Seal								
Blank : No Seal U : One Side Seal UU : Both Side Seal								
Retainer								
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)								
Outer-sleeves (by corrosion resistance type)								
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment								
Ball type (by corrosion resistance)								
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball								

PART NUMBER	Resin	Steel	DIAMETER		L	D ₁	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
			dr.	TOLERANCE										TOLERANCE	DYNAMIC(C)		
LMK6 L	LMK6L-A	6	12	⁰ / _{-0.013}	35	28	5	20	22	3.4	6.5	3.3	15	320	520	4	31
LMK8 L	LMK8L-A	8	15	⁰ / _{-0.010}	45	32	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMK10 L	LMK10L-A	10	19	⁰ / _{-0.010}	55	40	6	29	30	4.5	8.0	4.4	15	580	1100	4	105
LMK12 L	LMK12L-A	12	21	⁰ / _{-0.016}	57	42	6	32	32	4.5	8.0	4.4	15	650	1200	4	100
LMK13 L	LMK13L-A	13	23	⁰ / _{-0.016}	61	43	6	33	34	4.5	8.0	4.4	15	810	1570	4	130
LMK16 L	LMK16L-A	16	28		70	48	6	38	37	4.5	8.0	4.4	15	1230	2350	5	187
LMK20 L	LMK20L-A	20	32		80	54	8	43	42	5.5	9.5	5.4	20	1400	2750	5	260
LMK25 L	LMK25L-A	25	40	⁰ / _{-0.012}	112	62	8	51	50	5.5	9.5	5.4	20	1560	3140	6	515
LMK30 L		30	45	⁰ / _{-0.019}	123	74	10	60	58	6.6	11.0	6.5	20	2490	5490	6	655
LMK35 L		35	52	⁰ / _{-0.015}	135	82	10	67	64	6.6	11.0	6.5	25	2650	6470	6	970
LMK40 L		40	60	⁰ / _{-0.022}	154	96	13	78	75	9.0	14.0	8.6	25	3430	8040	6	1560
LMK50 L		50	80	⁰ / _{-0.020}	192	116	13	98	92	9.0	14.0	8.6	25	6080	15900	6	3500
LMK60 L		60	90	⁰ / _{-0.025}	211	134	18	112	106	11.0	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12 s 50km basis dynamic load rating C = 410N
LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMH FLANGED LINEAR BUSHING



Samick Oval Flanged Linear Bushing	LMH	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

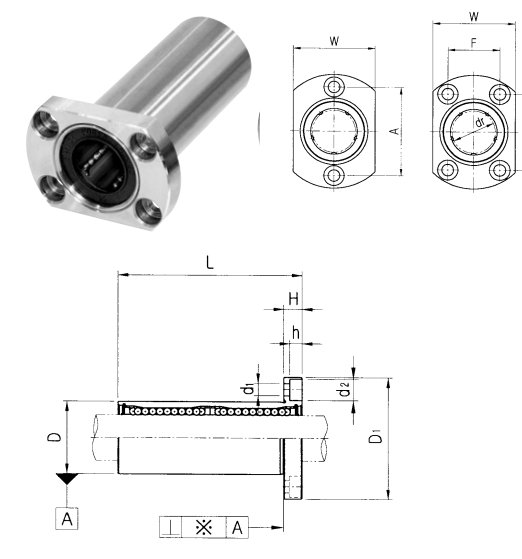
PART NUMBER	DIAMETER		D	L	D ₁	H	W	A	F	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
	Resin	Steel												dr.	TOLERANCE		
LMH6	LMH6-A	6	12	19	28	5	18	20	-	3.4	6.5	3.3	12	200	260	4	26.5
LMH8	LMH8-A	8	15 ^{-0.011}	24	32	5	21	24	-	3.4	6.5	3.3	12	260	400	4	40
LMH10	LMH10-A	10	19 ^{-0.009}	29	40	6	25	29	-	4.5	8.0	4.4	12	370	540	4	78
LMH12	LMH12-A	12	21 ^{-0.010}	30	42	6	27	32	-	4.5	8.0	4.4	12	410	590	4	76
LMH13	LMH13-A	13	23 ^{-0.013}	32	43	6	29	33	-	4.5	8.0	4.4	12	500	770	4	94
LMH16	LMH16-A	16	28 ^{-0.016}	37	48	6	34	31	22	4.5	8.0	4.4	12	770	1170	5	134
LMH20	LMH20-A	20	32 ^{-0.020}	42	54	8	38	36	24	5.5	9.5	5.4	15	860	1370	5	180
LMH25	LMH25-A	25	40 ^{-0.010}	59	62	8	46	40	32	5.5	9.5	5.4	15	980	1560	6	340
LMH30		30	45 ^{-0.015}	64	74	10	51	49	35	6.6	11.0	6.5	15	1560	2740	6	460

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMH_L FLANGED LINEAR BUSHING LONG



Samick Oval Flanged Linear Bushing	LMH	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type (for high load)								
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

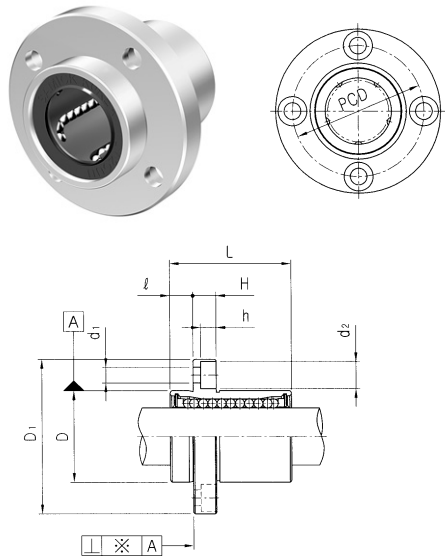
PART NUMBER	DIAMETER		D	L	D ₁	H	W	A	F	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
	Resin	Steel												dr.	TOLERANCE		
LMH6 L	LMH6L-A	6	12	35	28	5	18	20	-	3.4	6.5	3.3	15	320	520	4	31
LMH8 L	LMH8L-A	8	15 ^{-0.013}	45	32	5	21	24	-	3.4	6.5	3.3	15	430	780	4	53
LMH10 L	LMH10L-A	10	19 ^{-0.010}	55	40	6	25	29	-	4.5	8.0	4.4	15	580	1100	4	105
LMH12 L	LMH12L-A	12	21 ^{-0.016}	57	42	6	27	32	-	4.5	8.0	4.4	15	650	1200	4	100
LMH13 L	LMH13L-A	13	23 ^{-0.016}	61	43	6	29	33	-	4.5	8.0	4.4	15	810	1570	4	130
LMH16 L	LMH16L-A	16	28 ^{-0.016}	70	48	6	34	31	22	4.5	8.0	4.4	15	1230	2350	5	187
LMH20 L	LMH20L-A	20	32 ^{-0.019}	80	54	8	38	36	24	5.5	9.5	5.4	20	1400	2750	5	260
LMH25 L	LMH25L-A	25	40 ^{-0.012}	112	62	8	46	40	32	5.5	9.5	5.4	20	1560	3140	6	515
LMH30 L		30	45 ^{-0.019}	123	74	10	51	49	35	6.6	11.0	6.5	20	2490	5490	6	655

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12 s 50km basis dynamic load rating C = 410N
LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMFP FLANGED LINEAR BUSHING

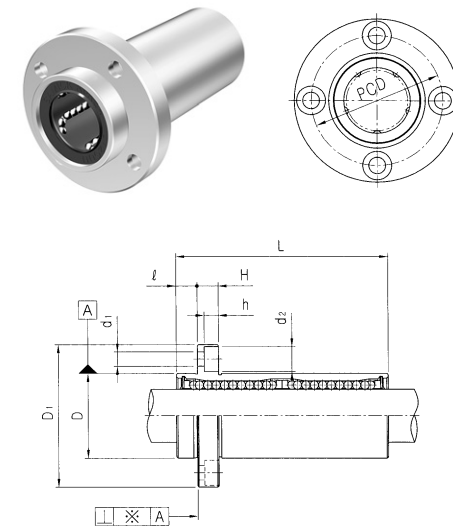


Samick Circular Pilot Flanged Linear Bushing		LMFP	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL OR CIRCUIT	WEIGHT (g)
Resin	Steel												DYNAMIC(C)	STATIC(C ₀)		
LMFP6	LMFP6-A	6	12	19	28	5	5	20	3.4	6.5	3.3	12	200	260	4	26.5
LMFP8	LMFP8-A	8	15 ^{-0.011}	24	32	5	5	24	3.4	6.5	3.3	12	260	400	4	40
LMFP10	LMFP10-A	10	19	29	40	6	6	29	4.5	8	4.4	12	370	540	4	76
LMFP12	LMFP12-A	12	21 ^{-0.009}	30	42	6	6	32	4.5	8	4.4	12	410	590	4	78
LMFP13	LMFP13-A	13	23 ^{-0.003}	32	43	6	6	33	4.5	8	4.4	12	500	770	4	94
LMFP16	LMFP16-A	16	28	37	48	6	6	38	4.5	8	4.4	12	770	1170	5	134
LMFP20	LMFP20-A	20	32	42	54	8	8	43	5.5	9.5	5.4	15	860	1370	5	180
LMFP25	LMFP25-A	25	40 ^{-0.010}	59	62	8	8	51	5.5	9.5	5.4	15	980	1560	6	340
LMFP30		30	45	64	74	10	10	60	6.6	11	6.5	15	1560	2740	6	460
LMFP35		35	52	70	82	10	10	67	6.6	11	6.5	20	1660	3130	6	795
LMFP40		40	60 ^{-0.012}	80	96	13	13	78	9	14	8.6	20	2150	4010	6	1054
LMFP50		50	80 ^{-0.009}	100	116	13	13	98	9	14	8.6	20	3820	7930	6	2200
LMFP60		60	90 ^{-0.015}	110	134	18	18	112	11	17.5	10.8	25	4700	9990	6	2960

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMFP_L FLANGED LINEAR BUSHING LONG

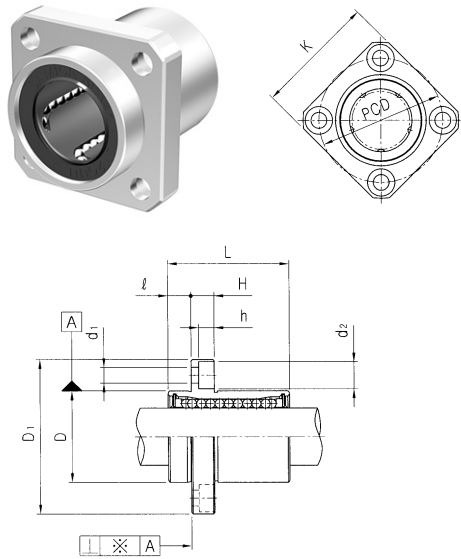


Samick Circular Pilot Flanged Linear Bushing		LMFP	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type (for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL OR CIRCUIT	WEIGHT (g)
Resin	Steel												DYNAMIC(C)	STATIC(C ₀)		
LMFP6L	LMFP6L-A	6	12	35	28	5	5	20	3.4	6.5	3.3	15	320	520	4	31
LMFP8L	LMFP8L-A	8	15 ^{-0.013}	45	32	5	5	24	3.4	6.5	3.3	15	430	780	4	53
LMFP10L	LMFP10L-A	10	19	55	40	6	6	29	4.5	8	4.4	15	580	1100	4	105
LMFP12L	LMFP12L-A	12	21 ^{-0.010}	57	42	6	6	32	4.5	8	4.4	15	650	1200	4	100
LMFP13L	LMFP13L-A	13	23 ^{-0.016}	61	43	6	6	33	4.5	8	4.4	15	810	1570	4	130
LMFP16L	LMFP16L-A	16	28	70	48	6	6	38	4.5	8	4.4	15	1230	2350	5	187
LMFP20L	LMFP20L-A	20	32	80	54	8	8	43	5.5	9.5	5.4	20	1400	2750	5	260
LMFP25L	LMFP25L-A	25	40 ^{-0.012}	112	62	8	8	51	5.5	9.5	5.4	20	1560	3140	6	515
LMFP30L		30	45	123	74	10	10	60	6.6	11	6.5	20	2490	5490	6	655
LMFP35L		35	52	135	82	10	10	67	6.6	11	6.5	25	2650	6470	6	970
LMFP40L		40	60 ^{-0.015}	154	96	13	13	78	9	14	8.6	25	3430	8040	6	1560
LMFP50L		50	80 ^{-0.022}	192	116	13	13	98	9	14	8.6	25	6080	15900	6	3500
LMFP60L		60	90 ^{-0.020}	211	134	18	18	112	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMKP FLANGED LINEAR BUSHING



Samick Square Pilot Flanged Linear Bushing		LMKP	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

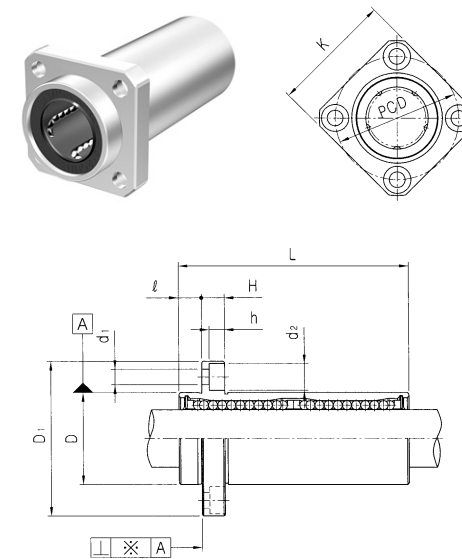
PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
Resin	Steel	dr. TOLERANCE	mm TOLERANCE											DYNAMIC(C)	STATIC(C ₀)		
LMKP6	LMKP6-A	6	12	19	28	5	5	20	22	3.4	6.5	3.3	12	200	260	4	26.5
LMKP8	LMKP8-A	8	15 ^{-0.011}	24	32	5	5	24	25	3.4	6.5	3.3	12	260	400	4	40
LMKP10	LMKP10-A	10	19 ⁰	29	40	6	6	29	30	4.5	8	4.4	12	370	540	4	76
LMKP12	LMKP12-A	12	21 ^{-0.009}	30	42	6	6	32	32	4.5	8	4.4	12	410	590	4	78
LMKP13	LMKP13-A	13	23 ^{-0.013}	32	43	6	6	33	34	4.5	8	4.4	12	500	770	4	94
LMKP16	LMKP16-A	16	28	37	48	6	6	38	37	4.5	8	4.4	12	770	1170	5	134
LMKP20	LMKP20-A	20	32	42	54	8	8	43	42	5.5	9.5	5.4	15	860	1370	5	180
LMKP25	LMKP25-A	25	40 ⁰ _{-0.010}	59	62	8	8	51	50	5.5	9.5	5.4	15	980	1560	6	340
LMKP30		30	45	64	74	10	10	60	58	6.6	11	6.5	15	1560	2740	6	460
LMKP35		35	52	70	82	10	10	67	64	6.6	11	6.5	20	1660	3130	6	795
LMKP40		40	60 ⁰ _{-0.012}	80	96	13	13	78	75	9	14	8.6	20	2150	4010	6	1054
LMKP50		50	80 ⁰ _{-0.019}	100	116	13	13	98	92	9	14	8.6	20	3820	7930	6	2200
LMKP60		60	90 ⁰ _{-0.022}	110	134	18	18	112	106	11	17	10.8	25	4700	9990	6	2960

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMKP_L FLANGED LINEAR BUSHING LONG



Samick Square Pilot Flanged Linear Bushing		LMKP	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type (for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

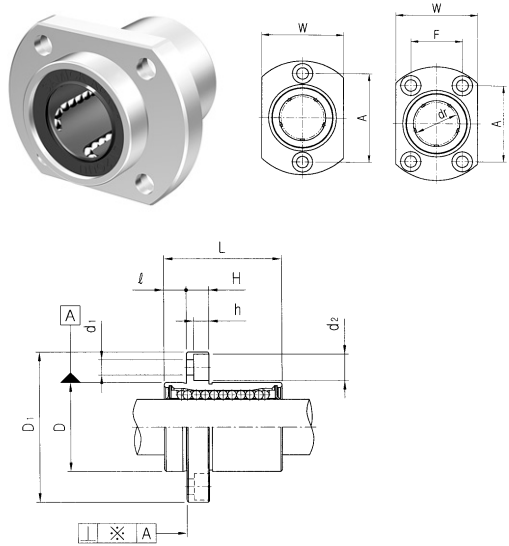
PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (gf)
Resin	Steel	dr. TOLERANCE	mm TOLERANCE											DYNAMIC(C)	STATIC(C ₀)		
LMKP6L	LMKP6L-A	6	12	35	28	5	5	20	22	3.4	6.5	3.3	15	320	520	4	31
LMKP8L	LMKP8L-A	8	15 ^{-0.013}	45	32	5	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMKP10L	LMKP10L-A	10	19	55	40	6	6	29	30	4.5	8	4.4	15	580	1100	4	105
LMKP12L	LMKP12L-A	12	21 ^{-0.010}	57	42	6	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMKP13L	LMKP13L-A	13	23 ^{-0.016}	61	43	6	6	33	34	4.5	8	4.4	15	810	1570	4	130
LMKP16L	LMKP16L-A	16	28	70	48	6	6	38	37	4.5	8	4.4	15	1230	2350	5	187
LMKP20L	LMKP20L-A	20	32	80	54	8	8	43	42	5.5	9.5	5.4	20	1400	2750	5	260
LMKP25L	LMKP25L-A	25	40 ⁰ _{-0.012}	112	62	8	8	51	50	5.5	9.5	5.4	20	1560	3140	6	515
LMKP30L		30	45	123	74	10	10	60	58	6.6	11	6.5	20	2490	5490	6	655
LMKP35L		35	52	135	82	10	10	67	64	6.6	11	6.5	25	2650	6470	6	970
LMKP40L		40	60 ⁰ _{-0.015}	154	96	13	13	78	75	9	14	8.6	25	3430	8040	6	1560
LMKP50L		50	80 ⁰ _{-0.022}	192	116	13	13	98	92	9	14	8.6	25	6080	15900	6	3500
LMKP60L		60	90 ⁰ _{-0.020}	211	134	18	18	112	106	11	17	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMHP FLANGED LINEAR BUSHING

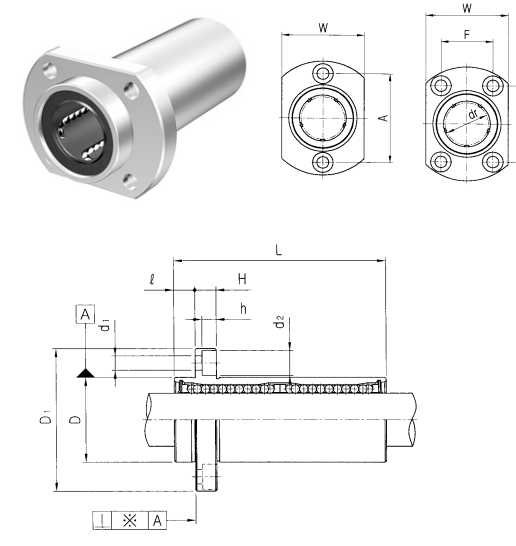


Samick Oval Pilot Flanged Linear Bushing		LMHP	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	ℓ	H	W	A	F	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT CIRCUIT (g)
Resin	Steel														DYNAMIC(C)	STATIC(C ₀)		
LMHP6	LMHP6-A	6	12	19	28	5	5	18	20		3.4	6.5	3.3	12	200	260	4	26.5
LMHP8	LMHP8-A	8	15 ^{-0.011}	24	32	5	5	21	24		3.4	6.5	3.3	12	260	400	4	40
LMHP10	LMHP10-A	10	19 ^{-0.009}	29	40	6	6	25	29		4.5	8	4.4	12	370	540	4	76
LMHP12	LMHP12-A	12	21 ^{-0.013}	30	42	6	6	27	32		4.5	8	4.4	12	410	590	4	78
LMHP13	LMHP13-A	13	23 ^{-0.016}	32	43	6	6	29	33		4.5	8	4.4	12	500	770	4	94
LMHP16	LMHP16-A	16	28	37	48	6	6	34	31	22	4.5	8	4.4	12	770	1170	5	134
LMHP20	LMHP20-A	20	32	42	54	8	8	38	36	24	5.5	9.5	5.4	15	860	1370	5	180
LMHP25	LMHP25-A	25 ^{-0.010}	40 ^{-0.016}	59	62	8	8	46	40	32	5.5	9.5	5.4	15	980	1560	6	340
LMHP30		30	45	64	74	10	10	51	49	35	6.6	11	6.5	15	1560	2740	6	460

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMHP_L FLANGED LINEAR BUSHING LONG

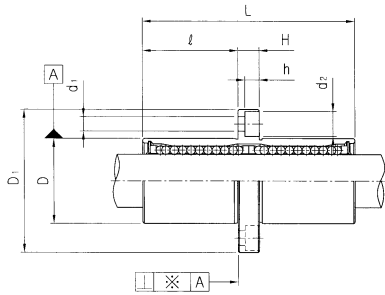
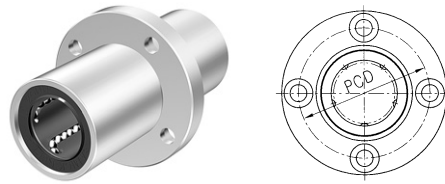


Samick Oval Pilot Flanged Linear Bushing		LMHP	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type(for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	ℓ	H	W	A	F	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT CIRCUIT (g)
Resin	Steel														DYNAMIC(C)	STATIC(C ₀)		
LMHP6L	LMHP6L-A	6	12	35	28	5	5	18	20		3.4	6.5	3.3	15	320	520	4	31
LMHP8L	LMHP8L-A	8	15 ^{-0.013}	45	32	5	5	21	24		3.4	6.5	3.3	15	430	780	4	53
LMHP10L	LMHP10L-A	10	19	55	40	6	6	25	29		4.5	8	4.4	15	580	1100	4	105
LMHP12L	LMHP12L-A	12	21 ^{-0.010}	57	42	6	6	27	32		4.5	8	4.4	15	650	1200	4	100
LMHP13L	LMHP13L-A	13	23 ^{-0.016}	61	43	6	6	29	33		4.5	8	4.4	15	810	1570	4	130
LMHP16L	LMHP16L-A	16	28	70	48	6	6	34	31	22	4.5	8	4.4	15	1230	2350	5	187
LMHP20L	LMHP20L-A	20	32	80	54	8	8	38	36	24	5.5	9.5	5.4	20	1400	2750	5	260
LMHP25L	LMHP25L-A	25 ^{-0.012}	40 ^{-0.019}	112	62	8	8	46	40	32	5.5	9.5	5.4	20	1560	3140	6	515
LMHP30L		30	45	123	74	10	10	51	49	35	6.6	11	6.5	20	2940	5490	6	655

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMFM FLANGED LINEAR BUSHING LONG

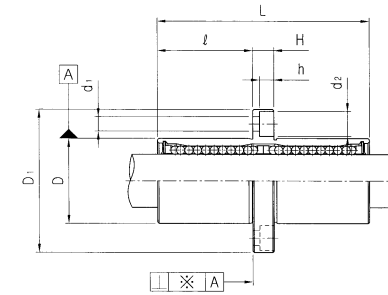
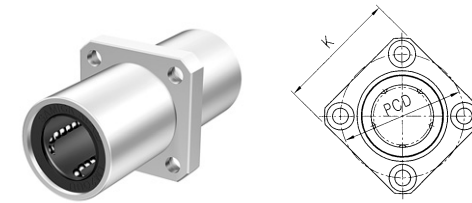


Samick Circular Middle Ranged Linear Bushing	LMFM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal							
U : One Side Seal							
UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard)							
A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard)							
N : Electroless nickel plating							
R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard)							
S : Stainless steel ball							

PART NUMBER	Resin	Steel	DIAMETER		L	D ₁	l	H	PCD	d ₁	d ₂	h	SQUARENESS μm	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)
			dr.	TOLERANCE										D	TOLERANCE		
LMFM6	LMFM6-A	6	12	0	35	28	15	5	20	3.4	6.5	3.3	15	320	520	4	31
LMFM8	LMFM8-A	8	15	-0.011	45	32	20	5	24	3.4	6.5	3.3	15	430	780	4	53
LMFM10	LMFM10-A	10	19	0	55	40	24.5	6	29	4.5	8	4.4	15	580	1100	4	105
LMFM12	LMFM12-A	12	21	-0.010	57	42	25.5	6	32	4.5	8	4.4	15	650	1200	4	100
LMFM13	LMFM13-A	13	23	-0.003	61	43	27.5	6	33	4.5	8	4.4	15	810	1570	4	130
LMFM16	LMFM16-A	16	28	0	70	48	32	6	38	4.5	8	4.4	15	1230	2350	5	187
LMFM20	LMFM20-A	20	32	0	80	54	36	8	43	5.5	9.5	5.4	20	1400	2750	5	260
LMFM25	LMFM25-A	25	40	0	112	62	52	8	51	5.5	9.5	5.4	20	1560	3140	6	515
LMFM30		30	45	0	123	74	56.5	10	60	6.6	11	6.5	20	2940	5490	6	655
LMFM35		35	52	0	135	82	62.5	10	67	6.6	11	6.5	25	2650	6470	6	970
LMFM40		40	60	-0.005	154	96	70.5	13	78	9	14	8.6	25	3430	8040	6	1560
LMFM50		50	80	-0.009	192	116	89.5	13	98	9	14	8.6	25	6080	15900	6	3500
LMFM60		60	90	-0.020	211	134	96.5	18	112	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
 In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12's 50km basis dynamic load rating C = 410N
 LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 Note 2) Based on the weight of resin retainer
 Note 3) Dimension : mm

LMKM FLANGED LINEAR BUSHING LONG

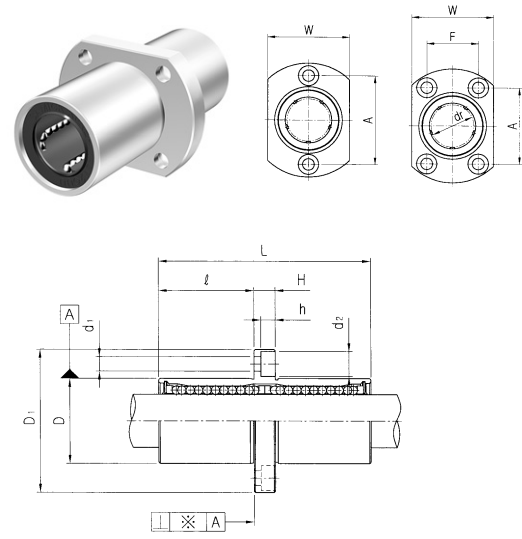


Samick Square Middle Ranged Linear Bushing	LMKM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal							
U : One Side Seal							
UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard)							
A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard)							
N : Electroless nickel plating							
R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard)							
S : Stainless steel ball							

PART NUMBER	Resin	Steel	DIAMETER		L	D ₁	l	H	PCD	K	d ₁	d ₂	h	SQUARENESS μm	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)
			dr.	TOLERANCE											D	TOLERANCE		
LMKM6	LMKM6-A	6	12	0	35	28	15	5	20	22	3.4	6.5	3.3	15	320	520	4	31
LMKM8	LMKM8-A	8	15	-0.013	45	32	20	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMKM10	LMKM10-A	10	19	0	55	40	24.5	6	29	30	4.5	8	4.4	15	580	1100	4	105
LMKM12	LMKM12-A	12	21	-0.010	57	42	25.5	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMKM13	LMKM13-A	13	23	-0.016	61	43	27.5	6	33	34	4.5	8	4.4	15	810	1570	4	130
LMKM16	LMKM16-A	16	28	0	70	48	32	6	38	37	4.5	8	4.4	15	1230	2350	5	187
LMKM20	LMKM20-A	20	32	0	80	54	36	8	43	42	5.5	9.5	5.4	20	1400	2750	5	260
LMKM25	LMKM25-A	25	40	-0.012	112	62	52	8	51	50	5.5	9.5	5.4	20	1560	3140	6	515
LMKM30		30	45	0	123	74	56.5	10	60	58	6.6	11	6.5	20	2940	5490	6	655
LMKM35		35	52	0	135	82	62.5	10	67	64	6.6	11	6.5	25	2650	6470	6	970
LMKM40		40	60	-0.015	154	96	70.5	13	78	75	9	14	8.6	25	3430	8040	6	2560
LMKM50		50	80	-0.022	192	116	89.5	13	98	92	9	14	8.6	25	6080	15900	6	3500
LMKM60		60	90	-0.025	211	134	96.5	18	112	106	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
 In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12's 50km basis dynamic load rating C = 410N
 LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 Note 2) Based on the weight of resin retainer
 Note 3) Dimension : mm

LMHM FLANGED LINEAR BUSHING



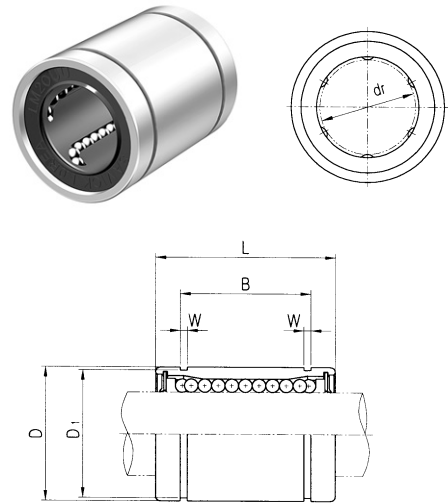
Series	LMHM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

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European Standard

PART NUMBER	DIAMETER D		L	D ₁	ℓ	H	W	A	F	d ₁	d ₂	h	SQUARENESS % (μm)	BASIC LOAD RATING(N)		NO. OF BALLS	WEIGHT (gf)	
	Resin	Steel												DR. TOLERANCE	mm TOLERANCE			DYNAMIC(C)
LMHM6	LMHM6-A	6	12	35	28	15	5	18	20	3.4	6.5	3.3	15	320	520	4	31	
LMHM8	LMHM8-A	8	15 ^{-0.013}	45	32	20	5	21	24	3.4	6.5	3.3	15	430	780	4	53	
LMHM10	LMHM10-A	10	19 ^{-0.010}	55	40	24.5	6	25	29	4.5	8	4.4	15	580	1100	4	105	
LMHM12	LMHM12-A	12	21 ^{-0.016}	57	42	25.5	6	27	32	4.5	8	4.4	15	650	1200	4	100	
LMHM13	LMHM13-A	13	23 ^{-0.016}	61	43	27.5	6	29	33	4.5	8	4.4	15	810	1570	4	130	
LMHM16	LMHM16-A	16	28	70	48	32	6	34	31	22	4.5	8	4.4	15	1230	2350	5	187
LMHM20	LMHM20-A	20	32	80	54	36	8	38	36	24	5.5	9.5	5.4	20	1400	2750	5	260
LMHM25	LMHM25-A	25	40 ^{-0.012}	112	62	52	8	46	40	32	5.5	9.5	5.4	20	1560	3140	6	515
LMHM30		30	45 ^{-0.019}	123	74	56.5	10	51	49	35	6.6	11	6.5	20	2940	5490	6	655

Note 1) Dynamic load rating is based on the nominal life of 50km.
 In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12's 50km basis dynamic load rating C = 410N
 LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 Note 2) Based on the weight of resin retainer
 Note 3) Dimension : mm

LME CLOSED LINEAR BUSHING

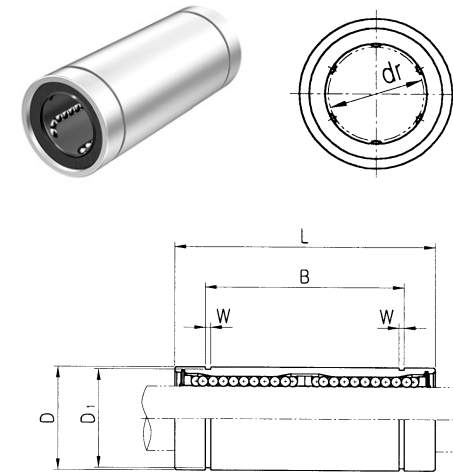


European Standard Samick Linear Bushing	LME	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal							
Blank : No Seal							
U : One Side Seal							
UU : Both Side Seal							
Retainer							
Blank : Resin retainer(Standard)							
A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)							
Blank : No-plating(Standard)							
N : Electroless nickel plating							
R : Raydent treatment							
Ball type (by corrosion resistance)							
Blank : High carbon bearing steel ball (standard)							
S : Stainless steel ball							

PART NUMBER	DIAMETER		L	B	W	D ₁	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
	Resin	Steel					dr. TOLERANCE	D mm TOLERANCE		
LME5			22	14.5	1.1	11.5	200	260	4	12
LME8	LME8-A	8	25	16.5	1.1	15.2	260	400	4	20
LME12	LME12-A	12	32	22.9	1.3	21	410	590	4	41
LME16	LME16-A	16	36	24.9	1.3	24.9	770	1170	5	57
LME20	LME20-A	20	45	31.5	1.6	30.3	860	1370	5	91
LME25	LME25-A	25	58	44.1	1.85	37.5	980	1560	6	215
LME30		30	68	52.1	1.85	44.5	1560	2740	6	325
LME40		40	80	60.6	2.15	59	2150	4010	6	705
LME50		50	100	77.6	2.65	72	3820	7930	6	1130
LME60		60	125	101.7	3.15	86.5	4700	9990	6	2220

Note 1) Dynamic load rating is based on the nominal life of 50km.
 In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12's 50km basis dynamic load rating C = 410N
 LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 Note 2) Based on the weight of resin retainer
 Note 3) Dimension : mm

LME_L LONG LINEAR BUSHING

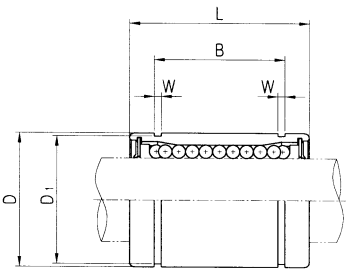
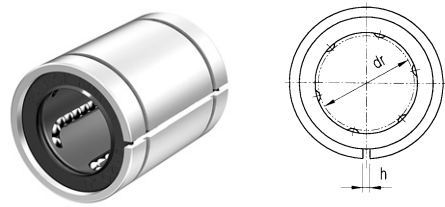


European Standard Samick Linear Bushing	LME	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type (for high load)								
Seal								
Blank : No Seal								
U : One Side Seal								
UU : Both Side Seal								
Retainer								
Blank : Resin retainer(Standard)								
A : Steel retainer(High temperature)								
Outer-sleeves (by corrosion resistance type)								
Blank : No-plating(Standard)								
N : Electroless nickel plating								
R : Raydent treatment								
Ball type (by corrosion resistance)								
Blank : High carbon bearing steel ball (standard)								
S : Stainless steel ball								

PART NUMBER	DIAMETER		L	B	W	D ₁	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)
	Resin	Steel					dr. TOLERANCE	D mm TOLERANCE		
LME8L	LME8L-A	8	45	33	1.1	15.2	430	780	4	31
LME12L	LME12L-A	12	57	45.8	1.3	21	650	1200	4	80
LME16L	LME16L-A	16	70	49.8	1.3	24.9	1230	2350	5	145
LME20L	LME20L-A	20	80	61	1.6	30.3	1400	2750	5	180
LME25L	LME25L-A	25	112	82	1.85	38	1560	3140	6	440
LME30L		30	123	104.2	1.85	44.5	2490	5490	6	580
LME40L		40	154	121.2	2.15	59	3430	8040	6	1170
LME50L		50	192	155.2	2.65	72	6080	15900	6	3100
LME60L		60	211	170	3.15	86.5	7650	20000	6	3500

Note 1) Dynamic load rating is based on the nominal life of 50km.
 In case of 100km, C on the table need to be divided by 1.26
 Ex) LM12 s 50km basis dynamic load rating C = 410N
 LM12 s 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
 Note 2) Based on the weight of resin retainer
 Note 3) Dimension : mm

LME_AJ ADJUSTABLE LINEAR BUSHING



European Standard Samick Linear Bushing												
LME	20	UU	AJ	-	A	N	S					
Nominal Shaft Diameter												
Seal												
Blank : No Seal U : One Side Seal UU : Both Side Seal												
Linear Bushing Adjustable type												
Retainer												
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)												
Outer-sleeves (by corrosion resistance type)												
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment												
Ball type (by corrosion resistance)												
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball												

PART NUMBER	DIAMETER		L	B	W	D _i	h	BASIC LOAD RATING(N)		NO. OF BALL ORUIT	WEIGHT (g)		
	Resin	Steel						dr. TOLERANCE	D TOLERANCE			DYNAMIC(C)	STATIC(C ₀)
LME5AJ			5	12	22	14.5	1.1	11.5	1	200	260	4	12
LME8AJ	LME8AJ-A		8	16 ^{+0.008/0}	25	16.5	1.1	15.2	1	260	400	4	20
LME12AJ	LME12AJ-A		12	22 ^{+0/0}	32	22.9	1.3	21	1.5	410	590	4	41
LME16AJ	LME16AJ-A		16	26 ^{+0.009/-0.001}	36	24.9	1.3	24.9	1.5	770	1170	5	57
LME20AJ	LME20AJ-A		20	32 ^{+0.009/-0.001}	45	31.5	1.6	30.3	2	860	1370	5	91
LME25AJ	LME25AJ-A		25	40 ^{+0.011/-0.001}	58	44.1	1.85	37.5	2	980	1560	6	215
LME30AJ			30	47 ^{+0.011/-0.001}	68	52.1	1.85	44.5	2	1560	2740	6	325
LME40AJ			40	62 ^{+0/0}	80	60.6	2.15	59	3	2150	4010	6	705
LME50AJ			50	75 ^{+0.013/-0.002}	100	77.6	2.65	72	3	3820	7930	6	1130
LME60AJ			60	90 ^{+0/0}	125	101.7	3.15	86.5	3	4700	9990	6	2220

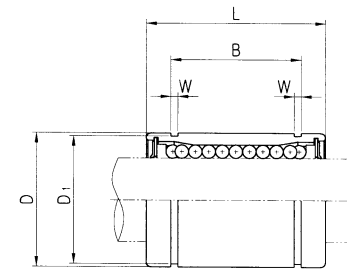
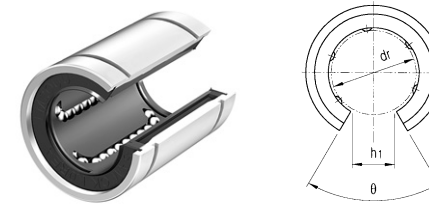
Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

Note 4) Outer diameter is the obtained value before the slotting process.

LME_OP OPEN LINEAR BUSHING



European Standard Samick Linear Bushing												
LME	20	UU	OP	-	A	N	S					
Nominal Shaft Diameter												
Seal												
Blank : No Seal U : One Side Seal UU : Both Side Seal												
Linear Bushing Open type												
Retainer												
Blank : Resin retainer(Standard) A : Steel retainer(High temperature)												
Outer-sleeves (by corrosion resistance type)												
Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment												
Ball type (by corrosion resistance)												
Blank : High carbon bearing steel ball (standard) S : Stainless steel ball												

PART NUMBER	DIAMETER		L	B	W	D _i	h ₁	θ	BASIC LOAD RATING(N)		NO. OF BALL ORUIT	WEIGHT (g)		
	Resin	Steel							dr. TOLERANCE	D TOLERANCE			DYNAMIC(C)	STATIC(C ₀)
LME120P	LME120P-A		12	22 ^{+0.008/0}	32	22.9	1.3	21	7.5	78°	410	590	3	41
LME160P	LME160P-A		16	26 ^{+0.009/-0.001}	36	24.9	1.3	24.9	10	78°	770	1170	4	57
LME200P	LME200P-A		20	32 ^{+0.009/-0.001}	45	31.5	1.6	30.3	10	60°	860	1370	4	91
LME250P	LME250P-A		25	40 ^{+0.011/-0.001}	58	44.1	1.85	37.5	12.5	60°	980	1560	5	215
LME300P			30	47 ^{+0.011/-0.001}	68	52.1	1.85	44.5	12.5	50°	1560	2740	5	325
LME400P			40	62 ^{+0/0}	80	60.6	2.15	59	16.8	50°	2150	4010	5	705
LME500P			50	75 ^{+0.013/-0.002}	100	77.6	2.65	72	21	50°	3820	7930	5	1130
LME600P			60	90 ^{+0/-0.015}	125	101.7	3.15	86.5	27.2	54°	4700	9990	5	2220

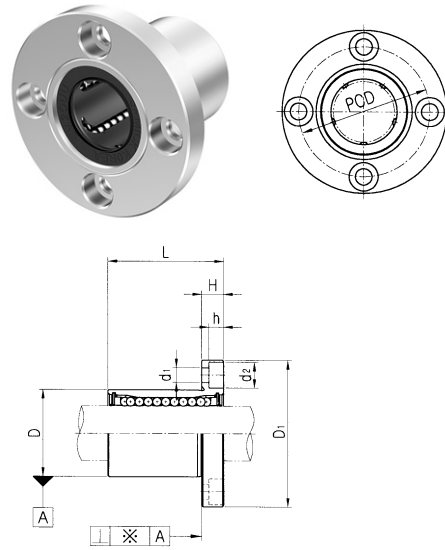
Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

Note 4) Outer diameter is the obtained value before the slotting process.

LMEF FLANGED LINEAR BUSHING



European Standard Samick Circular Flanged Linear Bushing		LMEF	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

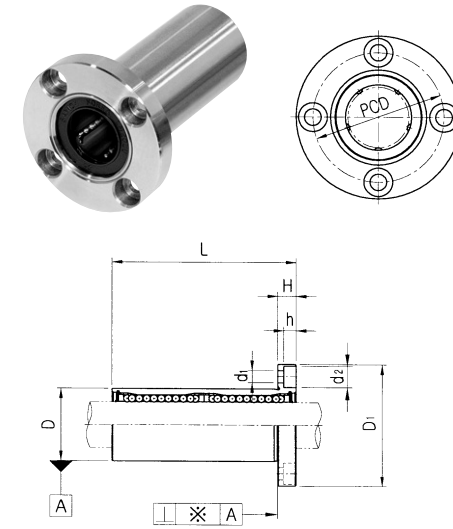
PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
Resin	Steel											DYNAMIC(C)	STATIC(C ₀)		
LMEF8	LMEF8-A	8 ^{+0.003} ₀	16 ⁰ _{-0.003}	25	32	5	24	3.4	6.5	3.3	12	260	400	4	44
LMEF12	LMEF12-A	12 ^{+0.003} ₀	22 ⁰ _{-0.003}	32	42	6	32	4.5	8	4.4	12	410	590	4	86
LMEF16	LMEF16-A	16 ^{+0.003} _{-0.001}	26 ⁰ _{-0.003}	36	46	6	36	4.5	8	4.4	12	770	1170	5	120
LMEF20	LMEF20-A	20 ^{+0.003} _{-0.001}	32 ⁰ _{-0.003}	45	54	8	43	5.5	9.5	5.4	15	860	1370	5	184
LMEF25	LMEF25-A	25 ^{+0.011} _{-0.001}	40 ⁰ _{-0.011}	58	62	8	51	5.5	9.5	5.4	15	980	1560	6	335
LMEF30		30 ^{+0.011} _{-0.001}	47 ⁰ _{-0.011}	68	76	10	62	6.6	11	6.5	15	1560	2740	6	545
LMEF40		40 ^{+0.011} _{-0.001}	62 ⁰ _{-0.011}	80	98	13	80	9	14	8.6	20	2150	4010	6	1185
LMEF50		50 ^{+0.013} _{-0.002}	75 ⁰ _{-0.013}	100	112	13	94	9	14	8.6	20	3820	7930	6	1730
LMEF60		60 ^{+0.013} _{-0.002}	90 ⁰ _{-0.013}	125	134	18	112	11	17.5	10.8	25	4700	9990	6	3180

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMEF_L FLANGED LINEAR BUSHING



European Standard Samick Circular Flanged Linear Bushing		LMEF	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type(for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

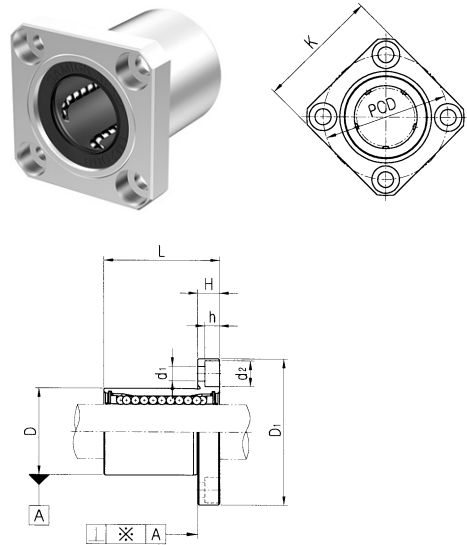
PART NUMBER		DIAMETER dr. TOLERANCE	D mm TOLERANCE	L	D ₁	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (gf)
Resin	Steel											DYNAMIC(C)	STATIC(C ₀)		
LMEF8L	LMEF8L-A	8 ^{+0.003} _{-0.001}	16 ⁰ _{-0.003}	45	32	5	24	3.4	6.5	3.3	15	430	780	4	53
LMEF12L	LMEF12L-A	12 ^{+0.003} _{-0.001}	22 ⁰ _{-0.003}	57	42	6	32	4.5	8	4.4	15	650	1200	4	100
LMEF16L	LMEF16L-A	16 ^{+0.011} _{-0.001}	26 ⁰ _{-0.001}	70	46	6	36	4.5	8	4.4	15	1230	2350	5	187
LMEF20L	LMEF20L-A	20 ^{+0.011} _{-0.001}	32 ⁰ _{-0.001}	80	54	8	43	5.5	9.5	5.4	17	1400	2750	5	260
LMEF25L	LMEF25L-A	25 ^{+0.013} _{-0.002}	40 ⁰ _{-0.013}	112	62	8	51	5.5	9.5	5.4	17	1560	3140	6	515
LMEF30L		30 ^{+0.013} _{-0.002}	47 ⁰ _{-0.013}	123	76	10	62	6.6	11	6.5	17	2490	5490	6	655
LMEF40L		40 ^{+0.013} _{-0.002}	62 ⁰ _{-0.013}	154	98	13	80	9	14	8.6	20	3430	8040	6	1560
LMEF50L		50 ^{+0.016} _{-0.004}	75 ⁰ _{-0.016}	192	112	13	94	9	14	8.6	20	6080	15900	6	3500
LMEF60L		60 ^{+0.016} _{-0.004}	90 ⁰ _{-0.020}	211	134	18	112	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N

Note 2) Based on the weight of resin retainer

Note 3) Dimension : mm

LMEK FLANGED LINEAR BUSHING

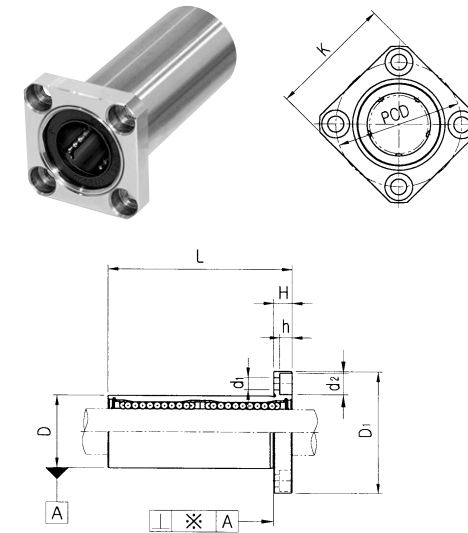


European Standard Samick Square Flanged Linear Bushing		LMEK	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER		L	D ₁	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL ORUIT	WEIGHT (gf)
Resin	Steel	dr. TOLERANCE	D TOLERANCE										DYNAMIC(C)	STATIC(C ₀)		
LMEK8	LMEK8-A	8	16	25	32	5	24	25	3.4	6.5	3.3	12	260	400	4	44
LMEK12	LMEK12-A	12	22	32	42	6	32	32	4.5	8	4.4	12	410	590	4	86
LMEK16	LMEK16-A	16	26	36	46	6	36	35	4.5	8	4.4	12	770	1170	5	120
LMEK20	LMEK20-A	20	32	45	54	8	43	42	5.5	9.5	5.4	15	860	1370	5	184
LMEK25	LMEK25-A	25	40	58	62	8	51	50	5.5	9.5	5.4	15	980	1560	6	335
LMEK30		30	47	68	76	10	62	60	6.6	11	6.5	15	1560	2740	6	545
LMEK40		40	62	80	98	13	80	75	9	14	8.6	20	2150	4010	6	1185
LMEK50		50	75	100	112	13	94	88	9	14	8.6	20	3820	7930	6	1730
LMEK60		60	90	125	134	18	112	106	11	17.5	10.8	25	4700	9990	6	3180

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEK_L FLANGED LINEAR BUSHING LONG

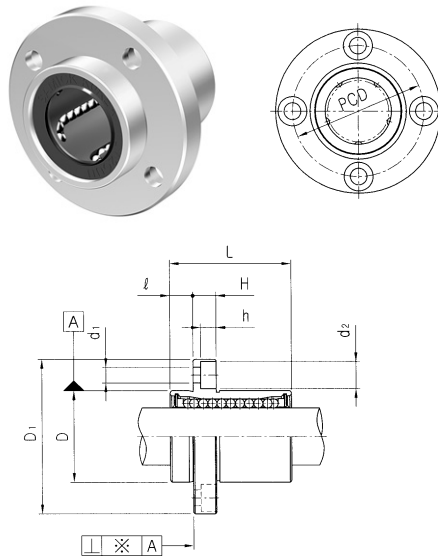


European Standard Samick Square Flanged Linear Bushing		LMEK	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type(for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER		L	D ₁	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL ORUIT	WEIGHT (gf)
Resin	Steel	dr. TOLERANCE	D TOLERANCE										DYNAMIC(C)	STATIC(C ₀)		
LMEK8L	LMEK8L-A	8	16	45	32	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMEK12L	LMEK12L-A	12	22	57	42	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMEK16L	LMEK16L-A	16	26	70	46	6	36	35	4.5	8	4.4	15	1230	2350	5	187
LMEK20L	LMEK20L-A	20	32	80	54	8	43	42	5.5	9.5	5.4	17	1400	2750	5	260
LMEK25L	LMEK25L-A	25	40	112	62	8	51	50	5.5	9.5	5.4	17	1560	3140	6	515
LMEK30L		30	47	123	76	10	62	60	6.6	11	6.5	17	2490	5490	6	655
LMEK40L		40	62	154	98	13	80	75	9	14	8.6	20	3430	8040	6	1560
LMEK50L		50	75	192	112	13	94	88	9	14	8.6	20	6080	15900	6	3500
LMEK60L		60	90	211	134	18	112	106	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEFP FLANGED LINEAR BUSHING

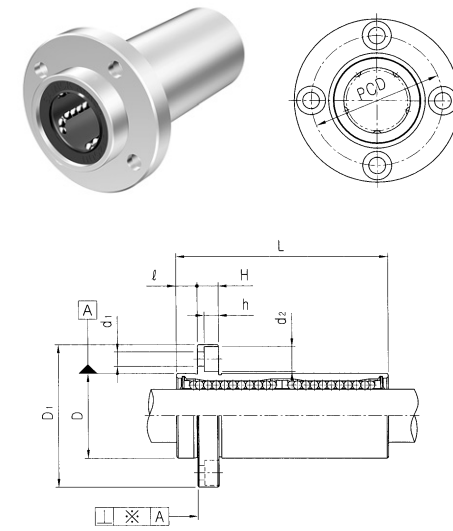


European Standard Samick Circular Flanged Linear Bushing	LMEFP	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)		
Resin	Steel	dr. TOLERANCE	mm TOLERANCE										DYNAMIC(C)	STATIC(C ₀)				
LMEFP8	LMEFP8-A	8	$^{+0.008}_0$	16	$^0_{-0.008}$	25	32	5	5	24	3.4	6.5	3.3	12	260	400	4	44
LMEFP12	LMEFP12-A	12	$^{+0.009}_0$	22	$^0_{-0.009}$	32	42	6	6	32	4.5	8	4.4	12	410	590	4	86
LMEFP16	LMEFP16-A	16	$^{+0.009}_{-0.001}$	26	$^0_{-0.009}$	36	46	6	6	36	4.5	8	4.4	12	770	1170	5	120
LMEFP20	LMEFP20-A	20	$^{+0.011}_{-0.001}$	32	$^0_{-0.011}$	45	54	8	8	43	5.5	9.5	5.4	15	860	1370	5	184
LMEFP25	LMEFP25-A	25	$^{+0.011}_{-0.001}$	40	$^0_{-0.011}$	58	62	8	8	51	5.5	9.5	5.4	15	980	1560	6	335
LMEFP30		30	$^{+0.013}_{-0.002}$	47	$^0_{-0.013}$	68	76	10	10	62	6.6	11	6.5	15	1560	2740	6	545
LMEFP40		40	$^{+0.013}_{-0.002}$	62	$^0_{-0.013}$	80	98	13	13	80	9	14	8.6	20	2150	4010	6	1185
LMEFP50		50	$^{+0.013}_{-0.002}$	75	$^0_{-0.013}$	100	112	13	13	94	9	14	8.6	20	3820	7930	6	1730
LMEFP60		60	$^{+0.013}_{-0.002}$	90	$^0_{-0.013}$	125	134	18	18	112	11	17.5	10.8	25	4700	9990	6	3180

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEFP_L FLANGED LINEAR BUSHING LONG

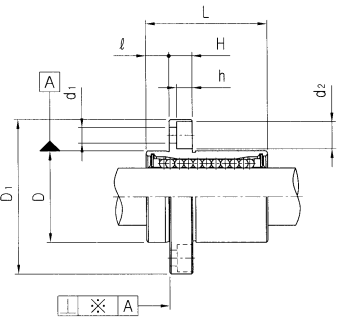
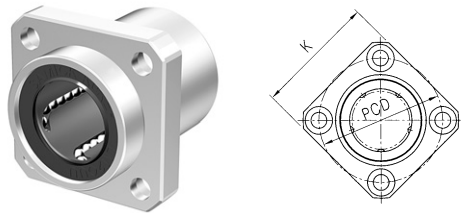


European Standard Samick Circular Flanged Linear Bushing	LMEFP	20	L	UU	-	A	N	S
Nominal Shaft Diameter								
Linear Bushing Long type(for high load)								
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL CIRCUIT	WEIGHT (g)		
Resin	Steel	dr. TOLERANCE	mm TOLERANCE										DYNAMIC(C)	STATIC(C ₀)				
LMEFP8L	LMEFP8L-A	8	$^{+0.009}_{-0.001}$	16	$^0_{-0.009}$	45	32	5	5	24	3.4	6.5	3.3	15	430	780	4	53
LMEFP12L	LMEFP12L-A	12	$^{+0.011}_{-0.001}$	22	$^0_{-0.011}$	57	42	6	6	32	4.5	8	4.4	15	650	1200	4	100
LMEFP16L	LMEFP16L-A	16	$^{+0.011}_{-0.001}$	26	$^0_{-0.011}$	70	46	6	6	36	4.5	8	4.4	15	1230	2350	5	187
LMEFP20L	LMEFP20L-A	20	$^{+0.013}_{-0.002}$	32	$^0_{-0.013}$	80	54	8	8	43	5.5	9.5	5.4	17	1400	2750	5	260
LMEFP25L	LMEFP25L-A	25	$^{+0.013}_{-0.002}$	40	$^0_{-0.013}$	112	62	8	8	51	5.5	9.5	5.4	17	1560	3140	6	515
LMEFP30L		30	$^{+0.013}_{-0.002}$	47	$^0_{-0.013}$	123	76	10	10	62	6.6	11	6.5	17	2490	5490	6	655
LMEFP40L		40	$^{+0.013}_{-0.002}$	62	$^0_{-0.013}$	154	98	13	13	80	9	14	8.6	20	3430	8040	6	1560
LMEFP50L		50	$^{+0.013}_{-0.002}$	75	$^0_{-0.013}$	192	112	13	13	94	9	14	8.6	20	6080	15900	6	3500
LMEFP60L		60	$^{+0.013}_{-0.002}$	90	$^0_{-0.013}$	211	134	18	18	112	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEKP FLANGED LINEAR BUSHING

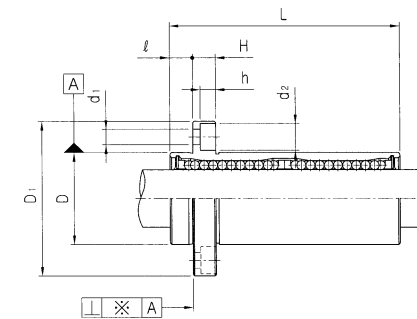
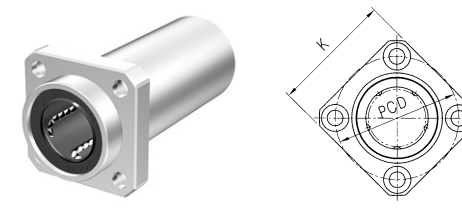


European Standard Samick Square Flanged Linear Bushing		LMEKP	20	UU	-	A	N	S
Nominal Shaft Diameter								
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER D	L	D ₁	l	H	PCD	K	d ₁	d ₂	h	SQUARENESS % (μm)	BASIC LOAD RATING(N)		NO. OF BALLS	WEIGHT (g)	
Resin	Steel												DR. TOLERANCE	mm TOLERANCE			DYNAMIC(C)
LMEKP8	LMEKP8-A	8	16	25	32	5	5	24	25	3.4	6.5	3.3	12	260	400	4	44
LMEKP12	LMEKP12-A	12	22	32	42	6	6	32	32	4.5	8	4.4	12	410	590	4	86
LMEKP16	LMEKP16-A	16	26	36	46	6	6	36	35	4.5	8	4.4	12	770	1170	5	120
LMEKP20	LMEKP20-A	20	32	45	54	8	8	43	42	5.5	9.5	5.4	15	860	1370	5	184
LMEKP25	LMEKP25-A	25	40	58	62	8	8	51	50	5.5	9.5	5.4	15	980	1560	6	335
LMEKP30		30	47	68	76	10	10	62	60	6.6	11	6.5	15	1560	2740	6	545
LMEKP40		40	62	80	98	13	13	80	75	9	14	8.6	20	2150	4010	6	1185
LMEKP50		50	75	100	112	13	13	94	88	9	14	8.6	20	3820	7930	6	1730
LMEKP60		60	90	125	134	18	18	112	106	11	17.5	10.8	25	4700	9990	6	3180

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEKP_L FLANGED LINEAR BUSHING LONG

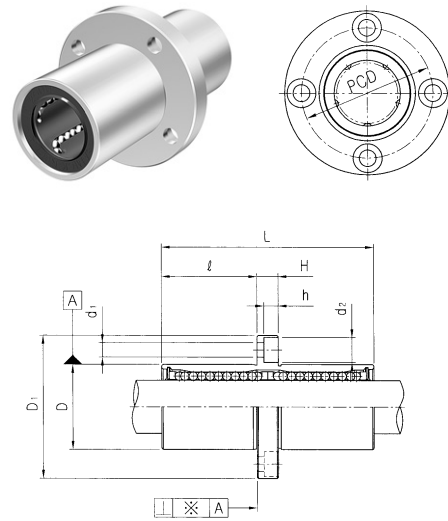


European Standard Samick Square Flanged Linear Bushing		LMEKP	20	L	UU	-	A	N	S
Nominal Shaft Diameter									
Linear Bushing Long type(for high load)									
Seal		Blank : No Seal U : One Side Seal UU : Both Side Seal							
Retainer		Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Outer-sleeves (by corrosion resistance type)		Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment							
Ball type (by corrosion resistance)		Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER		DIAMETER D	L	D ₁	l	H	PCD	K	d ₁	d ₂	h	SQUARENESS % (μm)	BASIC LOAD RATING(N)		NO. OF BALLS	WEIGHT (g)	
Resin	Steel												DR. TOLERANCE	mm TOLERANCE			DYNAMIC(C)
LMEKP8L	LMEKP8L-A	8	16	45	32	5	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMEKP12L	LMEKP12L-A	12	22	57	42	6	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMEKP16L	LMEKP16L-A	16	26	70	46	6	6	36	35	4.5	8	4.4	15	1230	2350	5	187
LMEKP20L	LMEKP20L-A	20	32	80	54	8	8	43	42	5.5	9.5	5.4	17	1400	2750	5	260
LMEKP25L	LMEKP25L-A	25	40	112	62	8	8	51	50	5.5	9.5	5.4	17	1560	3140	6	515
LMEKP30L		30	47	123	76	10	10	62	60	6.6	11	6.5	17	2490	5490	6	655
LMEKP40L		40	62	154	98	13	13	80	75	9	14	8.6	20	3430	8040	6	1560
LMEKP50L		50	75	192	112	13	13	94	88	9	14	8.6	20	6080	15900	6	3500
LMEKP60L		60	90	211	134	18	18	112	106	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEFM FLANGED LINEAR BUSHING LONG

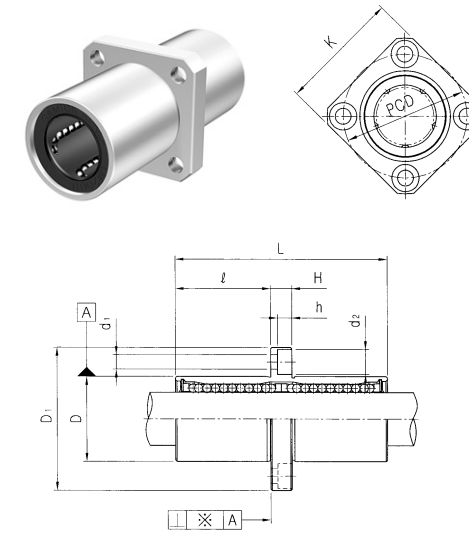


European Standard Samick Circular Mini-Flanged Linear Bushing	LMEFM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)		
Resin	Steel	dr.	TOLERANCE										DYNAMIC(C)	STATIC(C ₀)				
LMEFM8	LMEFM8-A	8	$\begin{matrix} +0.009 \\ -0.001 \end{matrix}$	16	$\begin{matrix} 0 \\ -0.009 \end{matrix}$	45	32	20	5	24	3.4	6.5	3.3	15	430	780	4	53
LMEFM12	LMEFM12-A	12	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	22	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	57	42	25.5	6	32	4.5	8	4.4	15	650	1200	4	100
LMEFM16	LMEFM16-A	16	$\begin{matrix} +0.011 \\ -0.001 \end{matrix}$	26	$\begin{matrix} 0 \\ -0.011 \end{matrix}$	70	46	32	6	36	4.5	8	4.4	15	1230	2350	5	187
LMEFM20	LMEFM20-A	20	$\begin{matrix} +0.011 \\ -0.001 \end{matrix}$	32	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	80	54	36	8	43	5.5	9.5	5.4	17	1400	2750	5	260
LMEFM25	LMEFM25-A	25	$\begin{matrix} +0.013 \\ -0.002 \end{matrix}$	40	$\begin{matrix} 0 \\ -0.013 \end{matrix}$	112	62	52	8	51	5.5	9.5	5.4	17	1560	3140	6	515
LMEFM30		30	$\begin{matrix} +0.013 \\ -0.002 \end{matrix}$	47	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	123	76	56.5	10	62	6.6	11	6.5	17	2400	5490	6	655
LMEFM40		40	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	62	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	154	98	70.5	13	80	9	14	8.6	20	3430	8040	6	1560
LMEFM50		50	$\begin{matrix} +0.016 \\ -0.004 \end{matrix}$	75	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	192	112	89.5	13	94	9	14	8.6	20	6080	15900	6	3500
LMEFM60		60	$\begin{matrix} 0 \\ -0.020 \end{matrix}$	90	$\begin{matrix} 0 \\ -0.020 \end{matrix}$	211	134	96.5	18	112	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

LMEKM FLANGED LINEAR BUSHING LONG

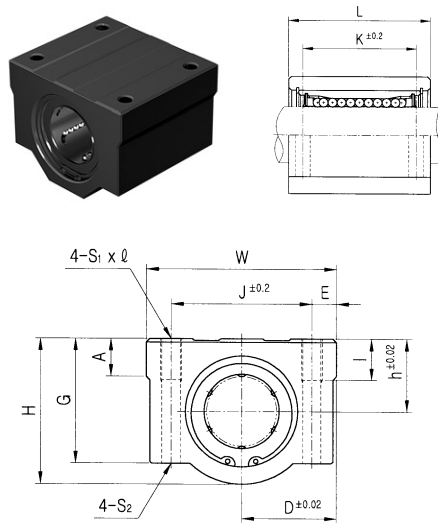


European Standard Samick Square Mini-Flanged Linear Bushing	LMEKM	20	UU	-	A	N	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Outer-sleeves (by corrosion resistance type)	Blank : No-plating(Standard) N : Electroless nickel plating R : Raydent treatment						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER		DIAMETER		L	D ₁	ℓ	H	PCD	K	d ₁	d ₂	h	SQUARENESS ※(μm)	BASIC LOAD RATING(N)		NO. OF BALL	WEIGHT (g)		
Resin	Steel	dr.	TOLERANCE											DYNAMIC(C)	STATIC(C ₀)				
LMEKM8	LMEKM8-A	8	$\begin{matrix} +0.009 \\ -0.001 \end{matrix}$	16	$\begin{matrix} 0 \\ -0.009 \end{matrix}$	45	32	20	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMEKM12	LMEKM12-A	12	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	22	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	57	42	25.5	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMEKM16	LMEKM16-A	16	$\begin{matrix} +0.011 \\ -0.001 \end{matrix}$	26	$\begin{matrix} 0 \\ -0.011 \end{matrix}$	70	46	32	6	36	35	4.5	8	4.4	15	1230	2350	5	187
LMEKM20	LMEKM20-A	20	$\begin{matrix} +0.011 \\ -0.001 \end{matrix}$	32	$\begin{matrix} 0 \\ -0.001 \end{matrix}$	80	54	36	8	43	42	5.5	9.5	5.4	17	1400	2750	5	260
LMEKM25	LMEKM25-A	25	$\begin{matrix} +0.013 \\ -0.002 \end{matrix}$	40	$\begin{matrix} 0 \\ -0.013 \end{matrix}$	112	62	52	8	51	50	5.5	9.5	5.4	17	1560	3140	6	515
LMEKM30		30	$\begin{matrix} +0.013 \\ -0.002 \end{matrix}$	47	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	123	76	56.5	10	62	60	6.6	11	6.5	17	2490	5490	6	655
LMEKM40		40	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	62	$\begin{matrix} 0 \\ -0.002 \end{matrix}$	154	98	70.5	13	80	75	9	14	8.6	20	3430	8040	6	1560
LMEKM50		50	$\begin{matrix} +0.016 \\ -0.004 \end{matrix}$	75	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	192	112	89.5	13	94	88	9	14	8.6	20	6080	15900	6	3500
LMEKM60		60	$\begin{matrix} 0 \\ -0.020 \end{matrix}$	90	$\begin{matrix} 0 \\ -0.020 \end{matrix}$	211	134	96.5	18	112	106	11	17.5	10.8	25	7650	20000	6	4500

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SC ALUMINUM CASE UNIT

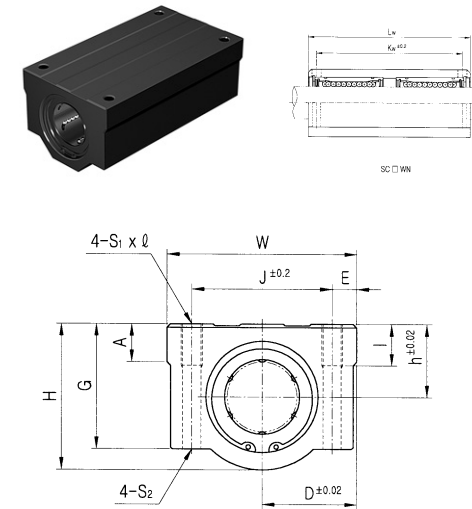


Aluminum Case Unit	SC	20	UU	N	-	A	S
Nominal Shaft Diameter							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
New type							
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K	L	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (gf)
SC8-B	LM8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	18	30	260	400	56
SC10-B	LM10UU	13	20	40	26	21	8	28	6	M5×10	Φ4.3	21	35	370	540	90
SC12-B	LM12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	26	39	410	590	112
SC12N-B	LM12UU	15	21	42	28	24	7.4	30.5	5.5	M5×12	Φ4.3	26	36	410	590	112
SC13-B	LM13UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	26	39	500	770	123
SC16-B	LM16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	34	44	770	1170	189
SC20-B	LM20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	40	50	860	1370	237
SC25-B	LM25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	50	67	980	1560	555
SC30-B	LM30UU	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	58	72	1560	2740	685
SC35-B	LM35UU	34	45	90	68	54	18	70	10	M8×18	Φ6.8	60	80	1660	3130	1100
SC40-B	LM40UU	40	51	102	78	62	20	80	11	M10×25	Φ8.6	60	90	2150	4010	1600
SC50-B	LM50UU	52	61	122	102	80	24	100	11	M10×25	Φ8.6	80	110	3820	7930	3350

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SCW ALUMINUM CASE UNIT LONG

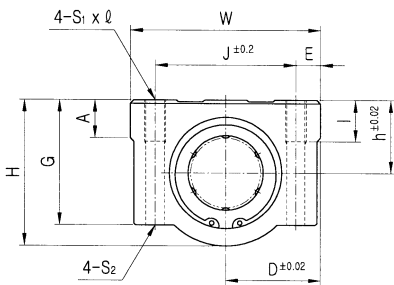
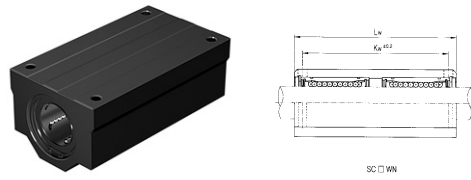


Aluminum Case Unit	SC	20	W	UU	-	A	S
Nominal Shaft Diameter							
Long type (for high load)							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K _w	L _w	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (gf)
SC8W-B	LM8U	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	94
SC10W-B	LM10U	13	20	40	26	21	8	28	6	M5×10	Φ4.3	46	68	590	1080	147
SC12W-B	LM12U	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	650	1180	220
SC13W-B	LM13U	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	800	1540	245
SC16W-B	LM16U	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	79	89	1230	2340	376
SC20W-B	LM20U	21	27	54	41	35	11	40	7	M6×12	Φ5.2	90	100	1370	2470	476
SC25W-B	LM25U	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	119	136	1560	3120	1115
SC30W-B	LM30U	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	132	146	2490	5480	1375
SC35W-B	LM35U	34	45	90	68	54	18	70	10	M8×18	Φ6.8	140	160	2650	6260	2200
SC40W-B	LM40U	40	51	102	78	62	20	80	11	M10×25	Φ8.6	150	180	3440	8020	3200
SC50W-B	LM50U	52	61	122	102	80	24	100	11	M10×25	Φ8.6	200	230	6110	15860	6720

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SCW_N ALUMINUM CASE UNIT LONG

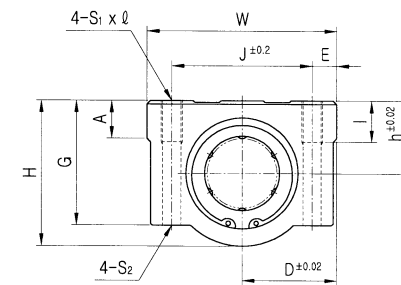
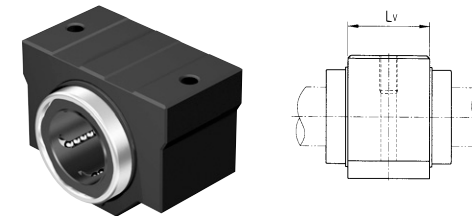


Aluminum Case Unit	SC	20	W	UU	N	-	A	S
Nominal Shaft Diameter								
Long type (for high load)								
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal							
New type								
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K _w	L _w	BASIC LOAD RATING(N) DYNAMIC(C) STATIC(C ₀)	WEIGHT (g)	
SC8WN-B	LM8U×2	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	94
SC10WN-B	LM10U×2	13	20	40	26	21	8	28	6	M5×12	Φ4.3	46	68	590	1080	147
SC12WN-B	LM12U×2	15	21	42	28	24	7.4	30.5	5.5	M5×12	Φ4.3	50	70	650	1180	220
SC13WN-B	LM13U×2	15	22	44	30	24.5	8	33	5.5	M5×12	Φ4.3	50	75	800	1540	245
SC16WN-B	LM16U×2	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	60	85	1230	2340	376
SC20WN-B	LM20U×2	21	27	54	41	35	11	40	7	M6×12	Φ5.2	70	96	1370	2470	476
SC25WN-B	LM25U×2	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	100	130	1560	3120	1115
SC30WN-B	LM30U×2	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	110	140	2490	5480	1375
SC35WN-B	LM35U×2	34	45	90	68	54	18	70	10	M8×18	Φ6.8	120	155	2650	6260	2200
SC40WN-B	LM40U×2	40	51	102	78	62	20	80	11	M10×25	Φ8.6	140	175	3440	8020	3200
SC50WN-B	LM50U×2	52	61	122	102	80	24	100	11	M10×25	Φ8.6	160	215	6110	15860	6720

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SCV ALUMINUM CASE UNIT

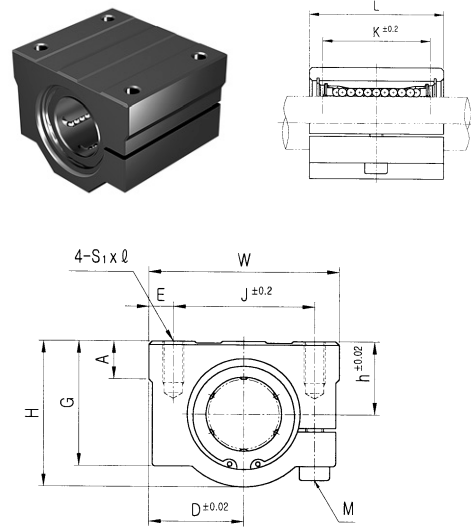


Aluminum Case Unit	SC	20	V	UU	-	A	S
Nominal Shaft Diameter							
Compact type							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	L _v	BASIC LOAD RATING(N) DYNAMIC(C) STATIC(C ₀)	WEIGHT (g)	
SC8V-B	LM8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	15.4	260	400	36
SC10V-B	LM10UU	13	20	40	26	21	8	28	6	M5×10	Φ4.3	19.5	370	540	63
SC12V-B	LM12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.5	410	590	74
SC12VN-B	LM12UU	15	21	42	28	24	7.4	30.5	5.5	M5×12	Φ4.3	20.5	410	590	74
SC13V-B	LM13UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.5	500	770	85
SC16V-B	LM16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	23.5	770	1170	132
SC20V-B	LM20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	27.4	860	1370	170
SC25V-B	LM25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	37.4	980	1560	405
SC30V-B	LM30UU	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	40.9	1560	2740	495
SC35V-B	LM35UU	34	45	90	68	54	18	70	10	M8×18	Φ6.8	45.4	1660	3130	790
SC40V-B	LM40UU	40	51	102	78	62	20	80	11	M10×25	Φ8.6	56.4	2150	4010	1220
SC50V-B	LM50UU	52	61	122	102	80	24	100	11	M10×25	Φ8.6	68.9	3820	7930	2300

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SCJ ADJUSTABLE ALUMINUM CASE UNIT

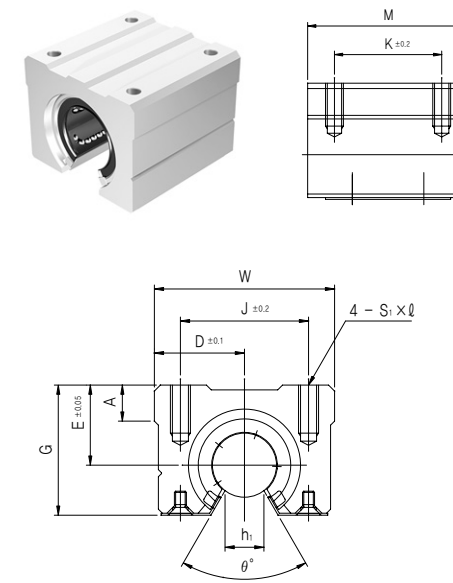


Aluminum Case Unit(Adjustable type)	SCJ	20	UU	-	A	S
Nominal Shaft Diameter						
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal					
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)					
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball					

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S1×l	K	L	M	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(Cs)	OUTER DIAMETER	WEIGHT (g)
SCJ10UU	LM10UUAJ	13	20	40	26	21	8	28	6	M5×12	21	35	M4	370	540	Φ10	90
SCJ12UU	LM12UUAJ	15	21	42	28	24	7.4	30.5	5.75	M5×12	26	36	M4	410	590	Φ12	112
SCJ13UU	LM13UUAJ	15	22	44	30	24.5	8	33	5.5	M5×12	26	39	M4	500	770	Φ13	123
SCJ16UU	LM16UUAJ	19	25	50	38.5	32.5	9	36	7	M5×12	34	44	M4	770	1170	Φ16	189
SCJ20UU	LM20UUAJ	21	27	54	41	35	11	40	7	M6×12	40	50	M5	860	1370	Φ20	237
SCJ25UU	LM25UUAJ	26	38	76	51.5	41	12	54	11	M8×18	50	67	M6	980	1560	Φ25	555
SCJ30UU	LM30UUAJ	30	39	78	59.5	49	15	58	10	M8×18	58	72	M6	1560	2740	Φ30	685
SCJ35UU	LM35UUAJ	34	45	90	68	54	18	70	10	M8×18	60	80	M6	1660	3130	Φ35	1100
SCJ40UU	LM40UUAJ	40	51	102	78	62	20	80	11	M10×25	60	90	M8	2150	4010	Φ40	1600
SCJ50UU	LM50UUAJ	52	61	122	102	80	24	100	11	M10×25	80	110	M8	3820	7930	Φ50	3350

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating $C_{100} = 410 / 1.26 = 325.40N$
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SBR ALUMINUM CASE UNIT OPEN

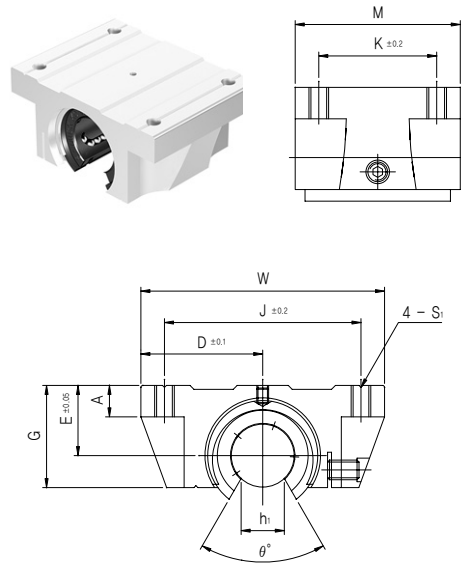


Aluminum Case Unit(Open type)	SBR	20	UU	-	A	S
Nominal Shaft Diameter						
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal					
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)					
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball					

PART NUMBER	L/B	D	W	G	θ	A	M	S×l	h	E	J	K	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(Cs)	WEIGHT (g)
SBR16UU	LM16UUOP	22.5	45	33	80°	9	45	M5×12	11	20	32	30	770	1170	0.15
SBR20UU	LM20UUOP	24	48	39	60°	11	50	M6×12	11	23	35	35	860	1370	0.20
SBR25UU	LM25UUOP	30	60	47	50°	14	65	M6×12	12	27	40	40	980	1560	0.45
SBR30UU	LM30UUOP	35	70	56	50°	15	70	M8×18	15	33	50	50	1560	2740	0.63
SBR35UU	LM35UUOP	40	80	63	50°	18	80	M8×18	17	37	55	55	1660	3130	0.92
SBR40UU	LM40UUOP	45	90	72	50°	20	90	M10×20	20	42	65	65	2150	4010	1.33
SBR50UU	LM50UUOP	60	120	91	50°	25	110	M10×20	25	53	94	80	3820	7930	3.00

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating $C_{100} = 410 / 1.26 = 325.40N$
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

TBR ALUMINUM CASE UNIT OPEN

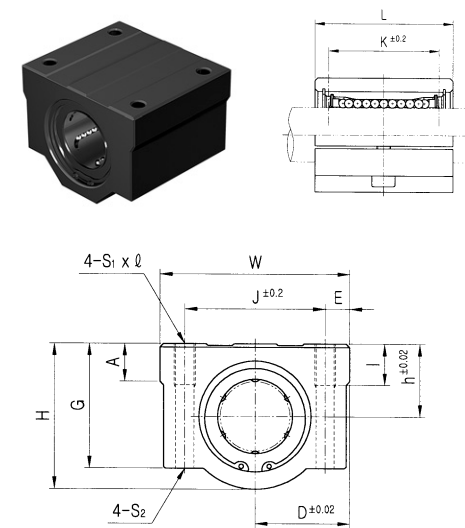


Aluminum Case Unit(Open type)	TBR	20	UU	-	A	S
Nominal Shaft Diameter						
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal					
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)					
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball					

PART NUMBER	L/B	D	W	G	θ	A	M	S ₁	h ₁	E	JK	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (g)
TBR16UU	LM16UUOP	31	62	26	80°	8	42	M5	11	18	50	392	490	0.18
TBR20UU	LM20UUOP	34	68	31	60°	10	51	M6	11	21	54	784	1176	0.3
TBR25UU	LM25UUOP	41	82	41	50°	12	65	M8	12	28	65	1568	2352	0.6
TBR30UU	LM30UUOP	45.5	91	48	50°	12	75	M8	15	34	75	1764	2940	0.9

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

SCE ALUMINUM CASE UNIT

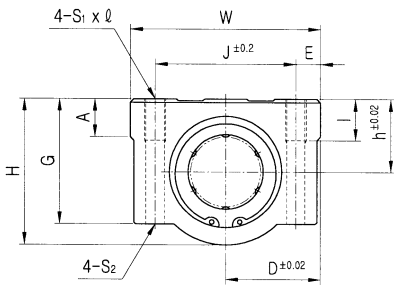
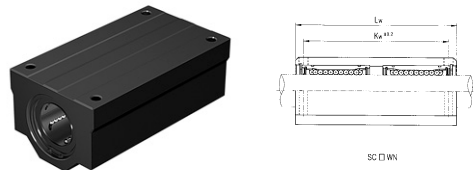


European Standard Aluminum Case Unit	SCE	20	UU	-	A	S
Nominal Shaft Diameter						
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal					
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)					
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball					

PART NUMBER	L/B	L	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (g)
SCE8-B	LME8UU	30	11	17	34	22	18	6	24	5	M4×8	Φ3.4	18	260	400	60
SCE12-B	LME12UU	39	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	26	410	590	118
SCE16-B	LME16UU	44	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	34	770	1170	180
SCE20-B	LME20UU	53	21	27	54	41	35	11	40	7	M6×12	Φ5.2	40	860	1370	245
SCE25-B	LME25UU	67	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	50	980	1560	550
SCE30-B	LME30UU	76	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	58	1560	2740	760
SCE40-B	LME40UU	90	40	51	102	78	62	20	80	11	M10×25	Φ8.6	60	2150	4010	1700
SCE50-B	LME50UU	110	52	61	122	102	80	24	100	11	M10×25	Φ8.6	80	3820	7930	2950

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

| SCE_W ALUMINUM CASE UNIT LONG |

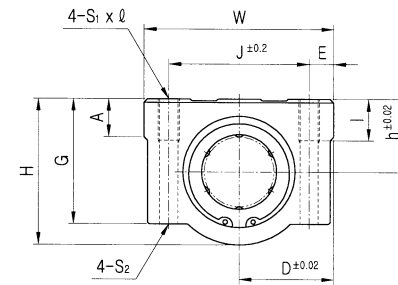
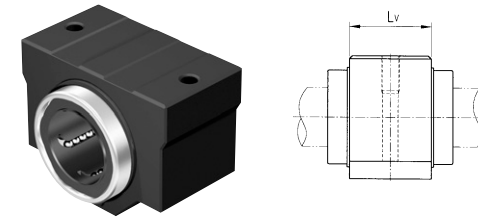


European Standard Aluminum Case Unit	SCE	20	W	UU	-	A	S
Nominal Shaft Diameter							
Long type (for high load)							
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal						
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)						
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball						

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K _w	L _w	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (gf)
SCE8W-B	LME8U×2	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	98
SCE12W-B	LME12U×2	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	650	1180	232
SCE16W-B	LME16U×2	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	79	89	1230	2340	360
SCE20W-B	LME20U×2	21	27	54	41	35	11	40	7	M6×12	Φ5.2	90	106	1370	2740	490
SCE25W-B	LME25U×2	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	119	136	1560	3120	1100
SCE30W-B	LME30U×2	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	132	154	2490	5480	1525
SCE40W-B	LME40U×2	40	51	102	78	62	20	80	11	M10×25	Φ8.6	150	180	3440	8020	3400
SCE50W-B	LME50U×2	52	61	122	102	80	24	100	11	M10×25	Φ8.6	200	230	6110	15860	5920

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

| SCE_V ALUMINUM CASE UNIT |



European Standard Aluminum Case Unit	SCE	20	V	UU	N	-	A	S
Nominal Shaft Diameter								
Compact type								
Seal	Blank : No Seal U : One Side Seal UU : Both Side Seal							
New type								
Retainer	Blank : Resin retainer(Standard) A : Steel retainer(High temperature)							
Ball type (by corrosion resistance)	Blank : High carbon bearing steel ball (standard) S : Stainless steel ball							

PART NUMBER	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	L _v	BASIC LOAD RATING(N) DYNAMIC(C)	STATIC(C ₀)	WEIGHT (gf)
SCE8V-B	LME8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	14.4	260	400	40
SCE12V-B	LME12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.3	410	590	82
SCE16V-B	LME16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	22.3	770	1170	122
SCE20V-B	LME20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	28.3	860	1370	176
SCE25V-B	LME25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	40.4	980	1560	400
SCE30V-B	LME30UU	30	39	78	59.5	49	15	58	10	M8×18	Φ6.8	48.4	1560	2740	570
SCE40V-B	LME40UU	40	51	102	78	62	20	80	11	M10×25	Φ8.6	56.4	2150	4010	1320
SCE50V-B	LME50UU	52	61	122	102	80	24	100	11	M10×25	Φ8.6	72.3	3820	7930	1900

Note 1) Dynamic load rating is based on the nominal life of 50km.
In case of 100km, C on the table need to be divided by 1.26
Ex) LM12's 50km basis dynamic load rating C = 410N
LM12's 100km basis dynamic load rating C₁₀₀ = 410 / 1.26 = 325.40N
Note 2) Based on the weight of resin retainer
Note 3) Dimension : mm

:: SAMICK Support Rail Unit

SAMICK Support Rail Unit is assembled of Support Rail, LM Shaft, and Open type Linear Bushing Case. All components are standardized for providing interchangeability, and less cost and designing time.



Support Rail Unit	SBS	C	h6	30	-	1000	L
SAMICK Support Rail Unit							
Support Rail Unit for SBR : SBS Support Rail Unit for TBR : TBS							
Shaft(by corrosion resistance)							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance shaft : blank European standard h6 tolerance shaft : h6							
Shaft Diameter							
16~50mm							
Shaft Length							
100~3000mm							

:: SAMICK LM Shaft

SAMICK supply precision LM shaft for SAMICK Linear Bushing. The hardness, surface finishing, and tolerance of shaft must be considered for choosing the proper shaft because the balls are running directly on the shaft surface. Shaft dimensions are as follows

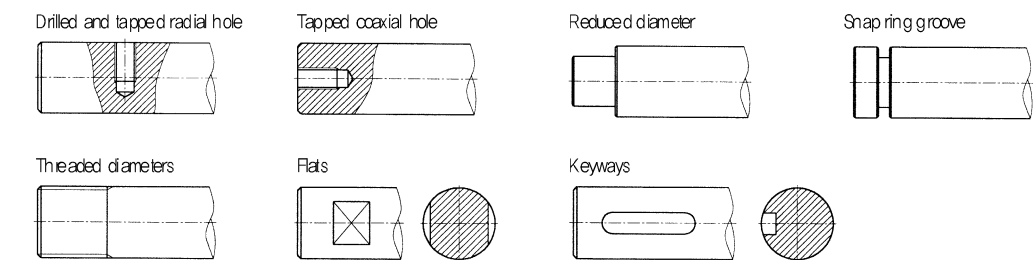
- Material : High carbon chromium bearing steel
- Hardness : Hrc58 ~ 64
- Hardened depth : 0.8 ~ 2.5mm
- Surface finishing : 0.8S ~ 1.6S
- Straightness : 0.05mm / 300mm

LM Shaft	SF	C	h6	30	-	1000	L
SAMICK Support Rail Unit							
Shaft(by corrosion resistance)							
No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R							
Shaft tolerance							
Asian standard g6 tolerance shaft : blank European standard h6 tolerance shaft : h6							
Shaft Diameter							
5~80mm							
Shaft Length							
100~3000mm							

Shaft Special Machining

SAMICK also supply specially machined shaft as shown in the below figure. The drilled and tapped holes on LM shaft for mounting on the Support Rail are also available.

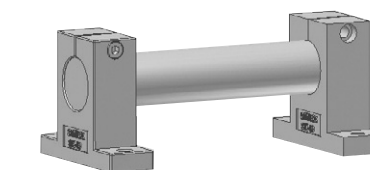
(Example of machining)



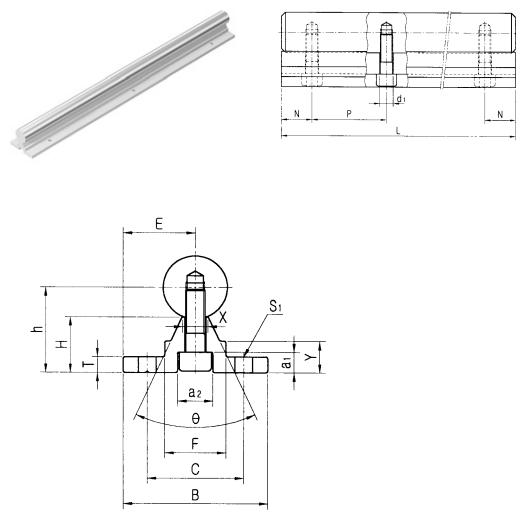
:: SAMICK Shaft Support

Support for Shaft ends, SAMICK Shaft Support is made of aluminum with compact design, and able to fix the LM shaft by tightening bolt at the axial direction slot.

Shaft Support	SK	20
SAMICK Shaft Support (Aluminum)		
LM Shaft diameter		
6~40mm		



| SBS SUPPORT RAIL UNIT |



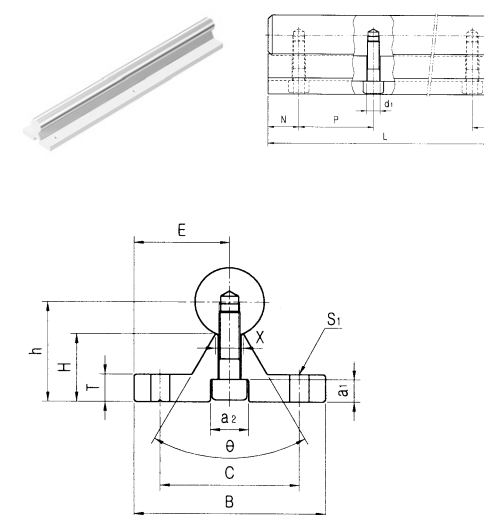
SUPPORT RAIL UNIT	SBS	C	h6	30	-	1000	L
Type	Support Rail Unit for SER : SBS						
Shaft (by corrosion resistance)	No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R						
Shaft tolerance	Asian standard g6 tolerance shaft : Blank European standard h6 tolerance shaft : h6						
Shaft Diameter	16~50mm						
Shaft Length	100~3000m						

PART NUMBER	Shaft Outer diameter	E	h	B	H	T	F	X	Y	C	θ	S ₁	a ₁	a ₂	d ₁	WEIGHT (kgf/m)
SBS16	16	20	25	40	17.79	5	18.5	8	11.7	30	80	5.5	6	9.5	5.5	2.56
SBS20	20	22.5	27	45	17.72	5	19	8	10	30	50	5.5	6.5	11	6.6	3.50
SBS25	25	27.5	33	55	21.13	6	21.5	8	12	35	50	6.6	6.5	11	6.6	5.30
SBS30	30	30	37	60	22.85	7	26.5	10.3	13	40	50	6.6	8.5	14	9	7.38
SBS35	35	32.5	43	65	26.62	8	28	13	15.5	45	50	9	8.5	14	9	9.68
SBS40	40	37.5	48	75	29.43	9	38	16	17	55	50	9	8.5	14	9	12.69
SBS45	45	47.5	62	95	38.79	11	45	20	21	70	50	11	12.5	19	11	20.46

PART NUMBER	Max. Length (mm)	P	500	600	800	1000	1200	1400	N x NH		1600	1800	2000	2200	2400	2600	3000
SBS16	3000	150	25x3	75x3	100x4	50x6	75x7	25x9	50x10	75x11	25x13	50x14	75x15	25x17	75x19		
SBS20	3000	150	25x3	75x3	100x4	50x6	75x7	25x9	50x10	75x11	25x13	50x14	75x15	25x17	75x19		
SBS25	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	75x11	25x13	50x14	75x15	25x17	75x19		
SBS30	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	75x11	25x13	50x14	75x15	25x17	75x19		
SBS35	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	75x11	25x13	50x14	75x15	25x17	75x19		
SBS40	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	75x11	25x13	50x14	75x15	25x17	75x19		
SBS50	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	75x11	25x13	50x14	75x15	25x17	75x19		

Note 1) N values can vary depending on length of Shaft.
 Note 2) NH (Number of Holes): the number of mounting hole according to pitch value.
 Note 3) P & N value must specified when orders.

| TBS SUPPORT RAIL UNIT |



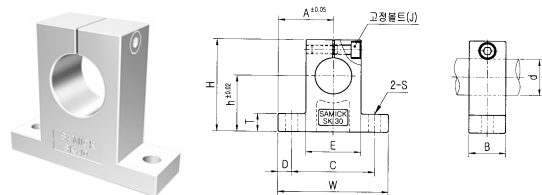
SUPPORT RAIL UNIT	TBS	C	h6	30	-	1000	L
Type	Support Rail Unit for TBR : TBS						
Shaft (by corrosion resistance)	No plating (Standard) : Blank Chrome plated shaft : C Nickel plated shaft : N Raydent treated shaft : R						
Shaft tolerance	Asian standard g6 tolerance shaft : Blank European standard h6 tolerance shaft : h6						
Shaft Diameter	16~50mm						
Shaft Length	100~3000mm						

PART NUMBER	OUTER DIAMETER	E	h	B	H	T	X	C	θ	S ₁	a ₁	a ₂	d ₁	WEIGHT (kgf/m)
TBS16A	Φ16	25	22	50	14.79	6	8	37	60°	Φ5.5	6	9.5	5.5	2.66
TBS20A	Φ20	27.5	29	55	19.72	8	8	40	50°	Φ5.5	6.5	11	6.6	4.23
TBS25A	Φ25	32.5	32	65	20.13	10	8	45	50°	Φ6.6	6.5	11	6.6	5.85
TBS30A	Φ30	37.5	36.5	75	22.35	12	10.3	55	50°	Φ6.6	8.5	14	9	8.28

PART NUMBER	Max. Length (mm)	P	500	600	800	1000	1200	1400	N x NH		1600	1800	2000	2200	2400	2600	3000
TBS16	3000	150	25x3	75x3	100x4	50x6	75x7	25x9	50x10	75x11	25x13	50x14	75x15	25x17	75x19		
TBS20	3000	150	25x3	75x3	100x4	50x6	75x7	25x9	50x10	75x11	25x13	50x14	75x15	25x17	75x19		
TBS25	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	100x8	100x9	100x10	100x11	100x12	100x14		
TBS30	3000	200	50x2	100x2	100x3	100x4	100x5	100x6	100x7	100x8	100x9	100x10	100x11	100x12	100x14		

Note 1) N values can vary depending on length of Shaft.
 Note 2) NH (Number of Holes): the number of mounting hole according to pitch value.
 Note 3) P & N value must specified when orders.

| SK Shaft Support |



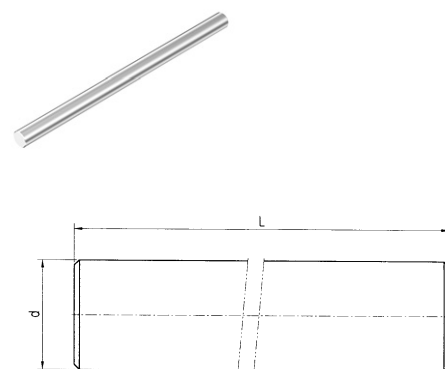
SHAFT SUPPORT SK 20
 Samick Shaft Support(Aluminum)
 Shaft Diameter

PART NUMBER	Shaft Outer diameter	h	A	W	H	T	E	D	C	B	S	J	WEIGHT (g)
SK8	8	20	21	42	32.8	6	18	5	32	14	5.5	M4	24
SK10	10	20	21	42	32.8	6	18	5	32	14	5.5	M4	24
SK12	12	23	21	42	38	6	20	5	32	14	5.5	M4	30
SK13	13	23	21	42	38	6	20	5	32	14	5.5	M4	30
SK16	16	27	24	48	44	8	25	5	38	16	5.5	M4	40
SK20	20	31	30	60	51	10	30	7.5	45	20	6.6	M5	70
SK25	25	35	35	70	60	12	38	7	56	24	6.6	M6	130
SK30	30	42	42	84	70	12	44	10	64	28	9	M6	180
SK35	35	50	49	98	85	15	50	12	74	32	11	M8	270
SK40	40	60	57	114	96	15	60	12	90	36	11	M8	420

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References

| SF Shaft |



Shaft SF C h6 30 - 1000 L
 Samick LM Shaft

Corrosion resistance treatment
 No plating (Standard) : Blank
 Chrome plated shaft : C
 Nickel plated shaft (Length Max 1m) : N
 Raydent treated shaft : R

Shaft tolerance
 Asian standard g6 tolerance shaft : Blank
 European standard h6 tolerance shaft : h6

Shaft Diameter 16~50mm

Shaft Length 100~3000mm

diameter	6	8	10	12	13	16	20	25	30	35	40	50	60	80
Diameter tolerance(g6)	-0.004	-0.005		-0.006			-0.007			-0.009			-0.010	
	-0.012	-0.014		-0.017			-0.020			-0.025			-0.029	
WEIGHT (kg/m)	0.22	0.39	0.62	0.89	1.04	1.58	2.46	3.85	5.55	7.55	9.86	15.41	22.18	39.44
Max Length(mm)	500	500	2000	2000	2000	3000	3000	3000	3000	3000	3000	3000	3000	3000

■ Shaft dimensions are as follows

- Material : SUJ2(High carbon chromium bearing steel)
- Hardened depth : 0.8~2.5mm
- Straightness : 0.05mm/300mm
- Hardness : H:C58~64
- Surface finishing : 0.8S~1.6S

THE PRINCIPLE OF LINEAR SYSTEM SUS SERIES LINEAR BUSHING

THE PRINCIPLE OF LINEAR SYSTEM
SUS SERIES LINEAR BUSHING

by SAMICK the Linear Instinct



CATALOG NO. SUS-0901K

삼익 리니어부싱 소개 05

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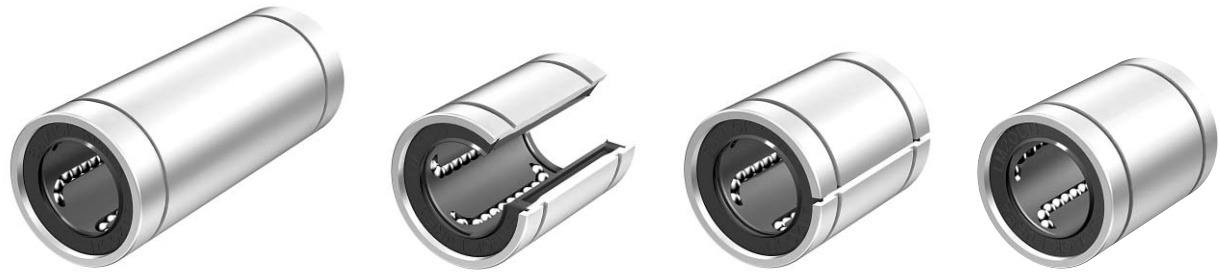


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5

Product Overview



일반형 리니어부싱-SUS SERIES

- 외통 및 볼 : 스테인레스사용 내식성 제품
- 동정격하중 최대 1,560N까지 제공
- 샤프트 직경 5~25mm까지 선택 가능
- Resin 리테이너(기본형)와 Steel 리테이너(고온용, 진공용) 가능

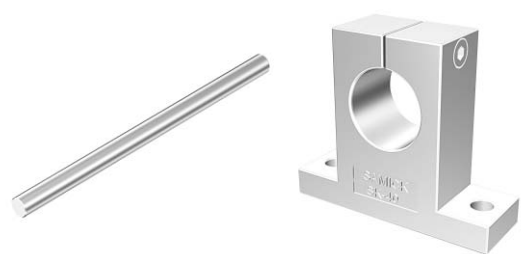
LM, LM_OP, LM_AJ, LM_L : 아시아 표준, p46
 LME, LME_OP, LME_AJ, LME_L : 유럽 표준, p66



플랜지형 리니어부싱-SUS SERIES

- 외통과 볼 및 플랜지 : 스테인레스사용 내식성 제품
- 다양한 디자인과 간편한 설치가 가능
- 운동체의 하중이 직접적으로 리니어부싱에 전달되는 경우 사용
- 하우징 없이 직접 설치 가능
- Resin 리테이너(기본형)와 Steel 리테이너(고온용, 진공용) 가능

LMF_(L), LMK_(L), LMH_(L) : 아시아 표준, p50
 LMEF_(L), LMEK_(L) : 유럽 표준, p70



샤프트/샤프트 서포트-SUS SERIES

- 내식용 스테인레스 샤프트
- 고탄소 베어링강 샤프트(표면처리 및 단말가공 가능)
- 알루미늄 샤프트 서포트

SF : 샤프트, 아시아, 유럽 표준, p98
 SK : 샤프트 서포트, 아시아, 유럽 표준, p98



파일럿 플랜지 리니어부싱-SUS SERIES

- 외통과 볼 및 플랜지 : 스테인레스사용 내식성 제품
- 다양한 디자인과 간편한 설치가 가능
- 운동체의 하중이 직접적으로 리니어부싱에 전달될 때, 파일럿 플랜지이로 인해 더욱 안정적인 운동을 얻을 수 있으며 모멘트 하중이 걸리는 곳에 최적.
- 하우징 없이 직접 설치 가능
- Resin 리테이너(기본형)와 Steel 리테이너(고온용, 진공용) 가능

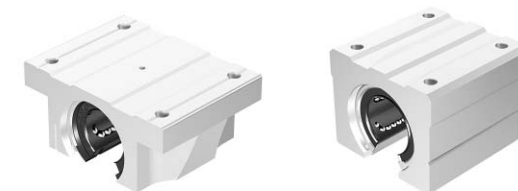
LMFP_(L), LMKP_(L), LMHP_(L) : 아시아 표준, p56
 LMEFP_(L), LMEKP_(L) : 유럽표준, p74



중간 플랜지 리니어부싱-SUS SERIES

- 외통과 볼 및 플랜지 : 스테인레스사용 내식성 제품
- 다양한 디자인과 간편한 설치가 가능
- 운동체의 하중이 직접적으로 리니어부싱에 전달될 때, 더욱 안정적인 운동결과를 얻을 수 있으며 모멘트 하중이 걸리는 곳에 최적
- 하우징 없이 직접 설치 가능
- Resin 리테이너(기본형)와 철 리테이너(고온용, 진공용) 가능

LMFM, LMKM, LMHM : 아시아 표준, p62
 LMEFM, LMEKM : 유럽 표준, p78



알루미늄 케이스 유니트(개방형)-SUS SERIES

- 개방형 알루미늄 하우징과 개방형 리니어부싱의 일체형
- 고경도의 가벼운 알루미늄 하우징
- 서포트 레일과 함께 사용

SBR, TBR : 아시아, 유럽 표준, p87

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Technical information

직선운동 시스템의 정격하중과 수명

직선운동 시스템을 사용하는 경우 각 제품을 선정할 때에는 사용조건에 따라서 부하용량과 수명에 대하여 우선 검토를 하여야 한다. 부하용량은 기본정정격하중을 이용하여 정적안전계수를 구함으로써 검토할 수 있으며, 수명은 기본동정격하중을 이용하여 정격수명을 계산하고 이 값들이 사용조건을 만족하는가를 판단함으로써 검토한다. 직선운동시스템의 수명이란 전동면이나 전동체에 반복응력이 작용함에 따라 재료의 구름피로에 의한 플래이킹(금속표면이 비늘 모양으로 벗겨짐) 현상이 발생할 때까지의 총주행거리를 말한다.

기본정격하중

직선운동시스템의 기본정격하중에는 정적하중관계를 결정하는 기본정격하중(C₀)과 수명산출에 사용하는 기본동정격하중(C)으로 분류한다.

기본정정격하중 (C₀)

직선운동시스템이 정지 혹은 운동하고 있는 상태에서 과도한 하중을 받거나 큰 충격하중을 받을 경우에 전동면과 전동체의 사이에 국부적인 영구변형이 발생한다. 이 영구변형량이 어느 한도를 넘으면 직선운동시스템이 원활하게 운동하는데 장애가 된다. 기본정정격하중이란 최대응력을 받고 있는 접촉부에서 전동체의 영구변형량과 전동면의 영구변형량의 합이 전동체 직경의 0.0001배가 되는 방향과 크기가 일정한 정지하중을 말한다. 직선운동시스템에서는 레이디얼 하중으로 정의하고 있다. 따라서 기본정정격하중을 정적하중의 한도로 한다. 리니어부싱 각각에 대한 기본정정격하중의 값은 본 카탈로그의 치수표에 기재되어 있다.

정적안전계수(f_s)

직선운동시스템은 정지 혹은 운동 중에 진동이나 충격, 기동정지에 의한 관성력의 발생 등 예상 외의 외력이 작용할 수 있다. 이러한 작용하중에 대하여 정적 안전계수를 고려할 필요가 있다. 정적안전계수는 직선운동시스템에 작용하는 부하하중에 대한 직선운동시스템의 부하능력(기본정정격하중)의 배수로 나타낼 수 있다.

$$f_s = \frac{C_0}{P} \quad \text{또는} \quad f_s = \frac{M_b}{M}$$

f_s : 정적안전계수
 C₀ : 기본정정격하중 (N)
 M_b : 정적하중모멘트 (N · mm)
 P : 부하 하중 (N)
 M : 부하 모멘트 (N · mm)

직선운동시스템에서 작용하는 하중을 산출하는 경우에는 수명계산에 사용되는 평균하중과 정적안전계수의 산출에 사용하는 최대하중을 산출할 필요가 있다. 특히 기동정지가 가혹한 경우나 절삭하중이 작용하는 경우, 오버행 하중에 의한 모멘트가 크게 작용하는 경우 등에서는 예상하지 못한 큰 하중이 작용하는 경우가 있기 때문에 형번을 선정할 때에는 동작시나 정지시에 관계없이 그 최대하중에 대하여 적정한가를 확인하여야 한다.

다음의 표는 정적안전계수의 기준치를 나타낸다

표1. 정적안전계수(f_s)의 기준치

적용분야	조 건	정적안전계수(f _s)의 하한
일반산업기계	진동, 충격이 없는 경우	1.0 ~ 1.3
	진동, 충격이 작용하는 경우	2.0 ~ 3.0
공작기계	진동, 충격이 없는 경우	1.0 ~ 1.5
	진동, 충격이 작용하는 경우	2.5 ~ 7.0

레이디얼 방향 하중이 큰 경우

$$\frac{f_H \cdot f_T \cdot f_c \cdot C_0}{P} \geq f_s$$

C₀ : 기본정정격하중 (N) P : 부하하중 (N) f_H : 경도계수
 f_T : 온도계수 f_c : 접촉계수

기본동정격하중(C)

기본동정격하중이란 1군의 같은 직선운동시스템을 동일조건으로 각각 운동 시켰을 때 정격수명(L)이 볼을 사용한 직선운동 시스템에는 L=50km, 로울러를 사용한 경우에는 L=100km가 되는 방향과 크기가 변동하지 않는 하중을 말하며, 직선운동시스템이 하중을 받고 운동하는 경우의 수명계산에 사용한다. 직선운동시스템의 각각의 값은 본 카탈로그의 치수표에 기재되어 있다.

정격수명

직선운동시스템의 수명은 동일하게 제작된 시스템을 동일 운전조건으로 사용해도 다소의 차이를 나타낸다. 이 때문에 직선운동시스템의 수명을 구하는 기준으로서 다음과 같이 정의된 정격수명을 사용한다. 정격수명이라는 것은 1군의 같은 직선운동시스템을 동일조건으로 각각 운동시켰을 때 그 중 90%가 플래이킹을 일으키지 않고 도달 가능한 총 주행거리를 말한다. 직선운동시스템의 정격수명(L)은 기본동정격하중(C)과 부하하중(P)로부터 다음의 식으로서 구한다.

볼을 사용한 경우	로울러를 사용한 경우
$L = \left(\frac{C}{P}\right)^3 \times 50$ $L_{100} = \left(\frac{C_{100}}{P}\right)^3 \times 100$ $\ast C_{100} = \left(\frac{C}{1.26}\right)$	$L = \left(\frac{C}{P}\right)^{10} \times 100$
L : 정격수명(50Km) L ₁₀₀ : 정격수명(100Km) C : 기본동정격하중(50Km) C ₁₀₀ : 기본동정격하중(100Km) P : 부하하중	L : 정격수명(100Km)

실제 수명에 영향을 미치는 요소들을 고려한 계산은 다음의 식으로 구한다.

$$L = \left(\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C}{P} \right)^3 \times 50$$

$$L_{100} = \left(\frac{f_H \times f_T \times f_C}{f_W} \times \frac{C_{100}}{P} \right)^3 \times 100$$

L : 정격수명(50Km) L₁₀₀ : 정격수명(100Km)
 C : 기본동정격하중(50Km) C₁₀₀ : 기본동정격하중(100Km)
 P : 계산하중(N) f_H : 경도계수(그림1 참조)
 f_T : 온도계수(그림2 참조) f_C : 접촉계수(표2 참조)
 f_W : 하중계수(표3 참조)

상기 식에서 정격수명(L)이 구해지면 스트로크 길이와 왕복회수가 일정한 경우 수명시간은 다음의 식에 의해 구한다.

$$L_h = \frac{L \times 10^6}{2 \times l_s \times N_b \times 60}$$

L_h : 수명시간(hr) l_s : 스트로크길이(mm)
 N_b : 매분왕복 회수(cpm)

∴ 수명에 영향을 미치는 요소

경도계수(f_H)

직선운동시스템의 부하능력을 충분히 발휘시키기 위해서는 전동면의 경도를 58~64HRC로 선택해야 한다. 이 경도보다 낮은 경우, 기본동정격하중 및 기본정정격하중이 저하되므로 각각의 경도계수를 곱한다.

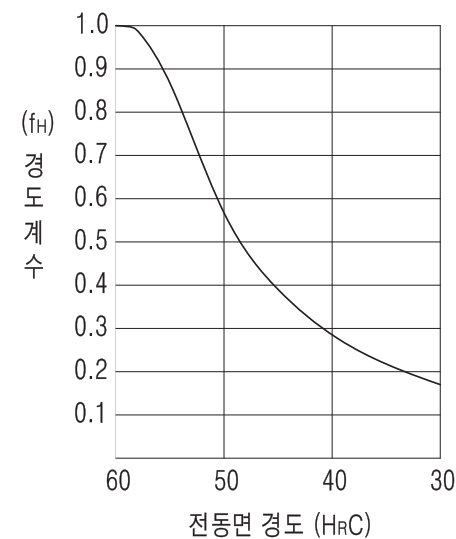


그림 1. 경도계수(f_H)

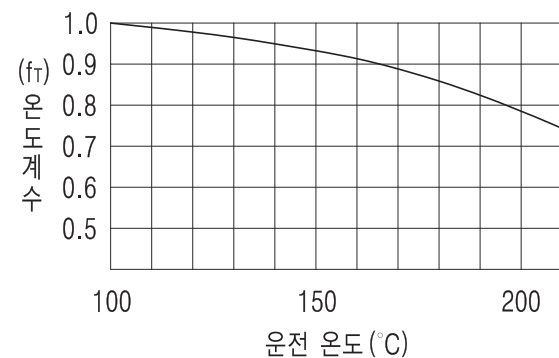


그림 2. 온도계수(f_T)

온도계수(f_T)

직선운동시스템의 사용온도가 100°C를 넘을 경우에는 온도에 의한 악영향을 고려하여 온도계수를 곱하여야 하며, 실과 리테이너 등의 재질을 고온사양으로 변경할 필요가 있다. 적정 사용 온도는 -20°C~80°C이며, 고온에서 사용 가능한 제품이 필요한 경우 당사로 문의 바랍니다.

접촉계수(f_C)

직선운동시스템에 2개이상의 리니어부싱을 밀착상태에서 사용하는 경우 모멘트나 설치면 정도가 직선운동시스템의 운동에 영향을 주어 균일한 하중분포를 얻기가 곤란하기 때문에 직선운동시스템에 2개이상의 리니어부싱을 밀착하여 사용하는 경우 아래의 접촉계수를 기본정격하중 C₀, C에 곱하여야 한다.

표2. 접촉계수(f_C)

LM 샤프트에 조립되는 리니어부싱의 수	접촉계수(f _C)
2	0.81
3	0.72
4	0.66
5	0.61
6 이상	0.60
통상 사용	1.0

하중계수(f_W)

직선운동시스템에 작용하는 하중을 계산할 경우 물체의 중량이나 운동속도에 따라 관성력의 영향으로 발생하는 모멘트 하중 등을 정확하게 계산할 필요가 있다. 일반적으로 왕복 운동하는 기계는 운전 중에 진동이나 충격을 동반하는 일이 많고, 특히 고속 운전시에 발생하는 진동이나 상시 반복되는 기동 정지시의 충격 등을 정확히 구하는 것은 어렵다. 따라서 속도, 진동의 영향이 큰 경우는 아래의 하중계수를 기본동정격하중(C)에 나누어준다.

표3. 하중계수(f_W)

사용조건		하중계수(f _W)
하중조건	속도	
충격·진동이 없는 경우	15 m/min 이하	1.0~1.5
충격·진동이 조금 있는 경우	60m/min 이하	1.5~2.0
충격·진동이 큰 경우	60m/min 이상	2.0~4.0

시스템 하중 계산

직선운동시스템은 하중의 무게중심위치, 추력위치, 가속도에 따른 관성력 등의 여러가지 외부 요인들에 의해 성능에 영향을 받을 수 있으므로 설계시 이러한 요인들을 고려하여야 한다. 다음의 예는 축의 방향과 무게중심의 위치가 직선운동시스템의 선정에 어떤 영향을 줄 수 있는지를 보여주는 계산식이다. 하중계산의 목적은 시스템에 작용하는 요인들을 고려하여 최적의 제품을 결정하는데 있다.

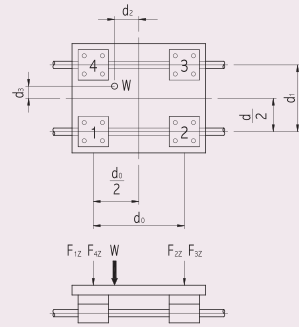
수평응용 | 등속운동 혹은 정지시

$$F_{1z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{2z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{3z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{4z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$



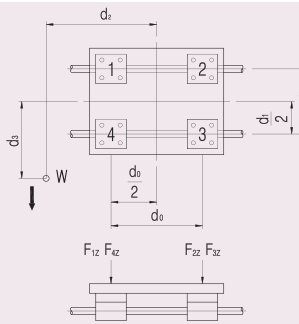
수평응용 | 등속운동 혹은 정지시

$$F_{1z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{2z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) - \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{3z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

$$F_{4z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right) + \left(\frac{W}{2} \cdot \frac{d_3}{d_1}\right)$$

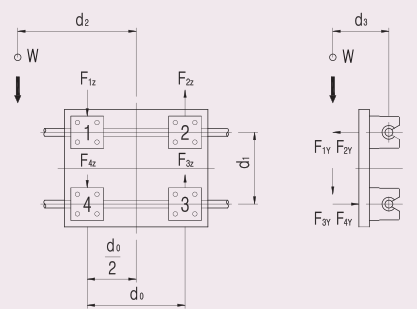


측면설치응용 | 등속운동 혹은 정지시

$$F_{1y} \sim F_{4y} = \frac{W}{2} \cdot \frac{d_3}{d_0}$$

$$F_{1z} = F_{4z} = \frac{W}{4} + \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right)$$

$$F_{2z} = F_{3z} = \frac{W}{4} - \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right)$$



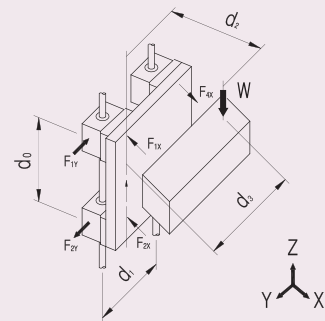
수직응용 | 등속운동 혹은 정지시 관성에 의해 하중이 변화하는 출발과 정지시

$$F_{1x} \sim F_{4x} = \left(\frac{W}{2} \cdot \frac{d_2}{d_0}\right)$$

$$F_{1y} \sim F_{4y} = \left(\frac{W}{2} \cdot \frac{d_3}{d_0}\right)$$

$$F_{1x} + F_{3x} \sim F_{2x} + F_{4x}$$

$$F_{1y} + F_{3y} \sim F_{2y} + F_{4y}$$



용어: d0 = 케이스유닛의 중심선 사이의 거리
 d1 = 운반체의 중심선과 하중작용점 사이의 거리
 d2 = 운반체의 중심선과 하중작용점 사이의 거리
 d3 = 운반체의 중심선과 하중작용점 사이의 거리
 W = 하중(N)
 F_{Nx} = X축 방향의 힘(N)
 F_{Ny} = Y축 방향의 힘(N)
 F_{Nz} = Z축 방향의 힘(N)

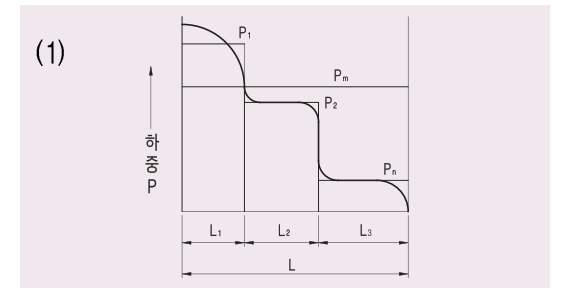
평균 하중의 산출

공업용 로봇의 암과 같이 전진할 때는 워크를 잡고 운동하고 후퇴할 때는 암의 자중만으로 움직이는 경우 혹은 공작기계 또는 일반산업기계와 같이 케이스 유닛의 부하하중이 여러가지 조건에 따라서 변동할 때에는 이 변동 하중 조건을 포함하여 수명계산을 할 필요가 있다. 평균하중(P_m)이라는 것은 케이스 유닛의 부하하중이 주행 중에 여러가지 조건에 따라서 변동할 때 이 변동하중 조건에서의 수명과 동일한 수명이 되는 일정 하중을 말한다. 아래의 식으로 기본식을 나타낸다.

단계적으로 변하는 경우

$$P_m = \sqrt[3]{\frac{1}{L} (P_1^3 \cdot L_1 + P_2^3 \cdot L_2 + \dots + P_n^3 \cdot L_n)} \dots \dots \dots (1)$$

P_m : 평균하중 (N)
 P_n : 변동하중 (N)
 L : 총주행거리 (mm)
 L_n : P_n을 부하하여 주행한 거리 (mm)

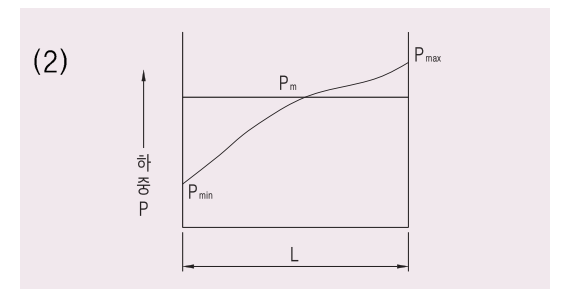


단계적인 변동하중

단조롭게 변하는 경우

$$P_m \approx \frac{1}{3} (P_{min} + 2 \cdot P_{max}) \dots \dots \dots (2)$$

P_m : 평균하중 (N)
 P_{min} : 최소하중 (N)
 P_{max} : 최대가중 (N)

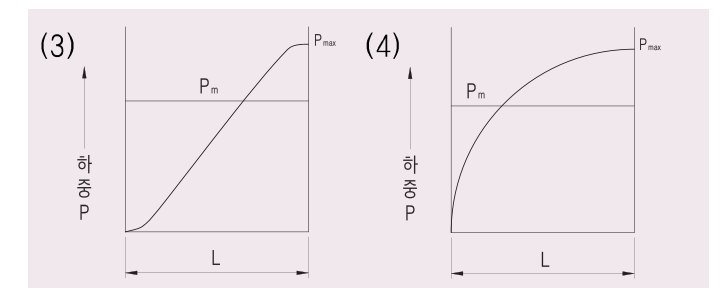


단조로운 변동하중

정현 곡선형으로 변하는 경우

$$P_m \approx 0.65 P_{max} \dots \dots \dots (3)$$

$$P_m \approx 0.75 P_{max} \dots \dots \dots (4)$$



정현 곡선형 변동하중

Wonna be supported?

Hey, You've got SAMICK Support!

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SAMICK Linear Bushing
SUS Series

삼익 리니어부싱 SUS SERIES

삼익리니어 부싱 SUS시리즈는 삼익리니어 부싱 표준품의 기술에 내식성 및 환경을 고려하여 외통 및 볼을 스테인레스(Stainless Steel)을 사용한 제품으로 녹발생 및 부식에 대한 위험성을 현저히 낮춘 제품입니다.

호환성

삼익 리니어부싱 SUS시리즈는 표준 리니어부싱의 치수 공차를 사용하여 100% 기존 제품과 호환이 됩니다.

외통의 내식성

전면 열처리 된 내식성의 SUS440C를 사용하여 충분한 감성을 가져 경쾌한 운동과 내식성을 동시에 가지고 있습니다.

고정도의 리테이너

SUS시리즈는 표준 타입에서 사용되는 일체 성형된 POM 리테이너가 조립되어 공급되며, 고온 또는 진공용으로 사용하기 위해서는 스테인레스를 사용한 금속계 리테이너 조합을 권장합니다.

리니어부싱 하우징 유니트

삼익의 표준 리니어부싱과 100% 호환이 되어 삼익의 알루미늄 하우징 유니트와 100% 조합이 가능합니다.

용도

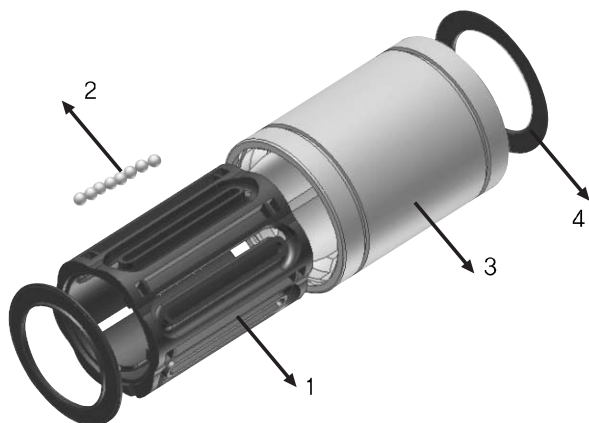
리니어부싱의 일반 용도 중 내식성이 필요한 곳 : 식품가공기, 진공설비, 반도체 장비, 의료용 장비 등



| PART NUMBER NOTATION |

리니어부싱	LM	E	F	P	20	L	UU	OP	-	SUS	A
삼익 리니어부싱											
대륙별 표준 선정(아시아, 유럽)											
아시아 표준 : Blank / 유럽 표준 : E											
플랜지 형태 선정(아시아, 유럽)											
일반형 리니어부싱 : Blank 원형 플랜지형 리니어부싱 : F 사각 플랜지형 리니어부싱 : K 타원 플랜지형 리니어부싱 : H											
플랜지 위치 선정											
기본형 : Blank 파일럿 플랜지형 : P 중간 플랜지형 : M											
내접원경(소프트 직경)선정											
표준형 : 5 ~ 60mm 플랜지형 통형 : 6 ~ 60mm											
리니어부싱 길이 선정											
기본형 : Blank 고하중용 통형 : L											
씰 선정											
씰 없음 : Blank 양측씰 : UU 편측씰 : U											
개방 형태 선정											
기본형 : Blank 개방형(소프트 레일용) : OP 틈새 조정(예압조정)형 : AJ											
재질											
외 통 : STAINLESS STEEL BALL : STAINLESS STEEL											
리테이너 선정											
Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)											

리니어부싱의 구조



part	소재
1 리테이너	- POM - 스테인리스 강
2 볼	- 스테인리스 강
3 아웃슬리브	- 스테인리스 강
4 고무씰	- 천연고무 ※ 고무씰은 선택사양임

정격하중과 수명

리니어부싱의 정격하중은 하중방향에 대한 볼열의 배열에 따라 변한다. 치수표에 제시된 기본정격하중은 1조열의 부하볼이 하중의 바로 밑에 있을 때의 값을 말한다. 하중방향에 대하여 대칭으로 부하되도록 설치하면 아래 그림과 같이 정격하중이 증가하고 수명성능을 향상 시킬 수 있다. 리니어부싱의 하중능력은 하중방향 및 볼열의 배열, 샤프트 경도에 따라 수명에 영향을 미친다.

볼열 배열에 따른 정격하중의 변화

볼 열수	볼열의 배열		
	4열	5열	6열
최대하중			
계산식	$F = 1.41 \times C$	$F = 1.46 \times C$	$F = 1.26 \times C$
최소하중			
계산식	$F = C$	$F = C$	$F = C$

기본동정격하중(C)과 수명

직선운동용 부싱의 수명은 사용하는 샤프트의 품질에 크게 좌우되며, 동정격하중이란 통상적인 사용조건하에서 주행거리가 50km까지 도달했을 때 90%의 신뢰도를 적용시킬 수 있는 최대연속하중을 의미한다. 수명계산식의 기본은 아래와 같다.

$$L = \left[\frac{C}{P} \right]^3 \times 50$$

L : 정격수명(50km 기준, 단위 km)
 $L_{100} = \left[\frac{C_{100}}{P} \right]^3 \times 100$
 L_{100} : 정격수명(100km 기준, 단위 km)
 C : 기본동정격하중(50km 기준, 단위 N)
 C_{100} : 기본동정격하중(100km 기준, 단위 N)
 P : 적용하중

하지만 실질적으로 리니어부싱의 수명에는 경도계수, 하중계수, 접촉계수 등과 같은 여러 요소들이 영향을 미친다.

$$L = \left(\frac{f_H \times f_r \times f_c}{f_w} \times \frac{C}{P} \right)^3 \times 50$$

f_w : 하중계수
 f_H : 경도계수
 f_r : 온도계수
 f_c : 접촉계수

$$L_{100} = \left(\frac{f_H \times f_r \times f_c}{f_w} \times \frac{C_{100}}{P} \right)^3 \times 100$$

리니어부싱의 밀착사용과 수명시간

외통 1개 또는 2개 밀착 사용하여 모멘트 부하를 받는 경우에는 등가 레이디얼 하중을 계산한다.

$$P_U \approx K \cdot M$$

P_U : 등가 레이디얼 하중(N)
 (모멘트 하중에 의한 하중)
 K : 등가계수(아래의 표 참조)
 M : 부하모멘트(N · mm)

모멘트 하중과 레이디얼 하중이 동시에 부하되는 경우에는 레이디얼 하중과 등가 레이디얼 하중의 합산으로 수명을 산출한다. 이상의 식으로서 수명(L)을 구하며 스트로크와 운동횟수가 일정한 경우 수명시간은 다음 식에 의해 구해진다.

$$L_h = \left[\frac{L \times 10^6}{2 \times l_s \times N_s \times 60} \right]$$

L_h : 수명시간 (hr)
 l_s : 스트로크 길이(mm)
 N_s : 매분 왕복 횟수 (cpm)

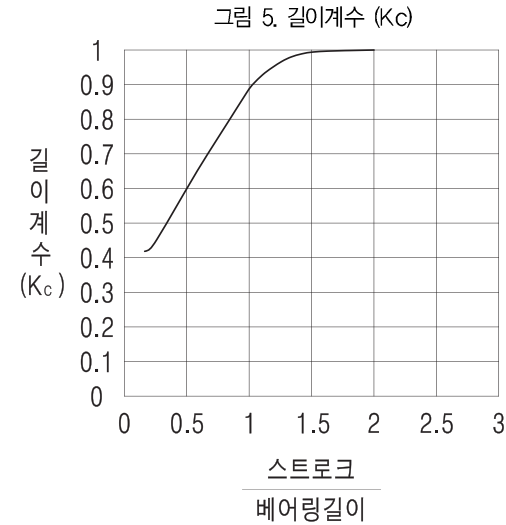
표4. 리니어부싱 등가계수표

등가계수(K)							
형번	1개	2개 밀착	형번	1개	형번	1개	2개 밀착
LM 5	1.253	0.178	LM 5L	0.223	LME 5	0.669	0.123
LM 6	0.553	0.162	LM 6L	0.201	LME 8	0.514	0.116
LM8S	0.708	0.166	LM 8L	0.151	LME 12	0.389	0.090
LM 8	0.442	0.128	LM 10L	0.118	LME 16	0.343	0.081
LM 10	0.389	0.101	LM 12L	0.113	LME 20	0.291	0.063
LM 12	0.389	0.097	LM 13L	0.107	LME 25	0.209	0.052
LM 13	0.343	0.093	LM 16L	0.096	LME 30	0.167	0.045
LM 16	0.279	0.084	LM 20L	0.082	LME 40	0.127	0.039
LM 20	0.257	0.071	LM 25L	0.060	LME 50	0.105	0.031
LM 25	0.163	0.054	LM 30L	0.053	LME 60	0.093	0.024
LM 30	0.153	0.049	LM 35L	0.050			
LM 35	0.143	0.045	LM 40L	0.043			
LM 40	0.117	0.040	LM 50L	0.034			
LM 50	0.096	0.032	LM 60L	0.031			
LM 60	0.093	0.028					

▶ 주1) LMF/K/H, LMF/KP/H/P, SC형의 등가계수는 LM형과 동일하다.
 ▶ 주2) LMF/K/H-L, LMF/KP/H-IP-L, LMF/KM/H-M형의 등가계수는 LM-L형과 동일하다.
 ▶ 주3) LMEF/K/H, SCE형의 등가계수는 LM형과 동일하다.

짧은 스트로크의 적용

리니어부싱이 짧은 스트로크에 적용될 경우, 리니어부싱의 수명보다 샤프트의 수명이 더 짧아진다. 이 경우 요구되는 기본 동정격하중은 그림 5에서 보는 바와 같이 길이계수(Kc)에 비례하므로 기본동정격하중에 길이계수(Kc)를 곱하여 수명을 산출한다.



윤활과 마찰

리니어부싱은 무급유 상태에서 사용되는 경우도 있으나, 일반적으로 그리스 또는 오일 윤활을 사용한다.

그리스(Grease) 윤활

초기 출하시 리니어부싱은 방청유로 도포되어 있으므로, 청정한 백등유나 유기용제로 세척 후 건조시킨 다음 그리스를 도포해야 한다. 양측씰(U)의 경우 조립시에 리니어부싱의 볼열에 그리스를 도포하여 사용한다. 그리고 씰(seal)이 없는 경우에도 상기와 같은 방법을 사용하거나 LM샤프트에 그리스를 직접 도포하여 사용하면 된다. 사용 그리스는 양질의 리튬계 그리스(JIS2호)를 권장한다.

오일(Oil) 윤활

사용온도 범위	점도(Viscosity)
-30℃ ~ 50℃	VG 15 ~ 46
50℃ ~ 80℃	VG 46 ~ 100

윤활을 목적으로 윤활유를 사용할 경우 도포되어 있는 내식성의 방청유를 제거할 필요가 없다. 윤활유는 ISO 점도 규격VG15~100의 범위내의 것을 사용하도록 권장한다. 사용되는 윤활유는 터빈유, 머신유, 스프린들유가 일반적이다. 급유는 LM샤프트 위에 떨어뜨리거나, 그림 6과 같이 하우징을 가공하여 기름구멍으로 주입하는 방법으로 한다. 단, 양측씰(Seal)형에서는 씰이 윤활유를 제거하기 때문에 낙하급유는 사용되지 않는다. 또한 리니어부싱 외경에 기름구멍이 가공된 제품도 요구에 따라 제작이 가능하므로 당사로 연락바랍니다.

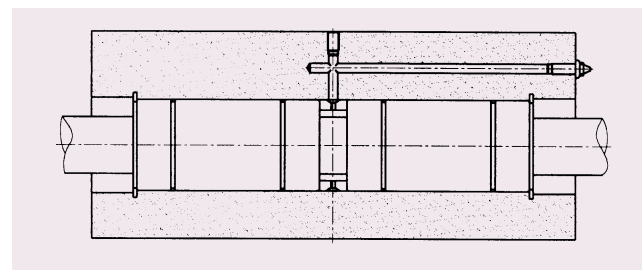


그림 6.

마찰계수

리니어부싱은 전동면 사이에 전동체 볼을 사용하여 구름운동을 하므로 마찰저항이 적다. 특히 정마찰은 대단히 적고 동마찰과 차이가 거의 없으므로 스틱슬립현상이 발생하지 않고 고정도의 이송이 가능하게 된다. 통상의 마찰계수는 그림7과 같고 마찰저항력은 다음 식에 의해 구할 수 있다.

$F = \mu \cdot P + f_s$

F : 마찰력 (N)
 f_s : 씰의 저항 (0.3 ~ 2.4N)
 P : 외부 적용 하중(샤프트의 중심선 수직인 하중)(N)
 μ : 마찰계수(동 또는 정)

리니어부싱의 동마찰계수

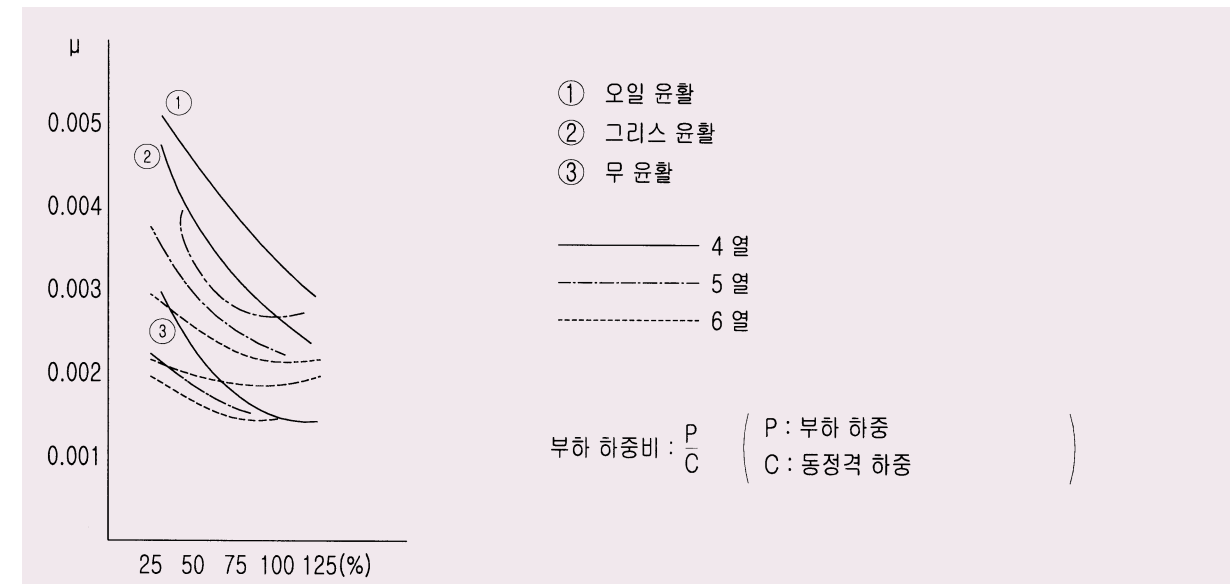


그림 7. 리니어 부싱의 동마찰계수

조립 및 설치

하우징 내경 치수

리니어부싱의 권장 하우징 내경공차를 아래의 표에 나타나 있다. 하우징과의 끼워맞춤은 보통 틈새 끼워맞춤이며 클리어런스를 없애는 경우에는 중간 끼워맞춤으로 한다.

표4. 리니어부싱 등가계수표

형 식		하 우 징	
형 번	정 도	틈새 끼워맞춤	중간 끼워맞춤
LM	상급(H)	H7	J7
LME	-	H7	K6, J6
LMF / FP LMK / KP LMH / HP LM_L LMF / FP_L LMK / KP_L LMH / HP_L LMFM	-	H7	J7

외통과 LM샤프트의 클리어런스(Clearance)

리니어부싱을 LM샤프트와 조합하여 사용하는 경우 통상 헐거운 끼워맞춤, 클리어런스(Clearance)를 없애는 경우는 정밀 클리어런스로 한다. 아래의 표는 축의 외경공차를 나타낸다.

표8. 축외경공차

형 식		LM샤프트	
형 번	정 도	보통 클리어런스	정밀 클리어런스
LM	상급(H)	f6, g6	h6
LME	-	h7	K6
LMF / FP LMK / KP LMH / HP LM_L LMF / FP_L LMK / KP_L LMH / HP_L LMFM	-	f6, g6	h6

단, 조립 후의 클리어런스(clearance)를 마이너스로 하는 경우 반경방향 틈새 허용치(Radial Clearance)를 넘지 않도록 하여야 한다.

		반경 방향 틈새 허용치(Radial Clearance) μm														
타입	축경	5	6	8S	8	10	12	13	16	20	25	30	35	40	50	60
LM(μm)		-3	-5	-5	-5	-5	-5	-7	-7	-9	-9	-9	-13	-13	-13	-16
LME(μm)		-5			-5		-7		-7	-9	-9	-9		-13	-13	-16

외통의 설치

리니어부싱의 외통 설치시 LM샤프트 방향의 고정 강도가 그다지 필요하지 않지만 때려 박음만으로 고정시키는 것이 피해야 한다.

표준설치

일반형 리니어부싱의 설치 예를 아래의 그림에 나타내었다. 이때 리니어부싱은 스프링과 고정판 등으로 고정한다.

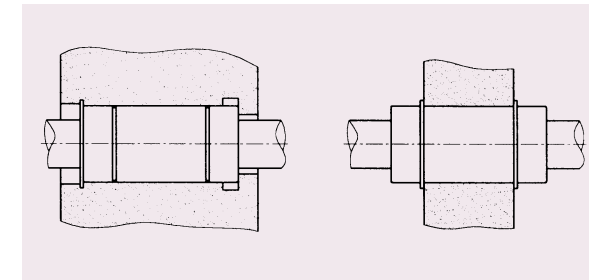


그림 8. 스프링 설치 예

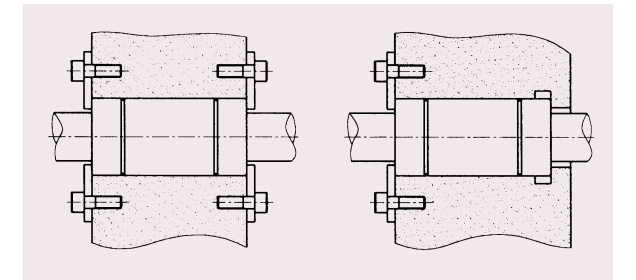


그림 9. 고정판 설치 예

설치용 멈춤링

리니어부싱 LM형의 고정용 멈춤링은 아래의 표를 참고하여 사용하면 된다.

형 번	멈춤링(mm)			
	외경용(축용)		내경용(구멍용)	
	C형 동심형	C형 멈춤링	C형 동심형	C형 멈춤링
LM 5	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 40	-	60	60	60
LM 50	-	80	80	80
LM 60	-	90	90	90

상기 표는 LM, LM_L 공통임

세트 스크류 불가

아래 그림과 같이 외통의 외경을 1개의 세트 스크류로 밀어붙여 고정하는 방법은 외통의 변형을 발생시킬 우려가 있으므로 피해야 한다.

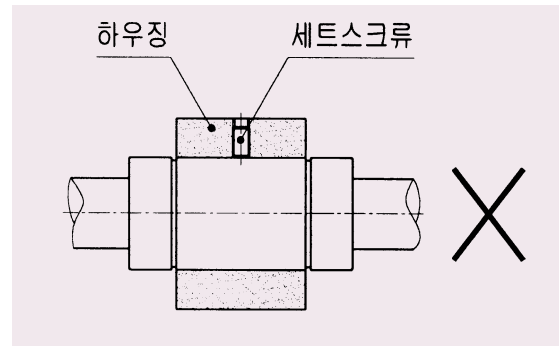
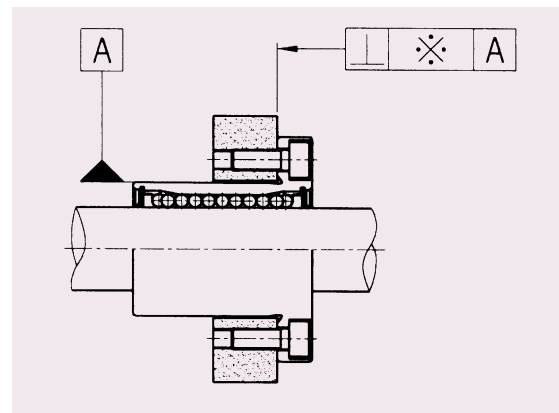


그림 10. 세트스크류 설치 예

플랜지형의 설치

LMF, LMK, LMH(롱 타입 포함) 형은 플랜지와 외통일체형이기 때문에 플랜지만으로 고정이 가능하다. 단 외통기준 설치시 치수표 내의 형상공차에 유의하여야 한다.



외통 기준 설치

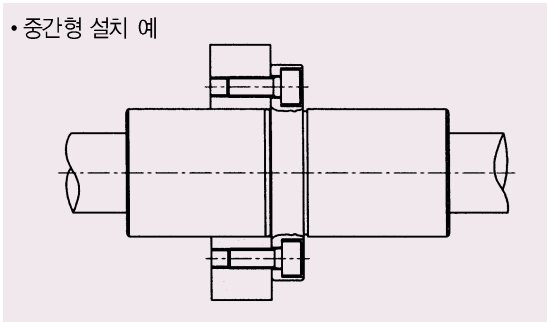
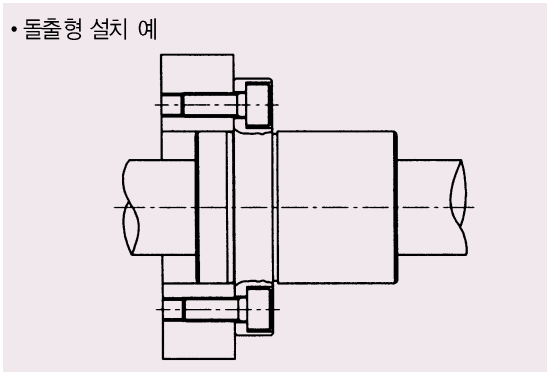
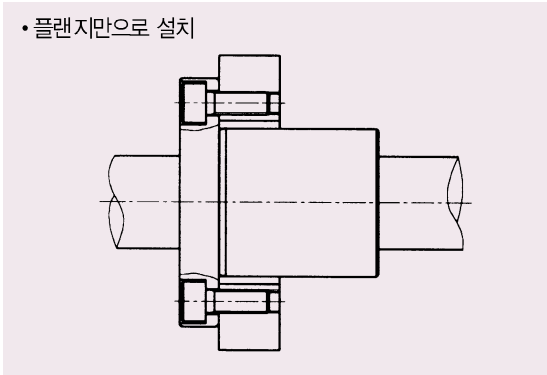
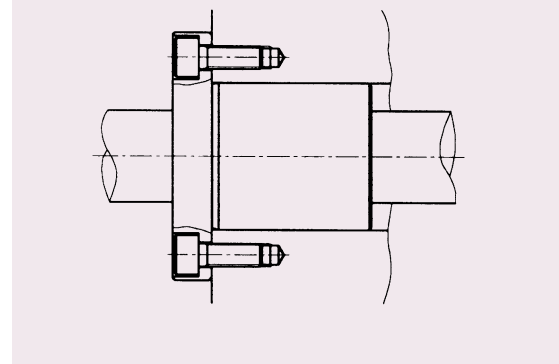


그림 11. 플랜지형 설치 예

클리어런스 조정형(AJ)형의 설치

클리어런스 조정형(AJ)의 클리어런스 조정은 외경을 조정 가능한 하우징에 사용하여 리니어부싱과 LM샤프트와의 클리어런스를 용이하게 조정할 수 있다. 이때 리니어부싱의 절개부분은 아래의 그림과 같이 하우징의 절개부분에 대해 90°의 위치로 하여 원주방향으로 균일한 변형을 줄 수가 있다.

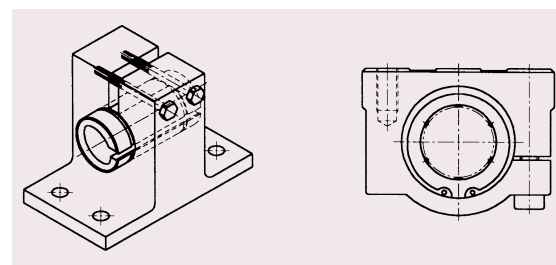


그림 12. 틈새조정형 설치 예

개방형의 설치

개방형(OP)도 아래의 그림과 같이 클리어런스가 조정 가능한 하우징을 사용할 수 있다. 개방형은 통상 가벼운 예압을 주어 사용하나, 과도한 외압은 리니어부싱의 변형을 일으킬 수 있으며, 원활한 운동을 방해하게 된다.

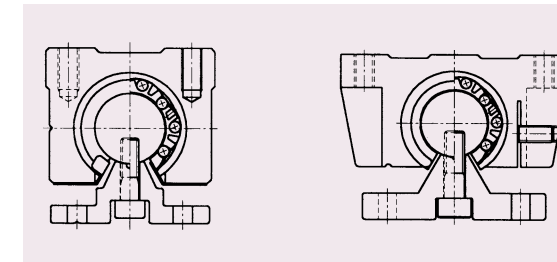


그림 13. 개방형 설치 예

샤프트 서포트의 설치

샤프트 서포트(SK)는 테이블에 설치볼트로써 용이하게 고정할 수 있으며, LM샤프트의 설치는 체결볼트로써 견고하게 체결할 수 있다.

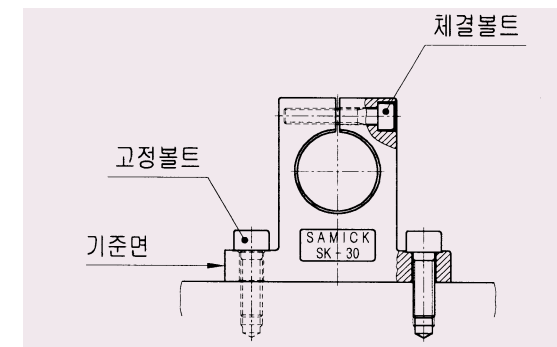


그림 14. 샤프트 서포트 설치 예

알루미늄 케이스 유니트의 설치

SC(E), SC(E)_W, SC(E)_V형은 상하방향 어느 쪽에서라도 볼트로써 체결이 가능하고 설치 시간도 단축된다.

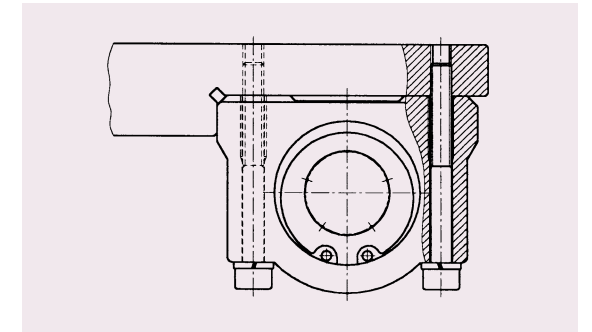
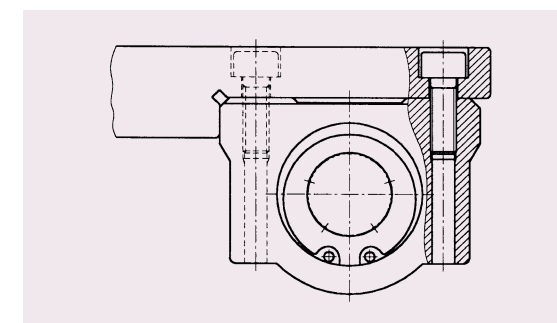


그림 15. 케이스 유니트 설치 예

∴ 사용상의 주의사항

외통의 조립

표준형 리니어부싱을 하우징에 조립하는 경우에 측판이나 씰을 직접 때리지 않도록 치구를 사용하여 아래의 그림처럼 균등하게 때려 넣든가 또는 받침판을 사용하여 가볍게 압입하도록 한다.

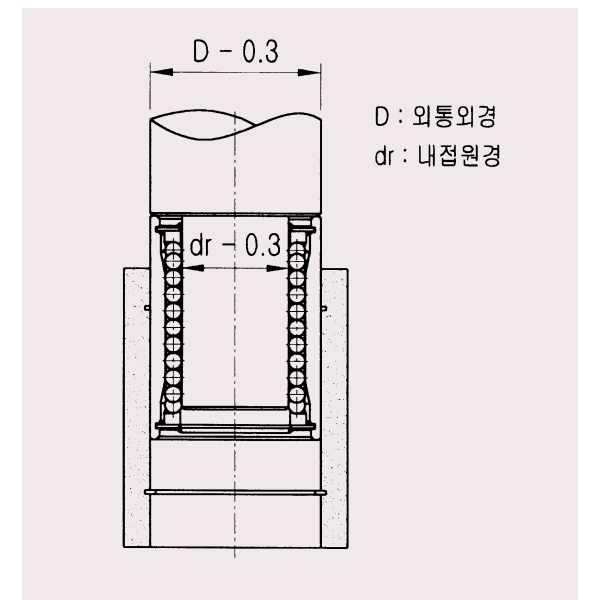


그림 16. 하우징에 삽입하는 방법 예

LM샤프트의 삽입

리니어부싱에 LM샤프트를 삽입하는 경우, LM샤프트를 빼돌어진 상태에서 삽입하면 볼이 탈락하거나, 리테이너를 변형시키므로 중심을 맞추어 천천히 조립하여 한다.

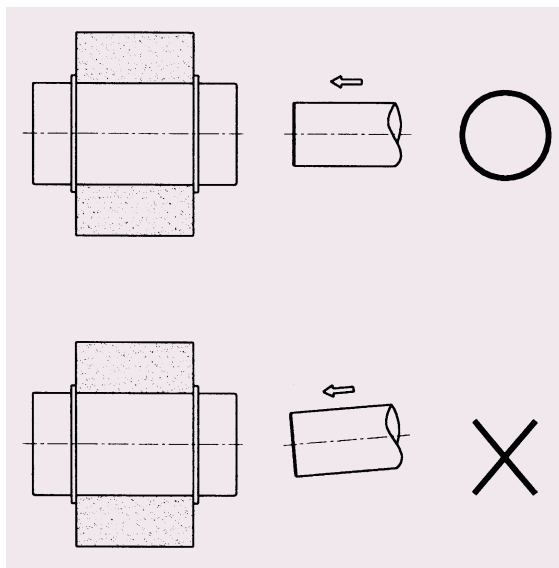


그림 17. LM샤프트를 삽입하는 방법 예

회전사용은 부적합

리니어부싱은 구조상 아래와 같은 회전운동에는 적합하지 않다. 무리하게 회전시키면 볼의 미끄럼 현상으로 마모 및 리테이너 파손의 원인이 되므로 주의하여야 한다.

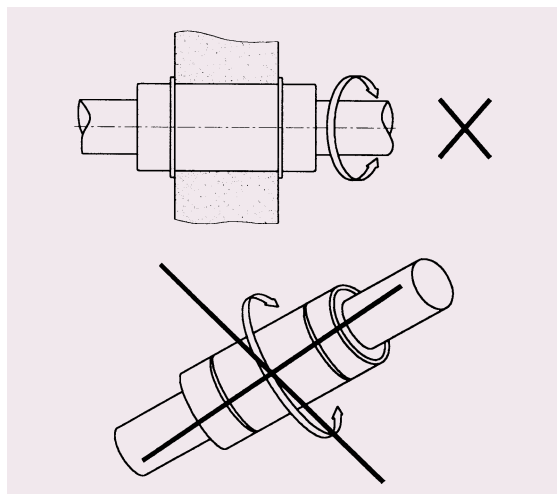


그림 18. 운동방향의 예

모멘트 하중 부하시

리니어부싱은 볼 전동면 전 길이에 걸쳐서 균등한 하중을 받도록 하여 사용해야 한다. 특히 모멘트가 작용하는 경우는 1본의 LM샤프트에 2개 이상의 리니어부싱을 사용하도록 하고 각 리니어부싱의 설치간 거리는 가능한 멀도록 하여 사용한다. 또한, 모멘트 부하가 걸리면서 사용되는 경우에는 등가레이디얼 하중을 산출하여 형번을 확인해야 한다.

개방형 3조열 리니어부싱의 설치

개방형의 볼열이 3조인 리니어부싱의 설치는 하중 분포를 고려하여 아래 그림과 같이 설치할 것을 권장한다.

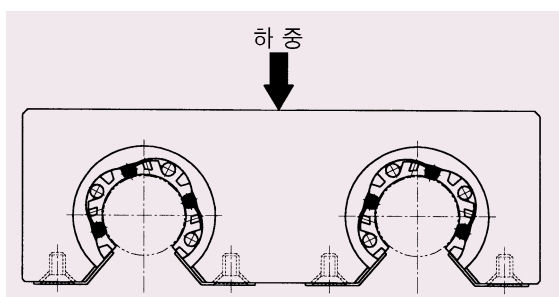
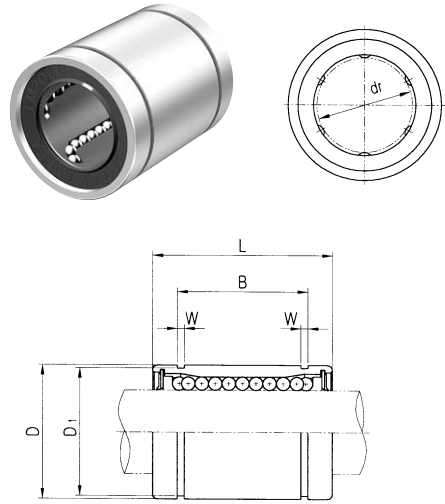


그림 19. LM12, LM3설치 예

LM CLOSED LINEAR BUSHING - SUS SERIES

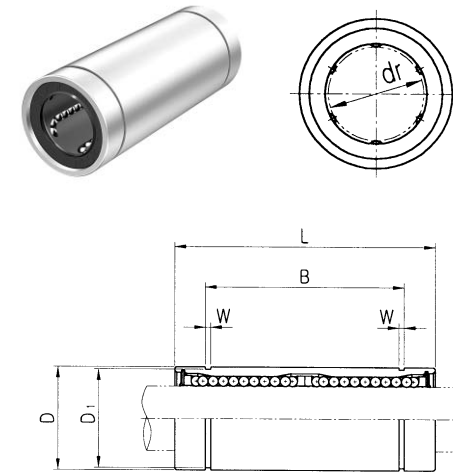


삼익 리니어부싱	LM	20	UU	-	SUS	A
내접원경(샤프트 직경)						
고무씰 선정	씰 없음 : Blank 양측씰 : UU 편측씰 : U					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

형번	내접원경	외경	L	B	W	D ₁	정격하중(N)	볼열	무게			
Resin	dr.	허용차	허용차				동정격(C)	정정격(C ₀)	(gf)			
LM5-SUS	5	-0.008	10	-0.008	15	10.2	1.1	9.6	167	206	4	4
LM6-SUS	LM6-SUSA	6	12		19	13.5	1.1	11.5	200	260	4	8
LM8S-SUS		8	15	-0.011	17	11.5	1.1	14.3	170	220	4	411
LM8-SUS	LM8-SUSA	8	15		24	17.5	1.1	14.3	260	400	4	16
LM10-SUS	LM10-SUSA	10	19	-0.009	29	22.0	1.3	18	370	540	4	30
LM12-SUS	LM12-SUSA	12	21	-0.013	30	23.0	1.3	20	410	590	4	31.5
LM13-SUS	LM13-SUSA	13	23		32	23.0	1.3	22	500	770	4	43
LM16-SUS	LM16-SUSA	16	28		37	26.5	1.6	27	770	1170	5	69
LM20-SUS	LM20-SUSA	20	32	-0.010	42	30.5	1.6	30.5	860	1370	5	87
LM25-SUS	LM25-SUSA	25	40	-0.016	59	41.0	1.85	38	980	1560	6	220

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
 100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
 예) LM12의 50km 기준 동정격하중 C = 410N
 LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
 2) 무게는 Resin 리테이너 기준 무게임(원통형 기준).
 3) 주요치수의 단위는 mm 임.
 4) 1N ≒ 0.102kgf

LM_L LONG LINEAR BUSHING - SUS SERIES

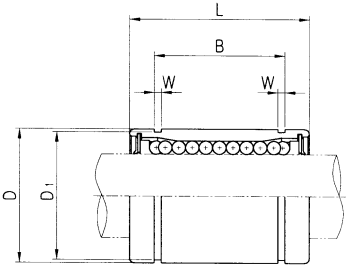
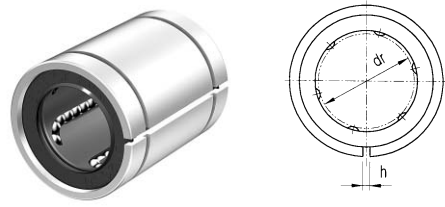


삼익 리니어부싱	LM	20	L	UU	-	SUS	A
내접원경 선정(샤프트 직경)							
리니어부싱 통형(고하중용)							
고무씰 선정	씰 없음 : Blank 양측씰 : UU 편측씰 : U						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

형번	내접원경	외경	L	B	W	D ₁	정격하중(N)	볼열	무게			
Resin	dr.	허용차	허용차				동정격(C)	정정격(C ₀)	(gf)			
LM6L-SUS	LM6L-SUSA	6	12		35	27	1.1	11.5	320	520	4	16
LM8L-SUS	LM8L-SUSA	8	15	-0.013	45	35	1.1	14.3	430	780	4	31
LM10L-SUS	LM10L-SUSA	10	19		55	44	1.3	18	580	1100	4	62
LM12L-SUS	LM12L-SUSA	12	21	-0.010	57	46	1.3	20	650	1200	4	80
LM13L-SUS	LM13L-SUSA	13	23		61	46	1.3	22	810	1570	4	90
LM16L-SUS	LM16L-SUSA	16	28		70	53	1.6	27	1230	2350	5	145
LM20L-SUS	LM20L-SUSA	20	32		80	61	1.6	30.5	1400	2750	5	180
LM25L-SUS	LM25L-SUSA	25	40	-0.012	112	82	1.85	38	1560	3140	6	440

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
 100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
 예) LM12의 50km 기준 동정격하중 C = 410N
 LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
 2) 무게는 Resin 리테이너 기준 무게임(원통형 기준).
 3) 주요치수의 단위는 mm 임.
 4) 1N ≒ 0.102kgf

LM_AJ ADJUSTABLE LINEAR BUSHING - SUS SERIES

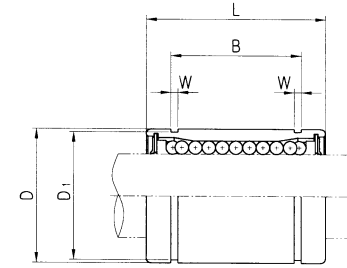
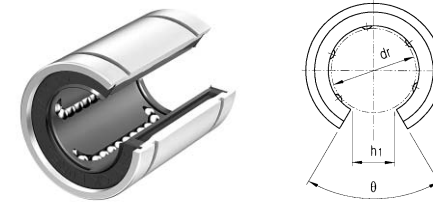


삼익 리니어부싱	LM	20	UU	AJ	-	SUS	A
내접원경 선정(사프트 직경)							
고무씰 선정 Blank : 고무씰 없음 UU : 양방 고무씰(운활용) U : 일방 고무씰(무 운활용)							
틈새조 정형 리니어부싱							
재질 외 통 : STAINLESS STEEL BALL : STAINLESS STEEL							
리테이너 선정 Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)							

형번	내접원경	외경	L	B	W	h	D ₁	정격하중(N)	볼열	무게
Resin	dr.	D						동정력(C) 정정력(C ₀)		(gf)
LM6AJ-SUS	6	12	19	13.5	1.1	1	11.5	200 260	4	8
LM8AJ-SUS	8	15 ^{-0.011}	17	11.5	1.1	1	14.3	170 220	4	11
LM8AJ-SUS	LM8AJ-SUSA	8	24	17.5	1.1	1	14.3	260 400	4	16
LM10AJ-SUS	LM10AJ-SUSA	10 ^{-0.009}	29	22.0	1.3	1	18	370 540	4	30
LM12AJ-SUS	LM12AJ-SUSA	12	30	23.0	1.3	1.5	20	410 590	4	31.5
LM13AJ-SUS	LM13AJ-SUSA	13	32	23.0	1.3	1.5	22	500 770	4	43
LM16AJ-SUS	LM16AJ-SUSA	16	37	26.5	1.6	1.5	27	770 1170	5	69
LM20AJ-SUS	LM20AJ-SUSA	20 ^{-0.010}	42	30.5	1.6	1.5	30.5	860 1370	5	87
LM25AJ-SUS	LM25AJ-SUSA	25 ^{-0.010}	59	41.0	1.85	2	38	980 1560	6	220

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 외경은 개방전 치수임.
5) 1N ≒ 0.102kgf

LM_OP OPEN LINEAR BUSHING - SUS SERIES

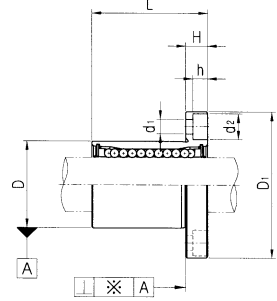
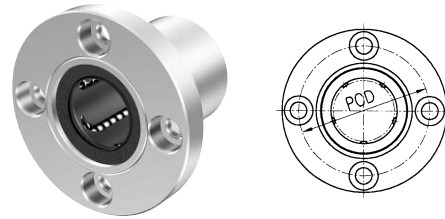


삼익 리니어부싱	LM	20	UU	OP	-	SUS
내접원경 선정(사프트 직경)						
고무씰 선정 Blank : 고무씰 없음 UU : 양방 고무씰(운활용) U : 일방 고무씰(무 운활용)						
개방형 리니어부싱						
재질 외 통 : STAINLESS STEEL BALL : STAINLESS STEEL 개방형 리니어 부싱은 금속계 리테이너 제공 안됨						

형번	내접원경	D	L	B	W	h ₁	θ	정격하중(N)	볼열	무게
Resin	dr.	허용차						동정력(C) 정정력(C ₀)		(gf)
LM12OP-SUS	12	21 ⁰	30	23.0	1.3	8	80	410 590	3	31.5
LM13OP-SUS	13 ^{-0.009}	23 ^{-0.013}	32	23.0	1.3	9	80	500 770	3	43
LM16OP-SUS	16	28	37	26.5	1.6	11	80	770 1170	4	69
LM20OP-SUS	20	32 ^{-0.010}	42	30.5	1.6	11	60	860 1370	4	87
LM25OP-SUS	25 ^{-0.010}	40 ^{-0.016}	59	41.0	1.85	12	50	980 1560	5	220

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 외경은 개방전 치수임.
5) 1N ≒ 0.102kgf

LMF FLANGED LINEAR BUSHING - SUS SERIES

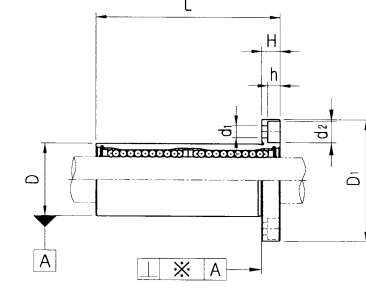
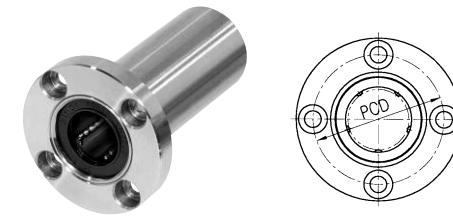


삼익 원형 플랜지 리니어부싱	LMF	20	UU	-	SUS	A
내접원경(샤프트 직경)						
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D 허용차	L	D1	H	PCD	d1	d2	h	직각도 ※(μm)	동정격(C)	정정격(Co)	볼열	무게 (gf)
LMF6-SUS	LMF6-SUSA	6	12	19	28	5	20	3.4	6.5	3.3	12	200	260	4	26.5
LMF8S-SUS		8	15 ⁰ _{-0.011}	17	32	5	24	3.4	6.5	3.3	12	170	220	4	34
LMF8-SUS	LMF8-SUSA	8	15	24	32	5	24	3.4	6.5	3.3	12	260	400	4	40
LMF10-SUS	LMF10-SUSA	10	19 ⁰ _{-0.009}	29	40	6	29	4.5	8.0	4.4	12	370	540	4	78
LMF12-SUS	LMF12-SUSA	12	21 ⁰ _{-0.013}	30	42	6	32	4.5	8.0	4.4	12	410	590	4	76
LMF13-SUS	LMF13-SUSA	13	23 ⁰ _{-0.013}	32	43	6	33	4.5	8.0	4.4	12	500	770	4	94
LMF16-SUS	LMF16-SUSA	16	28	37	48	6	38	4.5	8.0	4.4	12	770	1170	5	134
LMF20-SUS	LMF20-SUSA	20	32 ⁰ _{-0.010}	42	54	8	43	5.5	9.5	5.4	15	860	1370	5	180
LMF25-SUS	LMF25-SUSA	25	40 ⁰ _{-0.016}	59	62	8	51	5.5	9.5	5.4	15	980	1560	6	340

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMF_L FLANGED LINEAR BUSHING LONG - SUS SERIES

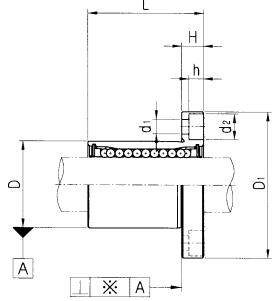
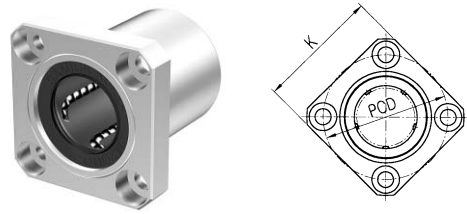


삼익 원형 플랜지 리니어부싱	LMF	20	L	UU	-	SUS	A
내접원경 선정(샤프트 직경)							
리니어부싱 통형							
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

Resin	Steel	내접원경 dr. 허용차	D 허용차	L	D1	H	PCD	d1	d2	h	직각도 ※(μm)	동정격(C)	정정격(Co)	볼열	무게 (gf)
LMF6L-SUS	LMF6L-SUSA	6	12 ⁰ _{-0.013}	35	28	5	20	3.4	6.5	3.3	15	320	520	4	31
LMF8L-SUS	LMF8L-SUSA	8	15 ⁰ _{-0.010}	45	32	5	24	3.4	6.5	3.3	15	430	780	4	53
LMF10L-SUS	LMF10L-SUSA	10	19 ⁰ _{-0.010}	55	40	6	29	4.5	8.0	4.4	15	580	1100	4	105
LMF12L-SUS	LMF12L-SUSA	12	21 ⁰ _{-0.016}	57	42	6	32	4.5	8.0	4.4	15	650	1200	4	100
LMF13L-SUS	LMF13L-SUSA	13	23 ⁰ _{-0.016}	61	43	6	33	4.5	8.0	4.4	15	810	1570	4	130
LMF16L-SUS	LMF16L-SUSA	16	28 ⁰ _{-0.012}	70	48	6	38	4.5	8.0	4.4	15	1230	2350	5	187
LMF20L-SUS	LMF20L-SUSA	20	32 ⁰ _{-0.012}	80	54	8	43	5.5	9.5	5.4	20	1400	2750	5	260
LMF25L-SUS	LMF25L-SUSA	25	40 ⁰ _{-0.019}	112	62	8	51	5.5	9.5	5.4	20	1560	3140	6	515

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMK FLANGED LINEAR BUSHING - SUS SERIES

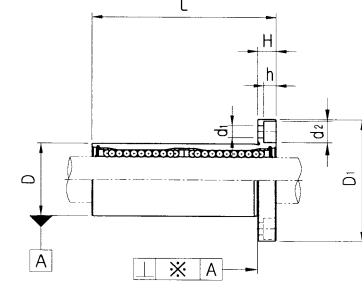
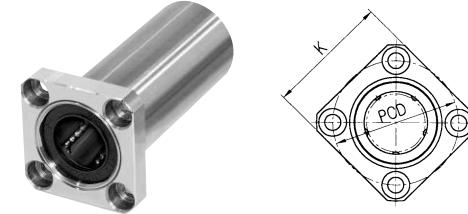


삼익 각형 플랜지 리니어부싱	LMK	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	형번	내접원경 dr.	D 허용차	L	D1	H	PCD	K	d1	d2	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(Co)	볼열	무게 (gf)
LMK6-SUS	LMK6-SUSA	6	12		19	28	5	20	22	3.4	6.5	3.3	12	200 260	4	26.5
LMK8S-SUS		8	15	$0_{-0.011}$	17	32	5	24	25	3.4	6.5	3.3	12	170 220	4	34
LMK8-SUS	LMK8-SUSA	8	15		24	32	5	24	25	3.4	6.5	3.3	12	260 400	4	40
LMK10-SUS	LMK10-SUSA	10	19	$0_{-0.009}$	29	40	6	29	30	4.5	8.0	4.4	12	370 540	4	78
LMK12-SUS	LMK12-SUSA	12	21	$0_{-0.013}$	30	42	6	32	32	4.5	8.0	4.4	12	410 590	4	76
LMK13-SUS	LMK13-SUSA	13	23		32	43	6	33	34	4.5	8.0	4.4	12	500 770	4	94
LMK16-SUS	LMK16-SUSA	16	28		37	48	6	38	37	4.5	8.0	4.4	12	770 1170	5	134
LMK20-SUS	LMK20-SUSA	20	32	$0_{-0.010}$	42	54	8	43	42	5.5	9.5	5.4	15	860 1370	5	180
LMK25-SUS	LMK25-SUSA	25	40	$0_{-0.016}$	59	62	8	51	50	5.5	9.5	5.4	15	980 1560	6	340

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMK_L FLANGED LINEAR BUSHING LONG - SUS SERIES

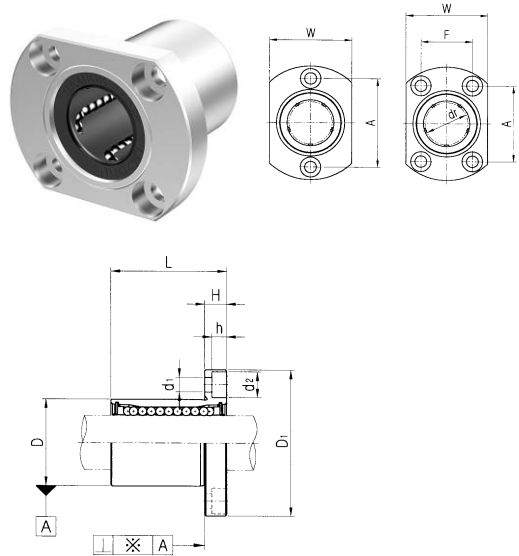


삼익 각형 플랜지 리니어부싱	LMK	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 통형							
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

Resin	Steel	형번	내접원경 dr.	D 허용차	L	D1	H	PCD	K	d1	d2	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(Co)	볼열	무게 (gf)
LMK6L-SUS	LMK6L-SUSA	6	12	$0_{-0.013}$	35	28	5	20	22	3.4	6.5	3.3	15	320 520	4	31
LMK8L-SUS	LMK8L-SUSA	8	15		45	32	5	24	25	3.4	6.5	3.3	15	430 780	4	53
LMK10L-SUS	LMK10L-SUSA	10	19	$0_{-0.010}$	55	40	6	29	30	4.5	8.0	4.4	15	580 1100	4	105
LMK12L-SUS	LMK12L-SUSA	12	21	$0_{-0.016}$	57	42	6	32	32	4.5	8.0	4.4	15	650 1200	4	100
LMK13L-SUS	LMK13L-SUSA	13	23		61	43	6	33	34	4.5	8.0	4.4	15	810 1570	4	130
LMK16L-SUS	LMK16L-SUSA	16	28		70	48	6	38	37	4.5	8.0	4.4	15	1230 2350	5	187
LMK20L-SUS	LMK20L-SUSA	20	32	$0_{-0.012}$	80	54	8	43	42	5.5	9.5	5.4	20	1400 2750	5	260
LMK25L-SUS	LMK25L-SUSA	25	40	$0_{-0.019}$	112	62	8	51	50	5.5	9.5	5.4	20	1560 3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMH FLANGED LINEAR BUSHING - SUS SERIES

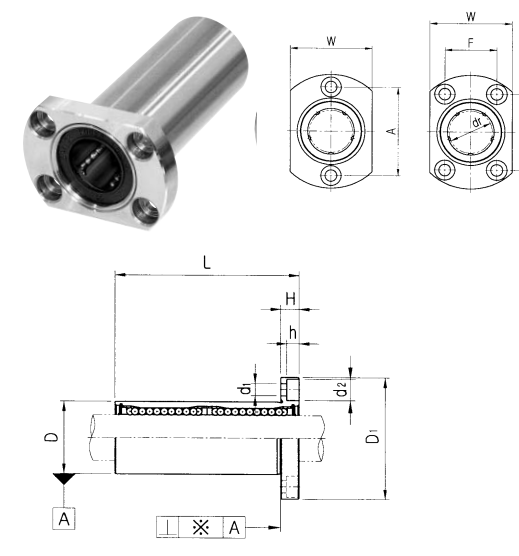


삼익 타원형 플랜지 리니어부싱	LMH	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

형번	내접원경 D	L	D1	H	W	A	F	d1	d2	h	직각도	정격하중(N)	볼열	무게		
Resin	dr. 허용차	허용차									(μ m)	동정력(C) 정정력(Co)		(gf)		
LMH6-SUS LMH6-SUSA	6	12	19	28	5	18	20	-	3.4	6.5	3.3	12	200	260	4	26.5
LMH8-SUS LMH8-SUSA	8	15 ^{-0.011}	24	32	5	21	24	-	3.4	6.5	3.3	12	260	400	4	40
LMH10-SUS LMH10-SUSA	10	19 ^{-0.009}	29	40	6	25	29	-	4.5	8.0	4.4	12	370	540	4	78
LMH12-SUS LMH12-SUSA	12	21 ^{-0.013}	30	42	6	27	32	-	4.5	8.0	4.4	12	410	590	4	76
LMH13-SUS LMH13-SUSA	13	23 ^{-0.013}	32	43	6	29	33	-	4.5	8.0	4.4	12	500	770	4	94
LMH16-SUS LMH16-SUSA	16	28	37	48	6	34	31	22	4.5	8.0	4.4	12	770	1170	5	134
LMH20-SUS LMH20-SUSA	20	32 ^{-0.010}	42	54	8	38	36	24	5.5	9.5	5.4	15	860	1370	5	180
LMH25-SUS LMH25-SUSA	25	40 ^{-0.016}	59	62	8	46	40	32	5.5	9.5	5.4	15	980	1560	6	340

주1) 동정력하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정력하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정력하중 C = 410N
LM12의 100km 기준 동정력하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMH_L FLANGED LINEAR BUSHING LONG - SUS SERIES

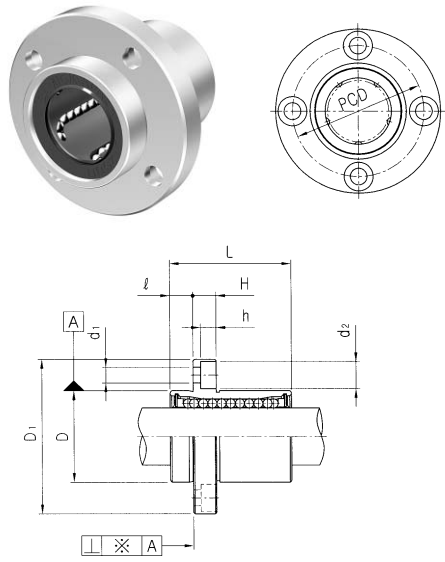


삼익 타원형 플랜지 리니어부싱	LMH	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 통형							
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

형번	내접원경 D	L	D1	H	W	A	F	d1	d2	h	직각도	정격하중(N)	볼열	무게		
Resin	dr. 허용차	허용차									(μ m)	동정력(C) 정정력(Co)		(gf)		
LMH6L-SUS LMH6L-SUSA	6	12	35	28	5	18	20	-	3.4	6.5	3.3	15	320	520	4	31
LMH8L-SUS LMH8L-SUSA	8	15 ^{-0.013}	45	32	5	21	24	-	3.4	6.5	3.3	15	430	780	4	53
LMH10L-SUS LMH10L-SUSA	10	19 ^{-0.010}	55	40	6	25	29	-	4.5	8.0	4.4	15	580	1100	4	105
LMH12L-SUS LMH12L-SUSA	12	21 ^{-0.016}	57	42	6	27	32	-	4.5	8.0	4.4	15	650	1200	4	100
LMH13L-SUS LMH13L-SUSA	13	23 ^{-0.016}	61	43	6	29	33	-	4.5	8.0	4.4	15	810	1570	4	130
LMH16L-SUS LMH16L-SUSA	16	28	70	48	6	34	31	22	4.5	8.0	4.4	15	1230	2350	5	187
LMH20L-SUS LMH20L-SUSA	20	32 ^{-0.012}	80	54	8	38	36	24	5.5	9.5	5.4	20	1400	2750	5	260
LMH25L-SUS LMH25L-SUSA	25	40 ^{-0.019}	112	62	8	46	40	32	5.5	9.5	5.4	20	1560	3140	6	515

주1) 동정력하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정력하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정력하중 C = 410N
LM12의 100km 기준 동정력하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMFP FLANGED LINEAR BUSHING - SUS SERIES

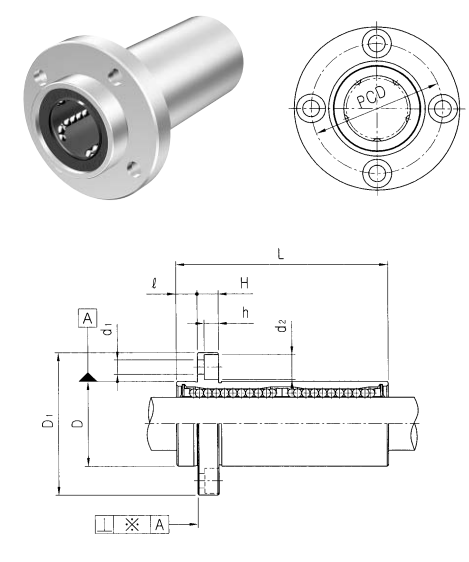


삼익 원형 파일럿 플랜지 리니어부싱	LMFP	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

형번	내접원경	D	L	D ₁	ℓ	H	PCD	d	d ₂	h	직각도	정격하중(N)	볼열	무게
Resin	dr.	허용차	mm	허용차							※(μm)	동정격(C)	정정격(C ₀)	(gf)
LMFP6-SUS LMFP6-SUSA	6	12	19	28	5	5	20	3.4	6.5	3.3	12	200	260	4
LMFP8-SUS LMFP8-SUSA	8	15 ^{-0.011}	24	32	5	5	24	3.4	6.5	3.3	12	260	400	4
LMFP10-SUS LMFP10-SUSA	10	19	29	40	6	6	29	4.5	8	4.4	12	370	540	4
LMFP12-SUS LMFP12-SUSA	12	21 ^{-0.009}	30	42	6	6	32	4.5	8	4.4	12	410	590	4
LMFP13-SUS LMFP13-SUSA	13	23 ^{-0.013}	32	43	6	6	33	4.5	8	4.4	12	500	770	4
LMFP16-SUS LMFP16-SUSA	16	28	37	48	6	6	38	4.5	8	4.4	12	770	1170	5
LMFP20-SUS LMFP20-SUSA	20	32	42	54	8	8	43	5.5	9.5	5.4	15	860	1370	5
LMFP25-SUS LMFP25-SUSA	25	40 ^{-0.010}	59 ^{-0.016}	62	8	8	51	5.5	9.5	5.4	15	980	1560	6

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMFP_L FLANGED LINEAR BUSHING LONG - SUS SERIES

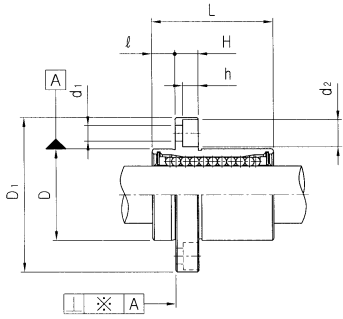
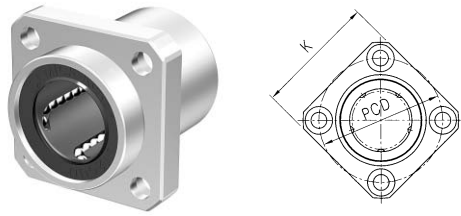


삼익 원형 파일럿 플랜지 리니어부싱	LMFP	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 롱형							
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

형번	내접원경	D	L	D ₁	ℓ	H	PCD	d	d ₂	h	직각도	정격하중(N)	볼열	무게
Resin	dr.	허용차	mm	허용차							※(μm)	동정격(C)	정정격(C ₀)	(gf)
LMFP6L-SUS LMFP6L-SUSA	6	12	35	28	5	5	20	3.4	6.5	3.3	15	320	520	4
LMFP8L-SUS LMFP8L-SUSA	8	15 ^{-0.013}	45	32	5	5	24	3.4	6.5	3.3	15	430	780	4
LMFP10L-SUS LMFP10L-SUSA	10	19	55	40	6	6	29	4.5	8	4.4	15	580	1100	4
LMFP12L-SUS LMFP12L-SUSA	12	21 ^{-0.010}	57	42	6	6	32	4.5	8	4.4	15	650	1200	4
LMFP13L-SUS LMFP13L-SUSA	13	23 ^{-0.016}	61	43	6	6	33	4.5	8	4.4	15	810	1570	4
LMFP16L-SUS LMFP16L-SUSA	16	28	70	48	6	6	38	4.5	8	4.4	15	1230	2350	5
LMFP20L-SUS LMFP20L-SUSA	20	32	80	54	8	8	43	5.5	9.5	5.4	20	1400	2750	5
LMFP25L-SUS LMFP25L-SUSA	25	40 ^{-0.012}	112 ^{-0.019}	62	8	8	51	5.5	9.5	5.4	20	1560	3140	6

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMKP FLANGED LINEAR BUSHING - SUS SERIES

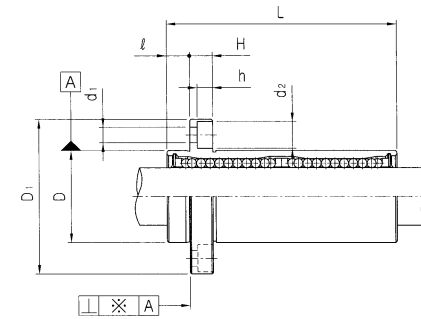
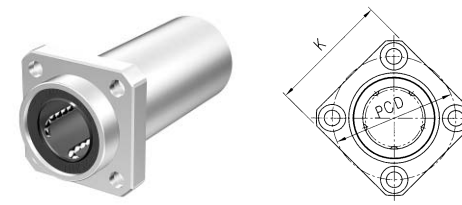


삼익 각종 파일럿 플랜지 리니어부싱	LMKP	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

형번	내접원경 D	L	D1	ℓ	H	PCD	K	d1	d2	h	직각도	정격하중(N)	볼열	무게		
Resin	dr. 허용차 mm	허용차	mm	mm	mm	mm	mm	mm	mm	mm	※(μm)	동정격(C) 정정격(Co)	(g)	(g)		
LMKP6-SUS LMKP6-SUSA	6	12	19	28	5	5	20	22	3.4	6.5	3.3	12	200	260	4	26.5
LMKP8-SUS LMKP8-SUSA	8	15 ^{-0.011}	24	32	5	5	24	25	3.4	6.5	3.3	12	260	400	4	40
LMKP10-SUS LMKP10-SUSA	10	19 ⁰	29	40	6	6	29	30	4.5	8	4.4	12	370	540	4	76
LMKP12-SUS LMKP12-SUSA	12	21 ^{-0.009}	30	42	6	6	32	32	4.5	8	4.4	12	410	590	4	78
LMKP13-SUS LMKP13-SUSA	13	23 ^{-0.013}	32	43	6	6	33	34	4.5	8	4.4	12	500	770	4	94
LMKP16-SUS LMKP16-SUSA	16	28	37	48	6	6	38	37	4.5	8	4.4	12	770	1170	5	134
LMKP20-SUS LMKP20-SUSA	20	32 ⁰	42	54	8	8	43	42	5.5	9.5	5.4	15	860	1370	5	180
LMKP25-SUS LMKP25-SUSA	25	40 ^{-0.010}	59	62	8	8	51	50	5.5	9.5	5.4	15	980	1560	6	340

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMKP_L FLANGED LINEAR BUSHING LONG - SUS SERIES

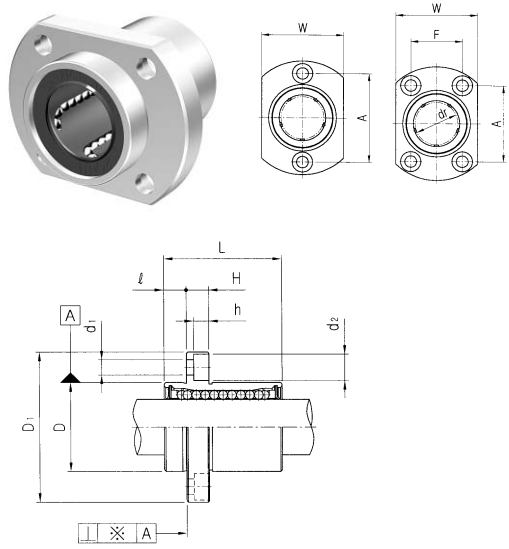


삼익 각종 파일럿 플랜지 리니어부싱	LMKP	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 롱형							
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

형번	내접원경 D	L	D1	ℓ	H	PCD	K	d1	d2	h	직각도	정격하중(N)	볼열	무게		
Resin	dr. 허용차 mm	허용차	mm	mm	mm	mm	mm	mm	mm	mm	※(μm)	동정격(C) 정정격(Co)	(g)	(g)		
LMKP6L-SUS LMKP6L-SUSA	6	12	35	28	5	5	20	22	3.4	6.5	3.3	15	320	520	4	31
LMKP8L-SUS LMKP8L-SUSA	8	15 ^{-0.013}	45	32	5	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMKP10L-SUS LMKP10L-SUSA	10	19 ⁰	55	40	6	6	29	30	4.5	8	4.4	15	580	1100	4	105
LMKP12L-SUS LMKP12L-SUSA	12	21 ^{-0.010}	57	42	6	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMKP13L-SUS LMKP13L-SUSA	13	23 ^{-0.016}	61	43	6	6	33	34	4.5	8	4.4	15	810	1570	4	130
LMKP16L-SUS LMKP16L-SUSA	16	28	70	48	6	6	38	37	4.5	8	4.4	15	1230	2350	5	187
LMKP20L-SUS LMKP20L-SUSA	20	32 ⁰	80	54	8	8	43	42	5.5	9.5	5.4	20	1400	2750	5	260
LMKP25L-SUS LMKP25L-SUSA	25	40 ^{-0.012}	112	62	8	8	51	50	5.5	9.5	5.4	20	1560	3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMHP FLANGED LINEAR BUSHING - SUS SERIES

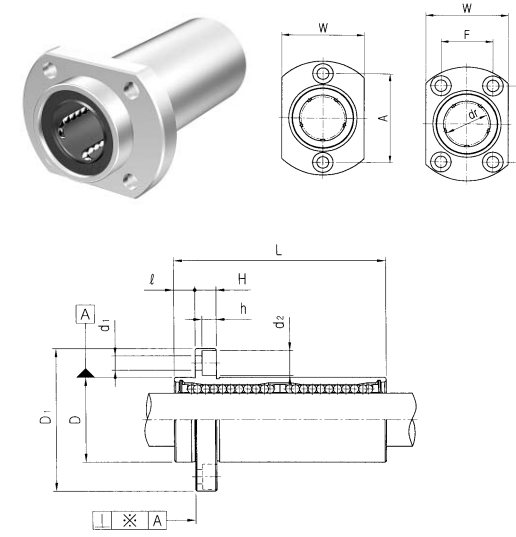


삼익 타원형 파일렛 플랜지 리니어부싱	LMHP	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정						
Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)						
재질						
외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정						
Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

형번	내접원경 D	L	D ₁	ℓ	H	W	A	F	d ₁	d ₂	h	직각도	정격하중(N)	볼열	무게	
Resin	dr. 허용차	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	※(μm)	동정격(C)	정정격(C ₀)	(gf)	
LMHP6-SUS LMHP6-SUSA	6	12 ⁰ _{-0.011}	19	28	5	5	18	20	3.4	6.5	3.3	12	200	260	4	26.5
LMHP8-SUS LMHP8-SUSA	8	15 ⁰ _{-0.009}	24	32	5	5	21	24	3.4	6.5	3.3	12	260	400	4	40
LMHP10-SUS LMHP10-SUSA	10	19 ⁰ _{-0.013}	29	40	6	6	25	29	4.5	8	4.4	12	370	540	4	76
LMHP12-SUS LMHP12-SUSA	12	21 ⁰ _{-0.016}	30	42	6	6	27	32	4.5	8	4.4	12	410	590	4	78
LMHP13-SUS LMHP13-SUSA	13	23 ⁰ _{-0.019}	32	43	6	6	29	33	4.5	8	4.4	12	500	770	4	94
LMHP16-SUS LMHP16-SUSA	16	28 ⁰ _{-0.024}	37	48	6	6	34	31	4.5	8	4.4	12	770	1170	5	134
LMHP20-SUS LMHP20-SUSA	20	32 ⁰ _{-0.030}	42	54	8	8	38	36	5.5	9.5	5.4	15	860	1370	5	180
LMHP25-SUS LMHP25-SUSA	25	40 ⁰ _{-0.036}	59	62	8	8	46	40	5.5	9.5	5.4	15	980	1560	6	340

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMHP_L FLANGED LINEAR BUSHING LONG - SUS SERIES

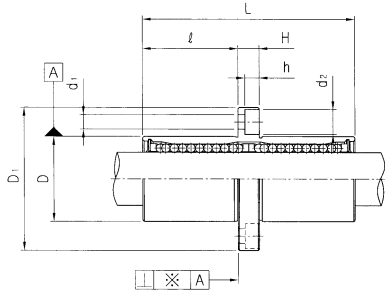
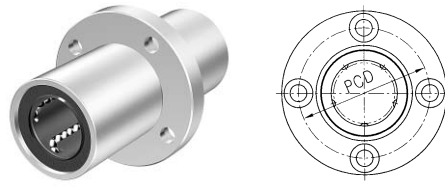


삼익 타원형 파일렛 플랜지 리니어부싱	LMHP	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 롱형							
고무실 선정							
Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)							
재질							
외 통 : STAINLESS STEEL BALL : STAINLESS STEEL							
리테이너 선정							
Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)							

형번	내접원경 D	L	D ₁	ℓ	H	W	A	F	d ₁	d ₂	h	직각도	정격하중(N)	볼열	무게
Resin	dr. 허용차	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	※(μm)	동정격(C)	정정격(C ₀)	(gf)
LMHP6L-SUS LMHP6L-SUSA	6	35	28	5	5	18	20	3.4	6.5	3.3	15	320	520	4	31
LMHP8L-SUS LMHP8L-SUSA	8	45	32	5	5	21	24	3.4	6.5	3.3	15	430	780	4	53
LMHP10L-SUS LMHP10L-SUSA	10	55	40	6	6	25	29	4.5	8	4.4	15	580	1100	4	105
LMHP12L-SUS LMHP12L-SUSA	12	57	42	6	6	27	32	4.5	8	4.4	15	650	1200	4	100
LMHP13L-SUS LMHP13L-SUSA	13	61	43	6	6	29	33	4.5	8	4.4	15	810	1570	4	130
LMHP16L-SUS LMHP16L-SUSA	16	70	48	6	6	34	31	4.5	8	4.4	15	1230	2350	5	187
LMHP20L-SUS LMHP20L-SUSA	20	80	54	8	8	38	36	5.5	9.5	5.4	20	1400	2750	5	260
LMHP25L-SUS LMHP25L-SUSA	25	112	62	8	8	46	40	5.5	9.5	5.4	20	1560	3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMFM FLANGED LINEAR BUSHING LONG - SUS SERIES

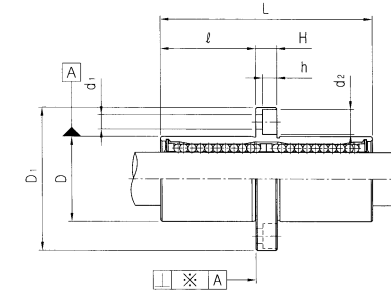
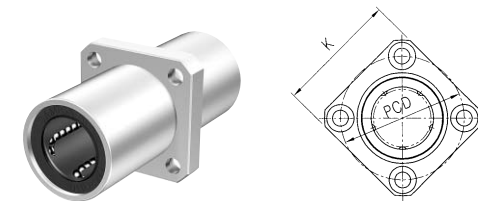


삼익 원형 중간 플랜지 리니어부싱	LMFM	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D mm	L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	직각도 ※(μm)	정격하중(N) 동정격(C)	정정격(C ₀)	볼열	무게 (gf)
LMFM6-SUS	LMFM6-SUSA	6	12 ⁰ _{-0.013}	35	28	15	5	20	3.4	6.5	3.3	15	320	520	4	31
LMFM8-SUS	LMFM8-SUSA	8	15 ⁰ _{-0.013}	45	32	20	5	24	3.4	6.5	3.3	15	430	780	4	53
LMFM10-SUS	LMFM10-SUSA	10	19 ⁰ _{-0.010}	55	40	24.5	6	29	4.5	8	4.4	15	580	1100	4	105
LMFM12-SUS	LMFM12-SUSA	12	21 ⁰ _{-0.010}	57	42	25.5	6	32	4.5	8	4.4	15	650	1200	4	100
LMFM13-SUS	LMFM13-SUSA	13	23 ⁰ _{-0.016}	61	43	27.5	6	33	4.5	8	4.4	15	810	1570	4	130
LMFM16-SUS	LMFM16-SUSA	16	28 ⁰ _{-0.016}	70	48	32	6	38	4.5	8	4.4	15	1230	2350	5	187
LMFM20-SUS	LMFM20-SUSA	20	32 ⁰ _{-0.012}	80	54	36	8	43	5.5	9.5	5.4	20	1400	2750	5	260
LMFM25-SUS	LMFM25-SUSA	25	40 ⁰ _{-0.012}	112	62	52	8	51	5.5	9.5	5.4	20	1560	3140	6	515

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

LMKM FLANGED LINEAR BUSHING LONG - SUS SERIES

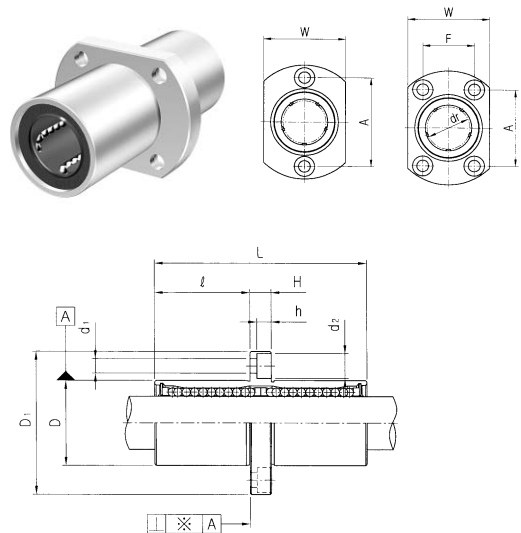


삼익 각형 중간 플랜지 리니어부싱	LMKM	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D mm	L	D ₁	ℓ	H	PCD	K	d ₁	d ₂	h	직각도 ※(μm)	정격하중(N) 동정격(C)	정정격(C ₀)	볼열	무게 (gf)
LMKM6-SUS	LMKM6-SUSA	6	12 ⁰ _{-0.013}	35	28	15	5	20	22	3.4	6.5	3.3	15	320	520	4	31
LMKM8-SUS	LMKM8-SUSA	8	15 ⁰ _{-0.013}	45	32	20	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMKM10-SUS	LMKM10-SUSA	10	19 ⁰ _{-0.010}	55	40	24.5	6	29	30	4.5	8	4.4	15	580	1100	4	105
LMKM12-SUS	LMKM12-SUSA	12	21 ⁰ _{-0.010}	57	42	25.5	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMKM13-SUS	LMKM13-SUSA	13	23 ⁰ _{-0.016}	61	43	27.5	6	33	34	4.5	8	4.4	15	810	1570	4	130
LMKM16-SUS	LMKM16-SUSA	16	28 ⁰ _{-0.016}	70	48	32	6	38	37	4.5	8	4.4	15	1230	2350	5	187
LMKM20-SUS	LMKM20-SUSA	20	32 ⁰ _{-0.012}	80	54	36	8	43	42	5.5	9.5	5.4	20	1400	2750	5	260
LMKM25-SUS	LMKM25-SUSA	25	40 ⁰ _{-0.012}	112	62	52	8	51	50	5.5	9.5	5.4	20	1560	3140	6	515

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

LMHM FLANGED LINEAR BUSHING LONG - SUS SERIES



삼익 타원형 중간 플랜지 리니어부싱	LMHM	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)					

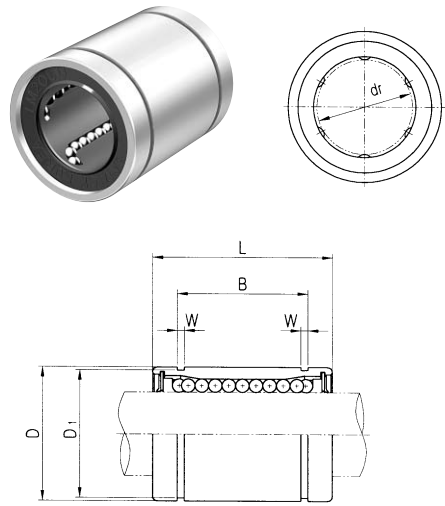
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European Standard

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D ₁	φ	H	W	A	F	d ₁	d ₂	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(C ₀)	볼열	무게 (gf)
LMHM6-SUS	LMHM6-SUSA	6	12 ⁰ _{-0.013}	35	28	15	5	18	20		3.4	6.5	3.3	15	320 520	4	31
LMHM8-SUS	LMHM8-SUSA	8	15 ⁰ _{-0.013}	45	32	20	5	21	24		3.4	6.5	3.3	15	430 780	4	53
LMHM10-SUS	LMHM10-SUSA	10	19 ⁰ _{-0.010}	55	40	24.5	6	25	29		4.5	8	4.4	15	580 1100	4	105
LMHM12-SUS	LMHM12-SUSA	12	21 ⁰ _{-0.016}	57	42	25.5	6	27	32		4.5	8	4.4	15	650 1200	4	100
LMHM13-SUS	LMHM13-SUSA	13	23 ⁰ _{-0.016}	61	43	27.5	6	29	33		4.5	8	4.4	15	810 1570	4	130
LMHM16-SUS	LMHM16-SUSA	16	28 ⁰ _{-0.012}	70	48	32	6	34	31	22	4.5	8	4.4	15	1230 2350	5	187
LMHM20-SUS	LMHM20-SUSA	20	32 ⁰ _{-0.012}	80	54	36	8	38	36	24	5.5	9.5	5.4	20	1400 2750	5	260
LMHM25-SUS	LMHM25-SUSA	25	40 ⁰ _{-0.019}	112	62	52	8	46	40	32	5.5	9.5	5.4	20	1560 3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N

2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LME CLOSED LINEAR BUSHING - SUS SERIES

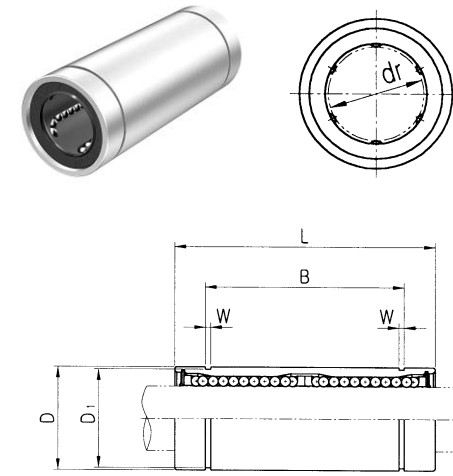


유럽표준 삼익 리니어부싱(표준형)	LME	20	UU	-	SUS	A
내접원경(샤프트 직경)						
고무씰 선정	Blank : 실 없음 UU : 양측씰 U : 편측씰					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	형번		내접원경		D	L	B	W	D1	정격하중(N)		볼열	무게(gf)
	Steel		dr.	허용차						동정격(C)	정정격(Co)		
LME5-SUS			5		12	22	14.5	1.1	11.5	200	260	4	12
LME8-SUS	LME8-SUSA		8	+0.003 0	16	25	16.5	1.1	15.2	260	400	4	20
LME12-SUS	LME12-SUSA		12		22	32	22.9	1.3	21	410	590	4	41
LME16-SUS	LME16-SUSA		16	+0.003 -0.001	26	36	24.9	1.3	24.9	770	1170	5	57
LME20-SUS	LME20-SUSA		20		32	45	31.5	1.6	30.3	860	1370	5	91
LME25-SUS	LME25-SUSA		25	+0.011	40	58	44.1	1.85	37.5	980	1560	6	215

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEL LONG LINEAR BUSHING - SUS SERIES

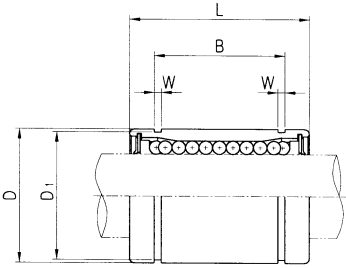
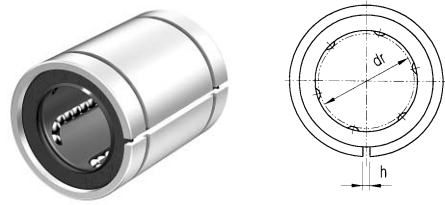


유럽표준 삼익 리니어부싱	LME	20	L	UU	-	SUS	A
내접원경 선정(샤프트 직경)							
리니어부싱 용형(고하중용)							
고무씰 선정	Blank : 실 없음 UU : 양측씰 U : 편측씰						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

Resin	형번		내접원경		D	L	B	W	D1	정격하중(N)		볼열	무게(gf)
	Steel		dr.	허용차						동정격(C)	정정격(Co)		
LME8L-SUS	LME8L-SUSA		8	+0.003	16	45	33	1.1	15.2	430	780	4	31
LME12L-SUS	LME12L-SUSA		12	-0.001	22	57	45.8	1.3	21	650	1200	4	80
LME16L-SUS	LME16L-SUSA		16	+0.011	26	70	49.8	1.3	24.9	1230	2350	5	145
LME20L-SUS	LME20L-SUSA		20	-0.001	32	80	61	1.6	30.3	1400	2750	5	180
LME25L-SUS	LME25L-SUSA		25	+0.013	40	112	82	1.85	38	1560	3140	6	440

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

| LME_AJ ADJUSTABLE LINEAR BUSHING - SUS SERIES |

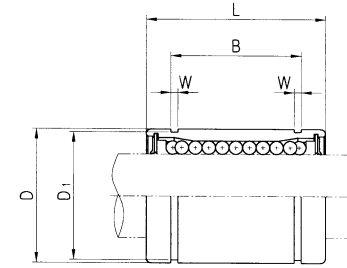
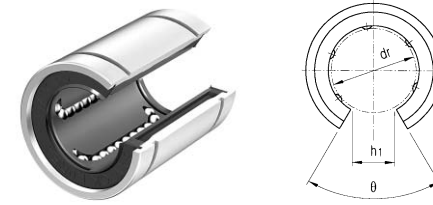


유럽표준 삼익 리니어부싱	LME	20	UU	AJ	-	SUS	A
내접원경 선정(사프트 직경)							
고무씰 선정 Blank : 고무씰 없음 UU : 양방 고무씰(윤활용) U : 일방 고무씰(무 윤활용)							
틈새조 정형 리니어부싱							
재질 외 통 : STAINLESS STEEL BALL : STAINLESS STEEL							
리테이너 선정 Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)							

형번	내접원경	D	L	B	W	D ₁	h	정격하중(N)	블열	무게
Resin	dr.	허용차	mm	mm	mm	mm	mm	동정격(C)	정정격(C ₀)	(gf)
LME5AJ-SUS	5	12	22	14.5	1.1	11.5	1	200	260	4
LME8AJ-SUS	LME8AJ-SUSA	8	16	25	16.5	1.1	15.2	1	260	400
LME12AJ-SUS	LME12AJ-SUSA	12	22	32	22.9	1.3	21	1.5	410	590
LME16AJ-SUS	LME16AJ-SUSA	16	26	36	24.9	1.3	24.9	1.5	770	1170
LME20AJ-SUS	LME20AJ-SUSA	20	32	45	31.5	1.6	30.3	2	860	1370
LME25AJ-SUS	LME25AJ-SUSA	25	40	58	44.1	1.85	37.5	2	980	1560

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
- 3) 주요치수의 단위는 mm 임.
- 4) 외경은 개방전 치수임.
- 5) 1N ≒ 0.102kgf

| LME_OP OPEN LINEAR BUSHING - SUS SERIES |

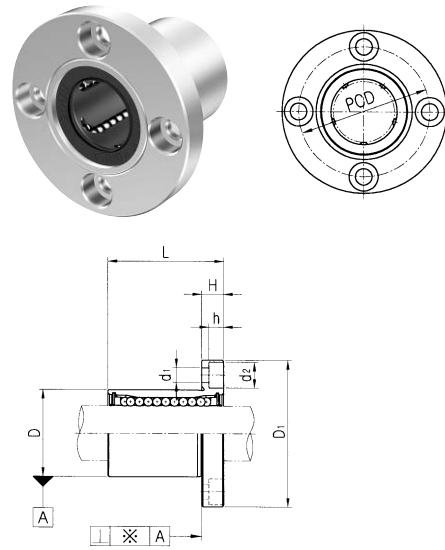


유럽표준 삼익 리니어부싱	LME	20	UU	OP	-	SUS	A
내접원경 선정(사프트 직경)							
고무씰 선정 Blank : 고무씰 없음 UU : 양방 고무씰(윤활용) U : 일방 고무씰(무 윤활용)							
개방형 리니어부싱							
재질 외 통 : STAINLESS STEEL BALL : STAINLESS STEEL 개방형 리니어 부싱은 금속계 리테이너 제공 안됨							
리테이너 선정 Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)							

형번	내접원경	D	L	B	W	D ₁	h	θ	정격하중(N)	블열	무게
Resin	dr.	허용차	mm	mm	mm	mm	mm	°	동정격(C)	정정격(C ₀)	(gf)
LME12OP-SUS	12	22	32	22.9	1.3	21	7.5	78°	410	590	3
LME16OP-SUS	16	26	36	24.9	1.3	24.9	10	78°	770	1170	4
LME20OP-SUS	20	32	45	31.5	1.6	30.3	10	60°	860	1370	4
LME25OP-SUS	25	40	58	44.1	1.85	37.5	12.5	60°	980	1560	5
LME30OP-SUS	30	47	68	52.1	1.85	44.5	12.5	50°	1560	2740	5
LME40OP-SUS	40	62	80	60.6	2.15	59	16.8	50°	2150	4010	5
LME50OP-SUS	50	75	100	77.6	2.65	72	21	50°	3820	7930	5
LME60OP-SUS	60	90	125	101.7	3.15	86.5	27.2	54°	4700	9990	5

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
- 3) 주요치수의 단위는 mm 임.
- 4) 외경은 개방전 치수임.
- 5) 1N ≒ 0.102kgf

LMEF FLANGED LINEAR BUSHING - SUS SERIES

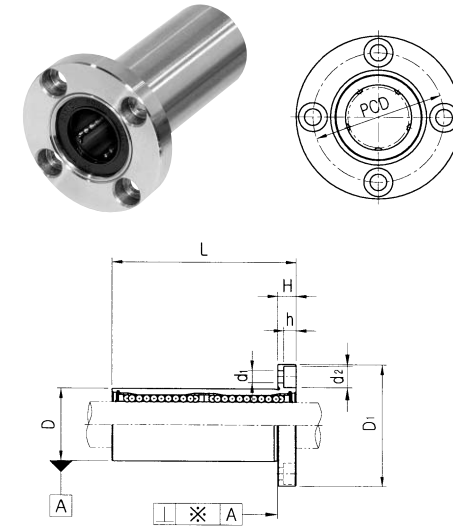


유럽표준 삼익원형 플랜지 리니어부싱	LMEF	20	UU	-	SUS	A
내접원경(샤프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D ₁	H	PCD	d ₁	d ₂	h	직각도 ※(μm)	동정력(C)	정정력(C ₀)	불열	무게(gf)
LMEF8-SUS	LMEF8-SUSA	8 ^{+0.003} ₀	16 ⁰ _{-0.003}	25	32	5	24	3.4	6.5	3.3	12	260	400	4	44
LMEF12-SUS	LMEF12-SUSA	12 ^{+0.003} ₀	22 ⁰ _{-0.003}	32	42	6	32	4.5	8	4.4	12	410	590	4	86
LMEF16-SUS	LMEF16-SUSA	16 ^{+0.003} _{-0.001}	26 ⁰ _{-0.003}	36	46	6	36	4.5	8	4.4	12	770	1170	5	120
LMEF20-SUS	LMEF20-SUSA	20 ^{+0.003} _{-0.001}	32 ⁰ _{-0.011}	45	54	8	43	5.5	9.5	5.4	15	860	1370	5	184
LMEF25-SUS	LMEF25-SUSA	25 ^{+0.011} ₀	40 ⁰ _{-0.011}	58	62	8	51	5.5	9.5	5.4	15	980	1560	6	335

- 주1) 동정력하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정력하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정력하중 C = 410N
LM12의 100km 기준 동정력하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEF_L FLANGED LINEAR BUSHING - SUS SERIES

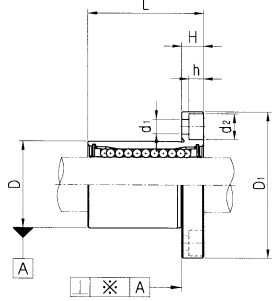
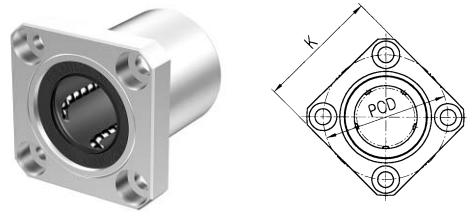


유럽표준 삼익원형 플랜지 리니어부싱	LMEF	20	L	UU	-	SUS	A
내접원경 선정(샤프트 직경)							
리니어부싱 통형							
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D ₁	H	PCD	d ₁	d ₂	h	직각도 ※(μm)	동정력(C)	정정력(C ₀)	불열	무게(gf)
LMEF8L-SUS	LMEF8L-SUSA	8 ^{+0.003} _{-0.001}	16 ⁰ _{-0.003}	45	32	5	24	3.4	6.5	3.3	15	430	780	4	53
LMEF12L-SUS	LMEF12L-SUSA	12 ^{+0.003} _{-0.001}	22 ⁰ _{-0.003}	57	42	6	32	4.5	8	4.4	15	650	1200	4	100
LMEF16L-SUS	LMEF16L-SUSA	16 ^{+0.011} _{-0.001}	26 ⁰ _{-0.003}	70	46	6	36	4.5	8	4.4	15	1230	2350	5	187
LMEF20L-SUS	LMEF20L-SUSA	20 ^{+0.011} _{-0.001}	32 ⁰ _{-0.013}	80	54	8	43	5.5	9.5	5.4	17	1400	2750	5	260
LMEF25L-SUS	LMEF25L-SUSA	25 ^{+0.013} ₀	40 ⁰ _{-0.013}	112	62	8	51	5.5	9.5	5.4	17	1560	3140	6	515

- 주1) 동정력하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정력하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정력하중 C = 410N
LM12의 100km 기준 동정력하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEK FLANGED LINEAR BUSHING - SUS SERIES

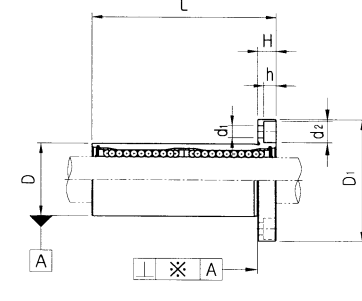
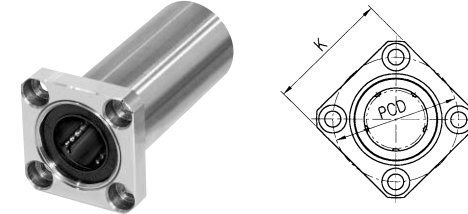


유형표준 삼익각형 플랜지 리니어부싱	LMEK	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

형번	내접원경	D	L	D1	H	PCD	K	d1	d2	h	직각도	정격하중(N)	볼열	무게
Resin	dr. 허용차	mm 허용차									※(μm)	동정격(C) 정정격(Co)		(gf)
LMEK8-SUS LMEK8-SUSA	8 ^{+0.003} / ₀	16 ⁰ / _{-0.003}	25	32	5	24	25	3.4	6.5	3.3	12	260 400	4	44
LMEK12-SUS LMEK12-SUSA	12 ^{+0.003} / ₀	22 ⁰ / _{-0.003}	32	42	6	32	32	4.5	8	4.4	12	410 590	4	86
LMEK16-SUS LMEK16-SUSA	16 ^{+0.003} / _{-0.001}	26 ^{-0.003} / ₀	36	46	6	36	35	4.5	8	4.4	12	770 1170	5	120
LMEK20-SUS LMEK20-SUSA	20 ^{+0.003} / _{-0.001}	32 ⁰ / _{-0.011}	45	54	8	43	42	5.5	9.5	5.4	15	860 1370	5	184
LMEK25-SUS LMEK25-SUSA	25 ^{+0.011} / ₀	40 ^{-0.011} / ₀	58	62	8	51	50	5.5	9.5	5.4	15	980 1560	6	335

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEK_L FLANGED LINEAR BUSHING LONG - SUS SERIES

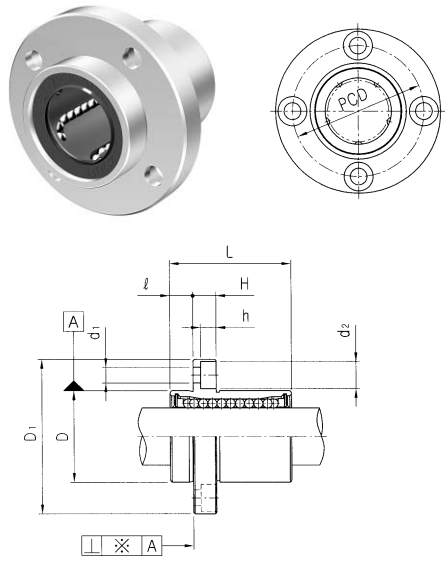


유형표준 삼익각형 플랜지 리니어부싱	LMEK	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 유형							
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

형번	내접원경	D	L	D1	H	PCD	K	d1	d2	h	직각도	정격하중(N)	볼열	무게
Resin	dr. 허용차	mm 허용차									※(μm)	동정격(C) 정정격(Co)		(gf)
LMEK8L-SUS LMEK8L-SUSA	8 ^{+0.003} / _{-0.001}	16 ⁰ / _{-0.003}	45	32	5	24	25	3.4	6.5	3.3	15	430 780	4	53
LMEK12L-SUS LMEK12L-SUSA	12 ^{+0.003} / _{-0.001}	22 ⁰ / ₀	57	42	6	32	32	4.5	8	4.4	15	650 1200	4	100
LMEK16L-SUS LMEK16L-SUSA	16 ^{+0.011} / _{-0.001}	26 ^{-0.001} / ₀	70	46	6	36	35	4.5	8	4.4	15	1230 2350	5	187
LMEK20L-SUS LMEK20L-SUSA	20 ^{+0.011} / _{-0.001}	32 ⁰ / _{-0.013}	80	54	8	43	42	5.5	9.5	5.4	17	1400 2750	5	260
LMEK25L-SUS LMEK25L-SUSA	25 ^{+0.013} / ₀	40 ^{-0.013} / ₀	112	62	8	51	50	5.5	9.5	5.4	17	1560 3140	6	515

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEFP FLANGED LINEAR BUSHING - SUS SERIES

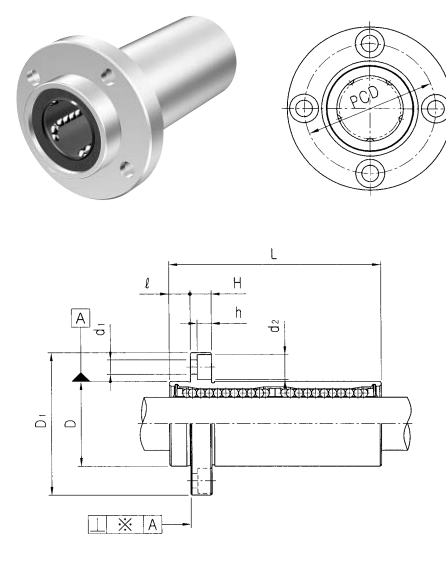


유럽표준 원형 패들렛 플랜지 리니어부싱	LMEFP	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(C ₀)	볼열	무게 (gf)
LMEFP8-SUS	LMEFP8-SUSA	8 _{+0.008}	16 _{-0.008}	25	32	5	5	24	3.4	6.5	3.3	12	260 400	4	44
LMEFP12-SUS	LMEFP12-SUSA	12 ₀	22 ₀	32	42	6	6	32	4.5	8	4.4	12	410 590	4	86
LMEFP16-SUS	LMEFP16-SUSA	16 _{+0.009}	26 _{-0.009}	36	46	6	6	36	4.5	8	4.4	12	770 1170	5	120
LMEFP20-SUS	LMEFP20-SUSA	20 _{+0.009}	32 _{-0.009}	45	54	8	8	43	5.5	9.5	5.4	15	860 1370	5	184
LMEFP25-SUS	LMEFP25-SUSA	25 _{+0.011}	40 _{-0.011}	58	62	8	8	51	5.5	9.5	5.4	15	980 1560	6	335

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEFP_L FLANGED LINEAR BUSHING LONG - SUS SERIES

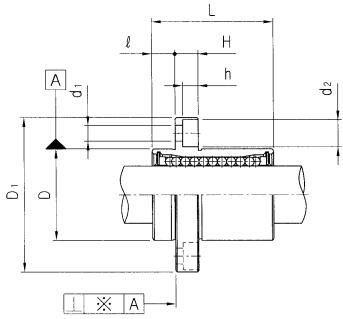
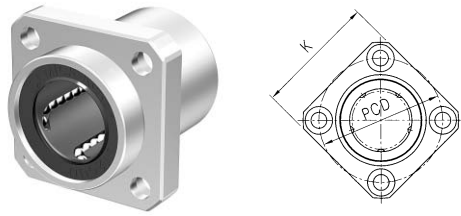


유럽표준 원형 패들렛 플랜지 리니어부싱	LMEFP	20	L	UU	-	SUS	A
내접원경(사프트 직경)							
리니어부싱 롱형							
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D ₁	ℓ	H	PCD	d ₁	d ₂	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(C ₀)	볼열	무게 (gf)
LMEFP8L-SUS	LMEFP8L-SUSA	8 _{+0.009}	16 _{-0.009}	45	32	5	5	24	3.4	6.5	3.3	15	430 780	4	53
LMEFP12L-SUS	LMEFP12L-SUSA	12 _{-0.001}	22 ₀	57	42	6	6	32	4.5	8	4.4	15	650 1200	4	100
LMEFP16L-SUS	LMEFP16L-SUSA	16 _{+0.011}	26 _{-0.011}	70	46	6	6	36	4.5	8	4.4	15	1230 2350	5	187
LMEFP20L-SUS	LMEFP20L-SUSA	20 _{+0.009}	32 _{-0.009}	80	54	8	8	43	5.5	9.5	5.4	17	1400 2750	5	260
LMEFP25L-SUS	LMEFP25L-SUSA	25 _{+0.013}	40 _{-0.013}	112	62	8	8	51	5.5	9.5	5.4	17	1560 3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEKP FLANGED LINEAR BUSHING - SUS SERIES



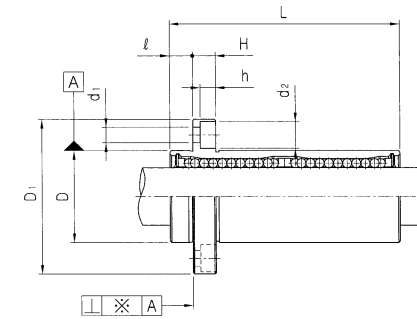
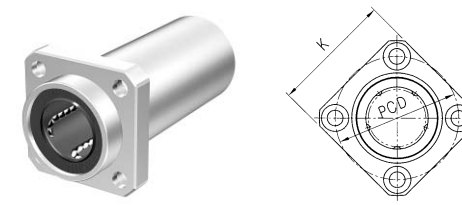
유럽표준 각형 플랜지 리니어부싱	LMEKP	20	UU	-	SUS	A
내접원경(소프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)					

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D1	l	HPCD	K	d1	d2	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(Co)	볼열	무게 (gf)		
LMEKP8-SUS	LMEKP8-SUSA	8 ^{+0.003} ₀	16 ⁰ _{-0.003}	25	32	5	5	24	25	3.4	6.5	3.3	12	260	400	4	44
LMEKP12-SUS	LMEKP12-SUSA	12 ⁰ _{-0.001}	22 ⁰ _{-0.003}	32	42	6	6	32	32	4.5	8	4.4	12	410	590	4	86
LMEKP16-SUS	LMEKP16-SUSA	16 ^{+0.003} _{-0.001}	26 ^{-0.003} ₀	36	46	6	6	36	35	4.5	8	4.4	12	770	1170	5	120
LMEKP20-SUS	LMEKP20-SUSA	20 ^{-0.001} ₀	32 ⁰ _{-0.011}	45	54	8	8	43	42	5.5	9.5	5.4	15	860	1370	5	184
LMEKP25-SUS	LMEKP25-SUSA	25 ^{+0.011} ₀	40 ^{-0.011} ₀	58	62	8	8	51	50	5.5	9.5	5.4	15	980	1560	6	335

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N

2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEKP_L FLANGED LINEAR BUSHING LONG - SUS SERIES



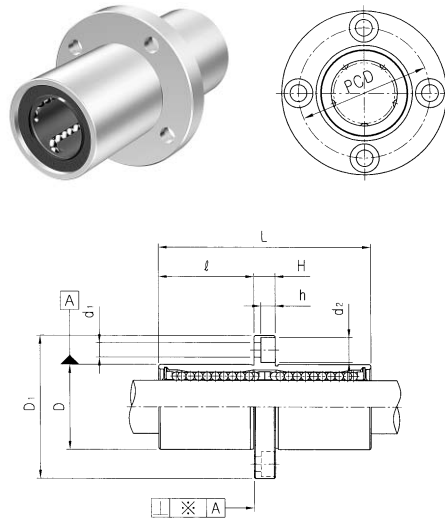
유럽표준 각형 플랜지 리니어부싱	LMEKP	20	L	UU	-	SUS	A
내접원경(소프트 직경)							
리니어부싱 롱형							
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

Resin	Steel	내접원경 dr. 허용차	D mm 허용차	L	D1	l	HPCD	K	d1	d2	h	직각도 ※(μm)	정격하중(N) 동정격(C) 정정격(Co)	볼열	무게 (gf)		
LMEKP8L-SUS	LMEKP8L-SUSA	8 ^{+0.003} _{-0.001}	16 ⁰ _{-0.003}	45	32	5	5	24	25	3.4	6.5	3.3	15	430	780	4	53
LMEKP12L-SUS	LMEKP12L-SUSA	12 ⁰ _{-0.001}	22 ⁰ _{-0.003}	57	42	6	6	32	32	4.5	8	4.4	15	650	1200	4	100
LMEKP16L-SUS	LMEKP16L-SUSA	16 ^{+0.011} _{-0.001}	26 ^{-0.011} ₀	70	46	6	6	36	35	4.5	8	4.4	15	1230	2350	5	187
LMEKP20L-SUS	LMEKP20L-SUSA	20 ^{-0.001} ₀	32 ⁰ _{-0.013}	80	54	8	8	43	42	5.5	9.5	5.4	17	1400	2750	5	260
LMEKP25L-SUS	LMEKP25L-SUSA	25 ^{+0.013} ₀	40 ^{-0.013} ₀	112	62	8	8	51	50	5.5	9.5	5.4	17	1560	3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N

2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEFM FLANGED LINEAR BUSHING LONG - SUS SERIES

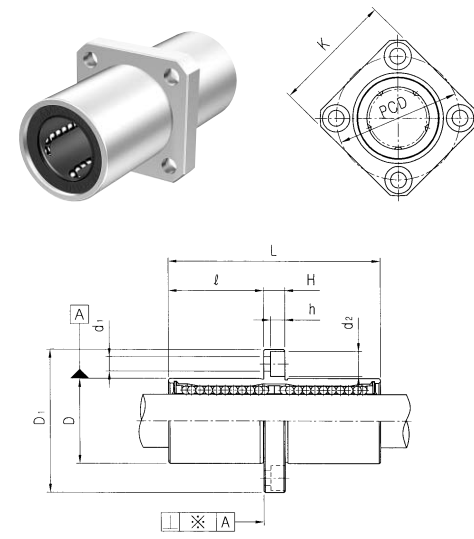


유럽표준 양형 중간 플랜지 리니어부싱	LMEFM	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)					

형번	내접원경	D	L	D ₁	l	H	PCD	d ₁	d ₂	h	직각도	정격하중(N)	볼열	무게
Resin	Steel	dr. 허용차	mm 허용차								※(μm)	동정격(C) 정정격(C ₀)		(gf)
LMEFM8-SUS LMEFM8-SUSA	8	16	45	32	20	5	24	3.4	6.5	3.3	15	430 780	4	53
LMEFM12-SUS LMEFM12-SUSA	12	22	57	42	25.5	6	32	4.5	8	4.4	15	650 1200	4	100
LMEFM16-SUS LMEFM16-SUSA	16	26	70	46	32	6	36	4.5	8	4.4	15	1230 2350	5	187
LMEFM20-SUS LMEFM20-SUSA	20	32	80	54	36	8	43	5.5	9.5	5.4	17	1400 2750	5	260
LMEFM25-SUS LMEFM25-SUSA	25	40	112	62	52	8	51	5.5	9.5	5.4	17	1560 3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

LMEKM FLANGED LINEAR BUSHING LONG - SUS SERIES



유럽표준 각형 중간 플랜지 리니어부싱	LMEKM	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)					

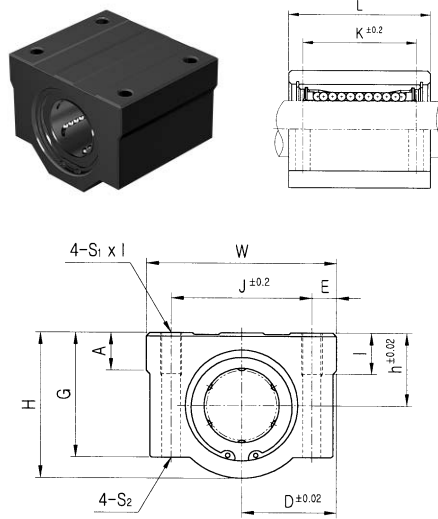
형번	내접원경	D	L	D ₁	l	H	PCD	K	d ₁	d ₂	h	직각도	정격하중(N)	볼열	무게
Resin	Steel	dr. 허용차	mm 허용차									※(μm)	동정격(C) 정정격(C ₀)		(gf)
LMEKM8-SUS LMEKM8-SUSA	8	16	45	32	20	5	24	25	3.4	6.5	3.3	15	430 780	4	53
LMEKM12-SUS LMEKM12-SUSA	12	22	57	42	25.5	6	32	32	4.5	8	4.4	15	650 1200	4	100
LMEKM16-SUS LMEKM16-SUSA	16	26	70	46	32	6	36	35	4.5	8	4.4	15	1230 2350	5	187
LMEKM20-SUS LMEKM20-SUSA	20	32	80	54	36	8	43	42	5.5	9.5	5.4	17	1400 2750	5	260
LMEKM25-SUS LMEKM25-SUSA	25	40	112	62	52	8	51	50	5.5	9.5	5.4	17	1560 3140	6	515

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

65

Aluminum Case Unit

SC ALUMINUM CASE UNIT - SUS SERIES

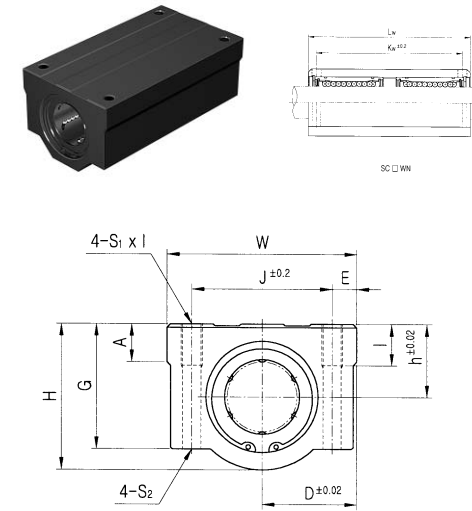


알루미늄 케이스 유니트	SC	20	UU	N	-	SUS	A
내접원경(사프트 직경)							
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
New type							
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

Resin	Steel	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K	L	정격하중(N) 동정격(C)	정정격(C ₀)	무게 (gf)
SC8-SUS	SC8-SUSA	LM8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	18	30	260	400	56
SC10-SUS	SC10-SUSA	LM10UU	13	20	40	26	21	8	28	6	M5×10	Φ4.3	21	35	370	540	90
SC12-SUS	SC12-SUSA	LM12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	26	39	410	590	112
SC12N-SUS	SC12-SUSA	LM12UU	15	21	42	28	24	7.4	30.5	5.75	M5×12	Φ4.3	26	36	410	590	112
SC13-SUS	SC13-SUSA	LM13UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	26	39	500	770	123
SC16-SUS	SC16-SUSA	LM16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	34	44	770	1170	189
SC20-SUS	SC20-SUSA	LM20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	40	50	860	1370	237
SC25-SUS	SC25-SUSA	LM25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	50	67	980	1560	555

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

SCW ALUMINUM CASE UNIT LONG - SUS SERIES

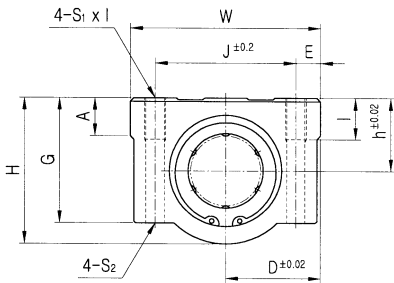
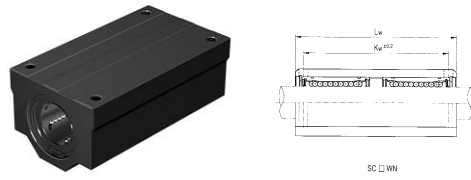


알루미늄 케이스 유니트	SC	20	W	UU	-	SUS	A
내접원경(사프트 직경)							
통형(고하중용)							
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

Resin	Steel	L/B×2	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K _w	L _w	정격하중(N) 동정격(C)	정정격(C ₀)	무게 (gf)
SC8W-SUS	SC8W-SUSA	LM8U	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	94
SC10W-SUS	SC10W-SUSA	LM10U	13	20	40	26	21	8	28	6	M5×10	Φ4.3	46	68	590	1080	147
SC12W-SUS	SC12W-SUSA	LM12U	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	650	1180	220
SC13W-SUS	SC13W-SUSA	LM13U	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	800	1540	245
SC16W-SUS	SC16W-SUSA	LM16U	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	79	89	1230	2340	376
SC20W-SUS	SC20W-SUSA	LM20U	21	27	54	41	35	11	40	7	M6×12	Φ5.2	90	100	1370	2740	476

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

SCW_N ALUMINUM CASE UNIT LONG - SUS SERIES

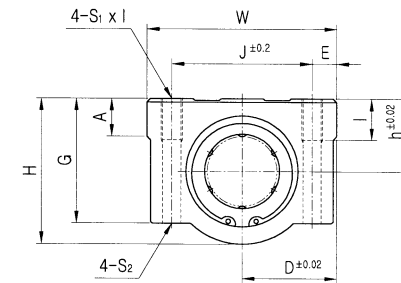
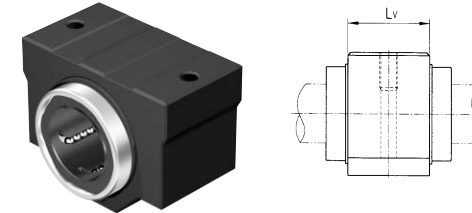


알루미늄 케이스 유니트	SC	20	W	UU	N	-	SUS	A
내접원경(사프트 직경)								
롱형(고하중용)								
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)							
New type								
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL							
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)							

Resin	Steel	형번	L/B×2	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	K _w	L _w	정격하중(N) 동정격(C)	정정격(C ₀)	무게 (gf)
SC8WN-SUS	SC8WN-SUSA	LM8U	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	94	
SC10WN-SUS	SC10WN-SUSA	LM10U	13	20	40	26	21	8	28	6	M5×12	Φ4.3	46	68	590	1080	147	
SC12WN-SUS	SC12WN-SUSA	LM12U	15	21	42	28	24	7.4	30.5	5.75	M5×12	Φ4.3	50	70	650	1180	220	
SC13WN-SUS	SC13WN-SUSA	LM13U	15	22	44	30	24.5	8	33	5.5	M5×12	Φ4.3	50	75	800	1540	245	
SC16WN-SUS	SC16WN-SUSA	LM16U	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	60	85	1230	2340	376	
SC20WN-SUS	SC20WN-SUSA	LM20U	21	27	54	41	35	11	40	7	M6×12	Φ5.2	70	96	1370	2740	476	
SC25WN-SUS	SC25WN-SUSA	LM25U	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	100	130	1560	3120	1115	

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

SCV ALUMINUM CASE UNIT - SUS SERIES

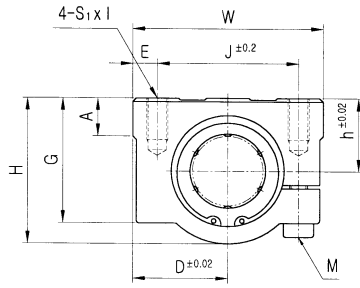
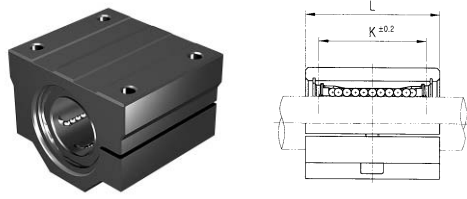


알루미늄 케이스 유니트	SC	20	V	UU	-	SUS	A
내접원경(사프트 직경)							
콤팩트형							
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)						

Resin	Steel	형번	L/B	h	D	W	H	G	A	J	E	S ₁ ×l	S ₂	L _v	정격하중(N) 동정격(C)	정정격(C ₀)	무게 (gf)
SC8V-SUS	SC8V-SUSA	LM8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	15.4	260	400	36	
SC10V-SUS	SC10V-SUSA	LM10UU	13	20	40	26	21	8	28	6	M5×10	Φ4.3	19.5	370	540	63	
SC12V-SUS	SC12V-SUSA	LM12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.5	410	590	74	
SC12VN-SUS	SC12VN-SUSA	LM12UU	15	21	42	28	24	7.4	30.5	5.75	M5×12	Φ4.3	20.5	410	590	74	
SC13V-SUS	SC13V-SUSA	LM13UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.5	500	770	85	
SC16V-SUS	SC16V-SUSA	LM16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	23.5	770	1170	132	
SC20V-SUS	SC20V-SUSA	LM20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	27.4	860	1370	170	
SC25V-SUS	SC25V-SUSA	LM25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	37.4	980	1560	405	

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

SCJ ADJUSTABLE ALUMINUM CASE UNIT - SUS SERIES

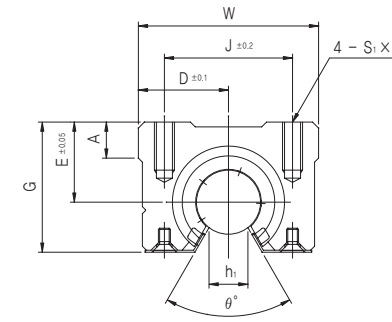
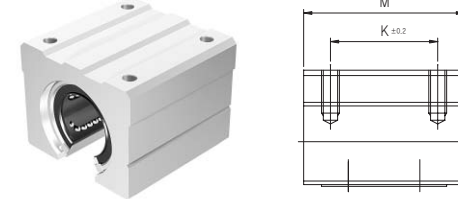


알루미늄 케이스 유닛(조정형)	SCJ	20	UU	-	SUS	A
내접원경(샤프트 직경)						
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)					
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(교온형)					

형번	Resin	Steel	L/B	h	D	W	H	G	A	J	E	S1 x l	K	L	M	정격하중(N) 동정격(C)	샤프트 직경 정정격(Co)	무게 (gf)
SCJ10-SUS	SCJ10-SUSA	LM10UUAJ	13	20	40	26	21	8	28	6	M5x12	21	35	M4	370	540	Φ10	90
SCJ12-SUS	SCJ12-SUSA	LM12UUAJ	15	21	42	28	24	7.4	30.5	5.75	M5x12	26	36	M4	410	590	Φ12	112
SCJ13-SUS	SCJ13-SUSA	LM13UUAJ	15	22	44	30	24.5	8	33	5.5	M5x12	26	39	M4	500	770	Φ13	123
SCJ16-SUS	SCJ16-SUSA	LM16UUAJ	19	25	50	38.5	32.5	9	36	7	M5x12	34	44	M4	770	1170	Φ16	189
SCJ20-SUS	SCJ20-SUSA	LM20UUAJ	21	27	54	41	35	11	40	7	M6x12	40	50	M5	860	1370	Φ20	237
SCJ25-SUS	SCJ25-SUSA	LM25UUAJ	26	38	76	51.5	41	12	54	11	M8x18	50	67	M6	980	1560	Φ25	555

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

SBR ALUMINUM CASE UNIT OPEN - SUS SERIES

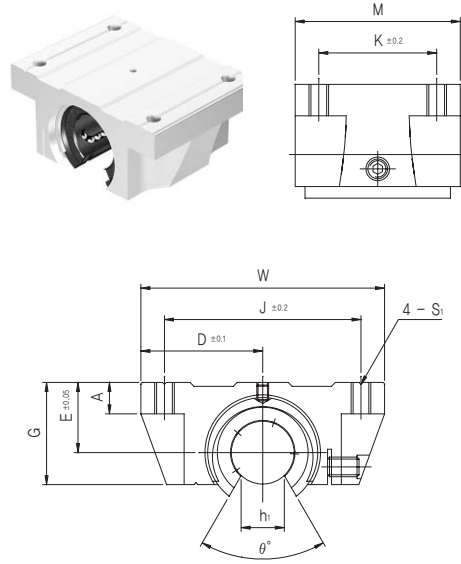


알루미늄 케이스 유닛(개방형)	SBR	20	UU	-	SUS
내접원경(샤프트 직경)					
고무씰 선정	Blank : 실 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)				
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL				

형번	L/B	D	W	G	θ	A	M	S1 x l	h	E	J	K	정격하중(N) 동정격(C)	정정격(Co)	무게 (gf)
SBR16-SUS	LM16UUOP	22.5	45	33	80°	9	45	M5x12	11	20	32	30	770	1170	150
SBR20-SUS	LM20UUOP	24	48	39	60°	11	50	M6x12	11	23	35	35	860	1370	200
SBR25-SUS	LM25UUOP	30	60	47	50°	14	65	M6x12	12	27	40	40	980	1560	450

- 주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₁₀₀ = 410 / 1.26 = 325.40N
- 주2) 무게는 Resin 리테이너 기준 무게임.
- 주3) 주요치수의 단위는 mm 임.
- 주4) 1N ≒ 0.102kgf

TBR ALUMINUM CASE UNIT OPEN - SUS SERIES



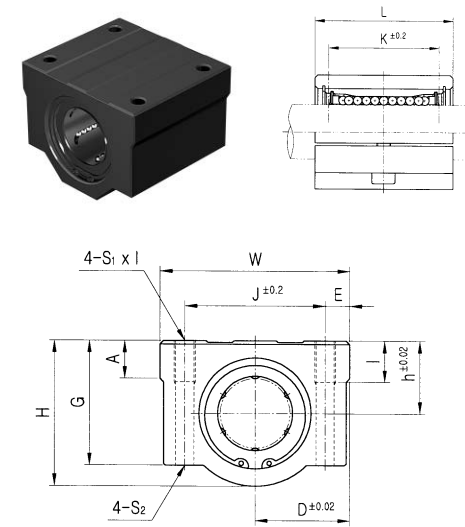
알루미늄 케이스 유닛(개방형)	TBR	20	UU	-	SUS
내접원경(사프트 직경)					
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)				
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL				

형번	L/B	D	W	G	θ	A	M	S ₁	h ₁	E	J	K	정격하중(N)		무게(gf)
													동정격(C)	정정격(C ₀)	
TBR16-SUS	LM16UUOP	31	62	26	80°	8	42	M5	11	18	50	30	392	490	180
TBR20-SUS	LM20UUOP	34	68	31	60°	10	51	M6	11	21	54	37	784	1176	300
TBR25-SUS	LM25UUOP	41	82	41	50°	12	65	M8	12	28	65	50	1568	2352	600

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N

2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

SCE ALUMINUM CASE UNIT - SUS SERIES



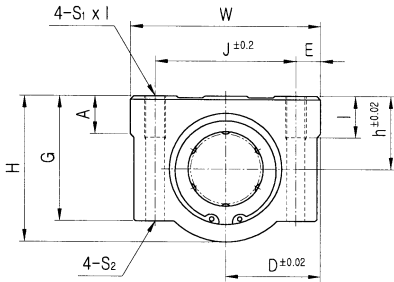
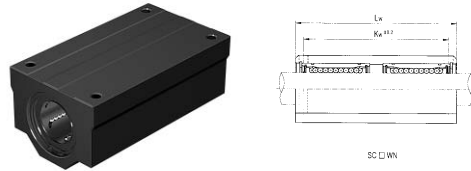
유럽 표준 알루미늄 케이스 유닛	SCE	20	UU	-	SUS	A
내접원경(사프트 직경)						
고무실 선정	Blank : 실 없음(무윤활용) UU : 양측실(윤활용) U : 편측실(특수용)					
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL					
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel 리테이너(고온형)					

형번	Resin	Steel	L/B	h	D	W	H	G	A	J	E	S ₁ x l	S ₂	K	L	정격하중(N)		무게(gf)
																동정격(C)	정정격(C ₀)	
SCE8-SUS		SCE8-SUSA	LME8UU	11	17	34	22	18	6	24	5	M4x8	Φ3.4	18	30	260	400	60
SCE12-SUS		SCE8-SUSA	LME12UU	15	22	44	30	24.5	8	33	5.5	M5x10	Φ4.3	26	39	410	590	118
SCE16-SUS		SCE8-SUSA	LME16UU	19	25	50	38.5	32.5	9	36	7	M5x12	Φ4.3	34	44	770	1170	180
SCE20-SUS		SCE8-SUSA	LME20UU	21	27	54	41	35	11	40	7	M6x12	Φ5.2	40	53	860	1370	245
SCE25-SUS		SCE8-SUSA	LME25UU	26	38	76	51.5	41	12	54	11	M8x18	Φ6.8	50	67	980	1560	550

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N

2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

| SCE_W ALUMINUM CASE UNIT LONG - SUS SERIES |

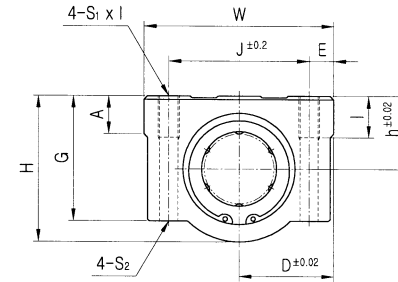
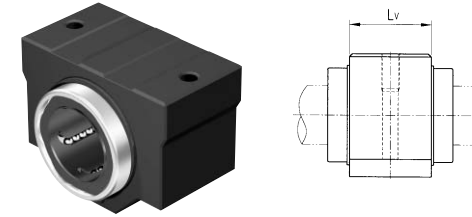


유럽표준 알루미늄 케이스 유닛	SCE	20	W	UU	-	SUS	A
내접원경(사프트 직경)							
종형(고하중용)							
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)						
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL						
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)						

Resin	Steel	L/B×2	h	D	W	H	G	A	J	E	S×ℓ	S	K _w	L _v	정격하중(N)		무게(gf)
															동정격(C)	정정격(C ₀)	
SCE8W-SUS	SCE8W-SUSA	LME8U	11	17	34	22	18	6	24	5	M4×8	Φ3.4	42	58	410	800	98
SCE12W-SUS	SCE12W-SUSA	LME12U	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	64	77	650	1180	232
SCE16W-SUS	SCE16W-SUSA	LME16U	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	79	89	1230	2340	360
SCE20W-SUS	SCE20W-SUSA	LME20U	21	27	54	41	35	11	40	7	M6×12	Φ5.2	90	106	1370	2740	490
SCE25W-SUS	SCE25W-SUSA	LME25U	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	119	136	1560	3120	1100

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf

| SCE_V ALUMINUM CASE UNIT - SUS SERIES |



유럽표준 알루미늄 케이스 유닛	SCE	20	V	UU	N	-	SUS	A
내접원경(사프트 직경)								
콤팩트형								
고무씰 선정	Blank : 씰 없음(무윤활용) UU : 양측씰(윤활용) U : 편측씰(특수용)							
New type								
리니어부싱 재질	외 통 : STAINLESS STEEL BALL : STAINLESS STEEL							
리테이너 선정	Blank : Resin 리테이너(기본형) A : Steel리테이너(고온형)							

Resin	Steel	L/B	h	D	W	H	G	A	J	E	S×ℓ	S	L _v	정격하중(N)		무게(gf)
														동정격(C)	정정격(C ₀)	
SCE8V-SUS	SCE8V-SUSA	LME8UU	11	17	34	22	18	6	24	5	M4×8	Φ3.4	14.4	260	400	40
SCE12V-SUS	SCE8V-SUSA	LME12UU	15	22	44	30	24.5	8	33	5.5	M5×10	Φ4.3	20.3	410	590	82
SCE16V-SUS	SCE8V-SUSA	LME16UU	19	25	50	38.5	32.5	9	36	7	M5×12	Φ4.3	22.3	770	1170	122
SCE20V-SUS	SCE8V-SUSA	LME20UU	21	27	54	41	35	11	40	7	M6×12	Φ5.2	28.3	860	1370	176
SCE25V-SUS	SCE8V-SUSA	LME25UU	26	38	76	51.5	41	12	54	11	M8×18	Φ6.8	40.4	980	1560	400

주1) 동정격하중은 50km의 정격수명 기준으로 계산함.
100km를 기준으로 할 경우 표의 동정격하중 값을 1.26을 나누어 구할 수 있음.
예) LM12의 50km 기준 동정격하중 C = 410N
LM12의 100km 기준 동정격하중 C₀₀ = 410 / 1.26 = 325.40N
2) 무게는 Resin 리테이너 기준 무게임.
3) 주요치수의 단위는 mm 임.
4) 1N ≒ 0.102kgf



Shaft and Supports

삼익 서포트 레일 유니트

삼익 서포트 레일은 개방형 알루미늄 하우징 유니트와 조립되는 서포트 레일과 샤프트의 조합으로 구성되어 있다. 모든 구성품들은 호환성이 있도록 표준화 되어 비용절감 및 설계시간 단축을 가능하게 한다.



서포트 레일 유니트	SBS	C	h6	30	-	1000	L
삼익 서포트 레일 유니트							
SBR 전용 서포트 레일 유니트 : SBS TBR 전용 서포트 레일 유니트 : TBS							
서포트 내식성 여부 선정							
무도금 샤프트(기본형) : Blank 스테인레스 샤프트 : M 크롬도금 샤프트(내식성, 길이무관) : C 니켈 도금 샤프트(내식용, 길이 1m이내) : N 레이던트 처리 샤프트(내식용, 길이무관) : R							
샤프트 치수 허용 오차 선정							
아시아 표준 샤프트공차 g6 : Blank 유럽 표준 샤프트공차 h6 : h6							
샤프트 직경 선정							
							16~50mm
샤프트 길이 선정							
							100~3000mm

삼익 LM샤프트

삼익은 리니어부싱 전용 정밀 LM샤프트를 제작 공급하고 있다. 샤프트 표면에 볼이 직접 접촉하여 구르기 때문에 경도, 표면조도 및 치수정도에 주의할 필요가 있다. 샤프트 규격은 아래와 같다.

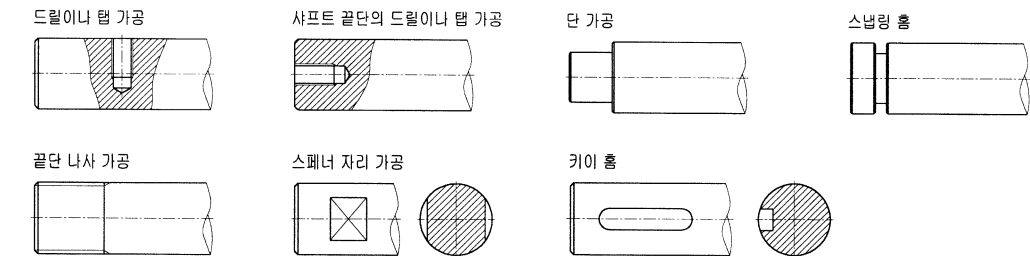
- 재질 : SW2(고탄소 크롬 베어링강)
- 강도 : HRC58 ~ 64
- 열처리깊이 : 0.8 ~ 2.5mm
- 조도 : 0.8S ~ 1.6S
- 진직도 : 0.05mm / 300mm

LM 샤프트	SF	C	h6	30	-	1000	L
삼익 LM 샤프트							
내식성 여부 선정							
무도금 샤프트(기본형) : Blank 스테인레스 샤프트 : M 크롬도금 샤프트(내식성, 길이무관) : C 니켈 도금 샤프트(내식용, 길이 1m이내) : N 레이던트 처리 샤프트(내식용, 길이무관) : R							
치수 허용 오차 선정							
아시아 표준 샤프트공차 g6 : Blank 유럽 표준 샤프트공차 h6 : h6							
샤프트 직경 선정							
							5~80mm
샤프트 길이 선정							
							100~3000mm

샤프트 특수가공

아래와 같은 탭, 밀링, 관통구멍, 단가공 등의 특수가공도 요구에 따라 제작한다.

〈LM샤프트의 가공예〉

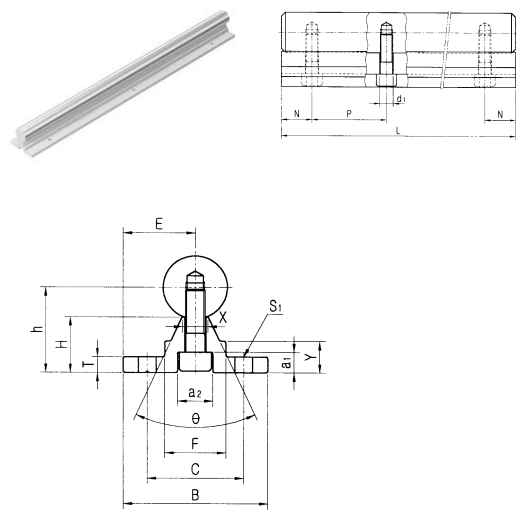


삼익 샤프트 서포트

샤프트 서포트는 샤프트 양단을 고정하는 지지대이다. 알루미늄 재질로서 외관이 미려하고 콤팩트하며, 상부에 샤프트길이 방향으로 갈라져 있으므로 고정볼트 체결을 통해 샤프트를 견고하게 고정할 수 있다.

샤프트 서포트	SK	20
SAMICK 샤프트 서포트(알루미늄)		
샤프트 직경 선정		
		6~40mm

SBS SUPPORT RAIL UNIT - SUS SERIES



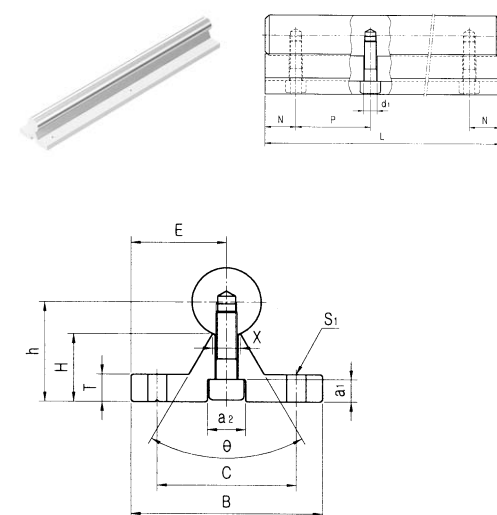
삼익 서포트 레일 유니트	SBS	C	h6	30	-	1000	L
타입선정							
SBR : 전용 서포트 레일유니트 : SBS							
샤프트 내식성 선정							
무도금 샤프트(기본형) : Blank							
스테인레스 샤프트 : M							
크롬도금 샤프트(내식성, 길이무관) : C							
니켈 도금 샤프트(내식용, 길이 1m이내) : N							
레이턴트 처리 샤프트(내식용, 길이무관) : R							
샤프트 치수 허용 오차 선정							
아시아 표준 샤프트공차 g6 : Blank							
유럽 표준 샤프트공차 : h6							
샤프트 직경 선정							
16~50mm							
샤프트 길이 선정							
100~3000mm							

형번	샤프트 외경	E	h	B	H	T	F	X	Y	C	θ	S ₁	a ₁	a ₂	d ₁	무게 (kgf/m)
SBS16	Φ16	20	25	40	17.79	5	18.5	8	11.7	30	80°	Φ5.5	6	9.5	5.5	2.56
SBS20	Φ20	22.5	27	45	17.72	5	19	8	10	30	50°	Φ5.5	6.5	11	6.6	3.50
SBS25	Φ25	27.5	33	55	21.13	6	21.5	8	12	35	50°	Φ6.6	6.5	11	6.6	5.30
SBS30	Φ30	30	37	60	22.85	7	26.5	10.3	13	40	50°	Φ6.6	8.5	14	9	7.38
SBS35	Φ35	32.5	43	65	26.62	8	28	13	15.5	45	50°	Φ9	8.5	14	9	9.68
SBS40	Φ40	37.5	48	75	29.43	9	38	16	17	55	50°	Φ9	8.5	14	9	12.69
SBS50	Φ50	47.5	62	95	38.79	11	45	20	21	70	50°	Φ11	12.5	19	11	20.46

형번	최대길이 (mm)	P	N × NH												
			500	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	3000
SBS16	3000	150	25×3	75×3	100×4	50×6	75×7	25×9	50×10	75×11	25×13	50×14	75×15	25×17	75×19
SBS20	3000	150	25×3	75×3	100×4	50×6	75×7	25×9	50×10	75×11	25×13	50×14	75×15	25×17	75×19
SBS25	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	75×11	25×13	50×14	75×15	25×17	75×19
SBS30	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	75×11	25×13	50×14	75×15	25×17	75×19
SBS35	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	75×11	25×13	50×14	75×15	25×17	75×19
SBS40	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	75×11	25×13	50×14	75×15	25×17	75×19
SBS50	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	75×11	25×13	50×14	75×15	25×17	75×19

주1) N값은 샤프트의 길이에 따라 달라질 수 있음.
 2) NH(Number of Holes) : Pitch 값에 따른 체결 홀의 개수임.(표준품의 경우)
 3) P·N은 주문시 지정 필요.
 ※ 무게는 Shaft 포함 무게임.

TBS SUPPORT RAIL UNIT - SUS SERIES



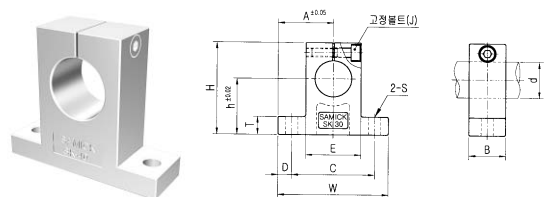
삼익 서포트 레일 유니트	TBS	C	h6	30	-	1000	L
타입선정							
TBR : 전용 서포트 레일유니트 : TBS							
샤프트 내식성 선정							
무도금 샤프트(기본형) : Blank							
스테인레스 샤프트 : M							
크롬도금 샤프트(내식성, 길이무관) : C							
니켈 도금 샤프트(내식용, 길이 1m이내) : N							
레이턴트 처리 샤프트(내식용, 길이무관) : R							
샤프트 치수 허용 오차 선정							
아시아 표준 샤프트공차 g6 : Blank							
유럽 표준 샤프트공차 : h6							
샤프트 직경 선정							
16~50mm							
샤프트 길이 선정							
100~3000mm							

형번	외경	E	h	B	H	T	X	C	θ	S ₁	a ₁	a ₂	d ₁	중량 (kgf/m)
TBS16	Φ16	25	22	50	14.79	6	8	37	60°	Φ5.5	6	9.5	5.5	2.66
TBS20	Φ20	27.5	29	55	19.72	8	8	40	50°	Φ5.5	6.5	11	6.6	4.23
TBS25	Φ25	32.5	32	65	20.13	10	8	45	50°	Φ6.6	6.5	11	6.6	5.85
TBS30	Φ30	37.5	36.5	75	22.35	12	10.3	55	50°	Φ6.6	8.5	14	9	8.28

형번	최대길이 (mm)	P	N × NH												
			500	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	3000
TBS16	3000	150	25×3	75×3	100×4	50×6	75×7	25×9	50×10	75×11	25×13	50×14	75×15	25×17	75×19
TBS20	3000	150	25×3	75×3	100×4	50×6	75×7	25×9	50×10	75×11	25×13	50×14	75×15	25×17	75×19
TBS25	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	100×8	100×9	100×10	100×11	100×12	100×14
TBS30	3000	200	50×2	100×2	100×3	100×4	100×5	100×6	100×7	100×8	100×9	100×10	100×11	100×12	100×14

주1) N값은 샤프트의 길이에 따라 달라질 수 있음.
 2) NH(Number of Holes) : Pitch 값에 따른 체결 홀의 개수임.(표준품의 경우)
 3) P·N은 주문시 지정 필요.
 ※ 무게는 Shaft 포함 무게임.

| SK Shaft Support - SUS SERIES |



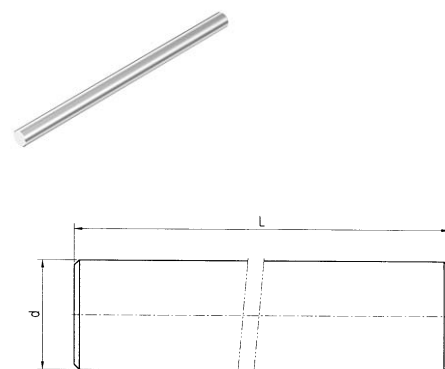
샤프트 서포트 SK
내접원경(샤프트 외경)

형번	샤프트 직경	h	A	W	H	T	E	D	C	B	S	J	무게 (gf)
SK8	Φ8	20	21	42	32.8	6	18	5	32	14	Φ5.5	M4	24
SK10	Φ10	20	21	42	32.8	6	18	5	32	14	Φ5.5	M4	24
SK12	Φ12	23	21	42	38	6	20	5	32	14	Φ5.5	M4	30
SK13	Φ13	23	21	42	38	6	20	5	32	14	Φ5.5	M4	30
SK16	Φ16	27	24	48	44	8	25	5	38	16	Φ5.5	M4	40
SK20	Φ20	31	30	60	51	10	30	7.5	45	20	Φ6.6	M5	70
SK25	Φ25	35	35	70	60	12	38	7	56	24	Φ6.6	M6	130
SK30	Φ30	42	42	84	70	12	44	10	64	28	Φ9	M6	180
SK35	Φ35	50	49	98	85	15	50	12	74	32	Φ11	M8	270
SK40	Φ40	60	57	114	96	15	60	12	90	36	Φ11	M8	420

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References

| SF Shaft - SUS SERIES |



삼익 샤프트 SF	C	h6	30	-	1000	L
샤프트 내식성 선정						
무도금 샤프트(기본형) : Blank						
스테인레스 샤프트 : M						
크롬도금 샤프트(내식성, 길이무관) : C						
니켈 도금 샤프트(내식용, 길이 1m이내) : N						
레이턴트 처리 샤프트(내식용, 길이무관) : R						
샤프트 내식성 선정						
아시아 표준 샤프트공차 g6 : Blank						
유럽 표준 샤프트공차 : h6						
LM샤프트 외경 16~50mm						
샤프트 길이 100~3000mm						

diameter	Φ6	Φ8	Φ10	Φ12	Φ13	Φ16	Φ20	Φ25	Φ30	Φ35	Φ40	Φ50	Φ60	Φ80
직경허용차 (g6)	-0.004 -0.012	-0.005 -0.014		-0.006 -0.017			-0.007 -0.020			-0.009 -0.025			-0.010 -0.029	
무게 (kg/m)	0.22	0.39	0.62	0.89	1.04	1.58	2.46	3.85	5.55	7.55	9.86	15.41	22.18	39.44
최대길이(m)	500	500	2000	2000	2000	3000	3000	3000	3000	3000	3000	3000	3000	3000

- 샤프트 규격은 아래와 같다.
- 재질 : SUJ2(고탄소 크롬베어링강) SUS440(고탄소 크롬베어링강)
- 강도 : HRC58~64
- 조도 : 0.83~1.6S
- 열처리 깊이 : 0.8~2.5mm
- 샤프트 진직도 : 0.05mm/300mm

축과 하우징부의 치수허용차(인치 시리즈)

●● 하우징의 치수 허용차

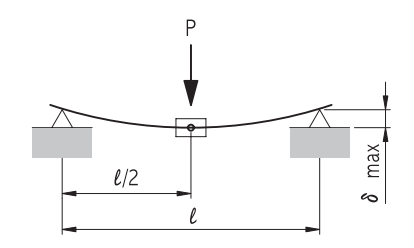
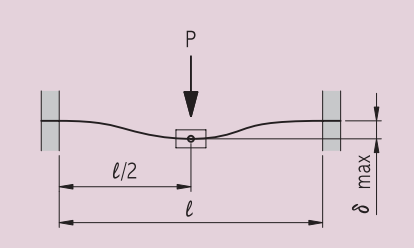
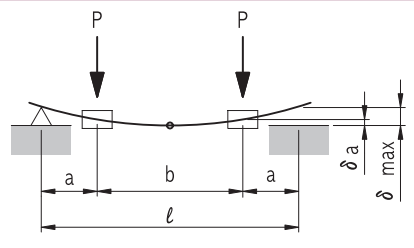
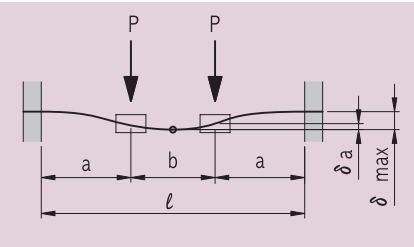
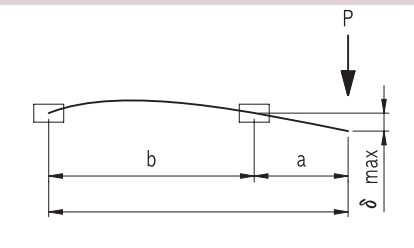
구분	SIZE		H5		H6		H7		H8	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
이상 이하	0.1181 0.2362	3 6	0.0002 0	0.005 0	0.0003 0	0.008 0	0.0004 0	0.012 0	0.0007 0	0.018 0
이상 이하	0.2362 0.3937	6 10	0.0002 0	0.006 0	0.0003 0	0.009 0	0.0003 0	0.015 0	0.0008 0	0.022 0
이상 이하	0.3937 0.7087	10 18	0.0003 0	0.008 0	0.0004 0	0.011 0	0.0007 0	0.018 0	0.0010 0	0.027 0
이상 이하	0.7087 1.1811	18 30	0.0003 0	0.009 0	0.0005 0	0.013 0	0.0008 0	0.021 0	0.0013 0	0.033 0
이상 이하	1.1811 1.9685	30 50	0.0004 0	0.011 0	0.0006 0	0.016 0	0.0009 0	0.025 0	0.0015 0	0.039 0
이상 이하	1.9685 3.1496	50 80	0.0005 0	0.013 0	0.0007 0	0.019 0	0.0011 0	0.030 0	0.0018 0	0.046 0
이상 이하	3.1496 4.7244	80 120	0.0005 0	0.015 0	0.0008 0	0.022 0	0.0013 0	0.035 0	0.0021 0	0.054 0

●● 축의 치수 허용차

구분	SIZE		g5		g6		g7		h5		h6		h7	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
이상 이하	0.1181 0.2362	3 6	-0.0001 -0.0003	-0.004 -0.009	-0.0001 -0.0004	-0.004 -0.012	-0.0001 -0.0006	-0.004 -0.016	0 -0.0002	0 -0.005	0 -0.0003	0 -0.008	0 -0.0004	0 -0.012
이상 이하	0.2362 0.3937	6 10	-0.0002 -0.0004	-0.005 -0.011	-0.0002 -0.0005	-0.005 -0.014	-0.0002 -0.0007	-0.005 -0.020	0 -0.0002	0 -0.006	0 -0.0003	0 -0.009	0 -0.0006	0 -0.015
이상 이하	0.3937 0.7087	10 18	-0.0002 -0.0005	-0.006 -0.014	-0.0002 -0.0006	-0.006 -0.017	-0.0002 -0.0009	-0.006 -0.024	0 -0.0003	0 -0.008	0 -0.0004	0 -0.011	0 -0.0007	0 -0.018
이상 이하	0.7087 1.1811	18 30	-0.0002 -0.0006	-0.007 -0.016	-0.0002 -0.0007	-0.007 -0.020	-0.0002 -0.0011	-0.007 -0.028	0 -0.0003	0 -0.009	0 -0.0005	0 -0.013	0 -0.0008	0 -0.021
이상 이하	1.1811 1.9685	30 50	-0.0003 -0.0007	-0.009 -0.020	-0.0003 -0.0009	-0.009 -0.025	-0.0003 -0.0013	-0.009 -0.034	0 -0.0004	0 -0.011	0 -0.0006	0 -0.016	0 -0.0009	0 -0.025
이상 이하	1.9685 3.1496	50 80	-0.0004 -0.0009	-0.010 -0.023	-0.0004 -0.0011	-0.010 -0.029	-0.0004 -0.0015	-0.010 -0.04	0 -0.0005	0 -0.013	0 -0.0007	0 -0.019	0 -0.011	0 -0.030
이상 이하	3.1496 4.7244	80 120	-0.0004 -0.0010	-0.012 -0.027	-0.0004 -0.0013	-0.012 -0.034	-0.0004 -0.0018	-0.012 -0.047	0 -0.0006	0 -0.015	0 -0.0008	0 -0.022	0 -0.0013	0 -0.035

축의 힘 계산식

지지방법 및 사용조건

축의 힘 계산식

$$\delta_{max} = \frac{P \cdot l^3}{48 \cdot E \cdot I} = 2.021 \times 10^{-6} \frac{P \cdot l^3}{d^4}$$

$$\delta_{max} = \frac{P \cdot l^3}{192 \cdot E \cdot I} = 5.053 \times 10^{-6} \frac{P \cdot l^3}{d^4}$$

$$\delta_a = \frac{P \cdot a^2}{6 \cdot E \cdot I} (2a+3b) = 1.617 \times 10^{-4} \frac{P \cdot a^2(2a+3b)}{d^4}$$

$$\delta_{max} = \frac{P \cdot a^2}{24 \cdot E \cdot I} (3l-4a^2) = 4.042 \times 10^{-5} \frac{P \cdot a \cdot (3l-4a^2)}{d^4}$$

$$\delta_a = \frac{P \cdot a^3}{6 \cdot E \cdot I} (2 - \frac{3a}{l}) = 1.617 \times 10^{-4} \frac{P \cdot a^3}{d^4} (2 - \frac{3a}{l})$$

$$\delta_{max} = \frac{P \cdot a^2}{24 \cdot E \cdot I} (2a+3b) = 4.042 \times 10^{-5} \frac{P \cdot a^2(2a+3b)}{d^4}$$

$$\delta_{max} = \frac{P \cdot a^2 l}{3 \cdot E \cdot I} = 3.234 \times 10^{-4} \frac{P \cdot a^2 l}{d^4}$$

E : 종탄성계수 2.1×10^4 (kgf/mm²)
 P : 부하하중(kgf)
 I : 단면 2차 모멘트(mm⁴); 중실축 : $I = \pi d^4/64$, 중공축 : $I = \pi(d^4-d_i^4)/64$
 d_i : 축의 내경(mm), d : 축의 외경(mm)

