

**QLH<sup>®</sup>**  
Linear Motion Technology



**QLH** has made a vital contribution to the growth and achievement of various machinery industries throughout its history. As a comprehensive bearing manufacturer, **QLH** responds to the needs of a wide variety of fields.

The corporate philosophy defines the ideal image of **QLH** in the 21st century and outlines management efforts and employee actions necessary to realize this ideal. The philosophy consists of a mission statement, management principles, corporate message and slogans.

### **Mission Statement**

**QLH** aims to contribute to the well-being and safety of society and to protect the global environment through its innovative technology integrating Motion & Control. We are guided by our vision of **QLH** as a truly international enterprise, and are working across national boundaries to improve relationships between people throughout the world.

### **Management Principles**

To serve our customers through innovative and responsive solutions, taking advantage of our world leading technologies. To provide challenges and opportunities to our employees, channeling their skills and fostering their creativity and individuality. To identify the needs of the times and of the future and to use all of **QLH's** resources to meet those needs by being versatile, responsive and dynamic.

To work together with our employees and contribute to the communities in which we operate. To manage our business from an international, perspective and to develop a strong presence throughout the world.

"Responsive" expresses **QLH** ability to react effectively to new opportunities and customer needs while maintaining a sense of harmony with societies and the global environment. More specifically, "Responsive" embodies five concepts:

**Resilience / Smoothness / Tenacity and perseverance / Flexibility / Technology**

"Creative" reflects our commitment to finding new ways to enhance our products and services as we work to realize the full potential of **QLH** and society. The corporate message communicates **QLH** ideas to clients and the general public and seeks to gain their understanding and support. The message's intent is to express the Corporation's spheres of activities and its future image.

Corporate slogans encapsulate the attitudes and actions required to realize the ideas in our mission statement. These ideas enhance **QLH** corporate culture, foster personal development and provide direction for its corporate development.

**- Beyond Limits, Beyond Today -**





## Linear Motion Bearing

(Page 2)



## Linear Shaft

(Page 18)



## Ball Cage

(Page 20)



## Precision Locknut

(Page 22)



## Ball Screw Support Unit

(Page 27)



## Self Lubricating Sliding DU Bushes

(Page 29)



## Oil Less graphite Bushes

(Page 33)



## Rod End

(Page 36)



## Cam Follower

(Page 39)



## Spherical Plain Bearing

(Page 40)



## Precision Ball Screw & Nut

(Page 43)



## Linear Guideways

(Page 46)



## One Way Clutch Bearing

(Page 49)



## Needle Roller Bearing

(Page 55)



## Ball Transfer Unit

(Page 67)





## Structure and Features

- The QLH linear motion bearing consists of an outer cylinder, ball retainer, balls and two end rings. The ball retainer which holds the balls in the recirculating trucks is held inside the outer cylinder by end rings.
- Those parts are assembled to optimize their required functions.
- The outer cylinder is maintained sufficient hardness by heat treatment, therefore it ensures the bushings projected travel life and satisfactory durability.
- The ball retainer is made from steel or resin. The steel retainer has high rigidity obtained by heat treatment. The user can select the optimum type for meeting the users service conditions

### 1. High Precision and Rigidity

The QLH linear motion bearing is produced from a solid steel outer cylinder. Also the linear motion bearing incorporates either a patented all steel hardened seamless ball retainer or an industrial strength resin retainer.

### 2. Ease of Assembly

The standard type of QLH linear motion bearing can be loaded from any directions. Precision control is possible using only the shaft supporter, and the mounting surface can be machined easily. QLH also provides a variety of housings for all types of slide bushings, offering convenience of design and assembly.

### 3. Ease of Replacement

QLH linear motion bearing of each type are completely interchangeable because of their standardized dimensions and strict precision control.

Replacement because of wear or damage is therefore easy and accurate.

### 4. Variety of Types

QLH offers a full line of linear motion bearing: the standard, integral single-retainer closed type, the clearance adjustable type and the open, double-retainer, and flanged types. The user can choose from among these according to the application requirements to be met.

**QLH**  
Linear motion  
Ball Bearings

LM/LME/LMB



LM...AJ/LME...AJ/LMB...AJ



LM-OP/LME-OP/LMB-OP



LM...L/LME...L/LMB...L



ST



**QLH**  
Pressing Bush  
Bearings

KH



**QLH**  
Flanged  
Linear Motion  
Ball Bearing

LMF/LMEF/LMBF



LMK/LMEK/LMBK



LMH



LMFP



LMKP



LMHP



LMK...L/LMEK...L/LMBK...L



LMH...L



LMFP...L



LMKP...L



LMHP...L



LMFM...L/LMEFM...L/  
LMBFM...L



LMKM...L/LMKM...L  
LMBKM...L



LMHM...L





**QLH**  
Linear motion  
Ball Bearing  
Slide Units

SC/SCE



SC...L/SCE...L



SC...S/SCE...S



SCAJ



**QLH**  
Support Rail  
Units

SC...UUOP



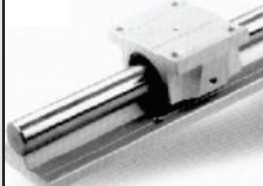
TBR



SBR...S



TBR...S

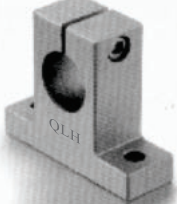


SBR



**QLH**  
Shaft Support

SK



SHF



**QLH**  
Shafts

QCS



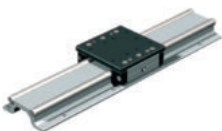
**QLH**  
O B Series

O B Series


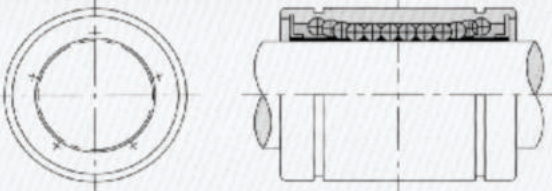

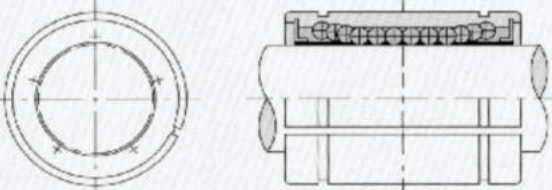

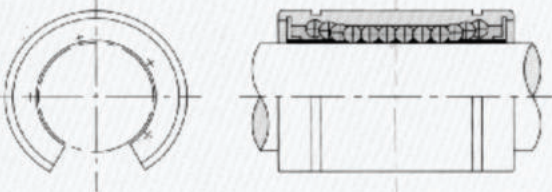

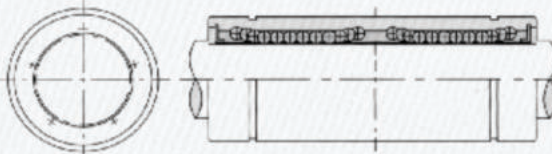




**QLH**  
Super Standard

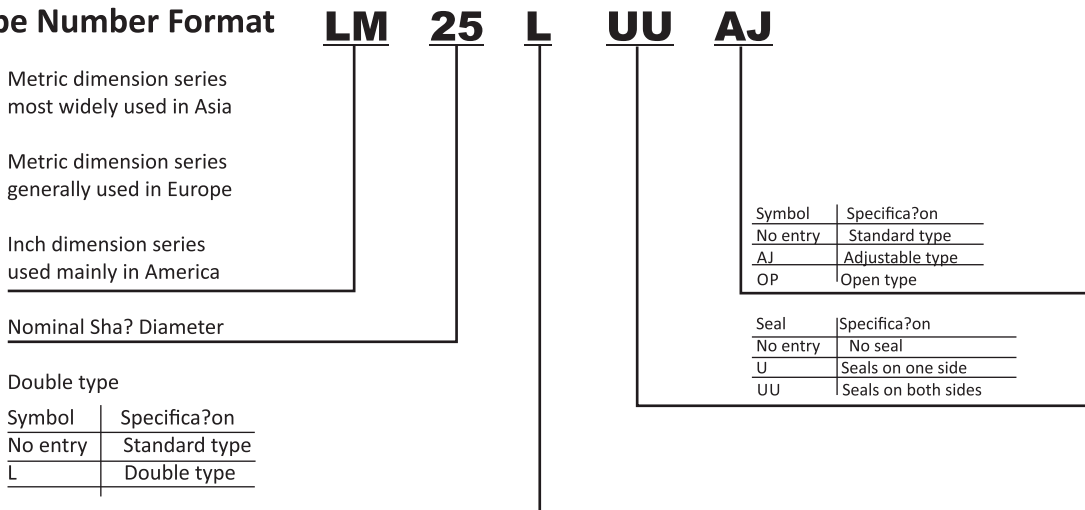
SLM





Type	Description	Material	
		Outer cylinder	Retainer
<b>Standard Type</b> 	 Closed type outside cylinder	Steel	Steel
		Steel	Resin
<b>Adjustable Type</b> 	 This type has a slot in the outside cylinder. This design allows for clearance adjustment.	Steel	Steel
		Steel	Resin
<b>Open Type</b> 	 One ball circuit is removed to allow an opening slot to fit over rail supports.	Steel	Steel
		Steel	Resin
<b>Double-Wide Type</b> 	 This type has two retainers in the outside cylinder. This structure is useful when moment loads are applied to the slide bush.	Steel	Steel
		Steel	Resin
<b>Pressing Outer Race Type</b> 	 Outer race is pressing	Steel	Resin

## Type Number Format



## Tolerance

• The MYT linear motion ball bearing are divided into high class and precision class, indicated in the dimension tables. Note the precision of inscribed circle diameters and outside diameters for the clearance adjustable type (...AJ) and the open type (...OP) indicates the value 1 obtained before the corresponding type is subjected to cutting Process.

## Load Rating and Life Expectancy

• The rated life (L) of a slide bush can be obtained from the following equation with the basic dynamic load rating and the load applied to the slide bush:

$$L = \left( \frac{f_H \cdot f_T \cdot f_C}{f_W} \cdot \frac{C}{P} \right)^3 \cdot 50 \quad (1)$$

L : Rated life ( km )  
 fH : Hardness factor  
 fT : Temperature coefficient

C : Basic dynamic load rating ( N )  
 fC : Contact coefficient  
 P : Working load ( N )  
 fW : Load coefficient

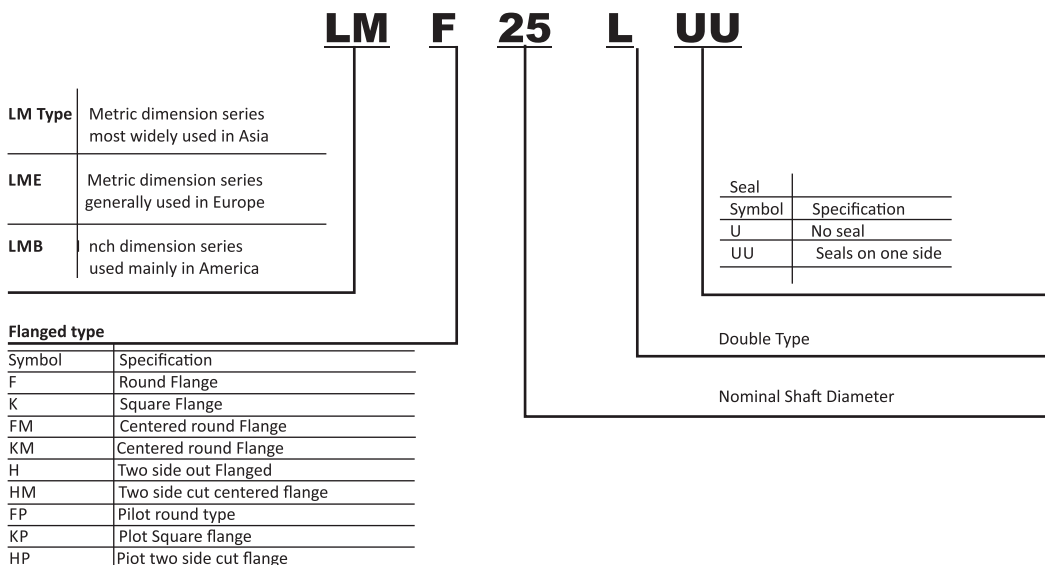
• The lifespan ( $L_h$ ) of a slide bush in hours can be obtained by calculating the traveling distance per unit time.  
 • The lifespan can be obtained from the following equation if the stroke length and the number of strokes are constant:

$$L_h = \left( \frac{L \cdot 10^3}{2 \cdot v_s \cdot n \cdot 60} \right) \quad (2)$$

Lh : Lifespan(hr)  
 L : Rated life(km)   n1 :

Ls : Stroke length(m)  
 nt : Number of strokes per minute(CPM)

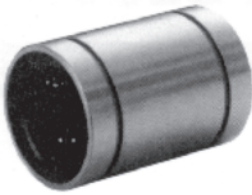
## Flanged Linear Motion Ball Bearings Type Number Format



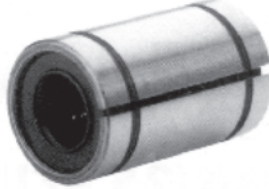
## LM

This type is a metric dimension series  
Widly used in Asia & Other Countries

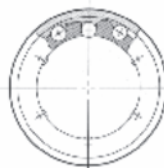
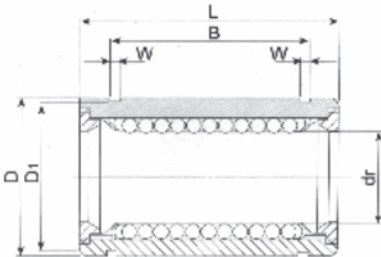
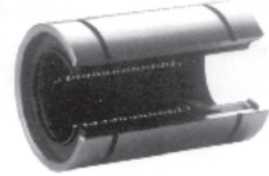
Standard Type



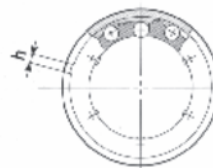
AJ - Type



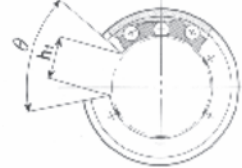
OP Type



LM



LM...AJ



LM...OP

Nominal Shaft Diameter mm	Model No.						Main dimensions and tolerance											Eccentricity μm	Radial clearance (max) μm	Basic Load Rating			
	LM	Ball	LM...AJ	Ball	LM...OP	Ball	dr	D		L		B		W	D <sub>i</sub>	h	h <sub>1</sub>			θ	dynamic C(kgf)	static Co(kgf)	
	LM...UU	circuit	LM...UU-AJ	circuit	LM...UU-OP	circuit	mm	Tolerances μm	mm	Tolerances μm	mm	Tolerances μm	mm	Tolerances μm	mm	mm	mm			mm	°		
3	LM 3	4	-	-	-	-	3	7	0	7	10	-	-	-	-	-	-	-	-	8	-3	7	10.7
4	LM 4	4	-	-	-	-	4	8	0	8	12	-	-	-	-	-	-	-	-	8	-3	9	13
	LM 5	4	-	-	-	-	5	10	-8	15	-12	10.2	-	1.1	9.6	-	-	-	-			17	21
6	LM 6	4	LM 6AJ	4	-	-	6	12	0	12	19	-	13.5	1.1	11.5	1	-	-	-	12	-3	21	27
	LM 6UU	4	LM 6UU-AJ	4	-	-	6	12	0	19	-	13.5	1.1	11.5	1	-	-	-	-			21	27
8	LM 8S	4	LM 8SAJ	4	-	-	8	15	0	15	17	-	11.5	1.1	14.3	1	-	-	-	8	-3	18	22
	LM 8SUU	4	LM 8SUU-AJ	4	-	-	8	15	-8	17	-11	11.5	1.1	14.3	1	-	-	-	-			18	22
8	LM 8	4	LM 8AJ	4	-	-	8	15	0	15	24	-	17.5	1.1	14.3	1	-	-	-	8	-3	28	40
	LM 8UU	4	LM 8UU-AJ	4	-	-	8	15	0	24	-	17.5	1.1	14.3	1	-	-	-	-			28	40
10	LM 10	4	LM 10AJ	4	LM 10 OP	3	10	19	0	19	29	-	22	1.3	18	1	6.8	80°	12	10	-4	38	56
	LM 10UU	4	LM 10UU-AJ	4	LM 10UU-OP	3	10	19	-9	29	-20	22	1.3	18	1	6.8	80°	12	38			56	
12	LM 12	4	LM 12AJ	4	LM 12 OP	3	12	21	0	21	30	-	23	1.3	20	1.5	8	80°	12	-4	42	61	
	LM 12UU	4	LM 12UU-AJ	4	LM 12UU-OP	3	12	21	-9	30	-20	23	1.3	20	1.5	8	80°	12			42	61	
13	LM 13	4	LM 13AJ	4	LM 13 OP	3	13	23	0	23	32	-	23	1.3	22	1.5	9	80°	13	-4	52	80	
	LM 13UU	4	LM 13UU-AJ	4	LM 13UU-OP	3	13	23	-9	32	-	23	1.3	22	1.5	9	80°	13			52	80	
16	LM 16	5	LM 16AJ	5	LM 16 OP	4	16	28	0	28	37	-	26.5	1.6	27	1.5	11	80°	16	-6	79	120	
	LM 16UU	5	LM 16UU-AJ	5	LM 16UU-OP	4	16	28	-10	37	-	26.5	1.6	27	1.5	11	80°	16			79	120	
20	LM 20	5	LM 20AJ	5	LM 20 OP	4	20	32	0	32	42	-	30.5	1.6	30.5	1.5	11	60°	20	-6	90	140	
	LM 20UU	5	LM 20UU-AJ	5	LM 20UU-OP	4	20	32	-10	42	-	30.5	1.6	30.5	1.5	11	60°	20			90	140	
25	LM 25	6	LM 25AJ	6	LM 25 OP	5	25	40	0	40	59	-	41	1.85	38	2	12	50°	25	-8	100	160	
	LM 25UU	6	LM 25UU-AJ	6	LM 25UU-OP	5	25	40	-10	59	-	41	1.85	38	2	12	50°	25			100	160	
30	LM 30	6	LM 30AJ	6	LM 30 OP	5	30	45	0	45	64	-	44.5	1.85	43	2.5	15	50°	30	-8	160	280	
	LM 30UU	6	LM 30UU-AJ	6	LM 30UU-OP	5	30	45	-10	64	-	44.5	1.85	43	2.5	15	50°	30			160	280	
35	LM 35	6	LM 35AJ	6	LM 35 OP	5	35	52	0	52	70	-	49.5	2.1	49	2.5	17	50°	35	-8	170	320	
	LM 35UU	6	LM 35UU-AJ	6	LM 35UU-OP	5	35	52	-12	70	-	49.5	2.1	49	2.5	17	50°	35			170	320	
40	LM 40	6	LM 40AJ	6	LM 40 OP	5	40	60	0	60	80	-	60.5	2.1	57	3	20	50°	40	-10	220	410	
	LM 40UU	6	LM 40UU-AJ	6	LM 40UU-OP	5	40	60	-12	80	-30	60.5	2.1	57	3	20	50°	40			220	410	
50	LM 50	6	LM 50AJ	6	LM 50 OP	5	50	80	0	80	100	-	74	2.6	76.5	3	25	50°	50	-13	390	810	
	LM 50UU	6	LM 50UU-AJ	6	LM 50UU-OP	5	50	80	-12	100	-	74	2.6	76.5	3	25	50°	50			390	810	
60	LM 60	6	LM 60AJ	6	LM 60 OP	5	60	90	0	90	110	-	85	3.15	86.5	3	30	50°	60	-13	480	1020	
	LM 60UU	6	LM 60UU-AJ	6	LM 60UU-OP	5	60	90	0	110	-	85	3.15	86.5	3	30	50°	60			480	1020	
80	LM 80	6	LM 80AJ	6	LM 80 OP	5	80	120	0	120	140	-	105.5	4.15	116	3	40	50°	80	-20	750	1630	
	LM 80UU	6	LM 80UU-AJ	6	LM 80UU-OP	5	80	120	-15	140	-40	105.5	4.15	116	3	40	50°	80			750	1630	

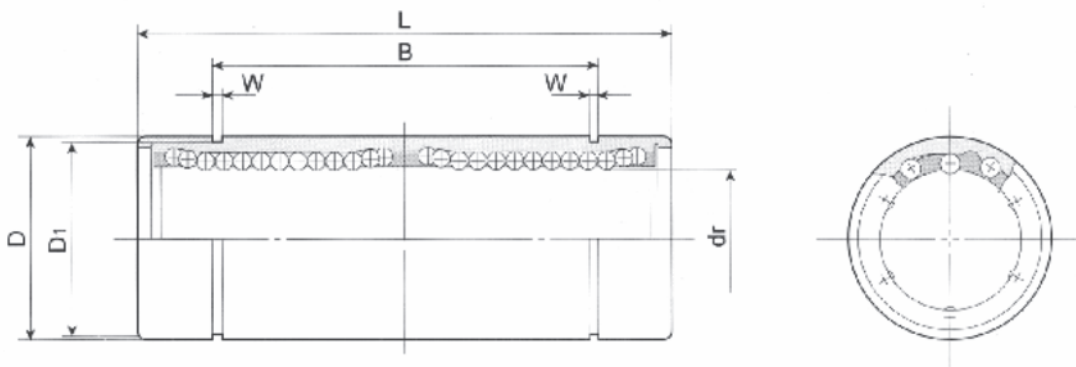
### LM20 UU

No Entry	No seals
U	Seal on one side
UU	Seal on both sides

## LM...L / LM...LUU (Resin Retainer)



This type is a metric dimension series. Long Type Series (Metric Dimension Series widely used in Asia)



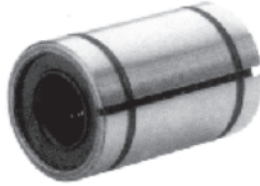
Nominal Shaft Diameter mm	Model No. LM...L LM...LUU	Ball Circuit	Weight g	Main Dimensions and tolerance								Eccentricity μm	Basic Load rating				
				dr		D		L		B			W mm	D1 mm	C(kgf)	Co(kgf)	
				mm	Tolerance μm	mm	Tolerance μm	mm	Tolerance μm	mm	Tolerance μm						
6	LM6L LM6LUU	4	16	6	0 -10	12	0	35	0 -0.3	27	0 -0.3	1.1	11.5	15	33	54	
8	LM8L LM8LUU	4	31	8		15	-13	45		35		1.1	14.3		44	80	
10	LM10L LM10LUU	4	62	10		19	0	55		44		1.3	18		60	112	
12	LM12L LM12LUU	4	80	12		21		57		46		1.3	20		83	160	
13	LM13L LM13LUU	4	90	13		23		-16		61		46	1.3		22	83	160
16	LM16L LM16LUU	5	145	16		28		70		53		1.6	27		125	240	
20	LM20L LM20LUU	5	180	20	32	0 -12	80	61	1.6	30.5	20	143	280				
25	LM25L LM25LUU	6	440	25	40		0	112	82	1.85		38	159	320			
30	LM30L LM30LUU	6	480	30	45		123	89	1.85	43		254	560				
35	LM35L LM35LUU	6	795	35	52	0 -15	135	99	2.1	49	25	270	640				
40	LM40L LM40LUU	6	1,170	40	60		0	151	121	2.1		57	350	820			
50	LM50L LM50LUU	6	3,100	50	80		192	148	2.6	76.5		620	1,620				
60	LM60L LM60LUU	6	3,500	60	0	90	0	209	170	3.15	86.5	30	770	2,040			



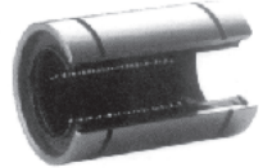
LME - Metric Dimension series generally used in Europe



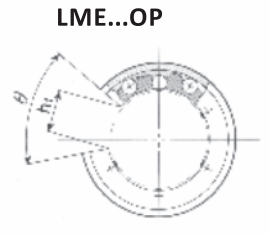
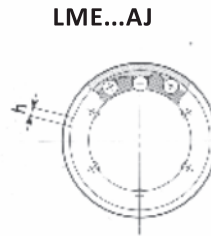
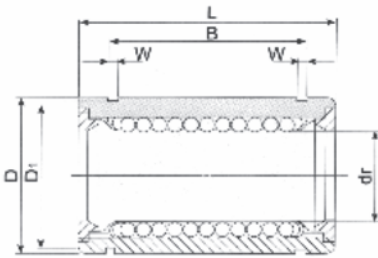
Standard type



AJ type



OP type

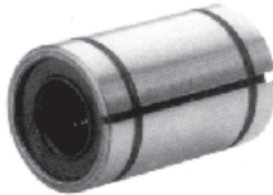


Nominal Shaft Diameter mm	Model No.						Main dimensions and tolerance													Eccentricity μm	Radial clearance (max) μm	Basic Load Rating	
	LME		LME...AJ		LME...OP		dr		D		L		B		W mm	D <sub>1</sub> mm	h mm	h <sub>1</sub> mm	θ			dynamic C(kgf)	static Co(kgf)
	LME...UU	Ball circuit	LME...UU-AJ	Ball circuit	LME...UU-OP	Ball circuit	mm	μm	mm	μm	mm	μm	mm	μm									
							Tolerances		Tolerances		Tolerances		Tolerances										
5	LME 5 LME 5UU	4	LME5AJ LME5UU-AJ	4	-	-	5		12	0	22		14.5		1.1	11.5	1	-	-	12	-3	21	27
8	LME 8 LME 8UU	4	LME8AJ LME8UU-AJ	4	-	-	8	+8 -0	16	-8	25		16.5		1.1	15.2	1	-	-	12	-3	27	41
12	LME 12 LME 12UU	4	LME12AJ LME12UU-AJ	4	LME12 OP LME12UU-OP	3	12		22	0	32	0 -0.2	22.9	0 -0.2	1.3	21	1.5	7.5	78°	12	-4	52	79
16	LME 16 LME 16UU	5	LME16AJ LME16UU-AJ	5	LME16 OP LME16UU-OP	4	16	+9	26	-9	36		24.9		1.3	24.9	1.5	10	78°	15	-6	59	91
20	LME 20 LME 20UU	5	LME20AJ LME20UU-AJ	5	LME20 OP LME20UU-OP	4	20	-1	32		45		31.5		1.6	30.3	2	10	60°	15	-6	88	140
25	LME 25 LME 25UU	6	LME25AJ LME25UU-AJ	6	LME25 OP LME25UU-OP	5	25	+11	40	0 -11	58		44.1		1.85	37.5	2	12.5	60°	15	-6	100	160
30	LME 30 LME 30UU	6	LME30AJ LME30UU-AJ	6	LME30 OP LME30UU-OP	5	30	-1	47		68	0	52.1	0	1.85	44.5	2	12.5	50°	15	-8	160	280
40	LME 40 LME 40UU	6	LME40AJ LME40UU-AJ	6	LME40 OP LME40UU-OP	5	40		62	0	80	-0.3	60.6	-0.3	2.12	59	3	16.8	50°	17	-8	220	410
50	LME 50 LME 50UU	6	LME50AJ LME50UU-AJ	6	LME50 OP LME50UU-OP	5	50	+13 -2	75	-13	100		77.6		2.65	72	3	21	50°	17	-8	390	810
60	LME 60 LME 60UU	6	LME60AJ LME60UU-AJ	6	LME60 OP LME60UU-OP	5	60		90	0 -13	125	0 -0.4	101.7	0 -0.4	3.15	86.5	3	27.2	54°	20	-13	480	1,000

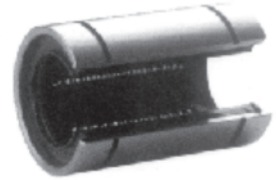
LMB Inch Dimension series mainly used in USA



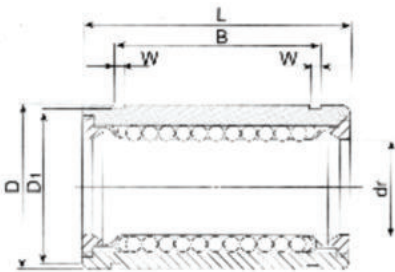
Standard type



AJ type



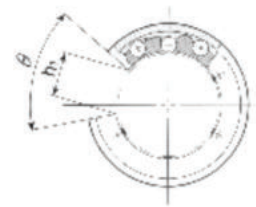
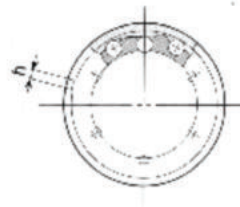
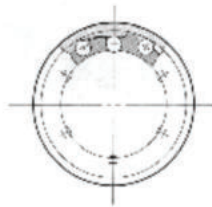
OP type




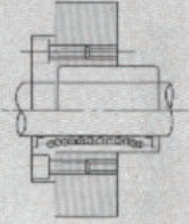



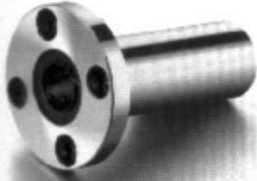
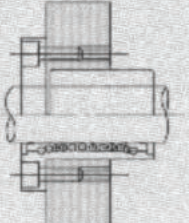




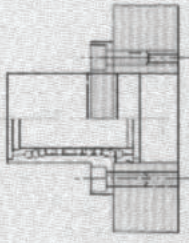



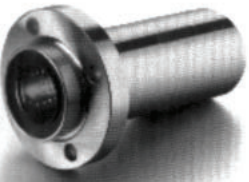
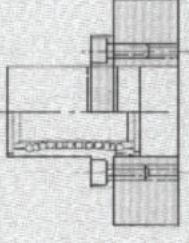



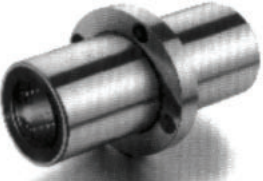
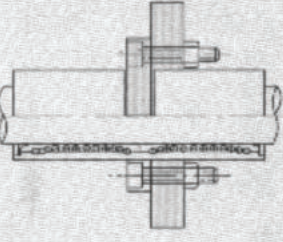



LMB

LMB...AJ

LMB...OP



Nominal Shaft Diameter mm / Inches	Model No.						Main dimensions and tolerance										Eccentricity μm	Radial clearance (max) μm	Basic Load Rating				
	LMB		LM...AJ		LMB...OP		dr		D		L		B		W mm	D <sub>1</sub> mm			h mm	h1 mm	θ	dynamic C(kgf)	static Co(kgf)
	LMB...UU	Ball circuit	LME...UU-AJ	Ball circuit	LMB...UU-OP	Ball circuit	mm	μm	mm	μm	mm	μm	mm	μm									
	Tolerances	Tolerances	Tolerances	Tolerances	Tolerances	Tolerances	mm	μm	mm	μm	mm	μm	mm	μm									
6.350 1/4"	LMB 4 LMB 4UU	4	LMB4AJ LMB4UU-AJ	4	-	-	6.350		12.700	° -11	19.050		12.98		0.992	11.906	1	-	-	12	-3	21	27
9.525 3/8"	LMB 6 LMB 6UU	4	LMB6SAJ LMB6SUU-AJ	4	-	-	9.525		15.875		22.225		16.15		0.992	14.935	1	-	-			23	32
12.700 1/2"	LMB 8 LMB 8UU	4	LMB8AJ LMB8UU-AJ	4	LMB8 OP LMB8UU-OP	3	12.700	° -9	22.225	° -13	31.750	° -200	24.46	° -200	1.168	20.853	1.5	7.9375	80°		-4	52	79
15.875 5/8"	LMB 10 LMB 10UU	5	LMB10AJ LMB10UU-AJ	5	LMB10 OP LMB10UU-OP	4	15.875		28.575		38.100		28.04		1.422	26.899	1.5	9.525	80°			59	120
19.050 3/4"	LMB 12 LMB 12UU	5	LMB12AJ LMB12UU-AJ	5	LMB12 OP LMB12UU-OP	4	19.050	° -10	31.750	° -16	41.275		29.61		1.422	29.870	1.5	11.113	60°	15	-6	88	140
25.400 1"	LMB 16 LMB 16UU	6	LMB16AJ LMB16UU-AJ	6	LMB16OP LMB16UU-OP	5	25.400		39.688		57.150		44.57		1.727	37.306	1.5	14.2875	50°			100	160
31.750 1 1/4"	LMB 20 LMB 20UU	6	LMB20AJ LMB20UU-AJ	6	LMB20OP LMB20UU-OP	5	31.750		50.800		66.675		50.92		1.727	47.904	2.5	15.875	50°	20	-8	160	280
38.100 1 1/2"	LMB 24 LMB 24UU	6	LMB24AJ LMB24UU-AJ	6	LMB24OP LMB24UU-OP	5	38.100	0 -12	60.325		76.200	° -300	61.26	° -300	2.184	56.870	3	19.050	50°			222	410
50.800 2"	LMB 32 LMB 32UU	6	LMB32AJ LMB32UU-AJ	6	LMB32OP LMB32UU-OP	5	50.800		76.200	0 -19	101.600		81.07		2.616	72.085	3	25.400	50°	25	-13	390	810

Structure	Mounting example	Flange type	Length
<b>Standard Flanged type</b> 		LMF LMEF LMBF	 Single
		LMK LMEK LMBK	 Single
		LMH	 Single
<b>Double - Wide Flanged type</b> 		LMF...L LMEF...L LMBF...L	 Double
		LMK...L LMEK...L LMBK...L	 Double
		LMH...L	 Double
<b>Pilot Flanged type</b> 		LMFP	 Single
		LMKP	 Single
		LMHP	 Single
<b>Double - Wide - Position - Pilot Flanged type</b> 		LMFP...L	 Double
		LMKP...L	 Double
		LMHP...L	 Double
<b>Double - Wide - Middle Flanged type</b> 		LMFM...L LMEFM...L LMBFM...L	 Double
		LMKM...L LMEKM...L LMBKM...L	 Double
		LMHM...L	 Double

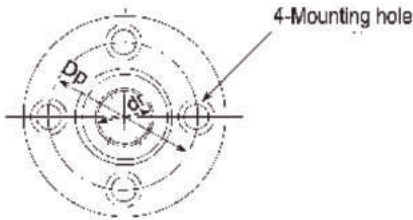
**LMF / LMK (...UU) (Resin retainer)**  
**This type is a metric dimension series**  
**Widely used in Asia and other Countries**



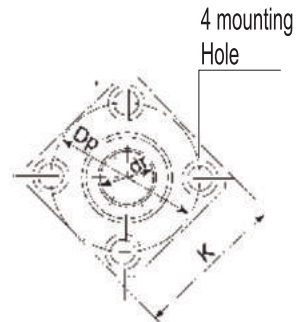
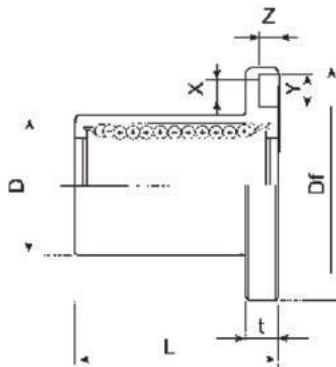
**LMF**



**LMK**



**LMF**



**LMK**

Nominal Shaft Diameter mm	Model No.				Main dimensions and tolerance												Eccentricity μm	Squarness μm	Basic Load Rating		
	LMF		LMK		dr		D		L		Flange								dynamic C(kgf)	static Co(kgf)	
					mm	μm	mm	μm	mm	μm	Df mm	K mm	t mm	Dp mm	X mm	Y mm					Z mm
6	LMF 6	LMF 6UU	LMK 6	LMK 6UU	6	0 -9	12	0 -11	19	0 -200	28	22	5	20	3.5	6	3.1	12	12	21	27
8	LMF 8S	LMF 8SUU	LMK 8S	LMK 8SUU	8		15		17		32	25	5	24	3.5	6	3.1			18	22
8	LMF 8	LMF 8UU	LMK 8	LMK 8UU	8		15		24		32	25	5	24	3.5	6	3.1			28	40
10	LMF 10	LMF 10UU	LMK 10	LMK 10UU	10	0 -13	19	0 -13	29	0 -300	40	30	6	29	4.5	7.5	4.1	20	20	38	56
12	LMF 12	LMF 12UU	LMK 12	LMK 12UU	12		21		30		42	32	6	32	4.5	7.5	4.1			52	61
13	LMF 13	LMF 13UU	LMK 13	LMK 13UU	13		23		32		43	34	6	33	4.5	7.5	4.1			52	80
16	LMF 16	LMF 16UU	LMK 16	LMK 16UU	16	0 -10	28	0 -19	37	0 -300	48	37	6	38	4.5	7.5	4.1	15	15	79	120
20	LMF 20	LMF 20UU	LMK 20	LMK 20UU	20		32		42		54	42	8	43	5.5	9	5.1			90	140
25	LMF 25	LMF 25UU	LMK 25	LMK 25UU	25		40		59		62	50	8	51	5.5	9	5.1			100	160
30	LMF 30	LMF 30UU	LMK 30	LMK 30UU	30	0 -12	45	0 -22	64	0 -300	74	58	10	60	6.6	11	6.1	20	20	160	280
35	LMF 35	LMF 35UU	LMK 35	LMK 35UU	35		52		70		82	64	10	67	6.6	11	6.1			170	320
40	LMF 40	LMF 40UU	LMK 40	LMK 40UU	40		60		80		96	75	13	78	9	14	8.1			220	410
50	LMF 50	LMF 50UU	LMK 50	LMK 50UU	50	0 -15	80	0 -25	100	0 -400	116	92	13	98	9	14	8.1	25	25	390	810
60	LMF 60	LMF 60UU	LMK 60	LMK 60UU	60		90		110		134	106	18	112	11	17	11.1			480	1020
80	LMF 80	LMF 80UU	LMK 80	LMK 80UU	80		120		140		164	136	18	142	11	17	11.1			750	1630
100	LMF 100	LMF 100UU	LMK 100	LMK 100UU	100	150	175	200	170	20	175	14	20	13	1,440	3,550					



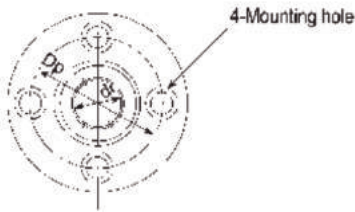
**LMF / LMK (...LUU) (Resin retainer)**  
**This type is a metric dimension series**  
**Widely used in Asia and other Countries**



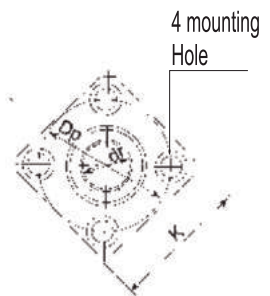
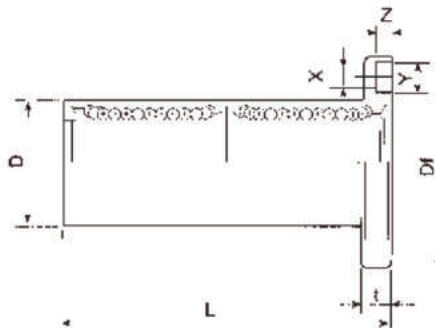
**LMF...L**



**LMK...L**



**LMF...L**



**LMK...L**

Nominal Shaft Diameter mm	Model No.				Main dimensions and tolerance												Eccentricity μm	Squareness μm	Basic Load Rating			
	LMF-L		LMK-L		dr mm	D Tolerances μm		L mm	Flange							dynamic C <sub>d</sub> (kgf)			static C <sub>s</sub> (kgf)			
	mm	mm	mm	mm		mm	μm		μm	μm	μm	mm	mm	mm	mm					mm	mm	
6	LMF 6L	LMF 6LUU	LMK 6L	LMK 6LUU	6	0	12	0	35	0	-300	Df	K	t	Dp	X	Y	Z	15	15	33	54
8	LMF 8L	LMF 8LUU	LMK 8L	LMK 8LUU	8		15	-13	45		32	25	5	24	3.5	6	3.1	44			80	
10	LMF 10L	LMF 10LUU	LMK 10L	LMK 10LUU	10		19	55	40		30	6	29	4.5	7.5	4.1	60	112				
12	LMF 12L	LMF 12LUU	LMK 12L	LMK 12LUU	12	-10	21	0	57	0	-300	42	32	6	32	4.5	7.5	4.1	20	20	67	122
13	LMF 13L	LMF 13LUU	LMK 13L	LMK 13LUU	13		23	-16	61		43	34	6	33	4.5	7.5	4.1	83			160	
16	LMF 16L	LMF 16LUU	LMK 16L	LMK 16LUU	16		28	70	48		37	6	38	4.5	7.5	4.1	125	240				
20	LMF 20L	LMF 20LUU	LMK 20L	LMK 20LUU	20	0	32	0	80	0	-300	54	42	8	43	5.5	9	5.1	25	25	143	280
25	LMF 25L	LMF 25LUU	LMK 25L	LMK 25LUU	25		40	-19	112		62	50	8	51	5.5	9	5.1	159			320	
30	LMF 30L	LMF 30LUU	LMK 30L	LMK 30LUU	30		45	123	74		58	10	60	6.6	11	6.1	254	560				
35	LMF 35L	LMF 35LUU	LMK 35L	LMK 35LUU	35	0	52	0	135	0	-400	82	64	10	67	6.6	11	6.1	30	30	270	640
40	LMF 40L	LMF 40LUU	LMK 40L	LMK 40LUU	40		60	-22	151		96	75	13	78	9	14	8.1	350			820	
50	LMF 50L	LMF 50LUU	LMK 50L	LMK 50LUU	50		80	192	116		92	13	98	9	14	8.1	620	1620				
60	LMF 60L	LMF 60LUU	LMK 60L	LMK 60LUU	60	0 -20	90	0 -25	209	134	106	18	112	11	17	11.1	770	2040				

## LMD(K)M...LUU (Resin Retainer)

This type is a metric dimension series

Widely used in Asia and other Countries

LMFM-LUU

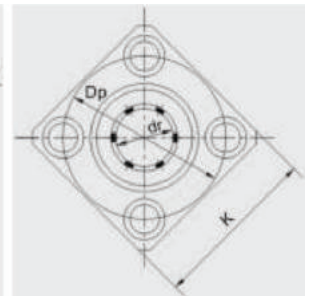
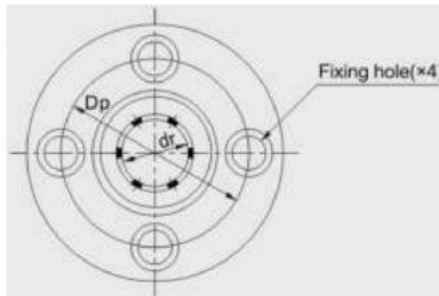
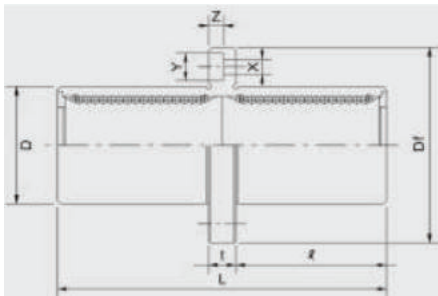


LMKM-LUU



LMFM-LUU

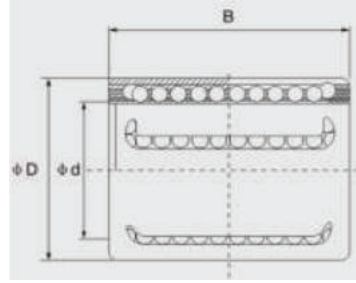
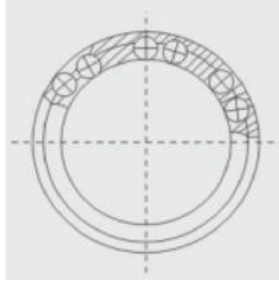
LMKM-LUU



Nominal shaft dia. mm	LMFM...LUU	Weight (gf)	Major dimensions and tolerance													Eccentricity $\mu\text{m}$	Squareness $\mu\text{m}$	Basic load rating		
			dr		D		L		Flange									Dynamic CN	Static CoN	
			mm	Tolerance $\mu\text{m}$	mm	Tolerance $\mu\text{m}$	mm	Tolerance $\mu\text{m}$	I mm	Df mm	K mm	t mm	Dp mm	X mm	Y mm					Z mm
6	LMFM6LUU	31	6	0-10	12	0-13	35	$\pm 300$	15	28	22	5	20	3.5	6	3.1	15	15	323	529
8	LMFM8LUU	51	8	0-10	15	0-16	45	$\pm 300$	20	32	25	5	24	3.5	6	3.1	15	15	431	784
10	LMFM10LUU	98	10	0-10	19	0-16	55	$\pm 300$	25	40	30	6	29	4.5	8	4.1	15	15	588	1,100
12	LMFM12LUU	110	12	0-10	21	0-16	57	$\pm 300$	26	42	32	6	32	4.5	8	4.1	15	15	813	1,570
13	LMFM13LUU	130	13	0-10	23	0-16	61	$\pm 300$	28	43	34	6	33	4.5	8	4.1	15	15	813	1,570
16	LMFM16LUU	190	16	0-10	28	0-16	70	$\pm 300$	32	48	37	6	38	4.5	8	4.1	15	15	1,230	2,350
20	LMFM20LUU	260	20	0-12	32	0-19	80	$\pm 300$	36	54	42	8	43	5.5	9	5.1	20	20	1,400	2,740
25	LMFM25LUU	540	25	0-12	40	0-19	112	$\pm 300$	52	62	50	8	51	5.5	9	5.1	20	20	1,560	3,140
30	LMFM30LUU	680	30	0-12	45	0-19	123	$\pm 300$	57	74	58	10	60	6.6	11	6.1	20	20	2,490	5,490
35	LMFM35LUU	1,020	35	0-15	52	0-22	135	$\pm 400$	63	82	64	10	67	6.6	11	6.1	25	25	2,650	6,270
40	LMFM40LUU	1,570	40	0-15	60	0-22	151	$\pm 400$	69	96	75	13	18	9	14	8.1	25	25	3,430	8,040
50	LMFM50LUU	3,600	50	0-15	80	0-22	192	$\pm 400$	90	116	92	13	98	9	14	8.1	25	25	6,080	15,900
60	LMFM60LUU	4,500	60	0-20	90	0-25	209	$\pm 400$	96	134	106	18	112	11	17	11	30	30	7,550	20,000

Nominal shaft dia. mm	Centered square flange long type LMKM...LUU	Weight (gf)	Eccentricity $\mu\text{m}$	Squareness $\mu\text{m}$	Major dimensions and tolerance													Basic load rating		
					dr		D		L		Flange							Dynamic C N	Static Co N	
					mm	Tolerance $\mu\text{m}$	mm	Tolerance $\mu\text{m}$	mm	Tolerance $\mu\text{m}$	I mm	Df mm	K mm	t mm	Dp mm	X mm	Y mm			Z mm
6	LMKM6LUU	25	15	15	6	0-10	12	0-13	35	$\pm 300$	15	28	22	5	20	3.5	6	3.1	323	529
8	LMKM8LUU	43	15	15	8	0-10	15	0-13	45	$\pm 300$	20	32	25	5	24	3.5	6	3.1	431	784
10	LMKM10LUU	78	15	15	10	0-10	19	0-16	55	$\pm 300$	24.5	40	30	6	29	4.5	7.5	4.1	588	1,100
12	LMKM12LUU	90	15	15	12	0-10	21	0-16	57	$\pm 300$	25.5	42	32	6	32	4.5	7.5	4.1	813	1,570
13	LMKM13LUU	108	15	15	13	0-10	23	0-16	61	$\pm 300$	27.5	43	34	6	33	4.5	7.5	4.1	813	1,570
16	LMKM16LUU	165	15	15	16	0-10	28	0-16	70	$\pm 300$	32	48	37	6	38	4.5	7.5	4.1	1,230	2,350
20	LMKM20LUU	225	20	20	20	0-12	32	0-19	80	$\pm 300$	36	54	42	8	43	5.5	9	5.1	1,400	2,740
25	LMKM25LUU	500	20	20	25	0-12	40	0-19	112	$\pm 300$	52	62	50	8	51	5.5	9	5.1	1,560	3,140
30	LMKM30LUU	590	20	20	30	0-12	45	0-19	123	$\pm 300$	56.5	74	58	10	60	6.6	11	6.1	2,490	5,490
35	LMKM35LUU	930	25	25	35	0-15	52	0-22	135	$\pm 400$	63	82	64	10	67	6.6	11	6.1	2,650	6,270
40	LMKM40LUU	1,380	25	25	40	0-15	60	0-22	151	$\pm 400$	69	96	75	13	18	9	14	8.1	3,430	8,040
50	LMKM50LUU	3,400	30	30	50	0-15	80	0-22	192	$\pm 400$	90	116	92	13	98	9	14	8.1	6,080	15,900
60	LMKM60LUU	4,060	30	30	60	0-20	90	0-25	209	$\pm 400$	96	134	106	18	112	11	17	11.1	7,550	20,000

## KH : Pressing Bush Bearing



Designation	Major dimensions(mm)			Basic load rating		Weight (gf)
	$\Phi d$	$\Phi D$	B	Dynamic C N	Static Co N	
KH0622	6	12	22	400	239	7
KH0824	8	15	24	435	280	12
KH1026	10	17	26	500	370	14.5
KH1228	12	19	28	620	510	18.5
KH1428	14	21	28	620	520	20.5
KH1630	16	24	30	800	620	27.5
KH2030	20	28	30	950	790	32.5
KH2540	25	35	40	1990	1,670	66
KH3050	30	40	50	2800	2,700	95
KH4060	40	52	60	4400	4,450	182
KH5070	50	62	70	5500	6,300	252

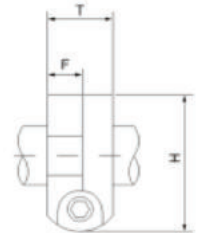
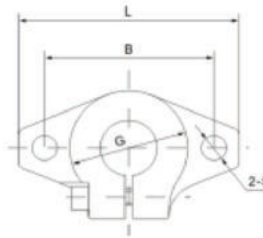
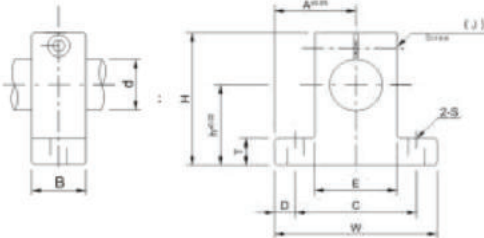
## SK...A

(Shaft End Support)



## SHF

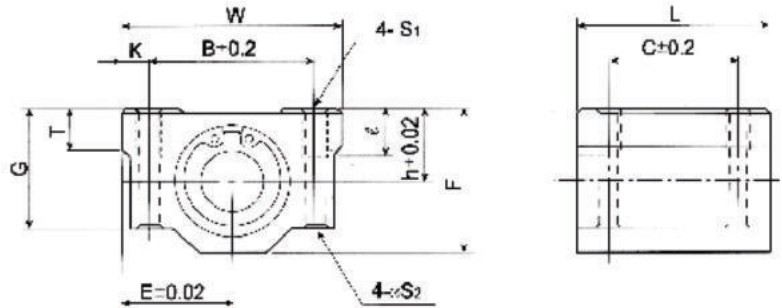
(Shaft End Support)



model	Shaft Diameter	Dimensions(mm)											Weight (g)
		h	A	W	H	T	E	D	C	B	S	J	
SK8	$\phi 8$	20	21	42	32.8	6	18	5	32	14	$\phi 5.5$	M4	24
SK10	$\phi 10$	20	21	42	32.8	6	18	5	32	14	$\phi 5.5$	M4	24
SK12	$\phi 12$	23	21	42	37.5	6	20	5	32	14	$\phi 5.5$	M4	30
SK13	$\phi 13$	23	21	42	37.5	6	20	5	32	14	$\phi 5.5$	M4	30
SK16	$\phi 16$	27	24	46	44	8	25	5	38	16	$\phi 5.5$	M4	40
SK20	$\phi 20$	31	30	60	51	10	30	7.5	45	20	$\phi 6.6$	M5	70
SK25	$\phi 25$	35	35	70	60	12	38	7	56	24	$\phi 6.6$	M6	130
SK30	$\phi 30$	42	42	84	70	12	44	10	64	28	$\phi 9$	M6	180
SK35	$\phi 35$	50	49	98	82	15	50	12	74	32	$\phi 11$	M8	270
SK40	$\phi 40$	60	57	114	96	15	60	12	90	36	$\phi 11$	M8	420
SK50	$\phi 50$	70	63	126	120	18	74	13	100	40	$\phi 14$	M12	750
SK60	$\phi 60$	80	74	148	136	18	90	14	120	45	$\phi 14$	M12	1,100

model	Shaft Diameter	Dimensions(mm)								Mounting bolt designation	Clamping bolt designation	Weight (g)
		L	T	F	B	G	H	S				
SHF10	$\phi 10$	43	10	5	32	20	24	5.5	M5	M4	13	
SHF12	$\phi 12$	47	13	7	36	25	28	5.5	M5	M4	20	
SHF13	$\phi 13$	47	13	7	36	25	28	5.5	M5	M4	20	
SHF16	$\phi 16$	50	16	8	40	28	31	5.5	M5	M4	27	
SHF20	$\phi 20$	60	20	8	48	34	37	7	M6	M5	40	
SHF25	$\phi 25$	70	25	10	56	40	42	7	M6	M5	60	
SHF30	$\phi 30$	80	30	12	64	46	50	9	M8	M6	110	
SHF35	$\phi 35$	92	35	14	72	50	58	12	M10	M8	380	
SHF40	$\phi 40$	102	40	16	80	56	67	12	M10	M10	510	
SHF50	$\phi 50$	122	50	19	96	70	83	14	M12	M12	890	
SHF60	$\phi 60$	140	60	23	112	82	95	14	M12	M12	1500	

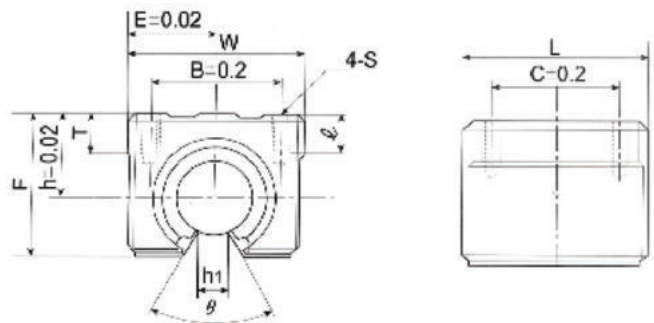
## SC...UU



Model no.	Nominal Shaft Diameter mm	Main dimensions							Mounting dimensions					Linear ball bearing			Weight g	
		h	E	W	L	F	G	T	B	C	K	S <sub>1</sub>	S <sub>2</sub>	l	Model No.	Dynamic C(kgf)		static Co(kgf)
SC 3 UU	3	5	8	16	13	10	8	-	11	8	2.5	M2	-	-	LM3	7	10.7	5
SC 4 UU	4	5.5	8.5	17	15	11	9	-	12	10	2.5	M3	-	-	LM4	9	13	7
SC 5 UU	5	7	11	22	18	14	11	-	16	12	3	M3	-	-	LM5	17	21	14
SC 6 UU	6	9	15	30	25	18	15	6	20	15	5	M4	3.4	8	LM6UU	21	27	34
SC 8 UU	8	11	17	34	30	22	18	6	24	18	5	M4	3.4	8	LM8UU	28	40	52
SC 10 UU	10	13	20	40	35	26	21	8	28	21	6	M5	4.3	12	LM10UU	38	56	92
SC 12 UU	12	15	21	42	36	28	24	8	30.5	26	5.75	M5	4.3	12	LM12UU	52	80	102
SC 13 UU	13	15	22	44	39	30	24.5	8	33	26	5.5	M5	4.3	12	LM13UU	52	80	120
SC 16 UU	16	19	25	50	44	38.5	32.5	9	36	34	7	M5	4.3	12	LM16UU	79	120	200
SC 20 UU	20	21	27	54	50	41	35	11	40	40	7	M6	5.2	12	LM20UU	90	140	255
SC 25 UU	25	26	38	76	67	51.5	42	12	54	50	11	M8	7	18	LM25UU	100	160	600
SC 30 UU	30	30	39	78	72	59.5	49	15	58	58	10	M8	7	18	LM30UU	160	280	735
SC 35 UU	35	34	45	90	80	68	54	18	70	60	10	M8	7	18	LM35UU	170	320	1100
SC 40 UU	40	40	51	102	90	78	62	20	80	60	11	M10	8.7	25	LM40UU	220	410	1590
SC 50 UU	50	52	61	122	110	102	80	25	100	80	11	M10	8.7	25	LM50UU	390	810	3340
SC 60 UU	60	58	66	132	122	114	94	30	108	90	12	M12	10.7	25	LM60UU	482	1020	4270

## SC...UUOP

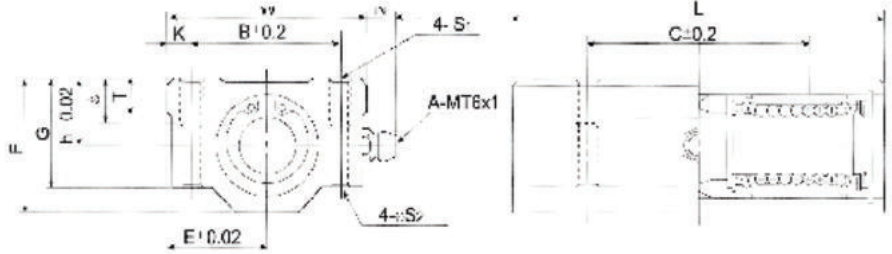
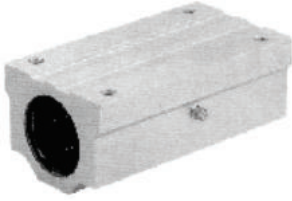
Open Type Linear Block



Model no.	Shaft Diameter	Main dimensions							Mounting dimensions				Linear ball bearing			Weight g	
		h	E	W	L	F	T	h <sub>1</sub>	$\theta$	B	C	S	Q	Model No.	Dynamic C(kgf)		static Co(kgf)
SC 12 UUOP	12	15	18	36	34	24	7	8	80°	26	24	M5	10	LM12UU..OP	42	61	65
SC 16 UUOP	16	20	22.5	45	45	33	9	10	80°	32	30	M5	12	LM16UU..OP	79	120	150
SC 20 UUOP	20	23	24	48	50	39	11	10	60°	35	35	M6	12	LM20UU..OP	90	140	200
SC 25 UUOP	25	27	30	60	65	47	14	11.5	50°	40	40	M6	12	LM25UU..OP	100	160	450
SC 30 UUOP	30	33	35	70	70	56	15	14	50°	50	50	M8	18	LM30UU..OP	160	280	630
SC 40 UUOP	40	42	45	90	90	72	20	19	50°	65	65	M10	20	LM40UU..OP	220	410	1330
SC 50 UUOP	50	53	60	120	110	92	25	23	50°	94	80	M10	20	LM50UU..OP	390	810	3000



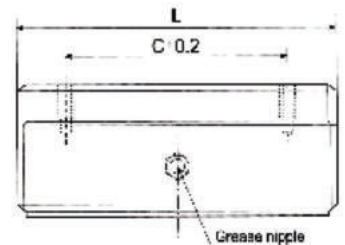
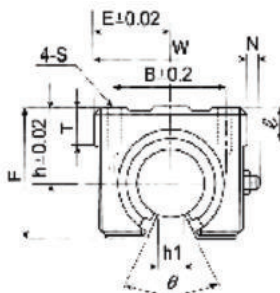
## SC...LUU



Unit : mm

Model No.	Nominal Shaft Diameter mm	Main dimensions								Main dimensions					Linear ball bearing			Weight g	
		h	E	W	L	F	G	T	N	B	C	K	S <sub>1</sub>	S <sub>2</sub>	l	Model No.	Dynamic C(kgf)		Static C(kgf)
SC 6 LUU	6	9	15	30	48	18	15	6	7	20	36	5	M4	3.4	8	LM6UX2	33	54	63
SC 8 LUU	8	11	17	34	58	22	18	6	7	24	42	5	M4	3.4	8	LM8UX2	44	80	102
SC 10 LUU	10	13	20	40	68	26	21	8	7	28	46	6	M5	4.3	12	LM10UX2	60	112	180
SC 12 LUU	12	15	21	42	70	28	24	8	6.5	30.5	50	5.75	M5	4.3	12	LM12UX2	67	120	205
SC 13 LUU	13	15	22	44	75	30	24.5	8	6.5	33	50	5.5	M5	4.3	12	LM13UX2	83	160	240
SC 16 LUU	16	19	25	50	85	38.5	32.5	9	6	36	60	7	M5	4.3	12	LM16UX2	125	240	400
SC 20 LUU	20	21	27	54	96	41	35	11	7	40	70	7	M6	5.2	12	LM20UX2	144	280	570
SC 25 LUU	25	26	38	76	130	51.5	42	12	4	54	100	11	M8	7	18	LM25UX2	164	320	1,200
SC 30 LUU	30	30	39	78	140	59.5	49	15	5	58	110	10	M8	7	18	LM30UX2	250	560	1,480
SC 35 LUU	35	34	45	90	155	68	54	18	5.5	70	120	10	M8	7	18	LM35UX2	270	640	2,200
SC 40 LUU	40	40	51	102	175	78	62	20	5	80	140	11	M10	8.7	25	LM40UX2	350	820	3,200
SC 50 LUU	50	52	61	122	215	102	80	25	5	100	160	11	M10	8.7	25	LM50UX2	620	1,620	6,700
SC 60 LUU	60	58	66	132	240	114	94	30	5	108	180	12	M12	10.7	25	LM60UX2	770	2,040	8,560

## SC...LUUOP

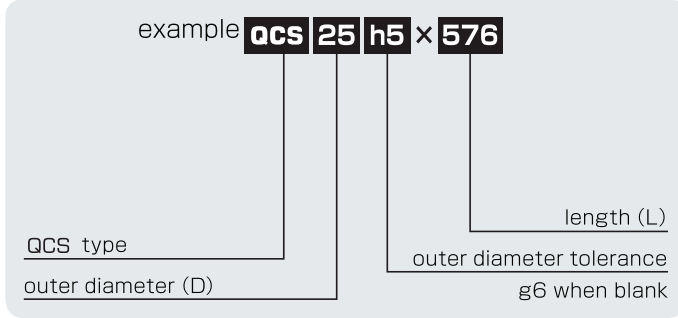


Model No.	Shaft Diameter	h	E	W	L	F	T	N	h <sub>1</sub>	θ	B	C	S	l	Linear Ball bearing No.	Basic Dynamic load rating C(kgf)	Basic Static load rating Co(kgf)	Weight g
SC 16 LUUOP	16	20	22.5	45	85	33	9	8	10	80°	32	60	M5	12	LM16UU OPX2	158	240	300
SC 20 LUUOP	20	23	24	48	96	39	11	8	10	60°	35	70	M6	12	LM20UU OPX2	180	280	400
SC 25 LUUOP	25	27	30	60	130	47	14	8	11.5	50°	40	100	M6	12	LM25UU OPX2	200	320	900
SC 30 LUUOP	30	33	35	70	140	56	15	8	14	50°	50	110	M8	18	LM30UU OPX2	320	560	1,260
SC 40 LUUOP	40	42	45	90	175	72	20	8	19	50°	65	140	M10	20	LM40UU OPX2	440	820	2480

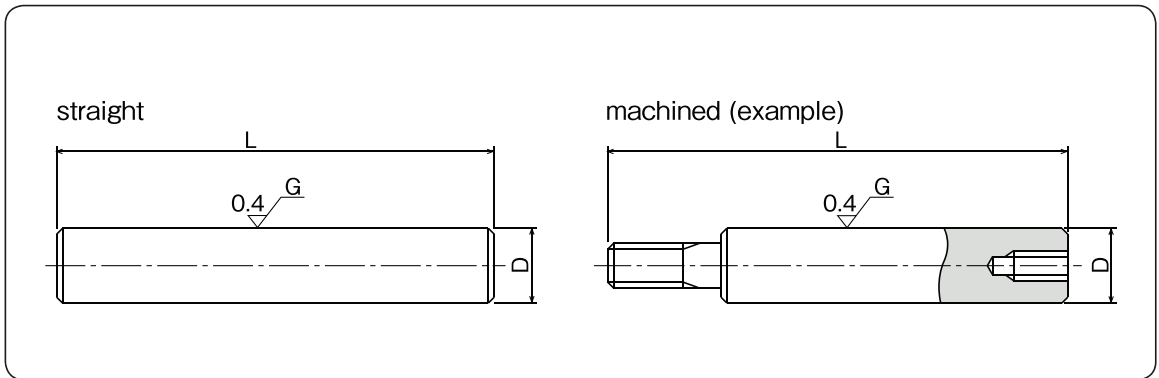


## QCS

### part number structure



- Size : Ø8 mm To Ø120 mm
- Material Grade : EN - 8 / Ck45
- Hard Chrome Plating thickness : 20microns +
- Hard Chrome Plating Hardness : 60 To 65 RC / 850 to 1000 HV
- Surface Roughness : Better than RA0.3 microns
- Tolerance : n8, f7, f8
- Straightness : 0.1 mm/meter



part number	outer diameter		length L	mass
	D mm	tolerance g6 µm		
QCS 3	3	-2/-8	50 ← → 300	0.06
QCS 4	4	-4	100 ← → 400	0.10
QCS 5	5	-12	100 ← → 500	0.16
QCS 6	6	-12	100 ← → 600	0.22
QCS 8	8	-5	200 ← → 1000	0.39
QCS 10	10	-14	200 ← → 1500	0.61
QCS 12	12	-6	200 ← → 2500	0.88
QCS 13	13	-17	200 ← → 3000	1.03
QCS 16	16	-17	300 ← → 4000	1.56
QCS 20	20	-7	300 ← → 5000	2.43
QCS 25	25	-20	300 ← → 6000	3.80
QCS 30	30	-20	300 ← → 6000	5.48
QCS 35	35	-9	400 ← → 6000	7.46
QCS 40	40	-25	400 ← → 6000	9.75
QCS 50	50	-25	500 ← → 6000	15.2
QCS 60	60	-10	600 ← → 6000	21.9
QCS 80	80	-29	800 ← → 6000	39.0
QCS 100	100	-12/-34	1000 ← → 6000	60.9

material: martensite stainless steel (equivalent to SUS440C)

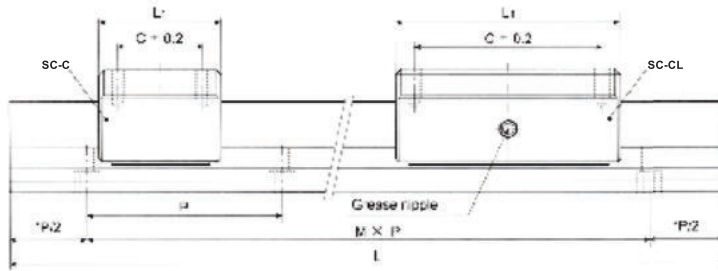
hardness: 56HRC (HV613) or more

The maximum length of hardening is up to 4500mm for shafts with diameter over 80mm.

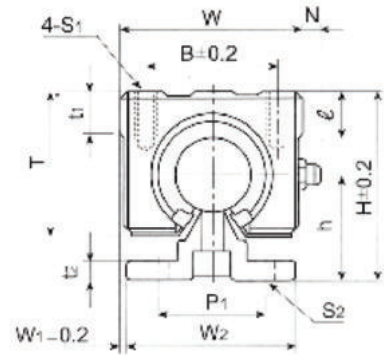
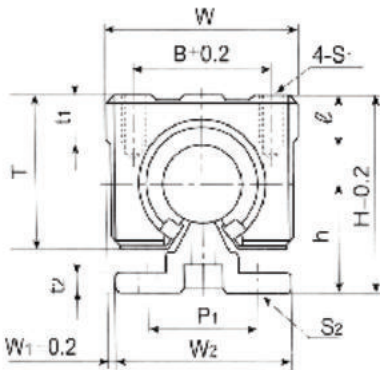
Tolerances other than g6 are available upon request.

# Linear Shaft With Bottom Support

**SC-C**  
**SC-CL**



**SBR**



**SC-C**  
SC-C16~SC-C40

**SC-CL**  
(Long Type)  
SC-CL16~SC-CL30

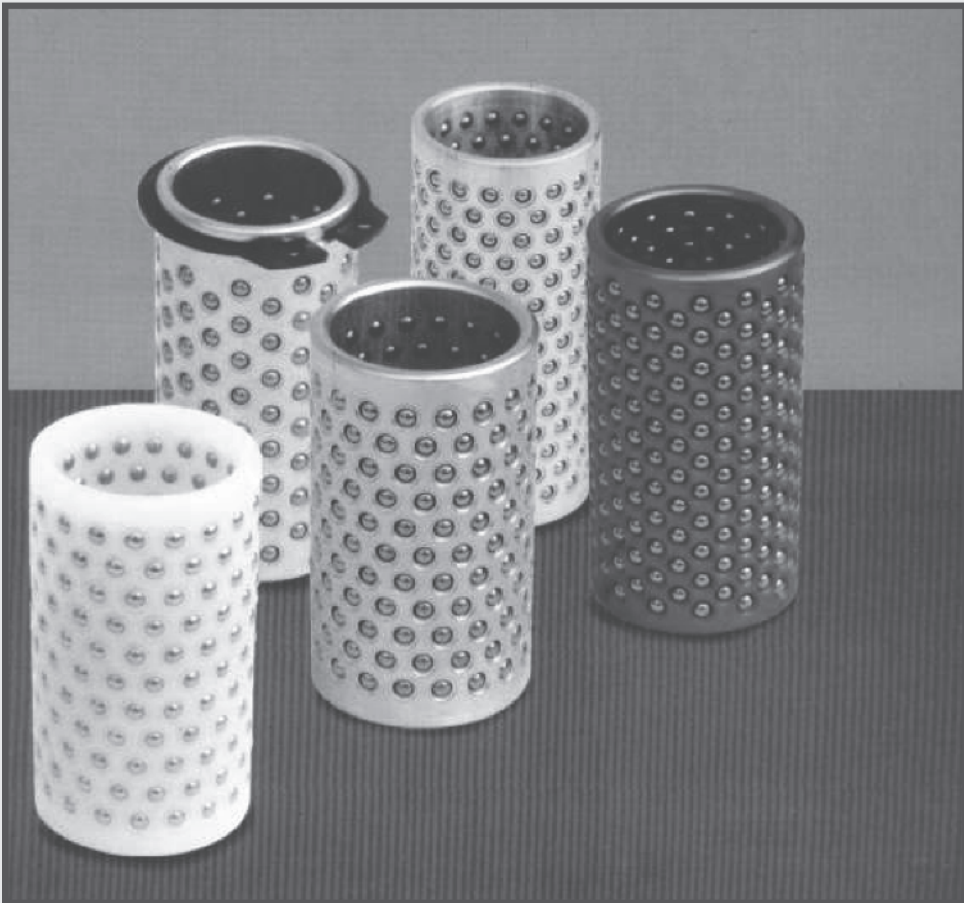
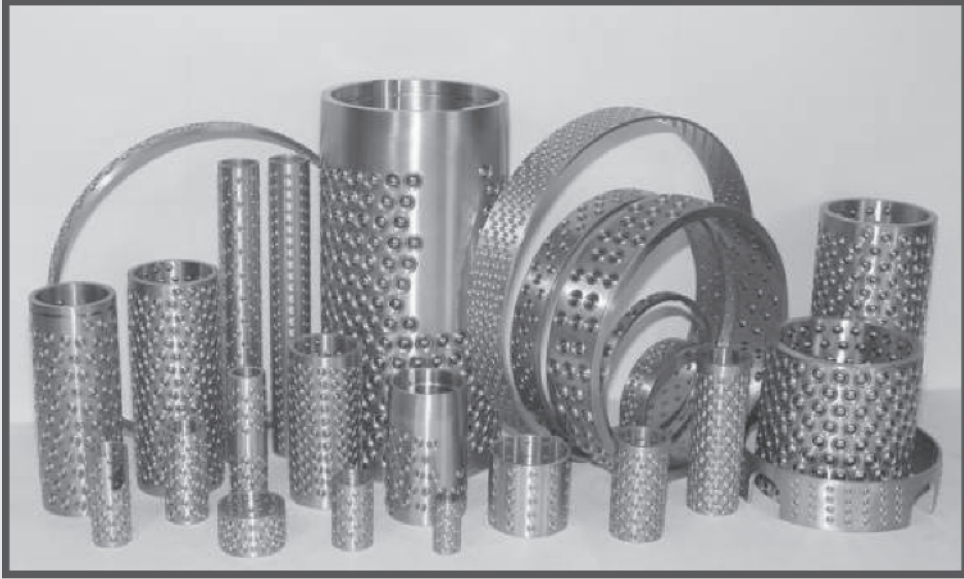
Model No.	Shaft Dia	Dimensions of assembly				Dimensions of Block								Dimensions of track rail						Basic dynamic load rating C(kgf)	Basic Static load rating Co(kgf)
		H	h	W1	W	L1	B	C	t1	ℓ	S1	T	N	W2	P1	t2	P	S2	L(max)		
SC-C16	16	45	25	2.5	45	45	32	30	9	12	M5	33	-	40	30	5	150	5.5	3600	79	120
SC-CL 16	16	45	25	2.5	45	85	32	60	9	12	M5	33	8	40	30	5	150	5.5	3600	158	240
SC-C 20	20	50	27	1.5	48	50	35	35	11	12	M6	39	-	45	30	5	150	5.5	4200	90	140
SC-CL 20	20	50	27	1.5	48	96	35	70	11	12	M6	39	8	45	30	5	150	5.5	4200	180	280
SC-C 25	25	60	33	2.5	60	65	40	40	14	12	M6	47	-	55	35	6	200	6.5	4200	100	160
SC-CL 25	25	60	33	2.5	60	130	40	100	14	12	M6	47	8	55	35	6	200	6.5	4200	200	320
SC-C 30	30	70	37	5	70	70	50	50	15	18	M8	56	-	60	40	7	200	6.5	4200	160	280
SC-CL 30	30	70	37	5	70	140	50	110	15	18	M8	56	8	60	40	7	200	6.5	4200	320	560
SC-C 40	40	90	48	7.5	90	90	65	65	20	20	M10	72	-	75	55	9	300	9	4200	220	410
SC-CL 40	40	90	48	7.5	90	175	65	140	20	20	M10	72	8	75	55	9	300	9	4200	440	820
SC-C 50	50	115	62	12.5	120	110	94	80	25	20	M10	92	-	95	70	11	300	11	4200	390	810

Example of identification number :

**SC-C25-B2-2400**

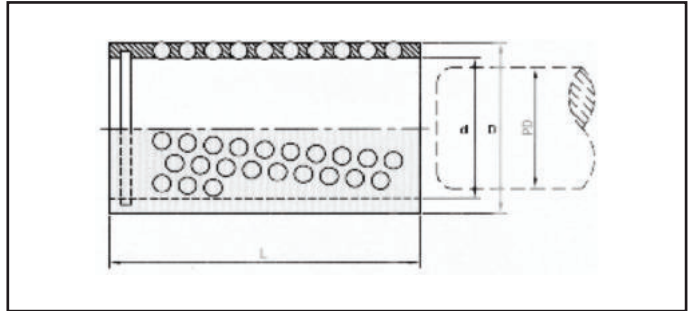
① ② ③ ④

- ① Model No. : SC-C, SC-CL
- ② Shaft Dimeter : Shaft L Hardness (HRC52±2) ground & chromium plated
- ③ Number of blocks per track rail : B1 : 1 Block B2 : 2 Blocks B3 : 3 Blocks
- ④ Length of track rail : (2400mm)



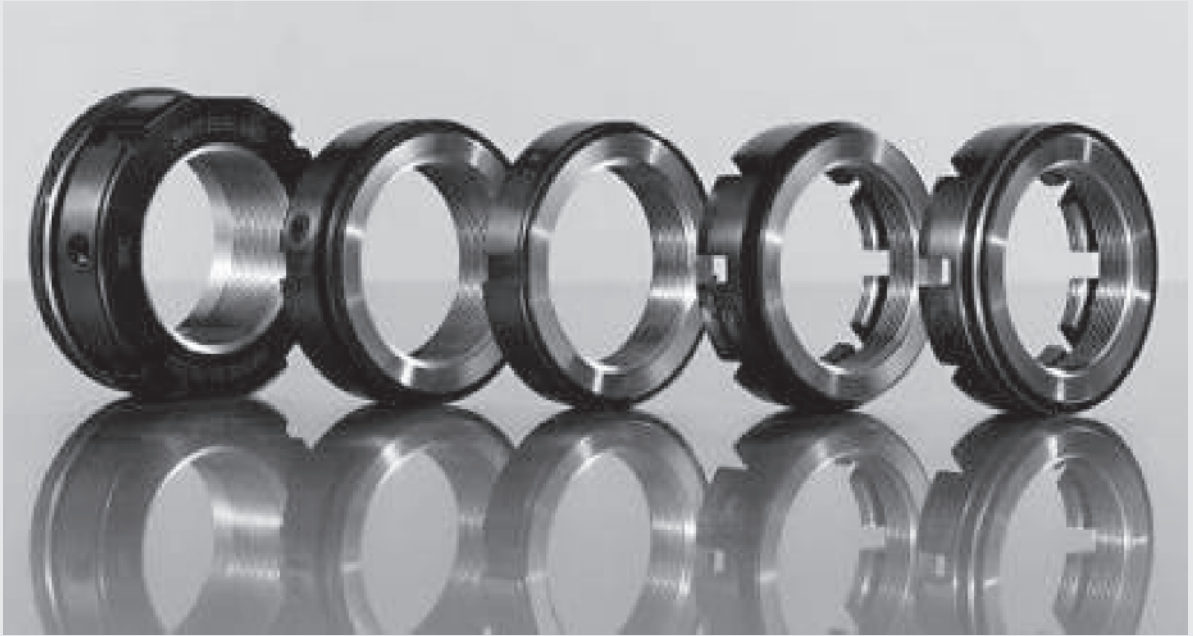


## Ball Cage Retainer bush Bearing (Brass)

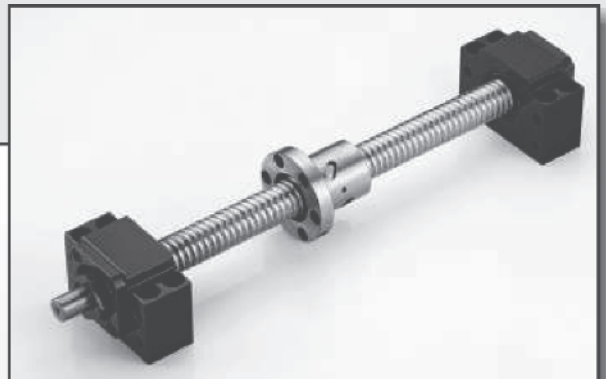
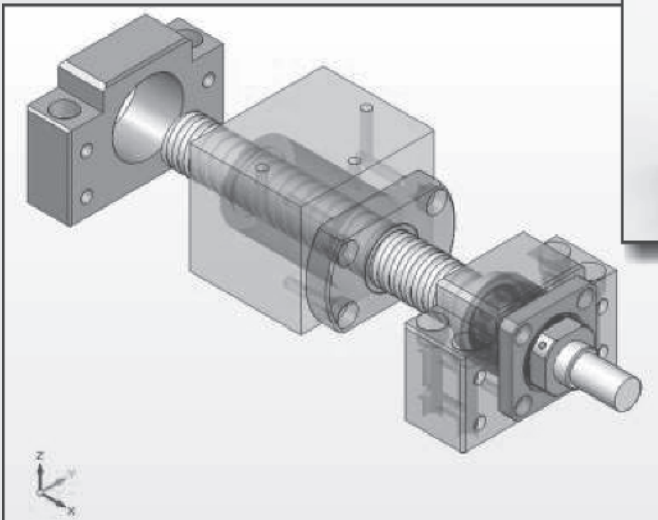


Model	d	D	L	Steel Ball No.	Weight Kg.
QLH.012.020	12	16	20	72	35
QLH.012.028			28	108	52.5
QLH.012.036			36	132	64.1
QLH.012.042			42	156	75.8
QLH.012.051	15	21	51	192	93.3
QLH.015.035			35	84	86.8
QLH.015.042			42	108	111.6
QLH.015.052			52	132	136.4
QLH.015.065	16	22	65	180	186
QLH.016.024			24	48	50.6
QLH.016.035			35	84	88.6
QLH.016.042			42	108	114
QLH.016.052	19	25	52	132	139.3
QLH.016.065			65	180	189.9
QLH.019.035			35	112	93.2
QLH.019.043			43	144	119.9
QLH.019.050	20	26	50	176	146.5
QLH.019.057			57	208	173.1
QLH.019.065			65	240	199.8
QLH.019.082			82	304	253
QLH.020.035	24	30	35	112	148.2
QLH.020.045			43	144	190.6
QLH.025.050			50	176	233
QLH.020.057			57	208	275.3
QLH.020.065	25	31	65	240	317.7
QLH.020.072			72	272	360
QLH.020.082			82	304	402.4
QLH.024.043			43	162	238.1
QLH.024.052	30	38	53	198	291
QLH.024.060			60	252	370.3
QLH.024.067			67	270	396.8
QLH.024.077			77	324	476.1
QLH.024.084	31	39	84	360	529
QLH.024.100			100	432	634.8
QLH.024.108			108	468	687.7
QLH.025.043			43	162	240.2
QLH.025.052	35	43	52	198	293.6
QLH.025.060			60	252	373.6
QLH.025.067			67	270	400.3
QLH.025.077			77	324	480.4
QLH.025.084	38	46	84	360	533.8
QLH.025.100			100	432	640.5
QLH.025.108			108	468	693.9
QLH.030.052			52	162	417

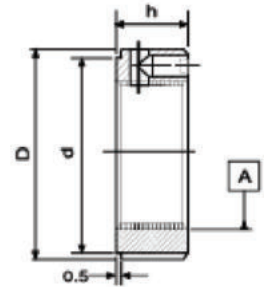
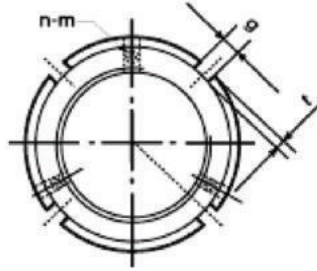
Model	d	D	L	Steel Ball No.	Weight Kg.
QLH.030.065	30	38	65	216	556
QLH.030.074			74	252	648.7
QLH.030.080			80	270	695
QLH.030.100			100	342	880.4
QLH.030.121	32	40	121	414	1065.7
QLH.032.052			52	162	423.2
QLH.032.065			65	216	564.3
QLH.032.074			74	252	658.3
QLH.032.080	38	46	80	270	705.4
QLH.032.090			90	306	799.4
QLH.032.100			100	342	893.5
QLH.032.121			121	414	1081.6
QLH.038.060	40	48	60	220	626.8
QLH.038.085			85	320	911.7
QLH.038.100			100	380	1082.7
QLH.040.055			55	200	575.3
QLH.040.060	48	56	60	220	632.8
QLH.040.065			65	240	690.3
7,611.040.075			75	280	805.4
QLH.040.080			80	300	862.9
QLH.040.085	50	58	85	320	920.5
QLH.040.100			100	380	1093
QLH.040.115			115	440	1265.6
QLH.040.125			125	480	1380.7
QLH.040.134	55	63	134	520	1495.7
QLH.040.150			150	580	1668.3
QLH.048.067			67	288	927.3
QLH.048.082			82	360	1159.1
QLH.048.094	60	71	94	432	1391
QLH.048.100			100	456	1468.2
QLH.048.110			110	504	1622.8
QLH.048.125			125	576	1854.6
QLH.048.136	63	74	136	624	2009.32
QLH.050.067			67	288	933
QLH.050.082			82	360	1166.3
QLH.050.094			94	432	1399.6
QLH.050.100	66	77	100	456	1477.3
QLH.050.110			110	504	1632.8
QLH.050.125			125	576	1866.1
QLH.050.136			136	624	2021.6
QLH.050.147	69	80	147	672	2177.1
QLH.063.100			100	608	2275.1
QLH.063.125			125	768	2873.8
QLH.063.155			155	960	3592.8



## Ballscrew Support Unit



## QLH-A series : Axial Locking



**Locking Mold** : axial (horizontal),  
three-point of cooper screws locking

**Material** : JIS G4105 (SCM440),  
DIN 17204 (42CrMo4)

**Hardness** : HRC 30 ±2

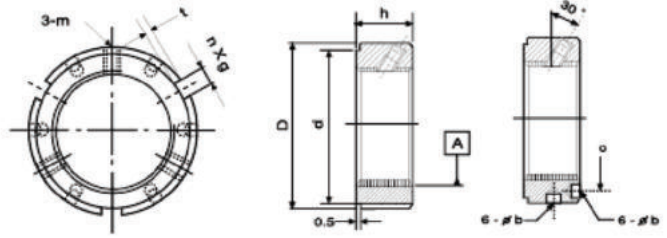
**Thread Tolerance** : ISO 4H

**Notes** : apply for high rigidity interchangeable with F series

thread	D	h	g	t	d	n- M	Max. Nm
QLHA M14x1.5	30	14	4	2	25	2-M4	3.5
QLHA M15x1					27		
QLHA M16x1.5					33		
QLHA M17x1	32	16	4	2	27	3-M4	4.5
QLHA M18x1.5					35		
QLHA M20x1					40		
QLHA M20x1.5	38	18	5	2.5	40	3-M6	8.0
QLHA M22x1.5					45		
QLHA M24x1.5					50		
QLHA M25x1.5	40	20	6	3	45	3-M8	18.0
QLHA M27x1.5					47		
QLHA M30x1.5					52		
QLHA M33x1.5	45	22	7	3	47	3-M8	18.0
QLHA M35x1.5					56		
QLHA M36x1.5					59		
QLHA M39x1.5	52	24	8	3.5	52	3-M8	18.0
QLHA M40x1.5					64		
QLHA M42x1.5					68		
QLHA M45x1.5	62	26	10	4	56	3-M8	18.0
A M48x1.5					73		
QLHA M50x1.5					78		
QLHA M52x1.5	70	28	10	4	64	3-M8	18.0
QLHA M55x2					73		
QLHA M56x2					78		
QLHA M60x2	80	30	10	4	73	3-M8	18.0
QLHA M64x2					84		
QLHA M65x2					86		
QLHA M68x2	85	32	10	4	78	3-M8	18.0
QLHA M70x2					84		
QLHA M72x2					86		
QLHA M75x2	92	34	10	4	84	3-M8	18.0
QLHA M76x2					86		
QLHA M80x2					90		
QLHA M85x2	94	36	10	4	86	3-M8	18.0
QLHA M90x2					90		
QLHA M95x2					96		
QLHA M100x2	105	38	10	4	96	3-M8	18.0
QLHA M100x2					102		
QLHA M100x2					108		
QLHA M100x2	110	40	10	4	102	3-M8	18.0
QLHA M100x2					108		
QLHA M100x2					113		
QLHA M100x2	120	42	10	4	108	3-M8	18.0
QLHA M100x2					113		
QLHA M100x2					118		

thread	D	h	g	t	d	n- M	Max. Nm
QLHA M105x2	140	28	12	5	125	3-M10	35.0
QLHA M110x2	145				132		
QLHA M115x2	150				137		
QLHA M120x2	155	30	14	6	142	3-M12	60.0
QLHA M125x2	160				147		
QLHA M130x2	165				152		
QLHA M135x2	175	32	16	7	160	3-M12	60.0
QLHA M140x2	180				165		
QLHA M145x2	190				175		
QLHA M150x2	195	34	18	8	180	3-M12	60.0
QLHA M155x3	200				190		
QLHA M160x3	210				190		
QLHA M165x3	210	36	18	8	200	3-M12	60.0
QLHA M170x3	220				205		
QLHA M180x3	230				215		
QLHA M190x3	240	38	20	8	215	3-M12	60.0
QLHA M200x3	250				225		

## QLH-F series : Flank Locking



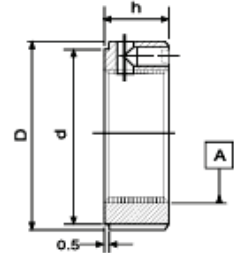
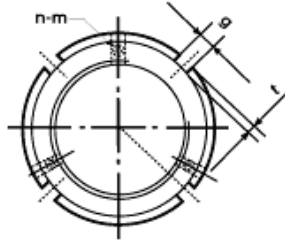
F series: Flank Locking  
 Locking Mold: flank 30°  
 three-point of cooper screws locking  
 Material: JIS G4105 (SCM440),  
 DIN 17204 (42CrMo4)  
 Hardness: HRC 30 ±2  
 Thread Tolerance: ISO 4H  
 Notes: apply for high rigidity interchangeable with A series

thread	D	h	d	tn x g/b	t/c	M	Max. Nm
QLHF M14x1.5	30	14	25	3x4/-	2 -	M5	4.5
QLHF M15x1					2 -		
QLHF M16x1.5					2 -		
QLHF M17x1					2 -		
QLHF M18x1.5					2 -		
QLHF M20x1	16	27	3x4/-	2 -	M6	8.0	
QLHF M20x1.5				2 -			
QLHF M22x1.5	38	33	3x5/-	2 -	M6	8.0	
QLHF M24x1.5				2 -			
QLHF M25x1.5				2 -			
QLHF M27x1.5	40	35	3x5/-	2 -	M6	8.0	
QLHF M30x1.5				2 -			
QLHF M33x1.5	45	40	3x5/-	2 -	M6	8.0	
QLHF M35x1.5				2 -			
QLHF M36x1.5	52	47	3x6/-	2 -	M6	8.0	
QLHF M39x1.5				2 -			
QLHF M40x1.5	58	52	3x6/-	2.5 -	M6	8.0	
QLHF M42x1.5				2.5 -			
QLHF M45x1.5	62	56	3x6/-	2.5 -	M6	8.0	
QLHF M48x1.5				2.5 -			
QLHF M50x1.5	65	59	3x6/-	2.5 -	M6	8.0	
QLHF M52x1.5				2.5 -			
QLHF M55x1.5	73	68	3x7/Ø6	63	M8	18.0	
QLHF M56x2				65			
QLHF M60x2	80	73	3x7/Ø6	3	M8	18.0	
QLHF M56x2				70			
QLHF M65x2	85	78	3x8/Ø6	75	M8	18.0	
QLHF M68x2				75			
QLHF M70x2	92	84	3x8/Ø6	81	M8	18.0	
QLHF M72x2				81			
QLHF M75x2	94	86	3x8/Ø6	83	M8	18.0	
QLHF M76x2				83			
QLHF M77x2	98	90	3x8/Ø6	3.5	M8	18.0	
QLHF M76x2				87			
QLHF M80x2	105	96	3x8/Ø7	87	M8	18.0	
QLHF M85x2				87			
QLHF M85x2	110	102	6x8/Ø7	93	M8	18.0	
QLHF M90x2				93			
QLHF M90x2	120	108	6x10/Ø7	98	M8	18.0	
QLHF M95x2				98			
QLHF M95x2	125	113	6x10/Ø7	105	M8	18.0	
QLHF M95x2				105			

thread	D	h	d	tn x g/b	t/c	M	Max. Nm
QLHF M100x2	130	26	118	6x10/Ø7	115	MB	18.0
QLHF M105x2	140	28	125		4	M10	35.0
F M110x2	145	28	132		123		
QLHF M115x2	150	28	137		128		
QLHF M120x2	155	28	142		133		
QLHF M125x2	160	30	147	138			
QLHF M130x2	165	30	152	143	M10	35.0	
QLHF M135x2	175	30	160	148			
QLHF M140x2	180	32	165	155			
QLHF M145x2	190	32	175	160			
QLHF M150x2	195	32	180	168			
QLHF M155x3	200	34	180	6x12/Ø7	5	M10	35.0
QLHF M160x3	210	34	190	173			
QLHF M165x3	210	34	190	178			
QLHF M170x3	220	34	200	185			
QLHF M180x3	230	36	205	188			
QLHF M190x3	240	36	215	6x14/Ø8	6	M12	60.0
QLHF M200x3	250	38	225	195			
QLHF M200x3	250	38	225	205			
QLHF M200x3	250	38	225	6x16/Ø8	7	M12	60.0
QLHF M200x3	250	38	225	215			
QLHF M200x3	250	38	225	225	7	M12	60.0
QLHF M200x3	250	38	225	225			



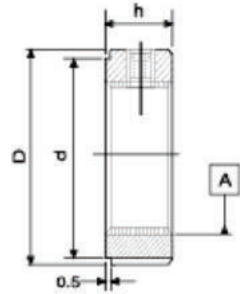
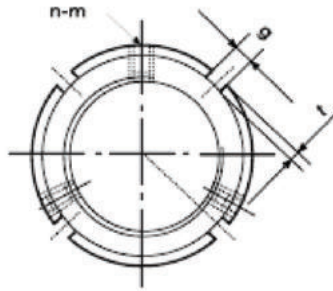
## QLH-C series : Clasp Axial Locking



C series: Clasp Axial Locking  
 Locking Mold: clasp axial (horizontal), multi-points of locking  
 Material: JIS G4105 (SCM440), DIN 17204 (42CrMo4)  
 Hardness: HRC 30 ±2 Thread  
 Tolerance: ISO 6H  
 Notes: apply for heavy loading

Thread	D	h	g	n M x L	n	b	c	Max.Nm	Thread	D	h	g	n M x L	n	b	c	Max.Nm
QLHC M16x1.5	34	18	29	4M4x12	4	4	24	3.5	QLHC M80x2	110	32	103	6M6x22	6	8	95	8
QLHC M17x1	37		32				26		QLHC M85x2	115		108				100	
QLHC M18x1.5	38		33				28		QLHC M90x2	120		113				105	
QLHC M20x1	40		35				30		QLHC M95x2	125		118				110	
QLHC M20x1.5	40		37				32		QLHC M100x2	130		123				115	
QLHC M22x1.5	42		39				34		QLHC M105x2	135		128				120	
QLHC M24x1.5	44		40				35		QLHC M110x2	140		133				125	
QLHC M25x1.5	45		43				37		QLHC M115x2	145		137				130	
QLHC M26x1.5	46	20	45	4M4x14	4	5	35	3.5	QLHC M120x2	155	36	146	6M6x25	6	8	136	8
QLHC M28x1.5	46		47				37		QLHC M125x2	160		150				140	
QLHC M30x1.5	48		50				39		QLHC M130x2	165		155				148	
QLHC M32x1.5	50		53				41		QLHC M135x2	170		160				153	
QLHC M35x1.5	53		55				44		QLHC M140x2	180		168				160	
QLHC M38x1.5	56		57				47		QLHC M145x2	185		173				165	
QLHC M40x1.5	58		59				49		QLHC M150x2	190		178				170	
QLHC M42x1.5	60		63				51		QLHC M155x3	195		183				175	
QLHC M45x1.5	68	25	65	6M4x18	6	6	57	3.5	QLHC M160x3	205	38	190	8M6x25	8	10	178	18
QLHC M48x1.5	69		66				58		QLHC M165x3	210		195				188	
QLHC M50x1.5	70		68				60		QLHC M170x3	215		200				193	
QLHC M52x1.5	72		71				62		QLHC M175x3	220		205				198	
QLHC M55x1.5	75		77				65		QLHC M180x3	230		213				205	
QLHC M55x2	75		79				65		QLHC M185x3	235		218				210	
QLHC M58x1.5	82		82				70		QLHC M190x3	240		223				215	
QLHC M60x1.5	84		84				72		QLHC M195x3	240		223				219	
QLHC M60x2	84	28	75	6M5x20	6	7	75	4.5	QLHC M200x3	245	40	230	8M8x30	8	10	223	18
QLHC M62x1.5	86		77				77		QLHC M155x3	195		183				175	
QLHC M65x1.5	88		79				77		QLHC M160x3	205		190				178	
QLHC M65x2	88		82				77		QLHC M165x3	210		195				188	
QLHC M68x1.5	93		84				80		QLHC M170x3	215		200				193	
QLHC M70x1.5	95		87				82		QLHC M175x3	220		205				198	
QLHC M70x2	95		89				82		QLHC M180x3	230		213				205	
QLHC M72x1.5	97		91				84		QLHC M185x3	235		218				210	
QLHC M75x1.5	100	94	87	QLHC M190x3	240	223	215										
QLHC M75x2	100	94	87	QLHC M195x3	240	223	219										
QLHC M75x2	100	94	87	QLHC M200x3	245	230	223										

## QLH-R series : Radial Locking



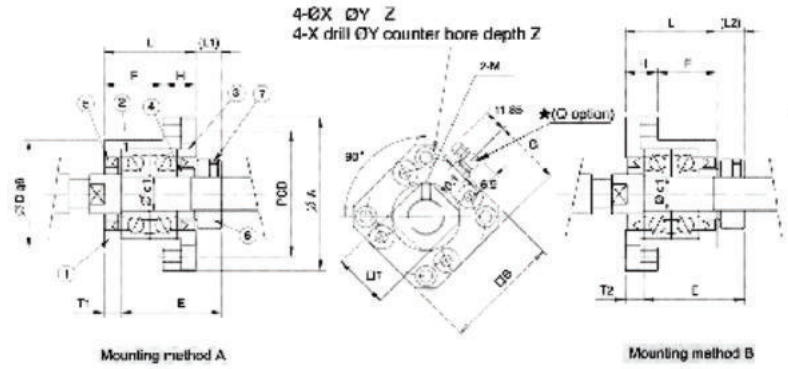
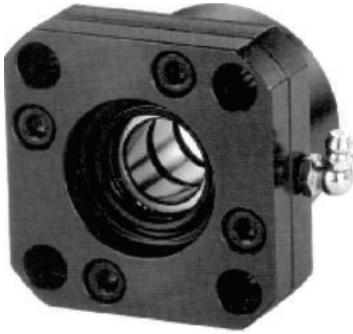
R series: Radial Locking  
 Locking Mold: radial (ver?cal)  
 three-point of cooper screws  
 lockingMaterial: JIS G4105 (SCM440),  
 DIN 17204 (42CrMo4)  
 Hardness: HRC 30 ±2Thread  
 Tolerance: ISO 4H  
 Notes: apply for limit space

thread	D	h	g	t	d	n- M	Max. Nm			
QLHR M6x0.5	16	8	3	2	11	2-M4	3.5			
QLHR M8x0.75	18				13					
QLHR M10x0.75								20	16	
QLHR M12x1										
QLHR M14x1.25	25	10	4	23	2-M5	4.5				
QLHR M15x1	28						25			
QLHR M16x1.5								30	27	
QLHR M18x1.5										
QLHR M20x1	32	12	5	30	3-M5	8.0				
QLHR M20x1.5	35						33			
QLHR M22x1.5								42	37	
QLHR M24x1.5										
QLHR M25x1.5	44	14	6	2.5	49	3-M6	8.0			
QLHR M27x1.5	48							40		
QLHR M30x1.5									52	45
QLHR M33x1.5										
QLHR M35x1.5	54	16	7	2.5	52	3-M6	8.0			
QLHR M36x1.5	58							47		
QLHR M39x1.5									62	56
QLHR M40x1.5										
QLHR M42x1.5	64	18	8	2.5	59	3-M6	8.0			
QLHR M45x1.5	70							62		
QLHR M48x1.5									74	69
QLHR M50x1.5										

thread	D	h	g	t	d	n- M	Max. Nm		
QLHR M52x1.5	73	16	7	3	66	3-M8	18.0		
QLHR M55x2	75				70				
QLHR M56x2	77							73	
QLHR M60x2									
QLHR M64x2	85	18	8	3.5	84	3-M8	18.0		
QLHR M65x2	92				86				
QLHR M68x2								98	90
QLHR M70x2									
QLHR M72x2	95	20	10	4	108	3-M8	18.0		
QLHR M75x2	100				92				
QLHR M76x2								105	96
QLHR M80x2									
QLHR M85x2	110	22	12	5	102	3-M10	35.0		
QLHR M90x2	120				113				
QLHR M95x2								125	118
QLHR M100x2									
QLHR M105x2	130	24	14	6	125	3-M10	35.0		
QLHR M110x2	140				132				
QLHR M115x2								145	137
QLHR M120x2									
QLHR M125x2	150	26	16	7	142	3-M12	60.0		
QLHR M130x2	155				147				
QLHR M135x2								160	152
QLHR M140x2									
QLHR M145x2	165	28	18	8	160	3-M12	60.0		
QLHR M150x2	175				165				
QLHR M155x3								180	175
QLHR M160x3									
QLHR M165x3	190	30	20	8	180	3-M12	60.0		
QLHR M170x3	200				180				
QLHR M180x3								210	190
QLHR M190x3									
QLHR M200x3	220	32	22	8	205	3-M12	60.0		
QLHR M210x3	230				215				
QLHR M220x3								240	215
QLHR M230x3									
QLHR M240x3	250	34	24	8	225	3-M12	60.0		
QLHR M250x3	260				225				
QLHR M260x3								270	235
QLHR M270x3									

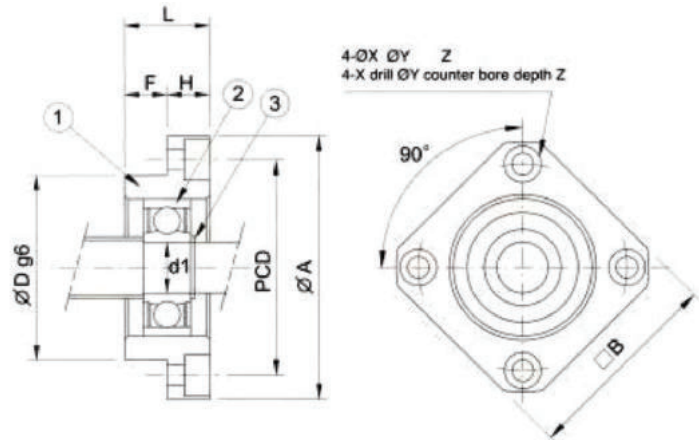


## FK TYPE



Model No.	Shaft diameter d1	L	H	F	E	Dg6	Mounting Method A				Mounting Method B				X	Y	Z	M	T	G	Q
							A	PCD	B	L1	T1	L2	T2								
FK 10	10	27	10	17	29.5	34	-0.009 -0.025	52	42	42	7.5	5	8.5	6	4.5	8	4	M3	16	-	M6
FK 12	12	27	10	17	29.5	36	-0.009 -0.025	54	44	44	7.5	5	8.5	6	4.5	8	4	M4	19	-	M6
FK 15	15	32	15	17	36	40	-0.009 -0.025	63	50	52	10	6	12	8	5.5	9.5	6	M4	22	26	M6
FK 17	17	45	22	23	47	50	-0.009 -0.025	77	62	61	11	9	14	12	6.6	11	10	M4	24	30.5	M6
FK 20	20	52	22	30	50	57	-0.010 -0.029	85	70	68	8	10	12	14	6.6	11	10	M4	30	34	M6
FK 25	25	57	27	30	60	63	-0.010 -0.029	98	80	79	13	10	20	17	9	15	13	M5	35	39	M6
FK 30	30	62	30	32	61	75	-0.010 -0.029	117	95	93	11	12	17	18	11	17.5	15	M6	40	46	M6

## FF TYPE



Model No.	Shaft Diameter d1	L	H	F	Dg6	A	PCD	B	X	Y	Z	Bearing	Snap ring	
FF 06	6	10	6	4	22	-0.007 -0.02	36	28	28	3.4	6.5	4	606ZZ	S 06
FF 10	8	12	7	5	28	-0.007 -0.02	43	35	35	3.4	6.5	4	608ZZ	S 08
FF 12	10	15	7	8	34	-0.009 -0.025	52	42	42	4.5	8	4	6000ZZ	S 10
FF 15	15	17	9	8	40	-0.009 -0.025	63	50	52	5.5	9.5	5.5	6002ZZ	S 15
FF 17	17	20	11	9	50	-0.009 -0.025	77	62	61	6.6	11	6.5	6203ZZ	S 17
FF 20	20	20	11	9	57	-0.010 -0.029	85	70	68	6.6	11	6.5	6204ZZ	S 20
FF 25	25	24	14	10	63	-0.010 -0.029	98	80	79	9	14	8.5	6205ZZ	S 25
FF 30	30	27	18	9	75	-0.010 -0.029	117	95	93	11	17	11	6206ZZ	S 30

FK PART LIST		
NO	PART NAME	Qty
1	Housing	1
2	Bearing	1Set
3	Holding lid	1
4	Collar	2
5	Seal	2
6	Lock nut	1Set
7	Hexagon socket - head setscrew (with set piece)	2
FF PART LIST		
1	Housing	1
2	Bearing	1Set
3	Snap Ring	1

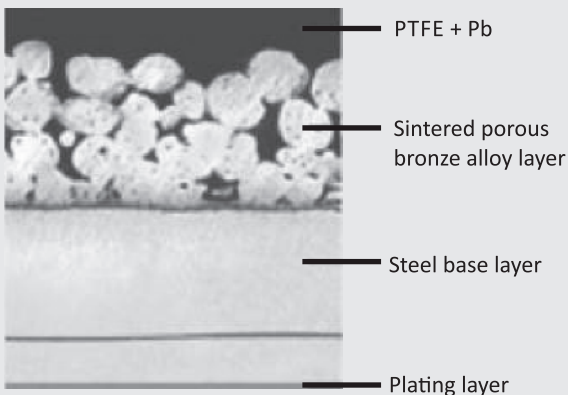




## Smooth, Oilless Operation

The Dry Bushing (DU bushing) is the ultimate in oilless bearing design, using lead and tetrafluoroethylene (Teflon) having excellent wear resistance which optimizes metal properties such as strength and dimensional stability.

Coefficients of static and dynamic friction are so small that the bearing surfaces run smoothly without lubrication, while at the same time eliminating sticking and slipping. Unlike regular bearings which require constant lubrication, the MB type does away with the need for costly maintenance. It is also possible to combine them with parts totally submerged in a lubricant.



## FEATURES

1. The bearing surfaces have such low coefficients of static and dynamic friction that they require no lubrication. QHmet bushing can also be used in lubricants.
2. The operating temperature range extends from - 200°C to 280°C.
3. QHmet bushing operate smoothly under loads which exert high levels of resistance, impact, intermittent motion, and thrust.
4. QHmet bushing are free from electrostatic induction. When installed, each MB bearing has an electrical resistance of 1Ω to 10Ω per 1 cm<sup>2</sup> wide contact area.
5. QHmet bushing surface is highly resistant to most industrial chemicals and solvents including gas, oil, and alcohol.
6. The mating surface (mounting shaft) is wear resistant.
7. Service life is extended.
8. QHmet bushing are light and thin (up to 3 mm thick), requiring little space and permit compact equipment design.
9. QHmet bushing minimize operating noise.
10. Standard QHmet bushings are available for quick delivery. Non-standard QHmet bushings can be made to order.

## Physical and Mechanical Performance

Performance Index		Data	Performance Index		Data
<b>Max Load</b>	Static Load	250 N/mm <sup>2</sup>	Friction Coefficient	Grease Lubrication	0.08~0.20
	Dynamic Load	140 N/mm <sup>2</sup>		Oil Lubrication	0.02~0.07
	Oscilation Load	60 N/mm <sup>2</sup>	Mating Axis	Hardness	> 120 HB
<b>Max Load</b>	Grease Lubrication	2.5 N/mm <sup>2</sup>		Roughness	Ra=0.4~1.25
	Oil Lubrication	5m/s	Working Temperature		-200~+280C
<b>Max Load</b>	Grease Lubrication	3.6 N/mm <sup>2</sup> .m/s	Heat conducting Coefficient		40W/(m - k)
	Oil Lubrication	50 N/mm <sup>2</sup> .m/s	Heat Expansion Coefficient (Axial)		11 x 10 <sup>-6</sup> k <sup>-1</sup>



## Physical and Mechanical Performance

Normally, the surface polymer of QHMET is of chemical-erosion resistant quality. However it can be eroded by fused alkali metal and high temperature fluorine compounds. Therefore its erosion-prevention quality is primarily decided by the quality of the steel back and its plating layer. Air-erosion could be effectively prevented if the steel back is bronze or tin-plated. If the bush is to be used in corrosive environment, the steel back needs to be plated with lead, zinc, nickel or nickel-chrome alloy, etc.

## Friction Characteristics

QHMET is of much lower friction coefficient. Friction coefficient may relatively become smaller under heavier load. When the load pressure is more than 7Mpa, its friction coefficient may reduce to 0.05 or smaller. In addition, friction coefficient will also become smaller with lower linear velocity and higher temperature.

## Anti-abrasion Performance

QHMET is of excellent anti-abrasion performance, mainly due to die particular molecule structure of PTFE. The abrasion process can be generally divided into three phases, so there are three kinds of friction coefficient. See the right graph:

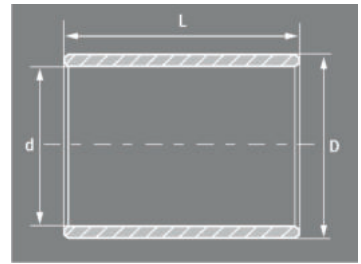
1. "Running-in" phrase: PTFE compound on the bush is transferred to its mating surface and forms a lubricating film. At this phase, the friction coefficient is bigger, thus the abrasion pace is very quick, See the curve showed in area I of the graph.  
"Running-in" phrase: PTFE compound on the bush is transferred to its mating surface and forms a lubricating film. At this phase, the friction coefficient is bigger, thus the abrasion pace is very quick, See the curve showed in area I of the graph.
2. 'Stabilization\* abrasion phrase: After the 'Running-in phase', the friction liappens between PTFE and PTFE, thus the friction coefficient is smaller and keeps steady. As a result, the wear rate is low and steady, bee the curve showed in area II of the graph.
3. "Slurp" abrasion phrase: As PTFE in the porous layer is slowly consumed up, not enough lubricant can be supplied to the gliding media. Friction coefficient .UK! wear rate will rapidly rise. When 70% of the bronze surface is exposed, service life of QHMET closes to its end. See the curve showed in area III of the graph.

## The Advantages of Self-Lubricating Bushings

- Elimination Of Oil Holes And Grooves - Cost for machining oil holes and oil grooves is unnecessary. Self-lubricating eliminates the need for the extra oiling system.
- Reduction Of The Machinery Running Cost - With maintenance free features, the lubricant oil is dramatically reduced; machinery running cost will also be decreased.
- Maintenance Free Operation - Self-lubricating bushings solve the problem of oiling operation and oiling devices, also saving bearing maintenance costs.
- Simplified Mechanical Design And Manufacture - With above advantages, thin wall thickness, higher load, and excellent wear resistance, mechanical designs can be simplified and made more economical.
- The Environment Is Protected - The self-lubricating bearing materials work without oil and meet the ROHS directive.

## QLHMC / QLHDX / P-20

Cylindrical Bushing

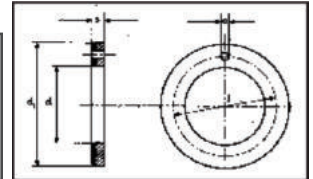


List of our standard dimensions in mm.

Description dxDxL	Description dxDxL	Description dxDxL	Description dxDxL	Description dxDxL
03x4.5x03	16x18x10	32x36x30	70x75x40	135x140x100
03x4.5x04	16x18x12	32x36x40	70x75x50	140x145x60
03x4.5x05	16x18x15	35x39x20	70x75x60	140x145x100
03x4.5x06	16x18x20	35x39x30	70x75x70	145x150x60
04x5.5x03	16x18x25	35x39x35	75x80x40	145x150x100
04x5.5x04	18x20x10	35x39x40	75x80x50	150x155x60
04x5.5x06	18x20x15	35x39x50	75x80x60	150x155x80
04x5.5x10	18x20x20	36x40x20	75x80x70	150x155x100
05x07x05	18x20x25	36x40x30	75x80x80	155x160x60
05x07x08	20x22x10	36x40x40	80x85x60	155x160x100
05x07x10	20x22x15	37x41x20	80x85x80	160x165x60
06x08x04	20x22x20	40x44x20	80x85x100	160x165x80
06x08x06	20x23x10	40x44x30	85x90x30	160x165x100
06x08x08	20x23x15	40x44x40	85x90x60	165x170x60
07x08x10	20x23x20	40x44x45	85x90x100	165x170x100
07x08x12	20x23x25	40x44x50	90x95x60	170x175x60
08x10x06	20x23x30	45x50x20	90x95x100	170x175x100
08x10x08	22x25x15	45x50x30	95x100x60	175x180x60
08x10x10	22x25x20	45x50x40	95x100x100	175x180x100
08x10x12	22x25x25	45x50x45	100x105x50	180x185x60
0x12x08	22x25x30	45x50x50	100x105x60	180x185x80
10x12x10	24x27x15	50x55x20	100x105x70	180x185x100
10x12x12	24x27x20	50x55x25	100x105x80	190x195x60
10x12x15	24x27x25	50x55x30	100x105x100	190x195x100
10x12x20	24x27x30	50x55x40	100x105x115	200x205x60
12x14x08	25x28x12	50x55x50	105x110x60	200x205x100
12x14x10	25x28x15	50x55x60	105x110x100	205x210x60
12x14x12	25x28x20	55x60x20	105x110x115	205x210x100
12x14x15	25x28x25	55x60x25	110x115x60	210x215x60
12x14x20	25x28x30	55x60x30	110x115x100	210x215x100
12x14x25	25x28x40	55x60x40	110x115x115	215x220x60
13x15x10	25x28x50	55x60x50	115x120x50	215x220x100
13x15x20	28x32x15	55x60x55	115x120x60	220x225x60
14x16x05	28x32x20	55x60x60	115x120x70	220x225x100
14x16x10	28x32x25	60x65x20	115x120x115	230x235x60
14x16x12	28x32x30	60x65x30	120x125x50	230x235x100
14x16x15	30x34x10	60x65x40	120x125x60	240x245x60
14x16x20	30x34x15	60x65x50	120x125x100	240x245x100
14x16x25	30x34x20	60x65x60	125x130x60	250x255x60
15x17x10	30x34x25	60x65x70	125x130x100	250x255x100
15x17x12	30x34x30	65x70x30	130x135x60	280x285x60
15x17x15	30x34x40	65x70x40	130x135x100	280x285x100
15x17x20	30x34x50	65x70x50	135x140x60	300x305x60
15x17x25	32x36x20	65x70x70	135x140x80	300x305x100

## QLHMW

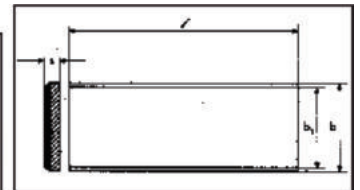
Thrust washer



CODE	Measures in mm. (Tolerance)				
	d <sub>1</sub> (+0.25)	d <sub>2</sub> (+0.25)	s (+0.05)	j (0.12)	a (+0.4+0.1)
QHMW10	10	20	1.5	15	1.5
QHMW12	12	24	1.5	18	1.5
QHMW14	14	26	1.5	20	2
QHMW16	16	30	1.5	22	2
QHMW18	18	32	1.5	25	2
QHMW20	20	36	1.5	28	3
QHMW22	22	38	1.5	30	3
QHMW26	26	44	1.5	35	3
QHMW28	28	48	1.5	38	4
QHMW32	32	54	1.5	43	4
QHMW38	38	62	1.5	50	4
QHMW42	42	66	1.5	54	4
QHMW48	48	74	2	61	4
QHMW52	52	78	2	65	4
QHMW62	62	90	2	76	4

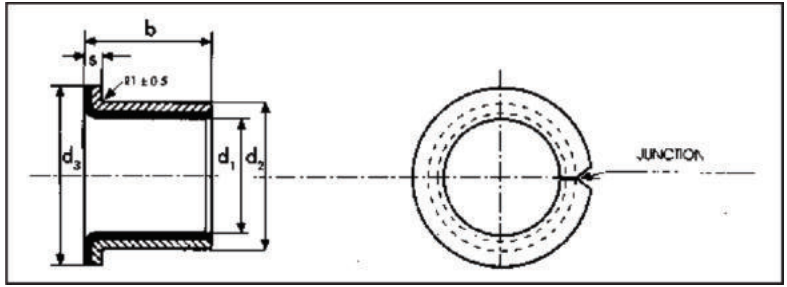
## QLHMS

Strips



CODE	Measures in mm. (Tolerance)			
	S (-0.04)	B	B1	L (+3)
QHMS 07120	0.75	120	108	1000
QHMS 10160	1.0	160	148	1000
QHMS 15160	1.5	160	148	1000
QHMS 20160	2.0	160	148	1000
QHMS 25160	2.5	160	148	1000
QHMS 30160	3.05	160	148	1000
QHMS 07300	0.75	300	288	1000
QHMS 10300	1.0	300	288	1000
QHMS 15300	1.5	300	288	1000
QHMS 20300	2.0	300	288	1000
QHMS 25300	2.5	300	288	1000
QHMS 30300	3.05	300	288	1000

## QLH-MF Flanged Bushing



CODE	Measure in mm.(tolerance)				
	d <sub>1</sub>	d <sub>2</sub>	D <sub>3</sub> (±0.5)	B (0.25)	s (-0.2)
QHMF 0604	6	8	12	4	1
QHMF 0607	6	8	12	7	1
QHMF 0608	6	8	12	8	1
QHMF 0805	8	10	15	5.5	1
QHMF 0807	8	10	15	7.5	1
QHMF 0809	8	10	15	9.5	1
QHMF 1007	10	12	18	7	1
QHMF 1009	10	12	18	9	1
QHMF 1012	10	12	18	12	1
QHMF 1017	10	12	18	17	1
QHMF 1207	12	14	20	7	1
QHMF 1209	12	14	20	9	1
QHMF 1212	12	14	20	12	1
QHMF 1217	12	14	20	17	1
QHMF 1412	14	16	22	12	1
QHMF 1417	14	16	22	17	1
QHMF 1509	15	17	23	9	1
QHMF 1512	15	17	23	12	1

CODE	Measure in mm.(tolerance)				
	d <sub>1</sub>	d <sub>2</sub>	D <sub>3</sub> (±0.5)	B (0.25)	s (-0.2)
QHMF 1517	15	17	23	17	1
QHMF 1612	16	18	24	12	1
QHMF 1617	16	18	24	17	1
QHMF 1812	18	20	26	12.	1
QHMF 1817	18	20	26	17	1
QHMF 1822	18	20	26	22	1
QHMF 2011	20	23	30	11.5	1.5
QHMF 2016	20	23	30	16.5	1.5
QHMF 2021	20	23	30	21.5	1.5
QHMF 2511	25	28	35	11.5	1.5
QHMF 2516	25	28	35	16.5	1.5
QHMF 2521	25	28	35	21.5	1.5
QHMF 3016	30	34	42	16	2
QHMF 3026	30	34	42	26	2
QHMF 3516	35	39	47	16	2
QHMF 3526	35	39	47	26	2
QHMF 4026	40	44	53	26	2



## Self Lubricating Bushes with solid Lubricants



### FEATURE

- Maintenance-free.
- excellent wear resistance in such places where an oil film is difficult to be formed due to reciprocating, Oscillating motions and frequently intermittent operations.
- Remarkable Resistance To Corrosion And Resistance To Chemical Attack.
- Exhibits In Comparable Performance Under A High Load, Low Speed Operation.
- No Imparity Through Discharge Of Lubrication.



### Service Range

Lubrication conditions	Dry	Periodic lubrication
Service temperature range °C	-40 to +300	-40 to+150
Allowable max. contact pressure P N/mm <sup>2</sup> {kgf/cm <sup>2</sup> }	29(98) {296(1,000)}	
Allowable max. velocity V m/s {m/min}	0.50(30)	1.00{60}
Allowable max. PV value N/mm <sup>2</sup> m/s {kgf/cm <sup>2</sup> m/min}	1.65{1,010}	3.25{1,990}

### Mechanical Properties

Density	g/cm <sup>3</sup>	7.8
Tensile strength	N/mm <sup>2</sup> {kgf/mm <sup>2</sup> }	755{77}
Tensile elongation at breQH	%	12
Yield stress (0.1%)	N/mm <sup>2</sup> {kgf/MM <sup>2</sup> }	345{35}
Impact strength	J/cm <sup>2</sup> {kgfm/cm <sup>2</sup> }	19{1.9}
Hardness	—	HB210
Modulus of longitudinal elasticity	N/mm <sup>2</sup> {kgf/mm <sup>2</sup> }	105,000{10,700}
Co-efficient of linear expansion	X10-5 0C-1	2.2
Thermal conductivity	W/mt {cal/sec 0Ccm}	0.009{0.21}

### Chemical Compositions

Chemical Compositions									
Product No.	Cu	Zn	Al	Fe	Mn	Si	Ni	Sn	Pb
	60~65	22~28	5.0~8.0	2.0~4.0	2.5~5.0	<0.1	<0.5	<0.2	<0.2

**Graphite Plug : Graphite : 85%. Mos2 : 3%. Resin : 7%. Balance : 3-5%**

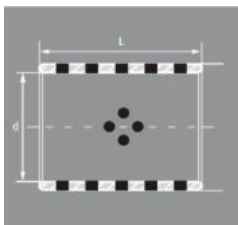
**For Hydro Application : ASTM (B505C86300) with PTFE Plug (White Color)**

**Chemical Composition : Cu (60.0-66.0). Zn(22.0-28.0). Fe (2.0-4.0). Al (5.0-7.5). Mn (2.5-5.0). Other**

**PTFE Plug : 100% Natural Pure PTFE.**

## QHLC = Cylindrical bushing

List of our standard dimensions in mm.



**QHLC**  
Cylindrical bushing

QLH Description dxDxL
QHLC 8x12x8
QHLC 8x12x10
QHLC 8x12x12
QHLC 8x12x15
QHLC 10x14x8
QHLC 10x14x10
QHLC 10x14x12
QHLC 10x14x15
QHLC 10x14x20
QHLC 12x18x10
QHLC 12x18x12
QHLC 12x18x15
QHLC 12x18x16
QHLC 12x18x20
QHLC 12x18x25
QHLC 12x18x30
QHLC 13x19x10
QHLC 13x19x15
QHLC 13x19x16
QHLC 13x19x20
QHLC 14x20x10
QHLC 14x20x12
QHLC 14x20x15
QHLC 14x20x20
QHLC 14x20x25
QHLC 14x20x30
QHLC 15x21x10
QHLC 15x21x12
QHLC 15x21x15
QHLC 15x21x16
QHLC 15x21x20
QHLC 15x21x25
QHLC 15x21x30
QHLC 16x22x10
QHLC 16x22x12
QHLC 16x22x15
QHLC 16x22x16
QHLC 16x22x20
QHLC 16x22x25
QHLC 16x22x30
QHLC 16x22x35
QHLC 16x22x40
QHLC 18x24x12
QHLC 18x24x16
QHLC 18x24x20
QHLC 18x24x25
QHLC 18x24x30
QHLC 18x24x35
QHLC 18x24x40

QLH Description dxDxL
QHLC 20x28x10
QHLC 20x28x12
QHLC 20x28x15
QHLC 20x28x16
QHLC 20x28x20
QHLC 20x28x25
QHLC 20x25x30
QHLC 20x28x35
QHLC 20x28x40
QHLC 20x28x50
QHLC 20x30x16
QHLC 20x30x20
QHLC 20x30x25
QHLC 20x30x30
QHLC 20x30x35
QHLC 20x30x40
QHLC 22x32x12
QHLC 22x32x15
QHLC 22x32x20
QHLC 22x32x25
QHLC 25x33x12
QHLC 25x33x15
QHLC 25x33x16
QHLC 25x33x20
QHLC 25x33x25
QHLC 25x33x30
QHLC 25x33x35
QHLC 25x33x40
QHLC 25x33x50
QHLC 25x33x60
QHLC 25x35x12
QHLC 25x35x15
QHLC 25x35x16
QHLC 25x35x20
QHLC 25x35x25
QHLC 25x35x30
QHLC 25x35x35
QHLC 25x35x40
QHLC 25x35x50
QHLC 28x38x20
QHLC 28x38x25
QHLC 28x38x30
QHLC 28x38x40
QHLC 30x38x12
QHLC 30x38x15
QHLC 30x38x15
QHLC 30x38x20
QHLC 30x38x25
QHLC 30x38x30
QHLC 30x38x35
QHLC 30x38x40
QHLC 30x38x50
QHLC 30x40x20
QHLC 30x40x25
QHLC 30x40x30
QHLC 30x40x35
QHLC 30x40x40
QHLC 30x40x50
QHLC 30x40x60

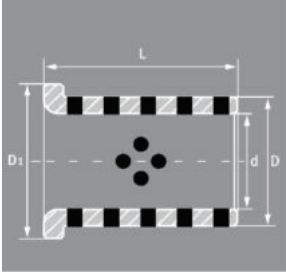
QLH Description dxDxL
QHLC 31x40x30
QHLC 31x40x40
QHLC 32x42x30
QHLC 32x42x40
QHLC 35x44x25
QHLC 35x44x30
QHLC 35x44x35
QHLC 35x44x40
QHLC 35x44x50
QHLC 35x44x60
QHLC 35x45x20
QHLC 35x45x25
QHLC 35x45x30
QHLC 35x45x35
QHLC 35x45x40
QHLC 35x45x50
QHLC 35x45x60
QHLC 38x48x30
QHLC 38x48x40
QHLC 40x50x20
QHLC 40x50x25
QHLC 40x50x30
QHLC 40x50x35
QHLC 40x50x40
QHLC 40x50x50
QHLC 40x50x60
QHLC 40x50x70
QHLC 40x50x80
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QHLC 45x60x40
QHLC 45x60x50
QHLC 45x60x60
QHLC 45x60x80
QHLC 50x60x30
QHLC 50x60x35
QHLC 50x60x40
QHLC 50x60x50
QHLC 50x60x60
QHLC 50x60x70
QHLC 50x60x80
QHLC 50x62x30
QHLC 50x62x35

QLH Description dxDxL
QHLC 50x62x40
QHLC 50x62x50
QHLC 50x62x60
QHLC 50x62x70
QHLC 50x65x30
QHLC 50x65x40
QHLC 50x65x50
QHLC 50x65x60
QHLC 50x65x70
QHLC 50x65x80
QHLC 50x65x100
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QHLC 60x75x60
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QHLC 60x75x80
QHLC 60x75x100
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QHLC 65x80x60
QHLC 65x80x70
QHLC 65x80x80
QHLC 70x85x35
QHLC 70x85x40
QHLC 70x85x50
QHLC 70x85x60
QHLC 70x85x70
QHLC 70x85x80
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QHLC 75x90x100
QHLC 75x95x60
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QHLC 80x96x60
QHLC 80x96x70

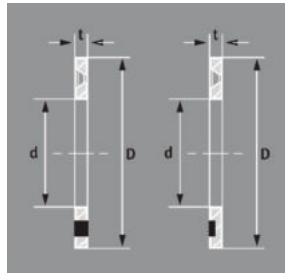
QLH Description dxDxL
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QHLC 80x96x100
QHLC 80x96x120
QHLC 80x100x40
QHLC 80x100x50
QHLC 80x100x60
QHLC 80x100x70
QHLC 80x100x80
QHLC 80x100x100
QHLC 80x100x120
QHLC 80x100x140
QHLC 85x100x80
QHLC 90x110x30
QHLC 90x110x50
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QHLC 120x140x100
QHLC 120x140x120
QHLC 120x140x140
QHLC 125x145x100
QHLC 125x145x120
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QHLC 150x170x150
QHLC 160x180x100
QHLC 160x180x150



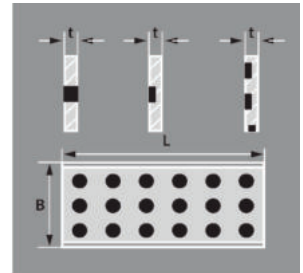
**QHLF**  
Flanged bushing



**QHLW**  
Thrust washer



**QHLS**  
Strips



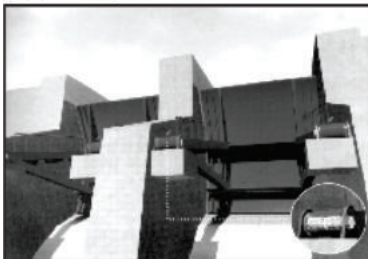
QLH Description dxDxDxL
QHLF 10x14x22x15
QHLF 10x14x22x20
QHLF 12x18x25x15
QHLF 12x18x25x20
QHLF 13x19x26x15
QHLF 13x19x26x20
QHLF 14x30x27x15
QHLF 14x30x27x20
QHLF 15x21x28x15
QHLF 15x21x28x20
QHLF 15x21x28x25
QHLF 15x21x28x30
QHLF 16x22x29x15
QHLF 16x22x29x20
QHLF 16x22x29x25
QHLF 16x22x29x30
QHLF 18x24x32x20
QHLF 18x24x32x30
QHLF 20x30x40x15
QHLF 20x30x40x20
QHLF 20x30x40x25
QHLF 20x30x40x30
QHLF 20x30x40x40
QHLF 25x35x45x15
QHLF 25x35x45x20
QHLF 25x35x45x25
QHLF 25x35x45x30
QHLF 25x35x45x40
QHLF 30x40x50x20
QHLF 30x40x50x25
QHLF 30x40x50x30
QHLF 30x40x50x35
QHLF 30x40x50x40
QHLF 30x40x50x50
QHLF 35x45x60x20
QHLF 35x45x60x30
QHLF 35x45x60x40
QHLF 35x45x60x50
QHLF 40x50x65x20
QHLF 40x50x65x30
QHLF 40x50x65x40
QHLF 40x50x65x50
QHLF 45x55x30x30
QHLF 45x55x30x40
QHLF 45x55x30x50
QHLF 45x55x30x60

QLH Description dxDxDxL
QHLF 50x60x75x30
QHLF 50x60x75x40
QHLF 50x60x75x50
QHLF 50x60x75x60
QHLF 55x65x80x40
QHLF 55x65x80x60
QHLF 60x75x90x40
QHLF 60x75x90x50
QHLF 60x75x90x80
QHLF 70x85x105x50
QHLF 70x85x105x80
QHLF 80x100x120x60
QHLF 80x100x120x80
QHLF 80x100x120x100
QHLF 90x110x130x60
QHLF 90x110x130x80
QHLF 100x120x150x80
QHLF 100x120x150x100
QHLF 120x140x170x80
QHLF 120x140x170x100

QLH Description	dxDxt
QHLW-10	10.2x30x3
QHLW-12	12.2x40x3
QHLW-13	13.2x40x3
QHLW-14	14.2x40x3
QHLW-15	15.2x50x3
QHLW-16	16.2x50x3
QHLW-18	18.2x50x3
QHLW-18	20.2x50x5
QHLW-20	25.2x55x5
QHLW-25	30.2x60x5
QHLW-30	30.2x60x5
QHLW-35	35.2x70x5
QHLW-40	40.2x80x7
QHLW-45	45.2x90x7
QHLW-50	50.3x100x8
QHLW-55	55.3x110x8
QHLW-60	60.3x120x8
QHLW-65	65.3x125x8
QHLW-70	70.3x130x10
QHLW-75	75.3x140x10
QHLW-80	80.3x150x10
QHLW-90	90.5x170x10
QHLW-100	100.5x190x10
QHLW-120	120.5x200x10

QLH Description	B x L x t
QHLS-1875	18x75x10
QHLS-18100	18x100x10
QHLS-18125	18x125x10
QHLS-18150	18x150x10
QHLS-2875	28x75x10
QHLS-28100	28x100x10
QHLS-28125	28x125x10
QHLS-35100	35x100x10
QHLS-35150	35x150x10
QHLS-35200	35x200x10
QHLS-35250	35x250x10
QHLS-35300	35x300x10
QHLS-35350	35x350x10
QHLS-3875	38x75x10
QHLS-38100	38x100x10
QHLS-38125	38x125x10
QHLS-38150	38x150x10
QHLS-4875	48x75x10
QHLS-48100	48x100x10
QHLS-48125	48x125x10
QHLS-48150	48x150x10
QHLS-50100	50x100x10
QHLS-50150	50x150x10
QHLS-50200	50x200x10
QHLS-50250	50x250x10
QHLS-50300	50x300x10
QHLS-50350	50x350x10
QHLS-50400	50x400x10
QHLS-75150	75x150x10
QHLS-75200	75x200x10
QHLS-75250	75x250x10
QHLS-75300	75x300x10
QHLS-75400	75x400x10
QHLS-75500	75x500x10

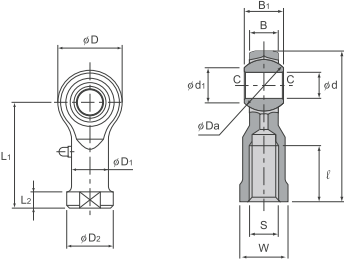
## Application







## Model PHS (Female Type)



Model No.	Outer dimensions			Threaded S <sub>1</sub> JIS Class 2	Holder Dimensions							Grease nipple	Spherical inner ring dimensions				Permissible tilt angles			Static applied load Radial C <sub>s</sub> N	Mass g
	Length L	Diameter D	Width B <sub>1</sub> 0 -0.1		W 0 -0.2	D <sub>1</sub>	D <sub>2</sub>	B ±0.1	L <sub>1</sub>	L <sub>2</sub>	ℓ		d H7	Ball diameter Da mm (inch)	d <sub>1</sub>	C	α <sub>1</sub> °	α <sub>2</sub> °	α <sub>3</sub> °		
PHS 5/5L	35	16	8	M5×0.8	9	9	11	6	27	4	14	PB107	5	11.112(7/16)	7.7	0.3	8	13	30	5590	16.5
PHS 6	39	18	9	M6×1	11	10	13	6.75	30	5	14		6	12.7(1/2)	9	0.3	8	13	30	6860	25
PHS 8	47	22	12	M8×1.25	14	12.5	16	9	36	5	17		8	15.875(5/8)	10.4	0.5	8	14	25	9800	43
PHS 10	56	26	14	M10×1.5	17	15	19	10.5	43	6.5	21		10	19.05(3/4)	12.9	0.5	8	14	25	13200	72
PHS 10-1	56	26	14	M10×1.25	17	15	19	10.5	43	6.5	21		10-1	19.05(3/4)	12.9	0.5	8	14	25	13200	72
PHS 12	65	30	16	M12×1.75	19	17.5	22	12	50	6.5	24		12	22.225(7/8)	15.4	0.5	8	13	25	16700	107
PHS 12-1	65	30	16	M12×1.25	19	17.5	22	12	50	6.5	24		12-1	22.225(7/8)	15.4	0.5	8	13	25	16700	107
PHS 14	74	34	19	M14×2	22	20	25	13.5	57	8	27		14	25.4(1)	16.9	0.7	10	16	24	20600	160
PHS 14-1	74	34	19	M14×1.5	22	20	25	13.5	57	8	27		14-1	25.4(1)	16.9	0.7	10	16	24	20600	160
PHS 16	83	38	21	M16×2	22	22	27	15	64	8	33		16	28.575(1 1/16)	19.4	0.7	9	15	24	25000	210
PHS 16-1	83	38	21	M16×1.5	22	22	27	15	64	8	33	16-1	28.575(1 1/16)	19.4	0.7	9	15	24	25000	210	
PHS 18	92	42	23	M18×1.5	27	25	31	16.5	71	10	36	18	31.75(1 1/4)	21.9	0.7	9	15	24	29400	295	
PHS 20	100	46	25	M20×1.5	30	27.5	34	18	77	10	40	20	34.925(1 3/8)	24.4	0.7	9	15	24	34300	380	
PHS 22	109	50	28	M22×1.5	32	30	37	20	84	12	43	22	38.1(1 1/2)	25.8	0.7	10	15	23	41200	490	
PHS 25	124	60	31	M24×2	36	33.5	42	22	94	12	48	25	42.862(1 7/16)	29.6	0.8	9	15	23	72500	750	
PHS 30	145	70	37	M30×2	41	40	50	25	110	15	56	30	50.8(2)	34.8	0.8	10	17	23	92200	1130	

### [Material]

Holder : S35C (Chromate treatment)  
Spherical inner ring : SUJ2, 58 HRC or higher

(Hard chrome plated except for the inner surface of the inner ring)

Bush : Special copper alloy

### [Fitting with the Shaft]

Condition	Dimensional tolerance of the shaft
Normal load	h7
Indeterminate load	p6

### [Clearance]

Radial clearance	0.035 or less
Axial clearance	0.1 or less

Unit: mm

Apply lubricant before using the product. The holder has a greasing hole and an oil groove; they allow grease to be replenished through the grease nipple as necessary.

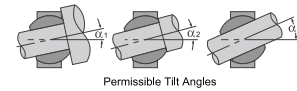
### [Identification of Left-hand Thread]

If the female threading is left-hand, symbol "L" is added. The actual product is marked with symbol "L" on the holder.

### Model number coding

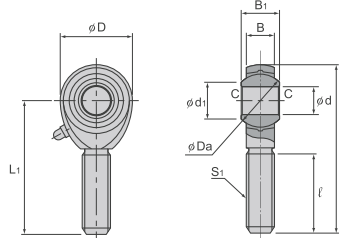
**PHS10 L**

Model number L Left-hand thread



Permissible Tilt Angles

## Model POS (Male Type)



Model No.	Outer dimensions			Threaded S <sub>1</sub> JIS Class 2	Holder Dimensions							Grease nipple	Spherical inner ring dimensions				Permissible tilt angles			Static applied load Radial C <sub>s</sub> N	Mass g
	Length L	Diameter D	Width B <sub>1</sub> 0 -0.1		W 0 -0.2	D <sub>1</sub>	D <sub>2</sub>	B ±0.1	L <sub>1</sub>	L <sub>2</sub>	ℓ		d H7	Ball diameter Da mm (inch)	d <sub>1</sub>	C	α <sub>1</sub> °	α <sub>2</sub> °	α <sub>3</sub> °		
POS 5/5L	35	16	8	M5×0.8	9	9	11	6	27	4	14	PB107	5	11.112(7/16)	7.7	0.3	8	13	30	5590	16.5
POS 6	39	18	9	M6×1	11	10	13	6.75	30	5	14		6	12.7(1/2)	9	0.3	8	13	30	6860	25
POS 8	47	22	12	M8×1.25	14	12.5	16	9	36	5	17		8	15.875(5/8)	10.4	0.5	8	14	25	9800	43
POS 10	56	26	14	M10×1.5	17	15	19	10.5	43	6.5	21		10	19.05(3/4)	12.9	0.5	8	14	25	13200	72
POS 10-1	56	26	14	M10×1.25	17	15	19	10.5	43	6.5	21		10-1	19.05(3/4)	12.9	0.5	8	14	25	13200	72
POS 12	65	30	16	M12×1.75	19	17.5	22	12	50	6.5	24		12	22.225(7/8)	15.4	0.5	8	13	25	16700	107
POS 12-1	65	30	16	M12×1.25	19	17.5	22	12	50	6.5	24		12-1	22.225(7/8)	15.4	0.5	8	13	25	16700	107
POS 14	74	34	19	M14×2	22	20	25	13.5	57	8	27		14	25.4(1)	16.9	0.7	10	16	24	20600	160
POS 14-1	74	34	19	M14×1.5	22	20	25	13.5	57	8	27		14-1	25.4(1)	16.9	0.7	10	16	24	20600	160
POS 16	83	38	21	M16×2	22	22	27	15	64	8	33		16	28.575(1 1/16)	19.4	0.7	9	15	24	25000	210
POS 16-1	83	38	21	M16×1.5	22	22	27	15	64	8	33	16-1	28.575(1 1/16)	19.4	0.7	9	15	24	25000	210	
POS 18	92	42	23	M18×1.5	27	25	31	16.5	71	10	36	18	31.75(1 1/4)	21.9	0.7	9	15	24	29400	295	
POS 20	100	46	25	M20×1.5	30	27.5	34	18	77	10	40	20	34.925(1 3/8)	24.4	0.7	9	15	24	34300	380	
POS 22	109	50	28	M22×1.5	32	30	37	20	84	12	43	22	38.1(1 1/2)	25.8	0.7	10	15	23	41200	490	
POS 25	124	60	31	M24×2	36	33.5	42	22	94	12	48	25	42.862(1 7/16)	29.6	0.8	9	15	23	72500	750	
POS 30	145	70	37	M30×2	41	40	50	25	110	15	56	30	50.8(2)	34.8	0.8	10	17	23	92200	1130	

### [Material]

Holder : S35C (Chromate treatment)  
Spherical inner ring : SUJ2, 58 HRC or higher

(Hard chrome plated except for the inner surface of the inner ring)

Bush : Special copper alloy

### [Fitting with the Shaft]

Condition	Dimensional tolerance of the shaft
Normal load	h7
Indeterminate load	p6

### [Clearance]

Radial clearance	0.035 or less
Axial clearance	0.1 or less

Unit: mm

Apply lubricant before using the product. The holder has a greasing hole and an oil groove; they allow grease to be replenished through the grease nipple as necessary. To lubricate the product, replenish grease from the holder greasing hole for models POS5 and 6, or from the grease nipple for other models.

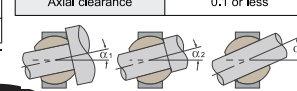
### [Identification of Left-hand Thread]

If the male thread is left-hand, symbol "L" is added. The actual product is marked with symbol "L" on the holder.

### Model number coding

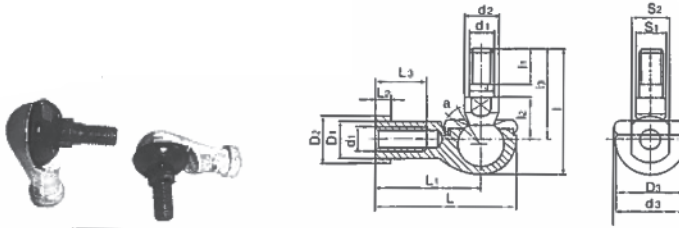
**POS10 L**

Model number L Left-hand thread



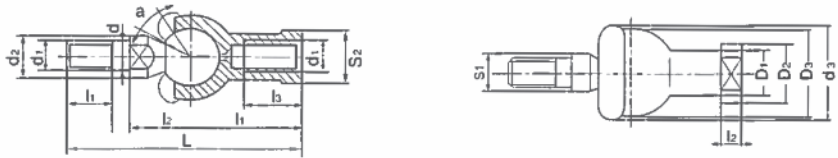
Permissible Tilt Angles

## SQ / RBL / LHSA



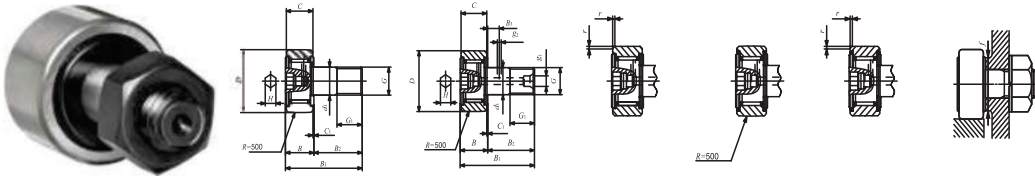
Number	Dimensions (mm)																	KN Load Ratings	Weight kg	
	d	d <sub>1</sub>	d <sub>2</sub> <sub>min</sub>	d <sub>3</sub> <sub>max</sub>	l <sub>1</sub> <sub>max</sub>	l <sub>1</sub> <sub>min</sub>	l <sub>2</sub>	l <sub>3</sub> <sub>max</sub>	S <sub>1</sub>	L <sub>max</sub>	L <sub>1</sub>	L <sub>2</sub> <sub>max</sub>	L <sub>3</sub> <sub>min</sub>	D <sub>1</sub>	D <sub>2</sub> <sub>max</sub>	D <sub>3</sub> <sub>max</sub>	S <sub>2</sub>			a
SQ 5-RS	5	M5x0.8	9	19	29	8	10	21	7	35	27	4	14	9	11	16	9	25	2.2	0.026
SQ 6-RS	6	M6x1	10	20	35.5	11	11	26	8	40	30	5	14	10	13	19	11	25	3.5	0.039
SQ 8-RS	8	M8x1.25	12	24	42.5	12	14	31	10	48	36	5	17	12.5	16	23	14	25	6.6	0.068
SQ 10-RS	10	M10x1.25	14	30	50.5	15	17	37	11	57	43	6.5	21	15	19	27	17	25	10	0.112
SQ 10-RS-1	10	M10x1.5	14	30	56.5	21	17	43	11	57	43	6.5	21	15	19	27	17	25	10	0.112
SQ 12-RS	12	M12x1.75	17	32	57.5	17	19	42	15	66	50	6.5	25	17.5	22	31	19	25	16	0.164
SQ 12-RS-1	12	M12x1.25	17	32	64.5	24	19	49	15	66	50	6.5	25	17.5	22	31	19	25	16	0.254
SQ 14-RS	14	M14x2	19	38	73.5	22	21.5	56	17	75	57	8	26	20	25	35	22	25	19	0.336
SQ 14-RS-1	14	M14x1.5	19	38	79.5	28	21.5	62	17	75	57	8	26	20	25	35	22	25	19	0.336
SQ 16-RS	16	M16x2	22	44	79.5	23	23.5	60	19	84	64	8	32	22	27	39	22	20	26	0.464
SQ 16-RS-1	16	M16x1.5	22	44	85.5	29	23.5	66	19	84	64	8	32	22	27	39	22	20	26	0.538
SQ 18-RS	18	M18x1.5	23	45	90	25	26.5	68	20	93	71	10	34	25	31	44	27	20	33	0.713
SQ 20-RS	20	M20x1.5	27	50	90	25	27	68	24	99	77	10	35	27.5	34	44	30	20	45	
SQ 22-RS	22	M22x1.5	27	52	95	26	28	70	24	109	84	12	41	30	37	50	32	16	48	

## SQZ / RBI



Number	Dimensions (mm)																	KN Load Ratings	Weight kg
	d	d <sub>1</sub>	d <sub>2</sub> <sub>min</sub>	d <sub>3</sub> <sub>max</sub>	l <sub>1</sub> <sub>min</sub>	l <sub>2</sub>	S <sub>1</sub>	L <sub>max</sub>	L	L <sub>1</sub> <sub>max</sub>	L <sub>2</sub> <sub>max</sub>	L <sub>3</sub> <sub>max</sub>	D <sub>1</sub> <sub>max</sub>	D <sub>2</sub> <sub>max</sub>	D <sub>3</sub> <sub>max</sub>	S <sub>2</sub>	a		
SQZ 5-RS	5	M5x0.8	9	20	8	11	7	46	24	4	12	9	11	17	17	9	15	2.8	0.025
SQZ 6-RS	6	M6x1	10	20	11	12.2	8	55.2	28	5	15	10	13	20	11	15	3.7	0.041	
SQZ 8-RS	8	M8x1.25	12	24	12	16	10	6.5	32	5	16	12.5	16	24	14	15	5.8	0.075	
SQZ 10-RS	10	M10x1.5	14	30	15	19.5	11	74.5	35	6.5	18	15	19	28	17	15	8.4	0.12	
SQZ 10-RS-1	10	M10x1.25	14	30	21	19.5	11	80.5	35	6.5	18	15	19	28	17	15	8.4	0.12	
SQZ 12-RS	12	M12x1.75	17	32	17	21	15	84	40	6.5	20	17.5	22	32	19	15	11	0.18	
SQZ 12-RS-1	12	M12x1.25	17	32	24	21	15	91	40	6.5	20	17.5	22	32	19	15	11	0.18	
SQZ 14-RS	14	M14x2	19	38	22	23.5	17	103	45	8	25	20	25	36	22	11	15	0.27	
SQZ 14-RS-1	14	M14x1.5	19	38	28	23.5	17	109	45	8	25	20	25	36	22	11	15	0.27	
SQZ 16-RS	16	M16x2	22	44	23	25.5	19	112	50	8	27	22	27	40	22	11	15	0.36	
SQZ 16-RS-1	16	M16x1.5	22	44	29	25.5	19	118	50	8	27	22	27	40	22	11	15	0.36	
SQZ 18-RS	18	M18x1.5	23	45	25	31	20	130.5	58	10	32	25	31	45	27	11	19	0.54	
SQZ 20-RS	20	M20x1.5	27	50	25	29	24	133	63	10	38	27.5	34	45	30	7.5	19	0.57	
SQZ 22-RS	22	M22x1.5	27	52	26	33	24	145	70	12	43	30	37	50	32	7.5	23	0.76	

## Standard Type Cam Followers [With Cage/With Hexagon Hole]



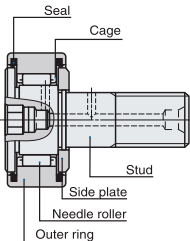
Stud dia. 3—30mm

Stud dia. mm	Identification number				Mass (Ref.) g	Boundary dimensions mm														Mounting dimension f Min. mm	Maximum tightening torque N-m	Basic dynamic load rating N	Basic static load rating N	Maximum allowable static load N
	Shield type		Sealed type			D	C	d <sub>1</sub>	G	G <sub>1</sub>	B	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	C <sub>1</sub>	g <sub>1</sub>	g <sub>2</sub>	H	f <sub>s min</sub>					
3	CF 3 BR	CF 3 B	CF 3 BUUR	CF 3 BUU	4.3	10	7	3	M 3×0.5	5	8	17	9	—	0.5	—	—	2	0.2	6.8	0.34	1 500	1 020	834
4	CF 4 BR	CF 4 B	CF 4 BUUR	CF 4 BUU	7.4	12	8	4	M 4×0.7	6	9	20	11	—	0.5	—	—	2.5	0.3	8.3	0.78	2 070	1 590	834
5	CF 5 BR	CF 5 B	CF 5 BUUR	CF 5 BUU	10.3	13	9	5	M 5×0.8	7.5	10	23	13	—	0.5	—	—	3	0.3	9.3	1.6	2 520	2 140	1 260
6	CF 6 BR	CF 6 B	CF 6 BUUR	CF 6 BUU	18.5	16	11	6	M 6×1	8	12.2max	28.2max	16	—	0.6	—	—	3	0.3	11	2.7	3 660	3 650	1 950
8	CF 8 BR	CF 8 B	CF 8 BUUR	CF 8 BUU	28.5	19	11	8	M 8×1.25	10	12.2max	32.2max	20	—	0.6	—	—	4	0.3	13	6.5	4 250	4 740	4 620
	CF 8 BRM	CF 8 BM	CF 8 BUURM	CF 8 BUUM	28.5	19	11	8	M 8×1	10	12.2max	32.2max	20	—	0.6	—	—	4	0.3	13	7.1	4 250	4 740	4 620
10	CF 10 BR	CF 10 B	CF 10 BUUR	CF 10 BUU	45	22	12	10	M10×1.25	12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	13.8	5 430	6 890	6 890
	CF 10 BRM	CF 10 BM	CF 10 BUURM	CF 10 BUUM	45	22	12	10	M10×1	12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	14.7	5 430	6 890	6 890
	CF 10-1 BR	CF 10-1 B	CF 10-1 BUUR	CF 10-1 BUU	60	26	12	10	M10×1.25	12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	13.8	5 430	6 890	6 890
	CF 10-1 BRM	CF 10-1 BM	CF 10-1 BUURM	CF 10-1 BUUM	60	26	12	10	M10×1	12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	14.7	5 430	6 890	6 890
12	CF 12 BR	CF 12 B	CF 12 BUUR	CF 12 BUU	95	30	14	12	M12×1.5	13	15.2max	40.2max	25	6	0.6	4	3	6	0.6	21	21.9	7 910	9 790	9 790
	CF 12-1 BR	CF 12-1 B	CF 12-1 BUUR	CF 12-1 BUU	105	32	14	12	M12×1.5	13	15.2max	40.2max	25	6	0.6	4	3	6	0.6	21	21.9	7 910	9 790	9 790
16	CF 16 BR	CF 16 B	CF 16 BUUR	CF 16 BUU	170	35	18	16	M16×1.5	17	19.6max	52.1max	32.5	8	0.8	4	3	6	0.6	26	58.5	12 000	18 300	18 300
18	CF 18 BR	CF 18 B	CF 18 BUUR	CF 18 BUU	250	40	20	18	M18×1.5	19	21.6max	58.1max	36.5	8	0.8	6	3	8	1	29	86.2	14 800	25 200	25 200
20	CF 20 BR	CF 20 B	CF 20 BUUR	CF 20 BUU	460	52	24	20	M20×1.5	21	25.6max	66.1max	40.5	9	0.8	6	4	8	1	34	119	20 700	34 600	34 600
	CF 20-1 BR	CF 20-1 B	CF 20-1 BUUR	CF 20-1 BUU	385	47	24	20	M20×1.5	21	25.6max	66.1max	40.5	9	0.8	6	4	8	1	34	119	20 700	34 600	34 600
24	CF 24 BR	CF 24 B	CF 24 BUUR	CF 24 BUU	815	62	29	24	M24×1.5	25	30.6max	80.1max	49.5	11	0.8	6	4	12	1	40	215	30 500	52 600	52 000
	CF 24-1 BR	CF 24-1 B	CF 24-1 BUUR	CF 24-1 BUU	1 140	72	29	24	M24×1.5	25	30.6max	80.1max	49.5	11	0.8	6	4	12	1	40	215	30 500	52 600	52 000
30	CF 30 BR	CF 30 B	CF 30 BUUR	CF 30 BUU	1 870	80	35	30	M30×1.5	32	37 max	100 max	63	15	1	6	4	17	1	49	438	45 400	85 100	85 100
	CF 30-1 BR	CF 30-1 B	CF 30-1 BUUR	CF 30-1 BUU	2 030	85	35	30	M30×1.5	32	37 max	100 max	63	15	1	6	4	17	1	49	438	45 400	85 100	85 100
	CF 30-2 BR	CF 30-2 B	CF 30-2 BUUR	CF 30-2 BUU	2 220	90	35	30	M30×1.5	32	37 max	100 max	63	15	1	6	4	17	1	49	438	45 400	85 100	85 100

### Structure of Cam Followers

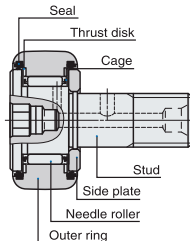
#### Standard Type Cam Follower(1)

CF...BUU



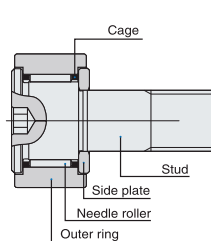
#### Thrust Disk Type Cam Follower(1)

CF...WBUUR



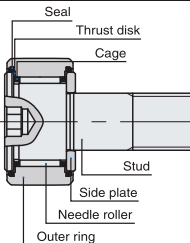
#### Cam Follower G(2)

CF...G



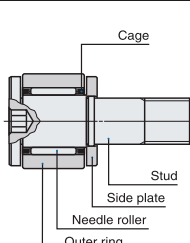
#### C-Lube Cam Follower(3)

CF...WB.../SG



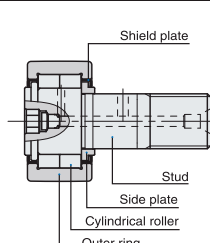
#### Miniature Type Cam Follower

CFS



#### Cylindrical Roller Cam Follower

NUCF...BR



Note(1) Minimum allowable value of chamfer dimension *r*

#### Remarks

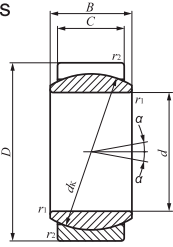
1. Models with a stud diameter *d*<sub>1</sub> of 4 mm or less have no oil hole. For models with a stud dia. 5 to 10mm, oil hole (re-greasing fitting) is provided at the head. Other models are provided with an oil hole (grease nipple) at the head and an oil hole each on the outside surface and end surface of the stud.

2. Shield type models with a stud diameter *d*<sub>1</sub> of 10mm or less and the sealed type models are provided with prepacked grease.

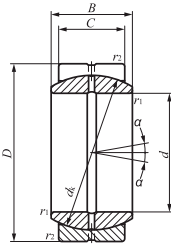
Other models are not provided with prepacked grease. Perform proper lubrication for use.

# Spherical Plain Bearing

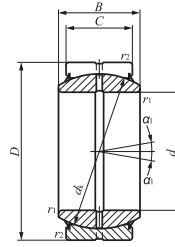
## Steel-on-steel Spherical Bushings



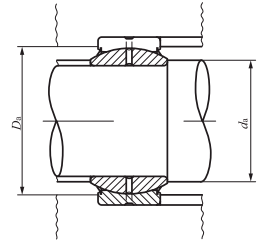
GE...E



GE...ES



GE...ES-2RS



Shaft dia. 4–300mm

Shaft dia. mm	Identification number		Mass (Ref.) kg	Boundary dimensions mm								Permissible tilting angle degree		Mounting dimensions mm				Dynamic load capacity $C_d$ N	Static load capacity $C_s$ N
	Without seals	With seals		$d$	$D$	$B$	$C$	$d_k$	$r_{1s \min}^{(1)}$	$r_{2s \min}^{(1)}$	$\alpha$	$\alpha_t$	Min.	Max. <sup>(2)</sup>	Max.	Min.			
4	GE 4E	—	0.003	4	12	5	3	8	0.3	0.3	16	—	6	6	9.5	8	2 350	14 100	
5	GE 5E	—	0.004	5	14	6	4	10	0.3	0.3	13	—	7.5	8	11.5	10	3 920	23 500	
6	GE 6E	—	0.004	6	14	6	4	10	0.3	0.3	13	—	8	8	11.5	10	3 920	23 500	
8	GE 8E	—	0.008	8	16	8	5	13	0.3	0.3	15	—	10	10	13.5	13	6 370	38 200	
10	GE 10E	—	0.012	10	19	9	6	16	0.3	0.3	12	—	12.5	13	16.5	15.5	9 410	56 500	
12	GE 12E	—	0.017	12	22	10	7	18	0.3	0.3	11	—	14.5	15	19.5	17	12 400	74 100	
15	GE 15ES	GE 15ES-2RS	0.032	15	26	12	9	22	0.3	0.3	8	5	17.5	18	23.5	22.5	19 400	117 000	
17	GE 17ES	GE 17ES-2RS	0.049	17	30	14	10	25	0.3	0.3	10	7	19.5	20.5	27.5	26	24 500	147 000	
20	GE 20ES	GE 20ES-2RS	0.065	20	35	16	12	29	0.3	0.3	9	6	22.5	24	32.5	30.5	34 100	205 000	
25	GE 25ES	GE 25ES-2RS	0.115	25	42	20	16	35.5	0.6	0.6	7	4	29	29	37.5	37	55 700	334 000	
30	GE 30ES	GE 30ES-2RS	0.160	30	47	22	18	40.7	0.6	0.6	6	4	34	34	42.5	41.5	71 800	431 000	
35	GE 35ES	GE 35ES-2RS	0.258	35	55	25	20	47	0.6	1	6	4	39.5	39.5	49.5	48	92 200	553 000	
40	GE 40ES	GE 40ES-2RS	0.315	40	62	28	22	53	0.6	1	7	4	44.5	45	56.5	54.5	114 000	686 000	
45	GE 45ES	GE 45ES-2RS	0.413	45	68	32	25	60	0.6	1	7	4	49.5	50.5	62.5	60	147 000	883 000	
50	GE 50ES	GE 50ES-2RS	0.560	50	75	35	28	66	0.6	1	6	4	54.5	56	69.5	66	181 000	1 090 000	
60	GE 60ES	GE 60ES-2RS	1.10	60	90	44	36	80	1	1	6	3	65.5	66.5	84.5	79	282 000	1 690 000	
70	GE 70ES	GE 70ES-2RS	1.54	70	105	49	40	92	1	1	6	4	75.5	77.5	99.5	91	361 000	2 170 000	
80	GE 80ES	GE 80ES-2RS	2.29	80	120	55	45	105	1	1	6	4	85.5	89	114.5	103	463 000	2 780 000	
90	GE 90ES	GE 90ES-2RS	2.82	90	130	60	50	115	1	1	5	3	95.5	98	124.5	112	564 000	3 380 000	
100	GE 100ES	GE 100ES-2RS	4.43	100	150	70	55	130	1	1	7	5	105.5	109.5	144.5	127	701 000	4 210 000	
110	GE 110ES	GE 110ES-2RS	4.94	110	160	70	55	140	1	1	6	4	115.5	121	154.5	138	755 000	4 530 000	
120	GE 120ES	GE 120ES-2RS	8.12	120	180	85	70	160	1	1	6	4	125.5	135.5	174.5	154	1 100 000	6 590 000	
140	GE 140ES	GE 140ES-2RS	11.4	140	210	90	70	180	1	1	7	5	145.5	155.5	204.5	176	1 240 000	7 410 000	
160	GE 160ES	GE 160ES-2RS	14.4	160	230	105	80	200	1	1	8	6	165.5	170	224.5	195	1 570 000	9 410 000	
180	GE 180ES	GE 180ES-2RS	18.9	180	260	105	80	225	1.1	1.1	6	5	187	199	253	221	1 770 000	10 600 000	
200	GE 200ES	GE 200ES-2RS	28.1	200	290	130	100	250	1.1	1.1	7	6	207	213.5	283	244	2 450 000	14 700 000	
220	GE 220ES	GE 220ES-2RS	36.1	220	320	135	100	275	1.1	1.1	8	6	227	239.5	313	269	2 700 000	16 200 000	
240	GE 240ES	GE 240ES-2RS	40.4	240	340	140	100	300	1.1	1.1	8	6	247	265	333	296	2 940 000	17 700 000	
260	GE 260ES	GE 260ES-2RS	52.0	260	370	150	110	325	1.1	1.1	7	6	267	288	363	320	3 510 000	21 000 000	
280	GE 280ES	GE 280ES-2RS	66.0	280	400	155	120	350	1.1	1.1	6	5	287	313.5	393	345	4 120 000	24 700 000	
300	GE 300ES	GE 300ES-2RS	76.0	300	430	165	120	375	1.1	1.1	7	6	307	336.5	423	371	4 410 000	26 500 000	

Notes<sup>(1)</sup> Minimum allowable value of chamfer dimensions  $r_1$  and  $r_2$

<sup>(2)</sup> When Spherical Bushings are used with full tilting angle, the shaft shoulder dimension must be less than the maximum value of  $d_4$ .

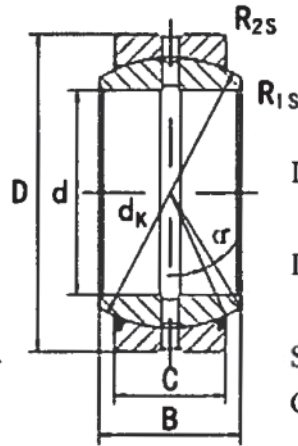
Remarks1. GE...E has no oil hole. Others are provided with an oil groove and two oil holes on the inner ring and outer ring, respectively.

2. No grease is prepacked. Perform proper lubrication.



## Radial spherical plain bearings GEG..E(S),GEG..ES 2RS

- Outer ring with single split in axial direction.
- Lubricating grooves and holes in the outer and inner rings of type ES.
- Outer ring of type-2RS with lip seals in both sides.
- Both outer and inner rings are properly phosphate treated.

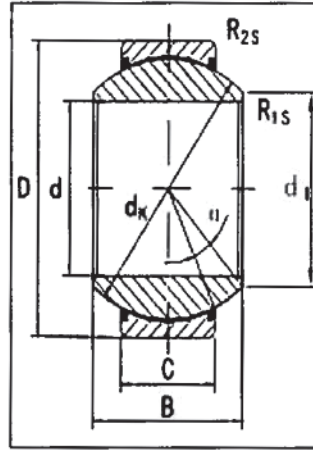


INA=GE...FO  
GE...FO 2RS  
IKO =GE...GS  
GE...GS 2RS  
SKF=GEH...ES  
GEH...ES 2RS

Part NO	Dimensions mm								Load ratings kN		Weight kg
	d	D	B	C	dk	R <sub>1s</sub> min	R <sub>2s</sub> min	α	dyn C	stat C <sub>0</sub>	
GE6FO	6	16	9	5	13	0.3	0.3	21	5.50	27.5	0.008
GE8FO	8	19	11	6	16	0.3	0.3	21	8.15	40.5	0.014
GE10FO	10	22	12	7	18	0.3	0.3	18	10.8	54.0	0.020
GE12FO	12	26	15	9	22	0.3	0.3	18	17.0	85.0	0.034
GE15FO GE15FO2RS	15	30	16	10	25	0.3	0.3	16	21.2	106	0.046
GE17FO GE17FO2RS	17	35	20	12	29	0.3	0.3	19	30.0	146	0.077
GE20FO GE20FO2RS	20	42	25	16	35.5	0.6	0.6	17	48.0	240	0.150
GE25FO GE25FO2RS	25	47	28	18	40.7	0.6	0.6	17	62.0	310	0.190
GE30FO GE30FO2RS	30	55	32	20	47	0.6	1.0	17	80.0	400	0.290
GE35FO GE35FO2RS	35	62	35	22	53	0.6	1.0	16	100	500	0.38
GE40FO GE40FO2RS	40	68	40	25	60	0.6	1.0	17	127	640	0.54
GE45FO GE45FO2RS	45	75	43	28	66	0.6	1.0	15	156	780	0.680
GE50FO GE50FO2RS	50	90	56	36	80	0.6	1.0	17	245	1220	1.40
GE60FO GE60FO2RS	60	105	63	40	92	1.0	1.0	17	315	1560	2.00
GE70FO GE70FO2RS	70	120	70	45	105	1.0	1.0	16	400	2000	2.90
GE80FO GE80FO2RS	80	130	75	50	115	1.0	1.0	14	490	2450	3.50
GE90FO GE90FO2RS	90	150	85	55	130	1.0	1.0	15	610	3050	5.40
GE100FO GE100FO2RS	100	160	85	55	140	1.0	1.0	14	655	3250	5.90
GE110FO GE110FO2RS	110	180	100	70	160	1.0	1.0	12	950	4750	9.6
GE120FO GE120FO2RS	120	210	115	70	180	1.0	1.0	16	1080	5400	15.1
GE140FO GE140FO2RS	140	230	130	80	200	1.0	1.0	16	1360	6800	19.01
GE160FO GE160FO2RS	160	260	135	80	225	1.0	1.1	16	1530	7650	24.70
GE180FO GE180FO2RS	180	290	155	100	250	1.1	1.1	14	2120	10600	35.4
GE200FO GE200FO2RS	200	320	165	100	270	1.1	1.1	15	2320	11600	45.28
GE220FO GE220FO2RS	220	340	175	100	300	1.1	1.1	16	2550	12700	51.12
GE240FO GE240FO2RS	240	370	190	110	325	1.1	1.1	15	3030	15190	65.12
GE260FO GE260FO2RS	260	400	205	120	350	1.1	1.1	15	3570	17850	82.44
GE280FO GE280FO2RS	280	430	210	120	375	1.1	1.1	15	3800	19100	97.21

## Radial spherical plain bearings GE..UK 2RS

- Outer ring with single split in axial direction.
- Outer race lined with PTFE fabric.
- Outer ring with lip seals in both sides.
- Spherical surface of inner ring chromium plated.
- Outer ring properly phosphate treated.



Part NO	Dimensions mm								Load ratings kN			Weight kg
	d	D	B	C	d <sub>1s</sub> min	d <sub>k</sub>	R <sub>1s</sub> min	R <sub>2s</sub> min	H	dyn C	stat C <sub>0</sub>	
GE15UK2RS	15	26	12	9	18	22	0.3	0.3	9	26	52	0.035
GE17UK2RS	17	30	14	10	20	25	0.3	0.3	10	48.7	81.2	0.041
GE20UK2RS	20	35	16	12	24	29	0.3	0.3	9	67.5	112	0.066
GE25UK2RS	25	42	20	16	29	35.5	0.6	0.6	7	127	212	0.119
GE30UK2RS	30	47	22	18	34	40.7	0.6	0.6	6	165	275	0.153
GE35UK2RS	35	55	25	20	39	47	0.6	1.0	6	210	350	0.233
GE40UK2RS	40	62	28	22	45	53	0.6	1.0	7	277	462	0.306
GE45UK2RS	45	68	32	25	50	60	0.6	1.0	7	360	600	0.427
GE50UK2RS	50	75	35	28	55	66	0.6	1.0	6	442	737	0.546
GE60UK2RS	60	90	44	36	66	80	1.0	1.0	6	690	1150	1.04
GE70UK2RS	70	105	49	40	77	92	1.0	1.0	6	885	1475	1.55
GE80UK2RS	80	120	55	45	88	105	1.0	1.0	6	1125	1875	2.31
GE90UK2RS	90	130	60	50	98	115	1.0	1.0	5	1283	2300	2.75
GE100UK2RS	100	150	70	55	109	130	1.0	1.0	7	1717	2862	4.45
GE110UK2RS	110	160	70	55	121	140	1.0	1.0	6	1845	3075	4.82
GE120UK2RS	120	180	85	70	135	160	1.0	1.0	6	2685	4475	8.05
GE140UK2RS	140	210	90	70	155	180	1.0	1.0	7	3015	5025	11.02
GE160UK2RS	160	230	105	80	170	200	1.0	1.0	8	3840	6400	14.01
GE180UK2RS	180	260	105	80	199	225	1.1	1.1	6	4320	7200	18.65
GE200UK2RS	200	290	130	100	213	250	1.1	1.1	7	6000	10000	28.03
GE220UK2RS	220	320	135	100	239	275	1.1	1.1	8	6600	11000	35.51
GE240UK2RS	240	340	140	100	265	300	1.1	1.1	8	7200	12000	39.91
GE260UK2RS	260	370	150	110	288	325	1.1	1.1	7	8550	14250	51.54
GE280UK2RS	280	400	155	120	313	350	1.1	1.1	6	10050	16750	65.06
GE300UK2RS	300	430	165	120	336	375	1.1	1.1	7	10800	18000	78.07



**(1) High reliability**

**QLH** has accumulated many years experience in production managing. It covers the whole production sequence, from receiving the order, designing, material preparation, machining, heat treating, grinding, assembling, inspection, packaging and delivery. The systemized managing ensures high reliability of **QLH** Ballscrews.

**(2) High accuracy**

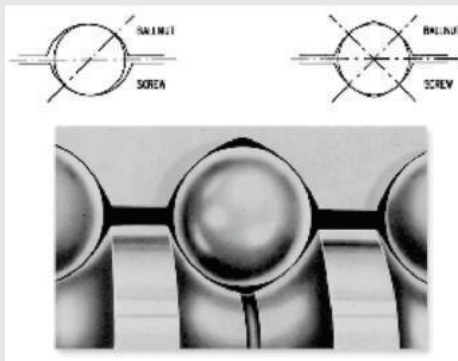
**QLH** Ballscrews are machined, ground, assembled and Q.C. inspected under the constant temperature control (20°C) to ensure high precision of Ballscrews.

**(4) High working efficiency**

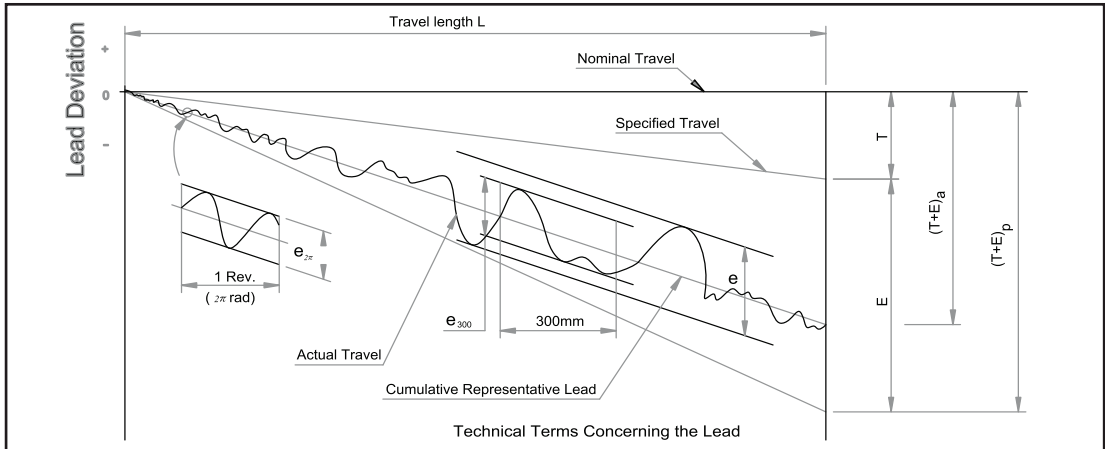
Balls are rotating inside the Ballscrew nut to offer high working efficiency. Comparing with the traditional ACME screws, which work by friction sliding between the nut and screw, the Ballscrews needs only 1/3 of driving torque. It is easy to transmit linear motion into rotation motion.

**(5) No backlash and with high rigidity**

The Gothic profile is applied by **QLH** Ballscrews to offer best contact between balls and the grooves. If suitable preload is exerted on Ballscrew hence to eliminate clearance between the ball nut and screw and to reduce elastic deformation, the ballscrew shall get much better rigidity and accuracy.



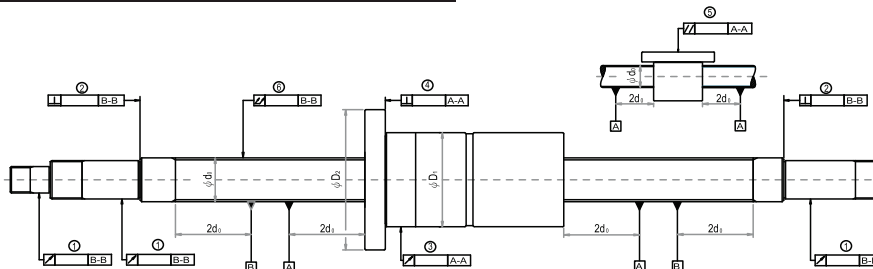
**Lead Accuracy :** Precision ground Ballscrews are controlled in accordance with JIS B 1192. The permissible values and each part of denitions are shown below.



## TERMS

<b>T + E</b>	Cumulative representative lead A straight line representing the tendency of the cumulative actual lead. This is obtained by least square method and measured by laser system.
<b>P</b>	Permissible value.
<b>a</b>	Actual value.
<b>T</b>	Specified travel. This value is determined by customer and maker as it depends on different application requirements.
<b>E</b>	Accumulated reference lead deviation. This is allowable deviation of specified travel. It is decided by both of the accuracy grade and effective thread length.
<b>e</b>	Total relative lead deviation. Maximum width of variation over the travel length.
<b>e<sub>300</sub></b>	Lead deviation in random 300 mm.
<b>e<sub>2<math>\pi</math></sub></b>	Lead deviation in random 1 revolution 2 $\pi$ rad.

## Tolerances on Various Areas of Ballscrew



Those on above are samples of accuracy of tolerance on various areas of *PMI* Ballscrew.

⊥ : Perpendicularity   ↗ : Radial runout   // : Parallel   A : Reference

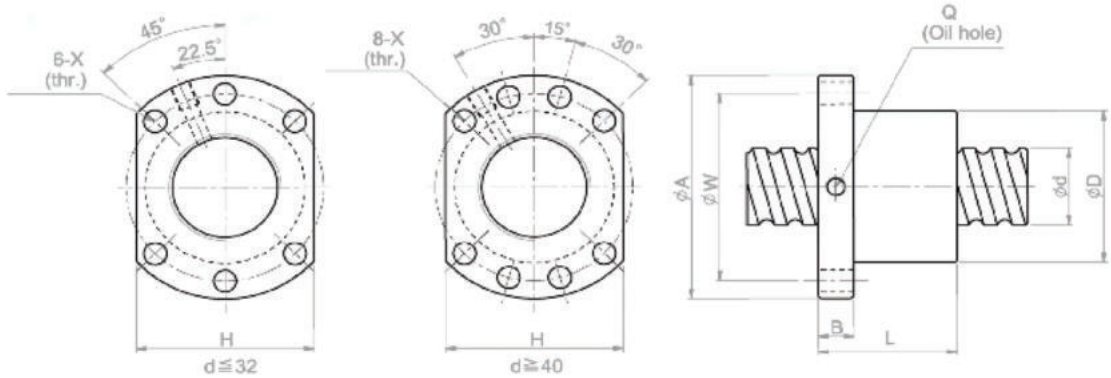
Accuracy on various areas of Ballscrew has to measure items:

1. Radial run-out of the circumference of the screw shaft supported portion in respect to the B-B' line.
2. Perpendicularity of the screw shaft supported portion end face to the B-B' line.
3. Radial run-out of the nut circumference in respect to the A-A' line.
4. Perpendicularity of the flange mounting surface to the A-A' line.
5. Parallelism between the nut circumference to the A-A' line.
6. Overall radial run-out to the A-A' line.

Note: The mounting surface of the Ballscrew is finished to the accuracy specied in JIS B 1192 - 1997



## TYPE SFU

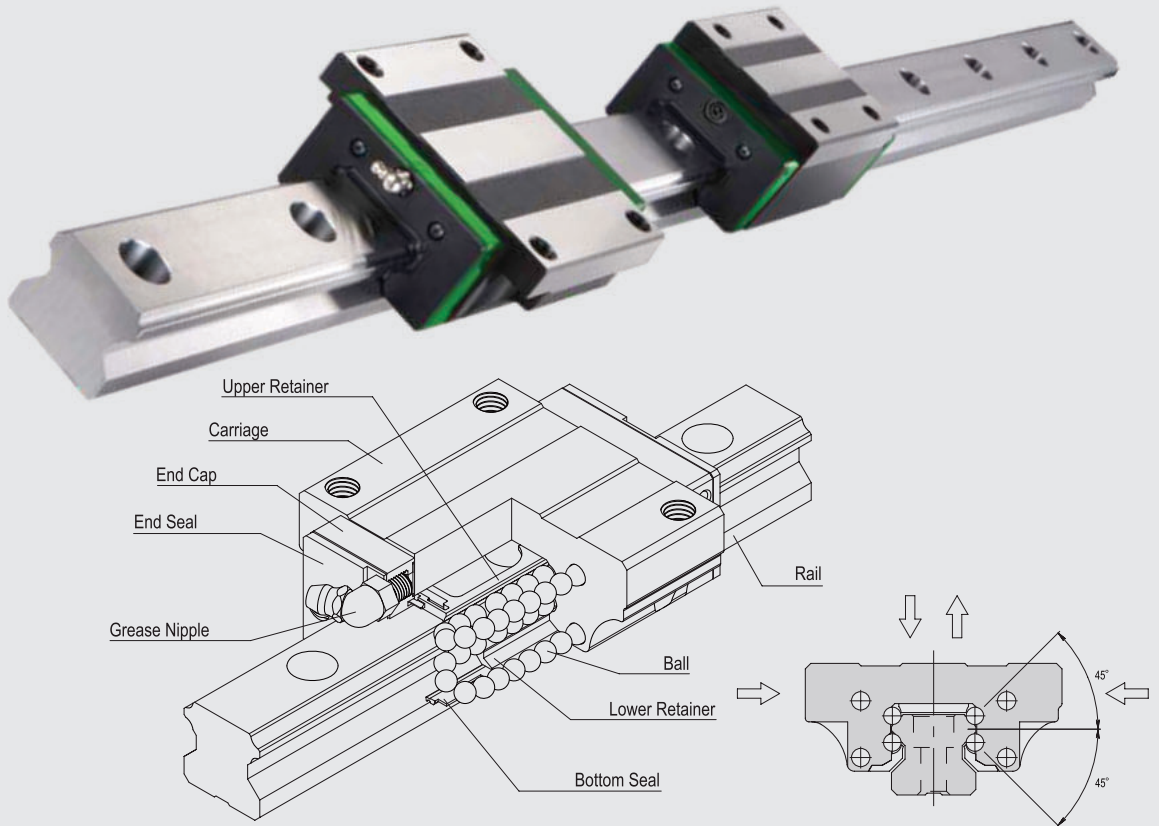


l:Lead Da:EM1 Ball Dia. n:Number of Circuits K: Stiffness (Kgf/ $\mu$ m)  
 Ca: Basic Dynamic Rating Load (Kgf) Coa: Basic Static Rating Load(Kgf)

(Unit) : mm

Model No.	Dimensions														
	d	l	Da	D	A	B	L	W	X	H	Q	n	Ca	Coa	K
SFU01204-4	12	4	2.5	24	40	10	40	32	4.5	30		1x4	902	1884	26
SFU01604-4		4	2.381	28	48	10	40	38	5.5	40	M6	1x4	973	2406	32
SFU01605-4	16	5	3.175	28	48	10	50	38	5.5	40	M6	1x4	1380	3052	32
SFU01610-3		10	3.175	28	48	10	57	38	5.5	40	M6	1x3	1103	2401	26
SFU02004-4	20	4	2.381	36	58	10	42	47	6.6	44	M6	1x4	1066	2987	38
SFU02005-4		5	3.175	36	58	10	51	47	6.6	44	M6	1x4	1551	3875	39
SFU02504-4		4	2.381	40	62	10	42	51	6.6	48	M6	1x4	1180	3795	43
SFU02505-4		5	3.175	40	62	10	51	51	6.6	48	M6	1x4	1724	4904	45
SFU02506-4	25	6	3.969	40	62	10	54	51	6.6	48	M6	1x4	2318	6057	47
SFU02508-4		8	4.762	40	62	10	63	51	6.6	48	M6	1x4	2963	7313	49
SFU02510-4		10	4.762	40	62	12	85	51	6.6	48	M6	1x4	2954	7295	50
SFU03204-4		4	2.381	50	80	12	44	65	9	62	M6	1x4	1296	4838	51
SFU03205-4		5	3.175	50	80	12	52	65	9	62	M6	1x4	1922	6343	54
SFU03206-4	32	6	3.969	50	80	12	57	65	9	62	M6	1x4	2632	7979	57
SFU03208-4		8	4.762	50	80	12	65	65	9	62	M6	1x4	3387	9622	60
SFU03210-4		10	6.35	50	80	12	90	65	9	62	M6	1x4	4805	12208	61
SFU04005-4		5	3.175	63	93	14	55	78	9	70	M8	1x4	2110	7988	63
SFU04006-4	40	6	3.969	63	93	14	60	78	9	70	M6	1x4	2873	9913	66
SFU04008-4		8	4.762	63	93	14	67	78	9	70	M6	1x4	3712	11947	70
SFU04010-4		10	6.35	63	93	14	93	78	9	70	M8	1x4	5399	15500	73
SFU05010-4	50	10	6.35	75	110	16	93	93	11	85	M8	1x4	6004	19614	85
SFU05020-4		20	7.144	75	110	16	138	93	11	85	M8	1x4	7142	22588	94
SFU06310-4	63	10	6.35	90	125	18	98	108	11	95	M8	1x4	6719	25358	99
SFU06320-4		20	9.525	95	135	20	149	115	13.5	100	M8	1x4	11444	36653	112
SFU08010-4	80	10	6.35	105	145	20	98	125	13.5	110	M8	1x4	7346	31953	109
SFU08020-4		20	9.525	125	165	25	154	145	13.5	130	M8	1x4	12911	47747	138
SFU10020-4	100	20	9.525	150	202	30	180	170	17.5	155	M8	1x4	14303	60698	162

## Construction & Characteristics



### Characteristics

The tracks of balls are designed to a contact angle of  $45^\circ$  which enables it to bear an equal load in radial, reversed radial and lateral directions. Therefore, it can be applied in any installation direction. Furthermore, JAH series can achieve a well balanced preload for increasing rigidity in four directions while keeping a low frictional resistance. This is especially suit to high precision and high rigidity required motion.

The patent design of lubrication route mQHes the lubricant evenly distribute in each circulation loop. Therefore, the optimum lubrication can be achieved in any installation direction, and this promotes the performance in running accuracy, service life, and reliability

### High Rigidity, Four-way Equal Load

The four tracks of balls are allocated to a circular contact angle at  $45^\circ$ , thus each track of balls can tQHe up an equal rated load in all four directions. Moreover, a sufficient preload can be achieved to increase rigidity, and this mQHes it suitable for any kind of installation.

### Self Alignment Capability

The self adjustment is performed spontaneously as the design of face-to-face (DF) circular arc groove. Therefore, the installation error could be compensated even under a preload, and which results in precise and smooth linear motion.

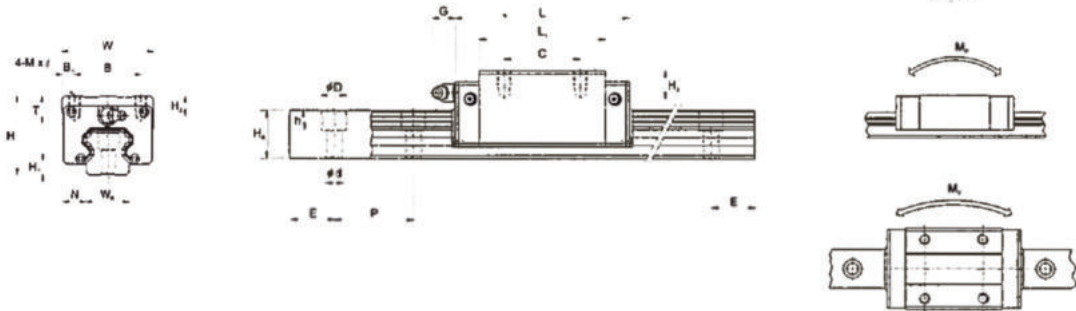
### Smooth Movement with Low Noise

The simplified design of circulating system with strengthened synthetic resin accessories mQHes the movement smooth and quiet.

### Interchangeability

For interchangeable type of linear guideways, the dimensional tolerances are strictly maintained within a reasonable range, and this has made the random matching of the same size of rails and carriages possible. Therefore, the similar preload and accuracy can be obtained even under the random matching condition. As a result of this advantage, the linear guideway can be stocked as standard parts, the installation and maintenance become more convenient. Moreover, this is also beneficial for shortening the delivery time.

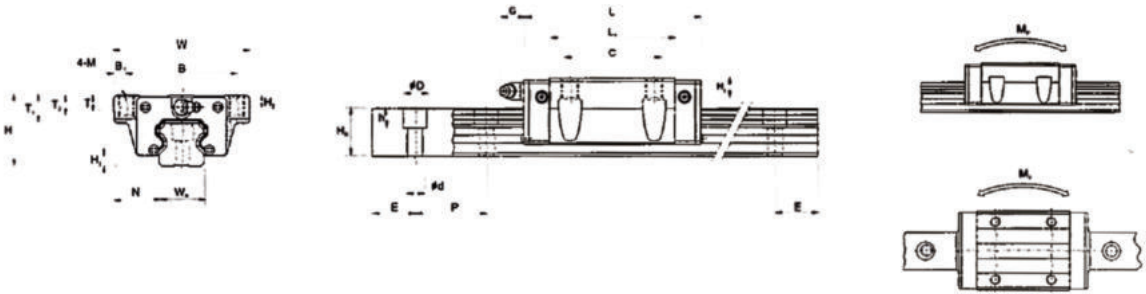
## QHGH-A / QHGH-HA



Model No.	Dimensions Of Assembly (mm)			Dimensions Of Block (mm)										
	H	H <sub>1</sub>	N	W	B	B <sub>1</sub>	C	L <sub>1</sub>	L	G	MX!	T	H <sub>1</sub>	H
QHGH 15A	26	4.3	9.5	34	26	4	26	39.4	61.4	5.3	M4X5	6	8.5	9.5
QHGH 20A QHGH 20HA	30	4.6	12	44	32	6	36 50	50.5 65.2	75.6 90.3	12	M5X6	8	6	7
QHGH 25A QHGH 25HA	40	5.5	12.5	48	35	6.5	35 50	58 78.6	83 103.6	12	M6X6	8	10	13
QHGH 30A QHGH 30HA	45	6	16	60	40	10	40 60	70 93	97.4 120.4	12	M8X10	8.5	9.5	13.8
QHGH 35A QHGH 35HA	55	7.5	18	70	50	10	50 72	80 105.8	112.4 138.2	12	M8X12	10.2	16	19.6
QHGH 45A QHGH 45HA	70	9.5	20.5	86	60	13	60 80	97 128.8	138 169.8	12.9	M10X17	16	18.5	30.5
QHGH 55A QHGH 55HA	80	13	23.5	100	75	12.5	75 95	117.7 155.8	165.7 203.8	12.9	M12X18	17.5	22	29
QHGH 65A QHGH 65HA	90	15	31.5	126	76	25	70 120	144.2 203.6	198.2 257.6	12.9	M16X20	25	15	15

Dimensiona of Rail (mm)							Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating C(kn)	Basic Stalk Load Rating C <sub>1</sub> (kn)	Static Rated Moment			Weight	
W <sub>1</sub>	H <sub>1</sub>	D	h	d	P	E				M <sub>R</sub> (kn-m)	M <sub>X</sub> (kn-m)	M <sub>Y</sub> (kn-m)	Block (kg)	Rail (kg/m)
15	15	7.5	5.3	4.5	60	20	M4X16	11.38	25.31	0.17	0.15	0.15	0.18	1.45
20	17.5	9.5	8.5	6	60	20	M5X16	17.75 21.18	37.84 48.84	0.38 0.48	0.27 0.47	0.27 0.47	0.30 0.39	2.21
23	22	11	9	7	60	20	M6X20	26.48 32.75	56.19 76.00	0.64 0.87	0.51 0.88	0.51 0.88	0.51 0.69	3.21
28	26	14	12	9	80	20	M8X25	38.74 47.27	83.06 110.13	1.06 1.40	0.85 1.47	0.85 1.47	0.88 1.16	4.47
34	29	14	12	9	80	20	M8X25	49.52 60.21	102.87 136.31	1.73 2.29	1.20 2.08	1.20 2.08	1.45 1.92	6.30
45	38	20	17	14	105	22.5	M12X35	77.57 94.54	155.93 207.12	3.01 4.00	2.35 4.07	2.35 4.07	2.73 3.61	10.41
53	44	23	20	16	120	30	M14X45	114.44 139.35	227.81 301.26	5.66 7.49	4.06 7.01	4.06 7.01	4.17 5.49	15.08
63	53	26	22	18	150	35	M16X50	163.63 208.36	324.71 457.15	10.02 14.15	6.44 11.12	6.44 11.12	7.00 9.82	21.18

## QHGW-C / QHGW-HA



Model No.	Dimensions of Assembly (mm)			Dimensions of Block (mm)													
QHGW 15C	24	4.3	16	47	38	4.5	30	39.4	61.4	5.3	M5	6	8.9	6.95	4.5	5.5	
QHGW 20C QHGW 20HA	30	4.6	21.5	63	53	5	40	50.5 65.2	75.6 90.3	12	M6	8	10	9.5	6	7	
QHGW 25C QHGW 25HA	36	5.5	23.5	70	57	6.5	45	58 78.6	83 103.6	12	M8	8	14	10	6	9	
QHGW 30C QHGW 30HA	42	6	31	90	72	9	52	70 93	97.4 120.4	12	M10	8.5	16	10	6.5	10.8	
QHGW 35C QHGW 35HA	48	7.5	33	100	82	9	62	80 105.8	112.4 138.2	12	M10	10.1	18	13	9	12.6	
QHGW 45C QHGW 45HA	60	9.5	37.5	120	100	10	80	97 128.8	138 169.8	12.9	M12	15.1	22	15	8.5	20.5	
QHGW 55C QHGW 55HA	70	13	43.5	140	116	12	95	117.7 155.8	165.7 203.8	12.9	M14	17.5	26.5	17	12	19	
QHGW 65C QHGW 65HA	90	15	53.5	170	142	14	110	144.2 203.6	198.2 257.6	12.9	M16	25	37.5	23	15	15	

Dimensions of Rail (mm)							Mounting Bolt for Rail (mm)	Basic Dynamic Load Rating C <sub>d</sub> (kn)	Basic Stalk Load Rating C <sub>r</sub> (kn)	Static Rated Moment			Weight	
W <sub>1</sub>	H <sub>1</sub>	D	h	d	P	E				M <sub>R</sub> (kn-m)	M <sub>x</sub> (kn-m)	M <sub>y</sub> (kn-m)	Block (kg)	Rail (kg/m)
15	15	7.5	5.3	4.5	60	20	M4X16	11.38	25.31	0.17	0.15	0.15	0.17	1.45
20	17.5	9.5	8.5	6	60	20	M5X16	17.75 21.18	37.84 48.84	0.38 0.48	0.27 0.47	0.27 0.47	0.40 0.52	2.21
23	22	11	9	7	60	20	M6X20	26.48 32.75	56.19 76.00	0.64 0.87	0.51 0.88	0.51 0.88	0.59 0.80	3.21
28	26	14	12	9	80	20	M8X25	38.74 47.27	83.06 110.13	1.06 1.40	0.85 1.47	0.85 1.47	1.09 1.44	4.47
34	29	14	12	9	80	20	M8X25	49.52 60.21	102.87 136.31	1.73 2.29	1.20 2.08	1.20 2.08	1.56 2.06	6.30
45	38	20	17	14	105	22.5	M12X35	77.57 94.54	155.93 207.12	3.01 4.00	2.35 4.07	2.35 4.07	2.79 3.69	10.41
53	44	23	20	16	120	30	M14X45	114.44 139.35	227.81 301.26	5.66 7.49	4.06 7.01	4.06 7.01	4.52 5.96	15.08
63	53	26	22	18	150	35	M16X50	163.63 208.36	324.71 457.15	10.02 14.15	6.44 11.12	6.44 11.12	9.17 12.89	21.18

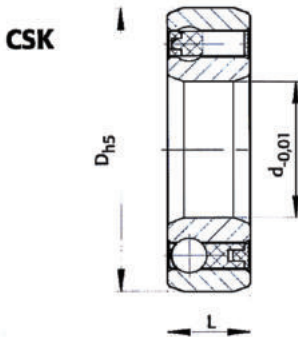


# One Way Clutch Bearing

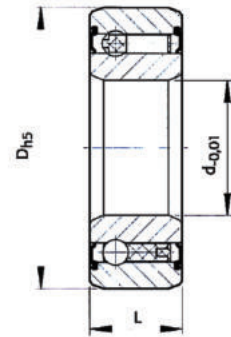




## CSK, CSK..2RS



### CSK..2RS



Type	Size	Bearing series	Bearing loads				Weight	Resistance torque		
			dyn.	stat.	C	C <sub>0</sub>				
CSK (KK)	d [mm]		T <sub>KN</sub> <sup>1)</sup> [Nm]	n <sub>max.</sub> [min <sup>-1</sup> ]	D [mm]	L [mm]	C [kN]	C <sub>0</sub> [kN]	[kg]	T <sub>R</sub> [Ncm]
	8*	-	2,5	15000	22	9	3,28	0,86	0,015	0,5
	12	6201	9,3	10000	32	10	6,1	2,77	0,04	0,7
	15	6202	16,90	8400	35	11	7,4	3,42	0,06	0,9
	17	6203	30,60	7350	40	12	7,9	3,8	0,070	1,1
	20	6204	50	6000	47	14	9,4	4,46	0,110	1,3
	25	6205	85	5200	52	15	10,7	5,46	0,140	2,0
	30	6206	138	4200	62	16	11,7	6,45	0,210	4,4
	35	6207	175	3600	72	17	12,6	7,28	0,300	5,8
	40	-	325	3000	80	22	15,54	12,25	0,5	7,0
CSK..2RS	8**	-	2,5	15000	22	9	3,28	0,86	0,015	0,8
	12	-	9,3	10000	32	14	6,1	2,77	0,05	3,0
	15	-	16,9	8400	35	16	7,4	3,42	0,070	4,0
	17	-	30,6	7350	40	17	7,9	3,8	0,09	5,6
	20	-	50	6000	47	19	9,4	4,46	0,145	6,0
	25	-	85	5200	52	20	10,7	5,46	0,175	6,0
	30	-	138	4200	62	21	11,7	6,45	0,270	7,5
	35	-	175	3600	72	22	12,6	7,28	0,400	8,2
	40	-	325	3000	80	27	15,54	12,25	0,6	10

### GB Notes

1) T<sub>max</sub> = 2 x T<sub>KN</sub>

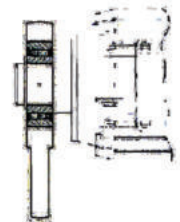
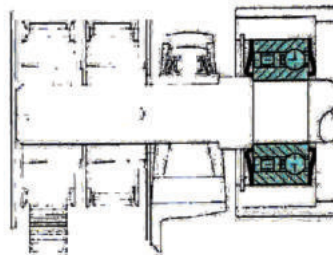
Refer to Selection page 14 to 21

\*) One Z seal on the bearing side only. Looking from this side, the outer race runs free in the counterclockwise direction

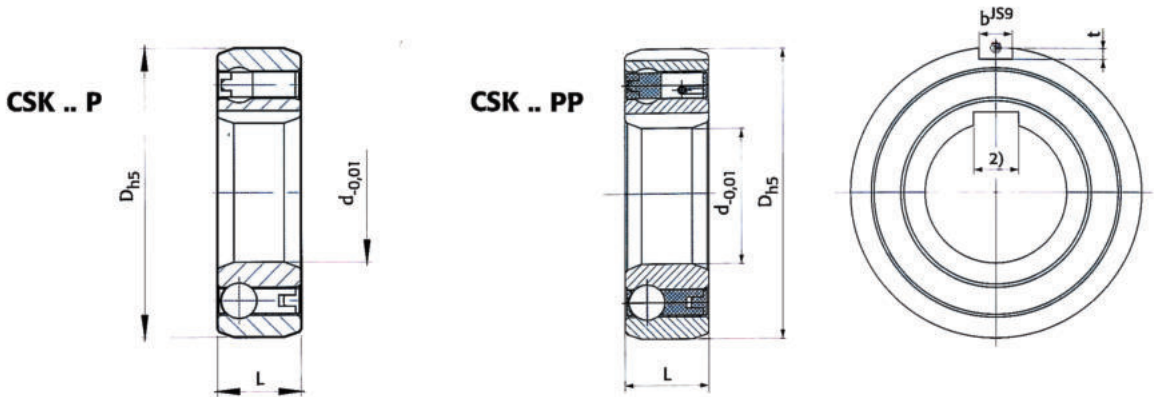
\*\*\*) Only one RS seal on the ball bearing side. looking from this side, the outer race runs free in the counterclockwise direction

Refer to mounting and maintenance instructions page 22 to 25

### Mounting examples



## CSK..P, CSK..PP, CSK..P-2RS



Type	Size	Bearing series	Bearing loads						Weight	Resistance torque		
			dyn.		stat.							
	d [mm]		T <sub>KN</sub> <sup>1)</sup> [Nm]	n <sub>max.</sub> [min <sup>-1</sup> ]	D [mm]	L [mm]	b [mm]	t [mm]	C [kN]	C <sub>0</sub> [kN]	[kg]	T <sub>R</sub> [Ncm]
CSK..P <sup>2)</sup>	12	6201	9,3	10000	32	10			6,1	2,77	0,04	0,7
	15	6202	16,9	8400	35	11			7,9	3,42	0,06	0,9
	17	6203	30,60	7350	40	12			9,4	3,8	0,070	1,1
	20	6204	50	6000	47	14			10,7	4,46	0,110	1,3
	25	6205	85	5200	52	15			11,7	5,46	0,140	2,0
	30	6206	138	4200	62	16			12,6	6,45	0,210	4,4
	35	6207	175	3600	72	17			15,54	7,28	0,300	5,8
	40	-	325	3000	80	22			12,25	0,5	7,0	
CSK..PP <sup>2)</sup>	15	6202	16,9	8400	35	11	2	0,6	7,4	3,42	0,06	0,9
	17	6203	30,6	7350	40	12	2	1,0	7,9	3,8	0,070	1,1
	20	6204	50	6000	47	14	3	1,5	9,4	4,46	0,110	1,3
	25	6205	85	5200	52	15	6	2,0	10,7	5,46	0,140	2,0
	30	6206	138	4200	62	16	6	2,0	11,7	6,45	0,210	4,4
	35	6207	175	3600	72	17	8	2,5	12,6	7,28	0,300	5,8
CSK..P-2RS <sup>2)</sup>	20	-	50	6000	47	19			9,4	4,46	0,145	6,0
	25	-	85	5200	52	20			10,7	5,46	0,175	6,0
	30	-	138	4200	62	21			11,7	6,45	0,270	7,5

### GB Notes

1) T<sub>max</sub> = 2 x T<sub>KN</sub>

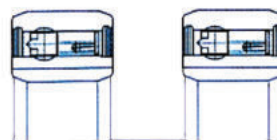
Refer to Selection page 14 to 21

2) Keyway to DIN 6885.3

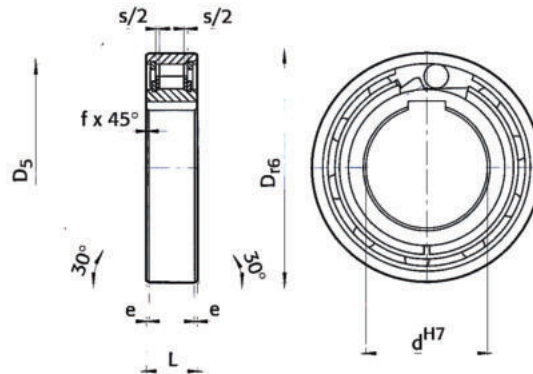
Size 40 keyway to DIN 6885.1

Refer to mounting and maintenance instructions page 22 to 25

### Mounting examples



## TYPE, NSS



Type	Size	Overrunning speeds									Weight	Resistance torque
(NSS)	dH7 [mm]	T <sub>KN1</sub> <sup>1)</sup> [Nm]	n <sub>imax</sub> <sup>2)</sup> [min <sup>-1</sup> ]	n <sub>amax</sub> <sup>3)</sup> [min <sup>-1</sup> ]	D <sub>r6</sub> [mm]	D <sub>5</sub> [mm]	L [mm]	s [mm]	e [mm]	f [mm]	[kg]	T <sub>R</sub> [Ncm]
	6	2,10	5000	7500	19	15,8	6	0,3	0,6	0,3	0,01	0,18
	8	3,8	4300	6500	24	20	8	1,3	0,6	0,6	0,02	0,24
	10	6,8	3500	5200	30	25,9	9	1,3	0,6	0,6	0,03	0,36
	12	13	3200	4800	32	28	10	1,3	0,6	0,6	0,04	0,48
	15	14	2800	4300	35	31	11	1,4	0,6	0,6	0,05	0,70
	20	40	2200	3300	47	40	14	2,4	0,8	0,8	0,12	1,4
	25	56	1900	2900	52	45,9	15	2,4	0,8	0,8	0,14	2,4
	30	90	1600	2400	62	55	16	2,4	0,8	1	0,22	7,8
	35	143	1300	2000	72	64	17	2,5	0,8	1	0,31	9,0
	40	185	1200	1800	80	72	18	2,5	0,8	1	0,39	10
	45	218	1000	1600	85	77	19	2,5	1,2	1	0,44	11
	50	230	950	1500	90	82	20	2,5	1,2	1	0,49	13
	55	308	800	1300	100	90	21	2,5	1,2	1	0,66	14
60	508	700	1100	110	100	22	2,5	1,2	1,5	0,81	26	
80	1063	600	900	140	128	26	2,5	1,2	1,5	1,41	58	

### GB Notes

AS6 without keyway.  $\varnothing D = \begin{smallmatrix} 0 & 0 \\ -0 & -0,009 \end{smallmatrix}$   
 AS8-12 keyway to DIN 6885.1.  
 Other sizes to DIN 6885.3

1)  $T_{max} = 2 \times T_{KN}$

Refer to Selection page 14 to 21

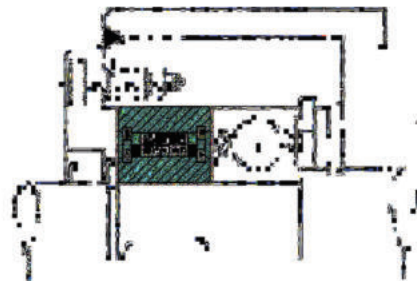
2) Inner race overruns

3) Outer race overruns

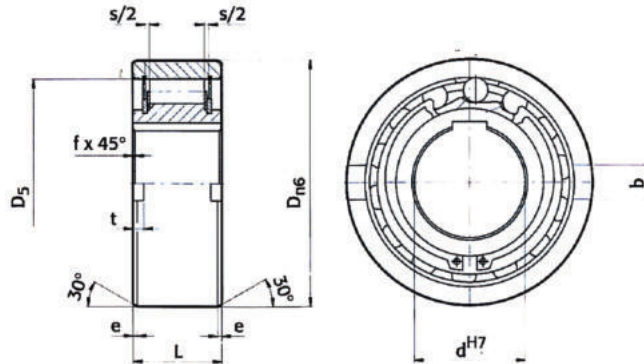
Mounting dimensions are identical to ball bearings series 62..

Refer to mounting and maintenance instructions page 22 to 25

### Mounting examples



## TYPE, NFS



Type	Size	Overrunning speeds										Weight	Resistance torque	
(NFS)	d <sup>H7</sup> [mm]	T <sub>KN</sub> <sup>1)</sup> [Nm]	n <sub>imax</sub> <sup>2)</sup> [min <sup>-1</sup> ]	n <sub>amax</sub> <sup>3)</sup> [min <sup>-1</sup> ]	D <sub>n6</sub> [mm]	L [mm]	D <sub>5</sub> [mm]	b [mm]	t [mm]	s [mm]	e [mm]	f [mm]	[kg]	T <sub>R</sub> [Ncm]
	8	12	3300	5000	35	13	28	4	1,4	2,4	0,6	0,3	0,07	1,6
	12	12	3300	5000	35	13	28	4	1,4	2,4	0,6	0,3	0,06	1,6
	15	30	2400	3600	42	18	37	5	1,8	2,4	0,8	0,3	0,11	1,9
	17	49	2300	3400	47	19	40	5	2,3	2,4	1,2	0,8	0,15	1,9
	20	78	2100	3100	52	21	42	6	2,3	2,4	1,2	0,8	0,19	1,9
	25	125	1700	2600	62	24	51	8	2,8	2,4	1,2	0,8	0,38	5,6
	30	255	1400	2200	72	27	60	10	2,5	2,4	1,8	1	0,54	14
	35	383	1200	1900	80	31	70	12	3,5	2,4	1,8	1	0,74	16
	40	538	1100	1700	90	33	78	12	4,1	2,5	1,8	1	0,92	38
	45	780	1000	1600	100	36	85	14	4,6	2,5	1,8	1	1,31	43
	50	1013	850	1350	110	40	92	14	5,6	2,5	1,8	1	1,74	55
	60	1825	750	1050	130	46	110	18	5,5	3,6	2,6	1,5	2,77	110
	70	2300	600	950	150	51	125	20	6,9	3,6	2,6	1,5	4,16	140
	80	3275	550	850	170	58	140	20	7,5	3,6	2,6	1,5	6,09	180
	90	5325	500	750	190	64	160	20	8,0	3,6	2,6	2	8,2	230
100	7250	450	680	215	73	175	24	8,5	3,6	2,6	2	12,6	380	
120	13500	370	550	260	86	215	28	10	3,6	2,6	2,5	22	650	
150	26625	300	460	320	108	260	32	12	3,6	3,6	2,5	42	1000	
200	44500	230	350	420	138	350	45	16	7,6	3,6	3	93	2000	

### GB Notes

ASNU8-12, ASNU200 keyway to DIN 6885.1, other sizes to DIN 6885.3

1)  $T_{max} = 2 \times T_{KN}$

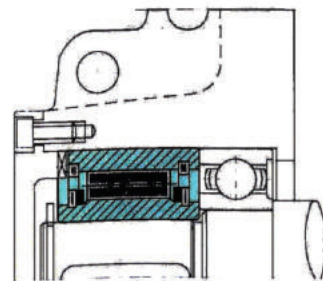
Refer to Selection page 14 to 21

2) Inner race overruns

3) Outer race overruns

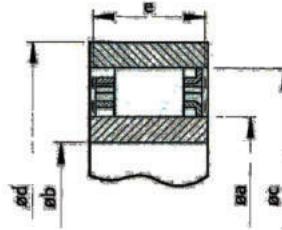
Refer to mounting and maintenance instructions page 22 to 25

### Mounting examples





## TYPE, DC



Type	Bearing series			Sprag space		Number of clips	Number of sprags	Weight [kg]				
	$T_{KN}^{(1)}$ [Nm]	$n_{max}^{(2)}$ [min <sup>-1</sup> ]	$n_{amax}^{(3)}$ [min <sup>-1</sup> ]	$oa$ <sup>+0,008</sup> <sub>-0,005</sub> [mm]	$oc$ $\pm 0,013$ [mm]							
DC2222G	63	8600	4300	22,225	38,885	8,33 $\pm 0,1$	10,0	50	15	-	12	0,030
DC2776	119	6900	3400	27,762	44,422	8,33 $\pm 0,1$	13,5	58	18	-	14	0,055
DC3034	124	6300	3100	30,340	47,000	8,33 $\pm 0,1$	13,5	62	20	-	14	0,060
DC3175(3C)	159	6000	3000	31,750	48,410	8,33 $\pm 0,1$	13,5	63	21	3	16	0,060
DC3809A	275	5000	2500	38,092	54,752	8,33 $\pm 0,1$	16,0	71	25	-	18	0,085
DC4127(3C)	224	4600	2300	41,275	57,935	8,33 $\pm 0,1$	13,5	75	27	3	18	0,090
DC4445A	363	4300	2100	44,450	61,110	8,33 $\pm 0,1$	16,0	79	29	-	20	0,095
DC4972(4C)	306	3800	1900	49,721	66,381	8,33 $\pm 0,1$	13,5	86	33	4	22	0,100
DC5476A	525	3500	1700	54,765	71,425	8,33 $\pm 0,1$	16,0	92	36	-	24	0,110
DC5476A(4C)	525	3500	1700	54,765	71,425	8,33 $\pm 0,1$	16,0	92	36	4	24	0,130
DC5476B(4C)	769	3500	1700	54,765	71,425	8,33 $\pm 0,1$	21,0	92	36	4	24	0,180
DC5476C(4C)	990	3500	1700	54,765	71,425	8,33 $\pm 0,1$	25,4	92	36	4	24	0,200
DC5776A	604	3300	1600	57,760	74,420	8,33 $\pm 0,1$	16,0	98	38	-	26	0,110
DC6334B	806	3000	1500	63,340	80,000	8,33 $\pm 0,1$	21,0	104	42	-	26	0,175
DC7221(5C)	675	2600	1300	72,217	88,877	8,33 $\pm 0,1$	13,5	115	48	5	30	0,140
DC7221B	1279	2600	1300	72,217	88,877	8,33 $\pm 0,1$	21,0	115	48	-	30	0,185
DC7221B(5C)	1279	2600	1300	72,217	88,877	8,33 $\pm 0,1$	21,0	115	48	5	30	0,210
DC7969C(5C)	2038	2400	1200	79,698	96,358	8,33 $\pm 0,1$	25,4	124	53	5	34	0,280
DC8334C	2055	2300	1100	83,340	100,000	8,33 $\pm 0,1$	25,4	132	55	-	34	0,270
DC8729A	1250	2200	1100	87,290	103,960	8,33 $\pm 0,1$	16,0	134	58	-	34	0,165
DC10323A(3C)*	1612	1800	900	103,231**	119,891	8,33 $\pm 0,1$	16,0	155	68	3	40	0,205
DC12334C*	4800	1500	750	123,340**	140,000	8,33 $\pm 0,1$	25,4	184	80	-	50	0,400
DC12388C(11C)	4875	1500	750	123,881	142,880	9,50 $\pm 0,10$	25,4	186	80	11	44	0,400

### GB Notes

1)  $T_{max} = 2 \times T_{KN}$

Refer to Selection page 14 to 21

2) Inner race overruns

3) Outer race overruns

\*) The inner cage centering flange is on the opposite side

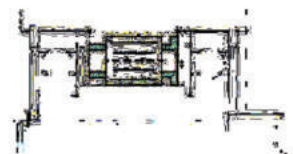
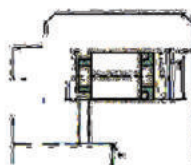
\*\*\*) Extension of tolerance to  $\pm 0,013$  permissible

Other dimensions on request

Refer to mounting and maintenance instructions

page 22 to 25

### Mounting examples

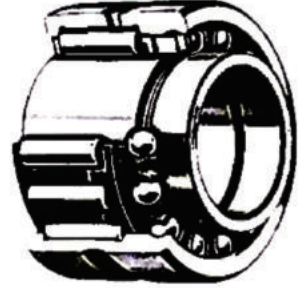




## Combined radial/ axial bearings



Needle roller/angular contact ball bearing NKIA, single direction



Needle roller/angular contact ball bearing NKIB, double direction

Combined INA needle roller bearings are radial needle roller bearings with a bearing component which can be axially loaded. They form locating or semi-locating bearings with an extremely small radial section height.

The needle roller bearing component has a lubrication groove with a lubrication hole.

Combined needle roller bearings are used mainly in transmission engineering and machine tools to support drilling spindles, multi-spindle drilling units, drill bushes, centring spindles, worm gear shafts, spindles of die heads and in similar applications.

### Needle roller/angular contact ball bearings, series NKIA

The needle roller/angular contact ball bearing series NKIA is a combination of a needle roller bearing with a single direction angular contact ball bearing. This is a particularly space-saving design of rolling bearing for taking heavy radial and light axial loads. The radial load is taken by the needle rollers and the axial load must not exceed 25% of the radial load.

Two single direction needle roller/angular contact ball bearings can be mounted opposite each other to support axial forces from both directions. Potential thermal expansion should be counteracted by suitable design measures (e.g. smaller distance between bearings or spring-mounting the bearings).

### Needle roller/angular contact ball bearings, series NKIB

The needle roller/angular contact ball bearing series NKIB is a combination of a needle roller bearing with a double direction angular contact ball bearing. It can take heavy radial and light axial loads in both directions and permits axial shaft location with an axial clearance of 0,08 mm to 0,25 mm. As with series NKIA bearings, the axial load must not exceed 25 % of the radial load.

The inner ring is in two parts for easier fitting and dismantling. For assembly reasons, the narrower part of the inner ring is manufactured with a larger diameter so that if a shaft with a k5 tolerance zone is selected, the result is an interference fit. The rings are not interchangeable and both rings must be axially clamped together.

**Range** - Combined INA needle roller bearings are available in the following designs:

Series	Description
NKIA	Combination of a needle roller bearing with a single direction angular contact ball bearing, DIN 5429, for low axial loads
NKIB	Combination of a needle roller bearing with a double direction angular contact ball bearing, for low axial loads
NX NX...Z	Combination of a needle roller bearing with a full complement axial ball bearing, with retaining cap, for medium axial loads
NIX <sup>1)</sup> NIX...Z <sup>1)</sup>	Combination of a needle roller bearing with a full complement axial ball bearing, without or with retaining cap, DIN 5429, for heavy axial loads
NIXR <sup>1)</sup> NIXR...Z <sup>1)</sup>	Combination of a needle roller bearing with an axial cylindrical roller bearing, without or with retaining cap, DIN 5429, for very heavy axial loads

<sup>1)</sup> See dimension table for designation to DIN 5429.

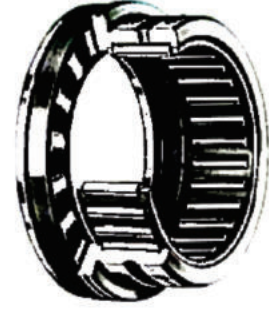




Needle roller/axial ball bearing NX



Needle roller/axial ball bearing NKX



Needle roller/axial cylindrical roller bearing NKXR

## Needle roller/axial ball bearings, series NX and NX..Z

The needle roller/axial ball bearing series NX is a combination of a needle roller bearing with a full complement axial ball bearing with retaining cap. It can take heavy radial loads and medium axial loads in one direction through the full complement ball set.

Bearings of this series are supplied without an inner ring. This allows even smaller shaft centre distances to be used than with bearings of the series NKIA and NKIB but with the same shaft diameter. However, the raceways on the shaft must be hardened and ground.

Bearings of series NX have holes in the retaining cap (see dimension figure) and can be used with oil lubrication. Grease lubrication can be used for bearings of series NX..Z. The retaining cap and shaft locating washer form a gap seal.

## Needle roller/axial ball bearings, series NKX and NKX..Z

The needle roller/axial ball bearing series NKX is a combination of a needle roller bearing with an axial ball bearing. It can take heavy radial loads as well as heavy axial loads in one direction.

Bearings of this series are supplied without an inner ring. Bearings of series NKX..Z have a retaining cap and are used with grease lubrication. The retaining cap and shaft locating washer form a gap seal.

## Needle roller/axial cylindrical roller bearings, series NKXR and NKXR..Z

The needle roller/axial cylindrical roller bearings series NKXR are a combination of a needle roller bearing with an axial cylindrical roller bearing. They have a higher axial load carrying capacity than bearings of series NKX.

Bearings of this series are supplied without an inner ring. Bearings of series NKXR..Z have a retaining cap and are used with grease lubrication. The retaining cap and shaft locating washer form a gap seal.

## Accuracy

Combined needle roller bearings are supplied with dimensional and geometrical accuracy to tolerance class PN to DIN 620.

Exceptions to this are the bore of the narrow inner ring part on series NKIB bearings and the width of both inner ring parts. Further exceptions are the diameters "D<sub>1</sub>" and "D<sub>2</sub>" on series NKX and NKXR bearings (see dimension tables).

All bearings with inner ring (NKIA, NKIB) have a normal internal clearance CN to DIN 620. The enveloping circle diameter for bearings without inner ring (NX, NKX, NKXR) before mounting is within the tolerance zone F6.

INA combined needle roller bearings are available, on request, in a special execution:

- with increased accuracy (suffix P5 or P6)

- with radial internal clearance other than normal (NKIA and NKIB only) (suffix C2 or C3 only).



## Combined radial/axial bearings

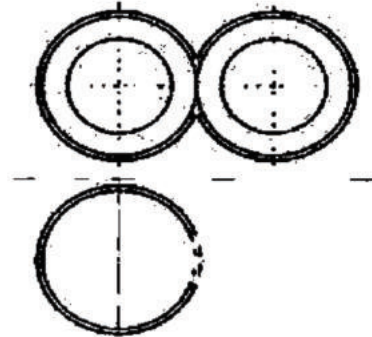


Figure 1 · Shortened snap rings

### Design of bearing arrangements

Bearings of series NX, NKX and NKXR are supplied without inner ring. The raceways on the shaft must therefore be hardened and ground. If the shafts are not hardened, inner rings can be used (see dimension tables for recommended inner rings).

If two needle roller/axial ball bearings are mounted so that they oppose each other, then axial loads acting in both directions can be supported. It is recommended that the unloaded bearing is axially preloaded by additional springs. Spring preload allows for thermal expansion and contributes to quiet running.

At speeds of more than  $0,2 n_G$ , this preload should be 1% to 2% of the axial dynamic load rating C.

If bearings of series NX are to take axial loads they can be supported by a snap ring in the groove provided in the outer ring, by a housing shoulder or by a snap ring in the housing bore.

When two bearings are arranged at the minimum shaft distance, the distance between the snap ring abutment faces must be carefully controlled to ensure they do not touch (see Figure 1).

See dimension tables for mounting tolerances.

See Table 1 for shaft and bore tolerances.

### Lubrication

Bearings of series NX, NKX and NKXR are designed for oil lubrication.

Bearings of series NX..Z, NKX..Z and NKXR..Z have a retaining cap and can be used with grease lubrication.

The axial part in bearings of series NX..Z, NKX..Z and NKXR..Z must be greased with a grease KP2K-30 (DIN 51 825) as initial greasing before installation is difficult.

Before being put into to use, the radial part must be greased with a compatible grease of similarly high quality

The operating life of these bearings is determined by the operating life of the grease in the axial part.

Table 1 · Mounting tolerances

Series	Shaft tolerance without inner ring	Shaft tolerance with inner ring	Bore tolerance
Needle roller/angular contact ball bearing NKIA	-	k5 <sup>2)</sup>	M6 <sup>2)</sup>
Needle roller/angular contact ball bearing NKIB	-	k5 <sup>2)</sup>	M6 <sup>2)</sup>
Needle roller/axial ball bearing NX	k5	k5	K6 M6 (for rigid bearing arrangements)
Needle roller/axial ball bearing NKX <sup>1)</sup>			
Needle roller/axial cylindrical roller bearing NKXR <sup>1)</sup>			

<sup>1)</sup> A recess in the housing for the axial bearing part must be at least 0,5 mm larger than the nominal diameter  $D_1$  or  $D_2$  in order to avoid double location.

<sup>2)</sup> For functional reasons, no fits tighter than those obtained with a k5 shaft and an M6 bore may be used.

### Ordering example

Needle roller/axial ball bearing bearing of series NKX with a retaining cap for grease lubrication:  
shaft diameter: 20 mm.

Additional feature:  
particularly high dimensional and geometrical accuracy to tolerance class P5 (suffix P5).

### Ordering designation

Designation	NKX 20 Z	P5
Suffix for special execution		

### Further technical details:

⚠ The information in the following sections must be taken into consideration:

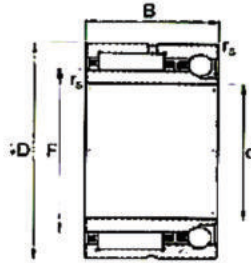
*The basic principles of rolling bearing technology*  
*Lubrication*

Ordering suffixes for special executions:  
in section *Ordering designations*

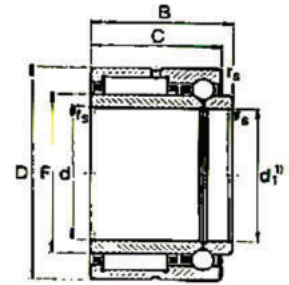
## Needle roller/ angular contact ball bearings

single direction  
Series NKIA

double direction  
Series NKIB



NKIA



NKIB

Dimension table - Dimensions in mm

Shaft diameter	Designation	Mass	Dimensions					Basic load ratings				Limiting speed $n_G$	Reference speed <sup>2)</sup> $n_B$	
			d	F	D	B	C	$r_s$	radial dyn. $C$	stat. $C_0$	axial dyn. $C$			stat. $C_0$
g													min <sup>-1</sup>	min <sup>-1</sup>
12	NKIA 5901	40	12	16	24	16	-	0,3	7,6	8,3	2,16	2,25	24 000	17 000
	NKIB 5901	43	12	16	24	17,5	16	0,3	7,6	8,3	2,16	2,25	24 000	17 000
15	NKIA 5902	50	15	20	28	18	-	0,3	10,6	13,6	2,34	2,75	22 000	15 000
	NKIB 5902	52	15	20	28	20	18	0,3	10,6	13,6	2,34	2,75	22 000	15 000
17	NKIA 5903	56	17	22	30	18	-	0,3	11	14,6	2,5	3,2	21 000	13 000
	NKIB 5903	58	17	22	30	20	18	0,3	11	14,6	2,5	3,2	21 000	13 000
20	NKIA 5904	103	20	25	37	23	-	0,3	21	25,5	3,95	4,85	17 000	12 000
	NKIB 5904	107	20	25	37	25	23	0,3	21	25,5	3,95	4,85	17 000	12 000
22	NKIA 59/22	118	22	28	39	23	-	0,3	22,8	29,5	4,25	5,6	16 000	11 000
	NKIB 59/22	122	22	28	39	25	23	0,3	22,8	29,5	4,25	5,6	16 000	11 000
25	NKIA 5905	130	25	30	42	23	-	0,3	23,6	31,5	4,35	6,1	15 000	9 500
	NKIB 5905	134	25	30	42	25	23	0,3	23,6	31,5	4,35	6,1	15 000	9 500
30	NKIA 5906	147	30	35	47	23	-	0,3	25	35,5	4,75	7,3	13 000	8 000
	NKIB 5906	151	30	35	47	25	23	0,3	25	35,5	4,75	7,3	13 000	8 000
35	NKIA 5907	243	35	42	55	27	-	0,6	31,5	50	6	9,8	11 000	7 500
	NKIB 5907	247	35	42	55	30	27	0,6	31,5	50	6	9,8	11 000	7 500
40	NKIA 5908	315	40	48	62	30	-	0,6	43	67	7,4	12,7	9 500	6 500
	NKIB 5908	320	40	48	62	34	30	0,6	43	67	7,4	12,7	9 500	6 500
45	NKIA 5909	375	45	52	68	30	-	0,6	45	73	7,7	14	8 500	6 000
	NKIB 5909	380	45	52	68	34	30	0,6	45	73	7,7	14	8 500	6 000
50	NKIA 5910	380	50	58	72	30	-	0,6	47	80	8,1	15,9	8 000	5 500
	NKIB 5910	385	50	58	72	34	30	0,6	47	80	8,1	15,9	8 000	5 500
55	NKIA 5911	550	55	63	80	34	-	1	58	100	9,7	19,2	7 500	5 000
	NKIB 5911	555	55	63	80	38	34	1	58	100	9,7	19,2	7 500	5 000
60	NKIA 5912	590	60	68	85	34	-	1	60	108	10	20,8	7 000	4 600
	NKIB 5912	595	60	68	85	38	34	1	60	108	10	20,8	7 000	4 600
65	NKIA 5913	635	65	72	90	34	-	1	61	112	10,3	22,3	6 500	4 300
	NKIB 5913	640	65	72	90	38	34	1	61	112	10,3	22,3	6 500	4 300
70	NKIA 5914	980	70	80	100	40	-	1	84	156	13,5	29	5 000	4 100
	NKIB 5914	985	70	80	100	45	40	1	84	156	13,5	29	5 000	4 100

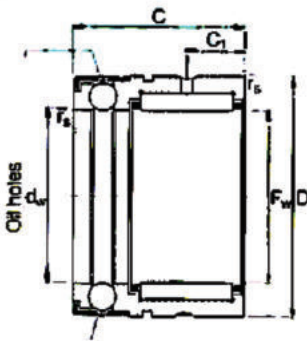
The ball cages are made of plastic, permissible operating temperature: 120 °C (continuous operation).

<sup>1)</sup> Diameter  $d_1$  deviates from DIN 620.

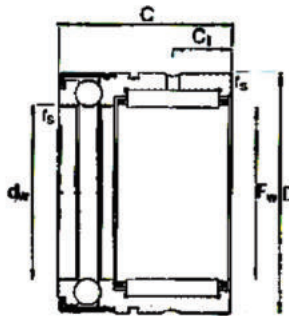
<sup>2)</sup> Treat as radial bearings when calculating the permissible speed.



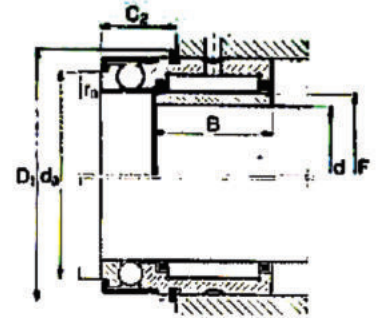
## Needle roller/axial ball bearings



NX (for oil lubrication)



NX.Z (for grease lubrication)



Mounting dimensions  
Snap ring in outer ring

**Dimension table** Dimensions in mm

Shaft diameter	Designation		Dimensions						
	for oil lubrication	for grease lubrication	Mass	$F_w$	D	C	$C_1$	$d_w$	$r_s$
			g			-0,25		E8	min.
7	<b>NX 7 TN<sup>1)</sup></b>	<b>NX 7 Z TN<sup>1)</sup></b>	14	7	14	18	4,7	7	0,3
10	<b>NX 10</b>	<b>NX 10 Z</b>	25	10	19	18	4,7	10	0,3
12	<b>NX 12</b>	<b>NX 12 Z</b>	28	12	21	18	4,7	12	0,3
15	<b>NX 15</b>	<b>NX 15 Z</b>	48	15	24	28	8	15	0,3
17	<b>NX 17</b>	<b>NX 17 Z</b>	53	17	26	28	8	17	0,3
20	<b>NX 20</b>	<b>NX 20 Z</b>	68	20	30	28	8	20	0,3
25	<b>NX 25</b>	<b>NX 25 Z</b>	115	25	37	30	8	25	0,3
30	<b>NX 30</b>	<b>NX 30 Z</b>	130	30	42	30	10	30	0,3
35	<b>NX 35</b>	<b>NX 35 Z</b>	160	35	47	30	10	35	0,3

<sup>1)</sup> TN = plastic cage, permissible operating temperature: 120 °C (continuous operation).  
With closing ring on one side.

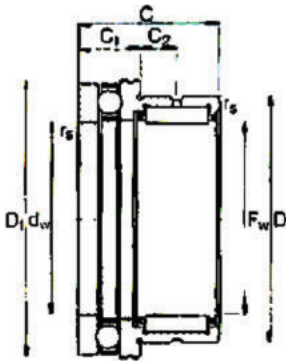
<sup>1)</sup> Minimum axial load  $F_a = 1\%$  to  $2\%$  of the axial dynamic load rating C.

<sup>2)</sup> Limiting speed for oil lubrication.  
With grease lubrication, 60% of the values given in the table is permissible.

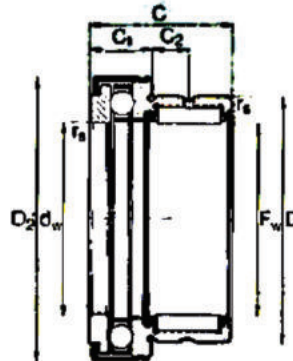
<sup>2)</sup> Inner rings and snap rings must be ordered separately,  
for further details, see pages 138 and 247.

## Needle roller/axial ball bearings

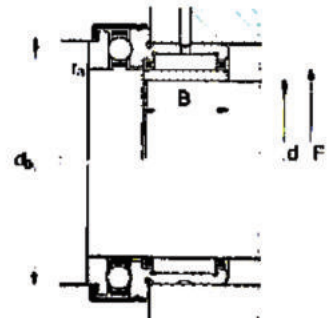
without or with retaining cap  
Series NKX, NKX...Z



NKX



NKX.Z



Mounting dimensions

**Dimension table** Dimensions in mm

Shaft diameter	Designation	Designation to DIN 5429	Mass	Bearing with retaining cap Designation	Designation to DIN 5429	Mass	Dimensions							
							F <sub>w</sub>	D	D <sub>1</sub>	D <sub>2</sub>	C	C <sub>1</sub>	C <sub>2</sub>	
			g			g		max.	max.	-0,25	0,2			
10	NKX 10 TN <sup>1)</sup>	NAXK 10 TN <sup>1)</sup>	34	NKX 10 Z TN <sup>1)</sup>	NAXK 10 Z TN <sup>1)</sup>	36	10	19	24,1	25,2	23	9	6,5	
12	NKX 12	NAXK 12	38	NKX 12 Z	NAXK 12 Z	40	12	21	26,1	27,2	23	9	6,5	
15	NKX 15	NAXK 15	44	NKX 15 Z	NAXK 15 Z	47	15	24	28,1	29,2	23	9	6,5	
17	NKX 17	NAXK 17	53	NKX 17 Z	NAXK 17 Z	55	17	26	30,1	31,2	25	9	8	
20	NKX 20	NAXK 20	83	NKX 20 Z	NAXK 20 Z	90	20	30	35,1	36,2	30	10	10,5	
25	NKX 25	NAXK 25	125	NKX 25 Z	NAXK 25 Z	132	25	37	42,1	43,2	30	11	9,5	
30	NKX 30	NAXK 30	141	NKX 30 Z	NAXK 30 Z	148	30	42	47,1	48,2	30	11	9,5	
35	NKX 35	NAXK 35	163	NKX 35 Z	NAXK 35 Z	168	35	47	52,1	53,2	30	12	9	
40	NKX 40	NAXK 40	200	NKX 40 Z	NAXK 40 Z	208	40	52	60,1	61,2	32	13	10	
45	NKX 45	NAXK 45	252	NKX 45 Z	NAXK 45 Z	265	45	58	65,2	66,5	32	14	9	
50	NKX 50	NAXK 50	280	NKX 50 Z	NAXK 50 Z	300	50	62	70,2	71,5	35	14	10	
60	NKX 60	NAXK 60	360	NKX 60 Z	NAXK 60 Z	380	60	72	85,2	86,5	40	17	12	
70	NKX 70	NAXK 70	500	NKX 70 Z	NAXK 70 Z	520	70	85	95,2	96,5	40	18	11	

<sup>1)</sup> TN = plastic cage, permissible operating temperature: 120 °C (continuous operation).  
With closing ring on one side.

<sup>2)</sup> Minimum axial load F<sub>a</sub> = 1% to 2% of the axial dynamic load rating C.

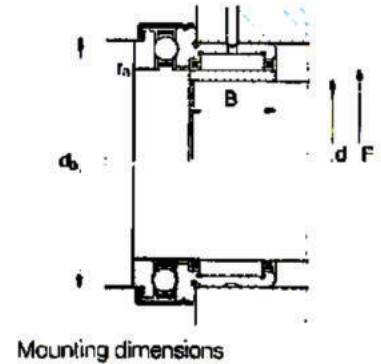
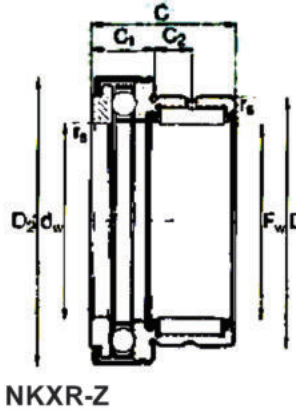
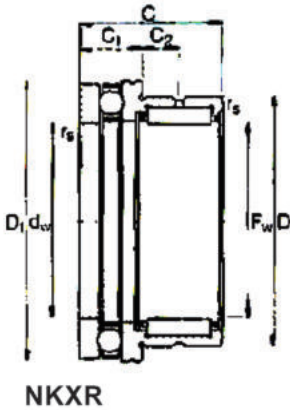
<sup>3)</sup> Limiting speed for oil lubrication.

<sup>4)</sup> With grease lubrication, 60% of the values given in the table is permissible.



## Needle roller/axial cylindrical roller bearings

without or with retaining cap  
Series NKXR, NKXR..Z



**Dimension table** - Dimensions in mm

Shaft diameter	Designation	Designation to DIN 5429	Mass	Bearing with retaining cap Designation	Designation to DIN 5429	Mass	Dimensions							
							F <sub>w</sub>	D	D <sub>1</sub>	D <sub>2</sub>	C	C <sub>1</sub>	C <sub>2</sub>	
			g			g			max.	max.	-0,25	-0,2		
15	<b>NKXR 15</b>	NAXR 15	42	<b>NKXR 15 Z</b>	NAXR 15 Z	45	15	24	28,1	29,2	23	9	6,5	
17	<b>NKXR 17</b>	NAXR 17	50	<b>NKXR 17 Z</b>	NAXR 17 Z	53	17	26	30,1	31,2	25	9	8	
20	<b>NKXR 20</b>	NAXR 20	80	<b>NKXR 20 Z</b>	NAXR 20 Z	84	20	30	35,1	36,2	30	10	10,5	
25	<b>NKXR 25</b>	NAXR 25	120	<b>NKXR 25 Z</b>	NAXR 25 Z	125	25	37	42,1	43,2	30	11	9,5	
30	<b>NKXR 30</b>	NAXR 30	135	<b>NKXR 30 Z</b>	NAXR 30 Z	141	30	42	47,1	48,2	30	11	9,5	
35	<b>NKXR 35</b>	NAXR 35	157	<b>NKXR 35 Z</b>	NAXR 35 Z	165	35	47	52,1	53,2	30	12	9	
40	<b>NKXR 40</b>	NAXR 40	204	<b>NKXR 40 Z</b>	NAXR 40 Z	214	40	52	60,1	61,2	32	13	10	
45	<b>NKXR 45</b>	NAXR 45	244	<b>NKXR 45 Z</b>	NAXR 45 Z	260	45	58	65,2	66,5	32	14	9	
50	<b>NKXR 50</b>	NAXR 50	268	<b>NKXR 50 Z</b>	NAXR 50 Z	288	50	62	70,2	71,5	35	14	10	

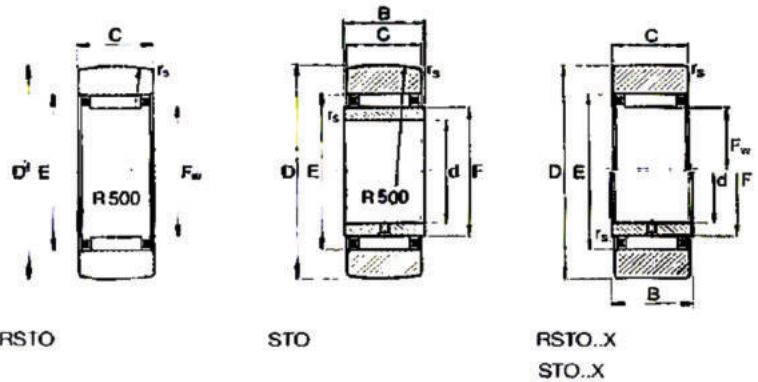
The axial cages are made of plastic, permissible operating temperature: 120 °C (continuous operation).

- <sup>1)</sup> Minimum axial load  $F_a = 1\%$  to  $2\%$  of the axial dynamic load rating  $C$ .
- <sup>2)</sup> Limiting speed for oil lubrication.  
With grease lubrication,  $25\%$  of the values given in the table is permissible.
- <sup>3)</sup> Treat as axial bearings when calculating the permissible speed.
- <sup>4)</sup> Inner rings must be ordered separately,  
for further details, see page 138.

## Yoke type track rollers

without axial guidance

Series RSTO,  
RSTO..X,  
STO,  
STO..X



Dimension table · Dimensions in mm

Outside diameter	Without inner ring Designation	Mass	With inner ring Designation	Mass	Dimensions							Basic load ratings <sup>2)</sup>				Limiting speed <sup>3)</sup> n <sub>G</sub>
					D	d	F <sup>1)</sup> F <sub>w</sub>	B	C	E	r <sub>s</sub>	dyn. C	stat. C <sub>0</sub>	Track roller dyn. C <sub>w</sub>	stat. C <sub>0w</sub>	
		g		g							min.	kN	kN	kN	kN	min <sup>1)</sup>
16	RSTO 5 TN	8,5	-	-	16	-	7	-	7,8	10	0,3	2,85	2,65	2,55	2,55	23 000
	RSTO 5 X TN	8,5	-	-	16	-	7	-	7,8	10	0,3	2,85	2,65	2,55	2,55	23 000
19	RSTO 6 TN	12,5	STO 6 TN	17	19	6	10	10	9,8	13	0,3	4,75	5,5	3,75	4,5	20 000
	RSTO 6 X TN	12,5	STO 6 X TN	17	19	6	10	10	9,8	13	0,3	4,75	5,5	3,75	4,5	20 000
24	RSTO 8 TN	21	STO 8 TN	26	24	8	12	10	9,6	15	0,3	4,9	6,1	4,2	5,5	16 000
	RSTO 8 X TN	21	STO 8 X TN	26	24	8	12	10	9,8	15	0,3	4,9	6,1	4,2	5,5	16 000
30	RSTO 10	42	STO 10	49	30	10	14	12	11,8	20	0,3	10,3	10,6	8,4	9,2	11 000
	RSTO 10 X	42	STO 10 X	49	30	10	14	12	11,8	20	0,3	10,3	10,6	8,4	9,2	11 000
32	RSTO 12	49	STO 12	57	32	12	16	12	11,8	22	0,3	11,5	12,5	8,9	10,1	9 000
	RSTO 12 X	49	STO 12 X	57	32	12	16	12	11,8	22	0,3	11,5	12,5	8,9	10,1	9 000
35	RSTO 15	50	STO 15	63	35	15	20	12	11,8	26	0,3	13,4	16,2	9,1	10,7	6 500
	RSTO 15 X	50	STO 15 X	63	35	15	20	12	11,8	26	0,3	13,4	16,2	9,1	10,7	6 500
40	RSTO 17	88	STO 17	107	40	17	22	16	15,8	29	0,3	20	25,5	14,3	17,7	5 500
	RSTO 17 X	88	STO 17 X	107	40	17	22	16	15,8	29	0,3	20	25,5	14,3	17,7	5 500
47	RSTO 20	130	STO 20	152	47	20	25	16	15,8	32	0,3	21	28	16,2	21,5	4 700
	RSTO 20 X	130	STO 20 X	152	47	20	25	16	15,8	32	0,3	21	28	16,2	21,5	4 700
52	RSTO 25	150	STO 25	177	52	25	30	16	15,8	37	0,3	23,1	33,5	16,5	22,9	3 600
	RSTO 25 X	150	STO 25 X	177	52	25	30	16	15,8	37	0,3	23,1	33,5	16,5	22,9	3 600
62	RSTO 30	255	STO 30	308	62	30	38	20	19,8	46	0,6	35,5	57	23,3	35	2 500
	RSTO 30 X	255	STO 30 X	308	62	30	38	20	19,8	46	0,6	35,5	57	23,3	35	2 500
72	RSTO 35	375	STO 35	441	72	35	42	20	19,8	50	0,6	36	59	26	41	2 200
	RSTO 35 X	375	STO 35 X	441	72	35	42	20	19,8	50	0,6	36	59	26	41	2 200
80	RSTO 40	420	STO 40	530	80	40	50	20	19,8	58	1	35,5	62	24	39	1 700
	RSTO 40 X	420	STO 40 X	530	80	40	50	20	19,8	58	1	35,5	62	24	39	1 700
85	RSTO 45	453	STO 45	576	85	45	55	20	19,8	63	1	40	74	25,5	43	1 500
	RSTO 45 X	453	STO 45 X	576	85	45	55	20	19,8	63	1	40	74	25,5	43	1 500
90	RSTO 50	481	STO 50	617	90	50	60	20	19,8	68	1	43,5	85	26	46,5	1 300
	RSTO 50 X	481	STO 50 X	617	90	50	60	20	19,8	68	1	43,5	85	26	46,5	1 300

TN = plastic cage, permissible operating temperature: +120 °C (continuous operation)

<sup>1)</sup> F = raceway diameter of inner ring.

F<sub>w</sub> = needle roller enveloping circle in the tolerance zone F6.

<sup>2)</sup> The basic load ratings C and C<sub>0</sub> apply if the bearing outer ring (with cylindrical outside surface) is mounted in a housing bore with the normal rolling bearing fit; when used as a track roller, the load ratings C<sub>w</sub> and C<sub>0w</sub> apply.

<sup>3)</sup> Limiting speed for grease lubrication.

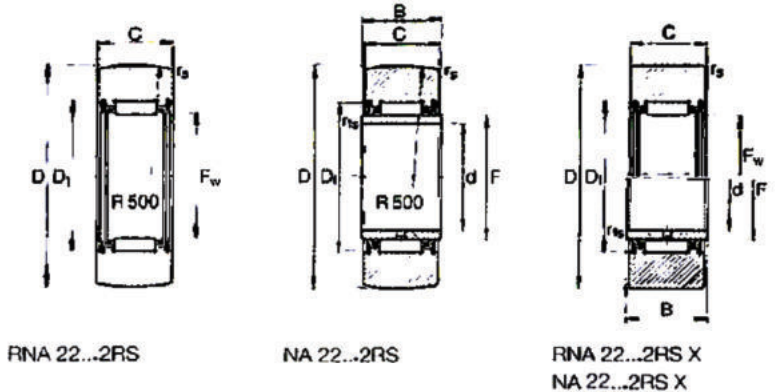
With oil lubrication, the speed can be increased by approximately 30%.



## Yoke type track rollers

without axial guidance,  
sealed

Series RNA 22...2RS,  
RNA 22...2RS X,  
NA 22...2RS,  
NA 22...2RS X



Dimension table · Dimensions in mm

Out-side diam-eter	Without inner ring Designation	Mass g	With inner ring Designation	Mass g	Dimensions								Basic load ratings <sup>2)</sup>				Limiting speed <sup>3)</sup> n <sub>3</sub> min <sup>-1</sup>
					D	d	F <sup>1)</sup> F <sub>w</sub>	B	C	r <sub>s</sub>	r <sub>fs</sub>	D <sub>1</sub>	dyn. C	stat. C <sub>0</sub>	dyn. C <sub>w</sub>	stat. C <sub>0w</sub>	
19	RNA 22/6.2RS	18	NA 22/6.2RS	22	19	6	10	12	11,8	0,3	0,3	16	5,3	4,65	3,9	3,7	18 000
	RNA 22/6.2RS X	18	NA 22/6.2RS X	22	19	6	10	12	11,8	0,3	0,3	16	5,3	4,65	3,9	3,7	18 000
24	RNA 22/8.2RS	29	NA 22/8.2RS	34	24	8	12	12	11,8	0,3	0,3	18	5,7	5,4	4,8	4,8	14 000
	RNA 22/8.2RS X	29	NA 22/8.2RS X	34	24	8	12	12	11,8	0,3	0,3	18	5,7	5,4	4,8	4,8	14 000
30	RNA 2200..2RS	52	NA 2200.2RS	60	30	10	14	14	13,8	0,6	0,3	20	7,8	8,3	7	8	11 000
	RNA 2200.2RS X	52	NA 2200.2RS X	60	30	10	14	14	13,8	0,6	0,3	20	7,8	8,3	7	8	11 000
32	RNA 2201.2RS	57	NA 2201.2RS	67	32	12	16	14	13,8	0,6	0,3	22	8,7	9,9	7,5	9	9 500
	RNA 2201.2RS X	57	NA 2201.2RS X	67	32	12	16	14	13,8	0,6	0,3	22	8,7	9,9	7,5	9	9 500
35	RNA 2202.2RS	60	NA 2202.2RS	75	35	15	20	14	13,8	0,6	0,3	26	9,8	12,3	7,6	9,6	7 000
	RNA 2202.2RS X	60	NA 2202.2RS X	75	35	15	20	14	13,8	0,6	0,3	26	9,8	12,3	7,6	9,6	7 000
40	RNA 2203.2RS	94	NA 2203.2RS	112	40	17	22	16	15,8	1	0,3	28	12,2	16,7	9,9	13,8	6 000
	RNA 2203.2RS X	94	NA 2203.2RS X	112	40	17	22	16	15,8	1	0,3	28	12,2	16,7	9,9	13,8	6 000
47	RNA 2204.2RS	152	NA 2204.2RS	177	47	20	25	18	17,8	1	0,3	33	18,9	22,3	15,2	18,3	4 600
	RNA 2204.2RS X	152	NA 2204.2RS X	177	47	20	25	18	17,8	1	0,3	33	18,9	22,3	15,2	18,3	4 600
52	RNA 2205.2RS	179	NA 2205.2RS	209	52	25	30	18	17,8	1	0,3	38	21,1	27	15,7	20	3 500
	RNA 2205.2RS X	179	NA 2205.2RS X	209	52	25	30	18	17,8	1	0,3	38	21,1	27	15,7	20	3 500
62	RNA 2206.2RS	284	NA 2206.2RS	324	62	30	35	20	19,8	1	0,3	43	23,3	32	18,3	25,5	2 800
	RNA 2206.2RS X	284	NA 2206.2RS X	324	62	30	35	20	19,8	1	0,3	43	23,3	32	18,3	25,5	2 800
72	RNA 2207.2RS	432	NA 2207.2RS	505	72	35	42	23	22,7	1,1	0,6	50	30	46,5	23	35,5	2 200
	RNA 2207.2RS X	432	NA 2207.2RS X	505	72	35	42	23	22,7	1,1	0,6	50	30	46,5	23	35,5	2 200
80	RNA 2208.2RS	530	NA 2208.2RS	628	80	40	48	23	22,7	1,1	0,6	57	38,5	58	27,5	40,5	1 700
	RNA 2208.2RS X	530	NA 2208.2RS X	628	80	40	48	23	22,7	1,1	0,6	57	38,5	58	27,5	40,5	1 700
85	RNA 2209.2RS	545	NA 2209.2RS	655	85	45	52	23	22,7	1,1	0,6	62	40,5	64	28,5	43	1 600
	RNA 2209.2RS X	545	NA 2209.2RS X	655	85	45	52	23	22,7	1,1	0,6	62	40,5	64	28,5	43	1 600
90	RNA 2210.2RS	563	NA 2210.2RS	690	90	50	58	23	22,7	1,1	0,6	68	42,5	70	28	42,5	1 300
	RNA 2210.2RS X	563	NA 2210.2RS X	690	90	50	58	23	22,7	1,1	0,6	68	42,5	70	28	42,5	1 300

<sup>1)</sup> F - raceway diameter of inner ring.

F<sub>w</sub> = needle roller enveloping circle in the tolerance zone F6.

<sup>2)</sup> The basic load ratings C and C<sub>0</sub> apply if the bearing outer ring (with cylindrical outside surface) is mounted in a housing bore with the normal rolling bearing fit, when used as a track roller, the load ratings C<sub>w</sub> and C<sub>0w</sub> apply.

<sup>3)</sup> Limiting speed for grease lubrication.

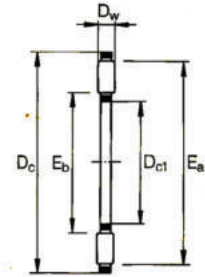
With oil lubrication, the speed can be increased by approximately 30%.

## Axial needle roller and cage assemblies

Series AXK

## Axial bearing washers

Series AS, LS, GS 811, WS 811



AXK

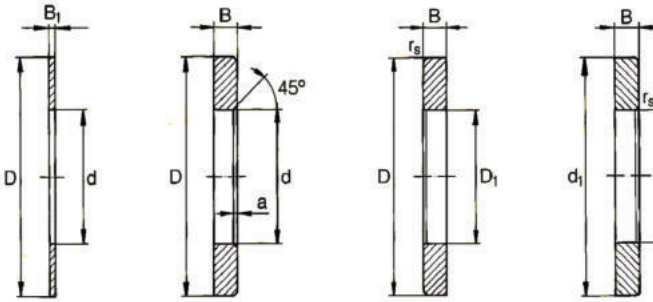
Dimension table · Dimensions in mm

Shaft diameter	Axial needle roller and cage assemblies			Axial bearing washers				
	Designation	Mass g	Bearing washer Designation	Mass g	Bearing washer Designation	Housing locating washer Designation	Shaft locating washer Designation	Mass g
4	AXK 0414 TN	0,7	AS 0414	1	-	-	-	-
5	AXK 0515 TN	0,8	AS 0515	1	-	-	-	-
6	AXK 0619 TN	1	AS 0619	2	LS 0619	-	-	4
8	AXK 0821 TN	2	AS 0821	2	LS 0821	-	-	4
10	AXK 1024	3	AS 1024	3	LS 1024	-	-	7
12	AXK 1226	3	AS 1226	3	LS 1226	-	-	8
15	AXK 1528	4	AS 1528	3	LS 1528	GS 81102	WS 81102	9
17	AXK 1730	4	AS 1730	4	LS 1730	GS 81103	WS 81103	9
20	AXK 2035	5	AS 2035	5	LS 2035	GS 81104	WS 81104	13
25	AXK 2542	7	AS 2542	7	LS 2542	GS 81105	WS 81105	19
30	AXK 3047	8	AS 3047	8	LS 3047	GS 81106	WS 81106	22
35	AXK 3552	10	AS 3552	9	LS 3552	GS 81107	WS 81107	29
40	AXK 4060	16	AS 4060	12	LS 4060	GS 81108	WS 81108	40
45	AXK 4565	18	AS 4565	13	LS 4565	GS 81109	WS 81109	50
50	AXK 5070	20	AS 5070	14	LS 5070	GS 81110	WS 81110	55
55	AXK 5578	28	AS 5578	18	LS 5578	GS 81111	WS 81111	88
60	AXK 6085	33	AS 6085	22	LS 6085	GS 81112	WS 81112	97
65	AXK 6590	35	AS 6590	24	LS 6590	GS 81113	WS 81113	115
70	AXK 7095	60	AS 7095	25	LS 7095	GS 81114	WS 81114	123
75	AXK 75100	61	AS 75100	27	LS 75100	GS 81115	WS 81115	142
80	AXK 80105	63	AS 80105	28	LS 80105	GS 81116	WS 81116	151
85	AXK 85110	67	AS 85110	29	LS 85110	GS 81117	WS 81117	159
90	AXK 90120	86	AS 90120	39	LS 90120	GS 81118	WS 81118	234
100	AXK 100135	104	AS 100135	50	LS 100135	GS 81120	WS 81120	350
110	AXK 110145	122	AS 110145	55	LS 110145	GS 81122	WS 81122	385
120	AXK 120155	131	AS 120155	59	LS 120155	GS 81124	WS 81124	415
130	AXK 130170	205	AS 130170	65	LS 130170	GS 81126	WS 81126	663
140	AXK 140180	219	AS 140180	79	LS 140180	GS 81128	WS 81128	749
150	AXK 150190	232	AS 150190	84	LS 150190	GS 81130	WS 81130	796
160	AXK 160200	246	AS 160200	89	LS 160200	GS 81132	WS 81132	842

TN = plastic cage, permissible operating temperature: 120 °C (continuous operation).

<sup>1)</sup> Limiting speed for oil lubrication.  
For grease lubrication, 25% of the values given in the table is permissible.





Axial needle roller and cage assemblies  
Axial cylindrical roller and cage assemblies  
Axial bearing washers  
Axial bearings

AS                      LS                      GS 811                      WS 811

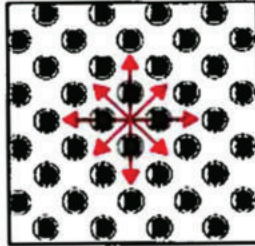
Dimensions				Raceway dimensions						Basic load ratings		Limiting speed <sup>1)</sup>	Reference speed	Shaft diameter
D <sub>c1</sub>	D <sub>1</sub>	D <sub>c</sub>	d <sub>1</sub>	D <sub>w</sub>	B <sub>1</sub>	B	a	E <sub>b</sub>	E <sub>a</sub>	dyn. C	stat. C <sub>0</sub>	n <sub>G</sub>	n <sub>B</sub>	
d		D					r <sub>s</sub> min.			kN	kN	min <sup>-1</sup>	min <sup>-1</sup>	
4	-	14	-	2	1	-	-	5	13	4,45	8	21 000	13 000	<b>4</b>
5	-	15	-	2	1	-	-	6	14	4,75	9,2	21 000	11 000	<b>5</b>
6	-	19	-	2	1	2,75	0,3	7	18	6,8	15,5	19 000	9 000	<b>6</b>
8	-	21	-	2	1	2,75	0,3	9	20	7,8	19,4	18 000	7 000	<b>8</b>
10	-	24	-	2	1	2,75	0,3	12	23	9,2	25,5	17 000	6 000	<b>10</b>
12	-	26	-	2	1	2,75	0,3	14	25	9,9	29	15 000	5 000	<b>12</b>
15	16	28	28	2	1	2,75	0,3	17	27	11,3	36	13 000	4 000	<b>15</b>
17	18	30	30	2	1	2,75	0,3	19	29	11,9	39,5	12 000	3 600	<b>17</b>
20	21	35	35	2	1	2,75	0,3	22	34	13,1	46,5	10 500	3 500	<b>20</b>
25	26	42	42	2	1	3	0,6	29	41	14,7	58	8 500	3 200	<b>25</b>
30	32	47	47	2	1	3	0,6	34	46	16,3	70	7 500	2 600	<b>30</b>
35	37	52	52	2	1	3,5	0,6	39	51	17,8	81	6 500	2 300	<b>35</b>
40	42	60	60	3	1	3,5	0,6	45	58	28	114	6 000	1 900	<b>40</b>
45	47	65	65	3	1	4	0,6	50	63	30	128	5 000	1 700	<b>45</b>
50	52	70	70	3	1	4	0,6	55	68	32	143	4 800	1 500	<b>50</b>
55	57	78	78	3	1	5	0,6	60	76	38	186	4 300	1 400	<b>55</b>
60	62	85	85	3	1	4,75	1	65	83	44,5	234	4 000	1 200	<b>60</b>
65	67	90	90	3	1	5,25	1	70	88	46,5	255	3 700	1 100	<b>65</b>
70	72	95	95	4	1	5,25	1	74	93	54	255	3 500	1 100	<b>70</b>
75	77	100	100	4	1	5,75	1	79	98	55	265	3 300	1 000	<b>75</b>
80	82	105	105	4	1	5,75	1	84	103	56	280	3 100	1 000	<b>80</b>
85	87	110	110	4	1	5,75	1	89	108	58	290	3 000	950	<b>85</b>
90	92	120	120	4	1	6,5	1	94	118	73	405	2 700	850	<b>90</b>
100	102	135	135	4	1	7	1	105	133	91	560	2 500	700	<b>100</b>
110	112	145	145	4	1	7	1	115	143	97	620	2 300	650	<b>110</b>
120	122	155	155	4	1	7	1	125	153	102	680	2 100	600	<b>120</b>
130	132	170	170	5	1	9	1	136	167	133	840	1 900	550	<b>130</b>
140	142	180	178	5	1	9,5	1	146	177	138	900	1 800	500	<b>140</b>
150	152	190	188	5	1	9,5	1	156	187	143	960	1 700	480	<b>150</b>
160	162	200	198	5	1	9,5	1	166	197	148	1020	1 600	450	<b>160</b>



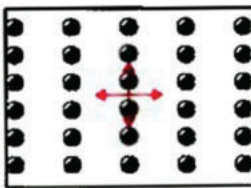
● **Typical ball transfer units arranging ways**



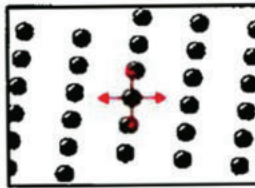
Square arranging



Diamond arranging

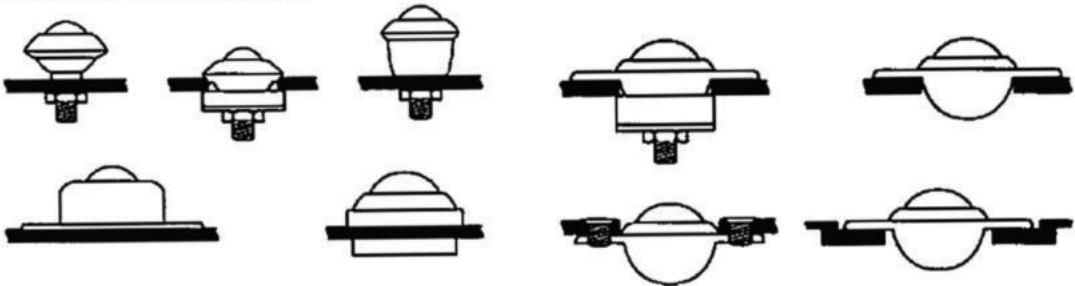


Long Column



Diagonal Column

● **Different installation ways**



● **Material Code**

CS/CS	Full carbon steel ball
PL/CS	Plastic ball, Carbon steel housing
SS/CS	Stainless steel ball, Carbon steel housing
CS/SS	Carbon steel ball, Stainless steel housing
SS/SS	Full stainless steel
PL/PL	Full plastic
SS/PL	Stainless steel ball, Plastic housing
PL/AL	Plastic ball, Aluminum alloy housing

● **Ordering**

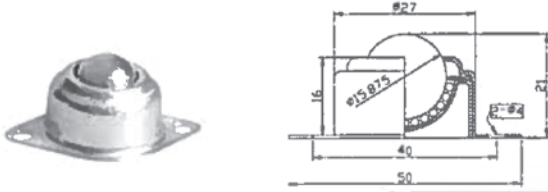
Model - Material Code x Quantity



# Ball Transfer Unit

## Pressed Metal Series

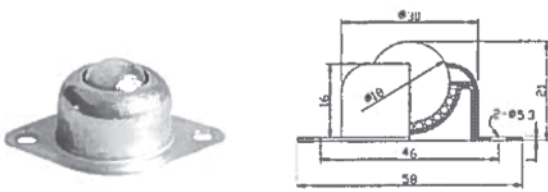
Available materials: CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-15A	10	15	0.038



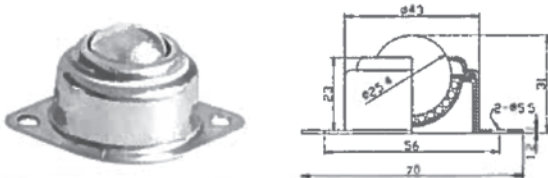
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-25E	20	25	0.048



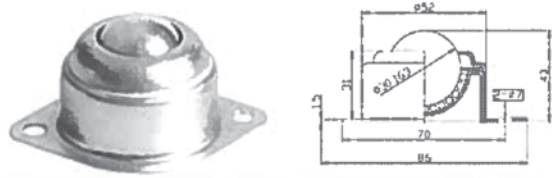
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-18A	20	25	0.048



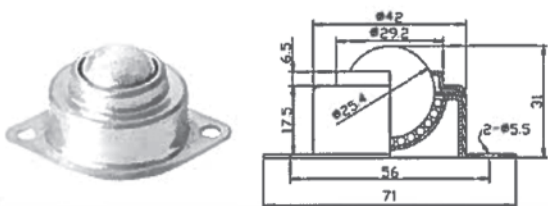
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-25FE	25	30	0.130



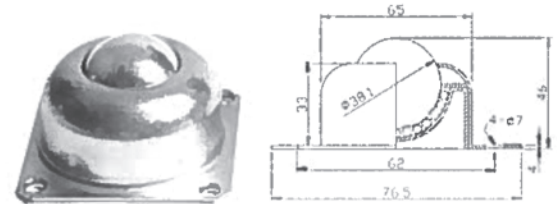
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-25A	25	30	0.130



Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-30A	40	50	0.240



Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-25A2	25	30	0.130

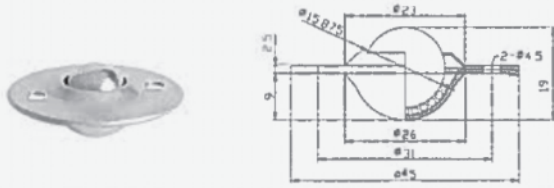


Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QCY-38A	60	80	0.460

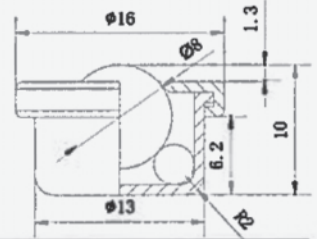


## Pressed Metal Series

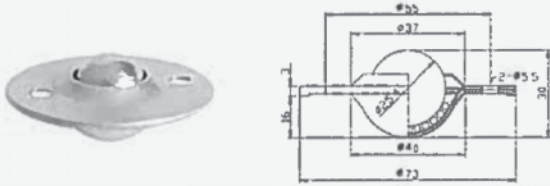
Available materials: CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



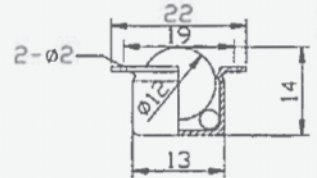
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-16B	10	15	0.040



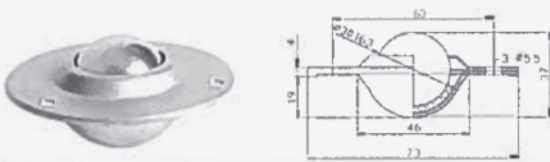
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-8H	3	5	0.005



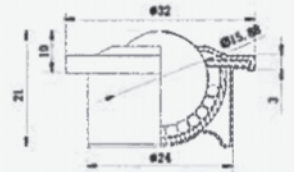
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-25B	25	30	0.150



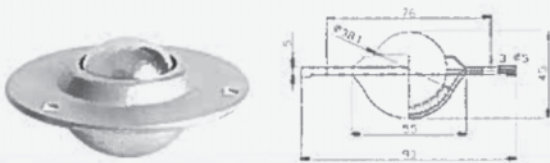
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-12H	5	8	0.010



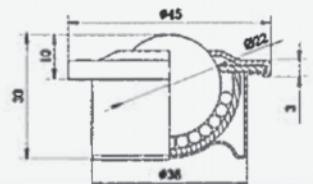
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-30B	35	45	0.220



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-15H	15	25	0.044



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-38B	45	55	0.430

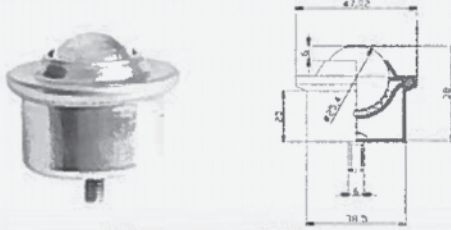


Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-22H	40	55	0.120

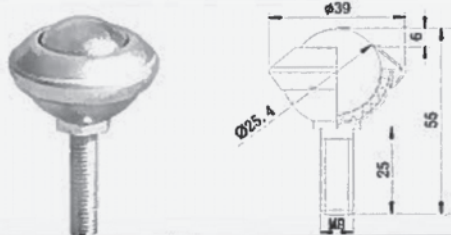


## Pressed Metal Series

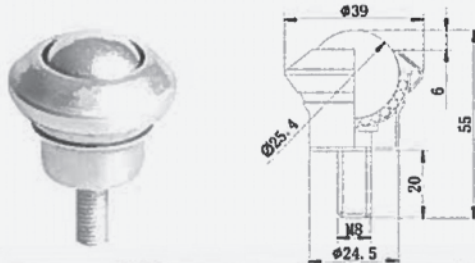
Available materials: CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



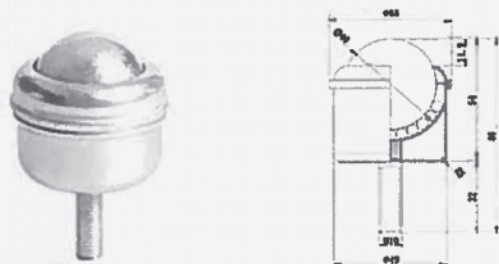
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-25HF	25	30	0.150



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-25FL	15	20	0.120



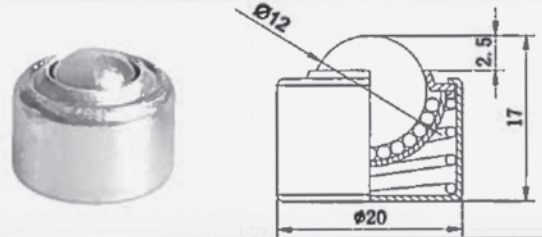
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-25FLB	25	30	0.130



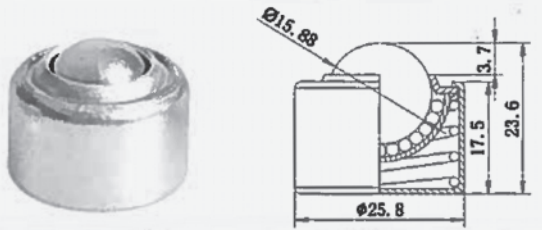
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-40F	40	50	0.460

## Pressed Metal Spring Load Series

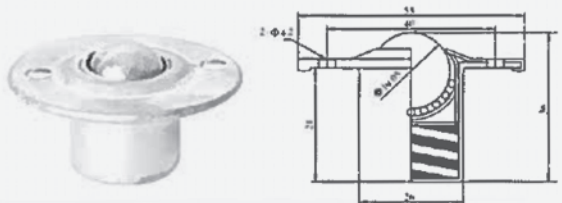
Inner Spring Shock Absorption



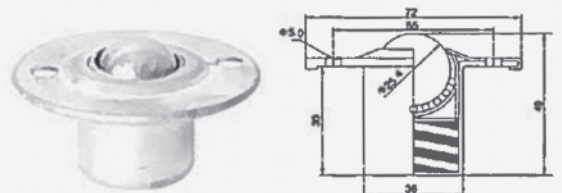
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-12T	5	7	0.020



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-15T	8	11	0.035



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-19TB	20	25	0.050

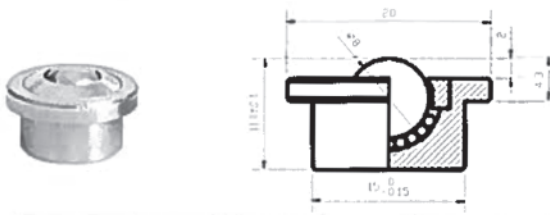


Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QCY-25TB	30	40	0.130

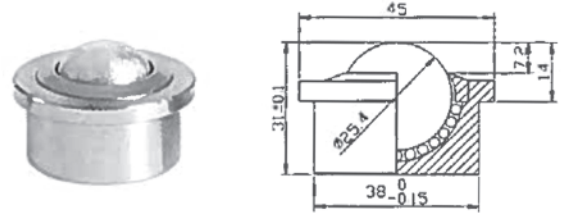


## Press Mount Heavy Duty Series

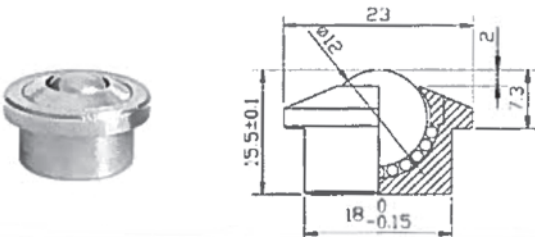
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



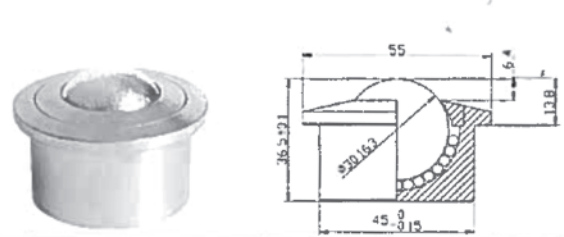
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-8	8	15	0.015



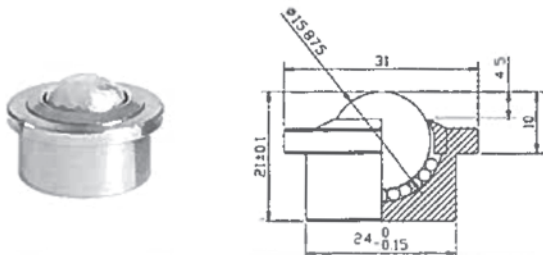
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-25	180	200	0.190



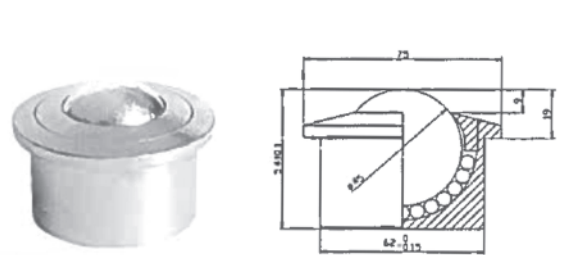
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-12	25	30	0.030



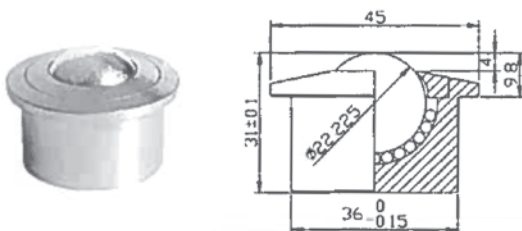
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-30	250	300	0.380



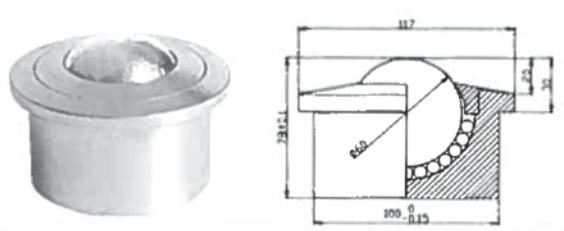
Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-15	40	50	0.060



Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-45	450	500	1.100



Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-22	140	160	0.185

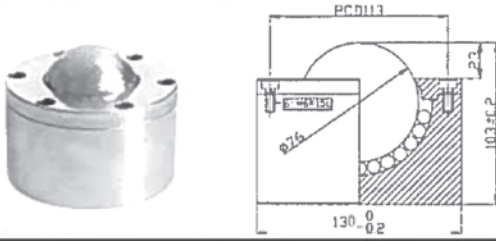


Model	Maximum Loading(kg) Suggested	Maximum Loading(kg) Breaking	Net Weight (kg)
QSP-60	800	1200	3.800

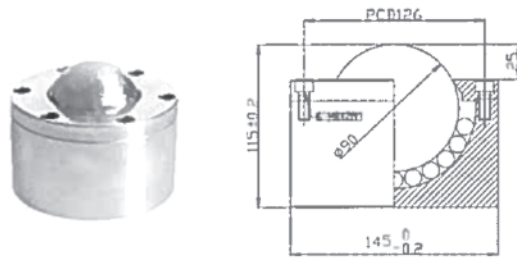


## Press Mount Heavy Duty Series

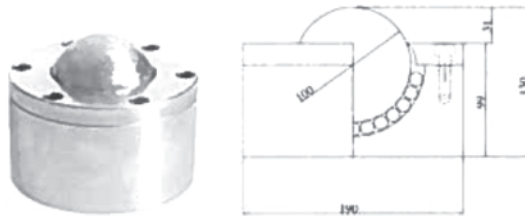
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



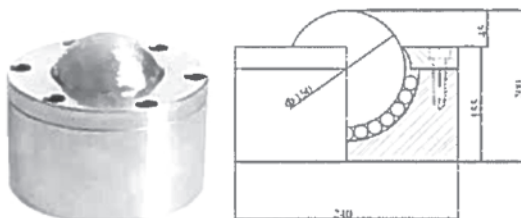
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-76	2000	2500	10.000



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-90	3000	3500	12.000



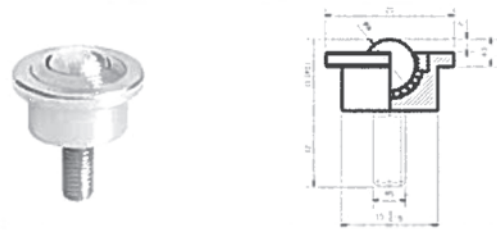
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-100	4500	5000	20.000



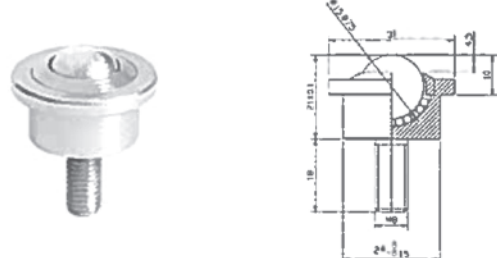
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-150	6000	6500	25.000

## Bolt Fix Heavy Duty Series

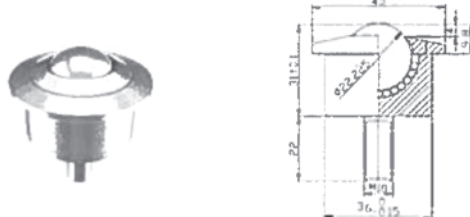
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



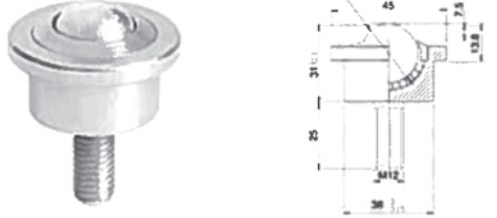
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-8FL	8	15	0.020



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-15FL	40	45	0.085



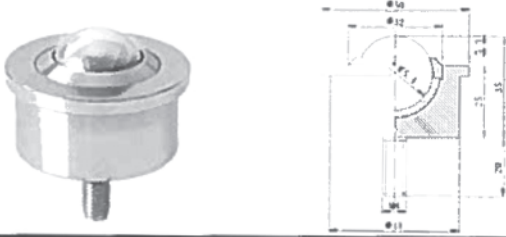
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-22FL	140	160	0.250



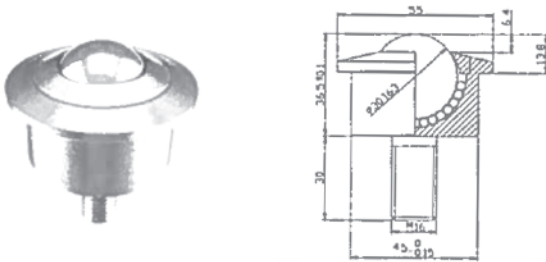
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-25FL	180	200	0.280

## Bolt Fix Heavy Duty Series

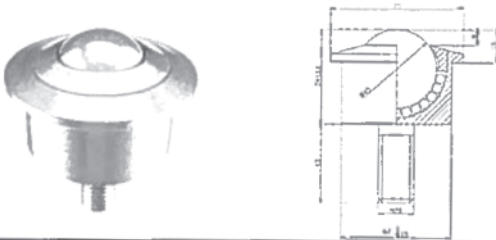
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



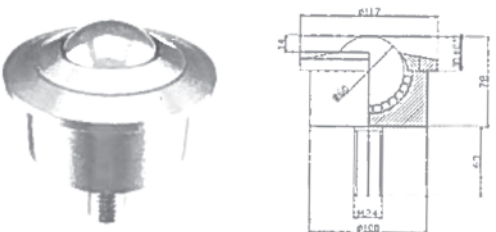
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-25FK	150	200	0.250



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-30FL	200	250	0.410



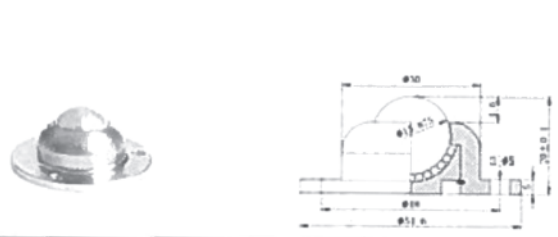
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-45FL	400	450	1.150



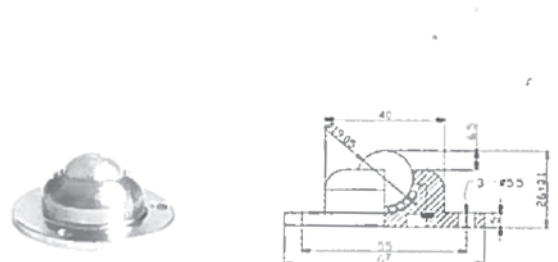
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QSP-60FL	800	1200	4.000

## Flange Mount Machined Series

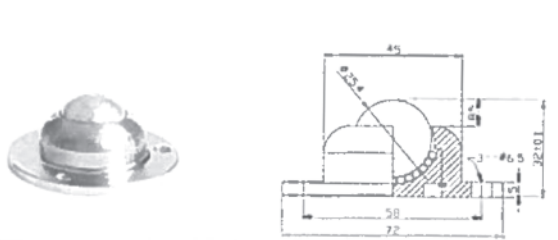
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



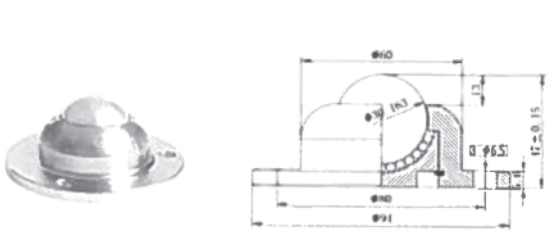
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIA-15	40	50	0.120



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIA-19	80	100	0.220



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIA-25	130	150	0.320

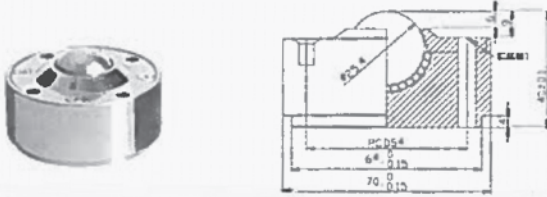


Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIA-30	200	250	0.380

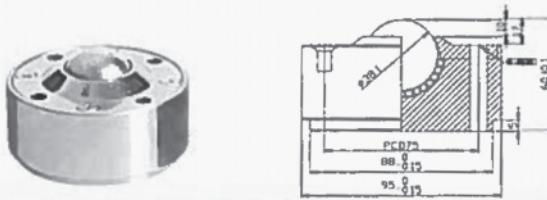


## Base Mount Machined Series

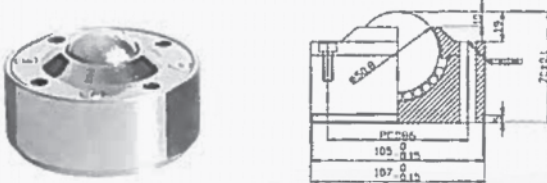
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



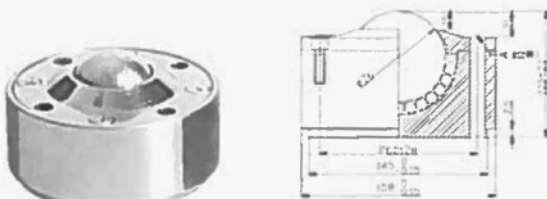
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIS-25	120	150	0.900



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIS-38	200	250	2.300



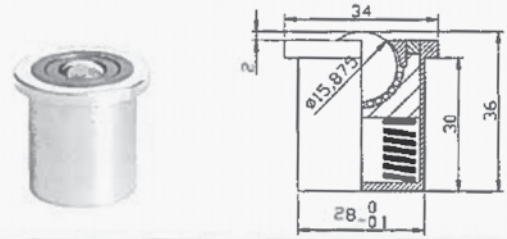
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIS-51	250	300	4.500



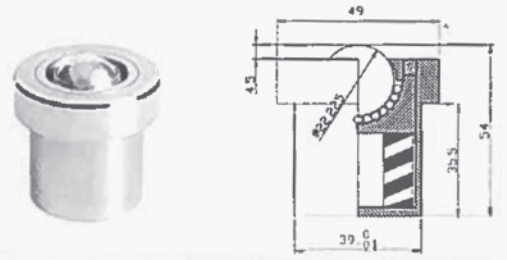
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QIS-76	400	450	10.500

## Inner Spring Shock Load Series

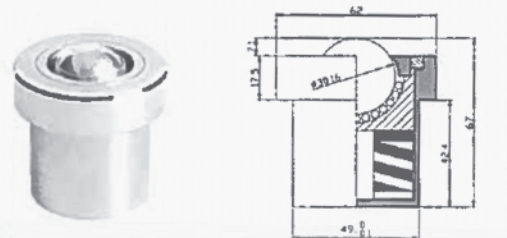
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



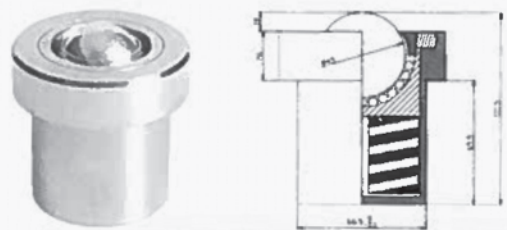
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-15	40/50	60	0.130



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-22	60/70	80	0.350



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-30	100/120	150	0.768

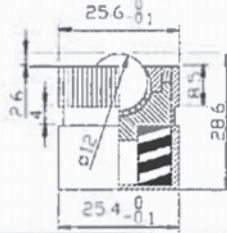


Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-45	200/250	280	2.120

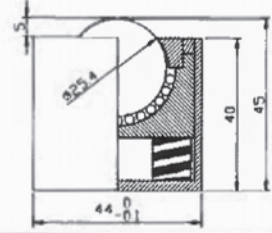


## Inner Spring Shock Load Series

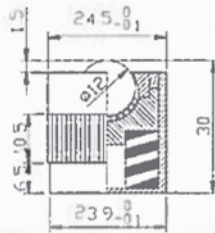
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



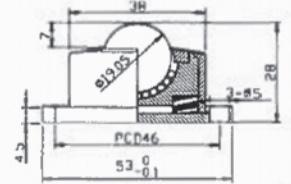
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKST-12	30/30	50	0.180



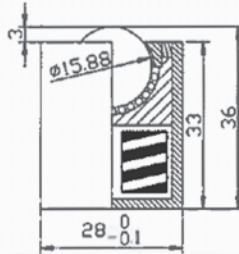
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSH-30	100/100	150	0.390



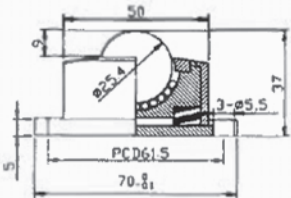
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSE-12	30/30	50	0.160



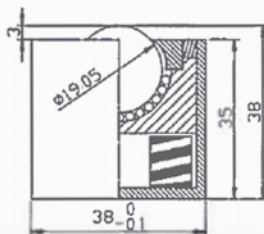
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-19B	60/70	80	0.260



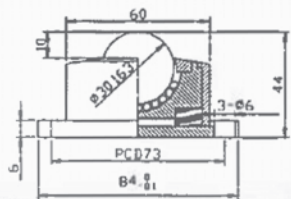
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSH-15	40/50	60	0.120



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-25B	100/120	150	0.400



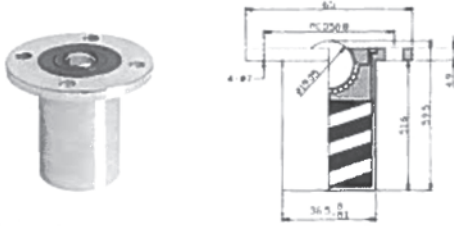
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSH-20	70/70	100	0.280



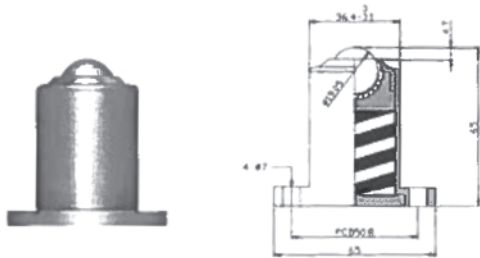
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSF-30B	150/200	250	1.100

## Inner Spring Shock Load Series

Available materials: CS/CS,SS/CS,SS/SS,PL/AL



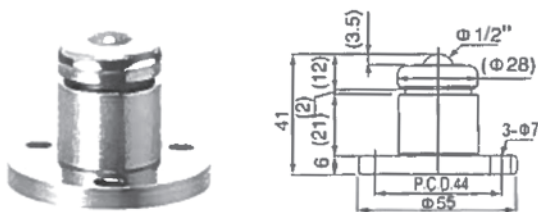
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSFT-19	40/40	60	0.450



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSFN-19	40/40	60	0.430



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKSFH-19	50/50	70	0.350



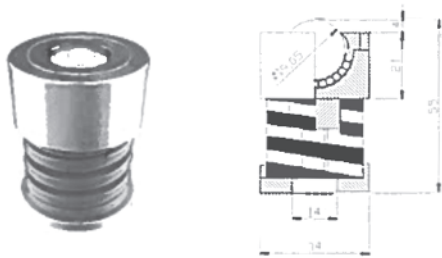
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-15	30/30	40	0.450

## External Spring Shock Load Series

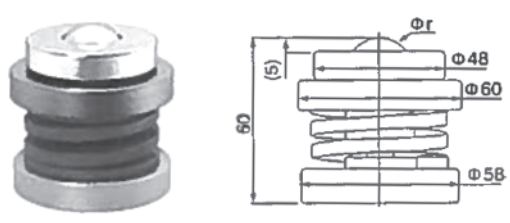
Available materials: CS/CS,SS/CS,SS/SS,PL/AL



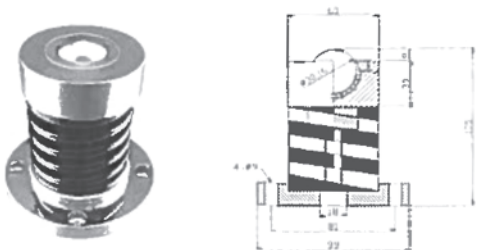
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-19	40/60	60	0.480



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-19H	50/50	60	0.450



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-20	40/40	60	0.260



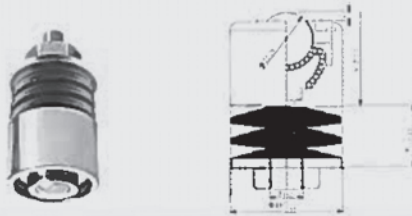
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-30	80/80	100	1.100

## External Spring Ball-Down Series

Available materials: CS/CS,SS/CS,SS/SS,PL/AL



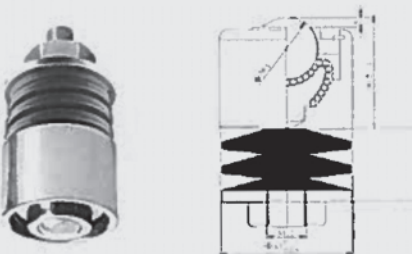
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-01	30/30	40	0.300



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-02	50/50	60	0.350



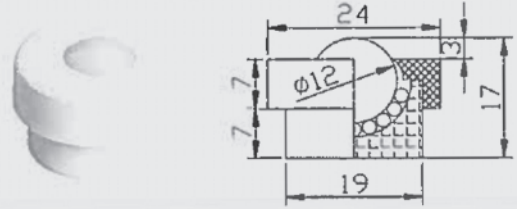
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-03	60/60	80	0.450



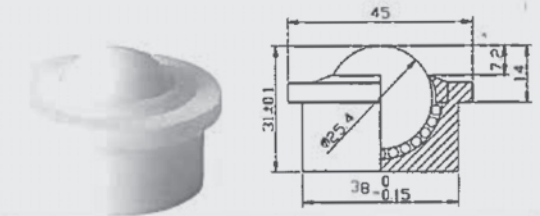
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QKS-04	100/100	120	1.100

## Plastic/Nylon Series

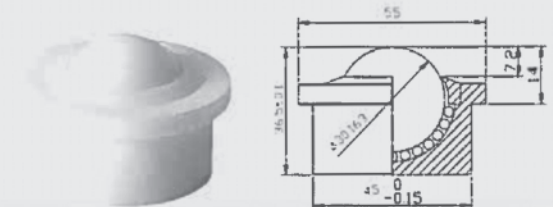
Available materials: PL/PL,Nylon/Nylon



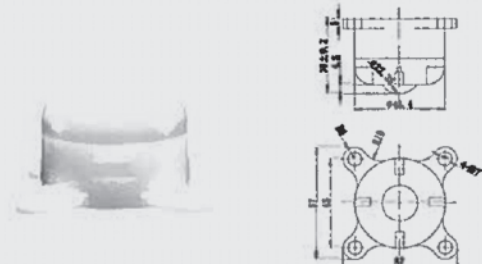
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-12	5	10	0.020



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-25	20	30	0.100



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-30	30	40	0.180



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-22AA	5	10	0.050

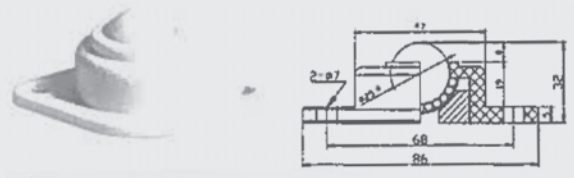


## Plastic/Nylon Series

Available materials: PL/PL,Nylon/Nylon



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-19A	10	15	0.055



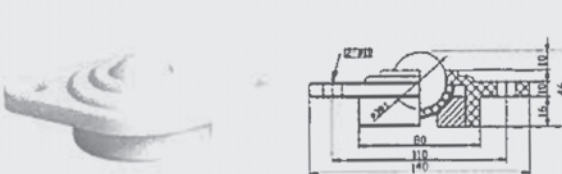
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-25B	20	25	0.120



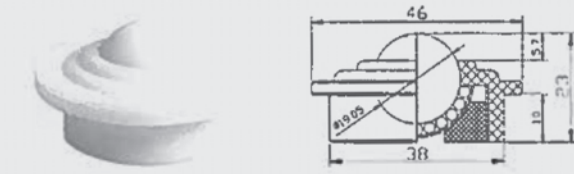
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-25A	20	25	0.120



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-38B	25	35	0.410



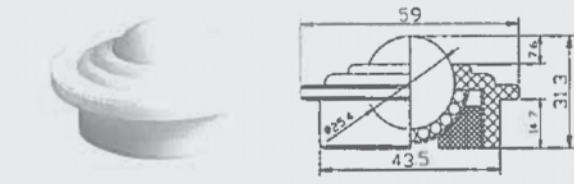
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-38A	25	35	0.410



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-19C	10	15	0.050



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-19B	10	15	0.055

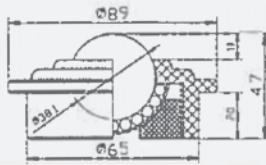


Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-25C	20	25	0.110

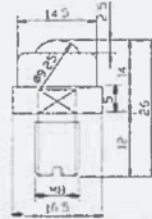


## Plastic/Nylon Series

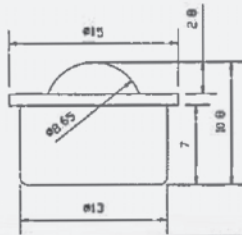
Available materials: PL/PL,Nylon/Nylon



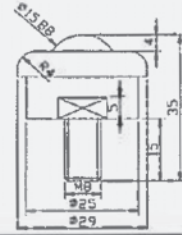
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-38C	25	35	0.400



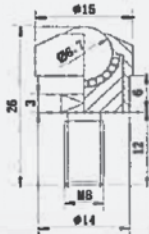
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-10M	4	5	0.015



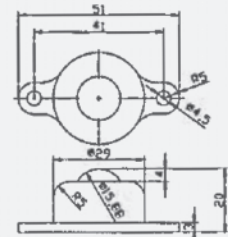
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-8H	2	3	0.003



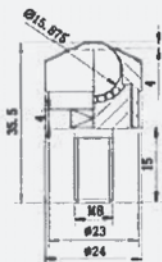
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-15M	6	8	0.040



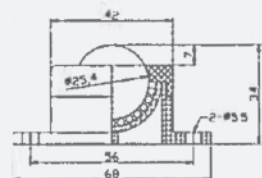
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-8N	2	3	0.012



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-16AA	8	10	0.035



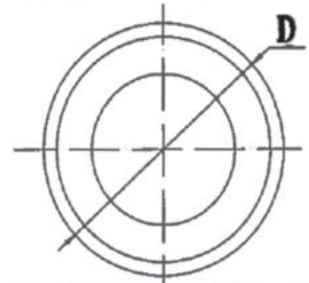
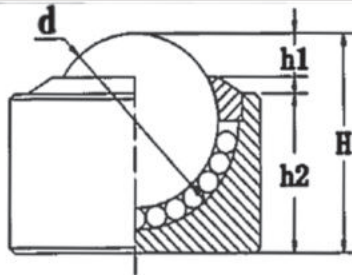
Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-15N	6	7	0.032



Model	Maximum Loading(kg)		Net Weight (kg)
	Suggested	Breaking	
QNL-25AA	15	20	0.050

## QKSM Pressed Mount Series

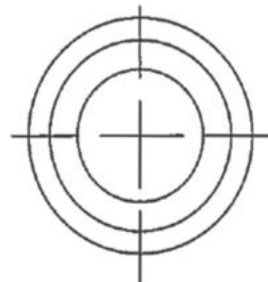
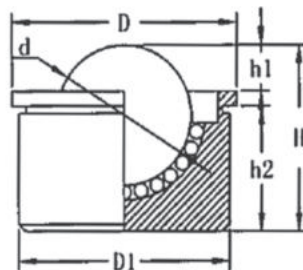
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	H2	Maximum Loading(kg)		Net weight (kg)
						Suggested	Breaking	
QKSM-8	8	12 <sub>0.1</sub>	10.3±0.1	2.3	8.0	5	8	0.006
QKSM-10	10	16 <sub>0.1</sub>	12.5±0.1	2.5	8.50	15	20	0.028
QKSM-12	12	18 <sub>0.1</sub>	15.5±0.1	2.0	14.0	25	30	0.035
QKSM-15	15	24 <sub>0.1</sub>	20.0±0.1	4.0	20.0	40	45	0.050
QKSM-22	22	36 <sub>0.1</sub>	31.0±0.1	6.0	23.0	80	100	0.190
QKSM-25	25	37 <sub>0.1</sub>	32.0±0.15	6.5	24.0	120	150	0.250
QKSM-30	30	45 <sub>0.2</sub>	38.0±0.15	8.0	27.0	180	200	0.340
QKSM-38	38	55 <sub>0.2</sub>	48.0±0.2	9.5	33.5	250	300	0.560
QKSM-45	45	62 <sub>0.2</sub>	53.4±0.2	11.0	37.6	400	450	0.900
QKSM-60	60	100 <sub>0.2</sub>	77.5±0.2	20.0	47.5	550	600	2.100

## QMSM QBCHA Pressed & Circlip Mount Series

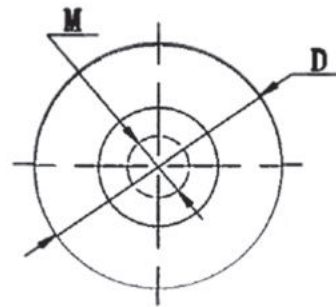
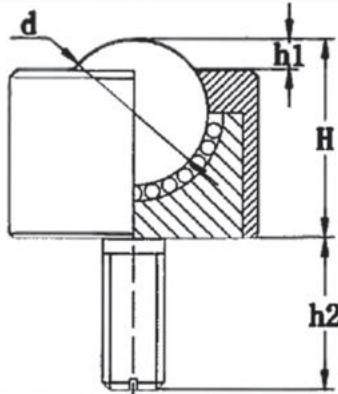
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	D1	H	h1	h2	Maximum Loading(kg)		Net weight (kg)
							Suggested	Breaking	
QBCHA-5	5.56(7/32")	13 <sub>0.1</sub>	11	8.5±0.1	1.5	6	4	5	0.010
QBCHA-8	8.73(11/32")	17 <sub>0.1</sub>	15	12.5±0.1	2.5	9	5.5	7	0.015
QBCHA-10	10.32(13/32")	20 <sub>0.1</sub>	18	14.5±0.1	3.5	10	6	8	0.035
QBCHA-15	15.88(5/8")	26 <sub>0.1</sub>	24	20.8±0.1	5.3	14	35	40	0.080
QBCHA-19	19.05(3/4")	32 <sub>0.1</sub>	30	25.3±0.1	6.3	17	40	45	0.190

## QD-H Mini Bolt Mount Series

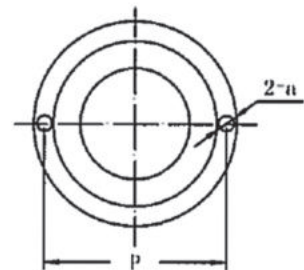
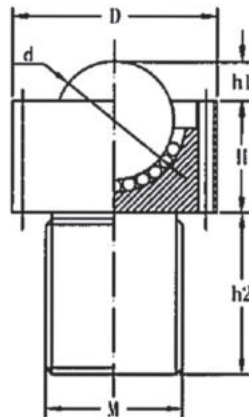
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	h2	M	Maximum Loading(kg)		Net weight (kg)
							Suggested	Breaking	
QD-6H	6.35(1/4")	12	9.0±0.1	1.5	12.0	M6	5	6	0.035
QD-9H	9.53(3/8")	15	15.0±0.1	1.5	12.0	M6	7	8	0.042
QD-12H	12.70(1/2")	20	18.0±0.1	3.0	12.0	M8	8	10	0.055
QD-15H	15.88(5/8")	24	20.5±0.1	4.0	12.0	M8	15	20	0.120
QD-19H	19.05(3/4")	32	26.0±0.1	4.0	12.0	M8	40	50	0.250

## QMSM QBCHM Bolt & Hole Mount Series

Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS

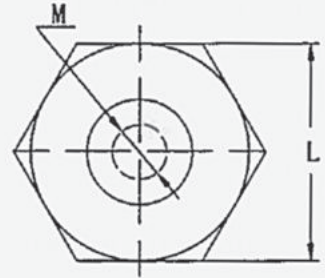
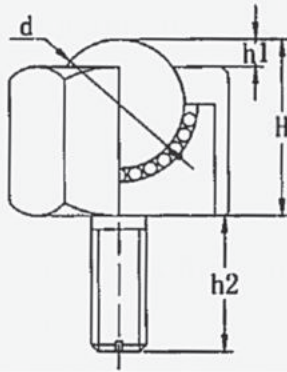


Model	d	D	H	h1	h2	P	a	M	Maximum Loading(kg)		Net weight (kg)
									Suggested	Breaking	
QBCHM-8	8.73(11/32")	18.5	10.0±0.1	2.5	12.0	15.0	2.0	M10	5.5	7	0.042
QBCHM-10	10.30(13/32")	22.0	11.0±0.1	3.5	15.0	18.5	2.0	M12	6	8	0.065
QBCHM-15	15.88(5/8")	27.0	15.0±0.1	5.3	20.0	24.0	2.5	M16	35	40	0.140
QBCHM-19	19.05(3/4")	33.0	18.0±0.1	6.3	25.0	29.6	2.5	M20	42	47	0.250



## QNJ Hex Body & Bolt Mount Series

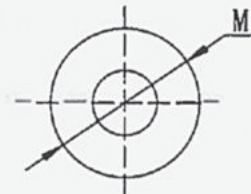
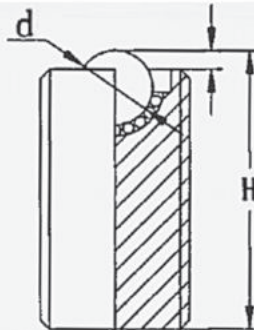
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	L	H	h1	h2	M	Maximum Loading(kg)		Net weight (kg)
							Suggested	Breaking	
QNJ-12	11.90(15/32")	18	13.0±0.1	3	12	M12	5	6	0.025
QNJ-16	15.88(5/8")	24	18.0±0.1	4	18	M12	10	15	0.150
QNJ-25	25.40(1")	36	33.0±0.1	6	27	M12	60	80	0.210
QNJ-30	30.16(1-3/16")	45	35.0±0.1	7	30	M14	150	200	0.230
QNJ-38	38.10(1-1/2")	55	51.0±0.1	9	40	M16	250	300	0.460
QNJ-45	45.24(1-25/32")	75	51.0±0.1	9	40	M16	350	400	1.800

## QLW Full Thread Body Mount Series

Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS

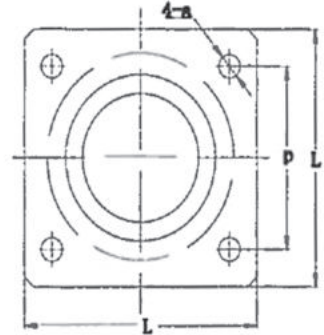
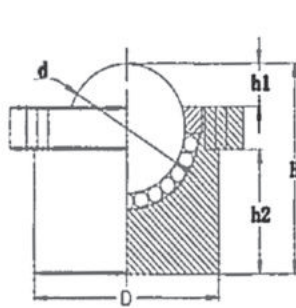


Model	d	H	h1	M	Maximum Loading(kg)		Net weight (kg)
					Suggested	Breaking	
QLW-6	6.35(7/16")	20.0±0.1	1.5	M12	3	5	0.010
QLW-8	7.93(5/16")	30.0±0.1	2.0	M16	5	8	0.020
QLW-12	11.90(15/32")	45.0±0.15	3.5	M24	12	15	0.029
QLW-16	15.88(5/8")	60.0±0.2	4.0	M30	20	25	0.038
QLW-19	19.05(3/4")	70.0±0.2	5.0	M40	25	30	0.160
QLW-22	22.22(7/8")	82.0±0.2	5.5	M44	40	45	0.280



## Top Flange Mount QSI Series

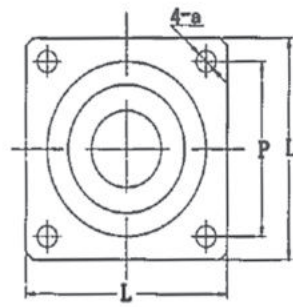
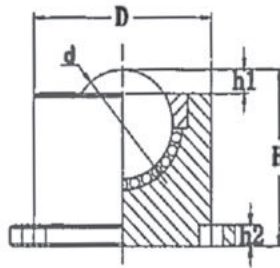
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	h2	P	L	a	Maximum Loading(kg)		Net weight (kg)
									Suggested	Breaking	
QSI-12	12.0	24	24	3.0	17.0	35	45	4.0	15	20	0.100
QSI-25	25.4	45	42	5.6	31.7	45	57	6.0	150	200	0.490
QSI-30	30.2	54	50	6.5	37.5	54	68	6.5	250	300	1.100
QSI-38	38.1	60	62	12.7	36.6	58	76	7.0	350	400	1.400
QSI-51	51.0	102	98	14.3	64.7	102	127	11.0	600	700	6.400

## Bottom Flange Mount QSD Series

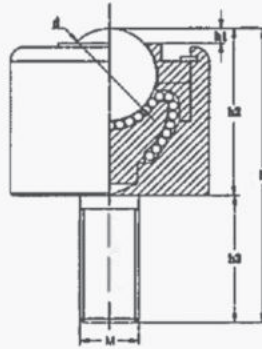
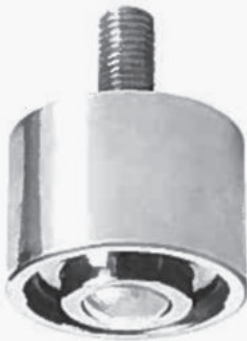
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	h2	P	L	a	Maximum Loading(kg)		Net weight (kg)
									Suggested	Breaking	
QSD-12	12.0	24	23	3.5	3	35	45	3.6	15	20	0.180
QSD-12	25.4	45	41	5.6	5	45	57	5.6	150	200	0.490
QSD-12	30.2	54	49	6.5	6	54	68	6.5	250	300	1.200
QSD-12	38.1	60	62	13.0	13	58	76	7.1	350	400	1.800
QSD-12	51.0	100	98	14.3	9.6	102	127	11	600	700	5.600

## Ball downward Bolt Mount QIK-N Series

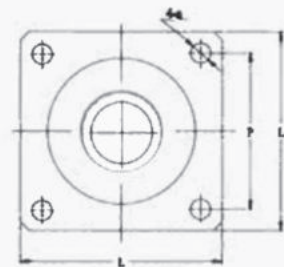
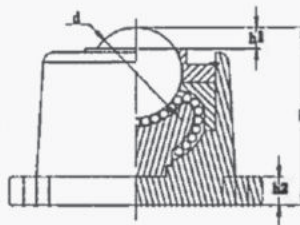
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	h2	h3	M	Maximum Loading(kg)		Net weight (kg)
								Suggested	Breaking	
QIK-19N	19.0	42	58	3.0	33	25	M12	50	60	0.250
QIK-22N	22.0	48	70	3.0	40	30	M12	75	90	0.380
QIK-25N	25.4	55	81	4.0	46	35	M16	100	150	0.700
QIK-38N	38.1	80	115	8.0	70	45	M22	150	200	2.100
QIK-51N	51.0	100	145	12.0	95	50	M24	400	450	4.400

## Ball downward Flange Mount QIK-B Series

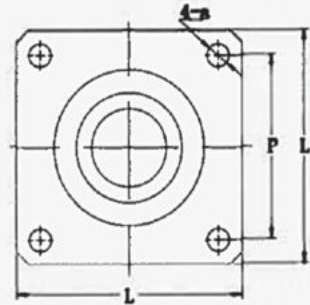
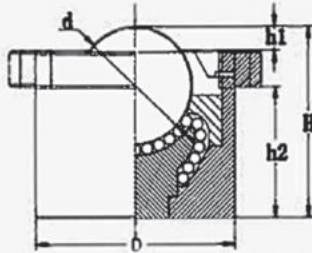
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	L	H	h1	h2	P	a	Maximum Loading(kg)		Net weight (kg)
								Suggested	Breaking	
QIK-19B	19.1	53	38	3.5	6.0	41	5.2	50	60	0.370
QIK-25B	25.4	70	50	6.0	8.0	55	7.0	100	120	0.900
QIK-38B	38.1	100	75	9.7	10.0	80	9.0	200	250	2.600
QIK-51B	51.0	130	100	13.0	12.0	102	11.0	300	350	5.300
QIK-76B	76.2	200	150	16.5	20.0	160	18.0	500	550	19.600

## Ball downward Flange Mount QUK Series

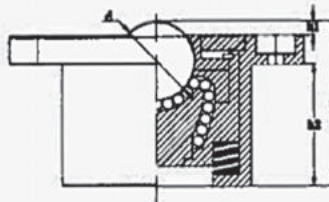
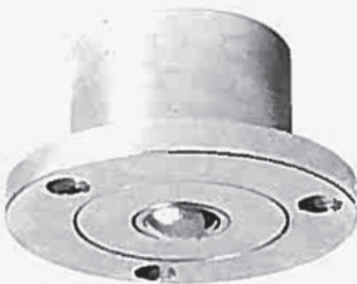
Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D	H	h1	h2	L	P	a	Maximum Loading(kg)		Net weight (kg)
									Suggested	Breaking	
QUK-12	12.7(1/2")	24	24	3.0	17.0	45	35	4.0	8	15	0.180
QUK-25	25.4(1")	45	42	5.3	31.7	57	45	5.6	100	120	0.460
QUK-38	38.1(1-1/2")	60	62	12.0	37.0	76	58	7.0	200	250	2.900
QUK-51	50.8(2")	102	98	14.3	64.7	127	102	11.0	300	350	5.500
QUK-76	76.2(3")	135	125	15.0	95.0	170	135	16.5	500	550	19.800

## Ball downward Spring Shock Loading QUK-T Series

Available materials : CS/CS,SS/CS,SS/SS,PL/CS,PL/SS



Model	d	D1	D2	H	h1	h2	P	a	Maximum Loading(kg)		Net weight (kg)
									Suggested	Breaking	
QUK-19T	19.1	74	48	40.5	3.5	30.0	60	6.0	50	80	3.000
QUK-30T	30.2	117	75	64.0	5.5	47.5	95	8.0	150	200	3.200
QUK-38T	38.1	148	95	81.0	7.0	60.0	120	10.0	200	250	4.500
QUK-45T	45.0	175	110	96.0	8.5	71.0	142	12.0	250	300	8.000
QUK-50T	50.0	195	125	106.0	9.5	78.0	158	14.0	300	350	15.000



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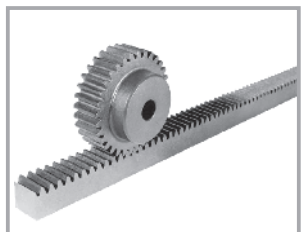


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