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SUPER BALL BUSHING

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Super Ball Bushing

WON begins home production of super ball bush as the first time in Korea. Super Ball Bush as heavy load and self alignment type has following feature.

Features

■ 27 Times Longer Travel Life (3 Times Higher Load Capacity)

WON Super Ball Bush affords the designer 27 times longer travel life than conventional ball bush with the same as-installed dimensions due to the high running speed and 3 times higher dynamic load capacity.

WON Super Ball Bush consists of hardened steel segmental load bearing plates with precisely ground ball tracks to be designed a little bigger than the ball diameters for unbeaten smooth running and high load. As 0.5° of Self-Alignment feature assures uniform load distribution over the entire row of balls and therefore prevents life-shortening by partial concentrated pressure

■ 0.5° of Self-Alignment

WON Super Ball Bush automatically compensates for 0.5° of self-alignment in the shaft length direction. The outer surface of the steel load bearing plates is designed with the curved surface. The curved surface absorbs increased pressure between ball bush edge and shaft by misalignment between ball bush and shaft and uniformly distributes load over the entire row of balls. Besides, this feature assures smooth entry and exit of the balls into and out of the load carrying area. (The self-alignment feature requires two Super Ball Bushes to be mounted on at least one of the two shafts of the assembly.)

■ Ease of Replacement

WON Super Ball Bush is completely interchangeable because of its' standardized dimensions and strict precision control; SB (JIS

Table.1 Comparing Life and Load Capacity

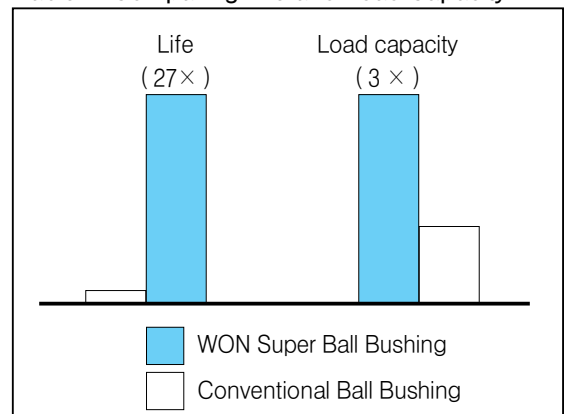


Fig.1 The cross-section of Super Ball Bushing

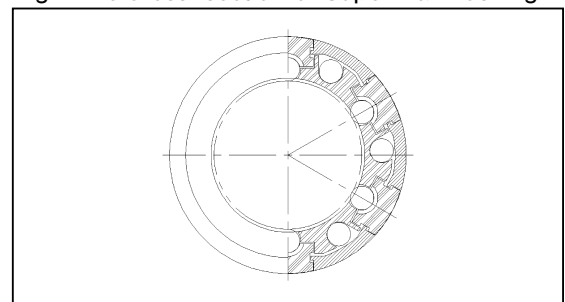
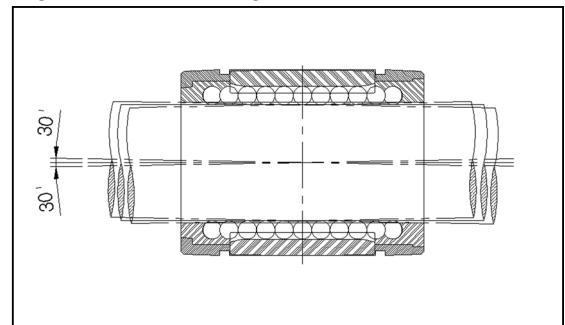


Fig.2 0.5° of Self-Alignment



standard) for Asian market service and SBE (ISO standard) for Europe market service.

Replacement due to wear or damage is therefore easy and accurate

■ High speed and Fast acceleration

WON Super Ball Bush guarantees 3 m/sec of velocity and 150 m/sec of acceleration with out life-shortening.

■ Ease of Adjusting the radial clearance

When WON Super Ball Bush is installed into a housing for adjustable clearance, its' bearing plates in the radial direction makes the radial clearance to be easily adjusted for precise and strict running.

● Adjusting the Zero clearance

After Super Ball Bush is installed into a housing for adjustable clearance, the radial clearance must be reduced by means of an adjusting screw in the bushing housing until a slight resistance is felt when the shaft is turned.

In application subject to vibration, the adjusting screw should be suitably secured against working loose once the desired clearance has been established.

● pre-load

If pre-load is required, we recommend that zero clearance should be established as described above using a dummy shaft whose diameter is smaller by the amount of the desired pre-load(μ) than the actual guide shaft diameter(d) on which the linear bushing is to run.

■ SH Block

SH block type is consist of a light aluminum block and super ball bush so the assembly can be finished by sample bolting.

More longer life can be obtained by adjusting the ball circuits orientation of Super ball bush against the direction of load.

■ Installation cost reduction

WON Super Ball Bush presents the reduction

both of the installation time and cost by the self-alignment feature against errors to be caused by inaccurate machining, mounting errors or shaft deflection.

■ Smooth Running

Self-Alignment feature makes easy entry of the balls into the load carrying area. As the bushing and the retainer are made of light and wear-resisting polyamide, the inertia force and the noise are small. So that, the friction factor of unsealed WON Super Ball Bush using oil as a lubricant lies up to 0.001.

■ Environmental Temperature

Use at the higher temperature than 100°C reduces the traveling life.(See Temperature factor of the page A-4.)

Fig. 3 Radial Clearance Adjustment

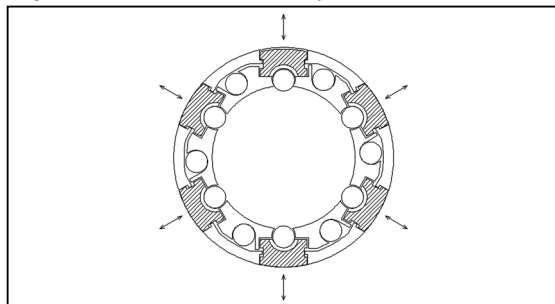
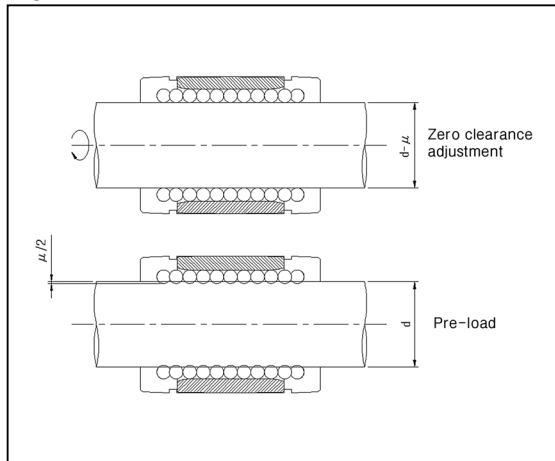


Fig. 4 Zero Clearance & Pre-load



Life

As long as the linear system is reciprocated while being loaded, continuous stress acts on the linear system to cause 'flaking' on the rolling bodies and planes because of material fatigue.

The traveling distance of linear system until the first flaking occurs is called the life of the system.

$$L = \left(\frac{C}{P} \cdot f_H \cdot f_T \cdot f_D \right)^3 \cdot 50(\text{km})$$

L : Running distance life (km)
 C : Basic dynamic load rating (N)
 T : Basic dynamic torque (N · m)
 P : Application load (N)
 f_H : Hardness coefficient (fig.5)
 f_T : Temperature coefficient (fig.6)
 f_D : Load direction coefficient

$$L_h = \frac{L \cdot 10^3}{2 \times S \times n_1 \times 60} \text{ (hr)}$$

L_h : Service life (hr)
 L : Running distance life (km)
 S : Stroke (m)
 n_1 : Number of strokes per minute (opm)

Basic Dynamic Load Rating (C)

This term is arrived at based on an evaluation of a number of identical linear systems individually run in the same conditions. If 90% of them can run with the load (with a constant value in a constant direction) for a distance of 50×10^3 meters without damage caused by rolling fatigue.

This is the basis of this rating.

Hardness factor (f_H)

The shaft must be sufficiently hardened when a slide bush is used. If not properly hardened, permissible load is lowered and the life of the bushing will be shortened. If the temperature of the linear system exceeds 100°C , the rating life is shortened.

Fig.5 Hardness factor (f_H)

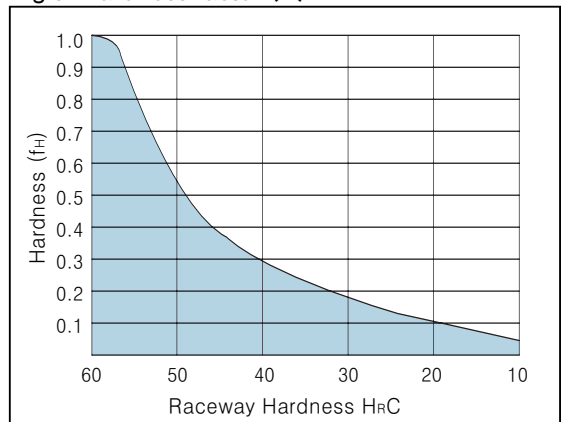
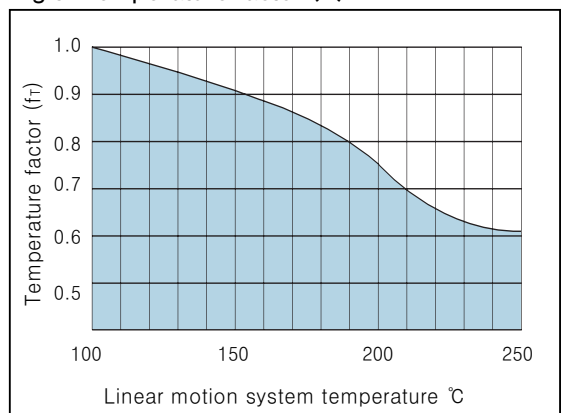


Fig.6 Temperature factor (f_T)



Temperature factor (f_T)

If the temperature of the linear system exceeds 100°C, the rating life is shortened. (fig.6)

Load direction factor (f_D)

The stated load capacities are valid for installation in 'min' position. If the load is acting in any other direction, these load capacities must be multiplied by factor 'C' and 'Co' as Fig. 7, 8

Fig.7 Direction of load and load capacity

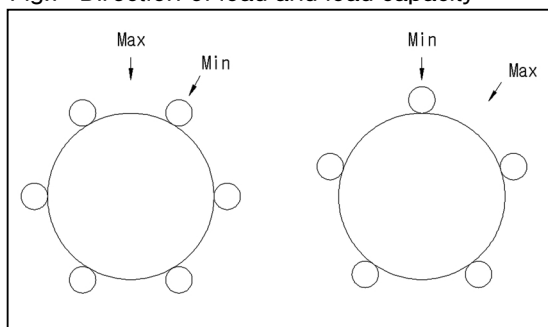
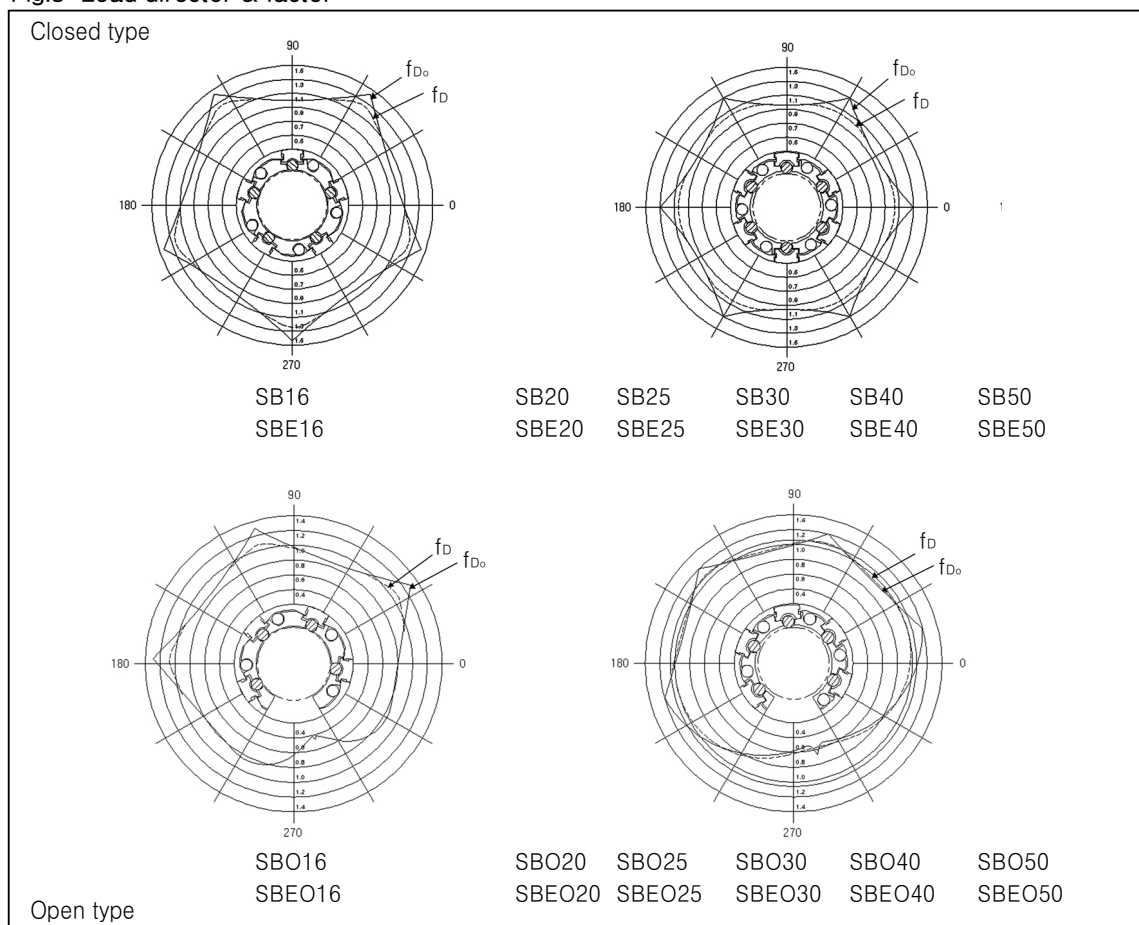


Fig.8 Load director & factor



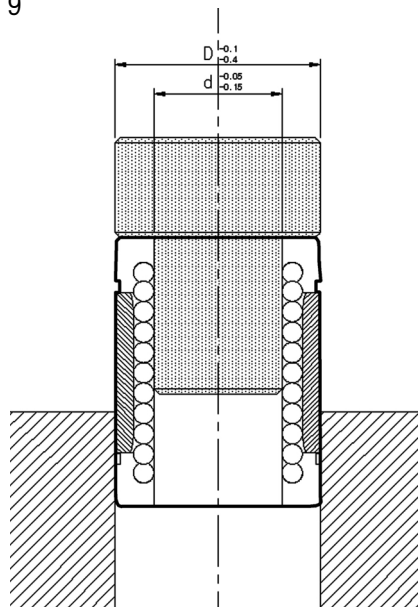
■ Basic Static Load Rating (Co)

This term defines a static load such that, at the contacting position where the maximum stress is exercised, the sum of the permanent deformation of the rolling elements and that of the rolling plane is 0.0001 time of the diameter of the rolling elements. If inertia force exceeds the Static Load Co by vibration, shock or high speed, the linear motion would be rough as well as the life would be very reduced. Thus, these points should be paid attention to.

■ Reducing load capacity in short-stroke application

In short-stroke application, the service life of the Won shafts is shorter than that of the Super Ball Bush. For this reason, the life can be shortened up to about 70% by the stroke.

Fig. 9



Assembly

WON Super Ball Bush is very precise and so that, it must be handled with meticulous care. Use of a jig (see illustration) is recommended for insertion into a housing and Care should be taken not to exert pressure on the ball retainer or seals.

The edge of the housing bore must be chamfered as well as the ends of the shaft are also chamfered. And the WON Super Ball Bush is not tilted when it is pushed onto the shaft.

■ Super Ball Bush Assembly

Housing tolerance H7, Shaft tolerance : SB-g6, SBE-h6

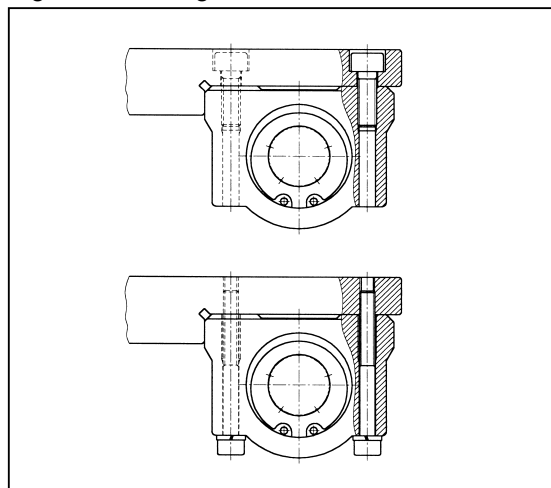
Shaft Dia. d (mm)	Radial clearance (μm)	
16	+1	+25
20	+2	+28
25	+2	+28
30	+2	+28
40	+4	+34
50	+4	+34

Mounting of LM Block Unit

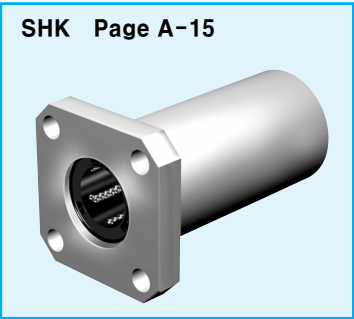
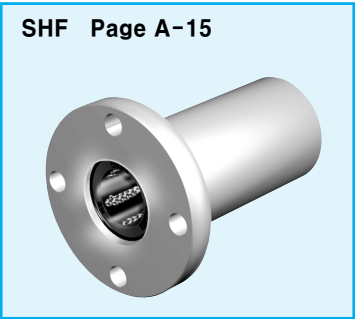
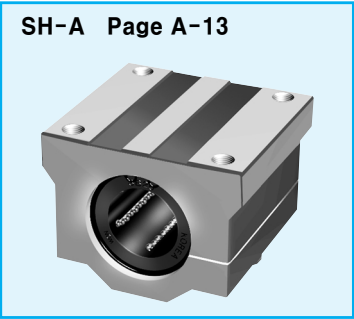
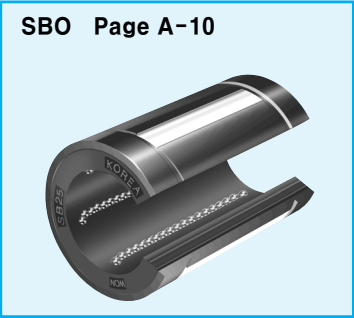
■ Mounting of SH type

Both of mounting of SH, SHW, SHO type from the top and the bottom side with mounting bolt are available, and it gives you minimum mounting time.

Fig. 10 Mounting of Block Unit

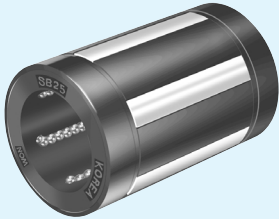


Asian Standard

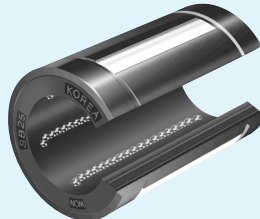


European Standard

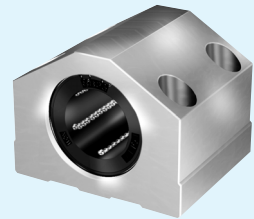
SBE Page A-17



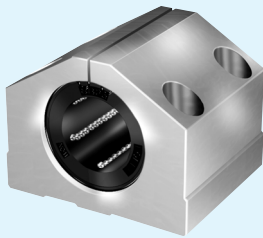
SBEO Page A-18



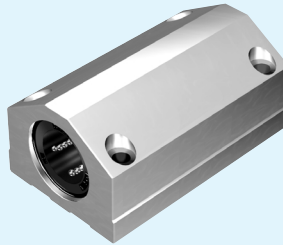
CS Page A-19



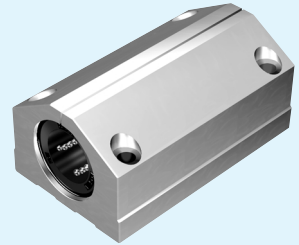
CS-A Page A-20



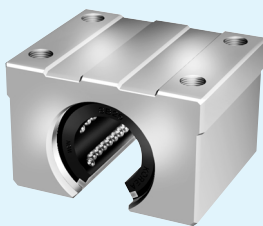
CSW Page A-21



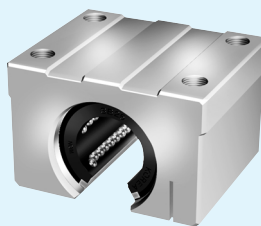
CSW-A Page A-22



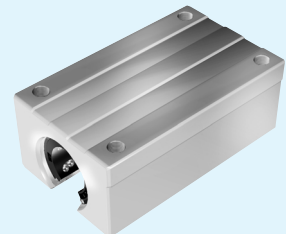
CSO Page A-23



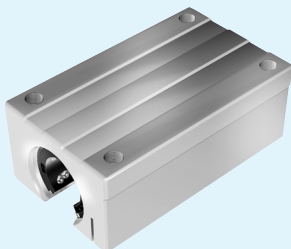
CSO-A Page A-24



CSOW Page A-25

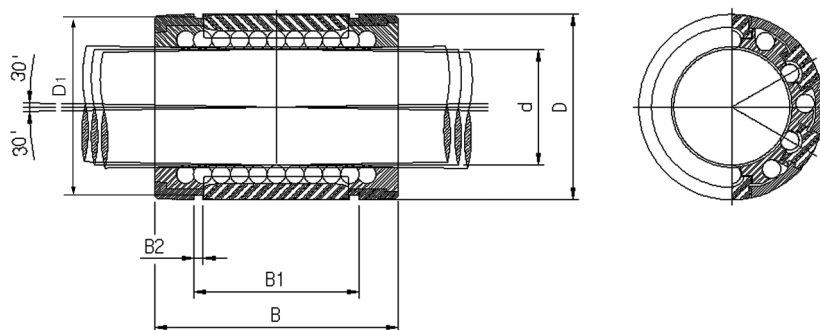
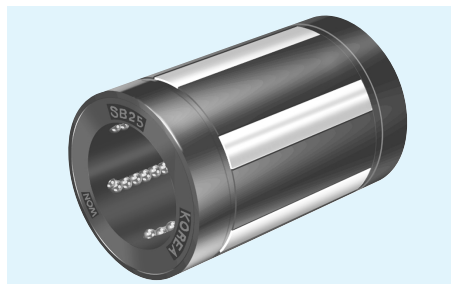


CSOW-A Page A-26



SB type

Asian Super Ball Bushing



Closed type

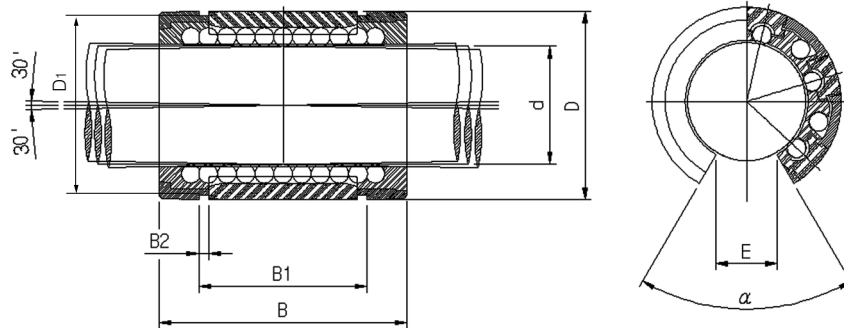
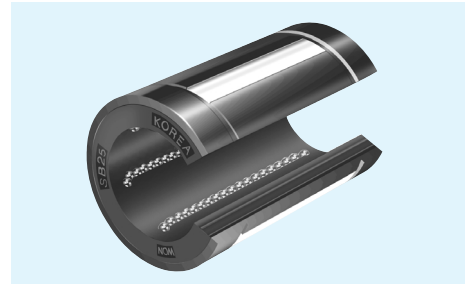
Unit: mm

Part No.			Dimensions					Shaft	No. Ball rows	Basic Load Ratings	
Without Seal	With One Seal	With Two Seal	D	D ₁	B	B ₁	B ₂	d		dyn. C (N)	stat. Co (N)
SB 16	SB 16U	SB 16UU	28	27.0	37	26.5	1.60	16	5	1225	637
SB 20	SB 20U	SB 20UU	32	30.5	42	30.5	1.60	20	6	2303	1225
SB 25	SB 25U	SB 25UU	40	38.0	59	41.0	1.85	25	6	4312	2058
SB 30	SB 30U	SB 30UU	45	43.0	64	44.5	1.85	30	6	4802	2548
SB 40	SB 40U	SB 40UU	60	57.0	80	60.5	2.10	40	6	9310	4312

1N ≒ 0.102kgf

SBO type

Asian Super Ball Bushing



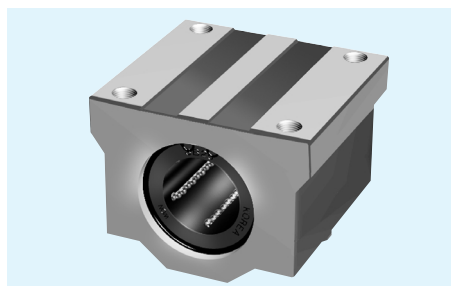
Open type

Unit: mm

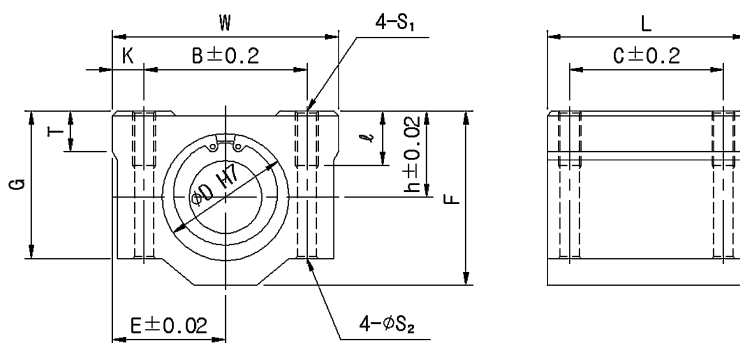
Part No.			Dimensions						Angle	Shaft	No. Ball rows	Basic Load Ratings	
Without Seal	With One Seal	With Two Seal	D	D ₁	B	B ₁	B ₂	E	α	d		dyn. C (N)	stat. Co (N)
SBO 16	SBO 16U	SBO 16UU	28	27.0	37	26.5	1.60	11.0	60°	16	4	1372	755
SBO 20	SBO 20U	SBO 20UU	32	30.5	42	30.5	1.60	11.0	60°	20	5	2332	1245
SBO 25	SBO 25U	SBO 25UU	40	38.0	59	41.0	1.85	12.5	60°	25	5	4351	2097
SBO 30	SBO 30U	SBO 30UU	45	43.0	64	44.5	1.85	15.0	60°	30	5	4851	2597
SBO 40	SBO 40U	SBO 40UU	60	57.0	80	60.5	2.10	20.0	60°	40	5	9408	4410

SH type

Asian Super Ball Bushing Block



A



Open type(with 1pc of SB)

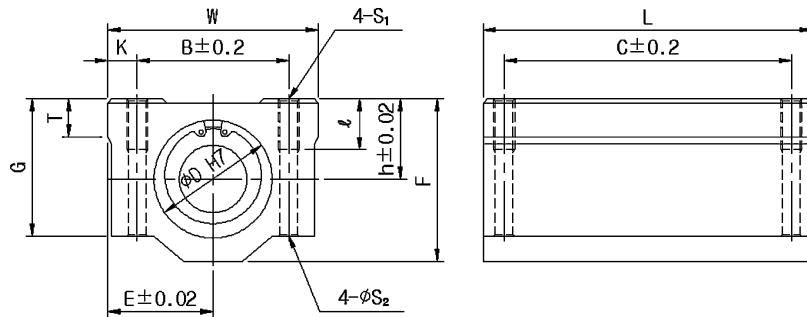
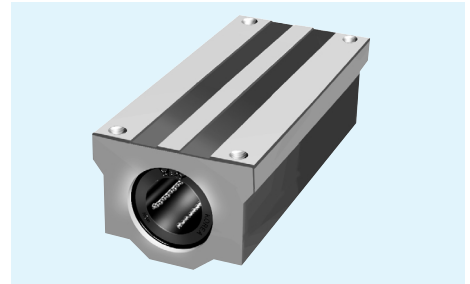
Unit: mm

Part No.	Dimensions								Mounting Dimensions						Shaft d	Basic Load Ratings	
	D	h	E	W	L	F	G	T	B	C	K	S ₁	S ₂	ℓ		dyn. C (N)	stat. Co (N)
SH 16UU	28	19	25	50	44	38.5	32.5	9	36	34	7	M 5	4.3	12	16	1225	637
SH 20UU	32	21	27	54	50	41.0	35.0	11	40	40	7	M 6	5.2	12	20	2303	1225
SH 25UU	40	26	38	76	67	51.5	42.0	12	54	50	11	M 8	7.0	18	25	4312	2058
SH 30UU	45	30	39	78	72	59.5	49.0	15	58	58	10	M 8	7.0	18	30	4802	2548
SH 40UU	60	40	51	102	90	78.0	62.0	20	80	60	11	M10	8.7	25	40	9310	4312
SH 50UU	80	52	61	122	110	102	80.0	25	100	80	11	M10	8.7	25	50	13132	6468

1N ≒ 0.102kgf

SHW type

Asian Super Ball Bushing Block



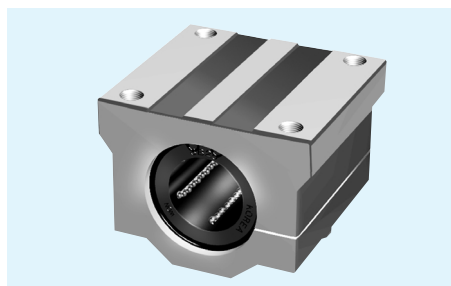
Double closed type(with 2pcs of SB)

Unit: mm

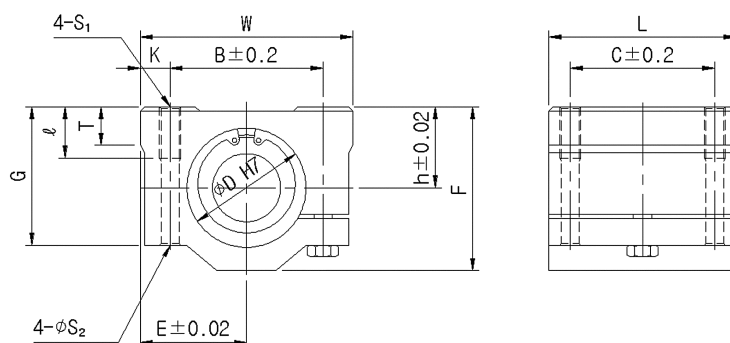
Part No.	Dimensions								Mounting Dimensions						Shaft d	Basic Load Ratings	
	D	h	E	W	L	F	G	T	B	C	K	S ₁	S ₂	ℓ		dyn. C (N)	stat. Co (N)
SHW 16UU	28	19	25	50	85	38.5	32.5	9	36	60	7	M 5	4.3	12	16	1989	1274
SHW 20UU	32	21	27	54	96	41.0	35.0	11	40	70	7	M 6	5.2	12	20	3734	2450
SHW 25UU	40	25	38	76	130	51.5	42.0	12	54	100	11	M 8	7.0	18	25	6987	4116
SHW 30UU	45	30	39	78	140	59.5	49.0	15	58	110	10	M 8	7.0	18	30	7781	5096
SHW 40UU	60	40	51	102	175	78.0	62.0	20	80	140	11	M10	8.7	25	40	15092	8624

SH-A type

Asian Super Ball Bushing Block



A



Closed adjustable clearance type (with 1pc of SB)

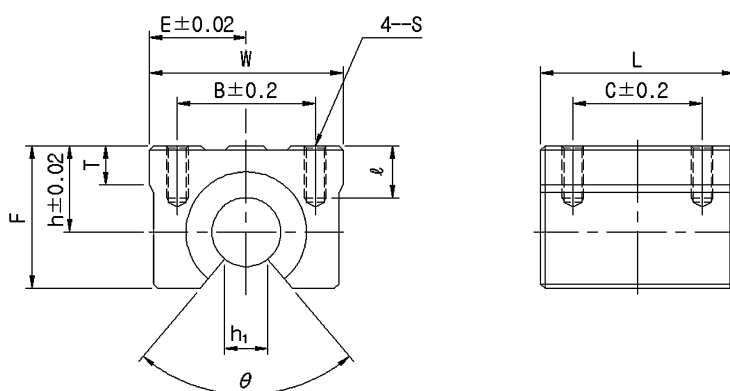
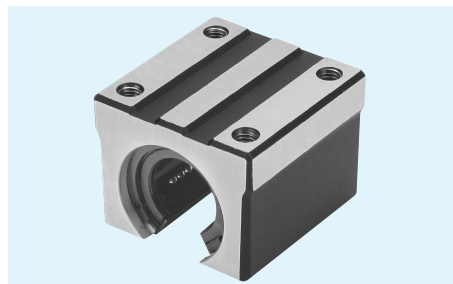
Unit: mm

Part No.	Dimensions							Mounting Dimensions						Shaft d	Basic Load Ratings	
	h	E	W	L	F	G	T	B	C	K	S ₁	S ₂	l		dyn. C (N)	stat. Co (N)
SH 16AUU	19	25	50	44	38.5	32.5	9	36	34	7	M 5	4.3	12	16	1225	637
SH 20AUU	21	27	54	50	41.0	35.0	11	40	40	7	M 6	5.2	12	20	2303	1225
SH 25AUU	26	38	76	67	51.5	42.0	12	54	50	11	M 8	7	18	25	4312	2058
SH 30AUU	30	39	78	72	59.5	49.0	15	58	58	10	M 8	7	18	30	4802	2548
SH 40AUU	40	51	102	90	78.0	62.0	20	80	60	11	M10	8.7	25	40	9310	4312
SH 50AUU	52	61	122	110	102	80.0	25	100	80	11	M10	8.7	25	50	13132	6468

1N ≒ 0.102kgf

SHO type

Asian Super Ball Bushing Block



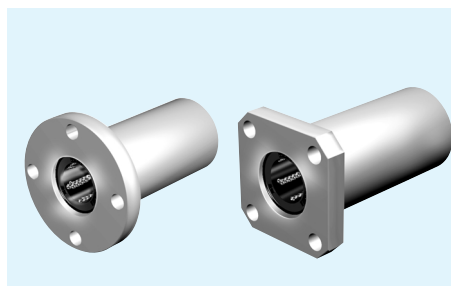
Open type(with 1pc of SBO)

Unit: mm

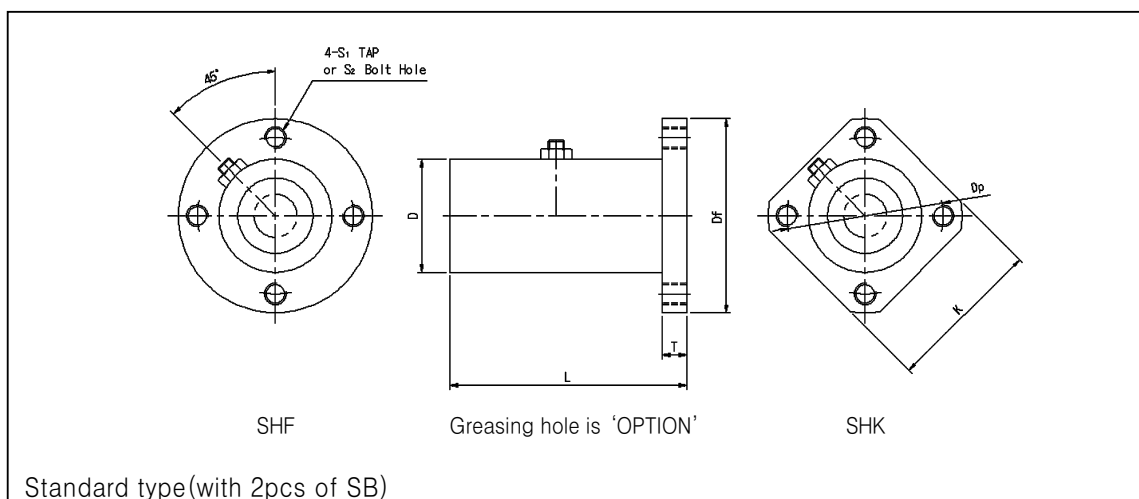
Part No.	Dimensions								Mounting Dimensions				Shaft d	Basic Load Ratings	
	h	E	W	L	F	T	h ₁	θ	B	C	S	ℓ		dyn. C (N)	stat. Co (N)
SHO 16UU	20	22.5	45	45	33	9	11.0	60°	32	30	M 5	12	16	1372	754
SHO 20UU	23	24.0	48	50	39	11	11.0	60°	35	35	M 6	12	20	2332	1244
SHO 25UU	27	30.0	60	65	47	14	12.5	60°	40	40	M 6	12	25	4351	2097
SHO 30UU	33	35.0	70	70	56	15	15.0	60°	50	50	M 8	18	30	4851	2997
SHO 40UU	42	45.0	90	90	72	20	20.0	60°	65	65	M10	20	40	9408	4410

SHF, SHK type

Super Ball Bushing Flange Unit



A



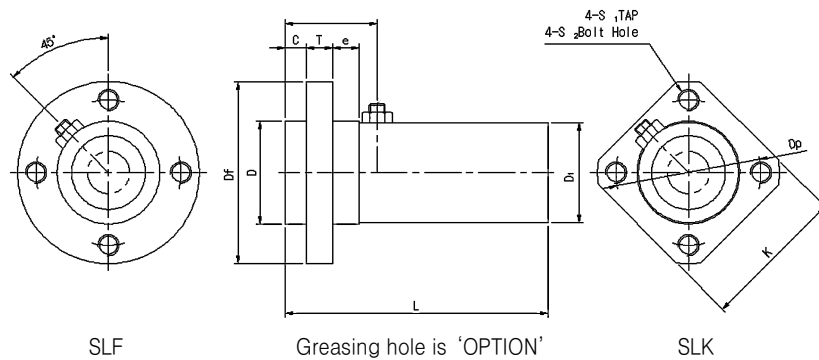
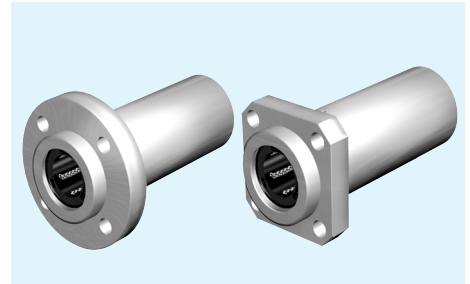
Unit: mm

Part No.	Dimensions								Shaft d	No. Ball rows	Basic Load Ratings	
	D _{h7}	L	D _f	T	D _p	K	S ₁	S ₂			dyn. C (N)	stat. Co (N)
SHF 16	42	88	72	9	58	—	M 8	M 6	16	5	1989	1274
SHK 16						58						
SHF 20	48	98	78	10	64	—	M 8	M 6	20	6	3733	2450
SHK 20						64						
SHF 25	58	134	90	11	76	—	M 8	M 6	25	6	6987	4116
SHK 25						76						
SHF 30	65	144	104	12	86	—	M10	M 8	30	6	7781	5096
SHK 30						86						
SHF40	84	178	124	14	106	—	M10	M 8	40	6	15092	8624
SHK40						106						
SHF50	102	224	150	15	128	—	M12	M10	50	6	26264	12936
SHK50						128						

1N ≒ 0.102kgf

SLF, SLK type

Super Ball Bushing Flange Unit



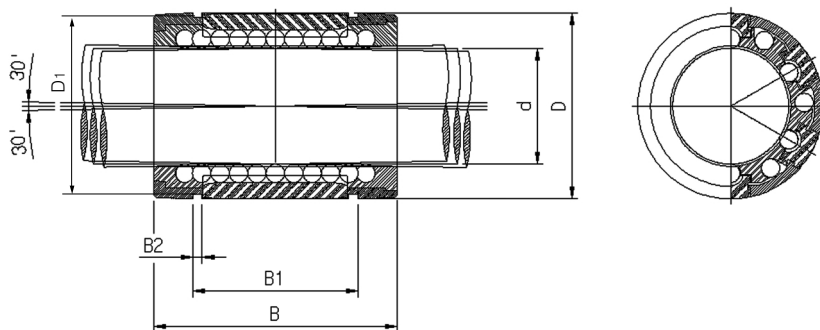
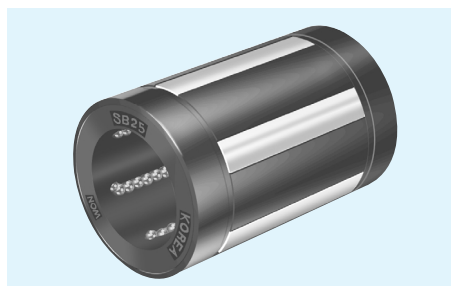
Long type(with 2pcs of SB)

Unit: mm

Part No.	Dimensions											Shaft d	No. Ball rows	Basic Load Ratings	
	D _{h7}	L	D _f	T	D _p	K	C	e	D ₁	S ₁	S ₂			dyn. C (N)	stat. Co (N)
SLF 16	42	100	72	10	58	—	8	10	41	M 8	M 6	16	5	1989	1274
SLK 16						58									
SLF 20	48	120	78	12	64	—	8	12	47	M 8	M 6	20	6	3733	2450
SLK 20						64									
SLF 25	58	150	90	12	76	—	12	12	57	M 8	M 6	25	6	6987	4116
SLK 25						76									
SLF 30	65	180	104	15	86	—	15	15	63	M10	M 8	30	6	7781	5096
SLK 30						86									
SLF40	84	240	124	15	106	—	15	15	82	M10	M 8	40	6	15092	8624
SLK40						106									

SBE type

European Super Ball Bushing



Closed type

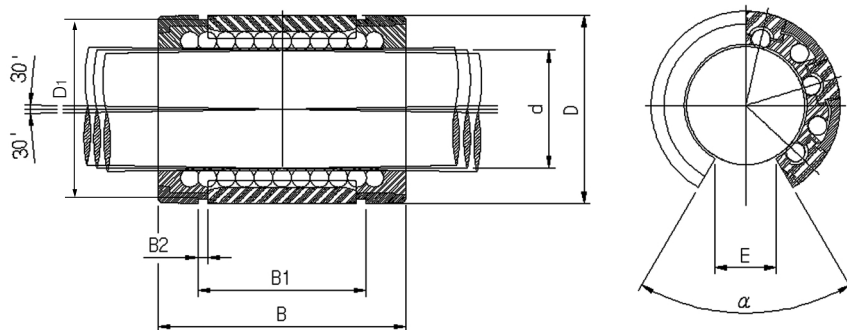
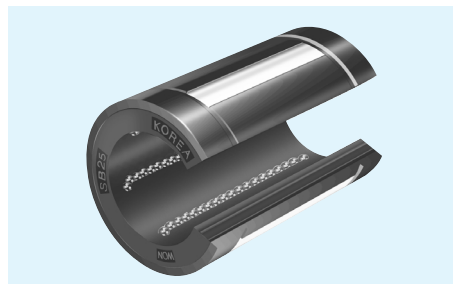
Unit: mm

Part No.			Dimensions					Shaft d	No. Ball rows	Basic Load Ratings	
Without Seal	With One Seal	With Two Seal	D	D ₁	B	B ₁	B ₂			dyn. C (N)	stat. Co (N)
SBE 16	SBE 16U	SBE 16UU	26	24.9	36	24.6	1.30	16	5	1176	607
SBE 20	SBE 20U	SBE 20UU	32	30.5	45	31.2	1.60	20	6	2352	1254
SBE 25	SBE 25U	SBE 25UU	40	38.5	58	43.7	1.85	25	6	4508	2195
SBE 30	SBE 30U	SBE 30UU	47	44.5	68	51.7	1.85	30	6	5586	2959
SBE 40	SBE 40U	SBE 40UU	62	58.5	80	60.3	2.15	40	6	9310	4312
SBE 50	SBE 50U	SBE 50UU	75	71.5	100	77.3	2.65	50	6	13720	6762

1N $\approx$ 0.102kgf

SBEO type

European Super Ball Bushing



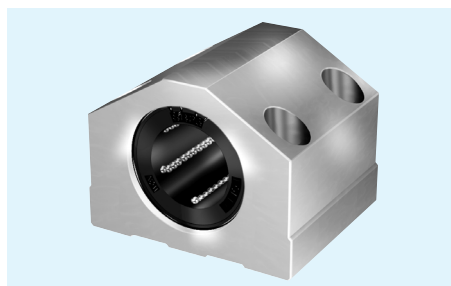
Open type

Unit: mm

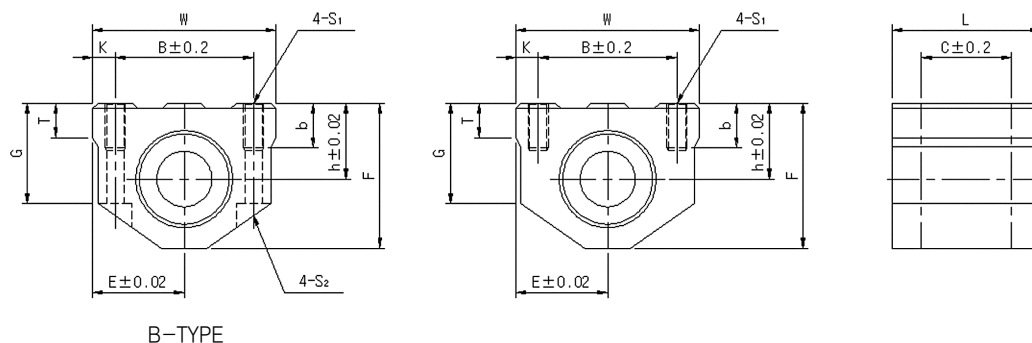
Part No.			Dimensions						Angle	Shaft	No. Ball rows	Basic Load Ratings	
Without Seal	With One Seal	With Two Seal	D	D ₁	B	B ₁	B ₂	E	α	d		dyn. C (N)	stat. Co (N)
SBEO 16	SBEO 16U	SBEO 16UU	26	24.9	36	24.6	1.30	9.0	68°	16	4	1332	715
SBEO 20	SBEO 20U	SBEO 20UU	32	30.5	45	31.2	1.60	9.0	55°	20	5	2371	1276
SBEO 25	SBEO 25U	SBEO 25UU	40	38.5	58	43.7	1.85	11.5	57°	25	5	4557	2234
SBEO 30	SBEO 30U	SBEO 30UU	47	44.5	68	51.7	1.85	14.0	57°	30	5	5644	3018
SBEO 40	SBEO 40U	SBEO 40UU	62	58.5	80	60.3	2.15	19.5	56°	40	5	9398	4410
SBEO 50	SBEO 50U	SBEO 50UU	75	71.5	100	77.3	2.65	22.5	54°	50	5	13857	6860

CS type

European Super Ball Bushing Block



A



Closed type(with 1pc of SBE)

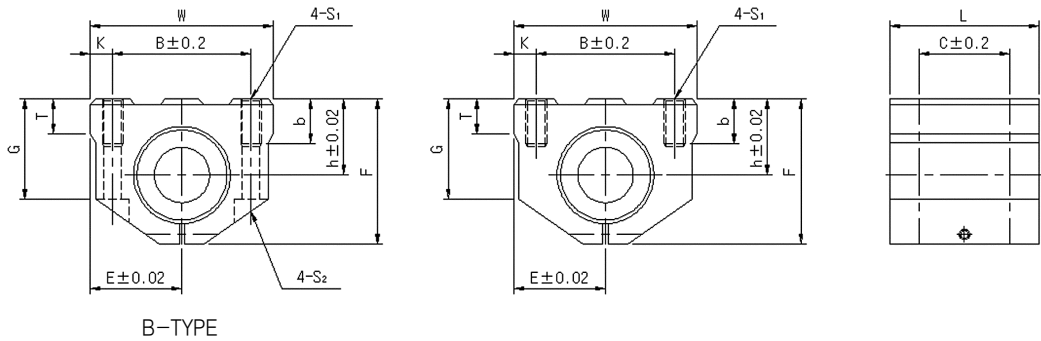
Unit: mm

Part No.	Dimensions							Mounting Dimensions						Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	G	T	B	C	K	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CS 16UU	22	26.5	53	43	42	29	10	40	26	6.5	13	M 6	—	16	5	1176	607
CS 16UU-B													M 5				
CS 20UU	25	30.0	60	54	50	34	12	45	32	7.5	18	M 8	—	20	6	2352	1254
CS 20UU-B													M 6				
CS 25UU	30	39.0	78	67	60	40	15	60	40	9.0	22	M10	—	25	6	4508	2195
CS 25UU-B													M 8				
CS 30UU	35	43.5	87	79	70	48	17	68	45	9.5	22	M10	—	30	6	5580	2959
CS 30UU-B													M 8				
CS 40UU	45	54.0	108	91	90	62	22	86	58	11.0	26	M12	—	40	6	9310	4312
CS 40UU-B													M10				
CS 50UU	50	66.0	132	113	105	68	25	108	50	12.0	34	M16	—	50	6	13720	6762
CS 50UU-B													M12				

1N ≒ 0.102kgf

CS-A type

European Super Ball Bushing Block



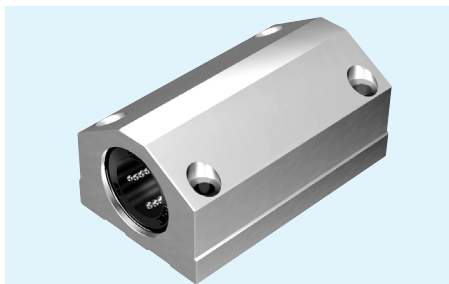
Closed adjustable clearance type(with 1pc of SBE)

Unit: mm

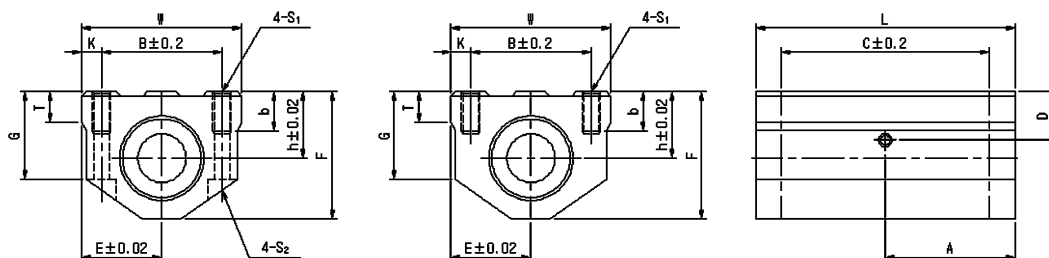
Part No.	Dimensions							Mounting Dimensions						Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	G	T	B	C	K	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CS 16AUU	22	26.5	53	43	42	29	10	40	26	6.5	13	M 6	—	16	5	1176	607
CS 16AUU-B													M 5				
CS 20AUU	25	30.0	60	54	50	34	12	45	32	7.5	18	M 8	—	20	6	2352	1254
CS 20AUU-B													M 6				
CS 25AUU	30	39.0	78	67	60	40	15	60	40	9.0	22	M10	—	25	6	4508	2195
CS 25AUU-B													M 8				
CS 30AUU	35	43.5	87	79	70	48	17	68	45	9.5	22	M10	—	30	6	5586	2959
CS 30AUU-B													M 8				
CS 40AUU	45	54.0	108	91	90	62	22	86	58	11.0	26	M12	—	40	6	9310	4312
CS 40AUU-B													M10				
CS 50AUU	50	66.0	132	113	105	68	25	108	50	12.0	34	M16	—	50	6	13720	6762
CS 50AUU-B													M12				

CSW type

European Super Ball Bushing Block



A



B-TYPE

Double closed type (with 2pcs of SBE)

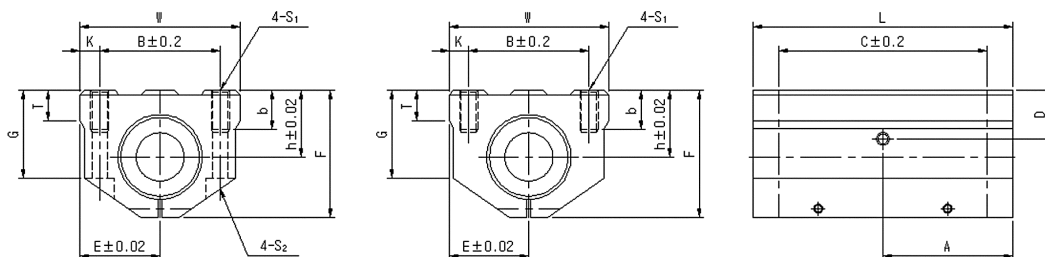
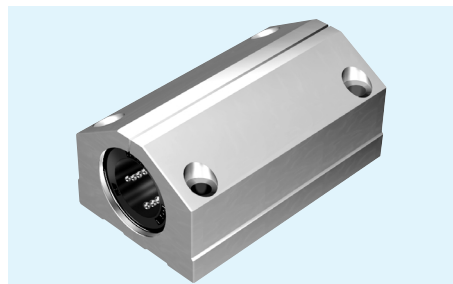
Unit: mm

Part No.	Dimensions							Mounting Dimensions						Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	G	T	B	C	K	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CSW 16 UU	22	26.5	53	84	42	29	10	40	64	6.5	13	M 6	—	16	5	1911	1215
CSW 16 UU-B													M 5				
CSW 20 UU	25	30.0	60	104	50	34	12	45	76	7.5	18	M 8	—	20	6	3812	2508
CSW 20 UU-B													M 6				
CSW 25 UU	30	39.0	78	130	60	40	15	60	94	9.0	22	M10	—	25	6	7310	4390
CSW 25 UU-B													M 8				
CSW 30 UU	35	43.5	87	152	70	48	17	68	106	9.5	22	M10	—	30	6	9055	5919
CSW 30 UU-B													M 8				
CSW 40 UU	45	54.0	108	176	90	62	22	86	124	11.0	26	M12	—	40	6	15092	8624
CSW 40 UU-B													M10				
CSW 50 UU	50	66.0	132	224	105	68	25	108	160	12.0	35	M16	—	50	6	22246	13524
CSW 50 UU-B													M12				

1N ≒ 0.102kgf

CSW-A type

European Super Ball Bushing Block



B-TYPE

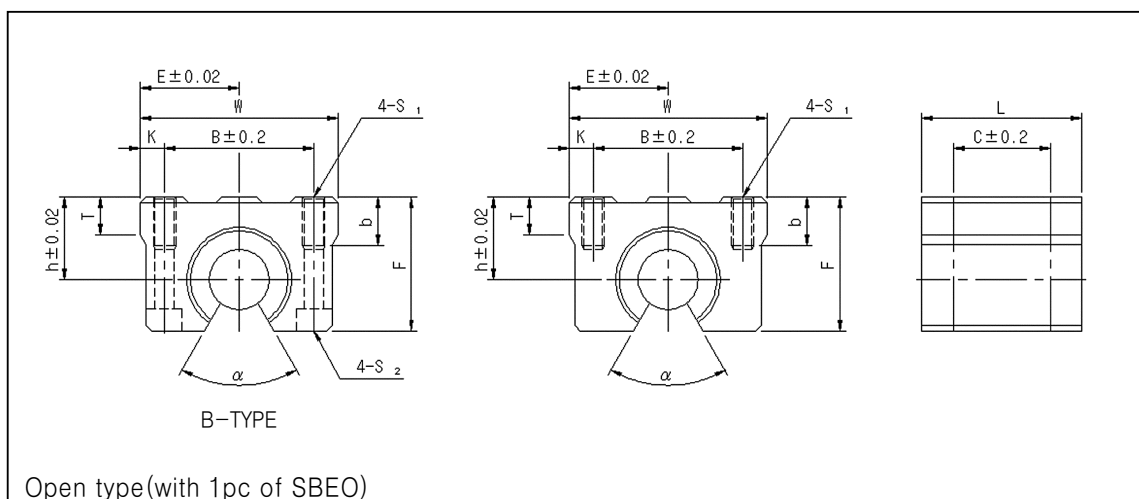
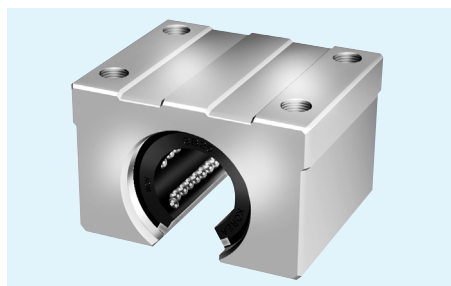
Double closed adjustable clearance type(with 2pcs of SBE)

Unit: mm

Part No.	Dimensions							Mounting Dimensions								Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	G	T	B	C	K	b	S ₁	S ₂	A	D			dyn. C (N)	stat. Co (N)
CSW 16AUU	22	26.5	53	84	42	29	10	40	64	6.5	12	M 6	—	42	16.0	16	5	1911	1215
CSW 16AUU-B													M 5						
CSW 20AUU	25	30.0	60	104	50	34	12	45	76	7.5	18	M 8	—	52	19.5	20	6	3812	2568
CSW 20AUU-B													M 6						
CSW 25AUU	30	39.0	78	130	60	40	15	60	94	9.0	25	M10	—	65	24.0	25	6	7310	4390
CSW 25AUU-B													M 8						
CSW 30AUU	35	43.5	87	152	70	48	17	68	106	9.5	25	M10	—	76	30.5	30	6	9055	5919
CSW 30AUU-B													M 8						
CSW 40AUU	45	54.0	108	176	90	62	22	86	124	11.0	25	M12	—	88	38.0	40	6	15092	8624
CSW 40AUU-B													M10						
CSW 50AUU	50	66.0	132	224	105	68	25	108	160	12.0	35	M16	—	112	43.0	50	6	22246	13524
CSW 50AUU-B													M12						

CSO type

European Super Ball Bushing Block



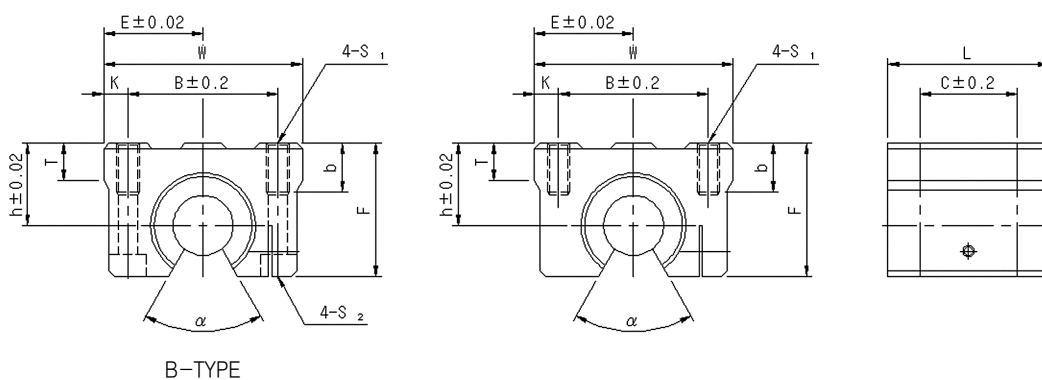
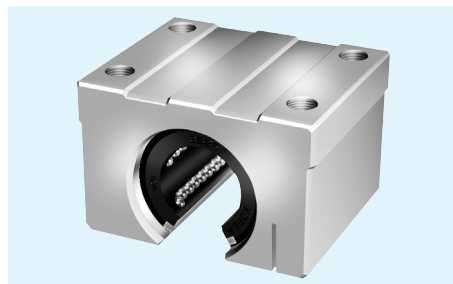
Unit: mm

Part No.	Dimensions								Mounting Dimensions					Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	T	h ₁	θ	B	C	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CSO 16UU	22	26.5	53	43	35	8	9.0	68°	40	26	13	M 6	—	16	4	1332	715
CSO 16UU-B													M 5				
CSO 20UU	25	30.0	60	54	42	10	9.0	55°	45	32	18	M 8	—	20	5	2371	1274
CSO 20UU-B													M 6				
CSO 25UU	30	39.0	78	67	51	13	11.5	57°	60	40	22	M10	—	25	5	4557	2234
CSO 25UU-B													M 8				
CSO 30UU	35	43.5	87	79	60	15	14.0	57°	68	45	22	M10	—	30	5	5644	3018
CSO 30UU-B													M 8				
CSO 40UU	45	54.0	108	91	77	20	19.5	56°	86	58	26	M12	—	40	5	9398	4410
CSO 40UU-B													M10				
CSO 50UU	50	66.0	132	113	88	25	22.5	54°	108	50	34	M16	—	50	5	13857	6860
CSO 50UU-B													M12				

1N ≒ 0.102kgf

CSO-A type

European Super Ball Bushing Block



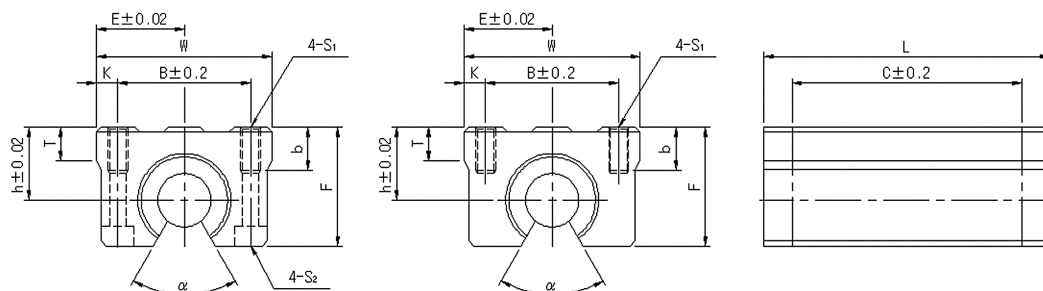
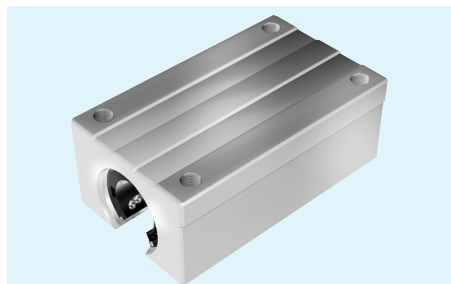
Open adjustable clearance type(with 1pc of SBEO)

Unit: mm

Part No.	Dimensions								Mounting Dimensions					Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	T	h ₁	θ	B	C	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CSO 16AUU	22	26.5	53	43	35	8	9.0	68°	40	26	13	M 6	—	16	4	1332	715
CSO 16AUU-B													M 5				
CSO 20AUU	25	30.0	60	54	42	10	9.0	55°	45	32	18	M 8	—	20	5	2371	1274
CSO 20AUU-B													M 6				
CSO 25AUU	30	39.0	78	67	51	13	11.5	57°	60	40	22	M10	—	25	5	4557	2234
CSO 25AUU-B													M 8				
CSO 30AUU	35	43.5	87	79	60	15	14.0	57°	68	45	22	M10	—	30	5	5644	3018
CSO 30AUU-B													M 8				
CSO 40AUU	45	54.0	108	91	77	20	19.5	56°	86	58	26	M12	—	40	5	9398	4410
CSO 40AUU-B													M10				
CSO 50AUU	50	66.0	132	113	88	25	22.5	54°	108	50	34	M16	—	50	5	13857	6860
CSO 50AUU-B													M12				

CSOW type

European Super Ball Bushing Block



B-TYPE

Double open type(with 2pcs of SBEO)

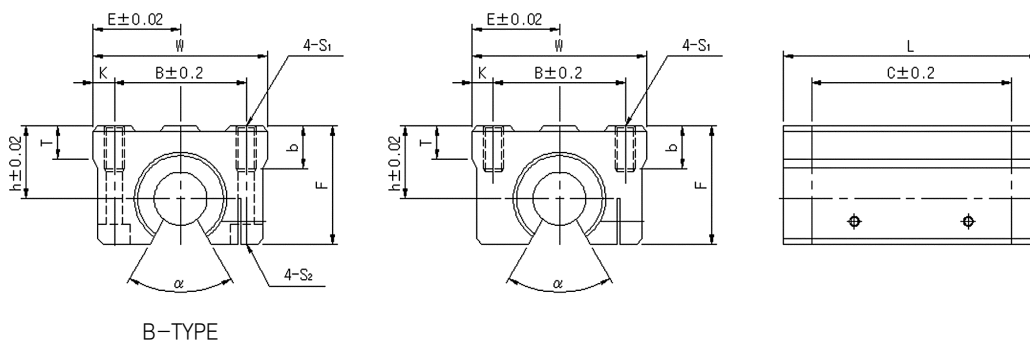
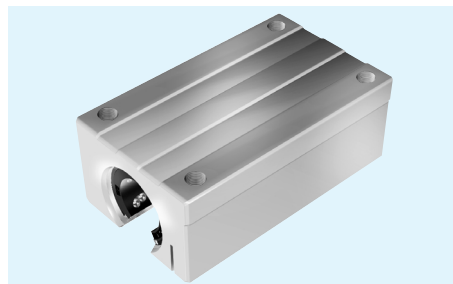
Unit: mm

Part No.	Dimensions								Mounting Dimensions					Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	T	h ₁	θ	B	C	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CSOW 16UU	22	26.5	53	84	35	10	9.0	68°	40	64	13	M 6	—	16	4	2195	1430
CSOW 16UU-B													M 5				
CSOW 20UU	25	30.0	60	104	42	12	9.0	55°	45	76	18	M 8	—	20	5	3871	2548
CSOW 20UU-B													M 6				
CSOW 25UU	30	39.0	78	130	51	15	11.5	57°	60	94	22	M10	—	25	5	9408	4468
CSOW 25UU-B													M 8				
CSOW 30UU	35	43.5	87	152	60	17	14.0	57°	68	106	22	M10	—	30	5	9212	6036
CSOW 30UU-B													M 8				
CSOW 40UU	45	54.0	108	176	77	22	19.5	56°	86	124	26	M12	—	40	5	15288	8820
CSOW 40UU-B													M10				
CSOW 50UU	50	66.0	132	224	88	25	22.5	54°	108	160	35	M16	—	50	5	21854	13720
CSOW 50UU-B													M12				

1N ≒ 0.102kgf

CSOW-A type

European Super Ball Bushing Block



Double open adjustable clearance type(with 2pcs of SBEO)

Unit: mm

Part No.	Dimensions								Mounting Dimensions					Shaft d	No. Ball rows	Basic Load Ratings	
	h	E	W	L	F	T	h ₁	θ	B	C	b	S ₁	S ₂			dyn. C (N)	stat. Co (N)
CSOW 16AUU	22	26.5	53	84	35	10	9.0	68°	40	64	13	M 6	—	16	4	2195	1430
CSOW 16AUU-B													M 5				
CSOW 20AUU	25	30.0	60	104	42	12	9.0	55°	45	76	18	M 8	—	20	5	3871	2548
CSOW 20AUU-B													M 6				
CSOW 25AUU	30	39.0	78	130	51	15	11.5	57°	60	94	22	M10	—	25	5	9408	4468
CSOW 25AUU-B													M 8				
CSOW 30AUU	35	43.5	87	152	60	17	14.0	57°	68	106	22	M10	—	30	5	9212	6036
CSOW 30AUU-B													M 8				
CSOW 40AUU	45	54.0	108	176	77	22	19.5	56°	86	124	26	M12	—	40	5	15288	8820
CSOW 40AUU-B													M10				
CSOW 50AUU	50	66.0	132	224	88	25	22.5	54°	108	160	35	M16	—	50	5	21854	13720
CSOW 50AUU-B													M12				

1N ≒ 0.102kgf