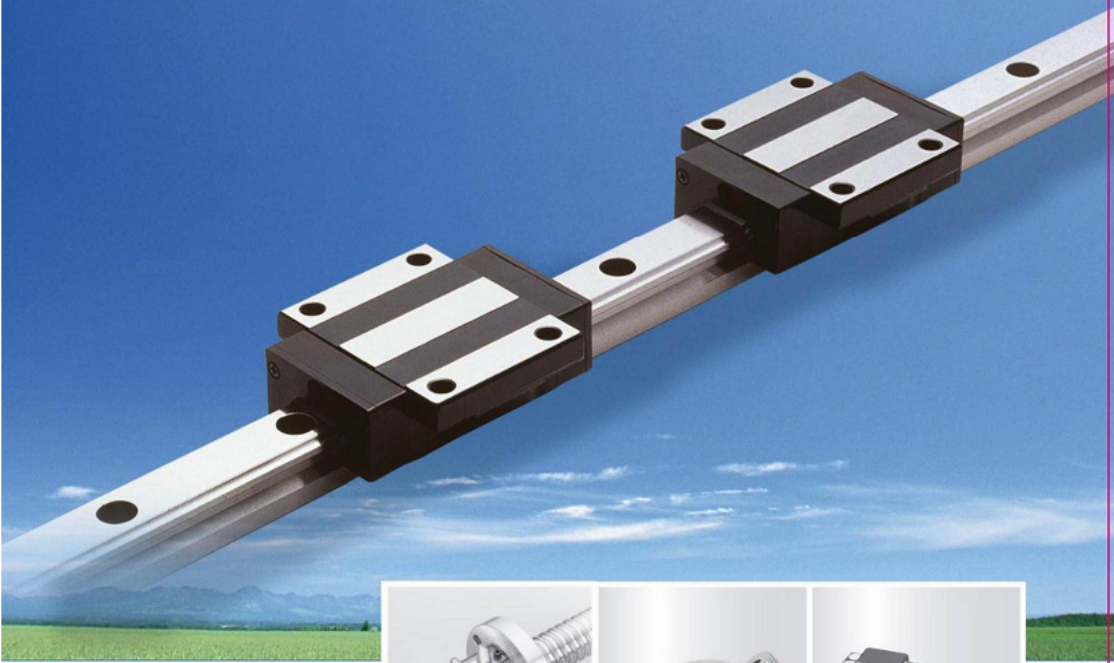




# Linear Motion Technology



Self-lubricant linear guideway

Ball screw

Elastomer coupling

Support unit



ABBA Linear Tech, established in 1999, was the first professional linear guideway manufacturer in Taiwan, putting patent self-lubricant and four-row linear guides into mass production. ABBA Linear Tech possessed critical techniques, combined R&D achievements with National Taiwan University of Science Technology, and launched the production successfully in 2000. With several international patents, **ABBA** is thriving worldwide with its own name and having channels in Taiwan, China, Korea, Japan, Europe, America, etc.

Since the beginning, ABBA Linear Tech has been making every endeavor on both marketing and product quality, and was recognized by The Creative Innovation Prize, The Rising Star Award, The National Business Start-up Award, and The Taiwan Symbol of Excellence in 2002 and 2004. Besides, ABBA obtained an investment approval in accordance with the encouragement to significant strategic industries by the Industrial Development Bureau of the Ministry of Economic Affairs. What ABBA strived for in the past years has been identified and supported by clients, suppliers, and the academia.

ABBA Linear Tech spirit to offer the best quality and professional service in order to integrate the global operation resources, fulfill clients' demands, and become a high-class linear guideway supplier within the coming years.



## BR Series Model Code Transition

Carriage-Standard end cap		
	Old item name	New item name
BR15	BRH15A	BRC15-A0
	BRH15B	BRC15-R0
	BRS15B	BRC15-U0
	BRS15BS	BRC15-SU
BR20	BRH20A	BRC20-A0
	BRH20AL	BRC20-LA
	BRH20B	BRC20-R0
	BRH20BL	BRC20-LR
	BRS20B	BRC20-U0
BR25	BRS20BS	BRC20-SU
	BRH25A	BRC25-A0
	BRH25AL	BRC25-LA
	BRH25B	BRC25-R0
	BRH25BL	BRC25-LR
BR30	BRS25B	BRC25-U0
	BRS25BS	BRC25-SU
	BRH30A	BRC30-A0
	BRH30AL	BRC30-LA
	BRH30B	BRC30-R0
	BRH30BL	BRC30-LR
BR30	BRS30B	BRC30-U0
	BRS30BS	BRC30-SU

Carriage-Short end cap		
	Old item name	New item name
BR15	BRH15A-S	BRD15-A0
	BRH15B-S	BRD15-R0
	BRS15B-S	BRD15-U0
	BRS15BS-S	BRD15-SU
BR20	BRH20A-S	BRD20-A0
	BRH20AL-S	BRD20-LA
	BRH20B-S	BRD20-R0
	BRH20BL-S	BRD20-LR
	BRS20B-S	BRD20-U0
BR25	BRS20BS-S	BRD20-SU
	BRH25A-S	BRD25-A0
	BRH25AL-S	BRD25-LA
	BRH25B-S	BRD25-R0
	BRH25BL-S	BRD25-LR
BR30	BRS25B-S	BRD25-U0
	BRS25BS-S	BRD25-SU
	BRH30A-S	BRD30-A0
	BRH30AL-S	BRD30-LA
	BRH30B-S	BRD30-R0
	BRH30BL-S	BRD30-LR
BR30	BRS30B-S	BRD30-U0
	BRS30BS-S	BRD30-SU
	BRH35A-S	BRD35-A0
	BRH35AL-S	BRD35-LA
BR35	BRH35B-S	BRD35-R0
	BRH35BL-S	BRD35-LR
	BRS35B-S	BRD35-U0
	BRS35BS-S	BRD35-SU
	BRH45A-S	BRD45-A0
BR45	BRH45AL-S	BRD45-LA
	BRH45B-S	BRD45-R0
	BRH45BL-S	BRD45-LR
	BRS45B-S	BRD45-U0

Rail		
	Old item name	New item name
Rail	BR	BRR

## BC Series Model Code Transition

Carriage-Standard end cap		
	Old item name	New item name
BC20	BCH20A	BCC20-A0
	BCH20AL	BCC20-LA
	BCH20B	BCC20-R0
	BCH20BL	BCC20-LR
BC25	BCH25A	BCC25-A0
	BCH25AL	BCC25-LA
	BCH25B	BCC25-R0
	BCH25BL	BCC25-LR
BC30	BCH30A	BCC30-A0
	BCH30AL	BCC30-LA
	BCH30B	BCC30-R0
	BCH30BL	BCC30-LR
BC35	BCH35A	BCC35-A0
	BCH35AL	BCC35-LA
	BCH35B	BCC35-R0
	BCH35BL	BCC35-LR
BC45	BCH45A	BCC45-A0
	BCH45AL	BCC45-LA
	BCH45B	BCC45-R0
	BCH45BL	BCC45-LR
BC55	BCH55A	BCC55-A0
	BCH55AL	BCC55-LA
	BCH55B	BCC55-R0
	BCH55BL	BCC55-LR

Rail		
	Old item name	New item name
Rail	BC	BCR

[www.abbatech.com.tw](http://www.abbatech.com.tw)



ABBA Linear Tech Co., Ltd.

No.75, Zhongshan Rd., Tucheng Dist.,  
New Taipei City 236, Taiwan (R.O.C.)

TEL: 886-2-22681133  
FAX: 886-2-22670907  
E-mail: abba@skf.com

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## Liner Ball Bearing Series

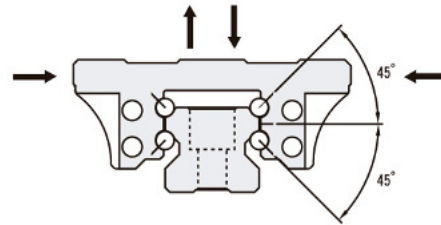
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Linear Guideway

## 1.1 Ten Characteristics

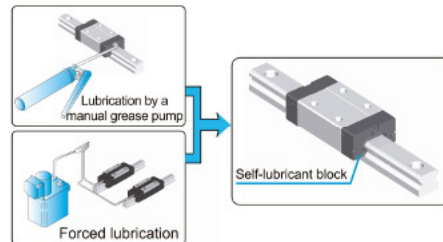
- Built-in long life lubrication (patent)
- Equivalent loading capacity in four directions
- Smooth running due to new ball re-circulation (patent)
- High rigidity : 4-row angular contact
- International standard dimension
- High accuracy, low friction, low maintenance
- High speed, low noise
- Integral all-round sealing
- Interchangeability
- Green production



## 1.2 Four Advantages of Self-Lubricant Block

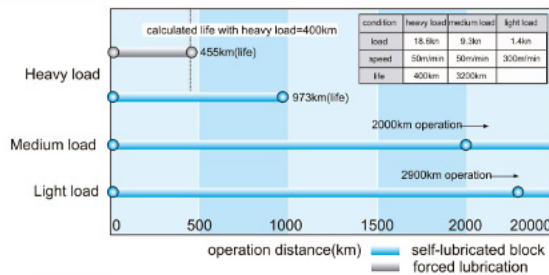
### Advantage 1

Maintenance free - No need for frequent periodic lubrication or automatic lubrication systems.



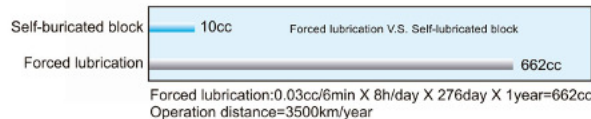
### Advantage 2

Extended intervals between maintenance.



### Advantage 3

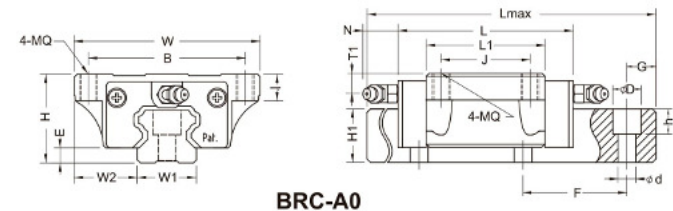
Curtailing lubrication cost.



### Advantage 4

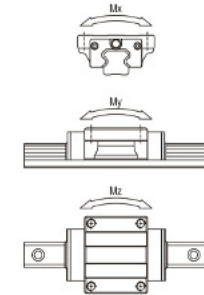
No oil leakage concern, easy for cleaning.

## 1.3 Interchangeability Notice



BRC-A0

1. Check the mounting height (H)
2. Check the mounting width (W)
3. Check the block length (L)
4. Check the block's body size (L1)
5. Check the hole Diameter and pitches on the block (BxJ)
6. Check the rail width (W1)
7. Check the pitch of the rail (F)
8. Check the hole Diameter and rail size (d x D x h)
9. When a specific length is required, please advise the (G) values in your order.



## 1.4 Precision Selection

We have three grades for your selection:  
Normal/ High/ Precision

	Application	Precision Grade				Application	Precision Grade		
		N	H	P			N	H	P
NC Machine tools	Machining Center			○	Industrial Robots	Orthogonal Type	○	○	○
	Lathe			○		Multi-joint Type	○	○	
	Milling Machine			○		Semiconductor Machine	Wire Bonder		
	Boring Machine			○	Prober				○
	Jig Borer			○	Insert Machine			○	○
	Grinding Machine			○	PCB Driller			○	○
	Electro-discharge Machine			○	Other Machines	Injection Molding Machine	○	○	
	Punching Press Machine		○	○		Measuring Machine			○
	Laser Cutting Machine		○	○		Business Machine	○	○	
	Wood Working Machine	○	○	○		Transporting Machine	○	○	
NC Drilling Machine		○	○	X-Y Table			○	○	
Milling Center		○	○	Painting Machine		○	○		
Packaging Machine	○			Welding Machine		○	○		
ATC	○			Medical Equipment		○	○		
Wire Cut Machine			○	Digitizer			○	○	
Grinding Wheel Machine		○	○	Test Equipment				○	



## 1.5 Precision Standard

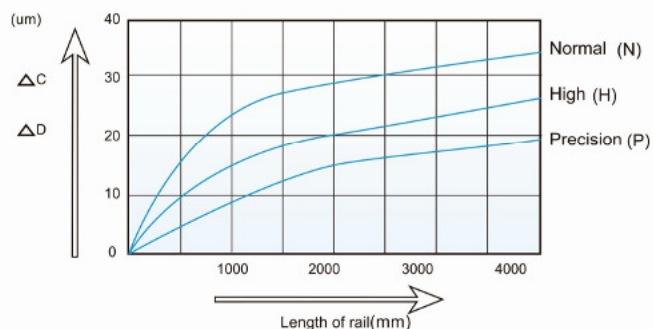
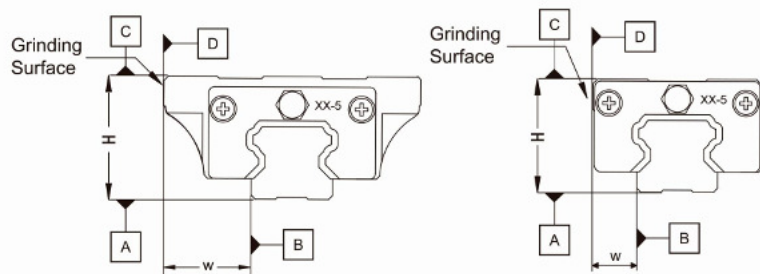
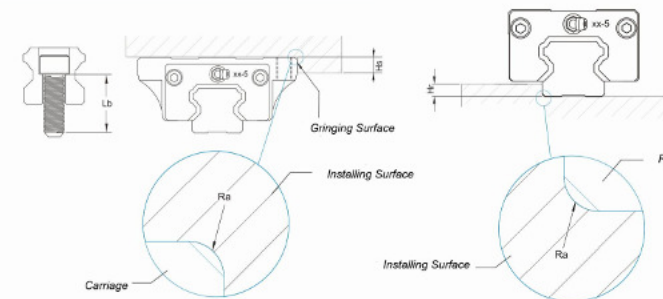


Fig.1 BR rail length and running parallelism

ITEM	GRADE		
	Normal (N)	High (H)	Precision (P)
Tolerance of height (H)	±0.1	±0.04	0 -0.04
Tolerance of width (W)	±0.1	±0.04	0 -0.04
Difference of heights (ΔH)	0.03	0.02	0.01
Difference of widths (ΔW)	0.03	0.02	0.01
Running parallelism of BR Block between surface A & C	ΔC Refer to Fig.1		
Running parallelism of BR Block between surface B & D	ΔD Refer to Fig.1		

## 1.6 Technical Information



ITEM	Maximum Fillet (Ra)	Maximum Height (Hr) rail shoulder	Height (Hs) block shoulder	Rail bolt Length (Lb) suggestion
BR-15	0.5	2.5	4	M4*16
BR-20	0.5	3.5	5	M5*20
BR-25	1	5	5	M6*25
BR-30	1	5	5	M8*30
BR-35	1	6	6	M8*30
BR-45	1	7.5	8	M12*40

Unit: mm

### Preload grade

#### Basic static load rating: C0

We define the basic static load rating C0 as a static load of constant magnitude acting in one direction under which the sum of the permanent deformations of rolling elements and raceway equals 0.0001 times of the diameter of the rolling elements.

#### Basic dynamic load rating: C

When each group of identical linear motion system is applied independently under the same condition, basic dynamic load rating C is the load of constant magnitude acting in one direction that results in a nominal life of 50 km.

GRADE	ITEM	
	Symbol	Preload force
Clearance	ZF	0
No Preload	Z0	0
Light Preload	Z1	0~0.02 C
Middle Preload	Z2	0.02 C~0.05 C
Heavy Preload	Z3	0.05 C~0.07 C

### Static safety coefficient : fs

Static safety factor fs is the ratio of the basic static load rating C0 to the load acting on the linear motion system.

$$f_s = (f_c * C_0) / P \quad \text{or} \quad f_s = (f_c * M_0) / M$$

fs : static safety factor

fc : contact factor

C0 : basic static load rating

M0 : static permissible moment

P : design load

M : design moment

Reference value of static safety factor fs shown below :

Operating condition	Load condition	Minimum fs
Normally stationary	Small impact and deflection	1.0 ~ 1.3
	Impact or twisting load is applied	2.0 ~ 3.0
Normally moving	Small impact or twisting load is applied	1.0 ~ 1.5
	Impact or twisting load is applied	2.5 ~ 5.0

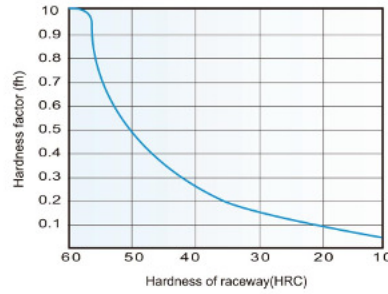
### Contact coefficient : fc

In linear motion system, it is hard to obtain identical load distribution due to moments, errors and other factors on the mounting surfaces. When multiple blocks on a rail are used in close contact, the basic load ratings C and C0 corresponding with contact coefficients are shown below.

Number of blocks in close contact	Contact factor
2	0.81
3	0.72
4	0.66
5	0.61
Normal operation	1

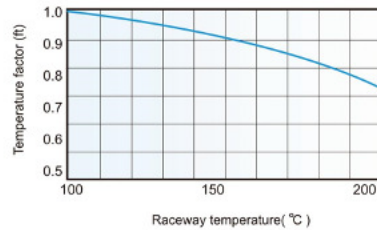
**Hardness coefficient : fh**

For linear motion system, its optimum load carrying capacity is HRC 58 to 64 hardness on the raceways. If the hardness is under HRC 58, both the basic dynamic load rating and basic static load rating should be multiplied by hardness coefficient fh.



**Temperature coefficient : ft**

When a linear motion system is subject to temperature above 100 C, the temperature factor should be taken into consideration.



**Load coefficient : fw**

Impacts and vibrations	Speed (V)	Measured vibration (G)	fw
Without external Impacts or Vibrations	At low speed V<=15m/min	G<=0.5	1~1.5
Without significant Impacts or Vibrations	At medium speed 15<V<=60m/min	0.5<G<=1.0	1.5~2.0
With external Impacts or Vibrations	At high speed V>60m/min	1.0<G<=2.0	2.0~3.5

**Formula of nominal life : L**

Given the basic dynamic load rating C and the applied load P, the following formulas shows the nominal life L of a linear motion system using steel balls.

$$L = \left( \frac{fh * ft * fc}{fw} \right) * \left( \frac{C}{P} \right)^3 * 50$$

- L : nominal life
- C : basic dynamic load rating
- P : applied load
- fh : Hardness factor
- ft : Temperature factor
- fc : Contact factor
- fw : Load factor

**1.7 Ordering Key System**

**B R S 1 5 - A 0 C 2 Z 1 - 1 0 8 0 0 N D 0 - A 0 S W 2**

**Size**  
15, 20, 25, 30, 35, 45

**Carriage Type <sup>1)</sup>**  
 A0 Flanged carriage, standard length, standard height  
 LA Flanged carriage, extended length, standard height  
 SU Slim-line carriage, short length, standard height  
 UO Slim-line carriage, standard length, standard height  
 RO Slim-line carriage, standard length, extended height  
 LR Slim-line carriage, extended length, extended height

**End Cap Type <sup>2)</sup>**  
 C Standard End Cap (for 15, 20, 25, 30)  
 D Short End Cap (for 15, 20, 25, 30, 35, 45)

**Number of carriages per rail**  
 1-9 1 - 9 carriages per rail  
 A-W > 9 carriages per rail (10=A, 11= B, 12=C...)

**Preload Class <sup>2)</sup>**  
 ZF Clearance  
 Z0 No preload  
 Z1 Light preload, 0-0.02C  
 Z2 Medium preload, 0.02-0.05C  
 Z3 Heavy preload, 0.05-0.07C

**Rail Length**  
00080-99999 mm (1 mm steps)

**Precision Class <sup>2)</sup>**  
 N Normal  
 H High  
 P Precision

**Rail Hole**  
 D0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 D4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 DX Special machining, customized according to drawing number

**Join Rail Track (if not selected-no code)**  
 A Yes  
 0 No

**Rail Treatment <sup>3)</sup>**  
 0 Standard (anti-rust oil)  
 B Black oxidation plating  
 H Hard chromium plating

**Sealing**  
 S Standard seal (only end seal)  
 1 Standard seal + Scraper plate  
 U <sup>2)</sup> Standard seal + Metal frame to hold two side seals

**No. of Parallel Rails**  
 00 Single Rail  
 W2-W9 Parallel Rails (W2: 2 rails, W3: 3 rails...)

1) Carriage type cross table  
 ●/○ : Carriage type available  
 ● : Sealing U type, Standard seal + Metal frame to hold two side seals

BRC (Standard End Cap)	A0	LA	SU	UO	RO	LR
15	●	○	○	○	○	○
20	●	○	○	○	○	○
25	●	○	○	○	○	○
30	●	○	○	○	○	○
35	○	○	○	○	○	○
45	○	○	○	○	○	○

BRD (Short End Cap)	A0	LA	SU	UO	RO	LR
15	○	○	○	○	○	○
20	○	○	○	○	○	○
25	○	○	○	○	○	○
30	○	○	○	○	○	○
35	●	○	○	○	○	○
45	○	○	○	○	○	○

2) Refer to following table for limitation

	For System			
	P	H	N	ZF
Precision	-	-	-	-
	20	20	20	20
	Z1	Z1	Z1	Z1
	Z2	Z2	Z2	Z2
Preload	Z3	Z3	Z3	Z3

3) Carriage Surface Treatment

- A. Standard: Anti-rust oil
- B. Non-Standard: See Drawing

4) Nipple/set screw quantity per carriage

- A. Size 15: 0° nipple(2 pcs)
- B. Size 20/25/30/35/45: 45° nipple(1 pc) + screw(1 pc)



## Ordering Key Carriage

B R C 1 5 - A 0 Z 1 - N 0 S

**End Cap Type** <sup>1)</sup> \_\_\_\_\_

C Standard End Cap (for 15, 20, 25, 30)  
 D Short End Cap (for 15, 20, 25, 30, 35, 45)

**Size** \_\_\_\_\_

15, 20, 25, 30, 35, 45

**Carriage Type** <sup>1)</sup> \_\_\_\_\_

A0 Flanged carriage, standard length, standard height  
 LA Flanged carriage, extended length, standard height  
 SU Slim-line carriage, short length, standard height  
 UO Slim-line carriage, standard length, standard height  
 RO Slim-line carriage, standard length, extended height  
 LR Slim-line carriage, extended length, extended height

**Preload Class** \_\_\_\_\_

ZF Clearance  
 Z0 No preload  
 Z1 Light preload, 0-0.02C

**Precision Class** \_\_\_\_\_

N Normal

**Block Treatment** \_\_\_\_\_

0 Standard (anti-rust oil)

**Sealing** \_\_\_\_\_

S Standard seal (only end seal)  
 1 Standard seal + Scraper plate  
 U <sup>2)</sup> Standard seal + Metal frame to hold two side seals

<sup>1)</sup> Carriage type cross table  
 ●/○ : Carriage type available  
 ● : Sealing U type, Standard seal + Metal frame to hold two side seals

BRC (Standard End Cap)	A0	LA	SU	UO	RO	LR
15	●	○	○	●	●	○
20	●	○	○	●	●	○
25	●	○	○	●	●	○
30	●	○	○	●	●	○
35						
45						

BRD (Short End Cap)	A0	LA	SU	UO	RO	LR
15	○	○	○	○	○	○
20	○	○	○	○	○	○
25	○	○	○	○	○	○
30	○	○	○	○	○	○
35	●	○	○	●	●	○
45	●	○	○	●	●	○

<sup>2)</sup> Nipple/set screw quantity per carriage  
 A. Size 15: 0° nipple(2 pcs)  
 B. Size 20/25/30/35/45: 45° nipple(1 pcs) + screw(1 pcs)

## Ordering Key Rail

B R R 1 5 - 1 0 8 0 0 N D 0 - A 0

**Size** \_\_\_\_\_

15, 20, 25, 30, 35, 45

**Rail Length** \_\_\_\_\_

00080-99999 mm (1 mm steps)

**Precision Class** \_\_\_\_\_

N Normal

**Rail Hole** \_\_\_\_\_

D0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 D4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 DX Special machining, customized according to drawing number

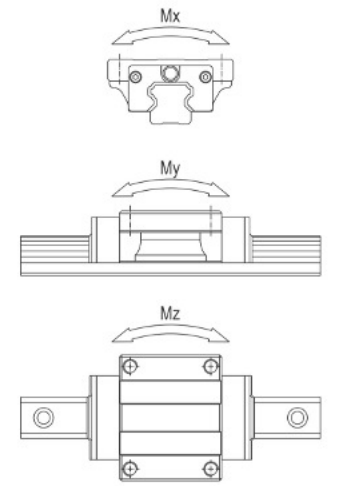
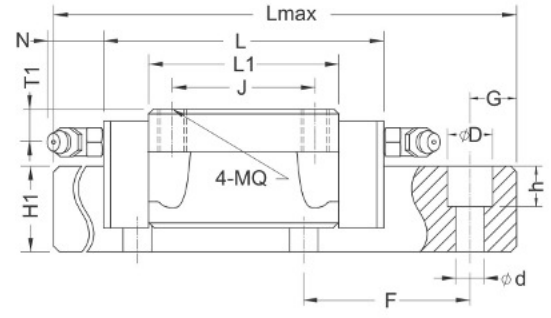
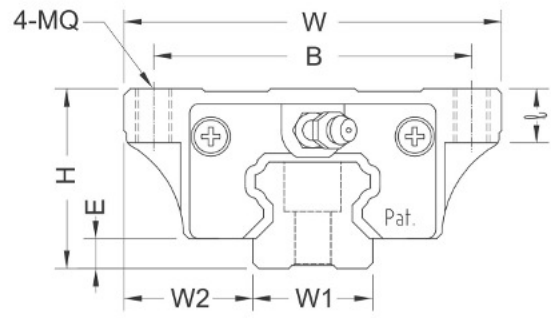
**Join Rail Track** (if not selected-no code) \_\_\_\_\_

A Yes  
 0 No

**Rail Treatment** \_\_\_\_\_

0 Standard (anti-rust oil)

**1.8 BRC-A0/LA, BRD-A0/LA**



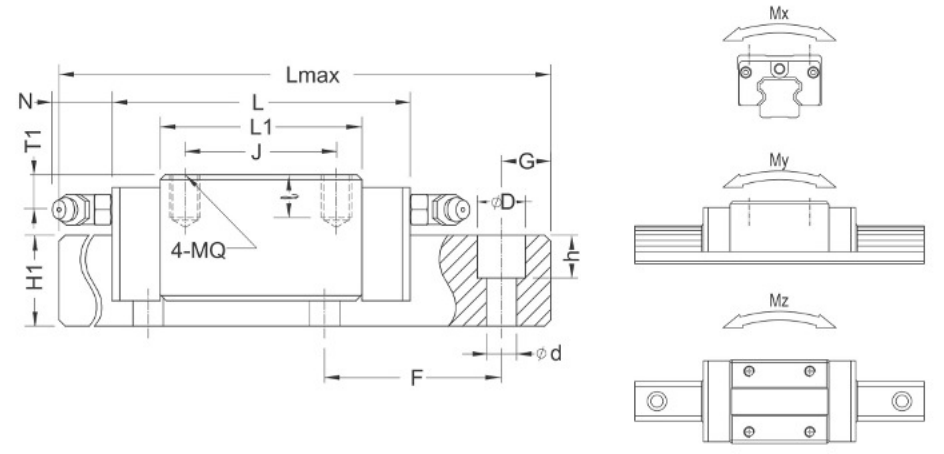
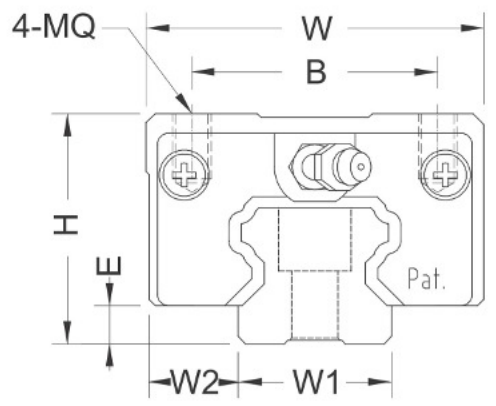
Model No.	Assembly (mm)				BR block (mm)							BR rail (mm)			
	H	W	W2	E	L	BxJ	MQxI	L1	Oil hole	T1	(N)	W1	H1	F	dxDxh
BRC15A0 BRD15A0	24	47	16	4.6	66 56	38x30	M5x8	40	ø 3	4.3	5	15	14	60	4.5x7.5x5.8
BRC20A0 BRD20A0	30	63	21.5	5	77.8	53x40	M6x9	48.8	M6x1	7	15.6	20	18	60	6x9.5x9.0
BRC20LA BRD20LA					67.8 92.4 82.4			63.4							
BRC25A0 BRD25A0	36	70	23.5	7	88	57x45	M8x12	57	M6x1	7.8	15.6	23	22	60	7x11x9.5
BRC25LA BRD25LA					78 110.1 100.1			79.1							
BRC30A0 BRD30A0	42	90	31	9	109	72x52	M10x12	72	M6x1	7	15.6	28	26	80	9x14x12.5
BRC30LA BRD30LA					99 131.3 121.3			94.3							
BRD35A0 BRD35LA	48	100	33	9.5	109	82x62	M10x13	80	M6x1	8	15.6	34	29	80	9x14x12.5
BRD45A0 BRD45LA					134.8			105.8							
BRD45A0 BRD45LA	60	120	37.5	14	138.2 163	100x80	M12x15	105 129.8	M8x1	8.5	16	45	38	105	14x20x17.5

Model No.	Ref.Data (mm)		Basic Load Rating (Kgf)		Static Moment (Kgf*m)			Weight	
	Lmax	G	(C)	(CO)	Mx	My	Mz	Block(Kg)	Rail(Kg/m)
BRC15A0 BRD15A0	4000	20	850	1350	10.1	6.8	6.8	0.21	1.4
BRC20A0 BRD20A0	4000	20	1400	2400	24	14.6	14.6	0.4	2.6
BRC20LA BRD20LA			1650	3000	30	23.8	23.8	0.52	
BRC25A0 BRD25A0	4000	20	1950	3200	36.8	22.8	22.8	0.57	3.6
BRC25LA BRD25LA			2600	4600	52.9	45.5	45.5	0.72	
BRC30A0 BRD30A0	4000	20	2850	4800	67.2	43.2	43.2	1.1	5.2
BRC30LA BRD30LA			3600	6400	89.6	75.4	75.4	1.4	
BRD35A0 BRD35LA	4000	20	3850	6200	105.4	62	62	1.6	7.2
BRD45A0 BRD45LA			4900	8300	141.1	109.8	109.8	2	
BRD45A0 BRD45LA	4000	22.5	6500	10500	236.3	137.8	137.8	2.7	12.3
BRD45LA			7700	13000	292.5	210.9	210.9	3.6	

Note: BR35 and BR45 are not equipped with self-lubricant parts.



**A** 1.9 BRC-R0/LR, BRD-R0/LR

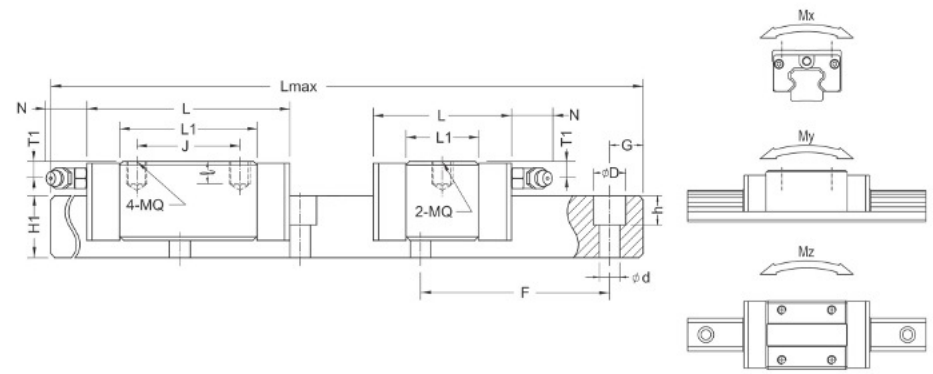
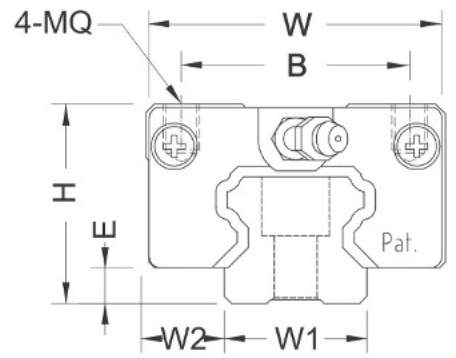


Model No.	Assembly (mm)				BR block (mm)						BR rail (mm)				
	H	W	W2	E	L	BxJ	MQxI	L1	Oil hole	T1	(N)	W1	H1	F	dxDxh
BRC15R0 BRD15R0	28	34	9.5	4.6	66 56	26x26	M4x6	40	∅ 3	8.3	5	15	14	60	4.5x7.5x5.8
BRC20R0 BRD20R0	30	44	12	5	77.8	32x36	M5x8	48.8	M6x1	7	15.6	20	18	60	6x9.5x9.0
BRC20LR BRD20LR					67.8 92.4 82.4	32x50									
BRC25R0 BRD25R0	40	48	12.5	7	88	35x35	M6x10	57	M6x1	11.8	15.6	23	22	60	7x11x9.5
BRC25LR BRD25LR					78 110.1 100.1	35x50									
BRC30R0 BRD30R0	45	60	16	9	109	40x40	M8x13	72	M6x1	10	15.6	28	26	80	9x14x12.5
BRC30LR BRD30LR					99 131.3 121.3	40x60									
BRD35R0 BRD35LR	55	70	18	9.5	109	50x50	M8x13	80	M6x1	15	15.6	34	29	80	9x14x12.5
BRD45R0 BRD45LR					134.8 138.2 163	50x72 60x60 60x80									

Model No.	Ref.Data (mm)		Basic Load Rating (Kgf)		Static Moment (Kgf*m)			Weight	
	Lmax	G	(C)	(CO)	Mx	My	Mz	Block(Kg)	Rail(Kg/m)
BRC15R0 BRD15R0	4000	20	850	1350	10.1	6.8	6.8	0.19	1.4
BRC20R0 BRD20R0	4000	20	1400	2400	24	14.6	14.6	0.31	2.6
BRC20LR BRD20LR			1650	3000	30	23.8	23.8	0.47	
BRC25R0 BRD25R0	4000	20	1950	3200	36.8	22.8	22.8	0.45	3.6
BRC25LR BRD25LR			2600	4600	52.9	45.5	45.5	0.56	
BRC30R0 BRD30R0	4000	20	2850	4800	67.2	43.2	43.2	0.91	5.2
BRC30LR BRD30LR			3600	6400	89.6	75.4	75.4	1.2	
BRD35R0 BRD35LR	4000	20	3850	6200	105.4	62	62	1.5	7.2
BRD45R0 BRD45LR			4800	8300	141.1	109.8	109.8	1.9	
BRD45R0 BRD45LR	4000	22.5	6500	10500	236.3	137.8	137.8	2.3	12.3
BRD45LR			7700	13000	292.5	210.9	210.9	2.8	

Note: BR35 and BR45 are not equipped with self-lubricant parts.

**1.10 BRC-SU/U0, BRD-SU/U0**



Model No.	Assembly (mm)				BR block (mm)							BR rail (mm)			
	H	W	W2	E	L	BxJ	MQxI	L1	Oil hole	T1	(N)	W1	H1	F	dxDxh
BRC15U0	24	34	9.5	4.6	66	26x26	M4x5.6	40	Φ3	4.3	5	15	14	60	4.5x7.5x5.8
BRD15U0					56			21.6							
BRC15SU					47.6	26x -									
BRD15SU					37.6										
BRC20U0	28	42	11	5	77.8	32x32	M5x6.4	48.8	M6x1	5	15.6	20	18	60	6x9.5x9.0
BRD20U0					67.8			28							
BRC20SU					57	32x -									
BRD20SU					47										
BRC25U0	33	48	12.5	7	88	35x35	M6x8	57	M6x1	4.8	15.6	23	22	60	7x11x9.5
BRD25U0					78			31.5							
BRC25SU					62.5	35x -									
BRD25SU					52.5										
BRC30U0	42	60	16	9	109	40x40	M8x11.5	72	M6x1	7	15.6	28	26	80	9x14x12.5
BRD30U0					99			38.6							
BRC30SU					75.6	40x -									
BRD30SU					65.6										
BRD35U0	48	70	18	9.5	109	50x50	M8x11.2	80	M6x1	8	15.6	34	29	80	9x14x12.5
BRD35SU					74.7	50x -		45.7							
BRD45U0					60	86		20.5							

Model No.	Ref.Data (mm)		Basic Load Rating (Kgf)		Static Moment (Kgf*m)			Weight	
	Lmax	G	(C)	(CO)	Mx	My	Mz	Block(Kg)	Rail(Kg/m)
BRC15U0	4000	20	850	1350	10.1	6.8	6.8	0.17	1.4
BRD15U0			520	680	5.1	1.8	1.8		
BRC15SU			520	680	5.1	1.8	1.8	0.1	
BRD15SU									
BRC20U0	4000	20	1400	2400	24	14.6	14.6	0.26	2.6
BRD20U0			950	1400	7	4.9	4.9		
BRC20SU			950	1400	7	4.9	4.9	0.17	
BRD20SU									
BRC25U0	4000	20	1950	3200	36.8	22.8	22.8	0.38	3.6
BRD25U0			1250	1750	17.5	6.9	6.9		
BRC25SU			1250	1750	17.5	6.9	6.9	0.21	
BRD25SU									
BRC30U0	4000	20	2850	4800	67.2	43.2	43.2	0.81	5.2
BRD30U0			1750	2400	33.6	11.6	11.6		
BRC30SU			1750	2400	33.6	11.6	11.6	0.48	
BRD30SU									
BRD35U0	4000	20	3850	6200	105.4	62	62	1.2	7.2
BRD35SU			2500	3650	62.1	20.9	20.9	0.8	
BRD45U0			6500	10500	236.3	137.8	137.8	2.1	

Note: BR35 and BR45 are not equipped with self-lubricant parts.



# MEMO

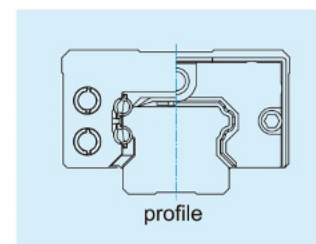
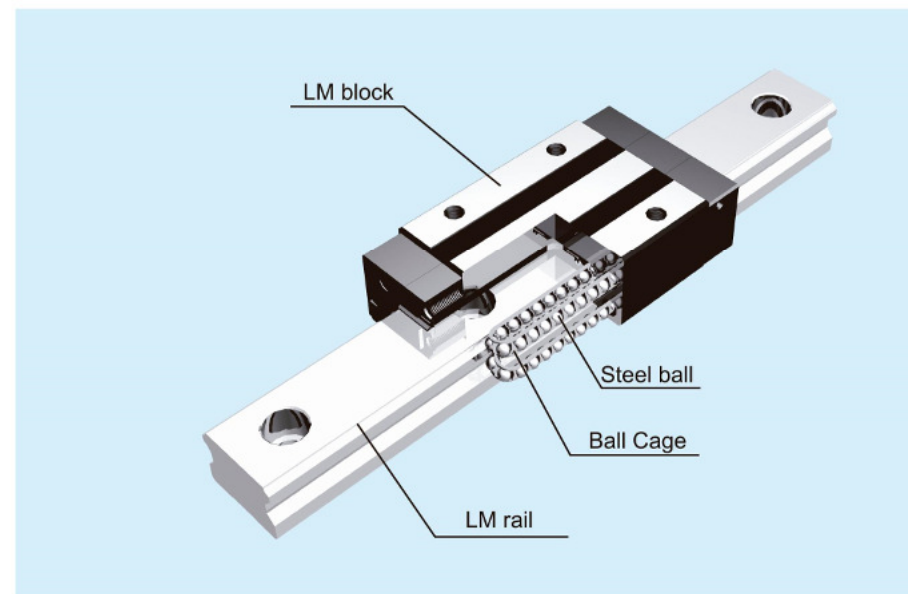


## 2.1 Ball Cage Linear Guideway

### Features

- Perfect smoothness, free of maintenance and greasing work.
- Equivalent loading, long service life.
- Equipped with ball cage, lower noise and smoother running.

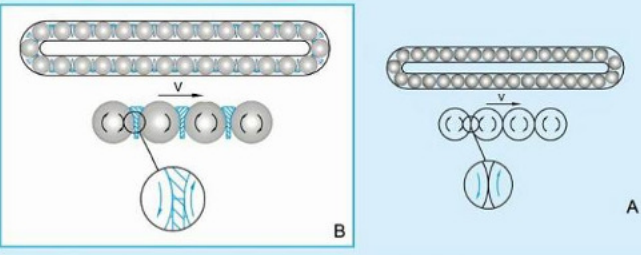
### BC Series Component Display



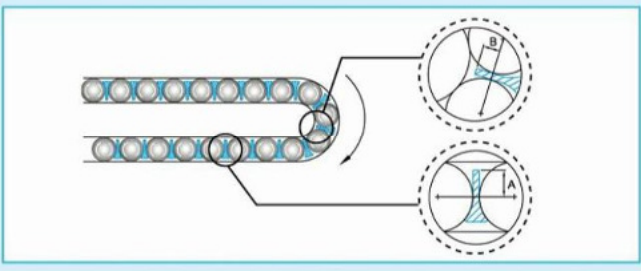
**BC series** is equipped with **ABBA**'s latest developed Ball Cage, which lowers the noise, and enables high-speed running, longer life time, and outstanding accuracy.

# The Characteristic of BC Series

New (with ball cage)

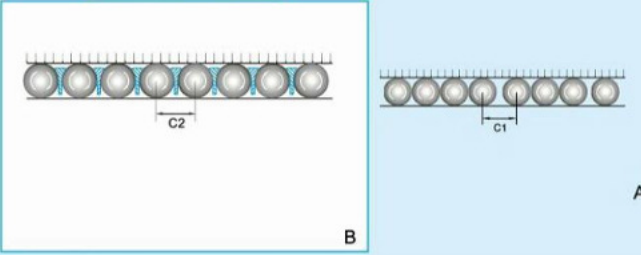


1. Steel balls chafe against each other in drawing A, in which the friction is two times larger than in drawing B, so that the life time in B is longer than in A.

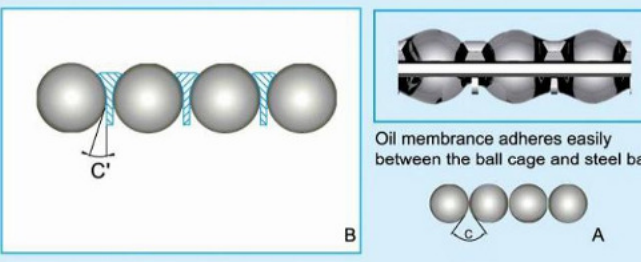


2. The difference between ABBA's ball cage and others' is that there will be no press and intervention from the inner part of the ball cage when it is turning that friction is lowered and life time extends.

New (with ball cage)



3. It shows in drawing B that due to the ball cage, steel balls are loaded equivalently that their service life could be longer.



4. As demonstrated above, the included angle in drawing A(C) is larger than the one in drawing B(C') with ball cage. Therefore, oil membrane adheres easily in the structure of BC series.

# 2.2 Ordering Key System

**B C S 2 0 - A 0 C 2 Z 1 - 1 0 8 0 0 N D 0 - A 0 S W 2**

**Size** \_\_\_\_\_  
 20, 25, 30, 35, 45, 55

**Carriage Type** \_\_\_\_\_  
 AO Flanged carriage, standard length, standard height  
 LA Flanged carriage, extended length, standard height  
 RO Slim-line carriage, standard length, extended height  
 LR Slim-line carriage, extended length, extended height

**End Cap Type** \_\_\_\_\_  
 C Standard End Cap

**Number of carriages per rail** \_\_\_\_\_  
 1-9 1 - 9 carriages per rail  
 A-W > 9 carriages per rail (10=A, 11=B, 12=C...)

**Preload Class** <sup>1)</sup> \_\_\_\_\_  
 ZF Clearance  
 Z0 No preload  
 Z1 Light preload, 0-0.02C

**Rail Length** \_\_\_\_\_  
 00080-99999 mm (1 mm steps)

**Precision Class** <sup>1)</sup> \_\_\_\_\_  
 N Normal  
 H High  
 P Precision

**Rail Hole** \_\_\_\_\_  
 D0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 D4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 DX Special machining, customized according to drawing number

**Join Rail Track** \_\_\_\_\_  
 A Yes (Refer to drawing for detail)  
 0 No

**Rail Treatment** <sup>2)</sup> \_\_\_\_\_  
 0 Standard (anti-rust oil)

**Sealing** \_\_\_\_\_  
 S Standard seal (only end seal)  
 1 Standard seal + Scrapper plate

**No. of Parallel Rails** \_\_\_\_\_  
 00 Single Rail  
 W2-W9 Parallel Rails (W2: 2 rails, W3: 3 rails...)

1) Refer to following table for limitation

System			
Precision	P	H	N
Preload	-	-	ZF
	Z0	Z0	Z0
	Z1	Z1	Z1
	Z2	Z2	Z2
	Z3	Z3	Z3

2) Carriage Surface Treatment  
 A. Standard: anti-rust oil  
 B. Non-Standard: See Drawing

3) Nipple/screw type of Standard type  
 A. Size 20/25/30/35/45/55: 45° nipple(1 pcs) + screw(1 pcs)

## Ordering Key Carriage

B C C 2 0 - A 0 Z 1 - N 0 S

### Size

20, 25, 30, 35, 45, 55

### Carriage Type

A0 Flanged carriage, standard length, standard height  
 LA Flanged carriage, extended length, standard height  
 RO Slim-line carriage, standard length, extended height  
 LR Slim-line carriage, extended length, extended height

### Preload Class

ZF Clearance  
 Z0 No preload  
 Z1 Light preload, 0~0.02C

### Precision Class

N Normal

### Block Treatment

0 Standard (anti-rust oil)

### Sealing

S Standard seal (only end seal)  
 1 Standard seal + Scrapper plate

1) Nipple/set screw type of Standard type

A. Size 20/25/30/35/45/55: 45° nipple(1 pcs) + screw(1 pcs)

## Ordering Key Rail

B C R 2 0 - 1 0 8 0 0 N D 0 - A 0

### Size

20, 25, 30, 35, 45, 55

### Rail Length

00080~99999 mm (1 mm steps)

### Precision Class

N Normal

### Rail Hole

D0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F0 Standard hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 D4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is produced equidistantly.)  
 F4 Blind hole (Standard hole distance. The distance of the first and last attachment holes is not produced equidistantly.)  
 DX Special machining, customized according to drawing number

### Join Rail Track

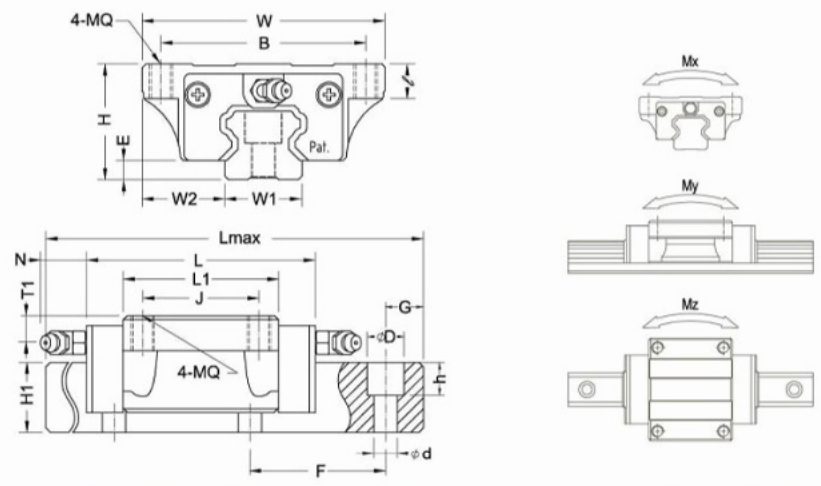
A Yes (Refer to drawing for detail)  
 0 No

### Rail Treatment

0 Standard (anti-rust oil)



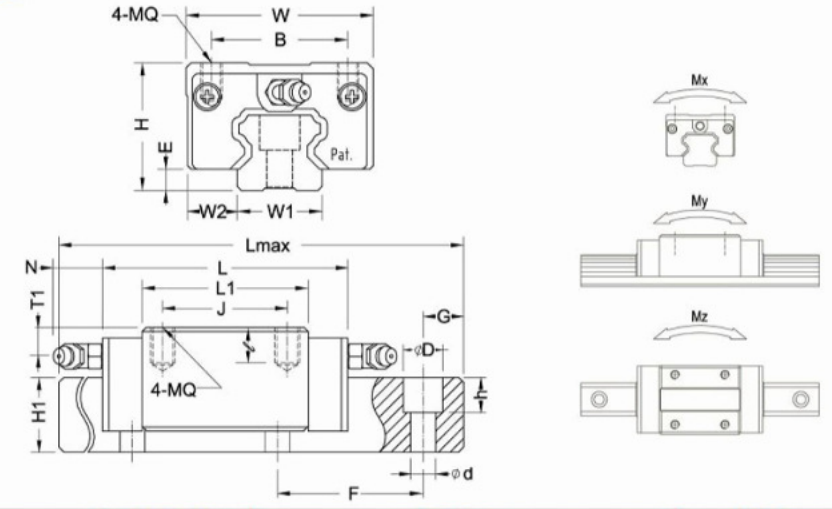
### 2.3 BCC-A0/LA



Model No.	Assembly (mm)				BC block (mm)						BC rail (mm)				
	H	W	W2	E	L	BxJ	MQx	L1	Oil hole	T1	(N)	W1	H1	F	dxDxh
BCC20A0	30	63	21.5	6	87	53x40	M6x10	59	M6x1	7.5	15.6	20	16.5	60	6x9.5x9.0
BCC20LA					106			78							
BCC25A0	36	70	23.5	6	102	57x45	M8x12	71	M6x1	10	15.6	23	20	60	7x11x9.5
BCC25LA					119			88							
BCC30A0	42	90	31	7	116	72x52	M10x15	80	M6x1	12	15.6	28	23	80	9x14x12.5
BCC30LA					141			105							
BCC35A0	48	100	33	7.5	132	82x62	M10x17	93	M6x1	12	15.6	34	26	80	9x14x12.5
BCC35LA					162			123							
BCC45A0	60	120	37.5	8.9	150	100x80	M12x17	106	M8x1	16	16	45	32	105	14x20x17.5
BCC45LA					184			140							
BCC55A0	70	140	43.5	12.7	181	116x95	M14x21	131	M8x1	20	16	53	38	120	16x23x20.1
BCC55LA					223			173							

Model No.	Ref.Data (mm)		Basic Load Rating (Kgf)		Static Moment (Kgf*m)			Weight	
	Lmax	G	(C)	(CO)	Mx	My	Mz	Block(Kg)	Rail(Kg/m)
BCC20A0	4000	20	1300	2500	32.9	30.4	30.4	0.45	2.3
BCC20LA			1600	3300	43	52	52		
BCC25A0	4000	20	1800	3400	51.3	51.8	51.8	0.75	3.2
BCC25LA			2100	4200	63.5	77.2	77.2		
BCC30A0	4000	20	2500	4600	79	72	72	1.31	4.5
BCC30LA			3100	6100	105	124	124	1.55	
BCC35A0	4000	20	3500	6300	140	126	126	1.9	6.2
BCC35LA			4300	8400	184	214	214	2.55	
BCC45A0	4000	22.5	4700	8200	245	187	187	3.3	10.4
BCC45LA			5800	10900	320	315	315	4.2	
BCC55A0	4000	30	7600	12800	446	355	355	5.4	14.5
BCC55LA			9300	17100	580	600	600	7.1	

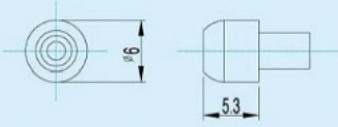
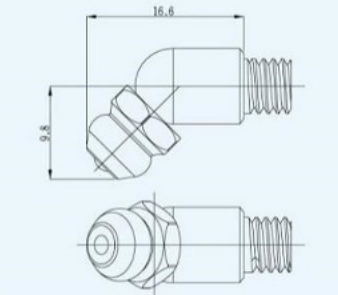
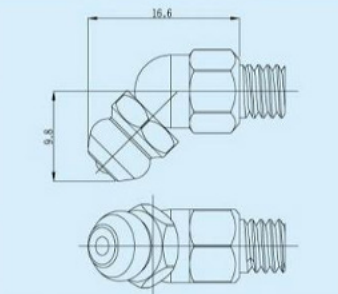
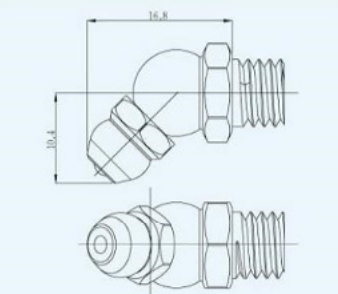
### 2.4 BCC-R0/LR



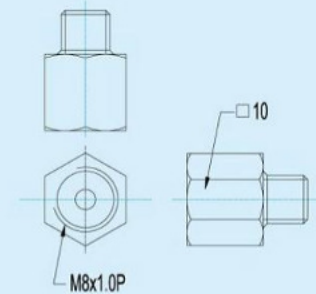
Model No.	Assembly (mm)				BC block (mm)						BC rail (mm)				
	H	W	W2	E	L	BxJ	MQx	L1	Oil hole	T1	(N)	W1	H1	F	dxDxh
BCC20R0	30	44	12	6	87	32x36	M5x7	59	M6x1	7.5	15.6	20	16.5	60	6x9.5x9.0
BCC20LR					106	32x50		78							
BCC25R0	40	48	12.5	6	102	35x35	M6x10	71	M6x1	14	15.6	23	20	60	7x11x9.5
BCC25LR					119	35x50		88							
BCC30R0	45	60	16	7	116	40x40	M8x12	80	M6x1	15	15.6	28	23	80	9x14x12.5
BCC30LR					141	40x60		105							
BCC35R0	55	70	18	7.5	132	50x50	M8x14	93	M6x1	19	15.6	34	26	80	9x14x12.5
BCC35LR					162	50x72		123							
BCC45R0	70	86	20.5	8.9	150	60x60	M10x16	106	M8x1	26	16	45	32	105	14x20x17.5
BCC45LR					184	60x80		140							
BCC55R0	80	100	23.5	12.7	181	75x75	M12x19	131	M8x1	30	16	53	38	120	16x23x20.1
BCC55LR					223	75x95		173							

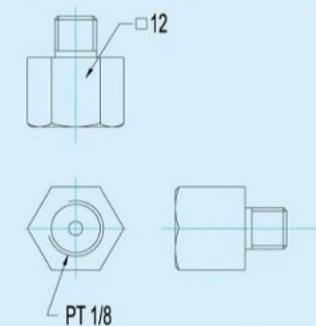
Model No.	Ref.Data (mm)		Basic Load Rating (Kgf)		Static Moment (Kgf*m)			Weight	
	Lmax	G	(C)	(CO)	Mx	My	Mz	Block(Kg)	Rail(Kg/m)
BCC20R0	4000	20	1300	2500	32.9	30.4	30.4	0.35	2.3
BCC20LR			1600	3300	43	52	52		
BCC25R0	4000	20	1800	3400	51.3	51.8	51.8	0.7	3.2
BCC25LR			2100	4200	63.5	77.2	77.2		
BCC30R0	4000	20	2500	4600	79	72	72	1.1	4.5
BCC30LR			3100	6100	105	124	124	1.4	
BCC35R0	4000	20	3500	6300	140	126	126	1.7	6.2
BCC35LR			4300	8400	184	214	214	2.2	
BCC45R0	4000	22.5	4700	8200	245	187	187	3.1	10.4
BCC45LR			5800	10900	320	315	315	4	
BCC55R0	4000	30	7600	12800	446	355	355	5.2	14.5
BCC55LR			9300	17100	580	600	600	6.7	

### 3.1 Grease Nipples (Standard)

Grease Nipples (VN-S)			
Size	Type	Standard Carriage	Standard Carriage + Metal Frame Standard Carriage + Scraper Plate
15		P140129 VN-SA-D1-05-00 (NLA01)	P140129 VN-SA-D1-05-00 (NLA01)
20		P140880 VN-SB-M6-05-00	P140137 VN-SB-M6-08-00 (NLB03)
25		P140135 VN-SB-M6-06-00 (NLB02)	P140137 VN-SB-M6-08-00 (NLB03)
30			
35			
45		P140138 VN-SB-M8-06-00 (NLB04)	P140473 VN-SB-M8-12-00

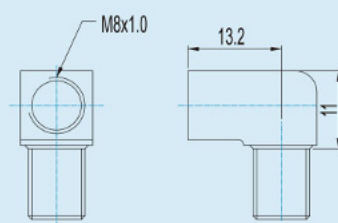
### Plumbing Nipple (Optional)

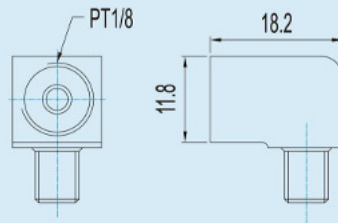
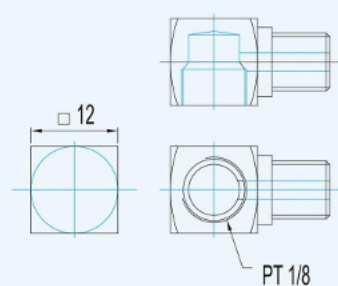
Plumbing Nipple (VN-PA)			
Size	Type	Standard Carriage	Standard Carriage + Metal Frame Standard Carriage + Scraper Plate
25		P140142 VN-PA-M6-06-00 (NPA01)	N / A
30			
35			
45		P140143 VN-PA-M8-06-00 (NPA02)	P140143 VN-PA-M8-06-00 (NPA02)

Plumbing Nipple (VN-PA)			
Size	Type	Standard Carriage	Standard Carriage + Metal Frame Standard Carriage + Scraper Plate
30		P140144 VN-PA-M6-08-00 (NPA03)	P140144 VN-PA-M6-08-00 (NPA03)
35			
45			
45		P140145 VN-PA-M8-08-00 (NPA04)	P140145 VN-PA-M8-08-00 (NPA04)



## Plumbing Nipple (Optional)

Plumbing Nipple (VN-PC)			
Size	Type	Standard Carriage	Standard Carriage + Metal Frame Standard Carriage + Scraper Plate
20		P140147 VN-PC-M6-07-01 (NPC02)	N / A
25			P140148 VN-PC-M6-10-00 (NPC03)
30			
35			
45		P140150 VN-PC-M8-10-00 (NPC05)	P140150 VN-PC-M8-10-00 (NPC05)

Plumbing Nipple (VN-PC)			
Size	Type	Standard Carriage	Standard Carriage + Metal Frame Standard Carriage + Scraper Plate
25		P140153 VN-PC-M6-07-00 (NPC08)	P140153 VN-PC-M6-07-00 (NPC08)
30		P140146 VN-PC-M6-08-00 (NPC01)	P140146 VN-PC-M6-08-00 (NPC01)
35			
45			

## 3.2 Lubrication

The objective of lubrication includes the reduction of friction among the rolling elements as well as between the rolling elements and the raceway, prevention of sintering, reduction of wear, and the prevention of rust by forming a film over the surfaces. To maximize the performance of a linear system, the lubricant type and a lubrication method appropriate for the operating environment should be selected.

### 1. Standard product prior to shipment

- Grease No. 2 is pre-applied to inside of block.
- Grease No. 0 is pre-applied to the lubrication reservoir of inside of the end plate.

### 2. Grease lubrication

#### ◆ Relubrication interval recommendation

- Nomial size 30 and below: per 100km
  - Nomial size 35 and above: per 40km
  - Make supplementary periodically per 3 months.
- \* whichever comes first.

#### ◆ First use and relubrication procedure

- Wipe the anti-rust oil from the surface of rail and block to prevent diluting the lubrication grease.
  - Apply the lubrication grease into whole the block through grease nipple. Please refer to the Recommended Relubrication Amount table for recommended grease amount.
- \* Notice: due to good function of end seal, lubrication grease on rail surface shall not lubricate the internal block.

### 3. Oil lubrication

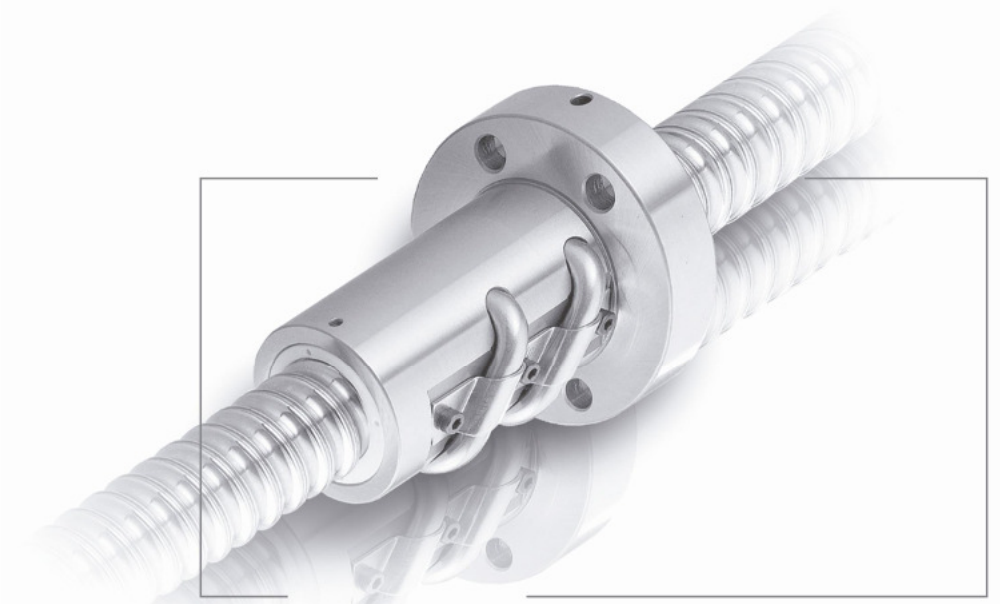
- First time lubrication: apply to whole internal block. Please refer to the Recommended Relubrication Amount table for recommended oil amount.
- Relubrication Amount:  $Q = n / 150$  (cm<sup>3</sup>/hrs)  
n: nomial size of linear rail (mm)
- Recommend lubricaiton oil spec: ISO VG32~68; ISO VG68~220



Recommended Relubrication Amount Table unit: ml					
Nomial Size	Amount	Nominal Size	Amount	Nominal Size	Amount
BRC15A0	2~3	BRC25R0	3~4	BRD35A0	6~8
BRC15R0		BRC25U0	2~3	BRD35R0	
BRC15U0		BRC25SU		BRD35U0	
BRC15SU	1~2	BRC25LA	4~6	BRD35SU	4~6
BRC20A0	2~3	BRC25LR		BRD35LA	7~10
BRC20R0		BRC30A0		BRD35LR	9~14
BRC20U0		BRC30R0	BRD45A0		
BRC20SU		BRC30U0	BRD45R0		
BRC20LA	3~4	BRC30SU	3~5	BRD45U0	11~17
BRC20LR		BRC30LA	6~8	BRD45LA	
BRC25A0		BRC30LR		BRD45LR	

4. Grease Lubrication No. And Spec

NGLI item	No. 0	No. 2
Drop point (°C)	205	206
Penetration (60worked, 1/10mm)	378	282
Penetration (1000worked, 1/10mm)	382	288
Appearance	Amber	Amber
Oxidation stability (100hrs, Pressure Drop, psi)	4	3
Oxidation stability (500hrs, Pressure Drop, psi)	8	7
Anti-corrosion Test	pass	pass
Copper plate corrosion (100°C, 24hrs)	1a	1a
Soap Base	lithium	lithium
Rinsing water resistance (79.4°C, %)	N/A	2.5
Viscosity of base oil (cSt, @100°C)	164.5	164.5

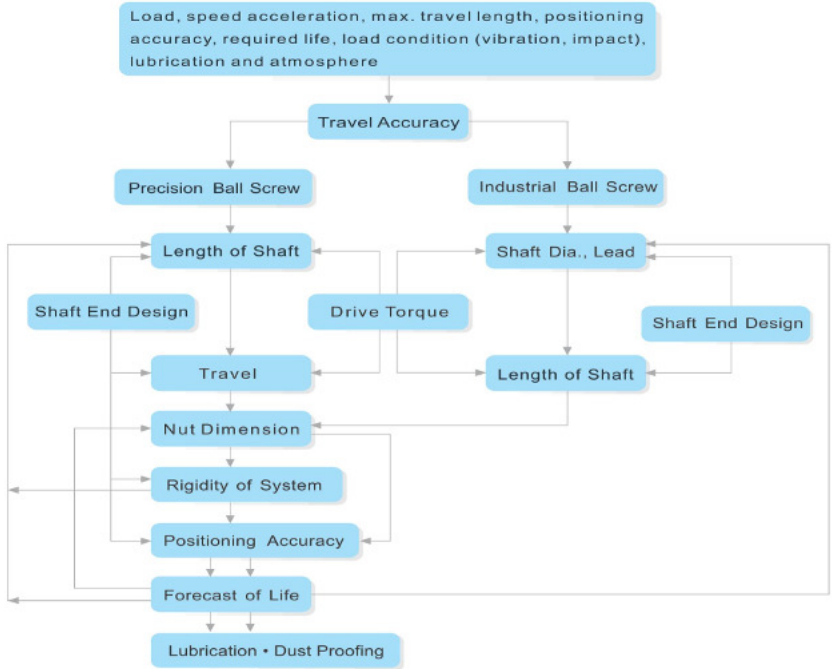


# Ball Screw

# 4.1 Selecting Correct Type of Ball screw

## Condition

- Accuracy
- Screw Shaft Design
- Drive Torque
- Nut Design
- Rigidity
- Positioning Accuracy
- Life Design
- Lubrication and safety design



## Ball Screw Size List

Lead	1	2	2.5	3	4	5	5.08	6	8	10	12.7	16	20	24	25	32	40	50
6	●																	
8	●	●	●															
10		●		●	●													
12	●				●	●				●	●							
14		●			●	●												
15													●					
16		●			●	●	●			●		●						
20					○	●				●		●	●					
25					●	●				●		●	●		●			
32					○	●		●	○	●		●	●			●		
36														○				
40						●		●		●		●	●				●	
50						○				●		●	●					●
63										●		●	●				●	
80										●		●	●					

● means rolled ball screw ○ means ground ball screw

# 4.2 Speciation Number of Ball Screw

FSU R 025 05 T4 D G C5 1000 P2

Nut type code

F (F: With flange, R: Without flange, X: Special flange)

S (S: Single nut, D: Double nut)

U (U DIN nut, W, I, E, K, C, Y, H type nut)

Direction of helix

R: Right

L: Left

Shaft dia. (mm)

Lead (mm)

No. of Turn (circuits) or Turn x Row

Turn (eg. : T4: 1 circuit x 4)

T: 1

A: 1.8

B: 2.5

C: 3.5

Flange type

N: Non-cutting

S: Single-cutting

D: Double-cutting

Process code

G: Ground

R: Rolled

Accuracy grade code

C0, C1, C2, C3, C5, C7

Overall length of shaft (mm)

Axial clearance and preload code

P0 : With backlash

P1 : Non-backlash

P2 : Light preload

P3 : Heavy preload

## 4.3 Technological Description of Ball Screw

Travel Length(mm)	Grade		C0		C1		C2		C3		C5		C7	C10
	Over	Incl.	±E	e	±E	e	±E	e	±E	e	±E	e	e	e
	100		3	3	3.5	5	5	7	8	8	18	18		
100	200		3.5	3	4.5	5	7	7	10	8	20	18		
200	315	4	3.5	6	5	8	7	12	8	8	23	18		
315	400	5	3.5	7	5	9	7	13	10	25	20			
400	500	6	4	8	5	10	7	15	10	27	20			
500	630	6	4	9	6	11	8	16	12	30	23			
630	800	7	5	10	7	13	9	18	13	35	25			
800	1000	8	6	11	8	15	10	21	15	40	27			
1000	1250	9	6	13	9	18	11	24	16	46	30			
1250	1600	11	7	15	10	21	13	29	18	54	35	±50 /300mm	±210 /300mm	
1600	2000			18	11	25	15	35	21	65	40			
2000	2500			22	13	30	18	41	24	77	46			
2500	3150			26	15	36	21	50	29	93	54			
3150	4000			30	18	44	25	60	35	115	65			
4000	5000					52	30	72	41	140	77			
5000	6300					65	36	90	50	170	93			
6300	8000							110	60	210	115			
8000	10000									260	140			
10000	12500									320	170			

Table 2.3 Variation per 300mm( $e_{300}$ )and Wobble Error( $e_{2\pi}$ ) (JIS B 1192)

Unit :  $\mu\text{m}$

Grade	C0	C1	C2	C3	C5	C7	C10
$e_{300}$	3.5	5	7	8	18	50	210
$e_{2\pi}$	3	4	5	6	8		

### Clearance in the Axial Direction of Ball Screw (P0)

Clearance in the Axial Direction of Ball Screw			Unit: mm
Screw Shaft OD	Rolled Ball Screw Clearance in the Axial Direction (max.)	Ground Ball Screw Clearance in the Axial Direction (max.)	
4mm~14mm	0.05	0.015	
15mm~50mm	0.08	0.025	
50mm~80mm	0.12	0.05	

### Clearance in the Axial Direction (P1)

Clearance in the Axial Direction of Ball Screw			Unit: mm
Screw Shaft OD	Rolled Ball Screw Clearance in the Axial Direction (max.)	Ground Ball Screw Clearance in the Axial Direction (max.)	
4mm~80mm	0	0	

### Spring Force of Internal Circulation

Spring Force of Internal Circulation (kgf.cm)						
Model No	P2		P3		P4	
	3%Spring Force	TP Reference Torque	8%Spring Force	TP Reference Torque	13%Spring Force	TP Reference Torque
1404-4	0.1	0.13	0.2	0.34	0.3	0.56
1604-3	0.1	0.17	0.3	0.45	0.5	0.73
1604-4	0.1	0.21	0.3	0.57	0.5	0.93
1605-3	0.2	0.29	0.4	0.79	0.7	1.28
1605-4	0.2	0.3	0.4	0.8	0.7	1.3
1610-3	0.2	0.39	0.5	1.04	0.9	1.69
2005-4	0.2	0.47	0.5	1.26	0.9	2.05
2504-4	0.1	0.33	0.3	0.88	0.6	1.43
2505-4	0.2	0.6	0.6	1.6	1.0	2.59
2510-3	0.4	1.11	1.2	2.95	1.9	4.79
2510-4	0.6	1.47	1.2	3.93	2.5	6.38
3205-4	0.2	0.76	0.6	2.02	1.0	3.28
3206-4	0.3	1.14	0.8	3.03	1.3	4.93
3210-3	0.6	2.02	1.7	5.37	2.7	8.73
3210-4	0.8	2.62	2.2	6.99	3.5	11.36
4005-4	0.2	0.95	0.6	2.53	1.1	4.11
4006-4	0.3	1.25	0.9	3.32	1.4	5.4
4010-3	0.8	2.59	2.2	6.91	3.6	11.23
4010-4	0.8	3.31	2.3	8.84	3.7	14.36
5010-3	0.9	3.29	2.3	8.77	3.8	14.26
5010-4	0.9	4.21	2.4	11.23	3.9	18.25
6310-4	1.0	5.42	2.7	14.46	4.4	23.49
6320-3	2.3	13.08	6.1	34.87	9.9	56.66
8010-4	1.1	6.68	2.9	17.82	4.6	28.96
8020-3	2.3	16.87	6.2	44.98	10.1	73.1



Spring Force of Plastic Circulation (kgf.cm)

Spring Force of Plastic Circulation (kgf.cm)						
Model No	P2		P3		P4	
	2%Spring Force	TP Reference Torque	5%Spring Force	TP Reference Torque	8%Spring Force	TP Reference Torque
1210-2	0.1	0.12	0.1	0.2	0.2	0.32
1605-4	0.2	0.32	0.4	0.81	0.7	1.29
1610-3	0.1	0.26	0.3	0.65	0.5	1.04
1610-4	0.1	0.33	0.4	0.83	0.6	1.33
1616-3	0.2	0.44	0.6	1.09	0.9	1.75
2005-4	0.2	0.42	0.4	1.04	0.7	1.67
2505-4	0.2	0.52	0.5	1.29	0.8	2.07
2510-4	0.3	0.84	0.8	2.09	1.3	3.34
3205-4	0.2	0.79	0.6	1.98	1.0	3.17
3220-3	0.4	1.45	1.1	3.62	1.8	5.8
4005-4	0.3	1.19	0.8	2.98	1.2	4.77
4020-3	0.8	3.14	2.0	7.85	3.2	12.55
5010-4	0.7	3.47	1.9	8.66	3.0	13.86
5020-5	1.5	6.98	3.8	17.46	6.0	27.93
1616-2	0.2	0.33	0.4	0.83	0.7	1.3
2020-2	0.2	0.45	0.4	1.12	0.7	1.79
2525-2	0.3	0.88	0.7	2.2	1.2	3.52
3232-2	0.4	1.61	1.1	4.04	1.7	6.46
4040-2	0.7	3.3	1.8	8.24	2.8	13.18
5050-2	1.3	7.35	3.3	18.38	5.3	29.41

Spring Force of External Circulation (kgf.cm)

Spring Force of External Circulation (kgf.cm)						
Model No	P2		P3		P4	
	3%Spring Force	TP Reference Torque	8%Spring Force	TP Reference Torque	15%Spring Force	TP Reference Torque
082.5-2.5	0.1	0.05	0.1	0.08	0.1	0.13
1003-2.5	0.1	0.06	0.1	0.15	0.2	0.24
1204-3.5	0.1	0.13	0.3	0.34	0.4	0.55
1205-3.5	0.2	0.22	0.5	0.59	0.7	0.95
1605-2.5	0.2	0.28	0.5	0.73	0.7	1.19
1520-1.5	1.5	3.41	4.0	9.08	6.6	14.76
2010-2.5	0.2	0.7	0.6	1.88	1.0	3.05

Permissible ranges of torque variation rates

Reference torque kgf · cm		Effective threading length (mm)										
		Below 4000								4000~10000		
		Slenderness 1 : below 40				Slenderness 1:40 ~ 1:60				-		
		Grade				Grade				Grade		
Over	Incl.	C0	C1	C2、C3	C5	C0	C1	C2、C3	C5	C1	C2、C3	C5
2	4	±35%	±40%	±45%	±55%	±45%	±45%	±55%	±65%	-	-	-
4	6	±25%	±30%	±35%	±45%	±38%	±38%	±45%	±50%	-	-	-
6	10	±20%	±25%	±30%	±35%	±30%	±30%	±35%	±40%	-	±40%	±45%
10	25	±15%	±20%	±25%	±30%	±25%	±25%	±30%	±35%	-	±35%	±40%
25	63	±10%	±15%	±20%	±25%	±20%	±20%	±25%	±30%	-	±30%	±35%
63	100	-	-	±15%	±20%	-	-	±20%	±25%	-	±25%	±30%

Remarks 1.Slenderness is the value of dividing the screws shaft outside diameter with the screws shaft threading length.

2.For reference torque less than 2 kgf · cm, **ABBA** specifications will apply.

### Calculation of reference torque $T_p$

The formula for computing reference torque of the ball screws is given in following:

$$T_p = 0.05 (\tan \beta)^{0.5} \cdot \frac{F_{ao} \cdot \ell}{2\pi}$$

Where ·  $F_{ao}$  : Preload (k f)

$\beta$  : Lead angle

$\ell$  : Lead (cm)

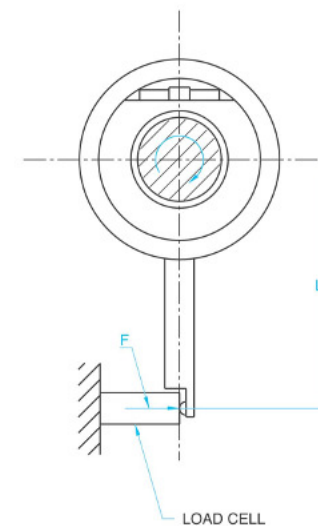
### Measurement conditions

The preload dynamic torque  $T_p$  is determined first by adopting the following measurement conditions together with the method illustrated in the right diagram for measuring the force  $F$  needed to rotate the screws shaft without bringing the nuts to rotate along with the shaft after the screws shaft has started rotating, then multiplying the measured value of  $F$  with the arm of force  $L$ , the product is  $T_p$ .

$$T_p = F \cdot L$$

Measure conditions

- (1) Measurement is executed under the condition of not attaching with scraper.
- (2) The rotating speed during measurement maintains at 100 rpm.
- (3) According to JSK 2001 (industrial lubrication oil viscosity classification standards), the lubrication oil used should be in compliance with ISO VG68.



Preload dynamic torque measuring method

Mounting Methods

- Both the critical speed and column buckling load depend upon the method of mounting and the unsupported length of the shaft, the most common mounting methods for ball screws are shown below.

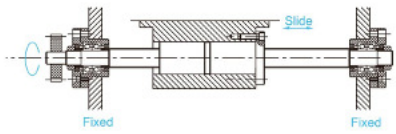


Fig. 1

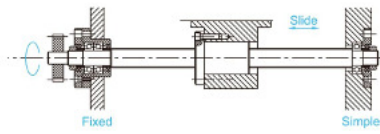


Fig. 5

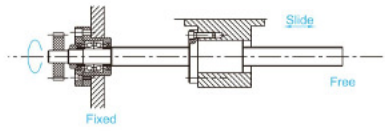


Fig. 2

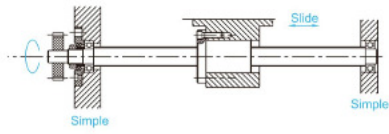


Fig. 6

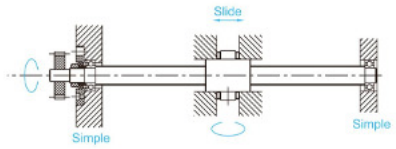


Fig. 3

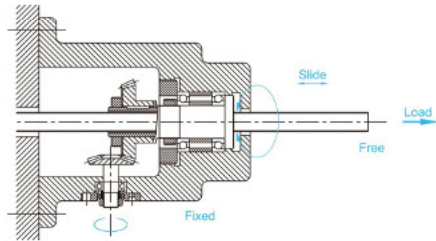


Fig. 7

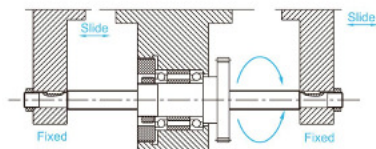


Fig. 4

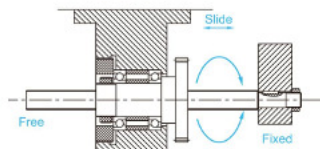


Fig. 8

Most Common Mounting Methods for Ball Screws

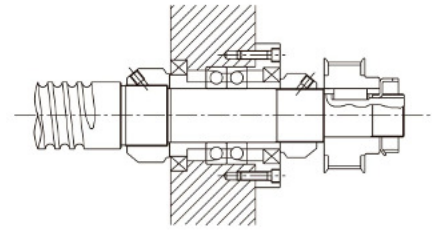


Fig. 9

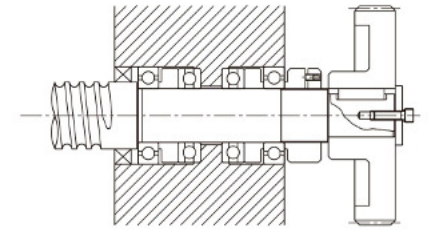


Fig. 11

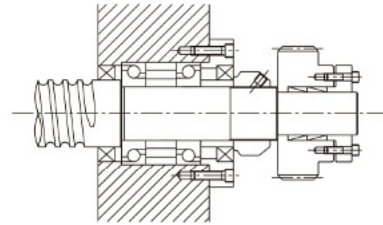


Fig. 10

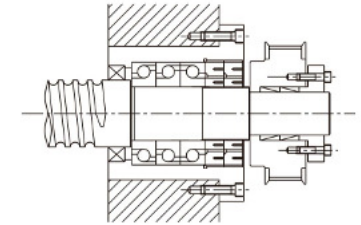


Fig. 12

Most Machines Mounting Methods for Ball Screws

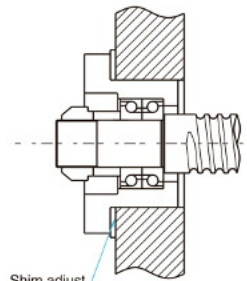


Fig. 13

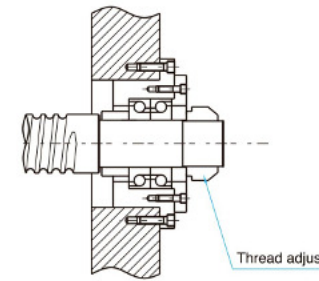


Fig. 14

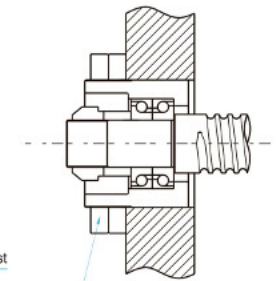


Fig. 15

Most Common Mounting Methods for Ball Screws



### Buckling Load

The safety of the screw shaft against buckling needs to be checked when the shaft is expected to receive buckling loads. The diagram below summarizes the allowable compressive load for buckling for each nominal outside diameter of screw shaft. (Calculate with the equation shown right when the nominal outside diameter of the screw shaft exceeds 125mm.)

Select the graduation of allowable axial load according to the method of ball screw support.

Remark: Allowable tensile / buckling load

Check the allowable tensile / buckling load (the formula shown below) and allowable load of the ball groove regardless of the mounting method when the mounting distance is short.

$$P = \sigma A = 11.8dr^2 \text{ (kgf)}$$

Where,

$\sigma$  : Allowable tensile compressive stress (kgf/mm<sup>2</sup>)

A : Sectional area (mm<sup>2</sup>) of screw shaft root bottom diameter

dr : Screw shaft root diameter (mm)

$$P = \alpha \times \frac{N\pi^2 E}{L^2} = m \frac{dr^4}{L^2} \times 10^3$$

Where,

$\alpha$  : Safety Factor (0.5)

E : Vertical elastic modulus (E = 2.1 × 10<sup>4</sup> kgf/mm<sup>2</sup>)

I : Min. secondary moment of screw shaft sectional area

$$I = \frac{\pi}{64} dr^4 \text{ (mm}^4\text{)}$$

dr : Screw shaft root diameter (mm)

L : Mounting distance (mm)

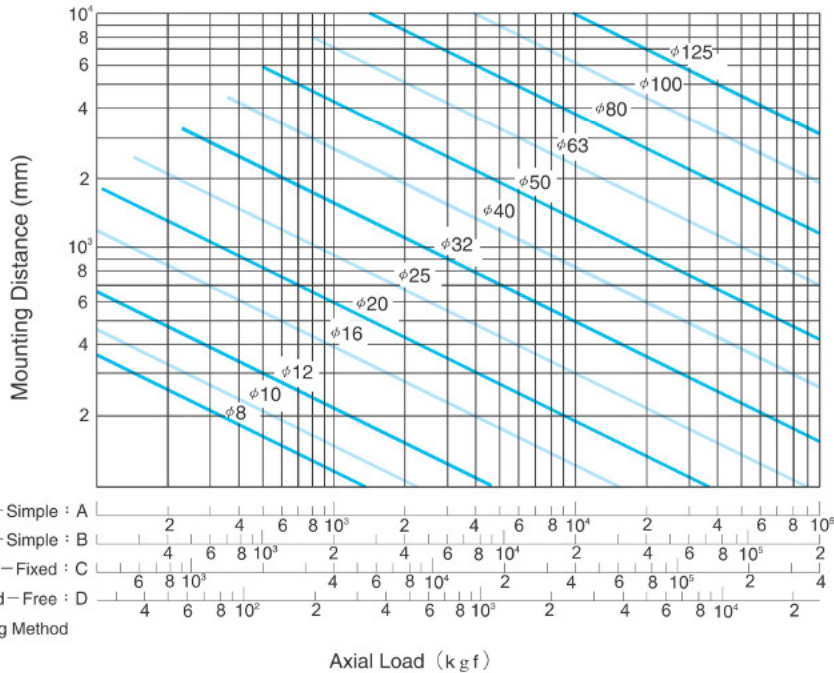
m · N : Coefficient determined from mounting method of ball screw:

Simple – Simple = 5.1 (N=1)

Fixed – Simple = 10.2 (N=2)

Fixed – Fixed = 20.3 (N=4)

Fixed – Free = 1.3 (N=1/4)



Buckling Load vs. Shaft Dia. and Length

### Critical Speed

It is necessary to check if the ball screw rotation speed is resonant with the natural frequency of the screw shaft.

ABBA has determined 80% or less of this critical speed as an allowable rotation speed. The diagram below summarizes the allowable rotation speed for shaft nominal diameters up to outside diameter of the screw shaft exceeds 125mm.) Select the graduation of allowable rotation speed according to the method of supporting the ball screw.

Where the working rotation speed presents a problem in terms of critical speed, it would be best to provide an intermediate support to increase the natural frequency of the screw shaft.

dm · n value

The allowable rotation speed is regulated also by the dm · n value (dm: diameter of central circle of steel ball, n: Revolution speed, rpm) which expresses the peripheral speed.

Generally;

For precision (accuracy grade C7 to C0)

dm · n ≤ 70,000

For general industry (C10)

dm · n ≤ 50,000

Product exceeding the above limits can be produced, contact **ABBA**.

$$n = \alpha \times \frac{60\lambda^2}{2\pi L^2} \sqrt{\frac{EI}{\gamma A}} = f \frac{dr}{L^2} \times 10^7 \text{ (rpm)}$$

Where,

$\alpha$  : Safety factor ( $\alpha = 0.8$ )

E : Vertical elastic modulus (E = 2.1 × 10<sup>4</sup> kgf/mm<sup>2</sup>)

I : Min. secondary moment of screw shaft sectional area

$$I = \frac{\pi}{64} dr^4 \text{ (mm}^4\text{)}$$

dr : Screw shaft root diameter (mm)

$\gamma$  : Acceleration of gravity ( $\gamma = 9.8 \times 10^3 \text{ mm/s}^2$ )

$\gamma$  : Density ( $\gamma = 7.8 \times 10^6 \text{ kgf/mm}^3$ )

A : Screw shaft sectional area ( $A = \pi dr^2/4 \text{ mm}^2$ )

L : Mounting distance (mm)

f ·  $\lambda$  : Coefficient determined from the ball screw mounting method

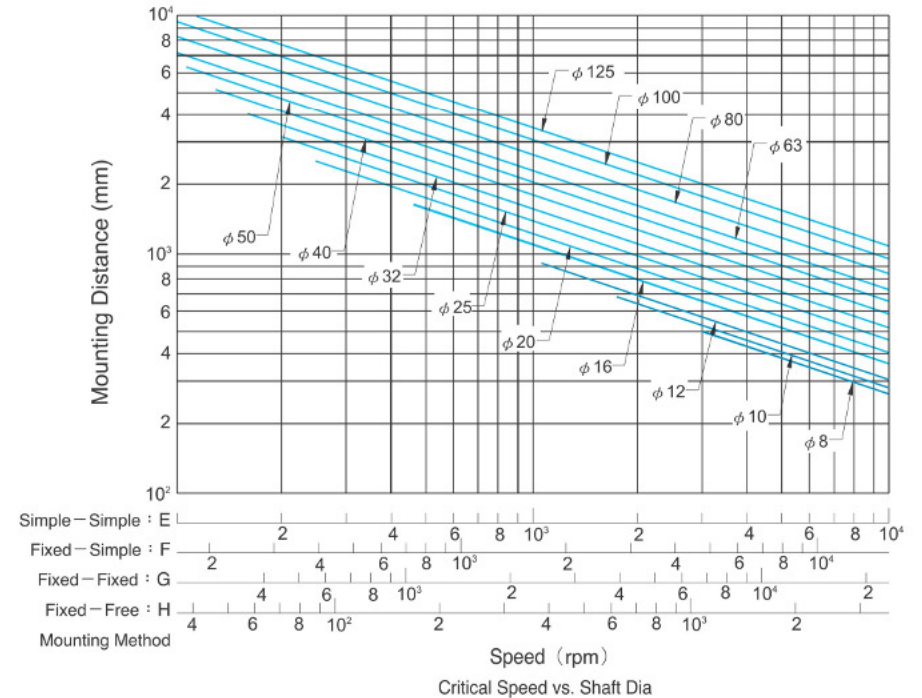
Simple – Simple f = 9.7 ( $\lambda = \pi$ )

Fixed – Simple f = 15.1 ( $\lambda = 3.927$ )

Fixed – Fixed f = 21.9 ( $\lambda = 4.730$ )

Fixed – Free f = 3.4 ( $\lambda = 1.875$ )

(\* Particular consideration is necessary for manufacturing when the screw length/shaft dia. Ratio is  $\epsilon > 70$ . In such an event, contact **ABBA**.)



Critical Speed vs. Shaft Dia



### Material and Hardness

Denomination	Material	Heat treating	Hardness (RHC)
Precision ground	50CrMo4 QT	Induction hardening	58~62
Rolled	S55C	Induction hardening	58~62
Nut	SCM415H	Carburized hardening	58~62

### Lubrication

Lithium base lubricants are used for Ball screw lubrication.  
Their viscosity are 30~40 cst (40°C) and ISO grades of 32~100.

Selecting:

1. Low temperature application: Using the lower viscosity lubricant.
2. High temperature, high load and low speed application: Using the higher viscosity lubricant.

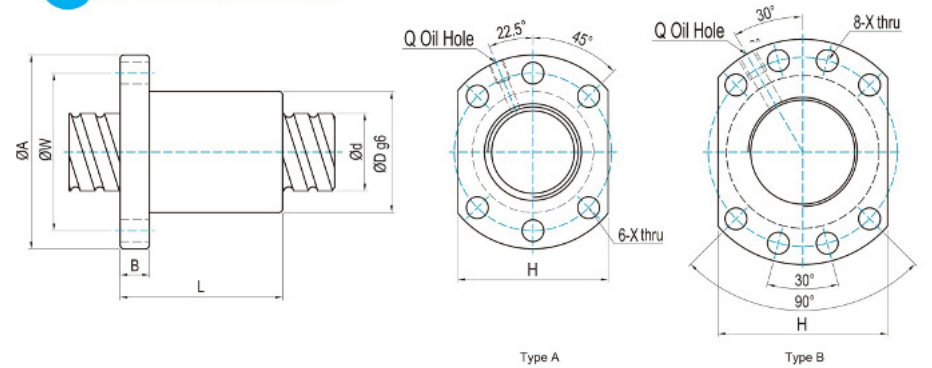
### Checking and supply interval of lubricant

Manner	Checking interval	Checking item	Supply or replacing interval
Automatic interval oil supply	Every week	Oil volume and purity	To supply on each check, its volume depends on oil tank capacity.
Lubricating grease	Within 2-3 months after starting operation of machine	Foreign matter	Normally supply once a year as per the result of check
Oil bath	Everyday before operation of machine	Oil surface	To supply as per wasting condition

### Dustproof

Same as the rolling bearings, if there is the particles such as chips or water get into the ball screw, the wearing problem shall be deteriorated. In some serious cases, the ball screw shall then be damaged. In order to prevent these problems from happening, there are wipers assembled at both ends of ball nut to scrape chips and dust. There is also the "O-Ring" at the wipers to seal the lubrication oil from leaking from ball nut.

## 4.4 FSU (DIN69051)

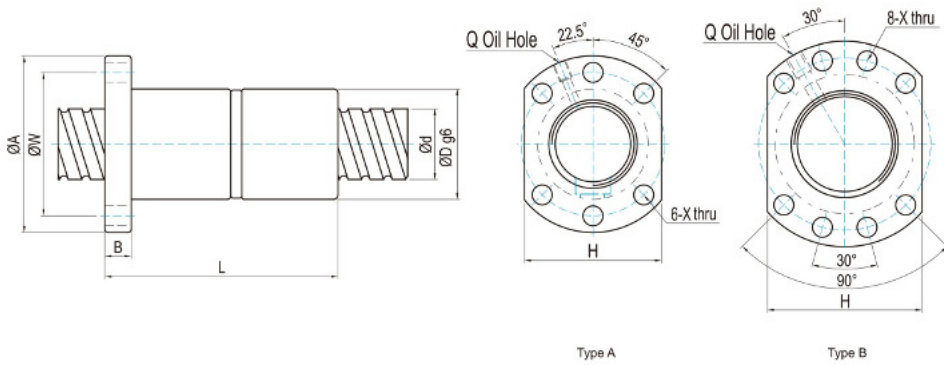


Unit : mm

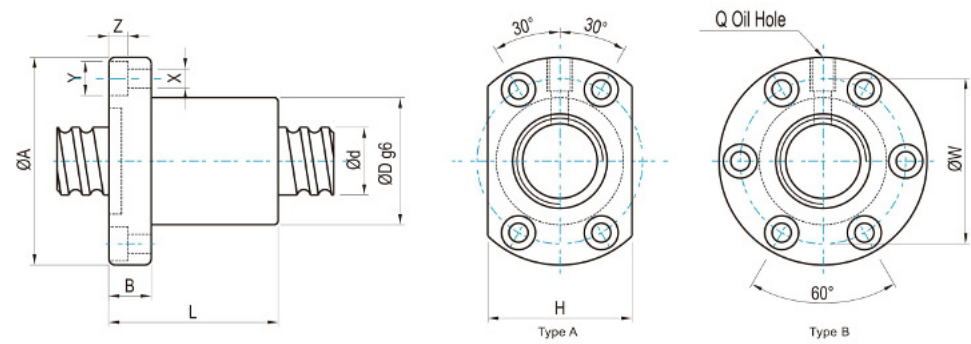
Model No.	Dimensions														Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	W	X	Type	H	Q	n			
1604-4	16	4	2.381	28	48	10	45	38	5.5	A	40	M6	T4	944	1254	
★ 1605-3	16	5	3.175	28	48	10	42	38	5.5	A	40	M6	T3	1049	1144	
★ 1605-4	16	5	3.175	28	48	10	50	38	5.5	A	40	M6	T4	1344	1525	
1610-3	16	10	3.175	28	48	12	65	38	5.5	A	40	M6	T3	1084	1232	
2005-3	20	5	3.175	36	58	10	47	47	6.6	A	44	M6	T3	1181	1496	
★ 2005-4	20	5	3.175	36	58	10	53	47	6.6	A	44	M6	T4	1512	1995	
2006-3	20	6	3.969	36	58	10	52	47	6.6	A	44	M6	T3	1569	1788	
2010-3	20	10	3.969	36	58	10	68	47	6.6	A	44	M6	T3	1621	1925	
2504-4	25	4	2.381	40	62	11	46	51	6.6	A	48	M6	T4	1178	2046	
2505-3	25	5	3.175	40	62	10	47	51	6.6	A	48	M6	T3	1330	1936	
★ 2505-4	25	5	3.175	40	62	10	53	51	6.6	A	48	M6	T4	1704	2581	
2510-3	25	10	4.762	40	62	12	75	51	6.6	A	48	M6	T3	2250	2772	
2510-4	25	10	4.762	40	62	12	85	51	6.6	A	48	M6	T4	2881	3695	
★ 3205-4	32	5	3.175	50	80	12	53	65	9	A	62	M6	T4	1924	3403	
3206-4	32	6	3.969	50	80	12	58	65	9	A	62	M6	T4	2598	4217	
3210-3	32	10	6.35	50	80	16	77.5	65	9	A	62	M6	T3	3775	5877	
3210-4	32	10	6.35	50	80	16	90	65	9	A	62	M6	T4	4834	7835	
★ 4005-4	40	5	3.175	63	93	16	56	78	9	B	70	M8	T4	2142	4342	
4006-4	40	6	3.969	63	93	14	60	78	9	B	70	M6	T4	2877	5318	
4010-4	40	10	6.35	63	93	18	93	78	9	B	70	M8	T4	5399	10074	
5006-4	50	6	3.969	75	110	15	62	93	11	B	85	M8	T4	3203	6784	
5010-4	50	10	6.35	75	110	18	93	93	11	B	85	M8	T4	5933	12313	
6310-4	63	10	6.35	90	125	18	98	108	11	B	95	M8	T4	6700	16230	
6320-3	63	20	9.525	95	135	20	138	115	13.5	B	100	M8	T3	8957	17945	
8010-4	80	10	6.35	105	145	20	98	125	13.5	B	110	M8	T4	7547	21268	
8020-3	80	20	9.525	125	165	25	143	145	13.5	B	130	M8	T3	10168	23611	

★Note : with sign \* can produce left helix

### 4.5 FDU (DIN69051)



### 4.6 FSI



Unit : mm

Model No.	Dimensions														
	d	l	Da	D	A	B	L	W	X	Type	H	Q	n	Ca(Kgf)	Coa(kgf)
★ 1605-3	16	5	3.175	28	48	10	80	38	5.5	A	40	M6	T3	1049	1144
★ 2005-4	20	5	3.175	36	58	12	92	47	6.6	A	44	M6	T4	1512	1995
★ 2505-4	25	5	3.175	40	62	12	92	51	6.6	A	48	M6	T4	1704	2581
2510-4	25	10	4.762	40	62	12	153	51	6.6	A	48	M6	T4	2881	3695
★ 3205-4	32	5	3.175	50	80	12	92	65	9	A	62	M6	T4	1924	3403
3210-4	32	10	6.35	50	80	16	160	65	9	A	62	M6	T4	4834	7835
4005-4	40	5	3.175	63	93	15	96	78	9	B	70	M8	T4	2142	4342
4010-4	40	10	6.35	63	93	18	162	78	9	B	70	M8	T4	5399	10074
5010-4	50	10	6.35	75	110	16	162	93	11	B	85	M8	T4	5933	12313
6310-4	63	10	6.35	90	125	18	182	108	11	B	95	M8	T4	6700	16230
6320-3	63	20	9.525	95	135	20	253	115	13.5	B	100	M8	T3	8957	17945
8010-4	80	10	6.35	105	145	20	182	125	13.5	B	110	M8	T4	7547	21268
8020-3	80	20	9.525	125	165	25	253	145	13.5	B	130	M8	T3	10168	23611

★ Note : with sign \* can produce left helix

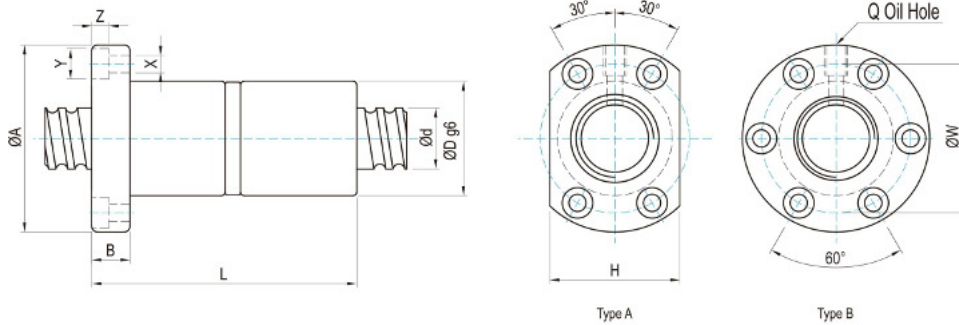
Unit : mm

Model No.	Dimensions																
	d	l	Da	D	A	B	L	W	X	Y	Z	Type	H	Q	n	Ca(Kgf)	Coa(kgf)
1404-4	14	4	2.381	26	46	10	47	36	4.5	8	4.5	A	34	M6	T4	875	1056
1405-3	14	5	3.175	26	46	10	45	36	4.5	8	4.5	A	34	M6	T3	1013	1056
1604-4	16	4	2.381	30	49	10	45	39	4.5	8	4.5	A	34	M6	T4	944	1254
1605-3	16	5	3.175	30	49	10	42	39	4.5	8	4.5	A	34	M6	T3	1049	1144
★ 1605-4	16	5	3.175	30	49	10	50	39	4.5	8	4.5	A	34	M6	T4	1344	1525
1610-3	16	10	3.175	34	58	10	65	45	5.5	9.5	5.5	A	36	M6	T3	1084	1232
★ 2005-4	20	5	3.175	34	57	12	53	45	5.5	9.5	5.5	A	40	M6	T4	1512	1995
2504-4	25	4	2.381	40	63	11	46	51	5.5	9.5	5.5	A	46	M6	T4	1178	2046
★ 2505-4	25	5	3.175	40	63	12	53	51	5.5	9.5	5.5	A	46	M8	T4	1704	2581
2510-4	25	10	4.762	46	72	12	85	58	6.5	11	6.5	A	52	M6	T4	2881	3695
★ 3205-4	32	5	3.175	46	72	12	53	58	6.5	11	6.5	A	52	M8	T4	1924	3403
3206-4	32	6	3.969	62	89	12	63	75	6.5	11	6.5	B	-	M8	T4	2598	4217
3210-4	32	10	6.35	54	88	16	90	70	9	14	8.5	A	62	M8	T4	4834	7835
★ 4005-4	40	5	3.175	56	90	16	56	72	9	14	8.5	A	64	M8	T4	2142	4342
4010-4	40	10	6.35	62	104	18	93	82	11	17.5	11	A	70	M8	T4	5399	10074
5010-4	50	10	6.35	72	114	18	93	92	11	17.5	11	A	82	M8	T4	5933	12313
6310-4	63	10	6.35	85	131	22	100	107	14	20	13	B	-	M8	T4	6700	16230
6320-3	63	20	9.525	95	153	23	130	123	18	26	17.5	B	-	M8	T3	8957	17945
8010-4	80	10	6.35	105	150	22	92	127	14	20	13	B	-	M8	T4	7547	21268
8020-3	80	20	9.525	115	173	23	130	143	18	26	17.5	B	-	M8	T3	10168	23611

★ Note : with sign \* can produce left helix



### 4.7 FDI

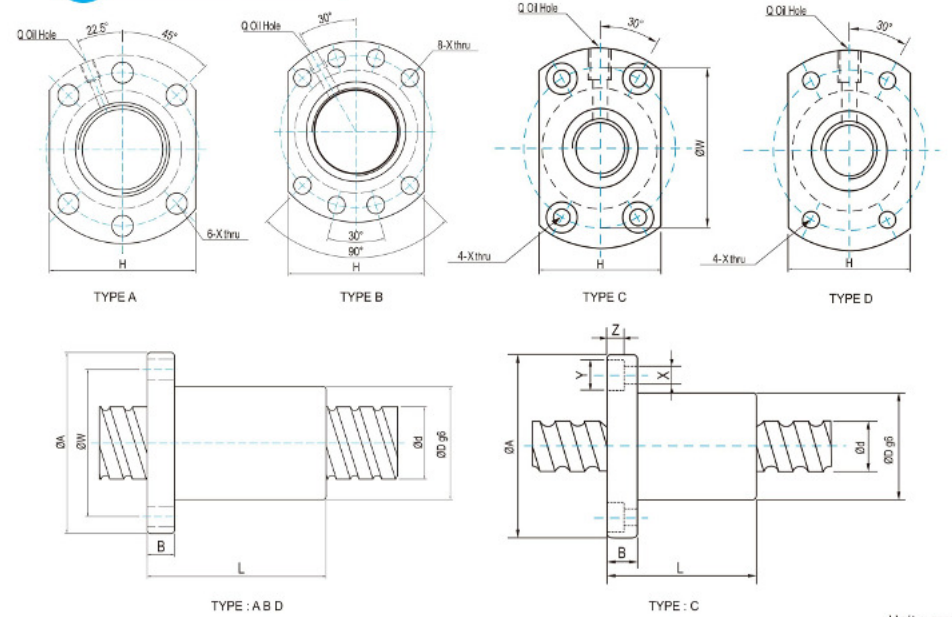


Unit : mm

Model No.	Dimensions																
	d	l	Da	D	A	B	L	W	X	Y	Z	Type	H	Q	n	Ca(Kgf)	Coa(kgf)
★ 1605-3	16	5	3.175	30	49	10	80	39	4.5	8	4.5	A	34	M6	T3	1049	1144
★ 2005-4	20	5	3.175	34	57	12	92	45	5.5	9.5	5.5	A	40	M6	T4	1512	1995
★ 2505-4	25	5	3.175	40	63	12	92	51	5.5	9.5	5.5	A	46	M8	T4	1704	2581
2510-4	25	10	4.762	46	72	12	156	58	6.5	11	6.5	A	52	M6	T4	2881	3695
★ 3205-4	32	5	3.175	46	72	12	92	58	6.5	11	6.5	A	52	M8	T4	1924	3403
3210-4	32	10	6.35	54	88	16	160	70	9	14	8.5	A	62	M8	T4	4834	7835
★ 4005-4	40	5	3.175	56	90	16	96	72	9	14	8.5	A	64	M8	T4	2142	4342
4010-4	40	10	6.35	62	104	18	162	82	11	17.5	11	A	70	M8	T4	5399	10074
5010-4	50	10	6.35	72	114	18	162	92	11	17.5	11	A	82	M8	T4	5933	12313
6310-4	63	10	6.35	85	131	22	182	107	14	20	13	B	-	M8	T4	6700	16230
6320-3	63	20	9.525	95	153	23	253	123	18	26	17.5	B	-	M8	T3	8957	17945
8010-4	80	10	6.35	105	150	22	182	127	14	20	13	B	-	M8	T4	7547	21268
8020-3	80	20	9.525	115	173	23	253	143	18	26	17.5	B	-	M8	T3	10168	23611

★ Note : with sign \* can produce left helix

### 4.8 FSC (DIN69051)



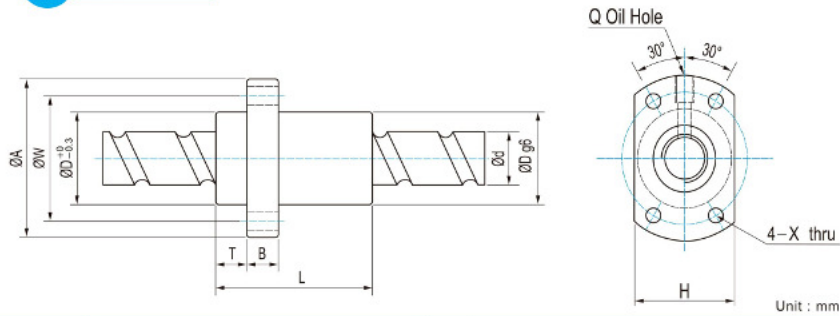
Unit : mm

Model No.	Dimensions																
	d	l	Da	D	A	B	L	W	X	Y	Z	Type	H	Q	n	Ca(Kgf)	Coa(kgf)
1210-2	12	10	2	30	50	10	40	40	4.5	8	4.5	C	32	M6	T2	390	466
1520-2	15	20	3.175	34	55	12	57	45	6	-	-	D	34	M6	T2	833	997
1610-3	16	10	3.175	28	48	12	43	38	5.5	-	-	A	40	M6	T3	1180	1496
1616-3	16	16	3.175	28	48	12	61	38	5.5	-	-	A	40	M6	T3	1180	1496
2010-2	20	10	3.969	46	74	13	54	59	6.6	11	5.5	C	46	M6	T2	1246	1559
2020-4	20	20	3.175	36	58	10	55	47	6.6	-	-	A	44	M6	T4	1659	2464
▲ 2510-4	25	10	3.5	40	62	12	64	51	6.6	-	-	A	48	M6	T4	2067	3280
2525-4	25	25	3.969	47	74	12	67	60	6.6	-	-	A	56	M6	T4	2481	3851
3220-3	32	20	3.969	50	80	13	78	65	9	-	-	A	62	M6	T3	2141	3576
3232-4	32	32	4.762	56	86	16	82	71	9	-	-	A	65	M6	T4	3585	6071
4020-3	40	20	5.556	63	93	15	83	78	9	-	-	B	70	M8	T3	3782	6468
4040-4	40	40	6.35	65	95	18	100	80	9	-	-	B	72	M8	T4	5778	11753
5020-5	50	20	6.35	75	110	18	121	93	11	-	-	B	85	M8	T5	7737	18189

▲ steel balls 3.5mm, please order 3.5mm shaft to meet



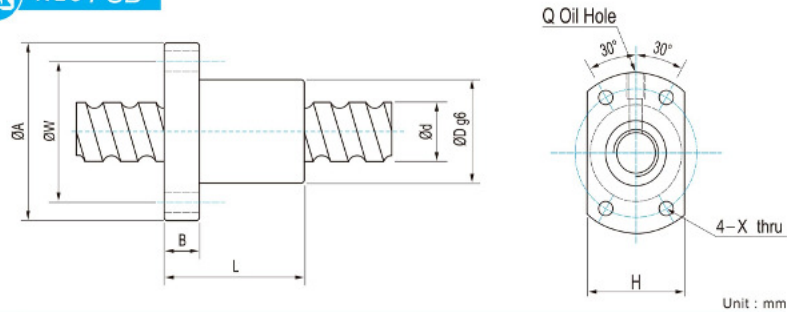
### 4.9 FSE



Model No.	Dimensions													Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	T	L	W	X	H	Q	n		
1616-2	16	16	3.175	32	53	10	10.5	48	42	4.5	38	M6	A2	1512	1995
★ 2020-2	20	20	3.175	39	62	10	10.8	55	50	5.5	46	M6	A2	1659	2464
2520-2	25	20	3.5	47	74	12	11	65	60	6.6	49	M6	A2	2106	3422
2525-2	25	25	3.969	47	74	12	11.2	67	60	6.6	56	M6	A2	2481	3851
3232-2	32	32	4.762	58	92	15	14	82	74	9	68	M6	A2	3585	6071
4040-2	40	40	6.35	73	114	17	17	100	93	11	84	M6	A2	5778	11753
5050-2	50	50	7.938	90	135	20	21.5	125	112	14	92	M6	A2	8819	19241

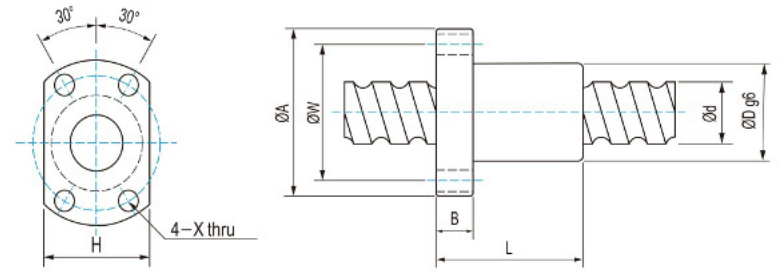
★ Note : with sign \* can produce left helix

### 4.10 FSB



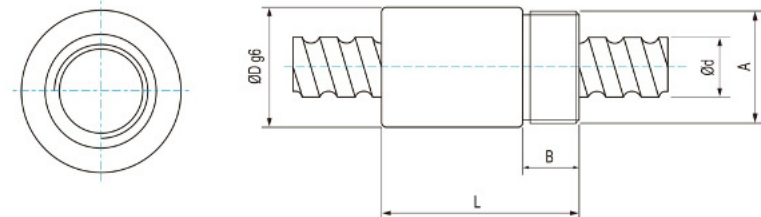
Model No.	Dimensions													Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	W	X	H	Q	n			
1404-3	14	4	2.381	31	50	10	40	40	4.5	37	M6	T3	684	792	
1405-3	14	5	3.175	32	50	10	45	40	4.5	38	M6	T3	1013	1056	
1605-3	16	5	3.175	34	54	10	42	44	4.5	40	M6	T3	1049	1144	
2005-3	20	5	3.175	40	60	10	47	50	4.5	46	M6	T3	1181	1496	
2505-3	25	5	3.175	43	67	10	47	55	5.5	50	M6	T3	1330	1936	
2510-3	25	10	4.762	60	96	15	75	78	9	72	M6	T3	2250	2772	
2510-4	25	10	4.762	60	96	15	97	78	9	72	M6	T4	2881	3695	
3210-3	32	10	6.35	67	103	15	78	85	9	78	M6	T3	3775	5877	
3210-4	32	10	6.35	67	103	15	97	85	9	78	M6	T4	4834	7835	
4010-4	40	10	6.35	76	116	17	100	96	11	88	M6	T4	5399	10074	

### 4.11 FSK



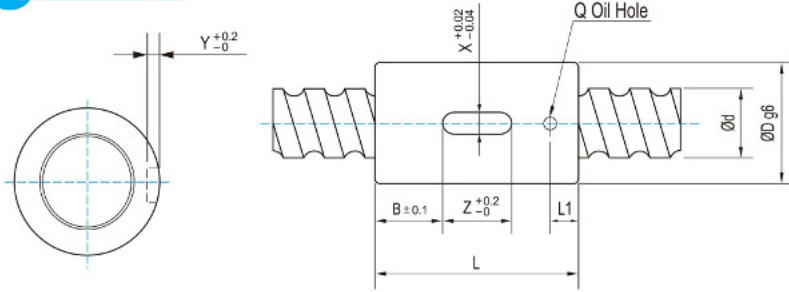
Model No.	Dimensions													Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	W	X	H	n				
0601-3	6	1	0.8	12	24	3.5	18	18	3.4	16	T3	111	123		
0801-3	8	1	0.8	14	27	4	20	21	3.4	18	T3	126	162		
0802-3	8	2	1.2	16	29	4	26	23	3.4	20	T3	215	239		
0825-3	8	2.5	1.2	16	29	4	26	23	3.4	20	T3	215	239		
1002-3	10	2	1.2	18	35	5	28	27	4.5	22	T3	240	302		
1004-3	10	4	2	26	46	10	35	36	4.5	28	T3	472	489		
1202-3	12	2	1.2	20	37	5	28	29	4.5	24	T3	265	377		
1204-3	12	4	2.381	28	48	6	35	39	5.5	30	T3	645	693		
1205-3	12	5	2	28	48	6	35	39	5.5	30	T3	514	594		
1402-3	14	2	1.2	21	40	6	28	31	5.5	26	T3	283	440		
1602-3	16	2	1.2	25	43	10	32	35	5.5	29	T3	300	503		

### 4.12 RSK (without wiper)



Model No.	Dimensions										Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	n				
0825-3	8	2.5	1.2	17.5	M15X1P	8	26	T3	215	239		
1003-3	10	3	1.8	21	M18X1P	9	29	T3	403	424		
1204-3	12	4	2.381	25.5	M20X1P	10	34	T3	645	693		
1205-3	12	5	2	25.5	M20X1P	10	39	T3	514	594		
1605-3	16	5	3.175	32.5	M26X1.5P	12	42	T3	1049	1144		

### 4.13 RSY

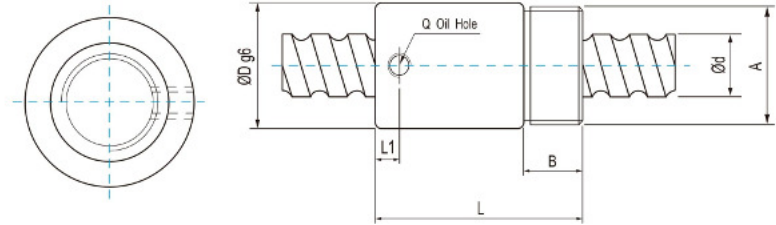


Unit : mm

Model No.	Dimensions												(Ca Kgf)	(Coa (Kgf))
	d	l	Da	D	L	B	X	Y	Z	Q	L1	n		
1202-3	12	2	1.2	24	30	9	3	1.5	12	Ø3	4	T3	265	377
1204-3	12	4	2.381	24	35	11.5	3	1.5	12	Ø3	5	T3	645	693
1205-3	12	5	2	24	40	14	3	1.5	12	Ø3	5	T3	514	594
1210-2	12	10	2	24	40	14	3	1.5	12	Ø3	5	T2	390	466
1602-3	16	2	1.2	28	40	10	5	2	20	Ø3	5	T3	300	503
1604-4	16	4	2.381	28	45	12.5	5	2	20	Ø3	7	T4	944	1254
1605-3	16	5	3.175	28	45	12.5	5	2	20	Ø3	7	T3	1049	1144
★ 1605-4	16	5	3.175	28	50	15	5	2	20	Ø3	7	T4	1344	1525
1610-3	16	10	3.175	28	45	12.5	5	2	20	Ø3	7	T3	1181	1496
1616-2	16	16	3.175	28	45	12.5	5	2	20	Ø3	7	T2	833	997
2005-3	20	5	3.175	36	47	13.5	5	2	20	Ø3	7	T3	1181	1496
★ 2005-4	20	5	3.175	36	53	16.5	5	2	20	Ø3	7	T4	1512	1995
2006-3	20	6	3.969	36	53	16.5	5	2	20	Ø3	7	T3	1568	1787
2010-3	20	10	3.969	36	68	24	5	2	20	Ø3	7	T3	1621	1925
2020-4	20	20	3.175	36	55	17.5	5	2	20	Ø3	7	T4	1659	2464
★ 2505-4	25	5	3.175	40	53	16.5	5	2	20	Ø3	7	T4	1704	2581
▲ 2510-3	25	10	3.5	40	54	17	5	2	20	Ø3	7	T3	1614	2460
★ 3205-4	32	5	3.175	50	53	11.5	6	2.5	30	Ø3	7	T4	1924	3403
3210-3	32	10	6.35	50	70	20	6	2.5	30	Ø3	7	T3	3775	5877
3220-3	32	20	3.969	50	78	24	6	2.5	30	Ø3	7	T3	2141	3576
★ 4005-4	40	5	3.175	63	56	13	6	2.5	30	Ø3	7	T4	2142	4342
4010-3	40	10	6.35	63	80	25	6	2.5	30	Ø3	7	T3	4216	7556
4020-3	40	20	5.556	63	83	26.5	6	2.5	30	Ø3	7	T3	3782	6468
5010-3	50	10	6.35	75	82	23	6	2.5	36	Ø3	7	T3	4633	9235
6310-4	63	10	6.35	85	90	29	6	3.5	32	Ø5	14	T4	6700	16230

★ Note : with sign \* can produce left helix  
▲ steel balls 3.5mm, please order 3.5mm shaft to meet

### 4.14 RSU

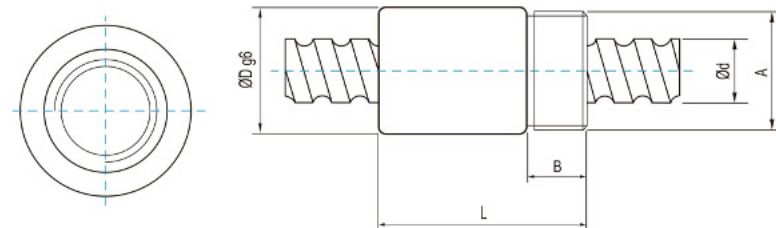


Unit : mm

Model No.	Dimensions											Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	Q	L1	n			
▲ 1604-3	16	4	2.381	29	M22X1.5P	8	32	-	-	T3	737	940	
1605-4	16	5	3.175	32	M30X1.5P	16	56	M6	6.5	T4	1344	1525	
2005-4	20	5	3.175	38	M35X1.5P	16.5	59.5	M6	7	T4	1512	1995	
2505-4	25	5	3.175	42	M40X1.5P	17	60	M6	7	T4	1704	2581	
2510-4	25	10	4.762	42	M40X1.5P	17	90	M6	10	T4	2881	3695	
3205-4	32	5	3.175	52	M48X1.5P	19	60	M6	7	T4	1924	3403	
3210-4	32	10	6.35	52	M48X1.5P	19	93	M6	12	T4	4834	7835	
4005-4	40	5	3.175	58	M56X1.5P	19	59	M8	6	T4	2142	4342	
4010-4	40	10	6.35	65	M60X1.5P	27	102	M8	12	T4	5399	10074	
5010-4	50	10	6.35	78	M72X1.5P	29	104	M8	12	T4	5933	12313	

▲ without wipers

### 4.15 RSH



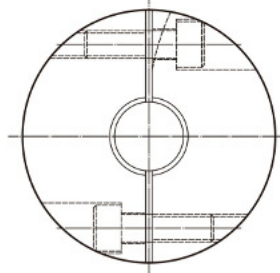
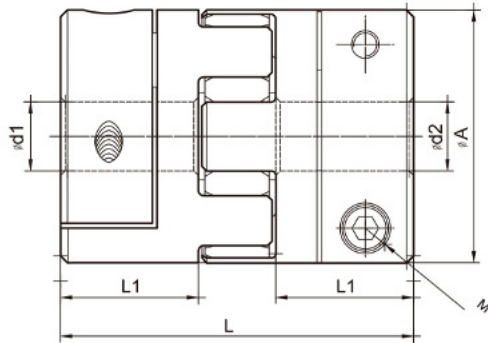
Unit : mm

Model No.	Dimensions								Ca(Kgf)	Coa(kgf)
	d	l	Da	D	A	B	L	n		
12H2-1.5	12	12.7	2.381	29.5	M25x1.5P	12	50	A1	397	445
16H5-3.5	16	5.08	3.175	25.4	15/16"x16un	12.7	43.43	C1	1348	1745



## 5.1 Elastomer Coupling

- High torque
- High rigidity
- Low inertia
- Backlash-free
- Long service life
- High vibration resistance



### FUNCTION

Model No.	Rated Torque (N.m)	Max Torque (N.m)	Max Rotational Frequency (min <sup>-1</sup> )	Static torsion spring stiffness (N.m/rad)	Dynamic torsion spring stiffness (N.m/rad)
SRJ-20C	5	10	15200	51.0	151
SRJ-30C	12.5	25	10200	170.9	505
SRJ-40C	17	34	7600	857.5	2571
SRJ-55C	60	120	5600	2060	6163
SRJ-65C	160	320	4700	3430	10291

Model No.	Weight (kg)		Mass moment of inertia J (kgm <sup>2</sup> )		Radial (mm)	Angular (°)	Axial (mm)
	each hub	spider	each hub	spider			
SRJ-20C	8.5x10 <sup>-3</sup>	1.7x10 <sup>-3</sup>	0.46x10 <sup>-6</sup>	0.073x10 <sup>-6</sup>	0.10	1.0	0.8
SRJ-30C	18x10 <sup>-3</sup>	4.2x10 <sup>-3</sup>	2.5x10 <sup>-6</sup>	0.45x10 <sup>-6</sup>	0.15	1.0	1
SRJ-40C	64x10 <sup>-3</sup>	6.5x10 <sup>-3</sup>	20.1x10 <sup>-6</sup>	1.44x10 <sup>-6</sup>	0.15	1.0	1.2
SRJ-55C	130x10 <sup>-3</sup>	17.4x10 <sup>-3</sup>	50.5x10 <sup>-6</sup>	7.3x10 <sup>-6</sup>	0.2	1.0	1.4
SRJ-65C	250x10 <sup>-3</sup>	28.6x10 <sup>-3</sup>	200.1x10 <sup>-6</sup>	16.3x10 <sup>-6</sup>	0.2	1.0	1.5

### DIMENSION

unit : mm

Model No.	A	L	L1	dmax	d1Xd2		M
					d1	d2	
SRJ-20C	20	30	10	10	4 · 5 · 6 · 6.35 · 7 · 8 · 10		M3
SRJ-30C	30	35	11	16	5 · 6 · 6.35 · 8 · 9 · 9.5 · 10 · 11 · 12 · 14 · 15		M4
SRJ-40C	40	66	25	22	8 · 9.5 · 10 · 11 · 12 · 14 · 15 · 16 · 18 · 19 · 20		M5
SRJ-55C	55	78	30	28	12 · 15 · 16 · 18 · 19 · 20 · 22 · 24 · 25		M6
SRJ-65C	65	90	35	38	20 · 22 · 24 · 25 · 28 · 30 · 32 · 35 · 38		M8

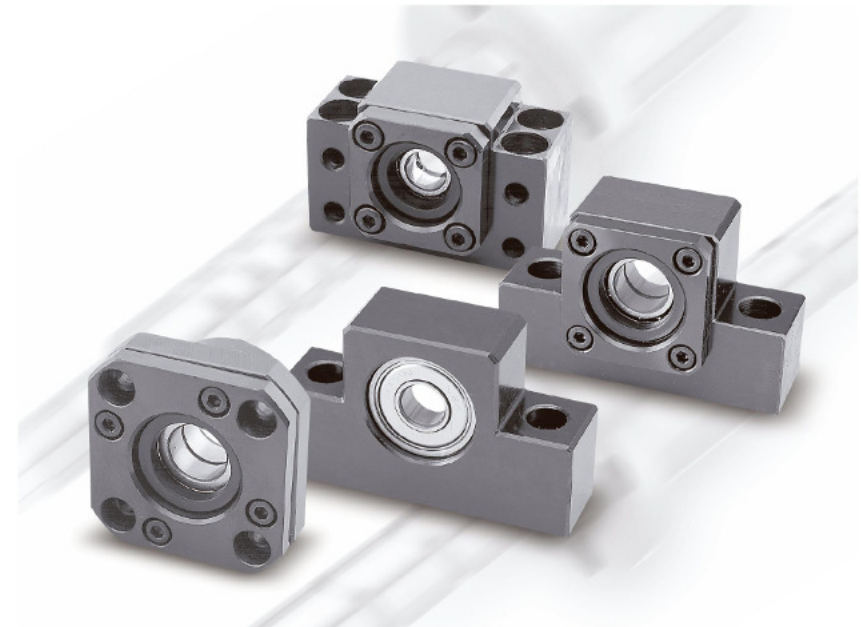
Buffer Material : Engineering Class Plastic    Material : Aluminum Alloy

Product No : SRJ-AC-d1xd2

ex:SRJ-30C-6x8



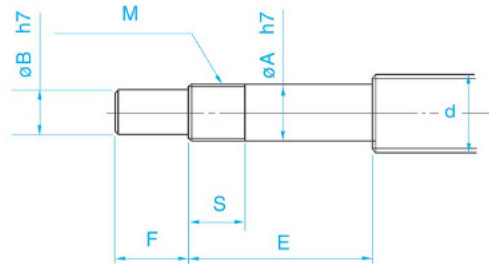
# Support Unit of Ball Screw





## 6.1 Recommended Shaft End Shape

For Support Unit Type BK and FK and EK Fixed Side



Unit : mm

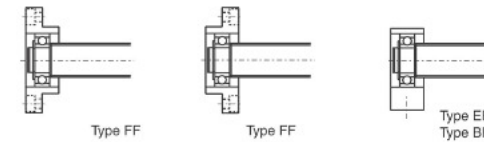
Support Unit model No.		Ball Screw shaft OD	Shaft Support Portion OD			Metric screw thread		
BK (Type BK)		d	A	B	E	F	M	S
BK 10		12/14/15	10	8	36	15	M10X1	16
BK 12		14/15/16	12	10	36	15	M12X1	14
BK 15		18/20	15	12	40	20	M15X1	12
BK 17		20/25	17	15	53	23	M17X1	17
BK 20		25/28	20	17	53	25	M20X1	15
BK 25		32/36	25	20	65	30	M25X1.5	18
BK 30		36/40	30	25	72	38	M30X1.5	25
BK 35		45	35	30	81	45	M35X1.5	28
BK 40		50	40	35	93	50	M40X1.5	35

Unit : mm

Support Unit model No.		Ball Screw shaft OD	Shaft Support Portion OD			Metric screw thread		
Type FK	Type EK	d	A	B	E	F	M	S
FK 6	EK 6	8	6	4	28	8	M6X0.75	8
FK 8	EK 8	10/12	8	6	32	9	M8X1	10
FK 10	EK 10	12/14/15	10	8	36	15	M10X1	11
FK 12	EK 12	14/15/16	12	10	36	15	M12X1	11
FK 15	EK 15	18/20	15	12	47	20	M15X1	13
FK 20	EK 20	25/28/30	20	17	62	25	M20X1	17
FK 25	-	30/32/36	25	20	76	30	M25X1.5	20
FK 30	-	36/40	30	25	72	38	M30X1.5	25

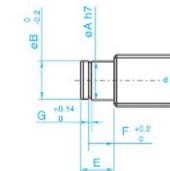
## 6.2 Recommended Shaft End Shape

For Support Unit Type FF and EF and BF (Floated Side)



Unit : mm

Support Unit model No.			Ball Screw shaft OD	Shaft Support Portion OD	
Type FF	Type EF	Type BF	d	A	E
FF 06	EF 06	-	8	6	9
FF 10	EF 10	BF 10	12/14/15	8	10
FF 12	EF 12	BF 12	14/15/16	10	11
FF 15	EF 15	BF 15	18/20	15	13
-	-	BF 17	20/25	17	16
FF 20	EF 20	(BF20) Note	25/28/30	20	19 (16)
FF 25	-	BF 25	30/32/36	25	20
FF 30	-	BF 30	36/40	30	21
-	-	BF 35	40/45	35	22
-	-	BF 40	50	40	23



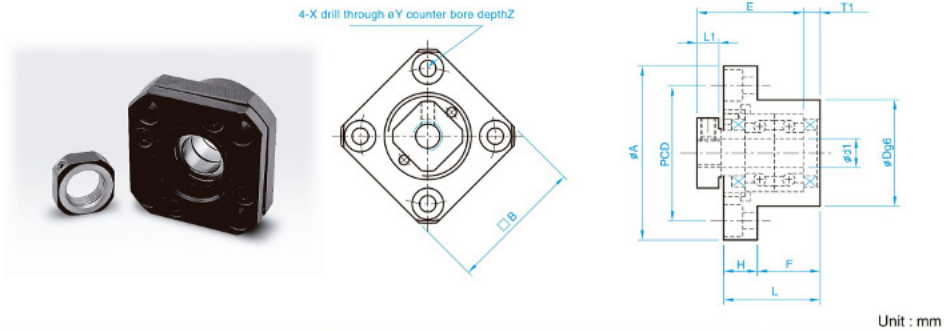
Note:

In this table, dimensions in parentheses are those of type BF20. These dimensions differ from those of type FF20 and EF20. When placing an order, always specify the model number of the Support Unit to be used.

Unit : mm

Support Unit model No.			Snap-ring Groove		
Type FF	Type EF	Type BF	B	F	G
FF 06	EF 06		5.7	6.8	0.8
FF 10	EF 10	BF 10	7.6	7.9	0.9
FF 12	EF 12	BF 12	9.6	9.15	1.15
FF 15	EF 15	BF 15	14.3	10.15	1.15
-	-	BF 17	16.2	13.15	1.15
FF 20	EF 20	(BF20) Note	19	15.35 (13.35)	1.35
FF 25	-	BF 25	23.9	16.35	1.35
FF 30	-	BF 30	28.6	17.75	1.75
-	-	BF 35	33	18.75	1.75
-	-	BF 40	38	19.95	1.95

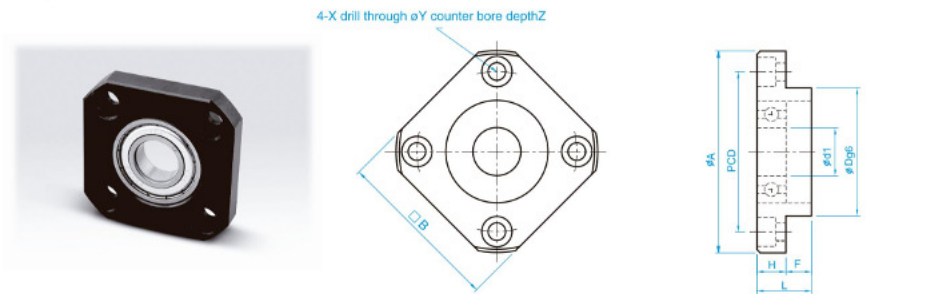
### 6.3 FK ( Fixed Side )



Unit : mm

Model No.	d1	L	H	F	E	Dg6	A	PCD	B	L1	T1	X	Y	Z
FK 5	5	16.5	6	10.5	18.5	20	34	26	26	5.5	3.5	3.4	6.5	4
FK 6	6	20	7	13	22	22	36	28	28	5.5	3.5	3.4	6.5	4
FK 8	8	23	9	14	26	28	43	35	35	7	4	3.4	6.5	4
FK 10	10	27	10	17	29.5	34	52	42	42	7.5	5	4.5	8	4
FK 12	12	27	10	17	29.5	36	54	44	44	7.5	5	4.5	8	4
FK 15	15	32	15	17	36	40	63	50	52	10	6	5.5	9.5	6
FK 20	20	52	22	30	50	57	85	70	68	8	10	6.6	11	10
FK 25	25	57	27	30	60	63	98	80	79	13	10	9	15	13
FK 30	30	62	30	32	61	75	117	95	93	11	12	11	17.5	15

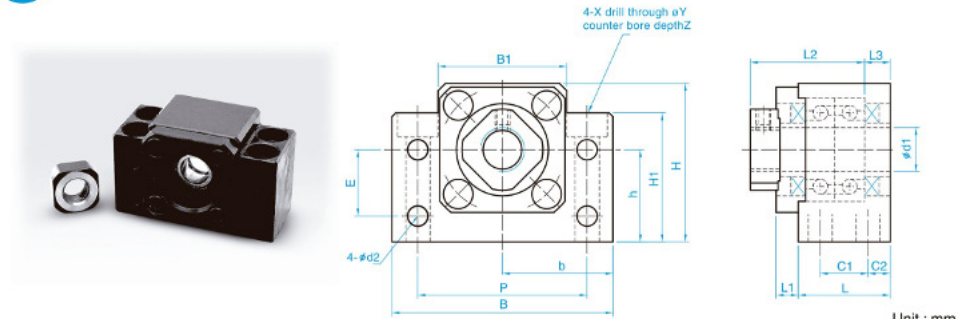
### 6.4 FF ( Floated Side )



Unit : mm

Model No.	d1	L	H	F	Dg6	A	PCD	B	X	Y	Z
FF 10	8	12	7	5	28	43	35	35	3.4	6.5	4
FF 12	10	15	7	8	34	52	42	42	4.5	8	4
FF 15	15	17	9	8	40	63	50	52	5.5	9.5	5.5
FF 20	20	20	11	9	57	85	70	68	6.6	11	6.5
FF 25	25	24	14	10	63	98	80	79	9	14	8.5
FF 30	30	27	18	9	75	117	95	93	11	17.5	11

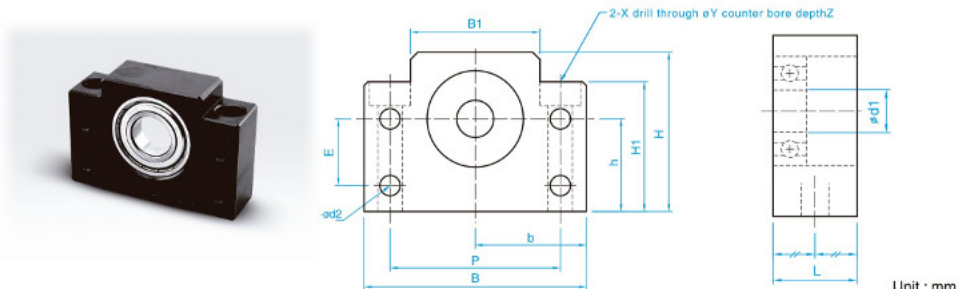
### 6.5 BK ( Fixed Side )



Unit : mm

Model No.	d1	L	L1	L2	L3	C1	C2	B	H	b <sup>+0.02</sup>	h <sup>+0.02</sup>	B1	H1	E	P	d2	X	Y	Z
BK 10	10	25	5	29	5	13	6	60	39	30	22	34	32.5	15	46	5.5	6.6	10.8	5
BK 12	12	25	5	29	5	13	6	60	43	30	25	35	32.5	18	46	5.5	6.6	10.8	1.5
BK 15	15	27	6	32	6	15	6	70	48	35	28	40	38	18	54	5.5	6.6	11	6.5
BK 17	17	35	9	44	7	19	8	86	64	43	39	50	55	28	68	6.6	9	14	8.5
BK 20	20	35	8	43	8	19	8	88	60	44	34	52	50	22	70	6.6	9	14	8.5
BK 25	25	42	12	54	9	22	10	106	80	53	48	64	70	33	85	9	11	17.5	11
BK 30	30	45	14	61	9	23	11	128	89	64	51	76	78	33	102	11	14	20	13
BK 35	35	50	14	67	12	26	12	140	96	70	52	88	79	35	114	11	14	20	13
BK 40	40	61	18	76	15	33	14	160	110	80	60	100	90	37	130	14	18	26	17.5

### 6.6 BF ( Floated Side )

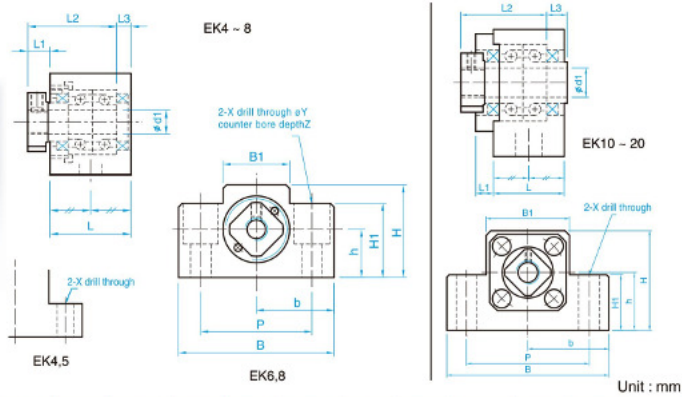


Unit : mm

Model No.	d1	L	B	H	b <sup>+0.02</sup>	h <sup>+0.02</sup>	B1	H1	E	P	d2	X	Y	Z
BF 10	8	20	60	39	30	22	34	32.5	15	46	5.5	6.6	10.8	5
BF 12	10	20	60	43	30	25	35	32.5	18	46	5.5	6.6	10.8	1.5
BF 15	15	20	70	48	35	28	40	38	18	54	5.5	6.6	11	6.5
BF 17	17	23	86	64	43	39	50	55	28	68	6.6	9	14	8.5
BF 20	20	26	88	60	44	34	52	50	22	70	6.6	9	14	8.5
BF 25	25	30	106	80	53	48	64	70	33	85	9	11	17.5	11
BF 30	30	32	128	89	64	51	76	78	33	102	11	14	20	13
BF 35	35	32	140	96	70	52	88	79	35	114	11	14	20	13
BF 40	40	37	160	110	80	60	100	90	37	130	14	18	26	17.5



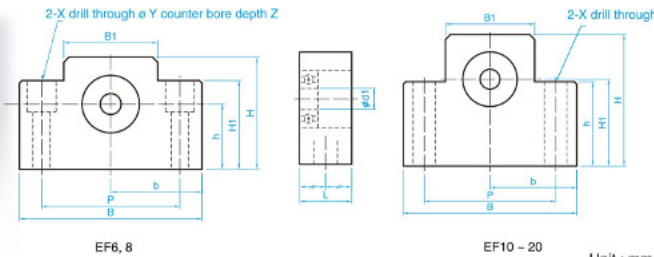
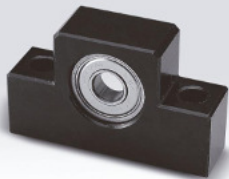
## 6.7 EK ( Fixed Side )



Model No.	d1	L	L1	L2	L3	B	H	b <sup>+0.02</sup>	h <sup>+0.02</sup>	B1	H1	P	X	Y	Z
EK 5	5	16.5	5.5	18.5	3.5	36	21	18	11	20	8	28	4.5	-	-
EK 6	6	20	5.5	22	3.5	42	25	21	13	18	20	30	5.5	9.5	11
EK 8	8	23	7	26	4	52	32	26	17	25	26	38	6.6	11	12
EK 10	10	24	6	29.5	6	70	43	35	25	36	24	52	9	-	-
EK 12	12	24	6	29.5	6	70	43	35	25	36	24	52	9	-	-
EK 15	15	25	6	36	5	80	49	40	30	41	25	60	11	-	-
EK 20	20	42	10	50	10	95	58	47.5	30	56	25	75	11	-	-

Unit : mm

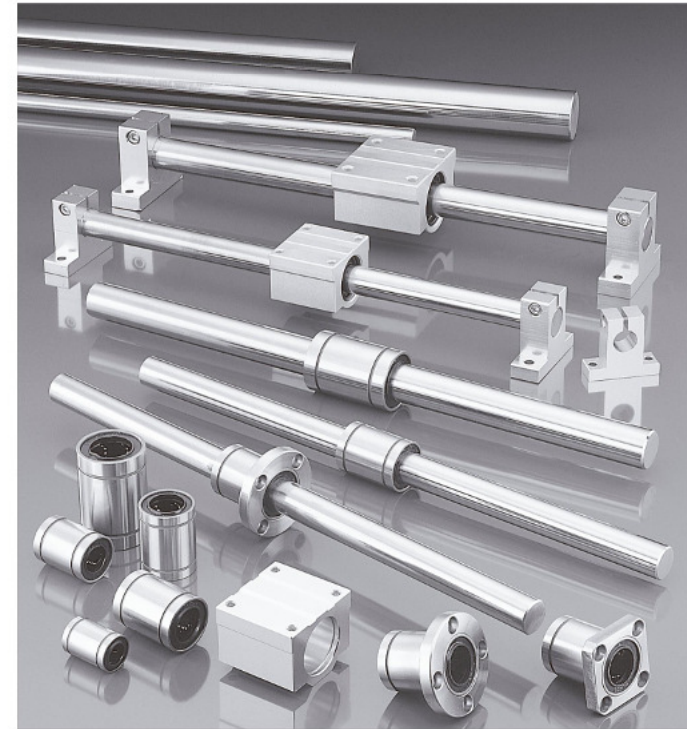
## 6.8 EF ( Floated Side )



Model No.	d1	L	B	H	b <sup>+0.02</sup>	h <sup>+0.02</sup>	B1	H1	P	X	Y	Z
EF 6	6	12	42	25	21	13	18	20	30	5.5	9.5	11
EF 8	6	14	52	32	26	17	25	26	38	6.6	11	12
EF 10	8	20	70	43	35	25	36	24	52	9	-	-
EF 12	10	20	70	43	35	25	36	24	52	9	-	-
EF 15	15	20	80	49	40	30	41	25	60	9	-	-
EF 20	20	26	95	58	47.5	30	56	25	75	11	-	-

Unit : mm

# Linear Ball Bearing Series

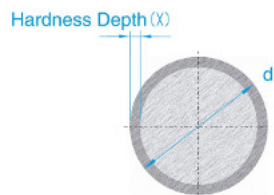




## 7.1 SF/WV series ( Slide Shaft )

SF : Harden and ground

WV: Harden ground and Chromium plated



Specification:

1. Material : JIS(S55C)

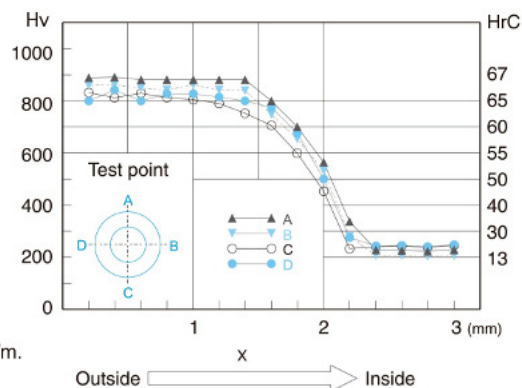
2. Hardness : Hrc62±2.

3. Surface finish : Ra 0.2 - 0.4μm.

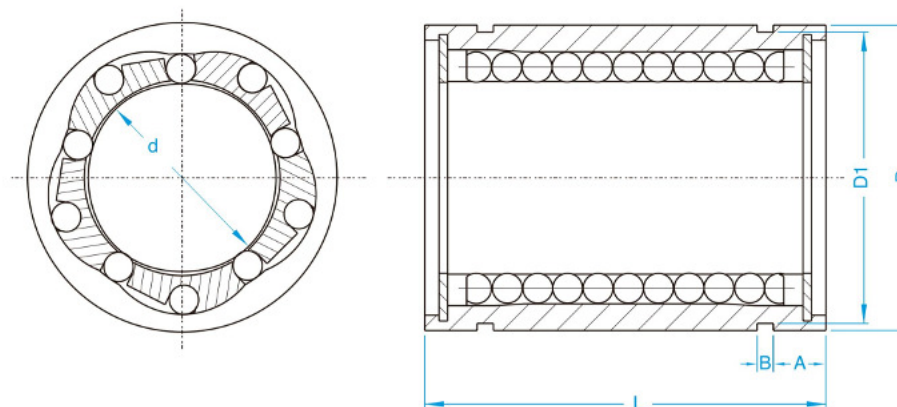
4. Shaft straightness : approx. 0.1~0.15 mm/m.

5. Shaft dia. tolerance : h7

If g6 or h6 tolerance is required, please advise.



## 7.2 LM series (Standard Type)



Unit : mm

Model No.	d	Standard Length				Dia. tolerance h7	Hardness Depth (X)
		1500	2000	2500	3000		
★ SF6	6					0 / -0.012	1.0 ~ 1.5
★ SF8	8					0 / -0.015	1.0 ~ 1.5
★ SF10	10					0 / -0.015	1.0 ~ 1.5
★ SF12	12					0 / -0.018	1.0 ~ 1.5
★ SF16	16					0 / -0.018	1.8 ~ 2.2
★ SF20	20					0 / -0.021	1.8 ~ 2.2
★ SF25	25					0 / -0.021	1.8 ~ 2.2
★ SF30	30					0 / -0.021	1.8 ~ 2.2
★ SF32	32					0 / -0.025	1.8 ~ 2.2
★ SF40	40					0 / -0.025	1.8 ~ 2.2
★ SF50	50					0 / -0.025	1.8 ~ 2.2

Note: 1. With sign ★ can supply Chromium plated slide shaft (Model No:WV)

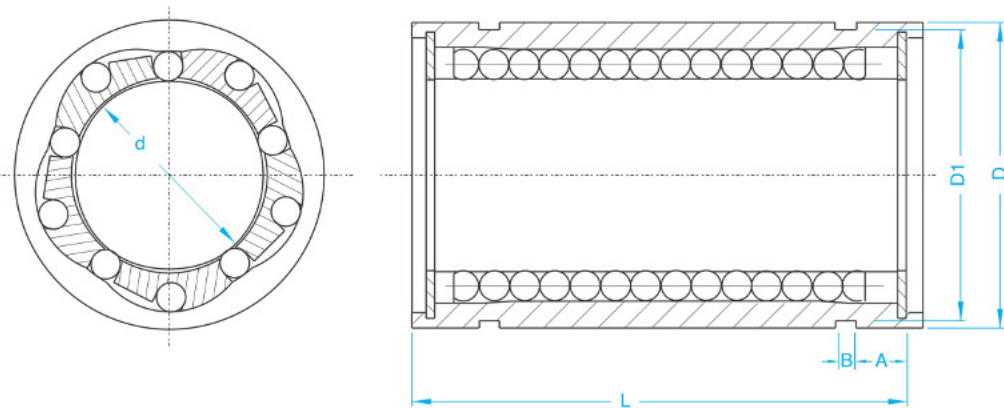
2. Hard Chrome thickness : 20μm.

Unit : mm

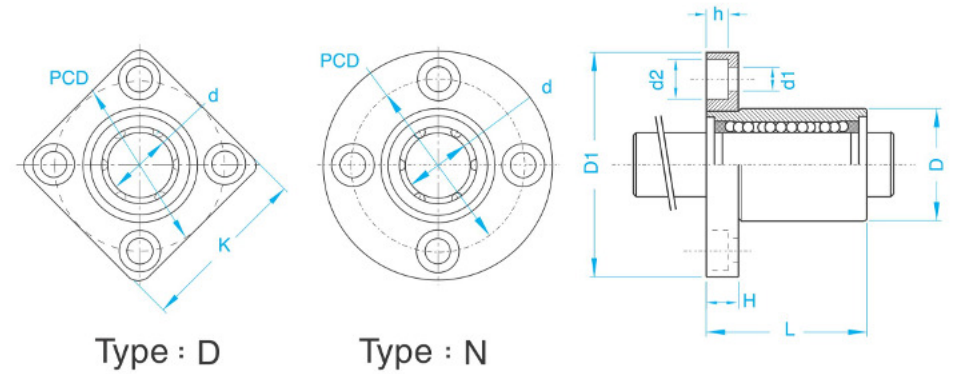
Model No.	Basic Dimension							Eccentricity (max) μm	Radial Clearance (max) μm	(Kgf) Load		Weight (g)	
	d	D	tolerance (μm)	L	tolerance (μm)	B	D1			A	Ca		Coa
LM4UU	4	8	0	12		-	-	0	8	-5	9	13	2
LM6UU	6	12	-11	19		1.1	11.5	2.75	12	-5	20	27	8
LM8UU	8	15		24	0	1.1	14.3	3.25	12	-5	27	41	16
LM10UU	10	19	0	29	-0.2	1.3	18	3.5	12	-5	38	55	30
LM12UU	12	21	-13	30		1.3	20	3.5	12	-5	42	60	31.5
LM16UU	16	28		37		1.6	27	5.25	12	-7	78	119	69
LM20UU	20	32	0	42		1.6	30.5	5.75	15	-9	83	140	87
LM25UU	25	40	-15	59		1.85	38	9	15	-9	100	159	220
LM30UU	30	45		64	0	1.85	43	9.75	15	-9	159	279	250
LM40UU	40	60	0	80	-0.3	2.1	57	9.75	20	-13	219	409	585
LM50UU	50	80	-19	100		2.6	76.5	13	20	-13	389	808	1580

Note : UU with oil seals in ends

### 7.3 LM-L series (Standard - Long Type)



### 7.4 LF series (Flange Type)



Unit : mm

Model No.	Basic Dimension								(Kgf) Load		Weight (g)
	d	D	tolerance (μm)	L	tolerance (μm)	B	A	D1	Ca	Coa	
LM6LUU	6	12	0	35	0	1.1	4	11.5	32	53	16
LM8LUU	8	15	-13	45		1.1	5	14.3	44	80	31
LM10LUU	10	19	0	55		1.1	5.5	18	59	112	62
LM12LUU	12	21	-16	57	-30	1.3	5.5	20	66	122	80
LM16LUU	16	28		70		1.3	8.5	27	125	240	145
LM20LUU	20	32	0	80	0	1.6	9.5	30.5	143	280	180
LM25LUU	25	40		112		1.85	15	38	159	320	440
LM30LUU	30	45	-19	123	-40	1.85	17	43	254	560	580
LM40LUU	40	60		151		2.1	15	57	350	820	1170
LM50LUU	50	80	-22	192		2.6	22	76.5	620	1622	3100

Note : UU with oil seals in ends

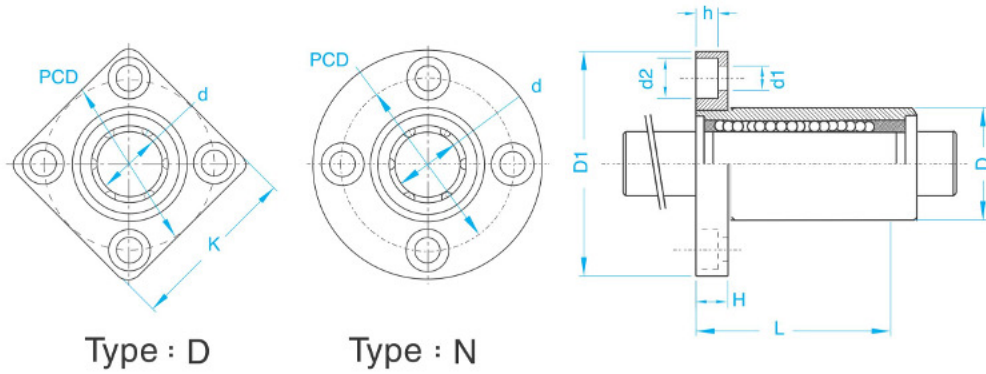
Unit : mm

Model No.	Basic Dimension													Eccentricity (max) μm	Radial Clearance (max) μm	(Kgf) Load		Weight (g)
	d	D	tolerance (μm)	L	tolerance (μm)	D1	tolerance (μm)	H	PCD	K	d1	d2	h			Ca	Coa	
LF6UU	6	12	0-11	19	0	28	-0.2	5	20	22	3.4	6.5	3.3	12	-5	200	206	26.5
LF8UU	8	15	0	24		32		5	24	25	3.4	6.5	3.3	12	-5	260	400	40
LF10UU	10	19	-13	29		40		6	29	30	4.5	8	4.4	12	-5	370	540	78
LF12UU	12	21		30	42	6	32	32	4.5	8	4.4	12	-5	410	290	76		
LF16UU	16	28	0	37	-20	48	0	6	38	37	4.5	8	4.4	12	-7	770	1170	134
LF20UU	20	32		42		54		8	43	42	5.5	9.5	5.4	15	-9	860	1370	180
LF25UU	25	40	-16	59	0	62	-0.2	8	51	50	5.5	9.5	5.4	15	-9	980	1560	340
LF30UU	30	45		64		74		10	60	58	6.6	11	6.5	15	-9	1560	2740	460
LF40UU	40	60	0	80	0	96	0	13	78	75	9	14	8.6	20	-13	2150	4010	1054
LF50UU	50	80	-19	100	-30	116	-0.3	13	98	92	9	14	8.6	20	-13	3820	7830	2200

Note : UU-with oil seals in ends

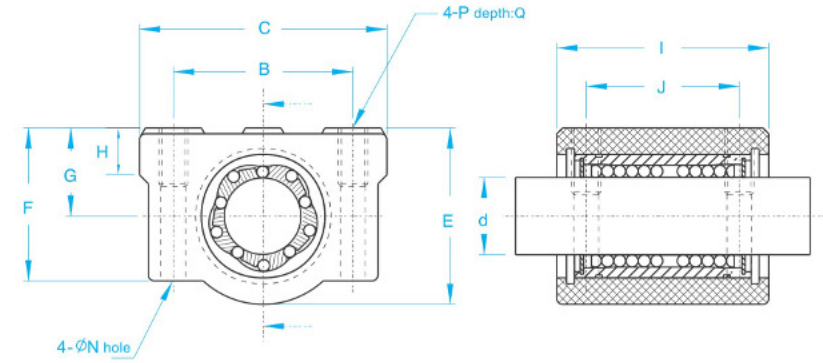


**7.5 LF-L series (Flange Long Type)**



**7.6 LU/LP series (Housing Type)**

LP:No Linear Ball Bearing (Housing Only)  
 LU:With Linear Ball Bearing (Lp+LM)



Unit : mm

Model No.	Basic Dimension											Eccentricity (max) $\mu\text{m}$	Radial Clearance (max) $\mu\text{m}$	(Kgf) Load		Weight (g)		
	d	D	tolerance ( $\mu\text{m}$ )	L	tolerance ( $\mu\text{m}$ )	D1	tolerance ( $\mu\text{m}$ )	H	PCD	K	d1			d2	h		Ca	Coa
LF6LUU	6	12	0	35		28		5	20	22	3.4	6.5	3.3	12	-5	200	206	26.5
LF8LUU	8	15	-13	45		32		5	24	25	3.4	6.5	3.3	12	-5	260	400	40
LF10LUU	10	19	0	55		40		6	29	30	4.5	8	4.4	12	-5	370	540	78
LF12LUU	12	21	-16	57	0	42	0	6	32	32	4.5	8	4.4	12	-5	410	290	76
LF16LUU	16	28	0	70	-30	48	-0.2	6	38	37	4.5	8	4.4	12	-7	770	1170	134
LF20LUU	20	32	0	80		54		8	43	42	5.5	9.5	5.4	15	-9	860	1370	180
LF25LUU	25	40	-19	112		62		8	51	50	5.5	9.5	5.4	15	-9	980	1560	340
LF30LUU	30	45	0	123		74		10	60	58	6.6	11	6.5	15	-9	1560	2740	460
LF40LUU	40	60	0	151	0	96	0	13	78	75	9	14	8.6	20	-13	2150	4010	1054
LF50LUU	50	80	-22	192	-40	116	-0.3	13	98	92	9	14	8.6	20	-13	3820	7830	2200

Note : UU-with oil seals in ends

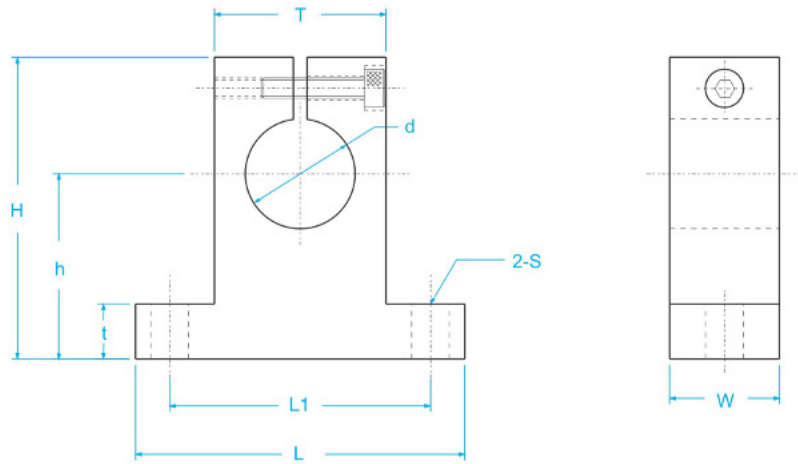
Material:Aluminum Alloy

Unit : mm

Model No.	Basic Dimension												weight (g)
	d	B	C	E	F	G $\pm 0.02$	H	I	J	N	P	Q	
LU6UU LP6	6	20	30	18	15	9	6	25	15	M3	M4	8	34
LU8UU LP8	8	24	34	22	18	11	6	30	18	M3	M4	8	56
LU10UU LP10	10	28	40	26	21	13	8	35	21	M4	M5	12	90
LU12UU LP12	12	30.5	42	29	25	15	8	36	26	M4	M5	12	112
LU16UU LP16	16	36	50	38.5	35	19	9	44	34	M4	M5	12	189
LU20UU LP20	20	40	54	42	36	21	11	50	40	M5	M6	12	237
LU25UU LP25	25	54	76	51.5	41	26	12	67	50	M6	M8	18	555
LU30UU LP30	30	58	78	59.5	49	30	15	72	58	M6	M8	18	685
LU40UU LP40	40	80	102	78	62	40	20	90	60	M8	M10	25	1600
LU50UU LP50	50	100	122	102	80	52	25	110	80	M8	M10	25	3350



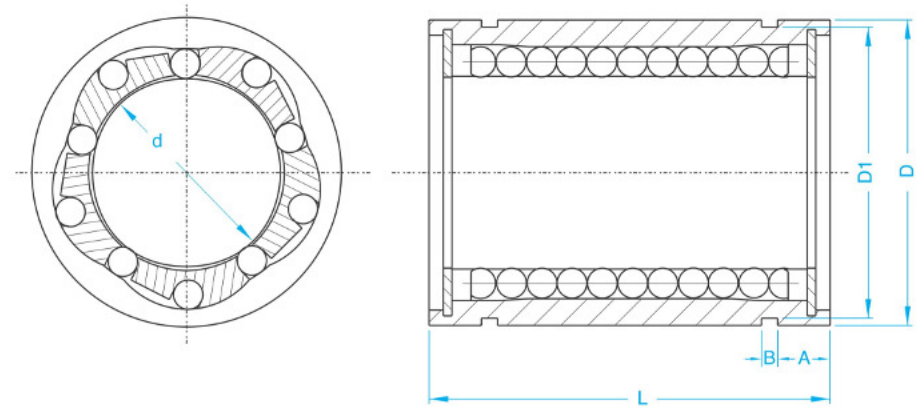
## 7.7 SS series ( Slide Shaft Support )



Unit : mm

Model No.	Basic Dimension									Weight (g)
	d	h	L	W	H	t	T	L1	S	
SS4	4	20	42	14	32.8	6	18	32	5.5	24
SS6	6	20	42	14	32.8	6	18	32	5.5	24
SS8	8	20	42	14	32.8	6	18	32	5.5	24
SS10	10	20	42	14	32.8	6	18	32	5.5	24
SS12	12	23	42	14	37.5	6	20	32	5.5	30
SS16	16	27	48	16	44	8	25	38	5.5	40
SS20	20	31	60	20	51	10	30	45	6.6	70
SS25	25	35	70	24	60	12	38	56	6.6	130
SS30	30	42	84	28	70	12	44	64	9	180
SS40	40	60	114	36	96	15	60	90	11	420
SS50	50	70	126	40	120	18	74	100	14	750

## 7.8 LME series ( European Type )



Unit : mm

Model No.	Basic Dimension							Eccentricity (max) $\mu\text{m}$	Radial Clearance (max) $\mu\text{m}$	(Kgf) Load		Weight (g)	
	d	D	tolerance ( $\mu\text{m}$ )	L	tolerance ( $\mu\text{m}$ )	B	A			D1	Ca		Coa
LME8UU	8	16	0/-8	25		1.1	4.25	15.2	12	-5	27	41	20
LME12UU	12	22	0	32	0	1.3	4.55	21	12	-7	51	78	41
LME16UU	16	26	-9	36	-20	1.3	5.55	24.9	12	-7	58	91	57
LME20UU	20	32	0	45		1.6	6.75	30.3	15	-9	88	139	91
LME25UU	25	40	-11	58		1.85	6.95	37.5	15	-9	100	159	215
LME30UU	30	47		68	0	1.85	7.95	44.5	15	-9	159	279	325
LME40UU	40	62	0	80	-30	2.15	9.7	59	17	-13	219	409	705
LME50UU	50	75	-13	100		2.65	11.2	72	17	-13	389	808	1130

Note : UU with oil seals in ends

