

# Ball Screw Support Units

## Outline

### MSU Series

KSS provides the customer with suitable Support Units for end journal of Miniature Ball Screws. MSU series have features of light weight & compact compared to existing series. Our Support Units fit the standard end journal profile of KSS Ball Screws. Please try and use them as well as Ball Screws.

## Compact Support Units

**Light weight (more than 50% down)**

Comparison to our current model



This type of Support Unit has features of light-weight & compact profile compared to our conventional Support Units. KSS believes this type is suitable for Miniature Ball Screws.

### ●Features

- By eliminating extra shape of Housing, and minimizing pitch of mounting holes, light-weight & compact design Support Units became reality.
- Pre-load controlled Angular Contact Bearings are installed, so Rigidity can be kept high.
- Reasonable price has been achieved with reducing number of components, because oil seals have been eliminated by using shielded type Angular Contact Bearings.
- Angular Contact Bearings are made from stainless steel and low contamination Grease is applied, so Support Units can be used in clean-environment.
- Ultra-compact size ( $\phi 3$ ) is standardized, it would be suitable for Ultra Miniature Ball Screws.
- Pillow & Flange type are standardized for both fixed & supported side, so wide variety of choices are available.

### ●Variation

Compact Support Units(MSU series) provide 2 choices of Housing type, which are Pillow type and Flange type. Fixed side and supported side Units are standardized for each type. In case of Pillow type, it became light-weight & more compact compared to our conventional type.

Pillow type



Flange type



### ●Specifications

Angular Contact Bearings built in Compact Support Units(MSU series) are made from stainless steel and low contamination Grease is applied. Other components of Support Units are also made from stainless steel or are coated by black finishing. These series can be used in clean-environment.

### [Ball Bearings for MSU Sries]

#### Angular Contact Ball Bearings



This series is the Angular Contact Ball Bearings built in fixed side of Compact Support Units(MSU series). This can be provided as a set of DF or DB configuration only. (Refer to dimension table in page E115-E116)

#### Deep Groove Bearings

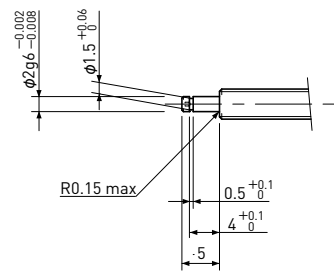


This series is the Deep Groove Ball Bearings built in supported side of Compact Support Units(MSU series). This type can be provided as a Bearing itself. (Refer to dimension table in page E117-E118)

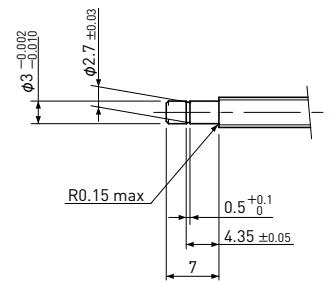
● Standardized end-journal profile

KSS Support Units are designed to fit standard end-journal profile of KSS Miniature Ball Screws. Table below shows KSS Support Units list corresponding to standard end-journal profile.

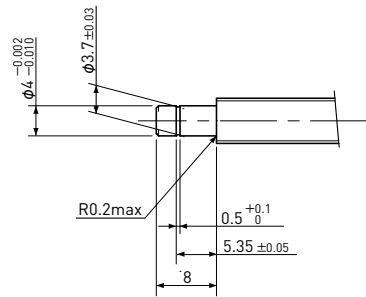
[Supported side]



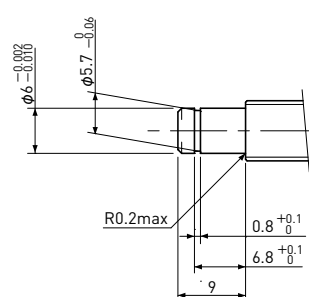
Brg. Inner dia.	Support Unit model
$\phi 2$	MSU-3CS / MSU-3GS



Brg. Inner dia.	Support Unit model
$\phi 3$	MSU-4CS / MSU-4GS



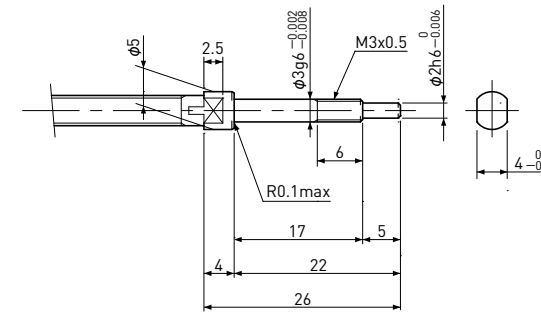
Brg. Inner dia.	Support Unit model
$\phi 4$	MSU-5CS / MSU-5GS



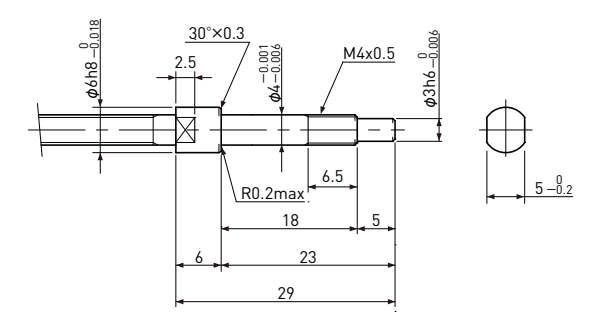
Brg. Inner dia.	Support Unit model
$\phi 6$	MSU-6CS / MSU-6GS MSU-8CS / MSU-8GS

Note) Request for Supported side Support Units with  $\phi 8$  and  $\phi 10$  as well as standard design, please ask KSS representative.

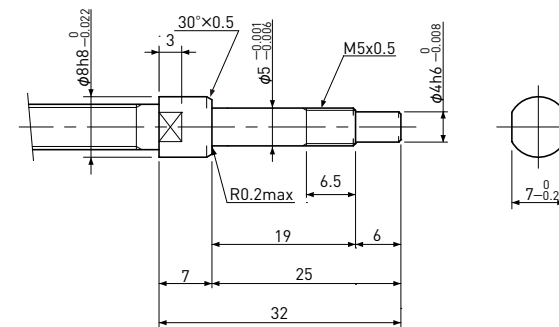
[Fixed side]



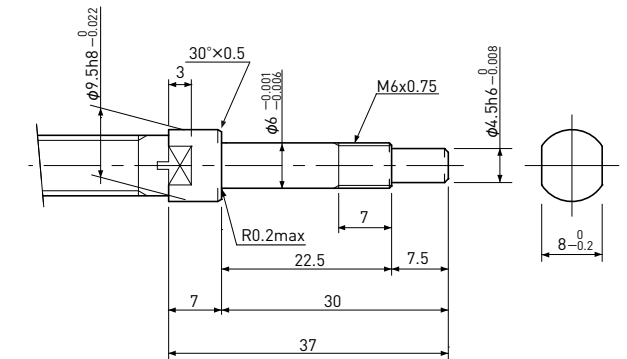
Brg. Inner dia.	Support Unit model
$\phi 3$	MSU-3C / MSU-3G



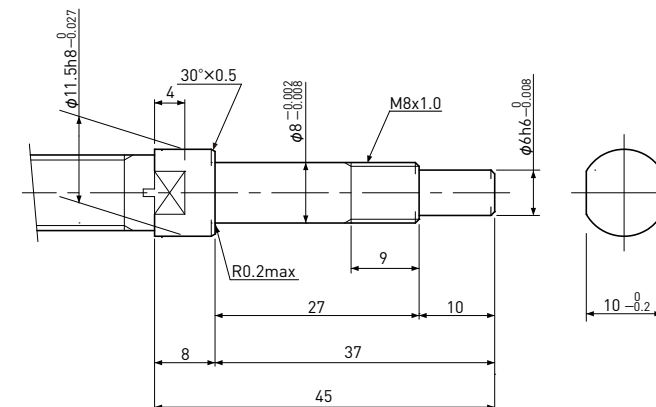
Brg. Inner dia.	Support Unit model
$\phi 4$	MSU-4C / MSU-4G



Brg. Inner dia.	Support Unit model
$\phi 5$	MSU-5C / MSU-5G



Brg. Inner dia.	Support Unit model
$\phi 6$	MSU-6C / MSU-6G



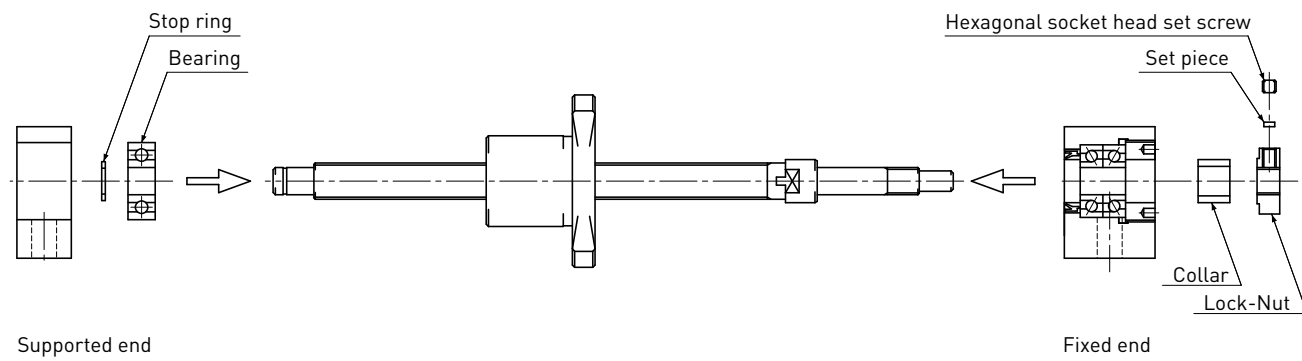
Brg. Inner dia.	Support Unit model
$\phi 8$	MSU-8C / MSU-8G

Note) Request for fixed side Support Units with  $\phi 10$  and  $\phi 12$  as well as standard design, please ask KSS representative.

● Mounting procedure

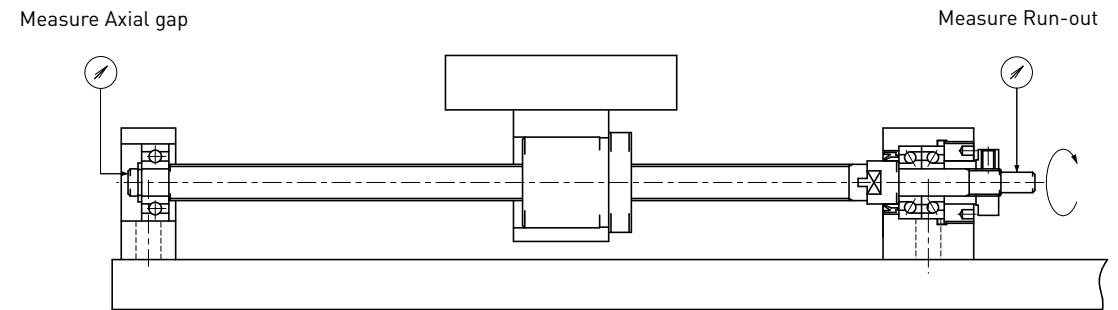
1. Assembling Support Unit

- 1) Mount the fixed end Support Unit onto the Ball Screw.
  - Note 1) Do not disassemble the Support Unit.
- 2) Tighten the Lock-Nut after inserting into the fixed end Support Unit, and secure using the set piece and hexagonal socket head set screw.
  - Note 1) Make sure that the set piece is not allowed to curl.
- 3) Mount the supported end Bearing, secure with the stop ring, and fit into the Housing.



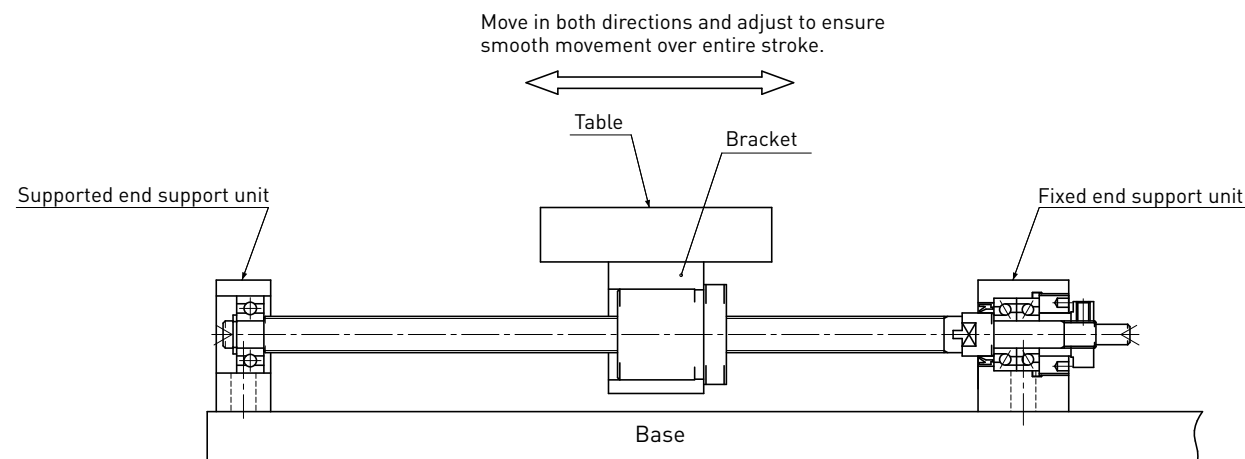
3. Mounting the supported end Housing on the base and checking accuracy

- 1) Move the table toward the supported end Housing and center it. Move the table in both directions and adjust to ensure smooth movement over entire length. Secure loosely to the base.
- 2) Check the Run-out and Axial gap at the Ball Screw Shaft end using a dial gauge, and fully tighten the Nut, fixed end Support Unit and supported end Housing.



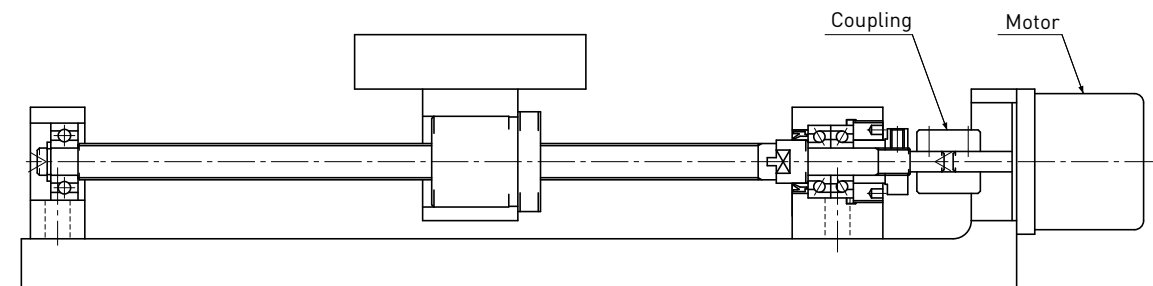
2. Mounting the table on the Ball Screw Nut and mounting the Support Unit on the base

- 1) Insert the Ball Screw Nut into the table or Bracket, which is attached to the table, and loosely tighten.
- 2) Loosely tighten the fixed end Support Unit to the base.
  - Note 1) Move the table toward the Support Unit and center it. Adjust to ensure that the table moves smoothly.



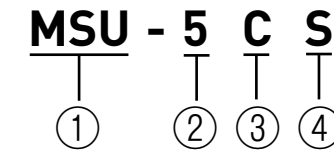
4. Connecting to the Motor

- 1) Secure the Motor to the main Unit.
- 2) Connect the Motor to the Ball Screw using the coupling.
- 3) Run in thoroughly.



Note) Instruction above is for Pillow type and Block type Support Units, In case of Flange type Support Units, the same procedure can be applicable.

● Model number notation



- ① Series No.  
MSU : KSS Compact Support Unit Series
- ② Nominal number
- ③ Housing type  
C : Pillow type  
G : Flange type
- ④ End-journal type  
None : fixed side  
S : supported side

Note) In some cases, nominal number is not the same as Bearing Inner diameter.

Parts List

Part No.	Part name	Qty
1	Housing (Black Chrome coating)	1
2	Bearings (with Shields)	1 set
3	Pressure Nut	1
4	Colla	1
5	Lock Nut	1
6	Hexagonal socket head set screw (with set piece)	1 set

Unit:mm

Type	Brg. Inner dia. d 0 -0.005	L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>	B	H	h <sub>1</sub> 0 -0.03	B <sub>1</sub>	H <sub>1</sub>		R	P	d <sub>1</sub>	M	T	Lock Nut	Tightening torque of Lock Nut N·cm	Bearing	Mass g	Type
MSU-3C	3	12.5	5.5	16.5	1.5	2	8.5	24	14.5	9	11	5		5.5	18	3.5	M3	8	M3×0.5	80	MTA03-08HP5DF	16.5	MSU-3C
MSU-4C	4	14	5.5	17.5	2	2.5	9	27	17	10	14	6		7	21	3.5	M3	10	M4×0.5	100	MTA04-11HP5DF	27	MSU-4C
MSU-5C	5	15	5.5	18.5	2	2	11	30.5	19.5	11	17	6		8.5	23	4.5	M3	11	M5×0.5	140	MTA05-13HP5DF	35	MSU-5C
MSU-6C	6	17	7.5	22	2.5	2.5	12	35	22.5	13	19	8		9.5	26	5.5	M3	12	M6×0.75	190	MTA06-15HP5DF	50	MSU-6C
MSU-8C	8	20	9	26	3	3	14	41	29	17	24	12		12	32	5.5	M3	14	M8×1.0	200	MTA08-19HP5DF	96	MSU-8C

Note 1) Angular Contact Ball Bearings (manufactured by ISC) are designed for clean room use, they are made of Stainless steel with low contamination grease (NSK LG2) packed.

Note 2) Pressure Nut, Collar and Lock Nut are coated with Black finishing.

Note 3) Do not disassemble Support Unit, as they are pre-loaded and pre-adjusted.

## MSU Series

## Pillow type (Supported side)

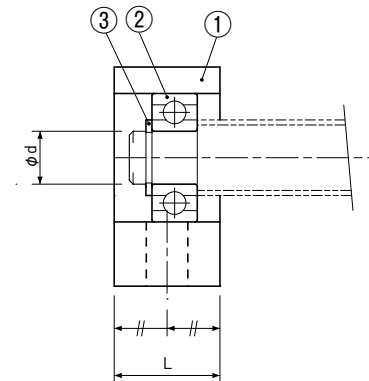
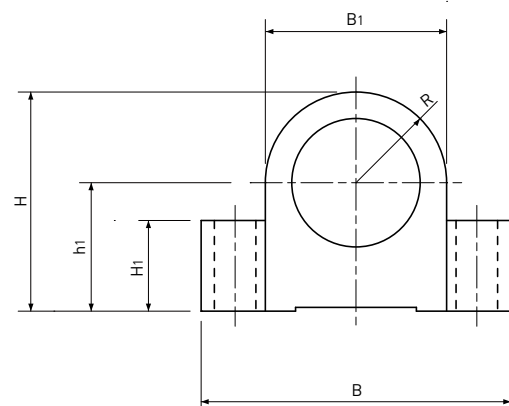
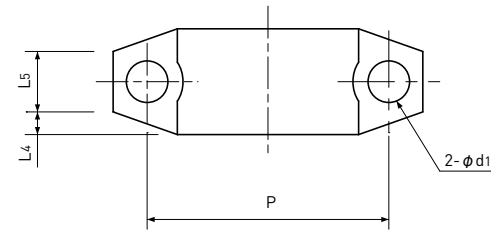
### Model number notation

**MSU - 5 C S**

①      ②      ③      ④

- ① Series No.  
MSU : KSS Compact Support Unit Series
- ② Nominal number
- ③ Housing type  
C : Pillow type  
G : Flange type
- ④ End-journal type  
None : fixed side  
S : supported side

Note) In some cases, nominal number is not the same as Bearing Inner diameter.



### Parts List

Part No.	Part name	Qty
1	Housing (Black Chrome coating)	1
2	Bearing (with Shields)	1
3	Stop ring	1

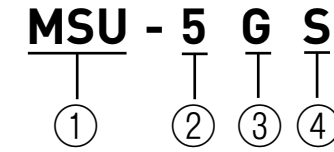
Unit:mm

Type	Brg. Inner dia. d 0 -0.005	L	L4	L5	B	H	h1 0 -0.03	B1	H1	R	P	d1	Bearing	Stop ring	Mass g	Type
MSU-3CS	2	8	2	4	24	14.5	9	11	5	5.5	18	3.5	602HZZ	ETW-1.5(OCHIAI)	8.5	MSU-3CS
MSU-4CS	3	10	2.5	5	27	17	10	14	6	7	21	3.5	623HZZ	G-3(IWATA)	16	MSU-4CS
MSU-5CS	4	10	2	6	30.5	19.5	11	17	6	8.5	23	4.5	624HZZ	G-4(IWATA)	21	MSU-5CS
MSU-6CS	6	12	2.5	7	35	22.5	13	19	8	9.5	26	5.5	B6-113HZZ1	STW-6(OCHIAI)	32	MSU-6CS
MSU-8CS	6	14	3	8	41	29	17	24	12	12	32	5.5	606HZZ1	STW-6(OCHIAI)	60	MSU-8CS

Note 1) Deep Groove Ball Bearing (manufactured by ISC) is designed for clean room use, it is made of Stainless steel with low contamination grease (NSK LG2) packed.

Note 2) Stop ring may be the equivalent one described in the table above.

● Model number notation



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Note) In some cases, nominal number is not the same as Bearing Inner diameter.

Parts List

Part No.	Part name	Qty
1	Housing (Black Chrome coating)	1
2	Bearings (with Shields)	1 set
3	Pressure Nut	1
4	Collar	1
5	Lock Nut	1
6	Hexagonal socket head set screw (with set piece)	1 set

Unit:mm

Type	Brg. Inner dia. d 0 -0.005	L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	F	L <sub>4</sub>	B	D <sub>f</sub>	D	P	d <sub>1</sub>	M	T	Lock Nut	Tightening torque of Lock Nut N·cm	Bearing	Mass g	Type
MSU-3G	3	12.5	5.5	16.5	1.5	3	7.5	11	23	11	17	3.5	M3	8	M3×0.5	80	MTA03-08HP5DF	12.5	MSU-3G
MSU-4G	4	13.5	5.5	17.5	1.5	3	8.5	14	26	14	20	3.5	M3	10	M4×0.5	100	MTA04-11HP5DF	20	MSU-4G
MSU-5G	5	15	5.5	18.5	2	3	10	17	29	17	23	3.5	M3	11	M5×0.5	140	MTA05-13HP5DF	30	MSU-5G
MSU-6G	6	17	7.5	22	2.5	4	12	19	34	19	26	4.5	M3	12	M6×0.75	190	MTA06-15HP5DF	42	MSU-6G
MSU-8G	8	20	9	26	3	4	16	24	39	24	31	4.5	M3	14	M8×1.0	200	MTA08-19HP5DF	70	MSU-8G

Note 1) Angular Contact Ball Bearings (manufactured by ISC) are designed for clean room use, they are made of Stainless steel with low contamination grease (NSK LG2) packed.

Note 2) Pressure Nut, Collar and Lock Nut are coated with Black finishing.

Note 3) Do not disassemble Support Unit, as they are pre-loaded and pre-adjusted.

## MSU Series

## Flange type (Supported side)

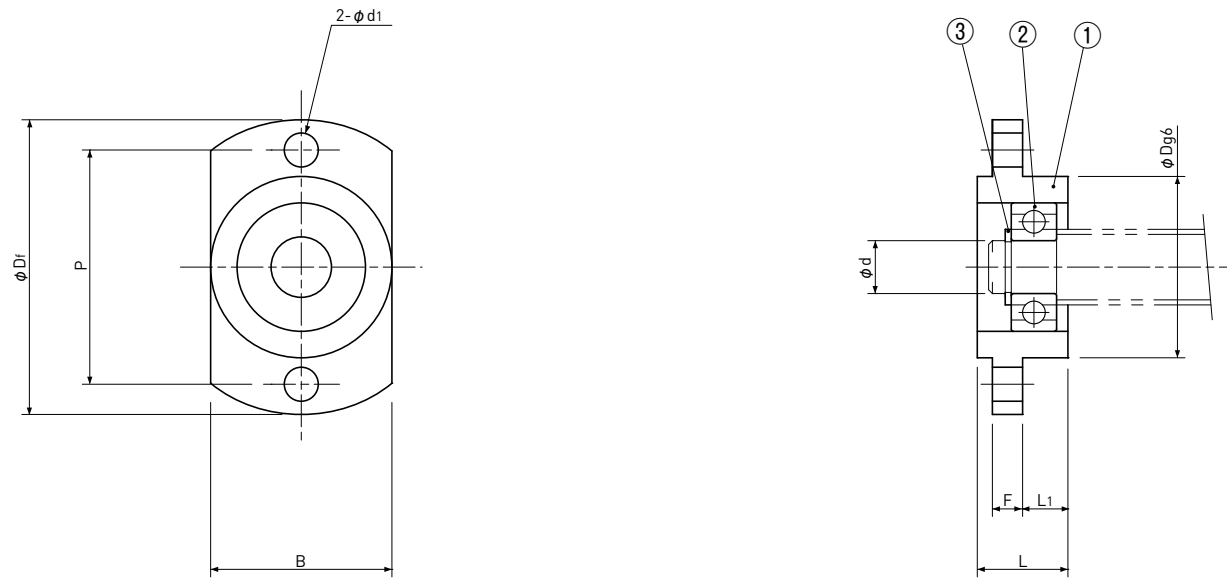
### Model number notation

**MSU - 5 G S**

①      ②      ③      ④

- ① Series No.  
MSU : KSS Compact Support Unit Series
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C : Pillow type  
G : Flange type
- ④ End-journal type  
None : fixed side  
S : supported side

Note) In some cases, nominal number is not the same as Bearing Inner diameter.



### Parts List

Part No.	Part name	Qty
1	Housing (Black Chrome coating)	1
2	Bearing (with Shields)	1
3	Stop ring	1

Unit:mm

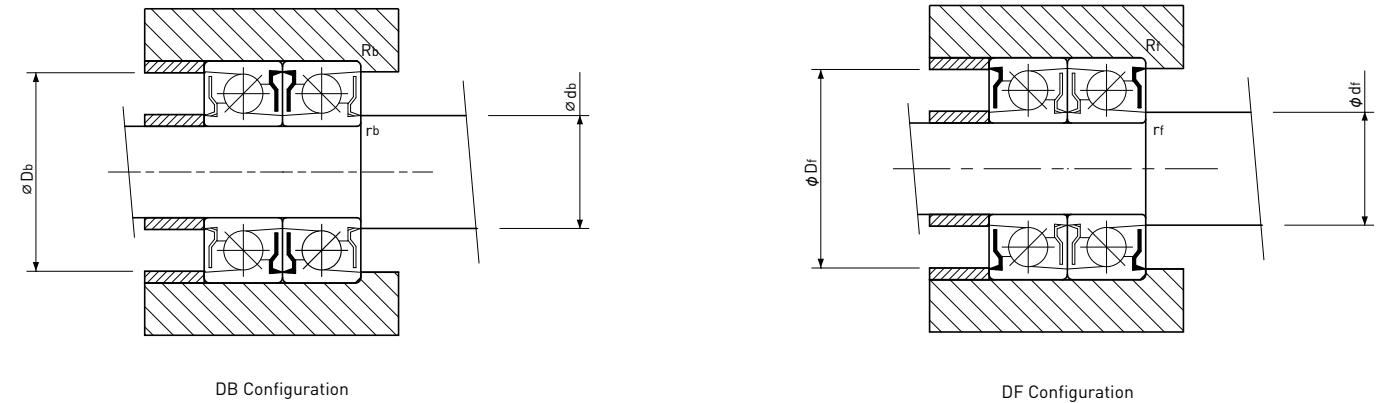
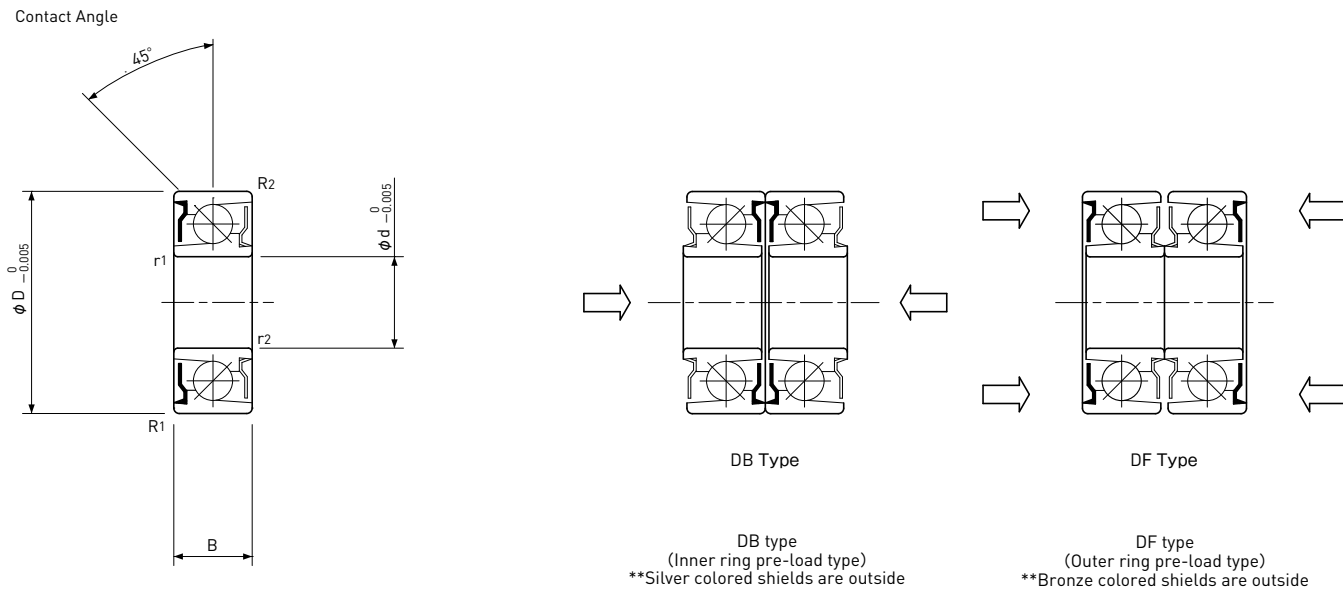
Type	Brg. Inner dia. d 0 -0.005	L	F	L <sub>1</sub>	B	D <sub>f</sub>	D	P	d <sub>1</sub>	Bearing	Stop ring	Mass g	Type
MSU-3GS	2	8	3	3	11	23	11	17	3.5	602HZZ	ETW-1.5(OCHIAI)	7.5	MSU-3GS
MSU-4GS	3	10	3	5	14	26	14	20	3.5	623HZZ	G-3(IWATA)	12	MSU-4GS
MSU-5GS	4	10	3	5	17	29	17	23	3.5	624HZZ	G-4(IWATA)	16	MSU-5GS
MSU-6GS	6	10	4	5	19	34	19	26	4.5	B6-113HZZ1	STW-6(OCHIAI)	24	MSU-6GS
MSU-8GS	6	10	4	6	24	39	24	31	4.5	606HZZ1	STW-6(OCHIAI)	40	MSU-8GS

Note 1) Deep Groove Ball Bearing (manufactured by ISC) is designed for clean room use, it is made of Stainless steel with low contamination grease (NSK LG2) packed.

Note 2) Stop ring may be the equivalent one described in the table above.

## Fixed side Ball Bearings for MSU series

## Angular Contact Ball Bearings (Stainless type)



### Model number notation

**MTA 08 -19 H P5 DF**

① ② ③ ④ ⑤ ⑥

- ① Series No.
- ② Inner diameter of Bearing (mm)
- ③ Outer diameter of Bearing (mm)
- ④ Material
  - H : Stainless Steel
  - T : Bearing Steel
- ⑤ Accuracy grade
  - Equivalent to P5
- ⑥ Duplex type
  - DF : Face to Face duplex
  - DB : Back to Back duplex

### Recommended tightening torque

Unit: N·cm (kgf·cm)

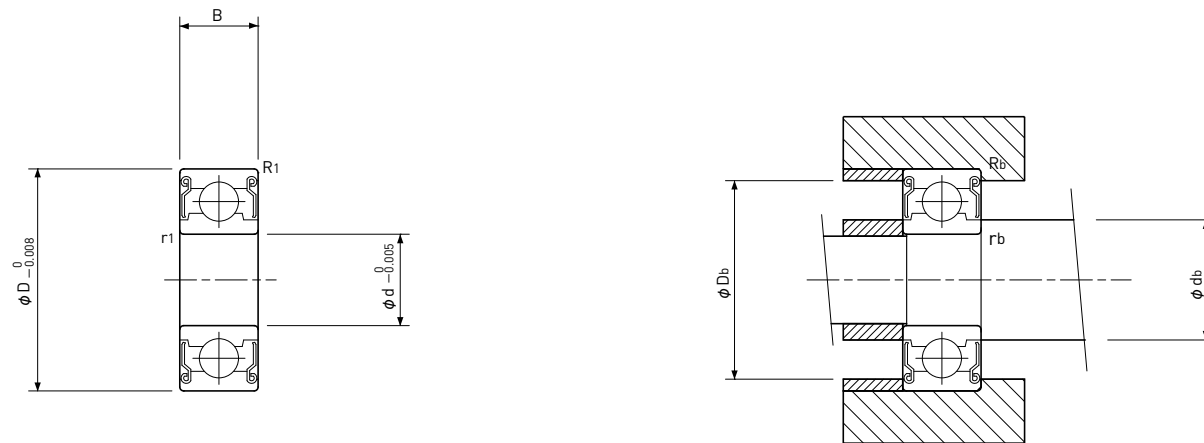
Type	DF type	DB type
MTA02-06HP5DF/DB	19.6(2.0)	9.8(1.0)
MTA03-08HP5DF/DB	19.6(2.0)	14.7(1.5)
MTA04-11HP5DF/DB	49(5.0)	19.6(2.0)
MTA05-13HP5DF/DB	49(5.0)	24.5(2.5)
MTA06-15HP5DF/DB	78.4(8.0)	29.4(3.0)
MTA08-19HP5DF/DB	78.4(8.0)	39.2(4.0)

Unit: mm

Type	Dimension							Basic Load Rating		Limit Speed min <sup>-1</sup>	Abutment & Fillet								Mass	Type
	I.D. $\phi d$	O.D. $\phi D$	Width B	Chamfer (min.)				Ca (N)	Coa (N)		DF type				DB type					
				r1	r2	R1	R2				Df max.	df min.	Rf max.	rf max.	Db max.	db min.	Rb max.	rb max.		
MTA02-06HP5DF/DB	2	6	3	0.10	0.10	0.10	0.04	470	360	26,000	5.0	2.8	0.10	0.10	5.3	3.0	0.04	0.10	0.8	MTA02-06HP5DF/DB
MTA03-08HP5DF/DB	3	8	4	0.10	0.10	0.15	0.03	820	670	22,000	6.7	3.9	0.15	0.10	7.2	4.4	0.03	0.10	1.8	MTA03-08HP5DF/DB
MTA04-11HP5DF/DB	4	11	4.5	0.20	0.20	0.20	0.10	1250	1130	17,000	8.9	5.1	0.20	0.20	9.5	6.2	0.10	0.20	3.8	MTA04-11HP5DF/DB
MTA05-13HP5DF/DB	5	13	5	0.20	0.20	0.20	0.10	1780	1740	16,000	10.8	6.1	0.20	0.20	11.3	7.2	0.10	0.20	5.6	MTA05-13HP5DF/DB
MTA06-15HP5DF/DB	6	15	5.5	0.20	0.20	0.20	0.20	2350	2360	14,000	12.5	7.2	0.20	0.20	13.2	8.6	0.20	0.20	7.8	MTA06-15HP5DF/DB
MTA08-19HP5DF/DB	8	19	6.5	0.20	0.20	0.30	0.30	3400	3480	13,000	15.8	9.4	0.30	0.20	16.8	11.4	0.30	0.20	14.5	MTA08-19HP5DF/DB

- Note 1) Angular Contact Ball Bearings (manufactured by ISC) are designed for clean room use, they are made of Stainless steel with low contamination grease (NSK LG2) packed.  
If necessary, Bearing steel type Angular Contact Ball Bearings with anti-fretting grease can be also provided.
- Note 2) Bearing duplex can be distinguished by the color of shield plate for each duplex, please refer to figure above.
- Note 3) Please designate duplex number (DF or DB), when you place order.
- Note 4) This series can be provided as sets of DF or DB configuration only.





Unit:mm

Type	Dimension					Basic Load Rating		Limit Speed min <sup>-1</sup>	Abutment & Fillet				Mass (g)	Type
	I.D. $\phi d$	O.D. $\phi D$	Width B	Chamfer (min.)		Cr (N)	Cor (N)		Db max.	db min.	Rb max.	rb max.		
				r1	R1									
602HZZ	2	7	3.5	0.15	0.15	320	102	63,000	6.25	3.85	0.15	0.15	0.6	602HZZ
623HZZ	3	10	4	0.15	0.15	535	175	50,000	7.98	4.35	0.15	0.15	1.7	623HZZ
624HZZ	4	13	5	0.20	0.20	1110	390	40,000	11.35	6.0	0.20	0.20	3.1	624HZZ
B6-113HZZ1	6	15	6	0.20	0.20	1470	535	40,000	13.3	7.9	0.20	0.20	4.3	B6-113HZZ1
606HZZ1	6	17	6	0.30	0.30	1920	670	38,000	14.8	8.2	0.30	0.30	6.1	606HZZ1

Note 1) Deep Groove Ball Bearings (manufactured by ISC) are designed for clean room use, they are made of Stainless steel with low contamination grease (NSK LG2) packed.