

FYH[®]

MOUNTED BEARING UNITS

Only EXTRACT of
main catalog 3320!



Premium











Supra

Eco

EasyRoll

ABEG[®]
Advanced Bearing Expert Group

Mounted Bearing Units (contents)

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BALL BEARING UNITS

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★The contents of this catalogue are subject to change without prior notice. Every possible effort has been made to ensure that the data listed in this catalog is correct. However, we can not assume responsibility for any errors or omissions.



2.3 Corrosion Resistant Series

The Corrosion Resistant Series is available in a wide array of sizes and styles, and units may be customized with a number of different specialized options to accommodate virtually any application. Federal compliance can be assured with FYH Bearing Units.

WASH DOWN



S6 STAINLESS INSERT



RINGS	Stainless steel (SUS 440C equivalent)
BALLS	SUS 440C
CAGE	SUS304
GREASE	H1 FOOD GRADE (FDA /USDA)
SEALS	NBR
SLINGER	SUS304
ANTI-ROTATION PIN	SUS304
SET SCREWS	SUS304
AVAILABLE SIZES	201X - 203X , 204 - 212
CLEARANCE	C3



S7 PLATED INSERT



RINGS	SUJ2 + (zinc plated + trivalent chromate treatment)
BALLS	SUJ2
CAGE	NYLON
GREASE	H1 FOOD GRADE (FDA /USDA)
SEALS	NBR
SLINGER	SPCC + (zinc plated + trivalent chromate treatment)
ANTI-ROTATION PIN	SUS304
SET SCREWS	SCM435 + (zinc plated + trivalent chromate treatment)
AVAILABLE SIZES	204 - 210
CLEARANCE	C3



VP VF VFL VPA
Thermoplastic Housings



Thermoplastic Polyester

H1, H9
Stainless Steel Housings



Lost Wax Casting
(SUS304 or 316 equivalent)

Z5
Nickel Plated Housings



Cast Iron + Nickel Plating



3 Models

3.1 Model List

Table 3.1 and Table 3.2 shows the models of FYH Ball Bearing Units and ball bearing inserts.

Table 3.1 FYH Ball Bearing Units models

Model	Type	Bearing bore dia. Surface (fixing to shaft)	Model code	Shaft dia.				Dimension table	
				(inch)		(mm)			
				min.	max.	min.	max.		
1 Pillow Block Units	(1) Pillow Block Units	with set screws with eccentric locking collar	UCP	1/2	4	12	140	P.82	
			NAP	1/2	2 15/16	12	75	P.88	
			NAP-E	1 3/16	2 15/16	–	–	P.90	
		with concentric locking collar Tapered bore (with adapter)	NAPK	1/2	2 15/16	12	75	P.92	
			NCP	3/4	2 7/16	20	60	P.94	
			UKP	3/4	4 1/2	20	125	P.96	
	(2) Thick Pillow Block Units	with set screws Tapered bore (with adapter)	UCIP	1 1/2	4	40	140	P.102	
			UKIP	1 1/4	4 1/2	35	125	P.104	
	(3) Tapped-Base Pillow Block Units	with set screws	UCPA	1/2	2	12	50	P.106	
			UCPAN	3/4	1 7/16	20	35	P.108	
		with concentric locking collar	NCPA	3/4	2	20	50	P.110	
			NCPAN	3/4	1 7/16	20	35	P.112	
	(4) High-Base Pillow Block Units	with set screws	UCPH	1/2	2	12	50	P.114	
	(5) Narrow Inner Ring Bearing Pillow Block Units	with set screws with eccentric locking collar	SBP-RKP8	3/4	1 1/2	20	40	P.116	
			SAP-FP9	3/4	2 3/16	20	55	P.116	
		with set screws with eccentric locking collar	SBPAN-RKP8	3/4	1 7/16	20	35	P.118	
			SAPAN-FP9	3/4	1 7/16	20	35	P.118	
	(6) Light Pillow Block Units	with set screws with eccentric locking collar	BLP	1/2	1 1/2	12	40	P.120	
			ALP	1/2	1 9/16	12	40	P.120	
	(7) Compact Pillow Block Units	with set screws	UP	–	–	10	30	P.122	
	(8) Corrosion Resistant Series Pillow Block Units	with set screws	UCSP-H1S6	1/2	2 7/16	12	60	P.124	
UCSPA-H1S6			1/2	1 9/16	12	40	P.126		
USP-S6			–	–	10	30	P.128		
UCVP-S6			3/4	2	20	50	P.130		
UCVP-ES7			3/4	2	20	50	P.132		
UCVPAN-ES7			3/4	1 7/16	20	35	P.134		
(9) Stamped Steel Pillow Block Units	with set screws with eccentric locking collar	SBPP	1/2	1 1/4	12	30	P.136		
		SAPP	1/2	1 1/4	12	30	P.136		
2 4-Bolt Flange Units	(1) 4-Bolt Flange Units	with set screws	UCF	1/2	4	12	140	P.138	
			UCF-E	1/2	3 7/16	12	85	P.144	
			NANF	1/2	2 7/16	12	60	P.148	
		with eccentric locking collar with concentric locking collar	NCF	3/4	2 7/16	20	60	P.150	
			NCF-E	3/4	2 7/16	20	60	P.152	
			UKF	3/4	4 1/2	20	125	P.154	
	(2) Square Piloted 4-Bolt Flange Units	with set screws Tapered bore (with adapter)	UCFS	1	4	25	140	P.160	
			UKFS	3/4	4 1/2	20	125	P.162	
	(3) Narrow Inner Ring Bearing 4-Bolt Flange Units	with set screws with eccentric locking collar	SBF-RKP8	3/4	1 1/2	20	40	P.164	
			SAF-FP9	3/4	2 3/16	20	55	P.164	
	(4) Corrosion Resistant Series 4-Bolt Flange Units	with set screws	UCSF-H1S6	3/4	2 7/16	20	60	P.166	
			UCSF-EH1S6	3/4	2 7/16	20	60	P.168	
			UCVF-S6	3/4	1 9/16	20	40	P.170	
			UCVF-ES7	3/4	1 9/16	20	40	P.172	
	3 Oval Flange Units	(1) 2-Bolt Flange Units	with set screws	UCFL	1/2	4	12	120	P.174
				UCFL-E	1/2	3 1/4	12	85	P.180
NANFL				1/2	2 3/16	12	55	P.184	
with eccentric locking collar with concentric locking collar			NCFL	3/4	2 7/16	20	60	P.186	
			NCFL-E	3/4	2 7/16	20	60	P.188	
			UKFL	3/4	4	20	110	P.190	
(2) Adjustable 2-Bolt Flange Units		with set screws	UCFA	1/2	2 3/16	12	55	P.194	
(3) 3-Bolt Flange Units		with set screws	UCFB	1/2	2	12	50	P.196	
(4) Narrow Inner Ring Bearing 2-Bolt Flange Units		with set screws with eccentric locking collar	SBFL-RKP8	3/4	1 1/2	20	40	P.198	
			SAFL-FP9	3/4	2 3/16	20	55	P.198	
(5) Light 3-Bolt Flange Units		with set screws with eccentric locking collar	SBTFD-H4RKP8	1/2	1 7/16	12	35	P.200	
			SATFD-FH4P9	1/2	1 7/16	12	35	P.200	
(6) Light 2-Bolt Flange Units		with set screws with eccentric locking collar	BLF	1/2	1 7/16	12	35	P.202	
			ALF	1/2	1 7/16	12	35	P.202	
(7) Compact 2-Bolt Flange Units		with set screws	UFL	–	–	8	30	P.204	
(8) Corrosion Resistant Series 2-Bolt Flange Units	with set screws	UCSFL-H1S6	1/2	2	12	50	P.206		
		UCSFL-EH1S6	1/2	2	12	50	P.208		
		USFL-S6	–	–	10	30	P.210		
		UCVFL-S6	3/4	1 9/16	20	40	P.212		
		UCVFL-ES7	3/4	1 9/16	20	40	P.214		
(9) Corrosion Resistant Series 3-Bolt Flange Units	with set screws	UCVFB-ES7	3/4	1 7/16	20	35	P.216		

Table 3.1 FYH Ball Bearing Units models (continued)

Model	Type	Bearing bore dia. Surface (fixing to shaft)	Model code	Shaft dia.				Dimension table
				(inch)		(mm)		
				min.	max.	min.	max.	
4 4-Bolt Flange Cartridge Units	(1) 4-Bolt Flange Cartridge Units	with set screws	UCFC	1/2	4	12	100	P.218
		with concentric locking collar Tapered bore (with adapter)	UCFCX-E UCFCF NCFC UKFC	1 7/8 3/4 3/4	4 2 3/16 2 7/16 3 1/2	25 25 20 20	100 55 60 90	P.222 P.224 P.226 P.228
	(2) Narrow Inner Ring Bearing 4-Bolt Flange Cartridge Units	with set screws with eccentric locking collar	SBFC-RKP8 SAFC-FP9	3/4 3/4	1 1/2 2 3/16	20 20	40 55	P.232 P.232
	(3) Corrosion Resistant Series 4-Bolt Flange Cartridge Units	with set screws	UCSFC-H1S6	3/4	1 9/16	20	40	P.234
5 Stamped Steel Flange Units	(1) Stamped Steel 3-Bolt Flange Cartridge Units	with set screws with eccentric locking collar	SBPF SAPF	1/2 1/2	1 7/16 1 7/16	12	35	P.236 P.236
		(2) Stamped Steel 2-Bolt Flange Units	with set screws with eccentric locking collar	SBPFL SAPFL	1/2 1/2	1 7/16 1 7/16	12	35
6 Take-Up Units	(1) Take-Up Units	with set screws	UCT	1/2	4	12	140	P.240
		with eccentric locking collar	UCT-E	1/2	3 7/16	12	85	P.246
		with concentric locking collar	NAT-E	1/2	2 15/16	12	75	P.250
			NCT	3/4	2 7/16	20	60	P.252
			NCT-E	3/4	2 7/16	20	60	P.254
			UKT	3/4	4 1/2	20	125	P.256
		Tapered bore (with adapter)						
	(2) Narrow Slot Take-Up Units	with set screws	UCTRS	7/8	1 7/16	25	35	P.260
	(3) Corrosion Resistant Series Take-Up Units	with set screws	UCST-H1S6	3/4	2	20	50	P.262
UCST-EH1S6			3/4	2	20	50	P.264	
	(4) Section Steel Frame Take-Up Units	with set screws	UCTH	1/2	2 1/2	12	65	P.266
	(5) Channel Steel Frame Take-Up Units	with set screws	UCTL	-	-	20	45	P.268
UCTU			-	-	40	90	P.270	
	(6) Steel Plate Frame Take-Up Units	with set screws	SBPTH	-	-	12	25	P.274
SBNPTH			-	-	12	25	P.276	
7 Other Units	(1) Cartridge Units	with set screws	UCC	1/2	4	12	140	P.278
		Tapered bore (with adapter)	UKC	3/4	4 1/2	20	125	P.282
	(2) Hanger Units	with set screws	UCHA	1/2	3	12	75	P.284

Table 3.2 Bearing insert models

Model	Type	Bearing bore dia. Surface (fixing to shaft)	Model code	Shaft dia.				Dimension table	
				(inch)		(mm)			
				min.	max.	min.	max.		
8 Ball Bearing Inserts	(1) UC inserts UC inserts (Stainless steel)	with set screws	UC	1/2	4	12	140	P.286	
		Tapered bore (with adapter)	UC-S6	1/2	2 7/16	12	60	P.294	
	(2) UK inserts		UK	3/4	4 1/2	20	125	P.306	
	(3) NC inserts	with concentric locking collar	NC	3/4	2 7/16	20	60	P.302	
	(4) NA inserts	with eccentric locking collar	NA	1/2	3	12	75	P.296	
	(5) SB inserts (Lightweight)	with set screws	SB	1/2	1 1/2	12	40	P.286	
			SB-RKP8	1/2	1 1/2	12	40	P.286	
	(6) SA inserts (Lightweight)	with eccentric locking collar	SA	1/2	1 9/16	12	40	P.296	
			SA-F	1/2	2 3/16	12	55	P.296	
		(7) SU inserts. Small size	with set screws	SU	-	-	8	30	P.286
		SU inserts. Small size (Stainless steel)		SU-S6	-	-	10	30	P.294
		(8) Cylindrical O.D. (with lubricating mechanism amd snap ring)	with set screws	ER	1/2	2 7/16	12	60	P.312
with concentric locking collar	ERC		3/4	2 7/16	20	60	P.304		
	(9) Cylindrical O.D.	with set screws	RB	1/2	1 9/16	12	40	P.312	
	(10) Standard	Cylindrical bore	SC	-	-	17	40	P.316	
	(11) Cylindrical O.D.	with set screws	SBB-RK	1/2	1 1/2	12	40	P.314	
with eccentric locking collar		SAA-F	1/2	2 3/16	12	55	P.314		
	(12) Adapter		H2300X	3/4	5	20	125	P.318	

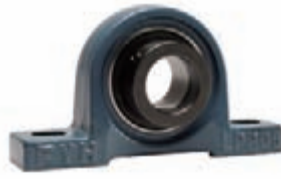
3 Models

(1 Pillow Block Units)

6 Light Pillow Block Units



BLP



ALP

BLP is a compact and lightweight pillow block unit which is ideal for limited space applications and light to moderate duty applications.

ALP with SA eccentric locking collar style is also available.

Duty: Light

7 Compact Pillow Block Units



UP

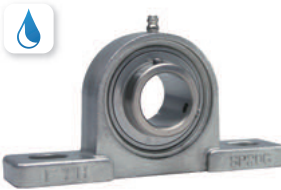


UP-C, CD

UP is a light duty pillow block unit that is part of the Clean Series. It has a zinc-alloy housing for a high level of corrosion resistance and it is capable of accepting end covers to increase contamination resistance.

Duty: Light

8 Corrosion Resistant Series Pillow Block Units



UCSP-H1S6



USP-S6

UCSP is a pillow block unit that is made entirely out of stainless steel components for the highest level of corrosion resistance for a mounted bearing unit. It is also pre-filled with food grade grease for food processing applications.

Duty: Standard



UCSPA-H1S6



UCVP-S6
UCVP-ES7

USP-S6 is a light duty stainless pillow block unit that is part of the Clean Series. It has a stainless housing for a high level of corrosion resistance and it is capable of accepting end covers to increase contamination resistance.

Duty: Light

UCSPA is a tapped-base pillow block unit with threaded bolt holes in the bottom of the housings. It is made entirely out of stainless steel components for the highest level of corrosion resistance for a mounted bearing unit. It is ideal for exact unit positioning and limited space applications. It is also pre-filled with food grade grease for food processing applications.

Duty: Standard



UCVPAN-ES7

UCVP and **UCVPAN** is a pillow block unit with a corrosion resistant thermoplastic housing and the option of either a stainless steel bearing insert or a zinc chromate plated bearing insert. Both bearing inserts offer a high level of corrosion resistance and they are factory lubricated with food grade grease.

Duty: Standard

9 Stamped Steel Pillow Block Units



SBPP



SAPP

SBPP is a pillow block unit with a lightweight and compact stamped steel housing for light to moderate duty applications. **SAPP** with SA eccentric locking collar style is also available.

Duty: Light

5 Light 3-Bolt Flange Units



SBTFD-H4RKP8



SATFD-FH4P9

SATFD is a compact and lightweight three-bolt flange unit with square bolt holes for carriage bolts and a ductile iron housing for added strength. It is ideal for limited space applications and light to moderate duty applications.
with ductile iron housing

Duty: Light

6 Light 2-Bolt Flange Units



BLF



ALF

BLF is a compact and lightweight two-bolt flange unit which is ideal for limited space applications and light to moderate duty applications.

ALF with SA eccentric locking collar style is also available.

Duty: Light

7 Compact 2-Bolt Flange Units



UFL



UFL-C, D

UFL is a light duty two-bolt flange unit that is part of the Clean Series. It has a zinc-alloy housing for a high level of corrosion resistance and it is capable of accepting end covers to increase contamination resistance.

Duty: Light

8 Corrosion Resistant Series 2-Bolt Flange Units



UCSFL-H1S6
UCSFL-EH1S6



USFL-S6

UCSFL is a two-bolt flange unit that is made entirely out of stainless steel components for the highest level of corrosion resistance for a mounted bearing unit. It is also pre-filled with food grade grease for food processing applications.

Duty: Standard

USFL-S6 is a light duty stainless two-bolt flange unit that is part of the Clean Series. It has a stainless housing for a high level of corrosion resistance and it is capable of accepting end covers to increase contamination resistance.

Duty: Light



UCVFL-S6
UCVFL-E57

UCVFL is a two-bolt flange unit with a corrosion resistant thermo-plastic housing and the option of either a stainless steel bearing insert or a zinc chromate plated bearing insert. Both bearing inserts offer a high level of corrosion resistance and they are factory lubricated with food grade grease.

Duty: Standard

7 **SU inserts (Small size)**



SU



SU-S6

with set screws

SU0...Standard type

Duty: Light

SU0-S6...Stainless steel

This deep groove ball bearing insert is intended for very light loads and is used in light duty conveying applications as part of our Clean Series. This bearing has a spherical O.D. and comes pre-lubricated from the factory. These inserts have a spherical O.D. with a wider inner ring and have no grease groove or grease holes for re-lubrication. Two setscrews at 120 degrees apart affix this insert to the shafting. The SU-S6 bearing is constructed of stainless steel material and is used as part of our stainless Clean Series. The stainless material is superior in corrosion resistance compared to the normal clean series insert.

8 ER inserts



ER



ERC

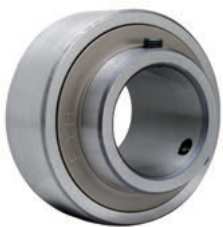
with set screws, cylindrical O.D. lubricating mechanism, locating snap ring and snap ring groove

ER2, ERC2

Duty: Standard

This deep groove ball bearing insert with a rubber seal and metal slinger come pre-lubricated with FYH grease. The ER series has a cylindrical O.D. with grease groove and grease holes outer ring for re-lubrication. The ER series uses two FYH Bullet Point type setscrews at 120 degrees apart to affix it to the shafting. The ER bearings have a snap ring on the outer ring to help make locating the bearing a simple task during installation. ERC with NU-LOC concentric locking collar style is also available.

9 RB inserts



RB

with set screws, cylindrical O.D.

RB2

Duty: Standard

This deep groove ball bearing insert with a rubber seal and metal slinger come pre-lubricated with FYH grease. The RB series has a cylindrical O.D. and has the same dimensions as the ER series but does not have a snap ring for locating or a grease groove and grease holes for re-lubrication. The RB series uses two FYH Bullet Point type setscrews at 120 degrees apart to affix it to the shafting.

6 Allowable Rotating Speed

6.1 Allowable Rotating Speed

The rotational speed of a bearing is limited by the temperature increase, mainly due to friction. When the bearing reaches the speed limits shown below, it will seize if operated continuously at these levels.

The limiting rotational speed is the maximum speed at which the bearing can be safely operated continuously.

These allowable rotational speeds of a ball bearing unit are dependent upon the dimensions of the bearing, type of seal, and the fit of the bearing inner ring to the shaft.

Table 6.1 shows the standard allowable rotating speeds of ball bearing units.

Table 6.1 Allowable rotating speed of ball bearing units (standard value)

Bore dia. code	UC type bearing, UC-S6 type bearing, UK type bearing, NC type bearing, NA type bearing, ER, RB type bearing									Unit: min ⁻¹	
	Standard type, heat resistant (D1K2), cold resistant type (D2K2) Standard blowers (S3), Heat-resistant (D9K2)			Triple lip seal type (L3)			Non contact seal (K3), Non contact seal for blowers (S5)			SA type bearing SB type bearing	SU type bearing SU-S6 type bearing
	Diameter series ³⁾			Diameter series ³⁾			Diameter series ³⁾			Diameter series ³⁾	Diameter series ³⁾
	2	X	3	2	X	3	2	X	3	2	0
8											10,000
00	–			–			–			–	10,000
01	5,800			2,300			8,700			6,800	8,000
02	5,800			2,300			8,700			6,800	6,600
03	5,800			2,300			8,700			6,800	5,800
04	5,800	–	–	2,300	–		8,700	–	–	5,800	5,000
05	5,100	4,300	4,600	2,100	960		7,700	6,400	6,700	5,100	4,000
06	4,300	3,700	3,900	960	830	–	6,400	5,500	5,800	4,300	3,300
07	3,700	3,300	3,400	830	750	770	5,500	5,000	5,100	3,700	–
08	3,300	3,100	3,100	750	690	690	5,000	4,600	4,600	3,300	
09	3,100	2,800	2,700	690	640	620	4,600	4,300	4,100	3,100	
10	2,800	2,500	2,400	640	570	550	4,300	3,800	3,700	2,800	
11	2,500	2,300	2,300	570	520	510	3,800	3,500	3,400		
12	2,300	2,200	2,100	520	490	470	3,500	3,200	3,100		
13	2,200	2,100	1,900	490	460	440	3,200	3,100	2,900		
14	2,100	2,000	1,800	460	440	410	3,100	2,900	2,700		
15	2,000	1,800	1,700	440	410	380	2,900	2,700	2,600		
16	1,800	1,700	1,600	410	380	360	2,700	2,600	2,400		
17	1,700	1,600	1,500	380	360	340	2,600	2,400	2,300		
18	1,600	1,500	1,400	360	340	320	2,400	2,300	2,100		
19	–	–	1,400	–	–	310	–	–	2,000		
20		1,300	1,300		300	280		2,000	1,900		
21		–	1,200		–	–		–	1,800		
22			1,100			250			1,700		
24			1,100			240			1,600		
26			1,000			220			1,500		
28			910			200			1,400		

Remarks 1. Allowable rotating speed of the units with covers is 80% of the value shown in the table above.

2. If a bearing unit is used with an excessively loose fit, allowable rotating speed must be corrected by multiplying it by the fitting factor f_c shown in **Table 6.2**.

3. The basic bearing size number consists of the duty code (2, X, or 3) followed by the inner ring size code (07, 10, 24, etc.)

8.3 Strength of Stamped Steel Housings

The precisely formed stamped steel housing is very rigid, but it is not as strong as cast iron or cast steel housings. Therefore, it will not support loads to the maximum rating of the bearing itself and must be down-rated per **Table 8.3**.

Table 8.3 Allowable load of steel plate housings (recommended)

Load direction	Allowable load of stamped steel housings
Radial	Approx. 1/6 of basic dynamic radial load rating of bearing (C_r)
Axial	Approx. 1/18 of basic dynamic radial load rating of bearing (C_r)

8.4 Strength of Stainless Steel Housings

FYH supplies stainless steel housings (SP-H1, SPA-H1, SF-H1, SFL-H1, ST-H1, SP, SFL).

Table 8.4 shows the safety factors for stainless steel products. As for the basic values of the static rupture strength of SP-H1, SPA-H1, SF-H1, SFL-H1, ST-H1, SFC-H1 type housings, apply P200 of **Fig. 8.1**, PA200 of **Fig. 8.3**, F200 of **Fig. 8.5**, FL200 of **Fig. 8.6** and T200 of **Fig. 8.7**. As for the basic values of the static rupture strength of SFC-H1 housings, apply F200 of **Fig. 8.5**. For the basic values of the static rupture strength of the SP and SFL type housings, see P000~P006 of **Fig. 8.12** and FL000~FL006 of **Fig. 8.13** and multiply them by 1.5 respectively.

Table 8.4 Safety factor of stainless steel products

Property of load	Safety factor of stainless steel products
Static load	3
With vibration	5
With impact	10

8.5 Strength of Die-cast Housings

The clean series housing is made of die-cast zinc alloy, but the zinc alloy material is not as strong as cast iron or cast steel. **Table 8.5** shows safety factors for die-cast zinc alloy, and **Fig. 8.12** and **8.13** show the basic values of the static rupture strength of the die-cast zinc alloy housing.

Table 8.5 Safety factor of zinc alloy die-cast products

Property of load	Safety factor of die-cast products
Static load	8
With vibration	15
With impact	20

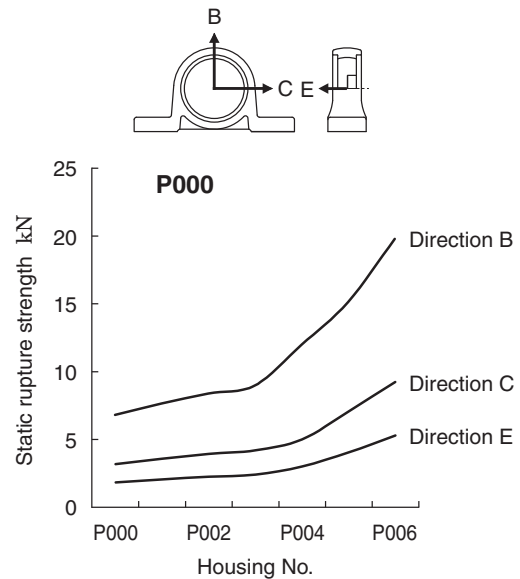


Fig. 8.12 Static rupture strength of clean housings (P)

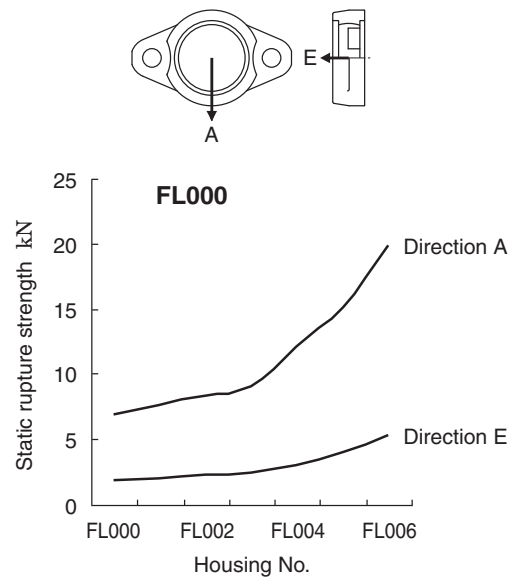


Fig. 8.13 Static rupture strength of clean housings (FL)

11 Accuracy and Internal Clearance

Accuracy of a ball bearing unit is specified in JIS B 1558 (ball bearings for ball bearing units) and JIS B 1559 (housings for ball bearing units). FYH produces products conforming to these standards.

11.1 Accuracy of Bearings

Table 11.1 to Table 11.4 shows the accuracy of a ball bearings for ball bearing units.

Ball bearings for blowers (special code: S3, S5) are produced with greater accuracy than standard models (see Table 11.3).

Table 11.5 shows the tolerance limitations of inner rings for cylindrical bore bearings.

Table 11.2 Tolerances and tolerance values of outer rings of ball bearings inserts

Unit: μm

Nominal bearing outer dia. D (mm)		Variation of tolerance of average outer dia. ΔD_m		Radial runout of outer ring K_{ea}
Over	Incl.	Max.	Min.	Max.
18	30	0	-9	15
30	50	0	-11	20
50	80	0	-13	25
80	120	0	-15	35
120	150	0	-18	40
150	180	0	-25	45
180	250	0	-30	50
250	315	0	-35	60

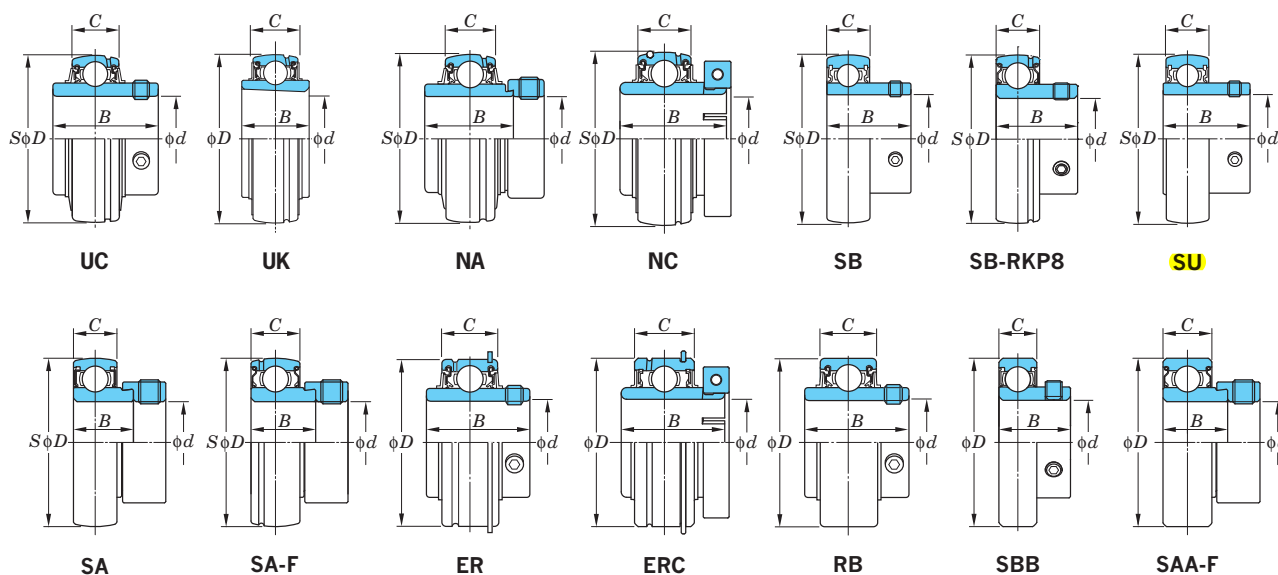
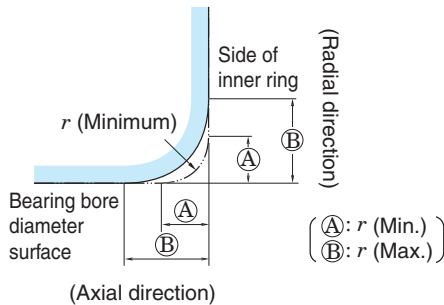


Table 11.1 Tolerances and tolerance values of inner rings of ball bearings for ball bearing units

Unit: μm

Nominal bearing bore dia. d (mm)		Variation of tolerance of average bore dia. in plane Δd_{mp}		Unequal bore dia. in plane V_{dsp}	Variation of tolerance of eccentricity on eccentric surface of inner ring and eccentric locking collar ΔH_s		Variation of tolerance of inner ring width ΔB_s		Radial runout of inner ring K_{ia}
Over	Incl.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.
-	10	+15	0	10	+100	-100	0	-120	10
10	18	+15	0	10	+100	-100	0	-120	15
18	31.75	+18	0	12	+100	-100	0	-120	18
31.75	50.8	+21	0	14	+100	-100	0	-120	20
50.8	80	+24	0	16	+100	-100	0	-150	25
80	120	+28	0	19	+100	-100	0	-200	30
120	180	+33	0	22	+100	-100	0	-250	35

Table 11.5 Tolerance limitations for radius dimensions for the inner ring of cylindrical bore bearings



Unit: mm

r (Min.)	r (Max.)	
	Radial direction	Axial direction
0.6	1	2
1	1.5	3
1.1	2	3.5
1.5	2.3	4
2	3	4.5
2.1	4	6.5
2.5	3.8	6
3	5	8
4	6.5	9

Remark Though accurate profile of chamfered surface is not specified, the profile on the axial plane should not exceed the virtual arc of radius r (minimum) that contacts with the side of inner ring and the bearing bore diameter surface.

11.2 Accuracy of Housings

This section details the tolerance specifications of the inner diameter of the spherical bore of FYH housings. These values determine how tight or how loose the bearing fits inside the housing.

Table 11.6 shows the tolerance of the diameter of the spherical bore of housings.

Standard tolerance for mounted units, between the outer diameter of the bearing and the inner diameter of the housing, is a class J7 intermediate fit.

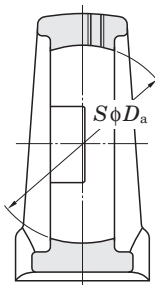
A class H7 tolerance allows greater clearance for applications where minor shaft alignment constantly occurs or in environments where higher temperatures can cause thermal expansion. An anti-rotation pin on the outer ring of the bearing is supplied with these units to prevent the outer ring of the bearing from spinning inside the housing.

A class K7 tolerance allows less clearance and is recommended to prevent the outer ring of the bearing from rotating inside the housing.

Fig. 11.1 shows examples of housing dimensions relative to installation position with tolerance values.

Table 11.6 Allowance of spherical bore diameter of housings

Unit: μm



Nominal dia. of spherical bore D_a (mm)		Tolerance class H7		Tolerance class J7		Tolerance class K7	
		Variation of tolerance of spherical bore dia. ΔD_{dam}		Variation of tolerance of spherical bore dia. ΔD_{dam}		Variation of tolerance of spherical bore dia. ΔD_{dam}	
Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.
18	30	+21	0	+12	-9	+6	-15
30	50	+25	0	+14	-11	+7	-18
50	80	+30	0	+18	-12	+9	-21
80	120	+35	0	+22	-13	+10	-25
120	180	+40	0	+26	-14	+12	-28
180	250	+46	0	+30	-16	+13	-33
250	315	+52	0	+36	-16	+16	-36

Remark FYH selects J, H, or K depending on the applications.

11.3 Internal Bearing Clearance

Internal bearing clearance is defined as the allowable space between the bearing balls and the raceways. The degree of internal clearance, referred to as “operation clearance”, greatly influences operational life of the bearing as well as characteristics of heat, noise, and vibration.

If the clearance is exceptionally tight between the shaft and the inner ring of the bearing then expansion of the inner ring must be taken into consideration and the correct ball clearance should be selected. Transmission heat from the shaft is also a factor to consider when determining the correct amount of ball clearance (see “7 Operating temperature and bearing specifications”).

Table 11.8 shows the internal clearance applicable to specific operating conditions and Table 11.9 shows the available options for internal clearance.

Table 11.8 Internal clearance applicable to specific operating conditions

Type	Applicable internal clearance	
	Bearing with cylindrical bore	Bearing with tapered bore
Standard type	CN	C3
NC	CN	–
Stainless steel type	C3	–
Heat resistant type (suffix code: D1K2)	C4	C5
Heat resistant type (suffix code: D9K2)	C4	C5
Cold resistant type (suffix code: D2K2)	CN	C3
High speed type (suffix code: K3)	CN	C3
For blower (suffix code: S3)	CN	C3
For high speed blower (suffix code: S5)	C2	C3

Remark For bearings with suffix codes, as those indicated above, the clearance is implied and not indicated in the part number.

Table 11.9 Available options for internal clearance

Unit: μm

Nominal bearing bore dia. d (mm)		Internal clearance											
		C2		CN		GN		C3		C4		C5	
Over	Incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
6	10	0	7	2	13	–	–	8	23	14	29	20	37
10	18	0	9	3	18	10	25	11	25	18	33	25	45
18	24	0	10	5	20	12	28	13	28	20	36	28	48
24	30	1	11	5	20	12	28	13	28	23	41	30	53
30	40	1	11	6	20	13	33	15	33	28	46	40	64
40	50	1	11	6	23	14	36	18	36	30	51	45	73
50	65	1	15	8	28	18	43	23	43	38	61	55	90
65	80	1	15	10	30	20	51	25	51	46	71	65	105
80	100	1	18	12	36	24	58	30	58	53	84	75	120
100	120	2	20	15	41	28	66	36	66	61	97	90	140
120	140	2	23	18	48	33	81	41	81	71	114	105	160

Remarks 1. Radial internal clearance in this table conforms to JIS B 1558 (ball bearing inserts).

2. Increase in radial internal clearance generated by measured load conforms to the table below. Smaller correction of C2 clearance is applicable to the minimum clearance, while larger correction is applicable to the maximum clearance.

Unit: μm

Nominal bearing bore dia. d (mm)		Measured load	Correction of clearance					
			N	C2	CN	GN, C3	C4	C5
2.5	18	24.5	3 – 4	4			4	
18	50	49	4 – 5	5			6	
50	280	147	6 – 8	8			9	

12 Materials

12.1 Bearing Material

Ball bearing inserts are comprised of inner and outer rings, balls, and steel ball cages all of which are made from the highest quality of bearing steel.

These bearings possess the following features.

- (1) High elastic limit to resist strong opposing force
- (2) High rolling fatigue strength to allow for heavy loads
- (3) Superior hardness
- (4) Superior wear resistance
- (5) Superior toughness against impact and shock loads
- (6) Superior precision of dimensional tolerances

High carbon chrome bearing steel is utilized for the bearing components as specified in JIS (Japanese Industrial Standards).

To increase reliability and reduce contamination within the material, a vacuum degassing process is executed to reduce non-metallic elements and any oxygen in the steel.

After the bearing is assembled it is heat tempered and quenched until the hardness reaches 60HRC.

Table 12.1 shows the chemical components of high carbon chrome bearing steel. Stainless steel bearing inserts (suffix: S6) utilize superior corrosion resistant JIS certified stainless steel.

Riveted steel ball cages are made of JIS certified cold rolled steel which is shown in **Table 12.2**.

12.2 Housing Material

FYH housings are made primarily of gray cast iron, and stamped steel. Gray cast iron is the most popular choice for mounted units because of its optimal characteristics of vibration absorption, high strength, and excellent heat dissipation.

Table 12.3 shows the mechanical properties of gray cast iron (FC200).

Nodular graphite cast iron, or ductile iron, (FCD450-10 of JIS G 5502) provides a good combination of rigidity and fracture resistance, and it is suitable where heavy vibration or impact forces are present.

Housings for units within the Clean Series are available

in die-cast zinc alloy as well as stainless steel. Housing material for stamped steel units consists of thick gauge cold rolled sheet steel and steel strip.

Table 12.4 to **12.8** show the mechanical properties of these housing materials.

Table 12.1 Chemical components of high carbon chrome bearing steel (JIS G 4805)

Code	Chemical components (%)						
	C	Si	Mn	P	S	Cr	Mo
SUJ 2	0.95– 1.10	0.15– 0.35	0.50 or less	0.025 or less	0.025 or less	1.30– 1.60	–
SUJ 3	0.95– 1.10	0.40– 0.70	0.90– 1.15	0.025 or less	0.025 or less	0.90– 1.20	–

Table 12.2 Chemical components of cold rolled steel and steel strip (SPCC) (JIS G 3141)

Code	Chemical components (%)						
	C	Si	Mn	P	S	Ni	Cr
SPCC	0.15 or less	–	0.60 or less	0.100 or less	0.050 or less	–	–
SPCD	0.12 or less	–	0.50 or less	0.040 or less	0.040 or less	–	–

Table 12.3 Mechanical properties of gray cast iron (FC200)

Type code	Tensile strength N/mm ²	Hardness HB
FC200	200 or more	223 or less

Table 12.4 Mechanical properties of cast carbon steel products (JIS G 3101)

Type code	Yielding point or bearing force N/mm ²			Tensile strength N/mm ²	Thickness of steel mm	Tensile test piece	Elongation %	Bending property		
	Thickness of steel mm							Bending angle	Inside dia.	Test piece
	incl. 16	Over 16 incl. 40	Over 40							
SS400	245 or more	235 or more	215 or more	400– 510	Over 5, 16 max.	No.1A	17 or more	180°	1.5 times of thickness	No.1
					Over 16, 40 max.	No.1A	21 or more			
					Over 40	No.4	23 or more			

Table 12.5 Mechanical properties of zinc alloy die-cast (ZDC02) (JIS H 5301) (Reference)

Code	Tensile strength N/mm ²	Elongation %	Impact N · m/cm ²	Hardness HB
ZDC2	285	10	140	82

Table 12.6 Mechanical properties of stainless cast steel products (SCS 13, SCS 14) (JIS G 5121)

Type code	Bearing force N/mm ²	Tensile strength N/mm ²	Elongation %	Hardness HB
SCS 13	185 or more	440 or more	30 or more	183 or less
SCS 14	185 or more	440 or more	28 or more	183 or less

Correspondence standards

SCS 13: ISO GX5CrNi 19 9, ASTM CF-8 (AISI 304)

SCS 14: ISO GX5CrNiMo 19 11 2, ASTM CF-8M (AISI 316)

Table 12.7 Mechanical properties of cold rolled sheet steel and steel strip (SPCC) (JIS G 3141)

Type code	Tensile strength N/mm ²	Elongation %
SPCC	270 or more	34 or more
SPCD	270 or more	36 or more

Table 12.8 Mechanical properties of ductile cast iron (FCD450-10) (JIS G 5502)

Type code	Tensile strength N/mm ²	Elongation %
FCD	450 or more	10 or more

12.3 Materials of Parts and Accessories

Table 12.9 shows materials of parts and accessories of a ball bearing unit.

Table 12.9 Materials of parts and accessories of ball bearing units

Designations	Materials	Code	Standard code
Seal (standard type)	Nitrile rubber	NBR	–
Seal (heat resistant, cold resistant)	Silicone rubber	VMQ	–
Slinger (flinger)	Cold rolled steel plate and steel strip	SPCC	JIS G 3141
Stainless steel slinger (flinger)	Cold rolled stainless steel plate and steel strip	SUS304-CP, SUS304-CS	JIS G 4305
Steel plate cover	Cold rolled steel plate and steel strip	SPCD	JIS G 3141
Stainless steel plate cover	Cold rolled stainless steel plate and steel strip	SUS304-CP, SUS304-CS	JIS G 4305
Cast iron cover	Gray cast iron products	FC200	JIS G 5501
Hexagon socket set screw	Chrome molybdenum steel	SCM435	JIS G 4053
Stainless steel hexagon socket set screw	Stainless bar steel	SUS304	JIS G 4303
Adapter sleeve for bearing	Mechanical structural carbon steel	S17C	JIS G 4051
Lock nut for bearing	Mechanical structural carbon steel	S17C	JIS G 4051
Washer for bearing	Cold rolled steel plate and steel strip	SPCC	JIS G 3141
Locking collar	Mechanical structural carbon steel	S17C	JIS G 4051
Grease fitting	Copper and copper alloy rod	SUM24L	JIS G 4804

15 Dimensional Tables for Ball Bearing Units

1 Pillow Block Units

Pillow Block Units

UCP (*d* 12 ~ 140) 82
 NAP (*d* 12 ~ 75) 88
 NAP-E (*d* 1 3/16 ~ 2 15/16) 90
 NAPK (*d* 12 ~ 75) 92
 NCP (*d* 20 ~ 60) 94
 UKP (*d*₁ 20 ~ 125) 96

Thick Pillow Block Units

UCIP (*d* 40 ~ 140) 102
 UKIP (*d*₁ 35 ~ 125) 104

Tapped-Base Pillow Block Units

UCPA (*d* 12 ~ 50) 106
 UCPAN (*d* 20 ~ 35) 108
 NCPA (*d* 20 ~ 50) 110
 NCPAN (*d* 20 ~ 35) 112

High-Base Pillow Block Units

UCPH (*d* 12 ~ 50) 114

Narrow Inner Ring Bearing Pillow Block Units

SBP-RKP8 (*d* 20 ~ 40) 116
 SAP-FP9 (*d* 20 ~ 55) 116
 SBPAN-RKP8 (*d* 20 ~ 35) 118
 SAPAN-FP9 (*d* 20 ~ 35) 118

Light Pillow Block Units

BLP (*d* 12 ~ 40) 120
 ALP (*d* 12 ~ 40) 120

Compact Pillow Block Units

UP (*d* 10 ~ 30) 122

Corrosion Resistant Series Pillow Block Units

UCSP-H1S6 (*d* 12 ~ 60) 124
 UCSPA-H1S6 (*d* 12 ~ 40) 126
 USP-S6 (*d* 10 ~ 30) 128
 UCVP-S6 (*d* 20 ~ 50) 130
 UCVP-ES7 (*d* 20 ~ 50) 132
 UCVPAN-ES7 (*d* 20 ~ 35) 134

Stamped Steel Pillow Block Units

SBPP (*d* 12 ~ 30) 136
 SAPP (*d* 12 ~ 30) 136

2 4-Bolt Flange Units

4-Bolt Flange Units

UCF (*d* 12 ~ 140) 138
 UCF-E (*d* 12 ~ 85) 144
 NANF (*d* 12 ~ 60) 148
 NCF (*d* 20 ~ 60) 150
 NCF-E (*d* 20 ~ 60) 152
 UKF (*d*₁ 20 ~ 125) 154

Square Piloted 4-Bolt Flange Units

UCFS (*d* 25 ~ 140) 160
 UKFS (*d*₁ 20 ~ 125) 162

Narrow Inner Ring Bearing 4-Bolt Flange Units

SBF-RKP8 (*d* 20 ~ 40) 164
 SAF-FP9 (*d* 20 ~ 55) 164

Corrosion Resistant Series 4-Bolt Flange Units

UCSF-H1S6 (*d* 20 ~ 60) 166
 UCSF-EH1S6 (*d* 20 ~ 60) 168
 UCVF-S6 (*d* 20 ~ 40) 170
 UCVF-ES7 (*d* 20 ~ 40) 172

3 Oval Flange Units

2-Bolt Flange Units

UCFL (*d* 12 ~ 120) 174
 UCFL-E (*d* 12 ~ 85) 180
 NANFL (*d* 12 ~ 55) 184
 NCFL (*d* 20 ~ 60) 186
 NCFL-E (*d* 20 ~ 60) 188
 UKFL (*d*₁ 20 ~ 110) 190

Adjustable 2-Bolt Flange Units

UCFA (*d* 12 ~ 55) 194

3-Bolt Flange Units

UCFB (*d* 12 ~ 50) 196

Narrow Inner Ring Bearing 2-Bolt Flange Units

SBFL-RKP8 (*d* 20 ~ 40) 198
 SAFL-FP9 (*d* 20 ~ 55) 198

Light 3-Bolt Flange Units

SBTFD-H4RKP8 (*d* 12 ~ 35) 200
 SATFD-FH4P9 (*d* 12 ~ 35) 200

Light 2-Bolt Flange Units

BLF (*d* 12 ~ 35) 202
 ALF (*d* 12 ~ 35) 202

Compact 2-Bolt Flange Units

UFL (*d* 8 ~ 30) 204

Corrosion Resistant Series 2-Bolt Flange Units

UCSFL-H1S6 (*d* 12 ~ 50) 206
 UCSFL-EH1S6 (*d* 12 ~ 50) 208
 USFL-S6 (*d* 10 ~ 30) 210
 UCVFL-S6 (*d* 20 ~ 40) 212
 UCVFL-ES7 (*d* 20 ~ 40) 214

Corrosion Resistant Series 3-Bolt Flange Units

UCVFB-ES7 (*d* 20 ~ 35) 216

4 4-Bolt Flange Cartridge Units

4-Bolt Flange Cartridge Units

UCFC (<i>d</i> 12 ~ 100)	218
UCFCX-E (<i>d</i> 25 ~ 100)	222
UCFCF (<i>d</i> 25 ~ 55)	224
NCFC (<i>d</i> 20 ~ 60)	226
UKFC (<i>d</i> ₁ 20 ~ 90)	228

Narrow Inner Ring Bearing

4-Bolt Flange Cartridge Units

SBFC-RKP8 (<i>d</i> 20 ~ 40)	232
SAPF-FP9 (<i>d</i> 20 ~ 55)	232

Corrosion Resistant Series

4-Bolt Flange Cartridge Units

UCSFC-H1S6 (<i>d</i> 20 ~ 40)	234
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5 Stamped Steel Flange Units

Stamped Steel 3-Bolt Flange Cartridge Units

SBPF (<i>d</i> 12 ~ 35)	236
SAPF (<i>d</i> 12 ~ 35)	236

Stamped Steel 2-Bolt Flange Units

SBPFL (<i>d</i> 12 ~ 35)	238
SAPFL (<i>d</i> 12 ~ 35)	238

6 Take-Up Units

Take-Up Units

UCT (<i>d</i> 12 ~ 140)	240
UCT-E (<i>d</i> 12 ~ 85)	246
NAT-E (<i>d</i> 12 ~ 75)	250
NCT (<i>d</i> 20 ~ 60)	252
NCT-E (<i>d</i> 20 ~ 60)	254
UKT (<i>d</i> ₁ 20 ~ 125)	256

Narrow Slot Take-Up Units

UCTRS (<i>d</i> 25 ~ 35)	260
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Corrosion Resistant Series Take-Up Units

UCST-H1S6 (<i>d</i> 20 ~ 50)	262
UCST-EH1S6 (<i>d</i> 20 ~ 50)	264

Section Steel Frame Take-Up Units

UCTH (<i>d</i> 12 ~ 65)	266
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Channel Steel Frame Take-Up Units

UCTL (<i>d</i> 20 ~ 45)	268
UCTU (<i>d</i> 40 ~ 90)	270

Steel Plate Frame Take-Up Units

SBPTH (<i>d</i> 12 ~ 25)	274
SBNPTH (<i>d</i> 12 ~ 25)	276

7 Other Units

Cartridge Units

UCC (<i>d</i> 12 ~ 140)	278
UKC (<i>d</i> 20 ~ 125)	282

Hanger Units

UCHA (<i>d</i> 12 ~ 75)	284
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8 Ball Bearing Inserts

Cylindrical bore (with set screws)

UC, SB, SB-RKP8, SU (<i>d</i> 8 ~ 140)	286
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Stainless steel series Cylindrical bore (with set screws)

UC-S6, SU-S6 (<i>d</i> 10 ~ 60)	294
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Cylindrical bore (with eccentric locking collar)

SA, SA-F, NA (<i>d</i> 12 ~ 75)	296
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Cylindrical bore (with concentric locking collar)

NC2 (<i>d</i> 20 ~ 60)	302
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Cylindrical bore (with concentric locking collar)

Cylindrical O. D.

ERC (<i>d</i> 20 ~ 60)	304
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Tapered bore (with adapter)

UK (<i>d</i> ₁ 20 ~ 125)	306
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Cylindrical bore (with set screws)

Cylindrical O. D.

ER, RB (<i>d</i> 12 ~ 60)	312
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Cylindrical bore (with set screws)

Cylindrical O. D.

SBB-RK (<i>d</i> 12 ~ 55)	314
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Cylindrical bore (with eccentric locking collar)

Cylindrical O. D.

SAA-FP7 (<i>d</i> 12 ~ 55)	314
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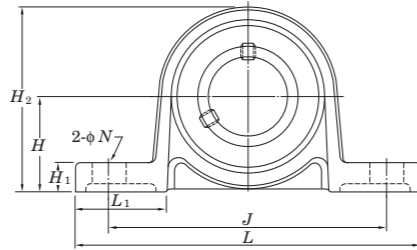
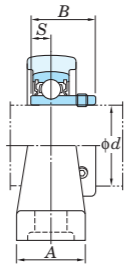
Cylindrical bore

SC (<i>d</i> 17 ~ 40)	316
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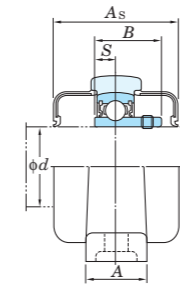
9 Bearing Adapter

H2300X (<i>d</i> ₁ 20 ~ 125)	318
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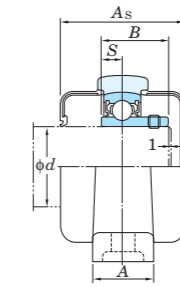
UP
Cylindrical bore (with set screws)
 d 10 ~ 30 mm



With Through Type Cover



With One Side Sealed Cover



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s) and variations of tolerance of distance between centers of bolt holes (ΔL_s)

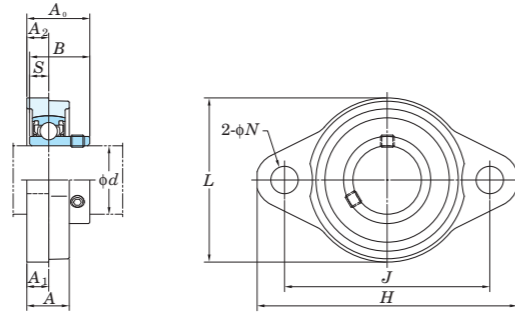
Housing No.	ΔH_s	ΔL_s
P000~P006	± 0.15	± 0.3

Unit: mm

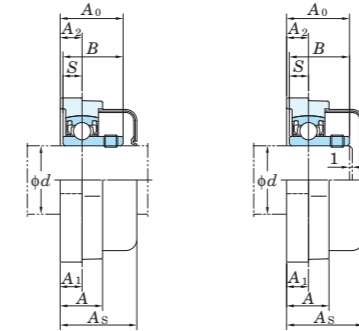
Shaft Dia. mm d	Dimensions inch mm										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Rubber Coated Cover				
	H	L	A	J	N	H_1	H_2	L_1	B	S		Unit No.	Housing No.	Bearing No.		Open Type	One Side Closed Type		Dimension mm A_s	inch	Mass kg		
10	$45/64$	$2\ 5/8$	$5/8$	$2\ 3/32$	$9/32$	$1/4$	$1\ 3/8$	$23/32$	0.591	0.197	$1/4$	UP000	P000	SU000		4.55	1.95	12.3	UP000C	UP000CD	29	$1\ 5/32$	0.07
	18	67	16	53	7	6	35	18	15	5	M6												
12	$3/4$	$2\ 25/32$	$5/8$	$2\ 13/64$	$9/32$	$1/4$	$1\ 1/2$	$3/4$	0.591	0.197	$1/4$	UP001	P001	SU001		5.10	2.40	13.2	UP001C	UP001CD	29	$1\ 5/32$	0.09
	19	71	16	56	7	6	38	19	15	5	M6												
15	$55/64$	$3\ 5/32$	$5/8$	$2\ 31/64$	$9/32$	$9/32$	$1\ 11/16$	$13/16$	0.650	0.217	$1/4$	UP002	P002	SU002		5.60	2.85	13.9	UP002C	UP002CD	31	$1\ 7/32$	0.11
	22	80	16	63	7	7	43	21	16.5	5.5	M6												
17	$15/16$	$3\ 11/32$	$23/32$	$2\ 41/64$	$9/32$	$9/32$	$1\ 27/32$	$13/16$	0.689	0.236	$1/4$	UP003	P003	SU003		6.00	3.25	14.4	UP003C	UP003CD	33	$1\ 5/16$	0.15
	24	85	18	67	7	7	47	21	17.5	6	M6												
20	$1\ 7/64$	$3\ 15/16$	$25/32$	$3\ 5/32$	$13/32$	$11/32$	$2\ 5/32$	$31/32$	0.827	0.276	$5/16$	UP004	P004	SU004		9.40	5.05	13.9	UP004C	UP004CD	38	$1\ 1/2$	0.23
	28	100	20	80	10	9	55	25	21	7	M8												
25	$1\ 17/64$	$4\ 13/32$	$25/32$	$3\ 35/64$	$13/32$	$13/32$	$2\ 7/16$	$1\ 3/32$	0.866	0.276	$5/16$	UP005	P005	SU005		10.1	5.85	14.5	UP005C	UP005CD	40	$1\ 9/16$	0.28
	32	112	20	90	10	10	62	28	22	7	M8												
30	$1\ 27/64$	$5\ 3/16$	$1\ 1/32$	$4\ 11/64$	$1/2$	$7/16$	$2\ 3/4$	$1\ 11/32$	0.965	0.295	$3/8$	UP006	P006	SU006		13.2	8.25	14.7	UP006C	UP006CD	44	$1\ 23/32$	0.42
	36	132	26	106	13	11	70	34	24.5	7.5	M10												

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.62.)
2. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UFL
Cylindrical bore (with set screws)
 $d \sim 30 \text{ mm}$



With Through Type Cover With One Side Sealed Cover



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and variations of tolerance of distance between centers of bolt holes (ΔJ_s)

Housing No.	ΔA_{2s}	ΔJ_s
FL08	±0.5	±0.3
FL000~FL006		

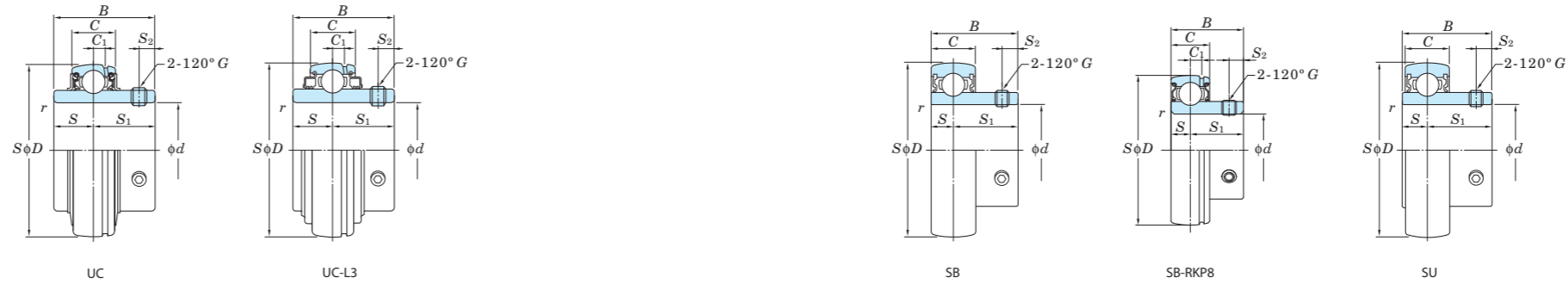
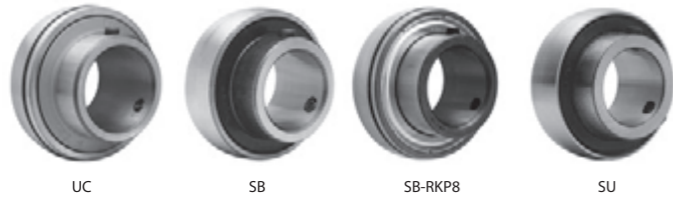
Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
FL08	±0.2
FL000~FL006	

Shaft Dia. mm d	Dimensions inch mm										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Rubber Coated Cover			
	H	L	A	J	N	A_1	A_2	A_0	B	S		Unit No.	Housing No.	Bearing No.		C_r	C_{0r}		Unit No. Open Type	Unit No. Closed Type	Dimension mm A_s	Dimension inch
8	1 7/8	1 1/16	1 1/32	1 29/64	3/16	5/32	5/32	1/2	0.472	0.1378	No.8	UFL08	FL08	SU08				-	-	-	-	
	48	27	8.5	37	4.8	4	4	12.5	12	3.5	M4											
10	2 3/8	1 13/32	1 5/32	1 49/64	9/32	1/4	15/64	5/8	0.591	0.197	1/4	UFL000	FL000	SU000				UFL000C	UFL000D	20.5	13/16	0.05
	60	36	12	45	7	6	6	16	15	5	M6											
12	2 15/32	1 1/2	1 5/32	1 57/64	9/32	1/4	15/64	5/8	0.591	0.197	1/4	UFL001	FL001	SU001				UFL001C	UFL001D	20.5	13/16	0.07
	63	38	12	48	7	6	6	16	15	5	M6											
15	2 3/8	1 21/32	1/2	2 3/32	9/32	1/4	1/4	1 1/16	0.650	0.217	1/4	UFL002	FL002	SU002				UFL002C	UFL002D	22	7/8	0.09
	67	42	13	53	7	6.5	6.5	17.5	16.5	5.5	M6											
17	2 25/32	1 13/16	9/16	2 13/64	9/32	9/32	9/32	23/32	0.689	0.236	1/4	UFL003	FL003	SU003				UFL003C	UFL003D	23.5	15/16	0.11
	71	46	14	56	7	7	7	18.5	17.5	6	M6											
20	3 17/32	2 5/32	5/8	2 51/64	13/32	5/16	5/16	7/8	0.827	0.276	5/16	UFL004	FL004	SU004				UFL004C	UFL004D	27	1 1/16	0.18
	90	55	16	71	10	8	8	22	21	7	M8											
25	3 3/4	2 3/8	5/8	2 61/64	13/32	5/16	5/16	29/32	0.866	0.276	5/16	UFL005	FL005	SU005				UFL005C	UFL005D	28	1 3/32	0.23
	95	60	16	75	10	8	8	23	22	7	M8											
30	4 13/32	2 3/4	23/32	3 11/32	1/2	1 1/32	23/64	1 1/32	0.965	0.295	3/8	UFL006	FL006	SU006				UFL006C	UFL006D	31	1 7/32	0.31
	112	70	18	85	13	9	9	26	24.5	7.5	M10											

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P62.)
2. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UC, SB, SB-RKP8, SU
Cylindrical bore (with set screws)
 $d \sim 25 \text{ mm}$



Shaft Dia. mm inch d	Dimensions						Basic Load Ratings kN		Factor f_0	Bearing No.		Dimensions						Set Screw Brg. Bore G		Mass kg
	D mm inch	B mm inch	C mm inch	r (min.) mm inch	C_r	C_{0r}	Standard	L3 Type		C_1 mm inch	S mm inch	S_1 mm inch	S_2 mm inch	mm inch	inch					
8	22	12	7	0.3	3.27	1.37	SU08										0.012			
10	26	15	8	0.3	4.55	1.95	SU000										0.024			
12	28	15	8	0.3	5.10	2.40	SU001										0.026			
	40	22	12	0.6	9.55	4.80	SB201										0.10			
	40	22	13	0.6	9.55	4.80	SB201RKP8										0.10			
12	47	31	16	0.6	12.8	6.65	UC201	UC201L2									0.21			
	40	22	12	0.6	9.55	4.80	SB201-8										0.10			
	40	22	13	0.6	9.55	4.80	SB201-8RKP8										0.10			
15	47	31	16	0.6	12.8	6.65	UC201-8	UC201-8L2									0.21			
	32	16.5	9	0.3	5.60	2.85	SU002										0.038			
	40	22	12	0.6	9.55	4.80	SB202										0.10			
15	40	22	13	0.6	9.55	4.80	SB202RKP8										0.10			
	47	31	16	0.6	12.8	6.65	UC202	UC202L2									0.19			
	40	22	12	0.6	9.55	4.80	SB202-10										0.10			
17	40	22	13	0.6	9.55	4.80	SB202-10RKP8										0.10			
	47	31	16	0.6	12.8	6.65	UC202-10	UC202-10L2									0.19			
	35	17.5	10	0.3	6.00	3.25	SU003										0.050			
17	40	22	12	0.6	9.55	4.80	SB203										0.10			
	40	22	13	0.6	9.55	4.80	SB203RKP8										0.10			
	47	31	16	0.6	12.8	6.65	UC203	UC203L2									0.18			
20	47	25	14	1	12.8	6.65	SB204-12										0.15			
	47	25	15	1	12.8	6.65	SB204-12RKP8										0.19			
	47	31	16	1	12.8	6.65	UC204-12	UC204-12L2									0.16			
20	42	21	12	0.6	9.40	5.05	SU004										0.080			
	47	25	14	1	12.8	6.65	SB204										0.15			
	47	25	15	1	12.8	6.65	SB204RKP8										0.19			
25	47	31	16	1	12.8	6.65	UC204	UC204L2									0.16			
	52	27	15	1	14.0	7.85	SB205-14										0.18			
	52	27	15	1	14.0	7.85	SB205-14RKP8										0.19			
25	52	27	15	1	14.0	7.85	UC205-14	UC205-14L2									0.23			
	52	27	15	1	14.0	7.85	SB205-15										0.18			
	52	27	15	1	14.0	7.85	SB205-15RKP8										0.19			
25	52	27	15	1	14.0	7.85	UC205-15	UC205-15L2									0.21			
	47	22	12	0.6	10.1	5.85	SU005										0.10			
	52	27	15	1	14.0	7.85	SB205										0.18			
25	52	27	15	1	14.0	7.85	SB205RKP8										0.19			
	52	27	15	1	14.0	7.85	UC205	UC205L2									0.20			
	62	38	22	1.1	21.2	10.9	UC305										0.45			
25	62	38.1	19	1	19.5	11.3	UCX05	UCX05L3									0.39			
	52	27	15	1	14.0	7.85	SB205-16										0.18			
	52	27	15	1	14.0	7.85	SB205-16RKP8										0.19			
25	52	27	15	1	14.0	7.85	UC205-16	UC205-16L2									0.20			
	62	38	22	1.1	21.2	10.9	UC305-16										0.44			
	62	38.1	19	1	19.5	11.3	UCX05-16	UCX05-16L3									0.38			
25	62	30	16	1	19.5	11.3	SB206-18										0.27			
	62	30	18	1	19.5	11.3	SB206-18RKP8										0.31			
	62	38.1	19	1	19.5	11.3	UC206-18	UC206-18L2									0.34			

Remarks 1. SU type product is the clean series ball bearing for unit.
2. From UC201 to 205 are the double seal type products (L2).

UC, SB, SB-RKP8, SU
Cylindrical bore (with set screws)
d 45 ~ (75) mm

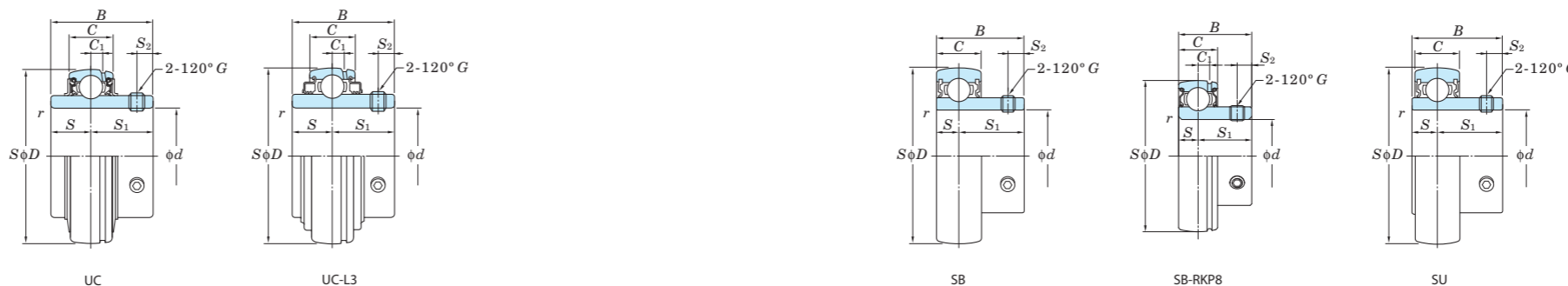
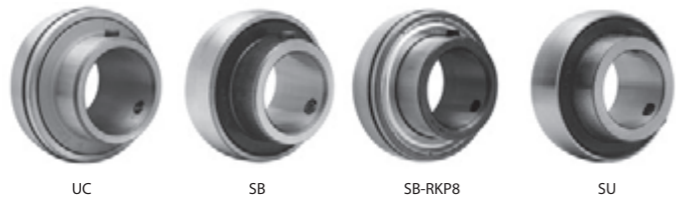
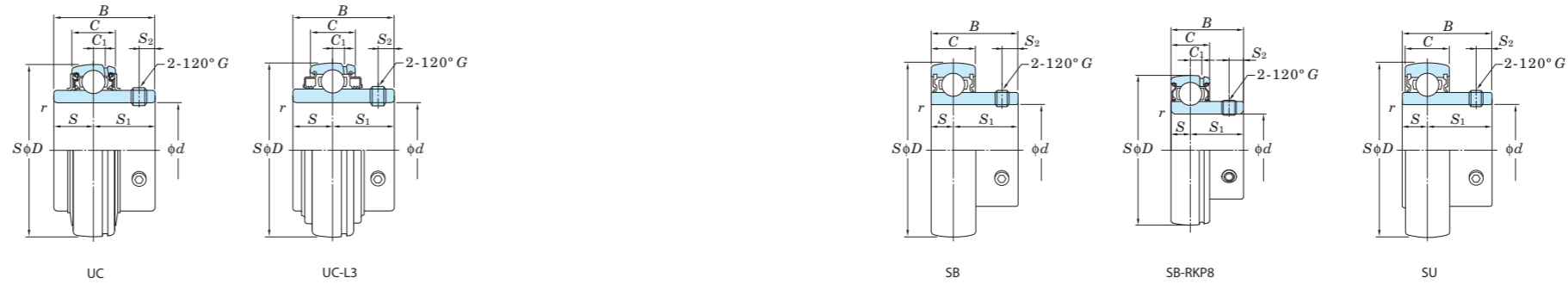
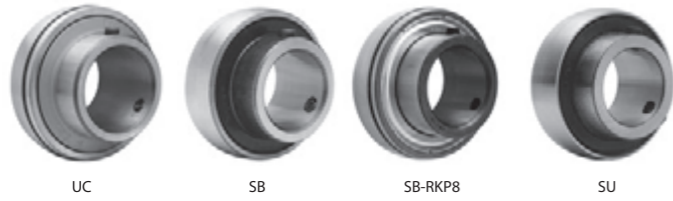


Table with columns: Shaft Dia. (mm, inch), Dimensions (D, B, C, r), Basic Load Ratings (Cr, Cor), Factor (f0), Bearing No. (Standard, L3 Type), Dimensions (C1, S, S1, S2), Set Screw Brg. Bore G, and Mass (kg). Rows list specifications for shaft diameters from 45mm to 160mm.

Remarks 1. SU type product is the clean series ball bearing for unit.
2. From UC201 to 205 are the double seal type products (L2).

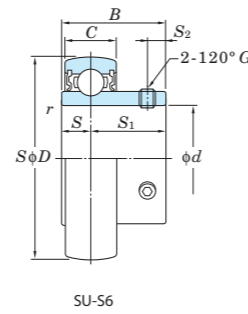
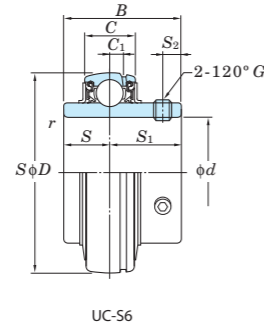
UC, SB, SB-RKP8, SU
Cylindrical bore (with set screws)
 d (75) ~ 140 mm



Shaft Dia. mm inch d	Dimensions								Basic Load Ratings kN		Factor f_0	Bearing No.		Dimensions								Set Screw Brg. Bore G		Mass kg	
	D mm inch	B mm inch	C mm inch	r (min.)		C_r	C_{0r}	Standard	L3 Type	C_1 mm inch		S		S_1		S_2		mm inch	inch						
				mm	inch							mm	inch	mm	inch	mm	inch			mm	inch				
–	3 1/8	140	5.512	82.6	3.252	33	1.299	2	0.079	72.7	53.0	14.6	UC216-50	UC216-50L3	9	0.354	33.3	1.311	49.3	1.941	14	0.551	–	1/2-20UNF	2.84
80	–	140	5.512	82.6	3.252	33	1.299	2	0.079	72.7	53.0	14.6	UC216	UC216L3	9	0.354	33.3	1.311	49.3	1.941	14	0.551	M12×1.5	–	2.79
		150	5.906	85.7	3.374	35	1.378	2	0.079	84.0	61.9	14.5	UCX16	UCX16L3	10	0.394	34.1	1.343	51.6	2.031	14	0.551	M12×1.5	–	3.87
		170	6.693	86	3.386	44	1.732	2.1	0.083	123	86.7	13.3	UC316	UC316L3	15	0.591	34	1.339	52	2.047	14	0.551	M14×1.5	–	5.60
–	3 1/4	150	5.906	85.7	3.374	35	1.378	2	0.079	84.0	61.9	14.5	UC217-52	UC217-52L3	10	0.394	34.1	1.343	51.6	2.031	14	0.551	–	1/2-20UNF	3.66
85	–	150	5.906	85.7	3.374	35	1.378	2	0.079	84.0	61.9	14.5	UC217	UC217L3	10	0.394	34.1	1.343	51.6	2.031	14	0.551	M12×1.5	–	3.45
		160	6.299	96	3.780	38	1.496	2	0.079	96.1	71.5	14.5	UCX17	UCX17L3	11	0.433	39.7	1.563	56.3	2.217	15	0.591	M12×1.5	–	5.05
		180	7.087	96	3.780	46	1.811	3	0.118	133	96.8	13.3	UC317	UC317L3	15	0.591	40	1.575	56	2.205	16	0.630	M16×1.5	–	6.90
–	3 7/16	160	6.299	96	3.780	38	1.496	2	0.079	96.1	71.5	14.5	UCX17-55	UCX17-55L3	11	0.433	39.7	1.563	56.3	2.217	15	0.591	–	1/2-20UNF	4.80
–	3 1/2	160	6.299	96	3.780	38	1.496	2	0.079	96.1	71.5	14.5	UC218-56	UC218-56L3	11	0.433	39.7	1.563	56.3	2.217	15	0.591	–	1/2-20UNF	4.46
90	–	190	7.480	96	3.780	48	1.890	3	0.118	143	107	13.3	UC318-56	UC318-56L3	15.5	0.610	40	1.575	56	2.205	16	0.630	M16×1.5	–	8.03
		160	6.299	96	3.780	38	1.496	2	0.079	96.1	71.5	14.5	UC218	UC218L3	11	0.433	39.7	1.563	56.3	2.217	15	0.591	M12×1.5	–	4.35
		170	6.693	104	4.094	40	1.575	2	0.079	109	81.9	14.4	UCX18	–	11.5	0.453	42.9	1.689	61.1	2.406	16	0.630	M14×1.5	–	6.00
95	–	190	7.480	96	3.780	48	1.890	3	0.118	143	107	13.3	UC318	UC318L3	15.5	0.610	40	1.575	56	2.205	16	0.630	M16×1.5	–	7.87
		200	7.874	103	4.055	50	1.969	3	0.118	153	119	13.3	UC319	UC319L3	16.5	0.650	41	1.614	62	2.441	18	0.709	M16×1.5	–	8.91
		190	7.480	117.5	4.626	43	1.693	2.1	0.083	133	105	14.4	UCX20	–	13	0.512	49.2	1.937	68.3	2.689	18	0.709	M16×1.5	–	8.56
100	–	215	8.465	108	4.252	54	2.126	3	0.118	173	141	13.2	UC320	UC320L3	18	0.709	42	1.654	66	2.598	20	0.787	M18×1.5	–	11.2
		190	7.480	117.5	4.626	43	1.693	2.1	0.083	133	105	14.4	UCX20-63	–	13	0.512	49.2	1.937	68.3	2.689	18	0.709	–	5/8-18UNF	8.56
		215	8.465	108	4.252	54	2.126	3	0.118	173	141	13.2	UC320-63	UC320-63L3	18	0.709	42	1.654	66	2.598	20	0.787	M18×1.5	–	11.2
–	4	190	7.480	117.5	4.626	43	1.693	2.1	0.083	133	105	14.4	UCX20-64	–	13	0.512	49.2	1.937	68.3	2.689	18	0.709	–	5/8-18UNF	8.33
105	–	215	8.465	108	4.252	54	2.126	3	0.118	173	141	13.2	UC320-64	UC320-64L3	18	0.709	42	1.654	66	2.598	20	0.787	M18×1.5	–	11.0
		225	8.858	112	4.409	56	2.205	3	0.118	184	153	13.2	UC321	–	19	0.748	44	1.732	68	2.677	20	0.787	M18×1.5	–	12.7
		240	9.449	117	4.606	60	2.362	3	0.118	205	180	13.2	UC322	UC322L3	20	0.787	46	1.811	71	2.795	20	0.787	M18×1.5	–	15.1
120	–	260	10.236	126	4.961	64	2.520	3	0.118	207	185	13.5	UC324	UC324L3	21	0.827	51	2.008	75	2.953	20	0.787	M18×1.5	–	19.0
130	–	280	11.024	135	5.315	68	2.677	4	0.157	229	214	13.6	UC326	UC326L3	22	0.866	54	2.126	81	3.189	20	0.787	M20×1.5	–	23.6
140	–	300	11.811	145	5.709	72	2.835	4	0.157	253	246	13.6	UC328	UC328L3	23	0.906	59	2.323	86	3.386	20	0.787	M20×1.5	–	29.4

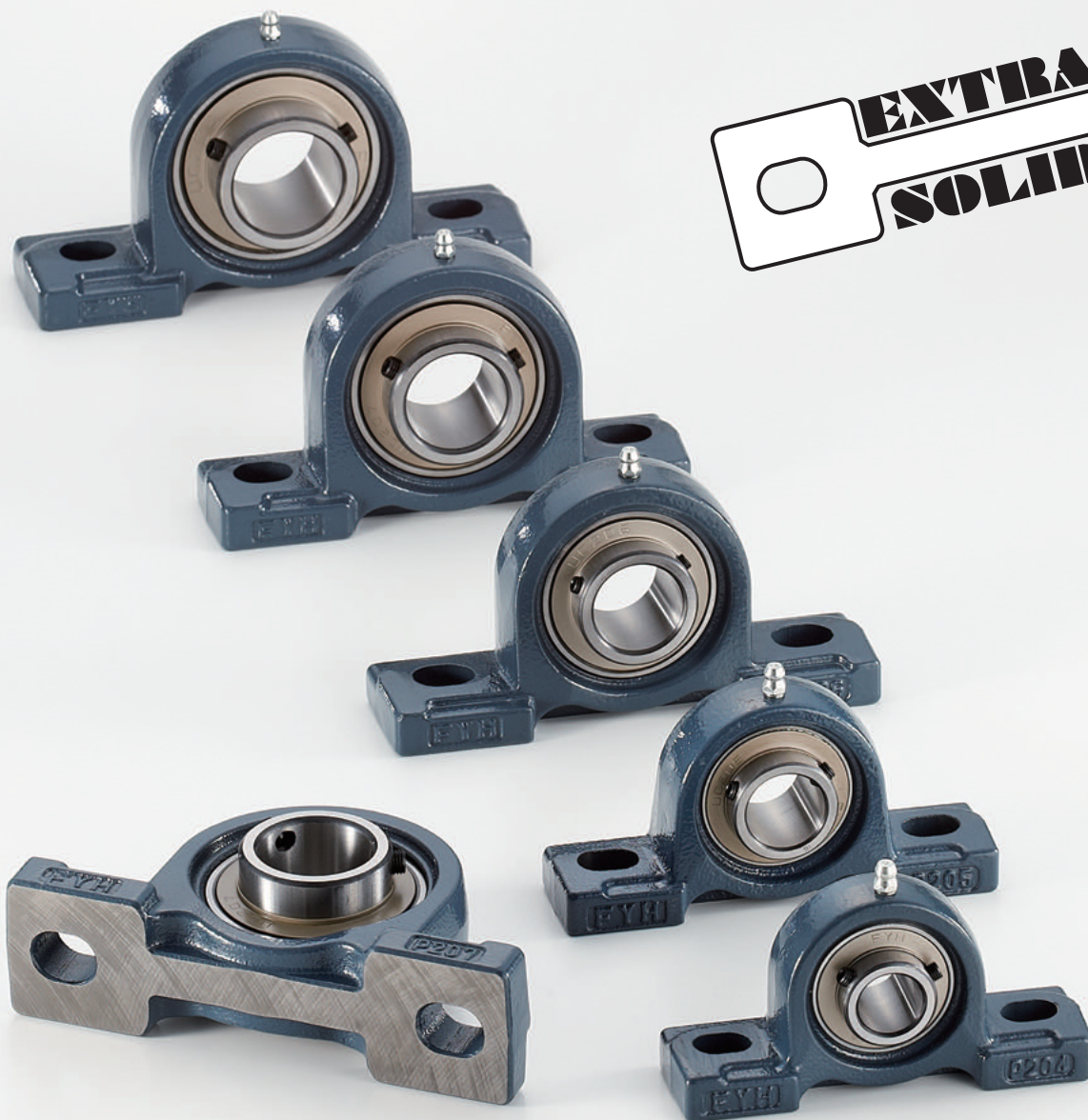
Remarks 1. SU type product is the clean series ball bearing for unit.
2. From UC201 to 205 are the double seal type products (L2).

UC-S6, SU-S6 (Stainless steel series)
Cylindrical bore (with set screws)
d 10 ~ 60 mm



Shaft Dia. mm inch <i>d</i>	Dimensions								Basic Load Ratings kN		Factor	Bearing No. Standard	Dimensions								Set Screw Brg. Bore G mm	Mass kg
	<i>D</i>		<i>B</i>		<i>C</i>		<i>r</i> (min.)		<i>C_r</i>	<i>C_{0r}</i>	<i>f₀</i>		<i>C₁</i>		<i>S</i>		<i>S₁</i>		<i>S₂</i>			
	mm	inch	mm	inch	mm	inch	mm	inch					mm	inch	mm	inch	mm	inch	mm	inch		
10	26	1.024	15	0.591	8	0.315	0.3	0.012	3.9	1.55	12.3	SU000S6	—	5	0.197	10	0.394	3	0.118	M3×0.35	0.024	
12	28	1.102	15	0.591	8	0.315	0.3	0.012	4.3	1.9	13.2	SU001S6	—	5	0.197	10	0.394	3	0.118	M3×0.35	0.026	
	40	1.575	27.4	1.079	13	0.512	0.6	0.024	8.15	3.85	13.2	UC201XS6	3.5	0.138	11.5	0.453	15.9	0.626	4	0.158	M5×0.5	0.10
15	40	1.575	27.4	1.079	13	0.512	0.6	0.024	8.15	3.85	13.2	UC201-8XS6	3.5	0.138	11.5	0.453	15.9	0.626	4	0.158	M5×0.5	0.10
	32	1.260	16.5	0.650	9	0.354	0.3	0.012	4.7	2.25	13.9	SU002S6	—	5.5	0.217	11	0.433	3.3	0.130	M4×0.5	0.038	
17	40	1.575	27.4	1.079	13	0.512	0.6	0.024	8.15	3.85	13.2	UC202XS6	3.5	0.138	11.5	0.453	15.9	0.626	4	0.158	M5×0.5	0.10
	40	1.575	27.4	1.079	13	0.512	0.6	0.024	8.15	3.85	13.2	UC202-10XS6	3.5	0.138	11.5	0.453	15.9	0.626	4	0.158	M5×0.5	0.10
20	35	1.378	17.5	0.689	10	0.394	0.3	0.012	5.1	2.6	14.4	SU003S6	—	6	0.236	11.5	0.453	3.3	0.130	M4×0.5	0.050	
	40	1.575	27.4	1.079	13	0.512	0.6	0.024	8.15	3.85	13.2	UC203XS6	3.5	0.138	11.5	0.453	15.9	0.626	4	0.158	M5×0.5	0.10
25	47	1.850	31	1.220	16	0.630	1	0.039	10.9	5.35	13.2	UC204-12S6	4	0.157	12.7	0.500	18.3	0.720	5	0.197	M6×0.75	0.16
	42	1.654	21	0.827	12	0.472	0.6	0.024	7.9	4	13.9	SU004S6	—	7	0.276	14	0.551	4	0.157	M5×0.5	0.080	
	47	1.850	31	1.220	16	0.630	1	0.039	10.9	5.35	13.2	UC204S6	4	0.157	12.7	0.500	18.3	0.720	5	0.197	M6×0.75	0.16
30	52	2.047	34.1	1.343	17	0.669	1	0.039	11.9	6.3	13.9	UC205-14S6	5	0.197	14.3	0.563	19.8	0.780	5.5	0.217	M6×0.75	0.23
	52	2.047	34.1	1.343	17	0.669	1	0.039	11.9	6.3	13.9	UC205-15S6	5	0.197	14.3	0.563	19.8	0.780	5.5	0.217	M6×0.75	0.21
	47	1.850	22	0.866	12	0.472	0.6	0.024	8.5	4.65	14.5	SU005S6	—	7	0.276	15	0.591	4.5	0.177	M5×0.5	0.10	
	52	2.047	34.1	1.343	17	0.669	1	0.039	11.9	6.3	13.9	UC205S6	5	0.197	14.3	0.563	19.8	0.780	5.5	0.217	M6×0.75	0.20
	52	2.047	34.1	1.343	17	0.669	1	0.039	11.9	6.3	13.9	UC205-16S6	5	0.197	14.3	0.563	19.8	0.780	5.5	0.217	M6×0.75	0.20
35	62	2.441	38.1	1.500	19	0.748	1	0.039	16.5	9.05	13.9	UC206-18S6	5	0.197	15.9	0.626	22.2	0.874	6	0.236	M6×0.75	0.34
	55	2.165	24.5	0.965	13	0.512	1	0.039	11.2	6.6	14.7	SU006S6	—	7.5	0.295	17	0.669	5.5	0.217	M5×0.5	0.15	
	62	2.441	38.1	1.500	19	0.748	1	0.039	16.5	9.05	13.9	UC206S6	5	0.197	15.9	0.626	22.2	0.874	6	0.236	M6×0.75	0.32
	62	2.441	38.1	1.500	19	0.748	1	0.039	16.5	9.05	13.9	UC206-19S6	5	0.197	15.9	0.626	22.2	0.874	6	0.236	M6×0.75	0.32
40	62	2.441	38.1	1.500	19	0.748	1	0.039	16.5	9.05	13.9	UC206-20S6	5	0.197	15.9	0.626	22.2	0.874	6	0.236	M6×0.75	0.30
	72	2.835	42.9	1.689	20	0.787	1.1	0.043	21.8	12.3	13.9	UC207-20S6	5.5	0.217	17.5	0.689	25.4	1.000	6.5	0.256	M8×1	0.54
	72	2.835	42.9	1.689	20	0.787	1.1	0.043	21.8	12.3	13.9	UC207-21S6	5.5	0.217	17.5	0.689	25.4	1.000	6.5	0.256	M8×1	0.51
	72	2.835	42.9	1.689	20	0.787	1.1	0.043	21.8	12.3	13.9	UC207-22S6	5.5	0.217	17.5	0.689	25.4	1.000	6.5	0.256	M8×1	0.48
	72	2.835	42.9	1.689	20	0.787	1.1	0.043	21.8	12.3	13.9	UC207S6	5.5	0.217	17.5	0.689	25.4	1.000	6.5	0.256	M8×1	0.48
72	2.835	42.9	1.689	20	0.787	1.1	0.043	21.8	12.3	13.9	UC207-23S6	5.5	0.217	17.5	0.689	25.4	1.000	6.5	0.256	M8×1	0.45	
45	80	3.150	49.2	1.937	21	0.827	1.1	0.043	24.8	14.3	14.0	UC208-24S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.68
	80	3.150	49.2	1.937	21	0.827	1.1	0.043	24.8	14.3	14.0	UC208-25S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.60
	80	3.150	49.2	1.937	21	0.827	1.1	0.043	24.8	14.3	14.0	UC208S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.64
50	85	3.346	49.2	1.937	22	0.866	1.1	0.043	27.8	16.2	14.0	UC209-26S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.78
	85	3.346	49.2	1.937	22	0.866	1.1	0.043	27.8	16.2	14.0	UC209-27S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.74
	85	3.346	49.2	1.937	22	0.866	1.1	0.043	27.8	16.2	14.0	UC209-28S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.70
	85	3.346	49.2	1.937	22	0.866	1.1	0.043	27.8	16.2	14.0	UC209S6	6	0.236	19	0.748	30.2	1.189	8	0.315	M8×1	0.68
55	90	3.543	51.6	2.031	24	0.945	1.1	0.043	29.8	18.6	14.4	UC210-30S6	6	0.236	19	0.748	32.6	1.283	9	0.354	M8×1	0.87
	90	3.543	51.6	2.031	24	0.945	1.1	0.043	29.8	18.6	14.4	UC210-31S6	6	0.236	19	0.748	32.6	1.283	9	0.354	M8×1	0.82
	90	3.543	51.6	2.031	24	0.945	1.1	0.043	29.8	18.6	14.4	UC210S6	6	0.236	19	0.748	32.6	1.283	9	0.354	M8×1	0.80
	90	3.543	51.6	2.031	24	0.945	1.1	0.043	29.8	18.6	14.4	UC210-32S6	6	0.236	19	0.748	32.6	1.283	9	0.354	M8×1	0.78
60	2	3.937	55.6	2.189	25	0.984	1.5	0.059	36.8	23.5	14.4	UC211-32S6	7	0.276	22.2	0.874	33.4	1.315	9	0.354	M10×1.25	1.26
	2 1/8	3.937	55.6	2.189	25	0.984	1.5	0.059	36.8	23.5	14.4	UC211-34S6	7	0.276	22.2	0.874	33.4	1.315	9	0.354	M10×1.25	1.15
	100	3.937	55.6	2.189	25	0.984	1.5	0.059	36.8	23.5	14.4	UC211S6	7	0.276	22.2	0.874	33.4	1.315	9	0.354	M10×1.25	1.11
	2 3/16	3.937	55.6	2.189	25	0.984	1.5	0.059	36.8	23.5	14.4	UC211-35S6	7	0.276	22.2	0.874	33.4	1.315	9	0.354	M10×1.25	1.09
60	110	4.331	65.1	2.563	27	1.063	1.5	0.059	44.5	29	14.4	UC212-36S6	7.5	0.295	25.4	1.000	39.7	1.563	10.5	0.413	M10×1.25	1.67
	110	4.331	65.1	2.563	27	1.063	1.5	0.059	44.5	29	14.4	UC212S6	7.5	0.295	25.4	1.000	39.7	1.563	10.5	0.413	M10×1.25	1.54
	2 3/8	4.331	65.1	2.563	27	1.063	1.5	0.059	44.5	29	14.4	UC212-38S6	7.5	0.295	25.4	1.000	39.7	1.563	10.5	0.413	M10×1.25	1.52
	2 7/16	4.331	65.1	2.563	27	1.063	1.5	0.059	44.5	29	14.4	UC212-39S6	7.5	0.295	25.4	1.000	39.7	1.563	10.5	0.413	M10×1.25	1.45

Remark S6 series product is the stainless steel series ball bearing for unit.



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