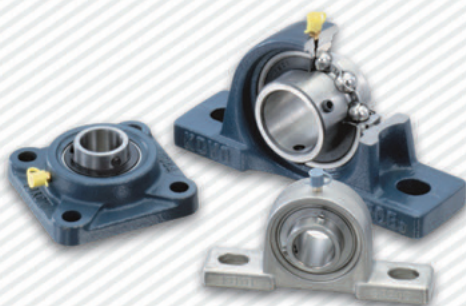
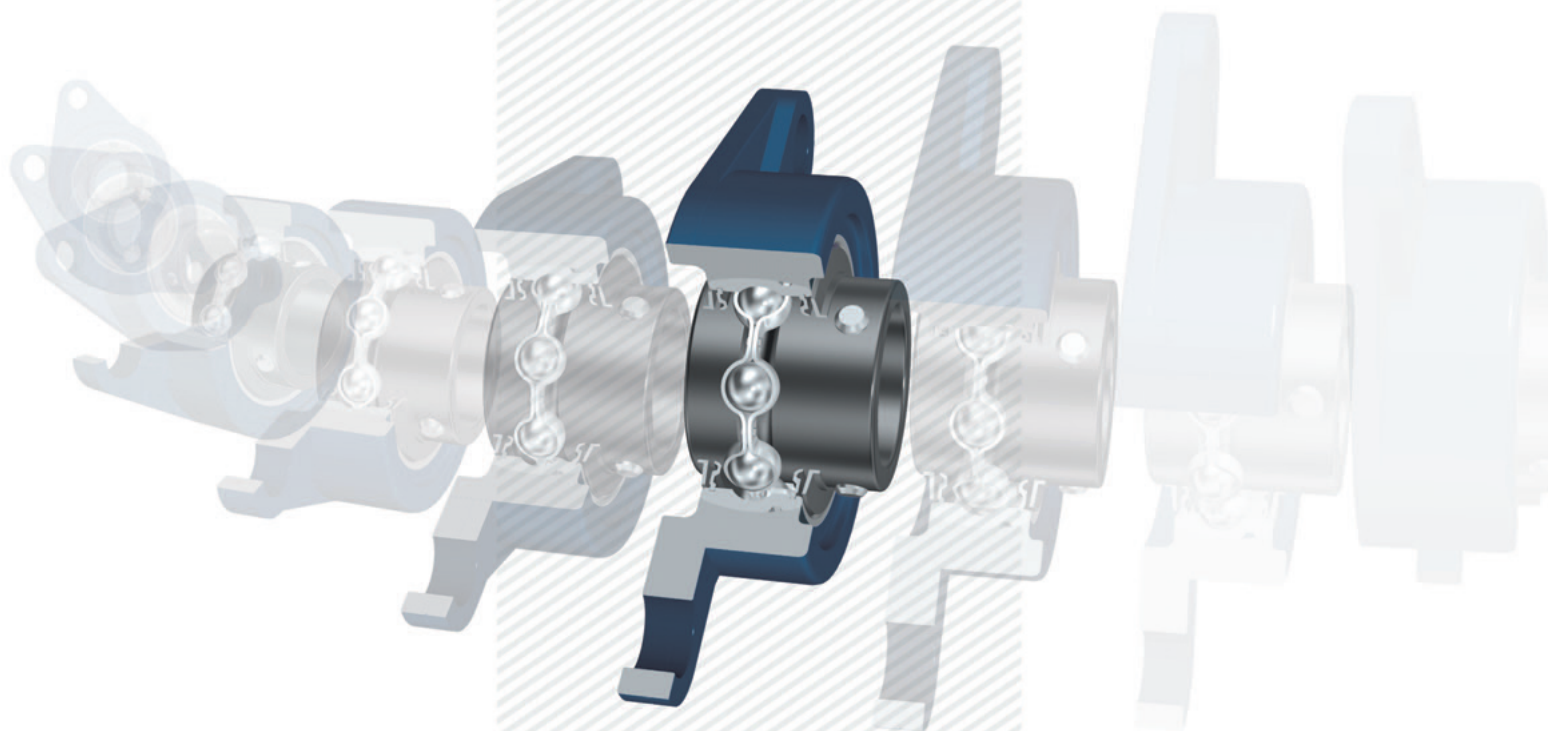




• General Bearings •

BALL BEARING UNITS



JTEKT

JTEKT CORPORATION

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Koyo | TOYODA

CAT. NO. B2007E-1









Ball Bearing Units (contents)

Technical section

1	Structure and features	7
2	Types	10
3	Selection of unit	25
4	Life of bearing	28
5	Bearing load	31
6	Allowable rotational speed	38
7	Operating temperature and bearing specifications	39
8	Strength of housing	40
9	Design of shaft and base	45
10	Unit number	50
11	Tolerances and internal clearance	52
12	Materials	57
13	Performance	59
14	Handling	61

Supplementary table

1	Simplified chart of ball bearing unit combinations	254
2	Tightening torques of mounting bolts for housing and cast iron cover	256
3	Tightening torques of set screws for inner ring and eccentric locking collar	257
4	Tightening torques of adapter lock nuts (reference)	257
5	Machining dimensions of holes for housing dowel pins	258
6	Shaft tolerances (deviation from nominal dimensions)	260
7	Housing bore tolerances (deviation from nominal dimensions)	262
8	SI units and conversion factors	264
9	Inch/millimeter conversion	268
10	Mechanical properties of metal materials (reference)	269
11	Hexagon socket head cap screws (abstract from JIS B 1176)	270
12	Hexagon head bolts (abstract from JIS B 1180)	272
13	Hexagon head nuts (abstract from JIS B 1181)	274
14	Steel hardness conversion	275
15	Viscosity conversion	276

Technical section	Technical section
Pillow block type	
Square-flanged type	
Oval flange type	
Round-flanged type with spigot joint	
Pressed steel flange type	
Take-up type	
Cartridge type	
Hanger type	
Ball bearings for units	
Parts and accessories	Parts and accessories
Example of use	Example of use
Supplementary table	Supplementary table



BALL BEARING UNITS

CAT. NO. B2007E-1

Value & Technology

Publication of New **Koyo** Ball Bearing Units Catalog

In recent years, needs in industrial world for machineries and equipment highly developed in all aspects have been increased more than ever. Therefore, high technology covering from superior technical advantages including longer service life and maintenance free to higher reliability even under extraordinary conditions such as high and low temperatures and rotation at a high speed is required for ball bearing units.

This catalog completely includes results of technical examinations and abundant research and development.

In the first half of this catalog, technical descriptions referring from the selection to the handling of Koyo Ball Bearing units are mentioned, while a lot of dimensional tables with types and dimensions are included in the last half. Varied technical information is provided at the last of this catalog. We trust this catalog will help you to select and use Koyo Ball Bearing units appropriately.

JTEKT keeps trying to get ideas from the market, step up persistent efforts of technical research and development, and provide the best technologies, quality, and services.

JTEKT is grateful for your patronage and look forward to continuing to serve you in the future.

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Every possible effort has been made to ensure that the data herein is correct;
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Contents

Technical section

1 Structure and features

1.1 Structure	7
1.2 Features	8

2 Types

2.1 Type list	10
2.2 Types and features	12
2.3 Unit for special use	23

3 Selection of unit

3.1 Outline of selection	25
3.2 Selection of type and specifications	26
3.3 Selection from a maintenance standpoint	27

4 Life of bearing

4.1 Basic rating life and basic rating load	28
4.2 Calculation of rating life	28
4.3 Grease life	30

5 Bearing load

5.1 Loads applied to bearing	31
5.2 Distribution of load to bearing	33
5.3 Dynamic equivalent load	33
5.4 Basic static load rating and static equivalent load	34
5.5 Example of applied calculation	35

6 Allowable rotational speed

6.1 Allowable rotational speed	38
6.2 Correction of allowable rotational speed by fitting	39

7 Operating temperature and bearing specifications

7.1 Operating temperature range	39
7.2 Operating temperature and internal clearance of bearing	39

8 Strength of housing

8.1 Strength of cast iron housing	40
8.2 Strength of cast steel housing	44
8.3 Strength of steel housing	44
8.4 Strength of stainless steel housing	44
8.5 Strength of "compact" series housing	44

9 Design of shaft and base

9.1 Design of shaft	45
9.2 Design of base	48
9.3 Machining dimensions of holes for housing dowel pins	49

10 Unit number

11 Tolerances and internal clearance

11.1 Tolerances of bearing	52
11.2 Tolerances of housing	54
11.3 Bearing internal clearance	56

12 Materials

12.1 Materials of bearing	57
12.2 Materials of housing	57
12.3 Materials of parts and accessories	58

13 Performance

13.1 Friction torque of bearing	59
13.2 Increase in temperature of bearing	59
13.3 Dustproof and waterproof performance ...	60

14 Handling

14.1 Installation	61
14.2 Test run inspection	64
14.3 Periodic inspection	65
14.4 Supply of grease	65
14.5 Replacing bearing	68

Unit specification table

15 Specification tables of ball bearing units	69
1 Pillow block type	
Pillow block type	72
Thick section pillow block type	96
Tapped-base pillow block type	100
Higher centerheight pillow block type	102
Light duty pillow block type	104
“Compact” series pillow block type	106
Stainless-series pillow block type	108
Pressed steel pillow block type	114
2 Square-flanged type	
Square-flanged type	116
Square-flanged type with spigot joint	134
Stainless-series square-flanged type	138
3 Oval flange type	
Rhombic-flanged type	140
Adjustable rhombic-flanged type	156
Three-bolt flange type	158
Light duty rhombic-flanged type	160
“Compact” series rhombic-flanged type	162
Stainless-series rhombic-flanged type	164
4 Round-flanged type with spigot joint	168
5 Pressed steel flange type	
Pressed steel round-flanged type	178
Pressed steel rhombic-flanged type	180
6 Take-up type	
Take-up type	182
Stainless-series take-up type	198
Section steel frame take-up type	200
Channel steel frame take-up type	202
Pressed steel frame take-up type	208
7 Other units	
Cartridge type	212
Hanger type	218
8 Ball bearings for units	220
9 Adapter assemblies	240

Parts and accessories

16 Parts and accessories	
16.1 Part No. of pressed steel covers	244
16.2 Part No. of cast iron covers	245
16.3 Nominal number and dimensions of grease nipples and reducing socket	246
16.4 Nominal number and dimensions of Allen key wrench	246
17 Example of use	247
18 Supplementary table (contents)	253
1 Simplified chart of ball bearing unit combinations	254
2 Tightening torques of mounting bolts for housing and cast iron cover	256
3 Tightening torques of set screws for inner ring and eccentric locking collar	257
4 Tightening torques of adapter lock nuts (reference)	257
5 Machining dimensions of holes for housing dowel pins	258
6 Shaft tolerances (deviation from nominal dimensions)	260
7 Housing bore tolerances (deviation from nominal dimensions)	262
8 SI units and conversion factors	264
9 Inch/millimeter conversion	268
10 Mechanical properties of metal materials (reference)	269
11 Hexagon socket head cap screws (abstract from JIS B 1176)	270
12 Hexagon head bolts (abstract from JIS B 1180)	272
13 Hexagon head nuts (abstract from JIS B 1181)	274
14 Steel hardness conversion	275
15 Viscosity conversion	276

1 Structure and features

Koyo Ball Bearing Units are highly precise bearing units comprising grease sealed deep groove ball bearings and housings in various forms. The ball bearing units allow easy handling and installation by followings: direct installation to machines and equipment with some bolts, self-aligning, and greasing.

1.1 Structure

Koyo Ball Bearing Unit comprises the ball bearing for unit with spherical outside surface and the housing with spherical bearing seat (Fig. 1.1).

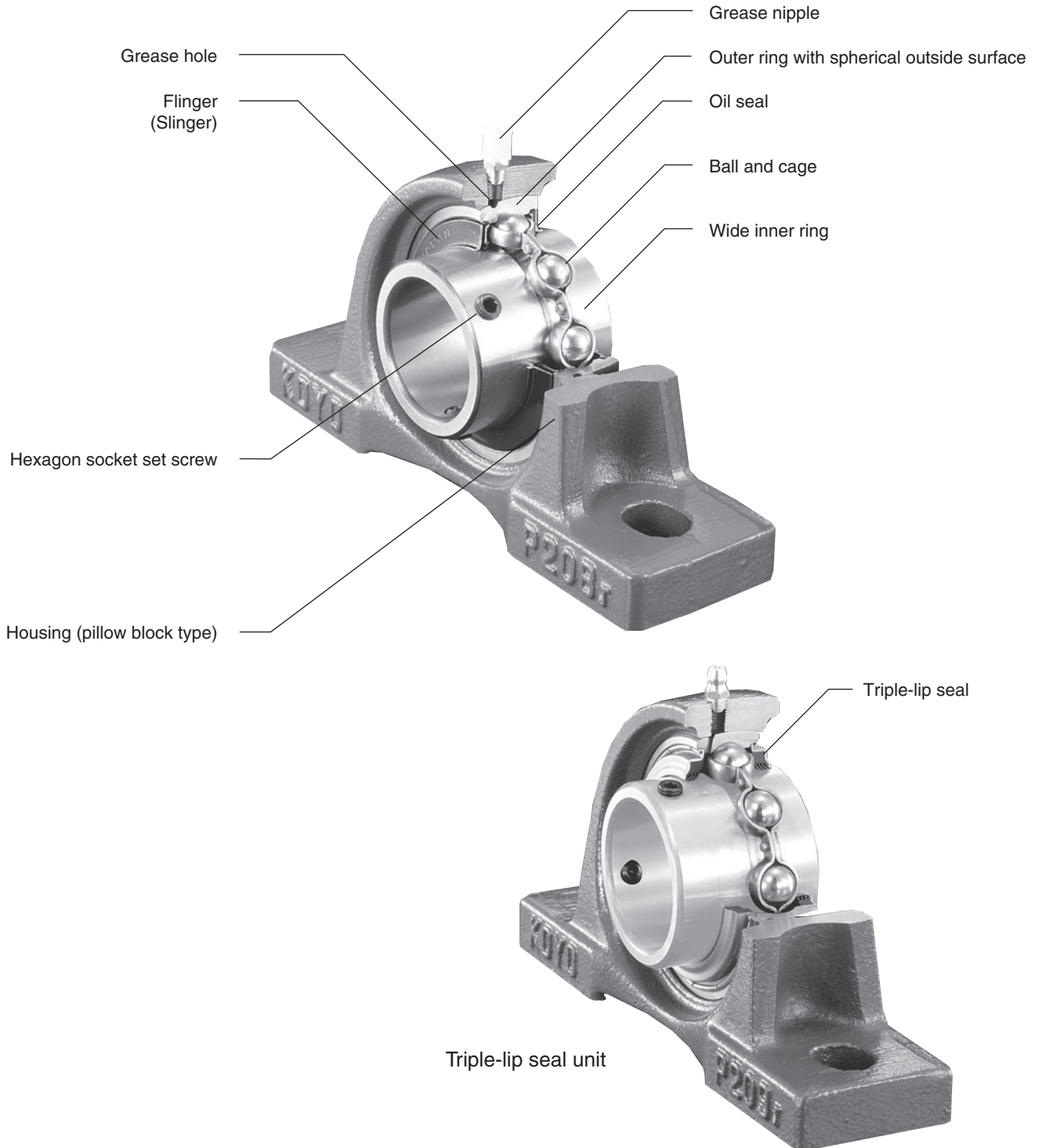


Fig. 1.1 Structure of ball bearing units (representative example)

1 Structure and features

1.2 Features

Koyo Ball Bearing Units, having many features, are available in various types. Select the bearing unit optimal for your purpose among the types with unique features.

1 Supreme load capacity and accuracy

Koyo Ball Bearings for bearing unit, featuring the internal structure identical to single row deep groove ball bearings, bear axial load in both directions, as well as great radial load. The tolerance is equal to that of a standard bearing. They feature high rotation accuracy and high speed rotation.

2 Rational self aligning mechanism and optimal fit

Koyo Ball Bearing Units have self aligning mechanism by the spherical outside surface bearing and the housing with spherical bearing seat. Because of this mechanism, deviation of the shaft center caused by warp of the shaft flexion of axis (shaft) or offset is automatically adjusted to eliminate abnormal load onto the bearing, leading to guarantee of original service life of the bearing.

Since the spherical outside surface of the bearing is ground and the spherical bearing seat of the housing is machined by a boring machine with high accuracy, optimal fitting of the bearing and the housing can be obtained, as well as superior aligning performance.

The allowable aligning angle of standard ball bearing unit is 3°, while that of ball bearing unit with cover is 1°.

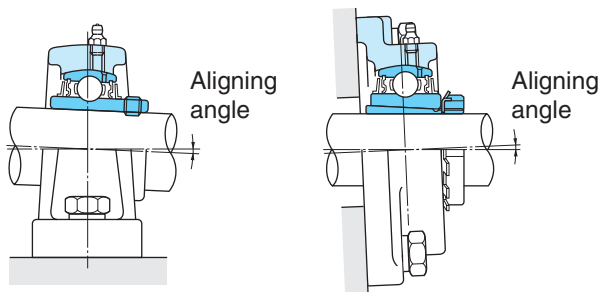


Fig. 1.2 Allowable aligning angle of ball bearing unit

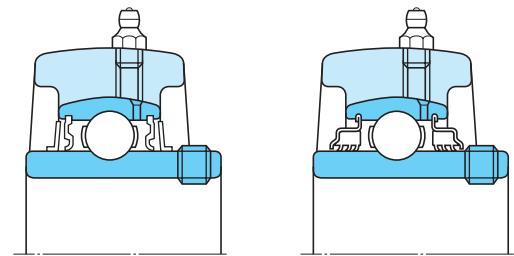
3 Superior sealing performance

Koyo Ball Bearing Units can prevent leak of grease in the bearing to the outside, as well as ingress of dusts and water from the outside into the inside of the bearing by the synergetic effect of the oil seal installed to the outer ring of the bearing and the flinger (slinger) installed to the inner ring of the bearing.

The oil seal is made of synthetic rubber featuring supreme oil proof. Its lip contacts with the inner ring of the bearing with optimal tension (radial load of lip).

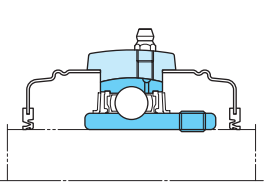
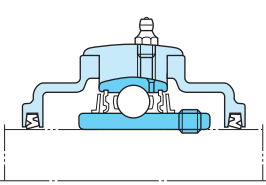
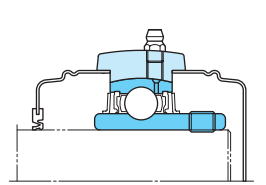
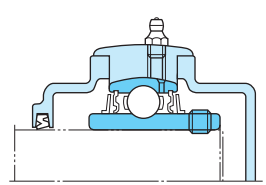
When using in environments with many dusts or high humidity, the triple-lip seal unit (supplementary code : L3) or the unit with cover (supplementary code : C, CD, FC, FD) is optimal.

The triple-lip seal unit or unit with cover strongly prevents ingress of water and dusts from the outside, and guarantees a longer service life of the bearing.



Standard type

Triple-lip seal type
(Supplementary code : L3)

	Pressed steel cover type	Cast iron cover type
Open ends type	 (Supplementary code : C)	 (Supplementary code : C, FC)
Closed end type	 (Supplementary code : CD)	 (Supplementary code : CD, FCD)

Unit with cover

Fig. 1.3 Sealing mechanism of ball bearing unit

4 Simple greasing

Because of the grease nipple on the housing of Koyo Ball Bearing Unit, fresh grease can be easily supplied to the bearing being operated. If the bearing is used in severe environments that are exposed to many dusts or high humidity or that is high temperature, supply fresh grease at a regular interval. Then, the lubrication status of the bearing is kept to the best, and the service life of the bearing can be extended.

When greasing to the bearing unit with the centralized lubricating system, use the socket for lubricating installed to the grease nipple tapped hole on the housing.

5 Highly rigid and strong housing

Koyo Ball Bearing Unit housing is designed so that it is optimal for reduction of deformation due to centralization of stress and load. After the selection of good material, it is produced by highly advanced casting technique or press working technique.

Since any abnormal load onto the bearing is eliminated by the highly rigid and strong housing, the service life of the bearing can be extended. Baking finish on the surface of the housing keeps good surface status for a long time.

6 Simple installation and handling

Koyo Ball Bearing Units of many types can be installed to any of machine or equipment with some bolts, and can be used in the status as it is. Clearance fit is used for the inner ring of bearing and the shaft, as a rule.

Therefore, Koyo Ball Bearing Unit does not need any work such as filling of lubricant or installation of sealing unit required for standard bearings. As a result, the total of manpower can be drastically reduced.

As for the fixing method of bearing to shaft, three methods, (1) set screw mounted to the cylindrical bore wide inner ring, (2) adapter installed to the tapered bore inner ring, and (3) eccentric locking collar installed to the cylindrical bore wide inner ring are available.

Fixing of bearing to shaft can be executed easily and securely by adopting any of these method.

7 Various types

Koyo Ball Bearing Units are available in various types.

Reliability of machine or equipment used together with the units can be improved by selecting and using bearing units optimal for the purpose and operating conditions.

2 Types

2.1 Type list

Table 2.1 and Table 2.2 show the types of Koyo Ball Bearing Units and ball bearing for unit.

Koyo Ball Bearing Units are available in various types.

Table 2.1 Koyo Ball Bearing Units types

Type	Bearing bore dia. Surface (fixing to shaft)	Type code	Shaft dia.		Dimension table	
			(inch)	(mm)		
1 Pillow block type	(1) Standard	Cylindrical bore (with set screws)	UCP	$1/2 - 4$	12 - 140	P.72
		Cylindrical bore (with eccentric locking collar)	NAP	$1/2 - 2^{15/16}$	12 - 75	P.78
			NAPK	$1/2 - 2^{15/16}$	12 - 75	P.80
		Tapered bore (with adapter)	UKP	$3/4 - 4^{1/2}$	20 - 125	P.82
	(2) Cast steel type	Cylindrical bore (with set screws)	UCP-SC	$7/8 - 4$	25 - 140	P.88
		Tapered bore (with adapter)	UKP-SC	$3/4 - 4^{1/2}$	20 - 125	P.92
	(3) Thick section type	Cylindrical bore (with set screws)	UCIP	$1^{1/2} - 4$	40 - 140	P.96
		Tapered bore (with adapter)	UKIP	$1^{1/4} - 4^{1/2}$	35 - 125	P.98
	(4) Tapped-base type	Cylindrical bore (with set screws)	UCPA	$1/2 - 2$	12 - 50	P.100
(5) Higher centerheight type	Cylindrical bore (with set screws)	UCPH	$1/2 - 2$	12 - 50	P.102	
(6) Light duty type	Cylindrical bore (with set screws)	BLP	$1/2 - 1^{9/16}$	12 - 40	P.104	
	Cylindrical bore (with eccentric locking collar)	ALP				
(7) "Compact" series	Cylindrical bore (with set screws)	UP	N/A	10 - 30	P.106	
(8) Stainless-series	Cylindrical bore (with set screws)	UCSP-H1S6	N/A	20 - 50	P.108	
		UCSPA-H1S6	N/A	20 - 40	P.110	
		USP-S6	N/A	10 - 30	P.112	
(9) Pressed steel type	Cylindrical bore (with set screws)	SBPP	$1/2 - 1^{1/4}$	12 - 30	P.114	
	Cylindrical bore (with eccentric locking collar)	SAPP				
2 Square-flanged type	(1) Standard	Cylindrical bore (with set screws)	UCF	$1/2 - 4$	12 - 140	P.116
		Cylindrical bore (with eccentric locking collar)	UCF-E	$1/2 - 3^{7/16}$	12 - 85	P.122
			NANF	$1/2 - 2^{7/16}$	12 - 60	P.126
		Tapered bore (with adapter)	UKF	$3/4 - 4^{1/2}$	20 - 125	P.128
	(2) With spigot joint	Cylindrical bore (with set screws)	UCFS	$1 - 4$	25 - 140	P.134
	Tapered bore (with adapter)	UKFS	$3/4 - 4^{1/2}$	20 - 125	P.136	
(3) Stainless-series	Cylindrical bore (with set screws)	UCSF-H1S6	N/A	20 - 50	P.138	
3 Oval flange type	(1) Rhombic-flanged type	Cylindrical bore (with set screws)	UCFL	$1/2 - 4$	12 - 130	P.140
			UCFL-E	$1/2 - 3^{1/4}$	12 - 85	P.146
		Cylindrical bore (with eccentric locking collar)	NANFL	$1/2 - 2^{3/16}$	12 - 55	P.150
		Tapered bore (with adapter)	UKFL	$3/4 - 4^{1/2}$	20 - 115	P.152
	(2) Adjustable rhombic-flanged type	Cylindrical bore (with set screws)	UCFA	$1/2 - 2^{3/16}$	12 - 55	P.156
	(3) Three-bolt type	Cylindrical bore (with set screws)	UCFB	$1/2 - 2$	12 - 50	P.158
	(4) Light duty rhombic-flanged type	Cylindrical bore (with set screws)	BLF	$1/2 - 1^{7/16}$	12 - 35	P.160
Cylindrical bore (with eccentric locking collar)		ALF				
(5) "Compact" series rhombic-flanged type	Cylindrical bore (with set screws)	UFL	N/A	8 - 30	P.162	
(6) Stainless-series rhombic-flanged type	Cylindrical bore (with set screws)	UCSFL-H1S6	N/A	20 - 50	P.164	
		USFL-S6	N/A	10 - 30	P.166	
4 Round-flanged type with spigot joint	Cylindrical bore (with set screws)	UCFC	$1/2 - 4$	12 - 100	P.168	
		UCFCX-E	$1 - 4$	25 - 100	P.172	
		UKFC	$3/4 - 3^{1/2}$	20 - 90	P.174	
5 Pressed steel flange type	(1) Round-flanged type	Cylindrical bore (with set screws)	SBPF	$1/2 - 1^{7/16}$	12 - 35	P.178
		Cylindrical bore (with eccentric locking collar)	SAPF			
	(2) Rhombic-flanged type	Cylindrical bore (with set screws)	SBPFL	$1/2 - 1^{7/16}$	12 - 35	P.180
		Cylindrical bore (with eccentric locking collar)	SAPFL			

Table 2.1 Koyo Ball Bearing Units types (continued)

Type	Bearing bore dia. Surface (fixing to shaft)	Type code	Shaft dia.		Dimension table	
			(inch)	(mm)		
6 Take-up type	(1) Standard	Cylindrical bore (with set screws)	UCT	$\frac{1}{2} - 4$	12 - 140	P.182
		Tapered bore (with adapter)	UCT-E UKT	$\frac{1}{2} - 3 \frac{7}{16}$ $\frac{3}{4} - 4 \frac{1}{2}$	12 - 85 20 - 125	P.188 P.192
	(2) Stainless-series	Cylindrical bore (with set screws)	UCST-H1S6	N/A	20 - 50	P.198
	(3) Section steel frame type	Cylindrical bore (with set screws)	UCTH	$\frac{1}{2} - 2 \frac{1}{2}$	12 - 65	P.200
	(4) Channel steel frame type	Cylindrical bore (with set screws)	UCTL UCTU	N/A N/A	20 - 45 40 - 90	P.202 P.204
(5) Pressed steel frame type	Cylindrical bore (with set screws)	SBPTH	N/A	12 - 25	P.208	
		SBNPTH	N/A	12 - 25	P.210	
7 Cartridge type	Cylindrical bore (with set screws) Tapered bore (with adapter)	UCC	$\frac{1}{2} - 4$	12 - 140	P.212	
		UKC	$\frac{3}{4} - 4 \frac{1}{2}$	20 - 125	P.216	
8 Hanger type	Cylindrical bore (with set screws)	UCHA	$\frac{1}{2} - 3$	12 - 75	P.218	

Table 2.2 Types of ball bearing for Koyo Ball Bearing Unit

Type	Bearing bore dia. Surface (fixing to shaft)	Type code	Shaft dia.		Dimension table	
			(inch)	(mm)		
Ball bearing for units	(1) Standard	Cylindrical bore (with set screws)	UC	$\frac{1}{2} - 4$	12 - 140	P.220
	(2) Standard	Tapered bore (with adapter)	UK	$\frac{3}{4} - 4 \frac{1}{2}$	20 - 125	P.228
	(3) Standard	Cylindrical bore (with eccentric locking collar)	NA	$\frac{1}{2} - 3$	12 - 75	P.234
	(4) Light duty	Cylindrical bore (with set screws)	SB	$\frac{1}{2} - 1 \frac{1}{2}$	12 - 40	P.220
	(5) Light duty	Cylindrical bore (with eccentric locking collar)	SA	$\frac{1}{2} - 1 \frac{9}{16}$	12 - 40	P.234
			SA-F	$\frac{1}{2} - 2 \frac{3}{16}$	12 - 55	
	(6) "Compact"	Cylindrical bore (with set screws)	SU	N/A	8 - 30	P.220
	(7) Stainless steel	Cylindrical bore (with set screws)	UC-S6	N/A	20 - 50	P.226
			SU-S6	N/A	10 - 30	
	(8) Cylindrical outside surface (with lubricating mechanism and snap ring)	Cylindrical bore (with set screws)	ER	$\frac{1}{2} - 2 \frac{7}{16}$	12 - 60	P.238
(9) Cylindrical outside surface	Cylindrical bore (with set screws)	RB	$\frac{1}{2} - 1 \frac{9}{16}$	12 - 40	P.238	
(10) Adapter assembly		H300X	$\frac{3}{4} - 3$	20 - 80	P.240	
		H2300X	$\frac{3}{4} - 4 \frac{1}{2}$	20 - 125		

2.2 Types and features

Koyo Ball Bearing Units are available in various types by combinations of bearings and housings.

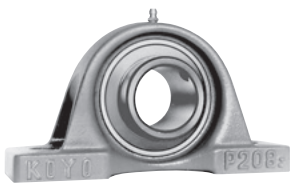
Types and features of the Ball Bearing Units are shown below.

1 Pillow block type units

1 Pillow block type units

Remark) Descriptions of codes for unit with cover are shown in the table below. (common to all the types)

Diameter series	Code	Descriptions
2	C, CD	Pressed steel cover type
	FC, FCD	Cast iron cover type
X	C, CD	From X05 to X17 : pressed steel cover type X18 and X20 : cast iron cover type
	C, CD	Cast iron cover type



UCP



UKP

Cylindrical bore (with set screws)...Bearing **UC2 (X, 3)** series are used.

UCP2 (X, 3) : Standard type, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Pressed steel cover type or cast iron cover type

UCP2 (3) SC : Cast steel housing, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Cast iron cover type

Cylindrical bore (with eccentric locking collar) ...Bearing **NA2** series are used.

NAP2, NAPK2 : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)...Bearing **UK2 (X, 3)** series are used.

UKP2 (X, 3) : Standard type, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Pressed steel cover type or cast iron cover type

UKP2 (3) SC : Cast steel housing, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Cast iron cover type

NAP

NAPK

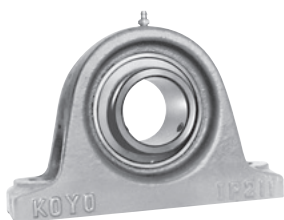
This is the most typical type ball bearing unit. The rib at the bottom of the housing mounting section allows the highly strong structure which withstands against loads applied from all the directions.

The bearing units (UCPsc, UKPsc) with cast steel housings are also available in series, and are used for purposes with severe load conditions.

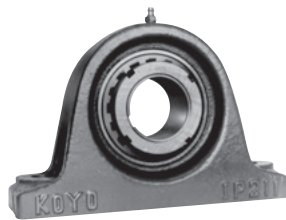
The housing can be installed to a machine with two bolts. As for the tapered bore (UKP) type, nominal number of adapter assembly which follows the nominal number of unit should be added.

Applications : Transmission devices, general industrial equipment

2 Thick section pillow block type units



UCIP



UKIP

Cylindrical bore (with set screws)...Bearing **UC2 (3)** series are used.

UCIP2 (3) : Standard type, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Pressed steel cover type or cast iron cover type

Tapered bore (with adapter)...Bearing **UK2 (3)** series are used.

UKIP2 (3) : Standard type, **L3** : Triple-lip seal type, **C, CD (FC, FCD)** : Pressed steel cover type or cast iron cover type

This pillow block type unit is applicable for use with a great load. The thick and highly rigid housing is suitable to environment exposed to a great load, vibration, and impact. The mounting bolt holes are drilled, and the housing can be installed to the exact location with two bolts.

Applications : Crane, heavy object conveyor, quarrying plant, ships

3 Tapped-base pillow block type unit



UCPA

Cylindrical bore (with set screws)...Bearing **UC2** series are used.
UCPA2 : Standard type, **L3** : Triple-lip seal type

This pillow block type unit is designed so that the mounting space is reduced. It is installed to machines with the two tapped holes on the housing mounting bottom.

Applications : Roller conveyor, purpose with small mounting space

4 Higher centerheight pillow block type unit



UCPH

Cylindrical bore (with set screws)...Bearing **UC2** series are used.
UCPH2 : Standard type, **L3** : Triple-lip seal type

This unit, designed as the higher centerheight pillow block type unit, has high strength against impact load. It is suitable for the machine that the distance from the mounting bottom to the shaft center is long. The housing can be installed to machines with two bolts.

Applications : Printing machine, spinneret

5 Light duty pillow block type unit



BLP

ALP

Cylindrical bore (with set screws)...Bearing **SB2** series are used.
BLP2

Cylindrical bore (with eccentric locking collar)

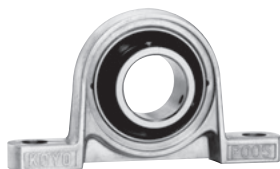
...Bearing **SA2** series are used.

ALP2

This pillow block type unit is designed for the aim of lightweight. The housing can be installed to machines with two bolts.

Applications : Machinery for general purposes aiming at lightweight

6 "Compact" series pillow block type unit



UP

Cylindrical bore (with set screws)...Bearing **SU0** series are used.
UP0

C, CD : Rubber coating cover type

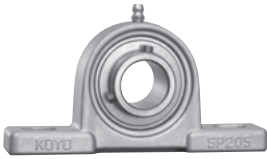
The small and lightweight pillow block type unit, comprising the ball bearing for unit for light load and the special lightweight alloy housing, needs not to be lubricated additionally.

The housing can be installed to machines with two bolts.
 Applications : Machineries for light load

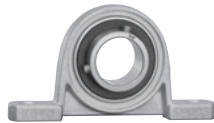
2 Types

(1 Pillow block type units)

7 Stainless-series pillow block type units



UCSP-H1S6



USP-S6

UCSPA-H1S6

Cylindrical bore (with set screws)
Standard... Bearing **UC2-S6** series are used.

UCSP2-H1S6

C, CD : Pressed stainless steel cover type

Tapped base... Bearing **UC2-S6** series are used.

UCSPA-H1S6

C, CD : Pressed stainless steel cover type

Compact... Bearing **SU0-S6** series are used.

USP0-S6

C, CD : Pressed stainless steel cover type

This superior anticorrosion pillow block type unit comprises the bearing and housing made of stainless steel. The unit is thinner than standard UCP series units, leading to downsizing of machinery. The housing can be installed to machines with two bolts.

Applications : Food machinery, agricultural machinery

8 Pressed steel pillow block type unit



SBPP

SAPP

Cylindrical bore (with set screws)... Bearing **SB2** series are used.
SBPP2

Cylindrical bore (with eccentric locking collar)

... Bearing **SA2** series are used.

SAPP2

This lightweight pillow block type unit for light load comprises the ball bearing for lightweight unit and the pressed steel plate housing.

The housing can be installed to machines with two bolts.

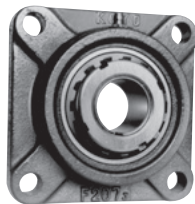
Applications : Light duty conveyor, environment exposed to light load and low speed rotation

2 Square-flanged type units

1 Square-flanged type units



UCF, UCF-E



UKF

NANF

Cylindrical bore (with set screws)... Bearing **UC2 (X, 3)** series are used.

UCF2 (X, 3) : Standard type, **L3** : Triple-lip seal type,

C, D (FC, FD) : Pressed steel cover type or cast iron cover type

UCF2 (X) -E : Standard type, **L3** : Triple-lip seal type

Cylindrical bore (with eccentric locking collar)

... Bearing **NA2** series are used.

NANF2 : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)... Bearing **UK2 (X, 3)** series are used.

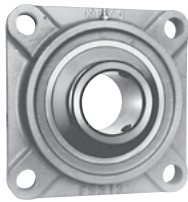
UKF2 (X, 3) : Standard type, **L3** : Triple-lip seal type,

C, D (FC, FD) : Pressed steel cover type or cast iron cover type

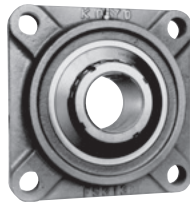
This bearing unit comprises the ball bearing for unit and the housing with square flange. It is suitable to use on a vertical surface, such as the side of machinery.

The housing can be installed to machines with four bolts.

2 Square-flanged types with spigot joint



UCFS



UKFS

Cylindrical bore (with set screws)...Bearing **UC3** series are used.

UCFS3 : Standard type, **L3** : Triple-lip seal type,
C, D : Cast iron cover type

Tapered bore (with adapter)...Bearing **UK3** series are used.

UKFS3 : Standard type, **L3** : Triple-lip seal type,
C, D : Cast iron cover type

This bearing unit comprises the ball bearing for unit, square flange, and the housing with spigot joint on the mounting surface. The housing can be installed to a machine by fitting the spigot joint into the mounting hole of it, and using four bolts.

The housing can be installed to the exact location by fitting the spigot joint into the mounting hole.

Applications : Rotating drum, rotating roller, purposes excellent mounting accuracy is required

3 Stainless-series square-flanged type unit

Cylindrical bore (with set screws)...Bearing **UC2-S6** series are used.

UCSF2-H1S6

C, D : Pressed stainless steel cover type

UCSF-H1S6

In this superior waterproof and anticorrosion square-flanged type unit, bearing and housing are made of stainless steel. The unit is thinner than standard UCF series units, leading to downsizing of machinery. The housing can be installed to machines with four bolts.

Applications : Food machinery, agricultural machinery

3 Oval flange type units

1 Rhombic-flanged type units



UCFL, UCFL-E



UKFL

Cylindrical bore (with set screws)...Bearing **UC2 (X, 3)** series are used.

UCFL2 (X, 3) : Standard type, **L3** : Triple-lip seal type,
C, D (FC, FD) : Pressed steel cover type or cast iron cover type

UCFL2 (X) -E : Standard type, **L3** : Triple-lip seal type,

Cylindrical bore (with eccentric locking collar)

...Bearing **NA2** series are used.

NANFL2 : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)...Bearing **UK2 (X, 3)** series are used.

UKFL2 (X, 3) : Standard type, **L3** : Triple-lip seal type,
C, D (FC, FD) : Pressed steel cover type or cast iron cover type

NANFL

This bearing unit comprises the ball bearing for unit and the housing with rhombic flange. It is suitable to use on a vertical surface, such as the side of machinery. Compared to the square-flanged type unit, it requires less mounting space, and the unit weight is also reduced.

Since the pitches of the center of two mounting bolt holes on the rhombic-flanged type housing are the same as those of the center of bolt holes located opposite each other on the square-flanged housing, they are compatible.

The housing can be installed to machines with two bolts.
Applications : Roller conveyor, environment the mounting dimensions are small

(3 Oval flange type units)

2 Adjustable rhombic-flanged type unit



UCFA

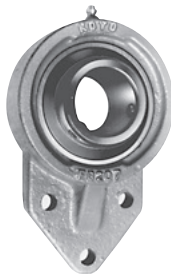
Cylindrical bore (with set screws)...Bearing **UC2** series are used.
UCFA2 : Standard type, **L3** : Triple-lip seal type

This rhombic-flanged type unit allows angle adjustment with a supporting point as the shaft center. Therefore, when the bearing unit is installed, fine adjustment of supporting location for the shaft center is enabled.

Since the pitches of the center of mounting bolt holes on the housing are the same as those of the square-flanged type unit and rhombic-flanged type unit, they are compatible.

The housing can be installed to machines with two bolts.

3 Three-bolt flange type unit



UCFB

Cylindrical bore (with set screws)...Bearing **UC2** series are used.
UCFB2 : Standard type, **L3** : Triple-lip seal type,

The housing of this unit has the one-side oval flange, and the unit is suitable to use on a vertical surface and in a limited space, such as the side of machinery.

The housing can be installed to machines with three bolts.

4 Light duty rhombic-flanged type units



BLF

ALF

Cylindrical bore (with set screws)...Bearing **SB2** series are used.
BLF2

Cylindrical bore (with eccentric locking collar)
 ...Bearing **SA2** series are used.

ALF2

This rhombic-flanged type unit is designed for the aim of lightweight. The housing can be installed to machines with two bolts.

5 "Compact" series rhombic-flanged type unit



UFL

Cylindrical bore (with set screws)...Bearing **SU0** series are used.
UFL0

C, D : Rubber coating cover type

The small and lightweight rhombic-flanged type unit, comprising the ball bearing for unit for light load and the special lightweight alloy housing, needs not to be lubricated additionally.

The housing can be installed to machines with two bolts.

Applications : Machineries for light load

6 Stainless-series rhombic-flanged type units



UCSFL-H1S6



USFL-S6

Cylindrical bore (with set screws)
Standard... Bearing **UC2X (2) -S6** series are used.
UCSFL2X (2) -H1S6

C, D : Pressed stainless steel cover type

Compact... Bearing **SU0-S6** series are used.
USFL0-S6

C, D : Rubber coating cover type

This superior anticorrosion rhombic-flanged type unit comprises the bearing and housing made of stainless steel. The unit is thinner than standard UCFL series units, leading to downsizing of machinery.

The housing can be installed to machines with two bolts.
Applications : Food machinery, agricultural machinery

4 Round-flanged types with spigot joint

Round-flanged types with spigot joint



UCFC, UCFC-E



UKFC

Cylindrical bore (with set screws)... Bearing **UC2 (X)** series are used.

UCFC2 (X) : Standard type, **L3** : Triple-lip seal type,

C, D (FC, FD) : Pressed steel cover or cast iron cover type

UCFCX-E : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)... Bearing **UK2 (X)** series are used.

UKFC2(X) : Standard type, **L3** : Triple-lip seal type,

C, D (FC, FD) : Pressed steel cover or cast iron cover type

This bearing unit comprises the ball bearing for unit, round flange, and the housing with spigot joint on the mounting surface. The housing can be installed to machines by fitting the spigot joint into the mounting hole of machinery, and using four bolts.

The housing can be installed to the exact location by fitting the spigot joint into the mounting hole.

Applications : Rotating drum, rotating roller, purposes excellent mounting accuracy is required.

5 Pressed steel flange type units

1 Pressed steel round-flanged type units



SBPF

SAPF

Cylindrical bore (with set screws)... Bearing **SB2** series are used.
SBPF2

Cylindrical bore (with eccentric locking collar)

... Bearing **SA2** series are used.

SAPF2

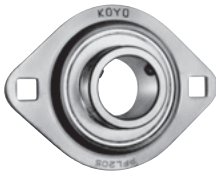
This lightweight round-flanged type unit for light load comprises the ball bearing for lightweight unit and the pressed steel plate housing.

The housing can be installed to machines with three bolts.

Applications : Light duty conveyor, environment exposed to light load and low speed rotation

(5 Pressed steel flange type units)

2 Pressed steel rhombic-flanged type units



SBPFL

SAPFL

Cylindrical bore (with set screws)...Bearing **SB2** series are used.
SBPFL2

Cylindrical bore (with eccentric locking collar)
...Bearing **SA2** series are used.

SAPFL2

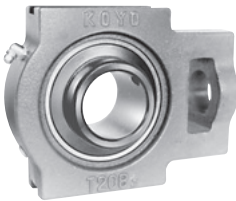
This lightweight rhombic-flanged type unit for light load comprises the ball bearing for lightweight unit and the pressed steel plate housing. Compared to the pressed steel round-flanged type unit, less mounting space is required.

The housing can be installed to machines with two bolts.

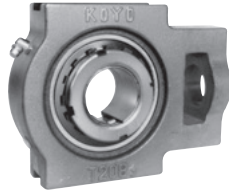
Applications : Light duty conveyor, environment exposed to light load and low speed rotation

6 Take-up type units

1 Take-up type units



UCT, UCT-E



UKT

Cylindrical bore (with set screws)...Bearing **UC2 (X, 3)** series are used.

UCT2 (X, 3) : Standard type, **L3** : Triple-lip seal type,
C, CD (FC, FCD) : Pressed steel cover or cast iron cover type

UCT2 (X) -E : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)...Bearing **UK2 (X, 3)** series are used.

UKT2(X, 3) : Standard type, **L3** : Triple-lip seal type,
C, CD (FC, FCD) : Pressed steel cover or cast iron cover type

The bearing unit comprises the ball bearing for unit and the housing with slide groove. This unit allows angle adjustment with a supporting point of the shaft center by moving the housing in radial direction along the slide groove.

Applications : Belt conveyor, use the supporting point of the shaft center must be adjusted

2 Stainless-series take-up type unit

Cylindrical bore (with set screws)...bearing **UC2-S6** series are used.

UCT2-H1S6

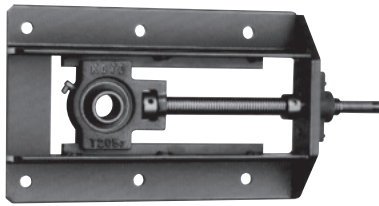
C, CD : Pressed stainless steel cover type

This superior anticorrosion take-up type unit comprises the bearing and the housing made of stainless steel. The unit is thinner than standard UCT series units, leading to downsizing of machinery.

Applications : Conveyor of food machinery, agricultural machinery

UCST-H1S6

3 Section steel frame take-up type unit



UCTH

Cylindrical bore (with set screws)...Bearing **UC2** series are used.

UCTH2 : Standard type, **L3** : Triple-lip seal type,

C, CD (FC, FCD) : Pressed steel or cast iron cover type

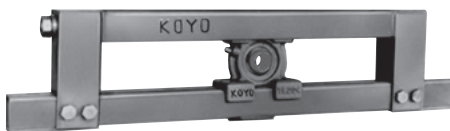
This unit comprises the take-up type unit, the section steel frame, adjuster bolt, and so on.

This unit allows adjustment of the supporting point of the shaft center by moving the housing in radial direction with the adjuster bolt on the unit.

The housing can be installed to machines with six bolts.

Applications : Belt conveyor, use the supporting point of the shaft center must be adjusted

4 Channel steel frame take-up type unit



UCTL

Cylindrical bore (with set screws)...Bearing **UC2 (3)** series are used.

UCTL2 : Standard type, **L3** : Triple-lip seal type,

C, CD (FC, FCD) : Pressed steel cover or cast iron cover type

UCTU2 (3) : Standard type, **L3** : Triple-lip seal type,

C, CD (FC, FCD) : Pressed steel cover or cast iron cover type

This unit comprises the take-up type unit, the channel steel frame, adjuster bolt, and so on. This unit allows adjustment of the supporting point of the shaft center by moving the housing in radial direction with the adjuster bolt in the frame.

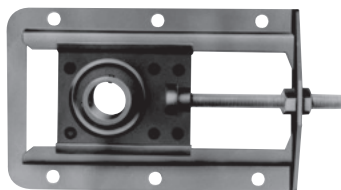
Since this unit is installed with the frame stood, the mounting space is reduced.

The TL lightweight type unit is made of light channel steel, and the TU highly rigid type unit is made of channel steel. The housing can be installed to machines with two or four bolts.

Tapered bore (with adapter) unit is also available (examples of nominal number : UKTL 207J-100, UKTU208J-500).

Applications : Belt conveyor, use the supporting point of the shaft center must be adjusted

5 Pressed steel frame take-up type unit



SBPTH

Cylindrical bore (with set screws)...Bearing **SB2** series are used.

SBPTH2

SBNPTH2

This unit comprises the pressed steel take-up type unit, the pressed steel frame, adjuster bolt, and so on. This unit allows adjustment of the supporting point of the shaft center by moving the housing in radial direction with the adjuster bolt in the frame.

Since the housing and the frame are made of pressed steel, the unit is compact and lightweight. The housing can be installed to machines with four or six bolts.

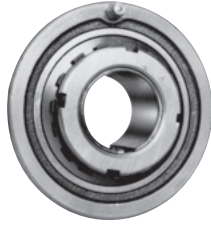
Applications : Small belt conveyor for lightload, use the supporting point of the shaft center must be adjusted

7 Other units

1 Cartridge type units



UCC



UKC

Cylindrical bore (with set screws)... Bearing **UC2 (X, 3)** series are used.

UC2 (X, 3) : Standard type, **L3** : Triple-lip seal type

Tapered bore (with adapter)... Bearing **UK2 (X, 3)** series are used.

UK2 (X, 3) : Standard type, **L3** : Triple-lip seal type

This unit comprises the ball bearing for unit and the housing with the cylindrical outside surface. The housing, having the grounded cylindrical outer surface, can be fit to the cylindrical bore of a machine.

The cartridge type unit, moving in axial direction, is used as the bearing for free side when a shaft is expanded or contracted.

The cylindrical outside surface and the automatic aligning mechanism allow handling similar to standard automatic aligning type bearing.

2 Hanger type unit



UCHA

Cylindrical bore (with set screws)... Bearing **UC2** series are used.

UCHA2 : Standard type, **L3** : Triple-lip seal type

The bearing unit comprises the ball bearing for unit and the housing with parallel thread for pipe on one side. The compact housing is installed to machinery with suspended with steel pipe.

Applications : Intermediate bearing of screw conveyor

8 Ball bearings for units

1 UC type bearing



UC

Cylindrical bore (with set screws)

UC2 (X, 3)...Standard type

UC2 (X, 3) L3...Triple-lip seal type

UC2-S6...Stainless steel series

This grease sealed type deep groove ball bearing incorporates the outer ring with the spherical outside surface and lubricating mechanism and wide inner ring with cylindrical bore set screw. Two types, standard type (oil seal and flinger are included) and triple-lip seal type (supplementary code : L3), are available, depending on the type of sealing device.

It can be fixed to shaft with two set screws on the inner ring. It is the most typical type in ball bearings for unit.

The UC2-S6 series are superior waterproof and anticorrosive ball bearings for unit. The bearing is made of stainless steel, and the series are used for stainless-series units.

As for the types and features of set screw for UC type bearing, see "14 Handling".

2 UK type bearing



UK

Tapered bore (with adapter)

UK2 (X, 3)...Standard type

UK2 (3) L3...Triple-lip seal type

This grease sealed type deep groove ball bearing incorporates the outer ring with the spherical outside surface and lubricating mechanism and wide inner ring with tapered bore. Two types, standard type (oil seal and flinger are included) and triple-lip seal type (supplementary code : L3), are available, depending on the type of sealing device.

It can be fixed to shaft with the adapter. The UK type bearing (with adapter) is optimal for use of long shaft.

As for the UK type bearing, applicable adapter assembly number should be added to the bearing number.

3 NA type ball bearing



NA

Cylindrical bore (with eccentric locking collar)

NA2

This type is based on the UC type bearing having set screw, but equipped with the eccentric locking collar. The grease sealed type deep groove ball bearing incorporates the spherical outside surface outer ring with lubricating mechanism and the cylindrical bore, wide inner ring, and eccentric locking collar with eccentric section on one side. The sealing device is equipped with the oil seal and flinger.

When fixing the bearing to shaft, fit the eccentric recessed section of the eccentric locking collar to the eccentric section of the inner ring, turn the eccentric locking collar to fix it to shaft, and tighten the set screw of the eccentric locking collar to shaft.

4 SB type bearing



SB

Cylindrical bore (with set screws)

SB2

This is the lightweight UC type bearing. The non-lubricating type grease sealed deep groove ball bearing incorporates the spherical outside surface outer ring and the wide inner ring with cylindrical bore set screw. When fixing it to shaft, use the two set screws on the inner ring.

It is used for lightweight unit or pressed steel unit.

5 SA type bearing



SA

SA-F

Cylindrical bore (with eccentric locking collar)

SA2, SA2-F

This type is based on the SB type bearing having set screw, but equipped with the eccentric locking collar. The non-lubricating type grease sealed type deep groove ball bearing incorporates the spherical outside surface outer ring and the cylindrical bore, wide inner ring, and eccentric locking collar with eccentric section on one side.

When fixing the bearing to shaft, fit the eccentric recessed section of the eccentric locking collar to the eccentric section of the inner ring, turn the eccentric locking collar to fix it to shaft, and tighten the set screw of the eccentric locking collar to shaft.

(SA-F type bearing has lubricating mechanism on outer ring.)

It is used for lightweight unit or pressed steel unit.

(8 Ball bearing for units)

6 SU type bearing (“compact” series)



SU

Cylindrical bore (with set screws)

SU0...Standard type

SU0-S6...Stainless steel

The bearing series intended for light load is suitable for downsizing and weight saving.

The non-lubricating type grease sealed deep groove ball bearing incorporates the spherical outside surface outer ring and the wide inner ring with cylindrical bore set screw. When fixing it to shaft, use the two set screws on the inner ring.

The SU0-S6 type bearing for unit, made of stainless steel, is superior in corrosion resistance, and used for stainless-series units.

7 ER type bearing



ER

Cylindrical bore (with set screws), cylindrical outside surface, lubricating mechanism, locating snap ring and snap ring groove

ER2

The grease sealed type deep groove ball bearing incorporates the spherical outside surface with lubricating mechanism and set screw, the wide inner ring with cylindrical bore set screw. When fixing it to shaft, use the two set screws on the inner ring.

It features lubricating mechanism, set screw (easy to locate bearing), clearance fit of inner ring and shaft (easy to install). Therefore, it can be used for various purposes in a similar way to standard bearings.

8 RB type bearing



RB

Cylindrical bore (with set screws), cylindrical outside surface

RB2

This bearing is based on the ER type bearing, but without the lubricating mechanism and locating snap ring and snap ring groove. The grease sealed deep groove ball bearing incorporates the spherical outside surface outer ring and the wide inner ring with cylindrical bore set screw. When fixing it to shaft, use the two set screws on the inner ring.

Since clearance fit may be used for installation of the inner ring to shaft (easy to install), it can be used for various purposes in a similar way to standard bearings.

2.3 Unit for special use

To meet with requests for varied and special purposes, JTEKT supplies ball bearing series for special use with various features, as well as standard types. If you use ball bearing units under special environment or conditions, select optimal type among ball bearing units for special use.

JTEKT produces bearing units in various forms and specifications, other than units for special use. Contact JTEKT, if you need them.

1 Triple-lip seal unit (supplementary code : L3)

Triple-lip seal has the structure in which the triple-lip oil seal is glued to the pressed steel shield plate with vulcanized adhesive. The triple-lip eliminates ingress of dusts and mud water into bearing to ensure long service life of the bearing even under severe environmental conditions.

Since the triple-lip seal is fit to the outer ring of the bearing, the triple-lip seal bearing unit can be handled in the same manner as the standard types. The triple-lip seal unit does not lead to uneven contact of the shaft with seal while the bearing is aligned unlike the unit with cover, and maintains stable sealing performance for a long time.

The triple-lip seal unit is the outstanding product that defects of conventional dust and water preventive unit are improved to realize energy-saving and low cost. The triple-lip seal is applicable to the UC type bearing and the UK type bearing.

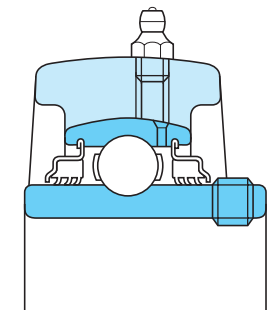


Fig. 2.1 Structure of triple-lip seal unit

2 Unit with cover (supplementary code : C, D, FC, FD)

The unit with cover is equipped with the standard type housing and the pressed steel cover or cast iron cover, and features the double sealing structure of bearing and housing. The unit ensures a long service life of bearing even under severe environmental conditions such as dusts and mud water.

The unit with cover is available in two types : open ends type C type, FC type, closed end type D type, and FD type (for pillow block type unit, CD type or FCD type).

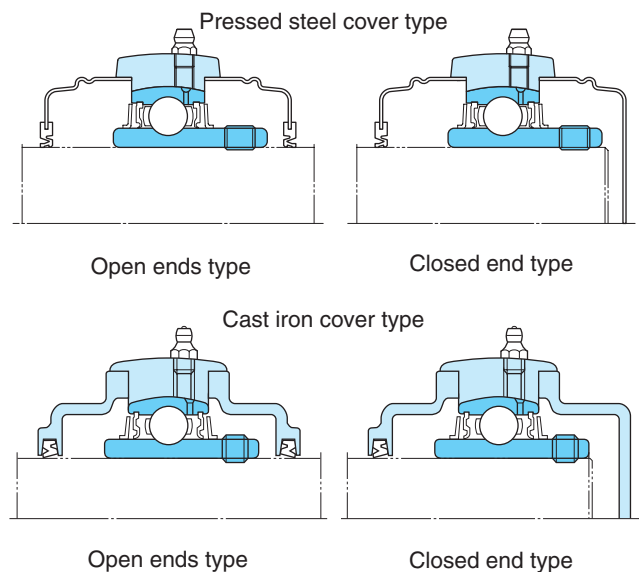


Fig. 2.2 Type and structure of unit with cover

3 Heat resistant unit (special code : D1K2) and Cold resistant unit (special code : D2K2)

The operating temperature range of a ball bearing unit depends on the performance of grease and oil seal (rubber) used for the bearing. The operating temperature range of Koyo Ball Bearing unit (standard type) ranges from -20°C to 100°C .

If you use bearing units in the higher or lower temperature range beyond the operating temperature range of standard type, select the heat resistant (special code : D1K2) or the cold resistant unit (special code : D2K2).

Specifications of the heat resistant unit and the cold resistant unit are shown in **Table 2.3**.

Table 2.3 Specifications of heat resistant unit and cold resistant unit

Category	Special code	Operating temperature range ($^{\circ}\text{C}$)	Grease	Oil seal rubber material	Bearing internal clearance	
					UC type	UK type
Standard	(no code)	-20 to 100	Alvania No. 2 or equivalence (lithium soap)	Nitrile	CN	C3
Heat resistant	D1K2	-40 to 180	SH44M (lithium soap)	Silicone	C4	C5
Cold resistant	D2K2	-50 to 120	SH33M (lithium soap)	Silicone	CN	C3

4 High speed unit (special code : K3)

The high speed unit (special code : K3) is the product that has been developed for intention of high speed and less heat. For the high speed unit bearing, the non-contact type oil seal optimal for high speed rotation and low torque is used.

This unit is intended for the purposes high speed rotation, low torque, and less heat are required, such as textile machinery and printing machinery.

5 Unit for blower (special code : S5)

The ball bearing unit for blower must meet requests for high speed rotation, less heat, less vibration, and low noise.

To meet with these requests for performance, JTEKT supplies the series of unit for blower (special code : S5) that the non-contact type oil seal is used, as well as improves the machining accuracy.

This unit is intended for the purposes high speed rotation, less heat, less vibration, low noise are required, such as a blower.

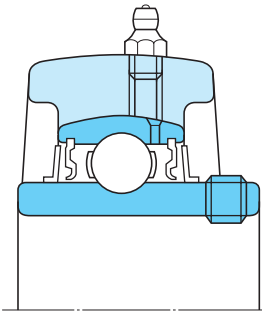


Fig. 2.3 Structure of bearing unit for blower

6 “Compact” series unit

For downsizing of machinery in facilities, the set screw method facilitating installation of the shaft is adopted for this unit.

The unit comprises the compact bearing and the special alloy housing.

Since the cover surface is coated with rubber, it contacts close with the housing well, and features superior dustproof and waterproof performance.

Operating temperature range : Standard temperature

7 Stainless-series unit (special code : S6)

The ball bearing units used for food machinery need waterproof performance.

For this purpose, JTEKT has released a series of Ball Bearing units of which bearings and housings are made of stainless steel in order to satisfy the required performance.

We can also provide bearing units packing grease applicable to use related to food certified by USDA (US Agriculture Department) H1.

Operating temperature range : From $-20\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$

* If you use this unit for machines splashed with water or in the environment that the operating temperature exceeds $50\text{ }^{\circ}\text{C}$, it is recommended you use UC-S6 to be able to be lubricated for SU-S6.

3 Selection of unit

3.1 Outline of selection

Koyo Ball Bearing Units are available in various types and series. Therefore, to select the bearing unit optimal for design of machinery, various factors including the structure of machinery, operating conditions, performance required

for bearing unit, specifications relative to the unit, marketability, and economic efficiency, must be comprehensively taken into consideration. Service life of the bearing greatly depends on the quality of selection.

Procedures of selection of standard ball bearing units are shown in **Table 3.1**.

Table 3.1 Procedures of selection of standard ball bearing units

Procedures of selection	Items to be examined	Operating conditions to be considered	Reference
1 Selection of type	<ul style="list-style-type: none"> · Pillow block type · Flange type · Take-up type · Cartridge type · Hanger type 	Structure of machinery, mounting space, mounting dimensions	2 Types (P.10)
2 Selection of shaft dia. and dia. series	<ul style="list-style-type: none"> · Bearing bore dia. : From 10 to 140 mm · Dia. series : 0, 2, X, 3 	Rating life of bearings required, load applied to bearings, rotational speed	4 Life of bearing (P.28) 5 Bearing load (P.31) 6 Allowable rotational speed (P.38)
3 Selection against atmosphere	<ul style="list-style-type: none"> · L3 type · Cover type · Stainless steel series · For high speed use · For blower 	Environment (dusts, mud water, high humidity, chemicals), rotational speed	2 Types (P.10) (P.23) 6 Allowable rotational speed (P.38)
4 Selection against temperature	<ul style="list-style-type: none"> · Heat resistant type · Cold resistant type · Measures against expansion and contraction of shaft · Grease supply 	Bearing temperature	2 Types (P.10) (P.23) 7 Operating temperature and bearing specifications (P.39) 9 Design of shaft and base (P.45) 14 Handling (P.61)
5 Selection of installing to shaft	<ul style="list-style-type: none"> · Set screw · Adapter · Eccentric locking collar 	Rotational speed, load conditions, handling	2 Types (P.10) 14 Handling (P.61)
6 Selection of shafts	<ul style="list-style-type: none"> · Dimensional tolerance · Adoption of shouldered shaft · Provision of set screw for shaft · Measures against expansion and contraction of shaft 	Rotational speed, load conditions, bearing temperature	2 Types (P.10) (P.23) 6 Allowable rotational speed (P.38) 9 Design of shaft and base (P.45) 14 Handling (P.61)
7 Selection of strength of housings	<ul style="list-style-type: none"> · Cast iron · Cast steel · Pressed steel 	Load conditions, load directions, presence of impact	8 Strength of housing (P.40)
8 Selection of lubrication	<ul style="list-style-type: none"> · Lubricating type · Non-lubricating type · Centralized lubricating type · Greasing interval 	Environment, importance of machine, bearing temperature, grease life	14 Handling (P.61)
9 Selection of maintenance and check	<ul style="list-style-type: none"> · Periodic inspection · Grease supply 	Environment, importance of machine, bearing temperature, grease life	14 Handling (P.61)

3 Selection of unit

3.2 Selection of type and specifications

Koyo Ball Bearing Units series are available in various types and specifications applicable to your purposes. Therefore, when selecting types and specifications of

bearing unit, structure of machine, operating conditions, and environment must be fully taken into consideration for comprehensive examination.

Outline of selection of ball bearing unit types and specifications are shown in **Table 3.2**.

Table 3.2 (1) Outline of selection of ball bearing unit types and specifications

○ : Acceptable or Yes, × : Unacceptable or No

Category	Performance required		Bearing specifications			Applicable housing
	Operating conditions	Fixing to shaft	Sealing structure	Type code	Lubrication	
Bearing	Standard	Set screw Adapter	Oil seal and flinger	UC UK	○	C, F, FA, FB, FC, FL, FS, HA, IP, P, PA, PH, T, TH, TL, TU
		Eccentric locking collar		NA		
	Dustproof and waterproof	Set screw Adapter	Triple-lip seal	UC-L3 UK-L3	○	C, F, FA, FB, FC, FL, FS, HA, IP, P, PA, PH, T, TH, TL, TU
	Lightweight	Set screw	Oil seal	SB	×	LF, LP, PF, PFL, PP, PTH, NPTH FL0, P0
	"Compact"	Set screw		SU		
	Anticorrosion	Set screw	Oil seal and flinger	UC-S6	○	SFL-H1, SP-H1
	Anticorrosion and compact		Oil seal	SU-S6	×	SFL0, SP0
	Heat resistant Cold resistant For high speed For blower	Set screw Adapter	Oil seal and flinger	UC UK	○	C, F, FA, FB, FC, FL, FS, HA, IP, P, PA, PH, T

Table 3.2 (2) Outline of selection of ball bearing unit types and specifications

Category	Performance required		Housing specifications				Applicable bearing	
	Type	Operating conditions	Type code	Material	Presence of cover	Lubrication		
Housing	Pillow block type	Standard	P	Cast iron			UC (-L3), UK (-L3)	
		Cast steel (highly strong)	Psc	Cast steel	○	○		
		Thick section (highly strong)	IP	Cast iron				
		Tapped-base	PA				○	UC (-L3)
		Higher centerheight	PH	Cast iron		×	○	UC (-L3)
		Light duty	LP				×	SB
		"Compact"	P0	Special light alloy			×	SU
		Anticorrosion	SP-H1	Stainless steel	○		○	UC-S6
		Anticorrosion and compact	SP0	Stainless steel			×	SU-S6
	Pressed steel	PP	Pressed steel		×	×	SB	
	Flange type	Square	F					UC (-L3), UK (-L3)
		With spigot joint (square)	FS	Cast iron		○	○	
		(round)	FC					
		Oval	FL					UC (-L3)
		Shaft alignment (adjustable oval)	FA	Cast iron		×	○	
Cantilever (deformed)		FB						
Light duty (oval)		LF	Cast iron		×	×	SB	
"Compact" (oval)	FL0	Special light alloy		○	×	SU		
Anticorrosion (oval)	SFL-H1	Stainless steel		○	○	UC-S6		
Anticorrosion and compact (oval)	SFL0	Stainless steel		○	×	SU-S6		

Table 3.2 (2) Outline of selection of ball bearing unit types and specifications

Category	Performance required		Housing specifications				Applicable bearing
	Type	Operating conditions	Type code	Material	Presence of cover	Lubrication	
Housing	Flange type	Pressed steel (round) (oval)	PF PFL	Pressed steel	×	×	SB
	Take-up type	Standard	T	Cast iron	○	○	UC (-L3), UK (-L3)
		Section steel frame type	TH	Cast iron	○	○	UC (-L3)
		Channel steel frame type	TL	Cast iron	○	○	UC (-L3), UK (-L3)
			TU				
	Pressed steel frame type	PTH NPTH	Pressed steel	×	×	SB	
	Cartridge type	Standard	C	Cast iron	×	○	UC (-L3), UK (-L3)
Hanger type	Standard	HA	Cast iron	×	○	UC (-L3)	

3.3 Selection from a maintenance standpoint

Koyo Ball Bearing Units need not to be maintained or checked for standard purposes during operation, because of their structures. However, they must be periodically maintained or checked if they are used for important machines or under special environment.

Thus, it is important that intervals of periodic maintenance or check during operation are extended or ball bearing units optimal for purposes or operating conditions are selected in order to reduce the manpower required for maintenance and check.

For your purposes, various factors must be fully examined. In the environment exposed to vibration or impact, increase in safety factor of service life of the bearing, and strength of the housing must be fully examined. In the environment exposed to great axial load, use of shouldered shaft, in the environment exposed to dusts or mud water, use of the triple-lip seal type or covered type, in the environment exposed to high or low temperature, material of oil seal and grease brand must be fully taken into consideration.

4 Life of bearing

If a ball bearing unit is installed to a machine or device and operated, vibration or noise from the unit may be increased or seizure may occur, after a certain period has passed, even under appropriate conditions. The period of bearing operation until the unit cannot be used due to these causes is called the life of ball bearing unit.

Life of a ball bearing unit is caused by two reasons, fatigue of bearing material (fatigue service life) and degradation of grease leading to faulty lubrication, and inability of continuous use. Each of them can be found as the rating life of bearing and grease life.

The life of ball bearing unit depends on the shorter one, between the rating life of bearing and grease life. Since the lubricating system is adopted for the Koyo Ball Bearing Unit, the grease life can be extended to the rating life of bearing by appropriate lubrication. If the bearing unit is used without lubrication, the shorter period, the rating life of bearing or grease life, is the life of the bearing unit.

However, a ball bearing unit is actually installed to a machine or device and operated, the unit cannot be used due to causes other than the rating life of bearing or grease service life (wear, dent, crack, seizure, etc.). They can be prevented by full examination of the selection, handling, installation, and lubrication of the ball bearing unit.

4.1 Basic rating life and basic rating load

4.1.1 Basic rating life

While a bearing is rotated under load, the raceways surfaces of the inner and outer rings of bearing and the rolling surfaces of rolling element are exposed to load continuously. Thus, damages like scales appear on the raceway surfaces or rolling surfaces due to fatigue of material (flaking or peel-off). The total number of revolution until the damages appear is called as “(Fatigue) service life” of bearing. Fatigue service life of bearing may be greatly varied even if the bearings having the same structure, dimensions, materials, and machining methods, are operated under the same operating conditions.

To solve this problem, if a group of the same bearings are operated under the same conditions, the total number of revolution of 90% of the bearings without damage due to rotating fatigue (life of 90% reliability) is called as the “Basic rating life of bearing”.

4.1.2 Basic rating load

Basic rating load indicates the withstanding strength against rolling fatigue of a bearing, that is to say, loading capacity. It is the pure radial load of a certain level and direction (for radial bearing) or central axial load (for thrust bearing) that a million times of rotations can be obtained as the basic rating life if the inner ring of bearing is rotated while the outer ring is stopped (or the outer ring is rotated while the inner ring is stopped).

They are called as the **basic dynamic radial load rating** (C_r) for radial bearing or the **basic dynamic axial load rating** (C_a) for axial bearings.

In the ball bearing for ball bearing unit, it is indicated as the basic dynamic radial load rating (C_r), and the value is shown in the dimensional table.

4.2 Calculation of rating life

Relation between the basic rating life, basic dynamic load rating, and the dynamic equivalent load of the ball bearing for ball bearing unit can be indicated as the **Formula (4.1)**. If the ball bearing unit is used at a fixed rotational speed, it is convenient that the life is indicated as time, as shown in the **Formula (4.2)**.

$$\text{(Total revolution)} \quad L_{10} = \left(\frac{C_r}{P_r}\right)^3 \dots\dots\dots (4.1)$$

$$\text{(Time)} \quad L_{10h} = \frac{10^6}{60n} \left(\frac{C_r}{P_r}\right)^3 \dots\dots\dots (4.2)$$

Whereas,	
L_{10} : Basic rating life	10^6 rotations
L_{10h} : Basic rating life	h
C_r : Basic dynamic load rating	N
P_r : Dynamic equivalent load (see “5 Bearing load”)	N
n : Rotational speed	min^{-1}

Calculation of the basic rating life with using the life factor (f_h) and the speed factor (f_n) in the **Formula (4.2)** are shown below.

$$L_{10h} = 500 f_n^3 \dots\dots\dots (4.3)$$

$$\text{Life factor} \quad f_h = f_n \cdot \frac{C_r}{P_r} \dots\dots\dots (4.4)$$

$$\begin{aligned} \text{Speed factor} \quad f_n &= \left(\frac{10^6}{500 \times 60n}\right)^{1/3} \\ &= (0.03n)^{-1/3} \dots\dots\dots (4.5) \end{aligned}$$

Values of f_n , f_h and L_{10h} can be easily found by the nomogram of **Fig. 4.1**.

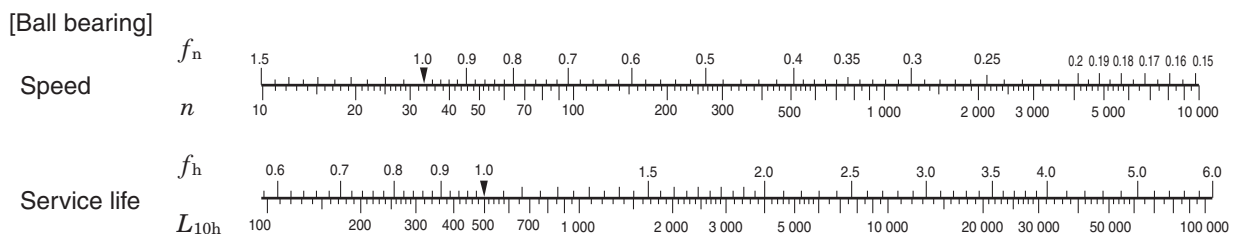


Fig. 4.1 Rotational speed (n) and its coefficients (f_n), and service life coefficient (f_h) and basic rating life (L_{10h})

4.2.1 Correction of basic rating load for high temperature use

If a ball bearing unit is used at a high temperature, structure of bearing material is changed, leading to decreased hardness, and the basic dynamic load rating is reduced than that of the use at standard temperature. Once the structure of bearing material is changed, it will not be restored even if the temperature returns to standard level.

Therefore, when using a ball bearing unit at 150 °C or more, the basic rating load must be corrected by multiplying the basic dynamic load rating shown in dimensional table by the temperature factor shown in **Table 4.1**.

If the ball bearing unit has been used for a long period at 120 °C or more, fluctuations in dimensions of the bearing may be increased. If you use it under such conditions, contact JTEKT.

Table 4.1 Temperature factor

Bearing temperature, °C	125	150	175	200	250
Temperature factor	1	1	0.95	0.90	0.75

4.2.2 Corrected rating life

Although the basic rating life (L_{10}) shown in **Formula (4.1)** is the fatigue life of bearing with 90% reliability, service life with 90% or more reliability is required, depending on the purposes. The bearing life may be extended by adoption of special material. Furthermore, operating conditions including lubrication may give influence on the bearing life.

The corrected rating life, obtained by correcting the basic rating life taking these points into consideration, can be found by **Formula (4.6)**.

$$L_{na} = a_1 a_2 a_3 L_{10} \dots\dots\dots (4.6)$$

Whereas,

- L_{na} : Corrected rating life 10⁶ rotations
Life that characteristics of bearing and operating conditions are taken into consideration with reliability 100– n % (the probability of failure occurrence is expressed by n)
- L_{10} : Basic rating load 10⁶ rotations
(Life with 90% reliability)
- a_1 : Reliability factor see (1)
- a_2 : Bearing characterization factor see (2)
- a_3 : Operating condition factor see (3)

(1) Reliability factor a_1

Values of reliability factor a_1 required in order to find the corrected rating life of bearing with 90% or more reliability (failure occurrence probability : 10% or less) are shown in **Table 4.2**.

Table 4.2 Reliability factor a_1

Reliability, %	L_{na}	a_1
90	L_{10a}	1
95	L_{5a}	0.62
96	L_{4a}	0.53
97	L_{3a}	0.44
98	L_{2a}	0.33
99	L_{1a}	0.21

(2) Bearing characterization factor a_2

Bearing characterization relative to the life of bearing may depend on the bearing material (type of steel, quality), production procedure, and design. In such a case, correct the basic rating life of bearing by the bearing characterization factor a_2 .

For Koyo Ball Bearing for ball bearing unit, high quality vacuum-degassed bearing steel is used as the standard material, and it causes a longer service life of bearing. In Koyo Ball Bearing for ball bearing unit, bearing characterization factor a_2 is 1 ($a_2 = 1$).

As for the bearing special material used for longer fatigue limit, bearing characterization factor a_2 larger than 1 ($a_2 > 1$) can be used.

(3) Operating condition factor a_3

If a bearing is operated under the operating conditions that may directly influence on the life of bearing (especially, appropriate or inappropriate lubrication), the basic rating life should be corrected with the operating condition factor a_3 .

If lubrication is appropriate, the operating condition factor should be as follows : $a_3 = 1$. If it is excellently good, following condition should be applied : $a_3 > 1$.

If any of the operating conditions shown below is satisfied, following condition should be applied : $a_3 < 1$.

- (1) Kinematical viscosity of lubricant during operation is low Ball bearing : 13 mm²/s or less,
- (2) Rotational speed is low $d_m n$: 10 000 or less
[Remark] d_m (Pitch dia. of ball set) × n (Rotational speed)
- (3) Foreign matters are mixed in lubricant

Even if the bearing characterization factor is as follows with using special material : $a_2 > 1$, the value satisfying the following condition cannot be adopted if lubricant is inappropriate : $a_2 \times a_3 > 1$. Therefore, if the operating condition factor is smaller than 1 ($a_3 < 1$), the following condition seems to be satisfied, in general : $a_2 \leq 1$.

4.2.3 Recommended service life of bearing

Excessively long life of ball bearing unit does not lead to economic operation. Setup of the recommended service life of bearing unit depending on the type of machine the ball bearing unit is used together and operating conditions is required.

Recommended service life of ball bearing unit empirically adopted is shown in **Table 4.3**.

Table 4.3 Recommended service life of ball bearing unit (reference)

Operating conditions	Application	Recommended service life, h
Operated in short period or intermittently	Home electric appliances, electric tool, agricultural machinery, hoist, etc.	4 000 – 8 000
Discontinuously but for a long period	Factory motor, general gear, etc.	12 000 – 20 000
Always operated for 8 hours or longer a day or operated continuously for a long period	General machinery, blower, etc.	20 000 – 30 000
Operated continuously for 24 hours, no fault is allowed	Electric power plant facility, mine drainage facility, etc.	100 000 –200 000

4.3 Grease life

Grease life of a ball bearing for ball bearing unit is influenced by the level of load, rotational speed of bearing, and operating temperature.

Grease life of a ball bearing for unit used under appropriate operating conditions can be found by the formula shown below.

$$\log L = 6.10 - 4.40 \times 10^{-6} d_m n - 2.50 \left(\frac{P_r}{C_r} - 0.05 \right) - (0.021 - 1.80 \times 10^{-8} d_m n) T \dots\dots\dots (4.7)$$

Whereas,

L : Grease life h

d_m : Pitch dia. of ball set mm

$$d_m = \frac{(D + d)}{2}$$

(D : Nominal bearing outer dia.,
 d : Nominal bearing bore dia.)

n : Rotational speed of bearing min⁻¹

P_r : Dynamic equivalent radial load N
(see “5 Bearing load”)

C_r : Basic dynamic radial load rating of bearing N

T : Operating temperature of bearing °C

Applicable conditions for the **Formula (4.7)** are shown below.

1) Operating temperature of bearing : T °C

To be applied if the following condition is satisfied :
 $T \leq 100$

(If T is smaller than 50 ($T < 50$),
following condition should be applied : $T = 50$.)

If T is larger than 100 ($T > 100$), contact JTEKT.

2) Rotational speed of bearing : $d_m n$

To be applied if the following condition is satisfied :
 $d_m n \leq 30 \times 10^4$

(If $d_m n$ is smaller than 12.5×10^4 ($d_m n < 12.5 \times 10^4$),
following condition should be applied :
 $d_m n = 12.5 \times 10^4$)

If $d_m n$ is larger than 30×10^4 ($d_m n > 30 \times 10^4$),
contact JTEKT.

3) Load condition of bearing : $\frac{P_r}{C_r}$

To be applied if the following condition is satisfied :
 $\frac{P_r}{C_r} \leq 0.2$

(If $\frac{P_r}{C_r}$ is smaller than 0.05 ($\frac{P_r}{C_r} < 0.05$),
following condition should be applied : $\frac{P_r}{C_r} = 0.05$)

If $\frac{P_r}{C_r}$ is larger than 0.2 ($\frac{P_r}{C_r} > 0.2$), contact JTEKT.

Reference figure of grease life obtained by the **Formula (4.7)** is shown in **Fig. 4.2**.

5 Bearing load

$$F_b = \frac{2M}{D_p} \cdot f_w \cdot f_b$$

$$= \frac{19.1 \times 10^6 W}{D_p \cdot n} \cdot f_w \cdot f_b \quad \dots\dots\dots (5.2)$$

Whereas,

- F_b : Load actually applied to pulley shaft or sprocket shaft N
- M : Torque applied to pulley or sprocket mN · m
- W : Transmitted power kW
- D_p : Pitch circle dia. of pulley or sprocket mm
- n : Rotational speed min⁻¹
- f_w : Load factor (see **Table 5.1**)
- f_b : Belt factor (see **Table 5.2**)

Table 5.2 Belt factor f_b

Belt type	f_b
Toothed belt	1.3 – 2
V belt	2 – 2.5
Flat belt (with tension pulley)	2.5 – 3
Flat belt	4 – 5
Chain	1.2 – 1.5

5.1.3 Load in case of gear transmission

As for gear transmission, load in tangential direction (K_t), load in radial direction (K_r), and axial load (K_a) are included as the theoretical loads applied to a gear. They can be dynamically found by transmission force and gear type.

The followings show the example of standard flat gear (as for flat gear, no axial load applied is expected.).

- (1) Load applied to gear in tangential direction (tangential line force)

$$K_t = \frac{2M}{D_p} = \frac{19.1 \times 10^6 W}{D_p n} \quad \dots\dots\dots (5.3)$$

- (2) Load applied to gear in radial direction (separating force)

$$K_r = K_t \tan \alpha \quad \dots\dots\dots (5.4)$$

- (3) Synthetic load applied to gear

$$K_g = \sqrt{K_t^2 + K_r^2} = K_t \sec \alpha \quad \dots\dots\dots (5.5)$$

Whereas,

- K_t : Load applied to gear in tangential direction (tangential line force) N
- K_r : Load applied to gear in radial direction (separating force) N
- K_g : Synthetic load applied to gear N
- M : Torque applied to gear mN · m
- D_p : Pitch circle dia. of gear mm
- W : Transmission power kW
- n : Rotational speed min⁻¹
- α : Pressure angle of gear deg

Note that the actual gear load must be found by multiplying the theoretical load by load factor (f_w) obtained with taking vibration and impact generated while machine is being operated into consideration and gear factor (f_g) with taking accuracy and finish of gear into consideration.

$$F_g = f_w \cdot f_g \cdot K_g \quad \dots\dots\dots (5.6)$$

Whereas,

- F_g : Load actually applied to gear N
- K_g : Theoretically synthetic load applied to gear N
- f_w : Load factor (see **Table 5.1**)
- f_g : Gear factor (see **Table 5.3**)

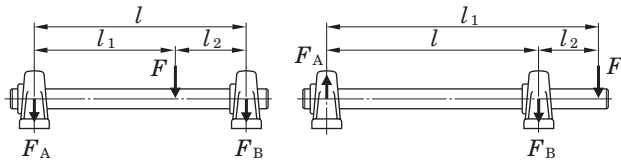
Table 5.3 Gear factor f_g

Gear type	f_g
Precision gear (both pitch error and tooth profile error should be 0.02 mm or less)	1 – 1.1
Standard gear (both pitch error and tooth profile error should be 0.1 mm or less)	1.1 – 1.3

5.2 Distribution of load to bearing

To distribute the load applied to the shaft system into the bearing which supports the shaft, find the radial component force of each load, and calculate the vector sum in accordance with the direction of load. **Fig. 5.1** shows the example of distribution of radial load.

In many cases, a bearing bears radial load as well as axial load, leading to synthetic loads. In such a case, convert it into dynamic equivalent load, and consider it as the bearing load.



$$F_A = \frac{l_2}{l} \cdot F \dots\dots\dots (5.7)$$

$$F_B = \frac{l_1}{l} \cdot F \dots\dots\dots (5.8)$$

Fig. 5.1 Distribution of load to bearing

5.3 Dynamic equivalent load

In many cases, a bearing is exposed to the synthetic load of radial load and axial load, and it is used under various conditions, including fluctuated load thus, the load actually applied to the bearing cannot be directly compared to the basic dynamic load rating.

In such a case, find the load running the bearing center in a fixed level and direction that allows the same bearing life as the actual bearing load and rotational speed. Then, compare it with the basic dynamic load rating.

The converted virtual load is called dynamic equivalent load (*P*).

5.3.1 Calculation of dynamic equivalent load

The dynamic equivalent radial load (*P_r*) of a radial bearing (ball bearing for unit is included) that bears the synthetic load in a fixed level and direction can be found by the formula shown below.

$$P_r = XF_r + YF_a \dots\dots\dots (5.9)$$

Whereas,

- P_r* : Dynamic equivalent radial load N
- F_r* : Radial load N
- F_a* : Axial load N
- X* : Radial load factor (see **Table 5.4**)
- Y* : Axial load factor (see **Table 5.4**)

Table 5.4 Radial load factor (*X*) and axial load factor (*Y*)

$\frac{f_0 F_a}{C_{0r}}$	<i>e</i>	$F_a / F_r \leq e$		$F_a / F_r > e$	
		<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>
0.172	0.19	1	0	0.56	2.30
0.345	0.22				1.99
0.689	0.26				1.71
1.03	0.28				1.55
1.38	0.30				1.45
2.07	0.34				1.31
3.45	0.38				1.15
5.17	0.42				1.04
6.89	0.44				1.00

- [Remarks] 1. *C_{0r}* (basic static radial load rating) and *f₀* (factor) are shown in the dimensional tables.
 2. If $f_0 F_a / C_{0r}$ does not conform to the table above, find by interpolation.

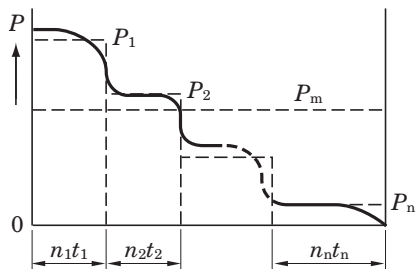
5.3.2 Mean dynamic equivalent load in case of fluctuated load

If level or direction of the load applied to a bearing is fluctuated, it is necessary to find the mean dynamic equivalent load to allow the same bearing life as that under actual fluctuated conditions.

Table 5.5 shows the method of finding the mean dynamic equivalent load under various fluctuated conditions.

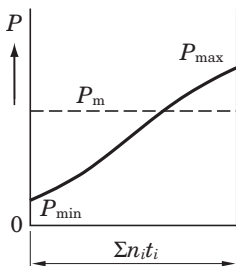
Table 5.5 Calculation of mean dynamic equivalent load in case of fluctuated load

(1) Staged fluctuation



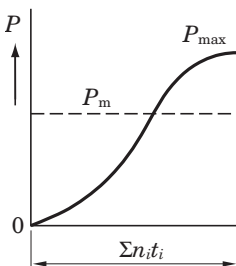
$$P_m = \sqrt[p]{\frac{P_1^p n_1 t_1 + P_2^p n_2 t_2 + \dots + P_n^p n_n t_n}{n_1 t_1 + n_2 t_2 + \dots + n_n t_n}} \dots \dots \dots (5.10)$$

(2) Stageless fluctuation



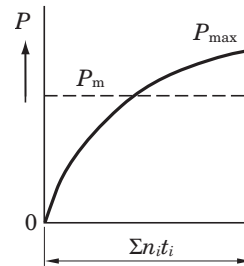
$$P_m = \frac{P_{min} + 2 P_{max}}{3} \dots \dots \dots (5.11)$$

(3) Sine curve fluctuation



$$P_m = 0.68 P_{max} \dots \dots \dots (5.12)$$

(4) Sine curve fluctuation (upper half of sine curve)



$$P_m = 0.75 P_{max} \dots \dots \dots (5.13)$$

Whereas,

- P_m : Mean dynamic equivalent load N
- P_1 : Dynamic equivalent load acting for t_1 hours at rotational speed of n_1 N
- P_2 : Dynamic equivalent load acting for t_2 hours at rotational speed of n_2 N
-
-
-
- P_n : Dynamic equivalent load acting for t_n hours at rotational speed of n_n N
- P_{min} : Minimum dynamic equivalent load N
- P_{max} : Maximum dynamic equivalent load N
- $\Sigma n_i t_i$: Total rotating frequency for t_1 to t_i hours

5.4 Basic static load rating and static equivalent load

5.4.1 Basic static load rating

If a bearing is exposed to excessive static load or impact load even under extra low rotational speed, partial permanent deformation occurs to the contact surface of the raceway of bearing with the rolling element. The permanent deformation increases with the increase of load, and when it exceeds a fixed level, smooth rotation of the bearing is interfered.

Basic static load rating of a bearing is the static load to generate the calculated contact stress shown below at the center of contact surface of the raceway the maximum load is applied and the rolling element.

- (1) Self-aligning ball bearing 4 600 MPa
- (2) Other ball bearings
(ball bearing for unit is included) 4 200 MPa
- (3) Roller bearing 4 000 MPa

The total permanent deformation of bearing raceway and rolling element to be generated under these contact stresses are 0.000 1 times of the diameter of rolling element.

In the ball bearing for unit, it is indicated as the **basic static radial load rating** (C_{0r}), and the values are shown in the dimensional tables.

5.4.2 Static equivalent load

Static equivalent load is the virtual load converted into the level that allows the generation of the same contact stress at the contact face of the raceway of bearing and rolling element that are exposed to the maximum stress as the contact stress under the actual load conditions, when a bearing is stopped or rotated at extra low speed.

Static equivalent radial load (P_{or}) of the ball bearing for unit can be calculated by the formula below (use greater value).

$$P_{or} = 0.6 F_r + 0.5 F_a \quad \dots\dots\dots (5.14)$$

$$P_{or} = F_r \quad \dots\dots\dots (5.15)$$

Whereas,

P_{or} : Static equivalent radial load N

F_r : Radial load N

F_a : Axial load N

5.4.3 Safety factor

The static equivalent load allowed by a bearing depends on the basic static load rating of the bearing, and the limitation of use of bearing by the permanent deformation (partial dent) of the bearing depends on the performance required for the bearing or operating conditions.

Therefore, in order to examine the safety of the basic static load rating of the bearing, safety factor is defined taking conventional experiences into consideration.

$$f_s = \frac{C_{or}}{P_{or}} \quad \dots\dots\dots (5.16)$$

Whereas,

f_s : Safety factor (see **Table 5.6**)

C_{or} : Basic static radial load rating N

P_{or} : Static equivalent radial load N

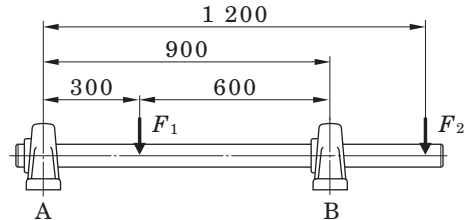
Table 5.6 Safety factor f_s (recommended)

Operating conditions		f_s (Min.)
Being rotated	High rotating accuracy is required	2
	Standard operating conditions	1
	Impact	1.5
Not always being rotated (sometimes oscillated)	Standard operating conditions	0.5
	Impact, unevenly distributed load	1

5.5 Example of applied calculation

Example 1 Distributing load

Find the load applied to the bearing A and bearing B, if the radial load F_1 ($F_1 = 1.5$ kN) and F_2 ($F_2 = 4.5$ kN) are applied.



- (1) Find the radial load F_{1A} applied to the bearing A by F_1 , with **Formulas (5.7) and (5.8)**.

$$F_{1A} = \frac{600}{900} \times 1.5 = 1.0 \text{ (kN)}$$

In a similar manner, find the radial load F_{2A} applied to the bearing A by F_2 .

$$F_{2A} = -\frac{1\,200 - 900}{900} \times 4.5 = -1.5 \text{ (kN)}$$

[Remark] Negative load is the upward load.

Radial load F_A applied to the bearing A :

$$F_A = F_{1A} + F_{2A} = 1.0 + (-1.5) = -0.5 \text{ (kN)}$$

- (2) In a similar manner to (1), find the radial load F_B applied to the bearing B.

$$F_{1B} = \frac{300}{900} \times 1.5 = 0.5 \text{ (kN)}$$

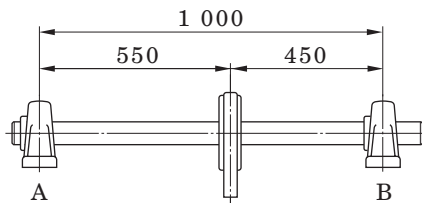
$$F_{2B} = \frac{1\,200}{900} \times 4.5 = 6.0 \text{ (kN)}$$

$$F_B = F_{1B} + F_{2B} = 0.5 + 6.0 = 6.5 \text{ (kN)}$$

5 Bearing load

Example 2 Calculating load by V-belt transmission

Find the load applied to the bearing A and bearing B when the shaft is driven by the V-belt, transmission power W is 7.5 kW ($W = 7.5 \text{ kW}$), rotational speed n is 300 min^{-1} ($n = 300 \text{ min}^{-1}$), effective diameter of pulley D_p is 300 mm ($D_p = 300 \text{ mm}$).



- (1) Find the load actually applied to the pulley shaft F_b with **Formula (5.2)**.

From **Table 5.1**, load factor f_w is 1.2 ($f_w = 1.2$), and the belt factor f_b is 2.5 ($f_b = 2.5$), from **Table 5.2**.

$$F_b = \frac{19.1 \times 10^6 W}{D_p \cdot n} \cdot f_w \cdot f_b$$

$$= \frac{19.1 \times 10^6 \times 7.5}{300 \times 300} \times 1.2 \times 2.5 = 4.78 \text{ (kN)}$$

- (2) Find the load actually applied to the bearing A and bearing B (F_A and F_B) with **Formulas (5.7) and (5.8)**.

$$F_A = \frac{450}{1000} \times 4.78 = 2.15 \text{ (kN)}$$

$$F_B = \frac{550}{1000} \times 4.78 = 2.63 \text{ (kN)}$$

Example 3 Calculating dynamic equivalent radial load

Find the dynamic equivalent radial load P_r when the radial load F_r , 1.5 kN ($F_r = 1.5 \text{ kN}$), and the axial load F_a , 0.85 kN, ($F_a = 0.85 \text{ kN}$) are applied to the pillow block type unit UCP306J (bearing UC306).

- (1) Find the radial load factor (X) and the axial load factor (Y) with using the static radial load rating C_{0r} of UCP306J (bearing UC306), 15.0 kN ($C_{0r} = 15.0 \text{ kN}$), and **Table 5.4**.

$$\frac{f_0 F_a}{C_{0r}} = \frac{13.3 \times 0.85}{15.0} = 0.754, e = 0.264$$

$$\frac{F_a}{F_r} = \frac{0.85}{1.5} = 0.567 > e (0.264)$$

Therefore, $X = 0.56$, $Y = 1.68$

- (2) Find the dynamic equivalent radial load P_r with **Formula (5.9)**.

$$P_r = XF_r + YF_a = 0.56 \times 1.5 + 1.68 \times 0.85$$

$$= 2.27 \text{ (kN)}$$

Example 4 Calculating bearing life

Under the conditions shown in the **Example 3**, find the bearing life L_{10h} when a bearing is used for a blower of the rotational speed n , 1 000 min^{-1} .

- (1) Select the load factor f_w is 1.2 ($f_w = 1.2$) from **Table 5.1**, and find the bearing load P_r .

$$P_r = f_w \cdot F = 1.2 \times 2.27 = 2.72 \text{ (kN)}$$

- (2) The dynamic radial load rating of UCP306J (bearing UC306), C_r , is 26.7 kN ($C_r = 26.7 \text{ kN}$), and calculate the bearing life L_{10h} with the **Formula (4.2)**.

$$L_{10h} = \frac{10^6}{60n} \cdot \left(\frac{C_r}{P_r}\right)^3 = \frac{10^6}{60 \times 1000} \times \left(\frac{26.7}{2.72}\right)^3$$

$$\doteq 15\,800 \text{ (h)}$$

- (3) Calculate bearing life L_{10h} with the nomogram shown in **Fig. 4.1**.

When the rotational speed n is 1 000 min^{-1} ($n = 1\,000 \text{ min}^{-1}$), rotational factor f_n is 0.32 ($f_n = 0.32$). next, find the life factor f_h by speed factor f_n , dynamic radial load rating of bearing C_r , and the bearing load P_r .

$$\text{Life factor } f_h = f_n \cdot \frac{C_r}{P_r} = 0.32 \times \frac{26.7}{2.72}$$

$$= 3.14$$

From life factor f_h , bearing life $L_{10h} \doteq 16\,000$ hours.

Example 5 Selecting ball bearing unit

If a bearing is operated under the following conditions, select the flange type unit (UCF) with at least two years (5 000 hours) or longer service life : rotational speed of shaft n is 1 500 min^{-1} ($n = 1\,500 \text{ min}^{-1}$), and radial load F_r is 5 kN ($F_r = 5 \text{ kN}$). The radial load F_r includes the load factor and gear factor.

- (1) From the nomogram shown in **Fig. 4.1**, when life time L_h is 5 000 h ($L_h = 5\,000 \text{ h}$), life factor f_h can be found as 2.16 ($f_h \doteq 2.16$), and speed factor f_n can be found as 0.28 ($f_n \doteq 0.28$) when the rotational speed n is 1 500 min^{-1} ($n = 1\,500 \text{ min}^{-1}$).

$$\text{Dynamic radial load rating } C_r = F_r \cdot \frac{f_h}{f_n} = 5 \times \frac{2.16}{0.28}$$

$$\doteq 38.6 \text{ (kN)}$$

- (2) Find the flange type unit that meets the following condition : dynamic radial load rating C_r is 38.6 kN ($C_r = 38.6 \text{ kN}$). As for the diameter series 2, UCF211J (dynamic radial load rating C_r is 43.4 kN ($C_r = 43.4 \text{ kN}$)) can be selected.

Example 6 Selecting pillow block type unit for low speed

If a bearing is used for a dolly under the following conditions, select the pillow block type unit (UCP) with 10 000 hours service life : radial load F_r is 12 kN ($F_r = 12$ kN), and rotational speed is 8 min^{-1} .

- (1) Find the required dynamic radial load rating C_r with using **Formulas (4.4) and (4.5)**.

$$\text{Speed factor } f_n = (0.03n)^{-1/p} = (0.03 \times 8)^{-1/3} \doteq 1.61$$

$$\text{Life factor } f_h = \left(\frac{L_{10h}}{500}\right)^{1/p} = \left(\frac{10\,000}{500}\right)^{1/3} \doteq 2.71$$

$$\begin{aligned} \text{Dynamic radial load rating } C_r &= P_r \cdot \frac{f_h}{f_n} = 12 \times \frac{2.71}{1.61} \\ &\doteq 20.2 \text{ (kN)} \end{aligned}$$

- (2) From **Table 5.6**, define safe factor f_s as 2 ($f_s = 2$), and find the static radial load rating of bearing required C_{0r} .

$$C_{0r} = f_s \cdot P_r = 2 \times 12 = 24 \text{ (kN)}$$

- (3) The unit is used for a dolly, and vibration or impact may occur. Thus, select UCP308J ($C_r = 40.7$ kN, $C_{0r} = 24.0$ kN).

Example 7 Calculating bearing life in case of use at high temperature

Find the bearing life if the heat resistant pillow block type unit (UCP215JD1K2) is operated under the following conditions : operating temperature is 175°C , radial load F_r is 4 kN ($F_r = 4$ kN), and the rotational speed n is 800 min^{-1} ($n = 800 \text{ min}^{-1}$). Note that the radial load F_r includes load factor and gear factor.

- (1) From **Table 4.1**, find the dynamic load rating C_r with in the case that a bearing is used at 175°C .

$$C_r = 67.4 \times 0.95 = 64.0 \text{ (kN)}$$

Find the bearing life L_{10h} with using **Formula (4.2)**.

$$\begin{aligned} L_{10h} &= \frac{10^6}{60n} \cdot \left(\frac{C_r}{P_r}\right)^3 = \frac{10^6}{60 \times 800} \times \left(\frac{64.0}{4}\right)^3 \\ &\doteq 85\,000 \text{ (h)} \end{aligned}$$

- (2) If a bearing unit is operated at 175°C , grease is degraded faster, and it cannot be used without lubrication. Supply grease at intervals specified in **Table 14.4**.
- (3) If the shaft is extended excessively, install a bearing unit on the identical shaft on the fixed side (positioning of shaft), and install another bearing unit on the free side (see “**9 Design of shaft and base**”).

Example 8 Calculating grease life

Find the grease life in the case that pillow block type unit UCP204J (bearing UC204) under the following conditions : radial load F_r is 1 kN ($F_r = 1$ kN), and rotational speed n is 800 min^{-1} ($n = 800 \text{ min}^{-1}$). Note that the radial load F_r includes load factor and belt factor. Operating temperature of the bearing should be 40°C .

Find the grease life L with using **Formula (4.7)**.

$$\begin{aligned} \log L &= 6.10 - 4.40 \times 10^{-6} d_{mn} - 2.50 \left(\frac{P_r}{C_r} - 0.05\right) \\ &\quad - (0.021 - 1.80 \times 10^{-8} d_{mn}) T \\ &= 6.10 - 4.40 \times 10^{-6} \times 12.5 \times 10^4 \\ &\quad - 2.50 \left(\frac{1}{12.8} - 0.05\right) \\ &\quad - (0.021 - 1.80 \times 10^{-8} \times 12.5 \times 10^4) \times 50 \\ &= 4.542 \\ L &\doteq 34\,800 \text{ (h)} \end{aligned}$$

Example 9 Calculating life of bearing unit in case of non-lubrication

Find the life of a bearing unit in the case that it is operated under the conditions shown in **Example 8**, but without lubrication.

- (1) Find the rating life of bearing L_{10h} with using **Formula (4.2)**.

$$\begin{aligned} L_{10h} &= \frac{10^6}{60n} \cdot \left(\frac{C_r}{P_r}\right)^3 = \frac{10^6}{60 \times 800} \times \left(\frac{12.8}{1}\right)^3 \\ &\doteq 43\,700 \text{ (h)} \end{aligned}$$

- (2) Compare the grease life L shown in **Example 8** to the rating life of bearings L_h . Then, grease life L is shorter than the bearing rating life. Therefore, life of a bearing unit should be the same as the grease life L , 34 800 hours ($L = 34\,800$ hours).

6 Allowable rotational speed

6 Allowable rotational speed

6.1 Allowable rotational speed

The rotational speed of a bearing is normally affected by friction heat generated in the bearing. If the heat exceeds a certain amount, seizure or other failures occur, thus causing rotation to be discontinued.

The allowable rotational speed is the highest speed at

which a bearing can continuously operate without generating such critical heat.

Allowable rotational speed of a ball bearing unit depends on the dimensions of the bearing, type of oil seal, and fitting conditions of bearing inner ring and shaft.

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

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

Unit : min⁻¹

Bore diameter No.	UC type bearing, UC-S6 type bearing, UK type bearing, NA type bearing, ER, RB type bearing										SA type bearing SB type bearing	SU type bearing SU-S6 type bearing
	Standard type, cold resistant type (D2K2)			Triple-lip sealed (L3)			Heat resistant type (D1K2)	Heat resistant type (K3), for blower (S5)				
	Diameter series			Diameter series			Diameter series	Diameter series				
	2	X	3	2	X	3	2, X, 3	2	X	3		
8												10 000
00	–			–			–	–			–	10 000
01	5 800			2 300			3 800	8 700			6 800	8 000
02	5 800			2 300			3 800	8 700			6 800	6 600
03	5 800			2 300			3 800	8 700			6 800	5 800
04	5 800	–	–	2 300	–		3 800	8 700	–	–	5 800	5 000
05	5 100	4 300	4 600	2 100	960		3 000	7 700	6 400	6 700	5 100	4 000
06	4 300	3 700	3 900	960	830	–	2 500	6 400	5 500	5 800	4 300	3 300
07	3 700	3 300	3 400	830	750	770	2 100	5 500	5 000	5 100	3 700	–
08	3 300	3 100	3 100	750	690	690	1 900	5 000	4 600	4 600	3 300	
09	3 100	2 800	2 700	690	640	620	1 700	4 600	4 300	4 100	3 100	
10	2 800	2 500	2 400	640	570	550	1 500	4 300	3 800	3 700	2 800	
11	2 500	2 300	2 300	570	520	510	1 400	3 800	3 500	3 400		
12	2 300	2 200	2 100	520	490	470	1 300	3 500	3 200	3 100		
13	2 200	2 100	1 900	490	460	440	1 200	3 200	3 100	2 900		
14	2 100	2 000	1 800	460	440	410	1 100	3 100	2 900	2 700		
15	2 000	1 800	1 700	440	410	380	1 000	2 900	2 700	2 600		
16	1 800	1 700	1 600	410	380	360	940	2 700	2 600	2 400		
17	1 700	1 600	1 500	380	360	340	880	2 600	2 400	2 300		
18	1 600	1 500	1 400	360	340	320	830	2 400	2 300	2 100		
19	–	–	1 400	–	–	310	790	–	–	2 000		
20		1 300	1 300		300	280	750		2 000	1 900		
21		–	1 200		–	–	710		–	1 800		
22			1 100			250	680			1 700		
24			1 100			240	630			1 600		
26			1 000			220	580			1 500		
28			910			200	540			1 400		

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

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

7 Operating temperature and bearing specifications

6.2 Correction of allowable rotational speed by fitting

For easier installation of a ball bearing unit to a shaft, clearance fit is used for a bearing inner ring and shaft, in general. Size of fitting clearance between the bearing inner ring and the shaft is related to the allowable rotational speed of the bearing unit. As the rotational speed is increased, the fitting clearance between the bearing inner ring and the shaft should be decreased.

Table 6.2 shows the fitting factors to correct the allowable rotational speed depending on the types of fitting of the bearing inner ring to the shaft.

As for the bearings with set screws, allowable rotational speed must be corrected by multiplying the allowable rotational speed (standard value) by fitting factor, depending on the tolerance class of the shaft used. For the bearings with adapter, shafts of h8 or h9 tolerance class are recommended, while shafts of h5 or j5 tolerance class are recommended for the bearings with eccentric locking collar.

Table 6.2 Fitting factor of ball bearing unit f_c (recommended)

Type of ball bearing unit	Fitting factor f_c					
	Shaft tolerance class					
	h5, j5	j6	h6	h7	h8	h9
With set screw						
Standard type	–	1.0	1.0	0.8	0.5	0.2
Triple-lip seal type (Supplementary code L3)	–	–	–	1.0	1.0	0.9
Heat resistant type (Special code D1K2)	–	–	–	1.0	1.0	0.7
Cold resistant type (Special code D2K2)	–	–	–	1.0	1.0	0.7
For high speed (Special code K3)	–	1.0	0.8	0.6	–	–
For blower (Special code S5)	1.0	–	0.8	0.6	–	–
With adapter	–	–	–	–	1.0	1.0
With eccentric locking collar	1.0	–	–	–	–	–

7.1 Operating temperature range

Operating temperature range of a ball bearing unit depends on the type of grease used for the bearing, oil seal rubber material, and the internal clearance of the bearing.

Koyo Ball Bearing Units are available in heat resistant unit (special code : D1K2) and cold resistant unit (special code : D2K2) series, as well as standard types, to allow selection optimal for the operating temperature (see **Table 2.3**).

Even though the bearing unit suitable for temperature is used, grease must be fed in accordance with the specified standards, since grease life greatly depends on temperature.

7.2 Operating temperature and internal clearance of bearing

If the temperature of transmission heat to the shaft is high or hot steam enters the hollow bore of the shaft, difference between the temperatures of the bearing inner and outer rings is increased and the internal clearance of the bearing is decreased, leading to breakage at early stages of the bearing service life.

Decrease in the internal clearance of the bearing depending on the difference in the temperatures of the bearing inner ring and the bearing outer ring can be found by **Formula (7.1)**.

Under these conditions, decrease in the internal clearance must be calculated, and the internal clearance of bearing needs to be selected properly.

$$S_{t1} = \alpha \cdot D_e \cdot \Delta t \quad \text{..... (7.1)}$$

Whereas,

S_{t1} : Decrease in the internal clearance of bearing depending on the difference in the temperatures of the bearing inner ring and the bearing outer ring mm

α : Line expansion factor of bearing steel 12.5×10^{-6}

D_e : Raceway dia. of bearing outer ring mm
 Diameter series 2, X $D_e \doteq 0.92 D$
 Diameter series 3 $D_e \doteq 0.9 D$

D : Nominal bearing outer dia. mm

Δt : Difference in temperatures of bearing inner ring and outer ring °C

If a ball bearing unit is used at a high temperature, abnormal axial load may be applied to the bearing due to axial extension of the shaft caused by high temperature, leading to breakage at early stages of the bearing service life. This fact must be taken into consideration, as well as the internal clearance of the bearing for use of the bearing at a high temperature.

The shaft of free side unit or the unit needs to be able to be moved axially, as the countermeasure against this problem.

(See “9 Design of shaft and base”)

8 Strength of housing

The housing for Koyo Ball Bearing Unit reliably withstands use under standard operating conditions, because of selection of good material and the highly tough design suitable to the load capacity of the bearing. However, if a great or impact loads occurs at a low rotational speed, strength of the bearing must be examined in advance, for the purpose safety is especially required.

Although the form of the housing is designed so that it is applicable to various purposes, destruction strength varies depending on the direction of load. Therefore, mounting direction of the bearing unit must be fully examined, as well as the strength of the housing.

At this time, setting of fixing device to support the housing is required depending on the direction or level of load.

Rigidity of the base and flatness of the mounting surface give influence on the strength of the housing. Note that the load applied to the ball bearing unit is recommended to be basically examined by the calculation result of bearing life even if the strength of the housing is satisfied.

8.1 Strength of cast iron housing

Though gray cast iron has many superior features as machine parts material, it is fragile against impact load. Therefore, prior to use of it, level, direction, and property of load applied to it must be fully examined.

Allowable load of gray cast iron housing can be found by using static destruction strength of the housing, taking safety factor into consideration.

Table 8.1 shows the safety factor of gray cast iron products against load, and Fig. 8.1 to Fig. 8.8 show the outline values of static destruction strength of pillow block type, flanged type and take-up type housings.

Table 8.1 Safety factor of gray cast iron products (recommended)

Property of load	Safety factor of gray cast iron
Static load	4
With vibration	10
With impact	15

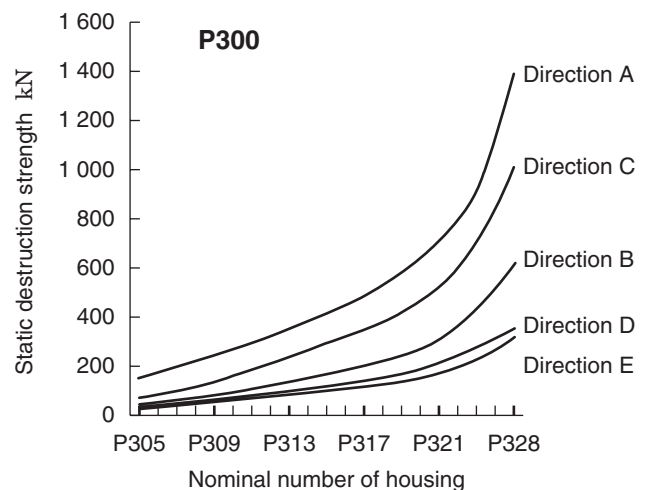
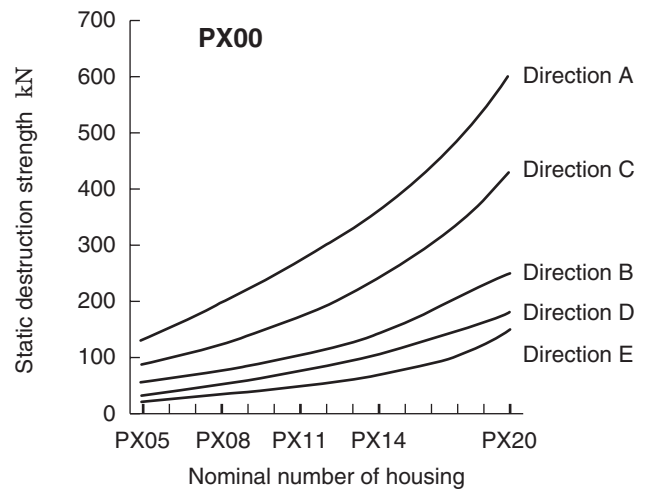
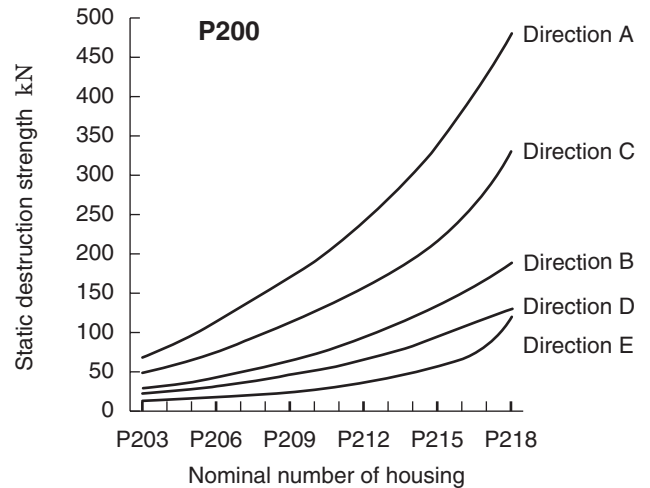
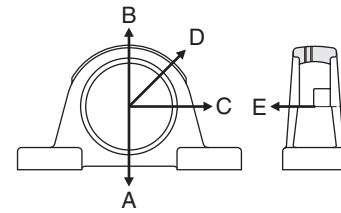


Fig. 8.1 Static destruction strength of pillow block type housing (P)

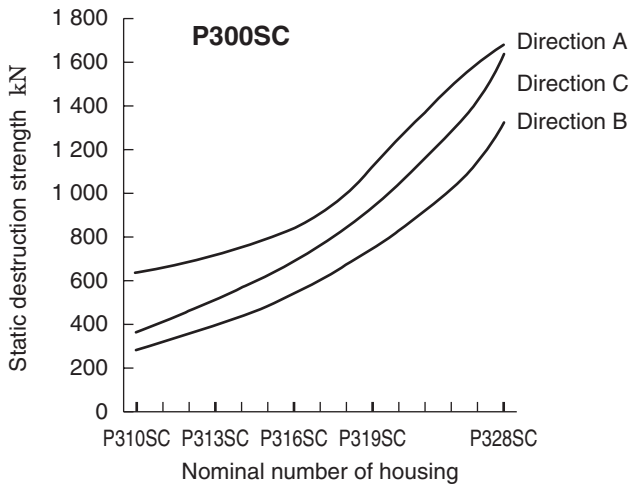
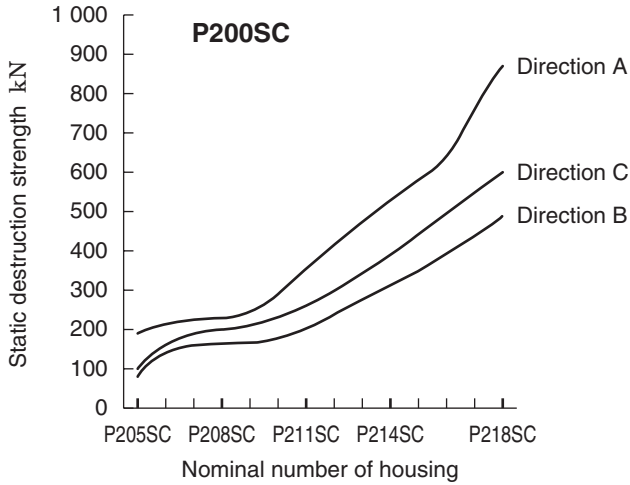
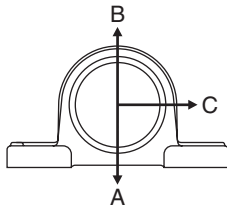


Fig. 8.2 Static destruction strength of cast steel pillow block type housing (Psc)

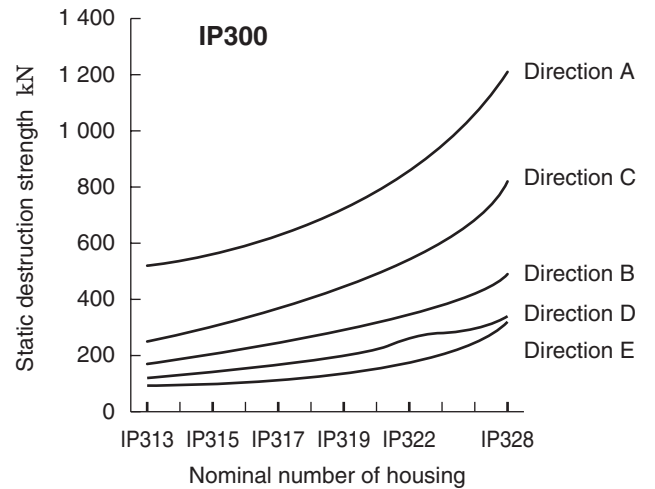
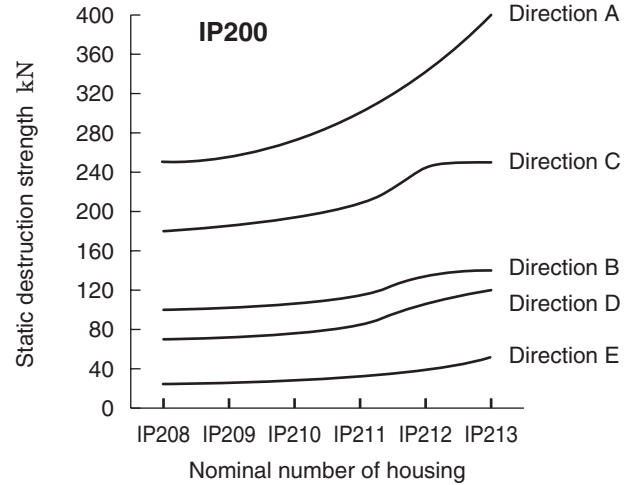
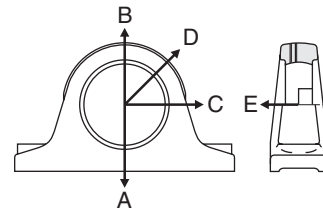


Fig. 8.3 Static destruction strength of thick section pillow block type housing (IP)

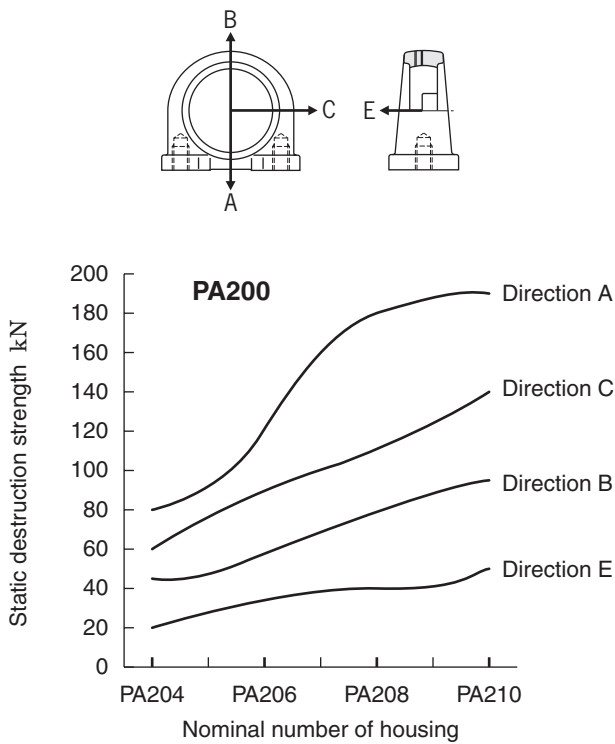


Fig. 8.4 Static destruction strength of tapped-base pillow block type housing (PA)

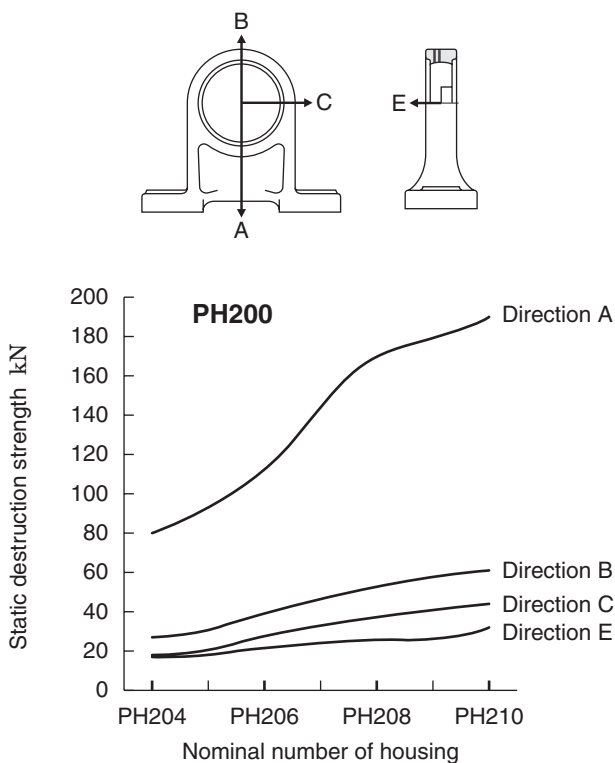
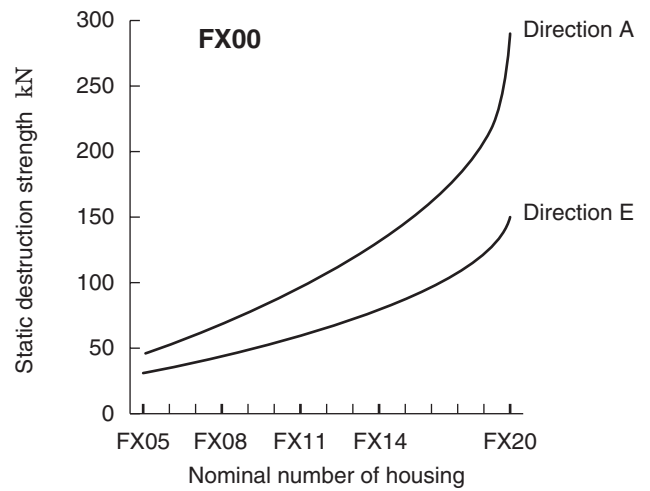
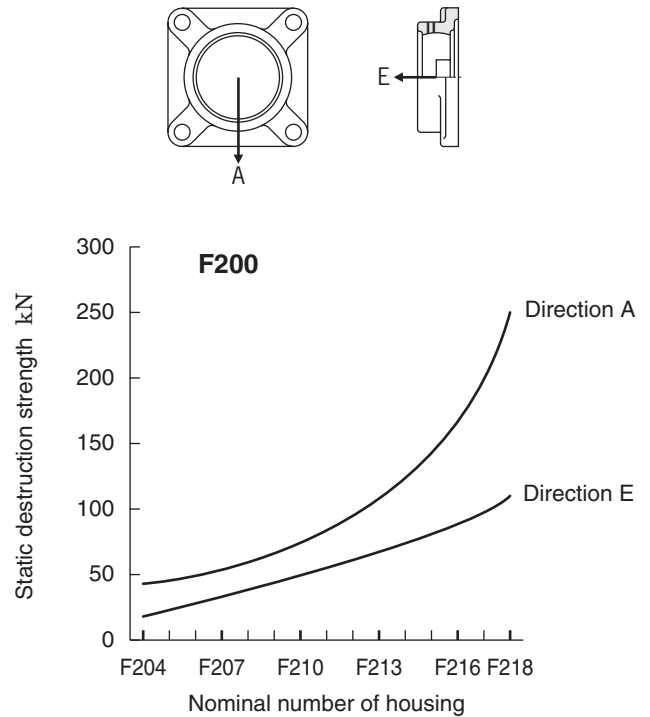


Fig. 8.5 Static destruction strength of higher centerheight pillow block type housing (PH)

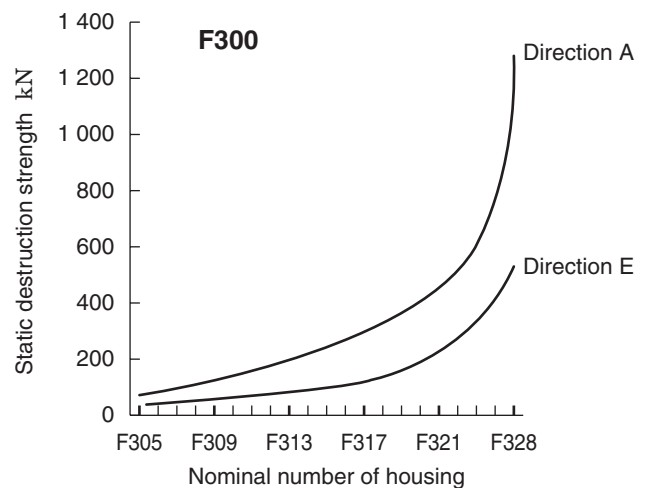


Fig. 8.6 Static destruction strength of square-flanged type housing (F)

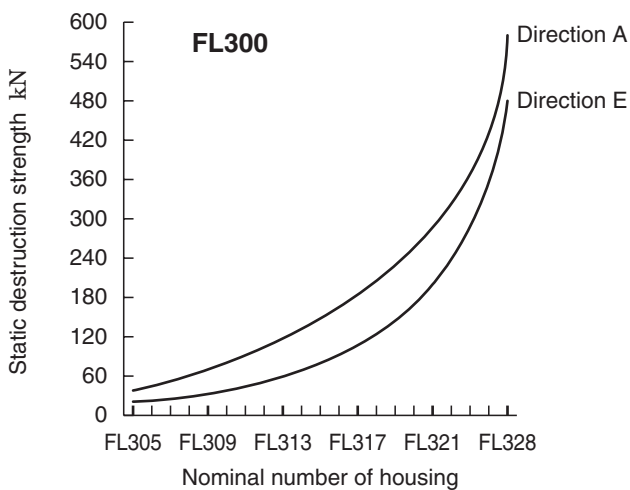
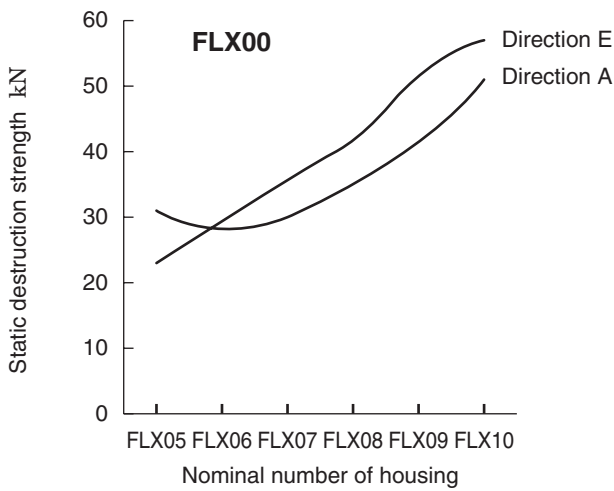
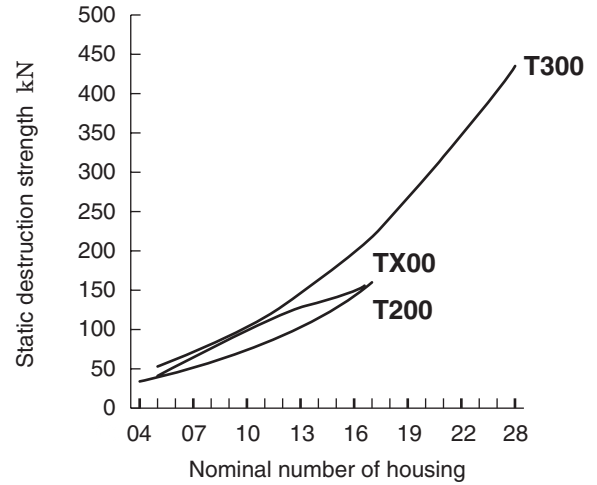
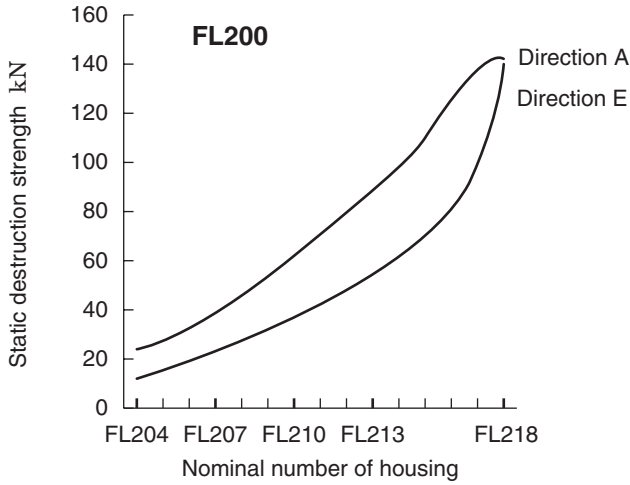
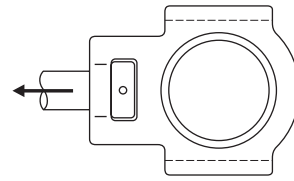
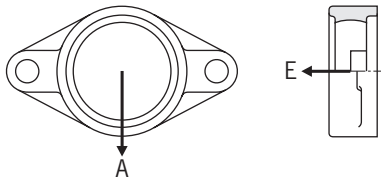


Fig. 8.8 Static destruction strength of take-up type housing (T)

Fig. 8.7 Static destruction strength of rhombic-flanged type housing (FL)

8.2 Strength of cast steel housing

If highly strong housing for ball bearing unit is needed, select the cast steel housing with high destruction strength and superior resistance against impact.

JTEKT supplies the cast steel pillow block type housing (P200sc, P300sc) series.

To find the allowable load of a cast steel housing, use the static destruction strength of a housing, taking safety factor into consideration.

Table 8.2 shows the safety factors for the load of cast steel products, and **Fig. 8.2** shows the outline values of the static destruction strength of a cast steel pillow block type housing.

Table 8.2 Safety factor of cast steel products (recommended)

Property of load	Safety factor of cast steel product
Static load	3
With vibration	5
With impact	10

8.3 Strength of steel housing

The precisely pressed steel housing is highly rigid, but great deformation occurs when load is applied until it is broken. Thus, allowable load of the pressed steel housing must be the value deformation of the housing caused by load does not influence on actual use.

Table 8.3 shows the allowable load of the pressed steel housing.

Table 8.3 Allowable load of pressed steel housing (recommended)

Load direction	Allowable load of pressed steel housing
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 housing

To find the allowable load of a stainless steel housing, use the static destruction strength of a housing, taking safety factor into consideration.

Table 8.4 shows the safety factors for stainless steel products. As for the basic values of the static destruction strength of SP200H1, SPA200H1, SF200H1, SFL200H1, ST200H1 type housings, apply P200 of **Fig. 8.1**, PA200 of **Fig. 8.4**, F200 of **Fig. 8.6**, FL200 of **Fig. 8.7** and T200 of **Fig. 8.8**. For the basic values of the static destruction strength of the SP000 and SFL000 type housings, see P000 of **Fig. 8.9** and FL000 of **Fig. 8.10** 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 “compact” series housing

The “compact” series housing is made of zinc alloy die-cast, but great deformation occurs when load is applied until it is broken.

Table 8.5 shows safety factor for zinc alloy die-cast, and **Fig. 8.9** and **8.10** show the outline values of the static destruction strength of the zinc alloy die-cast 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

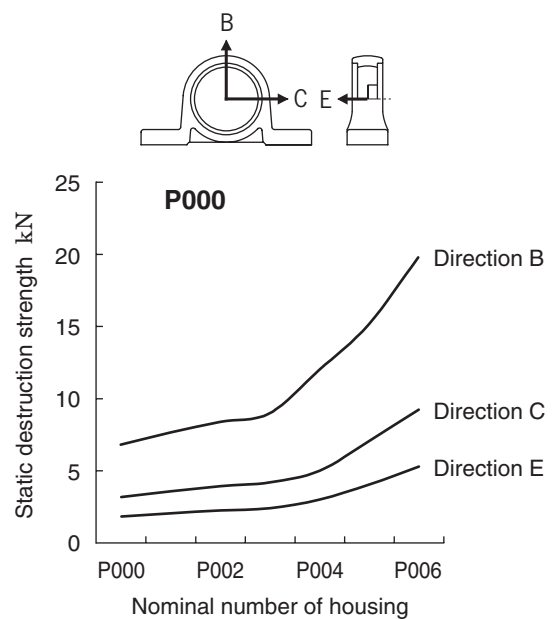


Fig. 8.9 Static destruction strength of “compact” housing (P)

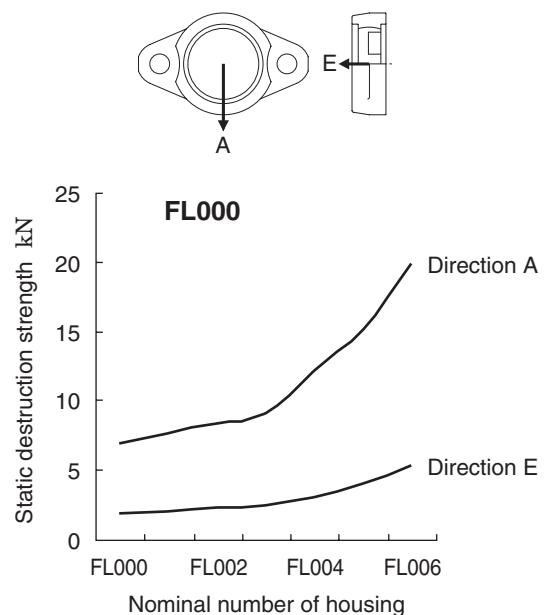


Fig. 8.10 Static destruction strength of “compact” housing (FL)

9 Design of shaft and base

9.1 Design of shaft

For intrinsic performance of a ball bearing unit and maintenance of it for a long time, selection of the shaft optimal for operating conditions is important. Use the shaft with enough rigidity but free from bend, scratch, or burr.

9.1.1 Tolerance of shaft

(1) Tolerance of shaft used for cylindrical bore bearing with set screws

For the cylindrical bore bearing with set screws, use the shaft of the tolerance class leading to relatively loose fitting to simplify the mounting procedures. The fitting clearance between the bearing inner ring and the shaft should be decreased as the rotational speed of the shaft

is increased.

Table 9.1 shows the guideline for the tolerance class of the rotational speed of the cylindrical bore bearing with set screws and the shaft used.

If the cylindrical bore bearing with set screws is exposed to heavy load ($P_r/C_r > 0.12$), vibration, or impact, use shaft of the tolerance class leading to relatively tight fitting to prevent creep or fretting to be occurred to the fitting surface of the bearing inner ring and the shaft.

To use tight fitting of the cylindrical bore bearing with set screws, see **Table 9.2** showing the guideline for the tolerance class of the shaft used.

Table 9.3 shows the recommended deviation from circular and cylindrical forms of the shaft used.

Table 9.1 Tolerance of shaft used for cylindrical bore bearing with set screws (recommended) (clearance fitting or transition fitting)

Unit : μm

Shaft diameter (mm)		Tolerance of shaft							
		j6		h6		h7		h8	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower
6	10	+ 7	- 2	0	- 9	0	-15	0	-22
10	18	+ 8	- 3	0	-11	0	-18	0	-27
18	30	+ 9	- 4	0	-13	0	-21	0	-33
30	50	+11	- 5	0	-16	0	-25	0	-39
50	80	+12	- 7	0	-19	0	-30	0	-46
80	120	+13	- 9	0	-22	0	-35	0	-54
120	180	+14	-11	0	-25	0	-40	0	-63
Applicable rotational speed $dn^{1)}$		Over 120 000		Over 100 000, up to 120 000		Over 60 000, up to 100 000		up to 60 000	

Note 1) $dn = d$ (bearing bore, mm) $\times n$ (rotational speed, min^{-1})

Table 9.2 Tolerance of shaft used for cylindrical bore bearing with set screws (recommended) (transition fitting or interference fitting)

Unit : μm

Shaft diameter (mm)		Tolerance of shaft					
		k6		k7		m6	
over	up to	upper	lower	upper	lower	upper	lower
6	10	+10	+1	+16	+1	+15	+ 6
10	18	+12	+1	+19	+1	+18	+ 7
18	30	+15	+2	+23	+2	+21	+ 8
30	50	+18	+2	+27	+2	+25	+ 9
50	80	+21	+2	+32	+2	+30	+11
80	120	+25	+3	+38	+3	+35	+13
120	180	+28	+3	+43	+3	+40	+15

Table 9.3 Tolerance of shaft used for ball bearing units (recommended)

Unit : μm

Shaft diameter (mm)		Deviation from circular and cylindrical forms
6	10	6
10	18	8
18	30	9
30	50	11
50	80	13
80	120	15
120	180	18

(2) Tolerance of shaft used for bearing for blower (cylindrical bore with set screws)

In the bearing for blower (special code S5), smaller internal clearance of bearing (C2) and once-class-higher bearing tolerance reduce vibration and noise during high-speed rotation.

Therefore, use of the shaft in the tolerance class shown in **Table 9.4** as the bearing for blower (cylindrical bore with set screws) used is recommended.

Table 9.4 Tolerance of shaft used for bearing for blower (cylindrical bore with set screws) (recommended)

Unit : μm

Shaft diameter (mm)		Tolerance of shaft			
over	up to	h5		j5	
		upper	lower	upper	lower
10	18	0	- 8	+5	- 3
18	30	0	- 9	+5	- 4
30	50	0	-11	+6	- 5
50	80	0	-13	+6	- 7
80	120	0	-15	+6	- 9
120	180	0	-18	+7	-11

(3) Tolerance of shaft used for tapered bore bearing (with adapter)

Since the tapered bore bearing is fixed to a shaft with the adapter, the shaft in the tolerance class allowing relatively loose fitting should be selected, for easier mounting.

Table 9.5 shows the tolerance of shaft used for the tapered bore bearing (with adapter).

Table 9.5 Tolerance of shaft used for tapered bore bearing (with adapter) (recommended)

Unit : μm

Shaft diameter (mm)		Tolerance of shaft			
over	up to	h8		h9	
		upper	lower	upper	lower
18	30	0	-33	0	- 52
30	50	0	-39	0	- 62
50	80	0	-46	0	- 74
80	120	0	-54	0	- 87
120	180	0	-63	0	-100

(4) Tolerance of shaft used for cylindrical bore bearing with eccentric locking collar

As for the cylindrical bore bearing with eccentric locking collar, if the fitting clearance between the bearing inner ring and the shaft is great, the shaft may be installed with being tilted because of its structure.

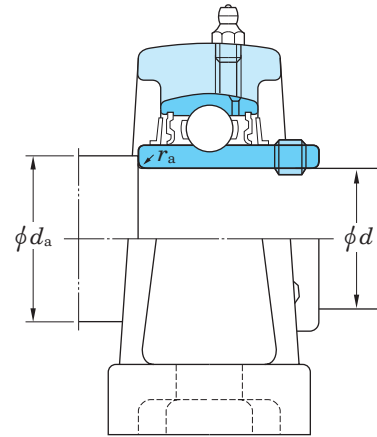
Therefore, for cylindrical bore bearing with eccentric locking collar, use of the shaft in the same tolerance class (h5 or j5) as that used with the bearing for blower (special code S5) is recommended (see **Table 9.4**).

9.1.2 Dimensions of shouldered shaft

When using the cylindrical bore bearing in the environment exposed to a great axial load, excessive vibration, or impact, adopt the shouldered shaft, and tighten the bearing inner ring with the nut.

Table 9.6 shows the shoulder diameter and the fillet radius of the shouldered shaft.

Table 9.6 Shoulder diameter and fillet radius of shouldered shaft (recommended)



Unit : mm

Bore dia. No.	Nominal bearing bore dia. d	UC200, UCX00		UC300	
		Shoulder dia. d_a	Fillet radius r_a (max.)	Shoulder dia. d_a	Fillet radius r_a (max.)
01	12	17	0.6		
02	15	20	0.6		
03	17	22	0.6		
04	20	30	1	-	-
05	25	35	1	35	1
06	30	40	1	40	1
07	35	45	1	45	1.5
08	40	50	1	50	1.5
09	45	55	1	55	1.5
10	50	60	1	60	2
11	55	65	1.5	65	2
12	60	70	1.5	75	2
13	65	75	1.5	80	2
14	70	80	1.5	85	2
15	75	85	1.5	90	2
16	80	90	2	95	2
17	85	95	2	100	2.5
18	90	100	2	105	2.5
19	95	-	-	110	2.5
20	100	115	2	115	2.5
21	105	-	-	120	2.5
22	110			125	2.5
24	120			135	2.5
26	130			150	3
28	140			160	3

9.1.3 Countermeasures against heat

In general, two or more ball bearing units are used for a shaft. If installation distance for the ball bearings is small or expansion and contraction of the shaft due to temperature are a little, install each of the bearing unit to the fixed side.

However, if installation distance is great and the shaft is exposed to heat, the shaft to be installed should be positioned with a bearing unit to be on the fixed side, and another bearing unit should be installed with it to be on the free side.

Because, if the shaft is exposed to heat, it is expanded in the axial direction, leading to a great axial load to the bearing, and it causes premature breakage of the bearing. Therefore, expansion of the shaft is absorbed by the bearing unit on the free side.

Formula (9.1) shows the relation of temperature increase to expansion of the shaft.

$$\Delta l = \alpha \cdot \Delta t \cdot l \dots\dots\dots (9.1)$$

Whereas,

Δl : Expansion of shaft	mm
α : Linear expansion coefficient of shaft	
in the case of standard steel	11~12 × 10 ⁻⁶
Δt : Temperature increase	°C
l : Installation distance of unit	mm

Countermeasures against great expansion of shaft as a result of exposure to heat are shown below.

(1) Installation with full dog point set screw on the free side

If the shaft is exposed to heat and expanded in axial direction, the bearing unit must be installed so that it or the shaft can freely move in axial direction.

If the rotational speed is relatively slow, provide the shaft with key groove, attach the full dog point set screw (special code G6) to the bearing, and use it as the free side unit. Fit the tip on the dog point of the set screw to the key groove on the shaft to guide the move of the shaft in axial direction.

Fig. 9.1 shows the structure example of bearing unit with key groove on shaft and full dog point set screw and use as free side unit. **Table 9.7** shows the dimensions of key groove for the full dog point set screw.

If a bearing unit is used as the free side bearing unit by adopting this method, h7 is recommended as the tolerance class of the shaft to be used.

If temperature of the shaft is higher than that in the bearing, the shaft in the tolerance class allowing a greater fitting clearance must be used.

If a bearing unit is used as the free side unit by adopting the above method, fretting corrosion may occur to the fitting surface between the bearing inner ring and the shaft. In order to prevent fretting corrosion, application of grease onto the bore surface of the bearing when the bearing unit is installed.

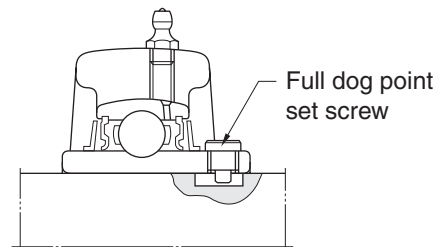
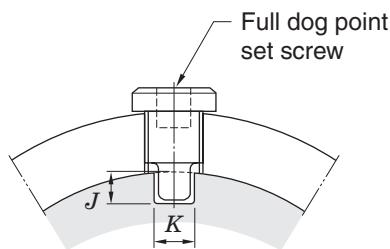


Fig. 9.1 Use on free side with full dog point set screw

Table 9.7 Dimensions of key groove for full dog point set screw (use on free side)

Nominal size of set screw	Dimensions of key groove (mm)		Applicable nominal bearing number		
	J	K (Min.)	UC200	UCX00	UC300
M6 × 0.75	5	4	201~206	X05	305, 306
M8 × 1	6	6	207~209	X06~X08	307
M10 × 1.25	6.5	7	210~212	X09~X11	308, 309
M12 × 1.5	7	9	213~218	X12~X17	310~314
M14 × 1.5	7	10		X18	315, 316
M16 × 1.5	8	12		X20	317~319
M18 × 1.5	8	13			320~324
M20 × 1.5	8	15			326, 328



Allowable tolerance of key groove dimension "K" (Recommended value : 0~+0.2)

(2) Use of cartridge type unit on free side

In the environment the rotational speed is relatively high or the bearing unit is exposed to vibration, use of the cartridge type unit as the free side unit and move of the bearing unit between the mounting bore on a machine and the outside surface of the housing in axial direction are recommended.

Fig. 9.2 shows the example of structure of the cartridge type unit as the free side unit.

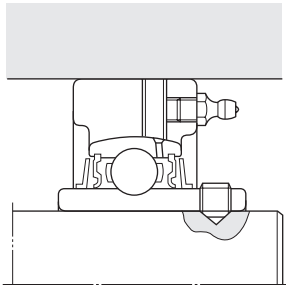


Fig. 9.2 Use of cartridge type unit on free side

If a ball bearing unit is exposed to heat, countermeasures against expansion of the shaft in axial direction as well as calculation of decrease in the internal clearance of the bearing to select the internal clearance of the bearing appropriately (see “7 Operating temperature and bearing specifications”).

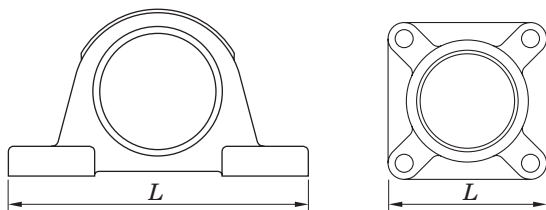
9.2 Design of base

9.2.1 Rigidity of base and flatness of mounting surface

If rigidity of the base that a ball bearing unit is to be installed is low or the flatness of the mounting surface is poor, vibration or abnormal noise may occur to the bearing unit during operation, leading to premature breakage or lower strength of the housing.

Therefore, the base that the ball bearing unit is to be installed must have enough rigidity, and the mounting surface must be finished with accuracy allowing elimination of deformation on the bearing or housing.

Fig. 9.3 shows the recommended values for flatness of the mounting surface of the base that the ball bearing unit is to be installed.



Max. : $L / 1\,000$ mm

Fig. 9.3 Flatness of mounting surface of base (recommended)

9.2.2 Mounting bore of cartridge type unit

The cartridge type unit is directly fit to the cylindrical bore of the base.

Under the standard operating conditions, select H7 as the tolerance class of cylindrical hole on the base that the cartridge type unit is to be installed. For such purposes that the shaft and the bearing inner ring are hot, select G7 as the tolerance class of cylindrical bore on the base.

In the environment the bearing unit is exposed to vibration or impact, selection of the tolerance class allowing smaller fitting clearance between the cylindrical bore of the base and the bearing unit is recommended.

Table 9.8 shows the tolerance of cylindrical bore of the base that the cartridge type unit is to be installed.

Table 9.8 Tolerance of cylindrical bore for mounting cartridge type unit (recommended)

Unit : μm

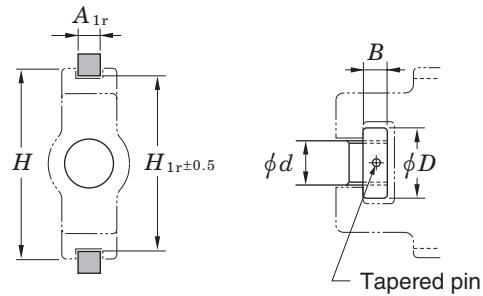
Nominal bore dia. of cylindrical bore (mm)		Tolerance of cylindrical bore			
		H7		G7	
over	up to	upper	lower	upper	lower
50	80	+30	0	+40	+10
80	120	+35	0	+47	+12
120	180	+40	0	+54	+14
180	250	+46	0	+61	+15
250	315	+52	0	+69	+17
315	400	+57	0	+75	+18

9.2.3 Dimensions relative to installation of take-up type unit

The take-up type unit is incorporated between the two guide rails on the base side, and enables adjustment of the support position with the shaft center by the adjuster bolt.

Table 9.9 shows the dimensions of the guide rail, adjuster bolt, and round nut to install the take-up type unit to the base.

Table 9.9 Dimensions relative to installation of take-up type unit (recommended)



Unit : mm

Nominal housing No.	Dimensions of guide rail			Dimensions of adjuster bolt and round nut		
	A_{1r}	H_{1r}	H (Reference)	d	D	B
T204 T205	11	77	89	16	28	14
T206 T207	11	90	102	18	32	14
T208	15	103	114	24	42	16
T209 T210	15	103	117	24	42	16
T211 T212	20	131	146	30	55	20 27
T213 T214 T215	24	152	167	36	60	27
T216	24	166	184	36	60	27
T217	28	174	198	42	60	30
TX05 TX06	11	90	102	18	32	14
TX07	15	103	114	24	42	16
TX08 TX09	15	103	117	24	42	16
TX10 TX11	20	131	146	30	55	20 27
TX12 TX13 TX14	24	152	167	36	60	27
TX15	26	166	184	36	60	27
TX16 TX17	26	174	198	42	60	30

Unit : mm

Nominal housing No.	Dimensions of guide rail			Dimensions of adjuster bolt and round nut		
	A_{1r}	H_{1r}	H (Reference)	d	D	B
T305	11	81	89	22	32	12
T306 T307	15	91 101	100 111	24 26	36 40	14
T308 T309	16	113 126	124 138	28 30	45 50	16 18
T310	18	141	151	32	55	20
T311 T312	20	151 161	163 178	34 36	60 65	22 24
T313 T314 T315	24	171 181 193	190 202 216	38 40 40	65 80 80	26 28 28
T316	28	205	230	46	90	34
T317 T318	30	216 230	240 255	46 50	90 95	34 38
T319	32	242	270	50	95	38
T320 T321	32	262	290	52	100	40
T322	36	287	320	55	110	44
T324	42	322	355	60	120	50
T326 T328	47	352 382	385 415	65 70	130 140	55 60

9.3 Machining dimensions of holes for housing dowel pins

The pillow block type, square-flanged type, and rhombic-flanged type housing have the dowel pin seat. If accurate positioning of the housing is required, install it with the dowel pin.

As for the position of the pin for fixing the housing and pin diameter, see the **Appendix 5** at the end of this catalogue.

10 Unit number

Nominal number of Koyo Ball Bearing Unit conform to JIS B1557, and comprise the bearing unit type number (comprising bearing type code and housing type code),

diameter series code, bore dia. number, supplementary code, and special code.

UC P 207 J L3

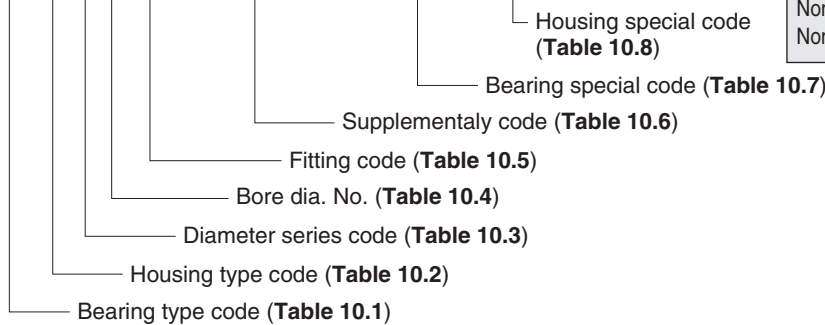
Nominal bearing number	UC207L3
Nominal housing number	P207J

UK P 209 J CD + H309X

Nominal bearing number	UK209+H309X
Nominal housing number	P209JE1
Nominal pressed steel cover number	(Through type) C-9x40 (Closed type) D-9

UC F 209 J L3 FD D1K2 G6 A1

Nominal bearing number	UC209L3D1K2G6
Nominal housing number	F209JA1E3
Nominal cast iron cover number	(Closed type) 209FD



[Remark] The above number shows an example of nominal number structure. It may depend on the bearing unit type.

Table 10.1 Bearing type code

Bearing type code	Details
UC	Cylindrical bore, with set screws
UC-S6	Cylindrical bore, with set screws (stainless-series)
UK	Tapered bore (for adapter)
NA	Cylindrical bore, with eccentric locking collar
SB	Cylindrical bore, with set screws (light duty type)
SU	Cylindrical bore, with set screws ("compact" series)
SU-S6	Cylindrical bore, with set screws (stainless-series)
ER	Cylindrical bore, with set screws, cylindrical outer diameter, Lubricating mechanism
RB	Cylindrical bore, with set screws, cylindrical outer diameter

Table 10.2 Housing type code (continued)

Housing type code	Details
SP	Pillow block type (stainless-series)
PP	Cast steel pillow block type
F	Square-flanged type
FL	Rhombic-flanged type
FA	Adjustable rhombic-flanged type
FB	Three-bolt flange type
FC	Round-flanged type with spigot joint
FS	Square-flanged type
FL	Rhombic-flanged type ("compact" series)
SF-H1	Square-flanged type (stainless-series)
SFL-H1	Rhombic-flanged type (stainless-series)
SFL	Rhombic-flanged type (stainless-series)
PF	Pressed steel round-flanged type
PFL	Pressed steel rhombic-flanged type
T	Take-up type
ST-H1	Take-up type (stainless-series)
TH	Section steel frame take-up type
TL	Light channel steel frame take-up type
TU	Channel steel frame take-up type
PTH	Pressed steel frame take-up type
NPTH	Pressed steel frame take-up type
C	Cartridge type
HA	Hanger type

Table 10.2 Housing type code

Housing type code	Details
P	Pillow block type
P-SC	Cast steel pillow block type
IP	Thick section pillow block type
PA	Tapped-base pillow block type
PH	Higher centerheight pillow block type
LP	Light duty pillow block type
P	Pillow block type ("compact" series)
SP-H1	Pillow block type (stainless-series)
SPA-H1	Tapped-base pillow (stainless-series)

Table 10.3 Diameter series code

Diameter series code	Details
0	For light duty
2	For medium duty
X	For medium duty
3	For heavy duty

Table 10.4 Bore dia. number

Bore dia. No.	Details
8	Nominal bearing bore dia. 8 mm
00	Nominal bearing bore dia. 10 mm
01	Nominal bearing bore dia. 12 mm
02	Nominal bearing bore dia. 15 mm
03	Nominal bearing bore dia. 17 mm
04 or more	(Bore dia. No.) × 5 = Nominal bearing bore dia. (mm)
01-8	– (bore dia. No.) /16 = nominal bearing bore dia. (inch) (in this case, 8/16 = 1/2 inch = 12.7 mm)

Table 10.5 Fitting code

Fitting code	Details
J	Tolerance class of spherical bore of the housing is J7 (not shown on the bearing that the spherical bore diameter exceeds 120 mm)
H	Tolerance class of spherical bore of the housing is H7
K	Tolerance class of spherical bore of the housing is K7

Table 10.6 Supplementary code

Supplementary code	Details
C ¹⁾	Cover, open type
D ¹⁾	Cover, closed type
FC	Cast iron cover, open type
FD	Cast iron cover, closed type
L3	Triple-lip seal type

Note 1) Standard specifications of codes C and D are as shown below.

201-218, X05-X17Pressed steel cover
 X18-X20, 305-328Cast iron cover

Table 10.7 Bearing special code

Item	Bearing special code	Details
Grease	None	Alvania No.2 or equivalents
	D1	SH44M
	D2	SH33M
	D9	Demnum L-200
Set Screw	None	Bullet Point
	G4	Pointed tip
	G6	With full dog point
Oil seal	None	Nitrile rubber
	K2	Silicone rubber
	K3	Non-contact type
Sealing Device	None	With oil seal and flinger (slinger) (UC, UK, NA, ER and RB types) With oil seal (SB, SA and SU types)
	P3	Without oil seal, flinger (slinger)
	P4	Without oil seal
	Others	S5
S6		Stainless steel bearing

Table 10.8 Housing special code

Item	Housing special code	Details
Grease Nipple Thread Bore dia.	None	As shown in dimensional table
	A1	PT1/8 tube thread
	A2	PF1/8 tube thread
	A3	PT1/4 tube thread
Grease Nipple Thread Bore Position	A4	PF1/4 tube thread
	None	As shown in dimensional table
	B1	Right
	B2	Left
	B3	45°
Machining	B5	30°
	B7	Both right and left
	None	Standard type
	E1	Pressed steel
Material	E3	Cast iron cover mounting groove (diameter series 2, X, 3)
	E4	Non-lubricating type
	None	Gray iron casting (FC200) or cold-reduced carbon steel sheets and strips (SPCC) Compact type is made of zinc alloy die-cast (ZDC2) Small stainless series is made of stainless cast steel type (SCS13)
Grease Nipple	H1	Stainless steel cast steel model (SCS13)
	H5	Rolled steel for general purpose (SS400)
	SC	Carbon steel cast steel model (SC450)
Grease Nipple	None	A type
	N1	B type (67.5°)
	N2	C type (90°)

11 Tolerances and internal clearance

Tolerances of a ball bearing unit is specified in JIS B 1558 (ball bearing for ball bearing unit) and JIS B 1559 (housing for ball bearing unit). JTEKT produces products conforming to these standards.

11.1 Tolerances of bearing

Table 11.1 to Table 11.4 show the tolerance of a ball bearing for ball bearing unit.

Ball bearings for blower unit (special code S5) are produced with higher accuracy than standard types (see Table 11.3).

Table 11.5 shows the permissible values for chamfer dimensions of cylindrical bore bearing inner ring.

Table 11.2 Tolerances and permissible values of outer ring of ball bearing for ball bearing unit

Unit : μm

Nominal bearing outer dia. D (mm)		Mean outside diameter deviation ΔD_m		Radial runout of assembled bearing outer ring K_{ea}
over	up to	upper	lower	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

[Remark] Values in Italics are prescribed in JTEKT standards.

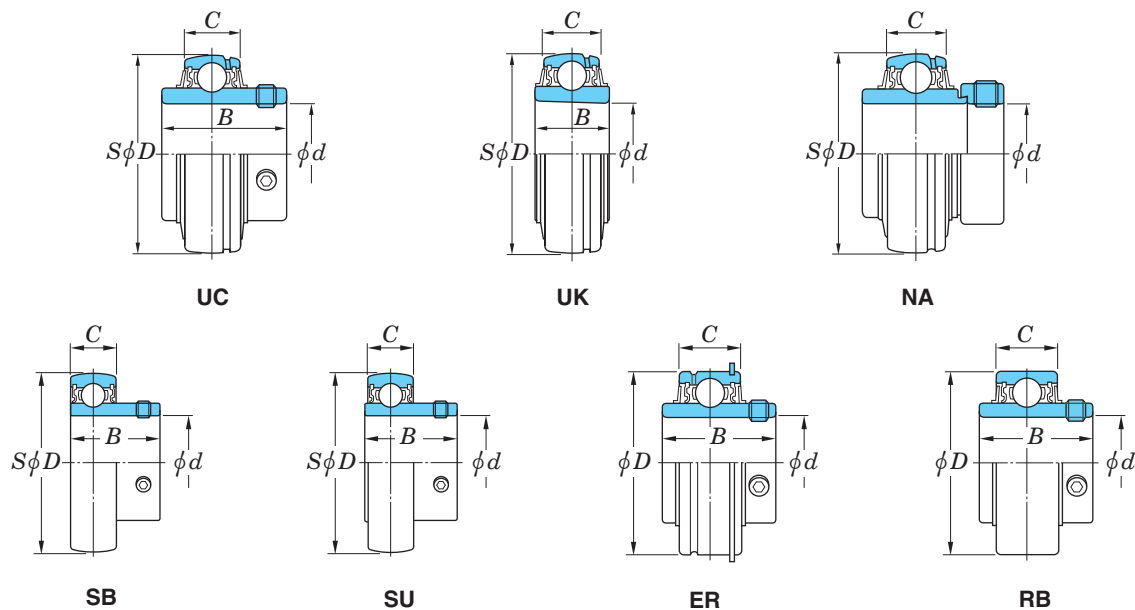


Table 11.1 Tolerances and permissible values of inner rings of ball bearings for ball bearing units

Unit : μm

Nominal bearing bore dia. d (mm)		Single plane mean bore diameter deviation Δd_{mp}		Single plane bore diameter variation V_{dsp}	eccentricity deviation of eccentric surface of inner ring and eccentric locking collar ΔH_s		Single inner (outer) ring width deviation $\Delta B_s (\Delta C_s)$		Radial runout of assembled bearing inner ring K_{ia}
over	up to	upper	lower	max.	upper	lower	upper	lower	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

[Remark] Values in Italics are prescribed in JTEKT standards.

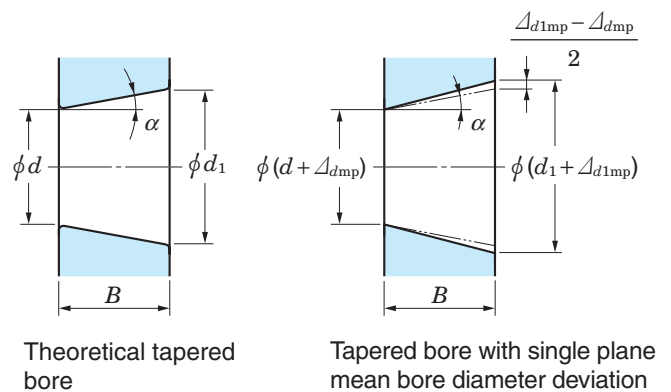
Table 11.3 Tolerances and permissible values of inner ring of ball bearing for blower unit (S5)

Unit : μm

Nominal bearing bore dia. d (mm)		Single plane mean bore diameter deviation Δ_{dmp}		Single plane bore diameter variation V_{dsp}	Radial runout of assembled bearing inner ring K_{ia}
over	up to	upper	lower	max.	max.
10 ¹⁾	18	+13	0	6	7
18	31.75	+13	0	6	8
31.75	50.8	+13	0	10	10
50.8	80	+15	0	10	10
80	120	+18	0	14	13
120	180	+23	0	14	18

Note 1) 10 mm should be included in this category.

Table 11.4 Tolerances and permissible values for tapered bore of bearing



Theoretical tapered bore

Tapered bore with single plane mean bore diameter deviation

Unit : μm

Nominal bearing bore dia. d , mm		Δ_{dmp}		$\Delta_{d1mp} - \Delta_{dmp}$		V_{dsp} ¹⁾
over	up to	upper	lower	upper	lower	max.
18	30	+33	0	+21	0	13
30	50	+39	0	+25	0	16
50	80	+46	0	+30	0	19
80	120	+54	0	+35	0	22
120	180	+63	0	+40	0	40

Note 1) To be applied to all the radial planes of tapered bore

[Remarks] 1. Applicable range

Applicable to tapered bore of inner ring of tapered bore radial bearing that standard value of taper ratio is 1/12

2. Amount code

d_1 : Standard diameter at theoretical large end of tapered bore $d_1 = d + \frac{1}{12} B$

Δ_{dmp} : Single plane mean bore diameter deviation at theoretical small end of tapered bore

Δ_{d1mp} : Single plane mean bore diameter deviation at theoretical large end of tapered bore

V_{dsp} : Single plane bore diameter variation (a tolerance for the diameter variation given by a maximum value applying in any radial plane of the bore)

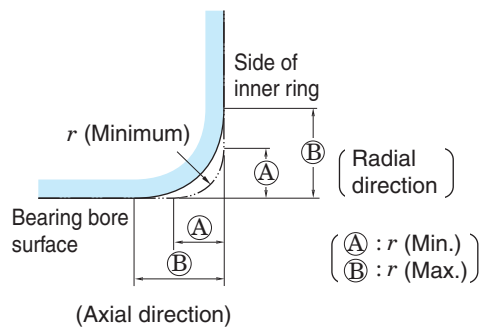
B : Nominal inner ring width

α : 1/2 of nominal tapered angle of tapered bore

$$\begin{aligned} \alpha &= 2^\circ 23' 9.4'' \\ &= 2.38594^\circ \\ &= 0.041643 \text{ rad} \end{aligned}$$

11 Tolerances and internal clearance

Table 11.5 Permissible values for chamfer dimensions of inner ring of bearing with cylindrical bore



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] There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of r_{\min} or $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

11.2 Tolerances of housing

As the tolerance of the housing for a ball bearing unit, tolerance of the diameter of spherical bearing seat fit to the bearing, and tolerance and permissible value of dimensions relative to installation of the housing are specified.

Table 11.6 shows the tolerance of diameter of the spherical bearing seat of housing. Usually, select tolerance class J7 that allows transition fitting of the housing and the bearing.

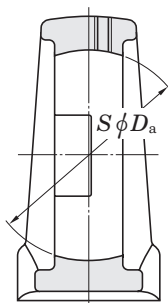
If priority should be given to operability in installation to a machine, select tolerance class H7 allowing clearance fitting. The unit conforming JIS of tolerance class H7 is equipped with the detent to the outer ring to prevent turning of the outer ring.

If rotating outer ring load occurs or the bearing is rotated while the shaft is stopped, select the tolerance K7 allowing interference fit.

Fig. 11.1 shows the representative example of dimensions relative to installation of the housing with tolerance and permissible value. Respective dimensional tables show the tolerance and permissible values of dimensions relative to installation of the housing.

Table 11.6 Tolerances of spherical bearing seat diameter of housing

Unit : μm



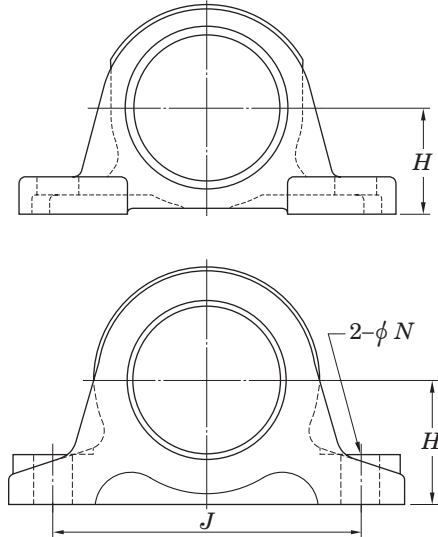
Nominal dia. of spherical bearing seat D_a (mm)		Tolerance class H7		Tolerance class J7		Tolerance class K7	
		Deviation of spherical bearing seat dia. ΔD_{am}		Deviation of spherical bearing seat dia. ΔD_{am}		Deviation of spherical bearing seat dia. ΔD_{am}	
over	up to	upper	lower	upper	lower	upper	lower
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] JTEKT generally applies class J to housing designs.

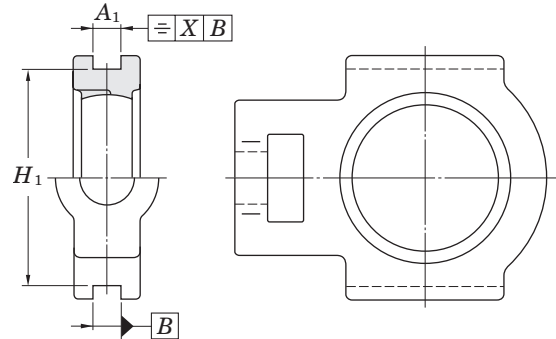
Class H and class K can also be applied depending on the application.

Fig. 11.1 Dimensions relative to installation of housing with tolerance and permissible value (representative example)

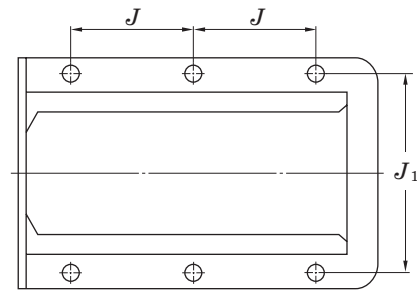
Pillow block type housing



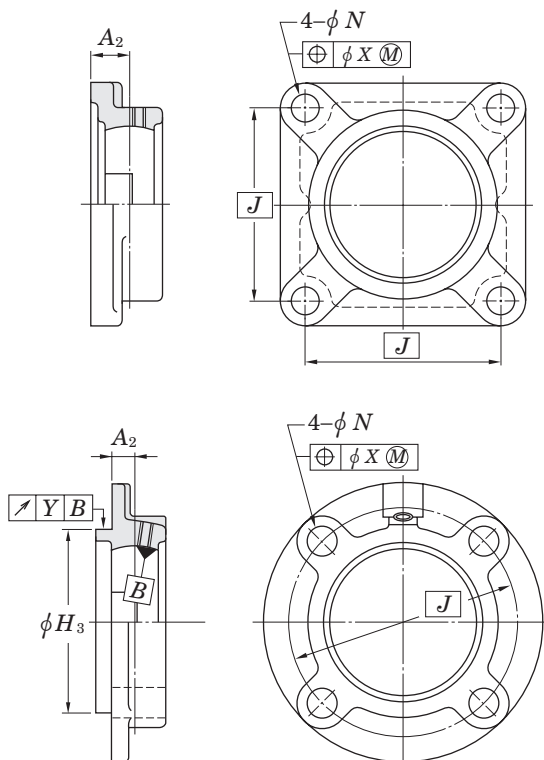
Take-up type housing



Frame for take-up type unit



Flange type housing



Cartridge type housing

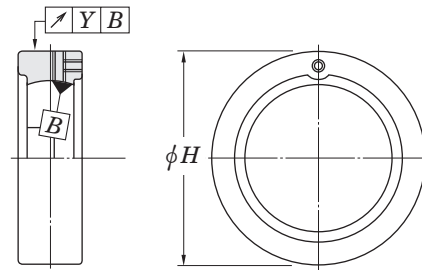


Table 11.7 shows standard tolerance of cut or cast portions not specified in this catalogue.

Table 11.7 Standard tolerance not specified respectively

Item	Standard No.	Class
Cutting	JIS B 0405	Medium
Casting of cast iron	JIS B 0403	Standard
Casting of cast steel	JIS B 0403	Standard

[Remark] Respective tolerances and permissible values for housing are shown in dimensional tables.

11 Tolerances and internal clearance

11.3 Bearing internal clearance

Ball bearing internal clearance for ball bearing unit is specified by the move at the time the inner ring or outer ring is moved in the radial direction (radial internal clearance). Value of internal clearance during operation (to be called operation clearance) gives a great influence on rolling fatigue life of the bearing, heat, noise, and vibration.

If the bearing inner ring is installed to the shaft with interference, the internal clearance of bearing must be fixed taking expansion of the bearing inner ring into consideration. If transmission heat to the shaft is high or hot steam runs through the hollow of the shaft, calculate the decrease of internal clearance, and appropriately select the internal clearance of bearing (see “7 Operating temperature and bearing specifications”).

Table 11.8 shows the internal clearance applicable to specifications of ball bearing for Koyo Ball Bearing Unit, and Table 11.9 shows the standard values of bearing internal clearance.

Table 11.8 Internal clearance applicable to types of ball bearing for ball bearing unit

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

[Remark] For the bearings that the internal clearance in this table is applied, no clearance code is indicated.

Table 11.9 Standard values for internal clearance of ball bearing for ball bearing unit

Unit : μm

Nominal bearing bore dia. d (mm)		Internal clearance											
		C2		CN		GN		C3		C4		C5	
over	up to	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper
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 for ball bearing unit).
 2. Increase in radial internal clearance generated by measured load conforms to the table below.
 Smaller correction of C2 clearance is applicable to the lower clearance, while larger correction is applicable to the upper clearance.

Unit : μm

Nominal bearing bore dia. d (mm)		Measured load	Correction of clearance				
over	up to		N	C2	CN	GN, C3	C4
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 Materials of bearing

Ball bearings for ball bearing unit are made of the following materials : bearing rings (outer and inner rings) and rolling elements (balls) are made of steel, and cages are made of pressed steel.

These bearing materials need the features shown below.

- (1) Higher elastic limit is required, since high contact stress occurs partially.
- (2) Higher rolling fatigue strength is required, since great contact load occurs repeatedly.
- (3) Superior hardness
- (4) Superior wear resistance
- (5) Superior toughness against impact load
- (6) Superior stability of dimensions

As the material of bearing rings (outer and inner rings) and rolling elements (balls) of the ball bearing for Koyo Ball Bearing Unit, high carbon chromium bearing steel specified in JIS is used.

For more reliability of bearing, vacuum degassing is executed against high carbon chromium bearing steel to reduce non-metallic inclusion and included oxygen. After the materials of bearing are made into the specified form, quench-and-temper is executed until its hardness is 60HRC.

Table 12.1 shows the chemical components of high carbon chromium bearing steel. As the material of bearing rings and rolling elements of the ball bearings for stainless-series unit (special code : S6), stainless steel with superior corrosion resistance is used. Cages are made of cold-reduced carbon steel sheets and strips specified in JIS.

Table 12.2 shows the chemical compositions of cold-reduced carbon steel sheets and strips specified in JIS.

12.2 Materials of housing

A housing for ball bearing unit is mainly made of gray iron casting products, carbon steel casting products, structural steel, cold-reduced carbon steel sheets and strips.

Gray iron casting is the most popular as the material of housing for ball bearing unit, featuring absorption of vibration, damping superior to other materials, easy and varied forming by casting, appropriate strength, and excellent heat property.

Table 12.3 shows the mechanical properties of gray iron casting.

If superior strength is required for the housing for ball bearing unit, select carbon steel casting products with higher rupture strength, carbon steel casting, or general structural rolled steel with higher strength against impact.

For the material of housings of the “compact” series unit, zinc alloy die-cast is used, and corrosion-resistant cast steel products are used for housings of the stainless series unit. Cold-reduced carbon steel sheets and strips are used as the material of housings for the pressed steel unit.

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

Spheroidal graphite iron casting (FCD450-10 of JIS G 5502) may be used, as well as these materials.

Table 12.1 Chemical compositions of high carbon chromium 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	0.08 or less

Table 12.2 Chemical compositions of cold-reduced carbon steel sheets and strips (SPCC) (JIS G 3141)

Code	Chemical components (%)						
	C	Si	Mn	P	S	Ni	Cr
SPCC	0.12 or less	–	0.50 or less	0.040 or less	0.045 or less	–	–

Table 12.3 Mechanical properties of gray iron casting (FC200) (JIS G 5501)

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

Table 12.4 Mechanical properties of carbon steel casting (SC450) (JIS G 5101)

Type code	Yielding point or bearing force N/mm ²	Tensile strength N/mm ²	Extension %	Construc- tion %
SC450	225 or more	450 or more	19 or more	30 or more

Table 12.5 Mechanical properties of general structural rolled steel (SS400) (JIS G 3101)

Type code	Yielding point or bearing force N/mm ²			Tensile strength MPa	Thickness of steel mm	Tensile test piece	Elongation %	Bendability		
	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 12.6 Mechanical properties of zinc alloy die-cast (ZDC02) (JIS H 5301) (Reference)

Code	Tensile strength MPa	Elongation %	Impact MJ/m ²	Hardness HB
ZDC2	285	10	1.4	82

Table 12.7 Mechanical properties of corrosion-resistant cast steel (SCS13) (JIS G 5121)

Type code	Bearing force MPa	Tensile strength MPa	Elongation %	Hardness HB
SCS13	185 or more	440 or more	30 or more	183 or more

Table 12.8 Mechanical properties of cold-reduced carbon steel sheets and strips (SPCC) (JIS G 3141)

Type code	Tensile strength MPa	Elongation %
SPCC	270 or more	34 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	Standard code
Oil seal (standard type)	Nitrile rubber	–
Oil seal (heat resistant, cold resistant)	Silicone rubber	–
Flinger (slinger)	Cold-reduced carbon steel sheets and strips	JIS G 3141
Stainless steel Flinger (slinger)	Cold rolled stainless steel plate and steel strip	JIS G 4305
Pressed steel cover	Cold-reduced carbon steel sheets and strips	JIS G 3141
Pressed stainless steel cover	Cold rolled stainless steel plate and steel strip	JIS G 4305
Cast iron cover	Gray casting iron products	JIS G 5501
Hexagon socket set screw	Chrome molybdenum steel	JIS G 4053
Stainless steel hexagon socket set screw	Stainless bar steel	JIS G 4303
Adapter sleeve for bearing	Mechanical structural carbon steel	JIS G 4051
Lock nut for bearing	Mechanical structural carbon steel	JIS G 4051
Washer for bearing	Cold-reduced carbon steel sheets and strips	JIS G 3141
Eccentric locking collar	Mechanical structural carbon steel	JIS G 4051
Grease nipple	Free cutting carbon steels	JIS G 4804

13 Performance

13.1 Friction torque of bearing

Friction torque of a ball bearing for ball bearing unit is the synthesis of rolling friction between the rolling elements (balls) and the bearing rings (outer and inner rings), sliding friction between the rolling elements and the cages, agitating resistance of lubricants, and friction resistance of oil seal.

Greatness of friction torque is influenced by the type, dimensions, load, and rotational speed of bearing, and lubricating conditions.

For the ball bearing unit, oil seals with especially superior dustproof performance are adopted to improve sealing performance of the bearing. Thus, friction resistance of the oil seal greatly depends on the friction torque of the bearing.

Friction torque of the ball bearing for ball bearing unit can be found by the Formulas below.

$$M = M_p + M_k \dots\dots\dots (13.1)$$

$$M_p = \mu \cdot P \cdot \frac{d}{2} \dots\dots\dots (13.2)$$

Whereas,

M :	Friction torque of bearing	mN · m
M_p :	Friction torque of sections changed by load	mN · m
M_k :	Friction torque of sections changed by rotational speed	mN · m
μ :	Friction coefficient (0.001 5 to 0.002)	
P :	Load applied to bearing	N
d :	Nominal bearing bore dia.	mm

Note that the agitating resistance of lubricants and the friction resistance of oil seal are difficult to be calculated, since they are fluctuated by rotational speed.

Fig. 13.1 shows the result of measurement of friction torque of the typical ball bearing unit.

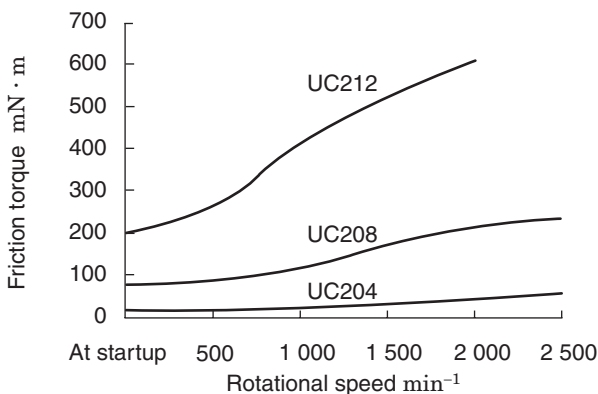


Fig. 13.1 Example of measurement result of ball bearing unit

13.2 Increase in temperature of bearing

Increase in temperature of the ball bearing for ball bearing unit is indicated as heat energy converted from the friction torque in the bearing during operation. Temperature of the bearing during operation increases in proportion to the greatness of friction torque and rotational speed (friction torque increases in proportion to the greatness of load).

Increase in temperature of the ball bearing for ball bearing unit depends on the heating value generated by friction in the bearing and that discharged outside from the surface of the bearing and housing. Therefore, increase in temperature of the ball bearing for ball bearing unit is influenced by the environmental conditions of the location that the ball bearing unit is installed (quality of heat radiation environment).

Temperature of the ball bearing unit is increased gradually after the startup of operation, and reaches the maximum level after one or two hours, if no abnormality occurs. Then, it is decreased a little, and enters the steady-state (see Fig. 13.2).

In this manner, if the operating conditions are not changed, bearing temperature is virtually constant, and therefore, measurement of temperature and assumption of the status of bearing are enabled.

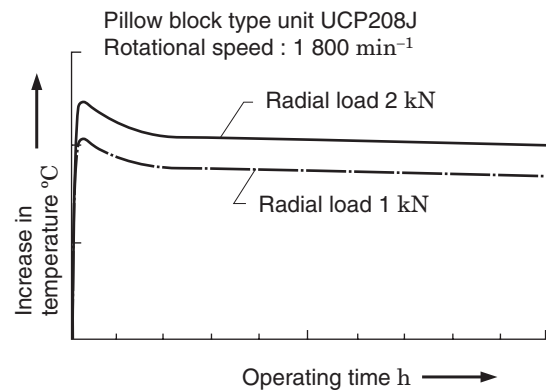


Fig. 13.2 Example of temperature measurement during operation of pillow block type unit

Increase in temperature during operation of the ball bearing unit depends on the type of oil seal used for the bearing as well as friction torque.

Increase in temperature of the triple-lip seal type (supplementary code L3) is greater than the standard type, and that of the non-contact seal type (special code K3, S5) is smaller than the standard type.

The bearing units for high speed and blower are equipped with the non-contact type oil seals for high speed use and reduction of heat, vibration, and noise.

13.3 Dustproof and waterproof performance

JTEKT executes various tests to check dustproof and waterproof performance of the ball bearing unit. Representative test results are shown below.

13.3.1 Dust sprinkle rotating test (dust preventive performance)

Use the drum type dust sprinkle rotating test machine for this test. Directly sprinkle dusts onto the ball bearing unit while it is being operated, and then, judge the dust preventive performance of the product.

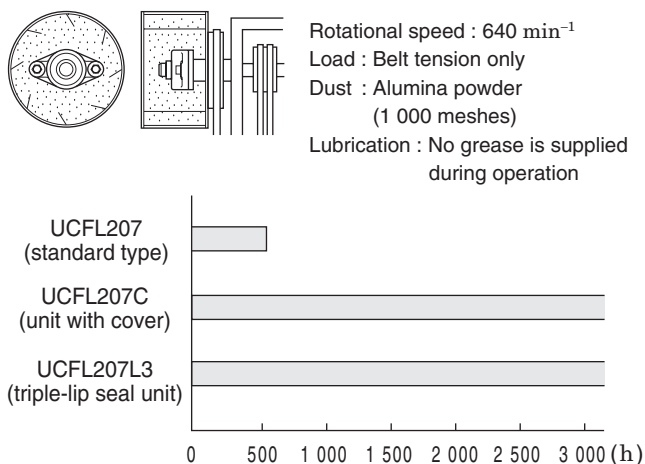


Fig. 13.3 Example of result of dust sprinkle rotating test (dust preventive performance)

In the case of the standard type, abnormal noise occurred about 500 hours after operation was started, and ingress of dusts was recognized.

On the other hand, no abnormality was found in the triple-lip seal type (supplementary code L3) and the covered type (supplementary code C) even after about 3 000 hours after operation was started, and superior dust proof performance was recognized.

13.3.2 Dust bury rotating test (dust preventive performance)

Bury the ball bearing unit into dusts, and run it with the impeller installed to the shaft while stirring dusts, and judge the dust preventive performance of the product. This test is executed under the severest conditions among the operating conditions of the ball bearing unit.

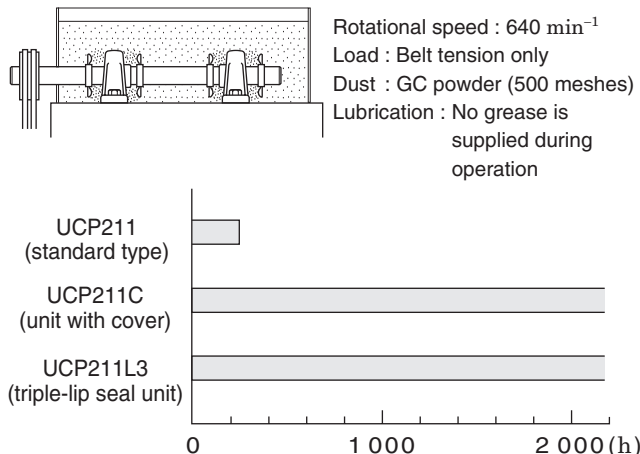


Fig. 13.4 Example of result of dust bury rotating test (dust preventive performance)

In the case of the standard type, abnormal noise occurred about 200 hours after operation was started, and ingress of dusts was recognized.

On the other hand, no abnormality was found in the triple-lip seal type (supplementary code L3) and the covered type (supplementary code C) even after about 2 000 hours after operation was started, and superior dust preventive performance was recognized.

13.3.3 Waterproof performance test

In this test, water is splashed directly impellers installed on the shaft.

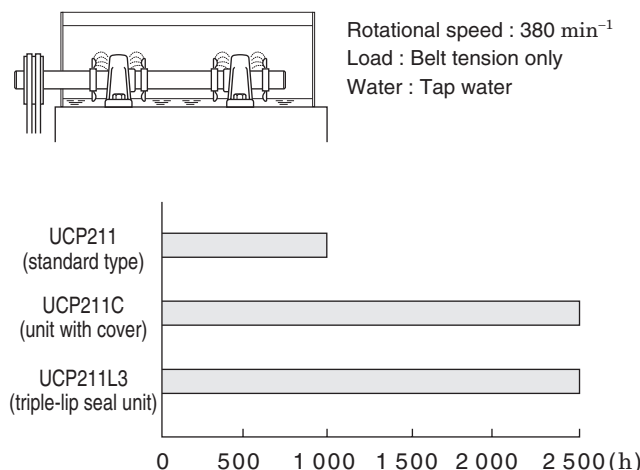


Fig. 13.5 Example result of waterproof performance test

In the case of the standard type, rust was found on the balls and raceway surface (outer and inner rings) about 1 000 hours after operation was started.

On the other hand, rust of equal level to the standard type was found in the triple-lip seal type (supplementary code L3) and the covered type (supplementary code C) after about 2 500 hours after operation was started.

14 Handling

The most significant feature of the ball bearing unit is simplicity of handling and installation. However, if handling or installation is wrong, premature breakage may occur to the ball bearing unit.

Therefore, handle and install it appropriately for genuine performance of the ball bearing unit.

14.1 Installation

14.1.1 Installation of unit with set screws

When installing the unit to the shaft with the set screws, it is enough to tighten the two set screws of the bearing inner ring with the specified torque.

However, if the environment is exposed to impact or vibration, the shaft is rotated in normal and reverse directions, or the machine is started and stopped frequently and repeatedly, grind the surface of the shaft where the set screw contacts with a file so that the flat seat (**Fig. 14.1**) or drilled seat (**Fig. 14.2**) is provided. It improves the tightening effect of the set screw substantially.

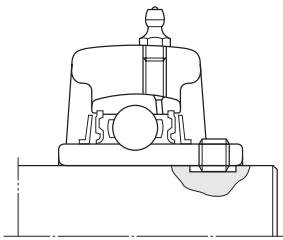


Fig. 14.1 Flat seat provided for shaft
(for improvement in set screw tightening effect)

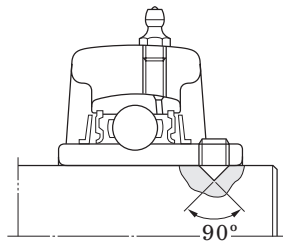


Fig. 14.2 Drilled seat provided for shaft
(for improvement in set screw tightening effect)

If the environment is exposed to a great axial load or excessive vibration, use the shouldered shaft, and tighten the bearing inner ring with the nut (**Fig. 14.3**).

As for the dimensions of the shouldered shaft, see “9 Design of shaft and base”.

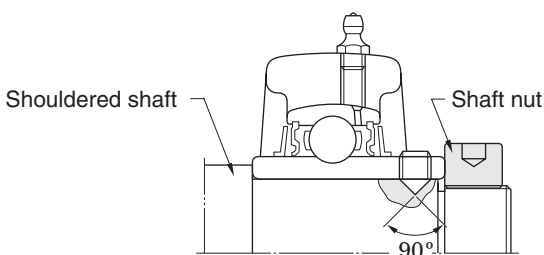





Fig. 14.3 Example of installation with using shouldered shaft and nut

The standard Koyo Ball Bearing Unit is equipped with the Bullet Point set screw featuring secure tightening to shaft. Other set screws are also available depending on your purposes and operating conditions (see **Table 14.1**).

Table 14.1 Set screw of ball bearing for unit

Designations (code)	Details
Bullet Point (no indication)  *Bullet Point is developed by NIPPON PILLOW BLOCK CO., LTD. (FYH).	The tip of the Bullet Point setscrew has a ball shape, and it is designed to firmly grip the shaft by expanding its threads outward against the threads of the inner ring of the bearing as it is tightened. When shock or vibration are problems, the Bullet Point setscrew can remain affixed to the shaft longer than other set screw styles including double point, ball point, or others.
Pointed (G4) 	The cone point set screw has a 90° angle and fits a drilled cone seat in the shaft. It allows correct positioning on the shaft and prevents shaft movement in an axial direction.
Full dog point cap (G6) 	The full dog point set screw fits into the key groove in the shaft and allows for expansion and contraction of the shaft.

Procedures for installation of the ball bearing unit with set screw are shown below.

- (1) Inspect the unit to ensure that the rigidity of the base, flatness of the mounting surface, variation of tolerance of the shaft meet the standards. Check for bend, flaw, or burr on the shaft.
- (2) Make sure that the tip of the set screw does not exceed the bearing bore diameter surface.
- (3) Fit the bearing unit to the shaft, and place it to the specified position. To fit it to the shaft with tight fitting, press-fit the bearing unit to the shaft with a press, cold-fit by cooling the shaft, or shrink-fit the bearing unit by warming it with air bath (100 °C or less).

Avoid hitting the side of the bearing inner ring with a hammer to press-fit the bearing to the shaft.

- (4) Place the bearing unit to the specified position on the base, and fix it with bolts (**Fig. 14.4**).

Tighten the mounting bolt of the housing with the specified torque by a torque wrench. As for the tighten-

ing torque of the mounting bolt, see the **Appendix table 2** at the end of this catalogue.

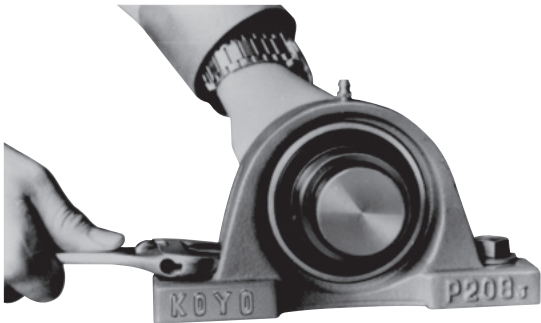


Fig. 14.4 Fixing ball bearing unit to base

(5) Tighten the set screws (two) of a bearing inner ring with the specified tightening torque evenly (**Fig. 14.5**).

As for the tightening torque of the set screw, see the **Appendix table 3** at the end of this catalogue.

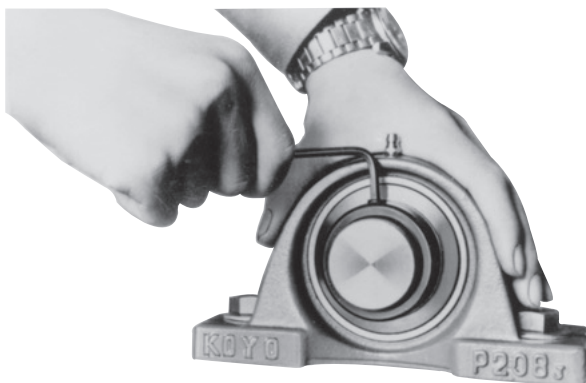


Fig. 14.5 Tightening of set screw

(6) Turn the shaft with your hands, and tighten the set screws (two) of another bearing inner ring with the specified torque.

(7) At last, turn the shaft with your hands, and check for abnormality in turning status of the bearing.

14.1.2 Installation of unit with adapter

To install the bearing with tapered bore to the shaft, set the adapter assembly (sleeve, locknut and washer) between the bearing bore diameter and the shaft. The bearing can be securely fixed even in the environment exposed to excessive vibration or impact.

If tightening of the locknut is loose, fitting to the shaft may be loosened during operation, and slippage occurs to the fitting surface, leading to wear on the shaft or parts. On the contrary, if tightening of the locknut is excessive, the bearing inner ring is expanded, and internal clearance of the bearing is too small, causing abnormal heat or premature breakage. Therefore, pay close attention to installation of the bearing with adapter.

Procedures for installation of the ball bearing unit with adapter assembly are shown below.

(1) Inspect the unit to ensure that the rigidity of the base, flatness of the installing surface, and variation of tolerance of the shaft meet the standards. Check for bend, flaw, or burr on the shaft.

(2) Fit the adapter sleeve to the shaft, and move the adapter sleeve to the installing position of the bearing unit.

If the fitting is too tight to insert the adapter sleeve, put a screwdriver into the cutout of the adapter sleeve, and expand the cutout for easier fitting.

(3) Fit the bearing unit to the shaft.

Then, place the cylindrical backing plate to the whole side of the bearing inner ring that the locknut is to be attached, and tap all around the large diameter side end face to fit the bore diameter surface of the bearing inner ring to the tapered surface of the adapter sleeve closely (**Fig. 14.6**).

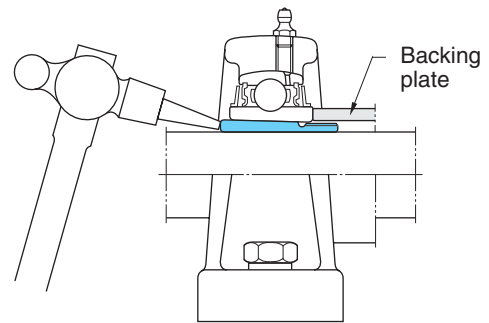


Fig. 14.6 Fitting adapter sleeve to bearing with tapered bore

(4) Fit the washer and locknut to the adapter sleeve, and tighten the locknut with your hands.

(5) Place the bearing unit to the specified position of the base, and fix it with the bolts.

Tighten the mounting bolt of the housing with the specified torque by a torque wrench.

As for the tightening torque of the set screw, see the **Appendix table 2** at the end of this catalogue.

(6) Tighten the locknut of the adapter.

When tightening the locknut, tighten it with a wrench for tightening, or place a jig onto the cutout of the locknut outer surface, and tap the jig with a hammer and turn the locknut by 1/4 to 1/3 turn (**Fig. 14.7**).

As for the tightening torque of the locknut, see the **Appendix table 4** at the end of this catalogue.



Fig. 14.7 Tightening locknut

- (7A) For the pillow block type unit, loosen the mounting bolts on a housing, adjust the position of the bearing unit in the axial direction while turning the shaft by your hands, and then, tighten the mounting bolt on the housing with the specified torque again.
- (7B) For the flange type unit, positions of the bearing and housing in the axial direction must be fit completely. Therefore, pay close attention and tighten the locknut to prevent any error of the position of bearing inner ring.
- (8) Bend the outer tab on a washer that fits to the position of cutout on the outer surface of the locknut, and lock the locknut (**Fig. 14.8**).



Fig. 14.8 Bending outer tab of washer (Locking locknut)

- (9) At last, turn the shaft with your hands, and check for abnormality in the rotating status of the bearing.

14.1.3 Installing unit with eccentric locking collar

When installing the bearing to the shaft with the eccentric ring, fit the eccentric section of the end outside surface of the bearing inner ring to the eccentric recessed section provided on the eccentric locking collar, turn the eccentric locking collar, and tighten the set screw of the eccentric locking collar to fix the bearing to the shaft.

Since the rotating force of the shaft increases the tightening force of the eccentric ring to the shaft, the unit with eccentric locking collar allows secure fixing of the bearing (**Fig. 14.9**).

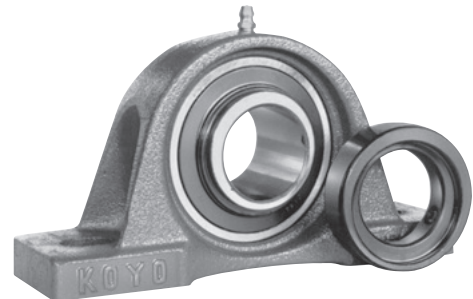


Fig. 14.9 Ball bearing unit with eccentric locking collar

Procedures for installation of the ball bearing unit with eccentric locking collar are shown below.

- (1) Inspect the unit to ensure that the rigidity of the base, flatness of the mounting surface, and variation of tolerance of the shaft meet the standards. Check for bend, flaw, or burr on the shaft.
- (2) Fit the bearing unit to the shaft, and place it on the specified position.
- (3) Install the bearing unit to the specified position of the base, and fix it with the bolts.

Tighten the mounting bolts for the housing with the specified torque with a torque wrench.

For the tightening torque of the mounting bolt, see the **Appendix table 2** at the end of this catalogue.

- (4) Fit the eccentric section of the bearing inner ring to the eccentric recessed section provided on the eccentric locking collar, turn the eccentric locking collar in the shaft turning direction, and tighten the set screw of the eccentric locking collar with the specified torque (**Fig. 14.10**).

For the tightening torque of the set screw, see the **Appendix table 3** at the end of this catalogue.



Fig. 14.10 Installing eccentric locking collar

- (5) Turn the shaft with your hands. Then, fix the eccentric locking collar of another bearing unit to the bearing inner ring, and tighten the set screw of the eccentric locking collar with the specified torque.
- (6) At last, turn the shaft with your hands, and check for abnormality in the rotating status of the bearing.

14.1.4 Installing unit with cover

Covers for ball bearing unit are available in two types, pressed steel and cast iron. Install both the covers at last after installation of the bearing and housing is complete.

Procedures for installation of the ball bearing unit with cover are shown below.

- (1) Apply grease all around the seal lip of the cover, and pack the internal space of the cover with grease (approximately 1/3 to 1/2 of the space capacity) (Fig. 14.11).

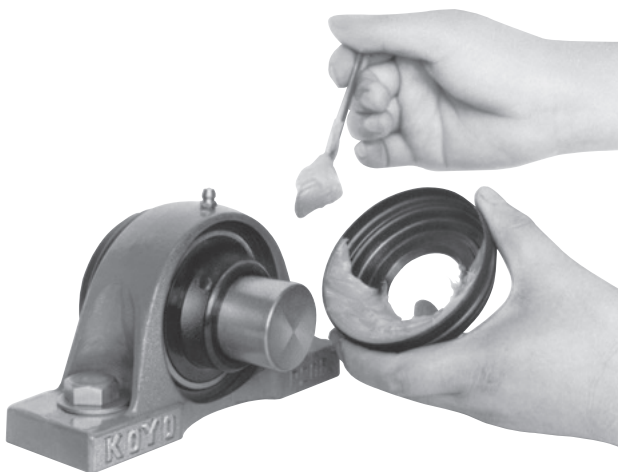
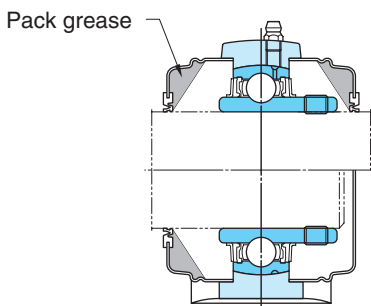


Fig. 14.11 Packing grease in internal space and seal lip of cover

- (2) Put a cover through the shaft, and then, fit the bearing unit to the shaft.
- (3) Fit the cover through the shaft to the cover groove on the housing, and fix it.
- (4A) For the pressed steel cover, tap all around the cover evenly with a synthetic resin hammer to prevent deformation, and install it to the housing (Fig. 14.12).

To remove the pressed steel cover, put a screwdriver into the groove on the periphery of the cover, and slightly pry it.

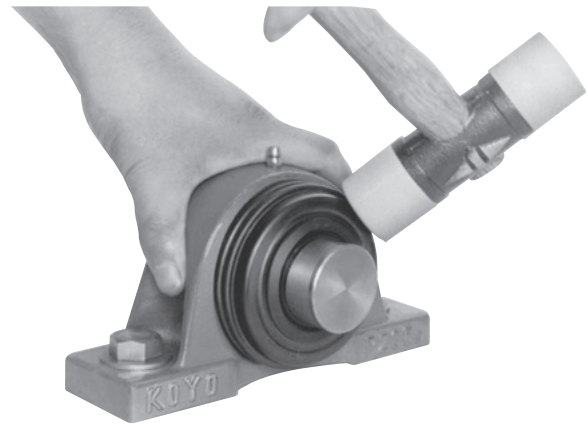


Fig. 14.12 Installing steel plate cover

- (4B) When installing the cast iron cover, fit the cover to the cover groove of the housing, and fix it with the bolt. For the tightening torque of the cast iron cover mounting bolt, see the **Appendix table 2** at the end of this catalogue.
- (5) Install another cover to the housing in a similar manner.
- (6) Check for abnormality of the installed cover.
- (7) At last, turn the shaft with your hands, and check for abnormality in the rotating status of the bearing.

14.2 Test run inspection

After installation of the ball bearing unit is complete, execute the test run inspection to ensure that it is done appropriately.

The test run inspection should be executed by following the procedures below. Check for abnormality in the bearing unit.

- (1) Turn the shaft with your hands, and make sure that the bearing is rotated smoothly. If any jam, vibration, great rotation torque (heavy), or uneven rotation is found, the bearing is judged to be faulty.
- (2) Execute power run with no load and at a low speed, and check for abnormal noise and vibration.
- (3) Carry out power run under the specified conditions, and check for abnormal noise, vibration, and temperature increase.

Table 14.2 shows the main faults that may occur during the test run inspection of the ball bearing unit and causes.

Table 14.2 Main faults occurred during test run inspection and their causes

Faults	Causes
Excessively great torque, uneven rotating torque	(1) Faulty installation, leading to preload onto bearing in axial direction (2) Inappropriate handling or installation, leading to interference of oil seal with flinger (slinger) (3) Excessive tightening of locknut (adapter), leading to too small internal clearance of bearing
Abnormal noise, abnormal vibration	(1) Insufficient tightening of set screw of bearing inner ring or mounting bolt of housing (2) Excessively large internal clearance of bearing (3) Bend on shaft, deviation of shaft center of shouldered shaft (4) Faulty accuracy of shaft (5) Insufficient rigidity or faulty flatness of base
Abnormal temperature increase	(1) Excessively small internal clearance of bearing (2) Inappropriate installation, leading to preload onto bearing in axial direction (3) Great load applied (4) Allowable rotational speed is exceeded (5) Faulty flatness of base (6) Inappropriate handling or installation, leading to interference of oil seal with flinger (slinger)

14.3 Periodic inspection

Koyo Ball Bearing Units do not need to be inspected, as well as standard sealed bearings. However, for especially important purposes, periodic inspection must be executed with appropriate intervals for safe operation of the bearing unit.

Since a ball bearing unit cannot be disassembled for inspection of internal status, check the appearance and operating status as shown below, and ensure that the bearing unit is free from fault or not.

- (1) Appearance
- (2) Looseness of set screw of bearing inner ring or mounting bolt of housing
- (3) Vibration, noise
- (4) Temperature
- (5) Grease supply interval, check of supplied amount

Table 14.3 shows the main faults found during the periodic inspection of ball bearing unit and their causes.

If any fault is found in the ball bearing unit during the periodic inspection, immediately provide countermeasures against them, and carry out them. If the unit is judged to be difficult to be used, replace the bearing unit. It is important to replace the bearing unit to prevent expanding damage to other parts.

Table 14.3 Main faults found during periodic inspection and their causes

Faults	Causes
Excessively great torque (heavy)	(1) Degraded grease (2) Interference of oil seal with flinger (slinger) due to excessive supply of grease (3) Deformation of flinger (slinger), leading to interference with oil seal (4) Abnormal load due to expansion of shaft
Abnormal noise, abnormal vibration	(1) Insufficient tightening of set screw of bearing inner ring or mounting bolt of housing (2) Wear on fitting surface of shaft and bearing inner ring due to creep or fretting (3) Ingress of foreign matters into bearing (4) Damage to raceway surface or rolling contact surface of rolling element by rolling fatigue (5) Dent on raceway surface or rolling contact surface of rolling element by excessive load (6) Excessive warp or bend of shaft
Abnormal temperature increase	(1) Degraded grease (2) Interference of oil seal with flinger (slinger) due to excessive supply of grease (3) Deformation of flinger (slinger), leading to interference with oil seal (4) Looseness of set screw or locknut (adapter) of bearing inner ring (5) Abnormal load due to expansion of shaft (6) Damage to raceway surface or rolling contact surface of rolling element by rolling fatigue

14.4 Supply of grease

In Koyo Ball Bearing Unit, grease of good quality is packed with high quality oil seal. Therefore, grease life is long under standard operating conditions, and use without lubrication is enabled.

If the operating temperature is high or the unit is used in the environment exposed to dusts or high humidity, grease may be degraded faster, leading to faulty lubrication in a short period.

Since Koyo Ball Bearing Units are lubricated type bearings, fresh grease must be periodically supplied to the bearings, if they are used for such purposes that premature degradation of grease is expected.

The ball bearing units can maintain normal lubricated status and longer service life by supplying fresh grease.

14.4.1 Grease life and supply intervals

Grease life of a packed grease ball bearing, like a ball bearing unit, can be found by **Formula (4. 7)** in page 30. It is recommended to supply grease with the intervals of 1/4 to 1/3 of grease life found by the calculation shown above to ball bearing units, taking peculiarity of lubricating method and safety of bearing unit into consideration.

If the bearing unit is used under severe environmental conditions, including much dust and high humidity, the greasing intervals must be further shortened, taking these influences into consideration.

If operating conditions of the ball bearing unit are not clear or the unit is operated under standard conditions, consider the greasing intervals shown in **Table 14.4** as the guideline.

14.4.2 Greasing amount

Initial greasing amount of Koyo Ball Bearing Unit is approximately 30 to 35% of the internal space capacity of the bearing. If amount of grease supplied in the bearing is excessive, agitating resistance of grease increases, leading to abnormal heat or grease leak. DO NOT exceed the initial greasing amount.

Table 14.5 shows the recommended values of greasing amount of Koyo Ball Bearing Unit.

If the unit is used at a low speed, supply grease of double amount of that shown in **Table 14.5** is recommended to increase dust preventive performance.

- [Remarks] 1. For greasing amount of the UK type bearing, use this table, too.
 2. For greasing amount of the triple-lip seal type, 1.5 times of the values shown in this table are recommended.
 3. Values shown in this table are applicable to standard grease (specific gravity : 0.9 g/ml). If you use greases of other specific gravity, adopt values converted with the same volume.

Table 14.5 Greasing amount of ball bearing unit (recommended)

Bore dia. No.	Greasing amount, g		
	UC200	UCX00	UC300
01	1.8		
02	1.8		
03	1.8		
04	1.8	–	–
05	1.8	3.3	4.2
06	3.3	4.5	5.9
07	4.5	5.6	8.1
08	5.6	6.5	10.1
09	6.5	7.7	12.6
10	7.7	10.3	18.1
11	10.3	13.2	25
12	13.2	14.9	31
13	14.9	18.2	39
14	18.2	21	47
15	21	25	56
16	25	31	65
17	31	38	78
18	38	48	90
19	–	–	108
20		69	141
21		–	165
22			198
24			237
26			291
28			337

Table 14.4 Greasing intervals of ball bearing unit (recommended)

Operating temperature, °C		Grease Intervals			Bearing used	Grease supplied
over	up to	Substantially clean	Much dust	Much dust and muddy water		
	50	(3 months) not necessary	(2 months) 1 year	(1 month) 4 months	(Low temperature D2K2) ¹⁾	(Lithium) Lithium
50	70	1 year	4 months	1 month	Standard bearing	
70	100	6 months	2 months	2 weeks		
100	120	2 months	2 weeks	5 days	High temperature D1K2	Lithium
120	150	2 weeks	5 days	2 days		
150	180	1 week	2 days	1 day		

Note 1) Greasing intervals in parentheses are applicable to the cold resistant type (D2K2).

[Remark] Greasing intervals shown in this table are applicable to the unit to be operated for 8 to 10 hours a day. If operating hour is out of this range, find the greasing interval proportionally by this table.

14.4.3 Types of grease supplied

Though various types of greases used for ball bearing units are available, if dissimilar grease, especially grease of which soap base is different, is mixed, lubricating performance may be significantly degraded.

Therefore, the same grease to be supplied as the initially packed grease must be used, and avoid use of dissimilar grease.

It is recommended to supply the same grease to Koyo Ball Bearing Unit as the initially packed grease (see **Table 2.3**). If you have no choice but to use other greases, you have to use grease of the same type (thickener) as the initially packed grease, if not the worst.

14.4.4 Supplying grease

When supplying grease to a ball bearing unit, use the grease nipple and grease gun installed to the housing (**Fig. 14.13**).

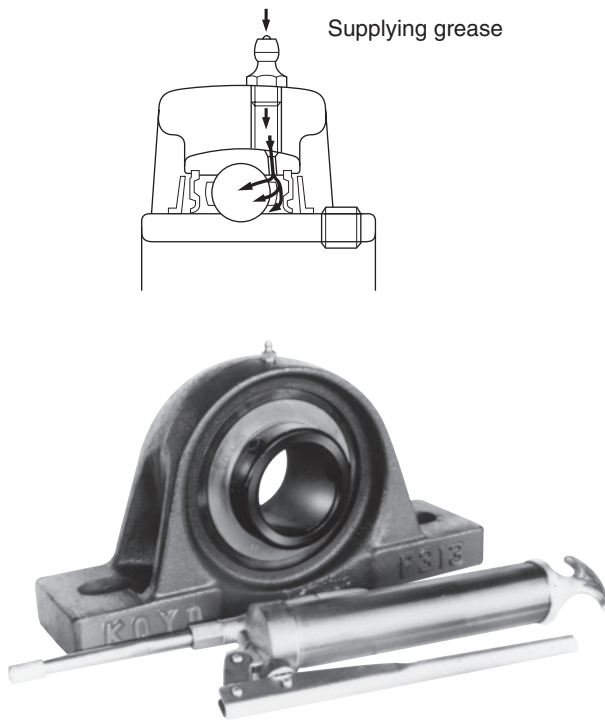


Fig. 14.13 Supplying grease to ball bearing unit

- (1) Clean the grease nipple and area around it to prevent ingress of foreign matters.
- (2) Clean the grease gun, and pack clean grease.
- (3) Supply grease.

When supplying grease to the ball bearing unit, turning of the shaft with your hands or turning of the bearing unit at a low speed is recommended.

It allows appropriate discharge of old grease and even supply of fresh grease into the bearing.

If the grease supply with the grease nipple of the standard type (type A) is difficult because of the structure of the machine, grease nipples of the type B or type C are also available. Contact JTEKT.

Fig. 14.14 shows the types of grease nipples.

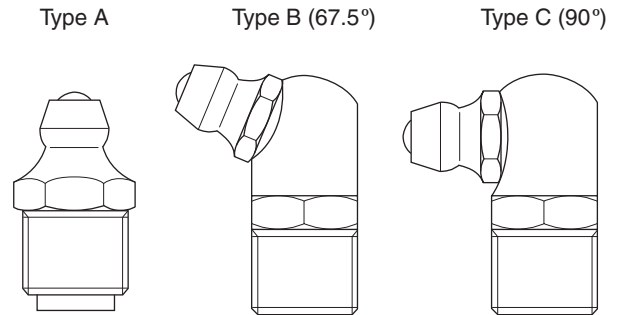


Fig. 14.14 Types of grease nipple for ball bearing unit

When supplying many ball bearing units with the centralized lubricating device, use soft grease with consistency from about 300 to 380, and provide piping appropriately so that grease of the specified amount is supplied.

Piping to the ball bearing unit should be provided with the tapped hole of the grease nipple of the housing. However, if size of the tapped hole on the housing differs from that of thread of the piping, use the reducing socket.

Fig. 14.15 shows the structure of the reducing socket for centralized lubricating.

When executing centralized lubricating, it is effective for the lubricating surface of the bearing to supply grease of the amount shown in **Table 14.5** by dividing into several times.

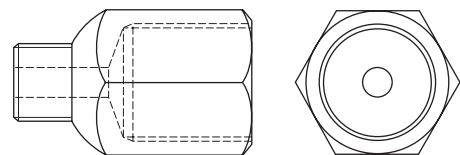


Fig. 14.15 Reducing socket for centralized lubricating

For details of grease nipples and reducing sockets, see “16 Parts and accessory”.

14.5 Replacing bearing

Since the bearings and the housings of Koyo ball bearing units are compatible, if a bearing is faulty, it can be replaced and used continuously.

Replacing procedures of the bearing of the ball bearing unit are shown below.

- (1) Remove the bearing unit from the shaft and the base.
- (2) Screw in the set screw so that the head of the set screw does not project out from the outside diameter surface of the inner ring of the bearing.
Head of the set screw may be hooked on the housing when the bearing is tilted.
- (3) Turn the bearing by 90° with a handle of a hammer until the bearing is horizontal.
- (4) Take out the bearing from the bearing groove of the housing.

To fit a new bearing to the housing, reverse the removing procedures.

15 Specification tables of ball bearing units



15 Specification tables of ball bearing units (contents)

1 Pillow block type

Pillow block type

UCP (<i>d</i> 12 ~ 140)	72
NAP (<i>d</i> 12 ~ 75)	78
NAPK (<i>d</i> 12 ~ 75)	80
UKP (<i>d</i> ₁ 20 ~ 125)	82
UCP-SC (<i>d</i> 25 ~ 140)	88
UKP-SC (<i>d</i> ₁ 20 ~ 125)	92

Thick section pillow block type

UCIP (<i>d</i> 40 ~ 140)	96
UKIP (<i>d</i> ₁ 35 ~ 125)	98

Tapped-base pillow block type

UCPA (<i>d</i> 12 ~ 50)	100
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Higher centerheight pillow block type

UCPH (<i>d</i> 12 ~ 50)	102
--------------------------------	-----

Light duty pillow block type

BLP, ALP (<i>d</i> 12 ~ 40)	104
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“Compact” series pillow block type

UP (<i>d</i> 10 ~ 30)	106
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Stainless-series pillow block type

UCSP-H1S6 (<i>d</i> 20 ~ 50)	108
UCSPA-H1S6 (<i>d</i> 20 ~ 40)	110
USP-S6 (<i>d</i> 10 ~ 30)	112

Pressed steel pillow block type

SBPP, SAPP (<i>d</i> 12 ~ 30)	114
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2 Square-flanged type

Square-flanged type

UCF (<i>d</i> 12 ~ 140)	116
UCF-E (<i>d</i> 12 ~ 85)	122
NANF (<i>d</i> 12 ~ 60)	126
UKF (<i>d</i> ₁ 20 ~ 125)	128

Square-flanged type with spigot joint

UCFS (<i>d</i> 25 ~ 140)	134
UKFS (<i>d</i> ₁ 20 ~ 125)	136

Stainless-series square-flanged type

UCSF-H1S6 (<i>d</i> 20 ~ 50)	138
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3 Oval flange type

Rhombic-flanged type

UCFL (<i>d</i> 12 ~ 130)	140
UCFL-E (<i>d</i> 12 ~ 85)	146
NANFL (<i>d</i> 12 ~ 55)	150
UKFL (<i>d</i> ₁ 20 ~ 115)	152

Adjustable rhombic-flanged type

UCFA (<i>d</i> 12 ~ 55)	156
--------------------------------	-----

Three-bolt flange type

UCFB (<i>d</i> 12 ~ 50)	158
--------------------------------	-----

Light duty rhombic-flanged type

BLF, ALF (<i>d</i> 12 ~ 35)	160
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“Compact” series rhombic-flanged type

UFL (<i>d</i> 8 ~ 30)	162
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Stainless-series rhombic-flanged type

UCSFL-H1S6 (<i>d</i> 20 ~ 50)	164
USFL-S6 (<i>d</i> 10 ~ 30)	166

4 Round-flanged type with spigot joint

UCFC (<i>d</i> 12 ~ 100)	168
UCFCX-E (<i>d</i> 25 ~ 100)	172
UKFC (<i>d</i> ₁ 20 ~ 90)	174

5 Pressed steel flange type

Pressed steel round-flanged type

SBPF, SAPF (<i>d</i> 12 ~ 35)	178
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Pressed steel rhombic-flanged type

SBPFL, SAPFL (<i>d</i> 12 ~ 35)	180
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6 Take-up type

Take-up type

UCT (<i>d</i> 12 ~ 140)	182
UCT-E (<i>d</i> 12 ~ 85)	188
UKT (<i>d</i> ₁ 20 ~ 125)	192

Stainless-series take-up type

UCST-H1S6 (<i>d</i> 20 ~ 50)	198
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Section steel frame take-up type

UCTH (<i>d</i> 12 ~ 65)	200
--------------------------------	-----

Channel steel frame take-up type

UCTL (<i>d</i> 20 ~ 45)	202
UCTU (<i>d</i> 40 ~ 90)	204

Pressed steel frame take-up type

SBPTH (<i>d</i> 12 ~ 25)	208
SBNPTH (<i>d</i> 12 ~ 25)	210

7 Other units

Cartridge type

UCC (<i>d</i> 12 ~ 140)	212
UKC (<i>d</i> ₁ 20 ~ 125)	216

Hanger type

UCHA (<i>d</i> 12 ~ 75)	218
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8 Ball bearings for units

Cylindrical bore (with set screws)

UC, SB, SU (<i>d</i> 8 ~ 140)	220
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Stainless-series,

Cylindrical bore (with set screws)

UC-S6, SU-S6 (<i>d</i> 10 ~ 50)	226
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Tapered bore (with adapter)

UK (<i>d</i> ₁ 20 ~ 125)	228
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Cylindrical bore

(with eccentric locking collar)

SA, SA-F, NA (<i>d</i> 12 ~ 75)	234
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Cylindrical bore (with set screws),

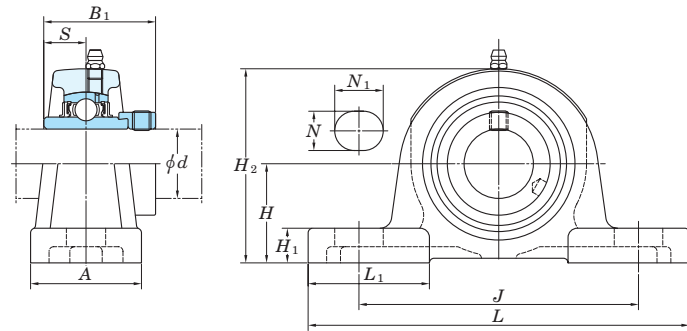
Cylindrical outside surface

ER, RB (<i>d</i> 12 ~ 60)	238
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9 Adapter assemblies

H300X, H2300X (<i>d</i> ₁ 20 ~ 125)	240
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NAP
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 75 mm



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

Housing No.	ΔH_s
P203-P210	±0.15
P211-P215	±0.2

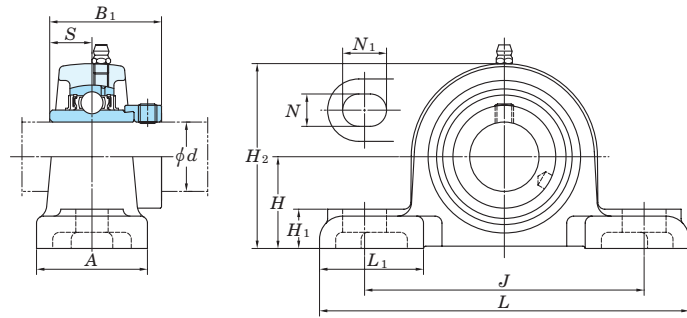
Unit : mm

Shaft Dia. mm inch <i>d</i>	Dimensions inch mm												Bolt Size inch mm	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor <i>f₀</i>	Mass kg
	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>N₁</i>	<i>H₁</i>	<i>H₂</i>	<i>L₁</i>	<i>B₁</i>	<i>S</i>	<i>C_r</i>					<i>C_{0r}</i>			
12 1/2	1 3/16	5	1 1/2	3 3/4	1/2	23/32	15/32	2 3/8	1 1/2	1.720	0.673	3/8	NAP201 NAP201-8 NAP202 NAP202-10 NAP203	P203	NA201 NA201-8 NA202 NA202-10 NA203	12.8	6.65	13.2	0.71 0.69 0.66	
15 5/8	30.2	127	38	95	13	18	12	60	38	43.7	17.1	M10								
17																				
20 3/4	1 5/16	5	1 1/2	3 3/4	1/2	23/32	1/2	2 17/32	1 1/2	1.720	0.673	3/8	NAP204-12 NAP204	P204	NA204-12 NA204	12.8	6.65	13.2	0.73	
25 7/8	1 7/16	5 1/2	1 1/2	4 1/8	1/2	23/32	1/2	2 25/32	1 11/16	1.748	0.689	3/8	NAP205-14 NAP205-15 NAP205 NAP205-16	P205	NA205-14 NA205-15 NA205 NA205-16	14.0	7.85	13.9	0.87	
30 1 1/8	1 11/16	6 1/2	1 7/8	4 3/4	21/32	13/16	19/32	3 5/16	2 3/32	1.906	0.720	1/2	NAP206-18 NAP206 NAP206-19 NAP206-20	P206	NA206-18 NA206 NA206-19 NA206-20	19.5	11.3	13.9	1.4	
35 1 3/16	1 7/8	6 9/16	1 7/8	5	21/32	13/16	5/8	3 21/32	2	2.012	0.740	1/2	NAP207-20 NAP207-21 NAP207-22 NAP207 NAP207-23	P207	NA207-20 NA207-21 NA207-22 NA207 NA207-23	25.7	15.4	13.9	1.8	
40 1 1/4	1 15/16	7 1/4	2 1/8	5 13/32	21/32	13/16	21/32	3 27/32	2 1/4	2.217	0.843	1/2	NAP208-24 NAP208-25 NAP208	P208	NA208-24 NA208-25 NA208	29.1	17.8	14.0	2.1	
45 1 9/16	2 1/8	7 15/32	2 1/8	5 3/4	21/32	13/16	21/32	4 3/16	2 3/8	2.217	0.843	1/2	NAP209-26 NAP209-27 NAP209-28 NAP209	P209	NA209-26 NA209-27 NA209-28 NA209	34.1	21.3	14.0	2.4	
50 1 5/8	2 1/4	8 1/8	2 3/8	6 1/4	25/32	7/8	3/4	4 7/16	2 15/32	2.469	0.969	5/8	NAP210-30 NAP210-31 NAP210 NAP210-32	P210	NA210-30 NA210-31 NA210 NA210-32	35.1	23.3	14.4	3.1	
55 1 15/16	2 1/2	8 5/8	2 3/8	6 23/32	25/32	7/8	3/4	4 29/32	2 3/4	2.811	1.094	5/8	NAP211-32 NAP211-34 NAP211 NAP211-35	P211	NA211-32 NA211-34 NA211 NA211-35	43.4	29.4	14.4	3.9	
60 2	2 3/4	9 1/2	2 3/4	7 1/4	25/32	31/32	7/8	5 7/16	3	3.063	1.220	5/8	NAP212-36 NAP212 NAP212-38 NAP212-39	P212	NA212-36 NA212 NA212-38 NA212-39	52.4	36.2	14.4	5.2	
65 2 1/4	3	10 7/16	2 3/4	8	31/32	1 3/16	31/32	5 29/32	3 1/16	3.374	1.343	3/4	NAP213-40 NAP213	P213	NA213-40 NA213	57.2	40.1	14.4	6.5	
70 2 3/8	3 1/8	10 15/32	2 27/32	8 9/32	31/32	1 3/16	1 3/32	6 5/32	3 1/16	3.374	1.343	3/4	NAP214-44 NAP214	P214	NA214-44 NA214	62.2	44.1	14.5	7.7	
75 2 7/16	3 1/4	10 13/16	2 29/32	8 17/32	31/32	1 3/16	1 3/32	6 3/8	3 3/32	3.626	1.469	3/4	NAP215-47 NAP215	P215	NA215-47 NA215	67.4	48.3	14.5	7.9	

Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF..... 201~210
 A-PT1/8..... 211~215

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : NAP206JL3, NA206L3)
 4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.
 5. Representative examples of the forms of housing are indicated.

NAPK
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 75 mm



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

Housing No.	ΔH_s
PK204-PK210	± 0.15
PK211-PK215	± 0.2

Unit : mm

Shaft Dia mm <i>d</i>	inch	Dimensions inch mm											Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg	
		<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>N</i> ₁	<i>H</i> ₁	<i>H</i> ₂	<i>L</i> ₁	<i>B</i> ₁	<i>S</i>					<i>C</i> _r	<i>C</i> _{0r}			
12	1/2													3/8	NAPK201 NAPK201-8 NAPK202 NAPK202-10 NAPK203 NAPK204-12 NAPK204	PK204	NA201 NA201-8 NA202 NA202-10 NA203 NA204-12 NA204	12.8	6.65	13.2	0.82
15	5/8	1 1/4	5 1/4	1 5/8	3 27/32	7/16	9/16	9/16	2 15/32	1 25/32	1.72	0.673									
17	3/4	31.8	133	41	98	11	14	14	63	45	43.7	17.1									
20																					
25	7/8	1 5/16	5 1/2	1 23/32	4 1/8	7/16	9/16	5/8	2 11/16	1 25/32	1.748	0.689									
	15/16	33.3	140	44	105	11	14	16	68	45	44.4	17.5									
	1																				
30	1 1/8	1 9/16	6 5/16	1 7/8	4 3/4	9/16	3/4	21/32	3 5/32	1 25/32	1.906	0.72									
	1 3/16	39.7	160	48	121	14	19	17	80	45	48.4	18.3									
	1 1/4																				
35	1 1/4	1 13/16	6 9/16	1 7/8	5	9/16	3/4	3/4	3 5/8	1 25/32	2.012	0.74									
	1 5/16	46	167	48	127	14	19	19	92	45	51.1	18.8									
	1 3/8																				
	1 7/16																				
40	1 1/2	1 15/16	7 1/8	2 1/8	5 1/2	9/16	3/4	3/4	3 15/16	1 31/32	2.217	0.843									
	1 9/16	49.2	181	54	140	14	19	19	100	50	56.3	21.4									
45	1 5/8	2 1/16	7 15/32	2 1/8	5 3/4	9/16	3/4	25/32	4 3/16	2 1/16	2.217	0.843									
	1 11/16	52.4	190	54	146	14	19	20	106	52	56.3	21.4									
	1 3/4																				
50	1 7/8	2 3/16	8	2 1/4	6 1/4	9/16	3/4	7/8	4 13/32	2 5/32	2.469	0.969									
	1 15/16	55.6	203	57	159	14	19	22	112	55	62.7	24.6									
	2																				
55	2	2 7/16	9 1/8	2 3/8	7 1/8	23/32	15/16	31/32	4 7/8	2 19/32	2.811	1.094									
	2 1/8	61.9	232	60	181	18	24	25	124	66	71.4	27.8									
	2 3/16																				
	2 1/4																				
60	2 3/8	2 11/16	9 1/2	2 17/32	7 17/32	23/32	15/16	13/32	5 11/32	2 9/16	3.063	1.22									
	2 7/16	68.3	241	64	191	18	24	28	136	65	77.8	31									
75	2 15/16	3 5/16	11 31/32	3 7/32	9 1/2	7/8	1/4	1 1/2	6 1/2	3 7/16	3.626	1.469									
		84.1	304	82	241	22	32	38	165	87	92.1	37.3									

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.

A-1/4-28UNF 201~210

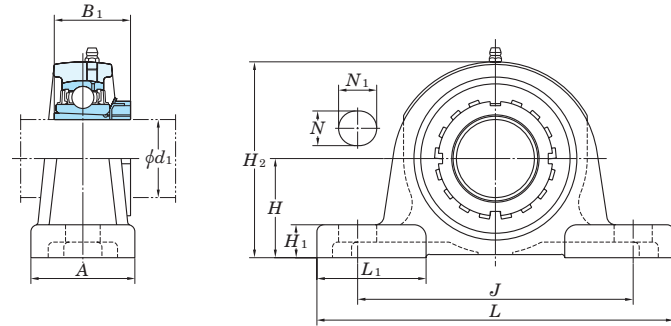
A-PT1/8 211~215

3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

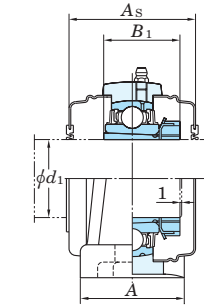
4. Representative examples of the forms of housing are indicated.

Pillow block type

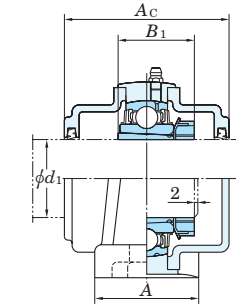
UKP
Tapered bore (with adapter)
 d_1 90 ~ 125 mm



With Pressed Steel Covers



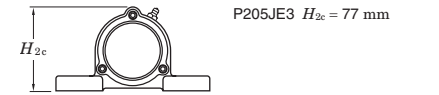
With Cast Iron Covers



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

Housing No.	ΔH_s
P205~P210	±0.15
P211~P218	±0.2
PX05~PX10	±0.3
P305~P310	±0.2
P311~P318	±0.3
PX20	±0.3
P319~P328	±0.3

Forms and dimensions of H_{2c} of P205JE3 (housing with cast iron covers) are shown below.



Shaft Dia. mm inch	Dimensions inch mm											Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic			With Pressed Steel Covers			With Cast Iron Covers				
	d_1	H	L	A	J	N	N_1	H_1	H_2	L_1	$B_1^{1)}$		Unit No.	Housing No.	Bearing No.			Mass kg	Load Ratings kN C_r C_{0r}	Factor f_0	Unit No.		Dimension mm inch	Mass kg	Unit No.		Dimension mm inch	Mass kg
																					Open Ends Type	Closed End Type			Open Ends Type	Closed End Type		
90 3 1/2	5	17	4 3/4	13 1/4	1 5/16	2 9/16	1 25/32	9 21/32	4 31/32	3 13/16	1	UKPX20	PX20	UKX20	29.3	133	105	14.4	-	-	-	-	-	-	-	-	-	
	127	432	121	337	33	65	45	245	126	97	M27	HE2320X		UKX20C	29.3	133	105	14.4	UKPX20C	UKPX20CD	186	7 5/16	34.3	UKPX20C	UKPX20CD	186	7 5/16	34.3
100 4	5 33/64	19 9/32	4 23/32	14 31/32	1 13/32	1 31/32	1 13/16	10 3/4	5 1/2	3 13/16	1 1/8	UKP320	P320	UK320	34.8	173	141	13.2	-	-	-	-	-	-	-	-		
	140	490	120	380	36	50	46	273	140	97	M30	HE2320X		UK320C	34.8	173	141	13.2	UKP320C	UKP320CD	174	6 27/32	41.0	UKP320C	UKP320CD	174	6 27/32	41.0
110 -	5 29/32	20 15/32	5 1/2	15 3/4	1 9/16	2 5/32	1 31/32	11 21/32	5 29/32	4 1/8	1 1/4	UKP322	P322	UK322	43.9	205	180	13.2	-	-	-	-	-	-	-	-		
	150	520	140	400	40	55	50	296	150	105	M33	H2322X		UK322C	43.9	205	180	13.2	UKP322C	UKP322CD	188	7 13/32	50.8	UKP322C	UKP322CD	188	7 13/32	50.8
115 4 1/2	6 19/64	22 7/16	5 1/2	17 23/32	1 9/16	2 5/32	1 31/32	12 7/16	6 5/16	4 13/32	1 1/4	UKP324	P324	UK324	55.7	207	185	13.5	-	-	-	-	-	-	-	-		
	160	570	140	450	40	55	50	316	160	112	M33	H2324		UK324C	55.7	207	185	13.5	UKP324C	UKP324CD	196	7 23/32	66.0	UKP324C	UKP324CD	196	7 23/32	66.0
125 -	7 3/32	23 5/8	5 1/2	18 29/32	1 9/16	2 5/32	1 31/32	13 21/32	7 11/16	4 3/4	1 1/4	UKP326	P326	UK326	71.9	229	214	13.6	-	-	-	-	-	-	-	-		
	180	600	140	480	40	55	50	355	195	121	M33	H2326		UK326C	71.9	229	214	13.6	UKP326C	UKP326CD	214	8 7/16	85.2	UKP326C	UKP326CD	214	8 7/16	85.2
125 -	7 7/8	24 13/32	5 1/2	19 11/16	1 9/16	2 5/32	2 3/8	15 15/32	7 9/32	5 5/32	1 1/4	UKP328	P328	UK328	92.5	253	246	13.6	-	-	-	-	-	-	-	-		
	200	620	140	500	40	55	60	393	185	131	M33	H2328		UK328C	92.5	253	246	13.6	UKP328C	UKP328CD	222	8 3/4	109	UKP328C	UKP328CD	222	8 3/4	109

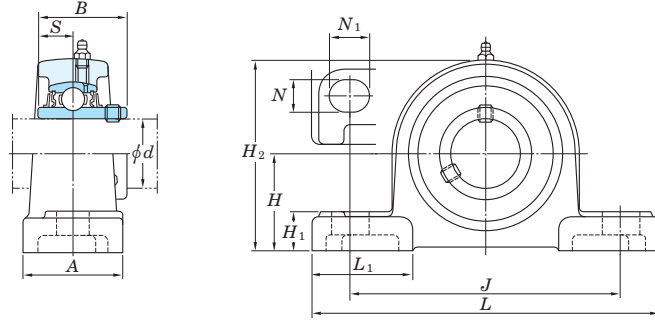
Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

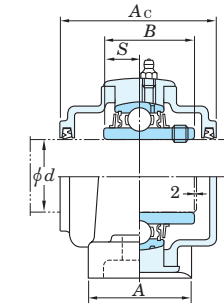
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF.....205~210, X05~X09, 305~308
A-PT1/8.....211~218, X10~X20, 309~328

3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No. : UKP206J + H306X, UK206 + H306X)
4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing.
5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.
6. Representative examples of the forms of housing are indicated.

UCP-SC
Cylindrical bore (with set screws),
cast steel housing
d 75 ~ 140 mm



With Cast Iron Covers



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s) Unit : mm

Housing No.		ΔH_s
P205SC-P210SC	P310SC	±0.15
P211SC-P218SC	P311SC-P318SC	±0.2
	P319SC-P328SC	±0.3

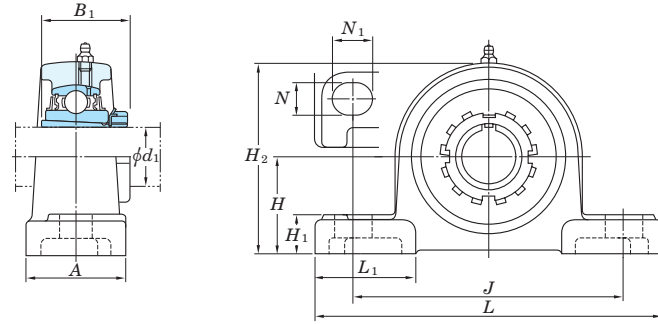
Shaft Dia. mm inch d	Dimensions inch mm												Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f ₀	With Cast Iron Covers			
	H	L	A	J	N	N ₁	H ₁	H ₂	L ₁	B	S	Unit No.		Housing No.	Bearing No.	C _r		C _{0r}	Open Ends Type		Closed End Type	Dimension mm inch A _c	Mass kg	
75 3	2 15/16 82.6	3 1/4 82.6	10 13/16 275	2 29/32 74	8 17/32 217	3 1/32 25	1 3/16 30	1 5/32 29	6 15/32 164	3 5/32 80	3.063 77.8	1.311 33.3	3/4 M20	UCP215-47SC UCP215SC UCP215-48SC	P215SC	UC215-47 UC215 UC215-48	7.7 7.7 7.7	67.4 48.3	14.5	- UCP215SCFC -	- UCP215SCFCD -	- 124 -	- 4 7/8 -	- 9.6 -
	2 15/16 100	3 15/16 100	14 31/32 380	3 15/16 100	11 13/32 290	1 1/16 27	1 9/16 40	1 1/2 38	7 7/8 200	4 7/32 107	3.228 82	1.260 32	7/8 M22	UCP315-47SC UCP315SC UCP315-48SC	P315SC	UC315-47 UC315 UC315-48	20.7 20.7 20.7	113 77.2	13.2	- UCP315SCC -	- UCP315SCCD -	- 134 -	- 5 9/32 -	- 23.2 -
	3 1/8 88.9	3 1/2 88.9	11 1/2 292	3 1/16 78	9 1/8 232	3 1/32 25	1 3/8 35	1 7/32 31	6 15/16 176	3 3/8 86	3.252 82.6	1.311 33.3	3/4 M20	UCP216-50SC UCP216SC	P216SC	UC216-50 UC216	9.3 9.3	72.7 53.0	14.6	- UCP216SCFC -	- UCP216SCFCD -	- 138 -	- 5 7/16 -	- 11.7 -
80 -	4 11/64 106	15 3/4 400	4 11/32 110	11 13/16 300	1 1/16 27	1 3/16 40	1 1/2 38	8 5/16 211	4 23/32 120	3.386 86	1.339 34	7/8 M22	UCP316SC	P316SC	UC316	24.2	123 86.7	13.3	- UCP316SCC -	- UCP316SCCD -	- 138 -	- 5 7/16 -	- 27.1 -	
	3 1/4 95.2	3 3/4 95.2	12 7/32 310	3 9/32 83	9 23/32 247	3 1/32 25	1 9/16 40	1 5/16 33	7 13/32 188	3 17/32 90	3.374 85.7	1.343 34.1	3/4 M20	UCP217-52SC UCP217SC	P217SC	UC217-52 UC217	11.7 11.7	84.0 61.9	14.5	- UCP217SCFC -	- UCP217SCFCD -	- 142 -	- 5 19/32 -	- 14.4 -
85 -	4 13/32 112	16 17/32 420	4 11/32 110	12 19/32 320	1 5/16 33	1 25/32 45	1 25/32 45	8 3/4 222	4 23/32 120	3.780 96	1.575 40	1 M27	UCP317SC	P317SC	UC317	28.4	133 96.8	13.3	- UCP317SCC -	- UCP317SCCD -	- 146 -	- 5 3/4 -	- 31.7 -	
	3 1/2 101.6	4 101.6	12 7/8 327	3 15/32 88	10 5/16 262	1 1/16 27	1 25/32 45	1 3/8 35	7 7/8 200	4 3/32 104	3.780 96	1.563 39.7	7/8 M22	UCP218-56SC UCP218SC	P218SC	UC218-56 UC218	13.5 13.5	96.1 71.5	14.5	- UCP218SCFC -	- UCP218SCFCD -	- 152 -	- 6 -	- 16.6 -
90 3 1/2	4 41/64 118	16 15/16 430	4 11/32 110	13 330	1 5/16 33	1 25/32 45	1 25/32 45	9 7/32 234	4 23/32 120	3.780 96	1.575 40	1 M27	UCP318-56SC UCP318SC	P318SC	UC318-56 UC318	30.9 30.9	143 107	13.3	- UCP318SCC -	- UCP318SCCD -	- 150 -	- 5 29/32 -	- 34.7 -	
	3 1/4 125	4 59/64 125	18 1/2 470	4 23/32 120	14 3/16 360	1 13/32 36	1 31/32 51	2 51	9 3/4 248	4 29/32 125	4.055 103	1.614 41	1 1/8 M30	UCP319SC	P319SC	UC319	37.9	153 119	13.3	- UCP319SCC -	- UCP319SCCD -	- 162 -	- 6 3/8 -	- 42.2 -
100 3 15/16 4	5 33/64 140	19 9/32 490	4 23/32 120	14 31/32 380	1 13/32 36	1 31/32 51	2 51	10 3/4 273	5 1/2 140	4.252 108	1.654 42	1 1/8 M30	UCP320SC UCP320-63SC UCP320-64SC	P320SC	UC320 UC320-63 UC320-64	45.2 45.2 45.2	173 141	13.2	- UCP320SCC -	- UCP320SCCD -	- 174 -	- 6 27/32 -	- 50.8 -	
	5 29/32 150	20 15/32 520	5 1/2 140	15 3/4 400	1 9/16 40	2 5/32 55	2 1/4 57	11 21/32 296	5 29/32 150	4.606 117	1.811 46	1 1/4 M33	UCP322SC	P322SC	UC322	53.1	205 180	13.2	- UCP322SCC -	- UCP322SCCD -	- 188 -	- 7 13/32 -	- 59.9 -	
120 -	6 19/64 160	22 7/16 570	5 1/2 140	17 23/32 450	1 9/16 40	2 5/32 55	2 1/4 57	12 7/16 316	6 5/16 160	4.961 126	2.008 51	1 1/4 M33	UCP324SC	P324SC	UC324	69.0	207 185	13.5	- UCP324SCC -	- UCP324SCCD -	- 196 -	- 7 23/32 -	- 78.5 -	
	7 3/32 180	23 5/8 600	5 1/2 140	18 29/32 480	1 9/16 40	2 5/32 55	2 1/4 57	13 21/32 355	7 11/16 195	5.315 135	2.126 54	1 1/4 M33	UCP326SC	P326SC	UC326	85.6	229 214	13.6	- UCP326SCC -	- UCP326SCCD -	- 214 -	- 8 7/16 -	- 97.7 -	
140 -	7 7/8 200	24 13/32 620	5 1/2 140	19 11/16 500	1 9/16 40	2 5/32 55	2 3/4 70	15 15/32 393	7 9/32 185	5.709 145	2.323 59	1 1/4 M33	UCP328SC	P328SC	UC328	114	253 246	13.6	- UCP328SCC -	- UCP328SCCD -	- 222 -	- 8 3/4 -	- 129 -	

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF 205-210
 A-PT1/8 211-218, 310-328

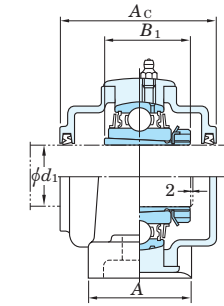
3. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing.
 (Example of Part No. : UCP206JSCL3, UC206L3)
 4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Pillow block type

UKP-SC
Tapered bore (with adapter),
cast steel housing
 d_1 80 ~ 125 mm



With Cast Iron Covers



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

Housing No.		ΔH_s
P205SC-P210SC	P310SC	± 0.15
P211SC-P218SC	P311SC-P318SC	± 0.2
	P319SC-P328SC	± 0.3

Unit : mm

Shaft Dia. mm inch	Dimensions inch mm											Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic Load Ratings kN		Factor f_0	With Cast Iron Covers		Dimension mm inch	Mass kg	
	H	L	A	J	N	N ₁	H ₁	H ₂	L ₁	B ₁ ¹⁾	Unit No.		Housing No.	Bearing No.	C _r			C _{0r}	Open Ends Type		Closed End Type	A _c			
80	-	4	12 7/8	3 15/32	10 5/16	1 1/16	1 25/32	1 3/8	7 7/8	4 3/32	2 9/16(3 3/8)	7/8	UKP218SC	P218SC	UK218	H318X(H2318X)	15.3	96.1	71.5	14.5	UKP218SCFC	UKP218SCFCD	152	6	18.4
	-	4 41/64	16 15/16	4 11/32	13	1 5/16	1 25/32	1 25/32	9 7/32	4 23/32	3 3/8	1	UKP318SC	P318SC	UK318	H2318X	31.0	143	107	13.3	UKP318SCC	UKP318SCCD	150	5 29/32	35.2
85	3 1/4	4 59/64	18 1/2	4 23/32	14 3/16	1 13/32	1 31/32	2	9 3/4	4 29/32	3 17/32	1 1/8	UKP319SC	P319SC	UK319	HE2319X H2319X	38.2 38.2	153	119	13.3	-	-	-	-	-
	-	125	470	120	360	36	50	51	248	125	90	M30									UKP319SCC	UKP319SCCD	162	6 3/8	42.9
90	3 1/2	5 33/64	19 9/32	4 23/32	14 31/32	1 13/32	1 31/32	2	10 3/4	5 1/2	3 13/16	1 1/8	UKP320SC	P320SC	UK320	HE2320X H2320X	44.9 44.9	173	141	13.2	-	-	-	-	-
	-	140	490	120	380	36	50	51	273	140	97	M30									UKP320SCC	UKP320SCCD	174	6 27/32	51.1
100	4	5 29/32	20 15/32	5 1/2	15 3/4	1 9/16	2 5/32	2 1/4	11 21/32	5 29/32	4 1/8	1 1/4	UKP322SC	P322SC	UK322	H2322X HE2322X	53.0 53.0	205	180	13.2	-	-	-	-	-
	-	150	520	140	400	40	55	57	296	150	105	M33									UKP322SCC	UKP322SCCD	188	7 13/32	59.9
110	-	6 19/64	22 7/16	5 1/2	17 23/32	1 9/16	2 5/32	2 1/4	12 7/16	6 5/16	4 13/32	1 1/4	UKP324SC	P324SC	UK324	H2324	69.3	207	185	13.5	-	-	-	-	-
	-	160	570	140	450	40	55	57	316	160	112	M33									UKP324SCC	UKP324SCCD	196	7 23/32	79.6
115	4 1/2	7 3/32	23 5/8	5 1/2	18 29/32	1 9/16	2 5/32	2 1/4	13 21/32	7 11/16	4 3/4	1 1/4	UKP326SC	P326SC	UK326	HE2326 H2326	85.4 85.4	229	214	13.6	-	-	-	-	-
	-	180	600	140	480	40	55	57	355	195	121	M33									UKP326SCC	UKP326SCCD	214	8 7/16	98.7
125	-	7 7/8	24 13/32	5 1/2	19 11/16	1 9/16	2 5/32	2 3/4	15 15/32	7 9/32	5 9/32	1 1/4	UKP328SC	P328SC	UK328	H2328	114	253	246	13.6	-	-	-	-	-
	-	200	620	140	500	40	55	70	393	185	131	M33									UKP328SCC	UKP328SCCD	222	8 3/4	131

Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF.....205~210
A-PT1/8.....211~218, 310~328

3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables.

(Example of Part No. : UKP206JSC + H306X, UK206 + H306X)

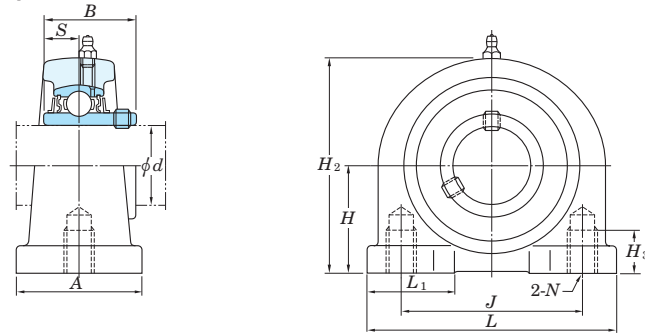
4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing.

(Example of Part No. : UKP206JSCL3 + H2306X, UK206L3 + H2306X)

5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Tapped-base pillow block type

UCPA
Cylindrical bore (with set screws)
d 12 ~ 50 mm



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 (ΔJ_s)

Housing No.	ΔH_s	ΔJ_s
PA204-PA210	±0.15	±0.5

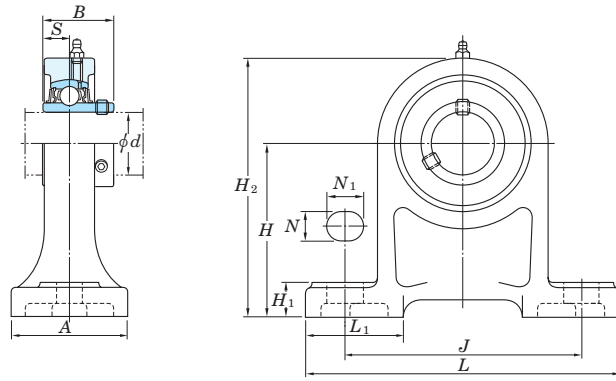
Unit : mm

Shaft Dia. mm inch d	Dimensions inch mm											Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	H	L	A	J	N	H ₂	H ₃	L ₁	B	S	C _r				C _{0r}			
12 1/2												UCPA201 UCPA201-8 UCPA202 UCPA202-10 UCPA203 UCPA204-12 UCPA204	PA204	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	12.8	6.65	13.2	0.64 0.62 0.61 0.59
15 5/8	1 3/16 30.2	3 76	1 9/16 40	2 3/64 52	M10×1.5	2 3/8 60	1/2 13	1 1/16 27	1.220 31	0.500 12.7		UCPA205-14 UCPA205-15 UCPA205 UCPA205-16	PA205	UC205-14 UC205-15 UC205 UC205-16	14.0	7.85	13.9	0.83
17 3/4												UCPA206-18 UCPA206 UCPA206-19 UCPA206-20	PA206	UC206-18 UC206 UC206-19 UC206-20	19.5	11.3	13.9	1.2
20												UCPA207-20 UCPA207-21 UCPA207-22 UCPA207 UCPA207-23	PA207	UC207-20 UC207-21 UC207-22 UC207 UC207-23	25.7	15.4	13.9	1.7
25 7/8 15/16	1 7/16 36.5	3 5/16 84	1 25/32 45	2 13/64 56	M10×1.5	2 25/32 71	1/2 13	1 3/16 30	1.343 34.1	0.563 14.3		UCPA208-24 UCPA208-25 UCPA208	PA208	UC208-24 UC208-25 UC208	29.1	17.8	14.0	2.0
30 1 1/8	1 11/16 42.9	3 11/16 94	1 31/32 50	2 19/32 66	M14×2	3 5/16 84	23/32 18	1 13/32 36	1.500 38.1	0.626 15.9		UCPA209-26 UCPA209-27 UCPA209-28 UCPA209	PA209	UC209-26 UC209-27 UC209-28 UC209	34.1	21.3	14.0	2.2
35 1 1/4 1 5/16 1 3/8	1 7/8 47.6	3 11/32 110	2 5/32 55	3 5/32 80	M14×2	3 21/32 93	25/32 20	1 5/8 41	1.689 42.9	0.689 17.5		UCPA210-30 UCPA210-31 UCPA210 UCPA210-32	PA210	UC210-30 UC210-31 UC210 UC210-32	35.1	23.3	14.4	2.8
40 1 1/2 1 9/16	1 15/16 49.2	4 9/16 116	2 9/32 58	3 5/16 84	M14×2	3 15/16 100	25/32 20	1 5/8 41	1.937 49.2	0.748 19								
45 1 5/8 1 11/16 1 3/4	2 9/64 54.2	4 23/32 120	2 3/8 60	3 35/64 90	M14×2	4 3/16 106	31/32 25	1 21/32 42	1.937 49.2	0.748 19								
50 1 7/8 1 15/16 2	2 1/4 57.2	5 1/8 130	2 17/32 64	3 45/64 94	M16×2	4 7/16 113	31/32 25	1 27/32 47	2.031 51.6	0.748 19								

Remarks 1. In Part No. of unit, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
2. Part No. of the applicable grease nipple is A-1/4-28UNF.
3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows Part No. of unit or bearing. (Example of Part No. : UCPA206JL3, UC206L3)

4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.
5. Tapered bore (with adapter) type products are also available. (Example of Part No. : UKPA205J + H305X, UK205 + H305X)

UCPH
Cylindrical bore (with set screws)
d 12 ~ 50 mm



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

Housing No.	ΔH_s
PH204-PH210	±0.15

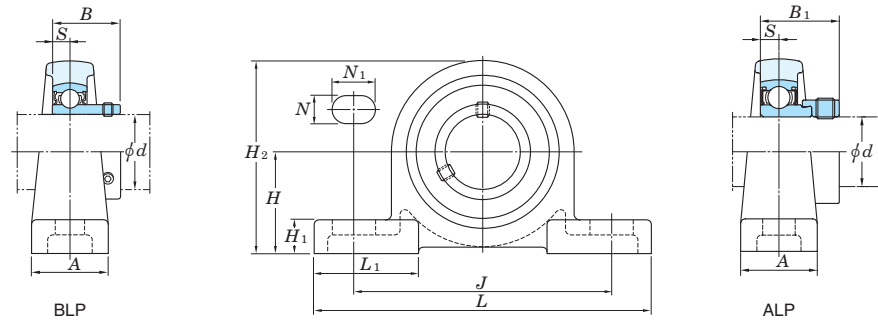
Shaft Dia. mm inch <i>d</i>	Dimensions inch mm											Bolt Size inch mm	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor <i>f</i> ₀	Mass kg	
	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>N</i> ₁	<i>H</i> ₁	<i>H</i> ₂	<i>L</i> ₁	<i>B</i>	<i>S</i>					<i>C</i> _r	<i>C</i> _{0r}			
12 1/2													3/8 M10	UCPH201 UCPH201-8 UCPH202 UCPH202-10 UCPH203 UCPH204-12 UCPH204	PH204	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	12.8	6.65	13.2	0.96 0.94 0.93 0.91
15 5/8	2 3/4 70	5 127	1 9/16 40	3 3/4 95	1/2 13	3/4 19	19/32 15	3 21/32 101	1 13/16 46	1.220 31	0.500 12.7		3/8 M10	UCPH205-14 UCPH205-15 UCPH205 UCPH205-16	PH205	UC205-14 UC205-15 UC205 UC205-16	14.0	7.85	13.9	1.2
17 3/4													1/2 M14	UCPH206-18 UCPH206 UCPH206-19 UCPH206-20	PH206	UC206-18 UC206 UC206-19 UC206-20	19.5	11.3	13.9	1.6
20													1/2 M14	UCPH207-20 UCPH207-21 UCPH207-22 UCPH207 UCPH207-23	PH207	UC207-20 UC207-21 UC207-22 UC207 UC207-23	25.7	15.4	13.9	2.0
25 7/8 15/16 1	3 5/32 80	5 1/2 140	1 31/32 50	4 1/8 105	1/2 13	3/4 19	5/8 16	3 1/2 114	1 15/16 49	1.343 34.1	0.563 14.3		1/2 M14	UCPH208-24 UCPH208-25 UCPH208	PH208	UC208-24 UC208-25 UC208	29.1	17.8	14.0	2.7
30 1 1/8 1 3/16 1 1/4	3 35/64 90	6 1/2 165	1 31/32 50	4 3/4 121	21/32 17	13/16 21	23/32 18	5 1/8 130	1 7/32 56	1.500 38.1	0.626 15.9		1/2 M14	UCPH209-26 UCPH209-27 UCPH209-28 UCPH209	PH209	UC209-26 UC209-27 UC209-28 UC209	34.1	21.3	14.0	3.0
35 1 1/4 1 5/16 1 3/8 1 7/16	3 47/64 95	6 9/16 167	2 3/8 60	5 127	21/32 17	13/16 21	23/32 18	5 1/2 140	1 1/8 54	1.689 42.9	0.689 17.5		5/8 M16	UCPH210-30 UCPH210-31 UCPH210	PH210	UC210-30 UC210-31 UC210	35.1	23.3	14.4	3.5
40 1 1/2 1 9/16	3 15/16 100	7 1/4 184	2 3/4 70	5 13/32 137	21/32 17	13/16 21	25/32 20	5 29/32 150	2 1/4 57	1.937 49.2	0.748 19		5/8 M16							
45 1 5/8 1 11/16 1 3/4	4 9/64 105	7 15/32 190	2 3/4 70	5 3/4 146	21/32 17	13/16 21	25/32 20	6 7/32 158	2 9/32 58	1.937 49.2	0.748 19									
50 1 7/8 1 15/16 2	4 21/64 110	8 1/8 206	2 3/4 70	6 1/4 159	25/32 20	7/8 22	7/8 22	6 1/2 165	2 9/16 65	2.031 51.6	0.748 19									

Remarks 1. In Part No. of unit, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of the applicable grease nipple is A-1/4-28UNF.
 3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows Part No. of unit or bearing. (Example of Part No. : UCPH206JL3, UC206L3)

4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.
 5. Tapered bore (with adapter) type products are also available. (Example of Part No. : UKPH205J + H305X, UK205 + H305X)

Light duty pillow block type

BLP
Cylindrical bore
(with set screws)
ALP
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 40 mm



Variations of tolerance of distance from mounting bottom to center of spherical bore (ΔH_s)

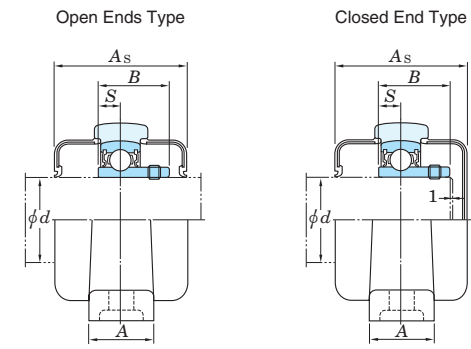
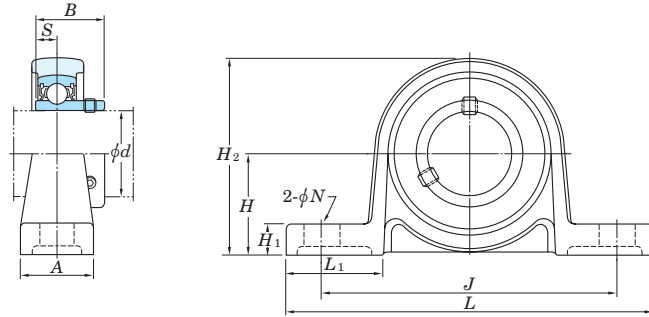
Housing No.	Unit : mm
LP203-LP208	±0.15

Shaft Dia. mm inch	Dimensions inch mm												Bolt Size inch mm	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN		Factor f_0	Mass kg		
	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>N</i> ₁	<i>H</i> ₁	<i>H</i> ₂	<i>L</i> ₁	<i>S</i>	BLP <i>B</i>	ALP <i>B</i> ₁							<i>C</i> _r	<i>C</i> _{0r}		BLP	ALP	
12 1/2	1 3/16	4 1/2	3 1/32	3 7/16	7/16	5/8	15/32	2 1/4	1 3/8	0.236	0.866	1.122	3/8	M10	BLP201 BLP201-8 BLP202 BLP202-10 BLP203	SB201 SB201-8 SB202 SB202-10 SB203	ALP201 ALP201-8 ALP202 ALP202-10 ALP203	SA201 SA201-8 SA202 SA202-10 SA203	LP203	9.55	4.80	13.2	0.36	0.39
15 5/8	1 5/16	4 29/32	1 1/16	3 13/16	7/16	5/8	1/2	2 25/32	1 1/2	0.276	0.984	1.161	3/8	M10	BLP204-12 BLP204	SB204-12 SB204	ALP204-12 ALP204	SA204-12 SA204	LP204	12.8	6.65	13.2	0.51	0.51
17 3/4	1 7/16	5 1/8	1 5/32	3 15/16	7/16	5/8	1/2	2 25/32	1 17/32	0.295	1.063	1.201	3/8	M10	BLP205-14 BLP205-15 BLP205 BLP205-16	SB205-14 SB205-15 SB205 SB205-16	ALP205-14 ALP205-15 ALP205 ALP205-16	SA205-14 SA205-15 SA205 SA205-16	LP205	14.0	7.85	13.9	0.57	0.61
20 3/4	1 11/16	6 5/32	1 5/16	4 23/32	9/16	13/16	9/16	3 9/32	1 27/32	0.315	1.181	1.335	1/2	M12	BLP206-18 BLP206 BLP206-19 BLP206-20 BLP207-20	SB206-18 SB206 SB206-19 SB206-20 SB207-20	ALP206-18 ALP206 ALP206-19 ALP206-20	SA206-18 SA206 SA206-19 SA206-20	LP206	19.5	11.3	13.9	0.69	0.72
25 1 1/8	1 7/8	6 1/2	1 3/8	5	9/16	13/16	5/8	3 21/32	1 31/32	0.335	1.260	1.437	1/2	M12	BLP207-22 BLP207 BLP207-23 BLP208-24	SB207-22 SB207 SB207-23 SB208-24	ALP207-22 ALP207 ALP207-23	SA207-22 SA207 SA207-23	LP207	25.7	15.4	13.9	0.94	1.0
30 1 3/8	1 5/16	7 1/4	1 15/32	5 1/2	9/16	7/8	23/32	4 1/32	2 5/32	0.354	1.339	1.595	1/2	M12	BLP208-24 BLP208	SA208-24 SA208	ALP208-24 ALP208	SA208-24 SA208	LP208	29.1	17.8	14.0	1.8	1.9

- Remarks 1. In Part No. of unit, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Allowable load to housing in radial direction is approximately half of basic load rating of bearing, C_r (when safety factor is 4).
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

“Compact” series pillow block type

UP
Cylindrical bore (with set screws)
d 10 ~ 30 mm



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 (ΔJ_s)

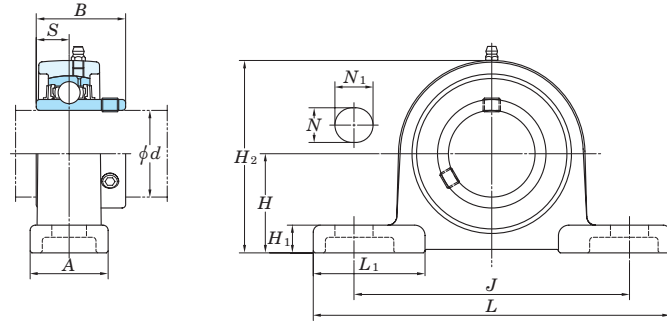
Housing No.	ΔH_s	ΔJ_s
P000-P006	±0.15	±0.3

Unit : mm

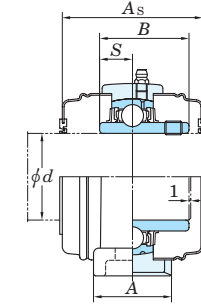
Shaft Dia. mm d	Dimensions inch mm										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f ₀	With Rubber Coated Covers			
	H	L	A	J	N	H ₁	H ₂	L ₁	B	S		Unit No.	Housing No.	Bearing No.		C _r	C _{0r}		Unit No.		Dimension mm inch	Mass kg
																			Open Ends Type	Closed End Type		
10	⁴⁵ / ₆₄ 18	2 ⁵ / ₈ 67	⁵ / ₈ 16	2 ³ / ₃₂ 53	⁹ / ₃₂ 7	¹ / ₄ 6	1 ³ / ₈ 35	²³ / ₃₂ 18	0.591 15	0.197 5	¹ / ₄ M6	UP000	P000	SU000	4.55	1.95	12.3	UP000C	UP000CD	29 1 ⁵ / ₃₂	0.070	
12	³ / ₄ 19	2 ²⁵ / ₃₂ 71	⁵ / ₈ 16	2 ¹³ / ₆₄ 56	⁹ / ₃₂ 7	¹ / ₄ 6	1 ¹ / ₂ 38	³ / ₄ 19	0.591 15	0.197 5	¹ / ₄ M6	UP001	P001	SU001	5.10	2.40	13.2	UP001C	UP001CD	29 1 ⁵ / ₃₂	0.090	
15	⁵⁵ / ₆₄ 22	3 ⁵ / ₃₂ 80	⁵ / ₈ 16	2 ³¹ / ₆₄ 63	⁹ / ₃₂ 7	⁹ / ₃₂ 7	1 ¹¹ / ₁₆ 43	¹³ / ₁₆ 21	0.650 16.5	0.217 5.5	¹ / ₄ M6	UP002	P002	SU002	5.60	2.85	13.9	UP002C	UP002CD	31 1 ⁷ / ₃₂	0.11	
17	¹⁵ / ₁₆ 24	3 ¹¹ / ₃₂ 85	²³ / ₃₂ 18	2 ⁴¹ / ₆₄ 67	⁹ / ₃₂ 7	⁹ / ₃₂ 7	1 ²⁷ / ₃₂ 47	¹³ / ₁₆ 21	0.689 17.5	0.236 6	¹ / ₄ M6	UP003	P003	SU003	6.00	3.25	14.4	UP003C	UP003CD	33 1 ⁵ / ₁₆	0.15	
20	1 ⁷ / ₆₄ 28	3 ¹⁵ / ₁₆ 100	²⁵ / ₃₂ 20	3 ⁵ / ₃₂ 80	¹³ / ₃₂ 10	¹¹ / ₃₂ 9	2 ⁵ / ₃₂ 55	³¹ / ₃₂ 25	0.827 21	0.276 7	⁵ / ₁₆ M8	UP004	P004	SU004	9.40	5.05	13.9	UP004C	UP004CD	38 1 ¹ / ₂	0.23	
25	1 ¹⁷ / ₆₄ 32	4 ¹³ / ₃₂ 112	²⁵ / ₃₂ 20	3 ³⁵ / ₆₄ 90	¹³ / ₃₂ 10	¹³ / ₃₂ 10	2 ⁷ / ₁₆ 62	1 ³ / ₃₂ 28	0.866 22	0.276 7	⁵ / ₁₆ M8	UP005	P005	SU005	10.1	5.85	14.5	UP005C	UP005CD	40 1 ⁹ / ₁₆	0.28	
30	1 ²⁷ / ₆₄ 36	5 ³ / ₁₆ 132	1 ¹ / ₃₂ 26	4 ¹¹ / ₆₄ 106	¹ / ₂ 13	⁷ / ₁₆ 11	2 ³ / ₄ 70	1 ¹¹ / ₃₂ 34	0.965 24.5	0.295 7.5	³ / ₈ M10	UP006	P006	SU006	13.2	8.25	14.7	UP006C	UP006CD	44 1 ²³ / ₃₂	0.42	

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Housing is made from special light alloy.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCSP-H1S6
Cylindrical bore (with set screws)
 d 20 ~ 50 mm



With Pressed Stainless Steel Covers



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 (ΔJ_s)

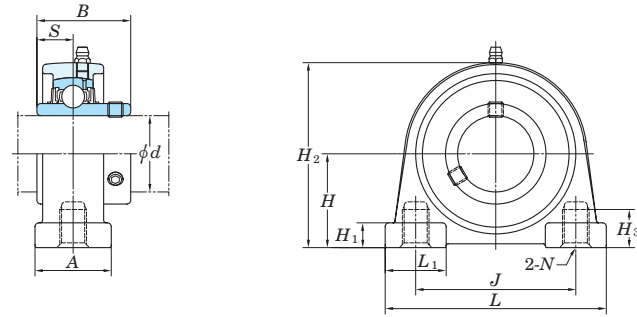
Housing No.	ΔH_s	ΔJ_s
SP204H1-SP210H1	±0.15	±0.3

Unit : mm

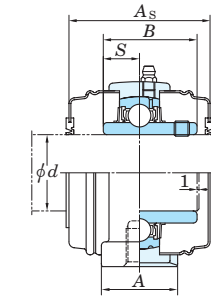
Shaft Dia. mm d	Dimensions											Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f ₀	With Pressed Stainless Steel Covers		Mass kg		
	H	L	A	J	N	N ₁	H ₁	H ₂	L ₁	B	S		Unit No.	Housing No.	Bearing No.		C _r	C _{0r}		Open Ends Type	Closed End Type		Dimension mm inch A _s	
20	1 5/16	5	1 3/16	3 3/4	1/2	23/32	7/16	2 15/32	1 21/32	1.220	0.500	3/8	UCSP204H1S6	SP204H1	UC204S6		10.9	5.35	13.2	UCSP204H1CS6	UCSP204H1CDS6	45	1 25/32	0.54
	33.3	127	30	95	13	18	11	63	42	31	12.7	M10												
25	1 7/16	5 1/2	1 3/16	4 1/8	1/2	3/4	15/32	2 23/32	1 13/16	1.343	0.563	3/8	UCSP205H1S6	SP205H1	UC205S6		11.9	6.3	13.9	UCSP205H1CS6	UCSP205H1CDS6	49	1 15/16	0.70
	36.5	140	30	105	13	19	12	69	46	34.1	14.3	M10												
30	1 11/16	6 1/2	1 13/32	4 3/4	21/32	13/16	1/2	3 3/16	2 1/8	1.500	0.626	1/2	UCSP206H1S6	SP206H1	UC206S6		16.5	9.05	13.9	UCSP206H1CS6	UCSP206H1CDS6	53	2 3/32	1.0
	42.9	165	36	121	17	21	13	81	54	38.1	15.9	M14												
35	1 7/8	6 9/16	1 1/2	5	21/32	13/16	9/16	3 19/32	2	1.689	0.689	1/2	UCSP207H1S6	SP207H1	UC207S6		21.8	12.3	13.9	UCSP207H1CS6	UCSP207H1CDS6	60	2 3/8	1.4
	47.6	167	38	127	17	21	14	91	51	42.9	17.5	M14												
40	1 15/16	7 1/4	1 9/16	5 13/32	21/32	13/16	9/16	3 13/16	2 3/8	1.937	0.748	1/2	UCSP208H1S6	SP208H1	UC208S6		24.8	14.3	14.0	UCSP208H1CS6	UCSP208H1CDS6	69	2 23/32	1.7
	49.2	184	40	137	17	21	14	97	60	49.2	19	M14												
45	2 1/8	7 15/32	1 9/16	5 3/4	21/32	13/16	19/32	4 3/32	2 13/32	1.937	0.748	1/2	UCSP209H1S6	SP209H1	UC209S6		27.8	16.2	14.0	UCSP209H1CS6	UCSP209H1CDS6	69	2 23/32	1.8
	54	190	40	146	17	21	15	104	61	49.2	19	M14												
50	2 1/4	8 1/8	1 25/32	6 1/4	25/32	7/8	5/8	4 3/8	2 9/16	2.031	0.748	5/8	UCSP210H1S6	SP210H1	UC210S6		29.8	18.6	14.4	UCSP210H1CS6	UCSP210H1CDS6	74	2 29/32	2.3
	57.2	206	45	159	20	22	16	111	65	51.6	19	M16												

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of the applicable grease nipple is A-1/4-28UNFN12.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCSPA-H1S6
Cylindrical bore (with set screws)
d 20 ~ 40 mm



With Pressed Stainless Steel Covers



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 (ΔJ_s)

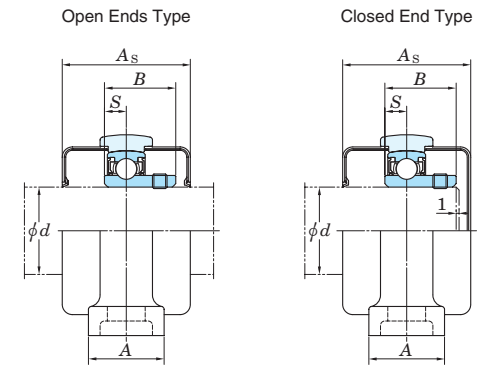
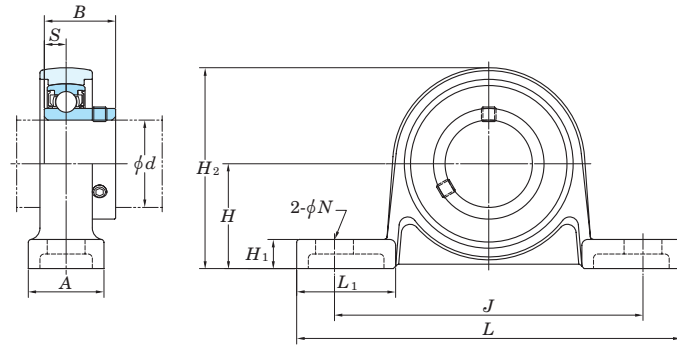
Housing No.	ΔH_s	ΔJ_s
SPA204H1-SPA208H1	±0.15	±0.5

Unit : mm

Shaft Dia. mm <i>d</i>	Dimensions											Standard			Mass kg	Basic Load Ratings kN		Factor <i>f</i> ₀	With Pressed Stainless Steel Covers		Mass kg	
	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>H</i> ₁	<i>H</i> ₂	<i>H</i> ₃	<i>L</i> ₁	<i>B</i>	<i>S</i>	Unit No.	Housing No.	Bearing No.		<i>C</i> _r	<i>C</i> _{0r}		Unit No.	Dimension mm <i>A</i> _s		
20	1 3/16	3	1 3/16	2 3/64	M10×1.5	13/32	2 3/8	1/2	7/8	1.220	0.500	UCSPA204H1S6	SPA204H1	UC204S6	10.9	5.35	13.2	UCSPA204H1CS6	UCSPA204H1CDS6	45	1 25/32	0.46
	30.2	76	30	52		10	60	13	22	31	12.7											
25	1 7/16	3 5/16	1 3/16	2 13/64	M10×1.5	15/32	2 23/32	1/2	15/16	1.343	0.563	UCSPA205H1S6	SPA205H1	UC205S6	11.9	6.3	13.9	UCSPA205H1CS6	UCSPA205H1CDS6	49	1 15/16	0.63
	36.5	84	30	56		12	69	13	24	34.1	14.3											
30	1 11/16	3 11/16	1 13/32	2 19/32	M14×2	15/32	3 3/16	23/32	1 3/32	1.500	0.626	UCSPA206H1S6	SPA206H1	UC206S6	16.5	9.05	13.9	UCSPA206H1CS6	UCSPA206H1CDS6	53	2 3/32	0.91
	42.9	94	36	66		12	81	18	28	38.1	15.9											
35	1 7/8	3 11/32	1 1/2	3 5/32	M14×2	1/2	3 19/32	25/32	1 3/16	1.689	0.689	UCSPA207H1S6	SPA207H1	UC207S6	21.8	12.3	13.9	UCSPA207H1CS6	UCSPA207H1CDS6	60	2 3/8	1.3
	47.6	110	38	80		13	91	20	30	42.9	17.5											
40	1 15/16	4 9/16	1 9/16	3 5/16	M14×2	1/2	3 13/16	25/32	1 1/4	1.937	0.748	UCSPA208H1S6	SPA208H1	UC208S6	24.8	14.3	14.0	UCSPA208H1CS6	UCSPA208H1CDS6	69	2 23/32	1.5
	49.2	116	40	84		13	97	20	32	49.2	19											

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of the applicable grease nipple is A-1/4-28UNFN12.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

USP-S6
Cylindrical bore (with set screws)
 d 10 ~ 30 mm



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 (ΔJ_s)

Housing No.	ΔH_s	ΔJ_s
SP000-SP006	± 0.15	± 0.3

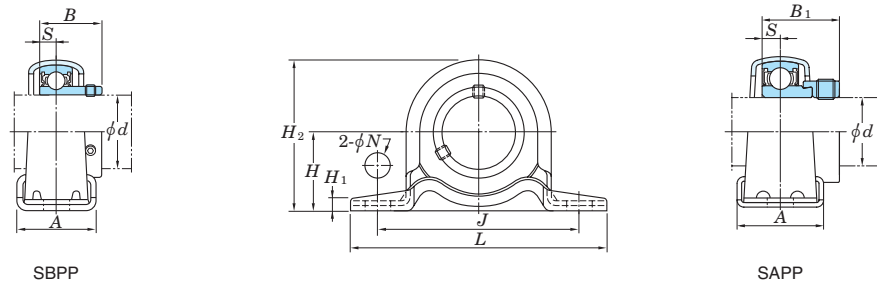
Unit : mm

Shaft Dia. mm d	Dimensions inch mm										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Rubber Coated Covers		
	H	L	A	J	N	H_1	H_2	L_1	B	S		Unit No.	Housing No.	Bearing No.		C_r	C_{0r}		Unit No.	Dimension mm inch	Mass kg
10	$45/64$	$2\ 5/8$	$5/8$	$2\ 3/32$	$9/32$	$3/16$	$1\ 3/8$	$23/32$	0.591	0.197	$1/4$	USP000S6	SP000	SU000S6		1.55	USP000CS6	USP000CDS6	29	$1\ 5/32$	0.076
	18	67	16	53	7	5	35	18	15	5	M6										
12	$3/4$	$2\ 25/32$	$5/8$	$2\ 7/32$	$9/32$	$3/16$	$1\ 15/32$	$23/32$	0.591	0.197	$1/4$	USP001S6	SP001	SU001S6		1.9	USP001CS6	USP001CDS6	29	$1\ 5/32$	0.08
	19	71	16	56	7	5	37	18.5	15	5	M6										
15	$55/64$	$3\ 5/32$	$5/8$	$2\ 15/32$	$9/32$	$1/4$	$1\ 11/16$	$13/16$	0.650	0.217	$1/4$	USP002S6	SP002	SU002S6		2.25	USP002CS6	USP002CDS6	31	$1\ 7/32$	0.11
	22	80	16	63	7	6	42.5	20.5	16.5	5.5	M6										
17	$15/16$	$3\ 11/32$	$23/32$	$2\ 5/8$	$9/32$	$1/4$	$1\ 13/16$	$13/16$	0.689	0.236	$1/4$	USP003S6	SP003	SU003S6		2.6	USP003CS6	USP003CDS6	33	$1\ 5/16$	0.14
	24	85	18	67	7	6	46	21	17.5	6	M6										
20	$1\ 7/64$	$3\ 15/16$	$25/32$	$3\ 5/32$	$13/32$	$5/16$	$2\ 5/32$	$31/32$	0.827	0.276	$5/16$	USP004S6	SP004	SU004S6		4	USP004CS6	USP004CDS6	38	$1\ 1/2$	0.23
	28	100	20	80	10	8	54.5	25	21	7	M8										
25	$1\ 17/64$	$4\ 13/32$	$25/32$	$3\ 17/32$	$13/32$	$11/32$	$2\ 13/32$	$1\ 3/32$	0.866	0.276	$5/16$	USP005S6	SP005	SU005S6		4.65	USP005CS6	USP005CDS6	40	$1\ 9/16$	0.28
	32	112	20	90	10	9	61	27.5	22	7	M8										
30	$1\ 27/64$	$5\ 3/16$	$1\ 1/32$	$4\ 3/16$	$1/2$	$13/32$	$2\ 23/32$	$1\ 11/32$	0.965	0.295	$3/8$	USP006S6	SP006	SU006S6		6.6	USP006CS6	USP006CDS6	44	$1\ 23/32$	0.43
	36	132	26	106	13	10	69	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.51.)
2. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Pressed steel pillow block type

SBPP
Cylindrical bore
(with set screws)
SAPP
Cylindrical bore
(with eccentric locking collar)
 d 12 ~ 30 mm



Variations of tolerance of distance between centers of bolt holes (ΔJ_s) and variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔJ_s	ΔN_s
PP203-PP206	±0.4	±0.5

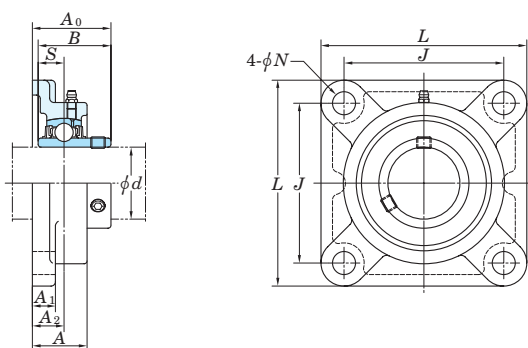
Unit : mm

Shaft Dia mm inch	Dimensions inch mm										Bolt Size inch mm	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN		Factor f_0	Mass kg		
	H	L	A	J	N	H_1	H_2	S	SBPP B	SAPP B_1							C_r	C_{0r}		SBPP	SAPP	
12 1/2	7/8	3 3/8	31/32	2 43/64	3/8	1/8	1 23/32	0.236	0.866	1.122	5/16	M8	SBPP201 SBPP201-8	SB201 SB201-8	SAPP201 SAPP201-8	SA201 SA201-8	PP203	9.55	4.80	13.2	0.16	0.19
15 5/8	1	3 27/32	1 1/4	2 63/64	3/8	1/8	2	0.276	0.984	1.161	5/16	M8	SBPP202 SBPP202-10	SB202 SB202-10	SAPP202 SAPP202-10	SA202 SA202-10	PP203	9.55	4.80	13.2	0.16	0.19
17	3/4	1	3 27/32	1 1/4	2 63/64	3/8	1/8	2	0.276	0.984	5/16	M8	SBPP203 SBPP203	SB203 SB203	SAPP203 SAPP203	SA203 SA203	PP204	12.8	6.65	13.2	0.23	0.23
20	3/4	1	3 27/32	1 1/4	2 63/64	3/8	1/8	2	0.276	0.984	5/16	M8	SBPP204 SBPP204	SB204-12 SB204	SAPP204-12 SAPP204	SA204-12 SA204	PP204	12.8	6.65	13.2	0.23	0.23
25	7/8	1 1/8	4 1/4	1 1/4	3 25/64	29/64	5/32	27/32	0.295	1.063	3/8	M10	SBPP205-14 SBPP205-15	SB205-14 SB205-15	SAPP205-14 SAPP205-15	SA205-14 SA205-15	PP205	14.0	7.85	13.9	0.28	0.32
25	15/16	1 1/8	4 1/4	1 1/4	3 25/64	29/64	5/32	27/32	0.295	1.063	3/8	M10	SBPP205 SBPP205-16	SB205 SB205-16	SAPP205 SAPP205-16	SA205 SA205-16	PP205	14.0	7.85	13.9	0.28	0.32
30	1 1/8	15/16	4 19/32	1 1/2	3 3/4	29/64	5/32	2 5/8	0.315	1.181	3/8	M10	SBPP206-18 SBPP206	SB206-18 SB206	SAPP206-18 SAPP206	SA206-18 SA206	PP206	19.5	11.3	13.9	0.47	0.50
30	13/16	1 1/8	4 19/32	1 1/2	3 3/4	29/64	5/32	2 5/8	0.315	1.181	3/8	M10	SBPP206-19 SBPP206-20	SB206-19 SB206-20	SAPP206-19 SAPP206-20	SA206-19 SA206-20	PP206	19.5	11.3	13.9	0.47	0.50

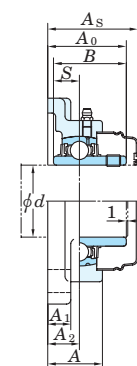
Remark For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Square-flanged type

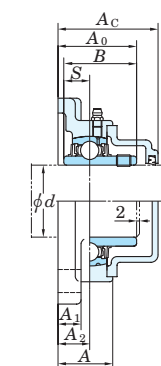
UCF Cylindrical bore (with set screws) d (45) ~ (75) mm



With Pressed Steel Cover



With Cast Iron Cover



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.			ΔA_{2s}	X
F204-F210	FX05-FX10	F305-F310	± 0.5	0.7
F211-F218	FX11-FX20	F311-F328	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.			ΔN_s
F204-F218	FX05-FX18	F305-F315	± 0.2
	FX20	F316-F328	± 0.3

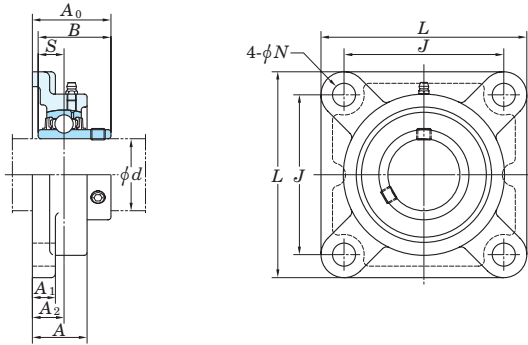
Shaft Dia. mm inch d	Dimensions inch mm										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Pressed Steel Cover				With Cast Iron Cover			
	L	A	J	N	A ₁	A ₂	A ₀	B	S	Unit No.		Housing No.	Bearing No.	Unit No.		Dimension mm inch	Mass kg		Unit No.	Dimension mm inch	Mass kg					
45 1 3/4	6 5/16 160	1 23/32 44	4 59/64 125	3/4 19	23/32 18	63/64 25	2 3/8 60	2.244 57	0.866 22	5/8 M16	UCF309-28 UCF309	F309	UC309-28 UC309	4.0 4.0	48.9 29.5	13.3	-	-	-	-	UCF309C	UCF309D	76 3	4.6		
50 1 7/8 1 15/16 2 1 15/16 2	5 5/8 143	1 9/16 40	4 3/8 111	5/8 16	5/8 16	55/64 22	2 5/32 54.6	2.031 51.6	0.748 19	1/2 M14	UCF210-30 UCF210-31 UCF210 UCF210-32	F210	UC210-30 UC210-31 UC210 UC210-32	2.5 2.5 2.5 2.5	35.1 23.3	14.4	-	-	-	-	-	UCF210C	UCF210D	59 2 5/16	2.5 3.0	
50 1 15/16 2	6 3/8 162	1 23/32 44	5 1/8 130	3/4 19	25/32 20	1 1/32 26	2 11/32 59.4	2.189 55.6	0.874 22.2	5/8 M16	UCFX10-31 UCFX10 UCFX10-32	FX10	UCX10-31 UCX10 UCX10-32	3.7 3.7 3.7	43.4 29.4	14.4	-	-	-	-	-	UCFX10C	UCFX10D	64 2 17/32	3.7	
-	6 7/8 175	1 7/8 48	5 13/64 132	29/32 23	3/4 19	1 7/64 28	2 5/8 67	2.402 61	0.866 22	3/4 M20	UCF310	F310	UC310	5.1	62.0 38.3	13.2	-	-	-	-	-	UCF310C	UCF310D	83 3 9/32	5.9	
55 2 2 1/8 2 3/16 2 3/16 2 1/4 2	6 3/8 162	1 11/16 43	5 1/8 130	3/4 19	23/32 18	63/64 25	2 5/16 58.4	2.189 55.6	0.874 22.2	5/8 M16	UCF211-32 UCF211-34 UCF211 UCF211-35	F211	UC211-32 UC211-34 UC211 UC211-35	3.4 3.4 3.4 3.4	43.4 29.4	14.4	-	-	-	-	-	UCF211C	UCF211D	63 2 15/32	3.4 4.0	
55 2 3/16 2 1/4 2	6 7/8 175	1 15/16 49	5 5/8 143	3/4 19	25/32 20	1 9/64 29	2 23/32 68.7	2.563 65.1	1.000 25.4	5/8 M16	UCFX11 UCFX11-35 UXPX11-36	FX11	UCX11 UCX11-35 UCX11-36	4.9 4.9 4.9	52.4 36.2	14.4	-	-	-	-	-	-	-	-	-	
60 2 1/4 2 3/8 2 7/16 2 7/16	7 9/32 185	2 1/16 52	5 33/64 140	29/32 23	25/32 20	1 3/16 30	2 25/32 71	2.598 66	0.984 25	3/4 M20	UCF311-32 UCF311	F311	UC311-32 UC311	5.6 5.6	71.6 45.0	13.2	-	-	-	-	-	UCF311C	UCF311D	87 3 7/16	6.5	
60 2 1/4 2 3/8 2 7/16	6 7/8 175	1 7/8 48	5 5/8 143	3/4 19	23/32 18	1 9/64 29	2 23/32 68.7	2.563 65.1	1.000 25.4	5/8 M16	UCF212-36 UCF212 UCF212-38 UCF212-39	F212	UC212-36 UC212 UC212-38 UC212-39	4.2 4.2 4.2 4.2	52.4 36.2	14.4	-	-	-	-	-	UCF212C	UCF212D	73 2 7/8	4.2 5.0	
60 2 7/16	7 3/8 187	2 5/16 59	5 55/64 149	3/4 19	13/16 21	1 11/32 34	2 29/32 73.7	2.563 65.1	1.000 25.4	5/8 M16	UCFX12 UCFX12-39	FX12	UCX12 UCX12-39	5.7 5.7	57.2 40.1	14.4	-	-	-	-	-	UCFX12C	UCFX12D	78 3 1/16	5.7	
65 2 1/2 2 1/2 2 1/2	7 11/16 195	2 7/32 56	5 29/32 150	29/32 23	25/32 22	1 19/64 33	2 795 78	2.795 71	1.024 26	3/4 M20	UCF312	F312	UC312	6.9	81.9 52.2	13.2	-	-	-	-	-	UCF312C	UCF312D	95 3 3/4	8.1	
65 2 1/2 2 1/2 2 1/2	7 3/8 187	1 31/32 50	5 55/64 149	3/4 19	7/8 22	1 3/16 30	2 3/4 69.7	2.563 65.1	1.000 25.4	5/8 M16	UCF213-40 UCF213	F213	UC213-40 UC213	5.2 5.2	57.2 40.1	14.4	-	-	-	-	-	UCF213C	UCF213D	74 2 29/32	5.2 6.0	
65 2 1/2	7 3/8 187	2 5/16 59	5 55/64 149	3/4 19	13/16 21	1 11/32 34	3 3/32 78.4	2.937 74.6	1.189 30.2	5/8 M16	UCFX13-40 UCFX13	FX13	UCX13-40 UCX13	6.3 6.3	62.2 44.1	14.5	-	-	-	-	-	UCFX13C	UCFX13D	83 3 9/32	6.3	
70 2 3/4 2 3/4 2 3/4	8 3/16 208	2 9/32 58	6 17/32 166	29/32 23	7/8 22	1 19/64 33	3 1/16 78	2.953 75	1.181 30	3/4 M20	UCF313-40 UCF313	F313	UC313-40 UC313	7.8 7.8	92.7 59.9	13.2	-	-	-	-	-	UCF313C	UCF313D	94 3 11/16	8.9	
70 2 3/4	7 19/32 193	2 1/8 54	5 63/64 152	3/4 19	7/8 22	1 7/32 31	2 31/32 75.4	2.937 74.6	1.189 30.2	5/8 M16	UCF214-44 UCF214	F214	UC214-44 UC214	5.9 5.9	62.2 44.1	14.5	-	-	-	-	-	UCF214C	UCF214D	80 3 5/32	5.9 6.8	
70 2 3/4	7 3/4 197	2 3/8 60	5 63/64 152	29/32 23	7/8 22	1 29/64 37	3 7/32 81.5	3.063 77.8	1.331 33.3	3/4 M20	UCFX14-44 UCFX14	FX14	UCX14-44 UCX14	7.0 7.0	67.4 48.3	14.5	-	-	-	-	-	UCFX14C	UCFX14D	86 3 3/8	7.0	
75 2 15/16 3 2 15/16 3	8 29/32 226	2 13/32 61	7 1/64 178	63/64 25	31/32 25	1 27/64 36	3 3/16 81	3.071 78	1.299 33	7/8 M22	UCF314-44 UCF314	F314	UC314-44 UC314	10.1 10.1	104 68.2	13.2	-	-	-	-	-	UCF314C	UCF314D	98 3 27/32	11.2	
75 2 15/16	7 7/8 200	2 7/32 56	6 17/64 159	3/4 19	7/8 22	1 11/32 34	3 3/32 78.5	3.063 77.8	1.311 33.3	5/8 M16	UCF215-47 UCF215 UCF215-48	F215	UC215-47 UC215 UC215-48	6.4 6.4 6.4	67.4 48.3	14.5	-	-	-	-	-	UCF215C	UCF215D	83 3 9/32	6.4 7.4	
75 2 15/16	7 3/4 197	2 11/16 68	5 63/64 152	29/32 23	15/16 24	1 9/16 40	3 17/32 89.3	3.252 82.6	1.311 33.3	3/4 M20	UCFX15-47 UCFX15 UCFX15-48	FX15	UCX15-47 UCX15 UCX15-48	8.4 8.4 8.4	72.7 53.0	14.6	-	-	-	-	-	UCFX15C	UCFX15D	94 3 11/16	8.4	

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF 201-210, X05-X09, 305-308
A-PT1/8 211-218, X10-X20, 309-328

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCF206JL3, UC206L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Square-flanged type

UCF-E
Cylindrical bore (with set screws)
d 12 ~ 55 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.		ΔA_{2s}	X
F204E-F210E	FX05E-FX10E	± 0.5	0.7
F211E-F217E	FX11E-FX17E	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.		ΔN_s
F204E-F217E	FX05E-FX17E	± 0.2

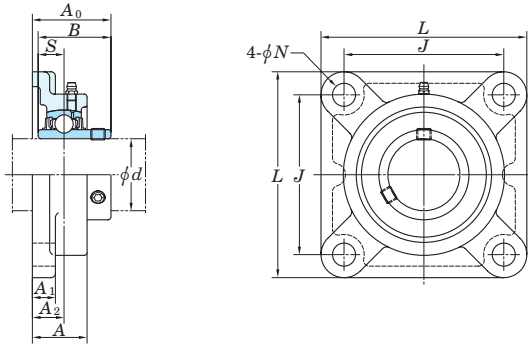
Shaft Dia. mm inch d	Dimensions inch mm										Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	L	A	J	N	A ₁	A ₂	A ₀	B	S	C _r					C _{0r}			
12 1/2												UCF201E UCF201-8E UCF202E	F204E	UC201 UC201-8 UC202	12.8	6.65	13.2	0.64 0.62
15 5/8	3 3/8	1	2 33/64	7/16	7/16	19/32	1 5/16	1.220	0.500		3/8	UCF202-10E UCF203E UCF204-12E UCF204E	F204E	UC202-10 UC203 UC204-12 UC204				0.61 0.59
17 3/4	86	25.5	64	11	11	15	33.3	31	12.7									
20												UCF205-14E UCF205-15E UCF205E UCF205-16E	F205E	UC205-14 UC205-15 UC205 UC205-16	14.0	7.85	13.9	0.83
25 7/8 15/16	3 3/4	1 1/16	2 3/4	29/64	1/2	5/8	1 13/32	1.343	0.563		3/8	UCFX05E UCFX05-16E	FX05E	UCX05 UCX05-16	19.5	11.3	13.9	1.2
25 1	95	27	70	11.5	13	16	35.8	34.1	14.3									
30 1 1/8	4 1/4	1 3/16	3 17/64	29/64	1/2	45/64	1 19/32	1.500	0.626		3/8	UCF206-18E UCF206E UCF206-19E UCF206-20E	F206E	UC206-18 UC206 UC206-19 UC206-20	19.5	11.3	13.9	1.1
30 1 3/16	108	30	83	11.5	13	18	40.2	38.1	15.9									
30 1 1/4	4 19/32	1 11/32	3 5/8	33/64	9/16	3/4	1 3/4	1.689	0.689		7/16	UCFX06E UCFX06-19E UCFX06-20E	FX06E	UCX06 UCX06-19 UCX06-20	25.7	15.4	13.9	1.6
35 1 1/4	117	34	92	13	14	19	44.4	42.9	17.5									
35 1 5/16	4 19/32	1 11/32	3 5/8	33/64	19/32	3/4	1 3/4	1.689	0.689		7/16	UCF207-20E UCF207-21E UCF207-22E UCF207E UCF207-23E	F207E	UC207-20 UC207-21 UC207-22 UC207 UC207-23	25.7	15.4	13.9	1.5
35 1 3/8	117	34	92	13	15	19	44.4	42.9	17.5									
40 1 7/16	5 1/8	1 1/2	4 1/64	33/64	9/16	53/64	2 1/32	1.937	0.748		7/16	UCFX07-22E UCFX07E UCFX07-23E	FX07E	UCX07-22 UCX07 UCX07-23	29.1	17.8	14.0	2.0
40 1 9/16	130	38	102	13	14	21	51.2	49.2	19									
40 1 1/2	5 13/32	1 9/16	4 9/64	19/32	9/16	55/64	2 1/16	1.937	0.748		1/2	UCF208-24E UCF208-25E UCF208E	F208E	UC208-24 UC208-25 UC208	29.1	17.8	14.0	1.9
45 1 3/4	137	40	105	15	14	22	52.2	49.2	19									
45 1 3/4	5 5/8	1 9/16	4 3/8	19/32	9/16	29/32	2 3/16	2.031	0.748		1/2	UCFX09-28E UCFX09E	FX09E	UCX09-28 UCX09	35.1	23.3	14.4	2.7
50 1 15/16	143	40	111	15	14	23	55.6	51.6	19									
50 2	6 3/8	1 23/32	5 1/8	21/32	25/32	1 1/32	2 11/32	2.189	0.874		9/16	UCFX10-31E UCFX10E UCFX10-32E	FX10E	UCX10-31 UCX10 UCX10-32	43.4	29.4	14.4	3.7
55 2	162	44	130	16.5	20	26	59.4	55.6	22.2									
55 2 1/8	6 3/8	1 11/16	5 1/8	43/64	23/32	63/64	2 5/16	2.189	0.874		5/8	UCF211-32E UCF211-34E UCF211E UCF211-35E	F211E	UC211-32 UC211-34 UC211 UC211-35	43.4	29.4	14.4	3.4
55 2 3/16	162	43	130	17	18	25	58.4	55.6	22.2									
55 2 3/16	6 7/8	1 15/16	5 5/8	21/32	25/32	1 9/64	2 23/32	2.563	1.000		9/16	UCFX11E UCFX11-35E UCFX11-36E	FX11E	UCX11 UCX11-35 UCX11-36	52.4	36.2	14.4	4.9
55 2 1/4	175	49	143	16.5	20	29	68.7	65.1	25.4									

Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF..... 201~208, X05~X09
A-PT1/8..... 211~217, X10~X17

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCF206EJL3, UC206L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Square-flanged type

UCF-E
Cylindrical bore (with set screws)
d 60 ~ 85 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.		ΔA_{2s}	X
F204E-F210E	FX05E-FX10E	± 0.5	0.7
F211E-F217E	FX11E-FX17E	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.		ΔN_s
F204E-F217E	FX05E-FX17E	± 0.2

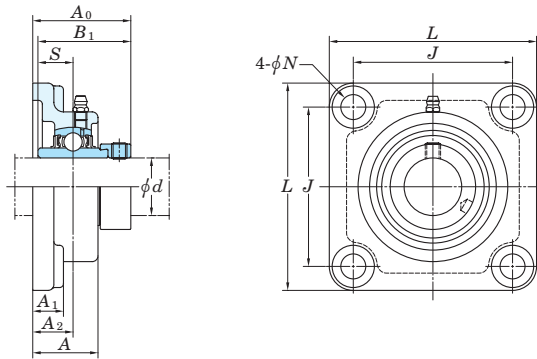
Shaft Dia. mm inch d	Dimensions inch mm										Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	L	A	J	N	A ₁	A ₂	A ₀	B	S	C _r					C _{0r}			
60	2 1/4	6 7/8	1 7/8	5 5/8	43/64	23/32	1 9/64	2 23/32	2.563	1.000	5/8	UCF212-36E UCF212E UCF212-38E UCF212-39E	F212E	UC212-36 UC212 UC212-38 UC212-39	52.4	36.2	14.4	4.2
	2 3/8	175	48	143	17	18	29	68.7	65.1	25.4		9/16	UCFX12E UCFX12-39E	FX12E	UCX12 UCX12-39	57.2	40.1	14.4
	2 7/16	7 3/8	2 5/16	5 55/64	21/32	13/16	1 11/32	2 29/32	2.563	1.000	5/8		UCF213-40E UCF213E	F213E	UC213-40 UC213	57.2	40.1	14.4
	2 7/16	187	59	149	16.5	21	34	73.7	65.1	25.4		9/16	UCFX13E UCFX13E	FX13E	UCX13-40 UCX13	62.2	44.1	14.5
65	2 1/2	7 3/8	1 31/32	5 55/64	43/64	7/8	1 3/16	2 3/4	2.563	1.000	5/8		UCF213-40E UCF213E	F213E	UC213-40 UC213	57.2	40.1	14.4
	2 1/2	187	50	149	17	22	30	69.7	65.1	25.4		9/16	UCFX13-40E UCFX13E	FX13E	UCX13-40 UCX13	62.2	44.1	14.5
70	2 3/4	7 3/4	2 3/8	5 63/64	25/32	7/8	1 29/64	3 7/32	3.063	1.331	11/16		UCFX14-44E UCFX14E	FX14E	UCX14-44 UCX14	67.4	48.3	14.5
	2 15/16	197	60	152	20	22	37	81.5	77.8	33.3		11/16	UCFX15-47E UCFX15E UCFX15-48E	FX15E	UCX15-47 UCX15 UCX15-48	72.7	53.0	14.6
75	3	7 3/4	2 11/16	5 63/64	25/32	15/16	1 9/16	3 17/32	3.252	1.311	11/16		UCFX15-47E UCFX15E UCFX15-48E	FX15E	UCX15-47 UCX15 UCX15-48	72.7	53.0	14.6
	3 1/8	8 3/16	2 9/32	6 1/2	3/4	7/8	1 11/32	3 9/32	3.252	1.311		11/16	UCF216-50E UCF216E	F216E	UC216-50 UC216	72.7	53.0	14.6
	-	208	58	165	19	22	34	83.3	82.6	33.3	11/16		UCFX16E	FX16E	UCX16	84.0	61.9	14.5
80	3 1/8	8 7/16	2 3/4	6 47/64	25/32	15/16	1 9/16	3 19/32	3.374	1.343		11/16	UCF217-52E UCF217E	F217E	UC217-52 UC217	84.0	61.9	14.5
	-	214	70	171	20	24	40	91.6	85.7	34.1	11/16		UCFX17E	FX17E	UCX17	96.1	71.5	14.5
	3 1/4	8 21/32	2 15/32	6 57/64	3/4	15/16	1 13/32	3 7/16	3.374	1.343		11/16	UCFX17E UCFX17-55E	FX17E	UCX17 UCX17-55	96.1	71.5	14.5
3 7/16	220	63	175	19	24	36	87.6	85.7	34.1	11/16	UCFX17E UCFX17-55E		FX17E	UCX17 UCX17-55	96.1	71.5	14.5	10.8
3 7/16	214	70	171	20	24	40	96.3	96	39.7		11/16	UCFX17E UCFX17-55E	FX17E	UCX17 UCX17-55	96.1	71.5	14.5	10.8

Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF 201~208, X05~X09
A-PT1/8 211~217, X10~X17

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCF206EJL3, UC206L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Square-flanged type

NANF
Cylindrical bore
(with eccentric locking collar)
 d 12 ~ 60 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of center position of bolt hole (X)

Housing No.	ΔA_{2s}	X
NF204~NF210	± 0.5	0.7
NF211~NF212	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
NF204~NF212	± 0.2

Shaft Dia mm inch d	Dimensions inch mm										Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	L	A	J	N	A_1	A_2	A_0	B_1	S	C_r					C_{0r}			
12 15 17 20	$3 \frac{3}{8}$ 86	$1 \frac{5}{32}$ 29.5	$2 \frac{33}{64}$ 64	$7/16$ 11	$19/32$ 15	$3/4$ 19	$1 \frac{25}{32}$ 45.6	1.720 43.7	0.673 17.1	$3/8$	NANF201 NANF201-8 NANF202 NANF202-10 NANF203 NANF204-12 NANF204	NF204	NA201 NA201-8 NA202 NA202-10 NA203 NA204-12 NA204	12.8	6.65	13.2	0.73	
25	$3 \frac{3}{4}$ 95	$1 \frac{7}{32}$ 31	$2 \frac{3}{4}$ 70	$29/64$ 11.5	$19/32$ 15	$25/32$ 20	$1 \frac{27}{32}$ 46.9	1.748 44.4	0.689 17.5	$3/8$	NANF205-14 NANF205-15 NANF205 NANF205-16	NF205	NA205-14 NA205-15 NA205 NA205-16	14.0	7.85	13.9	0.95	
30	$4 \frac{1}{4}$ 108	$1 \frac{11}{32}$ 34	$3 \frac{17}{64}$ 83	$33/64$ 13	$5/8$ 16	$53/64$ 21	2 51.1	1.906 48.4	0.720 18.3	$7/16$	NANF206-18 NANF206 NANF206-19 NANF206-20	NF206	NA206-18 NA206 NA206-19 NA206-20	19.5	11.3	13.9	1.4	
35	$4 \frac{19}{32}$ 117	$1 \frac{7}{16}$ 36.5	$3 \frac{5}{8}$ 92	$33/64$ 13	$21/32$ 17	$27/32$ 21.5	$2 \frac{1}{8}$ 53.8	2.012 51.1	0.740 18.8	$7/16$	NANF207-20 NANF207-21 NANF207-22 NANF207 NANF207-23	NF207	NA207-20 NA207-21 NA207-22 NA207 NA207-23	25.7	15.4	13.9	1.8	
40	$5 \frac{1}{8}$ 130	$1 \frac{17}{32}$ 39	$4 \frac{1}{64}$ 102	$35/64$ 14	$21/32$ 17	$15/16$ 24	$2 \frac{5}{16}$ 58.9	2.217 56.3	0.843 21.4	$1/2$	NANF208-24 NANF208-25 NANF208	NF208	NA208-24 NA208-25 NA208	29.1	17.8	14.0	2.2	
45	$5 \frac{13}{32}$ 137	$1 \frac{9}{16}$ 40	$4 \frac{9}{64}$ 105	$5/8$ 16	$23/32$ 18	$15/16$ 24	$2 \frac{5}{16}$ 58.9	2.217 56.3	0.843 21.4	$9/16$	NANF209-26 NANF209-27 NANF209-28 NANF209	NF209	NA209-26 NA209-27 NA209-28 NA209	34.1	21.3	14.0	2.6	
50	$5 \frac{5}{8}$ 143	$1 \frac{27}{32}$ 46.5	$4 \frac{3}{8}$ 111	$5/8$ 16	$25/32$ 20	$1 \frac{1}{8}$ 28.5	$2 \frac{5}{8}$ 66.6	2.469 62.7	0.969 24.6	$9/16$	NANF210-30 NANF210-31 NANF210 NANF210-32	NF210	NA210-30 NA210-31 NA210 NA210-32	35.1	23.3	14.4	3	
55	$6 \frac{3}{8}$ 162	$1 \frac{31}{32}$ 50	$5 \frac{1}{8}$ 130	$43/64$ 17	$13/16$ 21	$1 \frac{17}{64}$ 32	$2 \frac{31}{32}$ 75.6	2.811 71.4	1.094 27.8	$5/8$	NANF211-32 NANF211-34 NANF211 NANF211-35	NF211	NA211-32 NA211-34 NA211 NA211-35	43.4	29.4	14.4	4.1	
60	$6 \frac{7}{8}$ 175	$2 \frac{5}{32}$ 55	$5 \frac{5}{8}$ 143	$43/64$ 17	$13/16$ 21	$1 \frac{27}{64}$ 36	$3 \frac{1}{4}$ 82.8	3.063 77.8	1.220 31	$5/8$	NANF212-36 NANF212 NANF212-38 NANF212-39	NF212	NA212-36 NA212 NA212-38 NA212-39	52.4	36.2	14.4	4.9	

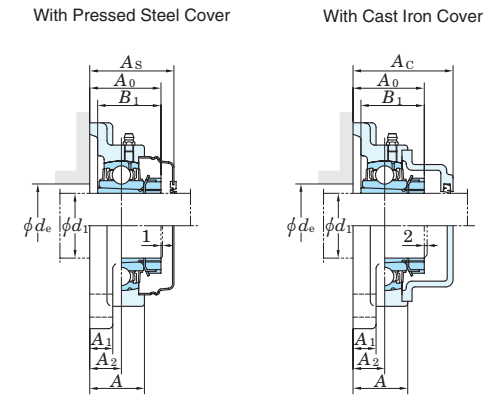
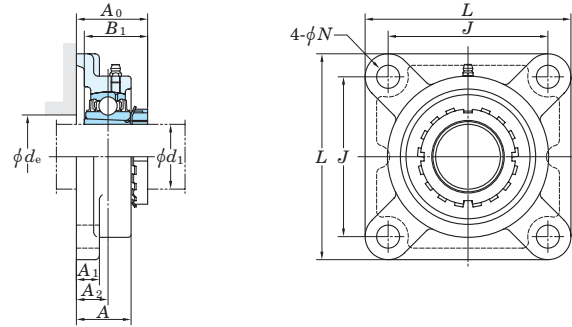
Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.

- A-1/4-28UNF 201~210
- A-PT1/8 211~212

3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UKF
Tapered bore (with adapter)
 d_1 20 ~ (50) mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.			ΔA_{2s}	X
F205-F210	FX05-FX10	F305-F310	± 0.5	0.7
F211-F218	FX11-FX20	F311-F328	± 0.8	1

Unit : mm

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.			ΔN_s
F205-F218	FX05-FX18	F305-F315	± 0.2
	FX20	F316-F328	± 0.3

Unit : mm

Shaft Dia. mm inch	Dimensions										Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic			With Pressed Steel Cover				With Cast Iron Cover							
	d_1	L	A	J	N	A ₁	A ₂	A ₀ ¹⁾	B ₁ ¹⁾	d_e (min.)		Unit No.	Housing No.	Bearing No.			Load Ratings kN	Factor	Open End Type	Closed End Type	Dimension mm inch	Mass kg	Open End Type	Closed End Type	Dimension mm inch	Mass kg					
20	^{3/4}	3 ^{3/4}	1 ^{1/16}	2 ^{3/4}	15/32	1/2	5/8	1 ^{11/32} (1 ^{13/32})	1 ^{5/32} (1 ^{3/8})	1 ^{3/16}	3/8	UKF205	F205	UK205	14.0 7.85 13.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		95	27	70	12	13	16	34.5(36)	29(35)	30	M10					H305X(H2305X)	0.87	UKF205C	UKF205D	40 1 ^{9/16}	0.87	UKF205FC	UKF205FD	49 1 ^{15/16}	1.1						
		108	30	83	12	13	18	37.5	35	30	M10					HE2305X	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	^{3/4}	4 ^{11/32}	1 ^{5/32}	3 ^{5/32}	5/8	1/2	5/8	1 ^{5/32}	1 ^{3/8}	-	1/2	UKF305	F305	UK305	21.2 10.9 12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		110	29	80	16	13	16	37.5	35	-	M14					HE2305X	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		117	34	92	16	14	19	40	38	36	M14					H2305X	1.2	UKFX05C	UKFX05D	44 1 ^{23/32}	1.2	-	-	-	-	-	-	-	-	-	-
30	1	4 ^{1/4}	1 ^{7/32}	3 ^{17/64}	15/32	1/2	45/64	1 ^{15/32} (1 ^{9/16})	1 ^{7/32} (1 ^{1/2})	1 ^{13/32}	3/8	UKF206	F206	UK206	19.5 11.3 13.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		108	31	83	12	13	18	37.5(39.5)	31(38)	36	M10					H306X(H2306X)	1.3	UKF206C	UKF206D	44 1 ^{23/32}	1.3	UKF206FC	UKF206FD	53 2 ^{3/32}	1.6						
		117	34	92	16	14	19	40	38	36	M14					HE2306X	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	1	4 ^{19/32}	1 ^{11/32}	3 ^{5/8}	5/8	9/16	3/4	1 ^{9/16}	1 ^{1/2}	1 ^{13/32}	1/2	UKFX06	FX06	UKX06	25.7 15.4 13.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		125	32	95	16	15	18	41	38	-	M14					H2306X	1.6	UKFX06C	UKFX06D	49 1 ^{15/16}	1.6	-	-	-	-	-	-	-	-	-	
		125	32	95	16	15	18	41	38	-	M14					HE2306X	1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	1 ^{1/8}	4 ^{19/32}	1 ^{11/32}	3 ^{5/8}	35/64	19/32	3/4	1 ^{5/8} (1 ^{11/16})	1 ^{3/8} (1 ^{11/16})	1 ^{5/8}	7/16	UKF207	F207	UK207	25.7 15.4 13.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		117	34	92	14	15	19	41(43)	35(43)	41	M12					HS307X(HS2307X)	1.6	UKF207C	UKF207D	49 1 ^{15/16}	1.6	UKF207FC	UKF207FD	58 2 ^{9/32}	2.0						
		130	38	102	16	14	21	43.5	43	41	M14					H307X(H2307X)	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	1 ^{1/8}	5 ^{1/8}	1 ^{1/2}	4 ^{1/64}	5/8	9/16	53/64	1 ^{23/32}	1 ^{11/16}	1 ^{5/8}	1/2	UKFX07	FX07	UKX07	29.1 17.8 14.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		130	38	102	16	14	21	43.5	43	41	M14					HS2307X	2.0	UKFX07C	UKFX07D	55 2 ^{5/32}	2.0	-	-	-	-	-	-	-	-		
		135	36	100	19	16	20	45.5	43	-	M16					H2307X	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	
50	1 ^{1/8}	5 ^{5/16}	1 ^{13/32}	3 ^{15/16}	3/4	5/8	25/32	1 ^{25/32}	1 ^{11/16}	-	5/8	UKF307	F307	UK307	33.4 19.3 13.2	-	-	-	-	-	-	-	-	-	-	-	-	-			
		135	36	100	19	16	20	45.5	43	-	M16					HS2307X	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	
		135	36	100	19	16	20	45.5	43	-	M16					H2307X	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	

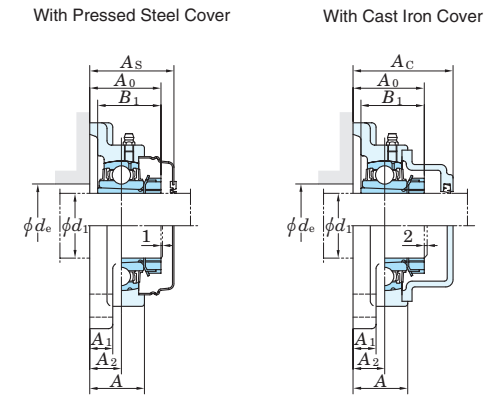
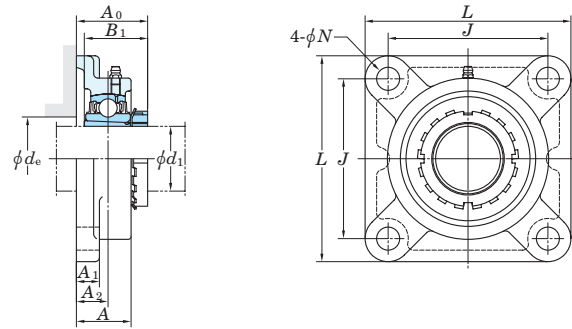
Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF.....205-210, X05-X09, 305-308
 A-PT1/8.....211-218, X10-X20, 309-328

3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables.
 (Example of Part No. : UKF206J + H306X, UK206 + H306X)
 4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (L2) follows the Part No. of unit or bearing.
 (Example of Part No. : UKF206JL3 + H2306X, UK206L3 + H2306X)
 5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

UKF
Tapered bore (with adapter)
 d_1 90 ~ 125 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.			ΔA_{2s}	X
F205-F210	FX05-FX10	F305-F310	± 0.5	0.7
F211-F218	FX11-FX20	F311-F328	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.			ΔN_s
F205-F218	FX05-FX18	F305-F315	± 0.2
	FX20	F316-F328	± 0.3

Shaft Dia. mm inch	Dimensions										Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic			Factor f_0	With Pressed Steel Cover				With Cast Iron Cover			
	inch mm											Unit No.	Housing No.	Bearing No.			Load Ratings kN C_r C_{0r}	Unit No.			Dimension mm inch	Mass kg	Unit No.		Dimension mm inch	Mass kg		
	d_1	L	A	J	N	A ₁	A ₂	A ₀ ¹⁾	B ₁ ¹⁾	d_e (min.)								Open End Type	Closed End Type				Open End Type	Closed End Type				
90 3 1/2	10 9/16	3 13/16	8 5/16	1 7/32	1 3/32	2 21/64	4 3/16	3 13/16	4 13/32	1	UKFX20	FX20	UKX20	HE2320X	18.4	133	105	14.4	-	-	-	-	-	-	-	-	-	-
	268	97	211	31	28	59	106	97	112	M27				H2320X	18.4									UKFX20C	UKFX20D	152	5 31/32	20.9
90 3 1/2	12 7/32	3 11/16	9 17/32	1 1/2	1 1/4	2 21/64	4 7/16	3 13/16	-	1 1/4	UKF320	F320	UK320	HE2320X	25.4	173	141	13.2	-	-	-	-	-	-	-	-	-	-
	310	94	242	38	32	59	113	97	-	M33				H2320X	25.4									UKF320C	UKF320D	146	5 3/4	28.5
100 4	13 3/8	3 25/32	10 15/32	1 39/64	1 3/8	2 23/64	4 23/32	4 1/8	-	1 3/8	UKF322	F322	UK322	H2322X	35.2	205	180	13.2	-	-	-	-	-	-	-	-	-	-
	340	96	266	41	35	60	120	105	-	M36				HE2322X	35.2									UKF322C	UKF322D	154	6 1/16	38.7
110 -	14 9/16	4 11/32	11 27/64	1 39/64	1 9/16	2 9/16	5 1/8	4 13/32	-	1 3/8	UKF324	F324	UK324	H2324	47.6	207	185	13.5	-	-	-	-	-	-	-	-	-	-
	370	110	290	41	40	65	130.5	112	-	M36				H2324	47.6									UKF324C	UKF324D	163	6 13/32	52.7
115 4 1/2	16 5/32	4 17/32	12 19/32	1 39/64	1 25/32	2 9/16	5 3/16	4 3/4	-	1 3/8	UKF326	F326	UK326	HE2326	65.3	229	214	13.6	-	-	-	-	-	-	-	-	-	-
	410	115	320	41	45	65	131.5	121	-	M36				H2326	65.3									UKF326C	UKF326D	172	6 25/32	71.9
125 -	17 23/32	4 29/32	13 25/32	1 39/64	2 5/32	2 51/64	5 13/16	5 5/32	-	1 3/8	UKF328	F328	UK328	H2328	93.4	253	246	13.6	-	-	-	-	-	-	-	-	-	-
	450	125	350	41	55	75	147.5	131	-	M36				H2328	93.4									UKF328C	UKF328D	186	7 5/16	102

Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.

A-1/4-28UNF.....205-210, X05-X09, 305-308
 A-PT1/8.....211-218, X10-X20, 309-328

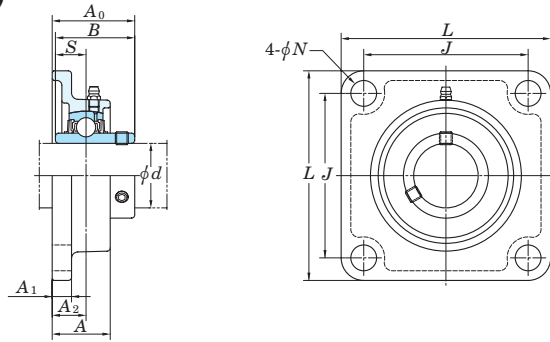
3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No. : UKF206J + H306X, UK206 + H306X)

4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UKF206JL3 + H2306X, UK206L3 + H2306X)

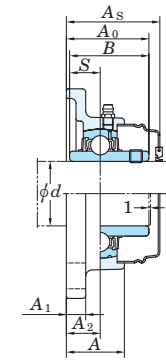
5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Stainless-series square-flanged type

UCSF-H1S6
Cylindrical bore (with set screws)
d 20 ~ 50 mm



With Pressed Stainless Steel Cover



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.	ΔA_{2s}	X
SF204 H1-210 H1	± 0.5	0.7

Unit : mm

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
SF204 H1-210 H1	± 0.2

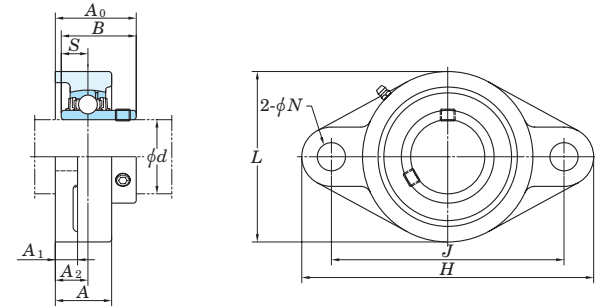
Unit : mm

Shaft Dia. mm d	Dimensions										Bolt Size inch mm	Unit No.	Standard Housing No.	Bearing No.	Mass kg	Basic			With Pressed Stainless Steel Cover				
	inch mm															Load Ratings kN		Factor f_0	Unit No.		Dimension mm inch		Mass kg
	L	A	J	N	A ₁	A ₂	A ₀	B	S	C _r						C _{0r}	Open End Type		Closed End Type	A _s			
20	3 3/8 86	1 1/32 26	2 33/64 64	15/32 12	13/32 10	19/32 15	1 5/16 33.3	1.220 31	0.500 12.7	3/8 M10	UCSF204H1S6	SF204H1	UC204S6	0.5	10.9	5.35	13.2	UCSF204H1CS6	UCSF204H1DS6	38	1 1/2	0.5	
25	3 3/4 95	1 3/32 27.5	2 3/4 70	15/32 12	13/32 10	5/8 16	1 13/32 35.8	1.343 34.1	0.563 14.3	3/8 M10	UCSF205H1S6	SF205H1	UC205S6	0.85	11.9	6.3	13.9	UCSF205H1CS6	UCSF205H1DS6	40	1 9/16	0.85	
30	4 1/4 108	1 7/32 31	3 17/64 83	15/32 12	13/32 10	45/64 18	1 19/32 40.2	1.500 38.1	0.626 15.9	3/8 M10	UCSF206H1S6	SF206H1	UC206S6	1.1	16.5	9.05	13.9	UCSF206H1CS6	UCSF206H1DS6	45	1 25/32	1.1	
35	4 19/32 117	1 11/32 34	3 5/8 92	35/64 14	7/16 11	3/4 19	1 3/4 44.4	1.689 42.9	0.689 17.5	7/16 M12	UCSF207H1S6	SF207H1	UC207S6	1.5	21.8	12.3	13.9	UCSF207H1CS6	UCSF207H1DS6	49	1 15/16	1.5	
40	5 1/8 130	1 13/32 36	4 1/64 102	5/8 16	15/32 12	53/64 21	2 1/32 51.2	1.937 49.2	0.748 19	1/2 M14	UCSF208H1S6	SF208H1	UC208S6	1.7	24.8	14.3	14.0	UCSF208H1CS6	UCSF208H1DS6	56	2 7/32	1.7	
45	5 13/32 137	1 1/2 38	4 9/64 105	5/8 16	1/2 13	55/64 22	2 1/16 52.2	1.937 49.2	0.748 19	1/2 M14	UCSF209H1S6	SF209H1	UC209S6	1.9	27.8	16.2	14.0	UCSF209H1CS6	UCSF209H1DS6	57	2 1/4	1.9	
50	5 5/8 143	1 9/16 40	4 3/8 111	5/8 16	1/2 13	55/64 22	2 5/32 54.6	2.031 51.6	0.748 19	1/2 M14	UCSF210H1S6	SF210H1	UC210S6	2.4	29.8	18.6	14.4	UCSF210H1CS6	UCSF210H1DS6	59	2 5/16	2.4	

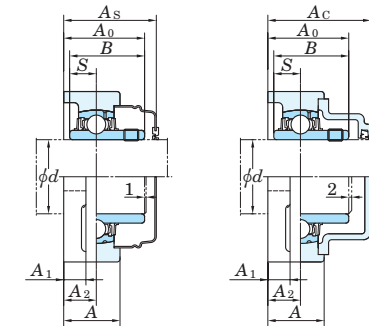
- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of the applicable grease nipple is A-1/4-28UNFN12.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Rhombic-flanged type

UCFL
Cylindrical bore (with set screws)
d (90) ~ 130 mm



With Pressed Steel Cover With Cast Iron Cover



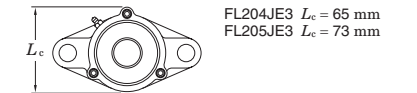
Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2a}) and tolerance of position of bolt hole (X) Unit : mm

Housing No.	ΔA_{2a}	X
FL204-FL210	±0.5	0.7
FL211-FL218	±0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s) Unit : mm

Housing No.	ΔN_s
FL204-FL218	±0.2
FL311-FL326	±0.3

Forms and dimensions of L_c of FL204JE3 and FL205JE3 (housing with cast iron cover) are shown below.



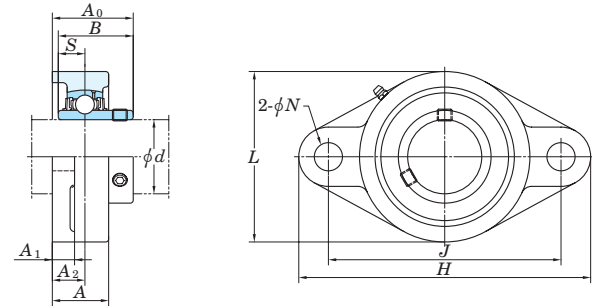
Shaft Dia. mm inch d	Dimensions											Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings			Factor f_0	With Pressed Steel Cover				With Cast Iron Cover						
	inch mm												Unit No.	Housing No.	Bearing No.		C_r	C_{0r}	Unit No.		Dimension mm inch	Mass kg	Unit No.		Dimension mm inch	Mass kg					
	H	L	A	J	N	A ₁	A ₂	A ₀	B	S	Open End Type								Closed End Type				A _s	Open End Type			Closed End Type	A _c			
90 3 1/2	15 5/32	9 1/4	3	12 13/32	1 1/2	1 13/32	1 47/64	3 15/16	3.780	1.575	1 1/4	UCFL318-56 UCFL318	FL318	UC318-56 UC318	19.0 19.0	143	107	13.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	385	235	76	315	38	36	44	100	96	40	M33								UCFL318C	UCFL318D	119	4 11/16	20.9								
95 -	15 15/16	9 27/32	3 11/16	13	1 39/64	1 9/16	2 21/64	4 3/4	4.055	1.614	1 3/8	UCFL319	FL319	UC319	24.6	153	119	13.3	-	-	-	-	-	-	-	-	-	-	-	-	
	405	250	94	330	41	40	59	121	103	41	M36								UCFL319C	UCFL319D	140	5 1/2	26.8								
100 3 15/16 4	17 5/16	10 5/8	3 11/16	14 11/64	1 47/64	1 9/16	2 21/64	4 29/32	4.252	1.654	1 1/2	UCFL320 UCFL320-63 UCFL320-64	FL320	UC320 UC320-63 UC320-64	29.4 29.4 29.4	173	141	13.2	-	-	-	-	-	-	-	-	-	-	-	-	
	440	270	94	360	44	40	59	125	108	42	M39								UCFL320C	UCFL320D	146	5 3/4	32.2								
	470	300	96	390	44	42	60	131	117	46	M39								-	-	-	-	-	-	-	-	-	-	-	-	-
110 -	18 1/2	11 13/16	3 25/32	15 23/64	1 47/64	1 21/32	2 23/64	5 9/32	4.606	1.811	1 1/2	UCFL322	FL322	UC322	36.2	205	180	13.2	-	-	-	-	-	-	-	-	-	-	-	-	
	470	300	96	390	44	42	60	131	117	46	M39								UCFL322C	UCFL322D	154	6 1/16	39.6								
120 -	20 15/32	13	4 11/32	16 59/64	1 27/32	1 7/8	2 9/16	5 1/2	4.961	2.008	1 5/8	UCFL324	FL324	UC324	51.6	207	185	13.5	-	-	-	-	-	-	-	-	-	-	-	-	
	520	330	110	430	47	48	65	140	126	51	M42								UCFL324C	UCFL324D	163	6 13/32	56.4								
130 -	21 21/32	14 3/16	4 17/32	18 7/64	1 27/32	1 31/32	2 9/16	5 3/4	5.315	2.126	1 5/8	UCFL326	FL326	UC326	61.6	229	214	13.6	-	-	-	-	-	-	-	-	-	-	-	-	
	550	360	115	460	47	50	65	146	135	54	M42								UCFL326C	UCFL326D	172	6 25/32	67.7								

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF 201~210, X05~X09, 305~308
A-PT1/8 211~218, X10, 309~326

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UCFL206JL3, UC206L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Rhombic-flanged type

UCFL-E
Cylindrical bore (with set screws)
d 12 ~ 75 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.	ΔA_{2s}	X
FL203E-FL210E	± 0.5	0.7
FL211E-FL217E	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

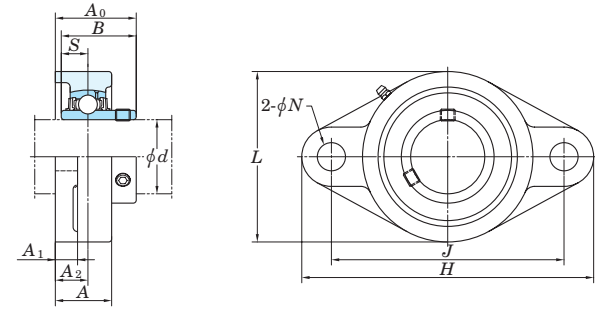
Housing No.	ΔN_s
FL203E-FL217E	± 0.2

Shaft Dia. mm inch d	Dimensions inch mm										Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	H	L	A	J	N	A ₁	A ₂	A ₀	B	S					C _r	C _{0r}		
12 1/2	3 7/32	2 7/32	1	3	25/64	7/16	19/32	1 5/16	1.220	0.500	5/16	UCFL201E UCFL201-8E UCFL202E UCFL202-10E UCFL203E	FL203E	UC201 UC201-8 UC202 UC202-10 UC203	12.8	6.65	13.2	0.42 0.4 0.39
15 5/8	98	56	25.5	76.2	10	11	15	33.3	31	12.7	5/16	UCFL204-12E UCFL204E	FL204E	UC204-12 UC204	12.8	6.65	13.2	0.48
17 3/4	4 7/16	2 3/8	1	3 17/32	25/64	7/16	19/32	1 5/16	1.220	0.500	5/16	UCFL205-14E UCFL205-15E UCFL205E UCFL205-16E	FL205E	UC205-14 UC205-15 UC205 UC205-16	14.0	7.85	13.9	0.64
20 3/4	113	60	25.5	89.7	10	11	15	33.3	31	12.7	5/16	UCFL206-18E UCFL206E UCFL206-19E UCFL206-20E	FL206E	UC206-18 UC206 UC206-19 UC206-20	19.5	11.3	13.9	0.93
25 7/8 15/16	5 1/8	2 11/16	1 1/16	3 57/64	15/32	1/2	5/8	1 13/32	1.343	0.563	3/8	UCFL207-20E UCFL207-21E UCFL207-22E UCFL207E UCFL207-23E	FL207E	UC207-20 UC207-21 UC207-22 UC207 UC207-23	3	15.4	13.9	1.2
30 1 1/8	5 13/16	3 5/32	1 7/32	4 19/32	15/32	1/2	45/64	1 19/32	1.500	0.626	3/8	UCFL208-24E UCFL208-25E UCFL208E	FL208E	UC208-24 UC208-25 UC208	29.1	17.8	14.0	1.6
35 1 1/4 1 5/16 1 3/8	6 11/32	3 17/32	1 11/32	5 1/8	33/64	9/16	3/4	1 3/4	1.689	0.689	7/16	UCFL209-26E UCFL209-27E UCFL209-28E UCFL209E	FL209E	UC209-26 UC209-27 UC209-28 UC209	34.1	21.3	14.0	1.9
40 1 1/2 1 9/16	6 7/8	3 15/16	1 13/32	5 21/32	33/64	9/16	53/64	2 1/32	1.937	0.748	7/16	UCFL210-30E UCFL210-31E UCFL210E UCFL210-32E	FL210E	UC210-30 UC210-31 UC210 UC210-32	35.1	23.3	14.4	2.2
45 1 5/8 1 11/16 1 3/4	7 13/32	4 1/4	1 1/2	5 27/32	19/32	19/32	55/64	2 1/16	1.937	0.748	1/2	UCFL211-32E UCFL211-34E UCFL211E UCFL211-35E	FL211E	UC211-32 UC211-34 UC211 UC211-35	43.4	29.4	14.4	3.3
50 1 7/8 1 15/16	7 3/4	4 17/32	1 9/16	6 3/16	19/32	19/32	55/64	2 5/32	2.031	0.748	1/2	UCFL212-36E UCFL212E UCFL212-38E UCFL212-39E	FL212E	UC212-36 UC212 UC212-38 UC212-39	52.4	36.2	14.4	4.2
55 2 1/8 2 3/16	8 13/16	5 1/8	1 11/16	7 1/4	21/32	23/32	63/64	2 5/16	2.189	0.874	9/16	UCFL213-40E UCFL213E	FL213E	UC213-40 UC213	57.2	40.1	14.4	5.2
60 2 3/8 2 7/16	9 27/32	5 1/2	1 7/8	7 61/64	21/32	23/32	1 9/64	2 23/32	2.563	1.000	9/16	UCFL214-44E UCFL214E	FL214E	UC214-44 UC214	62.2	44.1	14.5	5.7
65 2 1/2	10 5/32	6 3/32	1 31/32	8 17/64	21/32	25/32	1 3/16	2 3/4	2.563	1.000	9/16	UCFL215-47E UCFL215E UCFL215-48E	FL215E	UC215-47 UC215 UC215-48	67.4	48.3	14.5	6.4
70 2 3/4	10 7/16	6 9/16	2 1/8	8 1/2	21/32	25/32	1 7/32	2 31/32	2.937	1.189	9/16							
75 2 15/16 3	10 13/16	6 1/2	2 7/32	8 55/64	3/4	25/32	1 11/32	3 3/32	3.063	1.311	11/16							

Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF 201~210
A-PT1/8 211~217

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No.: UCFL206EJL3, UC206L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCFL-E
Cylindrical bore (with set screws)
d 80 ~ 85 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.	ΔA_{2s}	X
FL203E-FL210E	± 0.5	0.7
FL211E-FL217E	± 0.8	1

Unit : mm

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
FL203E-FL217E	± 0.2

Unit : mm

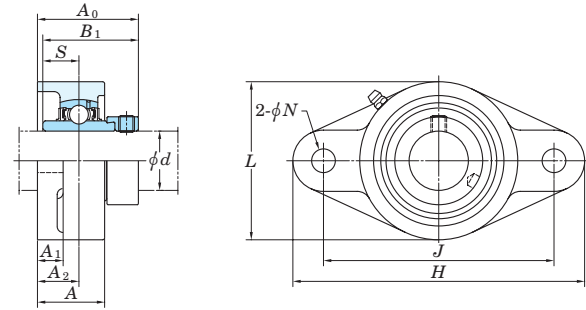
Shaft Dia. mm inch	Dimensions											Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings		Factor f_0	Mass kg
	H	L	A	J	N	A_1	A_2	A_0	B	S	C_r					C_{0r}			
80 3 1/8	11 13/32	7 3/32	2 9/32	9 11/64	3/4	25/32	1 11/32	3 9/32	3.252	1.311	11/16	UCFL216-50E UCFL216E	FL216E	UC216-50 UC216	72.7	53.0	14.6	7.8	
	290	180	58	233	19	20	34	83.3	82.6	33.3									
85 3 1/4	12	7 15/32	2 15/32	9 49/64	3/4	7/8	1 27/64	3 7/16	3.374	1.343	11/16	UCFL217-52E UCFL217E	FL217E	UC217-52 UC217	84.0	61.9	14.5	9.8	
	305	190	63	248	19	22	36	87.6	85.7	34.1									

- Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See **Table 10.5** in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF 201~210
 A-PT1/8 211~217

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UCFL206EJL3, UC206L3)
 4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Rhombic-flanged type

NANFL
Cylindrical bore
(with eccentric locking collar)
 d 12 ~ 55 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}) and tolerance of position of bolt hole (X)

Housing No.	ΔA_{2s}	X
NFL204-NFL210	± 0.5	0.7
NFL211	± 0.8	1

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
NFL204-NFL211	± 0.2

Shaft Dia mm inch d	Dimensions inch mm										Bolt Size inch	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	H	L	A	J	N	A_1	A_2	A_0	B_1	S					C_r	C_{0r}		
12 15 17 20	$4 \frac{7}{16}$ 113	$2 \frac{3}{8}$ 60	$1 \frac{5}{32}$ 29.5	$3 \frac{17}{32}$ 89.7	$\frac{25}{64}$ 10	$\frac{7}{16}$ 11	$\frac{3}{4}$ 19	$1 \frac{25}{32}$ 45.6	1.720 43.7	0.673 17.1	$\frac{5}{16}$	NANFL201 NANFL201-8 NANFL202 NANFL202-10 NANFL203 NANFL204-12 NANFL204	NFL204	NA201 NA201-8 NA202 NA202-10 NA203 NA204-12 NA204	12.8	6.65	13.2	0.59
25	$5 \frac{1}{8}$ 130	$2 \frac{11}{16}$ 68	$1 \frac{7}{32}$ 31	$3 \frac{57}{64}$ 98.8	$\frac{15}{32}$ 12	$\frac{1}{2}$ 13	$\frac{25}{32}$ 20	$1 \frac{27}{32}$ 46.9	1.748 44.4	0.689 17.5	$\frac{3}{8}$	NANFL205-14 NANFL205-15 NANFL205 NANFL205-16	NFL205	NA205-14 NA205-15 NA205 NA205-16	14.0	7.85	13.9	0.9
30	$5 \frac{13}{16}$ 148	$3 \frac{5}{32}$ 80	$1 \frac{11}{32}$ 34	$4 \frac{19}{32}$ 116.7	$\frac{15}{32}$ 12	$\frac{1}{2}$ 13	$\frac{53}{64}$ 21	2 51.1	1.906 48.4	0.720 18.3	$\frac{3}{8}$	NANFL206-18 NANFL206 NANFL206-19 NANFL206-20	NFL206	NA206-18 NA206 NA206-19 NA206-20	19.5	11.3	13.9	1.1
35	$6 \frac{11}{32}$ 161	$3 \frac{17}{32}$ 90	$1 \frac{7}{16}$ 36.5	$5 \frac{1}{8}$ 130.2	$\frac{33}{64}$ 13	$\frac{9}{16}$ 14	$\frac{27}{32}$ 21.5	$2 \frac{1}{8}$ 53.8	2.012 51.1	0.740 18.8	$\frac{7}{16}$	NANFL207-20 NANFL207-21 NANFL207-22 NANFL207 NANFL207-23	NFL207	NA207-20 NA207-21 NA207-22 NA207 NA207-23	3	15.4	13.9	1.6
40	$6 \frac{7}{8}$ 175	$3 \frac{15}{16}$ 100	$1 \frac{17}{32}$ 39	$5 \frac{21}{32}$ 143.7	$\frac{33}{64}$ 13	$\frac{9}{16}$ 14	$\frac{15}{16}$ 24	$2 \frac{5}{16}$ 58.9	2.217 56.3	0.843 21.4	$\frac{7}{16}$	NANFL208-24 NANFL208-25 NANFL208	NFL208	NA208-24 NA208-25 NA208	29.1	17.8	14.0	2
45	$7 \frac{13}{32}$ 188	$4 \frac{1}{4}$ 108	$1 \frac{9}{16}$ 40	$5 \frac{27}{32}$ 148.4	$\frac{19}{32}$ 15	$\frac{9}{16}$ 14	$\frac{15}{16}$ 24	$2 \frac{5}{16}$ 58.9	2.217 56.3	0.843 21.4	$\frac{1}{2}$	NANFL209-26 NANFL209-27 NANFL209-28 NANFL209	NFL209	NA209-26 NA209-27 NA209-28 NA209	34.1	21.3	14.0	2.3
50	$7 \frac{3}{4}$ 197	$4 \frac{17}{32}$ 115	$1 \frac{27}{32}$ 46.5	$6 \frac{3}{16}$ 157	$\frac{19}{32}$ 15	$\frac{9}{16}$ 14	$1 \frac{1}{8}$ 28.5	$2 \frac{5}{8}$ 66.6	2.469 62.7	0.969 24.6	$\frac{1}{2}$	NANFL210-30 NANFL210-31 NANFL210 NANFL210-32	NFL210	NA210-30 NA210-31 NA210 NA210-32	35.1	23.3	14.4	2.7
55	$8 \frac{13}{16}$ 224	$5 \frac{1}{8}$ 130	$1 \frac{31}{32}$ 50	$7 \frac{1}{4}$ 184	$\frac{21}{32}$ 16.5	$\frac{25}{32}$ 20	$1 \frac{17}{64}$ 32	$2 \frac{31}{32}$ 75.6	2.811 71.4	1.094 27.8	$\frac{9}{16}$	NANFL211-32 NANFL211-34 NANFL211 NANFL211-35	NFL211	NA211-32 NA211-34 NA211 NA211-35	43.4	29.4	14.4	4.1

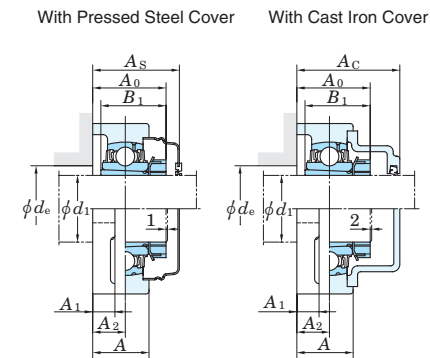
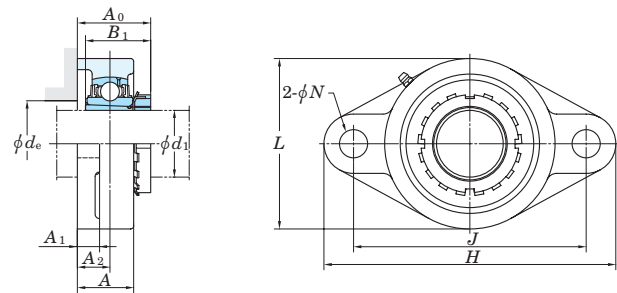
Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.

- A-1/4-28UNF 201~210
- A-PT1/8 211

3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UKFL
Tapered bore (with adapter)
 d_1 20 ~ (50) mm



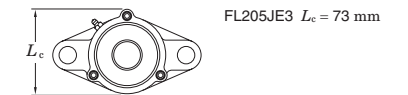
Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2a}) and tolerance of position of bolt hole (X) Unit : mm

Housing No.	ΔA_{2a}	X
FL205-FL210	±0.5	0.7
FL211-FL218	±0.8	1

Variations of tolerance of bolt hole diameter (ΔN_b) Unit : mm

Housing No.	ΔN_b
FL205-FL218	±0.2
FL312-FL326	±0.3

Forms and dimensions of L_c of FL205JE3 (housing with cast iron cover) are shown below.



Shaft Dia. mm inch	Dimensions										Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic			With Pressed Steel Cover				With Cast Iron Cover			
	d_1	H	L	A	J	N	A ₁	A ₂	A ₀ ¹⁾	B ₁ ¹⁾		d_e (min.)	Unit No.	Housing No.			Bearing No.	Load Ratings kN	Factor	Open End Type	Closed End Type	Dimension mm inch	Mass kg	Open End Type	Closed End Type	Dimension mm inch	Mass kg
20	3/4	5 1/8	2 11/16	1 1/16	3 57/64	5/8	1/2	5/8	1 11/32(1 13/32)	1 5/32(1 3/8)	1 3/16	1/2	FL205	UK205	HE305X(HE2305X) H305X(H2305X)	0.68 0.68	14.0	7.85	13.9	UKFL205C	UKFL205D	40 1 9/16	0.68	UKFL205FC	UKFL205FD	49 1 15/16	0.89
		141	83	30	117	12	13	18	37.5	35	30	M10	UKFLX05	UKX05	HE2305X H2305X	1.0 1.0	19.5	11.3	13.9	UKFLX05C	UKFLX05D	44 1 23/32	1.0	-	-	-	-
	3/4	150	80	29	113	19	13	16	37.5	35	-	M16	UKFL305	UK305	HE2305X H2305X	1.1 1.1	21.2	10.9	12.6	-	-	-	-	UKFL305C	UKFL305D	54 2 1/8	1.4
25	1	5 13/16	3 5/32	1 7/32	4 39/64	5/8	1/2	45/64	1 15/32(1 9/16)	1 7/32(1 1/2)	1 13/32	3/8	FL206	UK206	H306X(H2306X) HE306X(HE2306X)	0.97 0.97	19.5	11.3	13.9	UKFL206C	UKFL206D	44 1 23/32	0.97	UKFL206FC	UKFL206FD	53 2 3/32	1.2
		156	95	34	130	16	14	19	40	38	36	M14	UKFLX06	UKX06	H2306X HE2306X	1.5 1.5	25.7	15.4	13.9	UKFLX06C	UKFLX06D	49 1 15/16	1.5	-	-	-	-
	1	180	90	32	134	23	15	18	41	38	-	M20	UKFL306	UK306	H2306X HE2306X	1.5 1.5	26.7	15.0	13.3	-	-	-	-	UKFL306C	UKFL306D	59 2 5/16	1.8
30	1 1/8	6 11/32	3 17/32	1 11/32	5 1/8	5/8	9/16	3/4	1 5/8(1 11/16)	1 3/8(1 11/16)	1 5/8	3/8	FL207	UK207	HS307X(HS2307X) H307X(H2307X)	1.3 1.3	25.7	15.4	13.9	UKFL207C	UKFL207D	49 1 15/16	1.3	UKFL207FC	UKFL207FD	58 2 9/32	1.7
		171	105	38	144	16	14	21	43.5	43	41	M14	UKFLX07	UKX07	HS2307X H2307X	1.8 1.8	29.1	17.8	14.0	UKFLX07C	UKFLX07D	55 2 5/32	1.8	-	-	-	-
	1 1/8	185	100	36	141	23	16	20	45.5	43	-	M20	UKFL307	UK307	HS2307X H2307X	1.9 1.9	33.4	19.3	13.2	-	-	-	-	UKFL307C	UKFL307D	64 2 17/32	2.4
35	1 1/4	6 7/8	3 15/16	1 13/32	5 43/64	5/8	9/16	53/64	1 3/4(1 7/8)	1 13/32(1 13/16)	1 13/16	3/8	FL208	UK208	HE308X(HE2308X) HS308X(HS2308X) H308X(H2308X)	1.6 1.6 1.6	29.1	17.8	14.0	UKFL208C	UKFL208D	55 2 5/32	1.6	UKFL208FC	UKFL208FD	64 2 17/32	2.0
		179	111	40	148	16	14	22	46.5	46	46	M14	UKFLX08	UKX08	HE2308X HS2308X H2308X	2.1 2.1 2.1	34.1	21.3	14.0	UKFLX08C	UKFLX08D	56 2 7/32	2.1	-	-	-	-
	1 1/4	200	112	40	158	23	17	23	50.5	46	-	M20	UKFL308	UK308	HE2308X HS2308X H2308X	2.5 2.5 2.5	40.7	24.0	13.2	-	-	-	-	UKFL308C	UKFL308D	71 2 25/32	3.0
40	1 1/2	7 13/32	4 1/4	1 1/2	5 53/64	3/4	19/32	55/64	1 7/8(2)	1 17/32(1 31/32)	2 1/16	5/8	FL209	UK209	HE309X(HE2309X) H309X(H2309X) HS309X(HS2309X)	2.0 2.0 2.0	34.1	21.3	14.0	UKFL209C	UKFL209D	56 2 7/32	2.0	UKFL209FC	UKFL209FD	66 2 19/32	2.5
		189	116	40	157	16	14	23	48.5	50	52	M14	UKFLX09	UKX09	HE2309X H2309X HS2309X	2.5 2.5 2.5	35.1	23.3	14.4	UKFLX09C	UKFLX09D	60 2 3/8	2.5	-	-	-	-
	1 1/2	230	125	44	177	25	18	25	55	50	-	M22	UKFL309	UK309	HE2309X H2309X HS2309X	3.6 3.6 3.6	48.9	29.5	13.3	-	-	-	-	UKFL309C	UKFL309D	76 3	4.2
45	1 3/4	7 3/4	4 17/32	1 9/16	6 3/16	3/4	19/32	55/64	1 29/32(2 1/16)	1 21/32(2 5/32)	2 9/32	5/8	FL210	UK210	HE310X(HE2310X) H310X(H2310X)	2.3 2.3	35.1	23.3	14.4	UKFL210C	UKFL210D	59 2 5/16	2.3	UKFL210FC	UKFL210FD	70.5 2 25/32	2.8
		216	133	44	184	19	20	26	53.5	55	58	M16	UKFLX10	UKX10	HE2310X H2310X	3.7 3.7	43.4	29.4	14.4	UKFLX10C	UKFLX10D	64 2 17/32	3.7	-	-	-	-
	1 3/4	240	140	48	187	25	19	28	60	55	-	M22	UKFL310	UK310	HE2310X H2310X	4.4 4.4	62.0	38.3	13.2	-	-	-	-	UKFL310C	UKFL310D	83 3 3/32	5.2
50	2	8 13/16	5 1/8	1 11/16	7 1/4	3/4	23/32	63/64	2 1/16(2 1/4)	1 25/32(2 5/16)	2 17/32	5/8	FL211	UK211	HS311X(HS2311X) H311X(H2311X) HE311X(HE2311X)	3.3 3.3 3.3	43.4	29.4	14.4	UKFL211C	UKFL211D	63 2 15/32	3.3	UKFL211FC	UKFL211FD	74.5 2 15/16	3.9

Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF.....205-210, X05-X09, 305-308
A-PT1/8.....211-218, X10, 309-326

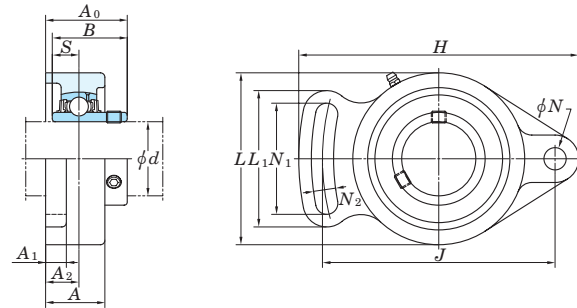
3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No. : UKFL206J + H306X, UK206 + H306X)

4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UKFL206JL3 + H2306X, UK206L3 + H2306X)

5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Adjustable rhombic-flanged type

UCFA
Cylindrical bore (with set screws)
d 12 ~ 55 mm



Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s})

Housing No.	ΔA_{2s}
FA204-FA210	± 0.5
FA211	± 0.8

Variations of tolerance of bolt hole diameter (ΔN_b)

Housing No.	ΔN_b
FA204-FA211	± 0.2

Shaft Dia. mm inch d	Dimensions inch mm													Bolt Size inch mm	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg	
	H	L	A	J	N	N ₁	N ₂	L ₁	A ₁	A ₂	A ₀	B	S					C _r	C _{0r}			
12 1/2																UCFA201 UCFA201-8		UC201 UC201-8				0.47
15 5/8	3 27/32	2 5/16	1 5/16	3 5/64	2 5/64	1 9/16	1 3/32	1 31/32	7/16	3 5/64	1 1/4	1.220	0.500		5/16	UCFA202 UCFA202-10	FA204	UC202 UC202-10	12.8	6.65	13.2	0.45
17 3/4	98	59	24	78	10	40	10	50	11	13.8	32.1	31	12.7		M8	UCFA203 UCFA204-12	UC203 UC204-12				0.44	
20																UCFA204	UC204				0.42	
25 7/8 1 5/16	4 7/8	2 3/4	1 1/16	3 55/64	7/16	1 15/16	7/16	2 17/32	1/2	5/8	1 13/32	1.343	0.563		3/8	UCFA205-14 UCFA205-15	FA205	UC205-14 UC205-15	14.0	7.85	13.9	0.68
25 1	124	70	27	98	11	49	11	64	13	16	35.8	34.1	14.3		M10	UCFA205	UC205					
25																UCFA205-16	UC205-16					
30 1 1/8	5 9/16	3 9/32	1 3/16	4 39/64	7/16	2 7/32	1 5/32	2 11/16	1/2	4 5/64	1 9/16	1.500	0.626		3/8	UCFA206-18 UCFA206	FA206	UC206-18 UC206	19.5	11.3	13.9	1.0
30 1 3/16	141	83	30	117	11	56	12	68	13	17.8	40	38.1	15.9		M10	UCFA206-19	UC206-19					
30 1 1/4																UCFA206-20	UC206-20					
35 1 1/4 1 5/16	6 3/32	3 25/32	1 11/32	5 1/8	3 3/64	2 15/32	1/2	2 15/16	9/16	4 7/64	1 23/32	1.689	0.689		7/16	UCFA207-20 UCFA207-21	FA207	UC207-20 UC207-21	25.7	15.4	13.9	1.5
35 1 3/8	155	96	34	130	13	63	13	75	14	18.6	44	42.9	17.5		M12	UCFA207-22 UCFA207	UC207-22 UC207					
35 1 7/16																UCFA207-23	UC207-23					
40 1 1/2 1 9/16	6 23/32	4 1/8	1 1/2	5 43/64	3 3/64	2 3/4	1/2	3 5/16	9/16	1 3/16	2	1.937	0.748		7/16	UCFA208-24 UCFA208-25	FA208	UC208-24 UC208-25	29.1	17.8	14	1.9
40	171	105	38	144	13	70	13	84	14	20.8	51	49.2	19		M12	UCFA208	UC208					
45 1 5/8 1 11/16	7 1/16	4 3/8	1 9/16	5 53/64	1 9/32	2 27/32	1 9/32	3 15/32	9/16	5 5/64	2 1/16	1.937	0.748		1/2	UCFA209-26 UCFA209-27	FA209	UC209-26 UC209-27	34.1	21.3	14	1.7
45 1 3/4	179	111	40	148	15	72	15	88	14	21.8	52	49.2	19		M14	UCFA209-28 UCFA209	UC209-28 UC209					
50 1 7/8 1 15/16	7 7/16	4 9/16	1 9/16	6 3/16	1 9/32	2 15/16	1 9/32	3 5/8	9/16	5 7/64	2 5/32	2.031	0.748		1/2	UCFA210-30 UCFA210-31	FA210	UC210-30 UC210-31	35.1	23.3	14.4	2.0
50 2	189	116	40	157	15	75	15	92	14	22.5	55.1	51.6	19		M14	UCFA210	UC210					
50																UCFA210-32	UC210-32					
55 2 1/8	8 1/2	5 1/4	1 23/32	7 1/4	5/8	3 3/8	5/8	4 1/32	2 5/32	1 1/64	2 5/16	2.189	0.874		1/2	UCFA211-32 UCFA211-34	FA211	UC211-32 UC211-34	43.4	29.4	14.4	3.6
55 2 3/16	216	133	44	184	16	86	16	102	20	25.7	59.1	55.6	22.2		M14	UCFA211	UC211					
55																UCFA211-35	UC211-35					

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF.....201~210
A-PT1/8.....211

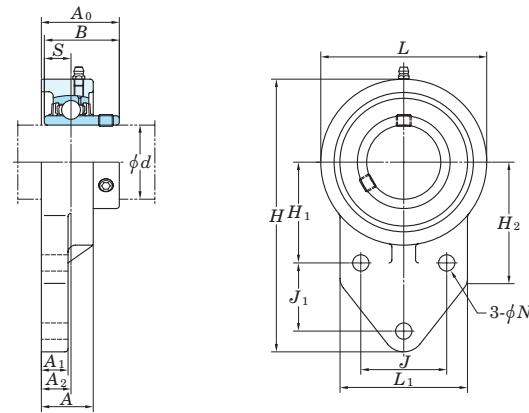
3. As for triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows Part No. of unit or bearing. (Example of Part No. : UCFA206JL3, UC206L3)

4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

5. Tapered bore (with adapter) type products are also available. (Example of Part No. : UKFA205J + H305X, UK205 + H305X)

Three-bolt flange type

UCFB
Cylindrical bore (with set screws)
d 12 ~ 50 mm



Shaft Dia. mm inch <i>d</i>	Dimensions inch mm															Bolt Size inch mm	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor <i>f</i> ₀	Mass kg
	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>J</i> ₁	<i>N</i>	<i>H</i> ₁	<i>H</i> ₂	<i>L</i> ₁	<i>A</i> ₁	<i>A</i> ₂	<i>A</i> ₀	<i>B</i>	<i>S</i>	<i>C</i> _r					<i>C</i> _{0r}			
12 1/2																5/16	UCFB201 UCFB201-8 UCFB202 UCFB202-10 UCFB203 UCFB204-12 UCFB204	FB204	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	12.8 6.65	13.2	0.64 0.62 0.61 0.59	
15 5/8	4 11/32	2 7/16	1 9/16	1 17/64	1 11/16	3/8	1 21/32	2 1/16	2 1/16	1/2	17/32	1 1/4	1.220	0.500		5/16	UCFB205-14 UCFB205-15 UCFB205 UCFB205-16	FB205	UC205-14 UC205-15 UC205 UC205-16	14.0 7.85	13.9	0.68	
17 3/4	110	62	24	32	27	9.5	42	52	52	13	13.5	31.8	31	12.7		M8	UCFB206-18 UCFB206 UCFB206-19 UCFB206-20	FB206	UC206-18 UC206 UC206-19 UC206-20	19.5 11.3	13.9	0.92	
20																5/16	UCFB207-20 UCFB207-21 UCFB207-22 UCFB207 UCFB207-23	FB207	UC207-20 UC207-21 UC207-22 UC207 UC207-23	25.7 15.4	13.9	1.3	
25 1 1/8	4 9/16	2 11/16	1 1/32	1 11/32	1 1/16	3/8	1 49/64	2 1/16	2 7/32	1/2	19/32	1 3/8	1.343	0.563		5/16	UCFB208-24 UCFB208-25 UCFB208	FB208	UC208-24 UC208-25 UC208	29.1 17.8	14.0	1.8	
30 1 3/16	5 1/8	3 1/16	1 5/32	1 37/64	1 9/64	3/8	1 31/32	2 5/32	2 9/16	1/2	43/64	1 17/32	1.500	0.626		5/16	UCFB209-26 UCFB209-27 UCFB209-28 UCFB209	FB209	UC209-26 UC209-27 UC209-28 UC209	34.1 21.3	14.0	2.0	
35 1 1/4	5 21/32	3 17/32	1 5/16	1 13/16	1 17/64	3/8	2 11/64	2 7/16	2 3/4	19/32	3/4	1 3/4	1.689	0.689		5/16	UCFB210-30 UCFB210-31 UCFB210	FB210	UC210-30 UC210-31 UC210	35.1 23.3	14.4	2.3	
40 1 5/16	6 15/32	3 15/16	1 11/32	1 31/32	1 39/64	7/16	2 23/64	2 27/32	3 1/16	5/8	25/32	1 31/32	1.937	0.748		3/8							
45 1 7/8	6 27/32	4 3/16	1 11/32	2 1/8	1 11/16	7/16	2 9/16	3	3 5/32	23/32	25/32	1 31/32	1.937	0.748		3/8							
50 1 15/16	7 1/4	4 13/32	1 3/8	2 9/32	1 13/16	7/16	2 43/64	3 7/32	3 3/8	23/32	25/32	2 1/16	2.031	0.748		M10							

Variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}), variations of tolerance of distance between centers of bolt holes (ΔJ_n , ΔJ_{1n}), variations of tolerance of distance between both grooves (ΔH_{1n})

Housing No.	ΔA_{2s}	ΔJ_n	ΔJ_{1n}	ΔH_{1n}
FB204-FB210	±0.5			

Variations of tolerance of bolt hole diameter (ΔN_s)

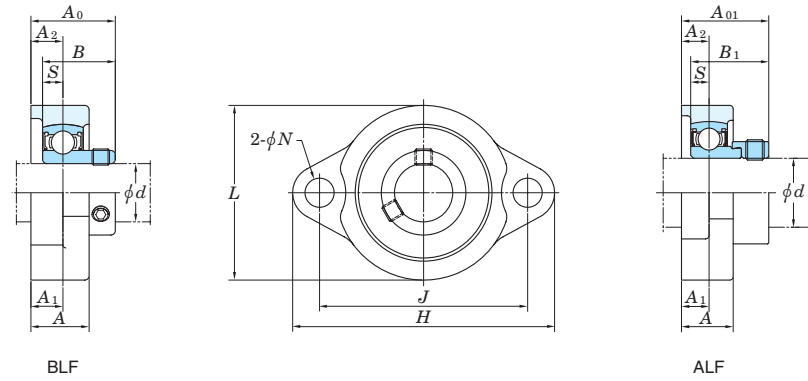
Housing No.	ΔN_s
FB204-FB210	±0.2

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipple is A-1/4-28UNF.
 3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows Part No. of unit or bearing. (Example of Part No. : UCFB206JL3, UC206L3)

4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.
 5. Tapered bore (with adapter) type products are also available. (Example of Part No. : UKFB205J + H305X, UK205 + H305X)

Light duty rhombic-flanged type

BLF
Cylindrical bore
(with set screws)
ALF
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 35 mm



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
LF203-LF207	± 0.5	± 0.7

Variations of tolerance of bolt hole diameter (ΔN_s)

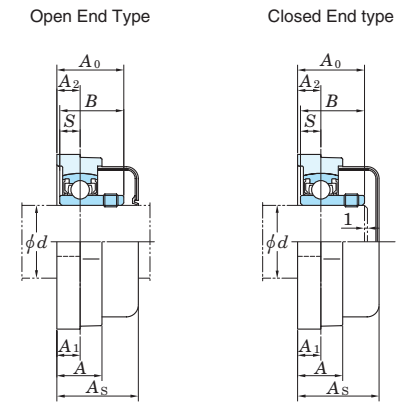
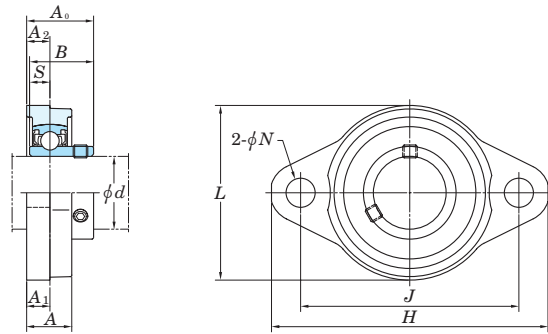
Housing No.	ΔN_s
LF203-LF207	± 0.2

Shaft Dia. mm inch	Dimensions													Bolt Size inch mm	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN		Factor f_0	Mass kg	
	inch mm																			C_r	C_{0r}		BLF	ALF
<i>d</i>	<i>H</i>	<i>L</i>	<i>A</i>	<i>J</i>	<i>N</i>	<i>A</i> ₁	<i>A</i> ₂	<i>S</i>	BLF		ALF													
12 1/2	3 3/16	2 1/16	23/32	2 1/2	5/16	3/8	3/8	0.236	1	0.866	1 1/4	1.122	1/4	BLF201	SB201	ALF201	SA201							
15 5/8	81	52	18	63.5	8	9.5	9.5	6	25.5	22	32	28.5	M6	BLF201-8	SB201-8	ALF201-8	SA201-8	LF203	9.55	4.80	13.2	0.25	0.28	
17														BLF202	SB202	ALF202	SA202							
20 3/4	3 17/32	2 3/8	25/32	2 13/16	25/64	7/16	7/16	0.276	1 5/32	0.984	1 5/16	1.161	5/16	BLF202-10	SB202-10	ALF202-10	SA202-10							
25 7/8	90	60	20	71.5	10	11	11	7	29	25	33.5	29.5	M8	BLF203	SB203	ALF203	SA203	LF204	12.8	6.65	13.2	0.33	0.33	
25 15/16	3 3/4	2 17/32	25/32	2 63/64	25/64	7/16	7/16	0.295	1 3/16	1.063	1 11/32	1.201	5/16	BLF204-12	SB204-12	ALF204-12	SA204-12							
30 1 1/8	4 7/16	3	7/8	3 9/16	15/32	15/32	15/32	0.315	1 11/32	1.181	1 1/2	1.335	3/8	BLF204	SB204	ALF204	SA204	LF205	14.0	7.85	13.9	0.38	0.42	
30 1 3/16	113	76	22.5	90.5	12	12	12	8	34	30	37.9	33.9	M10	BLF205-14	SB205-14	ALF205-14	SA205-14							
35 1 1/4	4 13/16	3 1/2	15/16	3 15/16	15/32	1/2	33/64	0.335	1 7/16	1.260	1 5/8	1.437	3/8	BLF205-15	SB205-15	ALF205-15	SA205-15	LF206	19.5	11.3	13.9	0.57	0.60	
35 1 5/16	122	89	24	100	12	13	13	8.5						BLF205	SB205	ALF205	SA205							
35 1 3/8														BLF205-16	SB205-16	ALF205-16	SA205-16							
35 1 7/16														BLF206-18	SB206-18	ALF206-18	SA206-18	LF207	25.7	15.4	13.9	0.77	0.85	
														BLF206	SB206	ALF206	SA206							
														BLF206-19	SB206-19	ALF206-19	SA206-19							
														BLF206-20	SB206-20	ALF206-20	SA206-20							
														BLF207-20	SB207-20	ALF207-20	SA207-20							
														BLF207-22	SB207-22	ALF207-22	SA207-22							
														BLF207	SB207	ALF207	SA207							
														BLF207-23	SB207-23	ALF207-23	SA207-23							

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
2. Allowable load to housing in radial direction is approximately half of basic load rating of bearing, C_r (when safety factor is 4).
3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

“Compact” series rhombic-flanged type

UFL
Cylindrical bore (with set screws)
 d 8 ~ 30 mm



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		

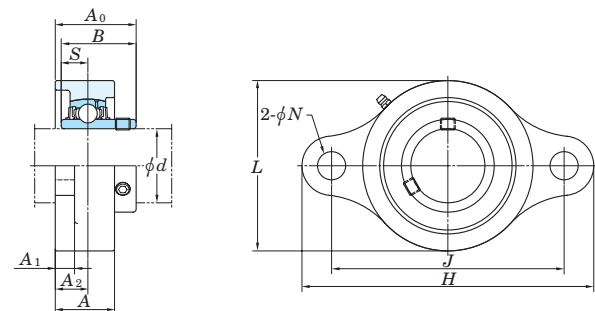
Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
FL08	±0.2
FL000-FL006	

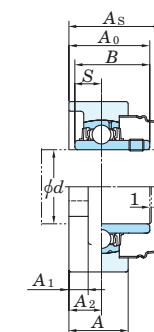
Shaft Dia. mm d	Dimensions										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Rubber Coated Cover				
	inch mm											Unit No.	Housing No.	Bearing No.		Cr	Cor		Unit No.		Dimension mm inch	Mass kg	
	H	L	A	J	N	A ₁	A ₂	A ₀	B	S									Open End Type	Closed End Type			A _s
8	1 7/8 48	1 1/16 27	1 1/32 8.5	1 29/64 37	3/16 4.8	5/32 4	5/32 4	1/2 12.5	0.472 12	0.1378 3.5	No.8 M4	UFL08	FL08	SU08	0.030	3.27	1.37	12.4	-	-	-	-	-
10	2 3/8 60	1 13/32 36	15/32 12	1 49/64 45	9/32 7	1/4 6	15/64 6	5/8 16	0.591 15	0.197 5	1/4 M6	UFL000	FL000	SU000	0.050	4.55	1.95	12.3	UFL000C	UFL000D	20.5	13/16	0.050
12	2 15/32 63	1 1/2 38	15/32 12	1 57/64 48	9/32 7	1/4 6	15/64 6	5/8 16	0.591 15	0.197 5	1/4 M6	UFL001	FL001	SU001	0.065	5.10	2.40	13.2	UFL001C	UFL001D	20.5	13/16	0.065
15	2 5/8 67	1 21/32 42	1/2 13	2 3/32 53	9/32 7	1/4 6.5	1/4 6.5	11/16 17.5	0.650 16.5	0.217 5.5	1/4 M6	UFL002	FL002	SU002	0.085	5.60	2.85	13.9	UFL002C	UFL002D	22	7/8	0.085
17	2 25/32 71	1 13/16 46	9/16 14	2 13/64 56	9/32 7	9/32 7	9/32 7	23/32 18.5	0.689 17.5	0.236 6	1/4 M6	UFL003	FL003	SU003	0.11	6.00	3.25	14.4	UFL003C	UFL003D	23.5	15/16	0.11
20	3 17/32 90	2 5/32 55	5/8 16	2 51/64 71	13/32 10	5/16 8	5/16 8	7/8 22	0.827 21	0.276 7	5/16 M8	UFL004	FL004	SU004	0.18	9.40	5.05	13.9	UFL004C	UFL004D	27	1 1/16	0.18
25	3 3/4 95	2 3/8 60	5/8 16	2 61/64 75	13/32 10	5/16 8	5/16 8	29/32 23	0.866 22	0.276 7	5/16 M8	UFL005	FL005	SU005	0.23	10.1	5.85	14.5	UFL005C	UFL005D	28	1 3/32	0.23
30	4 13/32 112	2 3/4 70	23/32 18	3 11/32 85	1/2 13	11/32 9	23/64 9	1 1/32 26	0.965 24.5	0.295 7.5	3/8 M10	UFL006	FL006	SU006	0.31	13.2	8.25	14.7	UFL006C	UFL006D	31	1 7/32	0.31

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
2. Housing is made from special light alloy.
3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCSFL-H1S6
Cylindrical bore (with set screws)
 d 20 ~ 50 mm



With Pressed Stainless Steel Covers



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
SFL204H1-SFL210H1	±0.5	0.3

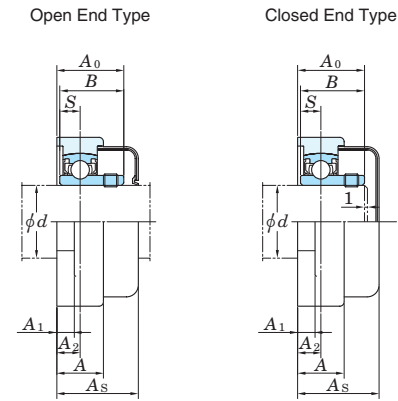
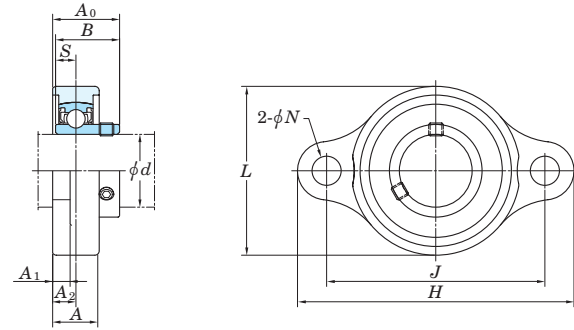
Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
SFL204H1-SFL210H1	±0.2

Shaft Dia. mm d	Dimensions										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f ₀	With Pressed Stainless Steel Covers		Mass kg	
	inch mm											Unit No.	Housing No.	Bearing No.		C _r	C _{0r}		Open End Type	Closed End Type		Dimension mm inch A _s
20	4 7/16	2 3/8	1 1/32	3 35/64	15/32	13/32	19/32	1 5/16	1.220	0.500	3/8	UCSFL204H1S6	SFL204H1	UC204S6	0.43	10.9	5.35	13.2	UCSFL204H1CS6	UCSFL204H1DS6	38 1 1/2	0.43
	113	60	26	90	12	10	15	33.3	31	12.7	M10											
25	5 1/8	2 11/16	1 3/32	3 57/64	5/8	13/32	5/8	1 13/32	1.343	0.563	1/2	UCSFL205H1S6	SFL205H1	UC205S6	0.60	11.9	6.30	13.9	UCSFL205H1CS6	UCSFL205H1DS6	40 1 9/16	0.60
	130	68	27.5	99	16	10	16	35.8	34.1	14.3	M14											
30	5 13/16	3 5/32	1 7/32	4 39/64	5/8	13/32	45/64	1 19/32	1.500	0.626	1/2	UCSFL206H1S6	SFL206H1	UC206S6	0.86	16.5	9.05	13.9	UCSFL206H1CS6	UCSFL206H1DS6	45 1 15/32	0.86
	148	80	31	117	16	10	18	40.2	38.1	15.9	M14											
35	6 11/32	3 11/32	1 11/32	5 1/8	5/8	7/16	3/4	1 3/4	1.689	0.689	1/2	UCSFL207H1S6	SFL207H1	UC207S6	1.1	21.8	12.3	13.9	UCSFL207H1CS6	UCSFL207H1DS6	49 1 15/16	1.1
	161	85	34	130	16	11	19	44.4	42.9	17.5	M14											
40	6 7/8	3 11/16	1 13/32	5 43/64	5/8	15/32	53/64	2 1/32	1.937	0.748	1/2	UCSFL208H1S6	SFL208H1	UC208S6	1.5	24.8	14.3	14.0	UCSFL208H1CS6	UCSFL208H1DS6	56 2 7/32	1.5
	175	94	36	144	16	12	21	51.2	49.2	19	M14											
45	7 13/32	3 15/16	1 1/2	5 53/64	3/4	1/2	55/64	2 1/16	1.937	0.748	5/8	UCSFL209H1S6	SFL209H1	UC209S6	1.8	27.8	16.2	14.0	UCSFL209H1CS6	UCSFL209H1DS6	57 1 1/4	1.8
	188	100	38	148	19	13	22	52.2	49.2	19	M16											
50	7 3/4	4 3/16	1 9/16	6 3/16	3/4	1/2	55/64	2 5/32	2.031	0.748	5/8	UCSFL210H1S6	SFL210H1	UC210S6	2.1	29.8	18.6	14.4	UCSFL210H1CS6	UCSFL210H1DS6	59 2 5/16	2.1
	197	106	40	157	19	13	22	54.6	51.6	19	M16											

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipple is A-1/4-28UNFN12.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

USFL-S6
Cylindrical bore (with set screws)
 d 10 ~ 30 mm



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
SFL000-SFL006	± 0.5	± 0.3

Unit : mm

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
SFL000-SFL006	± 0.2

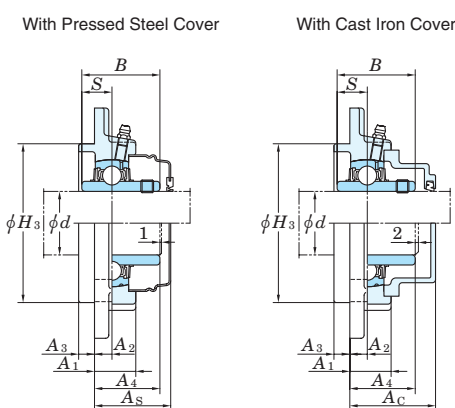
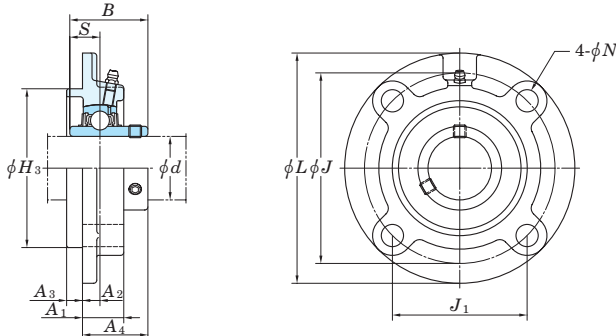
Unit : mm

Shaft Dia. mm d	Dimensions										Bolt Size inch mm	Standard			Mass kg	Basic Load Ratings kN		Factor f_0	With Rubber Coated Cover			
	inch mm											Unit No.	Housing No.	Bearing No.		C_r	C_{0r}		Unit No.		Dimension mm inch	Mass kg
	H	L	A	J	N	A_1	A_2	A_0	B	S									Open End Type	Closed End Type		
10	2 3/8 60	1 11/32 34	15/32 12	1 49/64 45	9/32 7	3/16 5	15/64 6	5/8 16	0.591 15	0.197 5	1/4 M6	USFL000S6	SFL000	SU000S6	0.076	3.9	1.55	12.3	USFL000CS6	USFL000DS6	20.5 13/16	0.076
12	2 15/32 63	1 13/32 36	15/32 12	1 57/64 48	9/32 7	3/16 5	15/64 6	5/8 16	0.591 15	0.197 5	1/4 M6	USFL001S6	SFL001	SU001S6	0.080	4.3	1.9	13.2	USFL001CS6	USFL001DS6	20.5 13/16	0.080
15	2 5/8 67	1 5/8 41	1/2 13	2 3/32 53	9/32 7	1/4 6	1/4 6.5	11/16 17.5	0.650 16.5	0.217 5.5	1/4 M6	USFL002S6	SFL002	SU002S6	0.1	4.7	2.25	13.9	USFL002CS6	USFL002DS6	22 7/8	0.1
17	2 25/32 71	1 23/32 44	9/16 14	2 13/64 56	9/32 7	1/4 6	9/32 7	23/32 18.5	0.689 17.5	0.236 6	1/4 M6	USFL003S6	SFL003	SU003S6	0.13	5.1	2.6	14.4	USFL003CS6	USFL003DS6	23.5 15/16	0.13
20	3 19/32 91	2 3/32 53	5/8 16	2 51/64 71	13/32 10	1/4 6	5/16 8	7/8 22	0.827 21	0.276 7	5/16 M8	USFL004S6	SFL004	SU004S6	0.21	7.9	4	13.9	USFL004CS6	USFL004DS6	27 1 1/16	0.21
25	3 3/4 95	2 9/32 58	5/8 16	2 51/64 75	13/32 10	1/4 6	5/16 8	29/32 23	0.866 22	0.276 7	5/16 M8	USFL005S6	SFL005	SU005S6	0.23	8.5	4.65	14.5	USFL005CS6	USFL005DS6	28 1 3/32	0.23
30	4 11/32 110	2 19/32 66	23/32 18	3 11/32 85	1/2 13	9/32 7	23/64 9	1 1/32 26	0.965 24.5	0.295 7.5	3/8 M10	USFL006S6	SFL006	SU006S6	0.33	11.2	6.6	14.7	USFL006CS6	USFL006DS6	31 1 7/32	0.33

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
2. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Round-flanged type with spigot joint

UCFC
 Cylindrical bore (with set screws)
d 12 ~ 50 mm



Variations of tolerance of spigot joint outside diameter (ΔH_{3s}), variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}), tolerance of position of bolt hole (X), and tolerance of circumferential runout of spigot joint (Y)

Housing No.	ΔH_{3s}	ΔA_{2s}	X	Y
FC204-FC206 FCX05	0 -0.046	±0.5	0.7	0.2
FC207-FC210 FCX06-FCX10	0 -0.054			
FC211-FC217 FCX11-FCX15	0 -0.063	±0.8	1	0.3
FC218 FCX16-FCX18 FCX20	0 -0.072			0.4

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
FC204-FC218 FCX05-FCX20	±0.2

Shaft Dia. mm inch <i>d</i>	Dimensions													Bolt Size inch mm	Standard			Basic			With Pressed Steel Cover			With Cast Iron Cover															
	<i>L</i>	<i>H</i> ₃	<i>J</i>	<i>J</i> ₁	<i>N</i>	inch				<i>B</i>	<i>S</i>	Unit No.	Housing No.		Bearing No.	Mass kg	Load Ratings kN		Factor <i>f</i> ₀	Unit No.		Dimension		Mass kg	Unit No.		Dimension		Mass kg										
						mm											<i>C</i> _r	<i>C</i> _{0r}		Open End Type	Closed End Type	<i>A</i> _s	mm		inch	Open End Type	Closed End Type	<i>A</i> _c		mm	inch								
12																																							
15																																							
17																																							
20																																							
25																																							
30																																							
35																																							
40																																							
45																																							
50																																							

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

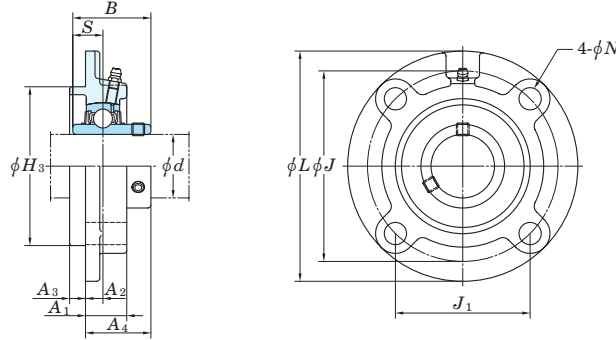
2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF..... 201-210, X05-X09
 A-PT1/8..... 211-218, X10-X20

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No.: UCFC206JL3, UC206L3)

4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Round-flanged type with spigot joint

UCFCX-E
Cylindrical bore (with set screws)
d 25 ~ 100 mm



Shaft Dia. mm inch <i>d</i>	Dimensions inch mm											Bolt Size inch mm	Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor <i>f</i> ₀	Mass kg
	<i>L</i>	<i>H</i> ₃	<i>J</i>	<i>J</i> ₁	<i>N</i>	<i>A</i> ₁	<i>A</i> ₂	<i>A</i> ₃	<i>A</i> ₄	<i>B</i>	<i>S</i>					<i>C</i> _r	<i>C</i> _{0r}		
25 1	4 3/8	3.000	3 5/8	2 9/16	3/8	15/16	25/64	15/64	1 9/32	1.500	0.626	5/16	UCFCX05E	FCX05E	UCX05	19.5	11.3	13.9	1.2
	111	76.2	92	65	9.5	24	10	6	32.2	38.1	15.9	M8	UCFCX05-16E	UCX05-16					
30 1 3/16 1 1/4	5	3.375	4 9/64	2 59/64	15/32	7/8	5/16	3/8	1 5/16	1.689	0.689	3/8	UCFCX06E	FCX06E	UCX06	25.7	15.4	13.9	1.5
	127	85.725	105	74.2	12	22.5	8	9.5	33.4	42.9	17.5	M10	UCFCX06-19E	UCX06-19					
35 1 3/8 1 7/16	5 1/4	3.625	4 3/8	3 3/32	15/32	1 1/32	23/64	7/16	1 17/32	1.937	0.748	3/8	UCFCX07-22E	FCX07E	UCX07	29.1	17.8	14.0	1.9
	133	92.075	111	78.5	12	26	9	11	39.2	49.2	19	M10	UCFCX07-23E	UCX07-23					
40 1 1/2	5 1/4	3.625	4 3/8	3 3/32	15/32	1 1/32	23/64	7/16	1 17/32	1.937	0.748	3/8	UCFCX08-24E	FCX08E	UCX08-24	34.1	21.3	14.0	2.0
	133	92.075	111	78.5	12	26	9	11	39.2	49.2	19	M10	UCFCX08E	UCX08					
45 1 3/4	6 3/32	4.250	5 1/8	3 5/8	35/64	31/32	5/16	15/32	1 19/32	2.031	0.748	7/16	UCFCX09-28E	FCX09E	UCX09-28	35.1	23.3	14.4	2.6
	155	107.95	130	91.9	14	25	8	12	40.6	51.6	19	M12	UCFCX09E	UCX09					
50 1 15/16 2	6 3/8	4.5	5 23/64	3 25/32	35/64	31/32	9/32	5/8	1 19/32	2.189	0.874	7/16	UCFCX10-31E	FCX10E	UCX10-31	43.4	29.4	14.4	3.2
	162	114.3	136	96.2	14	25	7	16	40.4	55.6	22.2	M12	UCFCX10E	UCX10					
60 2 7/16	7 5/8	5.500	6 1/2	4 19/32	5/8	1 5/16	7/16	25/32	2	2.563	1.000	1/2	UCFCX12E	FCX12E	UCX12	57.2	40.1	14.4	5.3
	194	139.7	165	116.7	16	33	11	20	50.7	65.1	25.4	M14	UCFCX12-39E	UCX12-39					
65 2 1/2	7 5/8	5.500	6 1/2	4 19/32	5/8	1 5/16	7/16	25/32	2 3/16	2.937	1.189	1/2	UCFCX13-40E	FCX13E	UCX13-40	62.2	44.1	14.5	5.7
	194	139.7	165	116.7	16	33	11	20	55.4	74.6	30.2	M14	UCFCX13E	UCX13					
70 2 3/4	8 3/4	6.375	7 31/64	5 9/32	3/4	1 13/32	35/64	25/32	2 5/16	3.063	1.331	5/8	UCFCX14-44E	FCX14E	UCX14-44	67.4	48.3	14.5	7.3
	222	161.925	190	134.3	19	36	14	20	58.5	77.8	33.3	M16	UCFCX14E	UCX14					
75 2 15/16 3	8 3/4	6.375	7 31/64	5 9/32	3/4	1 3/8	15/32	55/64	2 13/32	3.252	1.311	5/8	UCFCX15-47E	FCX15E	UCX15-47	72.7	53.0	14.6	8.0
	222	161.925	190	134.3	19	35	12	22	61.3	82.6	33.3	M16	UCFCX15E	UCX15					
80 —	10 1/4	7.375	8 5/8	6 3/32	29/32	1 13/32	25/64	63/64	2 7/16	3.374	1.343	3/4	UCFCX16E	FCX16E	UCX16	84.0	61.9	14.5	11.3
	260	187.325	219	154.8	23	36	10	25	61.6	85.7	34.1	M20							
85 3 7/16	10 1/4	7.375	8 5/8	6 3/32	29/32	1 13/32	25/64	63/64	2 5/8	3.780	1.563	3/4	UCFCX17E	FCX17E	UCX17	96.1	71.5	14.5	12.9
	260	187.325	219	154.8	23	36	10	25	66.3	96	39.7	M20	UCFCX17-55E	UCX17-55					
90 —	10 1/4	7.375	8 5/8	6 3/32	29/32	1 11/16	15/32	1 7/64	2 7/8	4.094	1.689	3/4	UCFCX18E	FCX18E	UCX18	109	81.9	14.4	13.5
	260	187.325	219	154.8	23	43	12	28	73.1	104	42.9	M20							
100 3 15/16 4	10 7/8	8.125	9 3/8	6 5/8	29/32	2 19/32	55/64	1 7/64	3 9/16	4.626	1.937	3/4	UCFCX20E	FCX20E	UCX20	133	105	14.4	18.2
	276	206.375	238	168.3	23	66	22	28	90.3	117.5	49.2	M20	UCFCX20-63E	UCX20-63					
													UCFCX20-64E	UCX20-64					

Remarks 1. In Part No. of unit, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF X05-X09
A-PT1/8 X10-X20

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCFCX06EL3, UCX06L3)
4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Variations of tolerance of spigot joint outside diameter (ΔH_{3s}), variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}), tolerance of position of bolt hole (*X*), and tolerance of circumferential runout of spigot joint (*Y*)

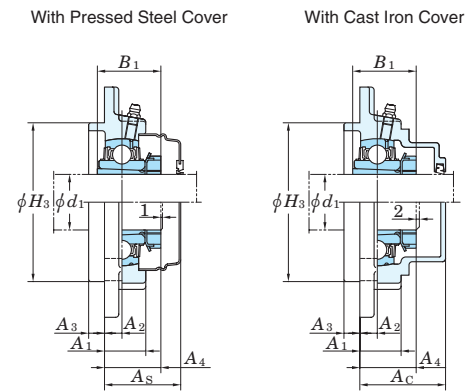
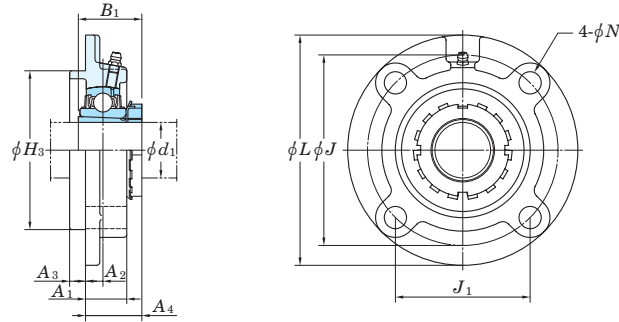
Housing No.	ΔH_{3s}	ΔA_{2s}	Unit : mm	
			<i>X</i>	<i>Y</i>
FCX05E	0 -0.046	±0.5	0.7	0.2
FCX06E-FCX10E	0 -0.054			
FCX12E-FCX15E	0 -0.063	±0.8	1	0.3
FCX16E-FCX18E	0 -0.072			
FCX20E				

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.	ΔN_s
FCX05E-FCX20E	±0.2

Round-flanged type with spigot joint

UKFC
Tapered bore (with adapter)
d₁ (65) ~ 90 mm



Variations of tolerance of spigot joint outside diameter (ΔH_{3s}), variations of tolerance of distance from mounting surface to center of spherical bore (ΔA_{2s}), tolerance of position of bolt hole (X), and tolerance of circumferential runout of spigot joint (Y)

Variations of tolerance of bolt hole diameter (ΔN_s)

Housing No.		ΔH_{3s}	ΔA_{2s}	X	Y
FC205-FC206	FCX05	0 -0.046	±0.5	0.7	0.2
FC207-FC210	FCX06-FCX10	0 -0.054			
FC211-FC217	FCX11-FCX15	0 -0.063	±0.8	1	0.3
FC218	FCX16-FCX18	0			
	FCX20	-0.072			

Housing No.		ΔN_s
FC204-FC218	FCX05-FCX20	±0.2

Shaft Dia. mm inch	Dimensions inch mm											Bolt Size inch mm	Standard			Adapter ¹⁾ assembly No.	Mass kg	Basic Load Ratings kN		Factor f ₀	With Pressed Steel Cover				With Cast Iron Cover				
	d ₁	L	H ₃	J	J ₁	N	A ₁	A ₂	A ₃	A ₄ ¹⁾	B ₁ ¹⁾		Unit No.	Housing No.	Bearing No.			Unit No.	Dimension mm inch		Mass kg	Unit No.	Dimension mm inch	Mass kg					
65	2 1/2	8 3/4	6.4567	7 31/64	5 9/32	3/4	1 3/8	15/32	55/64	1 7/8	2 7/8	5/8	UKFCX15	FCX15	UKX15	HE2315X	7.7	72.7	53.0	14.6	-	-	-	-	-	-	-	-	-
		222	164	190	134.3	19	35	12	22	48	73	M16				H2315X	7.7				UKFCX15C	UKFCX15D	66	2 19/32	7.7				
70	2 3/4	9 7/16	6.6929	7 7/8	5 9/16	29/32	1 31/32	45/64	5/8	2 7/32(2 15/32)	2 5/16(3 1/16)	3/4	UKFC216	FC216	UK216	HE316X(HE2316X)	9.0	72.7	53.0	14.6	-	-	-	-	-	-	-	-	
		240	170	200	141.4	23	42	18	16	56(62.5)	59(78)	M20				H316X(H2316X)	9.0				UKFC216C	UKFC216D	72	2 27/32	9.0	UKFC216FC	UKFC216FD	87	3 7/16
75	3	10 1/4	7.3228	8 5/8	6 3/32	29/32	1 13/32	25/64	63/64	1 15/16	3 1/16	3/4	UKFCX16	FCX16	UKX16	HE2316X	11.4	84.0	61.9	14.5	-	-	-	-	-	-	-	-	
		260	186	219	154.8	23	36	10	25	49	78	M20				H2316X	11.4				UKFCX16C	UKFCX16D	66	2 19/32	11.4				
75	3	9 27/32	7.0866	8 3/16	5 51/64	29/32	1 25/32	45/64	45/64	2 9/32(3 17/32)	2 15/32(3 7/32)	3/4	UKFC217	FC217	UK217	H317X(H2317X)	10.4	84.0	61.9	14.5	-	-	-	-	-	-	-	-	
		250	180	208	147.1	23	45	18	18	58(64.5)	63(82)	M20				HE317X(HE2317X)	10.4				UKFC217C	UKFC217D	74	2 29/32	10.4	UKFC217FC	UKFC217FD	89	3 1/2
80	3	10 1/4	7.3228	8 5/8	6 3/32	29/32	1 13/32	25/64	63/64	2 1/16	3 7/32	3/4	UKFCX17	FCX17	UKX17	H2317X	12.6	96.1	71.5	14.5	-	-	-	-	-	-	-	-	
		260	186	219	154.8	23	36	10	25	52	82	M20				HE2317X	12.6				UKFCX17C	UKFCX17D	71	2 25/32	12.6				
80	-	10 7/16	7.4803	8 21/32	6 1/8	29/32	1 31/32	55/64	45/64	2 17/32(2 13/16)	2 9/16(3 3/8)	3/4	UKFC218	FC218	UK218	H318X(H2318X)	13.3	96.1	71.5	14.5	-	-	-	-	-	-	-	-	
		265	190	220	155.5	23	50	22	18	64(71.5)	65(86)	M20								UKFC218C	UKFC218D	83	3 9/32	13.3	UKFC218FC	UKFC218FD	98	3 27/32	14.9
90	3 1/2	10 1/4	7.3228	8 5/8	6 3/32	29/32	1 11/16	15/32	1 7/64	2 5/32	3 3/8	3/4	UKFCX18	FCX18	UKX18	H2318X	13.0	109	81.9	14.4	-	-	-	-	-	-	-	-	
		260	186	219	154.8	23	43	12	28	55	86	M20								UKFCX18C	UKFCX18D	92	3 5/8	15.1					
90	3 1/2	10 7/8	8.1102	9 3/8	6 5/8	29/32	2 19/32	55/64	1 7/64	2 23/32	3 13/16	3/4	UKFCX20	FCX20	UKX20	HE2320X	17.1	133	105	14.4	-	-	-	-	-	-	-	-	
		276	206	238	168.3	23	66	22	28	69	97	M20				H2320X	17.1				UKFCX20C	UKFCX20D	116	4 9/16	19.9				

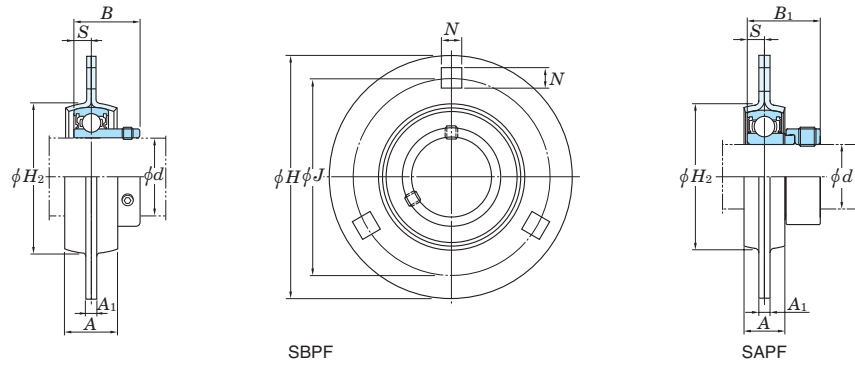
Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

2. Part No. of applicable grease nipples are shown below.
A-1/4-28UNF.....205-210, X05-X09
A-PT1/8.....211-218, X10-X20

3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No. : UKFC206J + H306X, UK206 + H306X)
4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UKFC206JL3 + H2306X, UK206L3 + H2306X)
5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Pressed steel round-flanged type

SBPF
Cylindrical bore
(with set screws)
SAPF
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 35 mm



Variations of tolerance of distance between centers of bolt holes (ΔJ_b) Unit : mm

Housing No.	ΔJ_b
PF203~PF207	±0.4

Variations of tolerance of bolt hole diameter (ΔN_b) Unit : mm

Housing No.	ΔN_b
PF203~PF207	±0.25

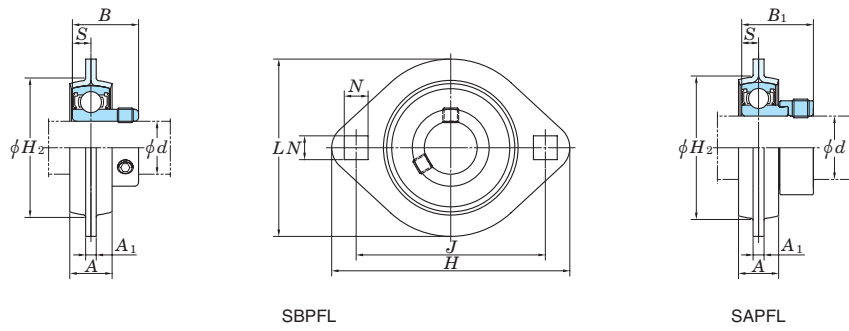
Shaft Dia mm inch <i>d</i>	Dimensions inch mm								SBPF <i>B</i>	SAPF <i>B</i> ₁	Bolt Size inch mm	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN		Factor <i>f</i> ₀	Mass kg	
	<i>H</i>	<i>A</i>	<i>A</i> ₁	<i>J</i>	<i>N</i>	<i>H</i> ₂	<i>S</i>	<i>C</i> _r									<i>C</i> _{0r}	SBPF		SAPF	
12 1/2	3 3/16	9/16	5/32	2 1/2	9/32	1 15/16	0.236	0.866	1.122	1/4	SBPF201 SBPF201-8	SB201 SB201-8	SAPF201 SAPF201-8	SA201 SA201-8	PF203	9.55	4.80	13.2	0.27	0.3	
15 5/8	81	14	4	63.5	7.1	49	6	22	28.5	M6	SBPF202 SBPF202-10	SB202 SB202-10	SAPF202 SAPF202-10	SA202 SA202-10							
17											SBPF203	SB203	SAPF203	SA203							
20 3/4	3 17/32	5/8	5/32	2 13/16	23/64	25/32	0.276	0.984	1.161	5/16	SBPF204-12 SBPF204	SB204-12 SB204	SAPF204-12 SAPF204	SA204-12 SA204	PF204	12.8	6.65	13.2	0.33	0.33	
25 7/8	3 3/4	23/32	5/32	2 63/64	23/64	2 3/8	0.295	1.063	1.201	5/16	SBPF205-14 SBPF205-15	SB205-14 SB205-15	SAPF205-14 SAPF205-15	SA205-14 SA205-15							
1	95	18	4	76	9	60	7.5	27	30.5	M8	SBPF205	SB205	SAPF205	SA205	PF205	14.0	7.85	13.9	0.38	0.42	
30 1 1/8	4 7/16	3/4	13/64	3 9/16	7/16	2 25/32	0.315	1.181	1.335	3/8	SBPF206-18 SBPF206	SB206-18 SB206	SAPF206-18 SAPF206	SA206-18 SA206							
1 1/4	113	19	5.2	90.5	11	71	8	30	33.9	M10	SBPF206-19 SBPF206-20	SB206-19 SB206-20	SAPF206-19 SAPF206-20	SA206-19 SA206-20							
1 1/4	4 13/16	7/8	13/64	3 15/16	7/16	3 3/16	0.335	1.260	1.437	3/8	SBPF207-20	SB207-20	SAPF207-20	SA207-20	PF207	25.7	15.4	13.9	0.82	0.9	
35 1 3/8	122	22	5.2	100	11	81	8.5	32	36.5	M10	SBPF207-22 SBPF207	SB207-22 SB207	SAPF207-22 SAPF207	SA207-22 SA207							
1 7/16											SBPF207-23	SB207-23	SAPF207-23	SA207-23							

Note 1) *H*₂ is the minimum size of the mounting hole.

Remark For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Pressed steel rhombic-flanged type

SBPFL
Cylindrical bore
(with set screws)
SAPFL
Cylindrical bore
(with eccentric locking collar)
d 12 ~ 35 mm



Variations of tolerance of distance between centers of bolt holes (ΔJ_b)
Unit : mm

Housing No.	ΔJ_b
PFL203-PFL207	± 0.4

Variations of tolerance of bolt hole diameter (ΔN_b)
Unit : mm

Housing No.	ΔN_b
PFL203-PFL207	± 0.25

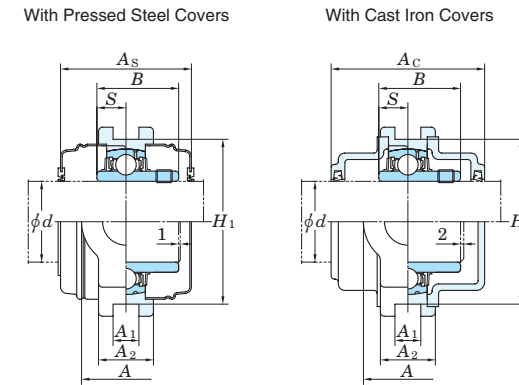
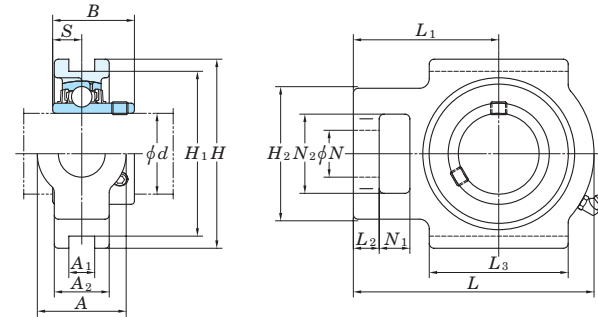
Shaft Dia mm inch <i>d</i>	Dimensions inch mm								SBPFL <i>B</i>	SAPFL <i>B</i> ₁	Bolt Size inch mm	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN		Factor <i>f</i> ₀	Mass kg	
	<i>H</i>	<i>L</i>	<i>A</i>	<i>A</i> ₁	<i>J</i>	<i>N</i>	<i>H</i> ₂	<i>S</i>									<i>C</i> _r	<i>C</i> _{0r}		SBPFL	SAPFL
12 1/2	3 3/16	2 5/16	9/16	5/32	2 1/2	9/32	1 15/16	0.236	0.866	1.122	1/4	SBPFL201 SBPFL201-8	SB201 SB201-8	SAPFL201 SAPFL201-8	SA201 SA201-8	PFL203	9.55	4.80	13.2	0.19	0.22
15 5/8	81	59	14	4	63.5	7.1	49	6	22	28.5	M6	SBPFL202 SBPFL202-10	SB202 SB202-10	SAPFL202 SAPFL202-10	SA202 SA202-10						
17												SBPFL203	SB203	SAPFL203	SA203						
20 3/4	3 17/32	2 5/8	5/8	5/32	2 13/16	23/64	25/32	0.276	0.984	1.161	5/16	SBPFL204-12 SBPFL204	SB204-12 SB204	SAPFL204-12 SAPFL204	SA204-12 SA204	PFL204	12.8	6.65	13.2	0.24	0.24
25 7/8 15/16	3 3/4	2 25/32	23/32	5/32	2 63/64	23/64	2 3/8	0.295	1.063	1.201	5/16	SBPFL205-14 SBPFL205-15	SB205-14 SB205-15	SAPFL205-14 SAPFL205-15	SA205-14 SA205-15	PFL205	14.0	7.85	13.9	0.28	0.32
	95	71	18	4	76	9	60	7.5	27	30.5	M8	SBPFL205	SB205	SAPFL205	SA205						
												SBPFL205-16	SB205-16	SAPFL205-16	SA205-16						
30 1 1/8 13/16	4 7/16	3 5/16	3/4	13/64	3 9/16	7/16	2 25/32	0.315	1.181	1.335	3/8	SBPFL206-18 SBPFL206	SB206-18 SB206	SAPFL206-18 SAPFL206	SA206-18 SA206	PFL206	19.5	11.3	13.9	0.38	0.41
	113	84	19	5.2	90.5	11	71	8	30	33.9	M10	SBPFL206-19	SB206-19	SAPFL206-19	SA206-19						
												SBPFL206-20	SB206-20	SAPFL206-20	SA206-20						
35 1 1/4 15/16 1 3/8	4 13/16	3 11/16	7/8	13/64	3 15/16	7/16	3 3/16	0.335	1.260	1.437	3/8	SBPFL207-20 SBPFL207-22	SB207-20 SB207-22	SAPFL207-20 SAPFL207-21	SA207-20 SA207-21	PFL207	25.7	15.4	13.9	0.66	0.74
	122	94	22	5.2	100	11	81	8.5	32	36.5	M10	SBPFL207	SB207	SAPFL207	SA207						
												SBPFL207-23	SB207-23	SAPFL207-23	SA207-23						

Note 1) *H*₂ is the minimum size of the mounting hole.

Remark For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Take-up type

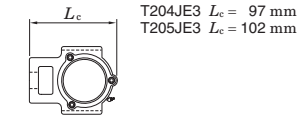
UCT
Cylindrical bore (with set screws)
d 12 ~ (45) mm



Variations of tolerance of groove width (ΔA_{1s}), variations of tolerance of distance between both grooves (ΔH_{1s}), and tolerance of symmetry of both groove sides (X)

Housing No.			ΔA_{1s}	ΔH_{1s}	X
T204-T210	TX05-TX10	T305-T310	+0.2 0	0 -0.5	0.5
T211-T217	TX11-TX17	T311-T318 T319-T322 T324-T328	+0.3 0	0 -0.8	0.6 0.7 0.8

Form and dimensions of L_c of T204JE3 and T205JE3 (housing with cast iron covers) are shown below.

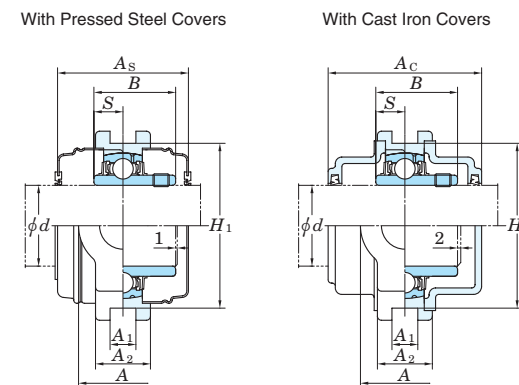
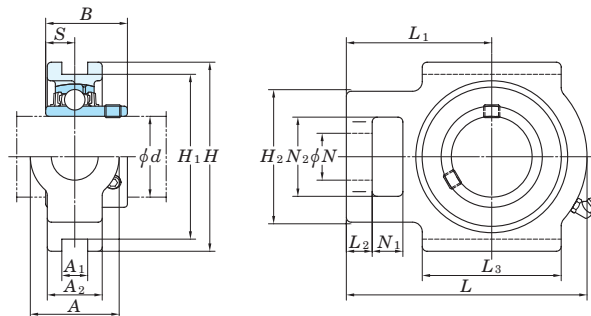


Shaft Dia. mm inch d	Dimensions inch mm																Standard		Bearing No.	Mass kg	Basic Load Ratings kN C_r C_{0r}	Factor f_0	With Pressed Steel Covers				With Cast Iron Covers					
	A	A ₁	A ₂	H	H ₁	H ₂	L	L ₁	L ₂	L ₃	N	N ₁	N ₂	B	S	Unit No.	Housing No.	Unit No.					Housing No.	Dimension mm inch	Mass kg	Unit No.	Housing No.	Dimension mm inch	Mass kg			
	Open Ends	Type	Closed End	Type	As	kg	Open Ends	Type	Closed End	Type	Ac	kg																				
12 15 17 20	1/2 5/8 3/4	1 1/4	15/32	13/16	3 1/2	2 63/64	2	3 11/16	2 13/32	13/32	2	3/4	5/8	1 1/4	1.220	0.500	UCT201 UCT201-8 UCT202 UCT202-10 UCT203 UCT204-12 UCT204	T204	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	0.81 0.81 0.79 0.79 0.78 0.78 0.76	12.8	6.65	13.2	UCT201C UCT201CD UCT202C UCT202CD UCT203C UCT203CD UCT204C UCT204CD	44 44 44 44	1 23/32	0.81 0.79 0.78 0.76	UCT204FC UCT204FCD	62	2 7/16	1.1	
		1 1/4	15/32	15/16	3 1/2	2 63/64	2	3 13/16	2 7/16	13/32	2	3/4	5/8	1 1/4	1.343	0.563	UCT205-14 UCT205-15 UCT205 UCT205-16	T205	UC205-14 UC205-15 UC205 UC205-16	0.84 0.84 0.84 0.84	14.0	7.85	13.9	UCT205C UCT205CD	48	1 7/8	0.84	UCT205FC UCT205FCD	66	2 19/32	1.2	
		1 15/32	15/32	1 3/32	4 1/32	3 1/2	2 7/32	4 7/16	2 3/4	13/32	2 1/4	7/8	5/8	1 15/32	1.500	0.626	UCTX05 UCTX05-16	TX05	UCX05 UCX05-16	1.4 1.4	19.5	11.3	13.9	UCTX05C UCTX05CD	52	2 1/16	1.4	—	—	—		
		1 13/32	15/32	1 1/32	3 1/2	3 5/32	2 7/16	4 13/16	3	15/32	2 9/16	1 1/32	5/8	1 13/32	1.496	0.591	UCT305 UCT305-16	T305	UC305 UC305-16	1.4 1.4	21.2	10.9	12.6	UCT305C UCT305CD	76	3	2.0	—	—	—		
		1 1/8	15/32	1 3/32	4 1/32	3 1/2	2 7/32	4 7/16	2 3/4	13/32	2 1/4	7/8	5/8	1 15/32	1.500	0.626	UCT206-18 UCT206 UCT206-19 UCT206-20	T206	UC206-18 UC206 UC206-19 UC206-20	1.3 1.3 1.3 1.3	19.5	11.3	13.9	UCT206C UCT206CD	52	2 1/16	1.3	UCT206FC UCT206FCD	70	2 3/4	1.8	
30	1 3/16 1 1/4	1 15/32	15/32	1 3/16	4 1/32	3 1/2	2 17/32	5 3/32	3 1/16	1/2	2 17/32	7/8	5/8	1 15/32	1.689	0.689	UCTX06 UCTX06-19 UCTX06-20	TX06	UCX06 UCX06-19 UCX06-20	1.7 1.7 1.7	25.7	15.4	13.9	UCTX06C UCTX06CD	59	2 5/16	1.7	—	—	—		
		1 5/8	5/8	1 3/32	3 15/16	3 35/64	2 3/4	5 13/32	3 11/32	9/16	2 29/32	1 3/32	23/32	1 5/8	1.693	0.669	UCT306	T306	UC306	1.8	26.7	15.0	13.3	UCT306C UCT306CD	82	3 7/32	2.4	—	—	—		
		1 1/4	15/32	1 3/16	4 1/32	3 1/2	2 17/32	5 3/32	3 1/16	1/2	2 17/32	7/8	5/8	1 15/32	1.689	0.689	UCT207-20 UCT207-21 UCT207-22 UCT207 UCT207-23	T207	UC207-20 UC207-21 UC207-22 UC207 UC207-23	1.6 1.6 1.6 1.6 1.6	25.7	15.4	13.9	UCT207C UCT207CD	59	2 5/16	1.6	UCT207FC UCT207FCD	78	3 1/16	2.3	
		1 15/16	5/8	1 13/32	4 1/2	4 1/64	3 9/32	5 21/32	3 15/32	19/32	3 9/32	1 5/32	3/4	1 15/16	1.937	0.748	UCTX07-22 UCTX07 UCTX07-23	TX07	UCX07-22 UCX07 UCX07-23	2.7 2.7 2.7	29.1	17.8	14.0	UCTX07C UCTX07CD	68	2 11/16	2.7	—	—	—		
		1 25/32	5/8	1 1/4	4 3/8	3 15/16	2 15/16	5 29/32	3 11/16	19/32	3 5/32	1 3/16	25/32	1 25/32	1.890	0.748	UCT307	T307	UC307	2.3	33.4	19.3	13.2	UCT307C UCT307CD	88	3 15/32	3.1	—	—	—		
40	1 1/2 1 9/16	1 15/16	5/8	1 5/16	4 1/2	4 1/64	3 9/32	5 21/32	3 15/32	5/8	3 9/32	1 5/32	3/4	1 15/16	1.937	0.748	UCT208-24 UCT208-25 UCT208	T208	UC208-24 UC208-25 UC208	2.5 2.5 2.5	29.1	17.8	14.0	UCT208C UCT208CD	68	2 11/16	2.5	UCT208FC UCT208FCD	86	3 3/8	3.3	
		1 15/16	5/8	1 13/32	4 19/32	4 1/64	3 9/32	5 21/32	3 7/16	19/32	3 9/32	1 5/32	3/4	1 15/16	1.937	0.748	UCTX08-24 UCTX08	TX08	UCX08-24 UCX08	2.6 2.6	34.1	21.3	14.0	UCTX08C UCTX08CD	68	2 11/16	2.6	—	—	—		
		1 1/2	1 31/32	49/64	1 11/32	4 7/8	4 13/32	3 9/32	6 3/8	3 15/16	21/32	3 1/2	1 1/4	7/8	1 31/32	2.047	0.748	UCT308-24 UCT308	T308	UC308-24 UC308	3.0 3.0	40.7	24.0	13.2	UCT308C UCT308CD	96	3 25/32	4.0	—	—	—	
		1 5/8	1 11/16	5/8	1 3/8	4 19/32	4 1/64	3 9/32	5 21/32	3 7/16	5/8	3 9/32	1 5/32	3/4	1 15/16	1.937	0.748	UCT209-26 UCT209-27 UCT209-28 UCT209	T209	UC209-26 UC209-27 UC209-28 UC209	2.4 2.4 2.4 2.4	34.1	21.3	14.0	UCT209C UCT209CD	68	2 11/16	2.4	UCT209FC UCT209FCD	88	3 15/32	3.2
		1 3/4	1 15/16	5/8	1 1/2	4 19/32	4 1/64	3 9/32	5 7/8	3 17/32	5/8	3 3/8	1 5/32	3/4	1 15/16	2.031	0.748	UCTX09-28 UCTX09	TX09	UCX09-28 UCX09	2.9 2.9	35.1	23.3	14.4	UCTX09C UCTX09CD	73	2 7/8	2.9	—	—	—	

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 B-1/4-28UNF..... 201-210, X05-X09, 305-308
 B-PT1/8..... 211-217, X10-X17, 309-328
 3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCT206JL3, UC206L3)
 4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Take-up type

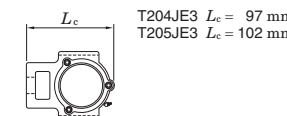
UCT
Cylindrical bore (with set screws)
d (45) ~ (75) mm



Variations of tolerance of groove width (ΔA_{1s}), variations of tolerance of distance between both grooves (ΔH_{1s}), and tolerance of symmetry of both groove sides (X)

Housing No.		ΔA_{1s}	ΔH_{1s}	X
T204-T210	TX05-TX10	+0.2 0	0 -0.5	0.5
T211-T217	TX11-TX17	+0.3 0	0 -0.8	0.6 0.7 0.8

Form and dimensions of L_c of T204JE3 and T205JE3 (housing with cast iron covers) are shown below.



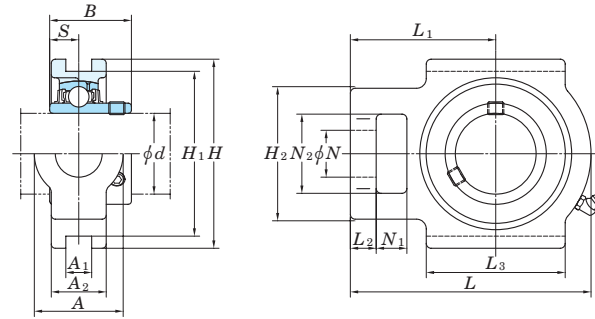
T204JE3 $L_c = 97$ mm
T205JE3 $L_c = 102$ mm

Shaft Dia. mm inch	Dimensions inch mm																Standard		Basic		Factor f_0	With Pressed Steel Covers			With Cast Iron Covers							
	A	A ₁	A ₂	H	H ₁	H ₂	L	L ₁	L ₂	L ₃	N	N ₁	N ₂	B	S	Unit No.	Housing No.	Bearing No.	Mass kg	C _r		C _{0r}	Unit No.	Dimension mm	Mass kg	Unit No.	Dimension mm	Mass kg				
45 1 3/4	2 5/32	45/64	1 1/2	5 7/16	4 59/64	3 17/32	7	4 11/32	29/32	3 13/16	1 11/32	1 5/16	2 5/32	2.244	0.866	UCT309-28 UCT309	T309	UC309-28 UC309	4.1 4.1	48.9	29.5	13.3	-	-	-	-	-	-				
	1 7/8	1 15/16	1 7/8	4 19/32	4 1/64	3 9/32	5 7/8	3 17/32	5/8	3 3/8	1 9/32	3/4	1 15/16	2.031	0.748	UCT210-30 UCT210-31 UCT210 UCT210-32	T210	UC210-30 UC210-31 UC210 UC210-32	2.6 2.6 2.6 2.6	35.1	23.3	14.4	UCT210C	UCT210CD	73	2 7/8	2.6	UCT210FC	UCT210FCD	97	3 13/16	3.6
50 2	2 17/32	55/64	1 21/32	5 3/4	5 1/8	4 1/32	6 23/32	4 3/16	3/4	3 3/4	1 3/8	31/32	2 17/32	2.189	0.874	UCTX10-31 UCTX10 UCTX10-32	TX10	UCX10-31 UCX10 UCX10-32	4.4 4.4 4.4	43.4	29.4	14.4	UCTX10C	UCTX10CD	75	2 15/16	4.4	-	-	-	-	-
	1 15/16	2 13/32	25/32	1 9/16	5 15/16	5 33/64	3 27/32	7 17/32	4 19/32	25/32	4 3/16	1 15/32	1 1/16	2 13/32	2.402	0.866	UCT310	T310	UC310	4.9	62.0	38.3	13.2	-	-	-	-	-	UCT310C	UCT310CD	110	4 11/32
55 2	2 17/32	55/64	1 1/2	5 3/4	5 1/8	4 1/32	6 23/32	4 3/16	3/4	3 3/4	1 3/8	31/32	2 17/32	2.189	0.874	UCT211-32 UCT211-34 UCT211 UCT211-35	T211	UC211-32 UC211-34 UC211 UC211-35	4.0 4.0 4.0 4.0	43.4	29.4	14.4	UCT211C	UCT211CD	75	2 15/16	4.0	UCT211FC	UCT211FCD	99	3 29/32	5.2
	2 3/16	2 17/32	55/64	1 23/32	5 3/4	5 1/8	4 1/32	7 5/8	4 11/16	3/4	4 1/32	1 3/8	1 1/4	2 17/32	2.563	1.000	UCTX11 UCTX11-35 UCTX11-36	TX11	UCX11 UCX11-35 UCX11-36	5.3 5.3 5.3	52.4	36.2	14.4	UCTX11C	UCTX11CD	88	3 15/32	5.3	-	-	-	-
60 2 3/8	2 19/32	55/64	1 23/32	6 13/32	5 29/32	4 1/8	8 5/32	5 13/16	4 17/32	1 17/32	1 5/32	2 19/32	2.598	0.984	UCT311-32 UCT311 UCT311-36	T311	UC311-32 UC311 UC311-36	6.1 6.1 6.1	71.6	45.0	13.2	-	-	-	-	-	UCT311C	UCT311CD	114	4 1/2	7.9	
	2 1/4	2 17/32	55/64	1 21/32	5 3/4	5 1/8	4 1/32	7 5/8	4 11/16	3/4	4 1/32	1 3/8	1 1/4	2 17/32	2.563	1.000	UCT212 UCT212-38 UCT212-39	T212	UC212 UC212-38 UC212-39	4.9 4.9 4.9	52.4	36.2	14.4	UCT212C	UCT212CD	88	3 15/32	4.9	UCT212FC	UCT212FCD	114	4 1/2
65 2 1/2	2 3/4	1 1/32	1 7/8	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCTX12 UCTX12-39	TX12	UCX12 UCX12-39	7.4 7.4	57.2	40.1	14.4	UCTX12C	UCTX12CD	88	3 15/32	7.4	-	-	-	-	-
	2 3/8	2 25/32	55/64	1 13/16	7	6 19/64	4 7/16	8 21/32	5 9/16	29/32	4 27/32	1 5/8	1 7/32	2 25/32	2.795	1.024	UCT312	T312	UC312	7.6	81.9	52.2	13.2	-	-	-	-	-	UCT312C	UCT312CD	124	4 7/8
70 2 3/4	2 3/4	1 1/32	1 23/32	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCT213-40 UCT213 UCTX13-40 UCTX13	T213	UC213-40 UC213 UCX13-40 UCX13	6.9 6.9 7.6 7.6	57.2	40.1	14.4	UCT213C	UCT213CD	88	3 15/32	6.9	UCT213FC	UCT213FCD	114	4 1/2	8.6
	2 1/2	2 3/4	1 1/32	1 7/8	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCT313-40 UCT313 UCT214-44 UCT214	T214	UC313-40 UC313 UC214-44 UC214	9.3 9.3 7.0 7.0	92.7	59.9	13.2	-	-	-	-	-	UCT313C	UCT313CD	122	4 13/16
75 2 15/16	2 3/4	1 1/32	1 7/8	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCTX14-44 UCTX14 UCT314-44 UCT314	TX14	UCX14-44 UCX14 UC314-44 UC314	7.9 7.9 11.1 11.1	67.4	48.3	14.5	UCTX14C	UCTX14CD	98	3 27/32	7.9	-	-	-	-	-
	3	2 3/4	1 1/32	1 23/32	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCT215-47 UCT215 UCT215-48 UCTX15-47 UCTX15	T215	UC215-47 UC215 UC215-48 UCX15-47 UCX15	7.3 7.3 7.3 8.7 8.7	67.4	48.3	14.5	UCT215C	UCT215CD	98	3 27/32	7.3	UCT215FC	UCT215FCD	124	4 7/8
75 3	2 3/4	1 7/64	1 7/8	7 1/4	6 1/2	4 3/8	9 1/4	5 1/2	13/16	4 3/4	1 5/8	1 1/4	2 3/4	3.252	1.311	UCTX15-47 UCTX15 UCTX15-48	TX15	UCX15-47 UCX15 UCX15-48	8.7 8.7 8.7	72.7	53.0	14.6	UCTX15C	UCTX15CD	108	4 1/4	8.7	-	-	-	-	-

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 B-1/4-28UNF..... 201~210, X05~X09, 305~308
 B-PT1/8..... 211~217, X10~X17, 309~328
 3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCT206JL3, UC206L3)
 4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Take-up type

UCT-E
Cylindrical bore (with set screws)
d 12 ~ 50 mm



Variations of tolerance of groove width (Δ_{A1s}), variations of tolerance of distance between both grooves (Δ_{H1s}), and tolerance of symmetry of both groove sides (X)
Unit : mm

Housing No.	Δ_{A1s}	Δ_{H1s}	X
T204E-T210E	+0.2 0	0 -0.5	0.5
T211E-T217E	+0.3 0	0 -0.8	0.6

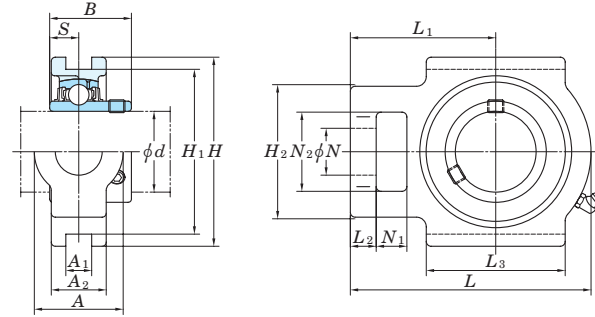
Shaft Dia. mm inch d	Dimensions inch mm															Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	A	A ₁	A ₂	H	H ₁	H ₂	L	L ₁	L ₂	L ₃	N	N ₁	N ₂	B	S				C _r	C _{0r}		
12 15 17 20	1 1/4 32	17/32 13.5	13/16 21	3 1/2 89	3 76.2	2 51	3 11/16 94	2 13/32 61	13/32 10	2 51	3/4 19	5/8 16	1 1/4 32	1.220 31	0.500 12.7	UCT201E UCT201-8E UCT202E UCT202-10E UCT203E UCT204-12E UCT204E	T204E	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	12.8 6.65	13.2	0.81 0.79 0.78 0.76	
25	1 1/4 32	17/32 13.5	15/16 24	3 1/2 89	3 76.2	2 51	3 13/16 97	2 7/16 62	13/32 10	2 51	3/4 19	5/8 16	1 1/4 32	1.343 34.1	0.563 14.3	UCT205-14E UCT205-15E UCT205E UCT205-16E	T205E	UC205-14 UC205-15 UC205 UC205-16	14.0 7.85	13.9	0.84	
30	1 15/32 37	17/32 13.5	1 3/32 28	4 1/32 102	3 1/2 88.9	2 7/32 56	4 7/16 113	2 3/4 70	13/32 10	2 1/4 57	7/8 22	5/8 16	1 15/32 37	1.500 38.1	0.626 15.9	UCTX05E UCTX05-16E	TX05E	UCX05 UCX05-16	19.5 11.3	13.9	1.4	
30	1 15/32 37	17/32 13.5	1 3/32 28	4 1/32 102	3 1/2 88.9	2 7/32 56	4 7/16 113	2 3/4 70	13/32 10	2 1/4 57	7/8 22	5/8 16	1 15/32 37	1.500 38.1	0.626 15.9	UCT206-18E UCT206E UCT206-19E UCT206-20E	T206E	UC206-18 UC206 UC206-19 UC206-20	19.5 11.3	13.9	1.3	
30	1 3/16 37	17/32 13.5	1 3/16 30	4 1/32 102	3 1/2 88.9	2 17/32 64	5 3/32 129	3 1/16 78	1/2 13	2 17/32 64	7/8 22	5/8 16	1 15/32 37	1.689 42.9	0.689 17.5	UCTX06E UCTX06-19E UCTX06-20E	TX06E	UCX06 UCX06-19 UCX06-20	25.7 15.4	13.9	1.7	
35	1 15/32 37	17/32 13.5	1 3/16 30	4 1/32 102	3 1/2 88.9	2 17/32 64	5 3/32 129	3 1/16 78	1/2 13	2 17/32 64	7/8 22	5/8 16	1 15/32 37	1.689 42.9	0.689 17.5	UCT207-20E UCT207-21E UCT207-22E UCT207E UCT207-23E	T207E	UC207-20 UC207-21 UC207-22 UC207 UC207-23	25.7 15.4	13.9	1.6	
35	1 15/16 49	11/16 17.5	1 13/32 36	4 1/2 114	4 101.6	3 9/32 83	5 21/32 144	3 15/32 88	19/32 15	3 9/32 83	1 5/32 29	3/4 19	1 15/16 49	1.937 49.2	0.748 19	UCTX07-22E UCTX07E UCTX07-23E	TX07E	UCX07-22 UCX07 UCX07-23	29.1 17.8	14.0	2.7	
40	1 15/16 49	11/16 17.5	1 5/16 33	4 1/2 114	4 101.6	3 9/32 83	5 21/32 144	3 15/32 88	19/32 16	3 9/32 83	1 5/32 29	3/4 19	1 15/16 49	1.937 49.2	0.748 19	UCT208-24E UCT208-25E UCT208E	T208E	UC208-24 UC208-25 UC208	29.1 17.8	14.0	2.5	
40	1 15/16 49	11/16 17.5	1 13/32 36	4 19/32 117	4 101.6	3 9/32 83	5 21/32 144	3 7/16 87	19/32 15	3 9/32 83	1 5/32 29	3/4 19	1 15/16 49	1.937 49.2	0.748 19	UCTX08-24E UCTX08E	TX08E	UCX08-24 UCX08	34.1 21.3	14.0	2.6	
45	1 15/16 49	11/16 17.5	1 3/8 35	4 19/32 117	4 101.6	3 9/32 83	5 21/32 144	3 7/16 87	5/8 16	3 9/32 83	1 5/32 29	3/4 19	1 15/16 49	1.937 49.2	0.748 19	UCT209-26E UCT209-27E UCT209-28E UCT209E	T209E	UC209-26 UC209-27 UC209-28 UC209	34.1 21.3	14.0	2.4	
45	1 3/4 49	11/16 17.5	1 1/2 38	4 19/32 117	4 101.6	3 9/32 83	5 7/8 149	3 17/32 90	5/8 16	3 3/8 86	1 5/32 29	3/4 19	1 15/16 49	2.031 51.6	0.748 19	UCTX09-28E UCTX09E	TX09E	UCX09-28 UCX09	35.1 23.3	14.4	2.9	
50	1 15/16 49	11/16 17.5	1 15/32 37	4 19/32 117	4 101.6	3 9/32 83	5 7/8 149	3 17/32 90	5/8 16	3 3/8 86	1 5/32 29	3/4 19	1 15/16 49	2.031 51.6	0.748 19	UCT210-30E UCT210-31E UCT210E UCT210-32E	T210E	UC210-30 UC210-31 UC210 UC210-32	35.1 23.3	14.4	2.6	
50	2 64	1 15/16 49	1 1/16 27	5 3/4 146	5 1/8 130.17	4 1/64 102	6 23/32 171	4 3/16 106	3/4 19	3 3/4 95	1 3/8 35	31/32 25	2 17/32 64	2.189 55.6	0.874 22.2	UCTX10-31E UCTX10E UCTX10-32E	TX10E	UCX10-31 UCX10 UCX10-32	43.4 29.4	14.4	4.4	

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
B-1/4-28UNF 201~210, X05~X09, 305~308
B-PT1/8 211~217, X10~X17, 309~328

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCT206EL3, UC206L3)
4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Take-up type

UCT-E
Cylindrical bore (with set screws)
d 55 ~ 85 mm



Variations of tolerance of groove width (Δ_{A1s}), variations of tolerance of distance between both grooves (Δ_{H1s}), and tolerance of symmetry of both groove sides (X)
Unit : mm

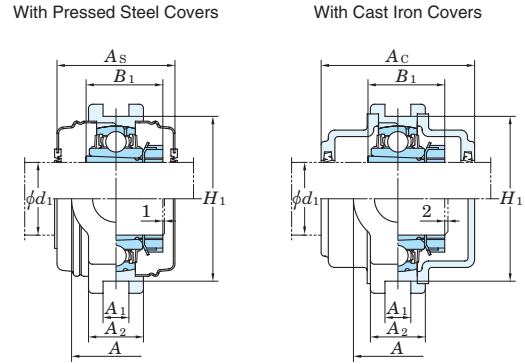
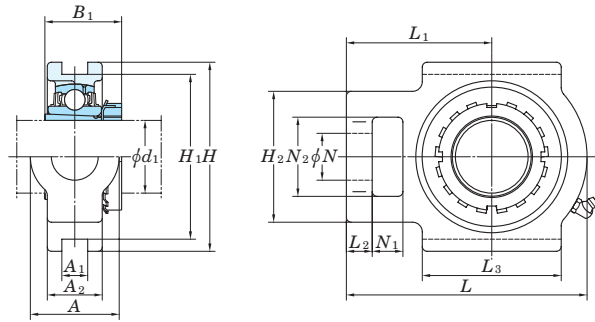
Housing No.	Δ_{A1s}	Δ_{H1s}	X
T204E-T210E	+0.2 0	0 -0.5	0.5
T211E-T217E	+0.3 0	0 -0.8	0.6

Shaft Dia. mm inch d	Dimensions inch mm															Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f ₀	Mass kg								
	A	A ₁	A ₂	H	H ₁	H ₂	L	L ₁	L ₂	L ₃	N	N ₁	N ₂	B	S				C _r	C _{0r}										
55	2 2 1/8	2 17/32	1 1/16	1 1/2	5 3/4	5 1/8	4 1/64	6 23/32	4 3/16	3/4	3 3/4	1 3/8	3 1/32	2 17/32	2.189	0.874	UCT211-32E UCT211-34E UCT211E UCT211-35E	T211E	UC211-32 UC211-34 UC211 UC211-35	43.4	29.4	14.4	4.0							
	2 3/16	64	27	38	146	130.17	102	171	106	19	95	35	25	64	55.6	22.2														
	2 3/16	2 17/32	1 1/16	1 23/32	5 3/4	5 1/8	4 1/64	7 5/8	4 11/16	3/4	4 1/32	1 3/8	1 1/4	2 17/32	2.563	1.000								UCTX11E UCTX11-35E UCTX11-36E	TX11E	UCX11 UCX11-35 UCX11-36	52.4	36.2	14.4	5.3
	2 1/4	64	27	44	146	130.17	102	194	119	19	102	35	32	64	65.1	25.4														
60	2 1/4	2 17/32	1 1/16	1 21/32	5 3/4	5 1/8	4 1/64	7 5/8	4 11/16	3/4	4 1/32	1 3/8	1 1/4	2 17/32	2.563	1.000	UCT212-36E UCT212E UCT212-38E UCT212-39E	T212E	UC212-36 UC212 UC212-38 UC212-39	52.4	36.2	14.4	4.9							
	2 3/8	64	27	42	146	130.17	102	194	119	19	102	35	32	64	65.1	25.4														
	2 7/16	2 3/4	1 1/16	1 7/8	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000								UCTX12E UCTX12-39E	TX12E	UCX12 UCX12-39	57.2	40.1	14.4	7.4
	2 7/16	70	27	48	167	150.8	111	224	137	21	121	41	32	70	65.1	25.4														
65	2 1/2	2 3/4	1 1/16	1 23/32	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.563	1.000	UCT213-40E UCT213E UCTX13-40E UCTX13E	T213E	UC213-40 UC213 UCX13-40 UCX13	57.2	40.1	14.4	6.9							
	2 1/2	70	27	44	167	150.8	111	224	137	21	121	41	32	70	65.1	25.4														
	2 1/2	2 3/4	1 1/16	1 7/8	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.937	1.189								UCT214-44E UCT214E	T214E	UC214-44 UC214	62.2	44.1	14.5	7.0
	2 1/2	70	27	48	167	150.8	111	224	137	21	121	41	32	70	74.6	30.2														
70	2 3/4	2 3/4	1 1/16	1 13/16	6 9/16	5 15/16	4 3/8	8 13/16	5 13/32	13/16	4 3/4	1 5/8	1 1/4	2 3/4	2.937	1.189	UCTX14-44E UCTX14E	TX14E	UCX14-44 UCX14	67.4	48.3	14.5	7.9							
	2 3/4	70	27	46	167	150.8	111	224	137	21	121	41	32	70	74.6	30.2														
	2 3/4	2 3/4	1 1/16	1 7/8	6 9/16	5 15/16	4 3/8	9 1/8	5 1/2	13/16	4 3/4	1 5/8	1 1/4	2 3/4	3.063	1.331								UCT215-47E UCT215E UCT215-48E	T215E	UC215-47 UC215 UC215-48	67.4	48.3	14.5	7.3
	2 3/4	70	27	48	167	150.8	111	232	140	21	121	41	32	70	77.8	33.3														
75	2 15/16	2 3/4	1 1/16	1 7/8	6 9/16	5 15/16	4 3/8	9 1/8	5 1/2	13/16	4 3/4	1 5/8	1 1/4	2 3/4	3.063	1.331	UCTX15-47E UCTX15E UCTX15-48E	TX15E	UCX15-47 UCX15 UCX15-48	72.7	53.0	14.6	8.7							
	3	70	27	48	167	150.8	111	232	140	21	121	41	32	70	77.8	33.3														
	2 15/16	2 3/4	1 1/16	1 7/8	7 1/4	6 1/2	4 3/8	9 1/4	5 1/2	13/16	4 3/4	1 5/8	1 1/4	2 3/4	3.252	1.311								UCT216-50E UCT216E	T216E	UC216-50 UC216	72.7	53.0	14.6	8.2
	3	70	27	48	184	165	111	235	140	21	121	41	32	70	82.6	33.3														
80	3 1/8	2 3/4	1 1/16	2	7 1/4	6 1/2	4 3/8	9 1/4	5 1/2	13/16	4 3/4	1 5/8	1 1/4	2 3/4	3.252	1.311	UCTX16E	TX16E	UCX16	84.0	61.9	14.5	12.4							
	3 1/8	70	27	51	184	165	111	235	140	21	121	41	32	70	82.6	33.3														
	3 1/2	3 1/2	1 13/16	2 11/16	7 25/32	6 13/16	4 7/8	10 1/4	6 3/8	1 3/32	6 3/16	1 7/8	1 1/2	2 7/8	3.374	1.343								UCT217-52E UCT217E	T217E	UC217-52 UC217	84.0	61.9	14.5	12.1
	3 1/2	89	46	68	198	173	124	260	162	28	157	48	38	73	85.7	34.1														
85	3 1/4	3 1/2	1 13/16	2 11/16	7 25/32	6 13/16	4 7/8	10 1/4	6 3/8	1 3/32	6 3/16	1 7/8	1 1/2	2 7/8	3.374	1.343	UCTX17E UCTX17-55E	TX17E	UCX17 UCX17-55	96.1	71.5	14.5	13.3							
	3 1/4	89	46	68	198	173	124	260	162	29	157	48	38	73	85.7	34.1														
	3 1/2	3 1/2	1 13/16	2 11/16	7 25/32	6 13/16	4 7/8	10 1/4	6 3/8	1 3/32	6 3/16	1 7/8	1 1/2	2 7/8	3.780	1.563								UCT217E UCTX17E	T217E	UC217 UCX17	84.0	61.9	14.5	12.1
	3 7/16	89	46	68	198	173	124	260	162	28	157	48	38	73	96	39.7														

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
2. Part No. of applicable grease nipples are shown below.
B-1/4-28UNF 201~210, X05~X09, 305~308
B-PT1/8 211~217, X10~X17, 309~328

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCT206EL3, UC206L3)
4. As for the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

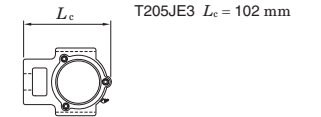
UKT Tapered bore (with adapter) d_1 20 ~ (50) mm



Variations of tolerance of groove width (Δ_{A1s}), variations of tolerance of distance between both grooves (Δ_{H1s}), and tolerance of symmetry of both groove sides (X)

Table with columns: Housing No., Δ_{A1s} , Δ_{H1s} , X. Rows include T205-T210, T211-T217, T305-T310, T311-T318, T319-T322, T324-T328.

Form and dimension of L_c of T205JE3 (housing with cast iron covers) are shown below.



Main data table with columns: Shaft Dia. (mm, inch), Dimensions (inch, mm), Standard (Unit No., Housing No., Bearing No.), Adapter assembly No., Mass (kg), Basic Load Ratings (Cr, Cor, fo), Factor, With Pressed Steel Covers (Unit No., Dimension mm, inch, Mass kg), and With Cast Iron Covers (Unit No., Dimension mm, inch, Mass kg). Rows are grouped by shaft diameter (20, 25, 30, 35, 40, 45, 50 mm).

Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

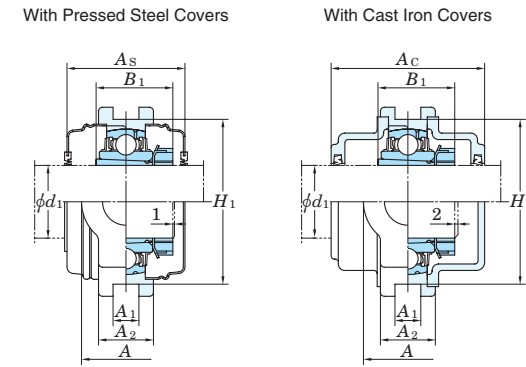
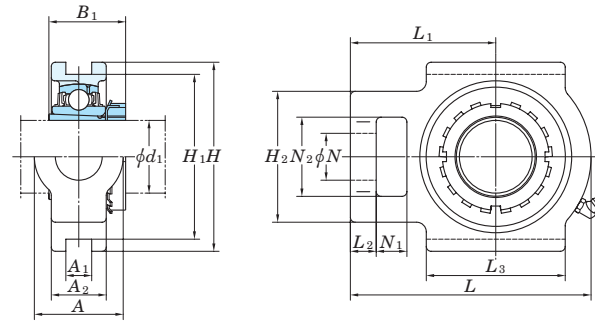
Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below. B-1/4-28UNF.....205-210, X05-X09, 305-308 B-PT1/8.....211-217, X10-X17, 309-328

3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No.: UKT206J + H306X, UK206 + H306X) 4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No.: UKT206JL3 + H2306X, UK206L3 + H2306X) 5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Take-up type

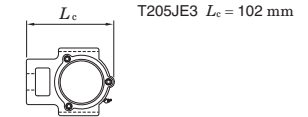
UKT
Tapered bore (with adapter)
 d_1 110 ~ 125 mm



Variations of tolerance of groove width (ΔA_{1s}), variations of tolerance of distance between both grooves (ΔH_{1s}), and tolerance of symmetry of both groove sides (X)

Housing No.		ΔA_{1s}	ΔH_{1s}	X
T205-T210	TX05-TX10 T305-T310	+0.2 0	0 -0.5	0.5
T211-T217	TX11-TX17 T311-T318	+0.3 0	0 -0.8	0.6 0.7
	T319-T322 T324-T328			0.8

Form and dimension of L_c of T205JE3 (housing with cast iron covers) are shown below.



Shaft Dia. mm inch	Dimensions inch mm														Unit No.	Housing No.	Bearing No.	Adapter ¹⁾ assembly No.	Mass kg	Basic Load Ratings kN C_r C_{0r}	Factor f_0	With Pressed Steel Covers			With Cast Iron Covers							
	A	A ₁	A ₂	H	H ₁	H ₂	L	L ₁	L ₂	L ₃	N	N ₁	N ₂	B ₁ ¹⁾								Open Ends Type	Closed End Type	Dimension mm inch	Mass kg	Open Ends Type	Closed End Type	Dimension mm inch	Mass kg			
110	5 1/2 140	1 49/64 45	3 17/32 90	13 31/32 355	12 9/32 320	8 9/32 210	17 432	10 1/2 267	1 21/32 42	9 1/16 230	2 3/4 70	2 3/8 60	5 1/2 140	4 13/32 112	UKT324	T324	UK324	H2324	54.7	207	185	13.5	-	-	-	-	-	UKT324C	UKT324CD	196	7 23/32	65.0
115	4 1/2 150	5 29/32 50	1 31/32 100	3 15/16 385	15 5/32 350	13 25/32 220	8 21/32 465	18 5/16 285	11 7/32 45	1 25/32 240	9 7/16 75	2 15/16 65	2 9/16 150	5 29/32 121	UKT326	T326	UK326	HE2326 H2326	69.1 69.1	229	214	13.6	-	-	-	-	-	UKT326C	UKT326CD	214	8 7/16	82.4
125	6 3/32 155	1 31/32 50	3 15/16 100	16 11/32 415	14 61/64 380	9 1/16 230	20 9/32 515	12 13/32 315	1 31/32 50	10 1/32 255	3 5/32 80	2 3/4 70	6 5/16 160	5 5/32 131	UKT328	T328	UK328	H2328	85.1	253	246	13.6	-	-	-	-	-	UKT328C	UKT328CD	222	8 3/4	102

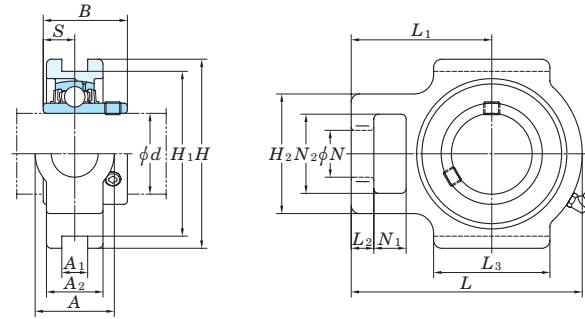
Note 1) Codes shown in parentheses indicate the dimensions and Part No. of applicable adapter (H2300X series) for UK200L3 series (triple-lip seal type).

2. Part No. of applicable grease nipples are shown below.
B-1/4-28UNF.....205~210, X05~X09, 305~308
B-PT1/8.....211~217, X10~X17, 309~328

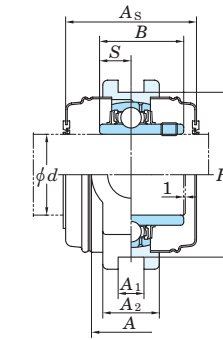
3. In Part No. of unit with adapters and bearing with adapters, Part No. of applicable adapter follow the Part No. shown in the dimensional tables. (Example of Part No. : UKT206J + H306X, UK206 + H306X)
4. As for the triple-lip seal type product (205 is the double-lip seal type product), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UKT206JL3 + H2306X, UK206L3 + H2306X)
5. For the dimensions and forms of applicable bearings and adapters, see the dimensional tables of ball bearing for unit and adapter assemblies.

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

UCST-H1S6
Cylindrical bore (with set screws)
d 20 ~ 50 mm



With Pressed Stainless Steel Covers



Variations of tolerance of groove width (Δ_{A1s}), variations of tolerance of distance between both grooves (Δ_{H1s}), and tolerance of symmetry of both groove sides (X)

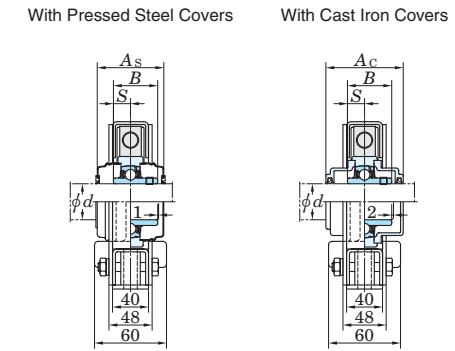
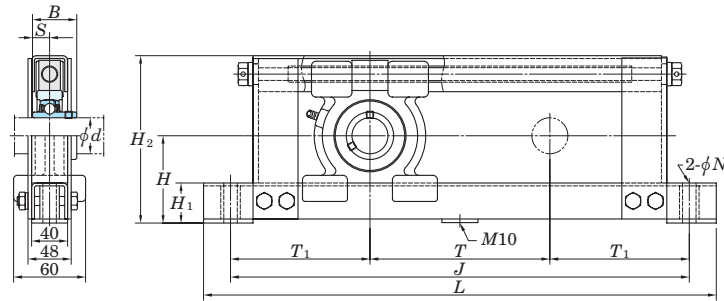
Housing No.	Δ_{A1s}	Δ_{H1s}	X
ST204H1-ST210H1	+0.2 0	0 -0.5	0.5

Unit : mm

Shaft Dia. mm <i>d</i>	Dimensions															Standard Unit No.	Housing No.	Bearing No.	Mass kg	Basic Load Ratings kN		Factor <i>f</i> ₀	With Pressed Stainless Steel Covers				
	inch																			Open Ends Type	Closed End Type		Dimension mm	Mass kg			
	mm																								A _s		
<i>A</i>	<i>A</i> ₁	<i>A</i> ₂	<i>H</i>	<i>H</i> ₁	<i>H</i> ₂	<i>L</i>	<i>L</i> ₁	<i>L</i> ₂	<i>L</i> ₃	<i>N</i>	<i>N</i> ₁	<i>N</i> ₂	<i>B</i>	<i>S</i>	<i>C</i> _r	<i>C</i> _{0r}	Unit No.	mm	inch								
20	1 1/4	15/32	29/32	3 1/2	2 63/64	1 13/16	3 1/2	2 5/16	1 1/32	1 23/32	3/4	23/32	1 1/4	1.220	0.500	UCST204H1S6	ST204H1	UC204S6	0.73	10.9	5.35	13.2	UCST204H1CS6	UCST204H1CDS6	45	1 25/32	0.73
	32	12	23	89	76	46	89	59	9	44	19	18	32	31	12.7												
25	1 1/4	15/32	31/32	3 1/2	2 63/64	1 13/16	3 21/32	2 3/8	1 1/32	1 23/32	3/4	23/32	1 1/4	1.343	0.563	UCST205H1S6	ST205H1	UC205S6	0.79	11.9	6.3	13.9	UCST205H1CS6	UCST205H1CDS6	49	1 15/16	0.79
	32	12	25	89	76	46	93	60	9	44	19	18	32	34.1	14.3												
30	1 15/32	15/32	1 1/16	4 1/32	3 1/2	2 1/16	4 3/16	2 5/8	1 1/32	1 31/32	7/8	23/32	1 15/32	1.500	0.626	UCST206H1S6	ST206H1	UC206S6	1.1	16.5	9.05	13.9	UCST206H1CS6	UCST206H1CDS6	53	2 3/32	1.1
	37	12	27	102	89	52	106	67	9	50	22	18	37	38.1	15.9												
35	1 15/32	15/32	1 7/32	4 1/32	3 1/2	2 7/32	4 11/16	2 15/16	7/16	2 7/32	7/8	23/32	1 15/32	1.689	0.689	UCST207H1S6	ST207H1	UC207S6	1.5	21.8	12.3	13.9	UCST207H1CS6	UCST207H1CDS6	60	2 3/8	1.5
	37	12	31	102	89	56	119	75	11	56	22	18	37	42.9	17.5												
40	1 15/16	5/8	1 1/4	4 1/2	4 1/64	2 29/32	5 5/16	3 11/32	9/16	2 17/32	1 5/32	25/32	1 15/16	1.937	0.748	UCST208H1S6	ST208H1	UC208S6	2	24.8	14.3	14.0	UCST208H1CS6	UCST208H1CDS6	69	2 23/32	2
	49	16	32	114	102	74	135	85	14	64	29	20	49	49.2	19												
45	1 15/16	5/8	1 11/32	4 19/32	4 1/64	2 29/32	5 13/32	3 11/32	9/16	2 19/32	1 5/32	25/32	1 15/16	1.937	0.748	UCST209H1S6	ST209H1	UC209S6	2.1	27.8	16.2	14.0	UCST209H1CS6	UCST209H1CDS6	69	2 23/32	2.1
	49	16	34	117	102	74	137	85	14	66	29	20	49	49.2	19												
50	1 15/16	5/8	1 3/8	4 19/32	4 1/64	2 29/32	5 5/8	3 7/16	9/16	2 27/32	1 5/32	25/32	1 15/16	2.031	0.748	UCST210H1S6	ST210H1	UC210S6	2.3	29.8	18.6	14.4	UCST210H1CS6	UCST210H1CDS6	74	2 29/32	2.3
	49	16	35	117	102	74	143	87	14	72	29	20	49	51.6	19												

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of the applicable grease nipple is A-1/4-28UNFN12.
 3. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCTL
Cylindrical bore (with set screws)
 d 20 ~ 45 mm



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 (ΔJ_s)

Nominal unit code	Unit : mm	
	ΔH_s	ΔJ_s
UCTL204-207	±2	±0.5
UCTL208, 209		±0.8

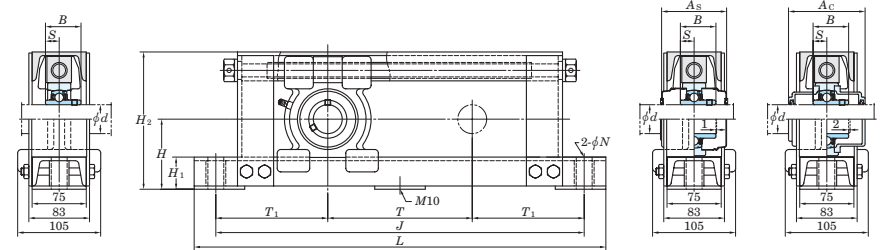
Shaft Dia. mm d	Dimensions mm											Bolt Size mm	Standard			Basic			Factor f_0	With Pressed Steel Covers				With Cast Iron Covers			
	H	H_1	H_2	L	J	N	T	T_1	B	S	Unit No.		Bearing No.	Mass	Load Ratings kN		Unit No.			Dimension	Mass	Unit No.		Dimension	Mass		
	kg	C_r	C_{or}	Open Ends Type	Closed End Type	mm	kg	Open Ends Type	Closed End Type	mm	kg		Open Ends Type	Closed End Type	mm	kg											
20	77	44	146	430	370	15	100	135	31	12.7	M12	UC204	6.0	12.8	6.65	13.2	UCTL204C-100	UCTL204CD-100	44	6.0	UCTL204FC-100	UCTL204FCD-100	62	6.5			
	77	44	146	530	470	15	200	135	31	12.7	M12	UC204	7.0	12.8	6.65	13.2	UCTL204C-200	UCTL204CD-200	44	7.0	UCTL204FC-200	UCTL204FCD-200	62	7.5			
	77	44	146	630	570	15	300	135	31	12.7	M12	UC204	7.5	12.8	6.65	13.2	UCTL204C-300	UCTL204CD-300	44	7.5	UCTL204FC-300	UCTL204FCD-300	62	8.0			
	77	44	146	730	670	15	400	135	31	12.7	M12	UC204	8.0	12.8	6.65	13.2	UCTL204C-400	UCTL204CD-400	44	8.0	UCTL204FC-400	UCTL204FCD-400	62	8.5			
25	82	44	156	440	380	15	100	140	34.1	14.3	M12	UC205	7.0	14.0	7.85	13.9	UCTL205C-100	UCTL205CD-100	48	7.0	UCTL205FC-100	UCTL205FCD-100	66	7.5			
	82	44	156	540	480	15	200	140	34.1	14.3	M12	UC205	7.5	14.0	7.85	13.9	UCTL205C-200	UCTL205CD-200	48	7.5	UCTL205FC-200	UCTL205FCD-200	66	8.0			
	82	44	156	640	580	15	300	140	34.1	14.3	M12	UC205	8.0	14.0	7.85	13.9	UCTL205C-300	UCTL205CD-300	48	8.0	UCTL205FC-300	UCTL205FCD-300	66	8.5			
	82	44	156	740	680	15	400	140	34.1	14.3	M12	UC205	9.0	14.0	7.85	13.9	UCTL205C-400	UCTL205CD-400	48	9.0	UCTL205FC-400	UCTL205FCD-400	66	9.5			
30	87	44	166	450	390	15	100	145	38.1	15.9	M12	UC206	7.0	19.5	11.3	13.9	UCTL206C-100	UCTL206CD-100	52	7.0	UCTL206FC-100	UCTL206FCD-100	70	7.5			
	87	44	166	550	490	15	200	145	38.1	15.9	M12	UC206	8.0	19.5	11.3	13.9	UCTL206C-200	UCTL206CD-200	52	8.0	UCTL206FC-200	UCTL206FCD-200	70	8.5			
	87	44	166	650	590	15	300	145	38.1	15.9	M12	UC206	9.0	19.5	11.3	13.9	UCTL206C-300	UCTL206CD-300	52	9.0	UCTL206FC-300	UCTL206FCD-300	70	9.5			
	87	44	166	750	690	15	400	145	38.1	15.9	M12	UC206	9.5	19.5	11.3	13.9	UCTL206C-400	UCTL206CD-400	52	9.5	UCTL206FC-400	UCTL206FCD-400	70	10			
35	92	44	176	460	400	15	100	150	42.9	17.5	M12	UC207	8.0	25.7	15.4	13.9	UCTL207C-100	UCTL207CD-100	59	8.0	UCTL207FC-100	UCTL207FCD-100	78	9.0			
	92	44	176	560	500	15	200	150	42.9	17.5	M12	UC207	8.5	25.7	15.4	13.9	UCTL207C-200	UCTL207CD-200	59	8.5	UCTL207FC-200	UCTL207FCD-200	78	9.5			
	92	44	176	660	600	15	300	150	42.9	17.5	M12	UC207	9.0	25.7	15.4	13.9	UCTL207C-300	UCTL207CD-300	59	9.0	UCTL207FC-300	UCTL207FCD-300	78	10			
	92	44	176	760	700	15	400	150	42.9	17.5	M12	UC207	10	25.7	15.4	13.9	UCTL207C-400	UCTL207CD-400	59	10	UCTL207FC-400	UCTL207FCD-400	78	11			
40	97	44	186	470	410	15	100	155	49.2	19	M12	UC208	8.5	29.1	17.8	14.0	UCTL208C-100	UCTL208CD-100	68	8.5	UCTL208FC-100	UCTL208FCD-100	86	9.5			
	97	44	186	570	510	15	200	155	49.2	19	M12	UC208	9.0	29.1	17.8	14.0	UCTL208C-200	UCTL208CD-200	68	9.0	UCTL208FC-200	UCTL208FCD-200	86	10			
	97	44	186	670	610	15	300	155	49.2	19	M12	UC208	10	29.1	17.8	14.0	UCTL208C-300	UCTL208CD-300	68	10	UCTL208FC-300	UCTL208FCD-300	86	11			
	97	44	186	770	710	15	400	155	49.2	19	M12	UC208	10.5	29.1	17.8	14.0	UCTL208C-400	UCTL208CD-400	68	10.5	UCTL208FC-400	UCTL208FCD-400	86	11.5			
45	100	44	192	480	420	15	100	160	49.2	19	M12	UC209	9.0	34.1	21.3	14.0	UCTL209C-100	UCTL209CD-100	68	9.0	UCTL209FC-100	UCTL209FCD-100	88	10			
	100	44	192	580	520	15	200	160	49.2	19	M12	UC209	9.5	34.1	21.3	14.0	UCTL209C-200	UCTL209CD-200	68	9.5	UCTL209FC-200	UCTL209FCD-200	88	10.5			
	100	44	192	680	620	15	300	160	49.2	19	M12	UC209	10.5	34.1	21.3	14.0	UCTL209C-300	UCTL209CD-300	68	10.5	UCTL209FC-300	UCTL209FCD-300	88	11.5			
	100	44	192	780	720	15	400	160	49.2	19	M12	UC209	11	34.1	21.3	14.0	UCTL209C-400	UCTL209CD-400	68	11	UCTL209FC-400	UCTL209FCD-400	88	12			

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter codes. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples is C-1/4-28UNF.
 3. As for the triple-lip seal type product (204 and 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No. : UCTL206JL3-100, UC206L3)
 4. The unit should be mounted so that load is applied to the frame mounting surface vertically and downward.

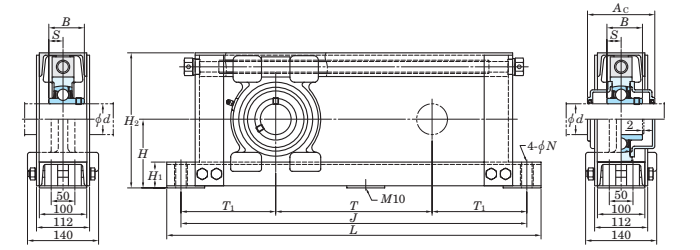
5. If heavy load ($P_r/C_r > 0.12$), vibration, or impact occurs, contact with JTEKT.
 6. Tapered bore (with adapter) type bearing units are also available. (Example of Part No. : UKTL206J-100 + H306X, UK206 + H306X)
 7. If frame parts need to be corrosion resistant, contact with JTEKT.
 8. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Channel steel frame take-up type

UCTU
Cylindrical bore (with set screws)
d 85 ~ 90 mm



UCTU200



UCTU300

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 (ΔJ_s)

Nominal unit code	ΔH_s	ΔJ_s
UCTU208-212	±2	±0.8
UCTU313-315		±1.2
UCTU316-318		

Shaft Dia. mm <i>d</i>	Dimensions mm										Bolt Size mm	Standard			Basic			With Pressed Steel Covers				With Cast Iron Covers			
	<i>H</i>	<i>H</i> ₁	<i>H</i> ₂	<i>L</i>	<i>J</i>	<i>N</i>	<i>T</i>	<i>T</i> ₁	<i>B</i>	<i>S</i>		Unit No.	Bearing No.	Mass kg	Load Ratings kN		<i>f</i> ₀	Unit No.		Dimension mm	Mass kg	Unit No.		Dimension mm	Mass kg
														<i>C</i> _r	<i>C</i> _{0r}		Open Ends Type	Closed End Type	<i>A</i> _s		Open Ends Type	Closed End Type	<i>A</i> _c		
85	165	55	325	1 020	960	22	500	230	96	40	M18	UC317	62	133	96.8	13.3	—	—	—	—	UCTU317C-500	UCTU317CD-500	146	65	
	165	55	325	1 120	1 060	22	600	230	96	40	M18	UC317	64	133	96.8	13.3	—	—	—	—	UCTU317C-600	UCTU317CD-600	146	67	
	165	55	325	1 220	1 160	22	700	230	96	40	M18	UC317	67	133	96.8	13.3	—	—	—	—	UCTU317C-700	UCTU317CD-700	146	70	
	165	55	325	1 320	1 260	22	800	230	96	40	M18	UC317	69	133	96.8	13.3	—	—	—	—	UCTU317C-800	UCTU317CD-800	146	72	
	165	55	325	1 420	1 360	22	900	230	96	40	M18	UC317	71	133	96.8	13.3	—	—	—	—	UCTU317C-900	UCTU317CD-900	146	74	
90	170	55	335	1 050	990	22	500	245	96	40	M18	UC318	65	143	107	13.3	—	—	—	—	UCTU318C-500	UCTU318CD-500	150	68	
	170	55	335	1 150	1 090	22	600	245	96	40	M18	UC318	67	143	107	13.3	—	—	—	—	UCTU318C-600	UCTU318CD-600	150	70	
	170	55	335	1 250	1 190	22	700	245	96	40	M18	UC318	70	143	107	13.3	—	—	—	—	UCTU318C-700	UCTU318CD-700	150	73	
	170	55	335	1 350	1 290	22	800	245	96	40	M18	UC318	72	143	107	13.3	—	—	—	—	UCTU318C-800	UCTU318CD-800	150	75	
	170	55	335	1 450	1 390	22	900	245	96	40	M18	UC318	74	143	107	13.3	—	—	—	—	UCTU318C-900	UCTU318CD-900	150	77	

Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)

2. Part No. of applicable grease nipples are shown below.

C-1/4-28UNF..... 208~210

C-PT1/8..... 211, 212, 313~318

3. As for the triple-lip seal type product, supplementary code L3 follows the Part No. of unit or bearing. (Example of Part No. : UCTU208JL3-500, UC208L3)

4. The unit should be mounted so that load is applied to the frame mounting surface vertically and downward.

5. If heavy load ($P_r/C_r > 0.12$), vibration, or impact occurs, contact with JTEKT.

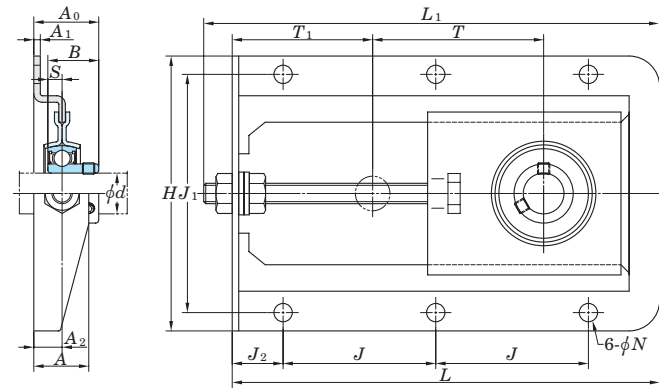
6. Tapered bore (with adapter) type bearing units are also available. (Example of Part No. : UKTU208J-500 + H308X, UK208 + H308X)

7. If frame parts need to be corrosion resistant, contact with JTEKT.

8. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Pressed steel frame take-up type

SBPTH
Cylindrical bore (with set screws)
 d 12 ~ 25 mm



Variations of tolerance of distance between centers of bolt holes ($\Delta J_s, \Delta J_{1s}$)

Nominal unit code	ΔJ_s	ΔJ_{1s}
SBPTH201-SBPTH205	± 0.7	± 0.7

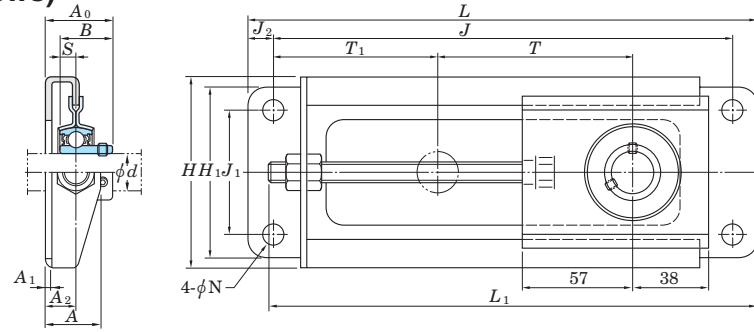
Unit : mm

Shaft Dia. mm d	Dimensions																Bolt Size inch mm	Unit No.	Bearing No.	Basic Load Ratings kN		Factor f_0	Mass kg
	H	L	L_1	A	J	J_1	J_2	N	T	T_1	A_1	A_2	A_0	B	S	C_r				C_{0r}			
12	5 5/16	8 9/32	8 21/32	1 1/16	2 61/64	4 39/64	31/32	11/32	3 15/32	2 23/32	1/8	35/64	1 3/16	0.866	0.236	5/16	SBPTH201-90	SB201	9.55	4.80	13.2	0.91	
	135	210	220	27	75	117	25	9	88	69	3.2	13.9	29.9	22	6	M8							
15	5 5/16	8 9/32	8 21/32	1 1/16	2 61/64	4 39/64	31/32	11/32	3 15/32	2 23/32	1/8	35/64	1 3/16	0.866	0.236	5/16	SBPTH202-90	SB202	9.55	4.80	13.2	0.91	
	135	210	220	27	75	117	25	9	88	69	3.2	13.9	29.9	22	6	M8							
17	5 5/16	8 9/32	8 21/32	1 1/16	2 61/64	4 39/64	31/32	11/32	3 15/32	2 23/32	1/8	35/64	1 3/16	0.866	0.236	5/16	SBPTH203-90	SB203	9.55	4.80	13.2	0.91	
	135	210	220	27	75	117	25	9	88	69	3.2	13.9	29.9	22	6	M8							
20	5 5/16	8 9/32	8 21/32	1 1/16	2 61/64	4 39/64	31/32	11/32	3 15/32	2 23/32	1/8	35/64	1 1/4	0.984	0.276	5/16	SBPTH204-90	SB204	12.8	6.65	13.2	0.91	
	135	210	220	27	75	117	25	9	88	69	3.2	13.9	31.9	25	7	M8							
25	5 5/16	8 9/32	8 21/32	1 1/16	2 61/64	4 39/64	31/32	11/32	3 15/32	2 23/32	1/8	35/64	1 5/16	1.063	0.295	5/16	SBPTH205-90	SB205	14.0	7.85	13.9	0.91	
	135	210	220	27	75	117	25	9	88	69	3.2	13.9	33.4	27	7.5	M8							

Remark For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

Pressed steel frame take-up type

SBNPTH
Cylindrical bore (with set screws)
d 12 ~ 25 mm



Variations of tolerance of distance between centers of bolt holes ($\Delta J_s, \Delta J_{1s}$)

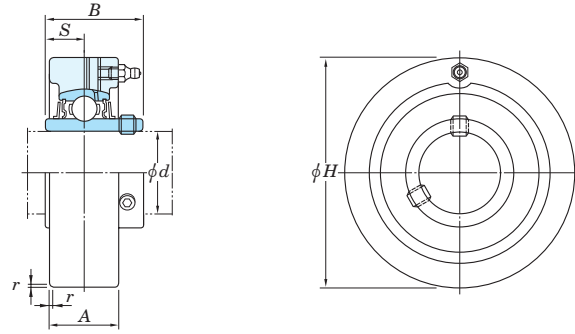
Nominal unit code	ΔJ_s	ΔJ_{1s}
SBNPTH201-SBNPTH205	± 0.7	± 0.7

Unit : mm

Shaft Dia. mm <i>d</i>	Dimensions																	Bolt Size	Unit No.	Bearing No.	Basic Load Ratings		Factor f_0	Mass kg
	<i>H</i>	<i>H</i> ₁	<i>L</i>	<i>L</i> ₁	<i>A</i>	<i>J</i>	<i>J</i> ₁	<i>J</i> ₂	<i>N</i>	<i>T</i>	<i>T</i> ₁	<i>A</i> ₁	<i>A</i> ₂	<i>A</i> ₀	<i>B</i>	<i>S</i>	<i>C</i> _r				<i>C</i> _{0r}			
12	3 15/16	3 17/32	10 1/4	9 11/16	1 1/16	9 1/4	2 9/16	1/2	7/16	3 15/16	3 9/32	1/8	19/32	1 7/32	0.866	0.236	5/16	SBNPTH201-100	SB201	9.55	4.80	13.2	0.93	
	100	90	260	246	27	235	65	12.5	11	100	83.5	3.2	15	31	22	6	M8							
15	3 15/16	3 17/32	10 1/4	9 11/16	1 1/16	9 1/4	2 9/16	1/2	7/16	3 15/16	3 9/32	1/8	19/32	1 7/32	0.866	0.236	5/16	SBNPTH202-100	SB202	9.55	4.80	13.2	0.93	
	100	90	260	246	27	235	65	12.5	11	100	83.5	3.2	15	31	22	6	M8							
17	3 15/16	3 17/32	10 1/4	9 11/16	1 1/16	9 1/4	2 9/16	1/2	7/16	3 15/16	3 9/32	1/8	19/32	1 7/32	0.866	0.236	5/16	SBNPTH203-100	SB203	9.55	4.80	13.2	0.93	
	100	90	260	246	27	235	65	12.5	11	100	83.5	3.2	15	31	22	6	M8							
20	3 15/16	3 17/32	10 1/4	9 11/16	1 1/16	9 1/4	2 9/16	1/2	7/16	3 15/16	3 9/32	1/8	19/32	1 5/16	0.984	0.276	5/16	SBNPTH204-100	SB204	12.8	6.65	13.2	0.93	
	100	90	260	246	27	235	65	12.5	11	100	83.5	3.2	15	33	25	7	M8							
25	3 15/16	3 17/32	10 1/4	9 11/16	1 1/16	9 1/4	2 9/16	1/2	7/16	3 15/16	3 9/32	1/8	19/32	1 11/32	1.063	0.295	5/16	SBNPTH205-100	SB205	14.0	7.85	13.9	0.93	
	100	90	260	246	27	235	65	12.5	11	100	83.5	3.2	15	34.5	27	7.5	M8							

Remark For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

UCC
Cylindrical bore (with set screws)
d 95 ~ 140 mm



Shaft Dia.		Dimensions					Unit No.	Housing No.	Bearing No.	Basic Load Ratings		Factor	Mass
mm	inch	inch mm								C_r	C_{0r}		
<i>d</i>		<i>H</i>	<i>A</i>	<i>r</i>	<i>B</i>	<i>S</i>							
95	—	9.449	2 53/64	0.16	4.055	1.614	UCC319	C319	UC319	153	119	13.3	15.8
		240	72	4	103	41							
100	3 15/16 4	10.236	2 61/64	0.16	4.252	1.654	UCC320 UCC320-63 UCC320-64	C320	UC320 UC320-63 UC320-64	173	141	13.2	19.6
		260	75	4	108	42							
105	—	10.236	2 61/64	0.16	4.409	1.732	UCC321	C321	UC321	184	153	13.2	27.0
110	—	11.811	3 5/32	0.2	4.606	1.811	UCC322	C322	UC322	205	180	13.2	29.2
		300	80	5	117	46							
120	—	12.598	3 35/64	0.2	4.961	2.008	UCC324	C324	UC324	207	185	13.5	35.9
		320	90	5	126	51							
130	—	13.386	3 15/16	0.24	5.315	2.126	UCC326	C326	UC326	229	214	13.6	43.0
		340	100	6	135	54							
140	—	14.173	3 15/16	0.24	5.709	2.323	UCC328	C328	UC328	253	246	13.6	52.9
		360	100	6	145	59							

- Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF 201~213, X05~X12, 305~308
 A-PT1/8 309~328
 3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (L2) follows the Part No. of unit or bearing. (Example of Part No. : UCC206JL3, UC206L3)
 4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.

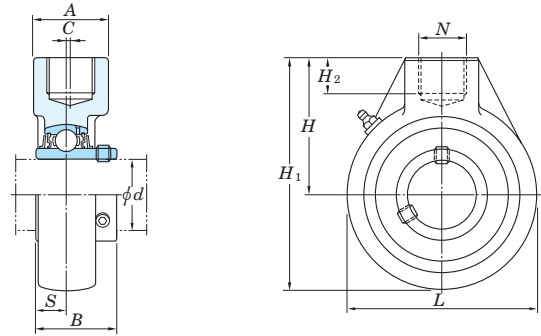
Variations of tolerance of outside diameter (ΔH_s), variations of tolerance of width (ΔA_s), and tolerance of circumferential runout of outside diameter (Y)

Housing No.			ΔH_s	ΔA_s	Y
C204-C205			0 -0.030	±0.2	0.2
C206-C210	CX05-CX08	C305-C308	0 -0.035		
C211-C213	CX09-CX10 CX11-CX12	C309-C310	0	±0.3	0.3
		C311-C314	-0.040		
		C315-C318	0		
		C319	-0.046		
		C320-C322	0 -0.052	±0.3	0.4
		C324-C328	0 -0.057		

Unit : mm

Hanger type

UCHA
Cylindrical bore (with set screws)
d 12 ~ 75 mm

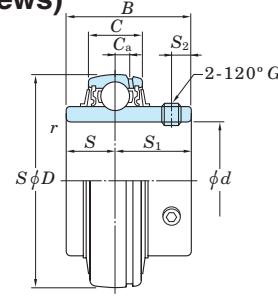


Shaft Dia. mm inch d	Dimensions inch mm										Unit No.	Housing No.	Bearing No.	Basic Load Ratings kN		Factor f ₀	Mass kg
	H	A	L	H ₁	H ₂	N	C	B	S	C _r				C _{0r}			
12 1/2											UCHA201 UCHA201-8 UCHA202 UCHA202-10 UCHA203 UCHA204-12 UCHA204	HA204	UC201 UC201-8 UC202 UC202-10 UC203 UC204-12 UC204	12.8	6.65	13.2	0.77 0.75 0.74 0.72
15 5/8	2 17/32	1 9/16	2 17/32	3 25/32	3/4	PF 3/4	—	1.220	0.500								
17 3/4	64	40	64	96	19	PF 3/4	—	31	12.7								
20											UCHA205-14 UCHA205-15 UCHA205 UCHA205-16 UCHA206-18 UCHA206 UCHA206-19 UCHA206-20	HA205	UC205-14 UC205-15 UC205 UC205-16 UC206-18 UC206 UC206-19 UC206-20	14.0	7.85	13.9	0.87
25 7/8 15/16	2 17/32	1 9/16	3 1/16	4 1/16	3/4	PF 3/4	—	1.343	0.563								
25	64	40	78	103	19	PF 3/4	—	34.1	14.3								
30 1 1/8	2 17/32	1 9/16	3 1/16	4 1/16	3/4	PF 3/4	—	1.500	0.626								
30	64	40	78	103	19	PF 3/4	—	38.1	15.9								
35 1 1/4 1 5/16 1 3/8	2 3/4	1 9/16	3 5/8	4 9/16	3/4	PF 3/4	—	1.689	0.689								
35	70	40	92	116	19	PF 3/4	—	42.9	17.5								
40 1 1/2 1 9/16	2 7/8	1 9/16	3 25/32	4 3/4	3/4	PF 3/4	5/64	1.937	0.748								
40	73	40	96	121	19	PF 3/4	2	49.2	19								
45 1 5/8 1 11/16 1 3/4	3 7/32	1 7/8	4 1/4	5 11/32	13/16	PF 1	13/64	1.937	0.748								
45	82	48	108	136	21	PF 1	5	49.2	19								
50 1 7/8 1 15/16	3 9/32	1 7/8	4 21/32	5 19/32	13/16	PF 1	13/64	2.031	0.748								
50	83	48	118	142	21	PF 1	5	51.6	19								
55 2 2 1/8 2 3/16	3 7/16	2 3/8	4 31/32	5 29/32	31/32	PF 1 1/4	9/32	2.189	0.874								
55	87	60	126	150	25	PF 1 1/4	7	55.6	22.2								
60 2 1/4 2 3/8 2 7/16	4 1/32	2 3/8	5 19/32	6 13/16	1 3/32	PF 1 1/4	23/64	2.563	1.000								
60	102	60	142	173	28	PF 1 1/4	9	65.1	25.4								
65 2 1/2	4 19/32	2 3/4	6 17/32	7 7/8	1 1/4	PF 1 1/2	3/8	2.563	1.000								
65	117	70	166	200	32	PF 1 1/2	9.5	65.1	25.4								
70 2 3/4	4 19/32	2 3/4	6 17/32	7 7/8	1 1/4	PF 1 1/2	3/8	2.937	1.189								
70	117	70	166	200	32	PF 1 1/2	9.5	74.6	30.2								
75 2 15/16 3	4 19/32	2 3/4	6 17/32	7 7/8	1 1/4	PF 1 1/2	3/8	3.063	1.311								
75	117	70	166	200	32	PF 1 1/2	9.5	77.8	33.3								

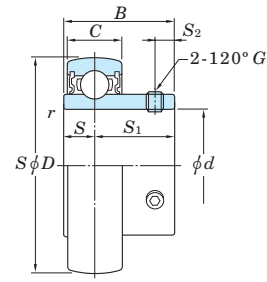
Remarks 1. In Part No. of unit and units with covers, fitting codes follow bore diameter numbers. (See Table 10.5 in P.51.)
 2. Part No. of applicable grease nipples are shown below.
 A-1/4-28UNF..... 201~210
 A-PT1/8..... 211~215

3. As for the triple-lip seal type product (from 201 to 205 are the double-lip seal type products), supplementary code L3 (or L2) follows the Part No. of unit or bearing. (Example of Part No.: UCHA206JL3, UC206L3)
 4. For the dimensions and forms of applicable bearings, see the dimensional tables of ball bearing for unit.
 5. Tapered bore (with adapter) type products are also available. (Example of Part No.: UKHA205J + H305X, UK205 + H305X)

UC-S6, SU-S6 (Stainless-series)
Cylindrical bore (with set screws)
d 10 ~ 50 mm



UC-S6

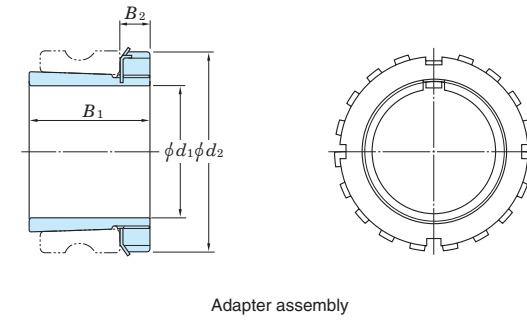
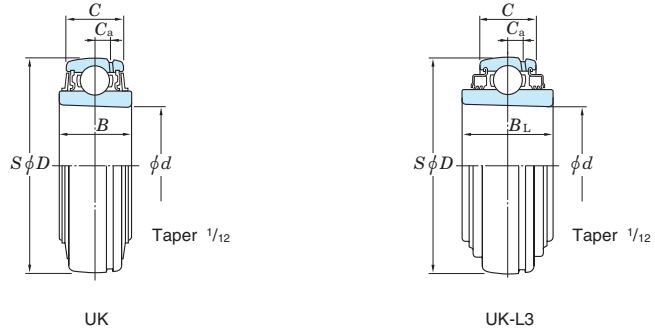


SU-S6

Shaft Dia. mm <i>d</i>	Dimensions							Basic Load Ratings kN			Factor <i>f</i> ₀	Bearing No.	Dimensions						Set Screw Dia. <i>G</i>	Mass kg		
	<i>D</i>		<i>B</i>		<i>C</i>		<i>r</i> (min.)		<i>C</i> _r	<i>C</i> _{0r}			<i>C</i> _a	<i>S</i>		<i>S</i> ₁		<i>S</i> ₂				
	mm	inch	mm	inch	mm	inch	mm	inch						mm	inch	mm	inch	mm			inch	mm
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
15	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	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
20	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	0.158	12.7	0.500	18.3	0.720	5	0.197	M6×0.75	0.16
25	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
30	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
35	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
40	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
45	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
50	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	8	0.315	M8×1	0.80

Ball bearings for units

UK
Tapered bore (with adapter)
d₁ 20 ~ (50) mm

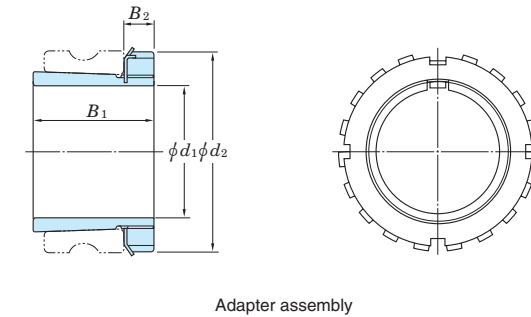
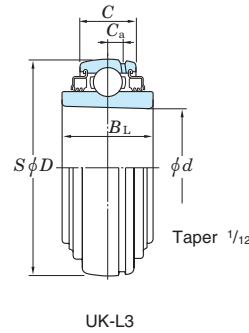
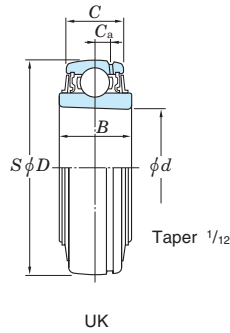


Shaft Dia. mm inch	Dimensions inch mm							Basic Load Ratings kN		Factor f ₀	Bearing		Mass kg	H3 Series Adapter				H23 Series Adapter									
	d ₁	d	D	B	B _L	C	C _a	C _r	C _{0r}		Standard	L3 Type		Standard	L3 Type	Adapter assembly No.	Dimensions inch mm			Mass kg	Sleeve No.	Adapter assembly No.	Dimensions inch mm			Mass kg	Sleeve No.
																	B ₁	B ₂	d ₂				B ₁	B ₂	d ₂		
20	3/4	0.984 25	2.047 52	0.827 21	0.945 24	0.669 17	0.197 5	14.0	7.85	13.9	UK205	UK205L2	0.16	0.18	HE305X H305X	1.142 29	0.315 8	1.496 38	0.075	AE305X A305X	HE2305X H2305X	1.378 35	0.315 8	1.496 38	0.095	AE2305X A2305X	
	3/4	0.984 25	2.441 62	0.906 23	-	0.748 19	0.197 5	19.5	11.3	13.9	UKX05	-	0.27	-	-	-	-	-	-	-	HE2305X H2305X	1.378 35	0.315 8	1.496 38	0.095	AE2305X A2305X	
	3/4	0.984 25	2.441 62	1.063 27	-	0.866 22	0.236 6	21.2	10.9	12.6	UK305	-	0.40	-	-	-	-	-	-	-	HE2305X H2305X	1.378 35	0.315 8	1.496 38	0.095	AE2305X A2305X	
25	1	1.181 30	2.441 62	0.906 23	1.063 27	0.748 19	0.197 5	19.5	11.3	13.9	UK206	UK206L3	0.25	0.29	H306X HE306X	1.220 31	0.315 8	1.772 45	0.11	A306X AE306X	H2306X HE2306X	1.496 38	0.315 8	1.772 45	0.13	A2306X HE2306X	
	1	1.181 30	2.835 72	1.024 26	-	0.787 20	0.217 5.5	25.7	15.4	13.9	UKX06	-	0.43	-	-	-	-	-	-	-	H2306X HE2306X	1.496 38	0.315 8	1.772 45	0.13	A2306X HE2306X	
	1	1.181 30	2.835 72	1.181 30	-	0.945 24	0.256 6.5	26.7	15.0	13.3	UK306	-	0.47	-	-	-	-	-	-	-	H2306X HE2306X	1.496 38	0.315 8	1.772 45	0.13	A2306X HE2306X	
30	1 1/8	1.378 35	2.835 72	1.024 26	1.181 30	0.787 20	0.217 5.5	25.7	15.4	13.9	UK207	UK207L3	0.37	0.43	HS307X H307X	1.378 35	0.354 9	2.047 52	0.14	AS307X A307X	HS2307X H2307X	1.693 43	0.354 9	2.047 52	0.17	AS2307X A2307X	
	1 1/8	1.378 35	3.150 80	1.063 27	-	0.827 21	0.236 6	29.1	17.8	14.0	UKX07	-	0.53	-	-	-	-	-	-	-	HS2307X H2307X	1.693 43	0.354 9	2.047 52	0.17	AS2307X A2307X	
	1 1/8	1.378 35	3.150 80	1.299 33	1.299 33	1.024 26	0.295 7.5	33.4	19.3	13.2	UK307	UK307L3	0.60	0.60	-	-	-	-	-	-	HS2307X H2307X	1.693 43	0.354 9	2.047 52	0.17	AS2307X A2307X	
35	1 1/4	1.575 40	3.150 80	1.063 27	1.339 34	0.827 21	0.236 6	29.1	17.8	14.0	UK208	UK208L3	0.47	0.58	HE308X HS308X H308X	1.417 36	0.394 10	2.283 58	0.19	AE308X AS308X A308X	HE2308X HS2308X H2308X	1.811 46	0.394 10	2.283 58	0.22	AE2308X AS2308X A2308X	
	1 1/4	1.575 40	3.346 85	1.142 29	-	0.866 22	0.236 6	34.1	21.3	14.0	UKX08	-	0.58	-	-	-	-	-	-	-	HE2308X HS2308X H2308X	1.811 46	0.394 10	2.283 58	0.22	AE2308X AS2308X A2308X	
	1 1/4	1.575 40	3.543 90	1.378 35	1.378 35	1.102 28	0.315 8	40.7	24.0	13.2	UK308	UK308L3	0.80	0.80	-	-	-	-	-	-	HE2308X HS2308X H2308X	1.811 46	0.394 10	2.283 58	0.22	AE2308X AS2308X A2308X	
40	1 1/2	1.772 45	3.346 85	1.142 29	1.417 36	0.866 22	0.236 6	34.1	21.3	14.0	UK209	UK209L3	0.52	0.65	HE309X H309X HS309X	1.535 39	0.433 11	2.559 65	0.25	AE309X A309X AS309X	HE2309X H2309X HS2309X	1.969 50	0.433 11	2.559 65	0.28	AE2309X A2309X AS2309X	
	1 1/2	1.772 45	3.543 90	1.142 29	-	0.945 24	0.236 6	35.1	23.3	14.4	UKX09	-	0.67	-	-	-	-	-	-	-	HE2309X H2309X HS2309X	1.969 50	0.433 11	2.559 65	0.28	AE2309X A2309X AS2309X	
	1 1/2	1.772 45	3.937 100	1.496 38	1.496 38	1.181 30	0.335 8.5	48.9	29.5	13.3	UK309	UK309L3	1.08	1.08	-	-	-	-	-	-	HE2309X H2309X HS2309X	1.969 50	0.433 11	2.559 65	0.28	AE2309X A2309X AS2309X	
45	1 3/4	1.969 50	3.543 90	1.142 29	1.417 36	0.945 24	0.236 6	35.1	23.3	14.4	UK210	UK210L3	0.59	0.65	HE310X H310X	1.654 42	0.472 12	2.756 70	0.30	AE310X A310X	HE2310X H2310X	2.165 55	0.472 12	2.756 70	0.36	AE2310X A2310X	
	1 3/4	1.969 50	3.937 100	1.220 31	-	0.984 25	0.276 7	43.4	29.4	14.4	UKX10	-	0.89	-	-	-	-	-	-	-	HE2310X H2310X	2.165 55	0.472 12	2.756 70	0.36	AE2310X A2310X	
	1 3/4	1.969 50	4.331 110	1.575 40	1.575 40	1.260 32	0.354 9	62.0	38.3	13.2	UK310	UK310L3	1.38	1.38	-	-	-	-	-	-	HE2310X H2310X	2.165 55	0.472 12	2.756 70	0.36	AE2310X A2310X	
50	1 7/8	2.165 55	3.937 100	1.220 31	1.575 40	0.984 25	0.276 7	43.4	29.4	14.4	UK211	UK211L3	0.80	1.09	HS311X H311X HE311X	1.772 45	0.472 12	2.953 75	0.35	AS311X A311X AE311X	HS2311X H2311X HE2311X	2.323 59	0.472 12	2.953 75	0.42	AS2311X A2311X AE2311X	

Remarks 1. In Part No. of unit with adapters, Part No. of applicable adapters follow the Part No. shown in the dimensional tables.
(Example of Part No. : UK206 + H306X, UK206L3 + H2306X)

2. Adapter series applicable to UK200 series
UK200..... H300X series
UK200L3 (or L2) H2300X series
3. UK205 is the double-lip seal type product (L2).
4. Inch bore diameter series adapters are also available (see the dimensional tables of adapter assemblies).

UK
Tapered bore (with adapter)
 d_1 (50) ~ 85 mm

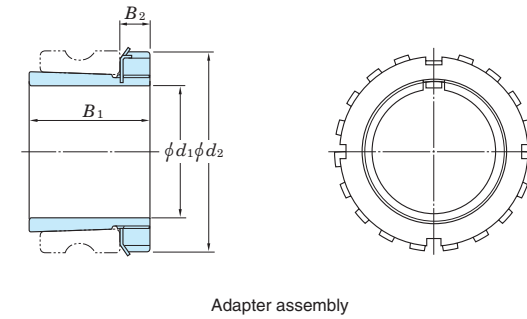
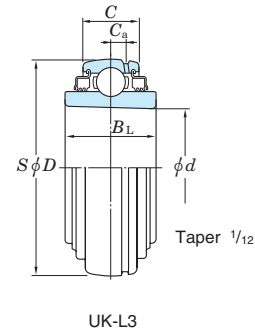
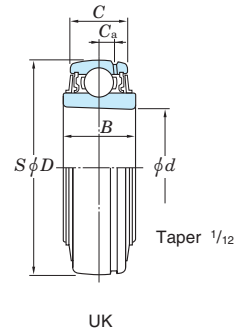


Shaft Dia. mm inch	Dimensions inch mm						Basic Load Ratings kN		Factor f_0	Bearing				H3 Series Adapter					H23 Series Adapter						
	d_1	d	D	B	B_L	C	C_a	C_r		C_{0r}	No.		Mass kg		Adapter assembly No.	Dimensions inch mm			Mass kg	Sleeve No.	Adapter assembly No.	Dimensions inch mm			Mass kg
										Standard	L3 Type	Standard	L3 Type		B_1	B_2	d_2				B_1	B_2	d_2		
50 1 7/8 2	2.165	4.331	1.299	—	1.063	0.295	52.4	36.2	14.4	UKX11	—	1.15	—	—	—	—	—	—	—	HS2311X H2311X HE2311X	2.323	0.472	2.953	0.42	AS2311X A2311X AE2311X
	55	110	33	—	27	7.5	71.6	45.0	13.2	UK311	UK311L3	1.78	1.78	—	—	—	—	—	—	HS2311X H2311X HE2311X	2.323	0.472	2.953	0.42	AS2311X A2311X AE2311X
55 2 1/8 2 1/8 2 1/8	2.362	4.331	1.299	1.850	1.063	0.295	52.4	36.2	14.4	UK212	UK212L3	1.02	1.41	HS312X H312X	1.850	0.512	3.150	0.43	AS312X A312X	HS2312X H2312X	2.441	0.512	3.150	0.48	AS2312X A2312X
	2.362	4.724	1.417	—	1.102	0.295	57.2	40.1	14.4	UKX12	—	1.45	—	—	—	—	—	—	—	HS2312X H2312X	2.441	0.512	3.150	0.48	AS2312X A2312X
	60	120	36	—	28	7.5	81.9	52.2	13.2	UK312	UK312L3	2.06	2.06	—	—	—	—	—	—	HS2312X H2312X	2.441	0.512	3.150	0.48	AS2312X A2312X
60 2 1/4 2 3/8 2 1/4 2 3/8	2.559	4.724	1.417	1.850	1.102	0.295	57.2	40.1	14.4	UK213	UK213L3	1.34	1.67	HE313X H313X HS313X	1.969	0.551	3.346	0.46	AE313X A313X AS313X	HE2313X H2313X HS2313X	2.559	0.551	3.346	0.56	AE2313X A2313X AS2313X
	2.559	4.921	1.575	—	1.181	0.354	62.2	44.1	14.5	UKX13	—	1.62	—	—	—	—	—	—	—	HE2313X H2313X HS2313X	2.559	0.551	3.346	0.56	AE2313X A2313X AS2313X
	2.559	5.512	1.929	1.929	1.496	0.472	92.7	59.9	13.2	UK313	UK313L3	2.71	2.71	—	—	—	—	—	—	HE2313X H2313X HS2313X	2.559	0.551	3.346	0.56	AE2313X A2313X AS2313X
	65	140	49	49	38	12	113	77.2	13.2	UK315	UK315L3	3.80	3.80	—	—	—	—	—	—	HE2313X H2313X HS2313X	2.559	0.551	3.346	0.56	AE2313X A2313X AS2313X
65 2 1/2 2 1/2 2 1/2	2.953	5.118	1.575	2.008	1.260	0.354	67.4	48.3	14.5	UK215	UK215L3	1.50	1.99	HE315X H315X	2.165	0.591	3.858	0.83	AE315X A315X	HE2315X H2315X	2.874	0.591	3.858	1.05	AE2315X A2315X
	2.953	5.512	1.654	—	1.299	0.354	72.7	53.0	14.6	UKX15	—	2.10	—	—	—	—	—	—	—	HE2315X H2315X	2.874	0.591	3.858	1.05	AE2315X A2315X
	75	130	40	51	32	9	113	77.2	13.2	UK315	UK315L3	3.80	3.80	—	—	—	—	—	—	HE2315X H2315X	2.874	0.591	3.858	1.05	AE2315X A2315X
70 2 3/4 2 3/4 2 3/4	3.150	5.512	1.654	2.165	1.299	0.354	72.7	53.0	14.6	UK216	UK216L3	1.96	2.56	HE316X H316X	2.323	0.669	4.134	1.05	AE316X A316X	HE2316X H2316X	3.071	0.669	4.134	1.3	AE2316X A2316X
	3.150	5.906	1.732	—	1.378	0.394	84.0	61.9	14.5	UKX16	—	2.64	—	—	—	—	—	—	—	HE2316X H2316X	3.071	0.669	4.134	1.3	AE2316X A2316X
	80	140	42	—	33	9	123	86.7	13.3	UK316	UK316L3	4.39	4.39	—	—	—	—	—	—	HE2316X H2316X	3.071	0.669	4.134	1.3	AE2316X A2316X
75 3 3 3	3.346	5.906	1.732	2.244	1.378	0.394	84.0	61.9	14.5	UK217	UK217L3	2.42	3.10	H317X HE317X	2.480	0.709	4.331	1.2	A317X AE317X	H2317X HE2317X	3.228	0.709	4.331	1.45	A2317X AE2317X
	3.346	6.299	1.890	—	1.496	0.433	96.1	71.5	14.5	UKX17	—	3.25	—	—	—	—	—	—	—	H2317X HE2317X	3.228	0.709	4.331	1.45	A2317X AE2317X
	3.346	7.087	2.362	2.362	1.811	0.591	133	96.8	13.3	UK317	UK317L3	5.30	5.30	—	—	—	—	—	—	H2317X HE2317X	3.228	0.709	4.331	1.45	A2317X AE2317X
80 — — —	3.543	6.299	1.890	2.480	1.496	0.433	96.1	71.5	14.5	UK218	UK218L3	2.90	3.77	H318X	2.559	0.709	4.724	1.4	A318X	H2318X	3.386	0.709	4.724	1.7	A2318X
	3.543	6.693	1.969	—	1.575	0.453	109	81.9	14.4	UKX18	—	3.80	—	—	—	—	—	—	—	H2318X	3.386	0.709	4.724	1.7	A2318X
	90	160	48	63	38	11	143	107	13.3	UK318	UK318L3	6.20	6.20	—	—	—	—	—	—	H2318X	3.386	0.709	4.724	1.7	A2318X
85 3 1/4	3.740	7.874	2.598	2.598	1.969	0.650	153	119	13.3	UK319	UK319L3	7.31	7.31	—	—	—	—	—	—	H2319X	3.543	0.748	4.921	1.95	A2319X

Remarks 1. In Part No. of unit with adapters, Part No. of applicable adapters follow the Part No. shown in the dimensional tables.
(Example of Part No. : UK206 + H306X, UK206L3 + H2306X)

2. Adapter series applicable to UK200 series
UK200..... H300X series
UK200L3 (or L2) H2300X series
3. UK205 is the double-lip seal type product (L2).
4. Inch bore diameter series adapters are also available (see the dimensional tables of adapter assemblies).

UK
Tapered bore (with adapter)
 d_1 90 ~ 125 mm

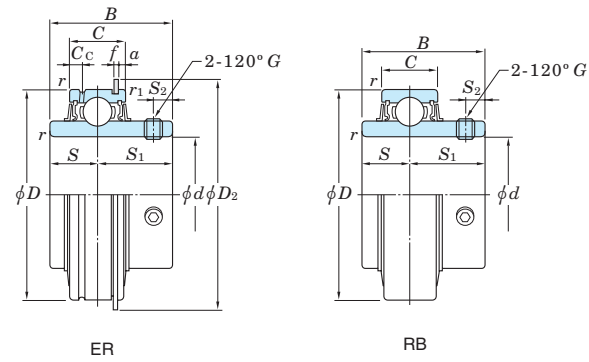


Shaft Dia. mm inch	Dimensions							Basic Load Ratings		Factor f_0	Bearing				Adapter assembly No.	H3 Series Adapter			Sleeve No.	H23 Series Adapter			Adapter assembly No.	Mass kg	Sleeve No.
	inch							C_r	C_{0r}		No.		Mass kg	Dimensions			Dimensions								
	mm										Standard	L3 Type		B_1		B_2	d_2	B_1		B_2	d_2				
90	3 1/2	3.937	7.480	2.126	—	1.693	0.512	133	105	14.4	UKX20	—	5.36	—	—	—	—	—	HE2320X	3.819	0.787	5.118	2.2	AE2320X	
	100	190	54	—	43	13	173	141	13.2	UK320	UK320L3	8.70	8.70	—	—	—	—	HE2320X	3.819	0.787	5.118	2.2	AE2320X		
100	3 1/2	3.937	8.465	2.677	2.677	2.126	0.709	173	141	13.2	UK320	UK320L3	8.70	8.70	—	—	—	—	HE2320X	3.819	0.787	5.118	2.2	AE2320X	
	100	215	68	68	54	18	173	141	13.2	UK320	UK320L3	8.70	8.70	—	—	—	—	HE2320X	3.819	0.787	5.118	2.2	AE2320X		
100	4	4.331	9.449	3.071	3.071	2.362	0.787	205	180	13.2	UK322	UK322L3	12.2	12.2	—	—	—	—	H2322X	4.134	0.827	5.709	2.75	AE2322X	
	110	240	78	78	60	20	205	180	13.2	UK322	UK322L3	12.2	12.2	—	—	—	—	H2322X	4.134	0.827	5.709	2.75	AE2322X		
110	—	4.724	10.236	3.425	3.425	2.520	0.827	207	185	13.5	UK324	UK324L3	16.1	16.1	—	—	—	—	H2324	4.409	0.866	6.102	3.2	A2324	
	120	260	87	87	64	21	207	185	13.5	UK324	UK324L3	16.1	16.1	—	—	—	—	H2324	4.409	0.866	6.102	3.2	A2324		
115	4 1/2	5.118	11.024	3.425	3.425	2.677	0.866	229	214	13.6	UK326	UK326L3	18.8	18.8	—	—	—	—	HE2326	4.764	0.906	6.496	4.6	AE2326	
	130	280	87	87	68	22	229	214	13.6	UK326	UK326L3	18.8	18.8	—	—	—	—	HE2326	4.764	0.906	6.496	4.6	AE2326		
125	—	5.512	11.811	3.819	3.819	2.835	0.906	253	246	13.6	UK328	UK328L3	23.9	23.9	—	—	—	—	H2328	5.157	0.945	7.087	5.5	A2328	
	140	300	97	97	72	23	253	246	13.6	UK328	UK328L3	23.9	23.9	—	—	—	—	H2328	5.157	0.945	7.087	5.5	A2328		

Remarks 1. In Part No. of unit with adapters, Part No. of applicable adapters follow the Part No. shown in the dimensional tables.
 (Example of Part No. : UK206 + H306X, UK206L3 + H2306X)

- Adapter series applicable to UK200 series
 UK200..... H300X series
 UK200L3 (or L2) H2300X series
- UK205 is the double-lip seal type product (L2).
- Inch bore diameter series adapters are also available (see the dimensional tables of adapter assemblies).

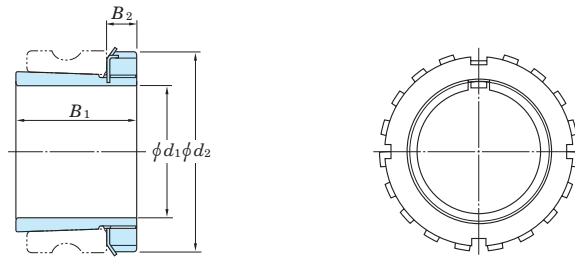
ER, RB
Cylindrical bore (with set screws),
Cylindrical outside surface
d 12 ~ 60 mm



Shaft Dia. mm inch	Dimensions						Basic Load Ratings			Factor <i>f</i> ₀	Bearing No.		Dimensions							Set Screw Brg. Bore <i>G</i>		Mass							
	<i>d</i>	<i>D</i>	<i>B</i>	<i>C</i>	<i>r</i> (min.)	<i>r</i> ₁ (min.)	<i>C</i> _r	<i>C</i> _{0r}	(<i>ER</i>)		(<i>RB</i>)	<i>S</i>	<i>S</i> ₁	<i>S</i> ₂	<i>C</i> _c	<i>a</i>	<i>f</i>	<i>D</i> ₂	mm	inch	(<i>ER</i>)	(<i>RB</i>)							
12	1/2	1.850	1.220	0.630	0.024	0.020	12.8	6.65		13.2		ER201	RB201	0.500	0.720	0.197	0.157	0.094	0.042	2.067	M6x0.75	-	0.27	0.27					
									ER201-8		RB201-8	-	1/4-28UNF								0.27	0.27							
15	5/8	47	31	16	0.6	0.5	12.8	6.65	13.2	ER202	RB202	12.7	18.3	5	4	2.38	1.07	52.5	M6x0.75	-	0.25	0.25							
										ER202-10	RB202-10	-	1/4-28UNF	0.25	0.25														
17										ER203	RB203							M6x0.75	-	0.24	0.24								
20	3/4	1.850	1.220	0.630	0.039	0.020	12.8	6.65	13.2	ER204-12	RB204-12	0.500	0.720	0.197	0.157	0.094	0.042	2.067	-	1/4-28UNF	0.22	0.22							
										ER204	RB204	12.7	18.3	5	4	2.38	1.07	52.5	M6x0.75	-	0.22	0.22							
25	7/8	2.047	1.343	0.748	0.039	0.020	14.0	7.85	13.9	ER205-14	RB205-14	0.563	0.780	0.217	0.197	0.094	0.042	2.272	-	1/4-28UNF	0.3	0.29							
										ER205-15	RB205-15								-	1/4-28UNF	0.28	0.27							
										ER205	RB205								14.3	19.8	5.5	5	2.38	1.07	57.7	M6x0.75	-	0.27	0.26
30	1 1/8	2.441	1.500	0.866	0.039	0.020	19.5	11.3	13.9	ER205-16	RB205-16	0.626	0.874	0.236	0.217	0.125	0.065	2.657	-	1/4-28UNF	0.41	0.4							
										ER206-18	RB206-18								M6x0.75	-	0.39	0.38							
										ER206	RB206								15.9	22.2	6	5.5	3.18	1.65	67.5	-	1/4-28UNF	0.39	0.38
										ER206-19	RB206-19								-	1/4-28UNF	0.37	0.36							
35	1 1/4	2.835	1.689	0.945	0.043	0.020	25.7	15.4	13.9	ER206-20	RB206-20	0.689	1.000	0.256	0.217	0.125	0.065	3.087	-	5/16-24UNF	0.69	0.68							
										ER207-20	RB207-20								-	5/16-24UNF	0.66	0.65							
										ER207-21	RB207-21								17.5	25.4	6.5	5.5	3.18	1.65	78.4	-	5/16-24UNF	0.64	0.63
										ER207-22	RB207-22								M8x1	-	0.63	0.62							
										ER207	RB207								-	5/16-24UNF	0.61	0.6							
40	1 1/2	3.150	1.937	1.102	0.043	0.020	29.1	17.8	14.0	ER207-23	RB207-23	0.748	1.189	0.315	0.236	0.125	0.065	3.402	-	5/16-24UNF	0.85	0.84							
										ER208-24	RB208-24								19	30.2	8	6	3.18	1.65	86.4	-	5/16-24UNF	0.82	0.81
										ER208-25	RB208-25								M8x1	-	0.81	0.78							
45	1 5/8	3.346	1.937	1.102	0.043	0.020	34.1	21.3	14.0	ER208	RB208	0.748	1.189	0.315	0.236	0.125	0.065	3.598	-	5/16-24UNF	1.0	-							
										ER209-26	-								-	5/16-24UNF	0.96	-							
										ER209-27	-								-	5/16-24UNF	0.92	-							
										ER209-28	-								-	5/16-24UNF	0.90	-							
50	1 7/8	3.543	2.031	1.102	0.043	0.020	35.1	23.3	14.4	ER209	-	0.748	1.283	0.354	0.295	0.125	0.095	3.791	-	3/8-24UNF	1.05	-							
										ER210-30	-								-	3/8-24UNF	1.0	-							
										ER210-31	-								19	32.6	9	7.5	3.18	2.41	96.3	M10x1.25	-	0.98	-
										ER210	-								-	3/8-24UNF	0.96	-							
55	2	3.937	2.189	1.181	0.059	0.020	43.4	29.4	14.4	ER210-32	-	0.874	1.315	0.354	0.295	0.125	0.095	4.185	-	3/8-24UNF	1.56	-							
										ER211-32	-								-	3/8-24UNF	1.45	-							
										ER211-34	-								22.2	33.4	9	7.5	3.18	2.41	106.3	M10x1.25	-	1.41	-
										ER211	-								-	3/8-24UNF	1.39	-							
60	2 3/8	4.331	2.563	1.260	0.059	0.020	52.4	36.2	14.4	ER211-35	-	1.000	1.563	0.413	0.295	0.125	0.095	4.583	-	3/8-24UNF	2.02	-							
										ER212-36	-								-	3/8-24UNF	1.89	-							
										ER212	-								25.4	39.7	10.5	7.5	3.18	2.41	116.4	M10x1.25	-	1.87	-
										ER212-38	-								-	3/8-24UNF	1.8	-							

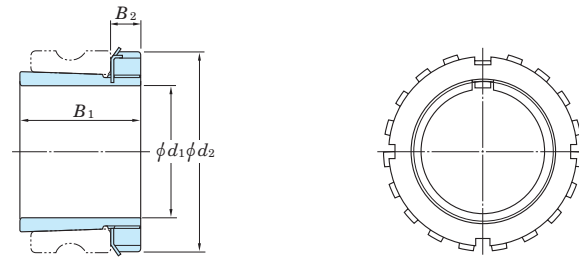
H300X, H2300X

d_1 20 ~ (70) mm



Shaft Dia. d_1			Dimensions			Adapter assembly			Sleeve			Lock Nut	Washer	Mass		
mm	inch		inch mm			No.			No.					No.	No.	kg
(H)	(HE)	(HS)	B_1	B_2	d_2	(H)	(HE)	(HS)	(H)	(HE)	(HS)			(H)	(HE)	(HS)
20	—	—	1.142	0.315	1.496	H305X	—	—	A305X	—	—	AN05	AW05X	0.075	—	—
	3/4	—	29	8	38	—	HE305X	—	—	AE305X	—	AN05	AW05X	—	0.08	—
20	—	—	1.378	0.315	1.496	H2305X	—	—	A2305X	—	—	AN05	AW05X	0.095	—	—
	3/4	—	35	8	38	—	HE2305X	—	—	AE2305X	—	AN05	AW05X	—	0.085	—
25	—	—	1.220	0.315	1.772	H306X	—	—	A306X	—	—	AN06	AW06X	0.11	—	—
	1	—	31	8	45	—	HE306X	—	—	AE306X	—	AN06	AW06X	—	0.105	—
25	—	—	1.496	0.315	1.772	H2306X	—	—	A2306X	—	—	AN06	AW06X	0.13	—	—
	1	—	38	8	45	—	HE2306X	—	—	AE2306X	—	AN06	AW06X	—	0.12	—
30	—	—	1.378	0.354	2.047	H307X	—	—	A307X	—	—	AN07	AW07X	0.14	—	—
	—	1 1/8	35	9	52	—	—	HS307X	—	—	AS307X	AN07	AW07X	—	—	0.15
30	—	—	1.693	0.354	2.047	H2307X	—	—	A2307X	—	—	AN07	AW07X	0.17	—	—
	—	1 1/8	43	9	52	—	—	HS2307X	—	—	AS2307X	AN07	AW07X	—	—	0.19
35	—	—	1.417	0.394	2.283	H308X	—	—	A308X	—	—	AN08	AW08X	0.19	—	—
	1 1/4	—	36	10	58	—	HE308X	—	—	AE308X	—	AN08	AW08X	—	0.23	—
35	—	—	1.811	0.394	2.283	H2308X	—	—	A2308X	—	—	AN08	AW08X	0.22	—	—
	1 1/4	—	46	10	58	—	HE2308X	—	—	AE2308X	—	AN08	AW08X	—	0.28	—
40	—	—	1.535	0.433	2.559	H309X	—	—	A309X	—	—	AN09	AW09X	0.25	—	—
	1 1/2	—	39	11	65	—	HE309X	—	—	AE309X	—	AN09	AW09X	—	0.28	—
40	—	—	1.969	0.433	2.559	H2309X	—	—	A2309X	—	—	AN09	AW09X	0.28	—	—
	1 1/2	—	50	11	65	—	HE2309X	—	—	AE2309X	—	AN09	AW09X	—	0.32	—
45	—	—	1.654	0.472	2.756	H310X	—	—	A310X	—	—	AN10	AW10X	0.30	—	—
	1 3/4	—	42	12	70	—	HE310X	—	—	AE310X	—	AN10	AW10X	—	0.31	—
45	—	—	2.165	0.472	2.756	H2310X	—	—	A2310X	—	—	AN10	AW10X	0.36	—	—
	1 3/4	—	55	12	70	—	HE2310X	—	—	AE2310X	—	AN10	AW10X	—	0.37	—
50	—	—	1.772	0.472	2.953	H311X	—	—	A311X	—	—	AN11	AW11X	0.35	—	—
	2	—	45	12	75	—	HE311X	—	—	AE311X	—	AN11	AW11X	—	0.33	—
50	—	—	2.323	0.472	2.953	H2311X	—	—	A2311X	—	—	AN11	AW11X	0.42	—	—
	2	—	59	12	75	—	HE2311X	—	—	AE2311X	—	AN11	AW11X	—	0.40	—
55	—	—	1.850	0.512	3.150	H312X	—	—	A312X	—	—	AN12	AW12X	0.43	—	—
	—	2 1/8	47	13	80	—	—	HS312X	—	—	AS312X	AN12	AW12X	—	—	0.40
55	—	—	2.441	0.512	3.150	H2312X	—	—	A2312X	—	—	AN12	AW12X	0.48	—	—
	—	2 1/8	62	13	80	—	—	HS2312X	—	—	AS2312X	AN12	AW12X	—	—	0.52
60	—	—	1.969	0.551	3.346	H313X	—	—	A313X	—	—	AN13	AW13X	0.46	—	—
	2 1/4	—	50	14	85	—	HE313X	—	—	AE313X	—	AN13	AW13X	—	0.56	—
60	—	—	2.559	0.551	3.346	H2313X	—	—	A2313X	—	—	AN13	AW13X	0.56	—	—
	2 1/4	—	65	14	85	—	HE2313X	—	—	AE2313X	—	AN13	AW13X	—	0.69	—
65	—	—	2.165	0.591	3.858	H315X	—	—	A315X	—	—	AN15	AW15X	0.83	—	—
	2 1/2	—	55	15	98	—	HE315X	—	—	AE315X	—	AN15	AW15X	—	0.89	—
65	—	—	2.874	0.591	3.858	H2315X	—	—	A2315X	—	—	AN15	AW15X	1.05	—	—
	2 1/2	—	73	15	98	—	HE2315X	—	—	AE2315X	—	AN15	AW15X	—	1.15	—
70	—	—	2.323	0.669	4.134	H316X	—	—	A316X	—	—	AN16	AW16X	1.05	—	—
	2 3/4	—	59	17	105	—	HE316X	—	—	AE316X	—	AN16	AW16X	—	1.05	—

H300X, H2300X
 d_1 (70) ~ 125 mm



Shaft Dia. d_1			Dimensions			Adapter assembly No.			Sleeve No.			Lock Nut No.	Washer No.	Mass kg		
mm	inch		inch mm			(H)	(HE)	(HS)	(H)	(HE)	(HS)			(H)	(HE)	(HS)
70	-	-	3.071	0.669	4.134	H2316X	-	-	A2316X	-	-	AN16	AW16X	1.3	-	-
	2 3/4	-	78	17	105	-	HE2316X	-	-	AE2316X	-			-	-	1.3
75	-	-	2.480	0.709	4.331	H317X	-	-	A317X	-	-	AN17	AW17X	1.2	-	-
	3	-	63	18	110	-	HE317X	-	-	AE317X	-			-	-	1.1
75	-	-	3.228	0.709	4.331	H2317X	-	-	A2317X	-	-	AN17	AW17X	1.45	-	-
	3	-	82	18	110	-	HE2317X	-	-	AE2317X	-			-	-	1.35
80	-	-	2.559	0.709	4.724	H318X	-	-	A318X	-	-	AN18	AW18X	1.4	-	-
	-	-	65	18	120	-	-	-	-	-	-			-	-	-
80	-	-	3.386	0.709	4.724	H2318X	-	-	A2318X	-	-	AN18	AW18X	1.7	-	-
	-	-	86	18	120	-	-	-	-	-	-			-	-	-
85	-	-	3.543	0.748	4.921	H2319X	-	-	A2319X	-	-	AN19	AW19X	1.95	-	-
	3 1/4	-	90	19	125	-	HE2319X	-	-	AE2319X	-			-	-	2.15
90	-	-	3.819	0.787	5.118	H2320X	-	-	A2320X	-	-	AN20	AW20X	2.2	-	-
	3 1/2	-	97	20	130	-	HE2320X	-	-	AE2320X	-			-	-	2.3
100	-	-	4.134	0.827	5.709	H2322X	-	-	A2322X	-	-	AN22	AW22X	2.75	-	-
	4	-	105	21	145	-	HE2322X	-	-	AE2322X	-			-	-	2.55
110	-	-	4.409	0.866	6.102	H2324	-	-	A2324	-	-	AN24	AW24	3.2	-	-
	-	-	112	22	155	-	-	-	-	-	-			-	-	-
115	-	-	4.764	0.906	6.496	H2326	-	-	A2326	-	-	AN26	AW26	4.6	-	-
	4 1/2	-	121	23	165	-	HE2326	-	-	AE2326	-			-	-	4.7
125	-	-	5.157	0.945	7.087	H2328	-	-	A2328	-	-	AN28	AW28	5.5	-	-
	-	-	131	24	180	-	-	-	-	-	-			-	-	-

16 Parts and accessories

16.1 Part No. of pressed steel covers

Table 16.1 Part No. of pressed steel cover for UC type bearing

Bearing No.	Shaft dia. (mm)	Pressed steel cover No.	
		Open ends type	Closed end type
UC201	12	C- 4×12	D- 4
UC202	15	C- 4×15	D- 4
UC203	17	C- 4×17	D- 4
UC204	20	C- 4×20	D- 4
UC205	25	C- 5×25	D- 5
UC206	30	C- 6×30	D- 6
UC207	35	C- 7×35	D- 7
UC208	40	C- 8×40	D- 8
UC209	45	C- 9×45	D- 9
UC210	50	C-10×50	D-10
UC211	55	C-11×55	D-11
UC212	60	C-12×60	D-12
UC213	65	C-13×65	D-13
UC214	70	C-14×70	D-14
UC215	75	C-15×75	D-15
UC216	80	C-16×80	D-16
UC217	85	C-17×85	D-17
UC218	90	C-18×90	D-18
UCX05	25	C- 6×25	D- 6
UCX06	30	C- 7×30	D- 7
UCX07	35	C- 8×35	D- 8
UCX08	40	C- 9×40	D- 9
UCX09	45	C-10×45	D-10
UCX10	50	C-11×50	D-11
UCX11	55	C-12×55	D-12
UCX12	60	C-13×60	D-13
UCX13	65	C-14×65	D-14
UCX14	70	C-15×70	D-15
UCX15	75	C-16×75	D-16
UCX16	80	C-17×80	D-17
UCX17	85	C-18×85	D-18

Table 16.2 Part No. of pressed steel cover for UK type bearing

Bearing No.	Shaft dia. (mm)	Pressed steel cover No.	
		Open ends type	Closed end type
-			
-			
-			
-			
UK205	20	C- 5×20	D- 5
UK206	25	C- 6×25	D- 6
UK207	30	C- 7×30	D- 7
UK208	35	C- 8×35	D- 8
UK209	40	C- 9×40	D- 9
UK210	45	C-10×45	D-10
UK211	50	C-11×50	D-11
UK212	55	C-12×55	D-12
UK213	60	C-13×60	D-13
-			
UK215	65	C-15×65	D-15
UK216	70	C-16×70	D-16
UK217	75	C-17×75	D-17
UK218	80	C-18×80	D-18
UKX05	20	C- 6×20	D- 6
UKX06	25	C- 7×25	D- 7
UKX07	30	C- 8×30	D- 8
UKX08	35	C- 9×35	D- 9
UKX09	40	C-10×40	D-10
UKX10	45	C-11×45	D-11
UKX11	50	C-12×50	D-12
UKX12	55	C-13×55	D-13
UKX13	60	C-14×60	D-14
-			
UKX15	65	C-16×65	D-16
UKX16	70	C-17×70	D-17
UKX17	75	C-18×75	D-18

Remark In the Part No. of the pressed steel covers for shouldered shaft, shaft diameter follows the basic code of the cover. For example, Part No. of the cover for a shaft with 30 mm diameter for UC206 is C-6×30.

16.2 Part No. of cast iron covers

Table 16.3 Part No. of cast iron cover for UC type bearing

Bearing No.	Shaft dia. (mm)	Cast iron cover No.		Mounting bolt (reference)
		Open ends type	Closed end type	
UC204	20	204FC×20 (204FC3×20) ¹⁾	204FD (204FD3) ¹⁾	M3 (M4)
UC205	25	205FC×25 (205FC3×25) ¹⁾	205FD (205FD3) ¹⁾	M3 (M4)
UC206	30	206FC×30	206FD	M4
UC207	35	207FC×35	207FD	M4
UC208	40	208FC×40	208FD	
UC209	45	209FC×45	209FD	
UC210	50	210FC×50	210FD	M4
UC211	55	211FC×55	211FD	
UC212	60	212FC×60	212FD	
UC213	65	213FC×65	213FD	M4
UC214	70	214FC×70	214FD	
UC215	75	215FC×75	215FD	
UC216	80	216FC×80	216FD	M5
UC217	85	217FC×85	217FD	
UC218	90	218FC×90	218FD	
UCX18	90	X18C×90 (X18C3×90) ²⁾	X18D (X18D3) ²⁾	M5
UCX20	100	X20C×100 (X20C3×100) ²⁾	X20D (X20D3) ²⁾	
UC305	25	305C×25	305D	M4
UC306	30	306C×30	306D	
UC307	35	307C×35	307D	
UC308	40	308C×40	308D	M5
UC309	45	309C×45	309D	
UC310	50	310C×50	310D	
UC311	55	311C×55	311D	M5
UC312	60	312C×60	312D	
UC313	65	313C×65	313D	
UC314	70	314C×70	314D	M5
UC315	75	315C×75	315D	
UC316	80	316C×80	316D	
UC317	85	317C×85	317D	M5
UC318	90	318C×90	318D	
UC319	95	319C×95	319D	
UC320	100	320C×100	320D	M5
UC321	105	321C×105	321D	
UC322	110	322C×110	322D	
UC324	120	324C×120	324D	M5
UC326	130	326C×130	326D	M8
UC328	140	328C×140	328D	

Table 16.4 Part No. of cast iron cover for UK type bearing

Bearing No.	Shaft dia. (mm)	Cast iron cover No.		Mounting bolt (reference)
		Open ends type	Closed end type	
–				
UK205	20	205FC×20 (205FC3×20) ¹⁾	205FD (205FD3) ¹⁾	M3 (M4)
UK206	25	206FC×25	206FD	M4
UK207	30	207FC×30	207FD	M4
UK208	35	208FC×35	208FD	
UK209	40	209FC×40	209FD	
UK210	45	210FC×45	210FD	M4
UK211	50	211FC×50	211FD	
UK212	55	212FC×55	212FD	
UK213	60	213FC×60	213FD	M4
–				
UK215	65	215FC×65	215FD	
UK216	70	216FC×70	216FD	M5
UK217	75	217FC×75	217FD	
UK218	80	218FC×80	218FD	
UKX18	80	X18C×80 (X18C3×80) ²⁾	X18D (X18D3) ²⁾	M5
UKX20	90	X20C×90 (X20C3×90) ²⁾	X20D (X20D3) ²⁾	
UK305	20	305C×20	305D	M4
UK306	25	306C×25	306D	
UK307	30	307C×30	307D	
UK308	35	308C×35	308D	M5
UK309	40	309C×40	309D	
UK310	45	310C×45	310D	
UK311	50	311C×50	311D	M5
UK312	55	312C×55	312D	
UK313	60	313C×60	313D	
–				
UK315	65	315C×65	315D	M5
UK316	70	316C×70	316D	
UK317	75	317C×75	317D	M5
UK318	80	318C×80	318D	
UK319	85	319C×85	319D	
UK320	90	320C×90	320D	M5
–				
UK322	100	322C×100	322D	
UK324	110	324C×110	324D	M5
UK326	115	326C×115	326D	M8
UK328	125	328C×125	328D	

Note 1) Items in parentheses are applicable to the pillow block type (P), square-flanged type (F), rhombic-flanged type (FL), and the take-up type (T) bearings, and can be mounted to housings with three hexagon socket head cap screws (use four to mount other items).

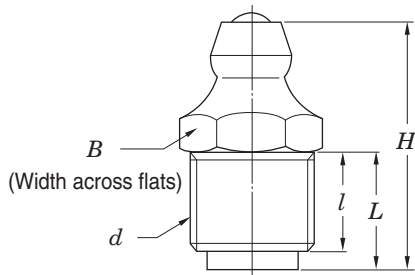
2) Items in parentheses are applicable to the round-flanged type with joint (FC), and can be mounted to housings with three hexagon socket head cap screws (use four to mount other items).

Remark In the nominal No. of the cast iron covers for shouldered shaft, shaft diameter follows the basic code of the cover. For example, Part No. of the cover for a shaft with 60 mm diameter for UC210 is 210FC×60.

16.3 Nominal number and dimensions of grease nipples and reducing socket

Table 16.5 Nominal number and dimensions of grease nipple

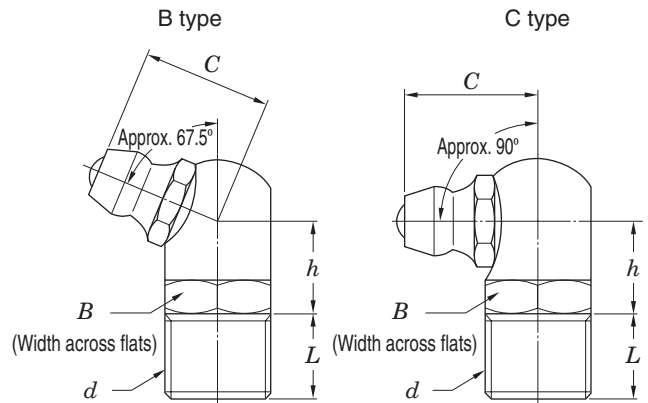
(1) Nominal number and dimensions of A type grease nipple



Unit : mm

Nominal grease nipple No.	Nominal screw code <i>d</i>	<i>B</i>	<i>H</i>	<i>L</i>	<i>l</i>
A-1/4-28UNF	1/4-28UNF	7	13.5	5.4	4
A-PT1/8	PT1/8	10	20	9.5	8

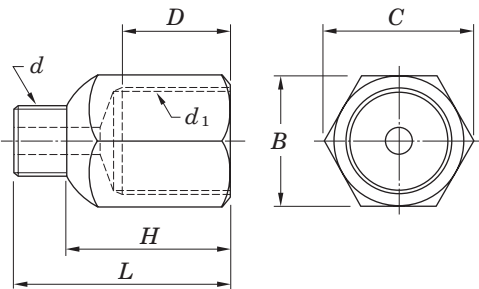
(2) Nominal number and dimensions of B and C type grease nipples



Unit : mm

Nominal grease nipple No.	Nominal screw code <i>d</i>	Type	<i>B</i>	<i>C</i>	<i>h</i>	<i>L</i>
B-1/4-28UNF	1/4-28UNF	B	8	9.5	6.5	5
C-1/4-28UNF		C				
B-PT1/8	PT1/8	B	10	12.5	8.5	8
C-PT1/8		C				

Table 16.6 Nominal number and dimensions of reducing socket code



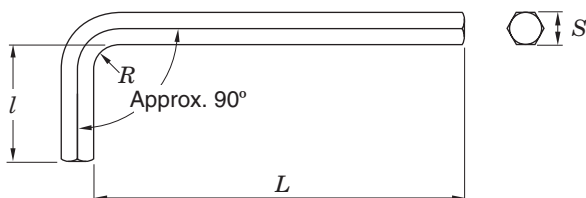
Unit : mm

Nominal No. of reducing socket	Nominal male thread code <i>d</i>	Nominal female thread code <i>d</i> ₁	<i>B</i>	<i>C</i>	<i>D</i>	<i>H</i>	<i>L</i>
1/4-28UNF-PT1/8	1/4-28UNF	PT1/8	12	13.8	10	15	20
1/4-28UNF-PF1/8		PF1/8					
1/4-28UNF-PT1/4	1/4-28UNF	PT1/4	17	19.6	11	17	22
1/4-28UNF-PF1/4		PF1/4					
PT1/8-PT1/4	PT1/8	PT1/4	17	19.6	11	19	26
PT1/8-PF1/4		PF1/4					

16.4 Nominal number and dimensions of Allen key wrench

Table 16.7 Nominal number and dimensions of Allen key wrench

Unit : mm



Nominal No. of Allen key wrench	<i>S</i>	<i>L</i> (Approx.)	<i>l</i> (Approx.)	<i>R</i> (Approx.)	Applicable set screw
2.5	2.5	56	18	2.5	M5
3	3	63	20	3	M6
4	4	70	25	4	M8
5	5	80	28	5	M10
6	6	90	32	6	M12, M14
8	8	100	36	8	M16, M18
10	10	112	40	10	M20

17 Example of use

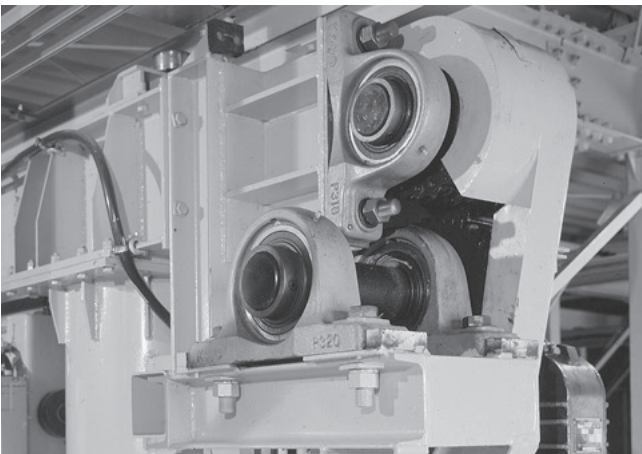
Koyo Ball Bearing units are used in varied equipment, and their performance contributes to technical advantages, automation, and energy-saving of equipment.

Automatic warehouse system

Many ball bearings are used in automatic warehouse systems for automation and energy-saving of the systems.



Automatic warehouse system



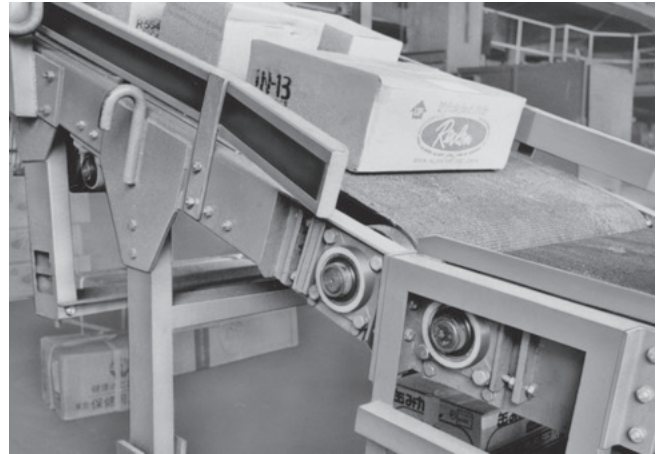
Mast driving system



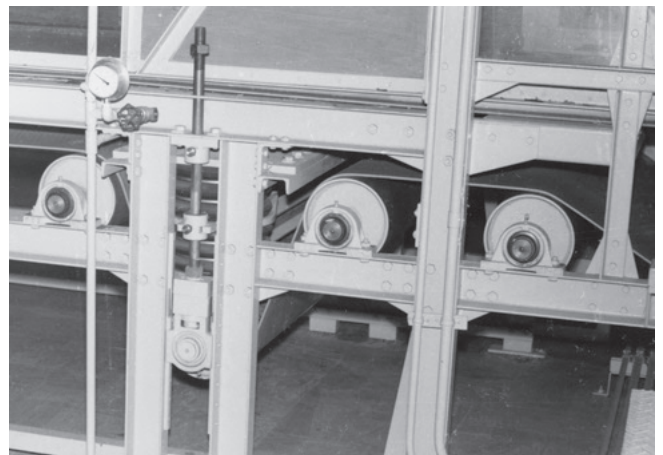
Conveyor

Delivery center

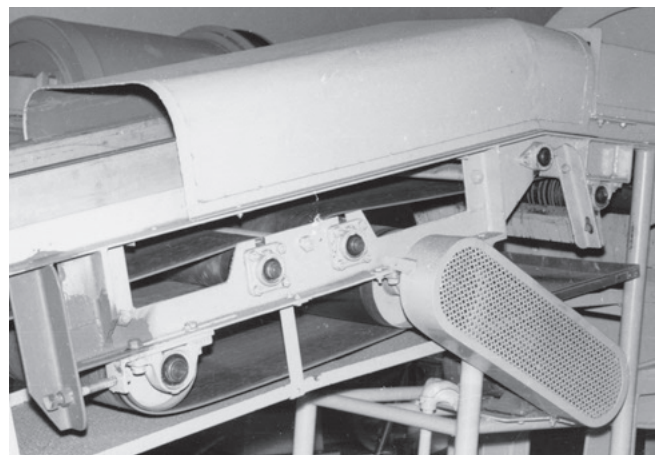
Koyo Ball bearings of various types including pillow block type, flange type, take-up type are used in conveyors of delivery centers.



Belt conveyor



Belt conveyor driving system



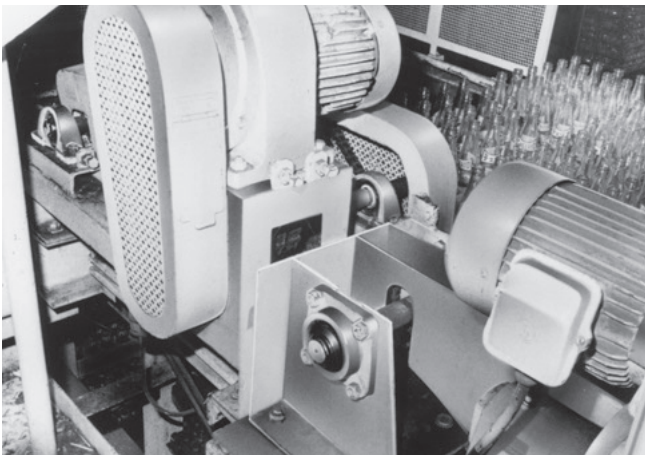
Belt conveyor driving system

Soft drink plant

Since soft drink manufacturing facilities are frequently cleaned for hygiene control, covered unit, "compact" series unit, and stainless-series unit are suitable for them.



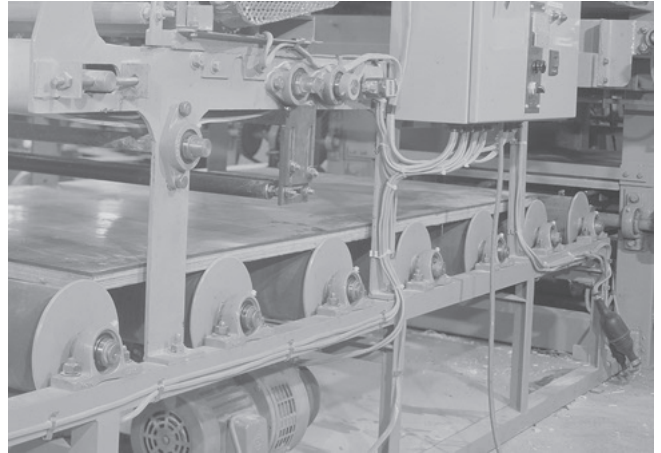
Bottle filling line conveyor



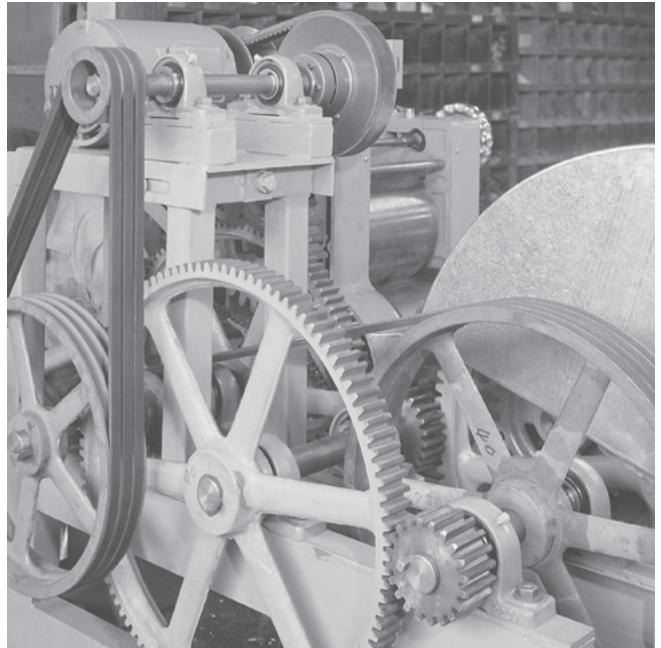
Pallet driving system

Noodle manufacturing plant

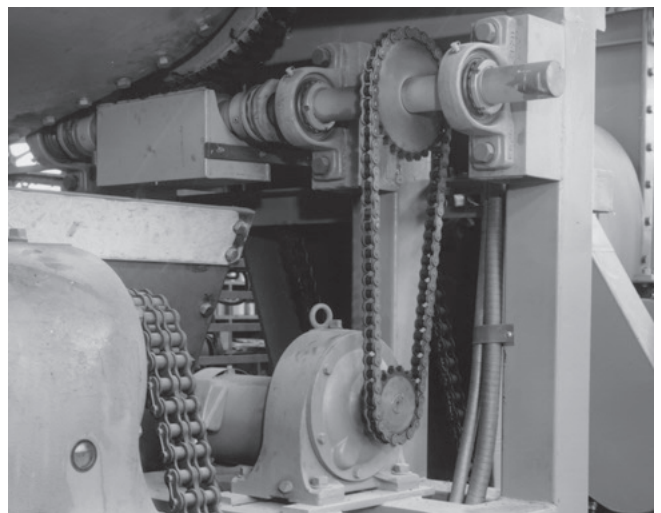
Triple-lip seal units or covered units are suitable for locations dusted with a great deal of noodle flour.



Feeding system



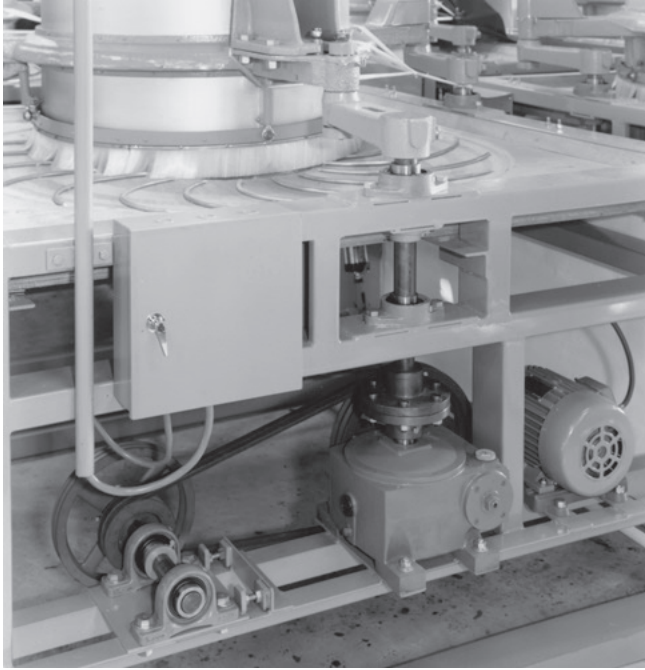
Noodle manufacturing machine driving system



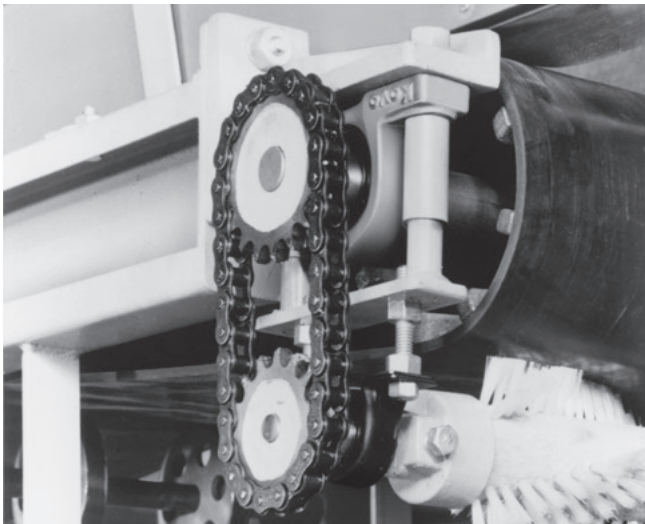
Mixer driving system

Tea manufacturing plant

Koyo Ball Bearings contribute to the automation of tea manufacturing lines and downsizing of tea manufacturing machines.



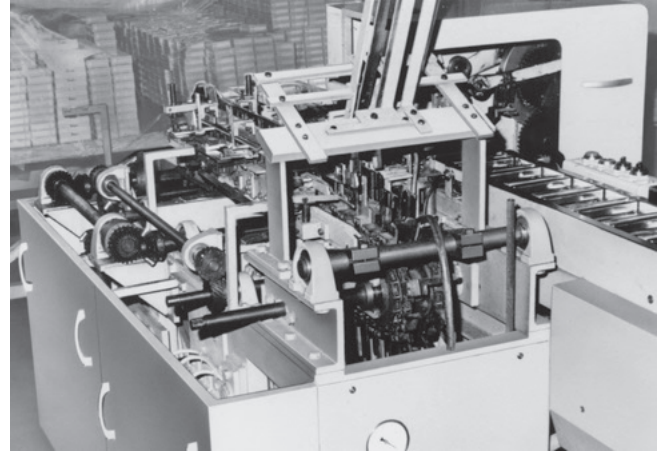
Tea processor driving system



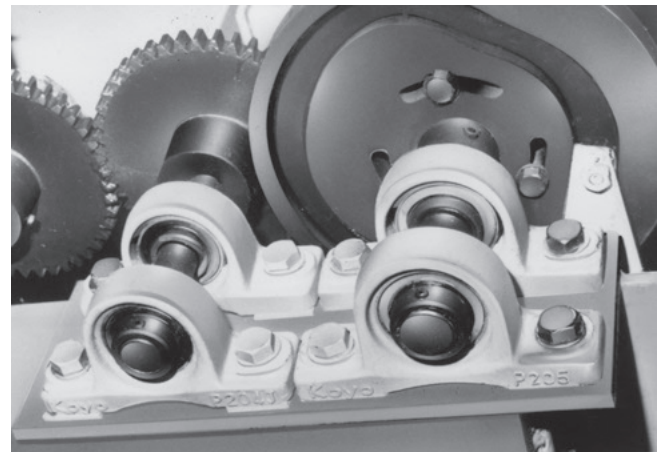
Conveyor driving system

Packing machine

Koyo Ball Bearings, used in transmission units, cam shafts, and conveyors, contribute to high-efficiency and automation of packing lines.



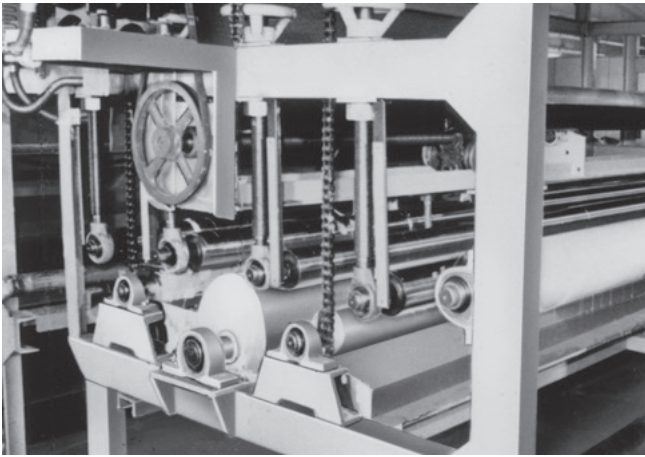
Packing machine



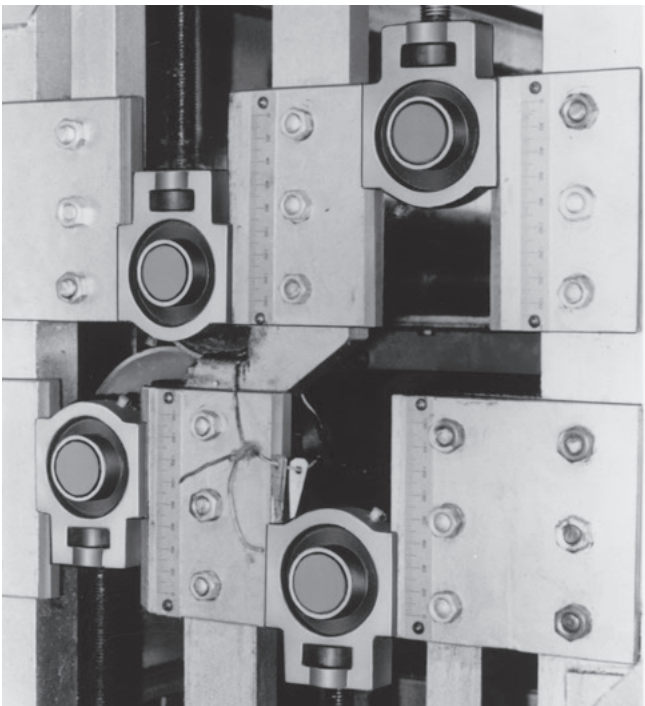
Cam shaft

Textile machine

Take-up units are suitable for locations where adjustment of distance between shaft axes is required, while hanger units are suitable for locations where the shaft must be hung because of the structure of the machine.



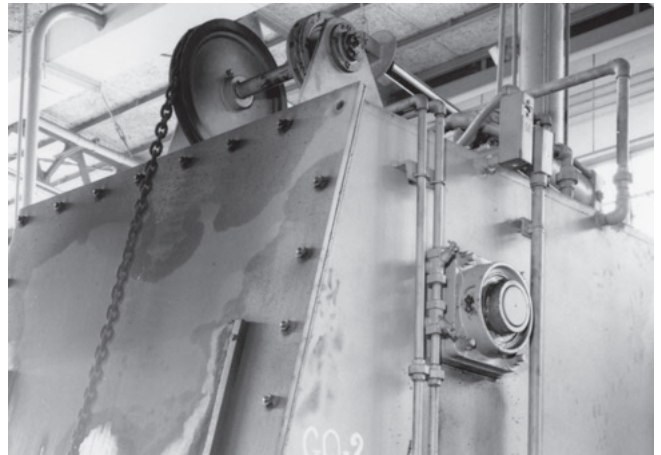
Carpet pasting system



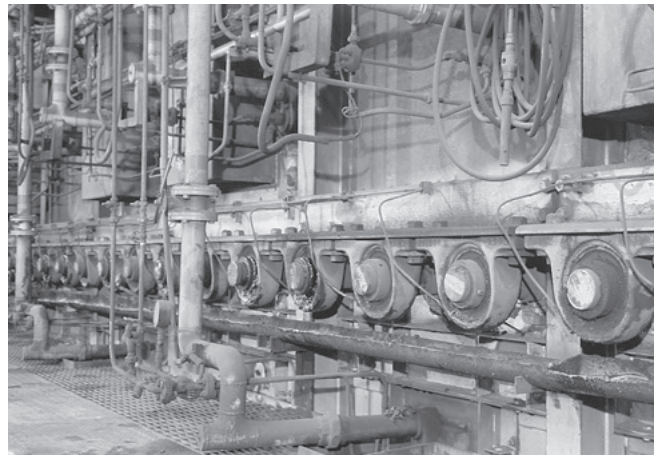
Carpet feeding shaft

Heat treatment system

The heat resistant unit is used for applications at a high temperature.



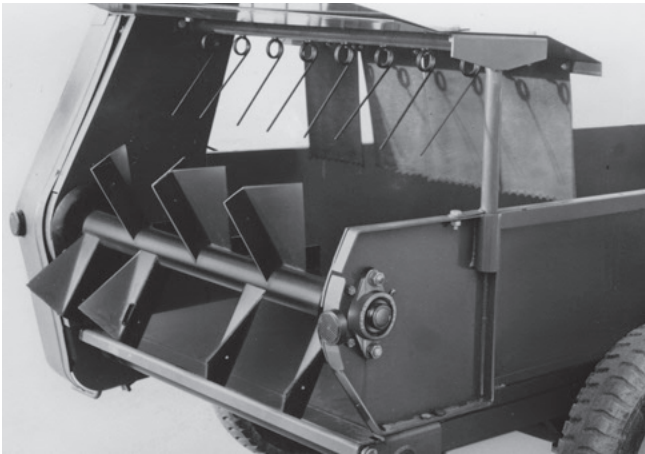
Carburizing furnace



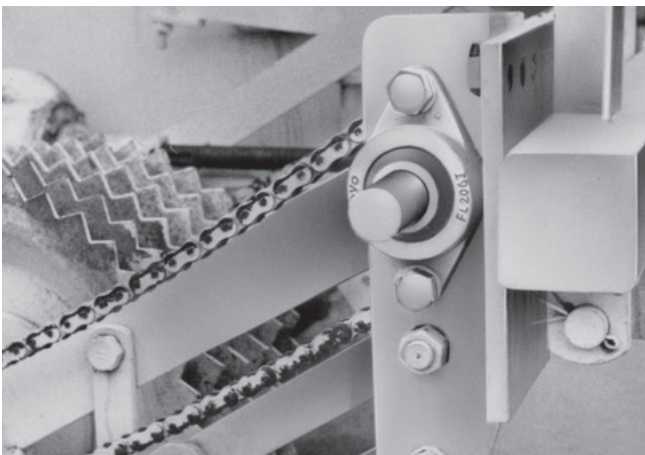
Heat treatment furnace

Agricultural machine

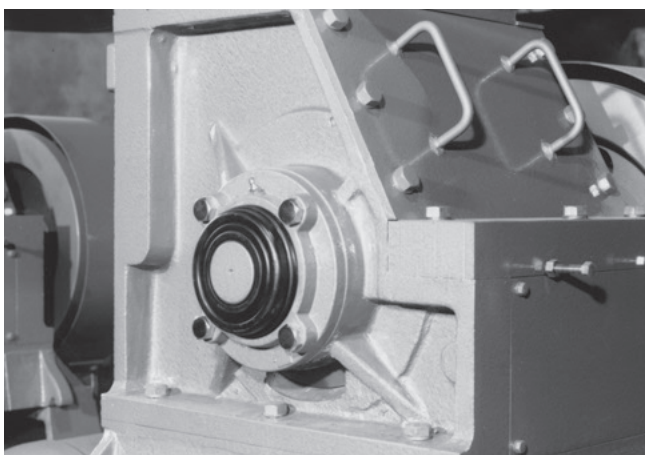
Koyo Ball Bearings contribute to downsizing and high-performance of agricultural machines. Triple-lip seal units or covered units are suitable for locations where are subject to a great deal of mud water and dusts.



Small wagon



Beat harvester power transmission system



Grain mill

Construction machinery

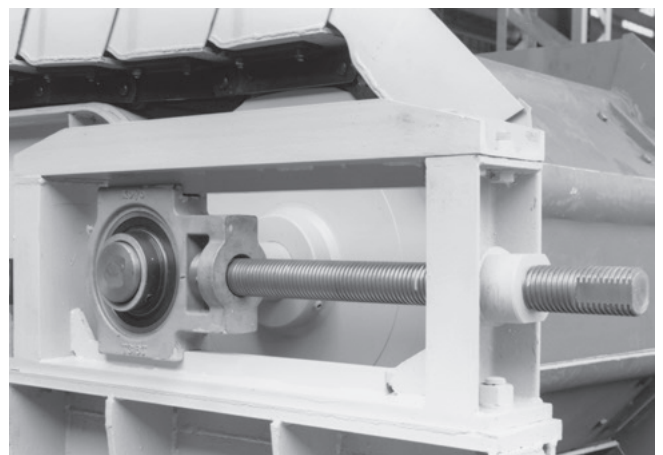
Koyo Ball Bearings contribute to high-performance and longer service life of construction machinery used under severe environment.



Concrete mixer



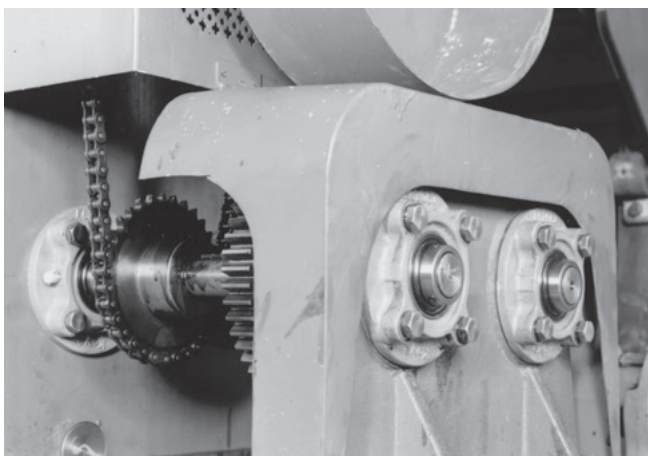
Conveyor



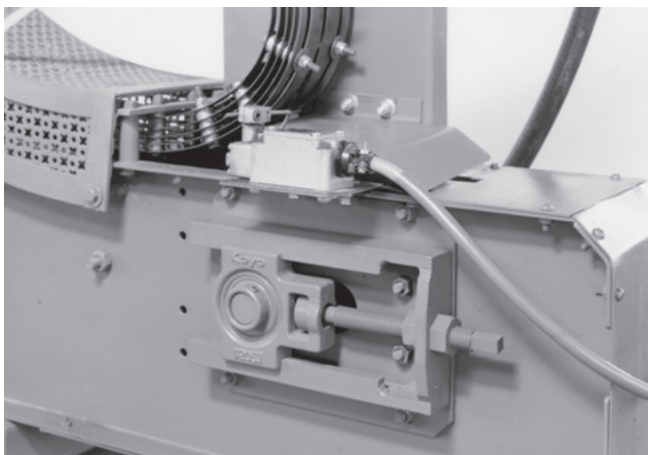
Conveyor

Other applications

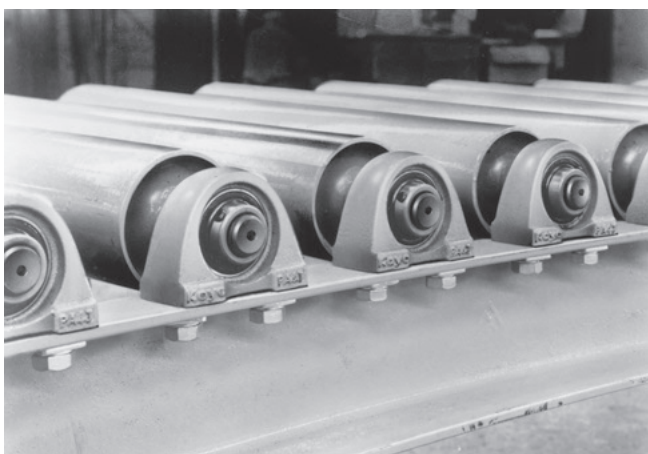
Ball Bearings of various types appropriate for applications and specifications are used.



(Round-flanged type with spigot joint)



(Take-up type unit)










(Pillow block type unit)

Supplementary table (contents)

1	Simplified chart of ball bearing unit combinations	254
2	Tightening torques of mounting bolts for housing and cast iron cover	256
3	Tightening torques of set screws for inner ring and eccentric locking collar	257
4	Tightening torques of adapter lock nuts (reference)	257
5	Machining dimensions of holes for housing dowel pins	258
6	Shaft tolerances (deviation from nominal dimensions)	260
7	Housing bore tolerances (deviation from nominal dimensions)	262
8	SI units and conversion factors	264
9	Inch/millimeter conversion	268
10	Mechanical properties of metal materials (reference)	269
11	Hexagon socket head cap screws (abstract from JIS B 1176)	270
12	Hexagon head bolts (abstract from JIS B 1180)	272
13	Hexagon head nuts (abstract from JIS B 1181)	274
14	Steel hardness conversion	275
15	Viscosity conversion	276

Supplementary table 1 Simplified chart of ball bearing unit combinations

Type	Housing for units	Ball bearing for units							
		Cylindrical bore (with set screws)				Tapered bore (with adapter)			
		UC200	UCX00	UC300	Stainless steel UC200S6	UK200	UKX00	UK300	
Pillow block type 	P200, PX00, P300 PK200	UCP200	UCPX00	UCP300		UKP200	UKPX00	UKP300	
	P200SC, P300SC	UCP200SC		UCP300SC		UKP200SC		UKP300SC	
	IP200, IP300 PA200, SPA200H1	UCIP200 UCPA200		UCIP300	UCSPA200H1S6	UKIP200		UKIP300	
	PH200 LP200	UCPH200							
P000, SP000 SP200H1 PP200					UCSP200H1S6				
Square-flanged type 	F200, FX00, F300 F200E, FX00E SF200H1 NF200 FS300	UCF200 UCF200E	UCFX00 UCFX00E	UCF300	UCSF200H1S6	UKF200	UKFX00	UKF300	
				UCFS300				UKFS300	
Oval flange type 	FL200, FLX00, FL300 FL200E FA200	UCFL200 UCFL200E UCFA200	UCFLX00	UCFL300		UKFL200	UKFLX00	UKFL300	
	FB200 LF200	UCFB200							
	FL000, SFL000 NFL200 SFL200H1				UCSFL200H1S6				
Round-flanged type with spigot joint 	FC200, FCX00, FCX00E	UCFC200	UCFCX00 UCFCX00E			UKFC200	UKFCX00		
Pressed steel flange type 	PF200 PFL200								
Take-up type 	T200, TX00, T300 T200E, TX00E ST200H1 T200+H	UCT200 UCT200E	UCTX00 UCTX200E	UCT300	UCST200H1S6	UKT200	UKTX00	UKT300	
	TL200 TU200, TU300	UCTL200 UCTU200		UCTU300		(UKTL200) (UKTU200)		(UKTU300)	
	PTH200 NPTH200								
Cartridge type 	C200, CX00, C300	UCC200	UCCX00	UCC300		UKC200	UKCX00	UKC300	
Hanger type 	HA200	UCHA200							

Ball bearing for units					Housing for units	Type
Cylindrical bore (with set screws)		Cylindrical bore (with eccentric locking collar)				
"Compact" series SU000	Stainless steel SU000S6	SB200	SA200	NA200		
				NAP200 NAPK200	P200, PX00, P300 PK200 P200SC, P300SC	Pillow block type
					IP200, IP300 PA200, SPA200H1	
		BLP200	ALP200		PH200 LP200	
UP000	USP000S6				P000, SP000 SP200H1 PP200	
		SBPP200	SAPP200			
					F200, FX00, F300 F200E, FX00E SF200H1 NF200 FS300	Square-flanged type
					FL200, FLX00, FL300 FL200E FA200	Oval flange type
		BLF200	ALF200		FB200 LF200	
UFL000	USFL000S6				FL000, SFL000 NFL200 SFL200H1	
						Round-flanged type with spigot joint
		SBPF200 SBPFL200	SAPF200 SAPFL200		PF200 PFL200	Pressed steel flange type
				NAT200	T200, TX00, T300 T200E, TX00E ST200H1 T200+H	Take-up type
					TL200 TU200, TU300	
		SBPTH200 SBNPTH200			PTH200 NPTH200	
						Cartridge type
						Hanger type
					HA200	

Supplementary table 2 Tightening torques of mounting bolts for housing and cast iron cover

(1) Tightening torques of mounting bolts for housing (recommended)

Nominal size of screws	Tightening torques N · m
M 6	2.6– 4.7
M 8	6 – 10
M10	12 – 21
M12	21 – 37
M14	34 – 60
M16	53 – 93
M18	77 – 137
M20	104 – 186
M22	143 – 256
M27	266 – 478
M30	360 – 645
M33	494 – 886
M36	631 –1 130

(2) Tightening torques of mounting bolts for cast iron cover (recommended)

Nominal size of screws	Tightening torques, N · m	Part No. of applicable cast iron covers (reference)		
		200 series	X00 series	300 series
M3	0.3– 0.6	204, 205	–	–
M4	0.8– 1.4	204FC3 (FD3), 205FC3 (FD3), 206–215	–	305–307
M5	1.5– 2.8	216–218	X18, X20	308–324
M8	6 –10	–	–	326, 328

Supplementary table 3 Tightening torques of set screws for inner ring and eccentric locking collar

(1) Tightening torques of set screws for inner ring and eccentric locking collar (metric series) (recommended)

Nominal size of screws	Tightening torques, N · m	Part No. of applicable bearings						
		UC200, RB200	UCX00	UC300	NA200	SB200	SU000	ER200
M 3X0.35	0.7						000, 001	
M 4X0.5	1.8	–				–	002, 003	
M 5X0.5	3	201X–203X	–	–		201–203	004–006	–
M 6X0.75	4	201–206	X05	305, 306	–	204–207	–	201–206
M 6X1	4	–	–	–	204, 205	–		
M 8X1	8.5	207–209	X06–X08	307	206–210	208		207–209
M10X1.25	17.5	210–212	X09–X11	308, 309	211, 212	–		210–212
M12X1.5	28	213–218	X12–X17	310–314	–			–
M14X1.5	35	–	X18	315, 316				
M16X1.5	56		X20	317–319				
M18X1.5	62		–	320–324				
M20X1.5	83			326, 328				

(2) Tightening torques of set screws for inner ring and eccentric locking collar (inch series) (recommended)

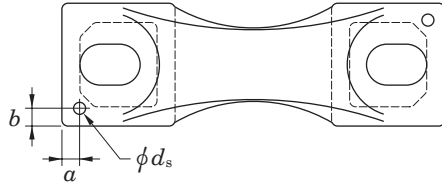
Nominal size of screws	Tightening torques, N · m	Part No. of applicable bearings		
		UC200, ER200, RB200	UCX00	SB200
10-32UNF	3	–	–	201, 202
1/4-28UNF	4	201–206	X05	204–207
5/16-24UNF	8.5	207–209	X06–X08	208
3/8-24UNF	17.5	210–212	X09–X11	–
1/2-20UNF	28	213–218	X12–X18	
5/8-18UNF	56	–	X20	

Supplementary table 4 Tightening torques of adapter lock nuts (reference)

Bore code	Tightening torques, N · m			Bore code	Tightening torques, N · m		
	UK200	UKX00	UK300		UK200	UKX00	UK300
05	24.5	34	29	16	196	255	441
06	29	39	44	17	225	294	530
07	39	49	59	18	265	343	608
08	49	73	78	19	–	–	706
09	59	78	117	20		490	883
10	73	108	147	22		–	1 220
11	98	137	177	24			1 470
12	127	167	225	26			1 770
13	147	196	265	28			2 150
15	167	215	373				

Supplementary table 5 Machining dimensions of holes for housing dowel pins

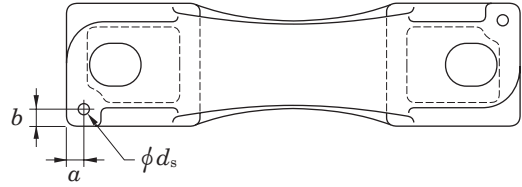
(1) Machining dimensions of holes for pillow block type housing (P) dowel pins (recommended)



Unit : mm

Nominal No.	a	b	d_s (reference)	Pin seat thickness
P203	6	6	4	12
P204	6	6	4	13
P205	6	6	4	13
P206	6	6	4	15
P207	8	8	5	16
P208	8	8	5	17
P209	8	8	5	17
P210	10	10	5	19
P211	10	10	6	19
P212	10	10	6	22
P213	10	10	6	25
P214	12	12	8	28
P215	12	12	8	28
P216	12	12	8	32
P217	12	12	8	32
P218	15	15	8	34
PX05	7	7	5	16
PX06	8	8	5	17
PX07	8	8	5	19
PX08	8	8	5	21
PX09	8	8	5	21
PX10	9	9	6	22
PX11	9	9	6	28
PX12	9	9	6	28
PX13	10	10	8	28
PX14	10	10	8	32
PX15	10	10	8	32
PX16	12	12	8	34
PX17	12	12	8	34
PX18	15	15	10	38
PX20	19	19	10	45
P305	8	8	5	16
P306	10	10	5	17
P307	10	10	5	19
P308	11	11	6	19
P309	11	11	6	21
P310	11	11	6	24
P311	12	12	8	27
P312	12	12	8	29
P313	12	12	8	32
P314	12	12	10	35
P315	14	14	10	35
P316	15	15	10	35
P317	15	15	10	40
P318	15	15	10	40
P319	15	15	10	46
P320	17	17	13	46
P321	17	17	13	46
P322	17	17	13	50
P324	17	17	13	50
P326	20	20	13	50
P328	20	20	13	60

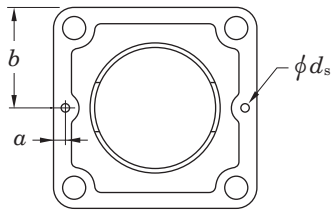
(2) Machining dimensions of holes for cast steel pillow block type housing (PSC) dowel pins (recommended)



Unit : mm

Nominal No.	a	b	d_s (reference)	Pin seat thickness
P205SC	7.5	6	4	16
P206SC	8.5	6	4	18
P207SC	10	6	5	19
P208SC	12	7	5	19
P209SC	10.5	8	5	20
P210SC	10	8	5	22
P211SC	12	8	6	24
P212SC	15	10	6	25
P213SC	12.5	10	6	28
P214SC	10	10	8	28
P215SC	11.5	10	8	29
P216SC	10	11	8	31
P217SC	12.5	11	8	33
P218SC	12.5	11	8	35
P310SC	14	7	6	27
P311SC	18	10	8	30
P312SC	18	10	8	32
P313SC	18	10	8	35
P314SC	17	10	10	38
P315SC	25	13	10	38
P316SC	30	13	10	38
P317SC	27	15	10	45
P318SC	27	15	10	45
P319SC	30	17	10	51
P320SC	30	18	13	51
P322SC	33	20	13	57
P324SC	33	20	13	57
P326SC	33	20	13	57
P328SC	33	20	13	70

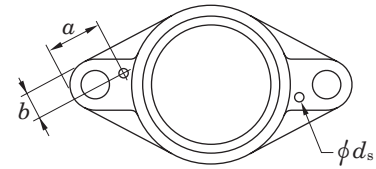
(3) Machining dimensions of holes for square-flanged type housing (F) dowel pins (recommended)



Unit : mm

Nominal No.	a	b	d _s (reference)	Pin seat thickness
F204	6	43	4	11
F205	6	47.5	4	13
F206	7.5	54	4	13
F207	7.5	58.5	5	15
F208	7.5	65	5	15
F209	7.5	68.5	5	16
F210	7.5	71.5	5	16
F211	9	81	6	18
F212	9	87.5	6	18
F213	9	93.5	6	22
F214	10	96.5	8	22
F215	10	100	8	22
F216	10	104	8	22
F217	10	110	8	24
F218	10	117.5	8	25
FX05	7.5	54	5	13
FX06	7.5	58.5	5	14
FX07	7.5	65	5	14
FX08	7.5	68.5	5	14
FX09	7.5	71.5	5	14
FX10	9	81	6	20
FX11	9	87.5	6	20
FX12	9	93.5	6	21
FX13	10	93.5	8	21
FX14	10	98.5	8	22
FX15	10	142	8	24
FX16	10	107	8	24
FX17	10	155	8	24
FX18	12	155	10	24
FX20	12	134	10	28
F305	7.5	55	5	13
F306	7.5	62.5	5	15
F307	7.5	67.5	5	16
F308	9	75	6	17
F309	9	80	6	18
F310	9	87.5	6	19
F311	10	92.5	8	20
F312	10	97.5	8	22
F313	10	104	8	22
F314	12	113	10	25
F315	12	118	10	25
F316	12	125	10	27
F317	12	130	10	27
F318	12	140	10	30
F319	12	145	10	30
F320	16	155	13	32
F321	16	155	13	32
F322	16	170	13	35
F324	16	185	13	40
F326	16	205	13	45
F328	16	225	13	55

(4) Machining dimensions of holes for Rombic-flanged type housing (FL) dowel pins (recommended)



Unit : mm

Nominal No.	a	b	d _s (reference)	Pin seat thickness
FL204	26	9	4	11
FL205	32	10	4	13
FL206	34	12	4	13
FL207	34	14	5	14
FL208	35	15	5	14
FL209	40	15	5	15
FL210	41	16	5	15
FL211	43	19	6	18
FL212	52	22	6	18
FL213	50	21	6	20
FL214	52	22	8	20
FL215	53	23	8	20
FL216	56	23	8	20
FL217	57	25	8	22
FL218	57	26	8	23
FLX05	27	12	5	13
FLX06	30	14	5	14
FLX07	32	15	5	14
FLX08	33	15	5	14
FLX09	35	16	5	14
FLX10	37	19	6	20
FL305	32	12	5	13
FL306	46	14	5	15
FL307	44	14	5	16
FL308	45	17	6	17
FL309	53	19	6	18
FL310	53	19	6	19
FL311	52	20	8	20
FL312	60	21	8	22
FL313	60	25	8	25
FL314	68	26	10	28
FL315	64	26	10	30
FL316	74	29	10	32
FL317	75	31	10	32
FL318	74	32	10	36
FL319	80	32	10	40
FL320	86	34	13	40
FL321	86	34	13	40
FL322	86	36	13	42
FL324	94	41	13	48
FL326	95	41	13	50
FL328	103	45	13	60

Supplementary table 6 Shaft tolerances (deviation from nominal dimensions)

Nominal shaft dia. (mm)		Deviation classes of shaft dia.															
Over	Up to	d 6	e 6	f 6	g 5	g 6	h 5	h 6	h 7	h 8	h 9	h 10	js 5	js 6	js 7	j 5	j 6
3	6	-30 -38	-20 -28	-10 -18	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18	0 -30	0 -48	± 2.5	± 4	± 6	+ 3 - 2	+ 6 - 2
6	10	-40 -49	-25 -34	-13 -22	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -36	0 -58	± 3	± 4.5	± 7.5	+ 4 - 2	+ 7 - 2
10	18	-50 -61	-32 -43	-16 -27	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27	0 -43	0 -70	± 4	± 5.5	± 9	+ 5 - 3	+ 8 - 3
18	30	-65 -78	-40 -53	-20 -33	-7 -16	-7 -20	0 -9	0 -13	0 -21	0 -33	0 -52	0 -84	± 4.5	± 6.5	±10.5	+ 5 - 4	+ 9 - 4
30	50	-80 -96	-50 -66	-25 -41	-9 -20	-9 -25	0 -11	0 -16	0 -25	0 -39	0 -62	0 -100	± 5.5	± 8	±12.5	+ 6 - 5	+11 - 5
50	80	-100 -119	-60 -79	-30 -49	-10 -23	-10 -29	0 -13	0 -19	0 -30	0 -46	0 -74	0 -120	± 6.5	± 9.5	±15	+ 6 - 7	+12 - 7
80	120	-120 -142	-72 -94	-36 -58	-12 -27	-12 -34	0 -15	0 -22	0 -35	0 -54	0 -87	0 -140	± 7.5	±11	±17.5	+ 6 - 9	+13 - 9
120	180	-145 -170	-85 -110	-43 -68	-14 -32	-14 -39	0 -18	0 -25	0 -40	0 -63	0 -100	0 -160	± 9	±12.5	±20	+ 7 -11	+14 -11
180	250	-170 -199	-100 -129	-50 -79	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115	0 -185	±10	±14.5	±23	+ 7 -13	+16 -13
250	315	-190 -222	-110 -142	-56 -88	-17 -40	-17 -49	0 -23	0 -32	0 -52	0 -81	0 -130	0 -210	±11.5	±16	±26	+ 7 -16	±16
315	400	-210 -246	-125 -161	-62 -98	-18 -43	-18 -54	0 -25	0 -36	0 -57	0 -89	0 -140	0 -230	±12.5	±18	±28.5	+ 7 -18	±18
400	500	-230 -270	-135 -175	-68 -108	-20 -47	-20 -60	0 -27	0 -40	0 -63	0 -97	0 -155	0 -250	±13.5	±20	±31.5	+ 7 -20	±20
500	630	-260 -304	-145 -189	-76 -120	-22 -54	-22 -66	0 -32	0 -44	0 -70	0 -110	0 -175	0 -280	±16	±22	±35	-	-
630	800	-290 -340	-160 -210	-80 -130	-24 -60	-24 -74	0 -36	0 -50	0 -80	0 -125	0 -200	0 -320	±18	±25	±40	-	-
800	1 000	-320 -376	-170 -226	-86 -142	-26 -66	-26 -82	0 -40	0 -56	0 -90	0 -140	0 -230	0 -360	±20	±28	±45	-	-

* Δ_{dmp} : Single plane mean bore diameter deviation

Unit : μm (Reference)

												Nominal shaft dia. (mm)		Δ_{dmp}^* of bearing (class 0)
k 5	k 6	k 7	m 5	m 6	m 7	n 5	n 6	p 6	r 6	r 7	Over	Up to		
+ 6 + 1	+ 9 + 1	+13 + 1	+ 9 + 4	+12 + 4	+ 16 + 4	+13 + 8	+ 16 + 8	+ 20 + 12	+ 23 + 15	+ 27 + 15	3	6	0 - 8	
+ 7 + 1	+10 + 1	+16 + 1	+12 + 6	+15 + 6	+ 21 + 6	+16 +10	+ 19 + 10	+ 24 + 15	+ 28 + 19	+ 34 + 19	6	10	0 - 8	
+ 9 + 1	+12 + 1	+19 + 1	+15 + 7	+18 + 7	+ 25 + 7	+20 +12	+ 23 + 12	+ 29 + 18	+ 34 + 23	+ 41 + 23	10	18	0 - 8	
+11 + 2	+15 + 2	+23 + 2	+17 + 8	+21 + 8	+ 29 + 8	+24 +15	+ 28 + 15	+ 35 + 22	+ 41 + 28	+ 49 + 28	18	30	0 - 10	
+13 + 2	+18 + 2	+27 + 2	+20 + 9	+25 + 9	+ 34 + 9	+28 +17	+ 33 + 17	+ 42 + 26	+ 50 + 34	+ 59 + 34	30	50	0 - 12	
+15 + 2	+21 + 2	+32 + 2	+24 +11	+30 +11	+ 41 + 11	+33 +20	+ 39 + 20	+ 51 + 32	+ 60 + 41	+ 71 + 41	50	65	0 - 15	
									+ 62 + 43	+ 73 + 43	65	80		
+18 + 3	+25 + 3	+38 + 3	+28 +13	+35 +13	+ 48 + 13	+38 +23	+ 45 + 23	+ 59 + 37	+ 73 + 51	+ 86 + 51	80	100	0 - 20	
									+ 76 + 54	+ 89 + 54	100	120		
+21 + 3	+28 + 3	+43 + 3	+33 +15	+40 +15	+ 55 + 15	+45 +27	+ 52 + 27	+ 68 + 43	+ 88 + 63	+103 + 63	120	140	0 - 25	
									+ 90 + 65	+105 + 65	140	160		
									+ 93 + 68	+108 + 68	160	180		
+24 + 4	+33 + 4	+50 + 4	+37 +17	+46 +17	+ 63 + 17	+51 +31	+ 60 + 31	+ 79 + 50	+106 + 77	+123 + 77	180	200	0 - 30	
									+109 + 80	+126 + 80	200	225		
									+113 + 84	+130 + 84	225	250		
+27 + 4	+36 + 4	+56 + 4	+43 +20	+52 +20	+ 72 + 20	+57 +34	+ 66 + 34	+ 88 + 56	+126 + 94	+146 + 94	250	280	0 - 35	
									+130 + 98	+150 + 98	280	315		
+29 + 4	+40 + 4	+61 + 4	+46 +21	+57 +21	+ 78 + 21	+62 +37	+ 73 + 37	+ 98 + 62	+144 +108	+165 +108	315	355	0 - 40	
									+150 +114	+171 +114	355	400		
+32 + 5	+45 + 5	+68 + 5	+50 +23	+63 +23	+ 86 + 23	+67 +40	+ 80 + 40	+108 + 68	+166 +126	+189 +126	400	450	0 - 45	
									+172 +132	+195 +132	450	500		
+32 0	+44 0	+70 0	+58 +26	+70 +26	+ 96 + 26	+76 +44	+ 88 + 44	+122 + 78	+194 +150	+220 +150	500	560	0 - 50	
									+199 +155	+225 +155	560	630		
+36 0	+50 0	+80 0	+66 +30	+80 +30	+110 + 30	+86 +50	+100 + 50	+138 + 88	+225 +175	+255 +175	630	710	0 - 75	
									+235 +185	+265 +185	710	800		
+40 0	+56 0	+90 0	+74 +34	+90 +34	+124 + 34	+96 +56	+112 + 56	+156 +100	+266 +210	+300 +210	800	900	0 -100	
									+276 +220	+310 +220	900	1 000		

Supplementary table 7 Housing bore tolerances (deviation from nominal dimensions)

Nominal Bore dia. (mm)		Deviation classes of housing bore														
Over	Up to	E 6	F 6	F 7	G 6	G 7	H 6	H 7	H 8	H 9	H 10	JS 5	JS 6	JS 7	J 6	J 7
10	18	+ 43 + 32	+ 27 + 16	+ 34 + 16	+17 + 6	+ 24 + 6	+11 0	+ 18 0	+ 27 0	+ 43 0	+ 70 0	± 4	± 5.5	± 9	+ 6 - 5	+10 - 8
18	30	+ 53 + 40	+ 33 + 20	+ 41 + 20	+20 + 7	+ 28 + 7	+13 0	+ 21 0	+ 33 0	+ 52 0	+ 84 0	± 4.5	± 6.5	±10.5	+ 8 - 5	+12 - 9
30	50	+ 66 + 50	+ 41 + 25	+ 50 + 25	+25 + 9	+ 34 + 9	+16 0	+ 25 0	+ 39 0	+ 62 0	+100 0	± 5.5	± 8	±12.5	+10 - 6	+14 -11
50	80	+ 79 + 60	+ 49 + 30	+ 60 + 30	+29 +10	+ 40 + 10	+19 0	+ 30 0	+ 46 0	+ 74 0	+120 0	± 6.5	± 9.5	±15	+13 - 6	+18 -12
80	120	+ 94 + 72	+ 58 + 36	+ 71 + 36	+34 +12	+ 47 + 12	+22 0	+ 35 0	+ 54 0	+ 87 0	+140 0	± 7.5	±11	±17.5	+16 - 6	+22 -13
120	180	+110 + 85	+ 68 + 43	+ 83 + 43	+39 +14	+ 54 + 14	+25 0	+ 40 0	+ 63 0	+100 0	+160 0	± 9	±12.5	±20	+18 - 7	+26 -14
180	250	+129 +100	+ 79 + 50	+ 96 + 50	+44 +15	+ 61 + 15	+29 0	+ 46 0	+ 72 0	+115 0	+185 0	±10	±14.5	±23	+22 - 7	+30 -16
250	315	+142 +110	+ 88 + 56	+108 + 56	+49 +17	+ 69 + 17	+32 0	+ 52 0	+ 81 0	+130 0	+210 0	±11.5	±16	±26	+25 - 7	+36 -16
315	400	+161 +125	+ 98 + 62	+119 + 62	+54 +18	+ 75 + 18	+36 0	+ 57 0	+ 89 0	+140 0	+230 0	±12.5	±18	±28.5	+29 - 7	+39 -18
400	500	+175 +135	+108 + 68	+131 + 68	+60 +20	+ 83 + 20	+40 0	+ 63 0	+ 97 0	+155 0	+250 0	±13.5	±20	±31.5	+33 - 7	+43 -20
500	630	+189 +145	+120 + 76	+146 + 76	+66 +22	+ 92 + 22	+44 0	+ 70 0	+110 0	+175 0	+280 0	±16	±22	±35	-	-
630	800	+210 +160	+130 + 80	+160 + 80	+74 +24	+104 + 24	+50 0	+ 80 0	+125 0	+200 0	+320 0	±18	±25	±40	-	-
800	1 000	+226 +170	+142 + 86	+176 + 86	+82 +26	+116 + 26	+56 0	+ 90 0	+140 0	+230 0	+360 0	±20	±28	±45	-	-
1 000	1 250	+261 +195	+164 + 98	+203 + 98	+94 +28	+133 + 28	+66 0	+105 0	+165 0	+260 0	+420 0	±23.5	±33	±52.5	-	-

* $\Delta_{D_{mp}}$: Single plane mean outside diameter deviation

Unit : μm (Reference)

													Nominal Bore dia. (mm)		Δ_{Dmp}^* of bearing (class 0)
K 5	K 6	K 7	M 5	M 6	M 7	N 5	N 6	N 7	P 6	P 7	R 7	Over	Up to		
+ 2 - 6	+ 2 - 9	+ 6 - 12	- 4 - 12	- 4 - 15	0 - 18	- 9 - 17	- 9 - 20	- 5 - 23	- 15 - 26	- 11 - 29	- 16 - 34	10	18	0 - 8	
+ 1 - 8	+ 2 - 11	+ 6 - 15	- 5 - 14	- 4 - 17	0 - 21	- 12 - 21	- 11 - 24	- 7 - 28	- 18 - 31	- 14 - 35	- 20 - 41	18	30	0 - 9	
+ 2 - 9	+ 3 - 13	+ 7 - 18	- 5 - 16	- 4 - 20	0 - 25	- 13 - 24	- 12 - 28	- 8 - 33	- 21 - 37	- 17 - 42	- 25 - 50	30	50	0 - 11	
+ 3 - 10	+ 4 - 15	+ 9 - 21	- 6 - 19	- 5 - 24	0 - 30	- 15 - 28	- 14 - 33	- 9 - 39	- 26 - 45	- 21 - 51	- 30 - 60	50	65	0 - 13	
											- 32 - 62	65	80		
+ 2 - 13	+ 4 - 18	+ 10 - 25	- 8 - 23	- 6 - 28	0 - 35	- 18 - 33	- 16 - 38	- 10 - 45	- 30 - 52	- 24 - 59	- 38 - 73	80	100	0 - 15	
											- 41 - 76	100	120		
+ 3 - 15	+ 4 - 21	+ 12 - 28	- 9 - 27	- 8 - 33	0 - 40	- 21 - 39	- 20 - 45	- 12 - 52	- 36 - 61	- 28 - 68	- 48 - 88	120	140	(up to 150) 0	
											- 50 - 90	140	160	- 18 (over to 150)	
											- 53 - 93	160	180	0 - 25	
+ 2 - 18	+ 5 - 24	+ 13 - 33	- 11 - 31	- 8 - 37	0 - 46	- 25 - 45	- 22 - 51	- 14 - 60	- 41 - 70	- 33 - 79	- 60 - 106	180	200	0 - 30	
											- 63 - 109	200	225		
											- 67 - 113	225	250		
+ 3 - 20	+ 5 - 27	+ 16 - 36	- 13 - 36	- 9 - 41	0 - 52	- 27 - 50	- 25 - 57	- 14 - 66	- 47 - 79	- 36 - 88	- 74 - 126	250	280	0 - 35	
											- 78 - 130	280	315		
											- 87 - 144	315	355		
+ 3 - 22	+ 7 - 29	+ 17 - 40	- 14 - 39	- 10 - 46	0 - 57	- 30 - 55	- 26 - 62	- 16 - 73	- 51 - 87	- 41 - 98	- 93 - 150	355	400	0 - 40	
											- 103 - 166	400	450		
+ 2 - 25	+ 8 - 32	+ 18 - 45	- 16 - 43	- 10 - 50	0 - 63	- 33 - 60	- 27 - 67	- 17 - 80	- 55 - 95	- 45 - 108	- 109 - 172	450	500	0 - 45	
											- 150 - 220	500	560		
0 - 32	0 - 44	0 - 70	- 26 - 58	- 26 - 70	- 26 - 96	- 44 - 76	- 44 - 88	- 44 - 114	- 78 - 122	- 78 - 148	- 155 - 225	560	630	0 - 50	
											- 175 - 255	630	710		
0 - 36	0 - 50	0 - 80	- 30 - 66	- 30 - 80	- 30 - 110	- 50 - 86	- 50 - 100	- 50 - 130	- 88 - 138	- 88 - 168	- 185 - 265	710	800	0 - 75	
											- 210 - 300	800	900		
0 - 40	0 - 56	0 - 90	- 34 - 74	- 34 - 90	- 34 - 124	- 56 - 96	- 56 - 112	- 56 - 146	- 100 - 156	- 100 - 190	- 220 - 310	900	1 000	0 - 100	
											- 250 - 355	1 000	1 120		
0 - 47	0 - 66	0 - 105	- 40 - 87	- 40 - 106	- 40 - 145	- 66 - 113	- 66 - 132	- 66 - 171	- 120 - 186	- 120 - 225	- 260 - 365	1 120	1 250	0 - 125	

Supplementary Table 8 (1) SI units and conversion factors

Mass	SI units	Other Units ¹⁾	Conversion into SI units	Conversion from SI units
Angle	rad [radian(s)]	° [degree(s)] * ' [minute(s)] * " [second(s)] *	1° = $\pi / 180$ rad 1' = $\pi / 10\,800$ rad 1" = $\pi / 648\,000$ rad	1 rad = 57.295 78°
Length	m [meter(s)]	Å [Angstrom unit] μ [micron(s)] in [inch(es)] ft [foot(feet)] yd [yard(s)] mile [mile(s)]	1 Å = 10^{-10} m = 0.1 nm = 100 pm 1 μ = 1 μm 1 in = 25.4 mm 1 ft = 12 in = 0.304 8 m 1 yd = 3 ft = 0.914 4 m 1 mile = 5 280 ft = 1 609.344 m	1 m = 10^{10} Å 1 m = 39.37 in 1 m = 3.280 8 ft 1 m = 1.093 6 yd 1 km = 0.621 4 mile
Area	m ²	a [are(s)] ha [hectare(s)] acre [acre(s)]	1 a = 100 m ² 1 ha = 10 ⁴ m ² 1 acre = 4 840 yd ² = 4 046.86 m ²	1 km ² = 247.1 acre
Volume	m ³	ℓ, L [liter(s)] * cc [cubic centimeters] gal (US) [gallon(s)] floz (US) [fluid ounce(s)] barrel (US) [barrels(US)]	1 ℓ = 1 dm ³ = 10 ⁻³ m ³ 1 cc = 1 cm ³ = 10 ⁻⁶ m ³ 1 gal (US) = 231 in ³ = 3.785 41 dm ³ 1 floz (US) = 29.573 5 cm ³ 1 barrel (US) = 158.987 dm ³	1 m ³ = 10 ³ ℓ 1 m ³ = 10 ⁶ cc 1 m ³ = 264.17 gal 1 m ³ = 33 814 floz 1 m ³ = 6.289 8 barrel
Time	s [second(s)]	min [minute(s)] * h [hour(s)] * d [day(s)] *		
Angular velocity	rad/s			
Velocity	m/s	kn [knot(s)] m/h *	1 kn = 1 852 m/h	1 km/h = 0.539 96 kn
Acceleration	m/s ²	G	1 G = 9.806 65 m/s ²	1 m/s ² = 0.101 97 G
Frequency	Hz [hertz]	c/s [cycle(s)/second]	1 c/s = 1 s ⁻¹ = 1 Hz	
Rotational frequency	s ⁻¹	rpm [revolutions per minute] min ⁻¹ * r/min	1 rpm = 1/60 s ⁻¹	1 s ⁻¹ = 60 rpm
Mass	kg [kilogram(s)]	t [ton(s)] * lb [pound(s)] gr [grain(s)] oz [ounce(s)] ton (UK) [ton(s) (UK)] ton (US) [ton(s) (US)] car [carat(s)]	1 t = 10 ³ kg 1 lb = 0.453 592 37 kg 1 gr = 64.798 91 mg 1 oz = 1/16 lb = 28.349 5 g 1 ton (UK) = 1 016.05 kg 1 ton (US) = 907.185 kg 1 car = 200 mg	1 kg = 2.204 6 lb 1 g = 15.432 4 gr 1 kg = 35.274 0 oz 1 t = 0.984 2 ton (UK) 1 t = 1.102 3 ton (US) 1 g = 5 car

Note 1) * : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary Table 8 (2) SI units and conversion factors

Mass	SI units	Other Units ¹⁾	Conversion into SI units	Conversion from SI units
Density	kg/m ³			
Linear density	kg/m			
Momentum	kg · m/s			
Moment of momentum, Angular momentum	} kg · m ² /s			
Moment of inertia		kg · m ²		
Force	N [newton(s)]	dyn [dyne(s)] kgf [kilogram-force] gf [gram-force] tf [ton-force] lbf [pound-force]	1 dyn = 10 ⁻⁵ N 1 kgf = 9.806 65 N 1 gf = 9.806 65 × 10 ⁻³ N 1 tf = 9.806 65 × 10 ³ N 1 lbf = 4.448 22 N	1 N = 10 ⁵ dyn 1 N = 0.101 97 kgf 1 N = 0.224 809 lbf
Moment of force	N · m [newton meter(s)]	gf · cm kgf · cm kgf · m tf · m lbf · ft	1 gf · cm = 9.806 65 × 10 ⁻⁵ N · m 1 kgf · cm = 9.806 65 × 10 ⁻² N · m 1 kgf · m = 9.806 65 N · m 1 tf · m = 9.806 65 × 10 ³ N · m 1 lbf · ft = 1.355 82 N · m	1 N · m = 0.101 97 kgf · m 1 N · m = 0.737 56 lbf · ft
Pressure, Normal stress	Pa [pascal(s)] or N/m ² {1 Pa = 1 N/m ² }	gf/cm ² kgf/mm ² kgf/m ² lbf/in ² bar [bar(s)] at [engineering air pressure] mH ₂ O, mAq [meter water column] atm [atmosphere] mHg [meter mercury column] Torr [torr]	1 gf/cm ² = 9.806 65 × 10 Pa 1 kgf/mm ² = 9.806 65 × 10 ⁶ Pa 1 kgf/m ² = 9.806 65 Pa 1 lbf/in ² = 6 894.76 Pa 1 bar = 10 ⁵ Pa 1 at = 1kgf/cm ² = 9.806 65 × 10 ⁴ Pa 1 mH ₂ O = 9.806 65 × 10 ³ Pa 1 atm = 101 325 Pa 1 mHg = $\frac{101\ 325}{0.76}$ Pa 1 Torr = 1mmHg = 133.322 Pa	1 MPa = 0.101 97 kgf/mm ² 1 Pa = 0.101 97 kgf/m ² 1 Pa = 0.145 × 10 ⁻³ lbf/in ² 1 Pa = 10 ⁻² mbar 1 Pa = 7.500 6 × 10 ⁻³ Torr
Viscosity	Pa · s [pascal second]	P [poise] kgf · s/m ²	10 ⁻² P = 1 cP = 1 mPa · s 1 kgf · s/m ² = 9.806 65 Pa · s	1 Pa · s = 0.101 97 kgf · s/m ²
Kinematic viscosity	m ² /s	St [stokes]	10 ⁻² St = 1 cSt = 1 mm ² /s	
Surface tension	N/m			

Note 1) * : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary Table 8 (3) SI units and conversion factors

Mass	SI units	Other Units ¹⁾	Conversion into SI units	Conversion from SI units
Work, energy	J [joule(s)] {1 J = 1 N · m}	eV [electron volt(s)] * erg [erg(s)] kgf · m lbf · ft	1 eV = (1.602 189 2 ± 0.000 004 6) × 10 ⁻¹⁹ J 1 erg = 10 ⁻⁷ J 1 kgf · m = 9.806 65 J 1 lbf · ft = 1.355 82 J	1 J = 10 ⁷ erg 1 J = 0.101 97 kgf · m 1 J = 0.737 56 lbf · ft
Power	W [watt(s)]	erg/s [ergs per second] kgf · m/s PS [French horse-power] HP [horse-power (British)] lbf · ft/s	1 erg/s = 10 ⁻⁷ W 1 kgf · m/s = 9.806 65 W 1 PS = 75 kgf · m/s = 735.5 W 1 HP = 550 lbf · ft/s = 745.7 W 1 lbf · ft/s = 1.355 82 W	1 W = 0.101 97 kgf · m/s 1 W = 0.001 36 PS 1 W = 0.001 34 HP
Thermo-dynamic temperature	K [kelvin(s)]			
Celsius temperature	°C [celsius(s)] {t °C = (t + 273.15) K}	°F [degree(s) Fahrenheit]	t°F = $\frac{5}{9} (t - 32) °C$	t°C = $(\frac{5}{9} t + 32) °F$
Linear expansion coefficient	K ⁻¹	°C ⁻¹ [per degree]		
Heat	J [joule(s)] {1 J = 1 N · m}	erg [erg(s)] kgf · m cal _{IT} [l. T. calories]	1 erg = 10 ⁻⁷ J 1 cal _{IT} = 4.186 8 J 1 Mcal _{IT} = 1.163 kW · h	1 J = 10 ⁷ erg 1 J = 0.238 85 cal _{IT} 1 kW · h = 0.86 × 10 ⁶ cal _{IT}
Thermal conductivity	W/ (m · K)	W/ (m · °C) cal/ (s · m · °C)	1 W/ (m · °C) = 1 W/ (m · K) 1 cal/ (s · m · °C) = 4.186 05 W/ (m · K)	
Coefficient of heat transfer	W/ (m ² · K)	W/ (m ² · °C) cal/ (s · m ² · °C)	1 W/ (m ² · °C) = 1 W/ (m ² · K) 1 cal/ (s · m ² · °C) = 4.186 05 W/ (m ² · K)	
Heat capacity	J/K	J/°C	1 J/°C = 1 J/K	
Massic heat capacity	J/ (kg · K)	J/ (kg · °C)		

Note 1) * : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary Table 8 (4) SI units and conversion factors

Mass	SI units	Other Units ¹⁾	Conversion into SI units	Conversion from SI units
Electric current	A [ampere(s)]			
Electric charge, quantity of electricity	C [coulomb(s)] {1 C = 1 A · s}	A · h * 	1 A · h = 3.6 kC	
Tension, electric potential	V [volt(s)] {1 V = 1 W/A}			
Capacitance	F [farad(s)] {1 F = 1 C/V}			
Magnetic field strength	A/m	Oe [oersted(s)]	$1 \text{ Oe} = \frac{10^3}{4\pi} \text{ A/m}$	1 A/m = $4\pi \times 10^{-3}$ Oe
Magnetic flux density	T [tesla(s)] {1 T = 1 N/(A · m) = 1 Wb/m ² = 1 V · s/m ² }	Gs [gauss(es)] γ [gamma(s)]	1 Gs = 10^{-4} T 1 γ = 10^{-9} T	1 T = 10^4 Gs 1 T = $10^9 \gamma$
Magnetic flux	Wb [weber(s)] {1 Wb = 1 V · s}	Mx [maxwell(s)]	1 Mx = 10^{-8} Wb	1 Wb = 10^8 Mx
Self inductance	H [henry (– ries)] {1 H = 1 Wb/A}			
Resistance (to direct current)	Ω [ohm(s)] {1 Ω = 1 V/A}			
Conductance (to direct current)	S [siemens] {1 S = 1 A/V}			
Active power	W {1 W = 1 J/s = 1 A · V}			

Note 1) * : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary table 10 Mechanical properties of metal materials (reference)

(1) Modulus of longitudinal elasticity, elastic limit, and ultimate strength

Material	Main components and others	Specific gravity	Modulus of longitudinal elasticity (GPa)	Elastic limit σ_e (MPa)	Ultimate strength (MPa)			
					Tensile K_t	Compression K_c	Shear K_s	
Gray cast iron (FC150)		7.1–7.3	69	29	118	590	108	
(FC200)		7.1–7.3	98	88	137– 216	740	206	
(FC250)		7.1–7.3	103	88	176– 314	880	206	
White heart malleable cast iron	Residual carbon : 1.6% or less	7.1–7.3	158	196	314– 392	820	382	
Black heart malleable cast iron		7.2–7.6	158	196	274– 392	820	382	
Carbon steel	General	7.7–7.8	196–216	176–245	314– 830	–	–	
Extra mild steel	C 0.05–0.15%	7.8	196	118	Up to 372	Virtually identical to tensile strength, provided buckling can be ignored	0.8 K_t	
Mild steel	C 0.15–0.25%	7.8	204	157	372– 392		0.75 K_t	
Middle hard steel	C 0.25–0.40%	7.8	206	245–294	490– 590		0.75 K_t	
Hard steel	C 0.40–0.50%	7.8	216	343	590– 690		0.7 K_t	
Maximum hard steel	C 0.50–0.65%	7.8	216	372	690– 830		0.65 K_t	
Mild steel	C 0.18% hot rolling	7.8	206	176	421		314	
Hard steel	Oil hardening, tempering at 700 °C	7.8	206	343	590		461	
Tool steel	C 0.60–1.50% hardening	7.8	216	441	660		820	
Cast steel	General	7.8–7.9	206–211	176–245	343– 600		343–600	284–382
Cast steel (mild)	C 0.15–0.22%	7.8–7.9	206	196	363– 431		363–431	284
Cast steel (middle hard)	C 0.22–0.30%	7.8–7.9	211	225	392– 490	392–490	333	
Cast steel (hard)	C 0.30–0.40%	7.9	211	245	490– 590	490–590	382	
Nickel steel	C 0.25–0.35% Ni 2–5%	7.85	206–216	333	640– 830	640	401	
Chrome steel	C 0.13–0.48% Cr 0.9–1.2%	7.85	206–216	–	780– 980	–	–	
Nickel chrome steel	C, Ni, Cr included	7.85	206–216	–	740– 980	–	382–500	
Chromium molybdenum steel	C, Cr, Mo included	7.85	206–216	–	830– 980	–	–	
Manganese steel	C 0.2–0.46% Mn 1–1.4%	7.85	206–216	–	440–1 080	–	–	
Spring steel		7.86	216	735	1 080–1 670	1 670	–	
Stainless steel	C, Cr, Ni included	7.75	206–216	–	620	–	410	
Brass casting	Cu 60% Zn 40%	8.5	69	–	176– 216	108	147	
Brass (forged plate)	Cu 60% Zn 40%	8.4	78– 98	–	274– 392	314	206	
Brass (forged rod)	Cu 60% Zn 40%	8.4	82	–	520	314	314	
Phosphor bronze casting	Cu 90% Sn 10% P 0.1%	8.8	93–103	–	196– 294	137	176	
Phosphor bronze (forging)	Cu 90% Sn 10% P 0.1%	8.8	132	–	294– 980	206	382	
Tin		7.28	39– 54	–	27	–	–	
Lead		11.34	15– 17	–	20	–	–	
Zinc		7.1	78–127	–	78– 176	–	–	

(2) Allowable stress

Unit : MPa

Material	Tensile K_t			Compression K_c		Bending K_b			Shear K_s			Torsion K_d		
	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
Cast iron (cast)	29– 34	20– 23	10–12	88– 98	59– 65	45– 59	30– 39	15–20	29– 34	20–23	10–12	26– 34	18–23	88–118
Cast iron (machined)	29– 34	20– 23	10–12	88– 98	59– 65	55– 71	–	–	29– 34	20–23	10–12	26– 34	18–23	88–118
Malleable cast iron	44– 69	29– 46	15–23	59– 88	39– 59	44– 98	29– 46	15–23	–	–	–	29– 39	20–26	10– 13
Cast steel	59–118	39– 78	20–39	88–147	59– 98	74–118	49– 78	25–39	47– 94	31–63	16–31	47– 94	31–63	16– 31
Mild steel	98–157	66–105	32–52	98–157	66–105	88–147	59– 98	35–49	78–127	52–85	26–42	78–137	52–91	26– 46
Middle hard steel	118–176	78–118	39–59	118–176	78–118	118–176	78–118	39–59	94–137	63–94	31–47	88–137	59–94	29– 47
Nickel steel	118–176	78–118	39–59	118–176	78–118	118–176	78–118	39–59	94–137	63–94	31–47	88–137	59–92	29– 47
Carbon steel casting	88–118	59– 78	29–39	88–118	59– 78	88–118	59– 78	29–39	71– 93	47–63	24–31	35– 47	24–31	12– 16
Brass (rolled)	10– 59	26– 35	13–20	39– 59	26– 39	39– 59	26– 39	13–20	34– 47	21–31	11–16	31– 47	21–31	11– 16
Bronze	29– 39	20– 26	10–13	29– 39	20– 26	29– 39	20– 26	10–13	–	–	–	–	–	–
Phosphor bronze	59– 88	39– 59	20–29	59– 88	39– 59	59– 88	39– 59	20–29	44– 69	29–46	15–23	44– 69	29–46	15– 23
Aluminum casting	10– 12	7– 8	2– 4	–	–	15– 20	10– 13	5– 7	–	–	–	–	–	–

Remarks 1. *a* is applicable in the case of static load, *b* is applicable in the case of dynamic load, and *c* is applicable to in the case of repeated load.

2. Bending allowable stress K_b and torsion allowable stress K_d of cast iron are applicable when the cross section is round and safety factor is within a range from 5 to 6.

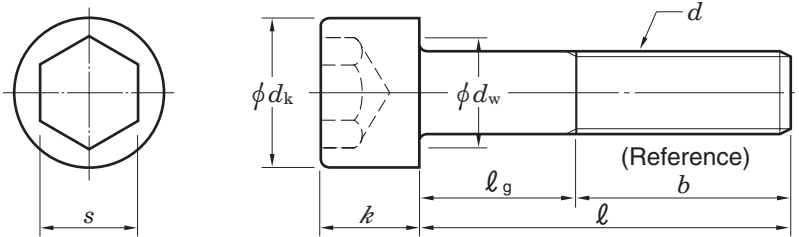
Supplementary table 11 Hexagon socket head cap screws

Supplementary table 11 (1) Hexagon socket head cap screws (abstract from JIS B 1176)

M 1.6 – 24

Allowance of bolt length (ℓ)

Unit : mm



Bolt length (ℓ)		Allowance of length
Over	Up to	
-	3	± 0.2
3	6	± 0.24
6	10	± 0.29
10	16	± 0.35
16	30	± 0.42
30	50	± 0.5
50	80	± 0.6
80	120	± 0.7
120	180	± 0.8
180	240	± 0.95
240	300	± 1.05

(1) Parts class A M 1.6–24

Unit : mm

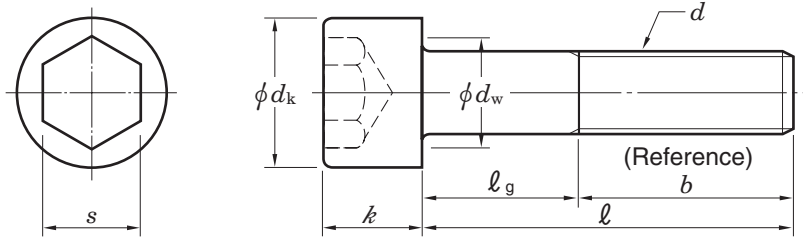
Nominal size of screw d	Coarse screw thread pitch	M 1.6	M 2	M 2.5	M 3	M 4	M 5	M 6	M 8	M 10	M 12	(M 14)	M 16	(M 18)	M 20	(M 22)	M 24
Head dia. d_k		3	3.8	4.5	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36
Head height k		1.6	2	2.5	3	4	5	6	8	10	12	14	16	18	20	22	24
Bearing surface dia. d_w (min.)		2.72	3.4	4.18	5.07	6.53	8.03	9.38	12.33	15.33	17.23	20.17	23.17	25.87	28.87	31.81	34.81
Nominal size of hexagon socket s		1.5	1.5	2	2.5	3	4	5	6	8	10	12	14	14	17	17	19
Thread length b (reference)		15	16	17	18	20	22	24	28	32	36	40	44	48	52	56	60

Nominal length ℓ	M 1.6	Body length ℓ_g (max.)															
2.5																	
3			M 2														
4				M 2.5													
5					M 3												
6						M 4											
8							M 5										
10								M 6									
12									M 8								
16										M 10							
20			M 2								M 12						
25				M 2.5	M 3							(M 14)	M 16				
30						M 4	M 5							(M 18)	M 20		
35								M 6								(M 22)	M 24
40									M 8								
45										M 10							
50											M 12						
55												(M 14)	M 16				
60														(M 18)			
65															M 20		
70																(M 22)	
80																	M 24
90																	
100																	
110																	
120																	
130																	
140																	
150																	
160																	
180																	
200																	

- Remarks
1. Priority is given to the nominal sizes of screws without parentheses.
 2. Nominal lengths (ℓ) to be recommended for the nominal sizes of screw are within the range enclosed by bold lines in the column of "Body length ℓ_g ". In the column of "Body length ℓ_g ", thread of the screw with length shorter than that indicated under dotted lines should be continuous. For the continuous thread stud screw, the incomplete thread portion length under the neck of the screw should be approximately three times of the thread pitch.
 3. The sides of the head of screw should be single or double knurled. The d_k values in the table are the maximum values without knurls.
 4. Roundness or chamfers on the bearing surface should be provided between the diameter of the head (d_k) and the diameter of bearing surface (d_w), and the surface should be free from burrs.

Supplementary table 11 (2) Hexagon socket head cap screws (abstract from JIS B 1176)

M 27 – 52



Allowance of bolt length (ℓ)

Unit : mm

Bolt length (ℓ)		Allowance of length
Over	Up to	
–	3	± 0.2
3	6	± 0.24
6	10	± 0.29
10	16	± 0.35
16	30	± 0.42
30	50	± 0.5
50	80	± 0.6
80	120	± 0.7
120	180	± 0.8
180	240	± 0.95
240	300	± 1.05

(2) Parts class A M 27–52

Unit : mm

Nominal size of screw d	Coarse screw thread pitch	(M 27)	M 30	(M 33)	M 36	(M 39)	M 42	(M 45)	M 48	(M 52)
Head dia. d_k		40	45	50	54	58	63	68	72	78
Head height k		27	30	33	36	39	42	45	48	52
Bearing surface dia. d_w (min.)		38.61	43.61	48.61	52.54	56.34	61.34	66.34	70.34	76.34
Nominal size of hexagon socket s		19	22	24	27	27	32	32	36	36
Thread length b (reference)		66	72	78	84	90	96	102	108	116

Nominal length ℓ	(M 27)	M 30	Body length ℓ_g (max.)							
45										
50										
55										
60										
65										
70										
80	(M 27)									(M 52)
90	24									
100	34	M 30	(M 33)							
110	44	38	32							
120	54	48	42							
130	64	58	52							
140	74	68	62							
150	84	78	72							
160	94	88	82							
180	114	108	102							
200	134	128	122							
220	154	148	142							
240	174	168	162							
260	194	188	182							
280	214	208	202							
300	234	228	222							

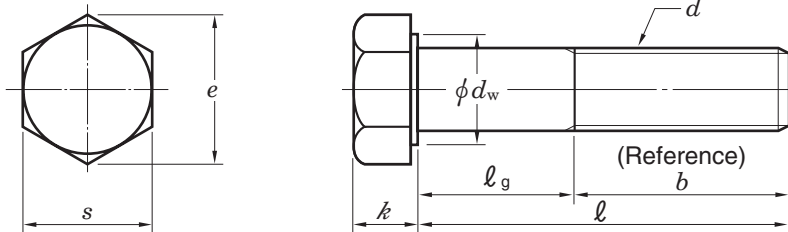
- Remarks
1. Priority is given to the nominal sizes of screws without parentheses.
 2. Nominal lengths (ℓ) to be recommended for the nominal sizes of screw are within the range enclosed by bold lines in the column of "Body length ℓ_g ". In the column of "Body length ℓ_g ", thread of the screw with length shorter than that indicated under dotted lines should be continuous. For the continuous thread stud screw, the incomplete thread portion length under the neck of the screw should be approximately three times of the thread pitch.
 3. The sides of the head of screw should be single or double knurled. The d_k values in the table are the maximum values without knurls.
 4. Roundness or chamfers on the bearing surface should be provided between the diameter of the head (d_k) and the diameter of bearing surface (d_w), and the surface should be free from burrs.

Supplementary table 12 (1) Hexagon head bolts (abstract from JIS B 1180)

Parts class A M 1.6 – 24

Allowance of bolt length (ℓ)

Unit : mm



Bolt length (ℓ)		Allowance of length
Over	Up to	
–	20	±0.35
20	30	±0.42
30	50	±0.5
50	80	±0.6
80	120	±0.7
120	150	±0.8

(1) Parts class A M 1.6–24

Unit : mm

Nominal size of screw d	Coarse screw thread pitch	M 1.6	M 2	M 2.5	M 3	(M 3.5)	M 4	M 5	M 6	M 8	M 10	M 12	(M 14)	M 16	(M 18)	M 20	(M 22)	M 24
		Fine thread	–	–	–	–	–	–	–	–	M 8 x 1	M 10 x 1	M 12 x 1.5	–	M 16 x 1.5	–	M 20 x 1.5	–
		–	–	–	–	–	–	–	–	–	(M 10 x 1.25)	(M 12 x 1.25)	(M 14 x 1.5)	–	(M 18 x 1.5)	(M 20 x 2)	(M 22 x 1.5)	–
Bearing surface dia. d_w (min.)		2.27	3.07	4.07	4.57	5.07	5.88	6.88	8.88	11.63	14.63	16.63	19.64	22.49	25.34	28.19	31.71	33.61
Width across flats s (max.)		3.2	4	5	5.5	6	7	8	10	13	16	18	21	24	27	30	34	36
Width across corners e (min.)		3.41	4.32	5.45	6.01	6.58	7.66	8.79	11.05	14.38	17.77	20.03	23.36	26.75	30.14	33.53	37.72	39.98
Head height k (basic)		1.1	1.4	1.7	2	2.4	2.8	3.5	4	5.3	6.4	7.5	8.8	10	11.5	12.5	14	15
Thread length b (reference)	$\ell \leq 125$	9	10	11	12	13	14	16	18	22	26	30	34	38	42	46	50	54
	$125 < \ell \leq 150$	–	–	–	–	–	–	–	–	–	–	–	40	44	48	52	56	60

Nominal length ℓ	Body length ℓ_g (max.)																	
12	3	M 2	M 2.5															
16	7	6	5	M 3	(M 3.5)													
20		10	9	8	7	M 4	M 5											
25			14	13	12	11	9	M 6										
30				18	17	16	14	12										
35					22	21	19	17	M 8									
40						26	24	22	18	M 10								
45							29	27	23	19	M 12							
50							34	32	28	24	20							
55								37	33	29	25	(M 14)						
60								42	38	34	30	26	M 16					
65									43	39	35	31	27	(M 18)				
70									48	44	40	36	32	28	M 20			
80									58	54	50	46	42	38	34	(M 22)	M 24	
90									64	60	56	52	48	44	40	36		
100									74	70	66	62	58	54	50	46		
110										80	76	72	68	64	60	56		
120										90	86	82	78	74	70	66		
130											90	86	82	78	74	70		
140											100	96	92	88	84	80		
150												106	102	98	94	90		

As for the bolts with nominal length within this area, standards of continuous thread stud hexagon head bolt (parts class A) should be observed.

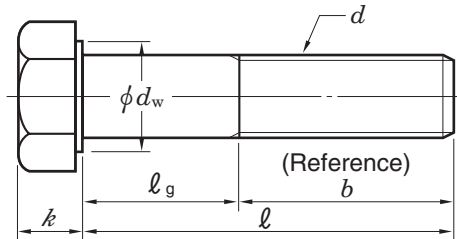
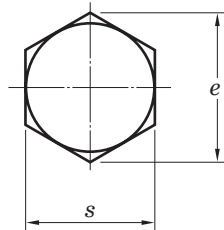
- Remarks 1. Priority is given to the nominal sizes of screws without parentheses.
- 2. Nominal lengths (ℓ) to be recommended for the nominal sizes of screw are within the range enclosed by bold lines.
- 3. Body length ℓ_g (maximum) should be found by the following formula : ℓ_g (maximum) = Nominal length (ℓ) – Thread length (b)

Supplementary table 12 (2) Hexagon head bolts (abstract from JIS B 1180)

Parts class B M 16 – 64

Allowance of bolt length (ℓ)

Unit : mm



Bolt length (ℓ)		Allowance of length
Over	Up to	
–	80	± 1.5
80	90	± 1.7
90	120	± 1.75
120	180	± 2
180	240	± 2.3
240	300	± 2.6
300	400	± 2.85
400	500	± 3.15

(2) Parts class B M 16–64

Unit : mm

Nominal size of screw d	Coarse screw thread pitch	M 16	(M 18)	M 20	(M 22)	M 24	(M 27)	M 30	(M 33)	M 36	(M 39)	M 42	(M 45)	M 48	(M 52)	M 56	(M 60)	M 64
		Fine thread	M 16 x 1.5	–	M 20 x 1.5	–	M 24 x 2	–	M 30 x 2	–	M 36 x 3	–	M 42 x 3	–	M 48 x 3	–	M 56 x 4	–
		–	(M 18 x 1.5)	(M 20 x 2)	(M 22 x 1.5)	–	(M 27 x 2)	–	(M 33 x 2)	–	(M 39 x 3)	–	(M 45 x 3)	–	(M 52 x 4)	–	(M 60 x 4)	–
Bearing surface dia. d_w (min.)		22	24.85	27.7	31.35	33.25	38	42.75	46.55	51.11	55.86	59.95	64.7	69.45	74.2	78.66	83.41	88.16
Width across flats s (max.)		24	27	30	34	36	41	46	50	55	60	65	70	75	80	85	90	95
Width across corners e (min.)		26.17	29.56	32.95	37.29	39.55	45.2	50.85	55.37	60.79	66.44	71.3	76.95	82.6	88.25	93.56	99.21	104.86
Head height k (basic)		10	11.5	12.5	14	15	17	18.7	21	22.5	25	26	28	30	33	35	38	40
Thread length b (reference)	$\ell \leq 125$	38	42	46	50	54	60	66	–	–	–	–	–	–	–	–	–	–
	$125 < \ell \leq 200$	44	48	52	56	60	66	72	78	84	90	96	102	108	116	–	–	–
	$200 < \ell \leq 500$	–	–	–	69	73	79	85	91	97	103	109	115	121	129	137	145	153

Nominal length ℓ	Body length ℓ_g (max.)																	
65	(M 18)																	
70	M 20																	
80	(M 22) M 24																	
90	(M 27)																	
100	40 M 30																	
110	50 44																	
120	60 54 (M 33)																	
130	64 58 M 36																	
140	74 68 62 56 (M 39)																	
150	84 78 72 66 60 M 42																	
160	116	112	108	104	100	94	88	82	76	70	64	(M 45)	M 48					
180	132 128 124 120 114 108 102 96 90 84 78 72 (M 52)																	
200	148 144 140 134 128 122 116 110 104 98 92 84 M 56																	
220	151 147 141 135 129 123 117 111 105 99 91 83 (M 60)																	
240	161 155 149 143 137 131 125 119 111 103 95 M 64																	
260	181 175 169 163 157 151 145 139 131 123 115 107																	
280	195 189 183 177 171 165 159 151 143 135 127																	
300	215 209 203 197 191 185 179 171 163 155 147																	
320	229 223 217 211 205 199 191 183 175 167																	
340	243 237 231 225 219 211 203 195 187																	
360	263 257 251 245 239 231 223 215 207																	
380	277 271 265 259 251 243 235 227																	
400	291 285 279 271 263 255 247																	
420	311 305 299 291 283 275 267																	
440	325 319 311 303 295 287																	
460	339 331 323 315 307																	
480	359 351 343 335 327																	
500	371 363 355 347																	

As for the bolts with nominal length within this area, standards of continuous thread stud hexagon head bolt (parts class A or B) should be observed.

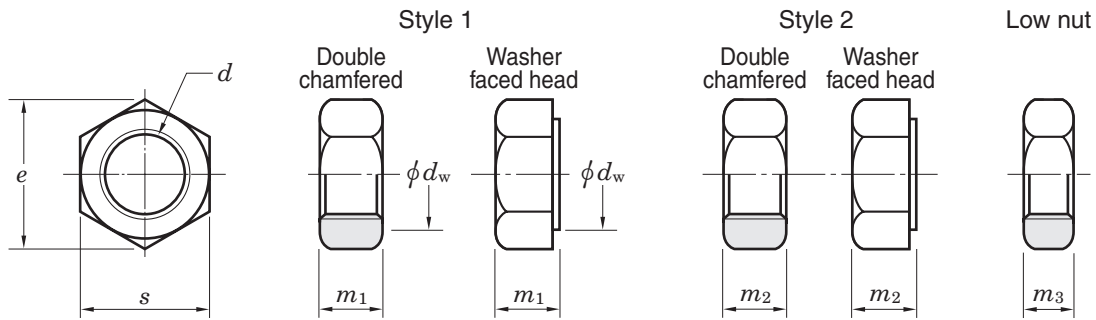
Remarks 1. Priority is given to the nominal sizes of screws without parentheses.

2. Nominal lengths (ℓ) to be recommended for the nominal sizes of screw are within the range enclosed by bold lines.

3. Body length ℓ_g (maximum) should be found by the following formula : ℓ_g (maximum) = Nominal length (ℓ) – Thread length (b)

Supplementary table 13 Hexagon head nuts (abstract from JIS B 1181)

Parts class A M 1.6 – 16
 Parts class B M 18 – 64



(1) Parts class A M 1.6–16

Unit : mm

Nominal size of screw <i>d</i>	Coarse screw thread pitch	M 1.6	M 2	M 2.5	M 3	(M 3.5)	M 4	M 5	M 6	M 8	M 10	M 12	(M 14)	M 16
	Fine thread		–	–	–	–	–	–	–	–	M 8 × 1	M 10 × 1	M 12 × 1.5	–
Bearing surface dia. <i>d_w</i> (min.)		2.27	3.07	4.07	4.57	5.07	5.88	6.88	8.88	11.63	14.63	16.63	19.64	22.49
Width across flats <i>s</i> (max.)		3.2	4	5	5.5	6	7	8	10	13	16	18	21	24
Width across corners <i>e</i> (min.)		3.41	4.32	5.45	6.01	6.58	7.66	8.79	11.05	14.38	17.77	20.03	23.36	26.75
Height	<i>m</i> ₁ (max.)	1.3	1.6	2	2.4	2.8	3.2	4.7	5.2	6.8	8.4	10.8	12.8	14.8
	<i>m</i> ₂ (max.)	–	–	–	–	–	–	5.1	5.7	7.5	9.3	12	14.1	16.4
	<i>m</i> ₃ (max.)	1	1.2	1.6	1.8	2	2.2	2.7	3.2	4	5	6	7	8

Remark Priority is given to the nominal sizes of screws without parentheses.

(2) Parts class B M 18–64

Unit : mm

Nominal size of screw <i>d</i>	Coarse screw thread pitch	(M 18)	M 20	(M 22)	M 24	(M 27)	M 30	(M 33)	M 36	(M 39)	M 42	(M 45)	M 48	(M 52)	M 56	(M 60)	M 64
	Fine thread		–	M 20 × 1.5	–	M 24 × 2	–	M 30 × 2	–	M 36 × 3	–	M 42 × 3	–	M 48 × 3	–	M 56 × 4	–
Bearing surface dia. <i>d_w</i> (min.)		24.85	27.7	31.35	33.25	38	42.75	46.55	51.11	55.86	59.95	64.7	69.45	74.2	78.66	83.41	88.16
Width across flats <i>s</i> (max.)		27	30	34	36	41	46	50	55	60	65	70	75	80	85	90	95
Width across corners <i>e</i> (min.)		29.56	32.95	37.29	39.55	45.2	50.85	55.37	60.79	66.44	71.3	76.95	82.6	88.25	93.56	99.21	104.86
Height	<i>m</i> ₁ (max.)	15.8	18	19.4	21.5	23.8	25.6	28.7	31	33.4	34	36	38	42	45	48	51
	<i>m</i> ₂ (max.)	17.6	20.3	21.8	23.9	26.7	28.6	32.5	34.7	–	–	–	–	–	–	–	–
	<i>m</i> ₃ (max.)	9	10	11	12	13.5	15	16.5	18	19.5	21	22.5	24	26	28	30	32

Remark Priority is given to the nominal sizes of screws without parentheses.

Supplementary table 14 Steel hardness conversion

Rockwell C scale 1 471.0 N (150 kgf)	Vickers	Brinell		Rockwell		Shore
		Standard steel ball	Tungsten carbide steel ball	A scale 588.4 N (60 kgf)	B scale 980.7 N (100 kgf)	
68	940			85.6		97
67	900			85.0		95
66	865			84.5		92
65	832		739	83.9		91
64	800		722	83.4		88
63	772		705	82.8		87
62	746		688	82.3		85
61	720		670	81.8		83
60	697		654	81.2		81
59	674		634	80.7		80
58	653		615	80.1		78
57	633		595	79.6		76
56	613		577	79.0		75
55	595	–	560	78.5		74
54	577	–	543	78.0		72
53	560	–	525	77.4		71
52	544	500	512	76.8		69
51	528	487	496	76.3		68
50	513	475	481	75.9		67
49	498	464	469	75.2		66
48	484	451	455	74.7		64
47	471	442	443	74.1		63
46	458	432	432	73.6		62
45	446		421	73.1		60
44	434		409	72.5		58
43	423		400	72.0		57
42	412		390	71.5		56
41	402		381	70.9		55
40	392		371	70.4	–	54
39	382		362	69.9	–	52
38	372		353	69.4	–	51
37	363		344	68.9	–	50
36	354		336	68.4	(109.0)	49
35	345		327	67.9	(108.5)	48
34	336		319	67.4	(108.0)	47
33	327		311	66.8	(107.5)	46
32	318		301	66.3	(107.0)	44
31	310		294	65.8	(106.0)	43
30	302		286	65.3	(105.5)	42
29	294		279	64.7	(104.5)	41
28	286		271	64.3	(104.0)	41
27	279		264	63.8	(103.0)	40
26	272		258	63.3	(102.5)	38
25	266		253	62.8	(101.5)	38
24	260		247	62.4	(101.0)	37
23	254		243	62.0	100.0	36
22	248		237	61.5	99.0	35
21	243		231	61.0	98.5	35
20	238		226	60.5	97.8	34
(18)	230		219	–	96.7	33
(16)	222		212	–	95.5	32
(14)	213		203	–	93.9	31
(12)	204		194	–	92.3	29
(10)	196		187		90.7	28
(8)	188		179		89.5	27
(6)	180		171		87.1	26
(4)	173		165		85.5	25
(2)	166		158		83.5	24
(0)	160		152		81.7	24

Supplementary table 15 Viscosity conversion

Kinematic viscosity mm ² /s	Saybolt SUS (second)		Redwood R (second)		Engler E (degree)
	100 °F	210 °F	50 °C	100 °C	
2	32.6	32.8	30.8	31.2	1.14
3	36.0	36.3	33.3	33.7	1.22
4	39.1	39.4	35.9	36.5	1.31
5	42.3	42.6	38.5	39.1	1.40
6	45.5	45.8	41.1	41.7	1.48
7	48.7	49.0	43.7	44.3	1.56
8	52.0	52.4	46.3	47.0	1.65
9	55.4	55.8	49.1	50.0	1.75
10	58.8	59.2	52.1	52.9	1.84
11	62.3	62.7	55.1	56.0	1.93
12	65.9	66.4	58.2	59.1	2.02
13	69.6	70.1	61.4	62.3	2.12
14	73.4	73.9	64.7	65.6	2.22
15	77.2	77.7	68.0	69.1	2.32
16	81.1	81.7	71.5	72.6	2.43
17	85.1	85.7	75.0	76.1	2.54
18	89.2	89.8	78.6	79.7	2.64
19	93.3	94.0	82.1	83.6	2.76
20	97.5	98.2	85.8	87.4	2.87
21	102	102	89.5	91.3	2.98
22	106	107	93.3	95.1	3.10
23	110	111	97.1	98.9	3.22
24	115	115	101	103	3.34
25	119	120	105	107	3.46
26	123	124	109	111	3.58
27	128	129	112	115	3.70
28	132	133	116	119	3.82
29	137	138	120	123	3.95
30	141	142	124	127	4.07
31	145	146	128	131	4.20
32	150	150	132	135	4.32
33	154	155	136	139	4.45
34	159	160	140	143	4.57

Kinematic viscosity mm ² /s	Saybolt SUS (second)		Redwood R (second)		Engler E (degree)
	100 °F	210 °F	50 °C	100 °C	
35	163	164	144	147	4.70
36	168	170	148	151	4.83
37	172	173	153	155	4.96
38	177	178	156	159	5.08
39	181	183	160	164	5.21
40	186	187	164	168	5.34
41	190	192	168	172	5.47
42	195	196	172	176	5.59
43	199	201	176	180	5.72
44	204	205	180	185	5.85
45	208	210	184	189	5.98
46	213	215	188	193	6.11
47	218	219	193	197	6.24
48	222	224	197	202	6.37
49	227	228	201	206	6.50
50	231	233	205	210	6.63
55	254	256	225	231	7.24
60	277	279	245	252	7.90
65	300	302	266	273	8.55
70	323	326	286	294	9.21
75	346	349	306	315	9.89
80	371	373	326	336	10.5
85	394	397	347	357	11.2
90	417	420	367	378	11.8
95	440	443	387	399	12.5
100	464	467	408	420	13.2
120	556	560	490	504	15.8
140	649	653	571	588	18.4
160	742	747	653	672	21.1
180	834	840	734	757	23.7
200	927	933	816	841	26.3
250	1 159	1 167	1 020	1 051	32.9
300	1 391	1 400	1 224	1 241	39.5

Remark 1 mm²/s = 1 cSt (centistokes)

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