Koyo®

Ball & Roller Bearings

JTEKT

JTEKT CORPORATION

CAT. NO. B2001E-3

Technical section

Bearing specification tables

Deep groove ball bearings


Open type ··· B 8
(68, 69, 160, 60
62, 63, 64)


Shielded/sealed type ··· B 20
(Z, RU
RD, RS)

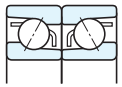

Locating snap ring type ··· B 32
(N
NR)


Extra-small & miniature ··· B 38
(flanged type ··· B 44)


Double-row ····· B 50
[42, 43]

Angular contact ball bearings


Single-row ··· B 60
(79, 70, 72, 73, 74
ACH9, ACH0)


Matched pair ··· B 92
(DB, DF
DT)

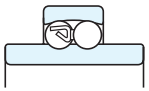

Double-row ··· B 124
(32, 33, 52, 53
52...2RS, 53...2RS)

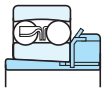

Four-point contact ··· B 130
[62...BI, 63...BI]

Self-aligning ball bearings

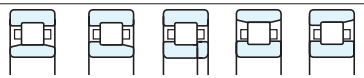

Open type ··· B 136
(12, 22
13, 23)


Sealed type ··· B 144
(22...2RS
23...2RS)

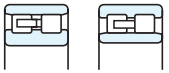

Extended inner ring type ··· B 148
[112, 113]


Adapter assemblies ··· B 150

Cylindrical roller bearings

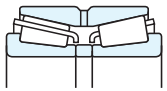

NU NJ NUP N NF
Single-row ··· B 158
(NU10, NU2, NU22, NU32
NU3, NU23, NU33, NU4)

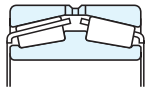

Thrust collars ··· B 184
[HJ]


NN NNU
Double-row ··· B 194
(NN30
NNU49)

Tapered roller bearings

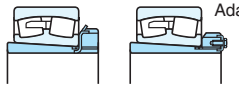

Metric series ··· B 204
Inch series ····· B 236
(329, 320, 330, 331, 302, 322
332, 303, 303D, 313, 323, IS0)


TDO type ····· B 280
(462, 463, 46T302, 46T322
46T303, 46T303D, 46T323)


TDI type ····· B 296
[452, 453]

Spherical roller bearings

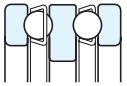

R, RR RH, RHR RHA
··· B 306
(239, 230, 240, 231, 241
222, 232, 213, 223)


Adapter assemblies ··· B 330


Withdrawal sleeves ··· B 338

Thrust ball, Spherical thrust roller bearings


Single direction ··· B 350
(511, 512, 513, 514
532, 533, 534
532U, 533U, 534U)

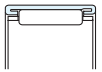

Double direction ··· B 360
(522, 523, 524
542, 543, 544
542U, 543U, 544U)


··· B 368
[292, 293, 294]

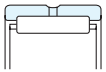
Needle roller bearings

Needle roller and cage ass'y ··· B 388

Drawn cup type ··· B 402



Machined ring type ··· B 424



Thrust ··· B 440

Stud type track rollers (cam followers) ··· B 450

Yoke type track rollers (roller followers) ··· B 454

(Miniature one-way clutches) ··· B 460

Ball bearing units


B 470


B 490


B 500

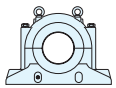

B 510

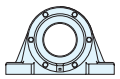

B 518


B 524

· Ball bearings for units ····· B 528

Plummer blocks


Split type ··· B 544
[SN, SSN, SD]


One-piece type ··· B 570
[V]

Special purpose bearings

· Ceramic & EXSEV bearing series ····· C 1
(Vacuum ball bearings, ceramic bearings, self-lubricating clean ball bearings, linear ball bearings for vacuum)

· K-series super thin section ball bearings ····· C 27

· Bearings for machine tool spindles (for support of axial loading) ····· C 47

· Precision ball screw support bearings and bearing units ····· C 65

· Full complement type cylindrical roller bearings for crane sheaves ····· C 71

· Rolling mill roll neck bearings ····· C 81

· Bearings for railway rolling stock axle journals ····· C 139

· Linear ball bearings ····· C 149

· Accessories ····· C 163

Supplementary tables

· Supplementary tables ····· D 1 – D 28

Koyo®

BALL & ROLLER BEARINGS

CAT. NO. B2001E-3

Koyo

Publication of Rolling Bearing Catalog

Today's technology-based society, in order to utilize the earth's limited resources effectively and protect the environment, must strive to develop new technologies and alternate energy sources, and in that connection it continues to pursue new targets in various fields. To achieve such targets, technically advanced and highly functional rolling bearings with significantly greater compactness, lighter weight, longer life and lower friction as well as higher reliability during use in special environments are sought.

This new-edition catalog is based on the results of wide-ranging technical studies and extensive R&D efforts and will enable the reader to select the optimal bearing for each application. In addition to standard bearings, this catalog provides information on a variety of bearings for specific purposes, such as ball bearing units, plummer blocks, and JTEKT EXSEV bearing series (bearings for extreme special environments).

JTEKT is confident that you will find this new catalog useful in the selection and use of rolling bearings. JTEKT is grateful for your patronage and look forward to continuing to serve you in the future.

★The contents of this catalog are subject to change without prior notice. Every possible effort has been made to ensure that the data herein is correct; however, JTEKT cannot assume responsibility for any errors or omissions.

Contents

Technical section

Specification tables

Supplementary tables

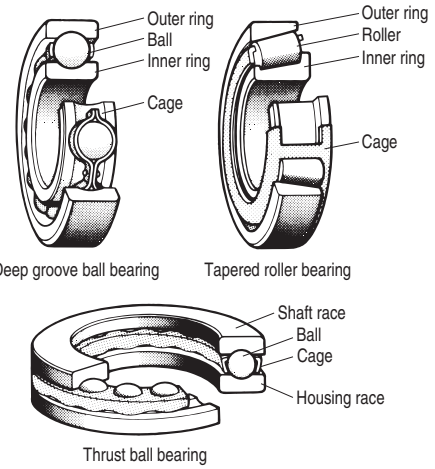
1. Rolling bearing structures and types

1-1 Structure

Rolling bearings (bearings hereinafter) normally comprise bearing rings, rolling elements and a cage. (see Fig. 1-1)

Rolling elements are arranged between inner and outer rings with a cage, which retains the rolling elements in correct relative position, so they do not touch one another. With this structure, a smooth rolling motion is realized during operation.

Bearings are classified as follows, by the number of rows of rolling elements : single-row, double-row, or multi-row (triple- or four-row) bearings.



Note) In thrust bearings inner and outer rings and also called “shaft race” and “housing race” respectively. The race indicates the washer specified in JIS.

Fig. 1-1 Bearing structure

1) Bearing rings

The path of the rolling elements is called the raceway; and, the section of the bearing rings where the elements roll is called the raceway surface. In the case of ball bearings, since grooves are provided for the balls, they are also referred to as raceway grooves.

The inner ring is normally engaged with a shaft; and, the outer ring with a housing.

2) Rolling element

Rolling elements may be either balls or rollers. Many types of bearings with various shapes of rollers are available.

- Ball
- Cylindrical roller ($L_W \leqq 3\,D_W$)*
- Long cylindrical roller ($3D_W \leqq L_W \leqq 10D_W$, $D_W > 6$ mm)*
- Needle roller ($3D_W \leqq L_W \leqq 10D_W$, $D_W \leqq 6$ mm)*
- Tapered roller (tapered trapezoid)
- Convex roller (barrel shape)

* L_W : roller length (mm)
D_W : roller diameter (mm)

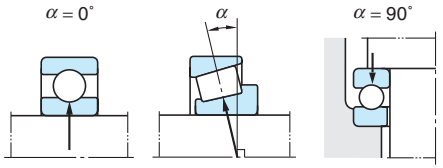
3) Cage

The cage guides the rolling elements along the bearing rings, retaining the rolling elements in correct relative position. There are various types of cages including pressed, machined, molded, and pin type cages.

Due to lower friction resistance than that found in full complement roller and ball bearings, bearings with a cage are more suitable for use under high speed rotation.

1-2 Type

The contact angle (α) is the angle formed by the direction of the load applied to the bearing rings and rolling elements, and a plan perpendicular to the shaft center, when the bearing is loaded.



Bearings are classified into two types in accordance with the contact angle (α).

· Radial bearings ($0° \leqq \alpha \leqq 45°$)
... designed to accommodate mainly radial load.
· Thrust bearings ($45° < \alpha \leqq 90°$)
... designed to accommodate mainly axial load.

Rolling bearings are classified in Fig. 1-2, and characteristics of each bearing type are described in Tables 1-1 to 1-13.

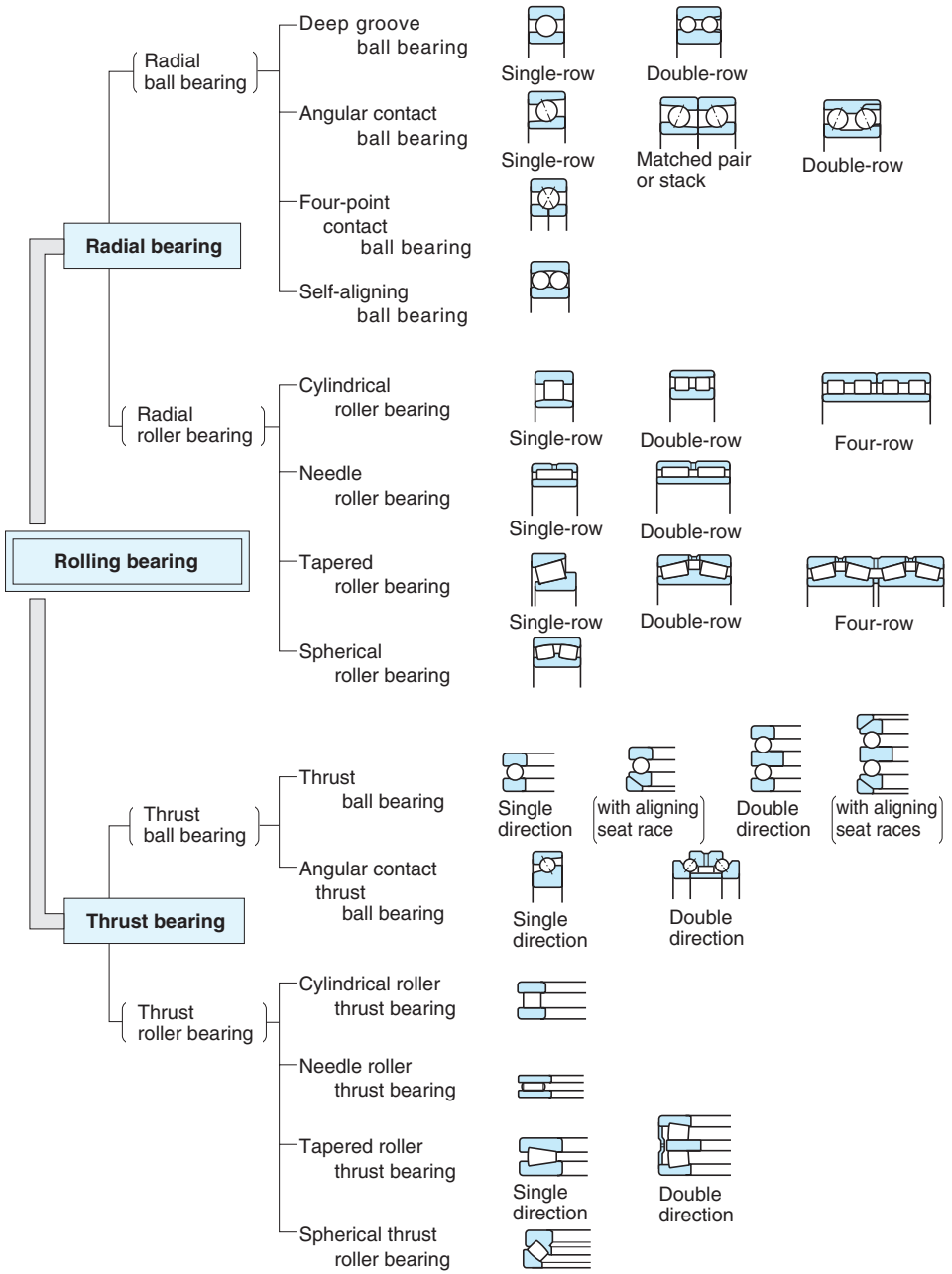


Fig. 1-2(1) Rolling bearings

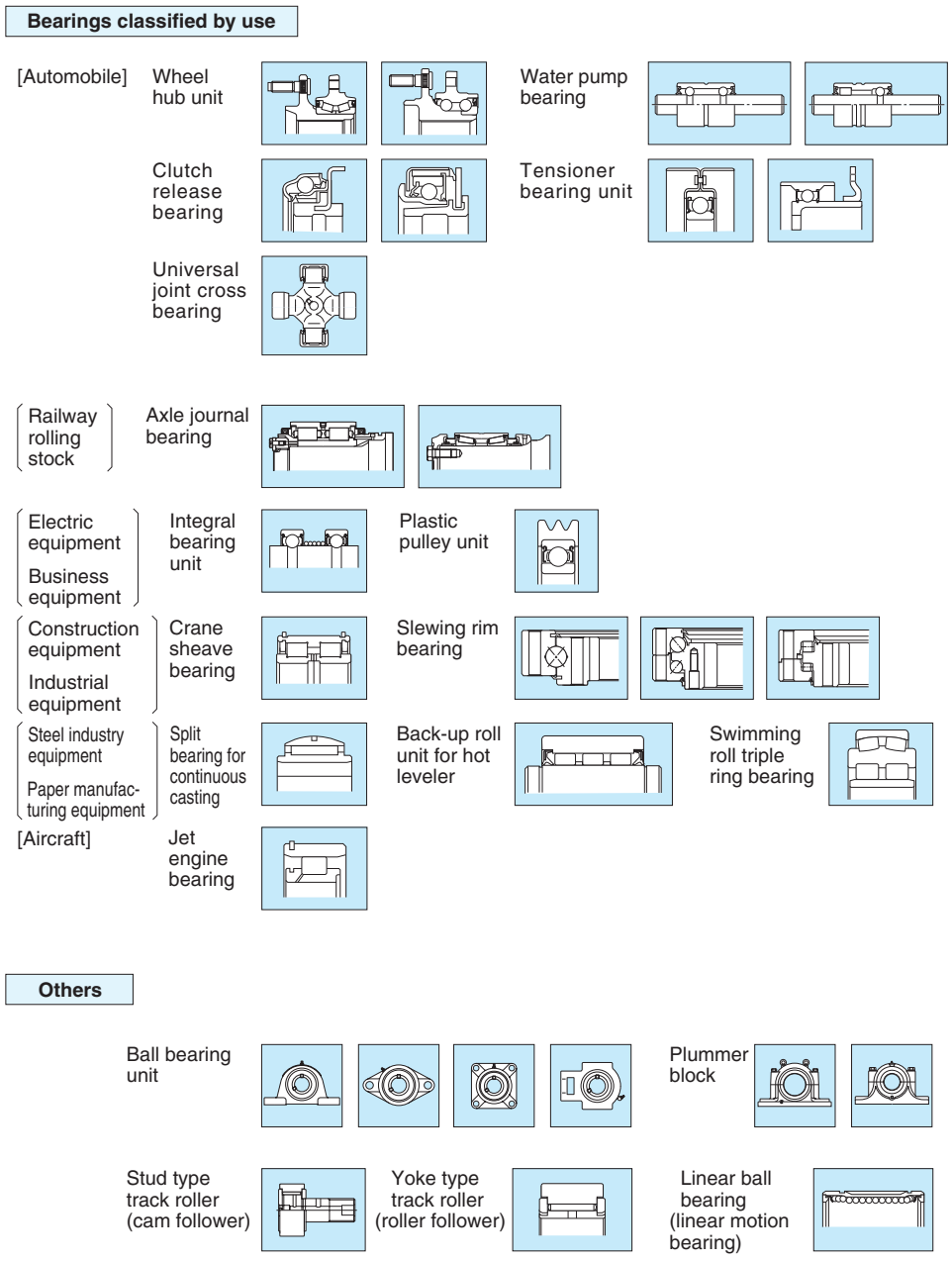
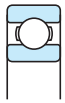
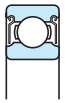
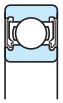
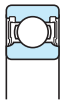
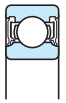
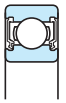
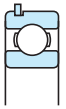


Fig. 1-2(2) Rolling bearings

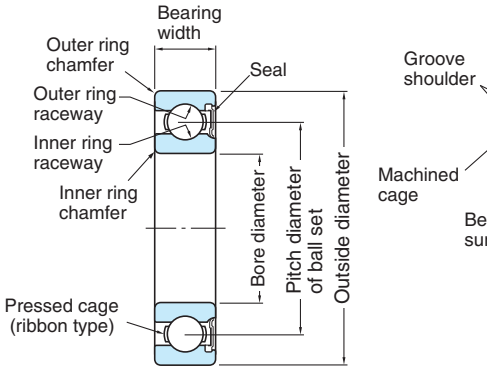
Table 1-1 Deep groove ball bearings

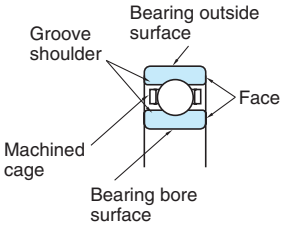
Single-row								Double-row
Open type	Shielded type	Non-contact sealed type	Contact sealed type		Extremely light contact sealed type	With locating snap ring	Flanged type	
							 Suitable for extra-small or miniature bearing	
	ZZ	2RU	2RS	2RK	2RD	NR		
680, 690, 6800, 6900,		600, 16000,	620, 6000,	630, 6200,	(ML) 6300,	···Extra-small, miniature bearing 6400		4200 4300

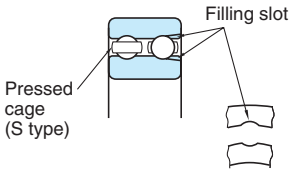
- The most popular types among rolling bearings, widely used in a variety of industries.
- Radial load and axial load in both directions can be accommodated.
- Suitable for operation at high speed, with low noise and low vibration.
- Sealed bearings employing steel shields or rubber seals are filled with the appropriate volume of grease when manufactured.
- Bearings with a flange or locating snap ring attached on the outer ring are easily mounted in housings for simple positioning of housing location.

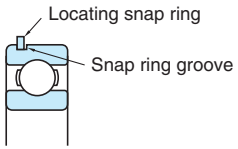
[Recommended cages] Pressed steel cage (ribbon type, snap type ··· single-row, S type ··· double-row), copper alloy or phenolic resin machined cage, synthetic resin molded cage

[Main applications] Automobile : front and rear wheels, transmissions, electric devices
Electric equipment : standard motors, electric appliances for domestic use
Others : measuring instruments, internal combustion engines, construction equipment, railway rolling stock, cargo transport equipment, agricultural equipment, equipment for other industrial uses





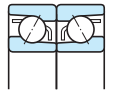
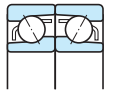
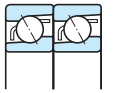




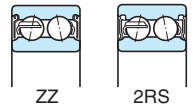
Bearing size (Reference) Unit : mm

Connotation	Bore diameter	Outside diameter
Miniature	–	Under 9
Extra-small	Under 10	9 or more
Small size	10 or more	80 or less
Medium size	–	80 – 180
Large size	–	180 – 800
Extra-large size	–	Over 800

Table 1-2 Angular contact ball bearings

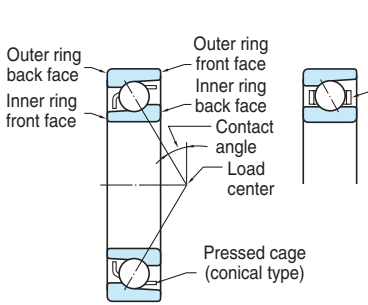
Single-row			Matched pair			Double-row	
		For high-speed use	Back-to-back arrangement	Face-to-face arrangement	Tandem arrangement		
 With pressed cage	 With machined cage	 HAR	 DB	 DF	 DT	 (With filling slot)	
7000, 7200, 7300, 7400 ·····Contact angle 30°						3200	5200
7000B, 7200B, 7300B, 7400B ····· 40°						3300	5300
7900C, 7000C, 7200C, 7300C ····· 15°						Contact angle 32°	Contact angle 24°
HAR900C, HAR000C							

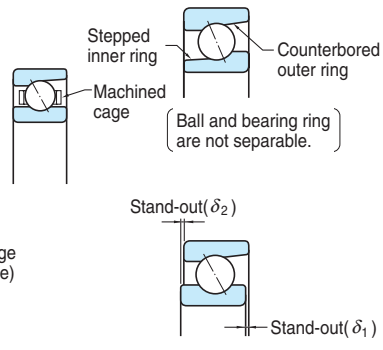
- Bearing rings and balls possess their own contact angle which is normally 15°, 30° or 40°.
  Larger contact angle ····· higher resistance against axial load
  Smaller contact angle ···· more advantageous for high-speed rotation
- Single-row bearings can accommodate radial load and axial load in one direction.
- DB and DF matched pair bearings and double-row bearings can accommodate radial load and axial load in both directions.
  DT matched pair bearings are used for applications where axial load in one direction is too large for one bearing to accept.
- HAR type high speed bearings were designed to contain more balls than standard bearings by minimizing the ball diameter, to offer improved performance in machine tools.
- Angular contact ball bearings are used for high accuracy and high-speed operation.
- Axial load in both directions and radial load can be accommodated by adapting a structure pairing two single-row angular contact ball bearings back to back.
- For bearings with no filling slot, the sealed type is available.



[Recommended cages] Pressed steel cage (conical type ··· single-row : S type, snap type ··· double-row), copper alloy or phenolic resin machined cage, synthetic resin molded cage

[Main applications] Single-row : machine tool spindles, high frequency motors, gas turbines, centrifugal separators, front wheels of small size automobiles, differential pinion shafts
Double-row : hydraulic pumps, roots blowers, air-compressors, transmissions, fuel injection pumps, printing equipment



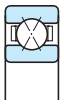
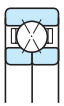
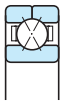


Contact angles (Reference)

Contact angle	Supplementary code
15°	C
20°	CA
25°	AC
30°	A (Omitted)
35°	E
40°	B

"G type" bearings are processed (with flush ground) such that the stand-out turns out to be $\delta_1 = \delta_2$.
The matched pair DB, DF, and DT, or stack are available.

Table 1-3 Four-point contact ball bearings

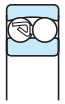
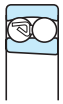
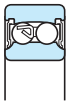
One-piece type	Two-piece inner ring	Two-piece outer ring
		
—	6200BI 6300BI	(6200BO) (6300BO)

- Radial load and axial load in both directions can be accommodated.
- A four-point contact ball bearing can substitute for a face-to-face or back-to-back arrangement of angular contact ball bearings.
- Suitable for use under pure axial load or combined radial and axial load with heavy axial load.
- This type of bearing possesses a contact angle (α) determined in accordance with the axial load direction. This means that the bearing ring and balls contact each other at two points on the lines forming the contact angle.

[Recommended cage] Copper alloy machined cage

[Main applications]
Motorcycle : Transmission, driveshaft pinion-side
Automobile : Steering, transmission

Table 1-4 Self-aligning ball bearings

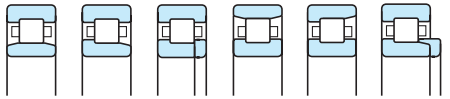
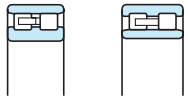
Cylindrical bore	Tapered bore	Sealed
		
	K (Taper 1 : 12)	2RS
120, 130 1200, 1300 2200, 2300	11200, 11300··· extended inner ring type	2200 2RS 2300 2RS

- Spherical outer ring raceway allows self-alignment, accommodating shaft or housing deflection and misaligned mounting conditions.
- Tapered bore design can be mounted readily using an adapter.

Pressed steel cage — staggered type···12, 13, 22...2RS, 23...2RS; snap type·····22, 23

Power transmission shaft of wood working and spinning machines, plummer blocks

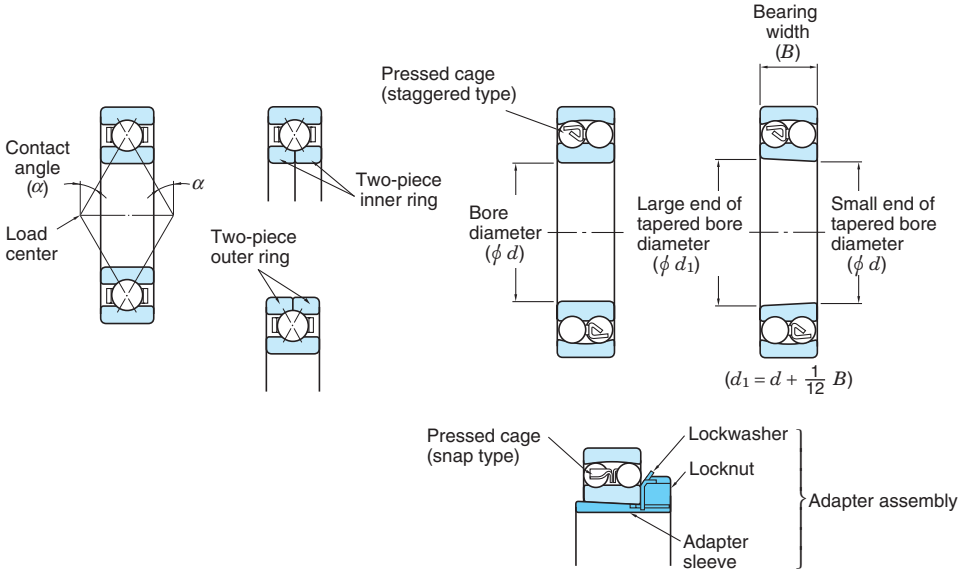
Table 1-5 Cylindrical roller bearings

Single-row						Double-row		Four-row
								
NU	NJ	NUP	N	NF	NH	NN	NNU	Mainly use on rolling mill roll neck
NU1000, NU200 (R), NU2200 (R), NU3200,		NU300 (R), NU400 NU2300 (R) NU3300				Cylindrical bore NNU4900 NN3000	Tapered bore NNU4900K NN3000K	(FC) , (4CR)

- Since the design allowing linear contact of cylindrical rollers with the raceway provides strong resistance to radial load, this type is suitable for use under heavy radial load and impact load, as well as at high speed.
- N and NU types are ideal for use on the free side: they are movable in the shaft direction in response to changes in bearing position relative to the shaft or housing, which are caused by heat expansion of the shaft or improper mounting.
- NJ and NF types can accommodate axial load in one direction; and NH and NUP types can accommodate partial axial load in both directions.
- With separable inner and outer ring, this type ensures easy mounting.
- Due to their high rigidity, NNU and NN types are widely used in machine tool spindles.

[Recommended cages] Pressed steel cage (Z type), copper alloy machined cage, pin type cage, synthetic resin molded cage

[Main applications] Large and medium size motors, traction motors, generators, internal combustion engines, gas turbines, machine tool spindles, speed reducers, cargo transport equipment, and other industrial equipment



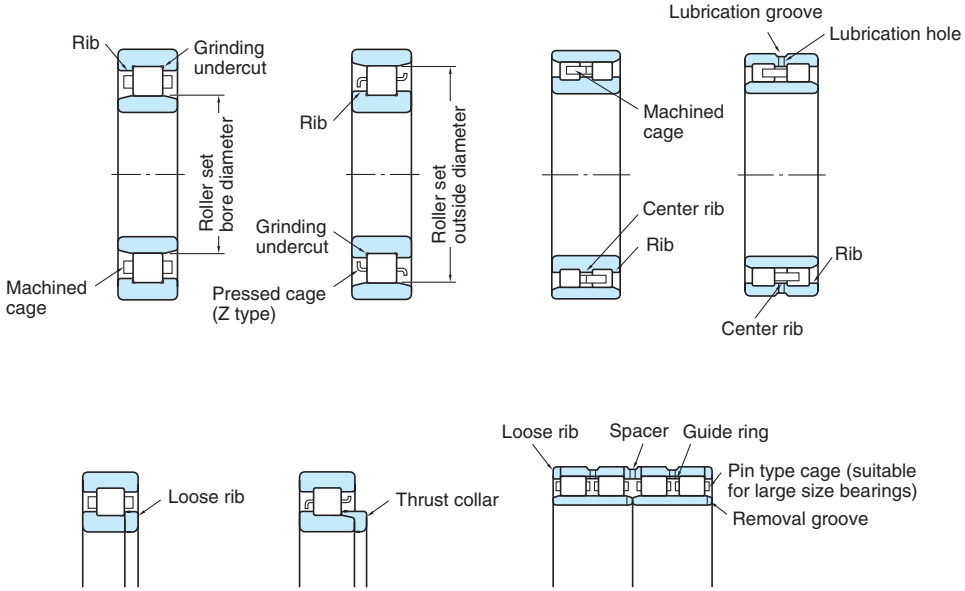
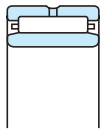
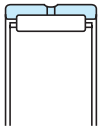
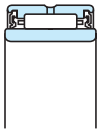
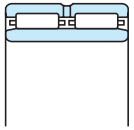
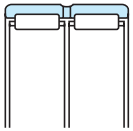


Table 1-6 Machined ring needle roller bearings

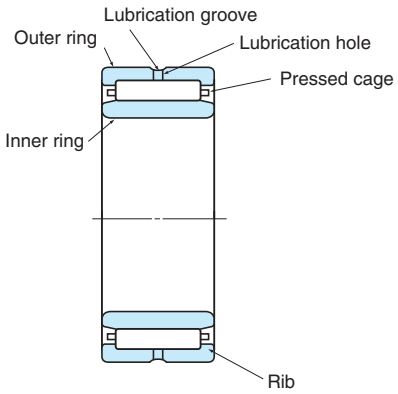
Single-row			Double-row	
 With inner ring	 Without inner ring	 Sealed	 With inner ring	 Without inner ring
NA4800 NA4900 NA5900 (NQI, NQIS)	RNA4800 RNA4900 RNA5900 (NQ, NQS)	– NA4900UU –	NA6900	RNA6900

- In spite of their basic structure, which is the same as that of NU type cylindrical roller bearings, bearings with minimum ring sections offer space savings and greater resistance to radial load, by using needle rollers.
- Bearings with no inner rings function using heat treated and ground shafts as their raceway surface.

[Recommended cage] Pressed steel cage

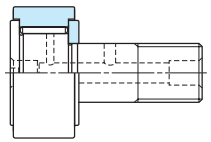
[Main applications] Automobile engines, transmissions, pumps, power shovel wheel drums, hoists, overhead traveling cranes, compressors

(Reference) Many needle roller bearings other than those with machined ring are available.
For further details, refer to the section, "needle roller bearing specification table".

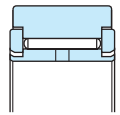


Needle roller and cage assemblies

Drawn cup needle roller bearings

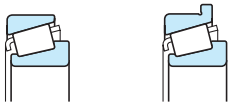
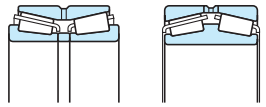
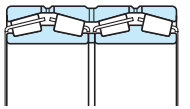


Stud type track roller (cam follower)



Yoke type track roller (roller follower)

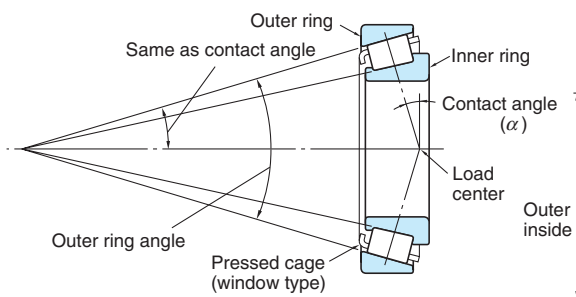
Table 1-7 Tapered roller bearings

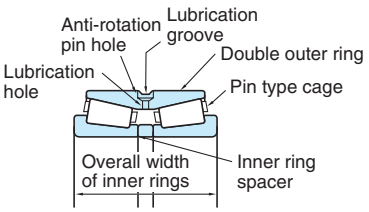
Single-row				Double-row		Four-row
 Flanged type				 TDO type	TDI type	 Mainly used on rolling mill roll necks
Standard contact angle		Inter mediate contact angle	Steep contact angle			
32900JR 32000JR 33000JR 33100JR	30200JR 32200JR 33200JR 30300JR 32300JR	30200CR 32200CR 30300CR 32300CR	30300DJ 30300DJR 31300JR	46200 46200A 46300 46300A (46T)	45200 45300 (45T)	37200 47200 47300 (47T) (4TR)

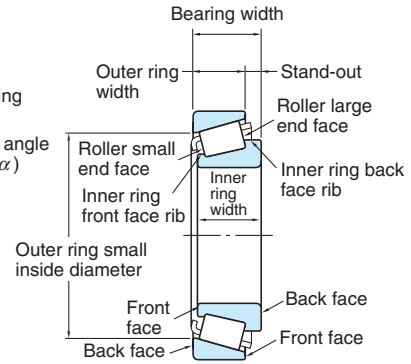
- Tapered rollers assembled in the bearings are guided by the inner ring back face rib.
- The raceway surfaces of inner ring and outer ring and the rolling contact surface of rollers are designed so that the respective apexes converge at a point on the bearing center line.
- Single-row bearings can accommodate radial load and axial load in one direction, and double-row bearings can accommodate radial load and axial load in both directions.
- This type of bearing is suitable for use under heavy load or impact load.
- Bearings are classified into standard, intermediate and steep types, in accordance with their contact angle (α).
  The larger the contact angle is, the greater the bearing resistance to axial load.
- Since outer ring and inner ring assembly can be separated from each other, mounting is easy.
- Bearings designated by the suffix "J" and "JR" are interchangeable internationally.
- Items sized in inches are still widely used.

[Recommended cages] Pressed steel cage, synthetic resin molded cage, pin type cage

[Main applications] Automobile : front and rear wheels, transmissions, differential pinion
Others : machine tool spindles, construction equipment, large size agricultural equipment, railway rolling stock speed reduction gears, rolling mill roll necks and speed reducers, etc







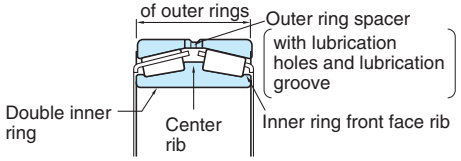
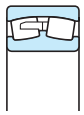
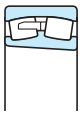


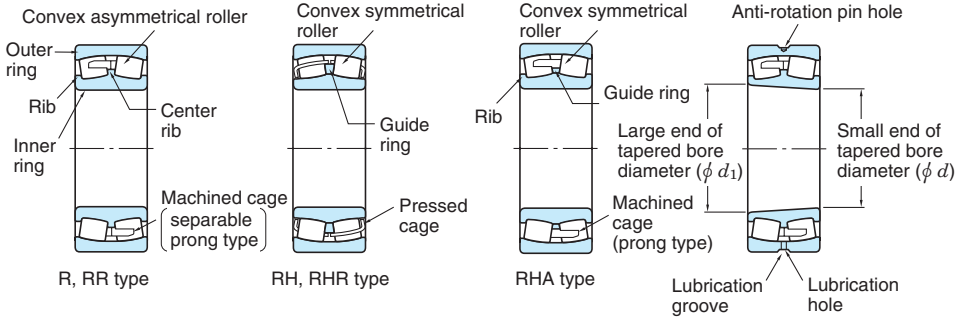
Table 1-8 Spherical roller bearings

Cylindrical bore			Tapered bore
Convex asymmetrical roller type	Convex symmetrical roller type		
			
R, RR	RH, RHR	RHA	K or K30
23900R, 23000R (RH, RHA), 23100R (RH, RHA), 22200R (RH, RHA), 21300R (RH) 24000R (RH, RHA), 24100R (RH, RHA), 23200R (RH, RHA), 22300R (RH, RHA)			

- Spherical roller bearings comprising barrel-shaped convex rollers, double-row inner ring and outer ring are classified into three types : R(RR), RH(RHR) and RHA, according to their internal structure.
- With the bearing designed such that the circular arc center of the outer ring raceway matches with the bearing center, the bearing is self-aligning, insensitive to errors of alignment of the shaft relative to the housing, and to shaft bending.
- This type can accommodate radial load and axial load in both directions, which makes it especially suitable for applications in which heavy load or impact load is applied.
- The tapered bore type can be easily mounted/dismounted by using an adapter or withdrawal sleeve.
  There are two types of tapered bores (tapered ratio) :
  - 1 : 30 (supplementary code K30) ··· Suitable for series 240 and 241.
  - 1 : 12 (supplementary code K) ··· Suitable for series other than 240 and 241.
- Lubrication holes, a lubrication groove and anti-rotation pin hole can be provided on the outer ring. Lubrication holes and a lubrication groove can be provided on the inner ring, too.

[Recommended cages] Copper alloy machined cage, pressed steel cage, pin type cage

[Main applications] Paper manufacturing equipment, speed reducers, railway rolling stock axle journals, rolling mill pinion stands, table rollers, crushers, shaker screens, printing equipment, wood working equipment, speed reducers for various industrial uses, plummer blocks



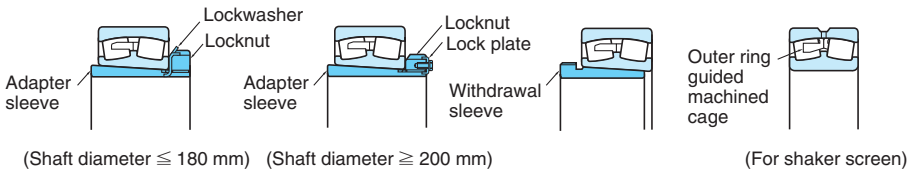
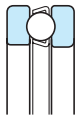
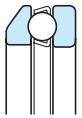
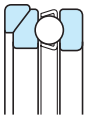
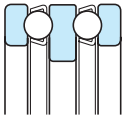
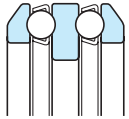
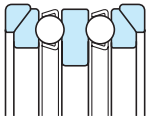


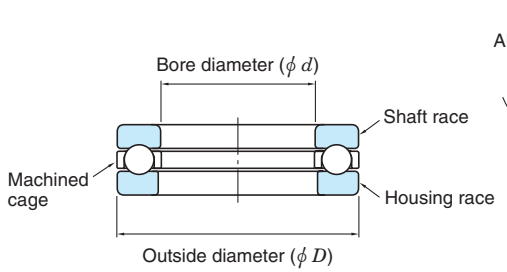
Table 1-9 Thrust ball bearings

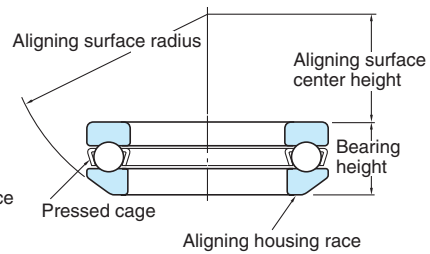
Single direction			Double direction		
With flat back faces	With spherical back face	With aligning seat race	With flat back faces	With spherical back faces	With aligning seat races
					
51100	–	–	–	–	–
51200	53200	53200U	52200	54200	54200U
51300	53300	53300U	52300	54300	54300U
51400	53400	53400U	52400	54400	54400U

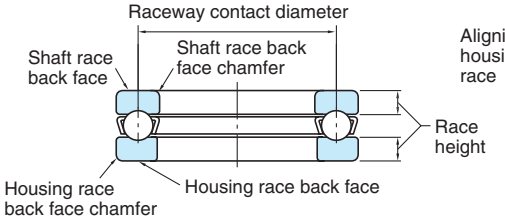
- This type of bearing comprises washer-shaped rings with raceway groove and ball and cage assembly.
- Races to be mounted on shafts are called shaft races (or inner rings); and, races to be mounted into housings are housing races (or outer rings).
  Central races of double direction bearings are mounted on the shafts.
- Single direction bearings accommodate axial load in one direction, and double direction bearings accommodate axial load in both directions. (Both of these bearings cannot accommodate radial loads.)
- Since bearings with a spherical back face are self- aligning, it helps to compensate for mounting errors.

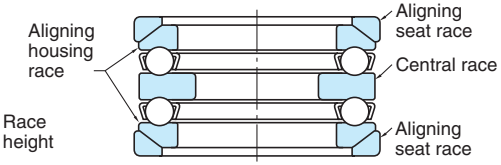
[Recommended cages] Pressed steel cage, copper alloy or phenolic resin machined cage, synthetic resin molded cage

[Main applications] Automobile king pins, machine tool spindles



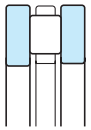






[Remark] The race indicates the washer specified in JIS.

Table 1-10 Cylindrical roller thrust bearings

Single direction

(THR.....R)
■ This type of bearing comprises washer-shaped rings (shaft and housing race) and cylindrical roller and cage assembly. Crowned cylindrical rollers produce uniform pressure distribution on roller/raceway contact surface. ■ Axial load can be accommodated in one direction. ■ Great axial load resistance and high axial rigidity are provided.
[Recommended cages] Copper alloy machined cage
[Main applications] Oil excavators, iron and steel equipment

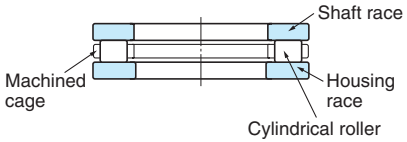
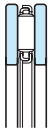
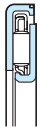
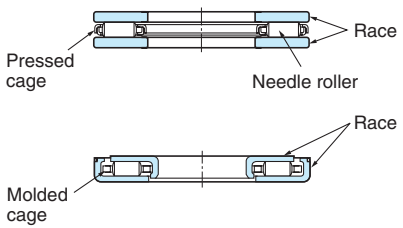


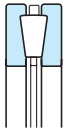
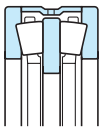
Table 1-11 Needle roller thrust bearings

Separable	Non-separable
	
(TPW) (TPWS) (TPWWS)	(TPK) (TVK)
■ The separable type, comprising needle roller and cage thrust assembly and a race, can be matched with a pressed thin race (W) or machined thick race (WS). ■ The non-separable type comprises needle roller and cage thrust assembly and a precision pressed race. ■ Axial load can be accommodated in one direction. ■ Due to the very small installation space required, this type contributes greatly to size reduction of application equipment. ■ In many cases, needle roller and cage thrust assembly function by using the mounting surface of the application equipment, including shafts and housings, as its raceway surface.	
Pressed steel cage, synthetic resin molded cage	
Transmissions for automobiles, cultivators and machine tools	



[Remark] The race indicates the thrust washer or washer specified in JIS.

Table 1-12 Tapered roller thrust bearings

Single direction	Double direction
	
(T) (THR)	(2THR)
■ This type of bearing comprises tapered rollers (with spherical large end), which are uniformly guided by ribs of the shaft and housing races. ■ Both shaft and housing races and rollers have tapered surfaces whose apexes converge at a point on the bearing axis. ■ Single direction bearings can accommodate axial load in one direction; and, double direction bearings can accommodate axial load in both directions. ■ Double direction bearings are to be mounted such that their central race is placed on the shaft shoulder. Since this type is treated with a clearance fit, the central race must be fixed with a sleeve, etc.	
[Recommended cages] Copper alloy machined cage	
[Main applications] Single direction : crane hooks, oil excavator swivels Double direction : rolling mill roll necks	

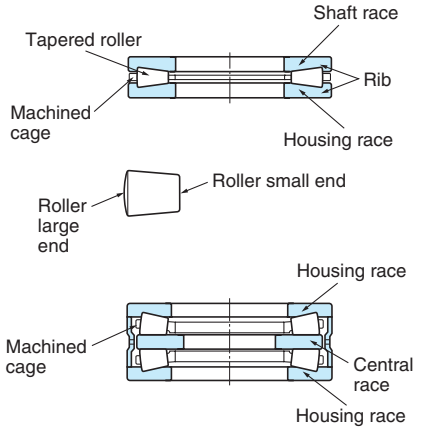
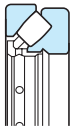
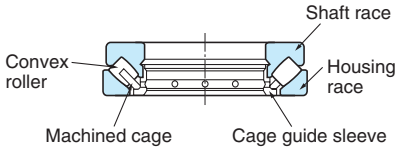


Table 1-13 Spherical thrust roller bearings


29200 29300 29400
■ This type of bearing, comprising barrel-shaped convex rollers arranged at an angle with the axis, is self-aligning due to spherical housing race raceway; therefore, shaft inclination can be compensated for to a certain degree. ■ Great axial load resistance is provided. This type can accommodate a small amount of radial load as well as heavy axial load. ■ Normally, oil lubrication is employed.
Copper alloy machined cage
Hydroelectric generators, vertical motors, propeller shafts for ships, screw down speed reducers, jib cranes, coal mills, pushing machines, molding machines



2. Outline of bearing selection

Currently, as bearing design has become diversified, their application range is being increasingly extended. In order to select the most suitable bearings for an application, it is necessary to conduct a comprehensive study on both bearings and the equipment in which the bearings will be installed, including operating conditions, the performance required of the bearings, specifications of the other components to be installed along with the bearings, marketability, and cost performance, etc.

In selecting bearings, since the shaft diameter is usually determined beforehand, the prospective bearing type is chosen based upon installation space, intended arrangement, and according to the bore diameter required.

Next, from the bearing specifications are determined the service life required when compared to that of the equipment in which it is used, along with a calculation of the actual service life from operational loads.

Internal specifications including bearing accuracy, internal clearance, cage, and lubricant are also selected, depending on the application.

For reference, general selection procedure and operating conditions are described in Fig. 2-1. There is no need to follow a specific order, since the goal is to select the right bearing to achieve optimum performance.

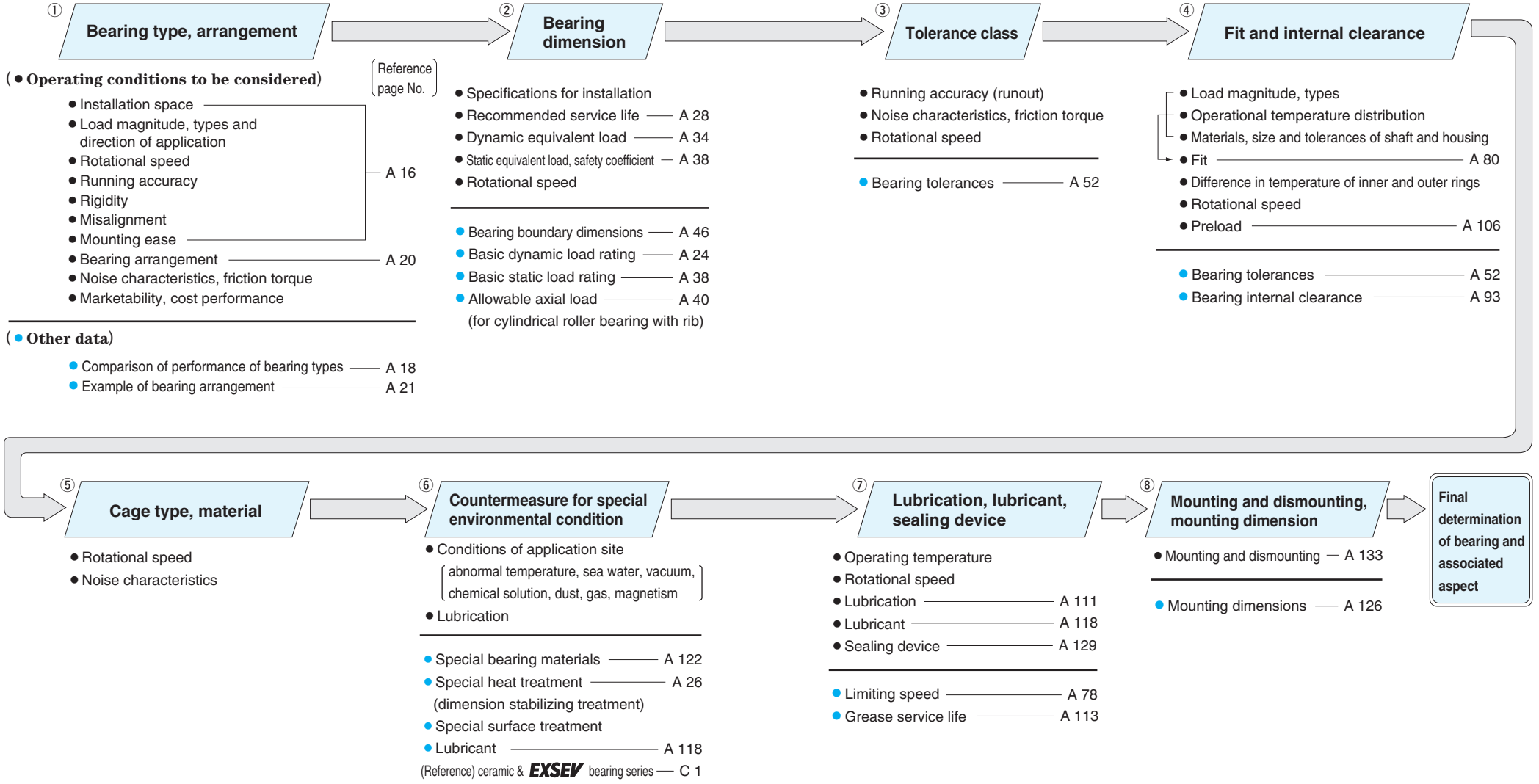


Fig. 2-1(1) Bearing selection procedure

Fig. 2-1(2) Bearing selection procedure

3. Selection of bearing type

In selecting bearings, the most important thing is to fully understand the operating conditions of the bearings.

The main factors to be considered are listed in Table 3-1, while bearing types are listed in Table 3-2.

Table 3-1 (1) Selection of bearing type

Items to be considered		Selection method	Reference page No.
1) Installation space	Bearing can be installed in target equipment	● When a shaft is designed, its rigidity and strength are considered essential; therefore, the shaft diameter, i.e., bore diameter, is determined at start. For rolling bearings, since wide variety with different dimensions are available, the most suitable bearing type should be selected. (Fig. 3-1)	A 46
2) Load	Load magnitude, type and direction which applied (Load resistance of bearing is specified in terms of the basic load rating, and its value is specified in the bearing specification table.)	● Since various types of load are applied to bearings, load magnitude, types (radial or axial) and direction of application (both directions or single direction in the case of axial load), as well as vibration and impact must be considered in order to select the proper bearing. ● The following is the general order for radial resistance ; (deep groove ball bearings < angular contact ball bearings < cylindrical roller bearings < tapered roller bearings < spherical roller bearings)	A 18 (Table 3-2) A 81
3) Rotational speed	Response to rotational speed of equipment in which bearings will be installed (The limiting speed for bearing is expressed as allowable speed, and this value is specified in the bearing specification table.)	● Since the allowable speed differs greatly depend-ing not only upon bearing type but on bearing size, cage, accuracy, load and lubrication, all factors must be considered in selecting bearings. ● In general, the following bearings are the most widely used for high speed operation. (deep groove ball bearings, angular contact ball bearings, cylindrical roller bearings)	A 18 (Table 3-2) A 78
4) Running accuracy	Accurate rotation delivering required performance (Dimension accuracy and running accuracy of bearings are provided by JIS, etc.)	● Performance required differs depending on equipment in which bearings are installed : for instance, machine tool spindles require high running accuracy, gas turbines require high speed rotation, and control equipment requires low friction. In such cases, bearings of tolerance class 5 or higher are required. ● The following are the most widely used bearings. (deep groove ball bearings, angular contact ball bearings, cylindrical roller bearings)	A 18 (Table 3-2) A 52
5) Rigidity	Rigidity that delivers the bearing performance required (When load is applied to a bearing, elastic deformation occurs at the point where its rolling elements contact the raceway surface. The higher the rigidity that bearings possess, the better they control elastic deformation.)	● In machine tool spindles and automobile final drives, bearing rigidity as well as rigidity of equipment itself must be enhanced. ● Elastic deformation occurs less in roller bearings than in ball bearings. ● Rigidity can be enhanced by providing preload. This method is suitable for use with angular contact ball bearings and tapered roller bearings.	A 18 (Table 3-2) A 106

Table 3-1 (2) Selection of bearing type

Items to be considered		Selection method	Reference page No.
6) Misalignment (aligning capability)	Operating conditions which cause misalignment (shaft deflection caused by load, inaccuracy of shaft and housing, mounting errors) can affect bearing performance (Allowable misalignment (in angle) for each bearing type is described in the section before the bearing specification table, to facilitate determination of the self-aligning capability of bearings.)	● Internal load caused by excessive misalignment damages bearings. Bearings designed to absorb such misalignment should be selected. ● The higher the self-aligning capability that bearings possess, the larger the angular misalignment that can be absorbed. The following is the general order of bearings when comparing allowable angular misalignment : (cylindrical roller bearings < tapered roller bearings < deep groove ball bearings, angular contact ball bearings < spherical roller bearings, self-aligning ball bearings)	A 18 (Table 3-2)
7) Mounting and dismounting	Methods and frequency of mounting and dismounting required for periodic inspection	● Cylindrical roller bearings, needle roller bearings and tapered roller bearings, with separable inner and outer rings, are recommended for applications in which mounting and dismounting is conducted frequently. ● Use of sleeve eases the mounting of self-aligning ball bearings and spherical roller bearings with tapered bore.	A 18 (Table 3-2)

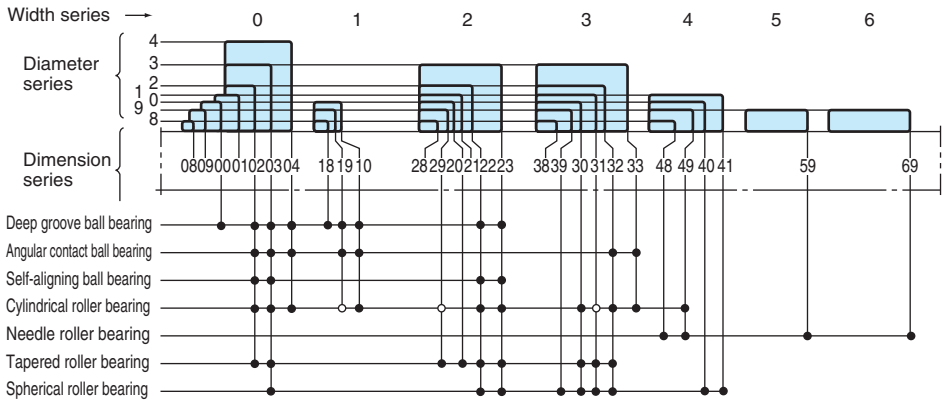


Fig. 3-1 Radial bearing dimension series

Table 3-2 Performance comparison of bearing type

		Deep groove ball bearing	Angular contact ball bearing: Single-row	Angular contact ball bearing: Matched pair or stack	Angular contact ball bearing: Double-row	Four-point contact ball bearing	Self-aligning ball bearing	Cylindrical roller bearing: NU · N	Cylindrical roller bearing: NJ · NF	Cylindrical roller bearing: NUP · NH	Cylindrical roller bearing: NN · NNU	Needle roller bearing (machined ring type)	Tapered roller bearing: Single-row	Tapered roller bearing: Double-row, four-row	Spherical roller bearing	Thrust ball bearing: With flat back faces	Thrust ball bearing: With aligning seat race	Double direction angular contact thrust ball bearing	Cylindrical roller thrust bearing	Needle roller thrust bearing	Tapered roller thrust bearing	Spherical thrust roller bearing	Reference page No.
Load resistance	Radial load	○	○	◎	◎	○	○	◎	◎	◎	◎	◎	◎	◎	◎	×	×	×	×	×	×	△	—
	Axial load	○ ↔	◎ ←	◎ ↔ *	◎ ↔ *	◎ ↔	△ ↔	×	△ ←	△ ↔	×	×	◎ ←	◎ ↔	△ ↔	○ ← *	○ ← *	◎ ↔	◎ ←	◎ ←	◎ ←	◎ ←	◎ ←	—
	Combined load radial and axial	○	○	◎	◎	○	△	×	△	△	×	×	◎	◎	△	×	×	×	×	×	×	×	△	—
	Vibration or impact load	△	△	△	△	△	△	◎	◎	◎	◎	○	◎	◎	◎	△	△	△	○	○	◎	◎	—
High speed adaptability		◎	◎	◎	○	◎	△	◎	◎	◎	◎	○	○	○	○	△	△	○	△	△	△	△	A16 A78
High accuracy		◎	◎	◎		◎		◎			◎		○			○		◎					A16, 52 A111
Low noise level/low torque		◎						○															A16
Rigidity				○		○		○	○	○	◎	○	○	◎				○	◎	◎	◎		A16
Misalignment		○	△	×	×	×	◎	△	△	△	△	△	△	△	◎	×	◎	×	×	×	×	◎	A17 Description before specification table
Inner and outer ring separability		×	×	×	×	■ *	×	■	■	■	■	■	■	■	×	■	■	■	■	■ *	■	■	—
Arrangement	Fixed side	■ ↔	■ ←	■ ↔	■ ↔ *	■ ↔	■ ↔	×	■ ←	■ ↔	×	×	■ ←	■ ↔	■ ↔								A20
	Free side	□		□	□	□	□	■	□	□	■	■		□	□								A20
Remarks			A pair of bearings mounted facing each other.	*DT arrangement is effective for one direction only.	*Filling slot type is effective for one direction only.	*Non-separable type is also available.							A pair of bearings mounted facing each other.			*Double direction bearings are effective for both directions.				*Non-separable type is also available.			—
Reference page No.		A4 B4	A5 B52			A6 B52	A6 B134	A7 B154				A8 B374	A9 B200		A10 B302	A11 B348		— C47	A12 —	A12 B374	A13 —	A13 B366	—

◎ Excellent ○ Good △ Fair × Unacceptable ↔ Both directions ← One direction only ■ Acceptable □ Acceptable, but shaft shrinkage must be compensated for.

4. Selection of bearing arrangement

As bearing operational conditions vary depending on devices in which bearings are mounted, different performances are demanded of bearings. Normally, two or more bearings are used on one shaft.

In many cases, in order to locate shaft positions in the axial direction, one bearing is mounted on the fixed side first, then the other bearing is mounted on the free side.

Table 4-1 Bearings on fixed and free sides

	Features	Recommended bearing type	Example No.
Fixed side bearing	● This bearing determines shaft axial position. ● This bearing can accommodate both radial and axial loads. ● Since axial load in both directions is imposed on this bearing, strength must be considered in selecting the bearing for this side.	Deep groove ball bearing Matched pair or stack angular contact ball bearing Double-row angular contact ball bearing Self-aligning ball bearing Cylindrical roller bearing with rib (NUP and NH types) Double-row tapered roller bearing Spherical roller bearing	Examples 1–11
Free side bearing	● This bearing is employed to compensate for expansion or shrinkage caused by operating temperature change and to allow ajustment of bearing position. ● Bearings which accommodate radial load only and whose inner and outer rings are separable are recommended as free side bearings. ● In general, if non-separable bearings are used on free side, clearance fit is provided between outer ring and housing to compensate for shaft movement through bearings. In some cases, clearance fit between shaft and inner ring is utilized.	● Separable types Cylindrical roller bearing (NU and N types) Needle roller bearing (NA type, etc.) ● Non-separable types Deep groove ball bearing Matched pair angular contact ball bearing (Back-to-back arrangement) Double-row angular contact ball bearing Self-aligning ball bearing Double-row tapered roller bearing (TDO type) Spherical roller bearing	
When fixed and free sides are not distinguished	● When bearing intervals are short and shaft shrinkage does not greatly affect bearing operation, a pair of angular contact ball bearings or tapered roller bearings is used in paired mounting to accommodate axial load. ● After mounting, the axial clearance is adjusted using nuts or shims.	Deep groove ball bearing Angular contact ball bearing Self-aligning ball bearing Cylindrical roller bearing (NJ and NF types) Tapered roller bearing Spherical roller bearing	Examples 12–16
Bearings for vertical shafts	● Bearings which can accommodate both radial and axial loads should be used on fixed side. Heavy axial load can be accommodated using thrust bearings together with radial bearings. ● Bearings which can accommodate radial load only are used on free side, compensating for shaft movement.	● Fixed side Matched pair angular contact ball bearing (Back-to-back arrangement) Double-row tapered roller bearing (TDO type) Thrust bearing + radial bearing	Examples 17 and 18

Table 4-2 (1) Example bearing arrangements

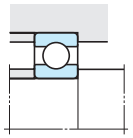
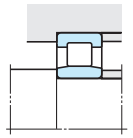
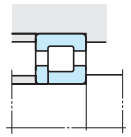
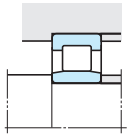
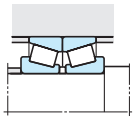
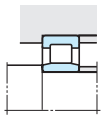
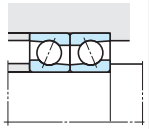
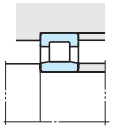
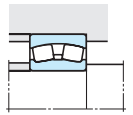
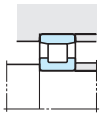
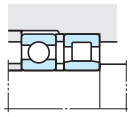
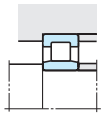
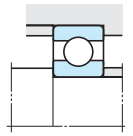
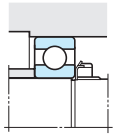
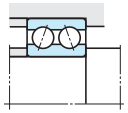
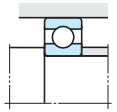
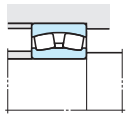
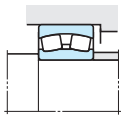
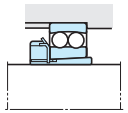
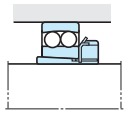
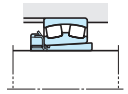
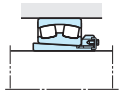
Example	Bearing arrangement		Recommended application	Application example
	Fixed side	Free side		
Ex. 1			○ Suitable for high-speed operation; used for various types of applications. ○ Not recommended for applications that have center displacement between bearings or shaft deflection.	Medium size motors, air blowers
Ex. 2			○ More suitable than Ex. 1 for operation under heavy load or impact load. Suitable also for high-speed operation. ○ Due to separability, suitable for applications requiring interference of both inner and outer rings. ○ Not recommended for applications that have center displacement between bearings or shaft deflection.	Traction motors for railway rolling stock
Ex. 3			○ Recommended for applications under heavier or greater impact load than those in Ex. 2. ○ This arrangement requires high rigidity from fixed side bearings mounted back to back, with preload provided. ○ Shaft and housing of accurate dimensions should be selected and mounted properly.	Steel manufacturing table rollers, lathe spindles
Ex. 4			○ This is recommended for operation at high speed or axial load lighter than in Ex. 3. ○ This is recommended for applications requiring interference of both inner and outer rings. ○ Some applications use double-row angular contact ball bearings on fixed side instead of matched pair angular contact ball bearings.	Motors
Ex. 5			○ This is recommended for operations under relatively small axial load. ○ This is recommended for applications requiring interference of both inner and outer rings.	Paper manufacturing calender rollers, diesel locomotive axle journals
Ex. 6			○ This is recommended for operations at high speed and heavy radial load, as well as normal axial load. ○ When deep groove ball bearings are used, clearance must be provided between outside diameter and housing, to prevent application of radial load.	Diesel locomotive transmissions
Ex. 7			○ This arrangement is most widely employed. ○ This arrangement can accommodate partial axial load as well as radial load.	Pumps, automobile transmissions

Table 4-2 (2) Example bearing arrangements

Example	Bearing arrangement: Fixed side	Bearing arrangement: Free side	Recommended application	Application example
Ex. 8			○ This is recommended for operations with relatively heavy axial load in both directions. ○ Some applications use matched pair angular contact ball bearings on fixed side instead of double-row angular contact ball bearings.	Worm gear speed reducers
Ex. 9			○ This is the optimum arrangement for applications with possible mounting errors or shaft deflection. ○ Bearings in this arrangement can accommodate partial axial load, as well as heavy radial load.	Steel manufacturing table roller speed reducers, overhead crane wheels
Ex. 10			○ This is optimum arrangement for applications with possible mounting errors or shaft deflection. ○ Ease of mounting and dismounting, ensured by use of adaptor, makes this arrangement suitable for long shafts which are neither stepped nor threaded. ○ This arrangement is not recommended for applications requiring axial load capability.	General industrial equipment counter shafts
Ex. 11			○ This is the optimum arrangement for applications with possible mounting errors or shaft deflection. ○ This is recommended for operations under impact load or radial load heavier than that in Ex. 10. ○ This arrangement can accommodate partial axial load as well as radial load.	Steel manufacturing table rollers

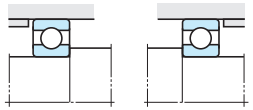
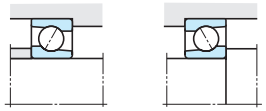
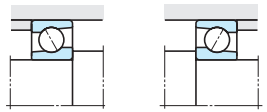
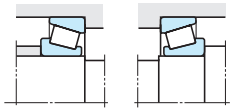
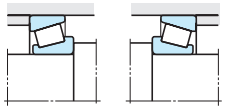
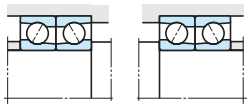
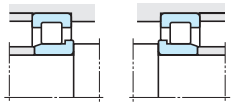
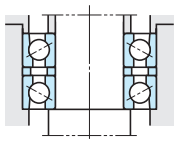
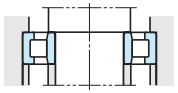
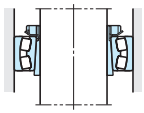
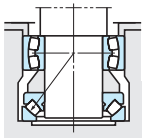
Arrangement in which fixed and free sides are not distinguished		Recommended application	Application example
Ex. 12		○ This arrangement is most popular when applied to small equipment operating under light load. ○ When used with light preloading, thickness-adjusted shim or spring is mounted on one side of outer ring.	Small motors, small speed reducers, small pumps
Ex. 13	 Back-to-back  Face-to-face	○ This is suitable for applications in which rigidity is enhanced by preloading. This is frequently employed in applications requiring high speed operation under relatively large axial load. ○ Back-to-back arrangement is suitable for applications in which moment load affects operation. ○ When preloading is required, care should be taken in preload adjustment.	Machine tool spindles

Table 4-2 (3) Example bearing arrangements

Example	Arrangement in which fixed and free sides are not distinguished	Recommended application	Application example
Ex. 14	 Back-to-back  Face-to-face	○ This is recommended for operation under impact load or axial load heavier than in Ex. 13. ○ This is suitable for applications in which rigidity is enhanced by preloading. ○ Back-to-back arrangement is suitable for applications in which moment load affects operation. ○ When interference is required between inner ring and shaft, face-to-face arrangement simplifies mounting. This arrangement is effective for applications in which mounting error is possible. ○ When preloading is required, care should be taken in preload adjustment.	Speed reducers, automobile wheels
Ex. 15		○ This is recommended for applications requiring high speed and high accuracy of rotation under light load. ○ This is suitable for applications in which rigidity is enhanced by preloading. ○ Tandem arrangement and face-to-face arrangement are possible, as is back-to-back arrangement.	Machine tool spindles
Ex. 16		○ This arrangement provides resistance against heavy radial and impact loads. ○ This is applicable when both inner and outer rings require interference. ○ Care should be taken not to reduce axial internal clearance a critical amount during operation.	Construction equipment final drive

Application to vertical shafts		Recommended application	Application example
Ex. 17	 Fixed side  Free side	○ This arrangement, using matched pair angular contact ball bearings on the fixed side and cylindrical roller bearings on the free side, is suitable for high speed operation.	Vertical motors, vertical pumps
Ex. 18	 Free side  Fixed side	○ This is recommended for operation at low speed and heavy load, in which axial load is heavier than radial load. ○ Due to self-aligning capability, this is suitable for applications in which shaft runout or deflection occurs.	Crane center shafts, vertical pumps

5. Selection of bearing dimensions

5-1 Bearing service life

When bearings rotate under load, material flakes from the surfaces of inner and outer rings or rolling elements by fatigue arising from repeated contact stress (ref. A 144).

This phenomenon is called flaking.

The total number of bearing rotations until flaking occurs is regarded as the bearing "(fatigue) service life".

"(Fatigue) service life" differs greatly depending upon bearing structures, dimensions, materials, and processing methods.

Since this phenomenon results from fatigue distribution in bearing materials themselves, differences in bearing service life should be statistically considered.

When a group of identical bearings are rotated under the same conditions, the total number of revolutions until 90 % of the bearings are left without flaking (i.e. a service life of 90 % reliability) is defined as the basic rating life. In operation at a constant speed, the basic rating life can be expressed in terms of time.

In actual operation, a bearing fails not only because of fatigue, but other factors as well, such as wear, seizure, creep, fretting, brinelling, cracking etc (ref. A 144, 16. Examples of bearing failures).

These bearing failures can be minimized by selecting the proper mounting method and lubricant, as well as the bearing most suitable for the application.

5-2 Calculation of service life

5-2-1 Basic dynamic load rating

The basic dynamic load rating is either pure radial (for radial bearings) or central axial load (for thrust bearings) of constant magnitude in a constant direction, under which the basic rating life of 1 million revolutions can be obtained, when the inner ring rotates while the outer ring is stationary, or vice versa. The basic dynamic load rating, which represents the capacity of a bearing under rolling fatigue, is specified as the basic dynamic radial load rating (C_r) for radial bearings, and basic dynamic axial load rating (C_a) for thrust bearings. These load ratings are listed in the specification table.

These values are prescribed by ISO 281/1990, and are subject to change by conformance to the latest ISO standards.

5-2-2 Basic rating life

The basic rating life in relation to the basic dynamic load rating and dynamic equivalent load can be expressed using equation (5-1).

It is convenient to express the basic rating life in terms of time, using equation (5-2), when a bearing is used for operation at a constant speed; and, in terms of traveling distance (km), using equation (5-3), when a bearing is used in railway rolling stock or automobiles.

(Total revolutions) $$L_{10} = \left(\frac{C}{P}\right)^p \quad \cdots\cdots (5\text{-}1)$$

(Time) $$L_{10h} = \frac{10^6}{60n}\left(\frac{C}{P}\right)^p \quad \cdots\cdots (5\text{-}2)$$

(Running distance) $$L_{10s} = \pi D L_{10} \quad \cdots\cdots (5\text{-}3)$$

where :

L_{10}	: basic rating life	10^6 revolutions
L_{10h}	: basic rating life	h
L_{10s}	: basic rating life	km
P	: dynamic equivalent load	N
	·····(refer to p. A 34.)	
C	: basic dynamic load rating	N
n	: rotational speed	min^{-1}
p	: for ball bearings····· $p = 3$	
	for roller bearings····· $p = 10/3$	
D	: wheel or tire diameter	mm

Accordingly, where the dynamic equivalent load is P, and rotational speed is n, equation (5-4) can be used to calculate the basic dynamic load rating C; the bearing size most suitable for a specified purpose can then be selected, referring to the bearing specification table.

The recommended bearing service life differs depending on the machines with which the bearing is used, as shown in Table 5-4, p. A 28.

$$C = P\left(L_{10h}\times\frac{60n}{10^6}\right)^{1/p} \quad \cdots\cdots (5\text{-}4)$$

[Reference]

The equations using a service life coefficient (f_h) and rotational speed coefficient (f_n) respectively, based on equation (5-2), are as follows :

$$L_{10h} = 500 f_h^p \quad \cdots\cdots (5\text{-}5)$$

Coefficient of service life :

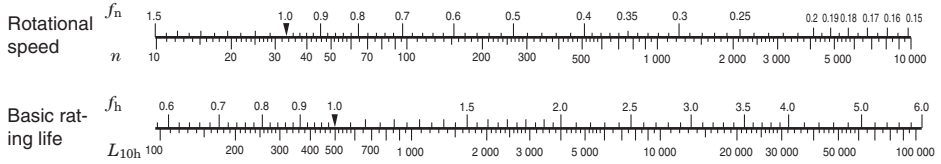
$$f_h = f_n\frac{C}{P} \quad \cdots\cdots (5\text{-}6)$$

Coefficient of rotational speed :

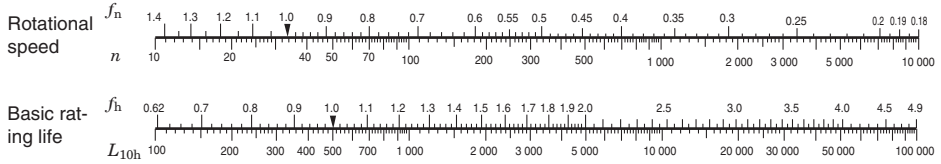
$$f_n = \left(\frac{10^6}{500\times 60n}\right)^{1/p} = (0.03n)^{-1/p} \quad \cdots\cdots (5\text{-}7)$$

For reference, the values of f_n, f_h, and L_{10h} can be easily obtained by employing the nomograph attached to this catalog, as an abbreviated method.

[Ball bearing]



[Roller bearing]



[Reference] Rotational speed (n) and its coefficients (f_n), and service life coefficient (f_h) and basic rating life (L_{10h})

5-2-3 Correction of basic dynamic load rating for high temperature use and dimension stabilizing treatment

In high temperature operation, bearing material hardness deteriorates, as material compositions are altered. As a result, the basic dynamic load rating is diminished. Once altered, material composition is not recovered, even if operating temperatures return to normal.

Therefore, for bearings used in high temperature operation, the basic dynamic load rating should be corrected by multiplying the basic dynamic load rating values specified in the bearing specification table by the temperature coefficient values in Table 5-1.

Table 5-1 Temperature coefficient values

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

Since normal heat treatment is not effective in maintaining the original bearing size in extended operation at 120 °C or higher, dimension stabilizing treatment is necessary. Dimension stabilizing treatment codes and their effective temperature ranges are described in Table 5-2.

Since dimension stabilizing treatment diminishes material hardness, the basic dynamic load rating may be reduced for some types of bearings.

Table 5-2 Dimension stabilizing treatment

Dimension stabilizing treatment code	Effective temperature range
S0	Over 100°C, up to 150°C
S1	150°C 200°C
S2	200°C 250°C

5-2-4 Corrected rating life

The basic rating life (L_{10}), expressed using equation (5-1), is (fatigue) life, whose estimate of reliability is 90 %. A certain application requires a service life whose reliability is more than 90 %.

Special materials help extend bearing life, and lubrication and other operating conditions may also affect bearing service life.
The corrected rating life can be obtained from the basic rating life using equation (5-8).

$$L_{na} = a_1 a_2 a_3 L_{10} \quad \cdots\cdots (5\text{-}8)$$

where :

L_{na} : corrected rating life 10^6 revolutions
(estimated reliability (100–n) % : the probability of failure occurrence is expressed by n, taking bearing characteristics and operating conditions into consideration.)

L_{10} : basic rating life 10^6 revolutions
(estimated reliability 90 %)

a_1 : reliability coefficient ····· refer to section (1)

a_2 : bearing characteristic coefficient ····· refer to section (2)

a_3 : operating condition coefficient ····· refer to section (3)

[Remark]
When bearing dimensions are to be selected given L_{na} greater than 90 % in reliability, the strength of shaft and housing must be considered.

(1) Reliability coefficient a_1

Table 5-3 describes reliability coefficient, a_1, which is necessary to obtain the corrected rating life of reliability greater than 90 %.

Table 5-3 Reliability coefficient 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 characteristic coefficient a_2

The bearing characteristic in relation to bearing life may differ according to bearing materials (steel types and their quality), and may be altered by production process, design, etc. In such cases, the bearing life calculation can be corrected using the bearing characteristic coefficient a_2.

JTEKT has employed vacuum-degassed bearing steel as JTEKT standard bearing material. It has a significant effect on bearing life extension which was verified through studies at JTEKT laboratory.

The basic dynamic load rating of bearings made of vacuum-degassed bearing steel is specified in the bearing specification table, taking the bearing characteristic coefficient as $a_2 = 1$.

For bearings made of special materials to extend fatigue life, the bearing characteristic coefficient is treated as $a_2 > 1$.

(3) Operating condition coefficient a_3

When bearings are used under operating conditions which directly affect their service life, including improper lubrication, the service life calculation can be corrected by using a_3.

Under normal lubrication, the calculation can be performed with $a_3 = 1$; and, under favorable lubrication, with $a_3 > 1$.

In the following cases, the operating condition coefficient is treated as $a_3 < 1$:

- Operation using lubricant of low kinematic viscosity
  (Ball bearing·····13 mm^2/s or less
  Roller bearing·····20 mm^2/s or less)
- Operation at very slow rotational speed
  (Product of rolling element pitch diameter and rotational speed is 10 000 or less.)
- Contamination of lubricant is expected
- Greater misalignment of inner and outer rings is present

[Note] When bearing hardness is diminished by heat, the basic dynamic load rating calculation must be corrected (ref. Table 5-1).

[Remark]
When $a_2 > 1$ in employing a special material, if lubrication is not proper, $a_2 \times a_3$ is not always > 1. In such cases, if $a_3 < 1$, bearing characteristic coefficient is normally treated as $a_2 \leqq 1$.

5-2-5 Service life of bearing system comprising two or more bearings

Even for systems which comprise two or more bearings, if one bearing is damaged, the entire system malfunctions.

Where all bearings used in an application are regarded as one system, the service life of the bearing system can be calculated using the following equation,

$$\frac{1}{L^e} = \frac{1}{L_1^e} + \frac{1}{L_2^e} + \frac{1}{L_3^e} + \cdots\cdots (5\text{-}9)$$

where :

L : rating life of system

L_1 , L_2 , L_3····· : rating life of each bearing

e : constant
(e = 10/9·····ball bearing
e = 9/8·····roller bearing
The mean value is for a system using both ball and roller bearings.)

[Example]
When a shaft is supported by two roller bearings whose service lives are 50 000 hours and 30 000 hours respectively, the rating life of the bearing system supporting this shaft is calculated as follows, using equation (5-9) :

$$\frac{1}{L^{9/8}} = \frac{1}{50\,000^{9/8}} + \frac{1}{30\,000^{9/8}}$$

$$L \fallingdotseq 20\,000 \text{ h}$$

The equation suggests that the rating life of these bearings as a system becomes shorter than that of the bearing with the shorter life.

This fact is very important in estimating bearing service life for applications using two or more bearings.

As the above explanation shows, since a_2 and a_3 are inter-dependent, some calculations treat them as one coefficient, a_{23} .

5-2-6 Applications and recommended bearing service life

Since longer service life does not always contribute to economical operation, the most suitable service life for each application and operating conditions should be determined.

For reference, Table 5-4 describes recommended service life in accordance with the application, as empirically determined.

Table 5-4 Recommended bearing service life (reference)

Operating condition	Application	Recommended service life (h)
Short or intermittent operation	Household electric appliance, electric tools, agricultural equipment, heavy cargo hoisting equipment	4 000 – 8 000
Not extended duration, but stable operation required	Household air conditioner motors, construction equipment, conveyers, elevators	8 000 – 12 000
Intermittent but extended operation	Rolling mill roll necks, small motors, cranes	8 000 – 12 000
	Motors used in factories, general gears	12 000 – 20 000
	Machine tools, shaker screens, crushers	20 000 – 30 000
	Compressors, pumps, gears for essential use	40 000 – 60 000
Daily operation more than 8 hr. or continuous extended operation	Escalators	12 000 – 20 000
	Centrifugal separators, air conditioners, air blowers, woodworking equipment, passenger coach axle journals	20 000 – 30 000
	Large motors, mine hoists, locomotive axle journals, railway rolling stock traction motors	40 000 – 60 000
	Paper manufacturing equipment	100 000 – 200 000
24 hr. operation (no failure allowed)	Water supply facilities, power stations, mine water discharge facilities	100 000 – 200 000

5-3 Calculation of loads

Loads affecting bearings includes force exerted by the weight of the object the bearings support, transmission force of devices such as gears and belts, loads generated in equipment during operation etc.

Seldom can these kinds of load be determined by simple calculation, because the load is not always constant.

In many cases, the load fluctuates, and it is difficult to determine the frequency and magnitude of the fluctuation.

Therefore, loads are normally obtained by multiplying theoretical values with various coefficients obtained empirically.

5-3-1 Load coefficient

Even if radial and axial loads are obtained through general dynamic calculation, the actual load becomes greater than the calculated value due to vibration and impact during operation.

In many cases, the load is obtained by multiplying theoretical values by the load coefficient.

Table 5-5 Values of load coefficient f_w

Operating condition	Application example	f_w
Operation with little vibration or impact	Motors Machine tools Measuring instrument	1.0 – 1.2
Normal operation (slight impact)	Railway rolling stock Automobiles Paper manufacturing equipment Air blowers Compressors Agricultural equipment	1.2 – 2.0
Operation with severe vibration or impact	Rolling mills Crushers Construction equipment Shaker screens	2.0 – 3.0

$$F = f_w \cdot F_c \quad \cdots\cdots (5\text{-}10)$$

where :

F : measured load N

F_c : calculated load N

f_w : load coefficient (ref. Table 5-5)

5-3-2 Load generated through belt or chain transmission

In the case of belt transmission, the theoretical value of the load affecting the pulley shafts can be determined by obtaining the effective transmission force of the belt.

For actual operation, the load is obtained by multiplying this effective transmission force by the load coefficient (f_w) considering vibration and impact generated during operation, and the belt coefficient (f_b) considering belt tension.

In the case of chain transmission, the load is determined using a coefficient equivalent to the belt coefficient.

This equation (5-11) is as follows ;

$$F_b = \frac{2M}{D_p} \cdot f_w \cdot f_b = \frac{19.1\times10^6 W}{D_p n} \cdot f_w \cdot f_b \quad \cdots\cdots (5\text{-}11)$$

where :

F_b : estimated load affecting pulley shaft or sprocket shaft N

M : torque affecting pulley or sprocket $mN \cdot m$

W : transmission force kW

D_p : pitch circle diameter of pulley or sprocket mm

n : rotational speed min^{-1}

f_w : load coefficient (ref. Table 5-5)

f_b : belt coefficient (ref. Table 5-6)

Table 5-6 Values of belt coefficient f_b

Belt type	f_b
Timing belt (with teeth)	1.3 – 2.0
V-belt	2.0 – 2.5
Flat belt (with tension pulley)	2.5 – 3.0
Flat belt	4.0 – 5.0
Chain	1.2 – 1.5

5-3-3 Load generated under gear transmission

(1) Loads affecting gear and gear coefficient

In the case of gear transmission, loads transmitted by gearing are theoretically classified into three types: tangential load (K_t), radial load (K_r) and axial load (K_a).

Those loads can be calculated dynamically (using equations ⓐ, ⓑ and ⓒ, described in section (2)).

To determine the actual gear loads, these theoretical loads must be multiplied by coefficients considering vibration and impact during operation (f_w) (ref. Table 5-5) and the gear coefficient (f_g) (ref. Table 5-7) considering the finish treatment of gears.

Table 5-7 Values of gear coefficient f_g

Gear type	f_g
Precision gears (both pitch error and tooth shape error less than 0.02 mm)	1.0 – 1.1
Normal gears (both pitch error and tooth shape error less than 0.1 mm)	1.1 – 1.3

(2) Calculation of load on gears

ⓐ Tangential load (tangential force) K_t

(Spur gears, helical gears, double-helical gears, straight bevel gears, spiral bevel gears)

$$K_t = \frac{2M}{D_p} = \frac{19.1\times10^6\ W}{D_p n} \quad \cdots\cdots (5\text{-}12)$$

ⓐ~ⓒ where :

K_t	: gear tangential load	N
K_r	: gear radial load	N
K_a	: gear axial load	N
M	: torque affecting gears	mN · m
D_p	: gear pitch circle diameter	mm
W	: transmitting force	kW
n	: rotational speed	min^{-1}
α	: gear pressure angle	deg
β	: gear helix (spiral) angle	deg
δ	: bevel gear pitch angle	deg

		ⓑ Radial load (separating force) K_r	ⓒ Axial load (axial force) K_a
Spur gears		$K_r = K_t \tan\alpha$ ····· (5-13)	0
Helical gears		$K_r = K_t \frac{\tan\alpha}{\cos\beta}$ ····· (5-14)	$K_a = K_t \tan\beta$ ····· (5-20)
Double-helical gears		$K_r = K_t \frac{\tan\alpha}{\cos\beta}$ ····· (5-15)	0
Straight[1] bevel gears	Drive side	$K_{r1} = K_t \tan\alpha \cos\delta_1$ ····· (5-16)	$K_{a1} = K_t \tan\alpha \sin\delta_1$ ····· (5-21)
	Driven side	$K_{r2} = K_t \tan\alpha \cos\delta_2$ ····· (5-17)	$K_{a2} = K_t \tan\alpha \sin\delta_2$ ····· (5-22)
Spiral[1), 2)] bevel gears	Drive side	$K_{r1} = \frac{K_t}{\cos\beta}\left(\tan\alpha \cos\delta_1 \pm \sin\beta \sin\delta_1\right)$ ····· (5-18)	$K_{a1} = \frac{K_t}{\cos\beta}\left(\tan\alpha \sin\delta_1 \mp \sin\beta \cos\delta_1\right)$ ····· (5-23)
	Driven side	$K_{r2} = \frac{K_t}{\cos\beta}\left(\tan\alpha \cos\delta_2 \mp \sin\beta \sin\delta_2\right)$ ····· (5-19)	$K_{a2} = \frac{K_t}{\cos\beta}\left(\tan\alpha \sin\delta_2 \pm \sin\beta \cos\delta_2\right)$ ····· (5-24)

[Notes] 1) Codes with subscript 1 and 2 shown in equations are respectively applicable to drive side gears and driven side gears.

2) Symbols (+) and (–) denote the following ;

Symbols in upper row : clockwise rotation accompanied by right-handed spiral or counterclockwise rotation with left-handed spiral

Symbols in lower row : counterclockwise rotation with right-handed spiral or clockwise rotation with left-handed spiral

[Remark] Rotating directions are described as viewed at the back of the apex of the pitch angle.

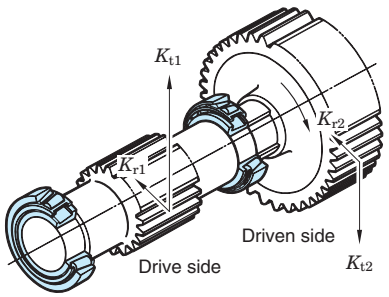


Fig. 5-1 Load on spur gears

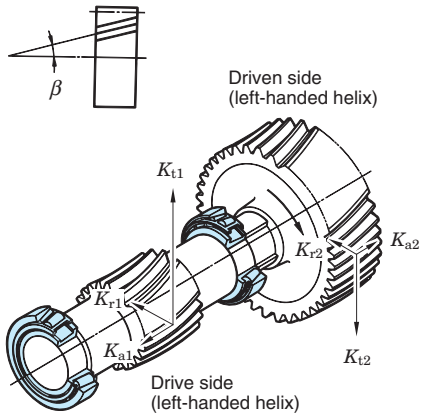


Fig. 5-2 Load on helical gears

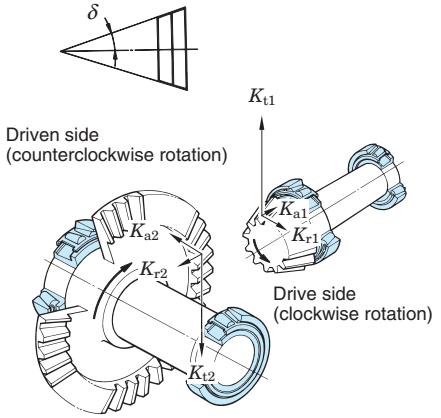


Fig. 5-3 Load on straight bevel gears

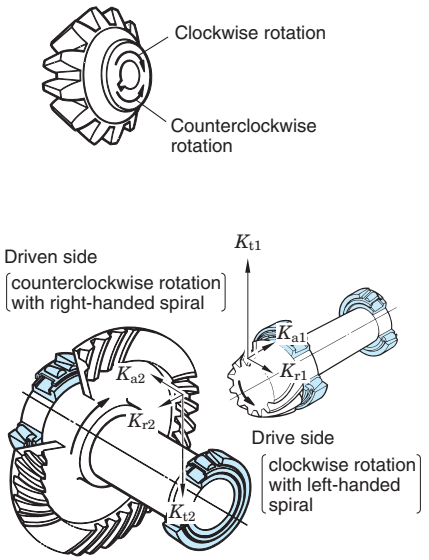


Fig. 5-4 Load on spiral bevel gears

5-3-4 Load distribution on bearings

The load distribution affecting bearings can be calculated as follows: first, radial force components are calculated, then, the sum of vectors of the components is obtained in accordance with the load direction.

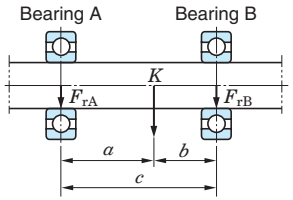
Calculation examples of radial load distribution are described in the following section.

[Remark]

Bearings shown in Exs. 3 to 5 are affected by components of axial force when these bearings accommodate radial load, and axial load (K_a) which is transferred externally, i.e. from gears.

For calculation of the axial load in this case, refer to page A 34.

Example 1 Fundamental calculation (1)

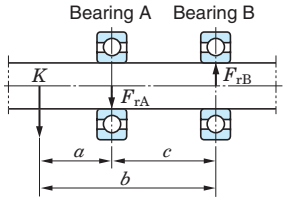


$$F_{rA} = \frac{b}{c}K$$

$$F_{rB} = \frac{a}{c}K$$

..... (5-25)

Example 2 Fundamental calculation (2)

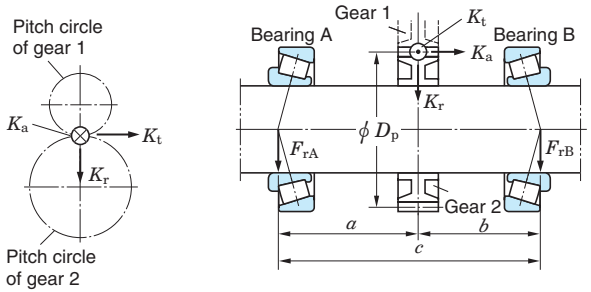


$$F_{rA} = \frac{b}{c}K$$

$$F_{rB} = \frac{a}{c}K$$

..... (5-26)

Example 3 Gear load distribution (1)

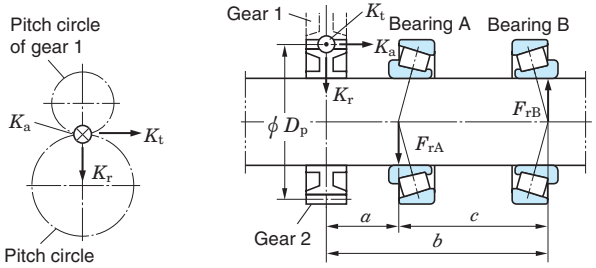


$$F_{rA} = \sqrt{\left(\frac{b}{c}K_t\right)^2 + \left(\frac{b}{c}K_r - \frac{D_p}{2c}K_a\right)^2}$$

$$F_{rB} = \sqrt{\left(\frac{a}{c}K_t\right)^2 + \left(\frac{a}{c}K_r + \frac{D_p}{2c}K_a\right)^2}$$

..... (5-27)

Example 4 Gear load distribution (2)



$$F_{rA} = \sqrt{\left(\frac{b}{c}K_t\right)^2 + \left(\frac{b}{c}K_r - \frac{D_p}{2c}K_a\right)^2}$$

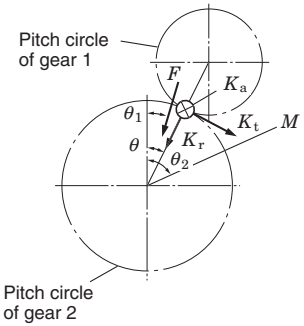
$$F_{rB} = \sqrt{\left(\frac{a}{c}K_t\right)^2 + \left(\frac{a}{c}K_r - \frac{D_p}{2c}K_a\right)^2}$$

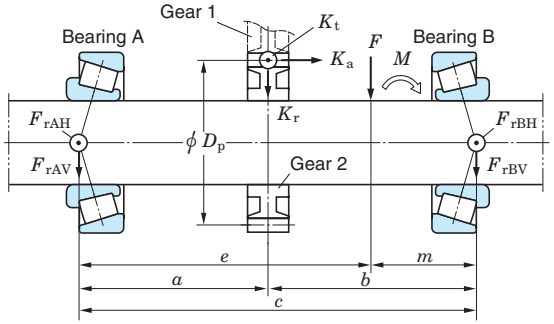
..... (5-28)

Description of signs in Examples 1 to 5

F_{rA}: radial load on bearing A	N	D_p: gear pitch circle diameter	mm
F_{rB}: radial load on bearing B	N	$\odot$: denotes load direction (upward	
K : shaft load	N	perpendicular to paper surface)	
K_t, K_r, K_a: gear load	N	$\otimes$: denotes load direction (downward	
(ref. A 30)		perpendicular to paper surface)	

Example 5 Simultaneous application of gear load and other load





Gears 1 and 2 are engaged with each other at angle θ. External load F, moment M, are applied to these gears at angles θ_1 and θ_2.

- Perpendicular radial component force (upward and downward along diagram)

$$F_{rAV} = \frac{b}{c}(K_r\cos\theta + K_t\sin\theta) - \frac{D_p}{2c}K_a\cos\theta + \frac{m}{c}F\cos\theta_1 - \frac{M}{c}\cos\theta_2$$

$$F_{rBV} = \frac{a}{c}(K_r\cos\theta + K_t\sin\theta) + \frac{D_p}{2c}K_a\cos\theta + \frac{e}{c}F\cos\theta_1 + \frac{M}{c}\cos\theta_2$$

- Horizontal radial component force (upward and downward perpendicular to diagram)

$$F_{rAH} = \frac{b}{c}(K_r\sin\theta - K_t\cos\theta) - \frac{D_p}{2c}K_a\sin\theta + \frac{m}{c}F\sin\theta_1 - \frac{M}{c}\sin\theta_2$$

$$F_{rBH} = \frac{a}{c}(K_r\sin\theta - K_t\cos\theta) + \frac{D_p}{2c}K_a\sin\theta + \frac{e}{c}F\sin\theta_1 + \frac{M}{c}\sin\theta_2$$

■ Combined radial force

$$F_{rA} = \sqrt{F_{rAV}{}^2 + F_{rAH}{}^2}$$

$$F_{rB} = \sqrt{F_{rBV}{}^2 + F_{rBH}{}^2}$$

..... (5-29)

When θ, F, and M are zero, the same result as in Ex. 3 is obtained

5-4 Dynamic equivalent load

Bearings are used under various operating conditions; however, in most cases, bearings receive radial and axial load combined, while the load magnitude fluctuates during operation.

Therefore, it is impossible to directly compare the actual load and basic dynamic load rating.

The two are compared by replacing the loads applied to the shaft center with one of a constant magnitude and in a specific direction, that yields the same bearing service life as under actual load and rotational speed.

This theoretical load is referred to as the dynamic equivalent load (P).

5-4-1 Calculation of dynamic equivalent load

Dynamic equivalent loads for radial bearings and thrust bearings ($\alpha \neq 90°$) which receive a combined load of a constant magnitude in a specific direction can be calculated using the following equation,

$$P = XF_r + YF_a \quad \cdots\cdots (5\text{-}30)$$

where :

P : dynamic equivalent load N

(for radial bearings, P_r : dynamic equivalent radial load
for thrust bearings, P_a : dynamic equivalent axial load)

F_r : radial load N

F_a : axial load N

X : radial load factor

Y : axial load factor

(values of X and Y are listed in the bearing specification table.)

■ When $F_a/F_r \leqq e$ for single-row radial bearings, it is taken that $X = 1$, and $Y = 0$. Hence, the dynamic equivalent load rating is $P_r = F_r$.

(Values of e, which designates the limit of F_a/F_r, are listed in the bearing specification table.)

■ For single-row angular contact ball bearings and tapered roller bearings, axial component forces (F_{ac}) are generated as shown in Fig. 5-5, therefore a pair of bearings is arranged face-to-face or back-to-back.

The axial component force can be calculated using the following equation.

$$F_{ac} = \frac{F_r}{2Y} \quad \cdots\cdots (5\text{-}31)$$

Table 5-8 describes the calculation of the dynamic equivalent load when radial loads and external axial loads (K_a) are applied to bearings.

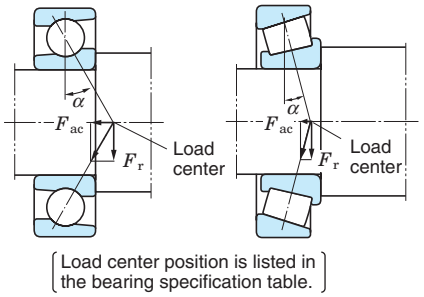


Fig. 5-5 Axial component force

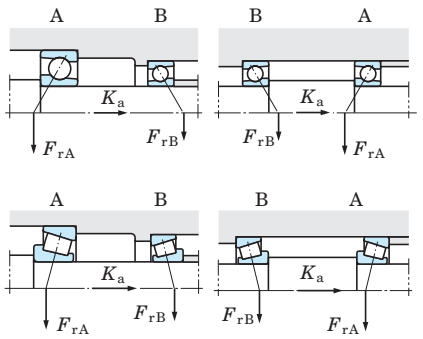
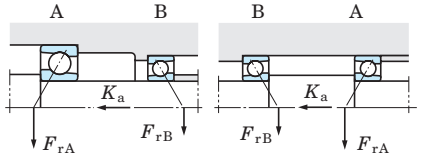
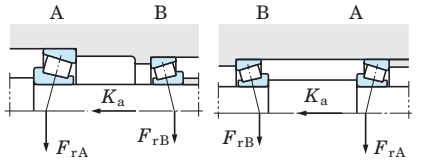
■ For thrust ball bearings with contact angle $\alpha = 90°$, to which an axial load is applied, $P_a = F_a$.

■ The dynamic equivalent load of spherical thrust roller bearing can be calculated using the following equation.

$$P_a = F_a + 1.2F_r \quad \cdots\cdots (5\text{-}32)$$

where : $F_r/F_a \leqq 0.55$

Table 5-8 Dynamic equivalent load calculation : when a pair of single-row angular contact ball bearings or tapered roller bearings is arranged face-to-face or back-to-back.

Paired mounting		Loading condition	Bearing	Axial load	Dynamic equivalent load
Back-to-back arrangement	Face-to-face arrangement				
		$\frac{F_{rB}}{2Y_B} + K_a \geqq \frac{F_{rA}}{2Y_A}$	Bearing A	$\frac{F_{rB}}{2Y_B} + K_a$	$P_A = XF_{rA} + Y_A\left(\frac{F_{rB}}{2Y_B} + K_a\right)$ $P_A = F_{rA}$, where $P_A < F_{rA}$
			Bearing B	–	$P_B = F_{rB}$
		$\frac{F_{rB}}{2Y_B} + K_a < \frac{F_{rA}}{2Y_A}$	Bearing A	–	$P_A = F_{rA}$
			Bearing B	$\frac{F_{rA}}{2Y_A} - K_a$	$P_B = XF_{rB} + Y_B\left(\frac{F_{rA}}{2Y_A} - K_a\right)$ $P_B = F_{rB}$, where $P_B < F_{rB}$
		$\frac{F_{rB}}{2Y_B} \leqq \frac{F_{rA}}{2Y_A} + K_a$	Bearing A	–	$P_A = F_{rA}$
			Bearing B	$\frac{F_{rA}}{2Y_A} + K_a$	$P_B = XF_{rB} + Y_B\left(\frac{F_{rA}}{2Y_A} + K_a\right)$ $P_B = F_{rB}$, where $P_B < F_{rB}$
		$\frac{F_{rB}}{2Y_B} > \frac{F_{rA}}{2Y_A} + K_a$	Bearing A	$\frac{F_{rB}}{2Y_B} - K_a$	$P_A = XF_{rA} + Y_A\left(\frac{F_{rB}}{2Y_B} - K_a\right)$ $P_A = F_{rA}$, where $P_A < F_{rA}$
			Bearing B	–	$P_B = F_{rB}$

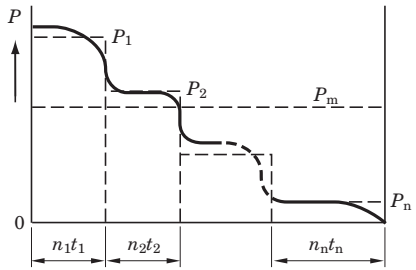
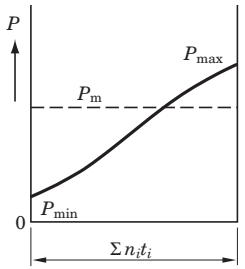
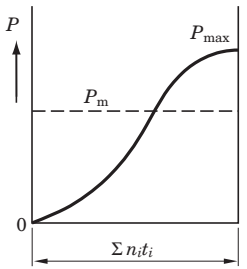
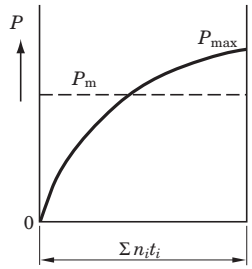
[Remarks] 1. These equations can be used when internal clearance and preload during operation are zero.
2. Radial load is treated as positive in the calculation, if it is applied in a direction opposite that shown in Fig. in Table 5-8.

5-4-2 Mean dynamic equivalent load

When load magnitude or direction varies, it is necessary to calculate the mean dynamic equivalent load, which provides the same length of bearing service life as that under the actual load fluctuation.

The mean dynamic equivalent load (P_m) under different load fluctuations is described using Graphs (1) to (4).

As shown in Graph (5), the mean dynamic equivalent load under stationary and rotating load applied simultaneously, can be obtained using equation (5-37).

(1) Staged fluctuation	(2) Stageless fluctuation	(3) Fluctuation forming sine curve	(4) Fluctuation forming sine curve (upper half of sine curve)
			
$P_m = \sqrt[p]{\dfrac{P_1{}^p n_1t_1 + P_2{}^p n_2t_2 + \cdots\cdots + P_n{}^p n_nt_n}{n_1t_1 + n_2t_2 + \cdots\cdots + n_nt_n}}$ ····· (5-33)	$P_m = \dfrac{P_{min} + 2P_{max}}{3}$ ····· (5-34)	$P_m = 0.68\,P_{max}$ ····· (5-35)	$P_m = 0.75\,P_{max}$ ····· (5-36)

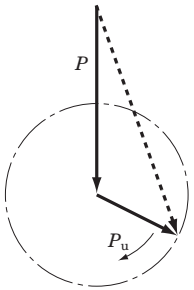
Symbols for Graphs (1) to (4)

P_m	: mean dynamic equivalent load	N
P_1	: dynamic equivalent load applied for t_1 hours at rotational speed n_1	N
P_2	: dynamic equivalent load applied for t_2 hours at rotational speed n_2	N
⋮	⋮	⋮
P_n	: dynamic equivalent load applied for t_n hours at rotational speed n_n	N
P_{min}	: minimum dynamic equivalent load	N
P_{max}	: maximum dynamic equivalent load	N
Σn_it_i	: total rotation in (t_1 to t_i) hours	
p	: for ball bearings, $p = 3$	
	for roller bearings, $p = 10/3$	

[Reference] Mean rotational speed n_m can be calculated using the following equation :

$$n_m = \frac{n_1t_1 + n_2t_2 + \cdots\cdots + n_nt_n}{t_1 + t_2 + \cdots\cdots + t_n}$$

(5) Stationary load and rotating load acting simultaneously



$$P_m = f_m(P + P_u) \quad \cdots\cdots (5\text{-}37)$$

where :

P_m	: mean dynamic equivalent load	N
f_m	: coefficient (refer. Fig. 5-6)	
P	: stationary load	N
P_u	: rotating load	N

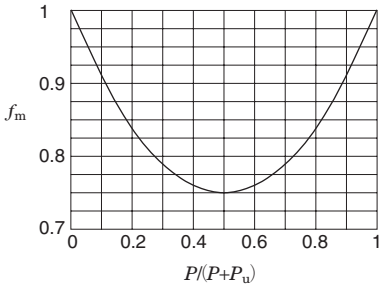


Fig. 5-6 Coefficient f_m

5-5 Basic static load rating and static equivalent load

5-5-1 Basic static load rating

Excessive static load or impact load even at very low rotation causes partial permanent deformation of the rolling element and raceway contacting surfaces. This permanent deformation increases with the load; if it exceeds a certain limit, smooth rotation will be hindered.

The basic static load rating is the static load which responds to the calculated contact stress shown below, at the contact center between the raceway and rolling elements which receive the maximum load.

- Self-aligning ball bearings ··· 4 600 MPa
- Other ball bearings ····· 4 200 MPa
- Roller bearings ····· 4 000 MPa

The total extent of contact stress-caused permanent deformation on surfaces of rolling elements and raceway will be approximately 0.000 1 times greater than the rolling element diameter.

The basic static load rating for radial bearings is specified as the basic static radial load rating, and for thrust bearings, as the basic static axial load rating. These load ratings are listed in the bearing specification table, using C_{0r} and C_{0a} respectively.

These values are prescribed by ISO 78/1987 and are subject to change by conformance to the latest ISO standards.

5-5-2 Static equivalent load

The static equivalent load is a theoretical load calculated such that, during rotation at very low speed or when bearings are stationary, the same contact stress as that imposed under actual loading condition is generated at the contact center between raceway and rolling element to which the maximum load is applied.

For radial bearings, radial load passing through the bearing center is used for the calculation; for thrust bearings, axial load in a direction along the bearing axis is used.

The static equivalent load can be calculated using the following equations.

[Radial bearings]

···The greater value obtained by the following two equations is used.

$$P_{0r} = X_0 F_r + Y_0 F_a \quad \cdots\cdots (5\text{-}38)$$

$$P_{0r} = F_r \quad \cdots\cdots (5\text{-}39)$$

[Thrust bearings]

($\alpha \neq 90°$)

$$P_{0a} = X_0 F_r + F_a \quad \cdots\cdots (5\text{-}40)$$

[When $F_a < X_0 F_r$, the solution becomes less accurate.]

($\alpha = 90°$)

$$P_{0a} = F_a \quad \cdots\cdots (5\text{-}41)$$

where :

P_{0r} : static equivalent radial load N
P_{0a} : static equivalent axial load N
F_r : radial load N
F_a : axial load N
X_0 : static radial load factor
Y_0 : static axial load factor
(values of X_0 and Y_0 are listed in the bearing specification table.)

5-5-3 Safety coefficient

The allowable static equivalent load for a bearing is determined by the basic static load rating of the bearing; however, bearing service life, which is affected by permanent deformation, differs in accordance with the performance required of the bearing and operating conditions.

Therefore, a safety coefficient is designated, based on empirical data, so as to ensure safety in relation to basic static load rating.

$$f_s = \frac{C_0}{P_0} \quad \cdots\cdots (5\text{-}42)$$

where :

f_s : safety coefficient (ref. Table 5-9)
C_0 : basic static load rating N
P_0 : static equivalent load N

Table 5-9 Values of safety coefficient f_s

Operating condition		f_s (min.)	
		Ball bearing	Roller bearing
With bearing rotation	When high accuracy is required	2	3
	Normal operation	1	1.5
	When impact load is applied	1.5	3
Without bearing rotation (occasional oscillation)	Normal operation	0.5	1
	When impact load or uneven distribution load is applied	1	2

[Remark] For spherical thrust roller bearings, $f_s \geqq 4$.

5-6 Allowable axial load for cylindrical roller bearings

Bearings whose inner and outer rings comprise either a rib or loose rib can accommodate a certain magnitude of axial load, as well as radial load. In such cases, axial load capacity is controlled by the condition of rollers, load capacity of rib or loose rib, lubrication, rotational speed etc.

For certain special uses, a design is available to accommodate very heavy axial loads. In general, axial loads allowable for cylindrical roller bearings can be calculated using the following equation, which are based on empirical data.

$$F_{ap} = 9.8 f_a \cdot f_b \cdot f_p \cdot d_m^2 \quad \cdots\cdots\cdots\cdots (5\text{-}43)$$

where :

F_{ap} : maximum allowable axial load N

f_a : coefficient determined from loading condition (Table 5-10)

f_b : coefficient determined from bearing diameter series (Table 5-11)

f_p : coefficient for rib surface pressure (Fig. 5-7)

d_m : mean value of bore diameter d and outside diameter D mm

$$\left(\frac{d+D}{2}\right)$$

Table 5-10 Values of coefficient determined from loading condition f_a

Loading condition	f_a
Continuous loading	1
Intermittent loading	2
Instantaneous loading	3

Table 5-11 Values of coefficient determined from bearing diameter series f_b

Diameter series	f_b
9	0.6
0	0.7
2	0.8
3	1.0
4	1.2

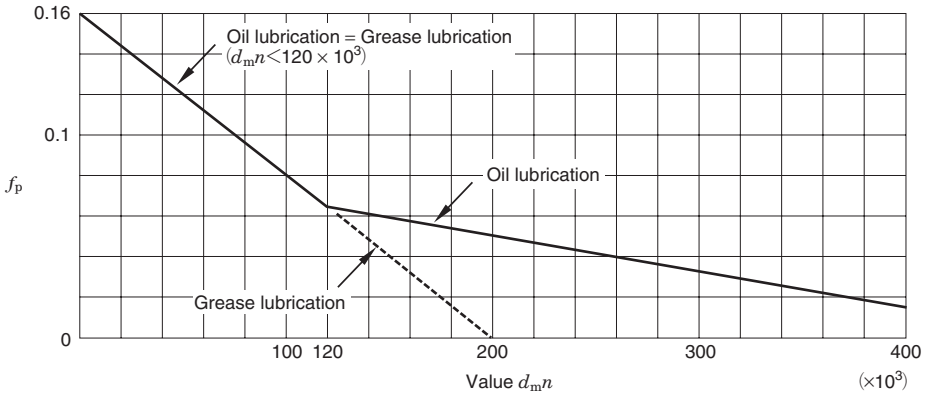
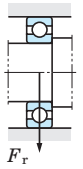


Fig. 5-7 Relationship between coefficient for rib surface pressure f_p and value $d_m n$ (n : rotational speed, min^{-1})

5-7 Applied calculation examples

[Example 1] Bearing service life (time) with 90 % reliability

(Conditions)
Deep groove ball bearing : 6308
Radial load $F_r = 3\,500$ N
Axial load not applied ($F_a = 0$)
Rotational speed $n = 800\ \mathrm{min}^{-1}$



① Basic dynamic load rating (C_r) is obtained from the bearing specification table.

$C_r = 40.7$ kN

② Dynamic equivalent radial load (P_r) is calculated using equation (5-30).

$P_r = F_r = 3\,500$ N

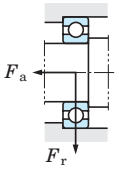
③ Bearing sevice life (L_{10h}) is calculated using equation (5-2).

$$L_{10h} = \frac{10^6}{60n}\left(\frac{C}{P}\right)^p$$

$$= \frac{10^6}{60 \times 800} \times \left(\frac{40.7 \times 10^3}{3\,500}\right)^3 \fallingdotseq \underline{32\,800\ \mathrm{h}}$$

[Example 2] Bearing service life (time) with 96 % reliability

(Conditions)
Deep groove ball bearing : 6308
Radial load $F_r = 3\,500$ N
Axial load $F_a = 1\,000$ N
Rotational speed $n = 800\ \mathrm{min}^{-1}$



① From the bearing specification table ;

- Basic load rating (C_r , C_{0r}) f_0 factor is obtained.

$C_r = 40.7$ kN
$C_{0r} = 24.0$ kN
$f_0 = 13.2$

- Values X and Y are obtained by comparing value e, calculated from value $f_0 F_a / C_{0r}$ via proportional interpolation, with value $f_0 F_a / F_r$.

$$\frac{f_0 F_a}{C_{0r}} = \frac{13.2 \times 1\,000}{24.0 \times 10^3} = 0.550$$

$$e = 0.22 + (0.26 - 0.22) \times \frac{(0.550 - 0.345)}{(0.689 - 0.345)}$$

$$= 0.24$$

$$\frac{F_a}{F_r} = \frac{1\,000}{3\,500} = 0.29 > e$$

The result is,

$$X = 0.56$$

$$Y = 1.99 - (1.99 - 1.71) \times \frac{(0.550 - 0.345)}{(0.689 - 0.345)}$$

$$= 1.82$$

② Dynamic equivalent load (P_r) is obtained using equation (5-30).

$$P_r = XF_r + YF_a$$

$$= (0.56 \times 3\,500) + (1.82 \times 1\,000) = 3\,780\ \mathrm{N}$$

③ Service life with 90 % reliability (L_{10h}) is obtained using equation (5-2).

$$L_{10h} = \frac{10^6}{60n}\left(\frac{C}{P}\right)^p$$

$$= \frac{10^6}{60 \times 800} \times \left(\frac{40.7 \times 10^3}{3\,780}\right)^3 \fallingdotseq \underline{26\,000\ \mathrm{h}}$$

④ Service life with 96 % reliability (L_{4ah}) is obtained using equation (5-8).

According to Table 5-3, $a_1 = 0.53$, $a_2 = 1$, $a_3 = 1$.

$$L_{4ah} = a_1 a_2 a_3 L_{10h} = 0.53 \times 1 \times 1 \times 26\,000$$

$$\fallingdotseq \underline{13\,800\ \mathrm{h}}$$

[Example 3] Bearing service life (total revolution)

(Conditions)

Tapered roller bearing

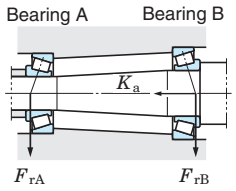
Bearing A : 30207 JR

Bearing B : 30209 JR

Radial load $F_{rA} = 5\,200$ N

$F_{rB} = 6\,800$ N

Axial load $K_a = 1\,600$ N



① From the bearing specification table, the following specifications are obtained.

	Basic dynamic load rating (C_r)	e	X[1)]	Y[1)]
Bearing A	55.1 kN	0.37	0.4	1.60
Bearing B	67.2 kN	0.40	0.4	1.48

[Note] 1) Those values are used, where $F_a/F_r \leqq e$, $X = 1$, $Y = 0$.

② Axial load applied to shafts must be calculated, considering the fact that component force in the axial direction is generated when radial load is applied to tapered roller bearings. (ref. equation 5-31, Table 5-8)

$$\frac{F_{rA}}{2\,Y_A} + K_a = \frac{5\,200}{2 \times 1.60} + 1\,600 = 3\,225 \text{ N}$$

$$\frac{F_{rB}}{2\,Y_B} = \frac{6\,800}{2 \times 1.48} = 2\,297 \text{ N}$$

Consequently, axial load $\frac{F_{rA}}{2\,Y_A} + K_a$ is applied to bearing B.

③ Dynamic equivalent load (P_r) is obtained from Table 5-8.

$$P_{rA} = F_{rA} = 5\,200 \text{ N}$$

$$P_{rB} = XF_{rB} + Y_B\left(\frac{F_{rA}}{2\,Y_A} + K_a\right)$$

$$= 0.4 \times 6\,800 + 1.48 \times 3\,225 = 7493 \text{N}$$

④ Each bearing service life (L_{10}) is calculated using equation (5-1).

$$L_{10A} = \left(\frac{C_{rA}}{P_{rA}}\right)^{10/3} = \left(\frac{55.1 \times 10^3}{5\,200}\right)^{10/3}$$

$$\fallingdotseq \underline{2\,610 \times 10^6 \text{ revolutions}}$$

$$L_{10B} = \left(\frac{C_{rB}}{P_{rB}}\right)^{10/3} = \left(\frac{67.2 \times 10^3}{7\,493}\right)^{10/3}$$

$$\fallingdotseq \underline{1\,500 \times 10^6 \text{ revolutions}}$$

[Example 4] Bearing size selection

(Conditions)

Deep groove ball bearing :

62 series

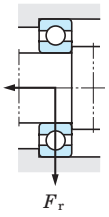
Required service life :

more than 10 000 h

Radial load $F_r = 2\,000$ N

Axial load $F_a = 300$ N

Rotational speed $n = 1\,600$ min^{-1}



① The dynamic equivalent load (P_r) is hypothetically calculated.

The resultant value, $F_a/F_r = 300/2\,000 = 0.15$, is smaller than any other values of e in the bearing specification table.

Hence, JTEKT can consider that $P_r = F_r = 2\,000$ N.

② The required basic dynamic load rating (C_r) is calculated according to equation (5-4).

$$C_r = P_r\left(L_{10h} \times \frac{60n}{10^6}\right)^{1/p}$$

$$= 2\,000 \times \left(10\,000 \times \frac{60 \times 1\,600}{10^6}\right)^{1/3}$$

$$= 19\,730 \text{ N}$$

③ Among those covered by the bearing specification table, the bearing of the 62 series with C_r exceeding 19 730 N is 6206 R, with bore diameter for 30 mm.

④ The dynamic equivalent load obtained at step ① is confirmed by obtaining value e for 6206 R.

Where C_{0r} of 6206 R is 12.8 kN, and f_0 is 13.0

$$f_0 F_a/C_{0r} = 13.0 \times 300/12\,800 = 0.305$$

Then, value e can be calculated using proportional interpolation.

$$e = 0.19 + (0.22 - 0.19) \times \frac{(0.305 - 0.172)}{(0.345 - 0.172)}$$

$$= 0.21$$

As a result, it can be confirmed that

$F_a/F_r = 0.15 < e$.

Hence, $P_r = F_r$.

[Example 5] Bearing size selection

(Conditions)

Deep groove ball bearing :

63 series

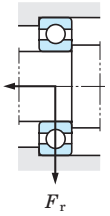
Required service life :

more than 10 000 h

Radial load $F_r = 4\,000$ N

Axial load $F_a = 2\,400$ N

Rotational speed $n = 1\,000$ min^{-1}



① The hypothetic dynamic equivalent load (P_r) is calculated :

Since $F_a/F_r = 2\,400/4\,000 = 0.6$ is much larger than the value e specified in the bearing specification table, it suggests that the axial load affects the dynamic equivalent load.

Hence, assuming that $X = 0.56$, $Y = 1.6$ (approximate mean value of Y), using equation (5-30),

$$P_r = XF_r + YF_a = 0.56 \times 4\,000 + 1.6 \times 2\,400$$

$$= 6\,080 \text{ N}$$

② Using equation (5-4), the required basic dynamic load rating (C_r) is :

$$C_r = P_r\left(L_{10h} \times \frac{60n}{10^6}\right)^{1/p}$$

$$= 6\,080 \times \left(10\,000 \times \frac{60 \times 1\,000}{10^6}\right)^{1/3}$$

$$= 51\,280 \text{ N}$$

③ From the bearing specification table, a 6310 with a bore diameter of 50 mm is selected as a 63 series bearing with C_r exceeding 51 280 N.

④ The dynamic equivalent load and basic rating life are confirmed, by calculating the value e for a 6310.

Values obtained using the proportional interpolation are :

where $f_0 F_a/C_{0r} = 13.2 \times 2\,400/38\,300 = 0.827$

$e = 0.268$, $Y = 1.65$.

Thus, $F_a/F_r = 0.6 > e$.

Using the resultant values, the dynamic equivalent load and basic rating life can be calculated as follows :

$$P_r = XF_r + YF_a$$

$$= 0.56 \times 4\,000 + 1.65 \times 2\,400 = 6\,200 \text{N}$$

$$L_{10h} = \frac{10^6}{60n}\left(\frac{C_r}{P_r}\right)^p$$

$$= \frac{10^6}{60 \times 1\,000} \times \left(\frac{62.0 \times 10^3}{6\,200}\right)^3 \fallingdotseq \underline{16\,700 \text{ h}}$$

⑤ The basic rating life of the 6309, using the same steps, is :

$L_{10h} \fallingdotseq 9\,320$ h, which does not satisfy the service life requirement.

[Example 6] Calculation of allowable axial load for cylindrical roller bearings

(Conditions)

Single-row cylindrical roller bearing : NUP 310

Rotational speed $n = 1\,500$ min^{-1}

Oil lubrication

Axial load is intermittently applied.

① Using the bearing specification table, the value d_m for the NUP 310 can be calculated as follows :

$$d_m = \frac{d + D}{2} = \frac{50 + 110}{2} = 80 \text{ mm}$$

② Each coefficient used in equation (5-43).

From values listed in Table 5-10, coefficient f_a related to intermittent load is : $f_a = 2$

From values listed in Table 5-11, coefficient f_b related to diameter series 3 is : $f_b = 1.0$

According to Fig. 5-7, coefficient f_p for allowable rib surface pressure, related to

$d_m n = 80 \times 1\,500 = 12 \times 10^4$, is : $f_p = 0.062$

③ Using equation (5-43), the allowable axial load F_{ap} is :

$$F_{ap} = 9.8 f_a \cdot f_b \cdot f_p \cdot d_m^2$$

$$= 9.8 \times 2 \times 1.0 \times 0.062 \times 80^2$$

$$\fallingdotseq \underline{7\,780 \text{ N}}$$

[Example 7] Calculation of service life of spur gear shaft bearings

(Conditions)

Tapered roller bearing

Bearing A : 32309 JR

Bearing B : 32310 JR

Gear type : spur gear (normally machined)

Gear pressure angle $\alpha_1 = \alpha_2 = 20°$

Gear pitch circle diameter $D_{p1} = 360$ mm

$D_{p2} = 180$ mm

Transmission power $W = 150$ kW

Rotational speed $n = 1\,000$ min^{-1}

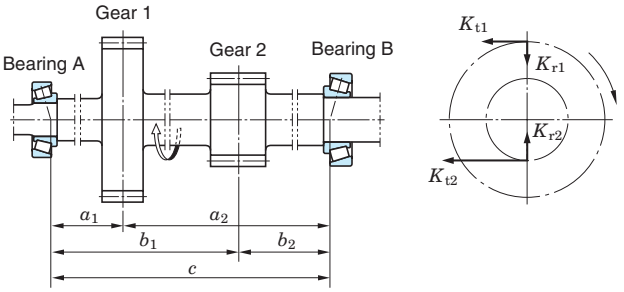
Operating condition: accompanied by impact

Installation locations

$a_1 = 95$ mm, $a_2 = 265$ mm,

$b_1 = 245$ mm, $b_2 = 115$ mm,

$c = 360$ mm



① Using equations (5-12) and (5-13), theoretical loads applied to gears (tangential load, K_t; radial load, K_r) are calculated.

[Gear 1]

$$K_{t1} = \frac{19.1 \times 10^6 W}{D_p n} = \frac{19.1 \times 10^6 \times 150}{360 \times 1\,000} = 7\,958 \text{ N}$$

$$K_{r1} = K_{t1} \tan \alpha_1 = 2\,896 \text{ N}$$

[Gear 2]

$$K_{t2} = \frac{19.1 \times 10^6 \times 150}{180 \times 1\,000} = 15\,917 \text{ N}$$

$$K_{r2} = K_{t2} \tan \alpha_2 = 5\,793 \text{ N}$$

② The radial load applied to the bearing is calculated, where the load coefficient is determined as $f_w = 1.5$ from Table 5-5, and the gear coefficient as $f_g = 1.2$ from Table 5-7.

[Bearing A]

- Load consisting of K_{t1} and K_{t2} is :

$$K_{tA} = f_w f_g \left(\frac{a_2}{c} K_{t1} + \frac{b_2}{c} K_{t2} \right)$$

$$= 1.5 \times 1.2 \times \left(\frac{265}{360} \times 7\,958 + \frac{115}{360} \times 15\,917 \right) = 19\,697 \text{ N}$$

- Load consisting of K_{r1} and K_{r2} is :

$$K_{rA} = f_w f_g \left(\frac{a_2}{c} K_{r1} - \frac{b_2}{c} K_{r2} \right)$$

$$= 1.5 \times 1.2 \times \left(\frac{265}{360} \times 2\,896 - \frac{115}{360} \times 5\,793 \right) = 506 \text{ N}$$

- Combining the loads of K_{tA} and K_{rA}, the radial load (F_{rA}) applied to bearing A can be calculated as follows :

$$F_{rA} = \sqrt{K_{tA}^2 + K_{rA}^2} = \sqrt{19\,697^2 + 506^2} = 19\,703 \text{ N}$$

[Bearing B]

- Load consisting of K_{t1} and K_{t2} is :

$$K_{tB} = f_w f_g \left(\frac{a_1}{c} K_{t1} + \frac{b_1}{c} K_{t2} \right)$$

$$= 1.5 \times 1.2 \times \left(\frac{95}{360} \times 7\,958 + \frac{245}{360} \times 15\,917 \right) = 23\,278 \text{ N}$$

- Load consisting of K_{r1} and K_{r2} is :

$$K_{rB} = f_w f_g \left(\frac{a_1}{c} K_{r1} - \frac{b_1}{c} K_{r2} \right)$$

$$= 1.5 \times 1.2 \times \left(\frac{95}{360} \times 2\,896 - \frac{245}{360} \times 5\,793 \right) = -5\,721 \text{ N}$$

- The radial load (F_{rB}) applied to bearing B can be calculated using the same steps as with bearing A.

$$F_{rB} = \sqrt{K_{tB}^2 + K_{rB}^2} = \sqrt{23\,278^2 + (-5\,721)^2} = 23\,971 \text{ N}$$

③ The following specifications can be obtained from the bearing specification table.

	Basic dynamic load rating (C_r)	e	$X^{1)}$	$Y^{1)}$
Bearing A	146 kN	0.35	0.4	1.74
Bearing B	176 kN			

[Note] 1) Those values are used, where $F_a/F_r > e$. Where $F_a/F_r \leqq e$, $X = 1$, $Y = 0$.

④ When an axial load is not applied externally, if the radial load is applied to the tapered roller bearing, an axial component force is generated.

Considering this fact, the axial load applied from the shaft and peripheral parts is to be calculated :

(Equation 5-31, Table 5-8)

$$\frac{F_{rB}}{2\,Y_B} = \frac{23\,971}{2 \times 1.74} > \frac{F_{rA}}{2\,Y_A} = \frac{19\,703}{2 \times 1.74}$$

According to the result, it is clear that the axial component force ($F_{rB}/2Y_B$) applied to bearing B is also applied to bearing A as an axial load applied from the shaft and peripheral parts.

⑤ Using the values listed in Table 5-8, the dynamic equivalent load is calculated, where $K_a = 0$:

$$P_{rA} = XF_{rA} + Y_A \frac{F_{rB}}{2\,Y_B} = 0.4 \times 19\,703 \times 1.74 \times \frac{23\,971}{2 \times 1.74} = 19\,867 \text{ N}$$

$$P_{rB} = F_{rB} = 23\,971 \text{ N}$$

⑥ Using equation (5-2), the basic rating life of each bearing is calculated :

[Bearing A]

$$L_{10hA} = \frac{10^6}{60n} \left(\frac{C_{rA}}{P_A} \right)^p = \frac{10^6}{60 \times 1\,000} \times \left(\frac{146 \times 10^3}{19\,867} \right)^{10/3} \fallingdotseq \underline{12\,900 \text{ h}}$$

[Bearing B]

$$L_{10hB} = \frac{10^6}{60n} \left(\frac{C_{rB}}{P_B} \right)^p = \frac{10^6}{60 \times 1\,000} \times \left(\frac{176 \times 10^3}{23\,971} \right)^{10/3} \fallingdotseq \underline{12\,800 \text{ h}}$$

Reference

Using equation (5-9), the system service life (L_{10hS}) using a pair of bearings is :

$$L_{10hS} = \frac{1}{\left(\frac{1}{L_{10hA}{}^e} + \frac{1}{L_{10hB}{}^e} \right)^{1/e}} = \frac{1}{\left(\frac{1}{12\,900^{9/8}} + \frac{1}{12\,800^{9/8}} \right)^{8/9}} \fallingdotseq \underline{6\,940 \text{ h}}$$

6. Boundary dimensions and bearing numbers

6-1 Boundary dimensions

Bearing boundary dimensions are dimensions required for bearing installation with shaft or housing, and as described in Fig. 6-1, include the bore diameter, outside diameter, width, height, and chamfer dimension.

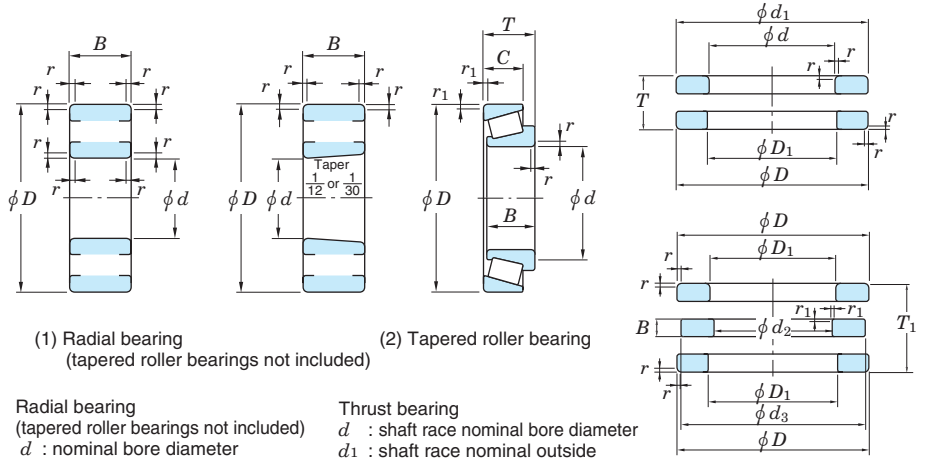
These dimensions are standardized by the International Organization for Standardization (ISO 15). JIS B 1512 "rolling bearing boundary dimensions" is based on ISO.

These boundary dimensions are provided, classified into radial bearings (tapered roller bearings are provided in other tables) and thrust bearings.

Boundary dimensions of each bearing are listed in Appendixes at the back of this catalog. In these boundary dimension tables, the outside diameter, width, height, and chamfer dimensions related to bearing bore diameter numbers and bore diameters are listed in diameter series and dimension series.

Reference

1) Diameter series is a series of nominal bearing outside diameters provided for respective ranges of bearing bore diameter; and, a dimension series includes width and height as well as diameters.
2) Tapered roller bearing boundary dimensions listed in the Appendixes are adapted to conventional dimension series (widths and diameters). Tapered roller bearing boundary dimensions provided in JIS B 1512-2000 are new dimension series based on ISO 355 (ref. descriptions before the bearing specification table); for reference, the bearing specification table covers numeric codes used in these dimension series.



Radial bearing
(tapered roller bearings not included)
d : nominal bore diameter
D : nominal outside diameter
B : nominal assembled bearing width
r : inner/outer ring chamfer dimension[1)]

Tapered roller bearing
d : nominal bore diameter
D : nominal outside diameter
T : nominal assembled bearing width
B : nominal inner ring width
C : nominal outer ring width
r : inner ring chamfer dimension[1)]
r_1 : outer ring chamfer dimension[1)]

Thrust bearing
d : shaft race nominal bore diameter
d_1 : shaft race nominal outside diameter[2)]
d_2 : central race nominal bore diameter
d_3 : central race nominal outside diameter[2)]
D : housing race nominal outside diameter
D_1 : housing race nominal bore diameter[1)]
T : single direction nominal bearing height
T_1 : double direction nominal bearing height
B : central race nominal height
r : shaft/housing race chamfer dimension[1)]
r_1 : central race chamfer dimension[1)]

[Notes]
1) The bearing specification table includes the minimum value.
2) The bearing specification table includes the maximum value.

Fig. 6-1 Bearing boundary dimensions

Cross-section dimensions of radial bearings and thrust bearings expressed in dimension series can be compared using Figs. 6-2 and 6-3.

In this way, many dimension series are provided; however, not all dimensions are practically adapted.

Some of them were merely prescribed, given expected future use.

6-2 Dimensions of snap ring grooves and locating snap rings

JIS B 1509 "rolling bearing -radial bearing with locating snap ring-dimensions and tolerances" conforms to the dimensions of snap ring groove for fitting locating snap ring on the outside surface of bearing and the dimensions and tolerances of locating snap ring.

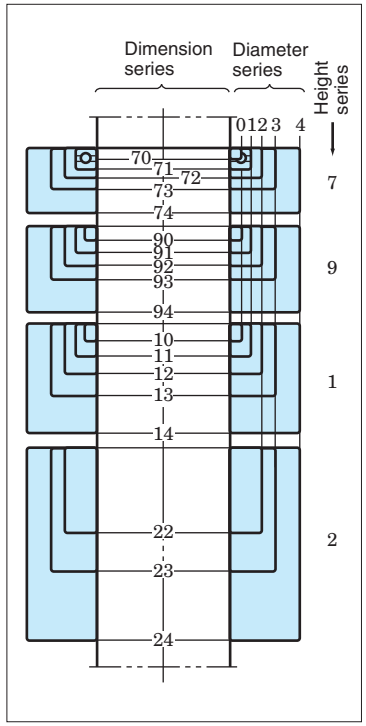


Fig. 6-3 Thrust bearing dimension series diagram (diameter series 5 omitted)

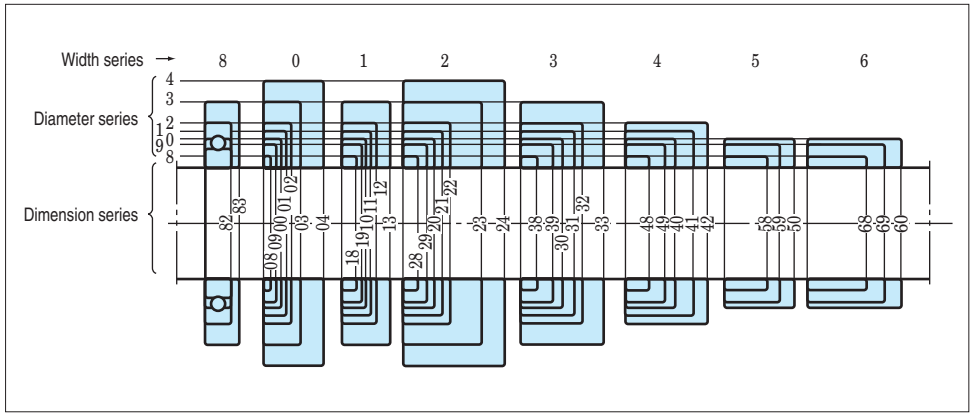


Fig. 6-2 Radial bearing dimension series diagram (diameter series 7 omitted)

6-3 Bearing number

A bearing number is composed of a basic number and a supplementary code, denoting bearing specifications including bearing type, boundary dimensions, running accuracy, and internal clearance.

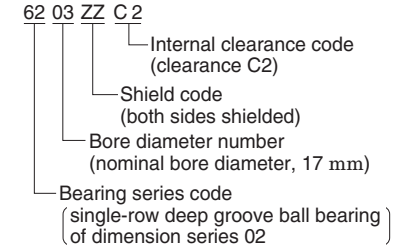
Bearing numbers of standard bearings corresponding to JIS B 1512 "rolling bearing boundary dimensions" are prescribed in JIS B 1513.

As well as these bearing numbers, JTEKT uses supplementary codes other than those provided by JIS.

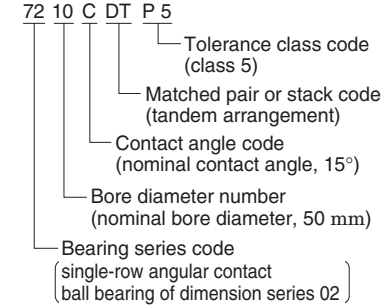
Among basic numbers, bearing series codes are listed in Table 6-1, and the composition of bearing numbers is described in Table 6-2, showing the order of arrangement of the parts.

[Examples of bearing numbers]

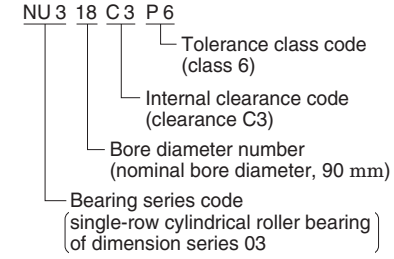
(Ex. 1)



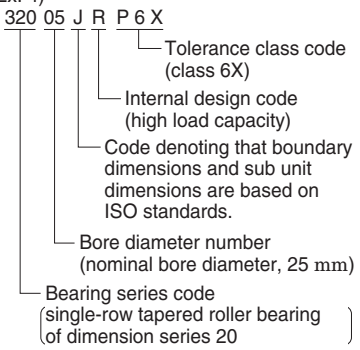
(Ex. 2)



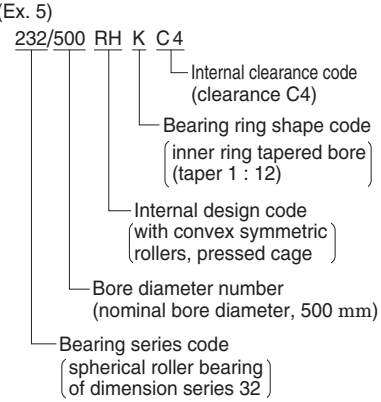
(Ex. 3)



(Ex. 4)



(Ex. 5)



(Ex. 6)

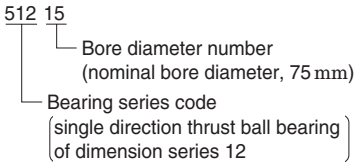


Table 6-1 Bearing series code

Bearing type	Bearing series code	Type code	Dimension series code: Width series[1]	Dimension series code: Diameter series
Single-row deep groove ball bearing	**68**	6	(1)	8
	69	6	(1)	9
	160 [2]	6	(0)	0
	60	6	(1)	0
	62	6	(0)	2
	63	6	(0)	3
	64	6	(0)	4
Double-row deep groove ball bearing (with filling slot)	**42**	4	(2)	2
	43	4	(2)	3
Single-row angular contact ball bearing	**79**	7	(1)	9
	70	7	(1)	0
	72	7	(0)	2
	73	7	(0)	3
	74	7	(0)	4
Double-row angular contact ball bearing (with filling slot)	**32**	(0)	3	2
	33	(0)	3	3
Double-row angular contact ball bearing	**52**	5	(3)	2
	53	5	(3)	3
Self-aligning ball bearing	**12**	1	(0)	2
	22	2	(2)	2
	13	1	(0)	3
	23	2	(2)	3
	112 [2]	1	(0) [3]	2
	113 [2]	1	(0) [3]	3
Single-row cylindrical roller bearing	**NU 10**	NU [4]	1	0
	NU 2	NU [4]	(0)	2
	NU 22	NU [4]	2	2
	NU 32	NU [4]	3	2
	NU 3	NU [4]	(0)	3
	NU 23	NU [4]	2	3
	NU 4	NU [4]	(0)	4
Double-row cylindrical roller bearing	**NNU 49**	NNU	4	9
	NN 30	NN	3	0
Single-row needle roller bearing	**NA 48**	NA	4	8
	NA 49	NA	4	9
	NA 59	NA	5	9
Double-row needle roller bearing	**NA 69**	NA	6	9

Bearing type	Bearing series code	Type code	Dimension series code: Width series	Dimension series code: Diameter series
Tapered roller bearing	**329**	3	2	9
	320	3	2	0
	330	3	3	0
	331	3	3	1
	302	3	0	2
	322	3	2	2
	332	3	3	2
	303	3	0	3
	313	3	1	3
	323	3	2	3
Spherical roller bearing	**239**	2	3	9
	230	2	3	0
	240	2	4	0
	231	2	3	1
	241	2	4	1
	222	2	2	2
	232	2	3	2
	213 [2]	2	0	3
	223	2	2	3
Single direction thrust ball bearing	**511**	5	1	1
	512	5	1	2
	513	5	1	3
	514	5	1	4
Single direction thrust ball bearing with spherical back face	**532**	5	3	2
	533	5	3	3
	534	5	3	4
Double direction thrust ball bearing	**522**	5	2	2
	523	5	2	3
	524	5	2	4
Double direction thrust ball bearing with spherical back faces	**542**	5	4	2
	543	5	4	3
	544	5	4	4
Spherical thrust roller bearing	**292**	2	9	2
	293	2	9	3
	294	2	9	4

[Notes]
1) Width series codes in parentheses are omitted in bearing series codes.
2) These are bearing series codes customarily used.
3) Nominal outer ring width series (inner rings only are wide).
4) Besides NU type, NJ, NUP, N, NF, and NH are provided.

Table 6-2 Bearing number configuration

Order of arrengement	Basic number: Bearing series code	Basic number: Bore diameter No.	Basic number: Contact angle code	Supplementary code: Internal design code, cage guide code	Supplementary code: Shield/seal code	Supplementary code: Ring shape code, lubrication hole/groove code	Supplementary code: Material code, special treatment code	Supplementary code: Matched pair or stack code	Supplementary code: Internal clearance code, preload code	Supplementary code: Spacer code	Supplementary code: Cage material/ shape code	Supplementary code: Tolerance code	Supplementary code: Grease code

(Codes and descriptions)

Bearing series code

68	Deep groove ball bearing
69	⋮
60	⋮
⋮	⋮

(For standard bearing code, refer to Table 6-1)

Bore diameter No.

/0.6	0.6 mm (Bore diameter)
1	1
/1.5	1.5
⋮	⋮
9	9
00	10
01	12
02	15
03	17
04	20
/22	22
05	25
⋮	⋮
96	480
/500	500
/2500	2500

· Bore diameters (mm) of bearing in the bore diameter range 04 to 96 can be obtained by multiplying their bore diameter number by five.

Contact angle code

A	(omitted) 30°	Angular contact ball bearing
AC	25°	
B	40°	
C	15°	
CA	20°	
E	35°	
B	(omitted) Less than 17°	Tapered roller bearing
C	20°	
D	28° 30'	
DJ	28° 48' 39"	

Internal design code

R	High load capacity (Deep groove ball bearing, cylindrical roller bearing, tapered roller bearing)
G	Equal stand-out is provided on both sides of the ring of angular contact ball bearing (In general, C2 clearance is used)
GST	Angular contact ball bearing described above with standard internal clearance provided
J	Tapered roller bearing, whose outer ring width, contact angle and outer ring small inside diameter conform to ISO standards
R	With convex asymmetric rollers and machined cage (Spherical roller bearings)
RH	With convex symmetric rollers and pressed cage (Spherical roller bearings)
RHA	With convex symmetric rollers and one-piece machined cage (Spherical roller bearings)
V	Full complement type ball or roller bearing (with no cage)

Shield/seal code

one side	both sides	
Z	ZZ	Fixed shield
ZX	ZZX	Removable shield
ZU	2ZU	Non-contact seal
RU	2RU	Non-contact seal
RS	2RS	Contact seal
RK	2RK	Contact seal
U	UU	Contact seal
RD	2RD	Extremely light contact seal

Ring shape code, lubrication hole/groove code

K	Inner ring tapered bore provided (1 : 12)
K30	Inner ring tapered bore provided (1 : 30)
N	Snap ring groove on outer ring outside surface provided
NR	Snap ring groove and locating snap ring on outer ring outside surface provided

(Codes and descriptions)

NY	Creep prevention synthetic resin ring on outer ring outside surface provided
SG	Spiral groove on inner ring bore surface provided
W	Lubrication hole and lubrication groove on cylindrical roller bearing outer ring outside surface provided
W33	Lubrication hole and lubrication groove on spherical roller bearing outer ring outside surface provided

Material code, special treatment code

Code not given	High carbon chrome bearing steel
E	Case carburizing steel
F	Case carburizing steel
H	Case carburizing steel
Y	Case carburizing steel
ST	Stainless steel
SH	Special heat treatment
S0	Up to 150 °C (Dimension stabilizing treatment)
S1	Up to 200 °C (Dimension stabilizing treatment)
S2	Up to 250 °C (Dimension stabilizing treatment)

Matched pair or stack code, cage guide code

DB	Back-to-back arrangement (Angular contact ball bearing)
DF	Face-to-face arrangement (Angular contact ball bearing)
DT	Tandem arrangement (Angular contact ball bearing)
PA	With outer ring guide cage (Ball bearing)
Q3	With roller guide cage (Roller bearing)

Internal clearance code, preload code

C1	Smaller than C2
C2	Smaller than standard clearance (Radial internal clearance for radial bearing)
CN	Standard clearance (Radial internal clearance for radial bearing)
C3	Greater than standard clearance (Radial internal clearance for radial bearing)
C4	Greater than C3 (Radial internal clearance for radial bearing)
C5	Greater than C4 (Radial internal clearance for radial bearing)
M1 to M6	Radial internal clearance for extra-small/ miniature ball bearing
CD2	Smaller than standard clearance (Radial internal clearance for double-row angular contact ball bearing)
CDN	Standard clearance (Radial internal clearance for double-row angular contact ball bearing)
CD3	Greater than standard clearance (Radial internal clearance for double-row angular contact ball bearing)
CM	Radial internal clearance for electric motor bearing (Deep groove ball bearing)
CT	Radial internal clearance for electric motor bearing (Cylindrical roller bearing)
NA	Non-interchangeable cylindrical roller bearing radial internal clearance (C1NA to C5NA)
S	Slight preload (Preload for angular contact ball bearing)
L	Light preload (Preload for angular contact ball bearing)
M	Medium preload (Preload for angular contact ball bearing)
H	Heavy preload (Preload for angular contact ball bearing)

Spacer code (Spacer width (mm) is affixed to the end of each code.)

+	Inner and outer ring spacers provided	Deep groove ball bearing
/	Inner and outer ring spacers provided	Angular contact ball bearing
/P	Outer ring spacer provided	Angular contact ball bearing
/S	Inner ring spacer provided	Angular contact ball bearing
+DP	Inner and outer ring spacers provided	Cylindrical roller bearing, spherical roller bearing
+IDP	Inner ring spacer provided	Cylindrical roller bearing, spherical roller bearing
+ODP	Outer ring spacer provided	Cylindrical roller bearing, spherical roller bearing

Cage material/type code

/	Steel sheet	Pressed cage
YS	Stainless steel sheet	Pressed cage
FT	Phenol resin	Machined cage
FY	High-tensile brass casting	Machined cage
FW	High-tensile brass casting (separable type)	Machined cage
MG	Polyamide	(Molded cage)
FG	Polyamide	(Molded cage)
FP	Carbon steel	(Pin type cage)

Tolerance code (JIS)

Omitted	Class 0
P6	Class 6
P6X	Class 6X
P5	Class 5
P4	Class 4
P2	Class 2

Grease code

A2	Alvania 2
AC	Andok C
B5	Beacon 325
SR	Multemp SRL

7. Bearing tolerances

7-1 Tolerances and tolerance classes for bearings

Bearing tolerances and permissible values for the boundary dimensions and running accuracy of bearings are specified.
These values are prescribed in JIS B 1514 "tolerances for rolling bearings." (These JIS standards are based on ISO standards.)

Bearing tolerances are standardized by classifying bearings into the following six classes (accuracy in tolerances becomes higher in the order described): 0, 6X, 6, 5, 4 and 2.

Class 0 bearings offer adequate performance for general applications; and, bearings of class 5 or higher are required for demanding applications and operating conditions including those described in Table 7-1.

These tolerances follow ISO standards, but some countries use different names for them. Tolerances for each bearing class, and organizations concerning bearings are listed in Table 7-2.

■ Boundary dimension accuracy
(items on shaft and housing mounting dimensions)
- Tolerances for bore diameter, outside diameter, ring width, assembled bearing width
- Tolerances for set bore diameter and set outside diameter of rollers
- Tolerance limits for chamfer dimensions
- Permissible values for width variation
- Tolerance and permissible values for tapered bore

■ Running accuracy
(items on runout of rotating elements)
- Permissible values for radial and axial runout of inner and outer rings
- Permissible values for perpendicularity of inner ring face
- Permissible values for perpendicularity of outer ring outside surface
- Permissible values for thrust bearing raceway thickness

Accuracies for dimensions and running of each bearing type are listed in Tables 7-3 through 7-10; and, tolerances for tapered bore and limit values for chamfer dimensions of radial bearings are in Tables 7-11 and 7-12.

Table 7-1 High precision bearing applications

Required performance	Applications	Tolerance class
High accuracy in runout is required for rolling elements.	Acoustic / visual equipment spindles (VTR, tape recorders)	P 5, P 4
	Radar / parabola antenna slewing shafts	P 4
	Machine tool spindles	P 5, P 4, P 2, ABEC 9
	Computers, magnetic disc spindles	P 5, P 4, P 2, ABEC 9
	Aluminum foil roll necks	P 5
	Multi-stage mill backing bearings	P 4
High speed rotation	Dental spindles	P 2, ABMA 5P, ABMA 7P
	Superchargers	P 5, P 4
	Jet engine spindles and accessories	P 5, P 4
	Centrifugal separators	P 5, P 4
	LNG pumps	P 5
	Turbo molecular pump spindles and touch-down	P 5, P 4
	Machine tool spindles	P 5, P 4, P 2, ABEC 9
	Tension reels	P 5, P 4
Low friction or low friction variation is required.	Control equipment (synchronous motors, servomotors, gyro gimbals)	P 4, ABMA 7P
	Measuring instruments	P 5
	Machine tool spindles	P 5, P 4, P 2, ABEC 9

Table 7-2 Bearing type and tolerance class

Bearing type			Applied standards	Applied tolerance class						Tolerance table
Deep groove ball bearing			JIS B 1514-1	Class 0	–	Class 6	Class 5	Class 4	Class 2	Table 7-3
Angular contact ball bearing				Class 0	–	Class 6	Class 5	Class 4	Class 2	
Self-aligning ball bearing				Class 0	–	–	–	–	–	
Cylindrical roller bearing				Class 0	–	Class 6	Class 5	Class 4	Class 2	
Needle roller bearing (machined ring type)			JIS B 1536-1	Class 0	–	–	–	–	–	
Tapered roller bearing	Metric series (single-row)		JIS B 1514-1	Class 0	Class 6X	(Class 6)	Class 5	Class 4	Class 2	Table 7-5
	Metric series (double or four-row)		BAS 1002	Class 0	–	–	–	–	–	Table 7-6
	Inch series		ANSI/ABMA	Class 4	–	Class 2	Class 3	Class 0	Class 00	Table 7-7
	Metric series (J-series)			Class PK	–	Class PN	Class PC	Class PB	–	Table 7-8
Spherical roller bearing			JIS B 1514-1	Class 0	–	–	–	–	–	Table 7-3
Thrust ball bearing			JIS B 1514-2	Class 0	–	Class 6	Class 5	Class 4	–	Table 7-9
Spherical thrust roller bearing				Class 0	–	–	–	–	–	Table 7-10
Precision ball screw support bearing			JTEKT standards	–	–	–	Class P5Z	Class P4Z	–	–
Double direction angular contact thrust ball bearing				–	–	–	Equivalent to class 5	Equivalent to class 4	–	–
(Reference) Class comparison	ISO	Radial bearing	ISO 492	Normal Class	Class 6X	Class 6	Class 5	Class 4	Class 2	–
		Thrust bearing	ISO 199	Normal Class	–	Class 6	Class 5	Class 4	–	–
	DIN BS NF	Radial and thrust bearings	DIN 620 BS 6107 NF E 22-335	Normal Class	Class 6X	Class 6	Class 5	Class 4	Class 2	–
	ANSI ABMA	Radial bearing	ABMA std. 20	ABEC 1 RBEC 1	– –	ABEC 3 RBEC 3	ABEC 5 RBEC 5	ABEC 7 –	ABEC 9 –	–
		Instrument ball bearing	ABMA std. 12	–	–	Class 3P	Class 5P Class 5T	Class 7P Class 7T	Class 9P	Table 7-4
		Tapered roller bearing	ABMA std. 19	Class 4 Class K	– –	Class 2 Class N	Class 3 Class C	Class 0 Class B	Class 00 Class A	Table 7-7

(Reference) Standards and organizations concerned with bearings

JIS : Japanese Industrial Standard
BAS : The Japan Bearing Industrial Association Standard
ISO : International Organization for Standardization
ANSI : American National Standards Institute, Inc.
ABMA : American Bearing Manufactures Association
DIN : Deutsches Institut für Normung
BS : British Standards Institution
NF : Association Francaise de Normalisation

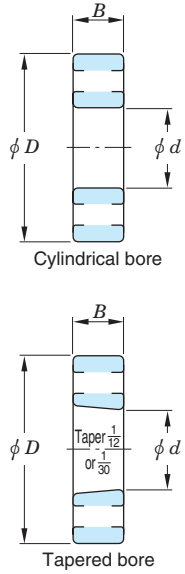
Table 7-3 (1) Radial bearing tolerances (tapered roller bearings excluded)

= JIS B 1514-1 =

(1) Inner ring (bore diameter)

Unit : μm

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δ_{dmp}										Single bore diameter deviation Δ_{ds} 1)				Single plane bore diameter variation V_{dsp}											Mean bore diameter variation V_{dmp}					Nominal bore diameter d mm	
		class 0		class 6		class 5		class 4		class 2		class 4		class 2		Diameter series 7, 8, 9				Diameter series 0, 1				Diameter series 2, 3, 4				Dia. series 1)	class 0	class 6	class 5	class 4	class 2		
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 2	max.						
–	0.6	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5	10	9	5	4	8	7	4	3	6	5	4	3	2.5	6	5	3	2	1.5	–	0.6
0.6	2.5	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5	10	9	5	4	8	7	4	3	6	5	4	3	2.5	6	5	3	2	1.5	0.6	2.5
2.5	10	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5	10	9	5	4	8	7	4	3	6	5	4	3	2.5	6	5	3	2	1.5	2.5	10
10	18	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5	10	9	5	4	8	7	4	3	6	5	4	3	2.5	6	5	3	2	1.5	10	18
18	30	0	– 10	0	– 8	0	– 6	0	– 5	0	– 2.5	0	– 5	0	– 2.5	13	10	6	5	10	8	5	4	8	6	5	4	2.5	8	6	3	2.5	1.5	18	30
30	50	0	– 12	0	– 10	0	– 8	0	– 6	0	– 2.5	0	– 6	0	– 2.5	15	13	8	6	12	10	6	5	9	8	6	5	2.5	9	8	4	3	1.5	30	50
50	80	0	– 15	0	– 12	0	– 9	0	– 7	0	– 4	0	– 7	0	– 4	19	15	9	7	19	15	7	5	11	9	7	5	4	11	9	5	3.5	2	50	80
80	120	0	– 20	0	– 15	0	– 10	0	– 8	0	– 5	0	– 8	0	– 5	25	19	10	8	25	19	8	6	15	11	8	6	5	15	11	5	4	2.5	80	120
120	150	0	– 25	0	– 18	0	– 13	0	– 10	0	– 7	0	– 10	0	– 7	31	23	13	10	31	23	10	8	19	14	10	8	7	19	14	7	5	3.5	120	150
150	180	0	– 25	0	– 18	0	– 13	0	– 10	0	– 7	0	– 10	0	– 7	31	23	13	10	31	23	10	8	19	14	10	8	7	19	14	7	5	3.5	150	180
180	250	0	– 30	0	– 22	0	– 15	0	– 12	0	– 8	0	– 12	0	– 8	38	28	15	12	38	28	12	9	23	17	12	9	8	23	17	8	6	4	180	250
250	315	0	– 35	0	– 25	0	– 18	*0*	*– 15*	–	–	*0*	*– 15*	–	–	44	31	18	*15*	44	31	14	*11*	26	19	14	*11*	–	26	19	9	*8*	–	250	315
315	400	0	– 40	0	– 30	0	– 23	*0*	*– 18*	–	–	*0*	*– 18*	–	–	50	38	23	*18*	50	38	18	*14*	30	23	18	*14*	–	30	23	12	*9*	–	315	400
400	500	0	– 45	0	– 35	*0*	*– 28*	*0*	*– 23*	–	–	*0*	*– 23*	–	–	56	44	*28*	*23*	56	44	*21*	*17*	34	26	*21*	*17*	–	34	26	*14*	*12*	–	400	500
500	630	0	– 50	0	– 40	*0*	*– 35*	–	–	–	–	–	–	–	–	63	50	*35*	–	63	50	*26*	–	38	30	*26*	–	–	38	30	*18*	–	–	500	630
630	800	0	– 75	*0*	*– 50*	*0*	*– 45*	–	–	–	–	–	–	–	–	*94*	*63*	*45*	–	*94*	*63*	*34*	–	*56*	*38*	*34*	–	–	*56*	*38*	*23*	–	–	630	800
800	1 000	0	– 100	*0*	*– 60*	*0*	*– 60*	–	–	–	–	–	–	–	–	*125*	*75*	*60*	–	*125*	*75*	*45*	–	*75*	*45*	*45*	–	–	*75*	*45*	*30*	–	–	800	1 000
1 000	1 250	0	– 125	*0*	*– 75*	*0*	*– 75*	–	–	–	–	–	–	–	–	*156*	*94*	*75*	–	*156*	*94*	*56*	–	*94*	*56*	*56*	–	–	*94*	*56*	*38*	–	–	1 000	1 250
1 250	1 600	0	– 160	–	–	–	–	–	–	–	–	–	–	–	–	*200*	–	–	–	*200*	–	–	–	*120*	–	–	–	–	*120*	–	–	–	–	1 250	1 600
1 600	2 000	0	– 200	–	–	–	–	–	–	–	–	–	–	–	–	*250*	–	–	–	*250*	–	–	–	*150*	–	–	–	–	*150*	–	–	–	–	1 600	2 000



(2) Inner ring (running accuracy and width)

Unit : μm

Nominal bore diameter d mm		Radial runout of assembled bearing inner ring K_{ia}					S_d			S_{ia} 2)			Single inner ring width deviation Δ_{Bs}						Single inner ring width deviation Δ_{Bs} 3)								Inner ring width variation V_{Bs}					Nominal bore diameter d mm	
		class 0	class 6	class 5	class 4	class 2	class 5	class 4	class 2	class 5	class 4	class 2	class 0		class 6		class 5		class 4		class 2		class 0 4)		class 6 4)		class 5 4)		classes 4, 2		class 0	class 6	class 5	class 4	class 2		
over	up to	max.					max.			max.			upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.						
–	0.6	10	5	4	2.5	1.5	7	3	1.5	7	3	1.5	0	– 40	0	– 40	0	– 40	0	– 40	0	– 40	–	–	–	–	0	– 250	0	– 250	12	12	5	2.5	1.5	–	0.6
0.6	2.5	10	5	4	2.5	1.5	7	3	1.5	7	3	1.5	0	– 40	0	– 40	0	– 40	0	– 40	0	– 40	–	–	–	–	0	– 250	0	– 250	12	12	5	2.5	1.5	0.6	2.5
2.5	10	10	6	4	2.5	1.5	7	3	1.5	7	3	1.5	0	– 120	0	– 120	0	– 40	0	– 40	0	– 40	0	– 250	0	– 250	0	– 250	0	– 250	15	15	5	2.5	1.5	2.5	10
10	18	10	7	4	2.5	1.5	7	3	1.5	7	3	1.5	0	– 120	0	– 120	0	– 80	0	– 80	0	– 80	0	– 250	0	– 250	0	– 250	0	– 250	20	20	5	2.5	1.5	10	18
18	30	13	8	4	3	2.5	8	4	1.5	8	4	2.5	0	– 120	0	– 120	0	– 120	0	– 120	0	– 120	0	– 250	0	– 250	0	– 250	0	– 250	20	20	5	2.5	1.5	18	30
30	50	15	10	5	4	2.5	8	4	1.5	8	4	2.5	0	– 120	0	– 120	0	– 120	0	– 120	0	– 120	0	– 250	0	– 250	0	– 250	0	– 250	20	20	5	3	1.5	30	50
50	80	20	10	5	4	2.5	8	5	1.5	8	5	2.5	0	– 150	0	– 150	0	– 150	0	– 150	0	– 150	0	– 380	0	– 380	0	– 250	0	– 250	25	25	6	4	1.5	50	80
80	120	25	13	6	5	2.5	9	5	2.5	9	5	2.5	0	– 200	0	– 200	0	– 200	0	– 200	0	– 200	0	– 380	0	– 380	0	– 380	0	– 380	25	25	7	4	2.5	80	120
120	150	30	18	8	6	2.5	10	6	2.5	10	7	2.5	0	– 250	0	– 250	0	– 250	0	– 250	0	– 250	0	– 500	0	– 500	0	– 380	0	– 380	30	30	8	5	2.5	120	150
150	180	30	18	8	6	5	10	6	4	10	7	5	0	– 250	0	– 250	0	– 250	0	– 250	0	– 250	0	– 500	0	– 500	0	– 380	0	– 380	30	30	8	5	4	150	180
180	250	40	20	10	8	5	11	7	5	13	8	5	0	– 300	0	– 300	0	– 300	0	– 300	0	– 300	0	– 500	0	– 500	0	– 500	0	– 500	30	30	10	6	5	180	250
250	315	50	25	13	*10*	–	13	*8*	–	15	*9*	–	0	– 350	0	– 350	0	– 350	*0*	*– 350*	–	–	0	– 500	0	– 500	0	– 500	–	–	35	35	13	*8*	–	250	315
315	400	60	30	15	*13*	–	15	*9*	–	20	*12*	–	0	– 400	0	– 400	0	– 400	*0*	*– 400*	–	–	0	– 630	0	– 630	0	– 630	–	–	40	40	15	*9*	–	315	400
400	500	65	35	*20*	*15*	–	*18*	*11*	–	*25*	*15*	–	0	– 450	0	– 450	*0*	*– 450*	*0*	*– 450*	–	–	–	–	–	–	–	–	–	–	50	45	*18*	*11*	–	400	500
500	630	70	40	*25*	–	–	*25*	–	–	*30*	–	–	0	– 500	0	– 500	*0*	*– 500*	–	–	–	–	–	–	–	–	–	–	–	–	60	50	*20*	–	–	500	630
630	800	80	*50*	*30*	–	–	*30*	–	–	*35*	–	–	0	– 750	*0*	*– 750*	*0*	*– 750*	–	–	–	–	–	–	–	–	–	–	–	–	70	*60*	*23*	–	–	630	800
800	1 000	90	*60*	*40*	–	–	*40*	–	–	*45*	–	–	0	– 1 000	*0*	*– 1 000*	*0*	*– 1 000*	–	–	–	–	–	–	–	–	–	–	–	–	80	*60*	*35*	–	–	800	1 000
1 000	1 250	100	*70*	*50*	–	–	*50*	–	–	*60*	–	–	0	– 1 250	*0*	*– 1 250*	*0*	*– 1 250*	–	–	–	–	–	–	–	–	–	–	–	–	100	*60*	*45*	–	–	1 000	1 250
1 250	1 600	120	–	–	–	–	–	–	–	–	–	–	0	– 1 600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	120	–	–	–	–	1 250	1 600
1 600	2 000	140	–	–	–	–	–	–	–	–	–	–	0	– 2 000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	140	–	–	–	–	1 600	2 000

S_d : perpendicularity of inner ring face with respect to the bore S_{ia} : axial runout of assembled bearing inner ring

[Notes] 1) These shall be applied to bearings of diameter series 0, 1, 2, 3 and 4.

2) These shall be applied to deep groove ball bearings and angular contact ball bearings.

3) These shall be appplied to individual bearing rings manufactured for matched pair or stack bearings.

4) Also applicable to the inner ring with tapered bore of $d \geqq 50$ mm.

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

Table 7-3 (2) Radial bearing tolerances (tapered roller bearings excluded)

(3) Outer ring (outside diameter)

Unit : μm

Nominal outside dia. D mm		Single plane mean outside diameter deviation Δ_{Dmp}										Single outside diameter deviation Δ_{Ds} 1)			
		class 0		class 6		class 5		class 4		class 2		class 4 5)		class 2	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
–	2.5	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5
2.5	6	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5
6	18	0	– 8	0	– 7	0	– 5	0	– 4	0	– 2.5	0	– 4	0	– 2.5
18	30	0	– 9	0	– 8	0	– 6	0	– 5	0	– 4	0	– 5	0	– 4
30	50	0	– 11	0	– 9	0	– 7	0	– 6	0	– 4	0	– 6	0	– 4
50	80	0	– 13	0	– 11	0	– 9	0	– 7	0	– 4	0	– 7	0	– 4
80	120	0	– 15	0	– 13	0	– 10	0	– 8	0	– 5	0	– 8	0	– 5
120	150	0	– 18	0	– 15	0	– 11	0	– 9	0	– 5	0	– 9	0	– 5
150	180	0	– 25	0	– 18	0	– 13	0	– 10	0	– 7	0	– 10	0	– 7
180	250	0	– 30	0	– 20	0	– 15	0	– 11	0	– 8	0	– 11	0	– 8
250	315	0	– 35	0	– 25	0	– 18	0	– 13	0	– 8	0	– 13	0	– 8
315	400	0	– 40	0	– 28	0	– 20	0	– 15	0	– 10	0	– 15	0	– 10
400	500	0	– 45	0	– 33	0	– 23	*0*	*– 17*	–	–	*0*	*– 17*	–	–
500	630	0	– 50	0	– 38	0	– 28	*0*	*– 20*	–	–	*0*	*– 20*	–	–
630	800	0	– 75	0	– 45	0	– 35	–	–	–	–	–	–	–	–
800	1 000	0	– 100	0	– 60	*0*	*– 50*	–	–	–	–	–	–	–	–
1 000	1 250	0	– 125	*0*	*– 75*	*0*	*– 63*	–	–	–	–	–	–	–	–
1 250	1 600	0	– 160	*0*	*– 90*	*0*	*– 80*	–	–	–	–	–	–	–	–
1 600	2 000	0	– 200	*0*	*– 120*	–	–	–	–	–	–	–	–	–	–
2 000	2 500	0	– 250	–	–	–	–	–	–	–	–	–	–	–	–

Nominal outside dia. D mm		Single plane outside diameter variation V_{Dsp}														Mean outside diameter variation V_{Dmp}					Nominal outside dia. D mm	
		Diameter series 7, 8, 9				Diameter series 0, 1				Diameter series 2, 3, 4				Dia. series 1)	Shielded/sealed type Diameter series 2, 3, 4	Shielded/sealed type Diameter series 0, 1, 2, 3, 4						
		class 0 2)	class 6 2)	class 5 5)	class 4 5)	class 0 2)	class 6 2)	class 5 5)	class 4 5)	class 0 3)	class 6 2)	class 5 5)	class 4 5)	class 2	class 0 2)	class 6 2)	class 0 3)	class 6 2)	class 5	class 4	class 2	
over	up to	max.				max.				max.				max.	max.		max.					over	up to
–	2.5	10	9	5	4	8	7	4	3	6	5	4	3	2.5	10	9	6	5	3	2	1.5	–	2.5
2.5	6	10	9	5	4	8	7	4	3	6	5	4	3	2.5	10	9	6	5	3	2	1.5	2.5	6
6	18	10	9	5	4	8	7	4	3	6	5	4	3	2.5	10	9	6	5	3	2	1.5	6	18
18	30	12	10	6	5	9	8	5	4	7	6	5	4	4	12	10	7	6	3	2.5	2	18	30
30	50	14	11	7	6	11	9	5	5	8	7	5	5	4	16	13	8	7	4	3	2	30	50
50	80	16	14	9	7	13	11	7	5	10	8	7	5	4	20	16	10	8	5	3.5	2	50	80
80	120	19	16	10	8	19	16	8	6	11	10	8	6	5	26	20	11	10	5	4	2.5	80	120
120	150	23	19	11	9	23	19	8	7	14	11	8	7	5	30	25	14	11	6	5	2.5	120	150
150	180	31	23	13	10	31	23	10	8	19	14	10	8	7	38	30	19	14	7	5	3.5	150	180
180	250	38	25	15	11	38	25	11	8	23	15	11	8	8	–	–	23	15	8	6	4	180	250
250	315	44	31	18	13	44	31	14	10	26	19	14	10	8	–	–	26	19	9	7	4	250	315
315	400	50	35	20	15	50	35	15	11	30	21	15	11	10	–	–	30	21	10	8	5	315	400
400	500	56	41	23	*17*	56	41	17	*13*	34	25	17	*13*	–	–	–	34	25	12	*9*	–	400	500
500	630	63	48	28	*20*	63	48	21	*15*	38	29	21	*15*	–	–	–	38	29	14	*10*	–	500	630
630	800	94	56	35	–	94	56	26	–	55	34	26	–	–	–	–	55	34	18	–	–	630	800
800	1 000	125	75	*50*	–	125	75	*38*	–	75	45	*38*	–	–	–	–	75	45	*25*	–	–	800	1 000
1 000	1 250	*156*	*94*	*63*	–	*156*	*94*	*47*	–	*94*	*56*	*47*	–	–	–	–	*94*	*56*	*31*	–	–	1 000	1 250
1 250	1 600	*200*	*113*	*80*	–	*200*	*113*	*60*	–	*120*	*68*	*60*	–	–	–	–	*120*	*68*	*40*	–	–	1 250	1 600
1 600	2 000	*250*	*150*	–	–	*250*	*150*	–	–	*150*	*90*	–	–	–	–	–	*150*	*90*	–	–	–	1 600	2 000
2 000	2 500	*313*	–	–	–	*313*	–	–	–	*188*	–	–	–	–	–	–	*188*	–	–	–	–	2 000	2 500

(4) Outer ring (running accuracy and width)

Unit : μm

Nominal outside dia. D mm		Radial runout of assembled bearing outer ring K_{ea}					S_D 4)			S_{ea} 3) 4)			Δ_{Cs} 3)		Ring width variation V_{Cs} 3)			
		class 0	class 6	class 5	class 4	class 2	class 5	class 4	class 2	class 5	class 4	class 2	classes 0, 6, 5, 4, 2		classes 0, 6	class 5	class 4	class 2
over	up to	max.					max.			max.			upper	lower		max.		
–	2.5	15	8	5	3	1.5	8	4	1.5	8	5	1.5				5	2.5	1.5
2.5	6	15	8	5	3	1.5	8	4	1.5	8	5	1.5				5	2.5	1.5
6	18	15	8	5	3	1.5	8	4	1.5	8	5	1.5				5	2.5	1.5
18	30	15	9	6	4	2.5	8	4	1.5	8	5	2.5				5	2.5	1.5
30	50	20	10	7	5	2.5	8	4	1.5	8	5	2.5				5	2.5	1.5
50	80	25	13	8	5	4	8	4	1.5	10	5	4				6	3	1.5
80	120	35	18	10	6	5	9	5	2.5	11	6	5				8	4	2.5
120	150	40	20	11	7	5	10	5	2.5	13	7	5				8	5	2.5
150	180	45	23	13	8	5	10	5	2.5	14	8	5				8	5	2.5
180	250	50	25	15	10	7	11	7	4	15	10	7				10	7	4
250	315	60	30	18	11	7	13	8	5	18	10	7				11	7	5
315	400	70	35	20	13	8	13	10	7	20	13	8				13	8	7
400	500	80	40	23	*15*	–	15	*12*	–	23	*15*	–				15	*9*	–
500	630	100	50	25	*18*	–	18	*13*	–	25	*18*	–				18	*11*	–
630	800	120	60	30	–	–	20	–	–	30	–	–				20	–	–
800	1 000	140	75	*40*	–	–	*23*	–	–	*40*	–	–				*23*	–	–
1 000	1 250	160	*85*	*45*	–	–	*30*	–	–	*45*	–	–				*30*	–	–
1 250	1 600	190	*95*	*60*	–	–	*45*	–	–	*60*	–	–				*45*	–	–
1 600	2 000	220	*110*	–	–	–	–	–	–	–	–	–				–	–	–
2 000	2 500	250	–	–	–	–	–	–	–	–	–	–				–	–	–

Shall conform to the tolerance Δ_{Bs} on d of the same bearing

Shall conform to the tolerance V_{Bs} on d of the same bearing

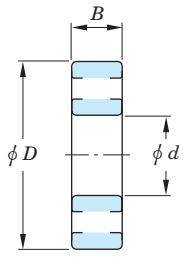
S_D : perpendicularity of outer ring outside surface with respect to the face
S_{ea} : axial runout of assembled bearing outer ring
Δ_{Cs} : deviation of a single outer ring width

[Notes]

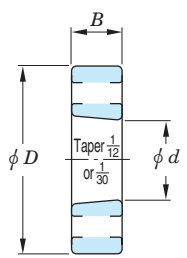
1) These shall be applied to bearings of diameter series 0, 1, 2, 3 and 4.
2) Shall be applied when locating snap ring is not fitted.
3) These shall be applied to deep groove ball bearings and angular contact ball bearings.
4) These shall not be applied to flanged bearings.
5) These shall not be applied to shielded bearings and sealed bearings.

[Remark]

Values in Italics are prescribed in JTEKT standards.



Cylindrical bore



Tapered bore

d : nominal bore diameter
D : nominal outside diameter
B : nominal assembled bearing width

(Refer.) Table 7-4 Tolerances for measuring instrument ball bearings (inch series)

= ANSI/ABMA standards = (reference)

(1) Inner ring and outer ring width

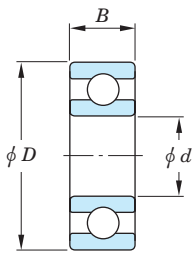
Unit : μm

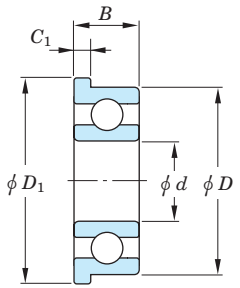
Nominal bore dia. d mm		Single plane mean bore diameter deviation Δ_{dmp}				Single bore diameter deviation Δ_{ds}				Single plane bore diameter variation V_{dsp}		Mean bore diameter variation V_{dmp}		Radial runout of assembled bearing inner ring K_{ia}			Axial runout of assembled bearing inner ring S_{ia}			Perpendicularity of inner ring face with respect to the bore S_d			Single inner or outer ring width deviation Δ_{Bs} , Δ_{Cs}		Inner or outer ring width variation V_{Bs} , V_{Cs}		
		classes 5P, 7P		class 9P		classes 5P, 7P		class 9P		classes 5P, 7P	class 9P	classes 5P, 7P	class 9P	class 5P	class 7P	class 9P	class 5P	class 7P	class 9P	class 5P	class 7P	class 9P	classes 5P, 7P, 9P		class 5P	class 7P	class 9P
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	max.		max.		max.			max.			max.			upper	lower	max.		
–	10	0	−5.1	0	−2.5	0	−5.1	0	−2.5	2.5	1.3	2.5	1.3	3.8	2.5	1.3	7.6	2.5	1.3	7.6	2.5	1.3	0	−25.4	5.1	2.5	1.3
10	18	0	−5.1	0	−2.5	0	−5.1	0	−2.5	2.5	1.3	2.5	1.3	3.8	2.5	1.3	7.6	2.5	1.3	7.6	2.5	1.3	0	−25.4	5.1	2.5	1.3
18	30	0	−5.1	0	−2.5	0	−5.1	0	−2.5	2.5	1.3	2.5	1.3	3.8	3.8	2.5	7.6	3.8	1.3	7.6	3.8	1.3	0	−25.4	5.1	2.5	1.3

(2) Outer ring

Unit : μm

Nominal outside dia. D mm		Single plane mean outside diameter deviation Δ_{Dmp}				Single outside diameter deviation Δ_{Ds}						Single plane outside diameter variation V_{Dsp}			Mean outside diameter variation V_{Dmp}			Radial runout of assembled bearing outer ring K_{ea}			Axial runout of assembled bearing outer ring S_{ea}			Perpendicularity of outer ring outside surface with respect to the face S_D			Single outer ring flange outside diameter deviation Δ_{D1s}		Single outer ring flange width deviation Δ_{C1s}	
		classes 5P, 7P		class 9P		classes 5P, 7P				class 9P		classes 5P, 7P		class 9P	classes 5P, 7P		class 9P	class 5P	class 7P	class 9P	class 5P	class 7P	class 9P	class 5P	class 7P	class 9P	classes 5P, 7P		classes 5P, 7P	
						Open type		Shielded/ sealed type		Open type		Open type	Shielded/ sealed type	Open type	Open type	Shielded/ sealed type	Open type													
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.			max.			max.			max.			max.			upper	lower	upper	lower
–	18	0	−5.1	0	−2.5	0	−5.1	+1	−6.1	0	−2.5	2.5	5.1	1.3	2.5	5.1	1.3	5.1	3.8	1.3	7.6	5.1	1.3	7.6	3.8	1.3	0	−25.4	0	−50.8
18	30	0	−5.1	0	−3.8	0	−5.1	+1	−6.1	0	−3.8	2.5	5.1	2	2.5	5.1	2	5.1	3.8	2.5	7.6	5.1	2.5	7.6	3.8	1.3	0	−25.4	0	−50.8
30	50	0	−5.1	0	−3.8	0	−5.1	+1	−6.1	0	−3.8	2.5	5.1	2	2.5	5.1	2	5.1	5.1	2.5	7.6	5.1	2.5	7.6	3.8	1.3	0	−25.4	0	−50.8





d : nominal bore diameter
D : nominal outside diameter
B : nominal assembled bearing width
D_1 : nominal outer ring flange outside diameter
C_1 : nominal outer ring flange width

Table 7-5 (1) Tolerances for metric series tapered roller bearings

= JIS B 1514-1 =

(1) Inner ring

Unit : μm

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δ_{dmp}								Single bore diameter deviation Δ_{ds}				Single plane bore diameter variation V_{dsp}									Mean bore diameter variation V_{dmp}									Radial runout of assembled bearing inner ring K_{ia}										S_d				S_{ia}		Single inner ring width deviation Δ_{Bs}										Nominal bore diameter d mm	
		classes 0, 6X		classes 6, 5		class 4		class 2		class 4		class 2		classes 0, 6X	class 6	class 5	class 4	class 2					classes 0, 6X	class 6	class 5	class 4	class 2					classes 0, 6X	class 6	class 5	class 4	class 2					class 5	class 4	class 2	class 4	class 2	class 0		class 6X		class 6		classes 5, 4		class 2			
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.									max.									max.									max.		max.											
–	10	0	– 12	0	– 7[1]	0	– 5	0	– 4	0	– 5	0	– 4	12	–	5	4	2.5	9	–	5	4	1.5	15	–	5	3	2	7	3	1.5	3	2	0	– 120	0	– 50	–	–	0	– 200	0	– 200	–	10
10	18	0	– 12	0	– 7	0	– 5	0	– 4	0	– 5	0	– 4	12	7	5	4	2.5	9	5	5	4	1.5	15	7	5	3	2	7	3	1.5	3	2	0	– 120	0	– 50	0	– 120	0	– 200	0	– 200	10	18
18	30	0	– 12	0	– 8	0	– 6	0	– 4	0	– 6	0	– 4	12	8	6	5	2.5	9	6	5	4	1.5	18	8	5	3	2.5	8	4	1.5	4	2.5	0	– 120	0	– 50	0	– 120	0	– 200	0	– 200	18	30
30	50	0	– 12	0	– 10	0	– 8	0	– 5	0	– 8	0	– 5	12	10	8	6	3	9	8	5	5	2	20	10	6	4	2.5	8	4	2	4	2.5	0	– 120	0	– 50	0	– 120	0	– 240	0	– 240	30	50
50	80	0	– 15	0	– 12	0	– 9	0	– 5	0	– 9	0	– 5	15	12	9	7	4	11	9	6	5	2	25	10	7	4	3	8	5	2	4	3	0	– 150	0	– 50	0	– 150	0	– 300	0	– 300	50	80
80	120	0	– 20	0	– 15	0	– 10	0	– 6	0	– 10	0	– 6	20	15	11	8	5	15	11	8	5	2.5	30	13	8	5	3	9	5	2.5	5	3	0	– 200	0	– 50	0	– 200	0	– 400	0	– 400	80	120
120	180	0	– 25	0	– 18	0	– 13	0	– 7	0	– 13	0	– 7	25	18	14	10	7	19	14	9	7	3.5	35	18	11	6	4	10	6	3.5	7	4	0	– 250	0	– 50	0	– 250	0	– 500	0	– 500	120	180
180	250	0	– 30	0	– 22	0	– 15	0	– 8	0	– 15	0	– 8	30	22	17	11	7	23	16	11	8	4	50	20	13	8	5	11	7	5	8	5	0	– 300	0	– 50	0	– 300	0	– 600	0	– 600	180	250
250	315	0	– 35	0	– 25[1]	0	– 18	0	– 8	0	– 18	0	– 8	35	*25*	19	12	8	26	*19*	13	9	5	60	*30*	13	9	6	13	8	5.5	9	6	0	– 350	0	– 50	*0*	– *350*	0	– 700	0	– 700	250	315
315	400	0	– 40	0	– 30[1]	–	–	–	–	–	–	–	–	40	*30*	23	–	–	30	*23*	15	–	–	70	*35*	15	–	–	15	–	–	–	–	0	– 400	0	– 50	*0*	– *400*	0	– 800[2]	–	–	315	400
400	500	0	– 45	0	– 35[1]	–	–	–	–	–	–	–	–	45	*35*	28	–	–	34	*26*	17	–	–	80	*40*	20	–	–	17	–	–	–	–	0	– 450	0	– 50	*0*	– *450*	0	– 900[2]	–	–	400	500
500	630	0	– 60	0	– 40[1]	–	–	–	–	–	–	–	–	60	*40*	35	–	–	40	*30*	20	–	–	90	*50*	25	–	–	20	–	–	–	–	0	– 500	–	–	*0*	– *500*	0	– 1 100[2]	–	–	500	630
630	800	0	– 75	0	– 50[1]	–	–	–	–	–	–	–	–	75	*50*	45	–	–	45	*38*	25	–	–	100	*60*	30	–	–	25	–	–	–	–	0	– 750	–	–	*0*	– *750*	0	– 1 600[2]	–	–	630	800
800	1 000	0	– 100	0	– 60[1]	–	–	–	–	–	–	–	–	100	*60*	60	–	–	55	*45*	30	–	–	115	*75*	37	–	–	30	–	–	–	–	0	– 1 000	–	–	*0*	– *1 000*	0	– 2 000[2]	–	–	800	1 000

S_d : perpendicularity of inner ring face with respect to the bore
S_{ia} : axial runout of assembled bearing inner ring

(2-1) Outer ring

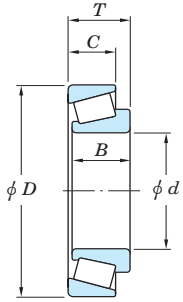
Unit : μm

Nominal outside diameter D mm		Single plane mean outside diameter deviation Δ_{Dmp}								Single outside diameter deviation Δ_{Ds}				Single plane outside diameter variation V_{Dsp}									Mean outside diameter variation V_{Dmp}									Radial runout of assembled bearing outer ring K_{ea}										S_D[3]				S_{ea}[3]		Nominal outside diameter D mm	
		classes 0, 6X		classes 6, 5		class 4		class 2		class 4		class 2		classes 0, 6X	class 6	class 5	class 4	class 2					classes 0, 6X	class 6	class 5	class 4	class 2					classes 0, 6X	class 6	class 5	class 4	class 2					class 5	class 4	class 2	class 4	class 2		
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.									max.									max.									max.		max.					
–	18	0	– 12	0	– 8[1]	0	– 6	0	– 5	0	– 6	0	– 5	12	–	6	5	4	9	–	5	4	2.5	18	–	6	4	2.5	8	4	1.5	5	2.5	–	18
18	30	0	– 12	0	– 8	0	– 6	0	– 5	0	– 6	0	– 5	12	8	6	5	4	9	6	5	4	2.5	18	9	6	4	2.5	8	4	1.5	5	2.5	18	30
30	50	0	– 14	0	– 9	0	– 7	0	– 5	0	– 7	0	– 5	14	9	7	5	4	11	7	5	5	2.5	20	10	7	5	2.5	8	4	2	5	2.5	30	50
50	80	0	– 16	0	– 11	0	– 9	0	– 6	0	– 9	0	– 6	16	11	8	7	4	12	8	6	5	2.5	25	13	8	5	4	8	4	2.5	5	4	50	80
80	120	0	– 18	0	– 13	0	– 10	0	– 6	0	– 10	0	– 6	18	13	10	8	5	14	10	7	5	3	35	18	10	6	5	9	5	3	6	5	80	120
120	150	0	– 20	0	– 15	0	– 11	0	– 7	0	– 11	0	– 7	20	15	11	8	5	15	11	8	6	3.5	40	20	11	7	5	10	5	3.5	7	5	120	150
150	180	0	– 25	0	– 18	0	– 13	0	– 7	0	– 13	0	– 7	25	18	14	10	7	19	14	9	7	4	45	23	13	8	5	10	5	4	8	5	150	180
180	250	0	– 30	0	– 20	0	– 15	0	– 8	0	– 15	0	– 8	30	20	15	11	8	23	15	10	8	5	50	25	15	10	7	11	7	5	10	7	180	250
250	315	0	– 35	0	– 25	0	– 18	0	– 9	0	– 18	0	– 9	35	25	19	14	8	26	19	13	9	5	60	30	18	11	7	13	8	6	10	7	250	315
315	400	0	– 40	0	– 28	0	– 20	0	– 10	0	– 20	0	– 10	40	28	22	15	10	30	21	14	10	6	70	35	20	13	8	13	10	7	13	8	315	400
400	500	0	– 45	0	– 33[1]	–	–	–	–	–	–	–	–	45	*33*	26	–	–	34	*25*	17	–	–	80	*40*	24	–	–	17	–	–	–	–	400	500
500	630	0	– 50	0	– 38[1]	–	–	–	–	–	–	–	–	60	*38*	30	–	–	38	*29*	20	–	–	100	*50*	30	–	–	20	–	–	–	–	500	630
630	800	0	– 75	0	– 45[1]	–	–	–	–	–	–	–	–	80	*45*	38	–	–	55	*34*	25	–	–	120	*60*	36	–	–	25	–	–	–	–	630	800
800	1 000	0	– 100	0	– 60[1]	–	–	–	–	–	–	–	–	100	*60*	50	–	–	75	*45*	30	–	–	140	*75*	43	–	–	30	–	–	–	–	800	1 000
1 000	1 250	0	– 125	0	– 80[1]	–	–	–	–	–	–	–	–	130	*75*	65	–	–	90	*56*	38	–	–	160	*85*	52	–	–	38	–	–	–	–	1 000	1 250
1 250	1 600	0	– 160	0	– 100[1]	–	–	–	–	–	–	–	–	170	*90*	90	–	–	100	*68*	50	–	–	180	*95*	62	–	–	50	–	–	–	–	1 250	1 600

(2-2) Outer ring

Unit : μm

Nominal bore diameter d mm		Single outer ring width deviation Δ_{Cs}				
		class 6X		classes 0, 6, 5, 4, 2		
over	up to	upper	lower	upper	lower	
–	10	0	– 100			Shall comform to the tolerance Δ_{Bs} on d of the same bearing
10	18	0	– 100			
18	30	0	– 100			
30	50	0	– 100			
50	80	0	– 100			
80	120	0	– 100			
120	150	0	– 100			
150	180	0	– 100			
180	250	0	– 100			
250	315	0	– 100			
315	400	0	– 100			
400	500	0	– 100			
500	630	–	–			
630	800	–	–			
800	1 000	–	–			



d : nominal bore diameter
D : nominal outside diameter
B : nominal inner ring width
C : nominal outer ring width
T : nominal assembled bearing width

S_D : perpendicularity of outer ring outside surface with respect to the face
S_{ea} : axial runout of assembled bearing outer ring

[Notes] 1) Class 6 values are prescribed in JTEKT standards.
2) These shall be applied to bearings of tolerance class 5.
3) These shall not be applied to flanged bearings.
[Remark] Values in Italics are prescribed in JTEKT standards.

Table 7-5 (2) Tolerances for metric series tapered roller bearings

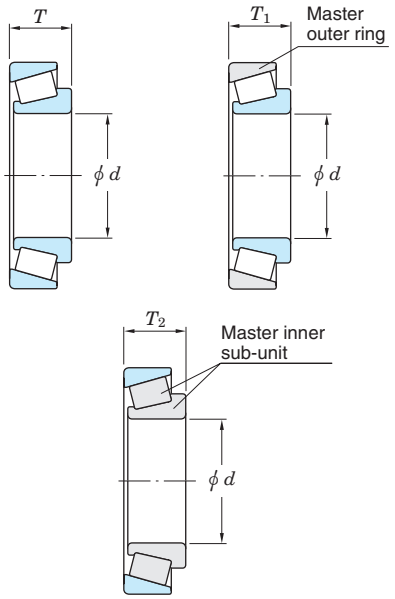
(3) Assembled bearing width and effective width

Unit : μm

Nominal bore diameter d mm		Actual bearing width deviation Δ_{Ts}										Actual effective inner sub-unit width deviation Δ_{T1s}							
		class 0		class 6X		class 6		classes 5, 4		class 2		class 0		class 6X		classes 5, 4		class 2	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower
–	10	+200	0	+100	0	–	–	+200	−200	+200	−200	+100	0	+50	0	+100	−100	+100	−100
10	18	+200	0	+100	0	+200	0	+200	−200	+200	−200	+100	0	+50	0	+100	−100	+100	−100
18	30	+200	0	+100	0	+200	0	+200	−200	+200	−200	+100	0	+50	0	+100	−100	+100	−100
30	50	+200	0	+100	0	+200	0	+200	−200	+200	−200	+100	0	+50	0	+100	−100	+100	−100
50	80	+200	0	+100	0	+200	0	+200	−200	+200	−200	+100	0	+50	0	+100	−100	+100	−100
80	120	+200	−200	+100	0	+200	−200	+200	−200	+200	−200	+100	−100	+50	0	+100	−100	+100	−100
120	180	+350	−250	+150	0	+350	−250	+350	−250	+200	−250	+150	−150	+50	0	+150	−150	+100	−100
180	250	+350	−250	+150	0	+350	−250	+350	−250	+200	−300	+150	−150	+50	0	+150	−150	+100	−150
250	315	+350	−250	+200	0	*+350*	*−250*	+350	−250	+200	−300	+150	−150	+100	0	+150	−150	+100	−150
315	400	+400	−400	+200	0	*+400*	*−400*	+400	−400[1]	–	–	+200	−200	+100	0	+200	−200[1]	–	–
400	500	+450	−450	+200	0	*+400*	*−400*	+450	−450[1]	–	–	+225	−225	+100	0	+225	−225[1]	–	–
500	630	+500	−500	–	–	*+500*	*−500*	+500	−500[1]	–	–	–	–	–	–	–	–	–	–
630	800	+600	−600	–	–	*+600*	*−600*	+600	−600[1]	–	–	–	–	–	–	–	–	–	–
800	1 000	+750	−750	–	–	*+750*	*−750*	+750	−750[1]	–	–	–	–	–	–	–	–	–	–

Nominal bore diameter d mm		Actual effective outer ring width deviation Δ_{T2s}							
		class 0		class 6X		classes 5, 4		class 2	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower
–	10	+100	0	+50	0	+100	−100	+100	−100
10	18	+100	0	+50	0	+100	−100	+100	−100
18	30	+100	0	+50	0	+100	−100	+100	−100
30	50	+100	0	+50	0	+100	−100	+100	−100
50	80	+100	0	+50	0	+100	−100	+100	−100
80	120	+100	−100	+50	0	+100	−100	+100	−100
120	180	+200	−100	+100	0	+200	−100	+100	−150
180	250	+200	−100	+100	0	+200	−100	+100	−150
250	315	+200	−100	+100	0	+200	−100	+100	−150
315	400	+200	−200	+100	0	+200	−200[1]	–	–
400	500	+225	−225	+100	0	+225	−225[1]	–	–
500	630	–	–	–	–	–	–	–	–
630	800	–	–	–	–	–	–	–	–
800	1 000	–	–	–	–	–	–	–	–

[Note] 1) These shall be applied to bearings of tolerance class 5.
[Remark] Values in Italics are prescribed in JTEKT standards.



d : nominal bore diameter
T : nominal assembled bearing width
T_1 : nominal effective width of inner sub-unit
T_2 : nominal effective width of outer ring

Table 7-6 Tolerances for metric series double-row and four-row tapered roller bearings (class 0) = BAS 1002 =

(1) Inner ring, outer ring width and overall width

Unit : μm

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δ_{dmp}		Single plane bore diameter variation V_{dsp}	Mean bore diameter variation V_{dmp}	K_{ia}	Single outer ring or inner ring width deviation Δ_{Bs}, Δ_{Cs}		Actual overall inner rings/ outer rings width deviation			
									Double-row Δ_{Ts}		Four-row Δ_{Ts}, Δ_{Ws}	
over	up to	upper	lower	max.	max.	max.	upper	lower	upper	lower	upper	lower
30	50	0	−12	12	9	20	0	−120	+240	−240	–	–
50	80	0	−15	15	11	25	0	−150	+300	−300	–	–
80	120	0	−20	20	15	30	0	−200	+400	−400	+500	−500
120	180	0	−25	25	19	35	0	−250	+500	−500	+600	−600
180	250	0	−30	30	23	50	0	−300	+600	−600	+750	−750
250	315	0	−35	35	26	60	0	−350	+700	−700	+900	−900
315	400	0	−40	40	30	70	0	−400	+800	−800	+1 000	−1 000
400	500	0	−45	45	34	80	0	−450	+900	−900	+1 200	−1 200
500	630	0	−60	60	40	90	0	−500	+1 000	−1 000	+1 200	−1 200
630	800	0	−75	75	45	100	0	−750	+1 500	−1 500	–	–
800	1 000	0	−100	100	55	115	0	−1 000	+1 500	−1 500	–	–

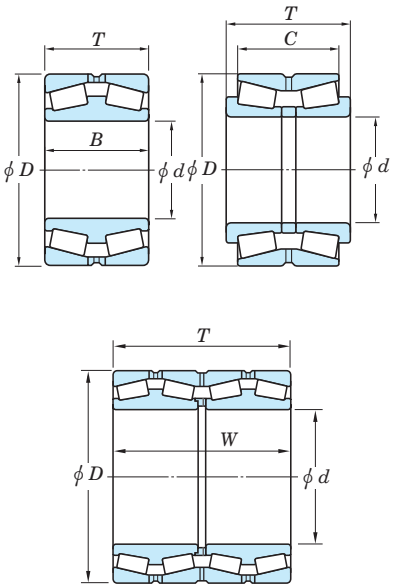
K_{ia} : radial runout of assembled bearing inner ring

(2) Outer ring

Unit : μm

Nominal outside diameter D mm		Single plane mean outside diameter deviation Δ_{Dmp}		Single plane outside diameter variation V_{Dsp}	Mean outside diameter variation V_{Dmp}	K_{ea}
over	up to	upper	lower	max.	max.	max.
50	80	0	−16	16	12	25
80	120	0	−18	18	14	35
120	150	0	−20	20	15	40
150	180	0	−25	25	19	45
180	250	0	−30	30	23	50
250	315	0	−35	35	26	60
315	400	0	−40	40	30	70
400	500	0	−45	45	34	80
500	630	0	−50	60	38	100
630	800	0	−75	80	55	120
800	1 000	0	−100	100	75	140
1 000	1 250	0	−125	130	90	160
1 250	1 600	0	−160	170	100	180

K_{ea} : radial runout of assembled bearing outer ring



d : nominal bore diameter
D : nominal outside diameter
B : nominal double inner ring width
C : nominal double outer ring width
T, W : nominal overall width of outer rings (inner rings)

Table 7-7 Tolerances and permissible values for inch series tapered roller bearings

= ANSI/ABMA 19 =

(1) Inner ring

Unit : μm

Applied bearing type	Nominal bore diameter d, mm (1/25.4) over	up to	Deviation of a single bore diameter Δ_{ds} class 4 upper	class 4 lower	class 2 upper	class 2 lower	class 3 upper	class 3 lower	class 0 upper	class 0 lower	class 00 upper	class 00 lower
All types	–	**76.2** (3.0)	+ 13	0	+ 13	0	+ 13	0	+ 13	0	+ 8	0
	76.2 (3.0)	**266.7** (10.5)	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
	266.7 (10.5)	**304.8** (12.0)	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
	304.8 (12.0)	**609.6** (24.0)	+ 51	0	+ 51	0	+ 25	0	–	–	–	–
	609.6 (24.0)	**914.4** (36.0)	+ 76	0	–	–	+ 38	0	–	–	–	–
	914.4 (36.0)	**1 219.2** (48.0)	+ 102	0	–	–	+ 51	0	–	–	–	–
	1 219.2 (48.0)	–	+ 127	0	–	–	+ 76	0	–	–	–	–

(2) Outer ring

Unit : μm

Applied bearing type	Nominal outside diameter D, mm (1/25.4) over	up to	Deviation of a single outside diameter Δ_{Ds} class 4 upper	class 4 lower	class 2 upper	class 2 lower	class 3 upper	class 3 lower	class 0 upper	class 0 lower	class 00 upper	class 00 lower
All types	–	**266.7** (10.5)	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
	266.7 (10.5)	**304.8** (12.0)	+ 25	0	+ 25	0	+ 13	0	+ 13	0	+ 8	0
	304.8 (12.0)	**609.6** (24.0)	+ 51	0	+ 51	0	+ 25	0	–	–	–	–
	609.6 (24.0)	**914.4** (36.0)	+ 76	0	+ 76	0	+ 38	0	–	–	–	–
	914.4 (36.0)	**1 219.2** (48.0)	+ 102	0	–	–	+ 51	0	–	–	–	–
	1 219.2 (48.0)	–	+ 127	0	–	–	+ 76	0	–	–	–	–

(3) Radial runout of assembled bearing inner ring/outer ring

Unit : μm

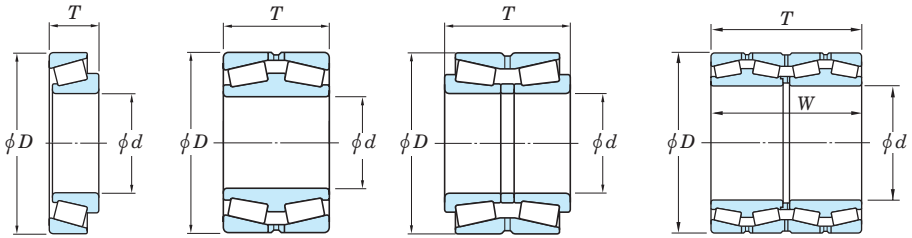
Applied bearing type	Nominal outside diameter D, mm (1/25.4) over	up to	Radial runout of inner ring/outer ring K_{ia}, K_{ea} class 4 max.	class 2 max.	class 3 max.	class 0 max.	class 00 max.
All types	–	**266.7** (10.5)	51	38	8	4	2
	266.7 (10.5)	**304.8** (12.0)	51	38	8	4	2
	304.8 (12.0)	**609.6** (24.0)	51	38	18	–	–
	609.6 (24.0)	**914.4** (36.0)	76	51	51	–	–
	914.4 (36.0)	**1 219.2** (48.0)	76	–	76	–	–
	1 219.2 (48.0)	–	76	–	76	–	–

(4) Assembled bearing width and overall width

Unit : μm

Applied bearing type	Nominal bore diameter d, mm (1/25.4) over	up to	Nominal outside diameter D, mm (1/25.4) over	up to	Deviation of the actual bearing width and overall width of inner rings/outer rings Δ_{Ts}, Δ_{Ws} class 4 upper	class 4 lower	class 2 upper	class 2 lower	class 3 upper	class 3 lower	classes 0,00 upper	classes 0,00 lower
Single-row	–	**101.6** (4.0)	–	–	+ 203	0	+ 203	0	+ 203	– 203	+ 203	– 203
	101.6 (4.0)	**266.7** (10.5)			+ 356	– 254	+ 203	0	+ 203	– 203	+ 203	– 203
	266.7 (10.5)	**304.8** (12.0)	–	–	+ 356	– 254	+ 203	0	+ 203	– 203	+ 203	– 203[1)]
	304.8 (12.0)	**609.6** (24.0)	–	**508.0** (20.0)	–	–	+ 381	– 381	+ 203	– 203	–	–
	304.8 (12.0)	**609.6** (24.0)	**508.0** (20.0)	–	–	–	+ 381	– 381	+ 381	– 381	–	–
	609.6 (24.0)		–	–	+ 381	– 381	–	–	+ 381	– 381	–	–
Double-row	–	**101.6** (4.0)	–	–	+ 406	0	+ 406	0	+ 406	– 406	+ 406	– 406
	101.6 (4.0)	**266.7** (10.5)	–	–	+ 711	– 508	+ 406	– 203	+ 406	– 406	+ 406	– 406
	266.7 (10.5)	**304.8** (12.0)	–	–	+ 711	– 508	+ 406	– 203	+ 406	– 406	+ 406	– 406[1)]
	304.8 (12.0)	**609.6** (24.0)	–	**508.0** (20.0)	–	–	+ 762	– 762	+ 406	– 406	–	–
	304.8 (12.0)	**609.6** (24.0)	**508.0** (20.0)	–	–	–	+ 762	– 762	+ 762	– 762	–	–
	609.6 (24.0)		–	–	+ 762	– 762	–	–	+ 762	– 762	–	–
Double-row (TNA type)	–	**127.0** (5.0)	–	–	–	–	+ 254	0	+ 254	0	–	–
	127.0 (5.0)		–	–	–	–	+ 762	0	+ 762	0	–	–
Four-row	Total dimensional range		–	–	+1 524	–1 524	+1 524	–1 524	+1 524	–1 524	+1 524	–1 524

[Note] 1) These shall be applied to bearings of class 0.



d : nominal bore diameter

D : nominal outside diameter

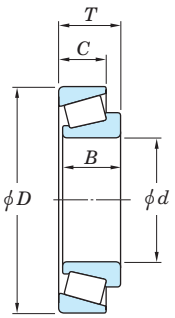
T, W : nominal assembled bearing width and nominal overall width of outer rings (inner rings)

Table 7-8 Tolerances for metric J series tapered roller bearings [1)]

(1) Bore diameter and width of inner ring and assembled bearing width

Unit : μm

Nominal bore diameter d mm		Deviation of a single bore diameter Δ_{ds}								Deviation of a single inner ring width Δ_{Bs}								Deviation of the actual bearing width Δ_{Ts}								Nominal bore diameter d mm	
		class PK		class PN		class PC		class PB		class PK		class PN		class PC		class PB		class PK		class PN		class PC		class PB			
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	over	up to
10	**18**	0	− 12	0	− 12	0	− 7	0	− 5	0	− 100	0	− 50	0	− 200	0	− 200	+ 200	0	+ 100	0	+ 200	− 200	+ 200	− 200	**10**	**18**
18	**30**	0	− 12	0	− 12	0	− 8	0	− 6	0	− 100	0	− 50	0	− 200	0	− 200	+ 200	0	+ 100	0	+ 200	− 200	+ 200	− 200	**18**	**30**
30	**50**	0	− 12	0	− 12	0	− 10	0	− 8	0	− 100	0	− 50	0	− 200	0	− 200	+ 200	0	+ 100	0	+ 200	− 200	+ 200	− 200	**30**	**50**
50	**80**	0	− 15	0	− 15	0	− 12	0	− 9	0	− 150	0	− 50	0	− 300	0	− 300	+ 200	0	+ 100	0	+ 200	− 200	+ 200	− 200	**50**	**80**
80	**120**	0	− 20	0	− 20	0	− 15	0	− 10	0	− 150	0	− 50	0	− 300	0	− 300	+ 200	− 200	+ 100	0	+ 200	− 200	+ 200	− 200	**80**	**120**
120	**180**	0	− 25	0	− 25	0	− 18	0	− 13	0	− 200	0	− 50	0	− 300	0	− 300	+ 350	− 250	+ 150	0	+ 350	− 250	+ 200	− 250	**120**	**180**
180	**250**	0	− 30	0	− 30	0	− 22	0	− 15	0	− 200	0	− 50	0	− 350	0	− 350	+ 350	− 250	+ 150	0	+ 350	− 250	+ 200	− 300	**180**	**250**
250	**315**	0	− 35	0	− 35	0	− 22	0	− 15	0	− 200	0	− 50	0	− 350	0	− 350	+ 350	− 250	+ 200	0	+ 350	− 300	+ 200	− 300	**250**	**315**



d : nominal bore diameter
D : nominal outside diameter
B : nominal inner ring width
C : nominal outer ring width
T : nominal assembled bearing width

(2) Outside diameter and width of outer ring and radial runout of assembled bearing inner ring/ outer ring

Unit : μm

Nominal outside diameter D mm		Deviation of a single outside diameter Δ_{Ds}								Deviation of a single outer ring width Δ_{Cs}								Radial runout of inner ring/outer ring K_{ia}, K_{ea}				Nominal outside diameter D mm	
		class PK		class PN		class PC		class PB		class PK		class PN		class PC		class PB		class PK	class PN	class PC	class PB		
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.	max.	max.	max.	over	up to
18	**30**	0	− 12	0	− 12	0	− 8	0	− 6	0	− 150	0	− 100	0	− 150	0	− 150	18	18	5	3	**18**	**30**
30	**50**	0	− 14	0	− 14	0	− 9	0	− 7	0	− 150	0	− 100	0	− 150	0	− 150	20	20	6	3	**30**	**50**
50	**80**	0	− 16	0	− 16	0	− 11	0	− 9	0	− 150	0	− 100	0	− 150	0	− 150	25	25	6	4	**50**	**80**
80	**120**	0	− 18	0	− 18	0	− 13	0	− 10	0	− 200	0	− 100	0	− 200	0	− 200	35	35	6	4	**80**	**120**
120	**150**	0	− 20	0	− 20	0	− 15	0	− 11	0	− 200	0	− 100	0	− 200	0	− 200	40	40	7	4	**120**	**150**
150	**180**	0	− 25	0	− 25	0	− 18	0	− 13	0	− 200	0	− 100	0	− 250	0	− 250	45	45	8	4	**150**	**180**
180	**250**	0	− 30	0	− 30	0	− 20	0	− 15	0	− 250	0	− 100	0	− 250	0	− 250	50	50	10	5	**180**	**250**
250	**315**	0	− 35	0	− 35	0	− 25	0	− 18	0	− 250	0	− 100	0	− 300	0	− 300	60	60	11	5	**250**	**315**
315	**400**	0	− 40	0	− 40	0	− 28	−	−	0	− 250	0	− 100	0	− 300	−	−	70	70	13	−	**315**	**400**

[Note] 1) Bearings with supplementary code “J” attached at the front of bearing number
Ex. JHM720249/JHM720210, and the like

Table 7-9 Tolerances for thrust ball bearings = JIS B 1514-2 =

(1) Shaft race and central race

Unit : μm

Nominal bore diameter of shaft or central race d or d_2, mm		Single plane mean bore diameter deviation Δ_{dmp} or Δ_{d2mp}				Single plane bore diameter variation V_{dsp} or V_{d2sp}		Race raceway to back face thickness variation S_i [1) 2)]			
		classes 0, 6, 5		class 4		classes 0, 6, 5	class 4	class 0	class 6	class 5	class 4
over	up to	upper	lower	upper	lower	max.		max.			
–	18	0	– 8	0	– 7	6	5	10	5	3	2
18	30	0	– 10	0	– 8	8	6	10	5	3	2
30	50	0	– 12	0	– 10	9	8	10	6	3	2
50	80	0	– 15	0	– 12	11	9	10	7	4	3
80	120	0	– 20	0	– 15	15	11	15	8	4	3
120	180	0	– 25	0	– 18	19	14	15	9	5	4
180	250	0	– 30	0	– 22	23	17	20	10	5	4
250	315	0	– 35	0	– 25	26	19	25	13	7	5
315	400	0	– 40	0	– 30	30	23	30	15	7	5
400	500	0	– 45	0	– 35	34	26	30	18	9	6
500	630	0	– 50	0	– 40	38	30	35	21	11	7
630	800	0	– 75	0	– 50	55	40	40	25	13	8
800	1 000	0	– 100	–	–	75	–	45	30	15	–
1 000	1 250	0	– 125	–	–	95	–	50	35	18	–

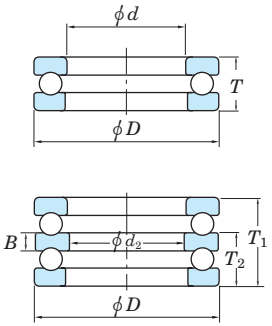
[Notes] 1) Double direction thrust ball bearings shall be included in d of single direction thrust ball bearings of the same diameter series and nominal outside diameter.
2) Applies only to thrust ball bearings and cylindrical roller thrust bearings with 90° contact angle.

(2) Housing race

Unit : μm

Nominal outside diameter D mm		Single plane mean outside diameter deviation Δ_{Dmp}				Single plane outside diameter variation V_{Dsp}		Race raceway to back face thickness variation S_e [1) 2)]
		classes 0, 6, 5		class 4		classes 0, 6, 5	class 4	classes 0, 6, 5, 4
over	up to	upper	lower	upper	lower	max.		max.
10	18	0	– 11	0	– 7	8	5	Shall conform to the tolerance S_i on d or d_2 of the same bearing
18	30	0	– 13	0	– 8	10	6	
30	50	0	– 16	0	– 9	12	7	
50	80	0	– 19	0	– 11	14	8	
80	120	0	– 22	0	– 13	17	10	
120	180	0	– 25	0	– 15	19	11	
180	250	0	– 30	0	– 20	23	15	
250	315	0	– 35	0	– 25	26	19	
315	400	0	– 40	0	– 28	30	21	
400	500	0	– 45	0	– 33	34	25	
500	630	0	– 50	0	– 38	38	29	
630	800	0	– 75	0	– 45	55	34	
800	1 000	0	– 100	0	– 60	75	45	
1 000	1 250	0	– 125	–	–	95	–	
1 250	1 600	0	– 160	–	–	120	–	

[Notes] 1) These shall be applied to race with flat back face only.
2) Applies only to thrust ball bearings and cylindrical roller thrust bearings with 90° contact angle.



d : shaft race nominal bore diameter
d_2 : central race nominal bore diameter
D : housing race nominal outside diameter
B : central race nominal height
T : nominal bearing height (single direction)
T_1, T_2 : nominal bearing height (double direction)

(3) Bearing height and central race height

Unit : μm

Nominal bore diameter d mm		Single direction		Double direction					
		Deviation of the actual bearing height Δ_{Ts}		Deviation of the actual bearing height Δ_{T1s} [1)]		Deviation of the actual bearing height Δ_{T2s} [1)]		Deviation of a single central race height B Δ_{Bs} [1)]	
		class 0		class 0		class 0		class 0	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower
–	30	*0*	*– 75*	*+ 50*	*– 150*	*0*	*– 75*	*0*	*– 50*
30	50	*0*	*– 100*	*+ 75*	*– 200*	*0*	*– 100*	*0*	*– 75*
50	80	*0*	*– 125*	*+ 100*	*– 250*	*0*	*– 125*	*0*	*– 100*
80	120	*0*	*– 150*	*+ 125*	*– 300*	*0*	*– 150*	*0*	*– 125*
120	180	*0*	*– 175*	*+ 150*	*– 350*	*0*	*– 175*	*0*	*– 150*
180	250	*0*	*– 200*	*+ 175*	*– 400*	*0*	*– 200*	*0*	*– 175*
250	315	*0*	*– 225*	*+ 200*	*– 450*	*0*	*– 225*	*0*	*– 200*
315	400	*0*	*– 300*	*+ 250*	*– 600*	*0*	*– 300*	*0*	*– 250*

[Note] 1) Double direction thrust ball bearings shall be included in d of single direction thrust ball bearings of the same diameter series and nominal outside diameter.

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

Table 7-10 Tolerances for spherical thrust roller bearings (class 0) = JIS B 1514-2 =

(1) Shaft race

Unit : μm

Nominal bore diameter d mm		Single plane mean bore diameter deviation Δ_{dmp}		Single plane bore diameter variation V_{dsp}	Refer. S_d	Refer. Actual bearing height deviation Δ_{Ts}	
over	up to	upper	lower	max.	max.	upper	lower
50	80	0	– 15	11	*25*	*+ 150*	*– 150*
80	120	0	– 20	15	*25*	*+ 200*	*– 200*
120	180	0	– 25	19	*30*	*+ 250*	*– 250*
180	250	0	– 30	23	*30*	*+ 300*	*– 300*
250	315	0	– 35	26	*35*	*+ 350*	*– 350*
315	400	0	– 40	30	*40*	*+ 400*	*– 400*
400	500	0	– 45	34	*45*	*+ 450*	*– 450*

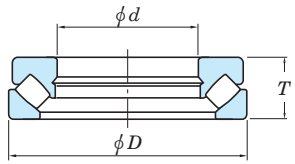
S_d : perpendicularity of inner ring face with respect to the bore

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

(2) Housing race

Unit : μm

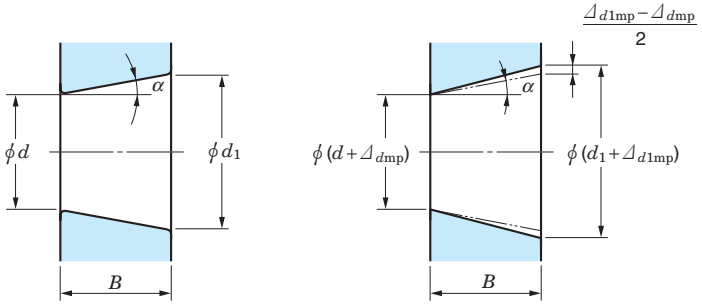
Nominal outside diameter D, mm		Single plane mean outside diameter deviation Δ_{Dmp}	
over	up to	upper	lower
120	180	0	– 25
180	250	0	– 30
250	315	0	– 35
315	400	0	– 40
400	500	0	– 45
500	630	0	– 50
630	800	0	– 75
800	1 000	0	– 100



d : shaft race nominal bore diameter
D : housing race nominal outside diameter
T : nominal bearing height

Table 7-11 Tolerances and permissible values for tapered bores of radial bearings

(class 0 ··· JIS B 1514-1)



Theoretical tapered bore

Tapered bore with single plane mean bore diameter deviation

(1) Basically tapered bore (taper 1:12) Unit : μm

Nominal bore diameter d, mm		Δ_{dmp}		$\Delta_{d1mp} - \Delta_{dmp}$		V_{dsp} [1]
over	up to	upper	lower	upper	lower	max.
–	10	+ 22	0	+ 15	0	9
10	18	+ 27	0	+ 18	0	11
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
180	250	+ 72	0	+ 46	0	46
250	315	+ 81	0	+ 52	0	52
315	400	+ 89	0	+ 57	0	57
400	500	+ 97	0	+ 63	0	63
500	630	+ 110	0	+ 70	0	70
630	800	+ 125	0	+ 80	0	–
800	1 000	+ 140	0	+ 90	0	–
1 000	1 250	+ 165	0	+ 105	0	–
1 250	1 600	+ 195	0	+ 125	0	–

(2) Basically tapered bore (taper 1:30) Unit : μm

Nominal bore diameter d, mm		Δ_{dmp}		$\Delta_{d1mp} - \Delta_{dmp}$		V_{dsp} [1]
over	up to	upper	lower	upper	lower	max.
–	50	+ 15	0	+ 30	0	19
50	80	+ 15	0	+ 30	0	19
80	120	+ 20	0	+ 35	0	22
120	180	+ 25	0	+ 40	0	40
180	250	+ 30	0	+ 46	0	46
250	315	+ 35	0	+ 52	0	52
315	400	+ 40	0	+ 57	0	57
400	500	+ 45	0	+ 63	0	63
500	630	+ 50	0	+ 70	0	70

[Note] 1) These shall be applied to all radial planes with tapered bore, not be applied to bearings of diameter series 7, 8.

[Remark] 1) Symbols of quantity d_1 : reference diameter at theoretical large end of tapered bore

$d_1 = d + \frac{1}{12}B$ or $d_1 = d + \frac{1}{30}B$

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 : $\frac{1}{2}$ of nominal tapered angle of tapered bore

(tapered ratio 1/12)	(tapered ratio 1/30)
$\alpha = 2°23'9.4''$	$\alpha = 0°57'17.4''$
$= 2.385\,94°$	$= 0.954\,84°$
$= 0.041\,643$ rad	$= 0.016\,665$ rad

Table 7-12 Tolerances and permissible values for flanged radial ball bearings

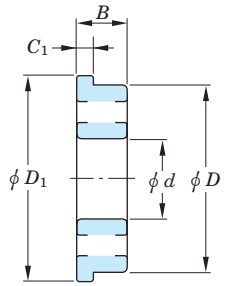
(1) Tolerances on flange outside diameters Unit : μm

Nominal outer ring flange outside diameter D_1 (mm)		Deviation of single outer ring flange outside diameter, Δ_{D1s}			
		Locating flange		Non-locating flange	
over	up to	upper	lower	upper	lower
–	6	0	– 36	+ 220	– 36
6	10	0	– 36	+ 220	– 36
10	18	0	– 43	+ 270	– 43
18	30	0	– 52	+ 330	– 52
30	50	0	– 62	+ 390	– 62
50	80	0	– 74	+ 460	– 74

(2) Tolerances and permissible values on flange widths and permissible values of running accuracies relating to flanges Unit : μm

Nominal outside diameter D (mm)		Deviation of single outer ring flange width Δ_{C1s} [1]	Variation of outer ring flange width V_{C1s} [1]				Perpendicularity of outer ring outside surface with respect to the flange back face S_{D1}						Axial runout of assembled bearing outer ring flange back face S_{ea1}				
							Deep groove ball bearings and angular contact ball bearings			Tapered roller bearings			Deep groove ball bearings and angular contact ball bearings			Tapered roller bearings	
		classes 0, 6, 5, 4, 2	classes 0, 6	class 5	class 4	class 2	class 5	class 4	class 2	class 5	class 4	class 2	class 5	class 4	class 2	class 4	class 2
over	up to	upper lower	max.				max.			max.			max.			max.	
–	2.5	Shall conform to the tolerance Δ_{Bs} on d of the same class and the bearing	Shall conform to the tolerance V_{Bs} on d of the same class and the bearing	5	2.5	1.5	8	4	1.5	8	4	1.5	11	7	3	7	4
2.5	6			5	2.5	1.5	8	4	1.5	8	4	1.5	11	7	3	7	4
6	18			5	2.5	1.5	8	4	1.5	8	4	1.5	11	7	3	7	4
18	30			5	2.5	1.5	8	4	1.5	8	4	1.5	11	7	4	7	4
30	50			5	2.5	1.5	8	4	1.5	8	4	2	11	7	4	7	4
50	80			6	3	1.5	8	4	1.5	8	4	2.5	14	7	6	7	6

[Note] 1) These shall be applied to groove ball bearings, i.e. deep groove ball bearing and angular contact ball bearing etc.



d : nominal bore diameter

D : nominal outside diameter

B : nominal assembled bearing width

D_1 : nominal outer ring flange outside diameter

C_1 : nominal outer ring flange width

Table 7-13 Permissible values for chamfer dimensions = JIS B 1514-3 =

(1) Radial bearing (tapered roller bearings excluded)

Unit : mm

$r_{\min}$ or $r_{1\min}$	Nominal bore diameter d mm		$r_{\max}$ or $r_{1\max}$	
	over	up to	Radial direction	Axial direction
0.05	–	–	0.1	0.2
0.08	–	–	0.16	0.3
0.1	–	–	0.2	0.4
0.15	–	–	0.3	0.6
0.2	–	–	0.5	0.8
0.3	–	40	0.6	1
	40	–	0.8	1
0.6	–	40	1	2
	40	–	1.3	2
1	–	50	1.5	3
	50	–	1.9	3
1.1	–	120	2	3.5
	120	–	2.5	4
1.5	–	120	2.3	4
	120	–	3	5
2	–	80	3	4.5
	80	220	3.5	5
	220	–	3.8	6
2.1	–	280	4	6.5
	280	–	4.5	7
2.5	–	100	3.8	6
	100	280	4.5	6
	280	–	5	7
3	–	280	5	8
	280	–	5.5	8
4	–	–	6.5	9
5	–	–	8	10
6	–	–	10	13
7.5	–	–	12.5	17
9.5	–	–	15	19
12	–	–	18	24
15	–	–	21	30
19	–	–	25	38

[Remarks]

1. Value of $r_{\max}$ or $r_{1\max}$ in the axial direction of bearings with nominal width lower than 2 mm shall be the same as the value in radial direction.
2. 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.

(2) Radial bearings with locating snap ring (snap ring groove side) and cylindrical roller bearings (separete thrust collar and loose rib side)

Unit : mm

$r_{1\min}$	Nominal bore dia. or nominal outside dia. d or D		$r_{1\max}$	
	over	up to	Radial direction	Axial direction
0.2	–	–	0.5	0.5
0.3	–	40	0.6	0.8
	40	–	0.8	0.8
0.5	–	40	1	1.5
	40	–	1.3	1.5
0.6	–	40	1	1.5
	40	–	1.3	1.5
1	–	50	1.5	2.2
	50	–	1.9	2.2
1.1	–	120	2	2.7
	120	–	2.5	2.7
1.5	–	120	2.3	3.5
	120	–	3	3.5
2	–	80	3	4
	80	220	3.5	4
	220	–	3.8	4
2.1	–	280	4	4.5
	280	–	4.5	4.5
2.5	–	100	3.8	5
	100	280	4.5	5
	280	–	5	5
3	–	280	5	5.5
	280	–	5.5	5.5
4	–	–	6.5	6.5
5	–	–	8	8
6	–	–	10	10

[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 $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

(3) Cylindrical roller bearings (non-rib side) and angular contact ball bearings (front face side)

Unit : mm

$r_{1\min}$	Nominal bore dia. or nominal outside dia. d or D		$r_{1\max}$	
	over	up to	Radial direction	Axial direction
0.1	–	–	0.2	0.4
0.15	–	–	0.3	0.6
0.2	–	–	0.5	0.8
0.3	–	40	0.6	1
	40	–	0.8	1
0.6	–	40	1	2
	40	–	1.3	2
1	–	50	1.5	3
	50	–	1.9	3
1.1	–	120	2	3.5
	120	–	2.5	4
1.5	–	120	2.3	4
	120	–	3	5
2	–	80	3	4.5
	80	220	3.5	5
	220	–	3.8	6

[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 $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

(4) Metric series tapered roller bearing

Unit : mm

$r_{\min}$ or $r_{1\min}$	Nominal bore dia. or nominal outside dia.[1] d or D, mm		$r_{\max}$ or $r_{1\max}$	
	over	up to	Radial direction	Axial direction
0.3	–	40	0.7	1.4
	40	–	0.9	1.6
0.6	–	40	1.1	1.7
	40	–	1.3	2
1	–	50	1.6	2.5
	50	–	1.9	3
1.5	–	120	2.3	3
	120	250	2.8	3.5
	250	–	3.5	4
2	–	120	2.8	4
	120	250	3.5	4.5
	250	–	4	5
2.5	–	120	3.5	5
	120	250	4	5.5
	250	–	4.5	6
3	–	120	4	5.5
	120	250	4.5	6.5
	250	400	5	7
	400	–	5.5	7.5
4	–	120	5	7
	120	250	5.5	7.5
	250	400	6	8
	400	–	6.5	8.5
5	–	180	6.5	8
	180	–	7.5	9
6	–	180	7.5	10
	180	–	9	11
7.5	–	–	*12.5*	*17*
9.5	–	–	*15*	*19*

[Note] 1) Inner ring shall be included in division d, and outer ring, in division D.

[Remarks]

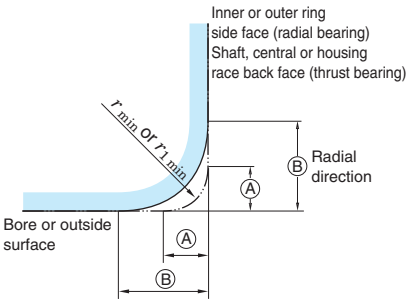
1. There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{\min}$ or $r_{1\min}$ which contacts the inner ring back face and bore, or the outer ring back face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

(5) Thrust bearing

Unit : mm

$r_{\min}$ or $r_{1\min}$	$r_{\max}$ or $r_{1\max}$
	Radial and axial direction
0.05	0.1
0.08	0.16
0.1	0.2
0.15	0.3
0.2	0.5
0.3	0.8
0.6	1.5
1	2.2
1.1	2.7
1.5	3.5
2	4
2.1	4.5
3	5.5
4	6.5
5	8
6	10
7.5	12.5
9.5	15
12	18
15	21
19	25

[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 with the shaft or central race back face and bore, or the housing race back face and outside surface.



(Ⓐ : $r_{\min}$ or $r_{1\min}$
Ⓑ : $r_{\max}$ or $r_{1\max}$)

7-2 Tolerance measuring method (reference)

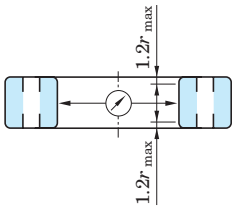
The details on measuring methods for bearings are prescribed in JIS B 1515.

This section outlines measuring methods for dimensional and running accuracy.

Dimensional accuracy (1)

Bore diameter (d) Cylindrical bore bearings

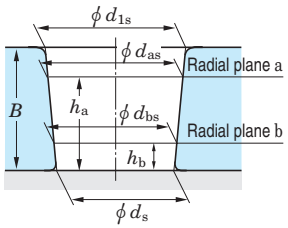
Obtain the maximum value ($d_{sp\,max}$) and the minimum value ($d_{sp\,min}$) of the bore diameter (d_s) acquired in a single radial plane.
Obtain the single plane mean bore diameter (d_{mp}) as the arithmetic mean value of the maximum value ($d_{sp\,max}$) and minimum values ($d_{sp\,min}$).



$$d_{mp} = \frac{d_{sp\,max} + d_{sp\,min}}{2}$$

Single plane mean bore diameter deviation ;
$\Delta_{dmp} = d_{mp} - d$
Bore diameter variation in a single plane ;
$V_{dsp} = d_{sp\,max} - d_{sp\,min}$
Mean bore diameter variation ;
$V_{dmp} = d_{mp\,max} - d_{mp\,min}$
Deviation of a single bore diameter ;
$\Delta_{ds} = d_s - d$

Bore diameter (d) Tapered bore bearings



Bore diameter at the theoretical small end and bore diameter at the theoretical large end ;

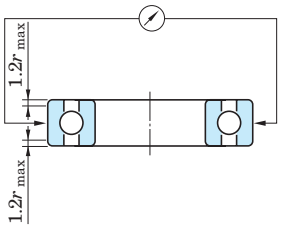
$$d_s = \frac{d_{bs} \cdot h_a - d_{as} \cdot h_b}{h_a - h_b}$$

$$d_{1s} = \frac{d_{as}\,(B - h_b) - d_{bs}\,(B - h_a)}{h_a - h_b}$$

Single plane mean bore diameter deviation at the theoretical small end ;
$\Delta_{dmp} = d_{mp} - d$
Deviation on taper ;
$(\Delta_{d1mp} - \Delta_{dmp}) = (d_{1mp} - d_1) - (d_{mp} - d)$
Bore diameter variation in a single plane ;
$V_{dsp} = d_{sp\,max} - d_{sp\,min}$

Outside diameter (D)

Obtain the single plane mean outside diameter (D_{mp}) as the arithmetical mean value of the maximum value ($D_{sp\,max}$) and the minimum value ($D_{sp\,min}$) of the outside diameters (D_s) acquired in a single radial plane.

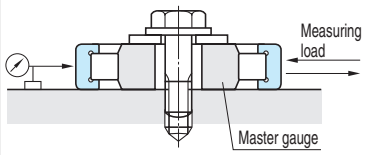


$$D_{mp} = \frac{D_{sp\,max} + D_{sp\,min}}{2}$$

Single plane mean outside diameter deviation ;
$\Delta_{Dmp} = D_{mp} - D$
Outside diameter variation in a single plane ;
$V_{Dsp} = D_{sp\,max} - D_{sp\,min}$
Mean outside diameter variation ;
$V_{Dmp} = D_{mp\,max} - D_{mp\,min}$
Deviation of a single outside diameter ;
$\Delta_{Ds} = D_s - D$

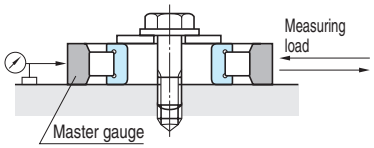
Dimensional accuracy (2)

Roller set bore diameter (F_w)



Deviation of the roller set bore diameter ;
$\Delta_{Fw} = (d_G + \delta_{1m}) - F_w$
Deviation of the minimum diameter of the roller set bore diameter ;
$\Delta_{Fw\,min} = (d_G + \delta_{1min}) - F_w$
(d_G) outside diameter of the master gauge
(δ_{1m}) arithmetical mean value of the amount of movement of the outer ring
(δ_{1min}) minimum value of the amount of movement of the outer ring

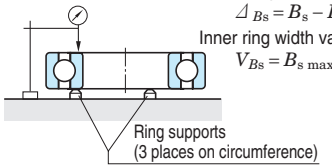
Roller set outside diameter (E_w)



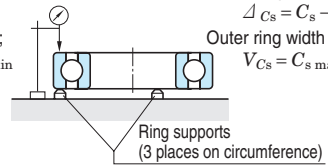
Deviation of the roller set outside diameter ;
$\Delta_{Ew} = (D_G + \delta_{2m}) - E_w$
(D_G) bore diameter of the master gauge
(δ_{2m}) arithmetical mean value of the amount of movement of the master gauge

Inner ring width (B)

Outer ring width (C)

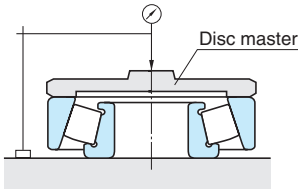


Deviation of a single inner ring width ;
$\Delta_{Bs} = B_s - B$
Inner ring width variation ;
$V_{Bs} = B_{s\,max} - B_{s\,min}$



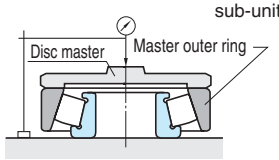
Deviation of a single outer ring width ;
$\Delta_{Cs} = C_s - C$
Outer ring width variation ;
$V_{Cs} = C_{s\,max} - C_{s\,min}$

Assembled bearing width of tapered roller bearing (T)

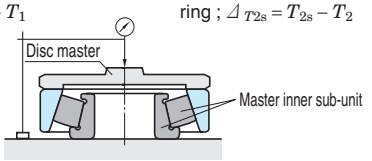


Deviation of the actual bearing width ; $\Delta_{Ts} = T_s - T$

Nominal effective width of tapered roller bearing (T_1, T_2)

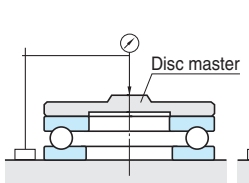


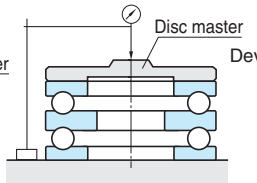
Deviation of the actual effective width of inner sub-unit ; $\Delta_{T1s} = T_{1s} - T_1$



Deviation of the actual effective width of outer ring ; $\Delta_{T2s} = T_{2s} - T_2$

Nominal height of thrust ball bearing with flat back face (T, T_1)

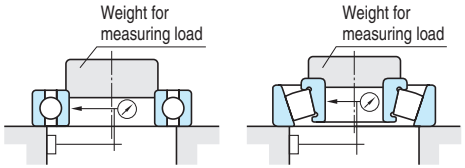




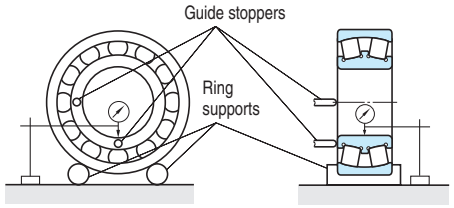
Deviation of the actual bearing height ;
$\Delta_{Ts} = T_s - T$ (single direction)
$\Delta_{T1s} = T_{1s} - T_1$ (double direction)

Running accuracy (1)

Radial runout of assembled bearing inner ring (K_{ia})

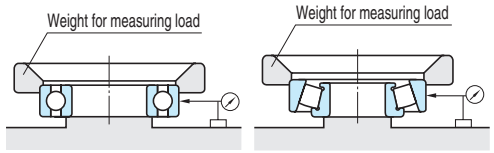


The radial runout of the inner ring (K_{ia}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation.

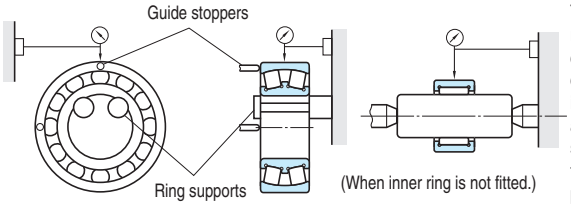


[Note]
The measurement of the radial runout of the inner ring of cylindrical roller bearings, machined ring needle roller bearings, self-aligning ball bearings and spherical roller bearings shall be carried out by fixing the outer ring with ring supports.

Radial runout of assembled bearing outer ring (K_{ea})

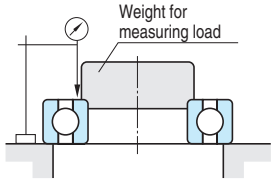


The measurement of outer ring runout (K_{ea}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation.



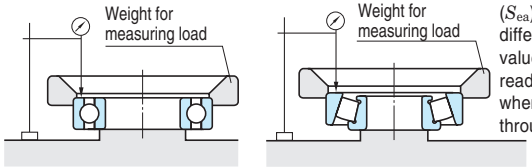
[Note]
The measurement of the radial runout of the outer ring of cylindrical roller bearings, machined ring needle roller bearings, self-aligning ball bearings and spherical roller bearings shall be carried out by fixing the inner ring with ring supports.

Axial runout of assembled bearing inner ring (S_{ia})



The axial runout of the inner ring (S_{ia}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation.

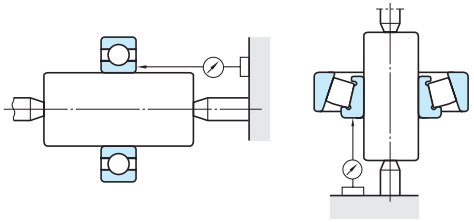
Axial runout of assembled bearing outer ring (S_{ea})



The axial runout of the outer ring (S_{ea}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation.

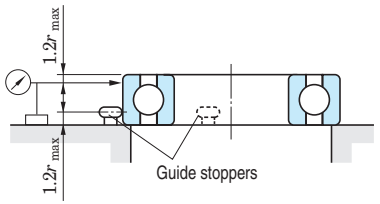
Running accuracy (2)

Perpendicularity of inner ring face with respect to the bore (S_d)



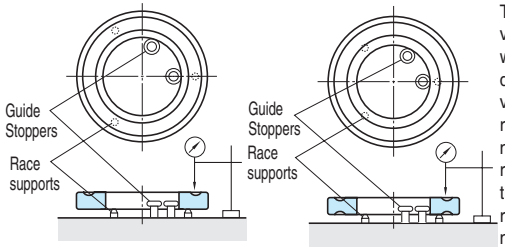
Perpendicularity of inner ring face (S_d) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation with the tapered arbor.

Perpendicularity of outer ring outside surface with respect to the face (S_D)



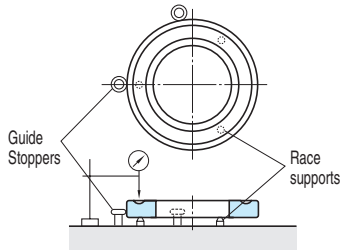
Perpendicularity of outer ring outside surface (S_D) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation along the guide stopper.

Shaft/central race raceway to back face thickness variation of thrust ball bearing with flat back face (S_i)



The measurement of the thickness variation (S_i) of shaft race raceway track shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the shaft race has been rotated through one rotation along the guide stopper. For the central race, carry out the same measurement for the two raceway grooves to obtain the thickness variation of the raceway track (S_i).

Housing race raceway to back face thickness variation of thrust ball bearing with flat back face (S_e)



The measurement of the thickness variation (S_e) of housing race raceway track shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the housing race has been rotated through one rotation along the guide stopper.

8. Limiting 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 limiting speed is the highest speed at which a bearing can continuously operate without generating such critical heat.

The limiting speed differs depending on various factors including bearing type, dimensions and their accuracy, lubrication, lubricant type and amount, shapes of cages and materials and load conditions, etc.

The limiting speed determined under grease lubrication and oil lubrication (oil bath) for each bearing type are listed in the bearing specification table.

These speeds are applied when bearings of standard design are rotated under normal load conditions (approximately, $C/P \geqq 13$, $F_a/F_r \leqq 0.25$).

Each lubricant has superior performance in use, according to type.

Some are not suitable for high speed ; when bearing rotational speed exceeds 80 % of catalog specification, consult with JTEKT.

8-1 Correction of limiting speed

When the load condition is $C/P < 13$, i.e. the dynamic equivalent load P exceeds approximately 8 % of basic dynamic load rating C, or when a combined load in which the axial load is greater than 25 % of radial load is applied, the limiting speed should be corrected by using equation (8-1) :

$$n_a = f_1 \cdot f_2 \cdot n \quad \cdots\cdots (8\text{-}1)$$

where :

n_a	: corrected limiting speed	min^{-1}
f_1	: correction coefficient determined from the load magnitude (Fig. 8-1)	
f_2	: correction coefficient determined from combined load (Fig. 8-2)	
n	: limiting speed under normal load condition (values in the bearing specification table)	min^{-1}
C	: basic dynamic load rating	N
P	: dynamic equivalent load	N
F_r	: radial load	N
F_a	: axial load	N

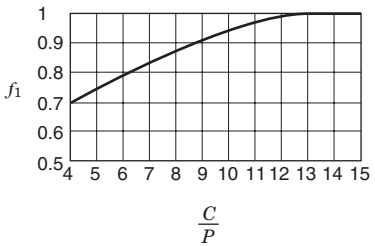


Fig. 8-1 Values of correction coefficient f_1 of load magnitude

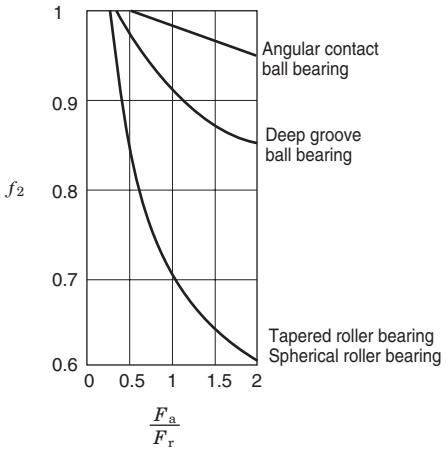


Fig. 8-2 Values of correction coefficient f_2 of combined load

8-2 Limiting speed for sealed ball bearings

The limiting speed of ball bearings with a contact seal (RS, RK type) are determined by the rubbing speed at which the seal contacts the inner ring. These allowable rubbing speeds differ depending on seal rubber materials; and, for ball bearings with the Koyo standard contact type seal (NBR), a rubbing speed of 15 m/s is utilized.

8-3 Considerations for high speed

When bearings are used for high speed, especially when the rotation speed approaches the limiting speed or exceeds it, the following should be considered :
(for further information on high speed, consult with JTEKT)

(1) Use of high precision bearings
(2) Study of proper internal clearance
  - Reduction in internal clearance caused by temperature increase should be considered.
(3) Selection of proper cage type and materials
  - For high speed, copper alloy or phenolic resin machined cages are suitable. Synthetic resin molded cages for high speed are also available.
(4) Selection of proper lubrication
  - Suitable lubrication for high speed should be selected jet lubrication, oil mist lubrication and oil air lubrication, etc.

8-4 Frictional coefficient (reference)

The frictional moment of rolling bearings can be easily compared with that of plain bearings. The frictional moment of rolling bearings can be obtained from their bore diameter, using the following equation :

$$M = \mu P \frac{d}{2} \quad \cdots\cdots (8\text{-}2)$$

where :

M	: frictional moment	mN · m
μ	: frictional coefficient	
P	: load on the bearing	N
d	: nominal bore diameter	mm

The friction coefficient is greatly dependent on bearing type, bearing load, rotation speed and lubrication, etc.

Reference values for the friction coefficient during stable operation under normal operating conditions are listed in Table 8-1.

For plain bearings, the value is normally 0.01 to 0.02 ; but, for certain cases, it is 0.1 to 0.2.

Table 8-1 Friction coefficient μ

Bearing type	Friction coefficient μ
Deep groove ball bearing	0.001 0 – 0.001 5
Angular contact ball bearing	0.001 2 – 0.002 0
Self-aligning ball bearing	0.000 8 – 0.001 2
Cylindrical roller bearing	
Full complement type needle roller bearing	0.002 5 – 0.003 5
Needle roller and cage assembly	0.002 0 – 0.003 0
Tapered roller bearing	0.001 7 – 0.002 5
Spherical roller bearing	0.002 0 – 0.002 5
Thrust ball bearing	0.001 0 – 0.001 5
Spherical thrust roller bearing	0.002 0 – 0.002 5

9. Bearing fits

9-1 Purpose of fit

The purpose of fit is to securely fix the inner or outer ring to the shaft or housing, to preclude detrimental circumferential sliding on the fitting surface.

Such detrimental sliding (referred to as "creep") will cause abnormal heat generation, wear of the fitting surface, infiltration of abrasion metal particles into the bearing, vibration, and many other harmful effects, which cause a deterioration of bearing functions.

Therefore, it is necessary to fix the bearing ring which is rotating under load to the shaft or housing with interference.

9-2 Tolerance and fit for shaft & housing

For metric series bearings, tolerances for the shaft diameter and housing bore diameter are standardized in JIS B 0401-1 and 0401-2 "ISO system of limits and fits - Part 1 and Part 2" (based on ISO 286; shown in Appendixes at the back of this catalogue). Bearing fits on the shaft and housing are determined based on the tolerances specified in the above standard.

Fig. 9-1 shows the relationship between tolerances for shaft and housing bore diameters and fits for bearings of class 0 tolerance.

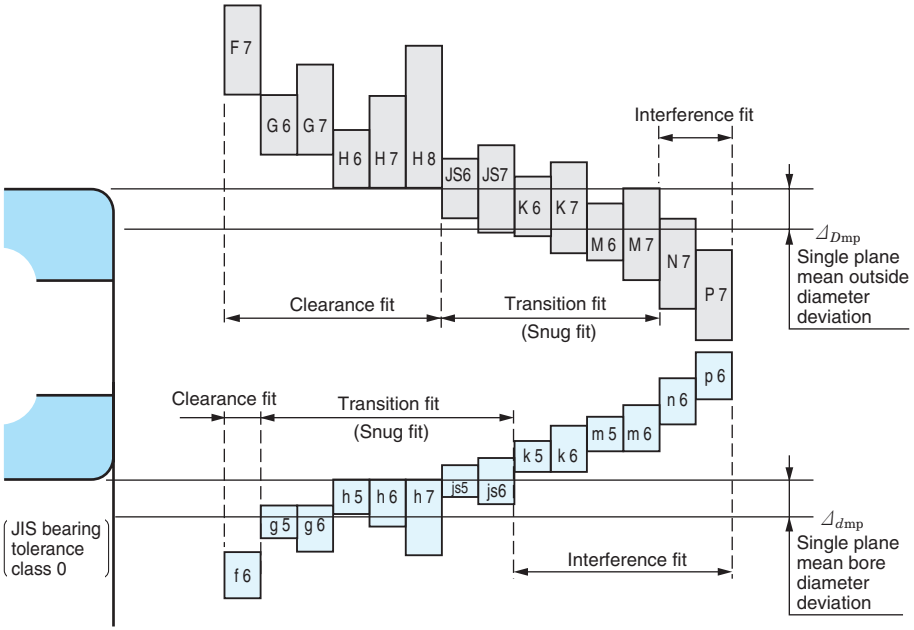


Fig. 9-1 Relationship between tolerances for shaft/housing bore diameters and fits (bearings of class 0 tolerance)

9-3 Fit selection

In selecting the proper fit, careful consideration should be given to bearing operating conditions.

Major specific considerations are :

- Load characteristics and magnitude
- Temperature distribution in operating
- Bearing internal clearance
- Surface finish, material and thickness of shaft and housing
- Mounting and dismounting methods
- Necessity to compensate for shaft thermal expansion at the fitting surface
- Bearing type and size

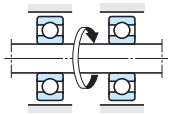
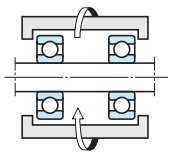
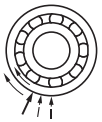
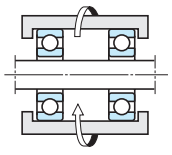
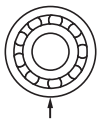
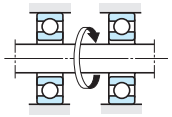
In view of these considerations, the following paragraphs explain the details of the important factors in fit selection.

1) Load characteristics

Load characteristics are classified into three types : rotating inner ring load; rotating outer ring load and indeterminate direction load.

Table 9-1 tabulates the relationship between these characteristics and fit.

Table 9-1 Load characteristics and fits

Rotation pattern	Direction of load	Loading conditions	Fit		Typical application
			Inner ring & shaft	Outer ring & housing	
 Inner ring : rotating Outer ring : stationary	 Stationary	Rotating inner ring load Stationary outer ring load	Interference fit necessary (k, m, n, p, r)	Clearance fit acceptable (F, G, H, JS)	Spur gear boxes, motors
 Inner ring : stationary Outer ring : rotating	 Rotating (with outer ring)				Greatly unbalanced wheels
 Inner ring : stationary Outer ring : rotating	 Stationary	Stationary inner ring load Rotating outer ring load	Clearance fit acceptable (f, g, h, js)	Interference fit necessary (K, M, N, P)	Running wheels & pulleys with stationary shaft
 Inner ring : rotating Outer ring : stationary	 Rotating (with inner ring)				Shaker screens (unbalanced vibration)
Indeterminate	Rotating or stationary	Indeterminate direction load	Interference fit	Interference fit	Cranks

2) Effect of load magnitude

When a radial load is applied, the inner ring will expand slightly. Since this expansion enlarges the circumference of the bore minutely, the initial interference is reduced.

The reduction can be calculated by the following equations :

[In the case of $F_r \leqq 0.25\ C_0$]

$$\Delta_{dF} = 0.08 \sqrt{\frac{d}{B} \cdot F_r} \times 10^{-3} \quad \cdots\cdots (9\text{-}1)$$

[In the case of $F_r > 0.25\ C_0$]

$$\Delta_{dF} = 0.02 \frac{F_r}{B} \times 10^{-3} \quad \cdots\cdots (9\text{-}2)$$

where:

Δ_{dF}	: reduction of inner ring interference	mm
d	: nominal bore diameter of bearing	mm
B	: nominal inner ring width	mm
F_r	: radial load	N
C_0	: basic static load rating	N

Consequently, when the radial load, exceeds the C_0 value by more than 25 %, greater interference is needed.

Much greater interference is needed, when impact loads are expected.

3) Effect of fitting surface roughness

The effective interference obtained after fitting differs from calculated interference due to plastic deformation of the ring fitting surface. When the inner ring is fitted, the effective interference, subject to the effect of the fitting surface finish, can be approximated by the following equations :

[In the case of a ground shaft]

$$\Delta_{deff} \fallingdotseq \frac{d}{d+2} \Delta_d \quad \cdots\cdots (9\text{-}3)$$

[In the case of a turned shaft]

$$\Delta_{deff} \fallingdotseq \frac{d}{d+3} \Delta_d \quad \cdots\cdots (9\text{-}4)$$

where:

Δ_{deff}	: effective interference	mm
Δ_d	: calculated interference	mm
d	: nominal bore diameter of bearing	mm

4) Effect of temperature

A bearing generally has an operating temperature, higher than the ambient temperature. When the inner ring operates under load, its temperature generally becomes higher than that of the shaft and the effective interference decreases due to the greater thermal expansion of the inner ring.

If the assumed temperature difference between the bearing inside and surrounding housing is Δ_t, the temperature difference at the fitting surfaces of the inner ring and shaft will be approximately (0.10 to 0.15) $\times \Delta_t$.

The reduction of interference (Δ_{dt}) due to temperature difference is then expressed as follows :

$$\Delta_{dt} = (0.10 \text{ to } 0.15)\ \Delta_t \cdot \alpha \cdot d$$
$$\fallingdotseq 0.001\ 5\ \Delta_t \cdot d \times 10^{-3} \quad \cdots\cdots (9\text{-}5)$$

where:

Δ_{dt}	: reduction of interference due to temperature difference	mm
Δ_t	: temperature difference between the inside of the bearing and the surrounding housing	℃
α	: linear expansion coefficient of bearing steel ($\fallingdotseq 12.5 \times 10^{-6}$)	1/℃
d	: nominal bore diameter of bearing	mm

Consequently, when a bearing is higher in temperature than the shaft, greater interference is required.

However, a difference in temperature or in the coefficient of expansion may sometimes increase the interference between outer ring and housing. Therefore, when clearance is provided to accommodate shaft thermal expansion, care should be taken.

5) Maximum stress due to fit

When a bearing is fitted with interference, the bearing ring will expand or contract, generating internal stress.

Should this stress be excessive, the bearing ring may fracture.

The maximum bearing fitting-generated stress is determined by the equation in Table 9-2.

In general, to avoid fracture, it is best to adjust the maximum interference to less than 1/1 000 of the shaft diameter, or the maximum stress (σ), determined by the equation in Table 9-2, should be less than 120 MPa.

6) Other considerations

When a high degree of accuracy is required, the tolerance of the shaft and housing must be improved. Since the housing is generally less easy to machine precisely than the shaft, it is advisable to use a clearance fit on the outer ring.

With hollow shafts or thin section housings, greater than normal interference is needed.

With split housings, on the other hand, smaller interference with outer ring is needed.

When the housing is made of aluminum or other light metal alloy, relatively greater than normal interference is needed.

In such a case, consult with JTEKT.

Table 9-2 Maximum fitting-generated stress in bearings

Shaft & inner ring	Housing bore & outer ring
(In the case of hollow shaft) $\sigma = \frac{E}{2} \cdot \frac{\Delta_{deff}}{d} \cdot \frac{\left(1 - \frac{d_0^2}{d^2}\right)\left(1 + \frac{d^2}{D_i^2}\right)}{\left(1 - \frac{d_0^2}{D_i^2}\right)}$	(In the case of $D_h \neq \infty$) $\sigma = E \cdot \frac{\Delta_{Deff}}{D} \cdot \frac{\left(1 - \frac{D^2}{D_h^2}\right)}{\left(1 - \frac{D_e^2}{D_h^2}\right)}$
(In the case of solid shaft) $\sigma = \frac{E}{2} \cdot \frac{\Delta_{deff}}{d} \cdot \left(1 + \frac{d^2}{D_i^2}\right)$	(In the case of $D_h = \infty$) $\sigma = E \cdot \frac{\Delta_{Deff}}{D}$

where :

σ	: maximum stress	MPa	D_e	: raceway contact diameter of outer ring	mm
d	: nominal bore diameter (shaft diameter)	mm		ball bearing ····· $D_e \fallingdotseq 0.2\ (4D + d)$ roller bearing ··· $D_e \fallingdotseq 0.25\ (3D + d)$	
D_i	: raceway contact diameter of inner ring	mm	D	: nominal outside diameter (bore diameter of housing)	mm
	ball bearing ····· $D_i \fallingdotseq 0.2\ (D + 4d)$ roller bearing ··· $D_i \fallingdotseq 0.25\ (D + 3d)$		Δ_{Deff}	: effective interference of outer ring	mm
Δ_{deff}	: effective interference of inner ring	mm	D_h	: outside diameter of housing	mm
d_0	: bore diameter of hollow shaft	mm	E	: young's modulus	2.08×10^5 MPa

[Remark] The above equations are applicable when the shaft and housing are steel. When other materials are used, JTEKT should be consulted.

9-4 Recommended fits

As described in Section 9-3, the characteristics / magnitude of the bearing load, temperature, mounting / dismounting methods and other conditions must be considered to choose proper fits.

Past experience is also valuable.

Table 9-3 shows standard fits for the metric series bearings; Tables 9-4 to 9-8 tabulate the most typical and recommended fits for different bearings types.

Table 9-3 Standard fits for metric series bearings [1)]

(1) Fits for bore diameter [2)] of radial bearings

Class of bearing	Rotating inner ring load or indeterminate direction load							Stationary inner ring load		
	Class of shaft tolerance range									
Classes 0, 6X, 6	r 6	p 6	n 6	m 6 m 5	k 6 k 5	js 6 js 5	h 5	h 6 h 5	g 6 g 5	f 6
Class 5	–	–	–	m 5	k 4	js 4	h 4	h 5	–	–
Fit	Interference fit					Transition fit				Clearance fit

(2) Fits for outside diameter [2)] of radial bearings

Class of bearing	Stationary outer ring load				Indeterminate direction load or rotating outer ring load				
	Class of housing bore tolerance range								
Classes 0, 6X, 6	G 7	H 7 H 6	JS 7 JS 6	–	JS 7 JS 6	K 7 K 6	M 7 M 6	N 7 N 6	P 7
Class 5	–	H 5	JS 5	K 5	–	K 5	M 5	–	–
Fit	Clearance fit		Transition fit						Interference fit

(3) Fits for bore diameter [2)] of thrust bearings

Class of bearing	Central axial load (generally for thrust bearings)		Combined load (in the case of spherical thrust roller bearing)			
			Rotating shaft race load or indeterminate direction load			Stationary shaft race load
	Class of shaft tolerance range					
Classes 0, 6	js 6	h 6	n 6	m 6	k 6	js 6
Fit	Transition fit		Interference fit			Transition fit

(4) Fits for outside diameter [2)] of thrust bearings

Class of bearing	Central axial load (generally for thrust bearings)	Combined load (in the case of spherical thrust roller bearing)				
		Stationary housing race load or indeterminate direction load			Rotating housing race load	
	Class of housing bore tolerance range					
Classes 0, 6	–	H 8	G 7	H 7	JS 7	K 7	M 7
Fit	Clearance fit				Transition fit		

[Notes] 1) Bearings specified in JIS B 1512
2) Follow JIS B 1514-1 and 1514-2 for tolerance.

Table 9-4 (1) Recommended shaft fits for radial bearings (classes 0, 6X, 6)

Conditions [1)]		Ball bearing		Cylindrical roller bearing Tapered roller bearing		Spherical roller bearing		Class of shaft tolerance range	Remarks	Applications (for reference)
		Shaft diameter (mm)								
		over	up to	over	up to	over	up to			
Cylindrical bore bearing (classes 0, 6X, 6)										
Rotating inner ring load or indeterminate direction load	Light load or fluctuating load $\left(\frac{P_r}{C_r} \leqq 0.06\right)$	–	18	–	–	–	–	h 5	For applications requiring high accuracy, js 5,k 5 and m 5 should be used in place of js 6, k 6 and m 6.	Electric appliances, machine tools, pumps, blowers, carriers etc.
		18	100	–	40	–	–	js 6		
		100	200	40	140	–	–	k 6		
		–	–	140	200	–	–	m 6		
	Normal load $\left(0.06 < \frac{P_r}{C_r} \leqq 0.12\right)$	–	18	–	–	–	–	js 5	For single-row tapered roller bearings and angular contact ball bearings, k 5 and m 5 may be replaced by k 6 and m 6, because internal clearance reduction due to fit need not be considered.	Electric motors, turbines, internal combustion engines, wood-working machines etc.
		18	100	–	40	–	40	k 5		
		100	140	40	100	40	65	m 5		
		140	200	100	140	65	100	m 6		
		200	280	140	200	100	140	n 6		
		–	–	200	400	140	280	p 6		
		–	–	–	–	280	500	r 6		
	Heavy load or impact load $\left(\frac{P_r}{C_r} > 0.12\right)$	–	–	50	140	50	100	n 6	Bearings with larger internal clearance than standard are required.	Railway rolling stock axle journals, traction motors
		–	–	140	200	100	140	p 6		
		–	–	200	–	140	200	r 6		
Stationary inner ring load	Inner ring needs to move smoothly on shaft.	All shaft diameters						g 6	For applications requiring high accuracy, g 5 should be used. For large size bearing, f 6 may be used for easier movement.	Stationary shaft wheels
	Inner ring does not need to move smoothly on shaft.	All shaft diameters						h 6	For applications requiring high accuracy, h 5 should be used.	Tension pulleys, rope sheaves etc.
Central axial load only		All shaft diameters						js 6	–	–
Tapered bore bearing (class 0) (with adapter or withdrawal sleeve)										
All loads		All shaft diameters						h 9/IT 5 [2)]	For transmission shafts, h 10/IT 7 [2)] may be applied.	

[Notes] 1) Light, normal, and heavy loads refer to those with dynamic equivalent radial loads (P_r) of 6 % or lower, over 6 % up to 12 % inclusive, and over 12 % respectively in relation to the basic dynamic radial load rating (C_r) of the bearing concerned.
2) IT 5 and IT 7 mean that shaft roundness tolerance, cylindricity tolerance, and other errors in terms of shape should be within the tolerance range of IT 5 and IT 7, respectively. For numerical values for standard tolerance grades IT 5 and IT 7, refer to supplementary table at end of this catalog.

[Remark] This table is applicable to solid steel shafts.

Table 9-4 (2) Recommended housing fits for radial bearings (classes 0, 6X, 6)

Conditions				Class of housing bore tolerance range	Remarks	Applications (for reference)
Housing	Load type etc.[1]		Outer ring axial displacement[2]			
One-piece or split type	Stationary outer ring load	All load types	Easily displaceable	H 7	G 7 may be applied when a large size bearing is used, or if the temperature difference is large between the outer ring and housing.	Ordinary bearing devices, railway rolling stock axle boxes, power transmission equipment etc.
		Light or normal load		H 8	–	
		High temperature at shaft and inner ring		G 7	F 7 may be applied when a large size bearing is used, or if the temperature difference is large between the outer ring and housing.	Drying cylinders etc.
One-piece type		Light or normal load, requiring high running accuracy	Not displaceable in principle	K 6	Mainly applied to roller bearings.	
			Displaceable	JS 6	Mainly applied to ball bearings.	
		Requiring low-noise rotation	Easily displaceable	H 6	–	
	Indeterminate direction load	Light or normal load	Normally displaceable	JS 7	For applications requiring high accuracy, JS 6 and K 6 should be used in place of JS 7 and K 7.	Electric motors, pumps, crankshaft main bearings etc.
		Normal or heavy load	Not displaceable in principle	K 7		
		High impact load	Not displaceable	M 7	–	Traction motors etc.
	Rotating outer ring load	Light or fluctuating load	Not displaceable	M 7	–	Conveyor rollers, ropeways, tension pulleys etc.
		Normal or heavy load		N 7	Mainly applied to ball bearings.	Wheel hubs with ball bearings etc.
		Thin section housing, heavy or high impact load		P 7	Mainly applied to roller bearings.	Wheel hubs with roller bearings, bearings for large end of connecting rods etc.

[Notes] 1) Loads are classified as stated in Note 1) to Table 9-4 (1).
2) Indicating distinction between applications of non-separable bearings permitting and not permitting axial displacement of the outer rings.

[Remarks] 1. This table is applicable to cast iron or steel housings.
2. If only central axial load is applied to the bearing, select such tolerance range class as to provide clearance in the radial direction for outer ring.

Table 9-5 (1) Recommended shaft fits for precision extra-small/miniature ball bearings ($d < 10$ mm)

Unit : μm

Load type		Bearing tolerance class	Single plane mean bore diameter deviation Δ_{dmp}		Shaft diameter dimensional tolerance		Fit[1]	Applications
			upper	lower	upper	lower		
Rotating inner ring load	Middle/high speed Light or normal load	ABMA 5P JIS class 5	0 0	−5.1 −5	+2.5	−2.5	7.6T − 2.5L 7.5T − 2.5L	Gyro rotors, air cleaners, electric tools, encoders
		ABMA 7P JIS class 4	0 0	−5.1 −4	+2.5	−2.5	7.6T − 2.5L 6.5T − 2.5L	
	Low speed Light load	ABMA 5P JIS class 5	0 0	−5.1 −5	−2.5	−7.5	2.6T − 7.5L 2.5T − 7.5L	Gyro gimbals, synchronizers, servomotors, floppy disc spindles
		ABMA 7P JIS class 4	0 0	−5.1 −4	−2.5	−7.5	2.6T − 7.5L 1.5T − 7.5L	
Rotating outer ring load	Low to high speed Light load	ABMA 5P JIS class 5	0 0	−5.1 −5	−2.5	−7.5	2.6T − 7.5L 2.5T − 7.5L	Pinch rolls, tape guide rollers, linear actuators
		ABMA 7P JIS class 4	0 0	−5.1 −4	−2.5	−7.5	2.6T − 7.5L 1.5T − 7.5L	

[Note] 1) Symbols T and L means interference and clearance respectively.

Table 9-5 (2) Recommended housing fits for precision extra-small/miniature ball bearings ($D \leqq 30$ mm)

Unit : μm

Load type		Bearing tolerance class	Single plane mean outside diameter deviation Δ_{Dmp}		Housing bore diameter dimensional tolerance		Fit[1]	Applications
			upper	lower	upper	lower		
Rotating inner ring load	Middle/high speed Light or normal load	ABMA 5P ABMA 7P	0	−5.1	+5	0	0 − 10.1L	Gyro rotors, air cleaners, electric tools, encoders
		JIS class 5[2]	0 0	−5 −6	+5	0	0 − 10 L 0 − 11 L	
		JIS class 4[2]	0 0	−4 −5	+5	0	0 − 9 L 0 − 10 L	
	Low speed Light load	ABMA 5P ABMA 7P	0	−5.1	+2.5	−2.5	2.5T − 7.6L	Gyro gimbals, synchronizers, servomotors, floppy disc spindles
		JIS class 5[2]	0 0	−5 −6	+2.5	−2.5	2.5T − 7.5L 2.5T − 8.5L	
		JIS class 4[2]	0 0	−4 −5	+2.5	−2.5	2.5T − 6.5L 2.5T − 7.5L	
Rotating outer ring load	Low to high speed Light load	ABMA 5P ABMA 7P	0	−5.1	+2.5	−2.5	2.5T − 7.6L	Pinch rolls, tape guide rollers
		JIS class 5[2]	0 0	−5 −6	+2.5	−2.5	2.5T − 7.5L 2.5T − 8.5L	
		JIS class 4[2]	0 0	−4 −5	+2.5	−2.5	2.5T − 6.5L 2.5T − 7.5L	

[Notes] 1) Symbols T and L means interference and clearance respectively.
2) In the columns "single plane mean outside diameter deviation" and "fit" upper row values are applied in the case of $D \leqq 18$ mm, lower row values in the case of $18 < D \leqq 30$ mm.

Table 9-6 (1) Recommended shaft fits for metric J series tapered roller bearings

■ Bearing tolerance : class PK, class PN

Load type		Nominal bore diameter d mm over	up to	Class of shaft tolerance range	Remarks
Rotating inner ring load	Normal load	10	120	m 6	
		120	500	n 6	
	Heavy load Impact load High speed rotation	10	120	n 6	Generally, bearing internal clearance should be larger than standard.
		120	180	p 6	
		180	250	r 6	
		250	500	r 7	
Rotating outer ring load	Normal load without impact	80	315	h 6 or g 6	
	Heavy load Impact load High speed rotation	10	120	n 6	Generally, bearing internal clearance should be larger than standard.
		120	180	p 6	
		180	250	r 6	
		250	500	r 7	

■ Bearing tolerance : class PC, class PB

Load type		Nominal bore diameter d mm over	up to	Class of shaft tolerance range (bearing tolerance class) PC	PB	Remarks
Rotating inner ring load	Spindles of precision machine tools	10	315	k 5	k 5	
		315	500	k 5	–	
	Heavy load Impact load High speed rotation	10	18	m 6	m 5	Generally, bearing internal clearance should be larger than standard.
		18	50	m 5	m 5	
		50	80	n 5	n 5	
		80	120	n 5	n 4	
		120	180	p 4	p 4	
		180	250	r 4	r 4	
		250	315	r 5	r 4	
		315	500	r 5	–	
Rotating outer ring load	Spindles of precision machine tools	10	315	k 5	k 5	
		315	500	k 5	–	

Table 9-6 (2) Recommended housing fits for metric J series tapered roller bearings

■ Bearing tolerance : class PK, class PN

Load type		Nominal outside diameter D mm over	up to	Class of housing bore diameter tolerance range	Remarks
Rotating inner ring load	Used for free or fixed side	18	315	G 7	Outer ring is easily displaceable in axial direction.
		315	400	F 6	
	Position of outer ring is adjustable (in axial direction)	18	400	J 7	Outer ring is displaceable in axial direction.
	Position of outer ring is not adjustable (in axial direction)	18	400	P 7	Outer ring is fixed in axial direction.
Rotating outer ring load	Position of outer ring is not adjustable (in axial direction)	18	120	R 7	Outer ring is fixed in axial direction.
		120	180		
		180	400		

■ Bearing tolerance : class PC, class PB

Load type		Nominal outside diameter D mm over	up to	Class of housing bore diameter tolerance range (bearing tolerance class) PC	PB	Remarks
Rotating inner ring load	Used for free side	18	315	G 5	G 5	Outer ring is easily displaceable in axial direction.
		315	500	G 5	–	
	Used for fixed side	18	315	H 5	H 4	Outer ring is displaceable in axial direction.
		315	500	H 5	–	
	Position of outer ring is adjustable (in axial direction)	18	120	K 5	K 5	Outer ring is fixed in axial direction.
		120	180	JS 6	JS 6	
		180	250	JS 6	JS 5	
		250	315	K 5	JS 5	
		315	500	K 5	–	
	Position of outer ring is not adjustable (in axial direction)	18	315	N 5	M 5	
		315	500	N 5	–	
Rotating outer ring load	Position of outer ring is not adjustable (in axial direction)	18	250	N 6	N 5	Outer ring is fixed in axial direction.
		250	315	N 5	N 5	
		315	500	N 5	–	

Table 9-7 (1) Recommended shaft fits for inch series tapered roller bearings

■ Bearing tolerance : class 4, class 2

Load type		Nominal bore diameter d mm (1/25.4) over	up to	Deviation of a single bore diameter Δ_{ds}, μm upper	lower	Dimensional tolerance of shaft diameter μm upper	lower	Remarks
Rotating inner ring load	Normal load	–	76.2 (3.0)	+13	0	+ 38	+ 25	
		76.2 (3.0)	304.8 (12.0)	+25	0	+ 64	+ 38	
		304.8 (12.0)	609.6 (24.0)	+51	0	+127	+ 76	
		609.6 (24.0)	914.4 (36.0)	+76	0	+190	+114	
	Heavy load Impact load High speed rotation	–	76.2 (3.0)	+13	0	Should be such that average interference stands at 0.000 5 × d (mm)		Generally, bearing internal clearance should be larger than standard.
		76.2 (3.0)	304.8 (12.0)	+25	0			
		304.8 (12.0)	609.6 (24.0)	+51	0			
		609.6 (24.0)	914.4 (36.0)	+76	0			
Rotating outer ring load	Normal load without impact	–	76.2 (3.0)	+13	0	+ 13	0	
		76.2 (3.0)	304.8 (12.0)	+25	0	+ 25	0	
		304.8 (12.0)	609.6 (24.0)	+51	0	+ 51	0	
		609.6 (24.0)	914.4 (36.0)	+76	0	+ 76	0	
	Normal load without impact	–	76.2 (3.0)	+13	0	0	– 13	Inner ring is displaceable in axial direction.
		76.2 (3.0)	304.8 (12.0)	+25	0	0	– 25	
		304.8 (12.0)	609.6 (24.0)	+51	0	0	– 51	
		609.6 (24.0)	914.4 (36.0)	+76	0	0	– 76	
	Heavy load Impact load High speed rotation	–	76.2 (3.0)	+13	0	Should be such that average interference stands at 0.000 5 × d (mm)		Generally, bearing internal clearance should be larger than standard.
		76.2 (3.0)	304.8 (12.0)	+25	0			
		304.8 (12.0)	609.6 (24.0)	+51	0			
		609.6 (24.0)	914.4 (36.0)	+76	0			

■ Bearing tolerance : class 3, class 0[1)]

Load type		Nominal bore diameter d mm (1/25.4) over	up to	Deviation of a single bore diameter Δ_{ds}, μm upper	lower	Dimensional tolerance of shaft diameter μm upper	lower	Remarks
Rotating inner ring load	Spindles of precision machine tools	–	76.2 (3.0)	+13	0	+ 30	+ 18	
		76.2 (3.0)	304.8 (12.0)	+13	0	+ 30	+ 18	
		304.8 (12.0)	609.6 (24.0)	+25	0	+ 64	+ 38	
		609.6 (24.0)	914.4 (36.0)	+38	0	+102	+ 64	
	Heavy load Impact load High speed rotation	–	76.2 (3.0)	+13	0	Should be such that average interference stands at 0.000 5 × d (mm)		Generally, bearing internal clearance should be larger than standard.
		76.2 (3.0)	304.8 (12.0)	+13	0			
		304.8 (12.0)	609.6 (24.0)	+25	0			
		609.6 (24.0)	914.4 (36.0)	+38	0			
Rotating outer ring load	Spindles of precision machine tools	–	76.2 (3.0)	+13	0	+ 30	+ 18	
		76.2 (3.0)	304.8 (12.0)	+13	0	+ 30	+ 18	
		304.8 (12.0)	609.6 (24.0)	+25	0	+ 64	+ 38	
		609.6 (24.0)	914.4 (36.0)	+38	0	+102	+ 64	

[Note] 1) Class 0 bearing : $d \leqq 304.8$ mm

Table 9-7 (2) Recommended housing fits for inch series tapered roller bearings

■ Bearing tolerance : class 4, class 2

Load type		Nominal outside diameter D mm (1/25.4) over	up to	Deviation of a single outside diameter Δ_{Ds}, μm upper	lower	Dimensional tolerance of housing bore diameter μm upper	lower	Remarks
Rotating inner ring load	Used for free or fixed side.	–	76.2 (3.0)	+ 25	0	+ 76	+ 51	Outer ring is easily displaceable in axial direction.
		76.2 (3.0)	127.0 (5.0)	+ 25	0	+ 76	+ 51	
		127.0 (5.0)	304.8 (12.0)	+ 25	0	+ 76	+ 51	
		304.8 (12.0)	609.6 (24.0)	+ 51	0	+152	+102	
		609.6 (24.0)	914.4 (36.0)	+ 76	0	+229	+152	
	Position of outer ring is adjustable (in axial direction).	–	76.2 (3.0)	+ 25	0	+ 25	0	Outer ring is displaceable in axial direction.
		76.2 (3.0)	127.0 (5.0)	+ 25	0	+ 25	0	
		127.0 (5.0)	304.8 (12.0)	+ 25	0	+ 51	0	
		304.8 (12.0)	609.6 (24.0)	+ 51	0	+ 76	+ 25	
		609.6 (24.0)	914.4 (36.0)	+ 76	0	+127	+ 51	
	Position of outer ring is not adjustable (in axial direction).	–	76.2 (3.0)	+ 25	0	– 13	– 38	Outer ring is fixed in axial direction.
		76.2 (3.0)	127.0 (5.0)	+ 25	0	– 25	– 51	
		127.0 (5.0)	304.8 (12.0)	+ 25	0	– 25	– 51	
		304.8 (12.0)	609.6 (24.0)	+ 51	0	– 25	– 76	
		609.6 (24.0)	914.4 (36.0)	+ 76	0	– 25	–102	
Rotating outer ring load	Position of outer ring is not adjustable (in axial direction).	–	76.2 (3.0)	+ 25	0	– 13	– 38	Outer ring is fixed in axial direction.
		76.2 (3.0)	127.0 (5.0)	+ 25	0	– 25	– 51	
		127.0 (5.0)	304.8 (12.0)	+ 25	0	– 25	– 51	
		304.8 (12.0)	609.6 (24.0)	+ 51	0	– 25	– 76	
		609.6 (24.0)	914.4 (36.0)	+ 76	0	– 25	–102	

■ Bearing tolerance : class 3, class 0[1)]

Load type		Nominal outside diameter D mm (1/25.4) over	up to	Deviation of a single outside diameter Δ_{Ds}, μm upper	lower	Dimensional tolerance of housing bore diameter μm upper	lower	Remarks
Rotating inner ring load	Used for free side.	–	152.4 (6.0)	+ 13	0	+ 38	+ 25	Outer ring is easily displaceable in axial direction.
		152.4 (6.0)	304.8 (12.0)	+ 13	0	+ 38	+ 25	
		304.8 (12.0)	609.6 (24.0)	+ 25	0	+ 64	+ 38	
		609.6 (24.0)	914.4 (36.0)	+ 38	0	+ 89	+ 51	
	Used for fixed side.	–	152.4 (6.0)	+ 13	0	+ 25	+ 13	Outer ring is displaceable in axial direction.
		152.4 (6.0)	304.8 (12.0)	+ 13	0	+ 25	+ 13	
		304.8 (12.0)	609.6 (24.0)	+ 25	0	+ 51	+ 25	
		609.6 (24.0)	914.4 (36.0)	+ 38	0	+ 76	+ 38	
	Position of outer ring is adjustable (in axial direction).	–	152.4 (6.0)	+ 13	0	+ 13	0	Outer ring is fixed in axial direction.
		152.4 (6.0)	304.8 (12.0)	+ 13	0	+ 25	0	
		304.8 (12.0)	609.6 (24.0)	+ 25	0	+ 25	0	
		609.6 (24.0)	914.4 (36.0)	+ 38	0	+ 38	0	
	Position of outer ring is not adjustable (in axial direction).	–	152.4 (6.0)	+ 13	0	0	– 13	
		152.4 (6.0)	304.8 (12.0)	+ 13	0	0	– 25	
		304.8 (12.0)	609.6 (24.0)	+ 25	0	0	– 25	
		609.6 (24.0)	914.4 (36.0)	+ 38	0	0	– 38	
Rotating outer ring load	Position of outer ring is not adjustable (in axial direction).	–	152.4 (6.0)	+ 13	0	– 13	– 25	Outer ring is fixed in axial direction.
		152.4 (6.0)	304.8 (12.0)	+ 13	0	– 13	– 38	
		304.8 (12.0)	609.6 (24.0)	+ 25	0	– 13	– 38	
		609.6 (24.0)	914.4 (36.0)	+ 38	0	– 13	– 51	

[Note] 1) Class 0 bearing : $D \leqq 304.8$ mm

Table 9-8 (1) Recommended shaft fits for thrust bearings (classes 0, 6)

Load type		Shaft diameter, mm over	Shaft diameter, mm up to	Class of shaft tolerance range	Remarks
Central axial load (generally for thrust bearings)		All shaft diameters		js 6	h 6 may also be used.
Combined load (spherical thrust roller bearing)	Stationary shaft race load	All shaft diameters		js 6	–
	Rotating shaft race load or indeterminate direction load	– 200 400	200 400 –	k 6 m 6 n 6	js 6, k 6 and m 6 may be used in place of k 6, m 6 and n 6, respectively.

Table 9-8 (2) Recommended housing fits for thrust bearings (classes 0, 6)

Load type		Class of housing bore diameter tolerance range	Remarks
Central axial load (generally for thrust bearings)		–	Select such tolerance range class as provides clearance in the radial direction for housing race.
		H 8	In case of thrust ball bearings requiring high accuracy.
Combined load (spherical thrust roller bearing)	Stationary housing race load	H 7	–
	Indeterminate direction load or rotating housing race load	K 7	In case of application under normal operating conditions.
		M 7	In case of comparably large radial load.

[Remark] This table is applicable to cast iron or steel housings.

10. Bearing internal clearance

Bearing internal clearance is defined as the total distance either inner or outer ring can be moved when the other ring is fixed.

If movement is in the radial direction, it is called radial internal clearance; if in the axial direction, axial internal clearance. (Fig. 10-1)

Bearing performance depends greatly upon internal clearance during operation (also referred to as operating clearance); inappropriate clearance results in short rolling fatigue life and generation of heat, noise or vibration.

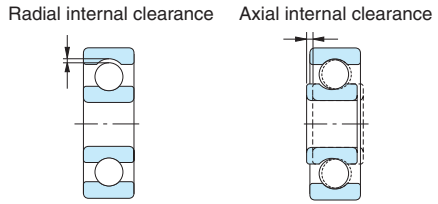


Fig. 10-1 Bearing internal clearance

In measuring internal clearance, a specified load is generally applied in order to obtain stable measurement values.

Consequently, measured clearance values will be larger than the original clearance by the amount of elastic deformation due to the load applied for measurement.

As far as roller bearings are concerned, however, the amount of elastic deformation is negligible.

Clearance prior to mounting is generally defined as the original clearance.

10-1 Selection of internal clearance

The term "residual clearance" is defined as the original clearance decreased owing to expansion or contraction of a raceway due to fitting, when the bearing is mounted in the shaft and housing.

The term "effective clearance" is defined as the residual clearance decreased owing to dimensional change arising from temperature differentials within the bearing.

The term "operating clearance" is defined as the internal clearance present while a bearing mounted in a machine is rotating under a certain load, or, the effective clearance increased due to elastic deformation arising from bearing loads.

As illustrated in Fig. 10-2, bearing fatigue life is longest when the operating clearance is slightly negative.

However, as the operating clearance becomes more negative, the fatigue life shortens remarkably.

Thus it is recommended that bearing internal clearance be selected such that the operating clearance is slightly positive.

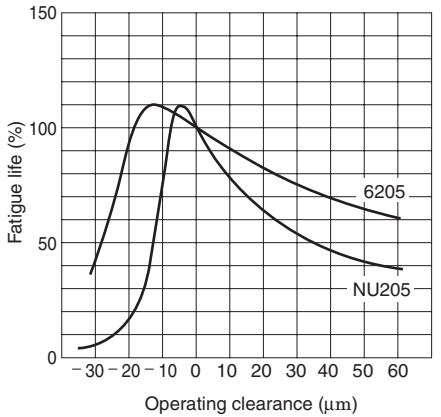


Fig. 10-2 Relationship between operating clearance and fatigue life

It is important to take specific operating conditions into consideration and select a clearance suitable for the conditions.

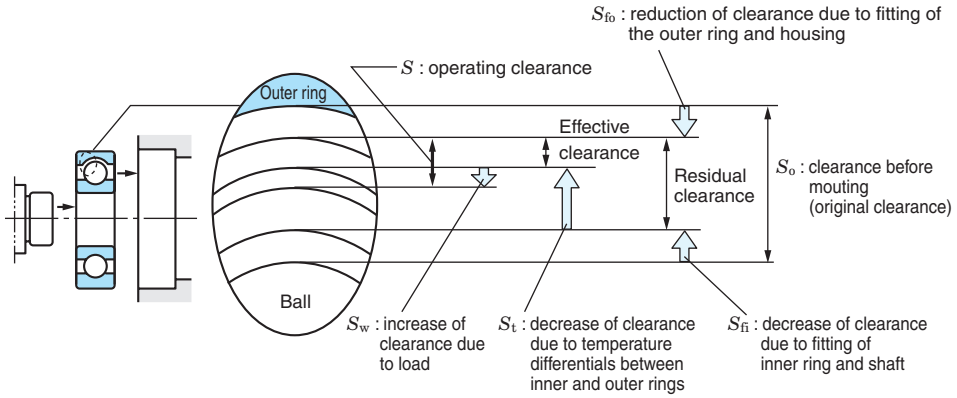
For example, when high rigidity is required, or when the noise must be minimized, the operating clearance must be reduced. On the other hand, when high operating temperature is expected, the operating clearance must be increased.

10-2 Operating clearance

Table 10-1 shows how to determine the operating clearance when the shaft and housing are made of steel.

Tables 10-2 to 10-10 show standard values for bearing internal clearance before mounting.
Table 10-11 shows examples of clearance selection excluding CN clearance.

Table 10-1 How to determine operating clearance



Operating clearance (S)	$S = S_o - (S_f + S_{t1} + S_{t2}) + S_w$ *	* [S_w (increase of clearance due to load) is generally small, and thus may be ignored, although there is a equation for determining the value.]
Decrease of clearance due to fitting (S_f)	(In the case of hollow shaft) $S_{fi} = \Delta_{deff} \frac{d}{D_i} \cdot \frac{\left(1 - \frac{d_0^2}{d^2}\right)}{\left(1 - \frac{d_0^2}{D_i^2}\right)}$ (In the case of solid shaft) $S_{fi} = \Delta_{deff} \frac{d}{D_i}$	(In the case of $D_h \neq \infty$) $S_{fo} = \Delta_{deff} \frac{D_e}{D} \cdot \frac{\left(1 - \frac{D^2}{D_h^2}\right)}{\left(1 - \frac{D_e^2}{D_h^2}\right)}$ (In the case of $D_h = \infty$) $S_{fo} = \Delta_{Deff} \frac{D_e}{D}$
Decrease of clearance due to temperature differentials between inner and outer rings (S_{t1})	The amount of decrease varies depending on the state of housing; however, generally the amount can be approximated by the following equation on the assumption that the outer ring will not expand : $S_{t1} = \alpha (D_i \cdot t_i - D_e \cdot t_e)$	where : $D_e = D_i + 2D_w$ Consequently, $S_{t1} + S_{t2}$ will be determined by the following equation : $S_{t1} + S_{t2} = \alpha \cdot D_i \cdot t_1 + 2\,\alpha \cdot D_w \cdot t_2$ [Temperature differential between the inner and outer rings, t_1, can be expressed as follows : $t_1 = t_i - t_e$ Temperature differential between the rolling element and outer ring, t_2, can be expressed as follows : $t_2 = t_w - t_e$]
Decrease of clearance due to temperature rise of rolling element (S_{t2})	$S_{t2} = 2\,\alpha \cdot D_w \cdot t_w$	

In Table 10-1,

S	: operating clearance	mm	Δ_{Deff}	: effective interference of outer ring	mm
S_o	: clearance before mounting	mm	D_h	: outside diameter of housing	mm
S_f	: decrease of clearance due to fitting	mm	D_e	: outer ring raceway contact diameter	mm
S_{fi}	: expansion of inner ring raceway contact diameter	mm		[ball bearing ····· $D_e \fallingdotseq 0.2(4\,D + d)$ roller bearing ··· $D_e \fallingdotseq 0.25(3\,D + d)$]	
S_{fo}	: contraction of outer ring raceway contact diameter	mm	D	: nominal outside diameter	mm
S_{t1}	: decrease of clearance due to temperature differentials between inner and outer rings	mm	α	: linear expansion coefficient of bearing steel (12.5×10^{-6})	1/℃
S_{t2}	: decrease of clearance due to temperature rise of the rolling elements	mm	D_w	: average diameter of rolling elements	mm
S_w	: increase of clearance due to load	mm		[ball bearing ····· $D_w \fallingdotseq 0.3(D - d)$ roller bearing ··· $D_w \fallingdotseq 0.25(D - d)$]	
Δ_{deff}	: effective interference of inner ring	mm	t_i	: temperature rise of the inner ring	℃
d	: nominal bore diameter (shaft diameter)	mm	t_e	: temperature rise of the outer ring	℃
			t_w	: temperature rise of rolling elements	℃
d_0	: bore diameter of hollow shaft	mm			
D_i	: inner ring raceway contact diameter	mm			
	[ball bearing ····· $D_i \fallingdotseq 0.2(D + 4\,d)$ roller bearing ··· $D_i \fallingdotseq 0.25(D + 3\,d)$]				

■ Bearings are sometimes used with a non-steel shaft or housing.
In the automotive industry, a statistical method is often incorporated for selection of clearance.
In these cases, or when other special operating conditions are involved, JTEKT should be consulted.

Table 10-2 Radial internal clearance of deep groove ball bearings (cylindrical bore)

Unit : μm

Nominal bore diameter d, mm		Clearance									
		C 2		C N		C 3		C 4		C 5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
2.5	6	0	7	2	13	8	23	*14*	*29*	*20*	*37*
6	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73
50	65	1	15	8	28	23	43	38	61	55	90
65	80	1	15	10	30	25	51	46	71	65	105
80	100	1	18	12	36	30	58	53	84	75	120
100	120	2	20	15	41	36	66	61	97	90	140
120	140	2	23	18	48	41	81	71	114	105	160
140	160	2	23	18	53	46	91	81	130	120	180
160	180	2	25	20	61	53	102	91	147	135	200
180	200	2	30	25	71	63	117	107	163	150	230
200	225	2	35	25	85	75	140	125	195	175	265
225	250	2	40	30	95	85	160	145	225	205	300
250	280	2	45	35	105	90	170	155	245	225	340
280	315	2	55	40	115	100	190	175	270	245	370
315	355	3	60	45	125	110	210	195	300	275	410
355	400	3	70	55	145	130	240	225	340	315	460

[Remarks] 1. For measured clearance, the increase of radial internal clearance caused by the measurement load should be added to the values in the above table for correction. Amounts for correction are as shown below.
Of the amounts for clearance correction in the C 2 column, the smaller is applied to the minimum clearance, the larger to the maximum clearance.
2. Values in Italics are prescribed in JTEKT standards.

Nominal bore diameter d, mm		Measurement load	Amounts of clearance correction, μm				
over	up to	N	C 2	C N	C 3	C 4	C 5
2.5	18	24.5	3 – 4	4	4	4	4
18	50	49	4 – 5	5	6	6	6
50	280	147	6 – 8	8	9	9	9

Table 10-3 Radial internal clearance of extra-small/miniature ball bearings

Unit : μm

Clearance code	M 1		M 2		M 3		M 4		M 5		M 6	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
Clearance	0	5	3	8	5	10	8	13	13	20	20	28

[Remark] For measured clearance, the following amounts should be added for correction.

Measurement load, N		Amounts of clearance correction, μm					
Extra-small ball bearing	Miniature ball bearing	M1	M2	M3	M4	M5	M6
2.3		1	1	1	1	1	1

Extra-small ball bearing : 9 mm or larger in outside diameter and under 10 mm in bore diameter
Miniature ball bearing : under 9 mm in outside diameter

Table 10-4 Axial internal clearance of matched pair angular contact ball bearings (measurement clearance) [1)]

Unit : μm

Nominal bore diameter d, mm		Contact angle : 15°				Contact angle : 30°							
		C 2		C N		C 2		C N		C 3		C 4	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
–	10	13	33	33	53	3	14	10	30	30	50	50	70
10	18	15	35	35	55	3	16	10	30	30	50	50	70
18	24	20	40	45	65	3	20	20	40	40	60	60	80
24	30	20	40	45	65	3	20	20	40	40	60	60	80
30	40	20	40	45	65	3	20	25	45	45	65	70	90
40	50	20	40	50	70	3	20	30	50	50	70	75	95
50	65	30	55	65	90	9	27	35	60	60	85	90	115
65	80	30	55	70	95	10	28	40	65	70	95	110	135
80	100	35	60	85	110	10	30	50	75	80	105	130	155
100	120	40	65	100	125	12	37	65	90	100	125	150	175
120	140	45	75	110	140	15	40	75	105	120	150	180	210
140	160	45	75	125	155	15	40	80	110	130	160	210	240
160	180	50	80	140	170	15	45	95	125	140	170	235	265
180	200	50	80	160	190	20	50	110	140	170	200	275	305

Nominal bore diameter d, mm		Contact angle : 40°							
		C 2		C N		C 3		C 4	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.
–	10	2	10	6	18	16	30	26	40
10	18	2	12	7	21	18	32	28	44
18	24	2	12	12	26	20	40	30	50
24	30	2	14	12	26	20	40	40	60
30	40	2	14	12	26	25	45	45	65
40	50	2	14	12	30	30	50	50	70
50	65	5	17	17	35	35	60	60	85
65	80	6	18	18	40	40	65	70	95
80	100	6	20	20	45	55	80	85	110
100	120	6	25	25	50	60	85	100	125
120	140	7	30	30	60	75	105	125	155
140	160	7	30	35	65	85	115	140	170
160	180	7	31	45	75	100	130	155	185
180	200	7	37	60	90	110	140	170	200

[Note] 1) Including increase of clearance caused by measurement load.

Table 10-5 Radial internal clearance of double-row angular contact ball bearings

Unit : μm

Nominal bore diameter d, mm		Clearance					
		CD2		CDN		CD3	
over	up to	min.	max.	min.	max.	min.	max.
2.5	10	0	7	2	10	8	18
10	18	0	7	2	11	9	19
18	24	0	8	2	11	10	21
24	30	0	8	2	13	10	23
30	40	0	9	3	14	11	24
40	50	0	10	4	16	13	27
50	65	0	11	6	20	15	30
65	80	0	12	7	22	18	33
80	100	0	12	8	24	22	38
100	120	0	13	9	25	24	42
120	140	0	15	10	26	25	44
140	160	0	16	11	28	26	46
160	180	0	17	12	30	27	47
180	200	0	18	14	32	28	48

[Remark]
Regarding deep groove ball bearings and matched pair and double-row angular contact ball bearings, equations of the relationship between radial internal clearance and axial internal clearance are shown on page A 105.

Table 10-6 Radial internal clearance of self-aligning ball bearings

Unit : μm

Nominal bore diameter d, mm		Cylindrical bore bearing clearance										Tapered bore bearing clearance									
		C 2		C N		C 3		C 4		C 5		C 2		C N		C 3		C 4		C 5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
2.5	6	1	8	5	15	10	20	15	25	21	33	–	–	–	–	–	–	–	–	–	–
6	10	2	9	6	17	12	25	19	33	27	42	–	–	–	–	–	–	–	–	–	–
10	14	2	10	6	19	13	26	21	35	30	48	–	–	–	–	–	–	–	–	–	–
14	18	3	12	8	21	15	28	23	37	32	50	–	–	–	–	–	–	–	–	–	–
18	24	4	14	10	23	17	30	25	39	34	52	7	17	13	26	20	33	28	42	37	55
24	30	5	16	11	24	19	35	29	46	40	58	9	20	15	28	23	39	33	50	44	62
30	40	6	18	13	29	23	40	34	53	46	66	12	24	19	35	29	46	40	59	52	72
40	50	6	19	14	31	25	44	37	57	50	71	14	27	22	39	33	52	45	65	58	79
50	65	7	21	16	36	30	50	45	69	62	88	18	32	27	47	41	61	56	80	73	99
65	80	8	24	18	40	35	60	54	83	76	108	23	39	35	57	50	75	69	98	91	123
80	100	9	27	22	48	42	70	64	96	89	124	29	47	42	68	62	90	84	116	109	144
100	120	10	31	25	56	50	83	75	114	105	145	35	56	50	81	75	108	100	139	130	170
120	140	10	38	30	68	60	100	90	135	125	175	40	68	60	98	90	130	120	165	155	205
140	160	15	44	35	80	70	120	110	161	150	210	45	74	65	110	100	150	140	191	180	240

Table 10-7 Radial internal clearance of electric motor bearings

1) Deep groove ball bearing

Unit : μm

Nominal bore diameter d, mm		Clearance	
		CM	
over	up to	min.	max.
10[1)]	18	4	11
18	30	5	12
30	50	9	17
50	80	12	22
80	120	18	30
120	160	24	38

[Note] 1) 10 mm is included.
[Remark] To adjust for change of clearance due to measuring load, use correction values shown in Table 10-2.

2) Cylindrical roller bearing

Unit : μm

Nominal bore diameter d, mm		Clearance			
		Interchangeability CT		Non-interchangeability CM	
over	up to	min.	max.	min.	max.
24	40	15	35	15	30
40	50	20	40	20	35
50	65	25	45	25	40
65	80	30	50	30	45
80	100	35	60	35	55
100	120	35	65	35	60
120	140	40	70	40	65
140	160	50	85	50	80
160	180	60	95	60	90
180	200	65	105	65	100

[Note] "Interchangeability" means interchangeable only among products (sub-units) of the same manufacturer ; not with others.

Table 10-8 Radial internal clearance of cylindrical roller bearings and machined ring needle roller bearings

(1) Cylindrical bore bearing

Unit : μm

Nominal bore diameter d, mm		Clearance									
		C 2		C N		C 3		C 4		C 5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
–	10	0	25	20	45	35	60	50	75	–	–
10	24	0	25	20	45	35	60	50	75	65	90
24	30	0	25	20	45	35	60	50	75	70	95
30	40	5	30	25	50	45	70	60	85	80	105
40	50	5	35	30	60	50	80	70	100	95	125
50	65	10	40	40	70	60	90	80	110	110	140
65	80	10	45	40	75	65	100	90	125	130	165
80	100	15	50	50	85	75	110	105	140	155	190
100	120	15	55	50	90	85	125	125	165	180	220
120	140	15	60	60	105	100	145	145	190	200	245
140	160	20	70	70	120	115	165	165	215	225	275
160	180	25	75	75	125	120	170	170	220	250	300
180	200	35	90	90	145	140	195	195	250	275	330
200	225	45	105	105	165	160	220	220	280	305	365
225	250	45	110	110	175	170	235	235	300	330	395
250	280	55	125	125	195	190	260	260	330	370	440
280	315	55	130	130	205	200	275	275	350	410	485
315	355	65	145	145	225	225	305	305	385	455	535
355	400	100	190	190	280	280	370	370	460	510	600
400	450	110	210	210	310	310	410	410	510	565	665
450	500	110	220	220	330	330	440	440	550	625	735

(2) Tapered bore bearing

Unit : μm

Nominal bore diameter d, mm		Non-interchangeable clearance													
		C 9 NA[1)]		C 1 NA		C 2 NA		C N NA		C 3 NA		C 4 NA		C 5 NA	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
12	14	5	10	–	–	–	–	–	–	–	–	–	–	–	–
14	24	5	10	10	20	20	30	35	45	45	55	55	65	75	85
24	30	5	10	10	25	25	35	40	50	50	60	60	70	80	95
30	40	5	12	12	25	25	40	45	55	55	70	70	80	95	110
40	50	5	15	15	30	30	45	50	65	65	80	80	95	110	125
50	65	5	15	15	35	35	50	55	75	75	90	90	110	130	150
65	80	10	20	20	40	40	60	70	90	90	110	110	130	150	170
80	100	10	25	25	45	45	70	80	105	105	125	125	150	180	205
100	120	10	25	25	50	50	80	95	120	120	145	145	170	205	230
120	140	15	30	30	60	60	90	105	135	135	160	160	190	230	260
140	160	15	35	35	65	65	100	115	150	150	180	180	215	260	295
160	180	15	35	35	75	75	110	125	165	165	200	200	240	285	320
180	200	20	40	40	80	80	120	140	180	180	220	220	260	315	355
200	225	20	45	45	90	90	135	155	200	200	240	240	285	350	395
225	250	25	50	50	100	100	150	170	215	215	265	265	315	380	430
250	280	25	55	55	110	110	165	185	240	240	295	295	350	420	475
280	315	30	60	60	120	120	180	205	265	265	325	325	385	470	530
315	355	30	65	65	135	135	200	225	295	295	360	360	430	520	585
355	400	35	75	75	150	150	225	255	330	330	405	405	480	585	660
400	450	45	85	85	170	170	255	285	370	370	455	455	540	650	735
450	500	50	95	95	190	190	285	315	410	410	505	505	600	720	815

[Note] 1) Clearance C 9 NA is applied to tapered bore cylindrical roller bearings of JIS tolerance classes 5 and 4.

Table 10-9 Radial internal clearance of spherical roller bearings

(1) Cylindrical bore bearing

Unit : μm

Nominal bore diameter d, mm		Clearance									
		C 2		C N		C 3		C 4		C 5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
14	18	10	20	20	35	35	45	45	60	60	75
18	24	10	20	20	35	35	45	45	60	60	75
24	30	15	25	25	40	40	55	55	75	75	95
30	40	15	30	30	45	45	60	60	80	80	100
40	50	20	35	35	55	55	75	75	100	100	125
50	65	20	40	40	65	65	90	90	120	120	150
65	80	30	50	50	80	80	110	110	145	145	180
80	100	35	60	60	100	100	135	135	180	180	225
100	120	40	75	75	120	120	160	160	210	210	260
120	140	50	95	95	145	145	190	190	240	240	300
140	160	60	110	110	170	170	220	220	280	280	350
160	180	65	120	120	180	180	240	240	310	310	390
180	200	70	130	130	200	200	260	260	340	340	430
200	225	80	140	140	220	220	290	290	380	380	470
225	250	90	150	150	240	240	320	320	420	420	520
250	280	100	170	170	260	260	350	350	460	460	570
280	315	110	190	190	280	280	370	370	500	500	630
315	355	120	200	200	310	310	410	410	550	550	690
355	400	130	220	220	340	340	450	450	600	600	750
400	450	140	240	240	370	370	500	500	660	660	820
450	500	140	260	260	410	410	550	550	720	720	900
500	560	150	280	280	440	440	600	600	780	780	1 000
560	630	170	310	310	480	480	650	650	850	850	1 100
630	710	190	350	350	530	530	700	700	920	920	1 190
710	800	210	390	390	580	580	770	770	1 010	1 010	1 300
800	900	230	430	430	650	650	860	860	1 120	1 120	1 440
900	1 000	260	480	480	710	710	930	930	1 220	1 220	1 570

(2) Tapered bore bearing

Unit : μm

Nominal bore diameter d, mm		Clearance									
		C 2		C N		C 3		C 4		C 5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	25	25	35	35	45	45	60	60	75
24	30	20	30	30	40	40	55	55	75	75	95
30	40	25	35	35	50	50	65	65	85	85	105
40	50	30	45	45	60	60	80	80	100	100	130
50	65	40	55	55	75	75	95	95	120	120	160
65	80	50	70	70	95	95	120	120	150	150	200
80	100	55	80	80	110	110	140	140	180	180	230
100	120	65	100	100	135	135	170	170	220	220	280
120	140	80	120	120	160	160	200	200	260	260	330
140	160	90	130	130	180	180	230	230	300	300	380
160	180	100	140	140	200	200	260	260	340	340	430
180	200	110	160	160	220	220	290	290	370	370	470
200	225	120	180	180	250	250	320	320	410	410	520
225	250	140	200	200	270	270	350	350	450	450	570
250	280	150	220	220	300	300	390	390	490	490	620
280	315	170	240	240	330	330	430	430	540	540	680
315	355	190	270	270	360	360	470	470	590	590	740
355	400	210	300	300	400	400	520	520	650	650	820
400	450	230	330	330	440	440	570	570	720	720	910
450	500	260	370	370	490	490	630	630	790	790	1 000
500	560	290	410	410	540	540	680	680	870	870	1 100
560	630	320	460	460	600	600	760	760	980	980	1 230
630	710	350	510	510	670	670	850	850	1 090	1 090	1 360
710	800	390	570	570	750	750	960	960	1 220	1 220	1 500
800	900	440	640	640	840	840	1 070	1 070	1 370	1 370	1 690
900	1 000	490	710	710	930	930	1 190	1 190	1 520	1 520	1 860

Table 10-10 Radial internal clearance of double/four-row and matched pair tapered roller bearings (cylindrical bore)

Unit : μm

Nominal bore diameter d, mm		Clearance									
		C 1		C 2		C N		C 3		C 4	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
14	18	0	10	10	20	20	30	30	40	40	50
18	24	0	10	10	20	20	30	30	40	40	55
24	30	0	10	10	20	20	30	30	45	45	60
30	40	0	12	12	25	25	40	40	55	55	75
40	50	0	15	15	30	30	45	45	60	60	80
50	65	0	15	15	30	30	50	50	70	70	90
65	80	0	20	20	40	40	60	60	80	80	110
80	100	0	20	20	45	45	70	70	100	100	130
100	120	0	25	25	50	50	80	80	110	110	150
120	140	0	30	30	60	60	90	90	120	120	170
140	160	0	30	30	65	65	100	100	140	140	190
160	180	0	35	35	70	70	110	110	150	150	210
180	200	0	40	40	80	80	120	120	170	170	230
200	225	0	40	40	90	90	140	140	190	190	260
225	250	0	50	50	100	100	150	150	210	210	290
250	280	0	50	50	110	110	170	170	230	230	320
280	315	0	60	60	120	120	180	180	250	250	350
315	355	0	70	70	140	140	210	210	280	280	390
355	400	0	70	70	150	150	230	230	310	310	440
400	450	0	80	80	170	170	260	260	350	350	490
450	500	0	90	90	190	190	290	290	390	390	540
500	560	0	100	100	210	210	320	320	430	430	590
560	630	0	110	110	230	230	350	350	480	480	660
630	710	0	130	130	260	260	400	400	540	540	740
710	800	0	140	140	290	290	450	450	610	610	830
800	900	0	160	160	330	330	500	500	670	670	920

Table 10-11 Examples of non-standard clearance selection

Service conditions	Applications	Examples of clearance selection
In the case of heavy/impact load, large interference	Railway rolling stock axle journals	C 3
In the case of vibration/impact load, interference fit both for inner/outer rings	Shaker screens, railway rolling stock traction motors, tractor final reduction gears	C 3, C 4 C 4 C 4
When shaft deflection is large	Automobile rear wheels	C 5
When shaft and inner ring are heated	Dryers of paper making machines, table rollers of rolling mills	C 3, C 4 C 3
When clearance fit both for inner/outer rings	Roll necks of rolling mills	C 2
When noise/vibration during rotation is to be lowered	Micro-motors	C 1, C 2, CM
When clearance after mounting is to be adjusted in order to reduce shaft runout	Lathe spindles	C 9 NA, C 1 NA

[Reference] Relationship between radial internal clearance and axial internal clearance

[Deep groove ball bearing]

$$\Delta_a = \sqrt{\Delta_r (4m_o - \Delta_r)} \quad \cdots\cdots (10\text{-}1)$$

[Double-row angular contact ball bearing]

$$\Delta_a = 2\sqrt{m_o^2 - \left(m_o \cos\alpha - \frac{\Delta_r}{2}\right)^2} - 2m_o \sin\alpha \quad \cdots\cdots (10\text{-}2)$$

[Matched pair angular contact ball bearing]

$$\Delta_a = 2m_o \sin\alpha - 2\sqrt{m_o^2 - \left(m_o \cos\alpha + \frac{\Delta_r}{2}\right)^2} \quad \cdots\cdots (10\text{-}3)$$

[Double/four-row and matched pair tapered roller bearing]

$$\Delta_a = \Delta_r \cot\alpha \fallingdotseq \frac{1.5}{e}\Delta_r \quad \cdots\cdots (10\text{-}4)$$

where :

Δ_a : axial internal clearance mm

Δ_r : radial internal clearance mm

$m_o = r_e + r_i - D_w$

(r_e : outer ring raceway groove radius mm
r_i : inner ring raceway groove radius mm
D_w : ball diameter mm)

α : nominal contact angle

e : limit value of F_a/F_r (shown in the bearing specification table.)

11. Preload

Generally, bearings are operated with a certain amount of proper clearance allowed. For some applications, however, bearings are mounted with axial load of such magnitude that the clearance will be negative.

The axial load, referred to as "preload," is often applied to angular contact ball bearings and tapered roller bearings.

11-1 Purpose of preload

- To improve running accuracy by reducing runout of shaft, as well as to heighten position accuracy in radial and axial directions.
  (Bearings for machine tool spindles and measuring instruments)
- To improve gear engagement accuracy by increasing bearing rigidity.
  (Bearings for automobile final reduction gears)
- To reduce smearing by eliminating sliding in irregular rotation, self-rotation, and around-the-raceway revolution of rolling elements.
  (For high rotation-speed angular contact ball bearings)
- To minimize abnormal noise due to vibration or resonance.
  (For small electric motor bearings)
- To keep rolling elements in the right position relative to the raceway.
  (For thrust ball bearings and spherical thrust roller bearings used on horizontal shafts)

11-2 Method of preloading

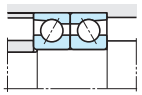
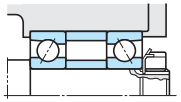
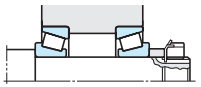
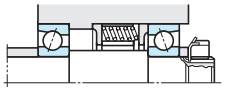
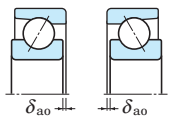
The preload can be done either by the position preloading or the constant pressure preloading; typical examples are given in Table 11-1.

(Comparison between position and constant pressure preloadings)

- With the same amount of preloading, the position preloading produces smaller displacement in the axial direction, and thus is liable to bring about higher rigidity.
- The constant pressure preloading produces stable preloading, or little fluctuation in the amount of preload, since the spring can absorb the load fluctuation and shaft expansion/contraction caused by temperature difference between the shaft and housing during operation.
- The position preloading can apply a larger preload.

Consequently, the position preloading is more suitable for applications requiring high rigidity, while the constant pressure preloading is more suitable for high rotational speed, vibration prevention in the axial direction, and thrust bearings used on horizontal shafts.

Table 11-1 Method of preloading

Position preloading			Constant pressure preloading
			
● Method using matched pair bearing with stand-out adjusted for preloading (see below). 	● Method using spacer with dimensions adjusted for preloading.	● Method using nut or bolt capable of adjusting preload in axial direction. (In this case, starting friction moment during adjustment should be measured so that proper preload will be applied.)	● Method using coil spring or diaphragm spring.

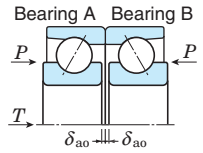
11-3 Preload and rigidity

For angular contact ball bearings and tapered roller bearings, the "back-to-back" arrangement is generally used to apply preload for higher rigidity.

This is because shaft rigidity is improved by the longer distance between load centers in the back-to-back arrangement.

Fig. 11-1 shows the relationship between preload given via position preloading and rigidity expressed by displacement in the axial direction of the back-to-back bearing.

(P : amount of preload (load)
T : axial load from outside
T_A : axial load applied to Bearing A
T_B : axial load applied to Bearing B
δ_a : displacement of matched pair bearing
δ_{aA} : displacement of Bearing A
δ_{aB} : displacement of Bearing B
$2\delta_{ao}$: clearance between inner rings before preloading)



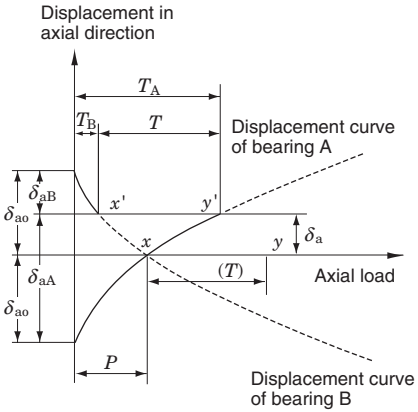


Fig. 11-1 Preloading diagram in position preloading

In Fig. 11-1, when preload P is applied (inner ring is tightened toward the axial direction), bearings A and B are displaced by δ_{ao} respectively, and the clearance between inner rings diminishes from $2\delta_{ao}$ to zero.

The displacement when axial load T is applied to these matched pair bearings from the outside can be determined as δ_a .

[For reference]
How to determine δ_a in Fig. 11-1
①Determine the displacement curve of bearing A.
②Determine the displacement curve of bearing B. ...Symmetrical curve in relation to horizontal axis intersecting vertical line of preload P at point x.
③With the load from outside defined as T, determine line segment $x-y$ on the horizontal line passing through point x.
Displace segment $x-y$ in parallel along the displacement curve of bearing B.
Determine point y' at which to intersect displacement curve of bearing A.
④δ_a can be determined as the distance between line segments $x'-y'$ and $x-y$.

Fig. 11-2 shows the relationship between preload and rigidity in the constant pressure preloading using the same matched pair bearings as in Fig. 11-1.

In this case, since the spring rigidity can be ignored, the matched pair bearing shows almost the same rigidity as a separate bearing with preload P applied in advance.

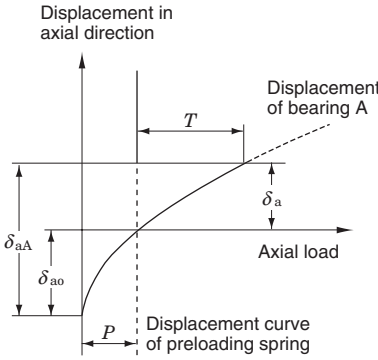


Fig. 11-2 Preloading diagram in constant pressure preloading

11-4 Amount of preload

The amount of preload should be determined, to avoid an adverse effect on bearing life, temperature rise, friction torque, or other performance characteristic, in view of the bearing application.

Decrease of preload due to wear-in, accuracy of the shaft and housing, mounting conditions, and lubrication should also be fully considered in determining preload.

11-4-1 Preload amount of matched pair angular contact ball bearings

Table 11-2 shows recommended preload for matched pair angular contact ball bearings of JIS class 5 or higher used for machine tool spindles or other higher precision applications.

JTEKT offers four types of standard preload: slight preload (S), light preload (L), medium preload (M), and heavy preload (H), so that preload can be selected properly and easily for various applications.

Generally, light or medium preload is recommended for grinder spindles, and medium or heavy preload for spindles of lathes and milling machines.

Table 11-3 shows recommended fits of high-precision matched pair angular contact ball bearings used with light or medium preload applied.

Table 11-3 Recommended fits for high-precision matched pair angular contact ball bearings with preload applied

(1) Dimensional tolerance of shaft Unit : μm

Shaft diameter mm over	up to	Inner ring rotation: Tolerance of shaft diameter	Inner ring rotation: Interference between shaft and inner ring (matching adjustment)[1]	Outer ring rotation: Tolerance of shaft diameter
6	10	− 2 / − 6	0 – 2	0 / − 4
10	18	− 2 / − 7	0 – 2	0 / − 5
18	30	− 2 / − 8	0 – 2.5	0 / − 6
30	50	− 2 / − 9	0 – 2.5	0 / − 7
50	80	− 2 / − 10	0 – 3	0 / − 8
80	120	− 2 / − 12	0 – 4	0 / − 10
120	180	− 2 / − 14	0 – 5	0 / − 12

[Note] 1) Matching adjustment means to measure of bore diameter the bearing and match it to the measured shaft diameter.

(2) Dimensional tolerance of housing bore Unit : μm

Housing bore diameter mm over	up to	Inner ring rotation: Tolerance of housing bore diameter: Fixed-side bearing	Inner ring rotation: Tolerance of housing bore diameter: Free-side bearing	Inner ring rotation: Clearance[1] between housing and outer ring	Outer ring rotation: Tolerance of housing bore diameter
18	30	± 4.5	+ 9 / 0	2 – 6	− 6 / − 12
30	50	± 5.5	+ 11 / 0	2 – 6	− 6 / − 13
50	80	± 6.5	+ 13 / 0	3 – 8	− 8 / − 16
80	120	± 7.5	+ 15 / 0	3 – 9	− 9 / − 19
120	180	± 9	+ 18 / 0	4 – 12	− 11 / − 23
180	250	± 10	+ 20 / 0	5 – 15	− 13 / − 27
250	315	± 11.5	+ 23 / 0	6 – 18	− 16 / − 32

[Note] 1) Lower value is desirable for fixed side; higher value for free side.

Table 11-2 Standard preload of high-precision matched pair angular contact ball bearings

[S : slight preload, L : light preload, M : medium preload, H : heavy preload] Unit : N

Bore diameter No.	7900 C			7000			7000 C				7200			7200 C				ACT 000		ACT 000 B		Bore diameter No.
	S	L	M	L	M	H	S	L	M	H	L	M	H	S	L	M	H	L	M	L	M	
00	5	15	30	30	80	145	6	20	50	100	50	145	245	10	30	80	145	–	–	–	–	00
01	7	20	40	30	80	145	6	20	50	100	60	145	295	15	40	100	195	–	–	–	–	01
02	8	25	50	50	145	245	10	30	80	145	80	245	390	15	50	145	245	–	–	–	–	02
03	8	25	50	60	145	295	15	40	100	165	100	245	540	25	70	145	345	–	–	–	–	03
04	15	40	80	60	145	295	15	40	100	245	145	295	635	25	80	195	390	–	–	–	–	04
05	15	50	100	100	245	490	20	60	145	295	145	390	785	35	100	245	490	–	–	–	–	05
06	15	50	100	145	295	635	25	80	195	390	145	590	930	35	100	295	590	195	345	295	685	06
07	25	70	140	145	390	785	35	100	245	490	245	785	1 270	50	145	390	785	195	390	390	735	07
08	25	80	155	145	390	785	35	100	295	590	390	880	1 570	65	195	440	880	245	440	440	835	08
09	35	100	195	245	540	980	50	145	345	635	490	1 080	1 770	85	245	540	1 080	245	490	490	930	09
10	35	100	195	245	635	1 180	50	145	390	735	540	1 180	2 060	85	245	590	1 180	295	540	540	1 030	10
11	40	120	235	295	785	1 370	65	195	440	880	635	1 370	2 450	100	295	735	1 470	390	685	685	1 270	11
12	40	120	235	390	880	1 570	65	195	490	980	785	1 470	2 940	115	345	785	1 670	390	735	735	1 420	12
13	50	145	295	440	980	1 770	85	245	540	1 090	835	1 670	3 330	130	390	930	1 860	440	835	785	1 520	13
14	65	195	390	490	1 080	2 060	85	245	635	1 270	930	1 860	3 720	160	490	980	2 060	590	1 130	1 030	2 010	14
15	65	195	390	590	1 180	2 150	100	295	685	1 370	980	2 150	3 920	195	590	1 180	2 350	590	1 130	1 080	2 110	15
16	65	195	390	635	1 370	2 350	100	295	735	1 470	1 080	2 450	4 310	225	685	1 370	2 750	685	1 370	1 270	2 500	16
17	85	245	490	735	1 570	2 550	130	390	880	1 770	1 270	2 940	4 900	260	785	1 570	2 940	735	1 420	1 320	2 600	17
18	100	295	590	785	1 670	2 840	145	440	980	1 960	1 470	3 230	5 390	260	785	1 770	3 430	980	1 860	1 770	3 380	18
19	100	295	590	880	1 770	3 140	160	490	1 080	2 060	1 670	3 430	5 880	290	880	1 960	3 920	980	1 960	1 860	3 530	19
20	100	345	685	880	1 960	3 530	175	540	1 180	2 150	1 860	3 920	6 370	325	980	2 150	4 410	1 030	2 010	1 910	3 680	20
21	100	345	685	980	2 150	3 920	195	590	1 270	2 350	2 060	4 310	7 060	360	1 080	2 350	4 900	1 180	2 250	2 150	3 770	21
22	145	390	785	1 080	2 380	4 410	210	635	1 470	2 550	2 250	4 900	7 840	385	1 180	2 450	5 290	1 320	2 600	2 450	4 760	22
24	145	490	980	1 180	2 650	4 900	225	685	1 670	2 840	2 450	5 390	8 820	420	1 270	2 840	5 490	1 420	2 800	2 550	5 100	24
26	195	590	1 180	1 370	3 140	5 390	245	735	1 770	3 140	2 750	5 880	9 310	485	1 470	3 140	5 880	1 770	3 380	3 230	6 230	26
28	195	635	1 270	1 470	3 430	5 880	260	785	1 960	3 920	2 940	6 370	9 800	520	1 570	3 430	6 370	2 010	3 920	3 720	7 210	28
30	245	735	1 470	1 770	3 920	6 860	275	835	2 150	4 410	3 330	6 860	10 300	585	1 770	3 720	6 860	2 500	4 850	4 660	8 920	30
32	245	785	1 570	2 150	4 410	7 840	290	880	2 350	4 900	3 630	7 350	10 800	645	1 960	4 120	7 840	2 500	4 850	4 660	8 920	32
34	345	880	1 810	2 450	4 900	8 820	325	980	2 450	5 390	3 920	7 840	11 800	645	2 150	4 410	8 330	3 090	6 030	5 730	11 100	34

11-4-2 Amount of preload for thrust ball bearings

When a thrust ball bearing is rotated at high speed, balls slide on raceway due to centrifugal force and the gyro moment, which often causes the raceway to suffer from smearing or other defects.

To eliminate such sliding, it is necessary to mount the bearing without clearance, and apply an axial load (preload) larger than the minimum necessary axial load determined by the following equation.

When an axial load from the outside is lower than 0.001 3 C_{0a}, there is no adverse effect on the bearing, as long as lubrication is satisfactory.

Generally, deep groove and angular contact ball bearings are recommended for applications when a portion of rotation under axial load is present at high speed.

11-4-3 Amount of preload for spherical thrust roller bearings

Spherical thrust roller bearings sometimes suffer from scuffing, smearing, or other defects due to sliding which occurs between the roller and raceway surface in operation.

To eliminate such sliding, it is necessary to mount the bearing without clearance, and apply an axial load (preload) larger than the minimum necessary axial load.

Of the two values determined by the two equations below, the higher should be defined as the minimum necessary axial load.

- Thrust ball bearing (contact angle : 90°)

$$F_{a\,min} = 5.1 \left(\frac{n}{1\,000}\right)^2 \cdot \left(\frac{C_{0a}}{1\,000}\right)^2 \times 10^{-3} \quad \text{(11-1)}$$

- Spherical thrust roller bearing (the higher value determined by the two equations should be taken.)

$$F_{a\,min} = \frac{C_{0a}}{2\,000} \quad \text{(11-2)}$$

$$F_{a\,min} = 1.8F_r + 1.33 \left(\frac{n}{1\,000}\right)^2 \cdot \left(\frac{C_{0a}}{1\,000}\right)^2 \times 10^{-4} \quad \text{(11-3)}$$

---

where :

$F_{a\,min}$	: minimum necessary axial load	N
n	: rotational speed	min^{-1}
C_{0a}	: static axial load rating	N
F_r	: radial load	N

12. Bearing lubrication

12-1 Purpose and method of lubrication

Lubrication is one of the most important factors determining bearing performance. The suitability of the lubricant and lubrication method have a dominant influence on bearing life.

Functions of lubrication :

- To lubricate each part of the bearing, and to reduce friction and wear
- To carry away heat generated inside bearing due to friction and other causes
- To cover rolling contact surface with the proper oil film in order to prolong bearing fatigue life
- To prevent corrosion and contamination by dirt

Bearing lubrication is classified broadly into two categories: grease lubrication and oil lubrication. Table 12-1 makes a general comparison between the two.

Table 12-1 Comparison between grease and oil lubrication

Item	Grease	Oil
· Sealing device	Easy	Slightly complicated and special care required for maintenance
· Lubricating ability	Good	Excellent
· Rotation speed	Low/medium speed	Applicable at high speed as well
· Replacement of lubricant	Slightly troublesome	Easy
· Life of lubricant	Relatively short	Long
· Cooling effect	No cooling effect	Good (circulation is necessary)
· Filtration of dirt	Difficult	Easy

12-1-1 Grease lubrication

Grease lubrication is widely applied since there is no need for replenishment over a long period once grease is filled, and a relatively simple structure can suffice for the lubricant sealing device.

There are two methods of grease lubrication. One is the closed lubrication method, in which grease is filled in advance into shielded/sealed bearing; the other is the feeding method, in which the bearing and housing are filled with grease in proper quantities at first, and refilled at a regular interval via replenishment or replacement.

Devices with numerous grease inlets sometimes employ the centralized lubricating method, in which the inlets are connected via piping and supplied with grease collectively.

1) Amount of grease

In general, grease should fill approximately one-third to one-half the inside space, though this varies according to structure and inside space of housing.

It must be borne in mind that excessive grease will generate heat when churned, and will consequently alter, deteriorate, or soften.

When the bearing is operated at low speed, however, the inside space is sometimes filled with grease to two-thirds to full, in order to preclude infiltration of contaminants.

2) Replenishment/replacement of grease

The method of replenishing/replacing grease depends largely on the lubrication method. Whichever method may be utilized, care should be taken to use clean grease and to keep dirt or other foreign matter out of the housing.

In addition, it is desirable to refill with grease of the same brand as that filled at the start.

When grease is refilled, new grease must be injected inside bearing.

Fig. 12-1 gives one example of a feeding method.

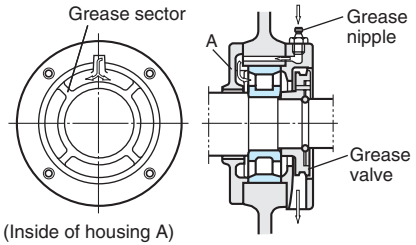


Fig. 12-1 Example of grease feeding method (using grease sector)

In the example, the inside of the housing is divided by grease sectors. Grease fills one sector, then flows into the bearing.

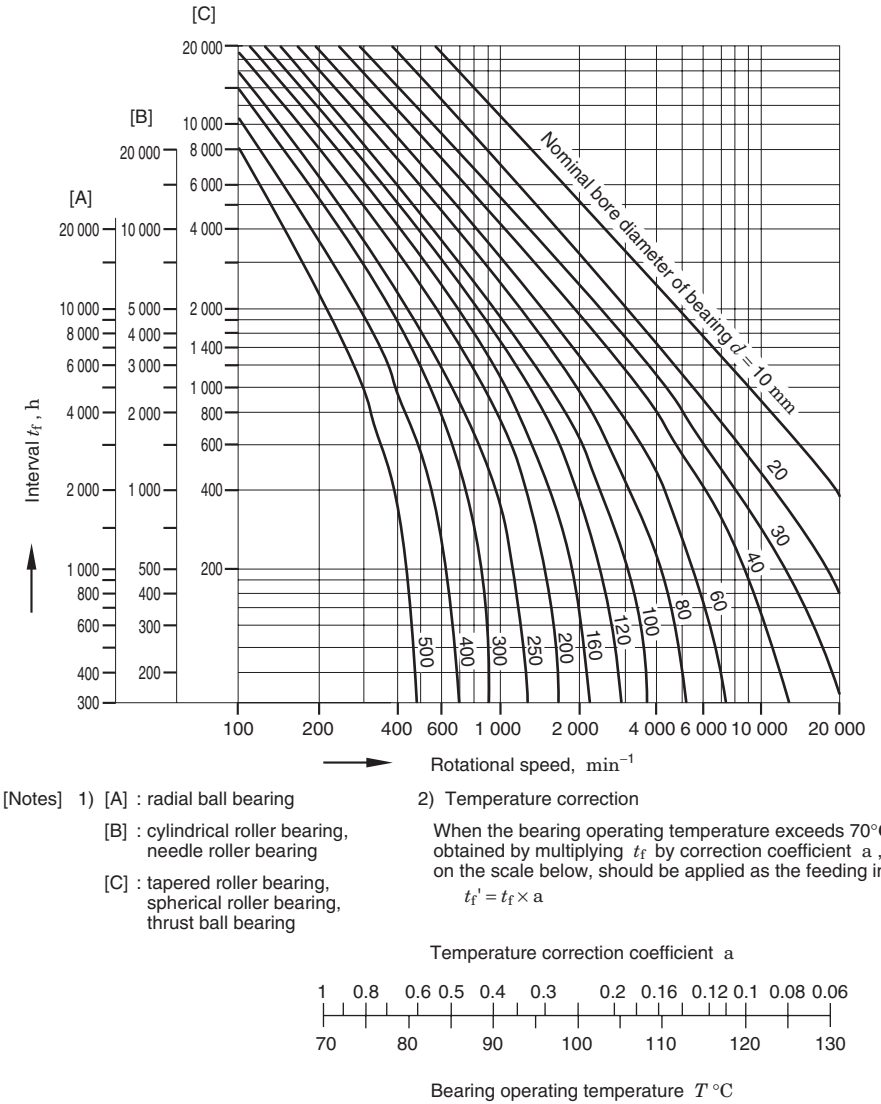
On the other hand, grease flowing back from the inside is forced out of the bearing by the centrifugal force of the grease valve.

When the grease valve is not used, it is necessary to enlarge the housing space on the discharge side to store old grease.

The housing is uncovered and the stored old grease is removed at regular intervals.

3) Grease feeding interval

In normal operation, grease life should be regarded roughly as shown in Fig. 12-2, and replenishment/replacement should be carried out accordingly.



[Notes] 1) [A] : radial ball bearing
[B] : cylindrical roller bearing, needle roller bearing
[C] : tapered roller bearing, spherical roller bearing, thrust ball bearing

2) Temperature correction

When the bearing operating temperature exceeds 70°C, t_f', obtained by multiplying t_f by correction coefficient a, found on the scale below, should be applied as the feeding interval.

$t_f' = t_f \times a$

Fig. 12-2 Grease feeding interval

4) Grease life in shielded/sealed ball bearing

Grease life can be estimated by the following equation when a single-row deep groove ball bearing is filled with grease and sealed with shields or seals.

$$\log L = 6.10 - 4.40 \times 10^{-6} d_m n - 2.50 \left(\frac{P_r}{C_r} - 0.05\right) - (0.021 - 1.80 \times 10^{-8} d_m n)\, T \quad \cdots (12\text{-}1)$$

where :

L	: grease life	h
d_m	$= \frac{D+d}{2}$ (D : outside diameter, d : bore diameter)	mm
n	: rotational speed	min^{-1}
P_r	: dynamic equivalent radial load	N
C_r	: basic dynamic radial load rating	N
T	: operating temperature of bearing	°C

The conditions for applying equation (12-1) are as follows :

a) Operating temperature of bearing : T °C

Applicable when $T \leqq 120$

(when $T < 50$, $T = 50$)

When $T > 120$, please contact with JTEKT.

b) Value of $d_m n$

Applicable when $d_m n \leqq 500 \times 10^3$

(when $d_m n < 125 \times 10^3$, $d_m n = 125 \times 10^3$)

When $d_m n > 500 \times 10^3$, please contact with JTEKT.

c) Load condition : $\frac{P_r}{C_r}$

Applicable when $\frac{P_r}{C_r} \leqq 0.2$

(when $\frac{P_r}{C_r} < 0.05$, $\frac{P_r}{C_r} = 0.05$)

When $\frac{P_r}{C_r} > 0.2$, please contact with JTEKT.

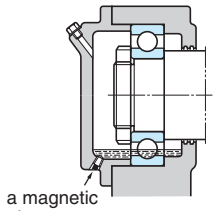
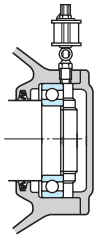
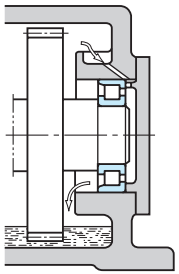
12-1-2 Oil lubrication

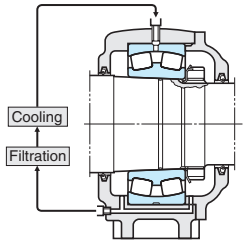
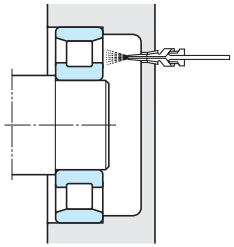
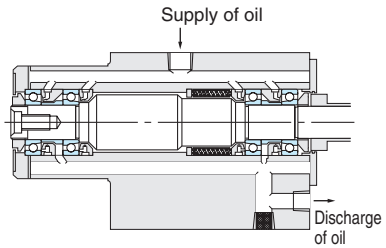
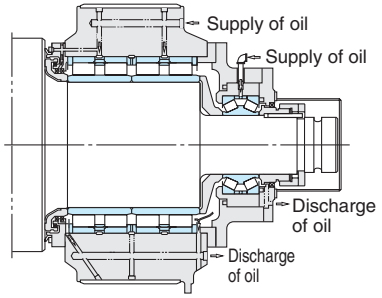
Oil lubrication is usable even at high speed rotation and somewhat high temperature, and is effective in reducing bearing vibration and noise.

Thus oil lubrication is used in many cases where grease lubrication does not work.

Table 12-2 shows major types and methods of oil lubrication.

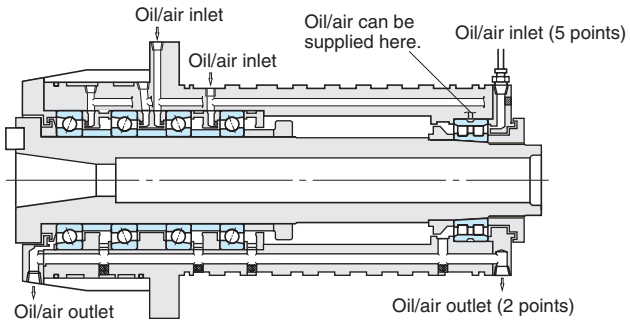
Table 12-2 Type and method of oil lubrication

① **Oil bath**	● Simplest method of bearing immersion in oil for operation. ● Suitable for low/medium speed. ● Oil level gauge should be furnished to adjust the amount of oil. (In the case of horizontal shaft) About 50 % of the lowest rolling element should be immersed. (In the case of vertical shaft) About 70 to 80 % of the bearing should be immersed. ● It is better to use a magnetic plug to prevent wear iron particles from dispersing in oil.	
② **Oil drip**	● Oil is dripped with an oiling device, and the inside of the housing is filled with oil mist by the action of rotating parts. This method has a cooling effect. ● Applicable at relatively high speed and up to medium load. ● In general, 5 to 6 drops of oil are utilized per minute. (It is difficult to adjust the dripping in 1mL/h or smaller amounts.) ● It is necessary to prevent too much oil from being accumulated at the bottom of housing.	
③ **Oil splash**	● This type of lubrication method makes use of a gear or simple flinger attached to shaft in order to splash oil. This method can supply oil for bearings located away from the oil tank. ● Usable up to relatively high speed. ● It is necessary to keep oil level within a certain range. ● It is better to use a magnetic plug to prevent wear iron particles from dispersing in oil. It is also advisable to set up a shield or baffle board to prevent contaminants from entering the bearing.	

④ **Forced oil circulation**	● This method employs a circulation-type oil supply system. Supplied oil lubricates inside of the bearing, is cooled and sent back to the tank through an oil escape pipe. The oil, after filtering and cooling, is pumped back. ● Widely used at high speeds and high temperature conditions. ● It is better to use an oil escape pipe approximately twice as thick as the oil supply pipe in order to prevent too much lubricant from gathering in housing. ● Required amount of oil : see Remark 1.	
⑤ **Oil jet lubrication**	● This method uses a nozzle to jet oil at a constant pressure (0.1 to 0.5MPa), and is highly effective in cooling. ● Suitable for high speed and heavy load. ● Generally, the nozzle (diameter 0.5 to 2 mm) is located 5 to 10 mm from the side of a bearing. When a large amount of heat is generated, 2 to 4 nozzles should be used. ● Since a large amount of oil is supplied in the jet lubrication method, old should be discharged with an oil pump to prevent excessive residual oil. ● Required amount of oil : see Remark 1.	
⑥ **Oil mist lubrication (spray lubrication)**	● This method employs an oil mist generator to produce dry mist (air containing oil in the form of mist). The dry mist is continuously sent to the oil supplier, where the mist is turned into a wet mist (sticky oil drops) by a nozzle set up on the housing or bearing, and is then sprayed onto bearing. ● Required amount of mist : see Remark 2. ● This method provides and sustains the smallest amount of oil film necessary for lubrication, and has the advantages of preventing oil contamination, simplifying bearing maintenance, prolonging bearing fatigue life, reducing oil consumption etc.	(Example of grinding machine)  (Example of rolling mill) 

⑦ Oil/air lubrication

- A proportioning pump sends forth a small quantity of oil, which is mixed with compressed air by a mixing valve. The admixture is supplied continuously and stably to the bearing.
- This method enables quantitative control of oil in extremely small amounts, always supplying new lubricating oil. It is thus suitable for machine tools and other applications requiring high speed.
- Compressed air and lubricating oil are supplied to the spindle, increasing the internal pressure and helping prevent dirt, cutting-liquid, etc. from entering. As well, this method allows the lubricating oil to flow through a feeding pipe, minimizing atmospheric pollution.
- JTEKT produces an oil/air lubricator and, air cleaner, as well as a spindle unit incorporating the oil/air lubrication system. Please refer to brochure "oil/air lubricator & air clean unit".



(Example of spindle unit incorporating oil/air lubrication system)

Remark 1 Required oil supply in forced oil circulation ; oil jet lubrication methods

$$G = \frac{1.88 \times 10^{-4} \mu \cdot d \cdot n \cdot P}{60\ c \cdot r \cdot \Delta T}$$

where :

G	: required oil supply	L/min
μ	: friction coefficient (see table at right)	
d	: nominal bore diameter	mm
n	: rotational speed	min^{-1}
P	: dynamic equivalent load of bearing	N
c	: specific heat of oil	1.88-2.09kJ/kg·K
r	: density of oil	g/cm^3
ΔT	: temperature rise of oil	K

Values of friction coefficient μ

Bearing type	μ
Deep groove ball bearing	0.001 0 – 0.001 5
Angular contact ball bearing	0.001 2 – 0.002 0
Cylindrical roller bearing	0.000 8 – 0.001 2
Tapered roller bearing	0.001 7 – 0.002 5
Spherical roller bearing	0.002 0 – 0.002 5

The values obtained by the above equation show quantities of oil required to carry away all the generated heat, with heat release not taken into consideration.

In reality, the oil supplied is generally half to two-thirds of the calculated value.

Heat release varies widely according to the application and operating conditions.

To determine the optimum oil supply, it is advised to start operating with two-thirds of the calculated value, and then reduce the oil gradually while measuring the operating temperature of bearing, as well as the supplied and discharged oil.

Remark 2 Notes on oil mist lubrication

1) Required amount of mist (mist pressure : 5 kPa)

(In the case of a bearing)	$Q = \frac{0.11dR}{1\,000}$
(In the case of two oil seals combined)	$Q = \frac{0.028d_1}{1\,000}$

where :

Q	: required amount of mist	L/min
d	: nominal bore diameter	mm
R	: number of rolling element rows	
d_1	: inside diameter of oil seal	mm

In the case of high speed ($d_m n \geqq 400 \times 10^3$), it is necessary to increase the amount of oil and heighten the mist pressure.

2) Piping diameter and design of lubrication hole/groove

When the flow rate of mist in piping exceeds 5 m/s, oil mist suddenly condenses into an oil liquid.

Consequently, the piping diameter and dimensions of the lubrication hole/groove in the housing should be designed to keep the flow rate of mist, obtained by the following equation, from exceeding 5 m/s.

$$V = \frac{0.167Q}{A} \leqq 5$$

where :

V	: flow rate of mist	m/s
Q	: amount of mist	L/min
A	: sectional area of piping or lubrication groove	cm^2

3) Mist oil

Oil used in oil mist lubrication should meet the following requirements.

- ability to turn into mist
- has high extreme pressure resistance
- good heat/oxidation stability
- rust-resistant
- unlikely to generate sludge
- superior demulsifier

Oil mist lubrication has a number of advantages for high speed rotation bearings. Its performance, however, is largely affected by surrounding structures and bearing operating conditions.

If contemplating the use of this method, please contact with JTEKT for advice based on JTEKT long experience with oil mist lubrication.

12-2 Lubricant

12-2-1 Grease

Grease is made by mixing and dispersing a solid of high oil-affinity (called a thickener) with lubricant oil (as a base), and transforming it into a semi-solid state.

As well, a variety of additives can be added to improve specific performance.

(1) Base oil

Mineral oil is usually used as the base oil for grease. When low temperature fluidity, high temperature stability, or other special performance is required, diester oil, silicon oil, polyglycolic oil, fluorinated oil, or other synthetic oil is often used.

Generally, grease with a low viscosity base oil is suitable for applications at low temperature or high rotation speed; grease with high viscosity base oils are suitable for applications at high temperature or under heavy load.

(2) Thickener

Most greases use a metallic soap base such as lithium, sodium, or calcium as thickeners. For some applications, however, non-soap base thickeners (inorganic substances such as bentone, silica gel, and organic substances such as urea compounds, fluorine compounds) are also used.

In general, the mechanical stability, bearing operating temperature range, water resistance, and other characteristics of grease are determined by the thickener.

(Lithium soap base grease)
Superior in heat resistance, water resistance and mechanical stability.

(Calcium soap base grease)
Superior in water resistance; inferior in heat resistance.

(Sodium soap base grease)
Superior in heat resistance; inferior in water resistance.

(Non-soap base grease)
Superior in heat resistance.

(3) Additives

Various additives are selectively used to serve the respective purposes of grease applications.

- Extreme pressure agents
  When bearings must tolerate heavy or impact loads.
- Oxidation inhibitors
  When grease is not refilled for a long period.
  Structure stabilizers, rust preventives, and corrosion inhibitors are also used.

(4) Consistency

Consistency, which indicates grease hardness, is expressed as a figure obtained, in accordance with ASTM (JIS), by multiplication by 10 the depth (in mm) to which the cone-shaped metallic plunger penetrates into the grease at 25°C by deadweight in 5 seconds. The softer the grease, the higher the figure.

Table 12-4 shows the relationships between the NLGI scales and ASTM (JIS) penetration indexes, service conditions of grease.
(NLGI : National Lubricating Grease Institute)

Table 12-4 Grease consistency

NLGI scale	ASTM (JIS) penetration index (25°C, 60 mixing operations)	Service conditions/ applications
0	355 – 385	For centralized lubricating
1	310 – 340	For centralized lubricating, at low temperature
2	265 – 295	For general use
3	220 – 250	For general use, at high temperature
4	175 – 205	For special applications

(5) Mixing of different greases

Since mixing of different greases changes their properties, greases of different brands should not be mixed.

If mixing cannot be avoided, greases containing the same thickener should be used. Even if the mixed greases contain the same thickener, however, mixing may still produce adverse effects, due to difference in additives or other factors.

Thus it is necessary to check the effects of a mixture in advance, through testing or other methods.

Table 12-3 Characteristics of respective greases

	Lithium grease			Calcium grease (cup grease)	Sodium grease (fiber grease)	Complex base grease		Non-soap base grease			
Thickener	Lithium soap			Calcium soap	Sodium soap	Lithium complex soap	Calcium complex soap	Bentone	Urea compounds	Fluorine compounds	Thickener
Base oil	Mineral oil	Synthetic oil (diester oil)	Synthetic oil (silicon oil)	Mineral oil	Mineral oil	Mineral oil	Mineral oil	Mineral oil	Mineral/ synthetic oil	Synthetic oil	Base oil
Dropping point (°C)	170 to 190	170 to 230	220 to 260	80 to 100	160 to 180	250 or higher	200 to 280	–	240 or higher	250 or higher	Dropping point (°C)
Operating temperature range (°C)	– 30 to + 120	– 50 to + 130	– 50 to + 180	– 10 to + 70	0 to + 110	– 30 to + 150	– 10 to + 130	– 10 to + 150	– 30 to + 150	– 40 to + 250	Operating temperature range (°C)
Rotation speed range	Medium to high	High	Low to medium	Low to medium	Low to high	Low to high	Low to medium	Medium to high	Low to high	Low to medium	Rotation speed range
Mechanical stability	Excellent	Good to excellent	Good	Fair to good	Good to excellent	Good to excellent	Good	Good	Good to excellent	Good	Mechanical stability
Water resistance	Good	Good	Good	Good	Bad	Good to excellent	Good	Good	Good to excellent	Good	Water resistance
Pressure resistance	Good	Fair	Bad to fair	Fair	Good to excellent	Good	Good	Good to excellent	Good to excellent	Good	Pressure resistance
Remarks	Most widely usable for various rolling bearings.	Superior low temperature and friction characteristics. Suitable for bearings for measuring instruments and extra-small ball bearings for small electric motors.	Superior high and low temperature characteristics.	Suitable for applications at low rotation speed and under light load. Not applicable at high temperature.	Liable to emulsify in the presence of water. Used at relatively high temperature.	Superior mechanical stability and heat resistance. Used at relatively high temperature.	Superior pressure resistance when extreme pressure agent is added. Used in bearings for rolling mills.	Suitable for applications at high temperature and under relatively heavy load.	Superior water resistance, oxidation stability, and heat stability. Suitable for applications at high temperature and high speed.	Superior chemical resistance and solvent resistance. Usable at up to 250 °C.	Remarks

12-2-2 Lubricating oil

For lubrication, bearings usually employ highly refined mineral oils, which have superior oxidation stability, rust-preventive effect, and high film strength.

With bearing diversification, however, various synthetic oils have been put into use.

These synthetic oils contain various additives (oxidation inhibitors, rust preventives, antifoaming agents, etc.) to improve specific properties. Table 12-5 shows the characteristics of lubricating oils.

Mineral lubricating oils are classified by applications in JIS and MIL.

Table 12-5 Characteristics of lubricating oils

Type of lubricating oil	Highly refined mineral oil	Major synthetic oils				
		Diester oil	Silicon oil	Polyglycolic oil	Polyphenyl ether oil	Fluorinated oil
Operating temperature range (°C)	− 40 to + 220	− 55 to + 150	− 70 to + 350	− 30 to + 150	0 to + 330	− 20 to + 300
Lubricity	Excellent	Excellent	Fair	Good	Good	Excellent
Oxidation stability	Good	Good	Fair	Fair	Excellent	Excellent
Radioactivity resistance	Bad	Bad	Bad to fair	Bad	Excellent	−

[Selection of lubricating oil]

The most important criterion in selecting a lubricating oil is whether the oil provides proper viscosity at the bearing operating temperature.

Standard values of proper kinematic viscosity can be obtained through selection by bearing type according to Table 12-6 first, then through selection by bearing operating conditions according to Table 12-7.

When lubricating oil viscosity is too low, the oil film will be insufficient. On the other hand, when the viscosity is too high, heat will be generated due to viscous resistance.

In general, the heavier the load and the higher the operating temperature, the higher the lubricating oil viscosity should be ; whereas, the higher the rotation speed, the lower the viscosity should be.

Fig. 12-3 illustrates the relationship between lubricating oil viscosity and temperature.

Table 12-6 Proper kinematic viscosity by bearing type

Bearing type	Proper kinematic viscosity at operating temperature
Ball bearing Cylindrical roller bearing	13mm²/ s or higher
Tapered roller bearing Spherical roller bearing	20mm²/ s or higher
Spherical thrust roller bearing	32mm²/ s or higher

Table 12-7 Proper kinematic viscosities by bearing operating conditions

Operating temperature	$d_m n$ value	Proper kinematic viscosity (expressed in the ISO viscosity grade or the SAE No.)	
		Light/normal load	Heavy/impact load
− 30 to 0°C	All rotation speeds	ISO VG 15, 22, 46 (Refrigerating machine oil)	—
0 to 60°C	300 000 or lower	ISO VG 46 (Bearing oil Turbine oil)	ISO VG 68 SAE 30 (Bearing oil Turbine oil)
	300 000 to 600 000	ISO VG 32 (Bearing oil Turbine oil)	ISO VG 68 (Bearing oil Turbine oil)
	600 000 or higher	ISO VG 7, 10, 22 (Bearing oil)	—
60 to 100°C	300 000 or lower	ISO VG 68 (Bearing oil)	ISO VG 68, 100 SAE 30 (Bearing oil)
	300 000 to 600 000	ISO VG 32, 46 (Bearing oil Turbine oil)	ISO VG 68 (Bearing oil Turbine oil)
	600 000 or higher	ISO VG 22, 32, 46 (Bearing oil Turbine oil Machine oil)	—
100 to 150°C	300 000 or lower	ISO VG 68, 100 SAE 30, 40 (Bearing oil)	ISO VG 100 to 460 (Bearing oil Gear oil)
	300 000 to 600 000	ISO VG 68 SAE 30 (Bearing oil Turbine oil)	ISO VG 68, 100 SAE 30, 40 (Bearing oil)

[Remarks] 1. $d_m n = \frac{D+d}{2} \times n$ ··· {D : nominal outside diameter (mm), d : nominal bore diameter (mm), n : rotational speed (min^{-1})}

2. Refer to refrigerating machine oil (JIS K 2211), turbine oil (JIS K 2213), gear oil (JIS K 2219), machine oil (JIS K 2238) and bearing oil (JIS K 2239).

3. Please contact with JTEKT if the bearing operating temperature is under −30°C or over 150°C .

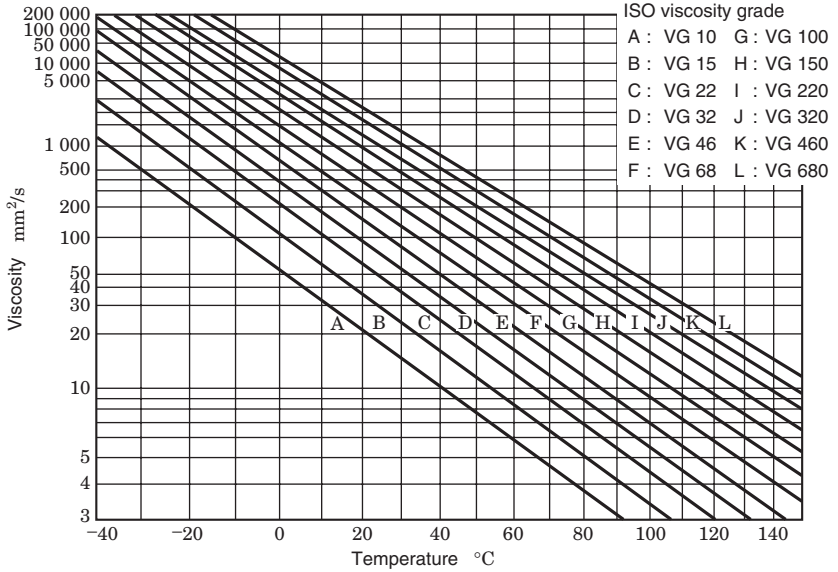


Fig. 12-3 Relationship between lubricating oil viscosity and temperature (viscosity index :100)

13. Bearing materials

Bearing materials include steel for bearing rings and rolling elements, as well as steel sheet, steel, copper alloy and synthetic resins for cages.

These bearing materials should possess the following characteristics :

1) High elasticity, durable under high partial contact stress. — Bearing rings
2) High strength against rolling contact fatigue due to large repetitive contact load. — Rolling elements
3) Strong hardness
4) High abrasion resistance
5) High toughness against impact load — Bearing rings, Rolling elements
6) Excellent dimensional stability — Cages

13-1 Bearing rings and rolling elements materials

1) High carbon chromium bearing steel

High carbon chromium bearing steel specified in JIS is used as a general material in bearing rings (inner rings, outer rings) and rolling elements (balls, rollers).

Their chemical composition classified by steel type is given in Table 13-1.

Among these steel types, SUJ 2 is generally used. SUJ 3, which contains additional Mn and Si, possesses high hardenability and is commonly used for thick section bearings.

SUJ 5 has increased hardenability, because it was developed by adding Mo to SUJ 3.

For small and medium size bearings, SUJ 2 and SUJ 3 are used, and for large size and extra-large size bearings with thick sections, SUJ 5 is widely used.

Generally, these materials are processed into the specified shape and then undergo hardening and annealing treatment until they attain a hardness of 57 to 64 HRC.

2) Case carburizing bearing steel (case hardened steel)

When a bearing receives heavy impact loads, the surface of the bearing should be hard and the inside soft.

Such materials should possess a proper amount of carbon, dense structure, and carburizing case depth on their surface, while having proper hardness and fine structure internally.

For this purpose, chromium steel and nickel-chromium-molybdenum steel are used as materials.

Typical steel materials are shown in Table 13-2.

These materials also undergo vacuum degassing in order to reduce non-metallic inclusions and oxygen content which leads to higher reliability.

3) Others

For special applications, the following materials are used, according to operational conditions.

(When very high reliability is required)
- high refining steel ··· developed by JTEKT
- vacuum arc remelted steel
- electro slag remelted steel

(When heat resistance is required)
- high speed steel for high temperature bearings ··· refer to Table 13-3

(When high corrosion resistance is required)
- stainless steel ··· refer to Table 13-4

(When high heat, corrosion, and chemical resistance are required)
- ceramics

Table 13-1 Chemical composition of high carbon chromium bearing steel

Standard	Code	Chemical composition (%)						
		C	Si	Mn	P	S	Cr	Mo
JIS G 4805	SUJ 2	0.95 – 1.10	0.15 – 0.35	Not more than 0.50	Not more than 0.025	Not more than 0.025	1.30 – 1.60	Not more than 0.08
	SUJ 3	0.95 – 1.10	0.40 – 0.70	0.90 – 1.15			0.90 – 1.20	Not more than 0.08
	SUJ 5	0.95 – 1.10	0.40 – 0.70	0.90 – 1.15			0.90 – 1.20	0.10 – 0.25
SAE J 404	52100	0.98 – 1.10	0.15 – 0.35	0.25 – 0.45	Not more than 0.025	Not more than 0.025	1.30 – 1.60	Not more than 0.06

[Remark] As for bearings which are induction hardened, carbon steel with a high carbon content of 0.55 to 0.65 % is used in addition to those listed in this table.

Table 13-2 Chemical composition of case carburizing bearing steel

Standard	Code	Chemical composition (%)							
		C	Si	Mn	P	S	Ni	Cr	Mo
JIS G 4053	SCr 415	0.13 – 0.18	0.15 – 0.35	0.60 – 0.85	Not more than 0.030	Not more than 0.030	–	0.90 – 1.20	–
	SCr 420	0.18 – 0.23	0.15 – 0.35	0.60 – 0.85			–	0.90 – 1.20	–
	SCM 420	0.18 – 0.23	0.15 – 0.35	0.60 – 0.85	Not more than 0.030	Not more than 0.030	–	0.90 – 1.20	0.15 – 0.30
	SNCM 220	0.17 – 0.23	0.15 – 0.35	0.60 – 0.90	Not more than 0.030	Not more than 0.030	0.40 – 0.70	0.40 – 0.65	0.15 – 0.30
	SNCM 420	0.17 – 0.23	0.15 – 0.35	0.40 – 0.70			1.60 – 2.00	0.40 – 0.65	0.15 – 0.30
	SNCM 815	0.12 – 0.18	0.15 – 0.35	0.30 – 0.60	Not more than 0.030	Not more than 0.030	4.00 – 4.50	0.70 – 1.00	0.15 – 0.30
SAE J 404	5120	0.17 – 0.22	0.15 – 0.35	0.70 – 0.90	Not more than 0.035	Not more than 0.040	–	0.70 – 0.90	–
	8620	0.18 – 0.23	0.15 – 0.35	0.70 – 0.90	Not more than 0.035	Not more than 0.040	0.40 – 0.70	0.40 – 0.60	0.15 – 0.25
	4320	0.17 – 0.22	0.15 – 0.30	0.45 – 0.65	Not more than 0.025	Not more than 0.025	1.65 – 2.00	0.40 – 0.60	0.20 – 0.30

Table 13-3 Chemical composition of high speed steel for high temperature bearings

Standard	Code	Chemical composition (%)											
		C	Si	Mn	P	S	Cr	Mo	V	Ni	Cu	Co	W
AISI	M 50	0.77 – 0.85	Not more than 0.25	Not more than 0.35	Not more than 0.015	Not more than 0.015	3.75 – 4.25	4.00 – 4.50	0.90 – 1.10	Not more than 0.10	Not more than 0.10	Not more than 0.25	Not more than 0.25

Table 13-4 Chemical composition of stainless steel

Standard	Code	Chemical composition (%)						
		C	Si	Mn	P	S	Cr	Mo
JIS G 4303	SUS 440 C	0.95 – 1.20	Not more than 1.00	Not more than 1.00	Not more than 0.040	Not more than 0.030	16.00 – 18.00	Not more than 0.75

13-2 Materials used for cages

Since the characteristics of materials used for cages greatly influence the performance and reliability of rolling bearings, the choice of materials is of great importance.

It is necessary to select cage materials in accordance with required shape, ease of lubrication, strength, and abrasion resistance.

Typical materials used for metallic cages are shown in Tables 13-5 and 13-6.

In addition, phenolic resin machined cages and other synthetic resin molded cages are often used.

Materials typically used for molded cages are polyacetal, polyamide (Nylon 6.6, Nylon 4.6), and polymer containing fluorine, which are strengthened with glass and carbon fibers.

Table 13-5 Chemical compositions of pressed cage steel sheet (A) and machined cage carbon steel (B)

	Standard	Code	Chemical composition (%)						
			C	Si	Mn	P	S	Ni	Cr
(A)	JIS G 3141	SPCC	Not more than 0.12	–	Not more than 0.50	Not more than 0.040	Not more than 0.045	–	–
	JIS G 3131	SPHC	Not more than 0.15	–	Not more than 0.60	Not more than 0.050	Not more than 0.050	–	–
	BAS 361	SPB 2	0.13 – 0.20	Not more than 0.04	0.25 – 0.60	Not more than 0.030	Not more than 0.030	–	–
	JIS G 4305	SUS 304	Not more than 0.08	Not more than 1.00	Not more than 2.00	Not more than 0.045	Not more than 0.030	8.00 – 10.50	18.00 – 20.00
(B)	JIS G 4051	S 25 C	0.22 – 0.28	0.15 – 0.35	0.30 – 0.60	Not more than 0.030	Not more than 0.035	–	–

Table 13-6 Chemical composition of high-tensile brass casting of machined cages (%)

Standard	Code	Cu	Zn	Mn	Fe	Al	Sn	Ni	Pb	Si
JIS H 5120	CAC 301 (HBsC*)	55 – 60	33 – 42	0.1 – 0.5	0.5 – 1.5	0.5 – 1.5	Not more than 1.0	Not more than 1.0	Not more than 0.4	Not more than 0.1

* : Material with HBsC is used.

14. Shaft and housing design

In designing the shaft and housing, the following should be taken into consideration.

1) Shafts should be thick and short.
(in order to reduce distortion including bending)

2) Housings should possess sufficient rigidity.
(in order to reduce distortion caused by load)
[Note] · For light alloy housings, rigidity may be provided by inserting a steel bushing.

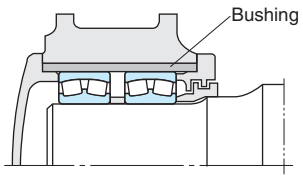


Fig. 14-1 Example of light alloy housing

3) The fitting surface of the shaft and housing should be finished in order to acquire the required accuracy and roughness.
The shoulder end-face should be finished in order to be perpendicular to the shaft center or housing bore surface. (refer to Table 14-1)

4) The fillet radius (r_a) should be smaller than chamfer dimension of the bearing.
(refer to Tables 14-2, 14-3)
[Notes] · Generally it should be finished so as to form a simple circular arc.
(refer to Fig. 14-2)
· When the shaft is given a ground finish, a recess may be provided.
(Fig. 14-3)

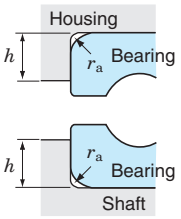


Fig. 14-2 Fillet radius

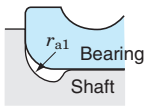


Fig. 14-3 Grinding undercut

5) The shoulder height (h) should be smaller than the outside diameter of inner ring and larger than bore diameter of outer ring so that the bearing is easily dismounted.
(refer to Fig. 14-2 and Table 14-2)

6) If the fillet radius must be larger than the bearing chamfer, or if the shaft/housing shoulder must be low/high, insert a spacer between the inner ring and shaft shoulder as shown in Fig. 14-4, or between the outer ring and the housing shoulder.

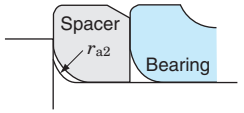


Fig. 14-4 Example of shaft with spacer

7) Screw threads and lock nuts should be completely perpendicular to shaft axis. It is desirable that the tightening direction of threads and lock nuts be opposite to the shaft rotating direction.

8) When split housings are used, the surfaces where the housings meet should be finished smoothly and provided with a recess at the inner ends of the surfaces that meet.

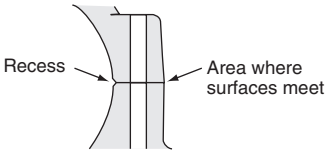


Fig. 14-5 Recesses on meeting surfaces

14-1 Accuracy and roughness of shafts and housings

The fitting surface of the shaft and housing may be finished by turning or fine boring when the bearing is used under general operating conditions. However, if the conditions require minimum vibration and noise, or if the bearing is used under severe operating conditions, a ground finish is required.

Recommended accuracy and roughness of shafts and housings under general conditions are given in Table 14-1.

Table 14-1 Recommended accuracy and roughness of shafts and housings

Item	Bearing class	Shaft	Housing bore
Roundness tolerance	classes 0, 6	IT 3 – IT 4	IT 4 – IT 5
	classes 5, 4	IT 2 – IT 3	IT 2 – IT 3
Cylindrical form tolerance	classes 0, 6	IT 3 – IT 4	IT 4 – IT 5
	classes 5, 4	IT 2 – IT 3	IT 2 – IT 3
Shoulder runout tolerance	classes 0, 6	IT 3	IT 3 – IT 4
	classes 5, 4	IT 3	IT 3
Roughness of fitting surfaces Ra	Small size bearings Large size bearings	0.8 a 1.6 a	1.6 a 3.2 a

[Remark] Refer to the figures listed in the attached table when the basic tolerance IT is required.

14-2 Mounting dimensions

Mounting dimensions mean the necessary dimensions to mount bearings on shafts or housings, which include the fillet radius or shoulder diameters.

Standard values are shown in Table 14-2. (The mounting related dimensions of each bearing are given in the bearing specification table.)

The grinding undercut dimensions for ground shafts are given in Table 14-3.

For thrust bearings, the mounting dimensions should be carefully determined such that bearing race will be perpendicular to the support and the supporting area will be wide enough.

For thrust ball bearings, the shaft shoulder diameter d_a should be larger than pitch diameter of ball set, while the shoulder diameter of housing D_a should be smaller than the pitch diameter of ball set. (Fig. 14-6)

For thrust roller bearings, the housing/shaft diameter D_a/d_a should cover the lengths of both rollers. (Fig. 14-7)

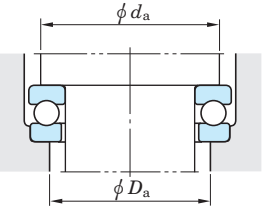


Fig. 14-6 Thrust ball bearings

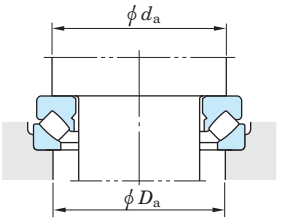
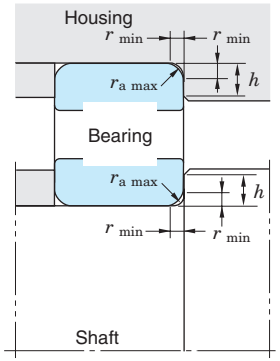


Fig. 14-7 Spherical thrust roller bearings

Table 14-2 Shaft/housing fillet radius and shoulder height of radial bearings

Unit : mm

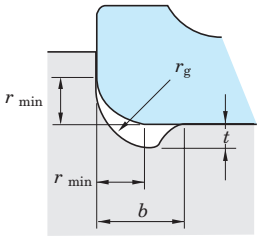


Chamfer dimension of inner ring or outer ring	Shaft and housing		
	Fillet radius	Shoulder height h min	
r min	$r_{a\ max}$	General [1] cases	Special [2] cases
0.05	0.05	0.3	0.3
0.08	0.08	0.3	0.3
0.1	0.1	0.4	0.4
0.15	0.15	0.6	0.6
0.2	0.2	0.8	0.8
0.3	0.3	1.25	1
0.5	0.5	1.75	1.5
0.6	0.6	2.25	2
0.8	0.8	2.75	2.5
1	1	2.75	2.5
1.1	1	3.5	3.25
1.5	1.5	4.25	4
2	2	5	4.5
2.1	2	6	5.5
2.5	2	6	5.5
3	2.5	7	6.5
4	3	9	8
5	4	11	10
6	5	14	12
7.5	6	18	16
9.5	8	22	20
12	10	27	24
15	12	32	29
19	15	42	38

[Notes]
1) Shoulder heights greater than those specified in the Table are required to accommodate heavy axial loads.
2) Used when an axial load is small.
These values are not recommended for tapered roller bearings, angular contact ball bearings, or spherical roller bearings.

[Remark]
Fillet radius can be applied to thrust bearings.

Table 14-3 Grinding undercut dimensions for ground shafts



Unit : mm

Chamfer dimension of inner ring r min	Grinding undercut dimensions		
	t	r_g	b
1	0.2	1.3	2
1.1	0.3	1.5	2.4
1.5	0.4	2	3.2
2	0.5	2.5	4
2.1	0.5	2.5	4
3	0.5	3	4.7
4	0.5	4	5.9
5	0.6	5	7.4
6	0.6	6	8.6
7.5	0.6	7	10

14-3 Shaft design

When bearings are mounted on shafts, locating method should be carefully determined. Shaft design examples for cylindrical bore bearings are given in Table 14-4, and those for bearings with a tapered bore in Table 14-5.

Table 14-4 Mounting designs for cylindrical bore bearings

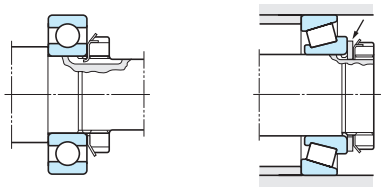
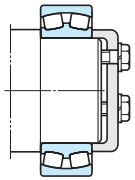
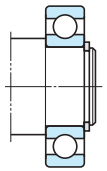
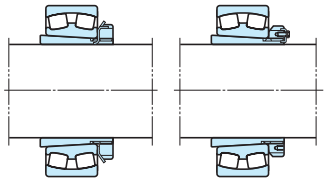
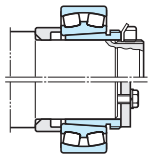
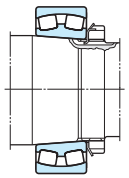
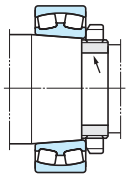
(a) Shaft locknut	(b) End plate	(c) Locating snap ring
		
Lockwashers are used to prevent loosening of locknuts. When tapered roller bearings or angular contact ball bearings are transition-fitted to shafts, plain washers several mm thick as shown above (at right) should be added and tightened with nut.	End of shaft should have bolt holes.	Used when the housing inside is limited, or to simplify shaft machining.

Table 14-5 Mounting designs for bearings with tapered bore

(d) Adapter assembly	(e) Withdrawal sleeve	(f) Shaft locknut	(g) Split ring
			
The simplest method for axial positioning is just to attach an adapter sleeve to the shaft and tighten the locknuts. To prevent locknut loosening, lock-washer (not more than 180 mm in shaft diameter) or lock plate (not less than 200 mm in shaft diameter) are used.	The locknut (above) or end plate (below) fixes the bearing with a withdrawal sleeve, which makes it easy to dismount the bearing.	The shaft is threaded in the same way as shown in Fig. (a). The bearing is located by tightening locknut.	A split ring with threaded outside diameter is inserted into groove on the tapered shaft. A key is often used to prevent the locknut and split ring from loosening.

14-4 Sealing devices

Sealing devices not only prevent foreign matter (dirt, water, metal powder) from entering, but prevent lubricant inside from leaking. If the sealing device fails to function satisfactorily, foreign matter or leakage will cause bearing damage as a result of malfunction or seizure.

Therefore, it is necessary to design or choose the most suitable sealing devices as well as to choose the proper lubricating measures according to operating conditions.

Sealing devices may be divided into non-contact and contact types according to their structure.

They should satisfy the following conditions :

- Free from excessive friction (heat generation)
- Easy maintenance (especially ease of mounting and dismounting)
- As low cost as possible

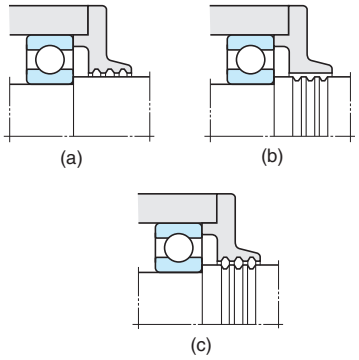
14-4-1 Non-contact type sealing devices

A non-contact type sealing device, which includes oil groove, flinger (slinger), and labyrinth, eliminates friction because it does not have a contact point with the shaft.

These devices utilize narrow clearance and centrifugal force and are especially suitable for operation at high rotation speed and high temperature.

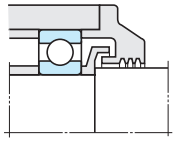
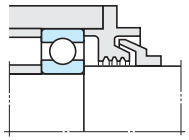
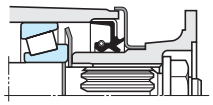
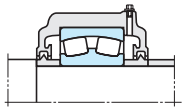
Table 14-6 (1) Non-contact type sealing devices

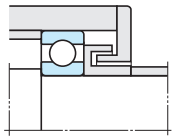
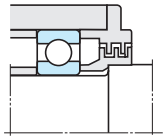
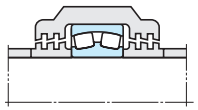
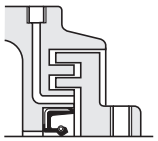
(1) Oil groove



- This kind of seal having more than three grooves at the narrow clearance between the shaft and housing cover, is usually accompanied by other sealing devices except when it is used with grease lubrication at low rotation speed.
- Preventing entrance of contaminants can be improved by filling the groove with calcium grease (cup grease) having a consistency of 150 to 200.
- The clearance between the shaft and housing cover should be as narrow as possible. Recommended clearances are as follows.
  - Shaft diameter of less than 50mm ····· 0.25 – 0.4mm
  - Shaft diameter of over 50mm ····· 0.5 – 1 mm
- Recommended dimensions for the oil groove are as follows.
  - Width ····· 2 – 5mm
  - Depth ····· 4 – 5mm

Table 14-6 (2) Non-contact type sealing devices

(2) Flinger (slinger)	(3) Labyrinth
 (d) Flinger attached inside	 (e) Flinger attached outside
 (f) Cover type flinger	 (g) Oil thrower
■ A flinger utilizes centrifugal force to splash away the oil and dirt. It produces an air stream which prevents oil leakage and dirt by a pumping action. In many cases, this device is used together with other sealing devices. ■ A flinger installed inside the housing (Fig. d) provides an inward pumping action, preventing lubricant leakage; and, when installed outside (Fig. e), the outward pumping action prevents lubricant contamination. ■ A cover type flinger (Fig. f) splashes away dirt and dust by centrifugal force. ■ The oil thrower, shown in (Fig. g), is a kind of flinger. An annular ridge on the shaft or a ring fitted onto the shaft utilizes centrifugal force to prevent the lubricant from flowing out.	

(3) Labyrinth
 (h) Axial labyrinth  (i) Radial labyrinth
 (j) Aligning labyrinth  (k) Axial labyrinth with greasing feature
■ A labyrinth provides clearance in the shape of engagements between the shaft and housing. It is the most suitable for prevention of lubricant leakage at high rotation speed. ■ Though an axial labyrinth, shown in (Fig. h), is popular because of its ease of mounting, the sealing effect is better in a radial labyrinth, shown in (Fig. i). ■ An aligning labyrinth (Fig. j) is used with self-aligning type bearings. ■ In the cases of (Fig. i) and (Fig. j), the housing or the housing cover should be split. ■ Recommended labyrinth clearances are given in the following table.

Shaft diameter	Radial clearance	Axial clearance
50mm or less	0.25 – 0.4mm	1 – 2mm
Over 50mm	0.5 – 1 mm	3 – 5mm

■ To improve sealing effect, fill the labyrinth clearance with grease, shown in (Fig. k).

14-4-2 Contact type sealing devices

This type provides a sealing effect by means of the contact of its end with the shaft and are manufactured from synthetic rubber, synthetic resin, or felt.

The synthetic rubber oil seal is most popular.

1) Oil seals

Many types and sizes of oil seals, as a finished part, have been standardized.

JTEKT produces various oil seals.

The names and functions of each oil seal part are shown in Fig. 14-8 and Table 14-7. Table 14-8 provides a representative example.

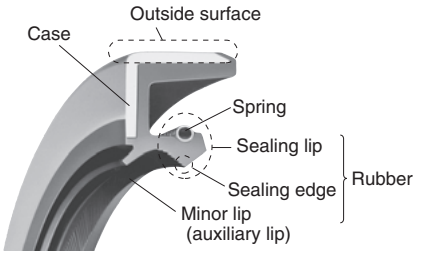


Fig. 14-8 Names of oil seal parts

Table 14-7 Complete list of oil seal part functions

Names	Functions
Sealing edge	Prevents fluid leakage by making contact with rotating shaft. (The contact surface of the sealing edge with the shaft should always filled with lubricant, so as to maintain an oil film therein.)
Sealing lip and spring	Provides proper pressure on the sealing edge to maintain stable contact. Spring provides proper pressure on the lip and maintains such pressure for a long time.
Outside surface	Fixes the oil seal to the housing and prevents fluid leakage through the fitting surface. (Comes encased in metal cased type or rubber covered type.)
Case	Strengthens seal.
Minor lip (auxiliary lip)	Prevents entry of contaminants. (In many cases, the space between the sealing lip and minor lip is filled with grease.)

Table 14-8 Typical oil seal types

With case				With inner case	Without case
Without spring		With spring			With spring
 HM (JIS GM) MH (JIS G)		 HMS (JIS SM) MHS (JIS S) CRS		 HMSH (JIS SA)	 MS
 HMA	MHA	 HMSA (JIS DM)	MHSA (JIS D) CRSA	 HMSAH (JIS DA)	–
● The oil seals shown in the lower row contain the minor lip (auxiliary lip). ● Special types of seals such as the mud resistance seal, pressure resistance seal and outer seal for rotating housings can be provided to serve under various operating conditions.					● By providing a slit on the oil seals, it is possible to attach them from other points than the shaft ends.

Oil seals without minor lips are mounted in different directions according to their operating conditions (shown in Fig. 14-9).

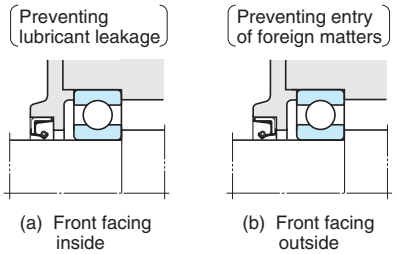


Fig. 14-9 Direction of sealing lips and their purpose

When the seal is used in a dirty operating environment, or penetration of water is expected, it is advisable to have two oil seals combined or to have the space between the two sealing lips be filled with grease. (shown in Fig. 14-10)

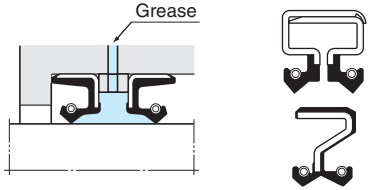


Fig. 14-10 Seals used in a dirty operating environment

Respective seal materials possess different properties. Accordingly, as shown in Table 14-9, allowable lip speed and operating temperature differ depending on the materials. Therefore, by selecting proper materials, oil seals can be used for sealing not only lubricants but also chemicals including alcohol, acids, alkali, etc.

Table 14-9 Allowable lip speed and operating temperature range of oil seals

Seal material	Allowable lip speed (m/s)	Operating temperature range (°C)
NBR	15	– 40 to + 120
Acrylic rubber	25	– 30 to + 150
Silicone rubber	32	– 50 to + 170
Fluoro rubber	32	– 20 to + 180

To ensure the maximum sealing effect of the oil seal, the shaft materials, surface roughness and hardness should be carefully chosen.

Table 14-10 shows the recommended shaft conditions.

Table 14-10 Recommended shaft conditions

Material	Machine structure steel, low alloy steel and stainless steel
Surface hardness	For low speed : harder than 30 HRC For high speed : harder than 50 HRC
Surface roughness (Ra)	0.2 – 0.6a A surface which is excessively rough may cause oil leakage or abrasion ; whereas an excessively fine surface may cause sealing lip seizure, preventing the oil film from forming. Surface must also be free of spiral grinding marks.

2) Felt seals and others

Although felt seals have been used conventionally, it is recommended to replace them with rubber oil seals because the use of felt seals are limited to the following conditions.

- Light dust protection
- Allowable lip speed : not higher than 5m/s

Contact type sealing devices include mechanical seals, O-rings and packings other than those described herein.

JTEKT manufactures various oil seals ranging from those illustrated in Table14-8 to special seals for automobiles, large seals for rolling mills, mud resistance seals, pressure resistance seals, outer seals for rotating housings and O-rings.

For details, refer to JTEKT separate catalog "Oil seals & O-rings" (CAT. NO. R2001E).

15. Handling of bearings

15-1 General instructions

Since rolling bearings are more precisely made than other machine parts, careful handling is absolutely necessary.

1) Keep bearings and the operating environment clean.
2) Handle carefully.
   Bearings can be cracked and brinelled easily by strong impact if handled roughly.
3) Handle using the proper tools.
4) Keep bearings well protected from rust.
   Do not handle bearings in high humidity.
   Operators should wear gloves in order not to soil bearings with perspiration from their hands.
5) Bearings should be handled by experienced or well trained operators.
6) Set bearing operation standards and follow them.
   - Storage of bearings
   - Cleaning of bearings and their adjoining parts.
   - Inspection of dimensions of adjoining parts and finish conditions
   - Mounting
   - Inspection after mounting
   - Dismounting
   - Maintenance and inspection (periodical inspection)
   - Replenishment of lubricants

15-2 Storage of bearings

In shipping bearings, since they are covered with proper anti-corrosion oil and are wrapped in antitarnish paper, the quality of the bearings is guaranteed as long as the wrapping paper is not damaged.

If bearings are to be stored for a long time, it is advisable that the bearings be stored on shelves set higher than 30 cm from the floor, at a humidity less than 65 %, and at a temperature around 20°C.

Avoid storage in places exposed directly to the sun's rays or placing boxes of bearings against cold walls.

15-3 Bearing mounting

15-3-1 Recommended preparation prior to mounting

1) Preparation of bearings

Wait until just before mounting before removing the bearings from their packaging to prevent contamination and rust.

Since the anti-corrosion oil covering bearings is a highly capable lubricant, the oil should not be cleaned off if the bearings are pre-lubricated, or when the bearings are used for normal operation. However, if the bearings are used in measuring instruments or at high rotation speed, the anti-corrosion oil should be removed using a clean detergent oil. After removal of the anti-corrosion oil, bearings should not be left for a long time because they rust easily.

2) Inspection of shafts and housings

Clean up the shaft and housing to check whether it has flaws or burrs as a result of machining.

Be very careful to completely remove lapping agents (SiC, Al_2O_3, etc.), casting sands, and chips from inside the housing.

Next, check that the dimensions, forms, and finish conditions of the shaft and the housing are accurate to those specified on the drawing.

The shaft diameter and housing bore diameter should be measured at the several points as shown in Figs. 15-1 and 15-2.

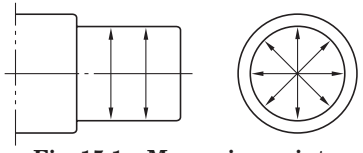


Fig. 15-1 Measuring points on shaft diameter

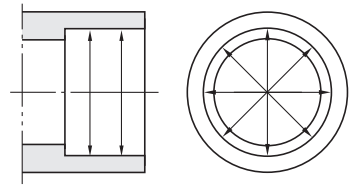


Fig. 15-2 Measuring points on housing bore diameter

Furthermore, fillet radius of shaft and housing, and the squareness of shoulders should be checked.

When using shaft and housing which have passed inspection, it is advisable to apply machine oil to each fitting surface just before mounting.

15-3-2 Bearing mounting

Mounting procedures depend on the type and fitting conditions of bearings.

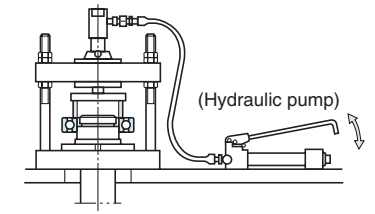
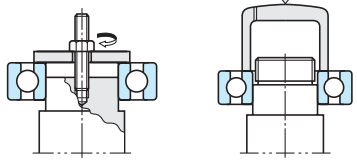
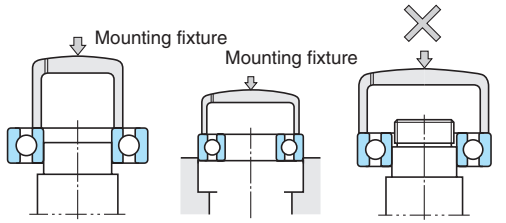
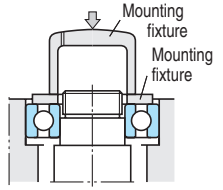
For general bearings in which the shaft rotates, an interference fit is applied to inner rings, while a clearance fit is applied to outer rings.

For bearings in which the outer rings rotate, an interference fit is applied to the outer rings.

Interference fitting is roughly classified as shown here. The detailed mounting processes are described in Tables 15-1 to 15-3.

- Interference fit of inner rings
  - Bearings with cylindrical bore
    - Press fit ··· Applied to small size bearings with restricted interference. (Table 15-1)
    - Shrink fit ··· Applied to bearings which allow heavy interference or to large size bearings. (Table 15-2)
  - Bearings with tapered bore
    - Mounting on tapered shafts ····· (Table 15-3)
    - Mounting using sleeves ····· (Table 15-3)
- Interference fit of outer rings
  - Press fit ··· Most widely used method (Table 15-1)
  - Cooling fit ··· Bearings are fit into housings by cooling them with dry ice, etc. In this method, proper rust-preventive treatment is required, since moisture in the atmosphere adheres to bearings.

Table 15-1 Press fit of bearings with cylindrical bores

Mounting methods	Descriptions
 (a) Using press fit (the most widely used method)  (b) Using bolts and nuts (screw hole should be provided at the shaft end) (c) Using hammers (only when there is no alternative measure)	■ As shown in the Fig., a bearing should be mounted slowly with care, by using a fixture to apply force evenly to the bearing. When mounting the inner ring, apply pressure to the inner ring only. Similarly, in mounting the outer ring, press only the outer ring.  (Inner ring press fit) (Outer ring press fit) (Inner ring press fit) ■ If interference is required on both the inner and outer ring of non-separable bearings, use two kinds of fixtures as shown in the Fig. and apply force carefully, as rolling elements are easily damaged. Be sure never to use a hammer in such cases.  Simultaneous press fit of inner ring and outer ring

Reference **Force is necessary to press fit or remove bearings.**

The force necessary to press fit or remove inner rings of bearings differs depending on the finish of shafts and how much interference the bearings allow.

The standard values can be obtained by using the following equations.

(Solid shafts)
$$K_a = 9.8 f_k \cdot \Delta_{deff} \cdot B \left(1 - \frac{d^2}{D_i^2}\right) \times 10^3 \quad \cdots\cdots (15\text{-}1)$$

(Hollow shafts)
$$K_a = 9.8 f_k \cdot \Delta_{deff} \cdot B \frac{\left(1 - \frac{d^2}{D_i^2}\right)\left(1 - \frac{d_0^2}{d^2}\right)}{\left(1 - \frac{d_0^2}{D_i^2}\right)} \times 10^3 \quad \cdots\cdots (15\text{-}2)$$

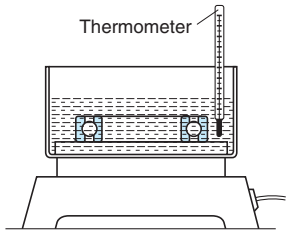
In equations (15-1) and (15-2),

K_a : force necessary for press fit or removal N
Δ_{deff} : effective interference mm
f_k : resistance coefficient (Coefficient taking into consideration friction between shafts and inner rings ··· refer to the table on the right)
B : nominal inner ring width mm
d : nominal inner ring bore diameter mm
D_i : average outside diameter of inner ring mm
d_0 : hollow shaft bore diameter mm

Value of resistance coefficient f_k

Conditions	f_k
· Press fitting bearings on to cylindrical shafts	4
· Removing bearings from cylindrical shafts	6
· Press fitting bearings on to tapered shafts or tapered sleeves	5.5
· Removing bearings from tapered shafts or tapered sleeves	4.5
· Press fitting tapered sleeves between shafts and bearings	10
· Removing tapered sleeves from the space between shafts and bearings	11

Table 15-2 Shrink fit of cylindrical bore bearings

Shrink fit	Descriptions
 (a) Heating in an oil bath  (b) Induction heater	■ This method, which expands bearings by heating them in oil, has the advantage of not applying too much force to bearings and taking only a short time.  [Notes] ● Oil temperature should not be higher than 100 °C, because bearings heated at higher than 120 °C lose hardness. ● Heating temperature can be determined from the bore diameter of a bearing and the interference by referring to Fig. 15-3. ● Use nets or a lifting device to prevent the bearing from resting directly on the bottom of the oil container. ● Since bearings shrink in the radial direction as well as the axial direction while cooling down, fix the inner ring and shaft shoulder tightly with the shaft nut before shrinking, so that no space is left between them. ■ Shrink fit proves to be clean and effective since, by this method, the ring can be provided with even heat in a short time using neither fire nor oil. (When electricity is being conducted, the bearing itself generates heat by its electrical resistance, aided by the built-in exciting coil.)

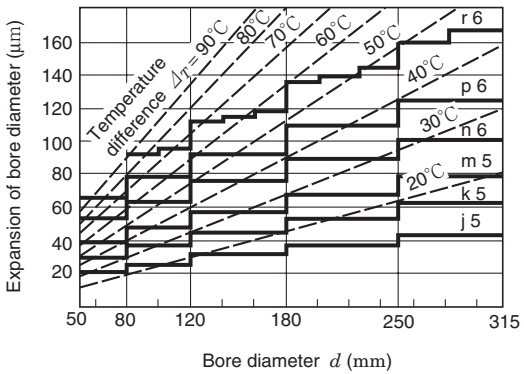


Fig. 15-3 Heating temperature and expansion of inner rings

[Remarks]
1. Thick solid lines show the maximum interference value between bearings (class 0) and shafts (r 6, p 6, n 6, m 5, k 5, j 5) at normal temperature.

2. Therefore, the heating temperature should be selected to gain a larger "expansion of the bore diameter" than the maximum interference values.
(When fitting class 0 bearings having a 90 mm bore diameter to m 5 shafts, this figure shows that heating temperature should be 40 °C higher than room temperature to produce expansion larger than the maximum interference value of 48 μm.
However, taking cooling during mounting into consideration, the temperature should be set 20 to 30 °C higher than the temperature initially required.)

Table 15-3 Mounting bearings with tapered bores

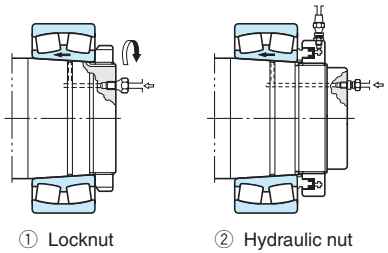
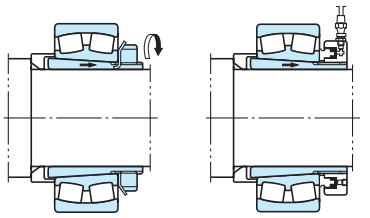
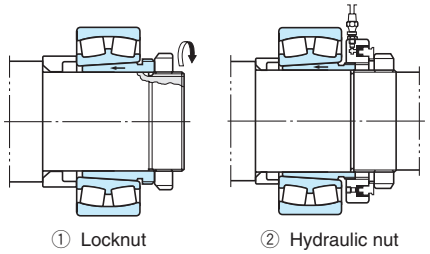
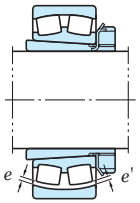
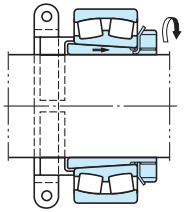
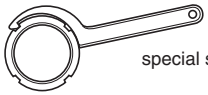
Mounting methods	Descriptions
 (a) Mounting on tapered shafts  (b) Mounting by use of an adapter sleeve  (c) Mounting by use of a withdrawal sleeve  (d) Measuring clearances	■ When mounting bearings directly on tapered shafts, provide oil holes and grooves on the shaft and inject high pressure oil into the space between the fitting surfaces (oil injection). Such oil injection can reduce tightening torque of locknut by lessening friction between the fitting surfaces. ■ When exact positioning is required in mounting a bearing on a shaft with no shoulder, use a clamp to help determine the position of the bearing.  Locating bearing by use of a clamp ■ When mounting bearings on shafts, locknuts are generally used. Special spanners are used to tighten them. Bearings can also be mounted using hydraulic nuts.  special spanner ■ When mounting tapered bore spherical roller bearings, the reduction in the radial internal clearance which gradually occurs during operation should be taken into consideration as well as the push-in depth described in Table 15-4. Clearance reduction can be measured by a thickness gage. First, stabilize the roller in the proper position and then insert the gage into the space between the rollers and the outer ring. Be careful that the clearance between both roller rows and the outer rings is roughly the same ($e \fallingdotseq e'$). Since the clearance may differ at different measuring points, take measurements at several positions. ■ When mounting self-aligning ball bearings, leave enough clearance to allow easy aligning of the outer ring.

Table 15-4 Mounting tapered bore spherical roller bearings

Nominal bore diameter d mm		Reduction of radial internal clearance μm		Axial displacement, mm				Minimum required residual clearance, μm		
				1/12 taper		1/30 taper		C N clearance	C 3 clearance	C 4 clearance
over	up to	min.	max.	min.	max.	min.	max.			
24	30	15	20	0.27	0.35	–	–	10	20	35
30	40	20	25	0.32	0.4	–	–	15	25	40
40	50	25	35	0.4	0.5	–	–	20	30	45
50	65	30	40	0.45	0.6	–	–	25	35	55
65	80	35	50	0.55	0.75	–	–	35	40	70
80	100	40	55	0.65	0.85	–	–	40	50	85
100	120	55	70	0.85	1.05	2.15	2.65	45	65	100
120	140	65	90	1.0	1.2	2.5	3.0	55	80	110
140	160	75	100	1.1	1.35	2.75	3.4	55	90	130
160	180	80	110	1.2	1.5	3.0	3.8	60	100	150
180	200	90	120	1.4	1.7	3.5	4.3	70	110	170
200	225	100	130	1.55	1.85	3.85	4.6	80	120	190
225	250	110	140	1.7	2.05	4.25	5.1	90	130	210
250	280	120	160	1.8	2.3	4.5	5.75	100	140	230
280	315	130	180	2.0	2.5	5.0	6.25	110	150	250
315	355	150	200	2.3	2.8	5.75	7.0	120	170	270
355	400	170	220	2.5	3.1	6.25	7.75	130	190	300
400	450	190	240	2.8	3.4	7.0	8.5	140	210	330
450	500	210	270	3.1	3.8	7.75	9.5	160	230	360
500	560	240	310	3.5	4.3	8.75	10.8	170	260	370
560	630	260	350	3.9	4.8	9.75	12.0	200	300	410
630	710	300	390	4.3	5.3	10.8	13.3	210	320	460
710	800	340	430	4.8	6.0	12.0	15.0	230	370	530
800	900	370	500	5.3	6.7	13.3	16.8	270	410	570
900	1000	410	550	5.9	7.4	14.8	18.5	300	450	640

[Remark] The values for reduction of radial internal clearance listed above are values obtained when mounting bearings with CN clearance on solid shafts. In mounting bearings with C 3 clearance, the maximum value listed above should be taken as the standard.

15-4 Test run

A trial operation is conducted to insure that the bearings are properly mounted.

In the case of compact machines, rotation may be checked by manual operation at first.

If no abnormalities, such as those described below, are observed, then further trial operation proceeds using a power source.

- Knocking ···
  due to flaws or insertion of foreign matter on rolling contact surfaces.
- Excessive torque (heavy) ···
  due to friction on sealing devices, too small clearances, and mounting errors.
- Uneven running torque ···
  due to improper mounting and mounting errors.

For machines too large to allow manual operation, idle running is performed by turning off the power source immediately after turning it on. Before starting power operation, it must be confirmed that bearings rotate smoothly without any abnormal vibration and noise.

Power operation should be started under no load and at low speed, then the speed is gradually increased until the designed speed is reached.

During power operation, check the noise, increase in temperature and vibration.

If any of the abnormalities listed in Tables 15-5 and 15-6 are found, operation must be stopped, and inspection for defects immediately conducted.

The bearings should be dismounted if necessary.

Table 15-5 Bearing noises, causes, and countermeasures

Noise types		Causes	Countermeasures
Cyclic	Flaw noise / Rust noise (similar to noise when punching a rivet) / Brinelling noise (Unclear siren-like noise)	Flaw on raceway Rust on raceway Brinelling on raceway	Improve mounting procedure, cleaning method and rust preventive method. Replace bearing.
	Flaking noise (similar to a large hammering noise)	Flaking on raceway	Replace bearing.
Not cyclic	Dirt noise (an irregular sandy noise.)	Insertion of foreign matter	Improve cleaning method, sealing device. Use clean lubricant. Replace bearing.
	Fitting noise (drumming or hammering noise)	Improper fitting or excessive bearing clearance	Review fitting and clearance conditions. Provide preload. Improve mounting accuracy.
	Flaw noise, rust noise, flaking noise	Flaws, rust and flaking on rolling elements	Replace bearing.
	Squeak noise (often heard in cylindrical roller bearings with grease lubrication, especially in winter or at low temperatures)	If noise is caused by improper lubrication, a proper lubricant should be selected. In general, however, serious damage will not be caused by an improper lubricant if used continuously.	
Others	Abnormally large metallic sound	Abnormal load Incorrect mounting Insufficient amount of or improper lubricant	Review fitting, clearance. Adjust preload. Improve accuracy in processing and mounting shafts and housings. Improve sealing device. Refill lubricant. Select proper lubricant.

Table 15-6 Causes and countermeasures for abnormal temperature rise

Causes	Countermeasures
Too much lubricant	Reduce lubricant amount. Use grease of lower consistency.
Insufficient lubricant	Refill lubricant.
Improper lubricant	Select proper lubricant.
Abnormal load	Review fitting and clearance conditions and adjust preload.
Improper mounting (excessive friction)	Improve accuracy in processing and mounting shaft and housing. Review fitting. Improve sealing device.

Normally, listening rods are employed for bearing noise inspections.

The instrument detecting abnormalities through sound vibration and the Diagnosis System utilizing acoustic emission for abnormality detection are also applicable.

In general, bearing temperature can be estimated from housing temperature, but the most accurate method is to measure the temperature of outer rings directly via lubrication holes.

Normally, bearing temperature begins to rise gradually when operation is just starting; and, unless the bearing has some abnormality, the temperature stabilizes within one or two hours.

Therefore, a rapid rise in temperature or unusually high temperature indicates some abnormality.

15-5 Bearing dismounting

After dismounting bearings, handling of the bearings and the various methods available for this should be considered.

If the bearing is to be disposed of, any simple method such as torch cutting can be employed. If the bearing is to be reused or checked for the causes of its failure, the same amount of care as in mounting should be taken in dismounting so as not to damage the bearing and other parts.

Since bearings with interference fits are easily damaged during dismounting, measures to prevent damage during dismounting must be incorporated into the design.

It is recommended that dismounting devices be designed and manufactured, if necessary.

It is useful for discovering the causes of failures when the conditions of bearings, including mounting direction and location, are recorded prior to dismounting.

Dismounting method

Tables 15-7 to 15-9 describe dismounting methods for interference fit bearings intended for reuse or for failure analysis.

The force necessary to remove bearings can be calculated using the equations given on page A 134.

Table 15-7 Dismounting of cylindrical bore bearings

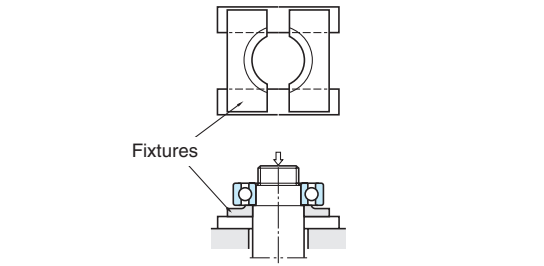
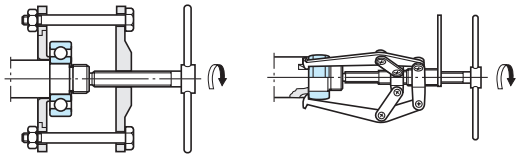
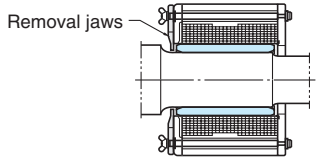
Inner ring dismounting methods	Descriptions
 (a) Dismounting by use of a press  (b) Dismounting by use of special tools (c) Dismounting by use of special tools  (d) Dismounting using induction heater	● Non-separable bearings should be treated carefully during dismounting so as to minimize external force, which affects their rolling elements. ● The easiest way to remove bearings is by using a press as shown in Fig. (a). It is recommended that the fixture be prepared so that the inner ring can receive the removal force. ● Figs. (b) and (c) show a dismounting method in which special tools are employed. In both cases, the jaws of the tool should firmly hold the side of the inner ring. ● Fig. (d) shows an example of removal by use of an induction heater : this method can be adapted to both mounting and dismounting of the inner rings of NU and NJ type cylindrical roller bearings. The heater can be used for heating and expanding inner rings in a short time.

Table 15-8 Dismounting tapered bore bearings

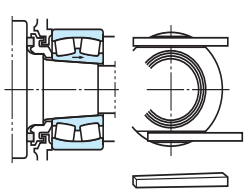
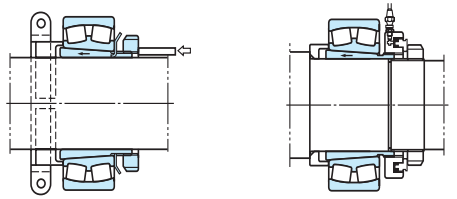
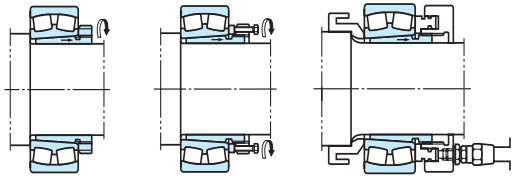
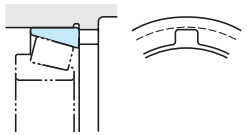
Inner ring dismounting methods	Descriptions
 (a) Dismounting by use of a wedge (b) Dismounting by use of oil pressure  (c) Dismounting by use of clamps (d) Dismounting by use of hydraulic nuts  (e) Dismounting by use of locknuts (f) Dismounting by use of bolts (g) Dismounting by use of hydraulic nuts	● Fig. (a) shows the dismounting of an inner ring by means of driving wedges into notches at the back of the labyrinth. Fig. (b) shows dismounting by means of feeding high pressure oil to the fitting surfaces. In both cases, it is recommended that a stopper (ex. shaft nuts) be provided to prevent bearings from suddenly dropping out. ● For bearings with an adapter sleeve, the following two methods are suitable. As shown in Fig. (c), fix bearings with clamps, loosen locknuts, then hammer off the adapter sleeve. This method is mainly used for small size bearings. Fig. (d) shows the method using hydraulic nuts. ● Small size bearings with withdrawal sleeves can be removed by tightening locknuts as shown in Fig. (e). For large size bearings, provide several bolt holes on locknuts as shown in Fig. (f), and tighten bolts. The bearings can then be removed as easily as small size bearings. ● Fig. (g) shows the method using hydraulic nuts.

Table 15-9 Dismounting of outer rings

Outer ring dismounting methods	Description
 (a) Notchs for dismounting (b) Bolt holes and bolts for dismounting	● To dismount outer rings with interference fits, it is recommended that notches or bolt holes be provided on the shoulder of the housings.

15-6 Maintenance and inspection of bearings

Periodic and thorough maintenance and inspection are indispensable to drawing full performance from bearings and lengthening their useful life.

Besides, prevention of accidents and down time by early detection of failures through maintenance and inspection greatly contributes to the enhancement of productivity and profitability.

15-6-1 Cleaning

Before dismounting a bearing for inspection, record the physical condition of the bearing, including taking photographs.

Cleaning should be done after checking the amount of remaining lubricant and collecting lubricant as a sample for examination.

- A dirty bearing should be cleaned using two cleaning processes, such as rough cleaning and finish cleaning.
  It is recommended that a net be set on the bottom of cleaning containers.
- In rough cleaning, use brushes to remove grease and dirt. Bearings should be handled carefully. Note that raceway surfaces may be damaged by foreign matter, if bearings are rotated in cleaning oil.
- During finish cleaning, clean bearings carefully by rotating them slowly in cleaning oil.

In general, neutral water-free light oil or kerosene is used to clean bearings, a warm alkali solution can also be used if necessary. In any case, it is essential to keep oil clean by filtering it prior to cleaning.

Apply anti-corrosion oil or rust preventive grease on bearings immediately after cleaning.

15-6-2 Inspection and analysis

Before determining that dismounted bearings will be reused, the accuracy of their dimensions and running, internal clearance, fitting surfaces, raceways, rolling contact surfaces, cages and seals must be carefully examined, so as to confirm that no abnormality is present.

It is desirable for skilled persons who have sufficient knowledge of bearings to make decisions on the reuse of bearings.

Criteria for reuse differs according to the performance and importance of machines and inspection frequency.

If the following defects are found, replace the bearing with a new one.

- Cracks and chips in bearing components
- Flaking on the raceway surfaces and the rolling contact surfaces
- Other failures of a serious degree described in the following section "16. Examples of bearing failures."

15-7 Methods of analyzing bearing failures

It is important for enhancing productivity and profitability, as well as for accident prevention that abnormalities in bearings are detected during operation.

Representative detection methods are described in the following section.

1) Noise checking

Since the detection of abnormalities in bearings from noises requires ample experience, sufficient training must be given to inspectors. Given this, it is recommended that specific persons be assigned to this work in order to gain this experience.

Attaching hearing aids or listening rods on housings is effective for detecting bearing noise.

2) Checking of operating temperature

Since this method utilizes change in operating temperature, its application is limited to relatively stable operations.

For detection, operating temperatures must be continuously recorded.

If abnormalities occur in bearings, operating temperature not only increase but also change irregularly.

It is recommended that this method be employed together with noise checking.

3) Lubricant checking

This method detects abnormalities from the foreign matter, including dirt and metallic powder, in lubricants collected as samples.

This method is recommended for inspection of bearings which cannot be checked by close visual inspection, and large size bearings.

16. Examples of bearing failures

Table 16-1 (1) Bearing failures, causes and countermeasures

Failures	Characteristics	Damages	Causes	Countermeasures
1 Flaking	 (A-6961) Flaking is a phenomenon when material is removed in flakes from a surface layer of the bearing raceways or rolling elements due to rolling fatigue. This phenomenon is generally attributed to the approaching end of bearing service life. However, if flaking occurs at early stages of bearing service life, it is necessary to determine causes and adopt countermeasures.  (A-6476) [Reference] Pitting Pitting is another type of failure caused by rolling fatigue, in which minute holes of approx. 0.1 mm in depth are generated on the raceway surface.	Flaking occurring at an incipient stage	· Too small internal clearance · Improper or insufficient lubricant · Too much load · Rust	· Provide proper internal clearance. · Select proper lubricating method or lubricant.
		Flaking on one side of radial bearing raceway	· Extraordinarily large axial load	· Fitting between outer ring on the free side and housing should be changed to clearance fit.
		Symmetrical flaking along circumference of raceway	· Inaccurate housing roundness	· Correct processing accuracy of housing bore. (Especially for split housings, care should be taken to ensure processing accuracy.)
		Slanted flaking on the radial ball bearing raceway	· Improper mounting · Shaft deflection · Inaccuracy of the shaft and housing	· Correct centering. · Widen bearing internal clearance. · Correct squareness of shaft or housing shoulder.
		Flaking occurring near the edge of the raceway or rolling contact surface of roller bearings		
		Flaking on the raceway surface at the same interval as rolling element spacing	· Heavy impact load during mounting · A flaw of cylindrical roller bearings or tapered roller bearings caused when they are mounted. · Rust gathered while out of operation	· Improve mounting procedure. · Provide rust prevention treatment before long cessation of operation.
2 Cracking, chipping	 (A-6395)	Cracking in outer ring or inner ring	· Excessive interference · Excessive fillet on shaft or housing · Heavy impact load · Advanced flaking or seizure	· Select proper fit. · Adjust fillet on the shaft or in the housing to smaller than that of the bearing chamfer dimension. · Re-examine load conditions.
		Cracking on rolling elements	· Heavy impact load · Advanced flaking	· Improve mounting and handling procedure. · Re-examine load conditions.
		Cracking on the rib	· Impact on rib during mounting · Excessive axial impact load	· Improve mounting procedure. · Re-examine load conditions.
3 Brinelling, nicks	 (A-6617) (Brinelling) · Brinelling is a small surface indentation generated either on the raceway through plastic deformation at the contact point between the raceway and rolling elements, or on the rolling surfaces from insertion of foreign matter, when heavy load is applied while the bearing is stationary or rotating at a low rotation speed. · Nicks are those indentations produced directly by rough handling such as hammering.	Brinelling on the raceway or rolling contact surface	· Entry of foreign matter	· Clean bearing and its peripheral parts. · Improve sealing devices.
		Brinelling on the raceway surface at the same interval as the rolling element spacing	· Impact load during mounting · Excessive load applied while bearing is stationary	· Improve mounting procedure. · Improve machine handling.
		Nicks on the raceway or rolling contact surface	· Careless handling	· Improve mounting and handling procedure.

Table 16-1 (2) Bearing failures, causes and countermeasures

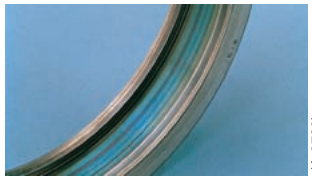
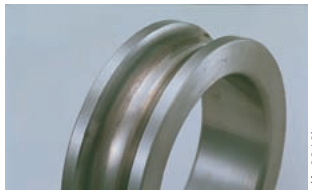
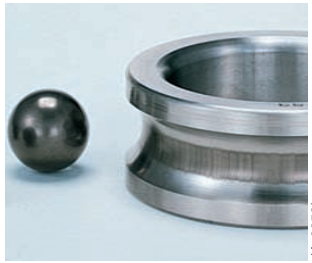
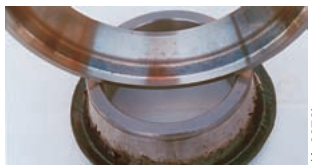
Failures	Characteristics	Damages	Causes	Countermeasures
4 Pear skin, discoloration	 (A-6720) (Discoloration) · Pear skin is a phenomenon in which minute brinell marks cover the entire rolling surface, caused by the insertion of foreign matter. This is characterized by loss of luster and a rolling surface that is rough in appearance. In extreme cases, this is accompanied by discoloration due to heat generation. · Discoloration is a phenomenon in which the surface color changes because of staining or heat generation during rotation. Color change caused by rust and corrosion is generally separate from this phenomenon.	Indentation similar to pear skin on the raceway and rolling contact surface.	· Entry of minute foreign matter	· Clean the bearing and its peripheral parts. · Improve sealing device.
		Discoloration of the raceway, surface rolling contact surface, rib face, and cage riding land.	· Too small bearing internal clearance · Improper or insufficient lubricant · Quality deterioration of lubricant due to aging, etc.	· Provide proper internal clearance. · Select proper lubricating method or lubricant.
5 Scratches, scuffing	 (A-6459) (Scuffing) · Scratches are relatively shallow marks generated by sliding contact, in the same direction as the sliding. This is not accompanied by apparent melting of material. · Scuffing refers to marks, the surface of which are partially melted due to higher contact pressure and therefore a greater heat effect. · Generally, scuffing may be regarded as a serious case of scratches.	Scratches on raceway or rolling contact surface	· Insufficient lubricant at initial operation · Careless handling	· Apply lubricant to the raceway and rolling contact surface when mounting. · Improve mounting procedure.
		Scuffing on rib face and roller end face	· Improper or insufficient lubricant · Improper mounting · Excessive axial load	· Select proper lubricating method or lubricant. · Correct centering of axial direction.
6 Smearing	 (A-6640) Smearing is a phenomenon in which a cluster of minute seizures cover the rolling contact surface. Since smearing is caused by high temperature due to friction, the surface of the material usually melts partially ; and, the smeared surfaces appear very rough in many cases.	Smearing on raceway or rolling contact surface	· Improper or insufficient lubricant · Slipping of the rolling elements (This occurs due to the break down of lubricant film when an abnormal self rotation causes slip of the rolling elements on the raceway.)	· Select proper lubricating method or lubricant. · Provide proper preload.
7 Rust, corrosion	 (A-7130) · Rust is a film of oxides, or hydroxides, or carbonates formed on a metal surface due to chemical reaction. · Corrosion is a phenomenon in which a metal surface is eroded by acid or alkali solutions through chemical reaction (electrochemical reaction such as chemical combination and battery formation) ; resulting in oxidation or dissolution. (It often occurs when sulfur or chloride contained in the lubricant additives is dissolved at high temperature.)	Rust partially or completely covering the bearing surface.	· Improper storage condition · Dew formation in atmosphere	· Improve bearing storage conditions. · Improve sealing devices. · Provide rust preventive treatment before long cessation of operation.
		Rust and corrosion at the same interval as rolling element spacing	· Contamination by water or corrosive matter	· Improve sealing devices.
8 Electric pitting	 (A-6652) When an electric current passes through a bearing while in operation, it can generate sparks between the raceway and rolling elements through a very thin oil film, resulting in melting of the surface metal in this area. This phenomenon appears to be pitting at first sight. (The resultant flaw is referred to as a pit.) When the pit is magnified, it appears as a hole like a crater, indicating that the material melted when it was sparking. In some cases, the rolling surface becomes corrugated by pitting.	Pitting or a corrugated surface failure on raceway and rolling contact surface (The bearings must be replaced, if the corrugated texture is found by scratching the surface with a fingernail or if pitting can be observed by visual inspection.)	· Sparks generated when electric current passes through bearings	· Providing a bypass which prevents current from passing through bearings. · Insulation of bearings.

Table 16-1 (3) Bearing failures, causes and countermeasures

Failures	Characteristics	Damages	Causes	Countermeasures
9 Wear	 (A-4719) Normally, wear of bearing is observed on sliding contact surfaces such as roller end faces and rib faces, cage pockets, the guide surface of cages and cage riding lands. Wear is not directly related to material fatigue. Wear caused by foreign matter and corrosion can affect not only sliding surfaces but rolling surfaces.	Wear on the contact surfaces (roller end faces, rib faces, cage pockets)	Improper or insufficient lubricant	· Select proper lubricating method or lubricant. · Improve sealing device. · Clean the bearing and its peripheral parts.
		Wear on raceways and rolling contact surfaces	· Entry of foreign matter · Improper or insufficient lubricant	
10 Fretting	 (A-6649) Fretting occurs to bearings which are subject to vibration while in stationary condition or which are exposed to minute vibration. It is characterized by rust-colored wear particles. Since fretting on the raceways often appears similar to brinelling, it is sometimes called "falsebrinelling".	Rust-colored wear particles generated on the fitting surface (fretting corrosion)	· Insufficient interference	· Provide greater interference · Apply lubricant to the fitting surface
		Brinelling on the raceway surface at the same interval as rolling element spacing (false brinelling)	· Vibration and oscillation when bearings are stationary.	· Improve fixing method of the shaft and housing. · Provide preload to bearing.
11 Creeping	 (A-6647) Creeping is a phenomenon in which bearing rings move relative to the shaft or housing during operation.	Wear, discoloration and scuffing, caused by slipping on the fitting surfaces	· Insufficient interference · Insufficient tightening of sleeve	· Provide greater interference. · Proper tightening of sleeve.
12 Damage to cages	 (A-6455) Since cages are made of low hardness materials, external pressure and contact with other parts can easily produce flaws and distortion. In some cases, these are aggravated and become chipping and cracks. Large chipping and cracks are often accompanied by deformation, which may reduce the accuracy of the cage itself and may hinder the smooth movement of rolling elements.	Flaws, distortion, chipping, cracking and excessive wear in cages. Loose or damaged rivets.	· Extraordinary vibration, impact, moment · Improper or insufficient lubricant · Improper mounting (misalignment) · Dents made during mounting	· Re-examine load conditions. · Select proper lubricating method or lubricant. · Minimize mounting deviation. · Re-examine cage types. · Improve mounting.
13 Seizure	 (A-6679) A phenomenon caused by abnormal heating in bearings.	Discoloration, distortion and melting together	· Too small internal clearance · Improper or insufficient lubricant · Excessive load · Aggravated by other bearing flaws	· Provide proper internal clearance. · Select proper lubricating method or lubricant. · Re-examine bearing type. · Earlier discovery of bearing flaws.

Bearing specification tables

Contents

Standard bearings

Special purpose bearings

Deep groove ball bearings

Deep groove ball bearings are available in a variety of sizes, and are the most popular of all rolling bearings. This type of bearing supports radial load and a certain degree of axial load in both directions simultaneously.

■ Shielded / sealed type
- Simplifies sealing structure of applications.
- Greasing is not necessary because bearings are pre-lubricated.
- Table 1 on the next page lists major shielded and sealed bearing types and compares their performance.

■ With locating snap ring
- Bearings with a locating snap ring can be fit to the housing easily, as the locating snap ring facilitates axial positioning.

■ Extra-small ball bearings and miniature ball bearings
- The open type is widely used. Also available are the shielded/sealed type and the flanged type; the latter is easily positioned in the axial direction.

Single-row deep groove ball bearings

Open type

Bore diameter **10** – **500** mm

Shielded/sealed type

Bore diameter **10** – **220** mm

With snap ring groove With locating snap ring

Bore diameter **10** – **130** mm

Extra-small ball bearings and miniature ball bearings

Bore diameter **1** – **9** mm

Flanged type

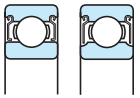
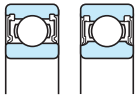
Bore diameter **1** – **9** mm

Double-row deep groove ball bearings

(with filling slot)

Bore diameter **10** – **75** mm

Table 1 Comparison of shielded and sealed bearing performance

Type / Characteristics	Shielded	Sealed			
	Non-contact type	Non-contact type	Contact type		Extremely light contact type
	ZZ type	2RU type	2RS type	2RK type	2RD type
	 (a) [1] (b)	 (c)	 (d) [2] (e)	 (f)	 (g)
Friction torque	Small	Small	Large	Large	Small
High speed performance	Good	Good	Limited because of contact		Good
Grease sealing property	Good	Better than ZZ type	Better than 2RU type for low-speed applications	Excellent	Excellent
Dirt resistance	Good	Better than ZZ type	Better than 2RU type	Excellent	Excellent
Water resistance	Economical	Better than ZZ type but inferior to 2RS, 2RK and 2RD types	Good	Excellent	Better than ZZ and 2RU types
Operating temperature [3]	– 30 to +110°C		– 30 to +100°C		– 30 to +110°C

[Notes] 1) Illustration (a) of the ZZ type shows the relatively small size bearing.
2) Illustration (d) of the 2RS type shows the relatively small size bearing.
3) The operating temperature range listed is for the standard type. It can be widened by using a different type of grease or sealing material. Consult with JTEKT for details.

■ Handling instructions

1) The shielded/sealed type deep groove ball bearing and the deep groove ball bearing with a locating snap ring are designed for use with the inner ring rotating.
Consult with JTEKT on use with the outer ring rotating.
2) When the axial load is large, make the shaft shoulder and housing shoulder larger than usual.
(Referring to the specification table, make the mounting dimension d_a larger and make D_a smaller.)

Boundary dimensions	The dimensions of standard series are as specified in JIS B 1512. For extra-small and miniature ball bearings, special series (ML) are specified together with those described above.
Tolerances	As specified in JIS B 1514-1. (refer to Table 7-3 on pp. A 54 – A 57.)
Radial internal clearance	■ Deep groove ball bearings (except extra-small ball bearings and miniature ball bearings) ..... as specified in JIS B 1520 (refer to Table 10-2 on p. A 96.) ■ Extra-small ball bearings and miniature ball bearings ..... (refer to Table 10-3 on p. A 96.) ■ Deep groove ball bearings for motors ..... (refer to Table 10-7 on p. A 99.)
Recommended fits	■ Bearings of classes 0 and 6 ..... (refer to Table 9-4 on pp. A 85, 86.) ■ Precision extra-small ball bearings and miniature ball bearings ..... (refer to Table 9-5 on p. A 87.)
Standard cages	● Polyamide molded cage (supplementary code : FG, MG) ● Pressed steel cage (supplementary code : //) ● Copper alloy machined cage (supplementary code : FY) [Remark] For certain applications, stainless steel sheet pressed cages (YS) may also be used.

Application of standard cages

Bearing series	Molded cage	Pressed cage	Machined cage
68	683 – 689	–	–
69	693 – 699	–	–
60	603 – 609	–	–
62	623 – 629	–	–
63	633 – 639	–	–
68	–	6800 – 6838	6840 – 68/600
69	–	6900 – 6918	6920 – 6980
160	–	16001 – 16028	16030 – 16072
60	6000 – 6009	6010 – 6034	6036 – 6084
62	6200 – 6208	6209 – 6230	6232 – 6248
63	6300 – 6306	6307 – 6328	6330 – 6340
64	–	6403 – 6418	–
42	–	4200 – 4215	–
43	–	4302 – 4315	–

Allowable misalignment	0.002 3 – 0.003 4 rad (8' – 12')

Equivalent radial load (Single/double-row)

Dynamic equivalent radial load
$P_r = XF_r + YF_a$
(refer to the table on the right for values X and Y.)

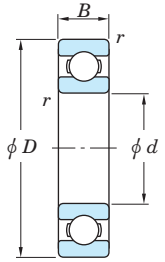
Static equivalent radial load
$P_{0r} = 0.6F_r + 0.5F_a$
(when the value of $P_{0r} < F_r$, $P_{0r} = F_r$)

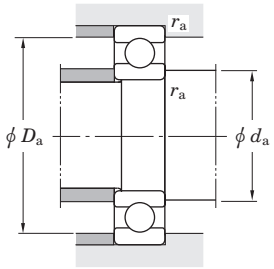
$i f_0 F_a / C_{0r}$	e	$F_a/F_r \le e$		$F_a/F_r > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22				1.99
0.689	0.26				1.71
1.03	0.28				1.55
1.38	0.30				1.45
2.07	0.34				1.31
3.45	0.38				1.15
5.17	0.42				1.04
6.89	0.44				1.00

Factor f_0 is shown in the bearing dimension table.

Single-row deep groove ball bearings open type

d 10 ~ (20) mm





Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
10	19	5	0.3	1.70	0.84	14.8	37 000	43 000	**6800**	12	17	0.3	0.005
	22	6	0.3	2.70	1.25	14.0	34 000	41 000	**6900**	12	20	0.3	0.010
	26	8	0.3	4.55	1.95	12.3	31 000	36 000	**6000**	12	24	0.3	0.019
	30	9	0.6	5.10	2.40	13.2	24 000	29 000	**6200**	14	26	0.6	0.032
	35	11	0.6	8.10	3.45	11.2	22 000	27 000	**6300**	14	31	0.6	0.053
12	21	5	0.3	1.90	1.05	15.3	33 000	39 000	**6801**	14	19	0.3	0.006
	24	6	0.3	2.90	1.45	14.5	31 000	36 000	**6901**	14	22	0.3	0.011
	28	7	0.3	5.10	2.40	13.2	27 000	32 000	**16001**	14	26	0.3	0.024
	28	8	0.3	5.10	2.40	13.2	27 000	32 000	**6001**	14	26	0.3	0.022
	32	10	0.6	6.80	3.05	12.3	22 000	27 000	**6201**	16	28	0.6	0.037
	37	12	1	9.70	4.20	11.1	20 000	25 000	**6301**	17	32	1	0.060
15	24	5	0.3	2.10	1.25	15.8	28 000	33 000	**6802**	17	22	0.3	0.007
	28	7	0.3	4.30	2.25	14.3	26 000	30 000	**6902**	17	26	0.3	0.017
	32	8	0.3	5.60	2.85	13.9	23 000	28 000	**16002**	17	30	0.3	0.025
	32	9	0.3	5.60	2.85	13.9	23 000	27 000	**6002**	17	30	0.3	0.030
	35	11	0.6	7.65	3.75	13.2	20 000	24 000	**6202**	19	31	0.6	0.045
	42	13	1	11.4	5.45	12.3	17 000	20 000	**6302**	20	37	1	0.082
17	26	5	0.3	2.60	1.55	15.7	26 000	30 000	**6803**	19	24	0.3	0.008
	30	7	0.3	4.60	2.55	14.7	23 000	28 000	**6903**	19	28	0.3	0.018
	35	8	0.3	6.00	3.25	14.4	21 000	25 000	**16003**	19	33	0.3	0.032
	35	10	0.3	6.00	3.25	14.4	21 000	25 000	**6003**	19	33	0.3	0.039
	40	12	0.6	9.55	4.80	13.2	17 000	21 000	**6203**	21	36	0.6	0.065
	47	14	1	13.6	6.65	12.4	15 000	18 000	**6303**	22	42	1	0.115
	47	14	1	15.6	7.60	12.0	15 000	18 000	**6303R**	22	42	1	0.121
	62	17	1.1	20.7	9.85	11.6	13 000	15 000	**6403**	23.5	55.5	1	0.270
20	32	7	0.3	4.00	2.45	15.5	21 000	25 000	**6804**	22	30	0.3	0.018
	37	9	0.3	6.35	3.70	14.7	19 000	23 000	**6904**	22	35	0.3	0.036
	42	8	0.3	7.95	4.50	14.4	17 000	21 000	**16004**	22	40	0.3	0.050

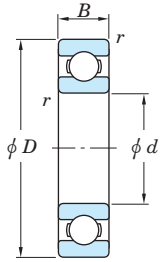
[Remark] Standard cage types used for the above bearings are described earlier in this section.

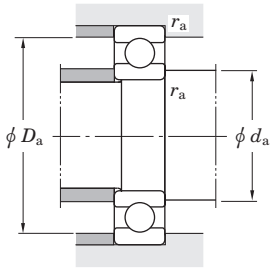
d (20) ~ (30) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
20	42	12	0.6	9.40	5.05	13.9	17 000	21 000	**6004**	24	38	0.6	0.069
	42	12	0.6	11.5	5.85	13.0	18 000	21 000	**6004R**	24	38	0.6	0.073
	47	14	1	12.8	6.65	13.2	15 000	17 000	**6204**	25	42	1	0.106
	47	14	1	15.6	7.60	12.0	15 000	18 000	**6204R**	25	42	1	0.114
	52	15	1.1	15.9	7.85	12.3	14 000	17 000	**6304**	26.5	45.5	1	0.144
	52	15	1.1	18.1	8.95	12.0	14 000	16 000	**6304R**	26.5	45.5	1	0.151
	72	19	1.1	31.0	15.2	11.1	11 000	13 000	**6404**	26.5	65.5	1	0.400
22	44	12	0.6	9.40	5.15	14.1	17 000	20 000	**60/22**	26	40	0.6	0.073
	50	14	1	12.8	6.65	13.2	15 000	17 000	**62/22**	27	45	1	0.118
	56	16	1.1	18.5	9.40	12.6	13 000	15 000	**63/22**	28.5	49.5	1	0.201
25	37	7	0.3	4.30	2.95	16.0	18 000	21 000	**6805**	27	35	0.3	0.022
	42	9	0.3	7.00	4.55	15.4	16 000	19 000	**6905**	27	40	0.3	0.041
	47	8	0.3	8.85	5.60	15.1	15 000	18 000	**16005**	27	45	0.3	0.060
	47	12	0.6	10.1	5.85	14.5	15 000	18 000	**6005**	29	43	0.6	0.080
	52	15	1	14.0	7.85	13.9	13 000	15 000	**6205**	30	47	1	0.128
	52	15	1	17.6	9.30	12.8	13 000	16 000	**6205R**	30	47	1	0.138
	62	17	1.1	20.6	11.3	13.2	11 000	13 000	**6305**	31.5	55.5	1	0.232
	62	17	1.1	26.2	13.4	11.9	11 000	14 000	**6305R**	31.5	55.5	1	0.255
	80	21	1.5	36.1	19.4	12.2	9 100	11 000	**6405**	33	72	1.5	0.530
28	52	12	0.6	12.4	7.40	14.5	14 000	16 000	**60/28**	32	48	0.6	0.097
	58	16	1	17.9	9.75	13.4	12 000	14 000	**62/28**	33	53	1	0.173
	68	18	1.1	23.5	13.1	13.3	10 000	12 000	**63/28**	34.5	61.5	1	0.328
30	42	7	0.3	4.55	3.40	16.4	15 000	18 000	**6806**	32	40	0.3	0.026
	47	9	0.3	7.25	5.00	15.8	14 000	17 000	**6906**	32	45	0.3	0.045
	55	9	0.3	11.2	7.35	15.2	13 000	15 000	**16006**	32	53	0.3	0.085
	55	13	1	13.2	8.25	14.7	13 000	15 000	**6006**	35	50	1	0.116
	62	16	1	19.5	11.3	13.9	11 000	13 000	**6206**	35	57	1	0.199
	62	16	1	23.4	12.8	13.0	11 000	13 000	**6206R**	35	57	1	0.212

Single-row deep groove ball bearings open type

d (30) ~ (45) mm





Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
30	72	19	1.1	26.7	15.0	13.3	9 600	12 000	**6306**	36.5	65.5	1	0.346
	72	19	1.1	33.4	17.7	12.0	9 800	12 000	**6306R**	36.5	65.5	1	0.379
	90	23	1.5	43.4	23.9	12.3	8 100	9 700	**6406**	38	82	1.5	0.735
32	58	13	1	15.0	9.15	14.5	12 000	14 000	**60/32**	37	53	1	0.127
	65	17	1	23.5	13.1	13.3	10 000	12 000	**62/32**	37	60	1	0.228
	75	20	1.1	30.1	16.2	12.7	9 300	11 000	**63/32**	38.5	68.5	1	0.437
35	47	7	0.3	4.75	3.85	16.5	13 000	16 000	**6807**	37	45	0.3	0.030
	55	10	0.6	10.9	7.75	15.7	12 000	14 000	**6907**	39	51	0.6	0.073
	62	9	0.3	12.2	8.85	15.7	11 000	13 000	**16007**	37	60	0.3	0.110
	62	14	1	15.9	10.3	14.9	11 000	13 000	**6007**	40	58	1	0.155
	72	17	1.1	25.7	15.4	13.9	9 200	11 000	**6207**	41.5	65.5	1	0.288
	72	17	1.1	31.0	17.5	12.9	9 300	11 000	**6207R**	41.5	65.5	1	0.309
	80	21	1.5	33.4	19.3	13.2	8 500	10 000	**6307**	43	72	1.5	0.457
	80	21	1.5	40.0	21.7	12.1	8 700	10 000	**6307R**	43	72	1.5	0.494
	100	25	1.5	55.0	31.0	12.2	7 200	8 600	**6407**	43	92	1.5	0.952
40	52	7	0.3	4.95	4.20	16.3	12 000	14 000	**6808**	42	50	0.3	0.033
	62	12	0.6	13.7	9.95	15.6	11 000	13 000	**6908**	44	58	0.6	0.112
	68	9	0.3	12.6	9.65	16.0	9 800	12 000	**16008**	42	66	0.3	0.125
	68	15	1	16.7	11.5	15.2	10 000	12 000	**6008**	45	63	1	0.192
	80	18	1.1	29.1	17.8	14.0	8 300	10 000	**6208**	46.5	73.5	1	0.366
	90	23	1.5	40.7	24.0	13.2	7 700	9 200	**6308**	48	82	1.5	0.633
	110	27	2	63.7	36.6	12.3	6 600	7 900	**6408**	49	101	2	1.23
45	58	7	0.3	6.20	5.40	16.3	11 000	13 000	**6809**	47	56	0.3	0.040
	68	12	0.6	14.1	10.9	15.9	9 700	11 000	**6909**	49	64	0.6	0.132
	75	10	0.6	15.5	12.3	16.0	8 900	10 000	**16009**	49	71	0.6	0.170
	75	16	1	21.0	15.1	15.3	9 200	11 000	**6009**	50	70	1	0.245
	85	19	1.1	32.7	20.3	14.0	7 700	9 200	**6209**	51.5	78.5	1	0.407
	100	25	1.5	48.9	29.5	13.3	6 800	8 100	**6309**	53	92	1.5	0.833

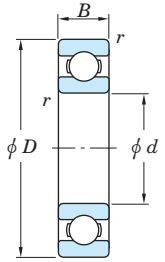
[Remark] Standard cage types used for the above bearings are described earlier in this section.

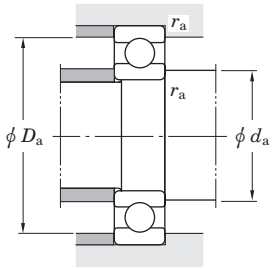
d (45) ~ (65) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
45	120	29	2	77.2	45.1	12.2	6 000	7 200	**6409**	54	111	2	1.53
50	65	7	0.3	6.60	6.10	16.1	9 600	11 000	**6810**	52	63	0.3	0.052
	72	12	0.6	14.5	11.7	16.1	9 000	11 000	**6910**	54	68	0.6	0.133
	80	10	0.6	16.0	13.3	16.2	8 200	9 700	**16010**	54	76	0.6	0.180
	80	16	1	21.8	16.6	15.6	8 400	9 900	**6010**	55	75	1	0.261
	90	20	1.1	35.1	23.3	14.4	7 100	8 500	**6210**	56.5	83.5	1	0.463
	90	20	1.1	40.4	25.5	13.9	7 100	8 600	**6210R**	56.5	83.5	1	0.487
	110	27	2	62.0	38.3	13.2	6 100	7 300	**6310**	59	101	2	1.07
	130	31	2.1	83.0	49.5	12.5	5 500	6 600	**6410**	61	119	2	1.88
55	72	9	0.3	8.80	8.10	16.2	8 700	10 000	**6811**	57	70	0.3	0.083
	80	13	1	16.6	14.1	16.2	8 100	9 600	**6911**	60	75	1	0.185
	90	11	0.6	19.3	16.3	16.2	7 400	8 800	**16011**	59	86	0.6	0.260
	90	18	1.1	28.3	21.2	15.3	7 600	8 900	**6011**	61.5	83.5	1	0.385
	100	21	1.5	43.4	29.4	14.4	6 300	7 600	**6211**	63	92	1.5	0.607
	120	29	2	71.6	45.0	13.2	5 600	6 700	**6311**	64	111	2	1.37
	140	33	2.1	100	62.3	12.2	5 000	6 000	**6411**	66	129	2	2.29
60	78	10	0.3	11.5	10.6	16.3	8 000	9 400	**6812**	62	76	0.3	0.104
	85	13	1	20.2	17.3	16.2	7 500	8 900	**6912**	65	80	1	0.192
	95	11	0.6	19.8	17.6	16.4	6 900	8 100	**16012**	64	91	0.6	0.280
	95	18	1.1	29.4	23.2	15.6	7 100	8 400	**6012**	66.5	88.5	1	0.415
	110	22	1.5	52.4	36.2	14.4	5 700	6 900	**6212**	68	102	1.5	0.783
	130	31	2.1	81.9	52.2	13.2	5 200	6 200	**6312**	71	119	2	1.70
	150	35	2.1	110	70.8	12.4	4 600	5 500	**6412**	71	139	2	2.77
65	85	10	0.6	11.9	11.5	16.2	7 300	8 600	**6813**	69	81	0.6	0.126
	90	13	1	17.4	16.1	16.6	7 100	8 400	**6913**	70	85	1	0.211
	100	11	0.6	17.1	16.0	16.5	6 600	7 800	**16013**	69	96	0.6	0.300
	100	18	1.1	30.5	25.2	15.8	6 600	7 800	**6013**	71.5	93.5	1	0.435

Single-row deep groove ball bearings
open type

d (65) ~ (85) mm





Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
65	120	23	1.5	57.2	40.1	14.4	5 400	6 400	**6213**	73	112	1.5	0.990
	140	33	2.1	92.7	59.9	13.2	4 800	5 800	**6313**	76	129	2	2.08
	160	37	2.1	118	79.2	12.4	4 300	5 200	**6413**	76	149	2	3.30
70	90	10	0.6	12.1	11.9	16.1	6 800	8 100	**6814**	74	86	0.6	0.134
	100	16	1	23.7	21.2	16.3	6 400	7 600	**6914**	75	95	1	0.342
	110	13	0.6	30.1	25.6	16.0	6 100	7 200	**16014**	74	106	0.6	0.433
	110	20	1.1	38.1	30.9	15.6	6 100	7 200	**6014**	76.5	103.5	1	0.602
	125	24	1.5	62.2	44.1	14.5	5 100	6 100	**6214**	78	117	1.5	1.07
	150	35	2.1	104	68.2	13.2	4 500	5 400	**6314**	81	139	2	2.52
	180	42	3	144	104	12.2	3 900	4 600	**6414**	83	167	2.5	4.83
75	95	10	0.6	12.5	12.9	16.0	6 400	7 600	**6815**	79	91	0.6	0.142
	105	16	1	24.4	22.6	16.5	6 100	7 200	**6915**	80	100	1	0.363
	115	13	0.6	27.5	25.3	16.4	5 700	6 700	**16015**	79	111	0.6	0.457
	115	20	1.1	39.6	33.5	15.8	5 700	6 800	**6015**	81.5	108.5	1	0.638
	130	25	1.5	67.4	48.3	14.5	4 800	5 800	**6215**	83	122	1.5	1.18
	160	37	2.1	113	77.2	13.2	4 200	5 000	**6315**	86	149	2	3.02
	190	45	3	154	115	12.3	3 600	4 400	**6415**	88	177	2.5	5.87
80	100	10	0.6	12.7	13.3	16.0	6 100	7 200	**6816**	84	96	0.6	0.150
	110	16	1	25.0	24.0	16.6	5 700	6 800	**6916**	85	105	1	0.382
	125	14	0.6	31.7	29.7	16.4	5 200	6 100	**16016**	84	121	0.6	0.597
	125	22	1.1	47.6	39.8	15.6	5 300	6 300	**6016**	86.5	118.5	1	0.850
	140	26	2	72.7	53.0	14.6	4 500	5 400	**6216**	89	131	2	1.40
	170	39	2.1	123	86.7	13.3	3 900	4 700	**6316**	91	159	2	3.59
	200	48	3	164	125	12.3	3 400	4 100	**6416**	93	187	2.5	6.84
85	110	13	1	18.7	19.0	16.2	5 600	6 600	**6817**	90	105	1	0.266
	120	18	1.1	31.9	29.6	16.4	5 300	6 300	**6917**	91.5	113.5	1	0.535
	130	14	0.6	32.6	31.7	16.5	4 900	5 800	**16017**	89	126	0.6	0.626

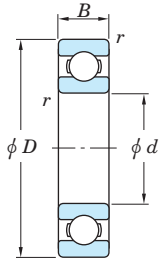
[Remark] Standard cage types used for the above bearings are described earlier in this section.

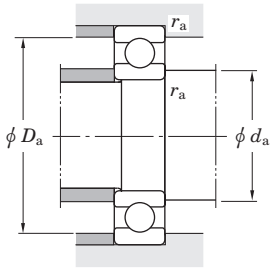
d (85) ~ 105 mm

Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
85	130	22	1.1	49.5	43.1	15.8	5 000	5 900	**6017**	91.5	123.5	1	0.890
	150	28	2	84.0	61.9	14.5	4 200	5 000	**6217**	94	141	2	1.79
	180	41	3	133	96.8	13.3	3 700	4 400	**6317**	98	167	2.5	4.23
	210	52	4	173	136	12.3	3 300	3 900	**6417**	101	194	3	8.07
90	115	13	1	19.0	19.7	16.1	5 300	6 300	**6818**	95	110	1	0.279
	125	18	1.1	32.8	31.6	16.5	5 100	6 000	**6918**	96.5	118.5	1	0.565
	140	16	1	39.9	37.0	16.3	4 700	5 600	**16018**	95	135	1	0.848
	140	24	1.5	58.2	49.7	15.6	4 700	5 600	**6018**	98	132	1.5	1.16
	160	30	2	96.1	71.5	14.5	3 900	4 700	**6218**	99	151	2	2.15
	190	43	3	143	107	13.3	3 500	4 200	**6318**	103	177	2.5	4.91
	225	54	4	184	149	12.5	3 100	3 700	**6418**	106	209	3	9.78
95	130	18	1.1	33.7	33.5	16.6	4 800	5 700	**6919**	101.5	123.5	1	0.705
	145	16	1	41.2	39.6	16.4	4 500	5 300	**16019**	100	140	1	0.885
	145	24	1.5	60.4	53.9	15.8	4 400	5 200	**6019**	103	137	1.5	1.21
	170	32	2.1	109	81.9	14.4	3 700	4 400	**6219**	106	159	2	2.62
	200	45	3	153	119	13.3	3 300	4 000	**6319**	108	187	2.5	5.67
100	125	13	1	19.6	21.2	16.0	4 800	5 700	**6820**	105	120	1	0.309
	140	20	1.1	45.0	41.9	16.2	4 500	5 300	**6920**	106.5	133.5	1	0.960
	150	16	1	42.4	42.1	16.5	4 300	5 100	**16020**	105	145	1	0.910
	150	24	1.5	60.2	54.2	15.9	4 300	5 100	**6020**	108	142	1.5	1.25
	180	34	2.1	122	93.1	14.4	3 500	4 200	**6220**	111	169	2	3.14
	215	47	3	173	141	13.2	3 000	3 600	**6320**	113	202	2.5	7.00
105	145	20	1.1	46.5	44.8	16.4	4 300	5 100	**6921**	111.5	138.5	1	1.00
	160	18	1	41.9	42.2	16.5	4 100	4 800	**16021**	110	155	1	1.20
	160	26	2	72.3	65.8	15.8	4 000	4 700	**6021**	114	151	2	1.59
	190	36	2.1	133	105	14.4	3 300	3 900	**6221**	116	179	2	3.70
	225	49	3	184	153	13.2	2 900	3 500	**6321**	118	212	2.5	8.05

Single-row deep groove ball bearings open type

d 110 ~ (150) mm





Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
110	140	16	1	28.1	30.7	16.1	4 300	5 100	**6822**	115	135	1	0.606
	150	20	1.1	47.9	47.8	16.4	4 100	4 900	**6922**	116.5	143.5	1	1.04
	170	19	1	57.5	56.7	16.3	3 800	4 500	**16022**	115	165	1	1.46
	170	28	2	82.0	73.0	15.6	3 800	4 500	**6022**	119	161	2	1.96
	200	38	2.1	144	117	14.4	3 100	3 700	**6222**	121	189	2	4.36
	240	50	3	205	180	13.2	2 700	3 200	**6322**	123	227	2.5	9.54
120	150	16	1	29.0	33.0	16.0	4 000	4 700	**6824**	125	145	1	0.655
	165	22	1.1	57.2	56.9	16.4	3 800	4 400	**6924**	126.5	158.5	1	1.41
	180	19	1	63.2	63.3	16.4	3 600	4 200	**16024**	125	175	1	1.80
	180	28	2	85.0	79.3	15.9	3 600	4 200	**6024**	129	171	2	2.07
	215	40	2.1	155	131	14.4	2 900	3 400	**6224**	131	204	2	5.15
	260	55	3	207	185	13.5	2 500	3 000	**6324**	133	247	2.5	12.5
130	165	18	1.1	36.9	41.2	16.1	3 600	4 300	**6826**	136.5	158.5	1	0.939
	180	24	1.5	65.2	67.4	16.3	3 400	4 100	**6926**	138	172	1.5	1.86
	200	22	1.1	71.3	74.8	11.2	3 000	3 600	**16026**	136.5	193.5	1	2.69
	200	33	2	106	101	15.8	3 200	3 800	**6026**	139	191	2	3.16
	230	40	3	167	146	14.5	2 700	3 200	**6226**	143	217	2.5	5.82
	280	58	4	229	214	13.6	2 300	2 700	**6326**	146	264	3	15.1
140	175	18	1.1	38.2	44.4	16.0	3 400	4 000	**6828**	146.5	168.5	1	1.00
	190	24	1.5	71.3	74.8	16.5	3 200	3 800	**6928**	148	182	1.5	1.98
	210	22	1.1	65.8	71.1	16.5	2 900	3 400	**16028**	146.5	203.5	1	2.86
	210	33	2	110	109	15.9	3 000	3 600	**6028**	149	201	2	3.55
	250	42	3	166	150	14.8	2 400	2 900	**6228**	153	237	2.5	7.45
	300	62	4	253	246	13.6	2 100	2 500	**6328**	156	284	3	19.4
150	190	20	1.1	47.8	54.9	16.1	3 100	3 700	**6830**	156.5	183.5	1	1.40
	210	28	2	93.4	94.3	16.2	2 900	3 400	**6930**	159	201	2	3.05
	225	24	1.1	91.2	99.3	16.6	2 700	3 100	**16030**	156.5	218.5	1	3.58
	225	35	2.1	125	126	16.0	2 800	3 300	**6030**	161	214	2	4.22

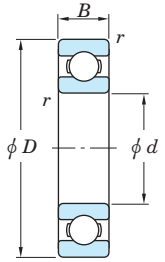
[Remark] Standard cage types used for the above bearings are described earlier in this section.

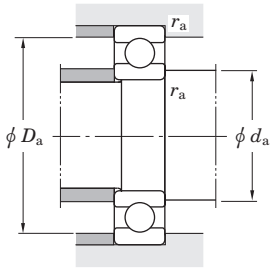
d (150) ~ (200) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
150	270	45	3	176	168	15.1	2 200	2 700	**6230**	163	257	2.5	9.41
	320	65	4	275	284	13.9	1 900	2 300	**6330**	166	304	3	26.2
160	200	20	1.1	48.4	56.9	16.1	2 900	3 400	**6832**	166.5	193.5	1	1.45
	220	28	2	96.1	101	16.4	2 700	3 200	**6932**	169	211	2	3.20
	240	25	1.5	98.8	108	16.5	2 600	3 100	**16032**	168	232	1.5	4.25
	240	38	2.1	136	135	15.9	2 600	3 000	**6032**	171	229	2	5.22
	290	48	3	185	186	15.4	2 100	2 500	**6232**	173	277	2.5	14.3
	340	68	4	278	286	13.9	1 800	2 200	**6332**	176	324	3	29.0
170	215	22	1.1	59.8	70.5	16.1	2 700	3 200	**6834**	176.5	208.5	1	1.90
	230	28	2	98.8	108	16.5	2 600	3 100	**6934**	179	221	2	3.35
	260	28	1.5	114	127	16.5	2 300	2 700	**16034**	178	252	1.5	5.75
	260	42	2.1	161	161	15.8	2 400	2 800	**6034**	181	249	2	6.80
	310	52	4	212	223	15.3	1 900	2 300	**6234**	186	294	3	17.5
	360	72	4	326	355	13.6	1 700	2 000	**6334**	186	344	3	38.6
180	225	22	1.1	60.7	73.1	16.1	2 600	3 000	**6836**	186.5	218.5	1	2.00
	250	33	2	123	129	16.3	2 400	2 800	**6936**	189	241	2	4.90
	280	31	2	135	148	16.4	2 100	2 500	**16036**	189	271	2	7.55
	280	46	2.1	182	194	15.8	2 200	2 600	**6036**	191	269	2	10.3
	320	52	4	227	241	15.1	1 800	2 200	**6236**	196	304	3	18.3
	380	75	4	354	407	13.9	1 600	1 900	**6336**	196	364	3	44.7
190	240	24	1.5	73.1	88.1	16.1	2 400	2 800	**6838**	198	232	1.5	2.60
	260	33	2	126	138	16.4	2 300	2 700	**6938**	199	251	2	5.20
	290	31	2	139	158	16.6	2 000	2 400	**16038**	199	281	2	7.85
	290	46	2.1	188	201	15.8	2 100	2 500	**6038**	201	279	2	10.8
	340	55	4	255	281	15.0	1 700	2 000	**6238**	206	324	3	23.0
	400	78	5	355	415	14.1	1 500	1 800	**6338**	210	380	4	51.5
200	250	24	1.5	78.0	93.6	16.1	2 300	2 700	**6840**	208	242	1.5	2.70

Single-row deep groove ball bearings open type

d (200) ~ (280) mm





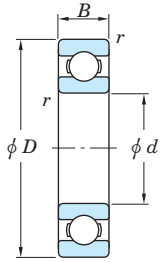
Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	(kg)
200	280	38	2.1	157	168	16.2	2 100	2 500	**6940**	211	269	2	7.30
	310	34	2	161	180	16.4	1 900	2 300	**16040**	209	301	2	10.1
	310	51	2.1	217	243	15.6	1 900	2 300	**6040**	211	299	2	14.0
	360	58	4	269	311	15.2	1 600	1 900	**6240**	216	344	3	28.2
	420	80	5	411	506	14.0	1 300	1 600	**6340**	220	400	4	58.0
220	270	24	1.5	80.7	101	16.0	2 000	2 400	**6844**	228	262	1.5	3.00
	300	38	2.1	160	180	16.4	1 900	2 200	**6944**	231	289	2	7.90
	340	37	2.1	180	217	16.5	1 700	2 000	**16044**	231	329	2	13.2
	340	56	3	235	271	15.6	1 700	2 000	**6044**	233	327	2.5	18.3
	400	65	4	311	376	15.1	1 400	1 700	**6244**	236	384	3	37.0
	460	88	5	433	539	13.8	1 200	1 500	**6344**	240	440	4	71.6
240	300	28	2	108	135	16.1	1 800	2 100	**6848**	249	291	2	4.50
	320	38	2.1	164	192	16.5	1 700	2 000	**6948**	251	309	2	8.50
	360	37	2.1	184	228	16.5	1 600	1 800	**16048**	251	349	2	14.1
	360	56	3	244	296	15.9	1 600	1 900	**6048**	253	347	2.5	19.7
	440	72	4	340	431	15.2	1 200	1 500	**6248**	256	424	3	51.0
	500	95	5	470	624	14.2	1 100	1 300	**6348**	260	480	4	93.3
260	320	28	2	112	146	16.0	1 700	2 000	**6852**	269	311	2	4.80
	360	46	2.1	213	263	16.3	1 500	1 800	**6952**	271	349	2	14.4
	400	44	3	236	310	16.4	1 400	1 600	**16052**	273	387	2.5	21.6
	400	65	4	291	377	15.8	1 400	1 700	**6052**	276	384	3	29.3
	480	80	5	402	541	15.1	1 100	1 300	**6252**	280	460	4	68.2
	540	102	6	531	741	14.2	990	1 200	**6352**	284	516	5	116
280	350	33	2	143	183	16.1	1 500	1 800	**6856**	289	341	2	7.40
	380	46	2.1	219	283	16.5	1 400	1 700	**6956**	291	369	2	15.1
	420	44	3	242	331	14.7	1 300	1 500	**16056**	293	407	2.5	22.9
	420	65	4	302	408	16.0	1 300	1 500	**6056**	296	404	3	31.0
	500	80	5	423	599	15.3	1 000	1 200	**6256**	300	480	4	71.8

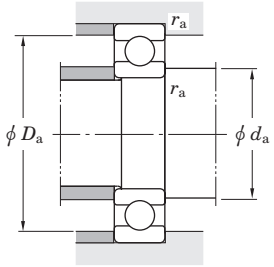
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (280) ~ (380) mm

Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	(kg)
280	580	108	6	568	845	14.5	880	1 100	**6356**	304	556	5	145
300	380	38	2.1	179	230	16.2	1 400	1 600	**6860**	311	369	2	10.5
	420	56	3	276	377	16.2	1 300	1 500	**6960**	313	407	2.5	24.1
	460	50	4	284	405	16.4	1 100	1 400	**16060**	316	447	3	32.2
	460	74	4	355	482	15.6	1 200	1 400	**6060**	316	444	3	44.0
	540	85	5	441	663	15.6	880	1 100	**6260**	320	520	4	89.5
	620	109	7.5	593	886	14.4	810	970	**6360**	332	588	6	169
320	400	38	2.1	182	239	16.1	1 300	1 500	**6864**	331	389	2	11.0
	440	56	3	285	404	16.4	1 200	1 400	**6964**	333	427	2.5	25.5
	480	50	4	292	432	16.5	1 100	1 300	**16064**	336	467	3	33.9
	480	74	4	352	487	15.7	1 100	1 300	**6064**	336	464	3	46.0
	580	92	5	489	744	15.4	840	1 000	**6264**	340	560	4	113
	670	112	7.5	634	1 010	14.8	720	870	**6364**	352	638	6	207
340	420	38	2.1	185	249	16.1	1 200	1 400	**6868**	351	409	2	11.5
	460	56	3	282	407	16.5	1 100	1 300	**6968**	353	447	2.5	26.8
	520	57	4	335	512	16.4	980	1 200	**16068**	356	507	3	46.8
	520	82	5	441	661	15.6	980	1 200	**6068**	360	500	4	61.8
	620	92	6	511	817	15.6	760	910	**6268**	364	596	5	131
	710	118	7.5	704	1 160	14.7	660	790	**6368**	372	678	6	238
360	440	38	2.1	192	268	16.0	1 100	1 300	**6872**	371	429	2	12.0
	480	56	3	289	432	16.5	1 000	1 200	**6972**	373	467	2.5	28.2
	540	57	4	345	546	16.5	900	1 100	**16072**	376	527	3	49.0
	540	82	5	438	668	15.7	920	1 100	**6072**	380	520	4	64.7
	650	95	6	557	904	15.4	700	840	**6272**	384	626	5	144
380	480	46	2.1	244	359	16.2	980	1 200	**6876**	391	469	2	20.0
	520	65	4	352	552	16.4	920	1 100	**6976**	396	504	3	40.8
	560	82	5	457	725	15.9	860	1 000	**6076**	400	540	4	67.6

Single-row deep groove ball bearings
open type
d (380) ~ 500 mm

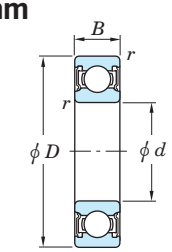


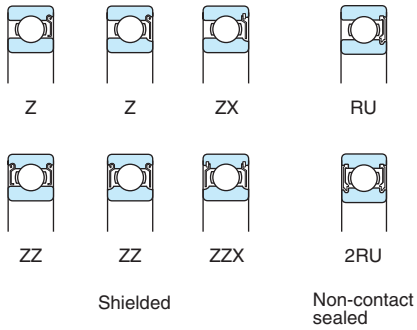


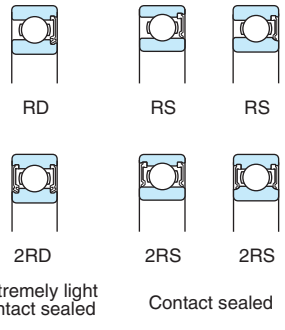
Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
380	680	95	6	584	990	15.6	650	780	**6276**	404	656	5	162
400	500	46	2.1	249	374	16.1	920	1 100	**6880**	411	489	2	20.5
	540	65	4	362	588	16.5	860	1 000	**6980**	416	524	3	42.7
	600	63	5	358	587	16.5	780	920	**16080**	420	580	4	65.0
	600	90	5	508	824	15.7	780	920	**6080**	420	580	4	87.7
	720	103	6	628	1 080	15.5	590	710	**6280**	424	696	5	197
420	520	46	2.1	253	389	16.1	860	1 000	**6884**	431	509	2	21.5
	560	65	4	359	588	16.5	810	950	**6984**	436	544	3	43.5
	620	63	5	367	617	16.4	740	870	**16084**	440	600	4	69.9
	620	90	5	530	894	15.8	740	870	**6084**	440	600	4	91.2
440	540	46	2.1	257	404	16.0	810	950	**6888**	451	529	2	22.5
	600	74	4	396	676	16.4	740	870	**6988**	456	584	3	61.3
	650	67	5	407	710	16.5	680	810	**16088**	460	630	4	81.7
460	580	56	3	314	517	16.2	740	870	**6892**	473	567	2.5	35.0
	620	74	4	407	711	16.5	690	820	**6992**	476	604	3	61.7
	680	71	5	431	767	16.5	630	750	**16092**	480	660	4	91.2
480	600	56	3	321	539	16.1	690	820	**6896**	493	587	2.5	36.5
	650	78	5	432	768	16.5	640	760	**6996**	500	630	4	72.5
	700	71	5	444	807	16.5	600	710	**16096**	500	680	4	98.5
500	620	56	3	327	561	16.1	650	770	**68/500**	513	607	2.5	37.5
	670	78	5	444	807	16.5	610	720	**69/500**	520	650	4	75.2
	720	71	5	455	846	16.4	560	660	**160/500**	520	700	4	102
	720	100	6	600	1 100	16.0	570	670	**60/500**	524	696	5	128

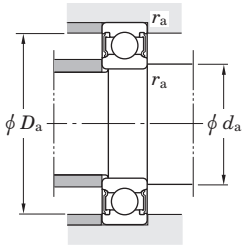
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
shielded type
sealed type
d 10 ~ (22) mm





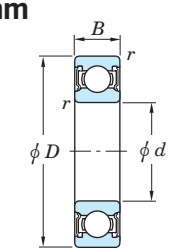


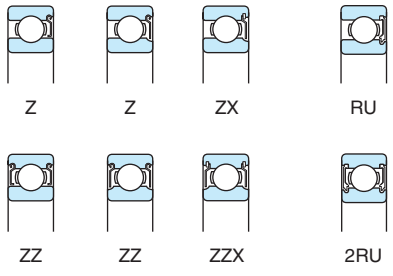


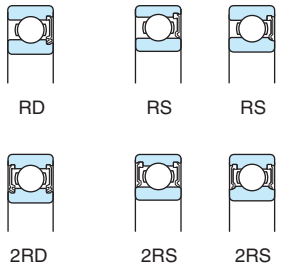
Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
10	19	5	0.3	1.70	0.84	14.8	37 000	—	22 000	43 000	**6800 ZZ**	**6800 2RU**	—	**6800 2RS**	12	12	17	0.3	0.005
	22	6	0.3	2.70	1.25	14.0	34 000	—	21 000	41 000	**6900 ZZ**	**6900 2RU**	—	**6900 2RS**	12	12.5	20	0.3	0.010
	26	8	0.3	4.55	1.95	12.3	31 000	28 000	19 000	36 000	**6000 ZZ**	**6000 2RU**	**6000 2RD**	**6000 2RS**	12	13	24	0.3	0.019
	30	9	0.6	5.10	2.40	13.2	24 000	22 000	16 000	29 000	**6200 ZZ**	**6200 2RU**	**6200 2RD**	**6200 2RS**	14	15	26	0.6	0.032
	35	11	0.6	8.10	3.45	11.2	22 000	20 000	16 000	27 000	**6300 ZZ**	**6300 2RU**	**6300 2RD**	**6300 2RS**	14	16	31	0.6	0.053
12	21	5	0.3	1.90	1.05	15.3	33 000	30 000	20 000	39 000	**6801 ZZ**	**6801 2RU**	**6801 2RD**	**6801 2RS**	14	14	19	0.3	0.006
	24	6	0.3	2.90	1.45	14.5	31 000	28 000	18 000	36 000	**6901 ZZ**	**6901 2RU**	**6901 2RD**	**6901 2RS**	14	14	22	0.3	0.011
	28	8	0.3	5.10	2.40	13.2	27 000	24 000	17 000	32 000	**6001 ZZ**	**6001 2RU**	**6001 2RD**	**6001 2RS**	14	15	26	0.3	0.022
	32	10	0.6	6.80	3.05	12.3	22 000	20 000	15 000	27 000	**6201 ZZ**	**6201 2RU**	**6201 2RD**	**6201 2RS**	16	16.5	28	0.6	0.037
	37	12	1	9.70	4.20	11.1	20 000	18 000	15 000	25 000	**6301 ZZ**	**6301 2RU**	**6301 2RD**	**6301 2RS**	17	17.5	32	1	0.060
15	24	5	0.3	2.10	1.25	15.8	28 000	—	16 000	33 000	**6802 ZZ**	**6802 2RU**	—	**6802 2RS**	17	17	22	0.3	0.007
	28	7	0.3	4.30	2.25	14.3	26 000	23 000	15 000	30 000	**6902 ZZ**	**6902 2RU**	**6902 2RD**	**6902 2RS**	17	18	26	0.3	0.017
	32	9	0.3	5.60	2.85	13.9	23 000	21 000	14 000	27 000	**6002 ZZ**	**6002 2RU**	**6002 2RD**	**6002 2RS**	17	18.5	30	0.3	0.030
	35	11	0.6	7.65	3.75	13.2	20 000	18 000	13 000	24 000	**6202 ZZ**	**6202 2RU**	**6202 2RD**	**6202 2RS**	19	19.5	31	0.6	0.045
	42	13	1	11.4	5.45	12.3	17 000	15 000	12 000	20 000	**6302 ZZ**	**6302 2RU**	**6302 2RD**	**6302 2RS**	20	21.5	37	1	0.082
17	26	5	0.3	2.60	1.55	15.7	26 000	—	14 000	30 000	**6803 ZZ**	**6803 2RU**	—	**6803 2RS**	19	19	24	0.3	0.008
	30	7	0.3	4.60	2.55	14.7	23 000	21 000	13 000	28 000	**6903 ZZ**	**6903 2RU**	**6903 2RD**	**6903 2RS**	19	19.5	28	0.3	0.018
	35	10	0.3	6.00	3.25	14.4	21 000	19 000	12 000	25 000	**6003 ZZ**	**6003 2RU**	**6003 2RD**	**6003 2RS**	19	21	33	0.3	0.039
	40	12	0.6	9.55	4.80	13.2	17 000	15 000	12 000	21 000	**6203 ZZ**	**6203 2RU**	**6203 2RD**	**6203 2RS**	21	22	36	0.6	0.065
	47	14	1	13.6	6.65	12.4	15 000	14 000	10 000	18 000	**6303 ZZ**	**6303 2RU**	**6303 2RD**	**6303 2RS**	22	24.3	42	1	0.115
20	32	7	0.3	4.00	2.45	15.5	21 000	—	12 000	25 000	**6804 ZZ**	**6804 2RU**	—	**6804 2RS**	22	22.5	30	0.3	0.018
	37	9	0.3	6.35	3.70	14.7	19 000	17 000	11 000	23 000	**6904 ZZ**	**6904 2RU**	**6904 2RD**	**6904 2RS**	22	23.5	35	0.3	0.036
	42	12	0.6	9.40	5.05	13.9	17 000	15 000	10 000	21 000	**6004 ZZ**	**6004 2RU**	**6004 2RD**	**6004 2RS**	24	25	38	0.6	0.069
	47	14	1	12.8	6.65	13.2	15 000	14 000	9 700	17 000	**6204 ZZ**	**6204 2RU**	**6204 2RD**	**6204 2RS**	25	26.5	42	1	0.106
	52	15	1.1	15.9	7.85	12.3	14 000	13 000	9 500	17 000	**6304 ZZ**	**6304 2RU**	**6304 2RD**	**6304 2RS**	26.5	27	45.5	1	0.144
22	44	12	0.6	9.40	5.15	14.1	17 000	15 000	9 900	20 000	**60/22 ZZ**	**60/22 2RU**	**60/22 2RD**	**60/22 2RS**	26	26.5	40	0.6	0.073
	50	14	1	12.8	6.65	13.2	15 000	14 000	9 700	17 000	**62/22 ZZ**	**62/22 2RU**	**62/22 2RD**	**62/22 2RS**	27	27	45	1	0.118

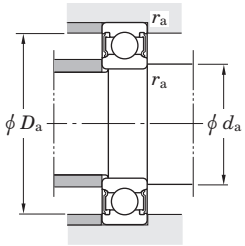
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
shielded type
sealed type
d (22) ~ 40 mm





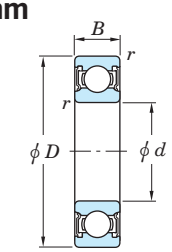


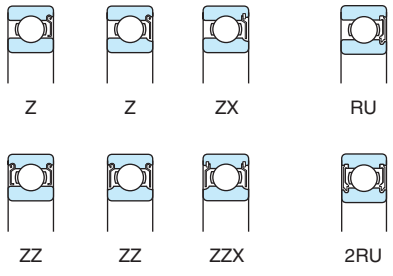


Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
22	56	16	1.1	18.5	9.40	12.6	13 000	12 000	8 600	15 000	**63/22 ZZ**	**63/22 2RU**	**63/22 2RD**	**63/22 2RS**	28.5	29	49.5	1	0.201
25	37	7	0.3	4.30	2.95	16.0	18 000	—	10 000	21 000	**6805 ZZ**	**6805 2RU**	—	**6805 2RS**	27	27.5	35	0.3	0.022
	42	9	0.3	7.00	4.55	15.4	16 000	14 000	9 300	19 000	**6905 ZZ**	**6905 2RU**	**6905 2RD**	**6905 2RS**	27	29	40	0.3	0.041
	47	12	0.6	10.1	5.85	14.5	15 000	14 000	9 000	18 000	**6005 ZZ**	**6005 2RU**	**6005 2RD**	**6005 2RS**	29	29.5	43	0.6	0.080
	52	15	1	14.0	7.85	13.9	13 000	12 000	8 400	15 000	**6205 ZZ**	**6205 2RU**	**6205 2RD**	**6205 2RS**	30	31.5	47	1	0.128
	62	17	1.1	20.6	11.3	13.2	11 000	9 900	7 500	13 000	**6305 ZZ**	**6305 2RU**	**6305 2RD**	**6305 2RS**	31.5	34	55.5	1	0.232
28	52	12	0.6	12.4	7.40	14.5	14 000	13 000	8 100	16 000	**60/28 ZZ**	**60/28 2RU**	**60/28 2RD**	**60/28 2RS1**	32	33	48	0.6	0.097
	58	16	1	17.9	9.75	13.4	12 000	11 000	7 600	14 000	**62/28 ZZ**	**62/28 2RU**	**62/28 2RD**	**62/28 2RS**	33	35	53	1	0.173
	68	18	1.1	23.5	13.1	13.3	10 000	9 000	6 900	12 000	**63/28 ZZ**	**63/28 2RU**	**63/28 2RD**	**63/28 2RS**	34.5	37.5	61.5	1	0.328
30	42	7	0.3	4.55	3.40	16.4	15 000	—	8 600	18 000	**6806 ZZ**	**6806 2RU**	—	**6806 2RS**	32	32.5	40	0.3	0.026
	47	9	0.3	7.25	5.00	15.8	14 000	13 000	8 200	17 000	**6906 ZZ**	**6906 2RU**	**6906 2RD**	**6906 2RS**	32	33	45	0.3	0.045
	55	13	1	13.2	8.25	14.7	13 000	12 000	7 500	15 000	**6006 ZZ**	**6006 2RU**	**6006 2RD**	**6006 2RS**	35	36	50	1	0.116
	62	16	1	19.5	11.3	13.9	11 000	9 900	7 000	13 000	**6206 ZZ**	**6206 2RU**	**6206 2RD**	**6206 2RS**	35	37.5	57	1	0.199
	72	19	1.1	26.7	15.0	13.3	9 600	8 600	6 400	12 000	**6306 ZZ**	**6306 2RU**	**6306 2RD**	**6306 2RS**	36.5	40	65.5	1	0.346
32	58	13	1	15.0	9.15	14.5	12 000	11 000	7 200	14 000	**60/32 ZZ**	**60/32 2RU**	**60/32 2RD**	**60/32 2RS**	37	38	53	1	0.127
	65	17	1	23.5	13.1	13.3	10 000	9 000	6 900	12 000	**62/32 ZZ**	**62/32 2RU**	**62/32 2RD**	**62/32 2RS**	37	38.5	60	1	0.228
	75	20	1.1	30.1	16.2	12.7	9 300	8 400	6 400	11 000	**63/32 ZZ**	**63/32 2RU**	**63/32 2RD**	**63/32 2RS**	38.5	41	68.5	1	0.437
35	47	7	0.3	4.75	3.85	16.5	13 000	—	7 400	16 000	**6807 ZZ**	**6807 2RU**	—	**6807 2RS**	37	37.5	45	0.3	0.030
	55	10	0.6	10.9	7.75	15.7	12 000	11 000	6 800	14 000	**6907 ZZ**	**6907 2RU**	**6907 2RD**	**6907 2RS**	39	40	51	0.6	0.073
	62	14	1	15.9	10.3	14.9	11 000	9 900	6 500	13 000	**6007 ZZ**	**6007 2RU**	**6007 2RD**	**6007 2RS**	40	42	58	1	0.155
	72	17	1.1	25.7	15.4	13.9	9 200	8 300	6 000	11 000	**6207 ZZ**	**6207 2RU**	**6207 2RD**	**6207 2RS**	41.5	43.5	65.5	1	0.288
	80	21	1.5	33.4	19.3	13.2	8 500	7 700	5 700	10 000	**6307 ZZ**	**6307 2RU**	**6307 2RD**	**6307 2RS**	43	46	72	1.5	0.457
40	52	7	0.3	4.95	4.20	16.3	12 000	11 000	6 700	14 000	**6808 ZZ**	**6808 2RU**	**6808 2RD**	**6808 2RS**	42	42	50	0.3	0.033
	62	12	0.6	13.7	9.95	15.6	11 000	9 900	6 100	13 000	**6908 ZZ**	**6908 2RU**	**6908 2RD**	**6908 2RS**	44	44.5	58	0.6	0.112
	68	15	1	16.7	11.5	15.2	10 000	9 000	5 800	12 000	**6008 ZZ**	**6008 2RU**	**6008 2RD**	**6008 2RS**	45	46.5	63	1	0.192
	80	18	1.1	29.1	17.8	14.0	8 300	7 500	5 400	10 000	**6208 ZZ**	**6208 2RU**	**6208 2RD**	**6208 2RS**	46.5	49	73.5	1	0.366
	90	23	1.5	40.7	24.0	13.2	7 700	6 900	5 100	9 200	**6308 ZZ**	**6308 2RU**	**6308 2RD**	**6308 2RS**	48	51.5	82	1.5	0.633

[Remark] Standard cage types used for the above bearings are described earlier in this section.

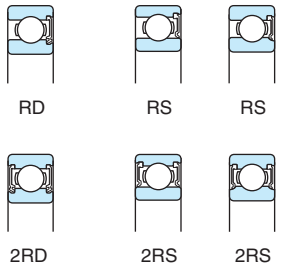
Single-row deep groove ball bearings
shielded type
sealed type
d 45 ~ (70) mm





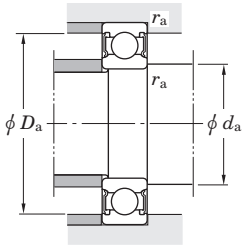
Shielded

Non-contact sealed



Extremely light contact sealed

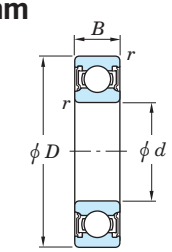
Contact sealed

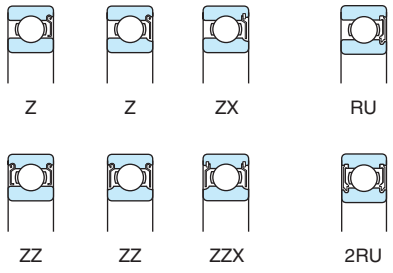


Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
45	58	7	0.3	6.20	5.40	16.3	11 000	9 900	5 900	13 000	**6809 ZZ**	**6809 2RU**	**6809 2RD**	**6809 2RS**	47	47	56	0.3	0.040
	68	12	0.6	14.1	10.9	15.9	9 700	8 700	5 500	11 000	**6909 ZZ**	**6909 2RU**	**6909 2RD**	**6909 2RS**	49	50	64	0.6	0.132
	75	16	1	21.0	15.1	15.3	9 200	8 300	5 300	11 000	**6009 ZZ**	**6009 2RU**	**6009 2RD**	**6009 2RS**	50	51.5	70	1	0.245
	85	19	1.1	32.7	20.3	14.0	7 700	6 900	5 100	9 200	**6209 ZZ**	**6209 2RU**	**6209 2RD**	**6209 2RS**	51.5	53.5	78.5	1	0.407
	100	25	1.5	48.9	29.5	13.3	6 800	6 100	4 500	8 100	**6309 ZZ**	**6309 2RU**	**6309 2RD**	**6309 2RS**	53	59.5	92	1.5	0.833
50	65	7	0.3	6.60	6.10	16.1	9 600	8 600	5 200	11 000	**6810 ZZ**	**6810 2RU**	**6810 2RD**	**6810 2RS**	52	53	63	0.3	0.052
	72	12	0.6	14.5	11.7	16.1	9 000	—	5 000	11 000	**6910 ZZ**	**6910 2RU**	—	—	54	55.5	68	0.6	0.133
	80	16	1	21.8	16.6	15.6	8 400	7 600	4 800	9 900	**6010 ZZ**	**6010 2RU**	**6010 2RD**	**6010 2RS**	55	57	75	1	0.261
	90	20	1.1	35.1	23.3	14.4	7 100	6 400	4 600	8 500	**6210 ZZ**	**6210 2RU**	**6210 2RD**	**6210 2RS**	56.5	59	83.5	1	0.463
	110	27	2	62.0	38.3	13.2	6 100	5 500	4 100	7 300	**6310 ZZ**	**6310 2RU**	**6310 2RD**	**6310 2RS**	59	66.5	101	2	1.07
55	72	9	0.3	8.80	8.10	16.2	8 700	7 800	—	10 000	**6811 ZZ**	**6811 2RU**	**6811 2RD**	—	57	58.5	70	0.3	0.083
	80	13	1	16.6	14.1	16.2	8 100	7 300	4 500	9 600	**6911 ZZ**	**6911 2RU**	**6911 2RD**	**6911 2RS**	60	60.5	75	1	0.185
	90	18	1.1	28.3	21.2	15.3	7 600	6 800	4 300	8 900	**6011 ZZ**	**6011 2RU**	**6011 2RD**	**6011 2RS**	61.5	62	83.5	1	0.385
	100	21	1.5	43.4	29.4	14.4	6 300	5 700	4 100	7 600	**6211 ZZ**	**6211 2RU**	**6211 2RD**	**6211 2RS**	63	66	92	1.5	0.607
	120	29	2	71.6	45.0	13.2	5 600	—	3 700	6 700	**6311 ZZ**	**6311 2RU**	—	**6311 2RS**	64	74.5	111	2	1.37
60	78	10	0.3	11.5	10.6	16.3	8 000	7 200	—	9 400	**6812 ZZ**	**6812 2RU**	**6812 2RD**	—	62	63	76	0.3	0.104
	85	13	1	20.2	17.3	16.2	7 500	—	—	8 900	**6912 ZZ**	**6912 2RU**	—	—	65	66	80	1	0.192
	95	18	1.1	29.4	23.2	15.6	7 100	—	4 000	8 400	**6012 ZZ**	**6012 2RU**	—	**6012 2RS**	66.5	68.5	88.5	1	0.415
	110	22	1.5	52.4	36.2	14.4	5 700	5 100	3 700	6 900	**6212 ZZ**	**6212 2RU**	**6212 2RD**	**6212 2RS**	68	72.5	102	1.5	0.783
	130	31	2.1	81.9	52.2	13.2	5 200	—	3 500	6 200	**6312 ZZ**	**6312 2RU**	—	**6312 2RS**	71	80	119	2	1.70
65	85	10	0.6	11.9	11.5	16.2	7 300	6 600	—	8 600	**6813 ZZ**	**6813 2RU**	**6813 2RD**	—	69	69	81	0.6	0.126
	90	13	1	17.4	16.1	16.6	7 100	6 400	3 900	8 400	**6913 ZZ**	**6913 2RU**	**6913 2RD**	**6913 2RS**	70	71	85	1	0.211
	100	18	1.1	30.5	25.2	15.8	6 600	—	3 700	7 800	**6013 ZZ**	**6013 2RU**	—	**6013 2RS**	71.5	74.5	93.5	1	0.435
	120	23	1.5	57.2	40.1	14.4	5 400	—	3 500	6 400	**6213 ZZ**	**6213 2RU**	—	**6213 2RS**	73	79	112	1.5	0.990
	140	33	2.1	92.7	59.9	13.2	4 800	—	3 200	5 800	**6313 ZZ**	**6313 2RU**	—	**6313 2RS**	76	86	129	2	2.08
70	90	10	0.6	12.1	11.9	16.1	6 800	6 100	—	8 100	**6814 ZZ**	**6814 2RU**	**6814 2RD**	—	74	74	86	0.6	0.134
	100	16	1	23.7	21.2	16.3	6 400	5 800	3 600	7 600	**6914 ZZ**	**6914 2RU**	**6914 2RD**	**6914 2RS**	75	76.5	95	1	0.342

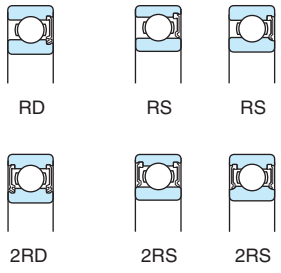
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
shielded type
sealed type
d (70) ~ 95 mm

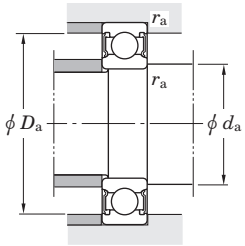




Shielded — Non-contact sealed



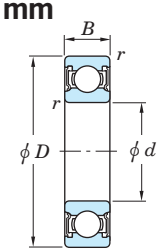
Extremely light contact sealed — Contact sealed

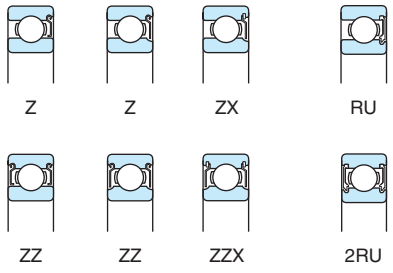


Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
70	110	20	1.1	38.1	30.9	15.6	6 100	—	3 500	7 200	**6014 ZZ**	**6014 2RU**	—	**6014 2RS**	76.5	79.5	103.5	1	0.602
	125	24	1.5	62.2	44.1	14.5	5 100	—	3 300	6 100	**6214 ZZ**	**6214 2RU**	—	**6214 2RS**	78	84	117	1.5	1.07
	150	35	2.1	104	68.2	13.2	4 500	—	3 000	5 400	**6314 ZZ**	**6314 2RU**	—	**6314 2RS**	81	92	139	2	2.52
75	95	10	0.6	12.5	12.9	16.0	6 400	5 800	—	7 600	**6815 ZZ**	**6815 2RU**	**6815 2RD**	—	79	79	91	0.6	0.142
	105	16	1	24.4	22.6	16.5	6 100	—	—	7 200	**6915 ZZ**	**6915 2RU**	—	—	80	82.5	100	1	0.363
	115	20	1.1	39.6	33.5	15.8	5 700	—	3 300	6 800	**6015 ZZ**	**6015 2RU**	—	**6015 2RS**	81.5	84.5	108.5	1	0.638
	130	25	1.5	67.4	48.3	14.5	4 800	—	3 100	5 800	**6215 ZZ**	**6215 2RU**	—	**6215 2RS**	83	88.5	122	1.5	1.18
	160	37	2.1	113	77.2	13.2	4 200	—	2 800	5 000	**6315 ZZ**	**6315 2RU**	—	**6315 2RS**	86	97.5	149	2	3.02
80	100	10	0.6	12.7	13.3	16.0	6 100	5 500	—	7 200	**6816 ZZ**	**6816 2RU**	**6816 2RD**	—	84	84	96	0.6	0.150
	110	16	1	25.0	24.0	16.6	5 700	5 100	3 200	6 800	**6916 ZZ**	**6916 2RU**	**6916 2RD**	**6916 2RS**	85	86.5	105	1	0.382
	125	22	1.1	47.6	39.8	15.6	5 300	—	3 100	6 300	**6016 ZZ**	**6016 2RU**	—	**6016 2RS**	86.5	90	118.5	1	0.850
	140	26	2	72.7	53.0	14.6	4 500	—	2 900	5 400	**6216 ZZ**	**6216 2RU**	—	**6216 2RS**	89	93	131	2	1.40
	170	39	2.1	123	86.7	13.3	3 900	—	2 700	4 700	**6316 ZZ**	**6316 2RU**	—	**6316 2RS**	91	105	159	2	3.59
85	110	13	1	18.7	19.0	16.2	5 600	5 000	—	6 600	**6817 ZZ**	**6817 2RU**	**6817 2RD**	—	90	90.5	105	1	0.266
	120	18	1.1	31.9	29.6	16.4	5 300	4 800	3 000	6 300	**6917 ZZ**	**6917 2RU**	**6917 2RD**	**6917 2RS**	91.5	92.5	113.5	1	0.535
	130	22	1.1	49.5	43.1	15.8	5 000	—	2 900	5 900	**6017 ZZ**	**6017 2RU**	—	**6017 2RS**	91.5	96.5	123.5	1	0.890
	150	28	2	84.0	61.9	14.5	4 200	—	2 700	5 000	**6217 ZZ**	**6217 2RU**	—	**6217 2RS**	94	102	141	2	1.79
	180	41	3	133	96.8	13.3	3 700	—	2 500	4 400	**6317 ZZX**	**6317 2RU**	—	**6317 2RS**	98	111	167	2.5	4.23
90	115	13	1	19.0	19.7	16.1	5 300	4 800	—	6 300	**6818 ZZ**	**6818 2RU**	**6818 2RD**	—	95	95.5	110	1	0.279
	125	18	1.1	32.8	31.6	16.5	5 100	4 600	2 800	6 000	**6918 ZZ**	**6918 2RU**	**6918 2RD**	**6918 2RS**	96.5	97.5	118.5	1	0.565
	140	24	1.5	58.2	49.7	15.6	4 700	—	2 700	5 600	**6018 ZZ**	**6018 2RU**	—	**6018 2RS**	98	100.5	132	1.5	1.16
	160	30	2	96.1	71.5	14.5	3 900	—	2 600	4 700	**6218 ZZ**	**6218 2RU**	—	**6218 2RS**	99	108.5	151	2	2.15
	190	43	3	143	107	13.3	3 500	—	2 400	4 200	**6318 ZZX**	**6318 2RU**	—	**6318 2RS**	103	117	177	2.5	4.91
95	130	18	1.1	33.7	33.5	16.6	4 800	4 300	2 700	5 700	**6919 ZZ**	**6919 2RU**	**6919 2RD**	**6919 2RS**	101.5	102	123.5	1	0.705
	145	24	1.5	60.4	53.9	15.8	4 400	—	2 500	5 200	**6019 ZZX**	**6019 2RU**	—	**6019 2RS**	103	107.5	137	1.5	1.21
	170	32	2.1	109	81.9	14.4	3 700	—	2 400	4 400	**6219 ZZX**	**6219 2RU**	—	**6219 2RS**	106	113	159	2	2.62
	200	45	3	153	119	13.3	3 300	—	2 200	4 000	**6319 ZZX**	**6319 2RU**	—	**6319 2RS**	108	122	187	2.5	5.67

[Remark] Standard cage types used for the above bearings are described earlier in this section.

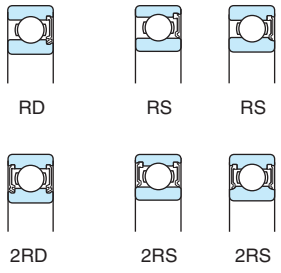
Single-row deep groove ball bearings
shielded type
sealed type
d 100 ~ (140) mm





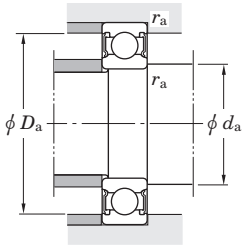
Shielded

Non-contact sealed



Extremely light contact sealed

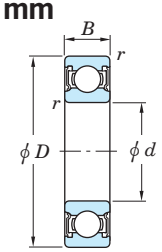
Contact sealed

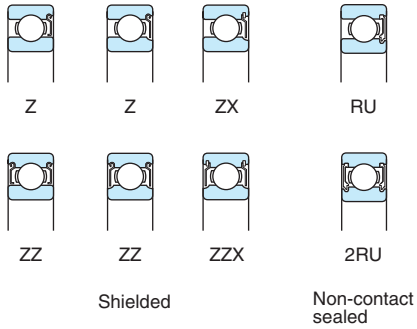


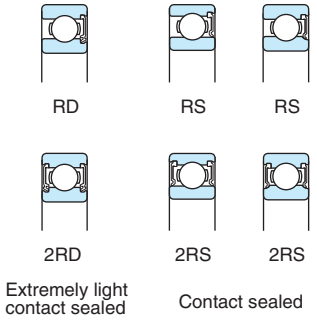
Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
100	125	13	1	19.6	21.2	16.0	4 800	4 300	—	5 700	**6820 ZZ**	**6820 2RU**	**6820 2RD**	—	105	105.5	120	1	0.309
	140	20	1.1	45.0	41.9	16.2	4 500	—	—	5 300	**6920-1 ZZ**	**6920-1 2RU**	—	—	106.5	110.5	133.5	1	0.960
	150	24	1.5	60.2	54.2	15.9	4 300	—	2 500	5 100	**6020 ZZ**	**6020 2RU**	—	**6020 2RS**	108	112	142	1.5	1.25
	180	34	2.1	122	93.1	14.4	3 500	—	2 300	4 200	**6220 ZZX**	**6220 2RU**	—	**6220 2RS**	111	122	169	2	3.14
	215	47	3	173	141	13.2	3 000	—	2 100	3 600	**6320 ZZX**	**6320 2RU**	—	**6320 2RS**	113	131	202	2.5	7.00
105	145	20	1.1	46.5	44.8	16.4	4 300	—	2 400	5 100	**6921-1 ZZ**	**6921-1 2RU**	—	**6921-1 2RS**	111.5	115	138.5	1	1.00
	160	26	2	72.3	65.8	15.8	4 000	—	2 300	4 700	**6021 ZZX**	**6021 2RU**	—	**6021 2RS**	114	119	151	2	1.59
	190	36	2.1	133	105	14.4	3 300	—	2 200	3 900	**6221 ZZX**	**6221 2RU**	—	**6221 2RS**	116	127	179	2	3.70
	225	49	3	184	153	13.2	2 900	—	2 000	3 500	**6321 ZZX**	**6321 2RU**	—	**6321 2RS**	118	136	212	2.5	8.05
110	140	16	1	28.1	30.7	16.1	4 300	3 900	—	5 100	**6822 ZZ**	**6822 2RU**	**6822 2RD**	—	115	116.5	135	1	0.606
	150	20	1.1	47.9	47.8	16.4	4 100	—	—	4 900	**6922 ZZ**	**6922 2RU**	—	—	116.5	119.5	143.5	1	1.04
	170	28	2	82.0	73.0	15.6	3 800	—	2 200	4 500	**6022 ZZX**	**6022 2RU**	—	**6022 2RS**	119	123	161	2	1.96
	200	38	2.1	144	117	14.4	3 100	—	2 000	3 700	**6222 ZZX**	**6222 2RU**	—	**6222 2RS**	121	136.5	189	2	4.36
	240	50	3	205	180	13.2	2 700	—	1 900	3 200	**6322 ZZX**	**6322 2RU**	—	**6322 2RS**	123	146.5	227	2.5	9.54
120	150	16	1	29.0	33.0	16.0	4 000	—	—	4 700	**6824 ZZ**	**6824 2RU**	—	—	125	128.5	145	1	0.655
	165	22	1.1	57.2	56.9	16.4	3 800	—	—	4 400	**6924 ZZ**	**6924 2RU**	—	—	126.5	131.5	158.5	1	1.41
	180	28	2	85.0	79.3	15.9	3 600	—	2 100	4 200	**6024 ZZX**	**6024 2RU**	—	**6024 2RS**	129	136	171	2	2.07
	215	40	2.1	155	131	14.4	2 900	—	1 900	3 400	**6224 ZZX**	**6224 2RU**	—	**6224 2RS**	131	144	204	2	5.15
	260	55	3	207	185	13.5	2 500	—	—	3 000	**6324 ZZX**	—	—	—	133	158	247	2.5	12.5
130	165	18	1.1	36.9	41.2	16.1	3 600	—	—	4 300	**6826 ZZ**	**6826 2RU**	—	—	136.5	139.5	158.5	1	0.939
	180	24	1.5	65.2	67.4	16.3	3 400	—	—	4 100	**6926-1 ZZ**	**6926-1 2RU**	—	—	138	144	172	1.5	1.86
	200	33	2	106	101	15.8	3 200	—	1 900	3 800	**6026 ZZX**	**6026 2RU**	—	**6026 2RS**	139	146.5	191	2	3.16
	230	40	3	167	146	14.5	2 700	—	1 800	3 200	**6226 ZZX**	**6226 2RU**	—	**6226 2RS**	143	157	217	2.5	5.82
	280	58	4	229	214	13.6	2 300	—	—	2 700	**6326 ZZX**	—	—	—	146	171	264	3	15.1
140	175	18	1.1	38.2	44.4	16.0	3 400	3 100	—	4 000	**6828 ZZ**	—	**6828 2RD**	—	146.5	148	168.5	1	1.00
	190	24	1.5	71.3	74.8	16.5	3 200	—	—	3 800	**6928-1 ZZ**	**6928-1 2RU**	—	—	148	153	182	1.5	1.98
	210	33	2	110	109	15.9	3 000	—	1 800	3 600	**6028 ZZX**	**6028 2RU**	—	**6028 2RS**	149	158.5	201	2	3.55

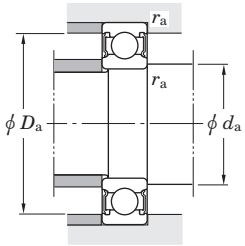
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
shielded type
sealed type
d (140) ~ 220 mm







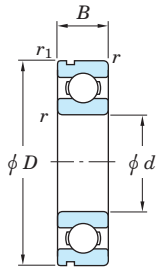


Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.				Mounting dimensions. (mm)				(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	f_0	Z, ZZ RU, 2RU	(RD, 2RD)	(RS, 2RS)	(Z)	Shielded	Non-contact sealed	Extremely light contact sealed	Contact sealed	d_a min.	d_a max.	D_a max.	r_a max.	Open type (kg)
140	250	42	3	166	150	14.8	2 400	—	1 600	2 900	**6228 ZZX**	**6228 2RU**	—	**6228 2RS**	153	169	237	2.5	7.45
	300	62	4	253	246	13.6	2 100	—	—	2 500	**6328 ZZX**	—	—	—	156	184	284	3	19.4
150	210	28	2	93.4	94.3	16.2	2 900	—	1 700	3 400	**6930 ZZ**	**6930 2RU**	—	**6930 2RS**	159	165.5	201	2	3.05
	225	35	2.1	125	126	16.0	2 800	—	1 600	3 300	**6030 ZZX**	**6030 2RU**	—	**6030 2RS**	161	168.5	214	2	4.22
	270	45	3	176	168	15.1	2 200	—	—	2 700	**6230 ZZX**	—	—	—	163	183.5	257	2.5	9.41
160	200	20	1.1	48.4	56.9	16.1	2 900	2 600	—	3 400	**6832 ZZ**	—	**6832 2RD**	—	166.5	168.5	193.5	1	1.45
	240	38	2.1	136	135	15.9	2 600	—	1 500	3 000	**6032 ZZX**	**6032 2RU**	—	**6032 2RS**	171	178.5	229	2	5.22
	290	48	3	185	186	15.4	2 100	—	—	2 500	**6232 ZZX**	—	—	—	173	198	277	2.5	14.3
170	215	22	1.1	59.8	70.5	16.1	2 700	—	—	3 200	**6834 ZZ**	—	—	—	176.5	182.5	208.5	1	1.90
	260	42	2.1	161	161	15.8	2 400	—	—	2 800	**6034 ZZX**	**6034 2RU**	—	—	181	194	249	2	6.80
	310	52	4	212	223	15.3	1 900	—	—	2 300	**6234 ZZX**	—	—	—	186	210.5	294	3	17.5
180	225	22	1.1	60.7	73.1	16.1	2 600	2 300	—	3 000	**6836 ZZ**	—	**6836 2RD**	—	186.5	189.5	218.5	1	2.00
	280	46	2.1	182	194	15.8	2 200	—	—	2 600	**6036 ZZX**	**6036 2RU**	—	—	191	209.5	269	2	10.3
	320	52	4	227	241	15.1	1 800	—	—	2 200	**6236-1 ZZX**	—	—	—	196	220.5	304	3	18.3
190	240	24	1.5	73.1	88.1	16.1	2 400	—	—	2 800	**6838 ZZ**	—	—	—	198	202	232	1.5	2.60
	290	46	2.1	188	201	15.8	2 100	—	—	2 500	**6038 ZZX**	—	—	—	201	215	279	2	10.8
200	310	51	2.1	217	243	15.6	1 900	—	—	2 300	**6040 ZZX**	—	—	—	211	228	299	2	14.0
	360	58	4	269	311	15.2	1 600	—	—	1 900	**6240-1 ZZX**	—	—	—	216	250	344	3	28.2
220	340	56	3	235	271	15.6	1 700	—	—	2 000	**6044 ZZX**	—	—	—	233	251	327	2.5	18.3

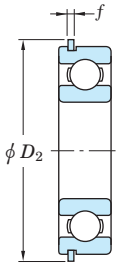
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
snap ring groove type
locating snap ring type

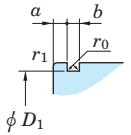
d 10 ~ 32 mm



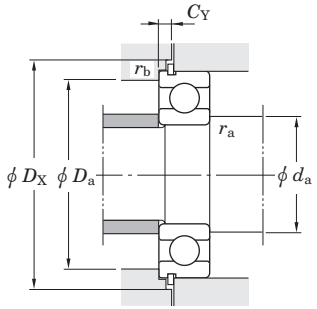
N
With snap ring groove

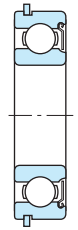


NR
With locating snap ring



Snap ring groove details





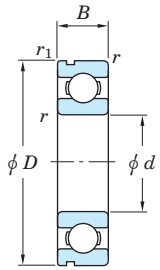
With locating snap ring and one shield

Boundary dimensions (mm)					Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.		D_1	Dimensions of snap ring groove (mm)			Dimensions of locating snap ring (mm)		Mounting dimensions (mm)						(Refer.) Mass	(Refer.) Bearing No.
d	D	B	r min.	r_1 min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	With snap ring groove	With locating snap ring	max.	a max.	b ±0.15	r_0 max.	D_2 max.	f ±0.05	d_a min.	D_a max.	D_X min.	C_Y max.	r_a max.	r_b max.	(kg)	
10	30	9	0.6	0.3	5.10	2.40	13.2	24 000	29 000	**6200N**	**6200NR**	28.17	2.06	1.5	0.4	34.7	1.07	14	26	35.5	2.92	0.6	0.3	0.032	**6200N**
	35	11	0.6	0.5	8.10	3.45	11.2	22 000	27 000	**6300N**	**6300NR**	33.17	2.06	1.5	0.4	39.7	1.07	14	31	40.5	2.92	0.6	0.5	0.053	**6300N**
12	32	10	0.6	0.3	6.80	3.05	12.3	22 000	27 000	**6201N**	**6201NR**	30.15	2.06	1.5	0.4	36.7	1.07	16	28	37.5	2.92	0.6	0.3	0.037	**6201N**
	37	12	1	0.5	9.70	4.20	11.1	20 000	25 000	**6301N**	**6301NR**	34.77	2.06	1.5	0.4	41.3	1.07	17	32	42	2.92	1	0.5	0.060	**6301N**
15	35	11	0.6	0.5	7.65	3.75	13.2	20 000	24 000	**6202N**	**6202NR**	33.17	2.06	1.5	0.4	39.7	1.07	19	31	40.5	2.92	0.6	0.5	0.045	**6202N**
	42	13	1	0.5	11.4	5.45	12.3	17 000	20 000	**6302N**	**6302NR**	39.75	2.06	1.5	0.4	46.3	1.07	20	37	47	2.92	1	0.5	0.082	**6302N**
17	40	12	0.6	0.5	9.55	4.80	13.2	17 000	21 000	**6203N**	**6203NR**	38.1	2.06	1.5	0.4	44.6	1.07	21	36	45.5	2.92	0.6	0.5	0.065	**6203N**
	47	14	1	0.5	13.6	6.65	12.4	15 000	18 000	**6303N**	**6303NR**	44.6	2.46	1.5	0.4	52.7	1.07	22	42	53.5	3.33	1	0.5	0.115	**6303N**
20	42	12	0.6	0.5	9.40	5.05	13.9	17 000	21 000	**6004N**	**6004NR**	39.75	2.06	1.5	0.4	46.3	1.07	24	38	47	2.92	0.6	0.5	0.069	**6004N**
	47	14	1	0.5	12.8	6.65	13.2	15 000	17 000	**6204N**	**6204NR**	44.6	2.46	1.5	0.4	52.7	1.07	25	42	53.5	3.33	1	0.5	0.106	**6204N**
	52	15	1.1	0.5	15.9	7.85	12.3	14 000	17 000	**6304N**	**6304NR**	49.73	2.46	1.5	0.4	57.9	1.07	26.5	45.5	58.5	3.33	1	0.5	0.144	**6304N**
22	44	12	0.6	0.5	9.40	5.15	14.1	17 000	20 000	**60/22N**	**60/22NR**	41.75	2.06	1.5	0.4	48.3	1.07	26	40	49	2.92	0.6	0.5	0.073	**60/22N**
	50	14	1	0.5	12.8	6.65	13.2	15 000	17 000	**62/22N**	**62/22NR**	47.6	2.46	1.5	0.4	55.7	1.07	27	45	56.5	3.33	1	0.5	0.118	**62/22N**
	56	16	1.1	0.5	18.5	9.40	12.6	13 000	15 000	**63/22N**	**63/22NR**	53.6	2.46	1.5	0.4	61.7	1.07	28.5	49.5	62.5	3.33	1	0.5	0.201	**63/22N**
25	47	12	0.6	0.5	10.1	5.85	14.5	15 000	18 000	**6005N**	**6005NR**	44.6	2.06	1.5	0.4	52.7	1.07	29	43	53.5	2.92	0.6	0.5	0.080	**6005N**
	52	15	1	0.5	14.0	7.85	13.9	13 000	15 000	**6205N**	**6205NR**	49.73	2.46	1.5	0.4	57.9	1.07	30	47	58.5	3.33	1	0.5	0.128	**6205N**
	62	17	1.1	0.5	20.6	11.3	13.2	11 000	13 000	**6305N**	**6305NR**	59.61	3.28	2.05	0.6	67.7	1.65	31.5	55.5	68.5	4.67	1	0.5	0.232	**6305N**
28	52	12	0.6	0.5	12.4	7.40	14.5	14 000	16 000	**60/28N**	**60/28NR**	49.73	2.06	1.5	0.4	57.9	1.07	32	48	58.5	2.92	0.6	0.5	0.097	**60/28N**
	58	16	1	0.5	17.9	9.75	13.4	12 000	14 000	**62/28N**	**62/28NR**	55.6	2.46	1.5	0.4	63.7	1.07	33	53	64.5	3.33	1	0.5	0.173	**62/28N**
	68	18	1.1	0.5	23.5	13.1	13.3	10 000	12 000	**63/28N**	**63/28NR**	64.82	3.28	2.05	0.6	74.6	1.65	34.5	61.5	76	4.67	1	0.5	0.328	**63/28N**
30	55	13	1	0.5	13.2	8.25	14.7	13 000	15 000	**6006N**	**6006NR**	52.6	2.08	1.5	0.4	60.7	1.07	35	50	61.5	2.9	1	0.5	0.116	**6006N**
	62	16	1	0.5	19.5	11.3	13.9	11 000	13 000	**6206N**	**6206NR**	59.61	3.28	2.05	0.6	67.7	1.65	35	57	68.5	4.67	1	0.5	0.199	**6206N**
	72	19	1.1	0.5	26.7	15.0	13.3	9 600	12 000	**6306N**	**6306NR**	68.81	3.28	2.05	0.6	78.6	1.65	36.5	65.5	80	4.67	1	0.5	0.346	**6306N**
32	58	13	1	0.5	15.0	9.15	14.5	12 000	14 000	**60/32N**	**60/32NR**	55.6	2.08	1.5	0.4	63.7	1.07	37	53	64.5	2.9	1	0.5	0.127	**60/32N**
	65	17	1	0.5	23.5	13.1	13.3	10 000	12 000	**62/32N**	**62/32NR**	62.6	3.28	2.05	0.6	70.7	1.65	37	60	71.5	4.67	1	0.5	0.228	**62/32N**
	75	20	1.1	0.5	30.1	16.2	12.7	9 300	11 000	**63/32N**	**63/32NR**	71.83	3.28	2.05	0.6	81.6	1.65	38.5	68.5	83	4.67	1	0.5	0.437	**63/32N**

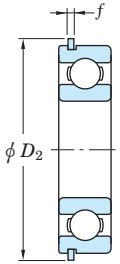
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Single-row deep groove ball bearings
snap ring groove type
locating snap ring type

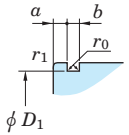
d 35 ~ 75 mm



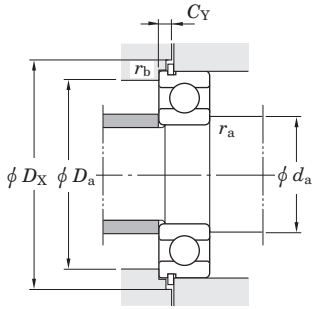
N
With snap ring groove

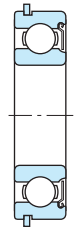


NR
With locating snap ring



Snap ring groove details



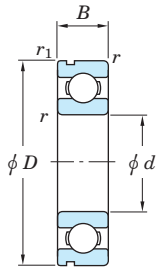


With locating snap ring and one shield

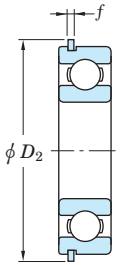
Boundary dimensions (mm)					Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.			Dimensions of snap ring groove (mm)			Dimensions of locating snap ring (mm)		Mounting dimensions (mm)						(Refer.) Mass	(Refer.) Bearing No.
d	D	B	r min.	r_1 min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	With snap ring groove	With locating snap ring	D_1 max.	a max.	b ±0.15	r_0 max.	D_2 max.	f ±0.05	d_a min.	D_a max.	D_X min.	C_Y max.	r_a max.	r_b max.	(kg)	
35	62	14	1	0.5	15.9	10.3	14.9	11 000	13 000	**6007N**	**6007NR**	59.61	2.08	2.05	0.6	67.7	1.65	40	58	68.5	3.48	1	0.5	0.155	**6007N**
	72	17	1.1	0.5	25.7	15.4	13.9	9 200	11 000	**6207N**	**6207NR**	68.81	3.28	2.05	0.6	78.6	1.65	41.5	65.5	80	4.67	1	0.5	0.288	**6207N**
	80	21	1.5	0.5	33.4	19.3	13.2	8 500	10 000	**6307N**	**6307NR**	76.81	3.28	2.05	0.6	86.6	1.65	43	72	88	4.67	1.5	0.5	0.457	**6307N**
40	68	15	1	0.5	16.7	11.5	15.2	10 000	12 000	**6008N**	**6008NR**	64.82	2.49	2.05	0.6	74.6	1.65	45	63	76	3.89	1	0.5	0.192	**6008N**
	80	18	1.1	0.5	29.1	17.8	14.0	8 300	10 000	**6208N**	**6208NR**	76.81	3.28	2.05	0.6	86.6	1.65	46.5	73.5	88	4.67	1	0.5	0.366	**6208N**
	90	23	1.5	0.5	40.7	24.0	13.2	7 700	9 200	**6308N**	**6308NR**	86.79	3.28	2.85	0.6	96.5	2.41	48	82	98	5.43	1.5	0.5	0.633	**6308N**
45	75	16	1	0.5	21.0	15.1	15.3	9 200	11 000	**6009N**	**6009NR**	71.83	2.49	2.05	0.6	81.6	1.65	50	70	83	3.89	1	0.5	0.245	**6009N**
	85	19	1.1	0.5	32.7	20.3	14.0	7 700	9 200	**6209N**	**6209NR**	81.81	3.28	2.05	0.6	91.6	1.65	51.5	78.5	93	4.67	1	0.5	0.407	**6209N**
	100	25	1.5	0.5	48.9	29.5	13.3	6 800	8 100	**6309N**	**6309NR**	96.8	3.28	2.85	0.6	106.5	2.41	53	92	108	5.43	1.5	0.5	0.833	**6309N**
50	80	16	1	0.5	21.8	16.6	15.6	8 400	9 900	**6010N**	**6010NR**	76.81	2.49	2.05	0.6	86.6	1.65	55	75	88	3.89	1	0.5	0.261	**6010N**
	90	20	1.1	0.5	35.1	23.3	14.4	7 100	8 500	**6210N**	**6210NR**	86.79	3.28	2.85	0.6	96.5	2.41	56.5	83.5	98	5.43	1	0.5	0.463	**6210N**
	110	27	2	0.5	62.0	38.3	13.2	6 100	7 300	**6310N**	**6310NR**	106.81	3.28	2.85	0.6	116.6	2.41	59	101	118	5.43	2	0.5	1.07	**6310N**
55	90	18	1.1	0.5	28.3	21.2	15.3	7 600	8 900	**6011N**	**6011NR**	86.79	2.87	2.85	0.6	96.5	2.41	61.5	83.5	98	5.03	1	0.5	0.385	**6011N**
	100	21	1.5	0.5	43.4	29.4	14.4	6 300	7 600	**6211N**	**6211NR**	96.8	3.28	2.85	0.6	106.5	2.41	63	92	108	5.43	1.5	0.5	0.607	**6211N**
	120	29	2	0.5	71.6	45.0	13.2	5 600	6 700	**6311N**	**6311NR**	115.21	4.06	3.25	0.6	129.7	2.77	64	111	131.5	6.58	2	0.5	1.37	**6311N**
60	95	18	1.1	0.5	29.4	23.2	15.6	7 100	8 400	**6012N**	**6012NR**	91.82	2.87	2.85	0.6	101.6	2.41	66.5	88.5	103	5.03	1	0.5	0.415	**6012N**
	110	22	1.5	0.5	52.4	36.2	14.4	5 700	6 900	**6212N**	**6212NR**	106.81	3.28	2.85	0.6	116.6	2.41	68	102	118	5.43	1.5	0.5	0.783	**6212N**
	130	31	2.1	0.5	81.9	52.2	13.2	5 200	6 200	**6312N**	**6312NR**	125.22	4.06	3.25	0.6	139.7	2.77	71	119	141.5	6.58	2	0.5	1.70	**6312N**
65	100	18	1.1	0.5	30.5	25.2	15.8	6 600	7 800	**6013N**	**6013NR**	96.8	2.87	2.85	0.6	106.5	2.41	71.5	93.5	108	5.03	1	0.5	0.435	**6013N**
	120	23	1.5	0.5	57.2	40.1	14.4	5 400	6 400	**6213N**	**6213NR**	115.21	4.06	3.25	0.6	129.7	2.77	73	112	131.5	6.58	1.5	0.5	0.990	**6213N**
	140	33	2.1	0.5	92.7	59.9	13.2	4 800	5 800	**6313N**	**6313NR**	135.23	4.9	3.25	0.6	149.7	2.77	76	129	152	7.37	2	0.5	2.08	**6313N**
70	110	20	1.1	0.5	38.1	30.9	15.6	6 100	7 200	**6014N**	**6014NR**	106.81	2.87	2.85	0.6	116.6	2.41	76.5	103.5	118	5.03	1	0.5	0.602	**6014N**
	125	24	1.5	0.5	62.2	44.1	14.5	5 100	6 100	**6214N**	**6214NR**	120.22	4.06	3.25	0.6	134.7	2.77	78	117	136.5	6.58	1.5	0.5	1.07	**6214N**
	150	35	2.1	0.5	104	68.2	13.2	4 500	5 400	**6314N**	**6314NR**	145.24	4.9	3.25	0.6	159.7	2.77	81	139	162	7.37	2	0.5	2.52	**6314N**
75	115	20	1.1	0.5	39.6	33.5	15.8	5 700	6 800	**6015N**	**6015NR**	111.81	2.87	2.85	0.6	121.6	2.41	81.5	108.5	123	5.03	1	0.5	0.638	**6015N**
	130	25	1.5	0.5	67.4	48.3	14.5	4 800	5 800	**6215N**	**6215NR**	125.22	4.06	3.25	0.6	139.7	2.77	83	122	141.5	6.58	1.5	0.5	1.18	**6215N**
	160	37	2.1	0.5	113	77.2	13.2	4 200	5 000	**6315N**	**6315NR**	155.22	4.9	3.25	0.6	169.7	2.77	86	149	172	7.37	2	0.5	3.02	**6315N**

[Remark] Standard cage types used for the above bearings are described earlier in this section.

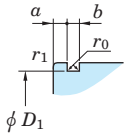
Single-row deep groove ball bearings
snap ring groove type
locating snap ring type
d 80 ~ 130 mm



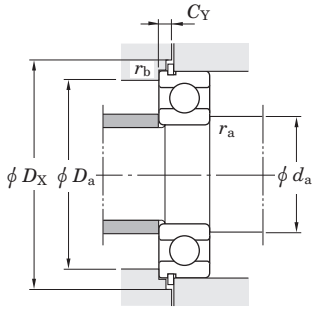
N
With snap ring groove

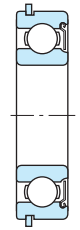


NR
With locating snap ring



Snap ring groove details



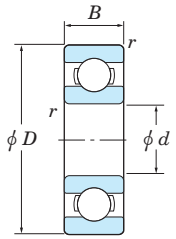


With locating snap ring and one shield

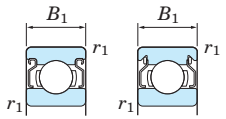
Boundary dimensions (mm)					Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.			Dimensions of snap ring groove (mm)			Dimensions of locating snap ring (mm)		Mounting dimensions (mm)						(Refer.) Mass	(Refer.) Bearing No.
d	D	B	r min.	r_1 min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	With snap ring groove	With locating snap ring	D_1 max.	a max.	b ±0.15	r_0 max.	D_2 max.	f ±0.05	d_a min.	D_a max.	D_X min.	C_Y max.	r_a max.	r_b max.	(kg)	
80	125	22	1.1	0.5	47.6	39.8	15.6	5 300	6 300	**6016N**	**6016NR**	120.22	2.87	3.25	0.6	134.7	2.77	86.5	118.5	136.5	5.39	1	0.5	0.850	**6016N**
	140	26	2	0.5	72.7	53.0	14.6	4 500	5 400	**6216N**	**6216NR**	135.23	4.9	3.25	0.6	149.7	2.77	89	131	152	7.37	2	0.5	1.40	**6216N**
	170	39	2.1	0.5	123	86.7	13.3	3 900	4 700	**6316N**	**6316NR**	163.65	5.69	3.65	0.6	182.9	3.05	91	159	185	8.44	2	0.5	3.59	**6316N**
85	130	22	1.1	0.5	49.5	43.1	15.8	5 000	5 900	**6017N**	**6017NR**	125.22	2.87	3.25	0.6	139.7	2.77	91.5	123.5	141.5	5.39	1	0.5	0.890	**6017N**
	150	28	2	0.5	84.0	61.9	14.5	4 200	5 000	**6217N**	**6217NR**	145.24	4.9	3.25	0.6	159.7	2.77	94	141	162	7.37	2	0.5	1.79	**6217N**
	180	41	3	0.5	133	96.8	13.3	3 700	4 400	**6317N**	**6317NR**	173.66	5.69	3.65	0.6	192.9	3.05	98	167	195	8.44	2.5	0.5	4.23	**6317N**
90	140	24	1.5	0.5	58.2	49.7	15.6	4 700	5 600	**6018N**	**6018NR**	135.23	3.71	3.25	0.6	149.7	2.77	98	132	152	6.17	1.5	0.5	1.16	**6018N**
	160	30	2	0.5	96.1	71.5	14.5	3 900	4 700	**6218N**	**6218NR**	155.22	4.9	3.25	0.6	169.7	2.77	99	151	172	7.37	2	0.5	2.15	**6218N**
	190	43	3	0.5	143	107	13.3	3 500	4 200	**6318N**	**6318NR**	183.64	5.69	3.65	0.6	202.9	3.05	103	177	205	8.44	2.5	0.5	4.91	**6318N**
95	145	24	1.5	0.5	60.4	53.9	15.8	4 400	5 200	**6019N**	**6019NR**	140.23	3.71	3.25	0.6	154.7	2.77	103	137	157	6.17	1.5	0.5	1.21	**6019N**
	170	32	2.1	0.5	109	81.9	14.4	3 700	4 400	**6219N**	**6219NR**	163.65	5.69	3.65	0.6	182.9	3.05	106	159	185	8.44	2	0.5	2.62	**6219N**
	200	45	3	0.5	153	119	13.3	3 300	4 000	**6319N**	**6319NR**	193.65	5.69	3.65	0.6	212.9	3.05	108	187	215	8.44	2.5	0.5	5.67	**6319N**
100	150	24	1.5	0.5	60.2	54.2	15.9	4 300	5 100	**6020N**	**6020NR**	145.24	3.71	3.25	0.6	159.7	2.77	108	142	162	6.17	1.5	0.5	1.25	**6020N**
	180	34	2.1	0.5	122	93.1	14.4	3 500	4 200	**6220N**	**6220NR**	173.66	5.69	3.65	0.6	192.9	3.05	111	169	195	8.44	2	0.5	3.14	**6220N**
105	160	26	2	0.5	72.3	65.8	15.8	4 000	4 700	**6021N**	**6021NR**	155.22	3.71	3.25	0.6	169.7	2.77	114	151	172	6.17	2	0.5	1.59	**6021N**
	190	36	2.1	0.5	133	105	14.4	3 300	3 900	**6221N**	**6221NR**	183.64	5.69	3.65	0.6	202.9	3.05	116	179	205	8.44	2	0.5	3.70	**6221N**
110	170	28	2	0.5	82.0	73.0	15.6	3 800	4 500	**6022N**	**6022NR**	163.65	3.71	3.65	0.6	182.9	3.05	119	161	185	6.45	2	0.5	1.96	**6022N**
	200	38	2.1	0.5	144	117	14.4	3 100	3 700	**6222N**	**6222NR**	193.65	5.69	3.65	0.6	212.9	3.05	121	189	215	8.44	2	0.5	4.36	**6222N**
120	180	28	2	0.5	85.0	79.3	15.9	3 600	4 200	**6024N**	**6024NR**	173.66	3.71	3.65	0.6	192.9	3.05	129	171	195	6.45	2	0.5	2.07	**6024N**
130	200	33	2	0.5	106	101	15.8	3 200	3 800	**6026N**	**6026NR**	193.65	5.69	3.65	0.6	212.9	3.05	139	191	215	8.44	2	0.5	3.16	**6026N**

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d 1 ~ (4) mm

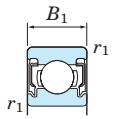


Open



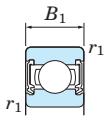
ZZ ZZX

Shielded



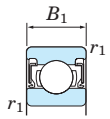
2RU

Non-contact sealed



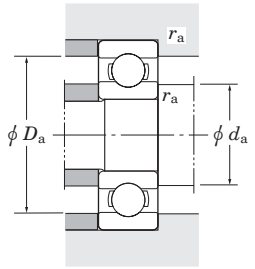
2RD

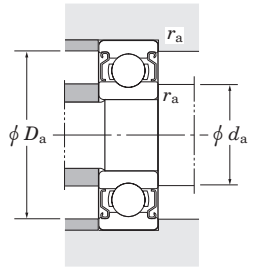
Extremely light contact sealed



2RS

Contact sealed

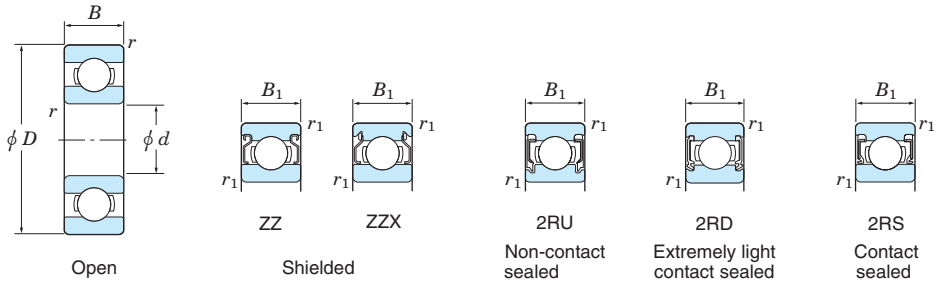


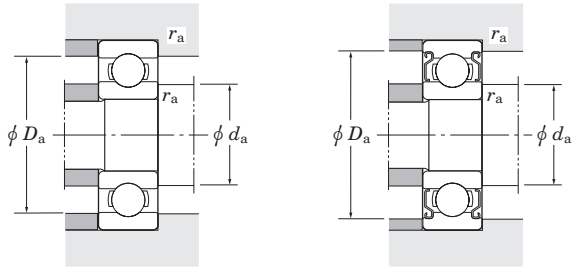


Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.					Mounting dimensions (mm)			(Refer.) Mass
d	D	B	B_1	r 1) min.	r_1 1) min.	C_r	C_{0r}	f_0	Open ZZ, 2RU	(2RD)	(2RS)	Open Z	Open	Shielded	Non-contact sealed	Extremely light shielded	Contact sealed	d_a min.	D_a max.	r_a max.	(g)
1	3	1	—	0.07	—	0.10	0.03	11.6	130 000	—	—	150 000	**681**	—	—	—	—	1.6	2.4	0.05	0.03
	3	1.5	—	0.08	—	0.08	0.02	12.8	130 000	—	—	150 000	**ML1003**	—	—	—	—	1.6	2.4	0.07	0.05
	4	1.6	—	0.1	—	0.14	0.04	11.4	120 000	—	—	140 000	**691**	—	—	—	—	1.8	3.2	0.1	0.1
1.2	4	1.8	—	0.08	—	0.11	0.03	11.4	120 000	—	—	140 000	**ML1204**	—	—	—	—	1.8	3.4	0.07	0.1
1.5	4	1.2	2	0.1	0.1	0.11	0.03	13.2	120 000	—	—	140 000	**68/1.5**	**W68/1.5 ZZ**	—	—	—	2.3	3.2	0.1	0.1
	5	2	2.6	0.15	0.15	0.24	0.07	13.3	110 000	—	—	130 000	**69/1.5**	**W69/1.5 ZZX**	—	—	—	2.7	3.8	0.15	0.1
	6	2.5	3	0.1	0.1	0.33	0.10	11.4	86 000	—	—	100 000	**ML1506**	**WML1506 ZZX**	—	—	—	2.3	5.2	0.1	0.3
2	5	1.5	2.3	0.1	0.1	0.17	0.05	13.3	98 000	—	—	110 000	**682**	**W682 ZZX**	—	—	—	2.8	4.4	0.1	0.1
	5	2	2.5	0.1	0.08	0.17	0.05	13.3	98 000	—	—	110 000	**ML2005**	**WML2005 ZZ**	—	—	—	2.6	4.2	0.07	0.1
	6	2.3	3	0.15	0.1	0.33	0.10	11.4	86 000	—	—	100 000	**692**	**W692 ZZ**	—	—	—	3.2	4.8	0.1	0.2
	6	2.5	3	0.1	0.1	0.33	0.10	11.4	86 000	—	—	100 000	**ML2006**	**WML2006 ZZX**	—	—	—	2.8	5.2	0.1	0.3
	7	2.5	3	0.15	0.15	0.39	0.13	12.6	67 000	—	—	79 000	**ML2007**	**WML2007 ZZX**	—	—	—	3.2	5.8	0.15	0.4
	7	2.8	3.5	0.15	0.15	0.39	0.13	12.6	67 000	—	—	79 000	**602**	**W602 ZZX**	—	—	—	3.2	5.8	0.15	0.5
2.5	6	1.8	2.6	0.1	0.1	0.19	0.06	14.3	75 000	—	—	89 000	**68/2.5**	**W68/2.5 ZZ**	—	—	—	3.3	5.2	0.1	0.2
	7	2.5	3.5	0.15	0.15	0.31	0.11	13.7	66 000	—	—	79 000	**69/2.5**	**W69/2.5 ZZ**	—	—	—	3.7	5.8	0.15	0.4
	8	2.5	—	0.1	—	0.43	0.15	13.4	63 000	—	—	75 000	**ML2508/1B**	—	—	—	—	3.3	7.2	0.1	0.6
	8	2.8	4	0.15	0.1	0.55	0.17	11.5	64 000	—	—	76 000	**ML2508**	**WML2508 ZZX**	—	—	—	3.7	6.8	0.1	0.6
3	6	2	2.5	0.08	0.05	0.19	0.06	14.3	75 000	—	—	89 000	**ML3006**	**WML3006 ZZ**	—	—	—	3.6	5.4	0.05	0.2
	7	2	3	(0.15)	(0.15)	0.31	0.11	13.7	66 000	—	—	79 000	**683**	**W683 ZZ**	—	—	—	4.2	5.8	0.1	0.3
	8	2.5	—	0.1	—	0.40	0.14	13.4	63 000	—	—	75 000	**ML3008**	—	—	—	—	3.8	7.2	0.1	0.5
	8	3	4	0.15	0.15	0.55	0.17	11.5	64 000	—	—	76 000	**693**	**W693 ZZ**	—	—	—	4.2	6.8	0.15	0.6
	9	3	5	0.15	0.15	0.43	0.16	14.0	60 000	—	—	72 000	**603**	**W603 ZZX**	—	—	—	4.2	7.8	0.15	0.9
	10	4	4	0.15	0.15	0.63	0.22	12.8	52 000	—	44 000	63 000	**623**	**623 ZZ**	—	—	**623 2RS**	4.2	8.8	0.15	1.6
	13	5	5	0.2	0.2	1.30	0.49	12.3	44 000	—	—	54 000	**633**	**633 ZZ**	—	—	—	4.6	11.4	0.2	3.0
4	7	2	2.5	0.08	0.05	0.26	0.11	15.1	64 000	—	—	76 000	**ML4007**	**WML4007 ZZ**	—	—	—	4.6	6.4	0.05	0.2
	8	2	3	0.1	0.08	0.40	0.14	14.6	61 000	—	—	73 000	**ML4008**	**WML4008 ZZ**	—	—	—	4.8	7.2	0.08	0.4
	9	2.5	4	(0.15)	(0.15)	0.64	0.23	12.8	59 000	—	—	70 000	**684**	**W684 ZZ**	—	—	—	5.2	7.8	0.1	0.6

[Note] 1) Numerical values in ( ) do not conform to JIS B 1521.

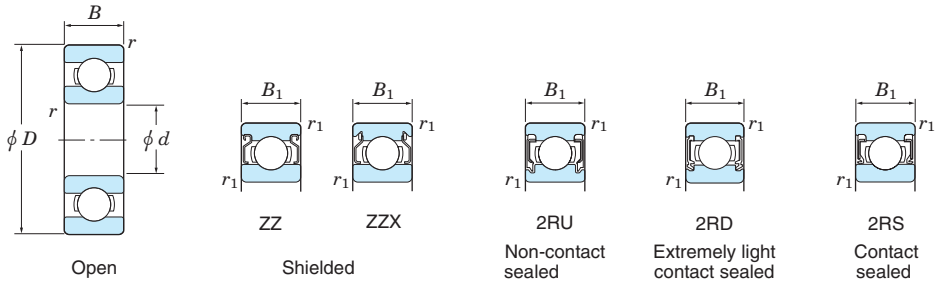
d (4) ~ (7) mm



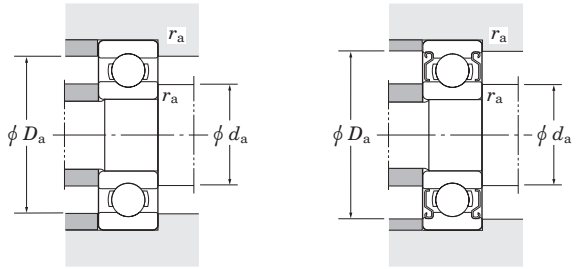


Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.					Mounting dimensions (mm)			(Refer.) Mass
d	D	B	B_1	r min.	r_1 min.	C_r	C_{0r}	f_0	Open ZZ, 2RU	(2RD)	(2RS)	Open Z	Open	Shielded	Non-contact sealed	Extremely light shielded	Contact sealed	d_a min.	D_a max.	r_a max.	(g)
4	10	3	4	0.15	0.1	0.65	0.23	13.3	56 000	—	—	67 000	**ML4010**	**WML4010 ZZ**	—	—	—	5.2	8.8	0.1	1.0
	11	4	4	0.15	0.15	0.96	0.35	12.4	54 000	—	44 000	65 000	**694**	**694 ZZ**	**694 2RU**	—	**694 2RS**	5.2	9.8	0.15	1.8
	12	4	4	0.2	0.2	0.96	0.35	12.4	53 000	—	—	63 000	**604**	**604 ZZ**	—	—	—	5.6	10.4	0.2	2.1
	13	5	5	0.2	0.2	1.30	0.48	12.3	44 000	—	39 000	54 000	**624**	**624 ZZ**	**624 2RU**	—	**624 2RS**	5.6	11.4	0.2	2.9
	16	5	5	0.3	0.3	1.35	0.52	12.4	40 000	—	—	49 000	**634**	**634 ZZ**	—	—	—	6	14	0.3	5.3
5	8	2	2.5	0.08	0.05	0.22	0.09	15.7	59 000	—	—	70 000	**ML5008**	**WML5008 ZZ**	—	—	—	5.6	7.4	0.05	0.3
	9	2.5	3	0.1	0.08	0.43	0.17	15.3	56 000	—	—	67 000	**ML5009**	**WML5009 ZZ**	—	—	—	5.8	8.2	0.08	0.5
	10	3	4	0.1	0.1	0.43	0.17	14.8	55 000	—	—	65 000	**ML5010**	**WML5010 ZZ**	—	—	—	5.8	9	0.1	0.9
	11	3	5	0.15	0.15	0.71	0.28	12.8	53 000	—	—	63 000	**685**	**W685 ZZ**	—	—	—	6.2	9.8	0.15	1.0
	13	4	4	0.2	0.2	1.10	0.43	12.3	50 000	45 000	42 000	60 000	**695**	**695 ZZ**	**695 2RU**	**695 2RD**	**695 2RS**	6.6	11.4	0.2	2.2
	14	5	5	0.2	0.2	1.30	0.49	12.3	50 000	—	—	60 000	**605**	**605 ZZ**	—	—	—	6.6	12.4	0.2	3.5
	16	5	5	0.3	0.3	1.75	0.67	12.4	40 000	36 000	33 000	49 000	**625**	**625 ZZ**	**625 2RU**	—	**625 2RS**	7	14	0.3	5.0
	19	6	6	0.3	0.3	2.35	0.89	12.3	35 000	32 000	27 000	43 000	**635**	**635 ZZ**	**635 2RU**	—	**635 2RS**	7	17	0.3	8.5
6	10	2.5	3	0.1	0.08	0.50	0.22	15.7	53 000	—	—	63 000	**ML6010**	**WML6010 ZZ**	—	—	—	6.8	9.2	0.08	0.6
	12	3	4	0.15	0.1	0.71	0.29	14.5	49 000	—	37 000	59 000	**ML6012**	**WML6012 ZZ**	—	—	**WML6012 2RS**	7.2	10.8	0.1	1.3
	13	3.5	5	0.15	0.15	1.10	0.44	13.7	48 000	43 000	36 000	57 000	**686**	**W686 ZZ**	—	—	**W686 2RS**	7.2	11.8	0.15	1.8
	15	5	5	0.2	0.2	1.35	0.52	12.4	45 000	41 000	32 000	54 000	**696**	**696 ZZ**	**696 2RU**	**696 2RD**	**696 2RS**	7.6	13.4	0.2	3.9
	17	6	6	0.3	0.3	1.95	0.74	12.2	43 000	39 000	—	51 000	**606**	**606 ZZ**	**606 2RU**	**606 2RD**	—	8	15	0.3	5.8
	19	6	6	0.3	0.3	2.35	0.89	12.3	35 000	32 000	27 000	43 000	**626**	**626 ZZ**	**626 2RU**	**626 2RD**	**626 2RS**	8	17	0.3	8.1
	19	8	8	0.3	0.3	2.60	1.05	12.3	40 000	—	—	47 000	**ML6019**	**ML6019 ZZ**	—	—	—	7	18	0.3	9.0
	22	7	7	0.3	0.3	3.30	1.35	12.4	31 000	—	23 000	37 000	**636**	**636 ZZ**	—	—	**636 2RS**	8	20	0.3	13
7	11	2.5	3	0.1	0.08	0.43	0.23	16.1	49 000	—	—	59 000	**ML7011**	**WML7011 ZZX**	—	—	—	7.8	10.2	0.08	0.7
	13	3	4	0.15	0.15	0.54	0.28	14.9	47 000	—	—	55 000	**ML7013**	**WML7013 ZZ**	—	—	—	8.2	11.8	0.15	1.4
	14	3.5	5	0.15	0.15	1.15	0.51	14.2	45 000	—	—	54 000	**687**	**W687 ZZ**	—	—	—	8.2	12.8	0.15	2.0
	17	5	5	0.3	0.3	1.60	0.71	14.0	42 000	—	28 000	50 000	**697**	**697 ZZ**	—	—	**697 2RS**	9	15	0.3	5.3
	19	6	6	0.3	0.3	2.35	0.89	12.3	40 000	36 000	27 000	47 000	**607**	**607 ZZ**	**607 2RU**	**607 2RD**	**607 2RS**	9	17	0.3	7.6
	22	7	7	0.3	0.3	3.30	1.35	12.4	31 000	28 000	23 000	37 000	**627**	**627 ZZ**	**627 2RU**	**627 2RD**	**627 2RS**	9	20	0.3	13
	22	8	8	0.3	0.3	3.30	1.35	12.4	34 000	—	—	41 000	**ML7022**	**ML7022 ZZ**	—	—	—	9	20	0.3	14

d (7) ~ 9 mm



Open | Shielded: ZZ, ZZX | 2RU: Non-contact sealed | 2RD: Extremely light contact sealed | 2RS: Contact sealed

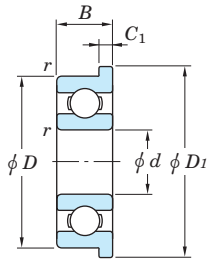


Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min⁻¹) Grease lub.			Oil lub.	Bearing No.					Mounting dimensions (mm)			(Refer.) Mass
d	D	B	B_1	r 1) min.	r_1 1) min.	C_r	C_{0r}	f_0	Open ZZ, 2RU	(2RD)	(2RS)	Open Z	Open	Shielded	Non-contact sealed	Extremely light shielded	Contact sealed	d_a min.	D_a max.	r_a max.	(g)
7	26	9	9	0.3	0.3	4.55	1.95	12.3	26 000	—	—	32 000	**637**	**637 ZZ**	—	—	—	9	24	0.3	24
8	12	2.5	3.5	0.1	0.08	0.54	0.27	16.4	47 000	—	—	55 000	**ML8012**	**WML8012 ZZ**	—	—	—	8.8	11.2	0.08	0.8
	14	3.5	4	0.15	0.15	0.81	0.39	15.3	44 000	—	—	52 000	**ML8014**	**WML8014 ZZ**	—	—	—	9.2	12.8	0.15	1.8
	16	4	5	0.2	0.2	1.25	0.59	14.0	42 000	38 000	28 000	50 000	**688**	**W688 ZZ**	**W688 2RU**	**W688 2RD**	**W688 2RS**	9.6	14.4	0.2	3.2
	19	6	6	0.3	0.3	2.25	0.91	12.9	39 000	35 000	27 000	46 000	**698**	**698 ZZ**	—	**698 2RD**	**698 2RS**	10	17	0.3	7.2
	22	7	7	0.3	0.3	3.30	1.35	12.4	34 000	31 000	23 000	41 000	**608**	**608 ZZ**	**608 2RU**	**608 2RD**	**608 2RS**	10	20	0.3	12
	24	8	8	0.3	0.3	3.35	1.40	12.8	28 000	—	22 000	35 000	**628**	**628 ZZ**	**628 2RU**	—	**628 2RS**	10	22	0.3	18
	28	9	9	0.3	0.3	4.55	1.95	12.3	26 000	23 000	—	32 000	**638**	**638 ZZ**	—	**638 2RD**	—	10	26	0.3	29
9	17	4	5	0.2	0.2	1.35	0.66	14.9	39 000	35 000	—	46 000	**689**	**W689 ZZ**	**W689 2RU**	**W689 2RD**	—	10.6	15.4	0.2	3.5
	20	6	6	0.3	0.3	2.45	1.05	13.3	35 000	32 000	25 000	42 000	**699**	**699 ZZ**	—	**699 2RD**	**699 2RS**	11	18	0.3	7.5
	24	7	7	0.3	0.3	3.35	1.40	12.8	33 000	30 000	22 000	40 000	**609**	**609 ZZ**	**609 2RU**	**609 2RD**	**609 2RS**	11	22	0.3	15
	26	8	8	(0.6)	(0.6)	4.55	1.95	12.4	27 000	24 000	19 000	33 000	**629**	**629 ZZ**	**629 2RU**	**629 2RD**	**629 2RS**	12.1	22	0.3	20
	30	10	10	0.6	0.6	4.65	2.10	12.3	24 000	—	—	29 000	**639**	**639 ZZ**	—	—	—	13	26	0.6	35

[Note] 1) Numerical values in ( ) do not conform to JIS B 1521.

Extra-small ball bearings, miniature ball bearings
flanged type

d **1 ~ (4) mm**



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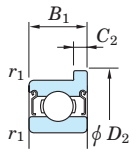

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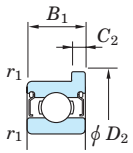

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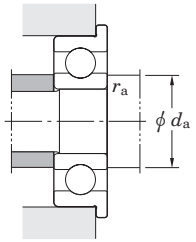
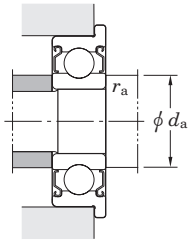
Shielded



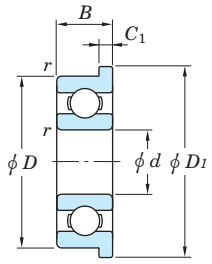


Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.	Oil lub.	Bearing No.		Dimensions of flange (mm)				Mounting dimensions (mm)		(Refer.) Mass
d	D	B	B_1	r [1] min.	r_1 [1] min.	C_r	C_{0r}	f_0	Open ZZ, ZZX	Open Z, ZX	Open	Shielded	D_1	D_2	C_1	C_2	d_a min.	r_a max.	(g)
1	3	1	—	0.07	—	0.10	0.03	11.6	130 000	150 000	**F681**	—	3.8	—	0.3	—	1.6	0.05	0.03
	4	1.6	—	0.1	—	0.14	0.04	11.4	120 000	140 000	**F691**	—	5	—	0.5	—	1.8	0.1	0.1
1.5	4	1.2	2	0.1	0.1	0.11	0.03	13.2	120 000	140 000	**F68/1.5**	**WF68/1.5 ZZ**	5	5	0.4	0.6	2.3	0.1	0.1
	5	2	2.6	0.15	0.15	0.24	0.07	12.9	110 000	120 000	**F69/1.5**	**WF69/1.5 ZZ**	6.5	6.5	0.6	0.8	2.7	0.15	0.2
	6	2.5	3	0.1	0.1	0.33	0.10	11.4	86 000	100 000	**MLF1506**	**WMLF1506 ZZ**	7.5	7.5	0.6	0.8	2.3	0.1	0.4
2	5	1.5	2.3	0.1	0.1	0.17	0.05	13.3	99 000	120 000	**F682**	**WF682 ZZ**	6.1	6.1	0.5	0.6	2.8	0.1	0.1
	5	2	2.5	0.1	0.08	0.17	0.05	12.9	99 000	120 000	**MLF2005**	**WMLF2005 ZZ**	6.2	6.2	0.6	0.6	2.8	0.07	0.2
	6	2.3	3	0.15	0.1	0.33	0.10	11.4	86 000	100 000	**F692**	**WF692 ZZ**	7.5	7.5	0.6	0.8	3.2	0.1	0.3
	6	2.5	3	0.1	0.1	0.33	0.10	11.4	86 000	100 000	**MLF2006**	**WMLF2006 ZZ**	7.2	7.2	0.6	0.6	2.8	0.1	0.4
	7	2.5	3	0.15	0.15	0.39	0.13	12.6	67 000	79 000	**MLF2007**	**WMLF2007 ZZ**	8.2	8.2	0.6	0.6	3.2	0.15	0.5
	7	2.8	3.5	0.15	0.15	0.39	0.13	12.6	67 000	79 000	**F602**	**WF602 ZZ**	8.5	8.5	0.7	0.9	3.2	0.15	0.6
2.5	6	1.8	2.6	0.1	0.1	0.21	0.07	14.3	69 000	82 000	**F68/2.5**	**WF68/2.5 ZZ**	7.1	7.1	0.5	0.8	3.3	0.1	0.2
	7	2.5	3.5	0.15	0.15	0.39	0.13	12.7	66 000	79 000	**F69/2.5**	**WF69/2.5 ZZX**	8.5	8.5	0.7	0.9	3.7	0.15	0.5
	8	2.5	—	0.1	—	0.56	0.18	11.7	63 000	75 000	**MLF2508/1B**	—	9.2	—	0.6	—	3.5	0.1	0.7
	8	2.8	4	0.15	0.1	0.56	0.18	11.5	63 000	75 000	**MLF2508**	**WMLF2508 ZZ**	9.5	9.5	0.7	0.9	3.7	0.1	0.7
3	6	2	2.5	0.08	0.05	0.21	0.07	14.3	69 000	82 000	**MLF3006**	**WMLF3006 ZZ**	7.2	7.2	0.6	0.6	3.6	0.05	0.2
	7	2	3	(0.15)	(0.15)	0.31	0.11	14.0	65 000	78 000	**F683**	**WF683 ZZ**	8.1	8.1	0.5	0.8	4.2	0.1	0.4
	8	2.5	—	0.1	—	0.40	0.14	13.4	61 000	72 000	**MLF3008**	—	9.2	—	0.6	—	4.0	0.1	0.6
	8	3	4	0.15	0.15	0.56	0.18	11.9	63 000	75 000	**F693**	**WF693 ZZ**	9.5	9.5	0.7	0.9	4.2	0.15	0.7
	9	3	5	0.15	0.15	0.57	0.19	12.4	60 000	72 000	**F603**	**WF603 ZZ**	10.5	10.5	0.7	1	4.2	0.15	1.0
	10	4	4	0.15	0.15	0.63	0.22	12.4	61 000	72 000	**F623**	**F623 ZZ**	11.5	11.5	1	1	4.2	0.15	1.8
4	7	2	2.5	0.08	0.05	0.25	0.11	15.1	63 000	75 000	**MLF4007**	**WMLF4007 ZZX**	8.2	8.2	0.6	0.6	4.6	0.05	0.3
	8	2	3	0.1	0.08	0.40	0.14	13.9	61 000	72 000	**MLF4008**	**WMLF4008 ZZ**	9.2	9.2	0.6	0.6	4.8	0.08	0.5
	9	2.5	4	(0.15)	(0.15)	0.64	0.23	12.8	59 000	70 000	**F684**	**WF684 ZZ**	10.3	10.3	0.6	1	5.2	0.1	0.7
	10	3	4	0.15	0.1	0.71	0.27	13.5	56 000	66 000	**MLF4010**	**WMLF4010 ZZ**	11.2	11.6	0.6	0.8	5.2	0.1	1.1
	11	4	4	0.15	0.15	0.96	0.35	12.4	54 000	65 000	**F694**	**F694 ZZ**	12.5	12.5	1	1	5.2	0.15	2.0
	12	4	4	0.2	0.2	0.96	0.35	12.4	54 000	65 000	**F604**	**F604 ZZ**	13.5	13.5	1	1	5.6	0.2	2.3

[Note] 1) Numerical values in ( ) do not conform to JIS B 1521.

Extra-small ball bearings, miniature ball bearings
flanged type

d (4) ~ 8 mm



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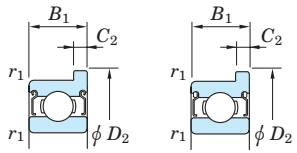

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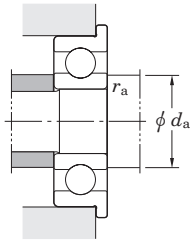
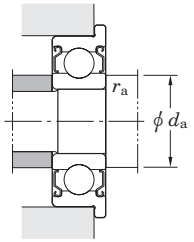
Shielded

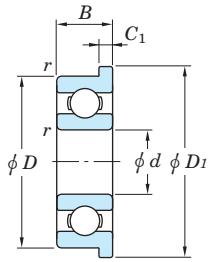




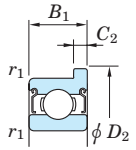
Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.	Oil lub.	Bearing No.		Dimensions of flange (mm)				Mounting dimensions (mm)		(Refer.) Mass
d	D	B	B_1	r min.	r_1 min.	C_r	C_{0r}	f_0	Open ZZ, ZZX	Open Z, ZX	Open	Shielded	D_1	D_2	C_1	C_2	d_a min.	r_a max.	(g)
4	13	5	5	0.2	0.2	1.30	0.48	12.2	50 000	60 000	**F624**	**F624 ZZ**	15	15	1	1	5.6	0.2	3.3
	16	5	5	0.3	0.3	1.35	0.52	13.0	47 000	55 000	**F634**	**F634 ZZ**	18	18	1	1	6	0.3	5.7
5	8	2	2.5	0.08	0.05	0.22	0.09	15.8	59 000	70 000	**MLF5008**	**WMLF5008 ZZX**	9.2	9.2	0.6	0.6	5.6	0.05	0.4
	9	2.5	3	0.1	0.08	0.43	0.17	14.6	57 000	67 000	**MLF5009**	**WMLF5009 ZZX**	10.2	10.2	0.6	0.6	5.8	0.08	0.6
	10	3	4	0.1	0.1	0.43	0.17	14.8	57 000	67 000	**MLF5010**	**WMLF5010 ZZ**	11.2	11.6	0.6	0.8	5.8	0.1	1.0
	11	3	5	0.15	0.15	0.71	0.28	14.0	53 000	63 000	**F685**	**WF685 ZZ**	12.5	12.5	0.8	1	6.2	0.15	1.1
	13	4	4	0.2	0.2	1.10	0.43	13.4	49 000	59 000	**F695**	**F695 ZZ**	15	15	1	1	6.6	0.2	2.5
	14	5	5	0.2	0.2	1.35	0.51	12.3	48 000	57 000	**F605**	**F605 ZZ**	16	16	1	1	6.6	0.2	3.9
	16	5	5	0.3	0.3	1.75	0.67	12.4	45 000	54 000	**F625**	**F625 ZZ**	18	18	1	1	7	0.3	5.4
	19	6	6	0.3	0.3	2.35	0.89	12.3	40 000	47 000	**F635**	**F635 ZZ**	22	22	1.5	1.5	7	0.3	9.7
6	10	2.5	3	0.1	0.08	0.50	0.22	15.2	53 000	63 000	**MLF6010**	**WMLF6010 ZZX**	11.2	11.2	0.6	0.6	6.8	0.08	0.7
	12	3	4	0.15	0.1	0.71	0.29	14.5	49 000	59 000	**MLF6012**	**WMLF6012 ZZ**	13.2	13.6	0.6	0.8	7.2	0.1	1.4
	13	3.5	5	0.15	0.15	1.10	0.44	13.7	48 000	57 000	**F686**	**WF686 ZZ**	15	15	1	1.1	7.2	0.15	2.1
	15	5	5	0.2	0.2	1.35	0.52	13.0	47 000	55 000	**F696**	**F696 ZZ**	17	17	1.2	1.2	7.6	0.2	4.3
	17	6	6	0.3	0.3	2.25	0.84	11.4	43 000	52 000	**F606**	**F606 ZZ**	19	19	1.2	1.2	8	0.3	6.3
	19	6	6	0.3	0.3	2.35	0.89	12.3	40 000	47 000	**F626**	**F626 ZZ**	22	22	1.5	1.5	8	0.3	9.2
	22	7	7	0.3	0.3	3.30	1.35	12.4	34 000	41 000	**F636**	**F636 ZZ**	25	25	1.5	1.5	8	0.3	14
7	11	2.5	3	0.1	0.08	0.46	0.20	15.6	49 000	59 000	**MLF7011**	**WMLF7011 ZZX**	12.2	12.2	0.6	0.6	7.8	0.08	0.8
	13	3	4	0.15	0.15	0.54	0.28	16.0	46 000	55 000	**MLF7013**	**WMLF7013 ZZ**	14.2	14.6	0.6	0.8	8.2	0.15	1.5
	14	3.5	5	0.15	0.15	1.15	0.51	14.2	45 000	54 000	**F687**	**WF687 ZZ**	16	16	1	1.1	8.2	0.15	2.4
	17	5	5	0.3	0.3	1.60	0.71	14.0	42 000	50 000	**F697**	**F697 ZZ**	19	19	1.2	1.2	9	0.3	5.8
	19	6	6	0.3	0.3	2.35	0.89	12.1	40 000	47 000	**F607**	**F607 ZZ**	22	22	1.5	1.5	9	0.3	8.7
	22	7	7	0.3	0.3	3.30	1.35	12.4	34 000	41 000	**F627**	**F627 ZZ**	25	25	1.5	1.5	9	0.3	14
8	12	2.5	3.5	0.1	0.08	0.54	0.27	15.9	47 000	55 000	**MLF8012**	**WMLF8012 ZZX**	13.2	13.6	0.6	0.8	8.8	0.08	0.9
	14	3.5	4	0.15	0.15	0.87	0.42	15.3	44 000	52 000	**MLF8014**	**WMLF8014 ZZ**	15.6	15.6	0.8	0.8	9.2	0.15	2.0
	16	4	5	0.2	0.2	1.25	0.59	14.8	42 000	50 000	**F688**	**WF688 ZZ**	18	18	1	1.1	9.6	0.2	3.6
	19	6	6	0.3	0.3	2.25	0.91	12.9	39 000	46 000	**F698**	**F698 ZZ**	22	22	1.5	1.5	10	0.3	8.3
	22	7	7	0.3	0.3	3.30	1.35	12.4	34 000	41 000	**F608**	**F608 ZZ**	25	25	1.5	1.5	10	0.3	13

Extra-small ball bearings, miniature ball bearings
flanged type

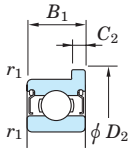
d 9 mm



Open



ZZ



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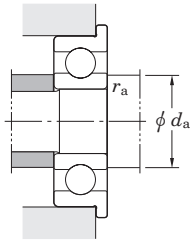
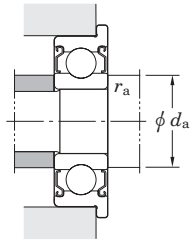
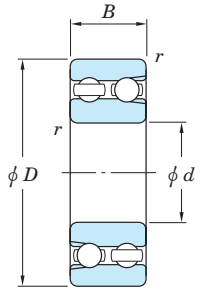
Shielded





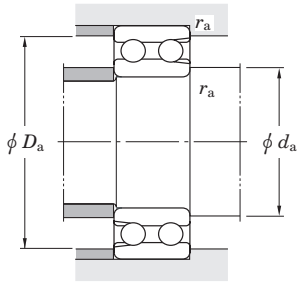
Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Limiting speeds (min^{-1}) Grease lub.	Oil lub.	Bearing No.		Dimensions of flange (mm)				Mounting dimensions (mm)		(Refer.) Mass
d	D	B	B_1	r min.	r_1 min.	C_r	C_{0r}	f_0	Open ZZ, ZZX	Open Z, ZX	Open	Shielded	D_1	D_2	C_1	C_2	d_a min.	r_a max.	(g)
9	17	4	5	0.2	0.2	1.35	0.66	15.1	39 000	46 000	**F689**	**WF689 ZZ**	19	19	1	1.1	10.6	0.2	3.9
	20	6	6	0.3	0.3	2.45	1.05	13.3	37 000	44 000	**F699**	**F699 ZZ**	23	23	1.5	1.5	11	0.3	8.7
	24	7	7	0.3	0.3	3.35	1.45	12.8	32 000	38 000	**F609**	**F609 ZZ**	27	27	1.5	1.5	11	0.3	16

d 10 ~ (60) mm



Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
10	30	14	0.6	7.70	5.90	13.0	15 000	20 000	**4200**	14	26	0.6	0.057
12	32	14	0.6	7.75	6.15	13.6	14 000	18 000	**4201**	16	28	0.6	0.062
15	35	14	0.6	9.75	9.00	14.2	12 000	16 000	**4202**	19	31	0.6	0.071
	42	17	1	13.1	11.7	13.7	11 000	14 000	**4302**	20	37	1	0.123
17	40	16	0.6	11.7	10.4	14.1	11 000	14 000	**4203**	21	36	0.6	0.106
	47	19	1	16.5	15.0	13.7	9 400	13 000	**4303**	22	42	1	0.171
20	47	18	1	16.4	16.0	14.2	9 000	12 000	**4204**	25	42	1	0.165
	52	21	1.1	19.5	17.0	13.5	8 300	11 000	**4304**	26.5	45.5	1	0.227
25	52	18	1	16.3	16.9	15.0	7 500	9 900	**4205**	30	47	1	0.189
	62	24	1.1	26.3	25.7	14.1	6 700	9 000	**4305**	31.5	55.5	1	0.365
30	62	20	1	22.0	24.7	15.1	6 400	8 500	**4206**	35	57	1	0.298
	72	27	1.1	35.5	35.9	14.0	5 700	7 600	**4306**	36.5	65.5	1	0.542
35	72	23	1.1	26.4	30.7	15.2	5 600	7 400	**4207**	41.5	65.5	1	0.460
	80	31	1.5	40.6	41.8	14.1	5 200	7 000	**4307**	43	72	1.5	0.752
40	80	23	1.1	33.7	42.4	15.5	4 700	6 300	**4208**	46.5	73.5	1	0.558
	90	33	1.5	46.0	48.8	14.7	4 600	6 100	**4308**	48	82	1.5	1.01
45	85	23	1.1	31.9	43.9	15.8	4 600	6 100	**4209**	51.5	78.5	1	0.605
	100	36	1.5	57.6	62.4	14.3	4 100	5 500	**4309**	53	92	1.5	1.35
50	90	23	1.1	31.4	44.6	16.1	4 200	5 600	**4210**	56.5	83.5	1	0.651
	110	40	2	70.4	77.7	14.2	3 700	5 000	**4310**	59	101	2	1.80
55	100	25	1.5	37.2	54.1	16.1	3 800	5 000	**4211**	63	92	1.5	0.882
	120	43	2	84.2	94.4	14.2	3 400	4 600	**4311**	64	111	2	2.29
60	110	28	1.5	47.9	67.6	15.9	3 500	4 700	**4212**	68	102	1.5	1.20

d (60) ~ 75 mm



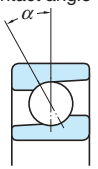
Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		d_a min.	D_a max.	r_a max.	
60	130	46	2.1	99.2	113	14.1	3 100	4 200	**4312**	71	119	2	2.87
65	120	31	1.5	54.7	78.5	15.9	3 200	4 300	**4213**	73	112	1.5	1.59
	140	48	2.1	107	124	14.3	2 900	3 900	**4313**	76	129	2	3.46
70	125	31	1.5	62.1	89.8	15.8	3 100	4 100	**4214**	78	117	1.5	1.68
	150	51	2.1	115	136	14.4	2 700	3 600	**4314**	81	139	2	4.21
75	130	31	1.5	61.6	90.7	16.0	2 900	3 900	**4215**	83	122	1.5	1.77
	160	55	2.1	132	158	14.4	2 500	3 400	**4315**	86	149	2	5.15

Angular contact ball bearings

Angular contact ball bearings are suitable for applications which require high accuracy and good high-speed performance. This type of bearing is designed to carry a combined load.

■ Single-row angular contact ball bearings and matched pair angular contact ball bearings

Contact angle



- The standard contact angles are 15°, 30° and 40°. They are identified, respectively, by the supplementary codes "C", "A" (omitted) and "B". Bearings with a smaller contact angle are more suitable for applications involving high-speed rotation. Those with a larger contact angle feature superior axial load resistance.
- Angular contact ball bearings are often preloaded to enhance their rigidity and rotating performance. (refer to p. A 106.)
  For high-precision matched pair angular contact ball bearings of class 5 or higher, which are used in machine tools and other precision equipment, the standard preload is specified in three levels: slight (S), light (L), medium (M) and heavy (H). (refer to Table 11-2 on p. A 108.)
- When this type of bearing is loaded radially, an axial component of force is produced. In this case, two bearings are used together facing one another, or two or more bearings are matched and used. (refer to p. A 34.)
- Tables 1 and 2 list the different types of single-row and matched pair/stack angular contact ball bearings and describe their characteristics.

■ Double-row angular contact ball bearings

Consist of two single-row angular contact ball bearings matched back-to-back, with inner and outer rings integrated.
Table 3 shows major types and their characteristics.

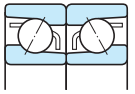
■ Four-point contact ball bearings

- Have a contact angle of 35° and an inner ring divided into two annular pieces. They are suitable for applications that involve either axial loading or combined loading, where the axial load makes up the major part of the load.
- Able to support both axial load and a certain degree of radial load. Each rolling element is in contact with each of the inner and outer rings at a single point, and both contact points lie on the contact angle line. The line runs to either the right or left depending on the direction of the axial load.

Single-row angular contact ball bearings

Bore diameter **10** – **380** mm

Matched pair angular contact ball bearings



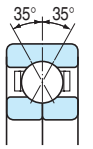
Bore diameter **10** – **380** mm

Double-row angular contact ball bearings

Bore diameter **10** – **110** mm

Four-point contact ball bearings

Bore diameter **20** – **110** mm



- Consult with JTEKT when using the four-point contact ball bearing because application conditions such as load magnitude should be examined carefully.

Table 1 Single-row angular contact ball bearings

Standard type  (with pressed cage)  (with machined cage)	● Single-row angular contact ball bearings accommodate radial load and axial load in one direction. ● Bearings with a machined cage are suitable for high-speed applications.
HAR type for high-speed applications 	● Compared with the standard type, this type has more balls that are smaller in diameter and are often used in machine tool spindles. For details, see the separately issued catalog for high ability bearings, CAT No.B2006 for High Ability Ball Bearing Series Angular Contact Ball Bearings for Machining Tools.

Reference **G-type bearing**

"G-type" bearings have a stand-out between the inner ring and outer ring on both sides that are equal in size. This arrangement is called "flush ground processing." These bearings can be matched in a variety of ways.

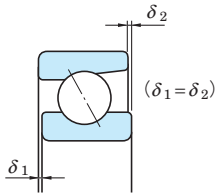
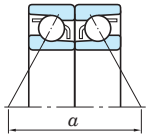
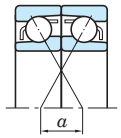
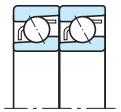
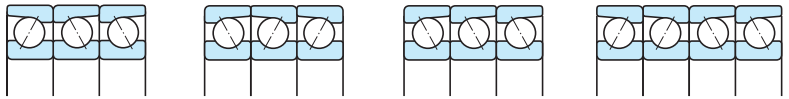


Table 2 Matched pair and stack angular contact ball bearings

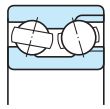
Back-to-back arrangement (DB)		● Carries radial load and axial load in both directions. ● Suitable for applications involving moment loading because the distance between the load centers (a) is long. ● As for the preloaded type, the clearance is pre-adjusted so that bearings will be preloaded the proper amount when the inner ring is fixed with a nut.
Face-to-face arrangement (DF)		● Carries radial load and axial load in both directions. ● Has a smaller moment load accommodating capacity than the back-to-back arrangement, because the distance between the load centers (a) is shorter. ● As for the preloaded type, the clearance is pre-adjusted so that bearings will be preloaded the proper amount when the outer rings are pressed together.
Tandem arrangement (DT)		● Carries radial load and axial load in one direction. ● Suitable for applications which involve a high degree of axial loading.

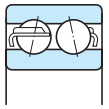
Matched stack

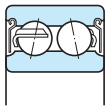


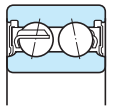
(DBD) (DFD) (DTD) (DBB)

Table 3 Double-row angular contact ball bearings


(with filling slot)
32, 33


(without filling slot)
52, 53


Shielded
52...ZZ, 53...ZZ


Sealed
52...2RS, 53...2RS

● Accommodates radial load and axial load in both directions. Also able to accommodate moment load. When installing bearings with filling slot (32 and 33 series), the raceway side without filling slot must accommodate main load.

● The 32 and 33 series are provided with a filling slot, while the 52 and 53 series are not.

32 and 33 series : contact angle 32°
52 and 53 series : contact angle 24°

● Inferior to single-row and matched pair angular contact ball bearings in terms of high-speed and high accuracy performance.

● Shielded or sealed 52 and 53 series bearings are also available.

Boundary dimensions	The dimensions of standard series are as specified in JIS B 1512.
Tolerances	· As specified in JIS B 1514-1. (refer to Table 7-3 on pp. A 54 – A 57.) · JTEKT has established "special tolerances" for bore diameter and outside diameter, as listed in the table to the right, to make it easy to produce high-precision matched stack bearings. Bearings which are produced based on these tolerances are identified by the supplementary code "K5."
Internal clearance	■ Matched pair bearing axial internal clearance.....(refer to Table 10-4 on p. A 97.) ■ Double-row bearing radial internal clearance.....(refer to Table 10-5 on p. A 98.)
Recommended fits	■ Classes 0 and 6 bearings.....(refer to Table 9-4 on pp. A 85, 86.) ■ Classes 5 and 4 bearings.....as listed in the table below. ■ Refer to Table 11-3 on page A 109 for the recommended fits of high-precision matched pair bearings (class 5 and class 4), which are used with light preload (L) or middle preload (M).

Special tolerances (K5) Unit : μm

Nominal bore diameter d (mm)		Single plane mean bore diameter (Δ_{dmp}) or single plane mean outside diameter deviation (Δ_{Dmp})			
		class 5		class 4	
over	up to	upper	lower	upper	lower
–	50	– 1	– 4	– 1	– 3
50	80	– 1	– 5	– 1	– 4
80	120	– 1	– 5	– 1	– 4

Fit		class 5	class 4
		Tolerance class	
With shaft	Inner ring rotation	js 5	js 4
	Outer ring rotation	h 5	h 4
With housing	Fixed side	JS 6	JS 5
	Free side	H 6	H 5
	Outer ring rotation	M 5	M 4

Standard cages

- Pressed steel cage (supplementary code : //)
- Copper alloy machined cage (supplementary code : FY)

[Note] Machine tools are generally equipped with bearings that have a phenolic resin machined cage (FT). Bearings with a polyamide molded cage can also be used depending on the applications. Four-point contact ball bearings usually use a copper alloy machined cage.

Application of standard cages

Bearing series	Pressed cage	Machined cage
79C	—	7900C – 7932C
79CPA	—	7900CPA – 7932CPA
70	—	7000 – 7040
70B	—	7000B – 7040B
70C	—	7000C – 7040C
70CPA	—	7000CPA – 7034CPA
72	7200 – 7220	7200 – 7240
72B	7200B – 7220B	7200B – 7240B
72C	7200C – 7220C	7200C – 7240C
72CPA	—	7200CPA – 7230CPA
73	7300 – 7320	7300 – 7340
73B	7303B – 7320B	7303B – 7340B
73C	7303C – 7320C	7303C – 7334C
74	7405 – 7409	7404 – 7418
74B	7405B – 7409B	7404B – 7418B
HAR9C	—	HAR910C – HAR934C
HAR0C	—	HAR006C – HAR034C
32	3200 – 3215	3216 – 3222
33	3302 – 3313	3314 – 3322
52	5203 – 5214	—
53	5304 – 5315	—

Allowable misalignment

Single-row.....0.000 6 rad (2') : Matched pair, double-row.....misalignment not allowed

Equivalent radial load

[Single-row and matched pair angular contact ball bearings]

Dynamic equivalent radial load

$$P_r = XF_r + YF_a$$

Contact angle	$if_0F_a^*/C_{0r}$	e	Single-row and tandem arrangement				Back-to-back and face-to-face arrangement			
			$F_a/F_r \leq e$		$F_a/F_r > e$		$F_a/F_r \leq e$		$F_a/F_r > e$	
			X	Y	X	Y	X	Y	X	Y
15°	0.178	0.38	1	0	0.44	1.47	1	1.65	0.72	2.39
	0.357	0.40				1.40		1.57		2.28
	0.714	0.43				1.30		1.46		2.11
	1.07	0.46				1.23		1.38		2.00
	1.43	0.47				1.19		1.34		1.93
	2.14	0.50				1.12		1.26		1.82
	3.57	0.55				1.02		1.14		1.66
	5.35	0.56				1.00		1.12		1.63
	7.14	0.56				1.00		1.12		1.63
30°	–	0.80	1	0	0.39	0.76	1	0.78	0.63	1.24
40°	–	1.14	1	0	0.35	0.57	1	0.55	0.57	0.93

* For i, use 2 for DB&DF and 1 for single&DT.
Factor f_0 is shown in the bearing dimention table.

[Note]
When two single-row angular contact ball bearings are used facing one another, an axial component of force is produced under radial load. In this case, refer to page A 34 for calculation of the dynamic equivalent radial load.

Static equivalent radial load

$$P_{0r} = X_0 F_r + Y_0 F_a$$

In reference to single-row and tandem arrangement bearings,

when $P_{0r} < F_r$, $P_{0r} = F_r$

Contact angle	Single-row and tandem arrangement		Back-to-back and face-to-face arrangement	
	X_0	Y_0	X_0	Y_0
15°	0.5	0.46	1	0.92
30°	0.5	0.33	1	0.66
40°	0.5	0.26	1	0.52

Equivalent radial load

[Double-row angular contact ball bearings]

Dynamic equivalent radial load

$$P_r = XF_r + YF_a$$

Contact angle	e	$F_a/F_r \leq e$		$F_a/F_r > e$		(reference)
		X	Y	X	Y	
24°	0.66	1	0.95	0.68	1.45	52, 53 series
32°	0.86	1	0.73	0.62	1.17	32, 33 series

Static equivalent radial load

$$P_{0r} = X_0 F_r + Y_0 F_a$$

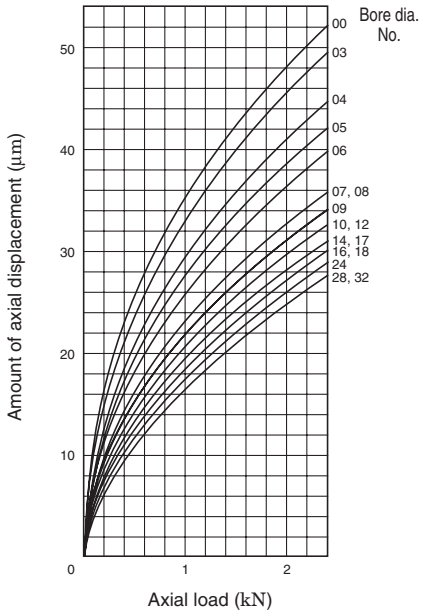
Contact angle	X_0	Y_0	(reference)
24°	1	0.78	52, 53 series
32°	1	0.63	32, 33 series

[Note] In angular contact ball bearings, slippage occurs between the balls and raceways under too small a load, causing smearing to develop.
Matched pair bearings may develop smearing when the ratio of the axial load to the radial load exceeds the value of e ($F_a / F_r > e$), as listed in the specification table. Consult with JTEKT when these bearings are used under the above conditions.

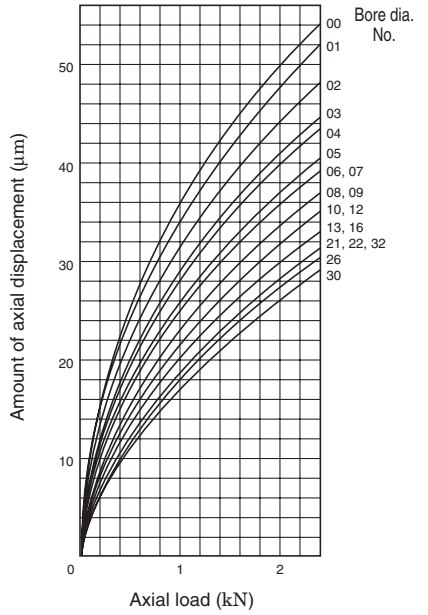
[Reference] Relationship between axial load and axial displacement

Diagrams (1) to (9) illustrate the relationship between axial load and axial displacement.

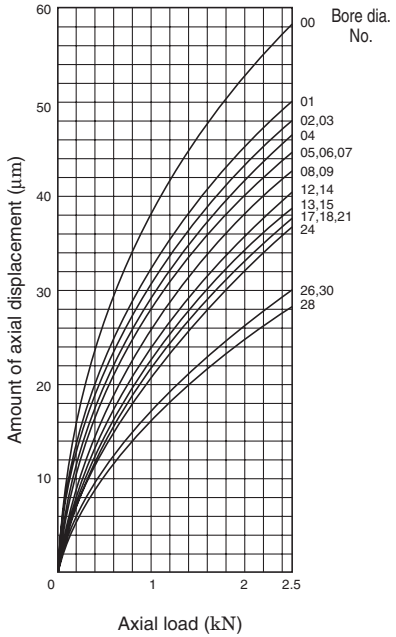
(1) 7900C (contact angle 15°)



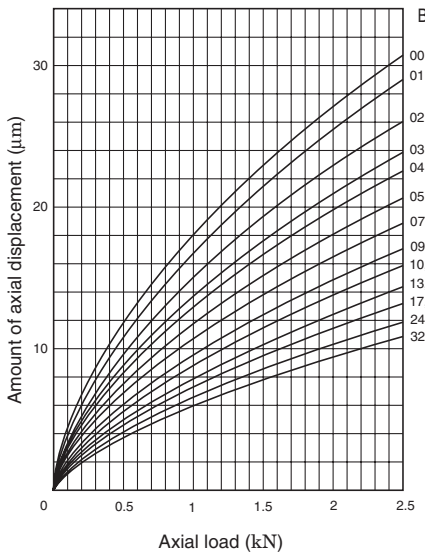
(2) 7000C (contact angle 15°)



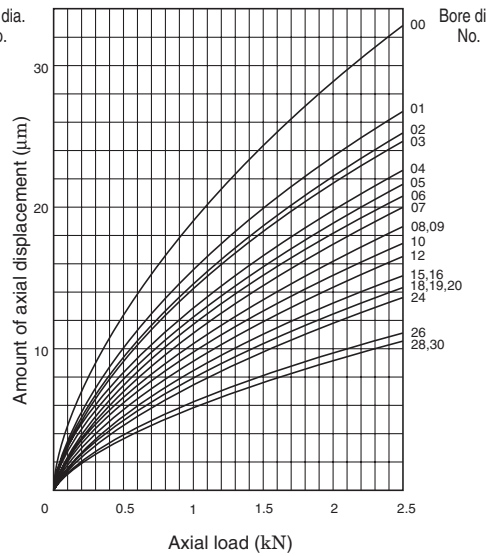
(3) 7200C (contact angle 15°)



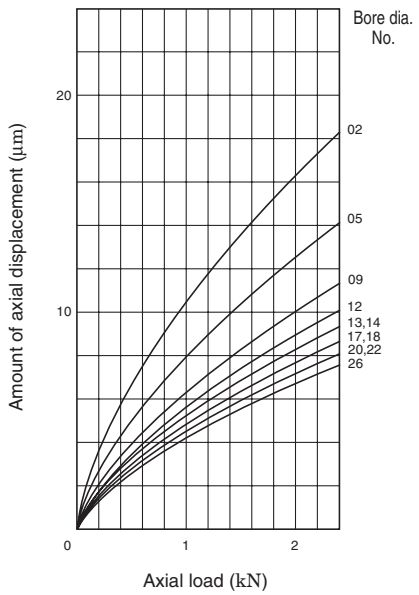
(4) 7000 (contact angle 30°)



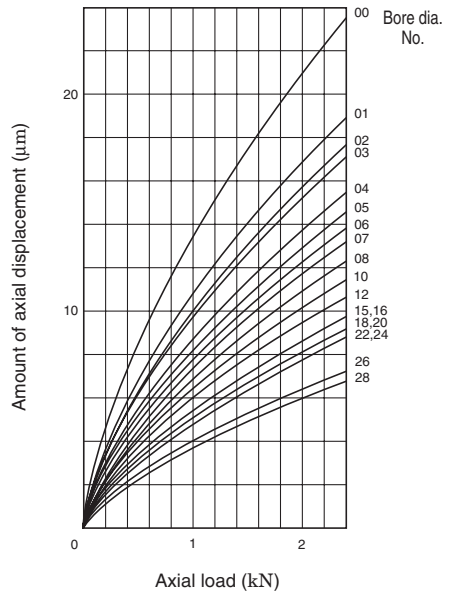
(5) 7200 (contact angle 30°)



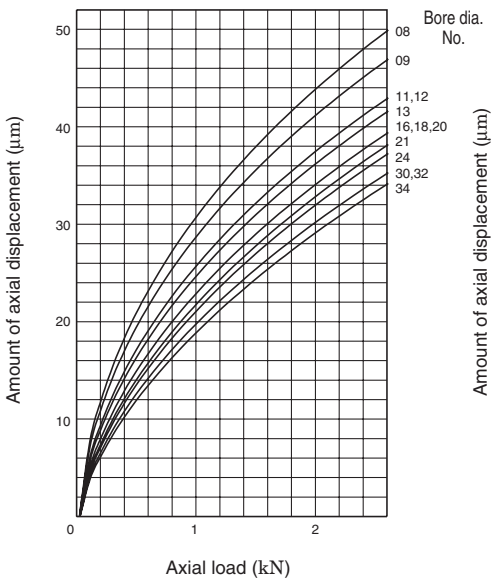
(6) 7000B (contact angle 40°)



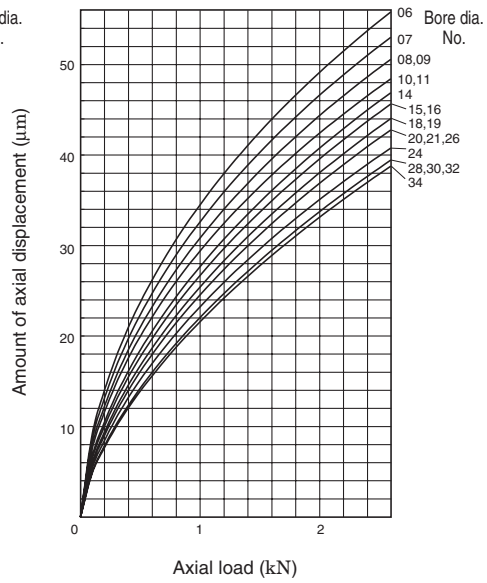
(7) 7200B (contact angle 40°)



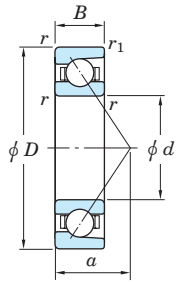
(8) HAR900C (contact angle 15°)



(9) HAR000C (contact angle 15°)

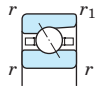


d 10 ~ (17) mm



With machined cage

With pressed cage



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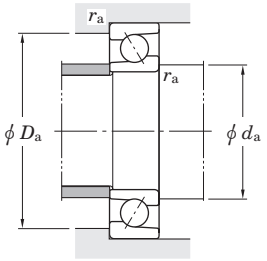


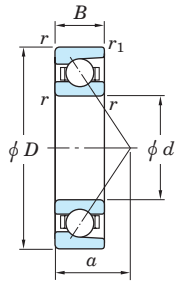
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds 1) (min^{-1})		Bearing No. 2)	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
10	22	6	0.3	0.15	3.00	1.50	—	—	14.2	52 000	69 000	**7900C**	5.1	12.5	19.5	0.3	0.008
	26	8	0.3	0.15	5.00	2.35	—	—	—	34 000	42 000	**7000**	9.1	12.5	23.5	0.3	0.021
	26	8	0.3	0.15	4.65	2.15	—	—	—	25 000	33 000	**7000B**	11.6	12.5	23.5	0.3	0.021
	26	8	0.3	0.15	5.30	2.45	—	—	12.5	47 000	62 000	**7000C**	6.4	12.5	23.5	0.3	0.021
	30	9	0.6	0.3	4.65	2.20	5.40	2.75	—	29 000	37 000	**7200**	10.4	14.5	25.5	0.6	0.031
	30	9	0.6	0.3	4.30	2.00	4.95	2.50	—	22 000	29 000	**7200B**	13.1	14.5	25.5	0.6	0.031
	30	9	0.6	0.3	5.00	2.35	5.80	2.95	13.4	40 000	54 000	**7200C**	7.2	14.5	25.5	0.6	0.031
	35	11	0.6	0.3	8.50	3.75	9.30	4.30	—	27 000	33 000	**7300**	12.0	14.5	30.5	0.6	0.054
12	24	6	0.3	0.15	3.20	1.70	—	—	14.7	48 000	62 000	**7901C**	5.4	14.5	21.5	0.3	0.010
	28	8	0.3	0.15	5.40	2.75	—	—	—	29 000	37 000	**7001**	9.9	14.5	25.5	0.3	0.024
	28	8	0.3	0.15	4.95	2.50	—	—	—	22 000	29 000	**7001B**	12.6	14.5	25.5	0.3	0.024
	28	8	0.3	0.15	5.80	2.95	—	—	13.4	40 000	54 000	**7001C**	6.7	14.5	25.5	0.3	0.024
	32	10	0.6	0.3	7.45	3.65	8.00	4.05	—	27 000	34 000	**7201**	11.4	16.5	27.5	0.6	0.038
	32	10	0.6	0.3	6.95	3.40	7.40	3.75	—	20 000	27 000	**7201B**	14.2	16.5	27.5	0.6	0.038
	32	10	0.6	0.3	7.90	3.85	8.50	4.30	12.5	38 000	50 000	**7201C**	7.9	16.5	27.5	0.6	0.038
	37	12	1	0.6	10.2	4.60	11.2	5.25	—	24 000	31 000	**7301**	13.1	17.5	31.5	1	0.065
15	28	7	0.3	0.15	4.75	2.65	—	—	14.5	39 000	52 000	**7902C**	6.4	17.5	25.5	0.3	0.015
	32	9	0.3	0.15	6.10	3.45	—	—	—	26 000	32 000	**7002**	11.3	17.5	29.5	0.3	0.035
	32	9	0.3	0.15	5.55	3.15	—	—	—	19 000	25 000	**7002B**	14.6	17.5	29.5	0.3	0.035
	32	9	0.3	0.15	6.60	3.70	—	—	14.1	35 000	47 000	**7002C**	7.6	17.5	29.5	0.3	0.035
	35	11	0.6	0.3	8.10	4.25	8.10	4.25	—	24 000	29 000	**7202**	12.9	19.5	30.5	0.6	0.048
	35	11	0.6	0.3	7.45	3.95	7.45	3.95	—	18 000	24 000	**7202B**	16.2	19.5	30.5	0.6	0.048
	35	11	0.6	0.3	8.65	4.55	8.65	4.55	13.3	33 000	43 000	**7202C**	8.9	19.5	30.5	0.6	0.048
	42	13	1	0.6	12.5	6.45	13.4	7.20	—	20 000	25 000	**7302**	15.0	20.5	36.5	1	0.088
17	30	7	0.3	0.15	5.00	2.95	—	—	14.9	36 000	47 000	**7903C**	6.7	19.5	27.5	0.3	0.016
	35	10	0.3	0.15	6.75	4.15	—	—	—	23 000	28 000	**7003**	12.7	19.5	32.5	0.3	0.045

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

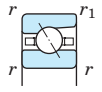
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (17) ~ (25) mm



With machined cage

With pressed cage



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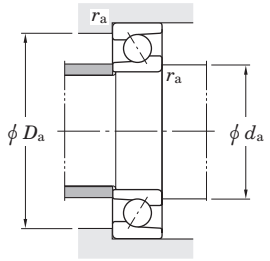


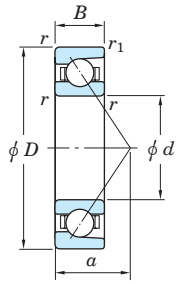
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		Basic load ratings (kN) With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
17	35	10	0.3	0.15	6.10	3.75	—	—	—	17 000	23 000	**7003B**	16.1	19.5	32.5	0.3	0.045
	35	10	0.3	0.15	7.30	4.45	—	—	14.6	31 000	41 000	**7003C**	8.6	19.5	32.5	0.3	0.045
	40	12	0.6	0.3	10.2	5.50	10.2	5.50	—	21 000	26 000	**7203**	14.4	21.5	35.5	0.6	0.070
	40	12	0.6	0.3	9.35	5.05	9.35	5.05	—	16 000	21 000	**7203B**	18.2	21.5	35.5	0.6	0.070
	40	12	0.6	0.3	10.9	5.90	10.9	5.90	13.4	29 000	38 000	**7203C**	9.9	21.5	35.5	0.6	0.070
	47	14	1	0.6	14.9	7.90	16.0	8.75	—	18 000	23 000	**7303**	16.5	22.5	41.5	1	0.120
	47	14	1	0.6	13.8	7.30	14.8	8.10	—	14 000	18 000	**7303B**	20.8	22.5	41.5	1	0.120
	47	14	1	0.6	15.8	8.40	15.8	8.40	12.6	25 000	33 000	**7303C**	11.4	22.5	41.5	1	0.120
20	37	9	0.3	0.15	7.30	4.55	—	—	14.9	30 000	39 000	**7904C**	8.3	22.5	34.5	0.3	0.035
	42	12	0.6	0.3	10.3	6.10	—	—	—	19 000	24 000	**7004**	15.1	24.5	37.5	0.6	0.079
	42	12	0.6	0.3	9.35	5.55	—	—	—	14 000	19 000	**7004B**	19.2	24.5	37.5	0.6	0.079
	42	12	0.6	0.3	11.1	6.60	—	—	14.1	26 000	35 000	**7004C**	10.2	24.5	37.5	0.6	0.079
	47	14	1	0.6	14.5	8.40	15.4	9.15	—	17 000	22 000	**7204**	17.0	25.5	41.5	1	0.112
	47	14	1	0.6	13.3	7.70	14.1	8.40	—	13 000	17 000	**7204B**	21.5	25.5	41.5	1	0.112
	47	14	1	0.6	15.5	9.00	16.5	9.80	13.4	24 000	32 000	**7204C**	11.6	25.5	41.5	1	0.112
	52	15	1.1	0.6	17.4	9.40	18.7	10.4	—	17 000	21 000	**7304**	17.9	27	45	1	0.150
	52	15	1.1	0.6	16.2	8.70	17.3	9.65	—	13 000	17 000	**7304B**	22.6	27	45	1	0.150
	52	15	1.1	0.6	18.5	9.95	19.9	11.1	12.6	23 000	31 000	**7304C**	12.3	27	45	1	0.150
	72	19	1.1	0.6	35.6	19.1	—	—	—	9 600	13 000	**7404**	23.1	27	65	1	0.395
	72	19	1.1	0.6	33.5	17.9	—	—	—	8 500	12 000	**7404B**	29.2	27	65	1	0.395
25	42	9	0.3	0.15	7.80	5.45	—	—	15.5	25 000	33 000	**7905C**	9.1	27.5	39.5	0.3	0.041
	47	12	0.6	0.3	11.3	7.40	—	—	—	17 000	21 000	**7005**	16.4	29.5	42.5	0.6	0.091
	47	12	0.6	0.3	10.2	6.70	—	—	—	12 000	17 000	**7005B**	21.1	29.5	42.5	0.6	0.091
	47	12	0.6	0.3	12.3	8.00	—	—	14.7	23 000	30 000	**7005C**	10.8	29.5	42.5	0.6	0.091
	52	15	1	0.6	15.3	9.50	16.2	10.3	—	15 000	19 000	**7205**	18.8	30.5	46.5	1	0.135
	52	15	1	0.6	14.0	8.70	14.7	9.40	—	12 000	15 000	**7205B**	23.9	30.5	46.5	1	0.135
	52	15	1	0.6	16.6	10.2	17.5	11.1	14.0	21 000	28 000	**7205C**	12.7	30.5	46.5	1	0.135

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

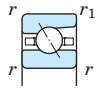
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (25) ~ (35) mm



With machined cage

With pressed cage



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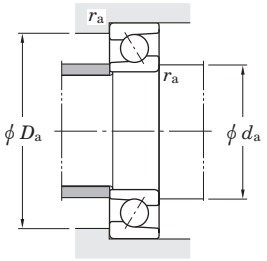


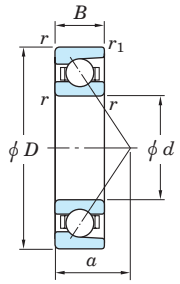
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
25	62	17	1.1	0.6	24.8	14.4	26.4	15.8	—	14 000	17 000	**7305**	21.1	32	55	1	0.243
	62	17	1.1	0.6	22.9	13.3	24.4	14.6	—	10 000	14 000	**7305B**	26.8	32	55	1	0.243
	62	17	1.1	0.6	26.4	15.3	28.1	16.8	12.8	19 000	25 000	**7305C**	14.3	32	55	1	0.243
	80	21	1.5	1	39.7	23.2	42.6	25.7	—	8 200	11 000	**7405**	26.4	33.5	71.5	1.5	0.527
	80	21	1.5	1	36.9	21.5	39.6	23.9	—	7 300	10 000	**7405B**	33.6	33.5	71.5	1.5	0.527
30	47	9	0.3	0.15	8.30	6.25	—	—	15.9	22 000	29 000	**7906C**	9.7	32.5	44.5	0.3	0.046
	55	13	1	0.6	8.70	4.85	—	—	7.9	26 000	40 000	**HAR006C**	12.2	35.5	49.5	1	0.116
	55	13	1	0.6	14.5	10.1	—	—	—	14 000	18 000	**7006**	18.8	35.5	49.5	1	0.133
	55	13	1	0.6	13.1	9.20	—	—	—	11 000	14 000	**7006B**	24.3	35.5	49.5	1	0.133
	55	13	1	0.6	15.8	11.0	—	—	14.9	20 000	26 000	**7006C**	12.2	35.5	49.5	1	0.133
	62	16	1	0.6	21.3	13.7	22.5	14.8	—	13 000	16 000	**7206**	21.5	35.5	56.5	1	0.208
	62	16	1	0.6	19.4	12.5	20.5	13.6	—	9 600	13 000	**7206B**	27.6	35.5	56.5	1	0.208
	62	16	1	0.6	23.0	14.7	24.3	16.0	14.0	18 000	24 000	**7206C**	14.3	35.5	56.5	1	0.208
	72	19	1.1	0.6	30.1	18.9	31.9	20.6	—	12 000	14 000	**7306**	24.5	37	65	1	0.362
	72	19	1.1	0.6	27.6	17.4	29.3	19.0	—	8 700	12 000	**7306B**	31.3	37	65	1	0.362
	72	19	1.1	0.6	32.3	20.3	34.2	22.1	13.4	16 000	21 000	**7306C**	16.5	37	65	1	0.362
	90	23	1.5	1	47.6	28.4	51.0	31.6	—	7 300	9 700	**7406**	29.3	38.5	81.5	1.5	0.686
	90	23	1.5	1	44.2	26.4	47.4	29.3	—	6 500	8 900	**7406B**	37.3	38.5	81.5	1.5	0.686
35	55	10	0.6	0.3	12.5	9.70	—	—	15.7	19 000	25 000	**7907C**	11.0	39.5	50.5	0.6	0.074
	62	14	1	0.6	9.25	5.55	—	—	8.1	23 000	35 000	**HAR007C**	13.5	40.5	56.5	1	0.158
	62	14	1	0.6	17.5	12.6	—	—	—	12 000	15 000	**7007**	21.2	40.5	56.5	1	0.170
	62	14	1	0.6	15.8	11.4	—	—	—	9 200	12 000	**7007B**	27.6	40.5	56.5	1	0.170
	62	14	1	0.6	19.1	13.7	—	—	15.0	17 000	22 000	**7007C**	13.5	40.5	56.5	1	0.170
	72	17	1.1	0.6	28.1	18.6	29.7	20.2	—	11 000	14 000	**7207**	24.2	42	65	1	0.295
	72	17	1.1	0.6	25.6	17.0	27.0	18.5	—	8 300	11 000	**7207B**	31.4	42	65	1	0.295
	72	17	1.1	0.6	30.4	20.1	32.1	21.7	14.0	15 000	20 000	**7207C**	15.8	42	65	1	0.295
	80	21	1.5	1	35.4	22.0	39.9	26.4	—	10 000	13 000	**7307**	27.4	43.5	71.5	1.5	0.475

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

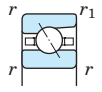
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (35) ~ (45) mm



With machined cage

With pressed cage



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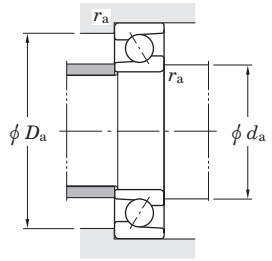


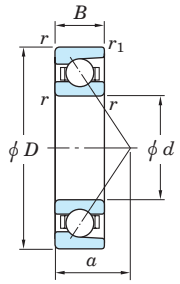
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		Basic load ratings (kN) With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
35	80	21	1.5	1	32.5	20.2	36.6	24.3	—	7 700	10 000	**7307B**	35.0	43.5	71.5	1.5	0.475
	80	21	1.5	1	37.9	23.6	42.8	28.3	13.4	14 000	19 000	**7307C**	18.3	43.5	71.5	1.5	0.475
	100	25	1.5	1	60.4	37.0	64.8	41.1	—	6 500	8 600	**7407**	32.6	43.5	91.5	1.5	0.950
	100	25	1.5	1	56.2	34.3	60.2	38.1	—	5 700	7 900	**7407B**	41.7	43.5	91.5	1.5	0.950
40	62	12	0.6	0.3	15.7	12.4	—	—	15.7	17 000	22 000	**7908C**	12.8	44.5	57.5	0.6	0.107
	62	12	0.6	0.3	6.35	4.05	—	—	8.4	22 000	33 000	**HAR908C**	12.8	44.5	57.5	0.6	0.115
	68	15	1	0.6	9.70	6.20	—	—	8.2	20 000	31 000	**HAR008C**	14.7	45.5	62.5	1	0.200
	68	15	1	0.6	18.7	14.6	—	—	—	11 000	14 000	**7008**	23.2	45.5	62.5	1	0.210
	68	15	1	0.6	16.8	13.2	—	—	—	8 300	11 000	**7008B**	30.2	45.5	62.5	1	0.210
	68	15	1	0.6	20.5	15.9	—	—	15.4	15 000	20 000	**7008C**	14.8	45.5	62.5	1	0.210
	80	18	1.1	0.6	33.6	23.3	35.3	25.1	—	10 000	12 000	**7208**	26.3	47	73	1	0.382
	80	18	1.1	0.6	30.6	21.3	32.1	23.0	—	7 500	10 000	**7208B**	34.2	47	73	1	0.382
	80	18	1.1	0.6	36.4	25.2	38.2	27.1	14.2	14 000	18 000	**7208C**	17.0	47	73	1	0.382
	90	23	1.5	1	43.2	27.4	48.8	32.9	—	9 200	12 000	**7308**	30.3	48.5	81.5	1.5	0.657
	90	23	1.5	1	39.7	25.2	44.8	30.3	—	6 900	9 200	**7308B**	38.8	48.5	81.5	1.5	0.657
	90	23	1.5	1	46.3	29.4	52.3	35.3	13.4	13 000	17 000	**7308C**	20.2	48.5	81.5	1.5	0.657
	110	27	2	1	69.9	43.5	75.0	48.4	—	5 900	7 900	**7408**	35.5	50	100	2	1.23
	110	27	2	1	64.9	40.4	69.6	44.9	—	5 200	7 200	**7408B**	45.4	50	100	2	1.23
45	68	12	0.6	0.3	16.6	14.1	—	—	16.0	15 000	20 000	**7909C**	13.6	49.5	63.5	0.6	0.127
	68	12	0.6	0.3	6.80	4.70	—	—	8.5	19 000	30 000	**HAR909C**	13.6	49.5	63.5	0.6	0.136
	75	16	1	0.6	10.9	7.10	—	—	8.3	18 000	28 000	**HAR009C**	16.0	50.5	69.5	1	0.251
	75	16	1	0.6	22.2	17.7	—	—	—	10 000	12 000	**7009**	25.3	50.5	69.5	1	0.260
	75	16	1	0.6	20.0	16.0	—	—	—	7 500	10 000	**7009B**	33.2	50.5	69.5	1	0.260
	75	16	1	0.6	24.4	19.3	—	—	15.4	14 000	18 000	**7009C**	16.0	50.5	69.5	1	0.260
	85	19	1.1	0.6	37.7	26.6	39.6	28.6	—	9 400	12 000	**7209**	28.0	52	78	1	0.430
	85	19	1.1	0.6	34.3	24.3	36.1	26.1	—	7 000	9 400	**7209B**	36.4	52	78	1	0.430
	85	19	1.1	0.6	40.8	28.7	42.9	30.9	14.2	13 000	17 000	**7209C**	18.1	52	78	1	0.430

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

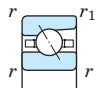
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (45) ~ (55) mm



With machined cage

With pressed cage



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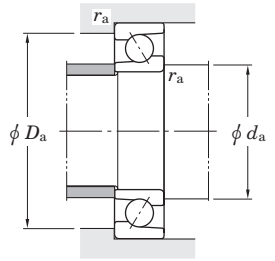


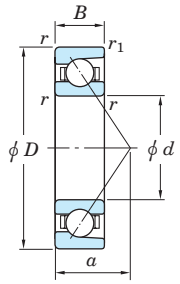
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds 1) (min^{-1})		Bearing No. 2)	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
45	100	25	1.5	1	55.1	37.1	58.4	40.4	—	8 200	10 000	**7309**	33.6	53.5	91.5	1.5	0.875
	100	25	1.5	1	50.6	34.1	53.6	37.2	—	6 200	8 200	**7309B**	43.1	53.5	91.5	1.5	0.875
	100	25	1.5	1	59.2	39.7	62.7	43.4	13.5	11 000	15 000	**7309C**	22.3	53.5	91.5	1.5	0.875
	120	29	2	1	84.9	53.8	91.1	59.8	—	5 400	7 100	**7409**	38.6	55	110	2	1.55
	120	29	2	1	78.9	50.0	84.7	55.5	—	4 800	6 600	**7409B**	49.5	55	110	2	1.55
50	72	12	0.6	0.3	17.4	15.7	—	—	16.2	14 000	18 000	**7910C**	14.2	54.5	67.5	0.6	0.128
	72	12	0.6	0.3	9.10	6.30	—	—	8.5	18 000	28 000	**HAR910C**	14.2	54.5	67.5	0.6	0.131
	80	16	1	0.6	11.4	7.85	—	—	8.4	17 000	26 000	**HAR010C**	16.7	55.5	74.5	1	0.273
	80	16	1	0.6	23.6	20.1	—	—	—	9 200	11 000	**7010**	26.9	55.5	74.5	1	0.290
	80	16	1	0.6	21.2	18.1	—	—	—	6 900	9 200	**7010B**	35.3	55.5	74.5	1	0.290
	80	16	1	0.6	26.0	21.9	—	—	15.7	13 000	17 000	**7010C**	16.8	55.5	74.5	1	0.290
	90	20	1.1	0.6	39.4	29.4	41.3	31.5	—	8 500	11 000	**7210**	30.4	57	83	1	0.485
	90	20	1.1	0.6	35.7	26.7	37.4	28.6	—	6 400	8 500	**7210B**	39.6	57	83	1	0.485
	90	20	1.1	0.6	42.8	31.8	44.8	34.1	14.6	12 000	16 000	**7210C**	19.4	57	83	1	0.485
	110	27	2	1	70.1	48.1	74.3	52.5	—	7 300	9 100	**7310**	37.2	60	100	2	1.14
	110	27	2	1	64.4	44.3	68.2	48.3	—	5 500	7 300	**7310B**	47.9	60	100	2	1.14
	110	27	2	1	75.1	51.6	79.6	56.2	13.4	10 000	13 000	**7310C**	24.5	60	100	2	1.14
	130	31	2.1	1.1	97.4	65.3	—	—	—	4 900	6 600	**7410**	41.6	62	118	2	1.92
	130	31	2.1	1.1	90.2	60.4	—	—	—	4 400	6 000	**7410B**	53.5	62	118	2	1.92
55	80	13	1	0.6	19.7	18.5	—	—	16.3	13 000	17 000	**7911C**	15.5	60.5	74.5	1	0.178
	80	13	1	0.6	10.1	7.65	—	—	8.6	16 000	25 000	**HAR911C**	15.5	60.5	74.5	1	0.189
	90	18	1.1	0.6	14.1	9.90	—	—	8.4	15 000	23 000	**HAR011C**	18.7	62	83	1	0.403
	90	18	1.1	0.6	31.1	26.3	—	—	—	8 300	10 000	**7011**	29.9	62	83	1	0.420
	90	18	1.1	0.6	27.9	23.7	—	—	—	6 200	8 300	**7011B**	39.4	62	83	1	0.420
	90	18	1.1	0.6	34.1	28.6	—	—	15.5	11 000	15 000	**7011C**	18.7	62	83	1	0.420
	100	21	1.5	1	48.7	37.1	51.0	39.8	—	7 600	9 500	**7211**	33.3	63.5	91.5	1.5	0.635
	100	21	1.5	1	44.1	33.8	46.2	36.2	—	5 700	7 600	**7211B**	43.6	63.5	91.5	1.5	0.635

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

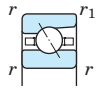
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (55) ~ (65) mm



With machined cage

With pressed cage



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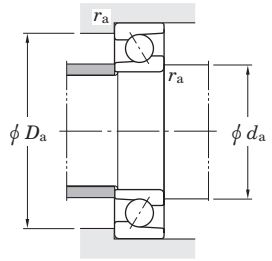


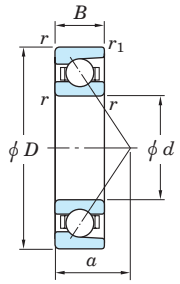
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
					With machined cage		With pressed cage										
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
55	100	21	1.5	1	52.9	40.2	55.4	43.1	14.6	11 000	14 000	**7211C**	21.1	63.5	91.5	1.5	0.635
	120	29	2	1	80.9	56.5	85.8	61.7	—	6 700	8 400	**7311**	40.2	65	110	2	1.45
	120	29	2	1	74.3	52.0	78.7	56.7	—	5 000	6 700	**7311B**	51.8	65	110	2	1.45
	120	29	2	1	86.8	60.6	91.9	66.1	13.4	9 300	12 000	**7311C**	26.4	65	110	2	1.45
	140	33	2.1	1.1	118	82.4	—	—	—	4 500	6 000	**7411**	45.0	67	128	2	2.36
	140	33	2.1	1.1	110	76.5	—	—	—	4 000	5 500	**7411B**	57.8	67	128	2	2.36
60	85	13	1	0.6	23.2	21.8	—	—	16.3	12 000	16 000	**7912C**	16.3	65.5	79.5	1	0.187
	85	13	1	0.6	9.95	7.75	—	—	8.6	15 000	23 000	**HAR912C**	16.2	65.5	79.5	1	0.202
	95	18	1.1	0.6	14.7	10.8	—	—	8.5	14 000	22 000	**HAR012C**	19.4	67	88	1	0.433
	95	18	1.1	0.6	31.9	28.1	—	—	—	7 700	9 700	**7012**	31.4	67	88	1	0.450
	95	18	1.1	0.6	28.6	25.3	—	—	—	5 800	7 700	**7012B**	41.5	67	88	1	0.450
	95	18	1.1	0.6	35.0	30.6	—	—	15.7	11 000	14 000	**7012C**	19.4	67	88	1	0.450
	110	22	1.5	1	58.9	45.7	61.7	49.0	—	6 900	8 600	**7212**	36.1	68.5	101.5	1.5	0.820
	110	22	1.5	1	53.4	41.6	55.9	44.6	—	5 100	6 900	**7212B**	47.5	68.5	101.5	1.5	0.820
	110	22	1.5	1	64.0	49.5	67.0	53.0	14.5	9 500	13 000	**7212C**	22.7	68.5	101.5	1.5	0.820
	130	31	2.1	1.1	92.5	65.6	98.1	71.6	—	6 200	7 700	**7312**	43.2	72	118	2	1.81
	130	31	2.1	1.1	84.9	60.3	90.0	65.8	—	4 600	6 200	**7312B**	55.8	72	118	2	1.81
	130	31	2.1	1.1	99.2	70.3	105	76.7	13.4	8 600	11 000	**7312C**	28.4	72	118	2	1.81
	150	35	2.1	1.1	129	93.6	—	—	—	4 100	5 500	**7412**	48.5	72	138	2	2.85
	150	35	2.1	1.1	119	86.7	—	—	—	3 700	5 100	**7412B**	62.6	72	138	2	2.85
65	90	13	1	0.6	20.8	21.2	—	—	16.5	11 000	15 000	**7913C**	16.9	70.5	84.5	1	0.205
	90	13	1	0.6	11.8	9.45	—	—	8.6	14 000	22 000	**HAR913C**	16.9	70.5	84.5	1	0.212
	100	18	1.1	0.6	15.3	11.8	—	—	8.5	13 000	21 000	**HAR013C**	20.1	72	93	1	0.462
	100	18	1.1	0.6	33.7	31.4	—	—	—	7 200	9 000	**7013**	33.0	72	93	1	0.470
	100	18	1.1	0.6	30.1	28.3	—	—	—	5 400	7 200	**7013B**	43.8	72	93	1	0.470
	100	18	1.1	0.6	37.1	34.3	—	—	15.9	10 000	13 000	**7013C**	20.1	72	93	1	0.470
	120	23	1.5	1	67.3	54.2	70.2	57.8	—	6 400	8 000	**7213**	38.2	73.5	111.5	1.5	1.02

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

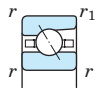
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (65) ~ (75) mm



With machined cage

With pressed cage



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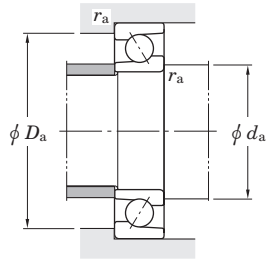


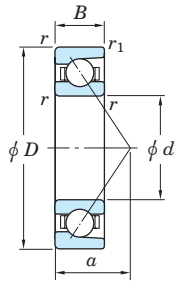
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds 1) (min^{-1})		Bearing No. 2)	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
65	120	23	1.5	1	60.9	49.3	63.6	52.6	—	4 800	6 400	**7213B**	50.3	73.5	111.5	1.5	1.02
	120	23	1.5	1	73.1	58.7	76.3	62.6	14.6	8 900	12 000	**7213C**	23.9	73.5	111.5	1.5	1.02
	140	33	2.1	1.1	105	75.3	111	82.2	—	5 800	7 200	**7313**	46.3	77	128	2	2.22
	140	33	2.1	1.1	96.1	69.3	102	75.6	—	4 300	5 800	**7313B**	59.7	77	128	2	2.22
	140	33	2.1	1.1	112	80.7	119	88.1	13.4	8 000	11 000	**7313C**	30.3	77	128	2	2.22
	160	37	2.1	1.1	139	104	—	—	—	3 900	5 200	**7413**	51.4	77	148	2	3.41
	160	37	2.1	1.1	129	96.8	—	—	—	3 500	4 800	**7413B**	66.3	77	148	2	3.41
70	100	16	1	0.6	28.9	29.0	—	—	16.4	10 000	12 000	**7914C**	19.4	75.5	94.5	1	0.332
	100	16	1	0.6	12.9	10.5	—	—	8.7	13 000	20 000	**HAR914C**	19.4	75.5	94.5	1	0.356
	110	20	1.1	0.6	20.7	15.5	—	—	8.4	12 000	19 000	**HAR014C**	22.1	77	103	1	0.629
	110	20	1.1	0.6	42.7	39.4	—	—	—	6 600	8 300	**7014**	36.0	77	103	1	0.660
	110	20	1.1	0.6	38.3	35.5	—	—	—	5 000	6 600	**7014B**	47.8	77	103	1	0.660
	110	20	1.1	0.6	46.9	43.0	—	—	15.7	9 200	12 000	**7014C**	22.1	77	103	1	0.660
	125	24	1.5	1	69.8	55.6	76.3	63.5	—	6 100	7 600	**7214**	40.2	78.5	116.5	1.5	1.12
	125	24	1.5	1	63.2	50.6	69.1	57.8	—	4 600	6 100	**7214B**	52.9	78.5	116.5	1.5	1.12
	125	24	1.5	1	75.9	60.2	83.0	68.8	14.6	8 400	11 000	**7214C**	25.1	78.5	116.5	1.5	1.12
	150	35	2.1	1.1	118	85.8	125	93.6	—	5 400	6 700	**7314**	49.3	82	138	2	2.70
	150	35	2.1	1.1	108	78.9	114	86.0	—	4 000	5 400	**7314B**	63.7	82	138	2	2.70
	150	35	2.1	1.1	126	91.9	134	100	13.4	7 500	9 900	**7314C**	32.2	82	138	2	2.70
	180	42	3	1.1	149	115	—	—	—	3 500	4 600	**7414**	57.6	84	166	2.5	4.99
	180	42	3	1.1	148	119	—	—	—	3 100	4 300	**7414B**	74.2	84	166	2.5	4.99
75	105	16	1	0.6	29.4	30.5	—	—	16.5	9 300	12 000	**7915C**	20.1	80.5	99.5	1	0.350
	105	16	1	0.6	13.3	11.2	—	—	8.7	12 000	19 000	**HAR915C**	20.1	80.5	99.5	1	0.370
	115	20	1.1	0.6	21.1	16.2	—	—	8.5	12 000	18 000	**HAR015C**	22.7	82	108	1	0.665
	115	20	1.1	0.6	43.6	41.7	—	—	—	6 300	7 800	**7015**	37.4	82	108	1	0.690
	115	20	1.1	0.6	39.1	37.6	—	—	—	4 700	6 300	**7015B**	49.9	82	108	1	0.690
	115	20	1.1	0.6	48.0	45.6	—	—	15.9	8 700	11 000	**7015C**	22.7	82	108	1	0.690

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

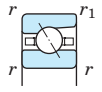
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (75) ~ (85) mm



With machined cage

With pressed cage



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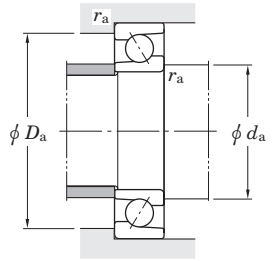


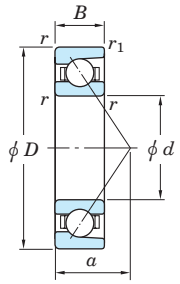
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds 1) (min^{-1})		Bearing No. 2)	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
75	130	25	1.5	1	79.2	65.2	82.7	69.5	—	5 800	7 200	**7215**	42.1	83.5	121.5	1.5	1.23
	130	25	1.5	1	71.7	59.3	74.9	63.3	—	4 300	5 800	**7215B**	55.5	83.5	121.5	1.5	1.23
	130	25	1.5	1	86.1	70.6	89.9	75.3	14.6	8 000	11 000	**7215C**	26.2	83.5	121.5	1.5	1.23
	160	37	2.1	1.1	128	97.0	136	106	—	5 000	6 300	**7315**	52.4	87	148	2	3.15
	160	37	2.1	1.1	118	89.2	125	97.3	—	3 800	5 000	**7315B**	67.8	87	148	2	3.15
	160	37	2.1	1.1	137	104	146	113	13.4	7 000	9 200	**7315C**	34.2	87	148	2	3.15
	190	45	3	1.1	171	141	—	—	—	3 300	4 400	**7415**	61.3	89	176	2.5	5.90
	190	45	3	1.1	158	131	—	—	—	2 900	4 000	**7415B**	78.9	89	176	2.5	5.90
80	110	16	1	0.6	29.8	31.6	—	—	16.5	8 800	11 000	**7916C**	20.7	85.5	104.5	1	0.368
	110	16	1	0.6	13.6	11.9	—	—	8.8	12 000	18 000	**HAR916C**	20.7	85.5	104.5	1	0.398
	125	22	1.1	0.6	24.7	19.2	—	—	8.4	10 000	16 000	**HAR016C**	24.7	87	118	1	0.903
	125	22	1.1	0.6	53.4	50.6	—	—	—	5 800	7 200	**7016**	40.6	87	118	1	0.930
	125	22	1.1	0.6	47.8	45.7	—	—	—	4 300	5 800	**7016B**	54.0	87	118	1	0.930
	125	22	1.1	0.6	58.7	55.3	—	—	15.7	8 000	11 000	**7016C**	24.7	87	118	1	0.930
	140	26	2	1	85.3	71.5	89.0	76.2	—	5 400	6 700	**7216**	44.8	90	130	2	1.50
	140	26	2	1	77.1	65.0	80.5	69.3	—	4 000	5 400	**7216B**	59.2	90	130	2	1.50
	140	26	2	1	92.8	77.5	96.9	82.7	14.7	7 500	9 900	**7216C**	27.7	90	130	2	1.50
	170	39	2.1	1.1	139	109	147	119	—	4 700	5 900	**7316**	55.6	92	158	2	3.85
	170	39	2.1	1.1	127	100	135	109	—	3 500	4 700	**7316B**	71.9	92	158	2	3.85
	170	39	2.1	1.1	149	117	158	127	13.5	6 500	8 600	**7316C**	36.2	92	158	2	3.85
	200	48	3	1.1	193	166	—	—	—	3 100	4 100	**7416**	65.0	94	186	2.5	6.00
	200	48	3	1.1	179	154	—	—	—	2 700	3 800	**7416B**	83.6	94	186	2.5	6.00
85	120	18	1.1	0.6	38.9	40.6	—	—	16.5	8 100	11 000	**7917C**	22.7	92	113	1	0.523
	120	18	1.1	0.6	16.3	14.2	—	—	8.7	10 000	16 000	**HAR917C**	22.7	92	113	1	0.570
	130	22	1.1	0.6	25.1	20.1	—	—	8.5	9 700	15 000	**HAR017C**	25.4	92	123	1	0.947
	130	22	1.1	0.6	54.6	53.7	—	—	—	5 500	6 800	**7017**	42.3	92	123	1	0.970
	130	22	1.1	0.6	48.8	48.4	—	—	—	4 100	5 500	**7017B**	56.5	92	123	1	0.970

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

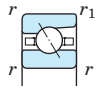
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (85) ~ (95) mm



With machined cage

With pressed cage



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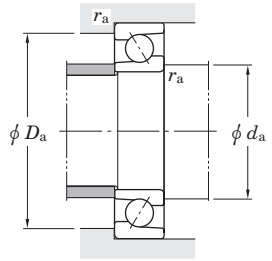


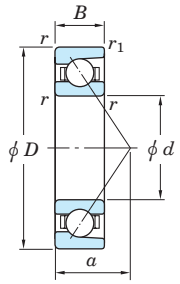
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
85	130	22	1.1	0.6	60.1	58.7	—	—	15.9	7 600	10 000	**7017C**	25.5	92	123	1	0.970
	150	28	2	1	98.6	83.6	103	89.2	—	5 000	6 300	**7217**	47.9	95	140	2	1.87
	150	28	2	1	89.2	76.0	93.1	81.1	—	3 800	5 000	**7217B**	63.3	95	140	2	1.87
	150	28	2	1	107	90.6	112	96.6	14.7	7 000	9 200	**7217C**	29.7	95	140	2	1.87
	180	41	3	1.1	150	122	159	133	—	4 400	5 500	**7317**	58.8	99	166	2.5	4.53
	180	41	3	1.1	137	112	145	122	—	3 300	4 400	**7317B**	76.1	99	166	2.5	4.53
	180	41	3	1.1	161	130	170	142	13.5	6 100	8 100	**7317C**	38.3	99	166	2.5	4.53
	210	52	4	1.5	204	180	—	—	—	3 000	3 900	**7417**	68.7	103	192	3	8.54
	210	52	4	1.5	189	167	—	—	—	2 600	3 600	**7417B**	88.1	103	192	3	8.54
90	125	18	1.1	0.6	39.6	42.6	—	—	16.6	7 800	10 000	**7918C**	23.4	97	118	1	0.551
	125	18	1.1	0.6	16.8	15.1	—	—	8.8	9 700	15 000	**HAR918C**	23.4	97	118	1	0.598
	140	24	1.5	1	32.8	26.1	—	—	8.4	9 100	14 000	**HAR018C**	27.4	98.5	131.5	1.5	1.21
	140	24	1.5	1	65.2	63.3	—	—	—	5 100	6 400	**7018**	45.2	98.5	131.5	1.5	1.26
	140	24	1.5	1	58.4	57.1	—	—	—	3 900	5 100	**7018B**	60.2	98.5	131.5	1.5	1.26
	140	24	1.5	1	71.7	69.1	—	—	15.7	7 100	9 400	**7018C**	27.4	98.5	131.5	1.5	1.26
	160	30	2	1	113	96.7	118	103	—	4 700	5 900	**7218**	51.1	100	150	2	2.30
	160	30	2	1	102	88.0	107	93.8	—	3 500	4 700	**7218B**	67.4	100	150	2	2.30
	160	30	2	1	123	105	128	112	14.6	6 500	8 600	**7218C**	31.7	100	150	2	2.30
	190	43	3	1.1	161	135	171	147	—	4 200	5 200	**7318**	61.9	104	176	2.5	5.30
	190	43	3	1.1	148	124	156	135	—	3 100	4 200	**7318B**	80.2	104	176	2.5	5.30
	190	43	3	1.1	173	145	183	158	13.5	5 800	7 700	**7318C**	40.3	104	176	2.5	5.30
	225	54	4	1.5	216	196	—	—	—	2 800	3 700	**7418**	72.5	108	207	3	11.4
	225	54	4	1.5	200	182	—	—	—	2 500	3 400	**7418B**	93.1	108	207	3	11.4
95	130	18	1.1	0.6	40.2	44.1	—	—	16.5	7 400	9 800	**7919C**	24.1	102	123	1	0.574
	130	18	1.1	0.6	17.3	16.0	—	—	8.8	9 300	14 000	**HAR919C**	24.1	102	123	1	0.626
	145	24	1.5	1	33.4	27.2	—	—	8.5	8 700	13 000	**HAR019C**	28.1	103.5	136.5	1.5	1.28
	145	24	1.5	1	66.6	67.1	—	—	—	4 800	6 000	**7019**	47.2	103.5	136.5	1.5	1.32

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

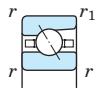
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (95) ~ (105) mm



With machined cage

With pressed cage



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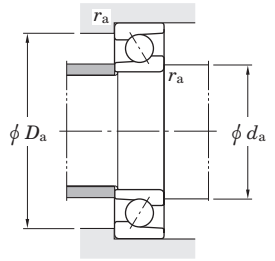


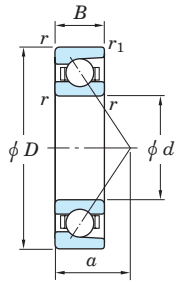
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
					With machined cage		With pressed cage										
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
95	145	24	1.5	1	59.6	60.5	—	—	—	3 600	4 800	**7019B**	63.2	103.5	136.5	1.5	1.32
	145	24	1.5	1	73.4	73.4	—	—	15.9	6 700	8 900	**7019C**	28.3	103.5	136.5	1.5	1.32
	170	32	2.1	1.1	122	103	128	111	—	4 400	5 500	**7219**	54.3	107	158	2	2.78
	170	32	2.1	1.1	111	94.0	116	101	—	3 300	4 400	**7219B**	71.6	107	158	2	2.78
	170	32	2.1	1.1	133	112	139	120	14.6	6 100	8 100	**7219C**	33.8	107	158	2	2.78
	200	45	3	1.1	172	149	183	162	—	4 000	4 900	**7319**	65.1	109	186	2.5	6.12
	200	45	3	1.1	158	137	167	149	—	3 000	4 000	**7319B**	84.4	109	186	2.5	6.12
	200	45	3	1.1	185	160	196	174	13.5	5 500	7 300	**7319C**	42.3	109	186	2.5	6.12
100	140	20	1.1	0.6	55.6	58.5	—	—	16.3	7 000	9 200	**7920C**	26.1	107	133	1	0.773
	140	20	1.1	0.6	24.2	21.7	—	—	8.7	8 700	13 000	**HAR920C**	26.1	107	133	1	0.839
	150	24	1.5	1	34.0	28.4	—	—	8.5	8 400	13 000	**HAR020C**	28.7	108.5	141.5	1.5	1.32
	150	24	1.5	1	68.4	70.6	—	—	—	4 700	5 900	**7020**	48.1	108.5	141.5	1.5	1.37
	150	24	1.5	1	61.2	63.6	—	—	—	3 500	4 700	**7020B**	64.4	108.5	141.5	1.5	1.37
	150	24	1.5	1	75.3	77.2	—	—	16.0	6 500	8 600	**7020C**	28.7	108.5	141.5	1.5	1.37
	180	34	2.1	1.1	137	117	144	126	—	4 100	5 200	**7220**	57.7	112	168	2	3.32
	180	34	2.1	1.1	124	107	130	115	—	3 100	4 200	**7220B**	76.2	112	168	2	3.32
	180	34	2.1	1.1	149	127	156	136	14.6	5 700	7 600	**7220C**	35.9	112	168	2	3.32
	215	47	3	1.1	184	161	207	194	—	3 600	4 600	**7320**	69.4	114	201	2.5	7.53
	215	47	3	1.1	168	148	190	178	—	2 700	3 600	**7320B**	90.2	114	201	2.5	7.53
	215	47	3	1.1	197	173	222	208	13.4	5 000	6 700	**7320C**	44.8	114	201	2.5	7.53
105	145	20	1.1	0.6	56.7	61.5	—	—	16.4	6 700	8 800	**7921C**	26.7	112	138	1	0.810
	145	20	1.1	0.6	24.9	23.1	—	—	8.7	8 400	13 000	**HAR921C**	26.7	112	138	1	0.874
	160	26	2	1	38.6	32.5	—	—	8.5	7 900	12 000	**HAR021C**	30.8	115	150	2	1.68
	160	26	2	1	79.8	81.9	—	—	—	4 400	5 500	**7021**	51.8	115	150	2	1.73
	160	26	2	1	71.4	73.8	—	—	—	3 300	4 400	**7021B**	68.6	115	150	2	1.73
	160	26	2	1	87.8	89.6	—	—	15.9	6 000	8 000	**7021C**	31.0	115	150	2	1.73
	190	36	2.1	1.1	149	132	—	—	—	3 900	4 900	**7221**	61.0	117	178	2	3.95

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

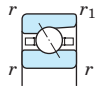
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (105) ~ (120) mm



With machined cage

With pressed cage



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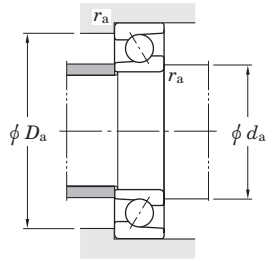


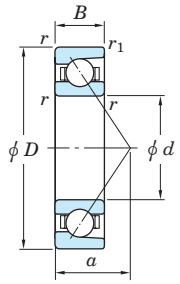
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds 1) (min^{-1})		Bearing No. 2)	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
105	190	36	2.1	1.1	135	121	—	—	—	2 900	3 900	**7221B**	80.5	117	178	2	3.95
	190	36	2.1	1.1	162	143	—	—	14.6	5 400	7 200	**7221C**	38.0	117	178	2	3.95
	225	49	3	1.1	208	193	—	—	—	3 500	4 400	**7321**	72.1	119	211	2.5	8.62
	225	49	3	1.1	191	177	—	—	—	2 600	3 500	**7321B**	93.7	119	211	2.5	8.62
	225	49	3	1.1	223	207	—	—	13.4	4 800	6 400	**7321C**	46.6	119	211	2.5	8.62
110	150	20	1.1	0.6	57.7	64.4	—	—	16.5	6 400	8 500	**7922C**	27.4	117	143	1	0.840
	150	20	1.1	0.6	25.1	23.8	—	—	8.7	8 000	12 000	**HAR922C**	27.4	117	143	1	0.909
	170	28	2	1	43.4	37.0	—	—	8.5	7 500	12 000	**HAR022C**	32.8	120	160	2	2.11
	170	28	2	1	91.9	92.8	—	—	—	4 200	5 200	**7022**	54.4	120	160	2	2.14
	170	28	2	1	82.3	83.7	—	—	—	3 100	4 200	**7022B**	72.7	120	160	2	2.14
	170	28	2	1	101	101	—	—	15.7	5 800	7 700	**7022C**	32.8	120	160	2	2.14
	200	38	2.1	1.1	162	148	—	—	—	3 700	4 600	**7222**	64.3	122	188	2	4.65
	200	38	2.1	1.1	147	135	—	—	—	2 800	3 700	**7222B**	84.9	122	188	2	4.65
	200	38	2.1	1.1	176	160	—	—	14.5	5 100	6 800	**7222C**	40.0	122	188	2	4.65
	240	50	3	1.1	232	226	—	—	—	3 200	4 000	**7322**	76.4	124	226	2.5	10.1
	240	50	3	1.1	213	208	—	—	—	2 400	3 200	**7322B**	99.6	124	226	2.5	10.1
	240	50	3	1.1	249	242	—	—	13.4	4 500	5 900	**7322C**	48.8	124	226	2.5	10.1
120	165	22	1.1	0.6	71.7	81.2	—	—	16.5	5 900	7 800	**7924C**	30.1	127	158	1	1.15
	165	22	1.1	0.6	29.4	28.4	—	—	8.8	7 300	11 000	**HAR924C**	30.1	127	158	1	1.25
	180	28	2	1	44.9	39.9	—	—	8.5	7 000	11 000	**HAR024C**	34.1	130	170	2	2.26
	180	28	2	1	96.6	103	—	—	—	3 900	4 900	**7024**	57.3	130	170	2	2.27
	180	28	2	1	86.4	93.0	—	—	—	2 900	3 900	**7024B**	76.9	130	170	2	2.27
	180	28	2	1	106	113	—	—	16.0	5 400	7 100	**7024C**	34.1	130	170	2	2.27
	215	40	2.1	1.1	174	166	—	—	—	3 400	4 300	**7224**	68.5	132	203	2	5.49
	215	40	2.1	1.1	158	151	—	—	—	2 600	3 400	**7224B**	90.3	132	203	2	5.49
	215	40	2.1	1.1	190	180	—	—	14.6	4 800	6 300	**7224C**	42.5	132	203	2	5.49
	260	55	3	1.1	246	252	—	—	—	3 000	3 700	**7324**	82.3	134	246	2.5	12.6

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

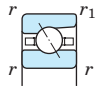
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (120) ~ 140 mm



With machined cage

With pressed cage



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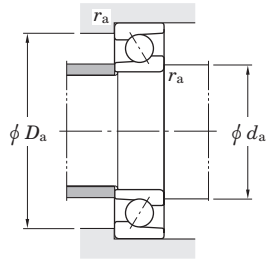


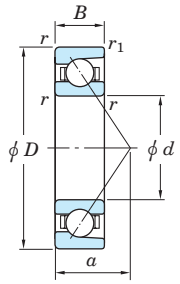
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
					With machined cage		With pressed cage										
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
120	260	55	3	1.1	225	231	—	—	—	2 200	3 000	**7324B**	107.2	134	246	2.5	12.6
	260	55	3	1.1	265	271	—	—	13.7	4 100	5 500	**7324C**	53.0	134	246	2.5	12.6
130	180	24	1.5	1	87.2	99.9	—	—	16.4	5 400	7 100	**7926C**	32.8	138.5	171.5	1.5	1.50
	180	24	1.5	1	35.1	35.1	—	—	8.8	6 700	10 000	**HAR926C**	32.8	138.5	171.5	1.5	1.66
	200	33	2	1	56.3	48.4	—	—	8.5	6 300	9 800	**HAR026C**	38.6	140	190	2	3.38
	200	33	2	1	117	125	—	—	—	3 500	4 400	**7026**	64.1	140	190	2	3.43
	200	33	2	1	105	113	—	—	—	2 600	3 500	**7026B**	85.7	140	190	2	3.43
	200	33	2	1	129	137	—	—	15.9	4 800	6 400	**7026C**	38.6	140	190	2	3.43
	230	40	3	1.1	196	198	—	—	—	3 200	4 000	**7226**	72.0	144	216	2.5	6.21
	230	40	3	1.1	177	180	—	—	—	2 400	3 200	**7226B**	95.5	144	216	2.5	6.21
	230	40	3	1.1	213	214	—	—	14.7	4 400	5 800	**7226C**	44.1	144	216	2.5	6.21
	280	58	4	1.5	301	329	—	—	—	2 700	3 400	**7326**	88.8	148	262	3	15.4
	280	58	4	1.5	250	268	—	—	—	2 100	2 700	**7326B**	115.0	148	262	3	15.4
	280	58	4	1.5	294	314	—	—	13.7	3 800	5 000	**7326C**	56.5	148	262	3	15.4
140	190	24	1.5	1	88.3	105	—	—	16.6	5 100	6 700	**7928C**	34.1	148.5	181.5	1.5	1.59
	190	24	1.5	1	35.2	36.2	—	—	8.8	6 300	9 800	**HAR928C**	34.1	148.5	181.5	1.5	1.76
	210	33	2	1	61.3	56.2	—	—	8.5	6 000	9 200	**HAR028C**	39.9	150	200	2	3.62
	210	33	2	1	120	133	—	—	—	3 300	4 100	**7028**	67.0	150	200	2	3.64
	210	33	2	1	107	119	—	—	—	2 500	3 300	**7028B**	89.9	150	200	2	3.64
	210	33	2	1	132	145	—	—	16.0	4 500	6 000	**7028C**	39.9	150	200	2	3.64
	250	42	3	1.1	218	234	—	—	—	2 900	3 600	**7228**	77.3	154	236	2.5	7.76
	250	42	3	1.1	197	213	—	—	—	2 200	2 900	**7228B**	102.8	154	236	2.5	7.76
	250	42	3	1.1	238	254	—	—	14.8	4 000	5 300	**7228C**	47.1	154	236	2.5	7.76
	300	62	4	1.5	329	374	—	—	—	2 500	3 200	**7328**	94.5	158	282	3	18.8
	300	62	4	1.5	302	344	—	—	—	1 900	2 500	**7328B**	123.3	158	282	3	18.8
	300	62	4	1.5	353	401	—	—	13.4	3 500	4 600	**7328C**	60.5	158	282	3	18.8

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

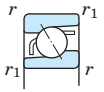
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

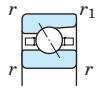
d 150 ~ (170) mm



With machined cage



With pressed cage



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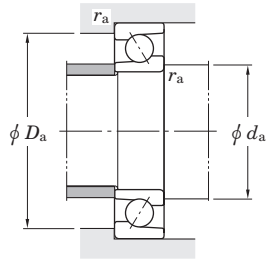
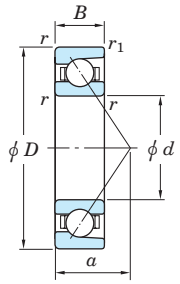


Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
					With machined cage		With pressed cage										
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
150	210	28	2	1	115	132	—	—	16.3	4 700	6 200	**7930C**	38.1	160	200	2	2.47
	210	28	2	1	48.9	48.9	—	—	8.7	5 800	9 000	**HAR930C**	38.1	160	200	2	2.68
	225	35	2	1	72.2	66.1	—	—	8.5	5 300	8 200	**HAR030C**	42.6	160	215	2	4.36
	225	35	2.1	1.1	137	154	—	—	—	3 000	3 800	**7030**	72.1	162	213	2	4.43
	225	35	2.1	1.1	122	138	—	—	—	2 300	3 000	**7030B**	96.2	162	213	2	4.43
	225	35	2.1	1.1	151	169	—	—	16.1	4 200	5 500	**7030C**	42.8	162	213	2	4.43
	270	45	3	1.1	248	280	—	—	—	2 700	3 300	**7230**	83.1	164	256	2.5	9.75
	270	45	3	1.1	225	254	—	—	—	2 000	2 700	**7230B**	110.6	164	256	2.5	9.75
	270	45	3	1.1	270	303	—	—	14.7	3 700	4 900	**7230C**	50.6	164	256	2.5	9.75
	320	65	4	1.5	348	414	—	—	—	2 300	2 900	**7330**	100.3	168	302	3	22.4
	320	65	4	1.5	318	380	—	—	—	1 800	2 300	**7330B**	131.1	168	302	3	22.4
	320	65	4	1.5	374	445	—	—	13.7	3 200	4 300	**7330C**	64.0	168	302	3	22.4
160	220	28	2	1	120	144	—	—	16.5	4 400	5 800	**7932C**	39.5	170	210	2	2.60
	220	28	2	1	50.2	51.8	—	—	8.8	5 200	8 100	**HAR932C**	39.5	170	210	2	2.83
	240	38	2.1	1.1	78.3	72.7	—	—	8.5	5 000	7 700	**HAR032C**	45.8	172	228	2	5.40
	240	38	2.1	1.1	155	176	—	—	—	2 800	3 500	**7032**	76.8	172	228	2	5.45
	240	38	2.1	1.1	139	158	—	—	—	2 100	2 800	**7032B**	102.9	172	228	2	5.45
	240	38	2.1	1.1	171	193	—	—	16.0	3 900	5 200	**7032C**	45.8	172	228	2	5.45
	290	48	3	1.1	230	263	—	—	—	2 500	3 100	**7232**	89.0	174	276	2.5	12.1
	290	48	3	1.1	238	279	—	—	—	1 800	2 500	**7232B**	118.4	174	276	2.5	12.1
	290	48	3	1.1	287	333	—	—	15.2	3 400	4 500	**7232C**	54.1	174	276	2.5	12.1
	340	68	4	1.5	365	455	—	—	—	2 200	2 700	**7332**	106.2	178	322	3	26.4
	340	68	4	1.5	332	416	—	—	—	1 600	2 200	**7332B**	138.9	178	322	3	26.4
	340	68	4	1.5	394	490	—	—	14.0	3 000	4 000	**7332C**	67.5	168.5	322	3	26.4
170	230	28	2	1	122	151	—	—	16.6	3 900	5 100	**7934C**	40.8	180	220	2	3.21
	230	28	2	1	51.4	54.8	—	—	8.8	5 000	7 700	**HAR934C**	40.8	180	220	2	2.97
	260	42	2.1	1.1	91.8	86.4	—	—	8.5	4 600	7 100	**HAR034C**	49.8	182	248	2	7.32

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

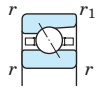
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (170) ~ 190 mm



With machined cage

With pressed cage



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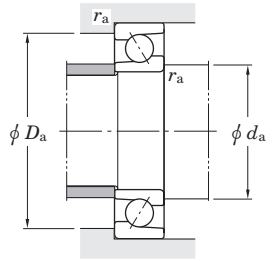
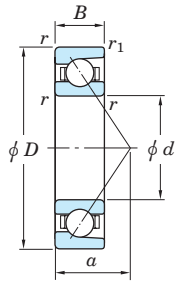


Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
170	260	42	2.1	1.1	186	214	—	—	—	2 600	3 200	**7034**	83.1	182	248	2	7.58
	260	42	2.1	1.1	166	193	—	—	—	1 900	2 600	**7034B**	111.2	182	248	2	7.77
	260	42	2.1	1.1	204	234	—	—	15.9	3 600	4 800	**7034C**	49.8	182	248	2	7.57
	310	52	4	1.5	272	331	—	—	—	2 300	2 800	**7234**	95.3	188	292	3	15.1
	310	52	4	1.5	245	300	—	—	—	1 700	2 300	**7234B**	126.7	188	292	3	15.1
	310	52	4	1.5	297	359	—	—	15.1	3 100	4 200	**7234C**	58.2	188	292	3	15.1
	360	72	4	1.5	389	485	—	—	—	2 000	2 500	**7334**	112.5	188	342	3	31.2
	360	72	4	1.5	355	444	—	—	—	1 500	2 000	**7334B**	147.2	188	342	3	31.2
	360	72	4	1.5	418	521	—	—	13.8	2 800	3 700	**7334C**	71.5	188	342	3	31.2
180	250	33	2	1	156	188	—	—	16.4	3 600	4 700	**7936C**	45.3	190	240	2	4.68
	280	46	2.1	1.1	212	253	—	—	—	2 400	3 000	**7036**	89.4	192	268	2	10.1
	280	46	2.1	1.1	190	228	—	—	—	1 800	2 400	**7036B**	119.5	192	268	2	10.2
	280	46	2.1	1.1	233	276	—	—	15.7	3 300	4 400	**7036C**	53.8	192	268	2	9.96
	320	52	4	1.5	293	362	—	—	—	2 200	2 700	**7236**	98.2	198	302	3	15.7
	320	52	4	1.5	265	329	—	—	—	1 600	2 200	**7236B**	130.9	198	302	3	15.7
	320	52	4	1.5	320	393	—	—	14.9	3 000	4 000	**7236C**	59.5	198	302	3	15.7
	380	75	4	1.5	409	534	—	—	—	1 900	2 400	**7336**	118.3	198	362	3	40.0
	380	75	4	1.5	373	488	—	—	—	1 400	1 900	**7336B**	155.0	198	362	3	40.0
190	260	33	2	1	158	197	—	—	16.5	3 300	4 500	**7938C**	46.6	200	250	2	4.83
	290	46	2.1	1.1	217	268	—	—	—	2 300	2 800	**7038**	92.3	202	278	2	10.8
	290	46	2.1	1.1	194	241	—	—	—	1 700	2 300	**7038B**	123.7	202	278	2	10.8
	290	46	2.1	1.1	239	293	—	—	15.9	3 100	4 200	**7038C**	55.2	202	278	2	10.8
	340	55	4	1.5	303	390	—	—	—	2 000	2 500	**7238**	104.0	208	322	3	18.8
	340	55	4	1.5	273	353	—	—	—	1 500	2 000	**7238B**	138.7	208	322	3	18.8
	340	55	4	1.5	331	424	—	—	15.1	2 800	3 700	**7238C**	63.0	208	322	3	18.8
	400	78	5	2	450	598	—	—	—	1 800	2 200	**7338**	124.2	212	378	4	45.5
	400	78	5	2	411	548	—	—	—	1 300	1 800	**7338B**	162.8	212	378	4	45.5

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

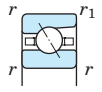
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d 200 ~ (340) mm



With machined cage

With pressed cage



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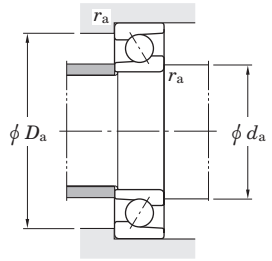


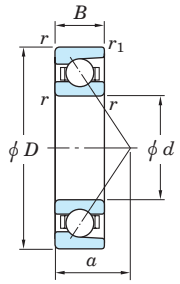
Boundary dimensions (mm)					Basic load ratings (kN) With machined cage		With pressed cage		Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
200	280	38	2.1	1.1	204	255	—	—	16.3	3 100	4 100	**7940C**	51.2	212	268	2	6.85
	310	51	2.1	1.1	244	309	—	—	—	2 100	2 600	**7040**	99.1	212	298	2	12.7
	310	51	2.1	1.1	218	279	—	—	—	1 600	2 100	**7040B**	132.5	212	298	2	12.7
	310	51	2.1	1.1	268	338	—	—	15.7	2 900	3 900	**7040C**	59.7	212	298	2	12.7
	360	58	4	1.5	324	423	—	—	—	1 900	2 400	**7240**	109.8	218	342	3	22.4
	360	58	4	1.5	292	384	—	—	—	1 400	1 900	**7240B**	146.5	218	342	3	22.4
	360	58	4	1.5	354	460	—	—	15.1	2 600	3 500	**7240C**	66.5	218	342	3	22.4
	420	80	5	2	474	658	—	—	—	1 700	2 100	**7340**	129.5	222	398	4	52.0
	420	80	5	2	432	602	—	—	—	1 200	1 700	**7340B**	170.1	222	398	4	52.0
220	340	56	3	1.1	267	353	—	—	—	1 900	2 400	**7044**	108.9	234	326	2.5	18.5
	340	56	3	1.1	239	318	—	—	—	1 400	1 900	**7044B**	145.5	234	326	2.5	18.9
240	360	56	3	1.1	273	375	—	—	—	1 700	2 200	**7048**	114.6	254	346	2.5	19.7
	360	56	3	1.1	244	338	—	—	—	1 300	1 700	**7048B**	153.9	254	346	2.5	20.1
	440	72	4	1.5	403	595	—	—	—	1 500	1 800	**7248**	134.2	258	422	3	51.8
	440	72	4	1.5	363	539	—	—	—	1 100	1 500	**7248B**	178.6	258	422	3	52.8
260	400	65	4	1.5	325	478	—	—	—	1 500	1 900	**7052**	128.4	278	382	3	28.7
	400	65	4	1.5	291	431	—	—	—	1 100	1 500	**7052B**	171.0	278	382	3	29.3
280	420	65	4	1.5	332	507	—	—	—	1 400	1 800	**7056**	133.5	298	402	3	30.4
	420	65	4	1.5	297	453	—	—	—	1 100	1 400	**7056B**	179.3	298	402	3	31.0
300	460	74	4	1.5	426	680	—	—	—	1 300	1 600	**7060**	146.7	318	442	3	43.7
	460	74	4	1.5	382	613	—	—	—	960	1 300	**7060B**	196.4	318	442	3	44.9
320	480	74	4	1.5	437	722	—	—	—	1 200	1 500	**7064**	152.5	338	462	3	46.0
	480	74	4	1.5	391	651	—	—	—	890	1 200	**7064B**	204.8	338	462	3	47.2
340	520	82	5	2	502	861	—	—	—	1 100	1 300	**7068**	165.1	362	498	4	61.8

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

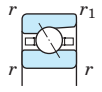
[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (340) ~ 380 mm



With machined cage

With pressed cage



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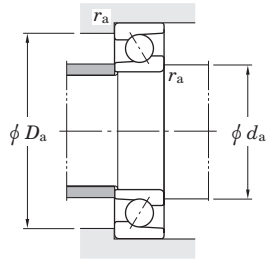


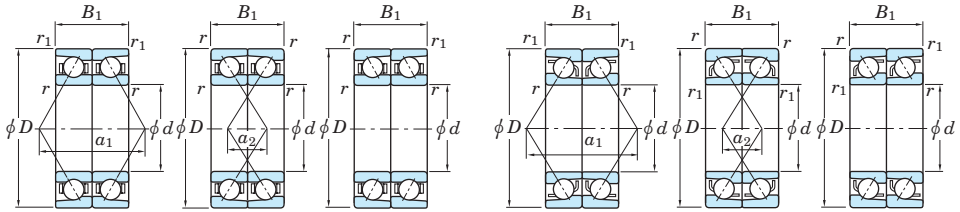
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]	Load center (mm)	Mounting dimensions (mm)			(Refer.) Mass (kg)
					With machined cage		With pressed cage										
d	D	B	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.		a	d_a min.	D_a max.	r_a max.	
340	520	82	5	2	450	777	—	—	—	800	1 100	**7068B**	221.4	362	498	4	63.3
360	540	82	5	2	515	913	—	—	—	1 000	1 300	**7072**	170.9	382	518	4	64.6
	540	82	5	2	461	824	—	—	—	750	1 000	**7072B**	229.8	382	518	4	66.2
380	560	82	5	2	528	966	—	—	—	940	1 200	**7076**	176.7	402	538	4	67.2
	560	82	5	2	472	870	—	—	—	700	940	**7076B**	238.2	402	538	4	69.1

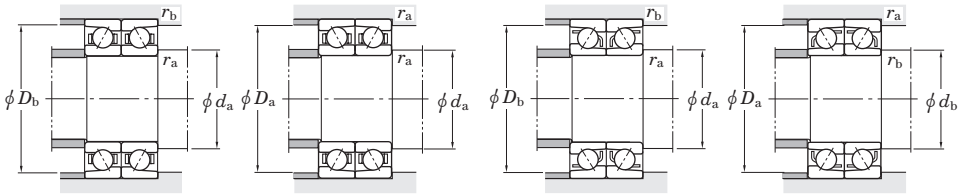
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cage or molded cage.

2) B or no indication after the bearing number indicates nominal contact angle of 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d 10 ~ (17) mm





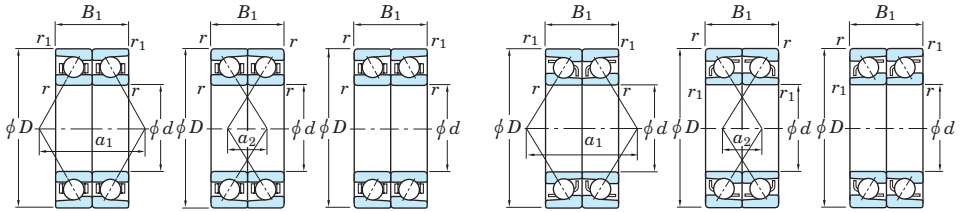
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
10	22	12	0.3	0.15	4.90	3.05	—	—	14.2	42 000	55 000	**7900CDB**	**7900CDF**	**7900CDT**	10.3	1.7	12.5	—	19.5	20.8	0.3	0.15	0.016
	26	16	0.3	0.15	8.10	4.65	—	—	—	27 000	34 000	**7000DB**	**7000DF**	**7000DT**	18.2	2.2	12.5	—	23.5	24.8	0.3	0.15	0.042
	26	16	0.3	0.15	7.55	4.35	—	—	—	20 000	27 000	**7000BDB**	**7000BDF**	**7000BDT**	23.1	7.1	12.5	—	23.5	24.8	0.3	0.15	0.042
	26	16	0.3	0.15	8.60	4.95	—	—	12.5	37 000	50 000	**7000CDB**	**7000CDF**	**7000CDT**	12.7	3.3	12.5	—	23.5	24.8	0.3	0.15	0.042
	30	18	0.6	0.3	7.55	4.40	8.80	5.45	—	23 000	29 000	**7200DB**	**7200DF**	**7200DT**	20.8	2.8	14.5	12.5	25.5	27.5	0.6	0.3	0.062
	30	18	0.6	0.3	6.95	4.05	8.10	5.05	—	18 000	23 000	**7200BDB**	**7200BDF**	**7200BDT**	26.2	8.2	14.5	12.5	25.5	27.5	0.6	0.3	0.062
	30	18	0.6	0.3	8.10	4.70	9.45	5.85	13.4	32 000	43 000	**7200CDB**	**7200CDF**	**7200CDT**	14.5	3.5	14.5	12.5	25.5	27.5	0.6	0.3	0.062
	35	22	0.6	0.3	13.8	7.55	15.1	8.60	—	21 000	27 000	**7300DB**	**7300DF**	**7300DT**	24.0	2.0	14.5	12.5	30.5	32.5	0.6	0.3	0.108
12	24	12	0.3	0.15	5.15	3.45	—	—	14.7	37 000	49 000	**7901CDB**	**7901CDF**	**7901CDT**	10.8	1.2	14.5	—	21.5	22.8	0.3	0.15	0.020
	28	16	0.3	0.15	8.80	5.45	—	—	—	23 000	29 000	**7001DB**	**7001DF**	**7001DT**	19.9	3.9	14.5	—	25.5	26.8	0.3	0.15	0.048
	28	16	0.3	0.15	8.10	5.05	—	—	—	18 000	23 000	**7001BDB**	**7001BDF**	**7001BDT**	25.2	9.2	14.5	—	25.5	26.8	0.3	0.15	0.048
	28	16	0.3	0.15	9.40	5.85	—	—	13.4	32 000	43 000	**7001CDB**	**7001CDF**	**7001CDT**	13.5	2.5	14.5	—	25.5	26.8	0.3	0.15	0.048
	32	20	0.6	0.3	12.1	7.25	13.0	8.05	—	22 000	27 000	**7201DB**	**7201DF**	**7201DT**	22.7	2.7	16.5	14.5	27.5	29.5	0.6	0.3	0.076
	32	20	0.6	0.3	11.3	6.80	12.1	7.50	—	16 000	22 000	**7201BDB**	**7201BDF**	**7201BDT**	28.5	8.5	16.5	14.5	27.5	29.5	0.6	0.3	0.076
	32	20	0.6	0.3	12.8	7.70	13.8	8.55	12.5	30 000	40 000	**7201CDB**	**7201CDF**	**7201CDT**	15.9	4.1	16.5	14.5	27.5	29.5	0.6	0.3	0.076
	37	24	1	0.6	16.6	9.20	18.1	10.5	—	20 000	24 000	**7301DB**	**7301DF**	**7301DT**	26.2	2.2	17.5	16.5	31.5	32.5	1	0.6	0.130
15	28	14	0.3	0.15	7.75	5.30	—	—	14.5	31 000	41 000	**7902CDB**	**7902CDF**	**7902CDT**	12.8	1.2	17.5	—	25.5	26.8	0.3	0.15	0.030
	32	18	0.3	0.15	9.95	6.85	—	—	—	20 000	26 000	**7002DB**	**7002DF**	**7002DT**	22.6	4.6	17.5	—	29.5	30.8	0.3	0.15	0.070
	32	18	0.3	0.15	9.05	6.30	—	—	—	15 000	20 000	**7002BDB**	**7002BDF**	**7002BDT**	29.1	11.1	17.5	—	29.5	30.8	0.3	0.15	0.070
	32	18	0.3	0.15	10.7	7.40	—	—	14.1	28 000	37 000	**7002CDB**	**7002CDF**	**7002CDT**	15.3	2.7	17.5	—	29.5	30.8	0.3	0.15	0.070
	35	22	0.6	0.3	13.2	8.55	13.2	8.55	—	19 000	24 000	**7202DB**	**7202DF**	**7202DT**	25.7	3.7	19.5	17.5	30.5	32.5	0.6	0.3	0.096
	35	22	0.6	0.3	12.1	7.85	12.1	7.85	—	14 000	19 000	**7202BDB**	**7202BDF**	**7202BDT**	32.4	10.4	19.5	17.5	30.5	32.5	0.6	0.3	0.096
	35	22	0.6	0.3	14.1	9.15	14.1	9.15	13.3	26 000	35 000	**7202CDB**	**7202CDF**	**7202CDT**	17.8	4.2	19.5	17.5	30.5	32.5	0.6	0.3	0.096
	42	26	1	0.6	20.3	12.9	21.8	14.4	—	16 000	20 000	**7302DB**	**7302DF**	**7302DT**	30.0	4.0	20.5	19.5	36.5	37.5	1	0.6	0.176
17	30	14	0.3	0.15	8.10	5.90	—	—	14.9	28 000	38 000	**7903CDB**	**7903CDF**	**7903CDT**	13.4	0.6	19.5	—	27.5	28.8	0.3	0.15	0.032
	35	20	0.3	0.15	10.9	8.25	—	—	—	18 000	23 000	**7003DB**	**7003DF**	**7003DT**	25.3	5.3	19.5	—	32.5	33.8	0.3	0.15	0.090

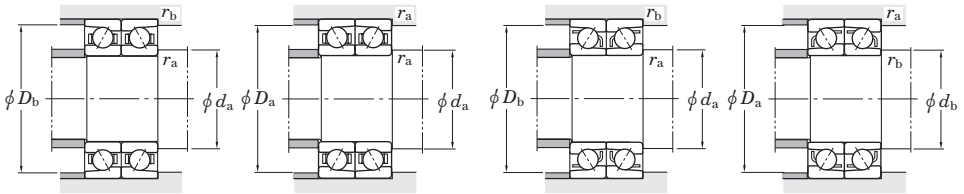
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (17) ~ (25) mm





Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
17	35	20	0.3	0.15	9.90	7.50	—	—	—	14 000	18 000	**7003BDB**	**7003BDF**	**7003BDT**	32.2	12.2	19.5	—	32.5	33.8	0.3	0.15	0.090
	35	20	0.3	0.15	11.9	8.95	—	—	14.6	25 000	33 000	**7003CDB**	**7003CDF**	**7003CDT**	17.1	2.9	19.5	—	32.5	33.8	0.3	0.15	0.090
	40	24	0.6	0.3	16.5	11.0	16.5	11.0	—	17 000	21 000	**7203DB**	**7203DF**	**7203DT**	28.8	4.8	21.5	19.5	35.5	37.5	0.6	0.3	0.140
	40	24	0.6	0.3	15.2	10.1	15.2	10.1	—	12 000	17 000	**7203BDB**	**7203BDF**	**7203BDT**	36.3	12.3	21.5	19.5	35.5	37.5	0.6	0.3	0.140
	40	24	0.6	0.3	17.7	11.8	17.7	11.8	13.4	23 000	30 000	**7203CDB**	**7203CDF**	**7203CDT**	19.8	4.2	21.5	19.5	35.5	37.5	0.6	0.3	0.140
	47	28	1	0.6	24.2	15.8	26.0	17.5	—	15 000	18 000	**7303DB**	**7303DF**	**7303DT**	33.1	5.1	22.5	21.5	41.5	42.5	1	0.6	0.240
	47	28	1	0.6	22.5	14.6	24.1	16.2	—	11 000	15 000	**7303BDB**	**7303BDF**	**7303BDT**	41.7	13.7	22.5	21.5	41.5	42.5	1	0.6	0.240
	47	28	1	0.6	25.7	16.8	25.7	16.8	12.6	20 000	27 000	**7303CDB**	**7303CDF**	**7303CDT**	22.8	5.2	22.5	21.5	41.5	42.5	1	0.6	0.240
20	37	18	0.3	0.15	11.8	9.15	—	—	14.9	24 000	31 000	**7904CDB**	**7904CDF**	**7904CDT**	16.6	1.4	22.5	—	34.5	35.8	0.3	0.15	0.070
	42	24	0.6	0.3	16.7	12.2	—	—	—	15 000	19 000	**7004DB**	**7004DF**	**7004DT**	30.2	6.2	24.5	—	37.5	39.5	0.6	0.3	0.158
	42	24	0.6	0.3	15.2	11.1	—	—	—	11 000	15 000	**7004BDB**	**7004BDF**	**7004BDT**	38.4	14.4	24.5	—	37.5	39.5	0.6	0.3	0.158
	42	24	0.6	0.3	18.0	13.2	—	—	14.1	21 000	28 000	**7004CDB**	**7004CDF**	**7004CDT**	20.4	3.6	24.5	—	37.5	39.5	0.6	0.3	0.158
	47	28	1	0.6	23.5	16.8	24.9	18.3	—	14 000	17 000	**7204DB**	**7204DF**	**7204DT**	33.9	5.9	25.5	24.5	41.5	42.5	1	0.6	0.224
	47	28	1	0.6	21.6	15.4	22.9	16.8	—	10 000	14 000	**7204BDB**	**7204BDF**	**7204BDT**	42.9	14.9	25.5	24.5	41.5	42.5	1	0.6	0.224
	47	28	1	0.6	25.2	18.0	26.7	19.6	13.4	19 000	26 000	**7204CDB**	**7204CDF**	**7204CDT**	23.2	4.8	25.5	24.5	41.5	42.5	1	0.6	0.224
	52	30	1.1	0.6	28.3	18.8	30.4	20.8	—	13 000	17 000	**7304DB**	**7304DF**	**7304DT**	35.8	5.8	27	24.5	45	47.5	1	0.6	0.300
	52	30	1.1	0.6	26.3	17.4	28.2	19.3	—	10 000	13 000	**7304BDB**	**7304BDF**	**7304BDT**	45.2	15.2	27	24.5	45	47.5	1	0.6	0.300
	52	30	1.1	0.6	30.1	19.9	32.3	22.2	12.6	18 000	24 000	**7304CDB**	**7304CDF**	**7304CDT**	24.6	5.4	27	24.5	45	47.5	1	0.6	0.300
	72	38	1.1	0.6	57.8	38.2	—	—	—	7 400	11 000	**7404DB**	**7404DF**	**7404DT**	46.1	8.1	27	—	65	67.5	1	0.6	0.790
	72	38	1.1	0.6	54.4	35.9	—	—	—	6 400	9 600	**7404BDB**	**7404BDF**	**7404BDT**	58.4	20.4	27	—	65	67.5	1	0.6	0.790
25	42	18	0.3	0.15	12.7	10.9	—	—	15.5	20 000	27 000	**7905CDB**	**7905CDF**	**7905CDT**	18.2	0.2	27.5	—	39.5	40.8	0.3	0.15	0.082
	47	24	0.6	0.3	18.3	14.8	—	—	—	13 000	17 000	**7005DB**	**7005DF**	**7005DT**	32.9	8.9	29.5	—	42.5	44.5	0.6	0.3	0.182
	47	24	0.6	0.3	16.6	13.4	—	—	—	10 000	13 000	**7005BDB**	**7005BDF**	**7005BDT**	42.3	18.3	29.5	—	42.5	44.5	0.6	0.3	0.182
	47	24	0.6	0.3	20.0	16.0	—	—	14.7	18 000	24 000	**7005CDB**	**7005CDF**	**7005CDT**	21.7	2.3	29.5	—	42.5	44.5	0.6	0.3	0.182
	52	30	1	0.6	24.9	19.0	26.3	20.6	—	12 000	15 000	**7205DB**	**7205DF**	**7205DT**	37.5	7.5	30.5	29.5	46.5	47.5	1	0.6	0.270
	52	30	1	0.6	22.7	17.4	24.0	18.8	—	9 200	12 000	**7205BDB**	**7205BDF**	**7205BDT**	47.7	17.7	30.5	29.5	46.5	47.5	1	0.6	0.270
	52	30	1	0.6	26.9	20.5	28.4	22.2	14.0	17 000	23 000	**7205CDB**	**7205CDF**	**7205CDT**	25.5	4.5	30.5	29.5	46.5	47.5	1	0.6	0.270

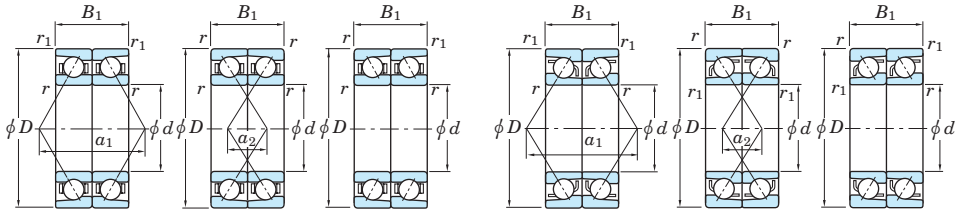
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

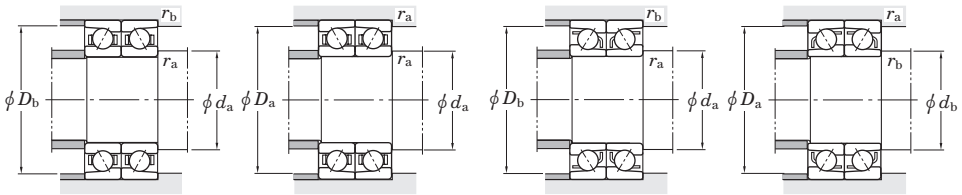
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Angular contact ball bearings (matched pair)

d (25) ~ (35) mm





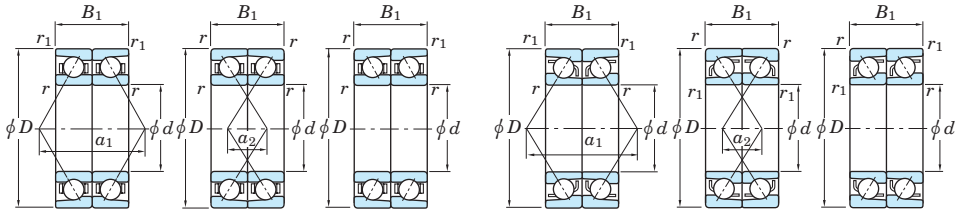
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
25	62	34	1.1	0.6	40.3	28.8	42.9	31.6	—	11 000	14 000	**7305DB**	**7305DF**	**7305DT**	42.1	8.1	32	29.5	55	57.5	1	0.6	0.486
	62	34	1.1	0.6	37.2	26.6	39.6	29.2	—	8 300	11 000	**7305BDB**	**7305BDF**	**7305BDT**	53.5	19.5	32	29.5	55	57.5	1	0.6	0.486
	62	34	1.1	0.6	42.8	30.6	45.6	33.7	12.8	15 000	20 000	**7305CDB**	**7305CDF**	**7305CDT**	28.7	5.3	32	29.5	55	57.5	1	0.6	0.486
	80	42	1.5	1	64.5	46.3	69.2	51.5	—	6 400	9 100	**7405DB**	**7405DF**	**7405DT**	52.8	10.8	33.5	30.5	71.5	74.5	1.5	1	1.05
	80	42	1.5	1	60.0	43.0	64.3	47.8	—	5 500	8 200	**7405BDB**	**7405BDF**	**7405BDT**	67.2	25.2	33.5	30.5	71.5	74.5	1.5	1	1.05
30	47	18	0.3	0.15	13.5	12.5	—	—	15.9	18 000	23 000	**7906CDB**	**7906CDF**	**7906CDT**	19.3	1.3	32.5	—	44.5	45.8	0.3	0.15	0.092
	55	26	1	0.6	14.2	9.75	—	—	7.9	21 000	32 000	**HAR006CDB**	**HAR006CDF**	**HAR006CDT**	24.4	1.6	35.5	—	49.5	50.5	1	0.6	0.232
	55	26	1	0.6	23.6	20.2	—	—	—	11 000	14 000	**7006DB**	**7006DF**	**7006DT**	37.5	11.5	35.5	—	49.5	50.5	1	0.6	0.266
	55	26	1	0.6	21.3	18.4	—	—	—	8 500	11 000	**7006BDB**	**7006BDF**	**7006BDT**	48.7	22.7	35.5	—	49.5	50.5	1	0.6	0.266
	55	26	1	0.6	25.7	22.0	—	—	14.9	16 000	21 000	**7006CDB**	**7006CDF**	**7006CDT**	24.4	1.6	35.5	—	49.5	50.5	1	0.6	0.266
	62	32	1	0.6	34.7	27.4	36.6	29.7	—	10 000	13 000	**7206DB**	**7206DF**	**7206DT**	43.0	11.0	35.5	34.5	56.5	57.5	1	0.6	0.416
	62	32	1	0.6	31.6	25.0	33.3	27.1	—	7 700	10 000	**7206BDB**	**7206BDF**	**7206BDT**	55.2	23.2	35.5	34.5	56.5	57.5	1	0.6	0.416
	62	32	1	0.6	37.4	29.5	39.5	32.0	14.0	14 000	19 000	**7206CDB**	**7206CDF**	**7206CDT**	28.5	3.5	35.5	34.5	56.5	57.5	1	0.6	0.416
	72	38	1.1	0.6	48.9	37.8	51.8	41.2	—	9 200	12 000	**7306DB**	**7306DF**	**7306DT**	49.0	11.0	37	34.5	65	67.5	1	0.6	0.724
	72	38	1.1	0.6	44.9	34.7	47.5	37.9	—	6 900	9 200	**7306BDB**	**7306BDF**	**7306BDT**	62.6	24.6	37	34.5	65	67.5	1	0.6	0.724
	72	38	1.1	0.6	52.5	40.5	55.6	44.2	13.4	13 000	17 000	**7306CDB**	**7306CDF**	**7306CDT**	32.9	5.1	37	34.5	65	67.5	1	0.6	0.724
	90	46	1.5	1	77.3	56.9	82.9	63.2	—	5 700	8 100	**7406DB**	**7406DF**	**7406DT**	58.5	12.5	38.5	35.5	81.5	84.5	1.5	1	1.37
	90	46	1.5	1	71.8	52.8	77.0	58.6	—	4 900	7 300	**7406BDB**	**7406BDF**	**7406BDT**	74.6	28.6	38.5	35.5	81.5	84.5	1.5	1	1.37
35	55	20	0.6	0.3	20.4	19.4	—	—	15.7	15 000	20 000	**7907CDB**	**7907CDF**	**7907CDT**	22.1	2.1	39.5	—	50.5	52.5	0.6	0.3	0.148
	62	28	1	0.6	15.0	11.1	—	—	8.1	18 000	28 000	**HAR007CDB**	**HAR007CDF**	**HAR007CDT**	27.0	1.0	40.5	—	56.5	57.5	1	0.6	0.316
	62	28	1	0.6	28.4	25.2	—	—	—	9 800	12 000	**7007DB**	**7007DF**	**7007DT**	42.3	14.3	40.5	—	56.5	57.5	1	0.6	0.340
	62	28	1	0.6	25.7	22.8	—	—	—	7 300	9 800	**7007BDB**	**7007BDF**	**7007BDT**	55.1	27.1	40.5	—	56.5	57.5	1	0.6	0.340
	62	28	1	0.6	31.0	27.4	—	—	15.0	13 000	18 000	**7007CDB**	**7007CDF**	**7007CDT**	27.0	1.0	40.5	—	56.5	57.5	1	0.6	0.340
	72	34	1.1	0.6	45.7	37.3	48.2	40.4	—	8 800	11 000	**7207DB**	**7207DF**	**7207DT**	48.5	14.5	42	39.5	65	67.5	1	0.6	0.590
	72	34	1.1	0.6	41.6	34.1	43.9	36.9	—	6 600	8 800	**7207BDB**	**7207BDF**	**7207BDT**	62.7	28.7	42	39.5	65	67.5	1	0.6	0.590
	72	34	1.1	0.6	49.4	40.2	52.1	43.5	14.0	12 000	16 000	**7207CDB**	**7207CDF**	**7207CDT**	31.6	2.4	42	39.5	65	67.5	1	0.6	0.590
	80	42	1.5	1	57.5	44.0	64.9	52.8	—	8 200	10 000	**7307DB**	**7307DF**	**7307DT**	54.8	12.8	43.5	40.5	71.5	74.5	1.5	1	0.950

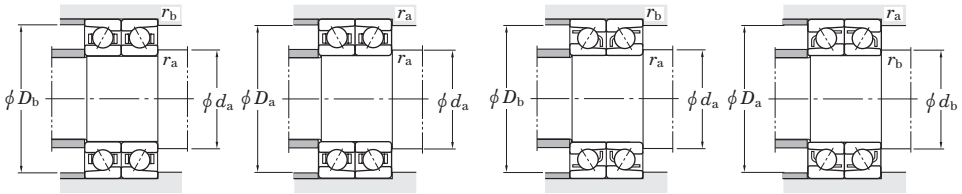
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (35) ~ (45) mm





Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
35	80	42	1.5	1	52.7	40.5	59.5	48.6	—	6 200	8 200	**7307BDB**	**7307BDF**	**7307BDT**	70.1	28.1	43.5	40.5	71.5	74.5	1.5	1	0.950
	80	42	1.5	1	61.6	47.2	69.6	56.6	13.4	11 000	15 000	**7307CDB**	**7307CDF**	**7307CDT**	36.7	5.3	43.5	40.5	71.5	74.5	1.5	1	0.950
	100	50	1.5	1	98.2	73.9	105	82.1	—	5 000	7 200	**7407DB**	**7407DF**	**7407DT**	65.2	15.2	43.5	40.5	91.5	94.5	1.5	1	1.90
	100	50	1.5	1	91.3	68.6	97.9	76.2	—	4 300	6 500	**7407BDB**	**7407BDF**	**7407BDT**	83.3	33.3	43.5	40.5	91.5	94.5	1.5	1	1.90
40	62	24	0.6	0.3	25.6	24.9	—	—	15.7	13 000	18 000	**7908CDB**	**7908CDF**	**7908CDT**	25.7	1.7	44.5	—	57.5	59.5	0.6	0.3	0.214
	62	24	0.6	0.3	10.3	8.15	—	—	8.4	17 000	27 000	**HAR908CDB**	**HAR908CDF**	**HAR908CDT**	25.7	1.7	44.5	—	57.5	59.5	0.6	0.3	0.230
	68	30	1	0.6	15.8	12.4	—	—	8.2	16 000	25 000	**HAR008CDB**	**HAR008CDF**	**HAR008CDT**	29.5	0.5	45.5	—	62.5	63.5	1	0.6	0.400
	68	30	1	0.6	30.4	29.2	—	—	—	8 900	11 000	**7008DB**	**7008DF**	**7008DT**	46.3	16.3	45.5	—	62.5	63.5	1	0.6	0.420
	68	30	1	0.6	27.4	26.4	—	—	—	6 600	8 900	**7008BDB**	**7008BDF**	**7008BDT**	60.5	30.5	45.5	—	62.5	63.5	1	0.6	0.420
	68	30	1	0.6	33.4	31.8	—	—	15.4	12 000	16 000	**7008CDB**	**7008CDF**	**7008CDT**	29.5	0.5	45.5	—	62.5	63.5	1	0.6	0.420
	80	36	1.1	0.6	54.6	46.7	57.4	50.3	—	8 000	10 000	**7208DB**	**7208DF**	**7208DT**	52.7	16.7	47	44.5	73	75.5	1	0.6	0.764
	80	36	1.1	0.6	49.7	42.7	52.2	45.9	—	6 000	8 000	**7208BDB**	**7208BDF**	**7208BDT**	68.3	32.3	47	44.5	73	75.5	1	0.6	0.764
	80	36	1.1	0.6	59.1	50.4	62.0	54.3	14.2	11 000	15 000	**7208CDB**	**7208CDF**	**7208CDT**	34.1	1.9	47	44.5	73	75.5	1	0.6	0.764
	90	46	1.5	1	70.2	54.9	79.3	65.9	—	7 400	9 200	**7308DB**	**7308DF**	**7308DT**	60.5	14.5	48.5	45.5	81.5	84.5	1.5	1	1.31
	90	46	1.5	1	64.5	50.5	72.8	60.6	—	5 500	7 400	**7308BDB**	**7308BDF**	**7308BDT**	77.5	31.5	48.5	45.5	81.5	84.5	1.5	1	1.31
	90	46	1.5	1	75.3	58.8	85.0	70.5	13.4	10 000	14 000	**7308CDB**	**7308CDF**	**7308CDT**	40.4	5.6	48.5	45.5	81.5	84.5	1.5	1	1.31
	110	54	2	1	114	87.1	122	96.8	—	4 600	6 600	**7408DB**	**7408DF**	**7408DT**	70.9	16.9	50	45.5	100	104.5	2	1	2.46
	110	54	2	1	105	80.8	113	89.8	—	3 900	5 900	**7408BDB**	**7408BDF**	**7408BDT**	90.8	36.8	50	45.5	100	104.5	2	1	2.46
45	68	24	0.6	0.3	27.0	28.2	—	—	16.0	12 000	16 000	**7909CDB**	**7909CDF**	**7909CDT**	27.1	3.1	49.5	—	63.5	65.5	0.6	0.3	0.254
	68	24	0.6	0.3	11.0	9.35	—	—	8.5	16 000	24 000	**HAR909CDB**	**HAR909CDF**	**HAR909CDT**	27.1	3.1	49.5	—	63.5	65.5	0.6	0.3	0.272
	75	32	1	0.6	17.6	14.2	—	—	8.3	15 000	23 000	**HAR009CDB**	**HAR009CDF**	**HAR009CDT**	32.1	0.1	50.5	—	69.5	70.5	1	0.6	0.502
	75	32	1	0.6	36.2	35.4	—	—	—	8 000	10 000	**7009DB**	**7009DF**	**7009DT**	50.7	18.7	50.5	—	69.5	70.5	1	0.6	0.520
	75	32	1	0.6	32.5	32.0	—	—	—	6 000	8 000	**7009BDB**	**7009BDF**	**7009BDT**	66.3	34.3	50.5	—	69.5	70.5	1	0.6	0.520
	75	32	1	0.6	39.6	38.5	—	—	15.4	11 000	15 000	**7009CDB**	**7009CDF**	**7009CDT**	32.1	0.1	50.5	—	69.5	70.5	1	0.6	0.520
	85	38	1.1	0.6	61.3	53.2	64.4	57.2	—	7 500	9 400	**7209DB**	**7209DF**	**7209DT**	56.0	18.0	52	49.5	78	80.5	1	0.6	0.860
	85	38	1.1	0.6	55.8	48.6	58.6	52.3	—	5 600	7 500	**7209BDB**	**7209BDF**	**7209BDT**	72.8	34.8	52	49.5	78	80.5	1	0.6	0.860
	85	38	1.1	0.6	66.3	57.4	69.7	61.8	14.2	10 000	14 000	**7209CDB**	**7209CDF**	**7209CDT**	36.2	1.8	52	49.5	78	80.5	1	0.6	0.860

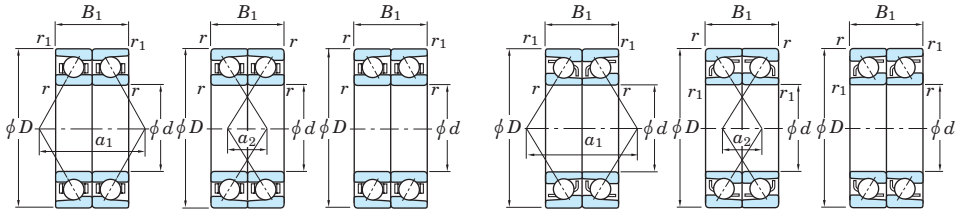
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

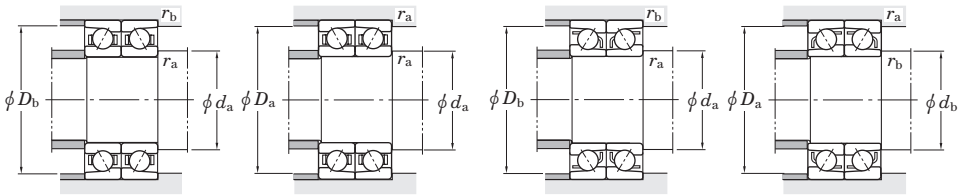
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Angular contact ball bearings (matched pair)

d (45) ~ (55) mm





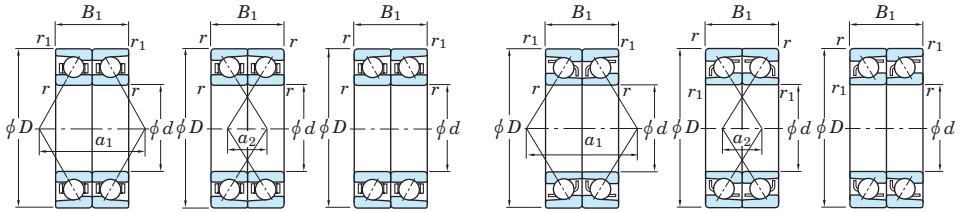
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
45	100	50	1.5	1	89.6	74.2	94.9	80.9	—	6 600	8 200	**7309DB**	**7309DF**	**7309DT**	67.2	17.2	53.5	50.5	91.5	94.5	1.5	1	1.75
	100	50	1.5	1	82.1	68.2	87.1	74.3	—	4 900	6 600	**7309BDB**	**7309BDF**	**7309BDT**	86.3	36.3	53.5	50.5	91.5	94.5	1.5	1	1.75
	100	50	1.5	1	96.1	79.5	102	86.7	13.5	9 000	12 000	**7309CDB**	**7309CDF**	**7309CDT**	44.6	5.4	53.5	50.5	91.5	94.5	1.5	1	1.75
	120	58	2	1	138	108	148	120	—	4 200	6 000	**7409DB**	**7409DF**	**7409DT**	77.2	19.2	55	50.5	110	114.5	2	1	3.10
	120	58	2	1	128	100	138	111	—	3 600	5 400	**7409BDB**	**7409BDF**	**7409BDT**	99.1	41.1	55	50.5	110	114.5	2	1	3.10
50	72	24	0.6	0.3	28.3	31.4	—	—	16.2	11 000	15 000	**7910CDB**	**7910CDF**	**7910CDT**	28.3	4.3	54.5	—	67.5	69.5	0.6	0.3	0.256
	72	24	0.6	0.3	14.8	12.6	—	—	8.5	14 000	22 000	**HAR910CDB**	**HAR910CDF**	**HAR910CDT**	28.3	4.3	54.5	—	67.5	69.5	0.6	0.3	0.262
	80	32	1	0.6	18.5	15.7	—	—	8.4	14 000	21 000	**HAR010CDB**	**HAR010CDF**	**HAR010CDT**	33.4	1.4	55.5	—	74.5	75.5	1	0.6	0.546
	80	32	1	0.6	38.4	40.2	—	—	—	7 300	9 200	**7010DB**	**7010DF**	**7010DT**	53.8	21.8	55.5	—	74.5	75.5	1	0.6	0.580
	80	32	1	0.6	34.5	36.2	—	—	—	5 500	7 400	**7010BDB**	**7010BDF**	**7010BDT**	70.5	38.5	55.5	—	74.5	75.5	1	0.6	0.580
	80	32	1	0.6	42.2	43.9	—	—	15.7	10 000	13 000	**7010CDB**	**7010CDF**	**7010CDT**	33.6	1.6	55.5	—	74.5	75.5	1	0.6	0.580
	90	40	1.1	0.6	64.0	58.7	67.0	62.9	—	6 800	8 500	**7210DB**	**7210DF**	**7210DT**	60.7	20.7	57	54.5	83	85.5	1	0.6	0.970
	90	40	1.1	0.6	58.0	53.5	60.7	57.3	—	5 100	6 800	**7210BDB**	**7210BDF**	**7210BDT**	79.2	39.2	57	54.5	83	85.5	1	0.6	0.970
	90	40	1.1	0.6	69.6	63.6	72.8	68.1	14.6	9 400	12 000	**7210CDB**	**7210CDF**	**7210CDT**	38.9	1.1	57	54.5	83	85.5	1	0.6	0.970
	110	54	2	1	114	96.3	121	105	—	5 800	7 300	**7310DB**	**7310DF**	**7310DT**	74.4	20.4	60	55.5	100	104.5	2	1	2.28
	110	54	2	1	105	88.6	111	96.6	—	4 400	5 800	**7310BDB**	**7310BDF**	**7310BDT**	95.8	41.8	60	55.5	100	104.5	2	1	2.28
	110	54	2	1	122	103	129	112	13.4	8 000	11 000	**7310CDB**	**7310CDF**	**7310CDT**	49.0	5.0	60	55.5	100	104.5	2	1	2.28
	130	62	2.1	1.1	158	131	—	—	—	3 800	5 500	**7410DB**	**7410DF**	**7410DT**	83.3	21.3	62	—	118	123	2	1	3.84
	130	62	2.1	1.1	147	121	—	—	—	3 300	4 900	**7410BDB**	**7410BDF**	**7410BDT**	106.9	44.9	62	—	118	123	2	1	3.84
55	80	26	1	0.6	32.0	37.0	—	—	16.3	10 000	14 000	**7911CDB**	**7911CDF**	**7911CDT**	31.1	5.1	60.5	—	74.5	75.5	1	0.6	0.356
	80	26	1	0.6	16.4	15.3	—	—	8.6	13 000	20 000	**HAR911CDB**	**HAR911CDF**	**HAR911CDT**	31.1	5.1	60.5	—	74.5	75.5	1	0.6	0.378
	90	36	1.1	0.6	22.9	19.8	—	—	8.4	12 000	19 000	**HAR011CDB**	**HAR011CDF**	**HAR011CDT**	37.4	1.4	62	—	83	85.5	1	0.6	0.806
	90	36	1.1	0.6	50.5	52.5	—	—	—	6 600	8 300	**7011DB**	**7011DF**	**7011DT**	59.9	23.9	62	—	83	85.5	1	0.6	0.840
	90	36	1.1	0.6	45.4	47.5	—	—	—	5 000	6 600	**7011BDB**	**7011BDF**	**7011BDT**	78.8	42.8	62	—	83	85.5	1	0.6	0.840
	90	36	1.1	0.6	55.4	57.3	—	—	15.5	9 100	12 000	**7011CDB**	**7011CDF**	**7011CDT**	37.4	1.4	62	—	83	85.5	1	0.6	0.840
	100	42	1.5	1	79.1	74.2	82.8	79.6	—	6 100	7 600	**7211DB**	**7211DF**	**7211DT**	66.6	24.6	63.5	60.5	91.5	94.5	1.5	1	1.27
	100	42	1.5	1	71.6	67.6	75.0	72.4	—	4 600	6 100	**7211BDB**	**7211BDF**	**7211BDT**	87.3	45.3	63.5	60.5	91.5	94.5	1.5	1	1.27

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

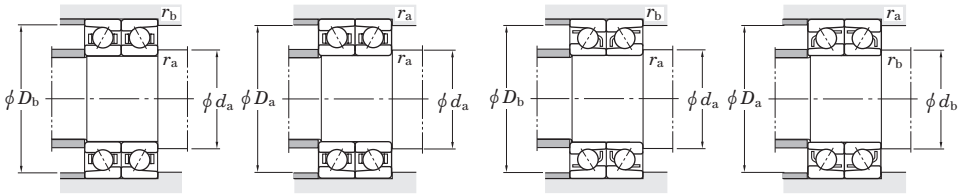
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (55) ~ (65) mm



(With machined cages) (With pressed cages)



(With machined cages) (With pressed cages)

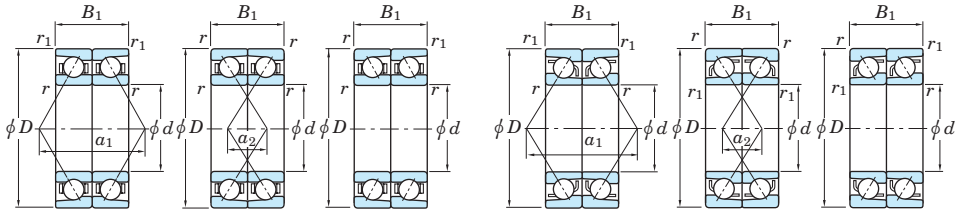
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
55	100	42	1.5	1	85.9	80.4	90.0	86.1	14.6	8 400	11 000	**7211CDB**	**7211CDF**	**7211CDT**	42.2	0.2	63.5	60.5	91.5	94.5	1.5	1	1.27
	120	58	2	1	132	113	139	123	—	5 400	6 700	**7311DB**	**7311DF**	**7311DT**	80.4	22.4	65	60.5	110	114.5	2	1	2.90
	120	58	2	1	121	104	128	113	—	4 000	5 400	**7311BDB**	**7311BDF**	**7311BDT**	103.7	45.7	65	60.5	110	114.5	2	1	2.90
	120	58	2	1	141	121	149	132	13.4	7 400	9 800	**7311CDB**	**7311CDF**	**7311CDT**	52.9	5.1	65	60.5	110	114.5	2	1	2.90
	140	66	2.1	1.1	192	165	—	—	—	3 500	5 000	**7411DB**	**7411DF**	**7411DT**	89.9	23.9	67	—	128	133	2	1	4.72
	140	66	2.1	1.1	179	153	—	—	—	3 000	4 500	**7411BDB**	**7411BDF**	**7411BDT**	115.7	49.7	67	—	128	133	2	1	4.72
60	85	26	1	0.6	37.8	43.6	—	—	16.3	9 100	13 000	**7912CDB**	**7912CDF**	**7912CDT**	32.6	6.6	65.5	—	79.5	80.5	1	0.6	0.374
	85	26	1	0.6	16.2	15.5	—	—	8.6	12 000	19 000	**HAR912CDB**	**HAR912CDF**	**HAR912CDT**	32.4	6.4	65.5	—	79.5	80.5	1	0.6	0.404
	95	36	1.1	0.6	23.9	21.7	—	—	8.5	11 000	18 000	**HAR012CDB**	**HAR012CDF**	**HAR012CDT**	38.8	2.8	67	—	88	90.5	1	0.6	0.866
	95	36	1.1	0.6	51.8	56.1	—	—	—	6 200	7 700	**7012DB**	**7012DF**	**7012DT**	62.8	26.8	67	—	88	90.5	1	0.6	0.900
	95	36	1.1	0.6	46.4	50.7	—	—	—	4 600	6 200	**7012BDB**	**7012BDF**	**7012BDT**	83.0	47.0	67	—	88	90.5	1	0.6	0.900
	95	36	1.1	0.6	56.9	61.3	—	—	15.7	8 500	11 000	**7012CDB**	**7012CDF**	**7012CDT**	38.8	2.8	67	—	88	90.5	1	0.6	0.900
	110	44	1.5	1	95.7	91.5	100	98.0	—	5 500	6 900	**7212DB**	**7212DF**	**7212DT**	72.3	28.3	68.5	65.5	101.5	104.5	1.5	1	1.64
	110	44	1.5	1	86.8	83.3	90.8	89.2	—	4 100	5 500	**7212BDB**	**7212BDF**	**7212BDT**	95.0	51.0	68.5	65.5	101.5	104.5	1.5	1	1.64
	110	44	1.5	1	104	99.0	109	106	14.5	7 500	10 000	**7212CDB**	**7212CDF**	**7212CDT**	45.3	1.3	68.5	65.5	101.5	104.5	1.5	1	1.64
	130	62	2.1	1.1	150	131	159	143	—	5 000	6 200	**7312DB**	**7312DF**	**7312DT**	86.5	24.5	72	67	118	123	2	1	3.62
	130	62	2.1	1.1	138	121	146	132	—	3 700	5 000	**7312BDB**	**7312BDF**	**7312BDT**	111.6	49.6	72	67	118	123	2	1	3.62
	130	62	2.1	1.1	161	141	171	153	13.4	6 800	9 100	**7312CDB**	**7312CDF**	**7312CDT**	56.7	5.3	72	67	118	123	2	1	3.62
	150	70	2.1	1.1	209	187	—	—	—	3 200	4 600	**7412DB**	**7412DF**	**7412DT**	97.0	27.0	72	—	138	143	2	1	5.70
	150	70	2.1	1.1	194	173	—	—	—	2 800	4 100	**7412BDB**	**7412BDF**	**7412BDT**	125.1	55.1	72	—	138	143	2	1	5.70
65	90	26	1	0.6	33.7	42.3	—	—	16.5	8 600	12 000	**7913CDB**	**7913CDF**	**7913CDT**	33.8	7.8	70.5	—	84.5	85.5	1	0.6	0.410
	90	26	1	0.6	19.1	18.9	—	—	8.6	11 000	18 000	**HAR913CDB**	**HAR913CDF**	**HAR913CDT**	33.8	7.8	70.5	—	84.5	85.5	1	0.6	0.424
	100	36	1.1	0.6	24.8	23.5	—	—	8.5	11 000	16 000	**HAR013CDB**	**HAR013CDF**	**HAR013CDT**	40.1	4.1	72	—	93	95.5	1	0.6	0.924
	100	36	1.1	0.6	54.7	62.8	—	—	—	5 800	7 200	**7013DB**	**7013DF**	**7013DT**	65.9	29.9	72	—	93	95.5	1	0.6	0.940
	100	36	1.1	0.6	48.9	56.6	—	—	—	4 300	5 800	**7013BDB**	**7013BDF**	**7013BDT**	87.6	51.6	72	—	93	95.5	1	0.6	0.940
	100	36	1.1	0.6	60.2	68.7	—	—	15.9	7 900	11 000	**7013CDB**	**7013CDF**	**7013CDT**	40.2	4.2	72	—	93	95.5	1	0.6	0.940
	120	46	1.5	1	109	108	114	116	—	5 200	6 400	**7213DB**	**7213DF**	**7213DT**	76.4	30.4	73.5	70.5	111.5	114.5	1.5	1	2.04

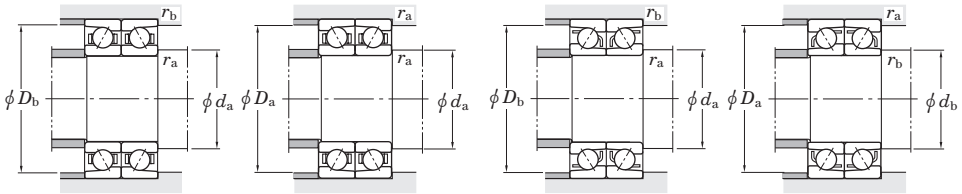
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (65) ~ (75) mm





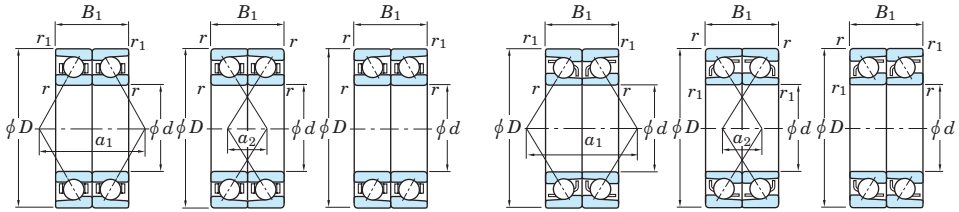
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
65	120	46	1.5	1	99.0	98.7	103	105	—	3 900	5 200	**7213BDB**	**7213BDF**	**7213BDT**	100.6	54.6	73.5	70.5	111.5	114.5	1.5	1	2.04
	120	46	1.5	1	119	117	124	125	14.6	7 100	9 400	**7213CDB**	**7213CDF**	**7213CDT**	47.8	1.8	73.5	70.5	111.5	114.5	1.5	1	2.04
	140	66	2.1	1.1	170	151	180	164	—	4 600	5 800	**7313DB**	**7313DF**	**7313DT**	92.5	26.5	77	72	128	133	2	1	4.44
	140	66	2.1	1.1	156	139	165	151	—	3 500	4 600	**7313BDB**	**7313BDF**	**7313BDT**	119.4	53.4	77	72	128	133	2	1	4.44
	140	66	2.1	1.1	182	161	193	176	13.4	6 300	8 500	**7313CDB**	**7313CDF**	**7313CDT**	60.6	5.4	77	72	128	133	2	1	4.44
	160	74	2.1	1.1	226	209	—	—	—	3 000	4 300	**7413DB**	**7413DF**	**7413DT**	102.9	28.9	77	—	148	153	2	1	6.82
	160	74	2.1	1.1	209	194	—	—	—	2 600	3 900	**7413BDB**	**7413BDF**	**7413BDT**	132.7	58.7	77	—	148	153	2	1	6.82
70	100	32	1	0.6	47.0	58.0	—	—	16.4	7 800	11 000	**7914CDB**	**7914CDF**	**7914CDT**	38.8	6.8	75.5	—	94.5	95.5	1	0.6	0.664
	100	32	1	0.6	20.9	20.9	—	—	8.7	10 000	16 000	**HAR914CDB**	**HAR914CDF**	**HAR914CDT**	38.8	6.8	75.5	—	94.5	95.5	1	0.6	0.712
	110	40	1.1	0.6	33.7	30.9	—	—	8.4	9 800	15 000	**HAR014CDB**	**HAR014CDF**	**HAR014CDT**	44.1	4.1	77	—	103	105.5	1	0.6	1.26
	110	40	1.1	0.6	69.3	78.7	—	—	—	5 300	6 600	**7014DB**	**7014DF**	**7014DT**	72.0	32.0	77	—	103	105.5	1	0.6	1.32
	110	40	1.1	0.6	62.1	71.1	—	—	—	4 000	5 300	**7014BDB**	**7014BDF**	**7014BDT**	95.5	55.5	77	—	103	105.5	1	0.6	1.32
	110	40	1.1	0.6	76.2	86.0	—	—	15.7	7 300	9 700	**7014CDB**	**7014CDF**	**7014CDT**	44.1	4.1	77	—	103	105.5	1	0.6	1.32
	125	48	1.5	1	113	111	124	127	—	4 900	6 100	**7214DB**	**7214DF**	**7214DT**	80.3	32.3	78.5	75.5	116.5	119.5	1.5	1	2.24
	125	48	1.5	1	103	101	112	116	—	3 700	4 900	**7214BDB**	**7214BDF**	**7214BDT**	105.8	57.8	78.5	75.5	116.5	119.5	1.5	1	2.24
	125	48	1.5	1	123	120	135	138	14.6	6 700	8 900	**7214CDB**	**7214CDF**	**7214CDT**	50.1	2.1	78.5	75.5	116.5	119.5	1.5	1	2.24
	150	70	2.1	1.1	191	172	203	187	—	4 300	5 400	**7314DB**	**7314DF**	**7314DT**	98.5	28.5	82	77	138	143	2	1	5.40
	150	70	2.1	1.1	175	158	186	172	—	3 200	4 300	**7314BDB**	**7314BDF**	**7314BDT**	127.3	57.3	82	77	138	143	2	1	5.40
	150	70	2.1	1.1	205	184	217	200	13.4	5 900	7 900	**7314CDB**	**7314CDF**	**7314CDT**	64.5	5.5	82	77	138	143	2	1	5.40
	180	84	3	1.1	242	230	—	—	—	2 700	3 900	**7414DB**	**7414DF**	**7414DT**	115.3	31.3	84	—	166	173	2.5	1	9.98
	180	84	3	1.1	241	237	—	—	—	2 300	3 500	**7414BDB**	**7414BDF**	**7414BDT**	148.4	64.4	84	—	166	173	2.5	1	9.98
75	105	32	1	0.6	47.7	60.9	—	—	16.5	7 400	9 800	**7915CDB**	**7915CDF**	**7915CDT**	40.1	8.1	80.5	—	99.5	100.5	1	0.6	0.700
	105	32	1	0.6	21.5	22.4	—	—	8.7	9 800	15 000	**HAR915CDB**	**HAR915CDF**	**HAR915CDT**	40.1	8.1	80.5	—	99.5	100.5	1	0.6	0.740
	115	40	1.1	0.6	34.3	32.4	—	—	8.5	9 300	14 000	**HAR015CDB**	**HAR015CDF**	**HAR015CDT**	45.5	5.5	82	—	108	110.5	1	0.6	1.33
	115	40	1.1	0.6	70.9	83.4	—	—	—	5 000	6 300	**7015DB**	**7015DF**	**7015DT**	74.9	34.9	82	—	108	110.5	1	0.6	1.38
	115	40	1.1	0.6	63.5	75.2	—	—	—	3 800	5 000	**7015BDB**	**7015BDF**	**7015BDT**	99.7	59.7	82	—	108	110.5	1	0.6	1.38
	115	40	1.1	0.6	78.0	91.3	—	—	15.9	6 900	9 200	**7015CDB**	**7015CDF**	**7015CDT**	45.5	5.5	82	—	108	110.5	1	0.6	1.38

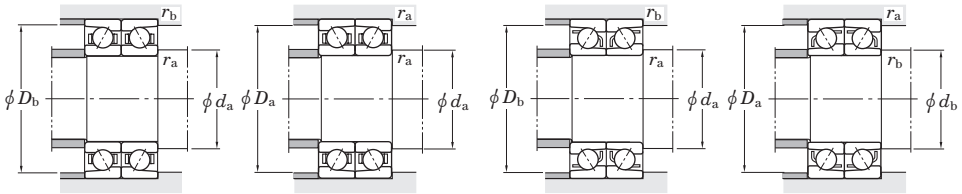
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (75) ~ (85) mm





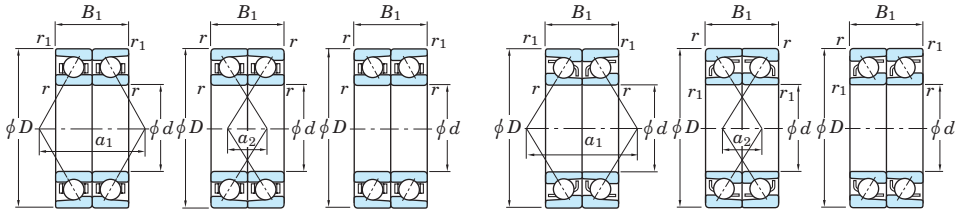
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
75	130	50	1.5	1	129	130	134	139	—	4 600	5 800	**7215DB**	**7215DF**	**7215DT**	84.2	34.2	83.5	80.5	121.5	124.5	1.5	1	2.46
	130	50	1.5	1	116	119	122	127	—	3 500	4 600	**7215BDB**	**7215BDF**	**7215BDT**	111.0	61.0	83.5	80.5	121.5	124.5	1.5	1	2.46
	130	50	1.5	1	140	141	146	151	14.6	6 400	8 500	**7215CDB**	**7215CDF**	**7215CDT**	52.5	2.5	83.5	80.5	121.5	124.5	1.5	1	2.46
	160	74	2.1	1.1	208	194	221	212	—	4 000	5 000	**7315DB**	**7315DF**	**7315DT**	104.9	30.9	87	82	148	153	2	1	6.30
	160	74	2.1	1.1	191	178	202	195	—	3 000	4 000	**7315BDB**	**7315BDF**	**7315BDT**	135.6	61.6	87	82	148	153	2	1	6.30
	160	74	2.1	1.1	223	208	236	227	13.4	5 500	7 400	**7315CDB**	**7315CDF**	**7315CDT**	68.5	5.5	87	82	148	153	2	1	6.30
	190	90	3	1.1	278	282	—	—	—	2 500	3 600	**7415DB**	**7415DF**	**7415DT**	122.7	32.7	89	—	176	183	2.5	1	11.8
	190	90	3	1.1	257	261	—	—	—	2 200	3 300	**7415BDB**	**7415BDF**	**7415BDT**	157.9	67.9	89	—	176	183	2.5	1	11.8
80	110	32	1	0.6	48.4	63.2	—	—	16.5	7 000	9 300	**7916CDB**	**7916CDF**	**7916CDT**	41.5	9.5	85.5	—	104.5	105.5	1	0.6	0.736
	110	32	1	0.6	22.2	23.9	—	—	8.8	9 300	14 000	**HAR916CDB**	**HAR916CDF**	**HAR916CDT**	41.5	9.5	85.5	—	104.5	105.5	1	0.6	0.796
	125	44	1.1	0.6	40.1	38.5	—	—	8.4	8 200	13 000	**HAR016CDB**	**HAR016CDF**	**HAR016CDT**	49.5	5.5	87	—	118	120.5	1	0.6	1.81
	125	44	1.1	0.6	86.7	101	—	—	—	4 600	5 800	**7016DB**	**7016DF**	**7016DT**	81.2	37.2	87	—	118	120.5	1	0.6	1.86
	125	44	1.1	0.6	77.7	91.3	—	—	—	3 500	4 600	**7016BDB**	**7016BDF**	**7016BDT**	108.0	64.0	87	—	118	120.5	1	0.6	1.86
	125	44	1.1	0.6	95.3	111	—	—	15.7	6 400	8 500	**7016CDB**	**7016CDF**	**7016CDT**	49.5	5.5	87	—	118	120.5	1	0.6	1.86
	140	52	2	1	139	143	145	152	—	4 300	5 400	**7216DB**	**7216DF**	**7216DT**	89.5	37.5	90	85.5	130	134.5	2	1	3.00
	140	52	2	1	125	130	131	139	—	3 200	4 300	**7216BDB**	**7216BDF**	**7216BDT**	118.3	66.3	90	85.5	130	134.5	2	1	3.00
	140	52	2	1	151	155	157	165	14.7	5 900	7 900	**7216CDB**	**7216CDF**	**7216CDT**	55.5	3.5	90	85.5	130	134.5	2	1	3.00
	170	78	2.1	1.1	226	218	239	238	—	3 800	4 700	**7316DB**	**7316DF**	**7316DT**	111.2	33.2	92	87	158	163	2	1	7.70
	170	78	2.1	1.1	207	200	219	218	—	2 800	3 800	**7316BDB**	**7316BDF**	**7316BDT**	143.9	65.9	92	87	158	163	2	1	7.70
	170	78	2.1	1.1	242	233	256	255	13.5	5 200	6 900	**7316CDB**	**7316CDF**	**7316CDT**	72.5	5.5	92	87	158	163	2	1	7.70
	200	96	3	1.1	313	332	—	—	—	2 400	3 400	**7416DB**	**7416DF**	**7416DT**	130.0	34.0	94	—	186	193	2.5	1	12.0
	200	96	3	1.1	290	307	—	—	—	2 100	3 100	**7416BDB**	**7416BDF**	**7416BDT**	167.2	71.2	94	—	186	193	2.5	1	12.0
85	120	36	1.1	0.6	63.2	81.3	—	—	16.5	6 500	8 600	**7917CDB**	**7917CDF**	**7917CDT**	45.5	9.5	92	—	113	115.5	1	0.6	1.05
	120	36	1.1	0.6	26.6	28.4	—	—	8.7	8 200	13 000	**HAR917CDB**	**HAR917CDF**	**HAR917CDT**	45.5	9.5	92	—	113	115.5	1	0.6	1.14
	130	44	1.1	0.6	40.8	40.2	—	—	8.5	7 800	12 000	**HAR017CDB**	**HAR017CDF**	**HAR017CDT**	50.8	6.8	92	—	123	125.5	1	0.6	1.89
	130	44	1.1	0.6	88.6	107	—	—	—	4 400	5 500	**7017DB**	**7017DF**	**7017DT**	84.7	40.7	92	—	123	125.5	1	0.6	1.94
	130	44	1.1	0.6	79.3	96.7	—	—	—	3 300	4 400	**7017BDB**	**7017BDF**	**7017BDT**	113.0	69.0	92	—	123	125.5	1	0.6	1.94

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

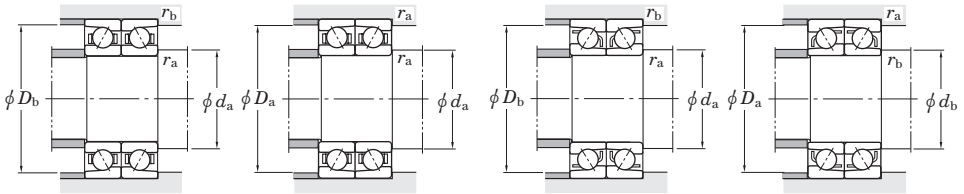
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (85) ~ (95) mm



(With machined cages) (With pressed cages)



(With machined cages) (With pressed cages)

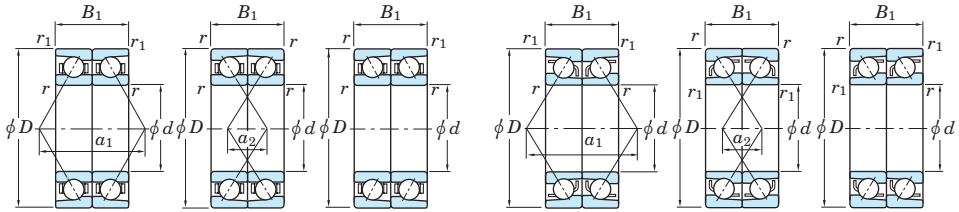
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
85	130	44	1.1	0.6	97.6	117	—	—	15.9	6 000	8 000	**7017CDB**	**7017CDF**	**7017CDT**	51.1	7.1	92	—	123	125.5	1	0.6	1.94
	150	56	2	1	160	167	167	178	—	4 000	5 000	**7217DB**	**7217DF**	**7217DT**	95.9	39.9	95	90.5	140	144.5	2	1	3.74
	150	56	2	1	145	152	151	162	—	3 000	4 000	**7217BDB**	**7217BDF**	**7217BDT**	126.6	70.6	95	90.5	140	144.5	2	1	3.74
	150	56	2	1	174	181	182	193	14.7	5 500	7 400	**7217CDB**	**7217CDF**	**7217CDT**	59.5	3.5	95	90.5	140	144.5	2	1	3.74
	180	82	3	1.1	243	243	258	265	—	3 500	4 400	**7317DB**	**7317DF**	**7317DT**	117.5	35.5	99	92	166	173	2.5	1	9.06
	180	82	3	1.1	223	223	236	244	—	2 700	3 500	**7317BDB**	**7317BDF**	**7317BDT**	152.2	70.2	99	92	166	173	2.5	1	9.06
	180	82	3	1.1	261	261	277	284	13.5	4 900	6 500	**7317CDB**	**7317CDF**	**7317CDT**	76.5	5.5	99	92	166	173	2.5	1	9.06
	210	104	4	1.5	331	360	—	—	—	2 300	3 300	**7417DB**	**7417DF**	**7417DT**	137.5	33.5	103	—	192	201.5	3	1.5	17.1
	210	104	4	1.5	307	334	—	—	—	2 000	3 000	**7417BDB**	**7417BDF**	**7417BDT**	176.2	72.2	103	—	192	201.5	3	1.5	17.1
90	125	36	1.1	0.6	64.3	85.2	—	—	16.6	6 200	8 200	**7918CDB**	**7918CDF**	**7918CDT**	46.8	10.8	97	—	118	120.5	1	0.6	1.10
	125	36	1.1	0.6	27.3	30.2	—	—	8.8	7 800	12 000	**HAR918CDB**	**HAR918CDF**	**HAR918CDT**	46.8	10.8	97	—	118	120.5	1	0.6	1.20
	140	48	1.5	1	53.3	52.1	—	—	8.4	7 300	11 000	**HAR018CDB**	**HAR018CDF**	**HAR018CDT**	54.8	6.8	98.5	—	131.5	134.5	1.5	1	2.43
	140	48	1.5	1	106	127	—	—	—	4 100	5 100	**7018DB**	**7018DF**	**7018DT**	90.4	42.4	98.5	—	131.5	134.5	1.5	1	2.52
	140	48	1.5	1	94.9	114	—	—	—	3 100	4 100	**7018BDB**	**7018BDF**	**7018BDT**	120.5	72.5	98.5	—	131.5	134.5	1.5	1	2.52
	140	48	1.5	1	116	138	—	—	15.7	5 700	7 500	**7018CDB**	**7018CDF**	**7018CDT**	54.8	6.8	98.5	—	131.5	134.5	1.5	1	2.52
	160	60	2	1	183	193	191	206	—	3 800	4 700	**7218DB**	**7218DF**	**7218DT**	102.2	42.2	100	95.5	150	154.5	2	1	4.60
	160	60	2	1	166	176	173	188	—	2 800	3 800	**7218BDB**	**7218BDF**	**7218BDT**	134.9	74.9	100	95.5	150	154.5	2	1	4.60
	160	60	2	1	199	209	208	223	14.6	5 200	6 900	**7218CDB**	**7218CDF**	**7218CDT**	63.5	3.5	100	95.5	150	154.5	2	1	4.60
	190	86	3	1.1	261	270	277	294	—	3 300	4 200	**7318DB**	**7318DF**	**7318DT**	123.9	37.9	104	97	176	183	2.5	1	10.6
	190	86	3	1.1	240	248	254	270	—	2 500	3 300	**7318BDB**	**7318BDF**	**7318BDT**	160.5	74.5	104	97	176	183	2.5	1	10.6
	190	86	3	1.1	281	289	297	315	13.5	4 600	6 100	**7318CDB**	**7318CDF**	**7318CDT**	80.5	5.5	104	97	176	183	2.5	1	10.6
	225	108	4	1.5	351	393	—	—	—	2 100	3 100	**7418DB**	**7418DF**	**7418DT**	145.0	37.0	108	—	207	216.5	3	1.5	22.8
	225	108	4	1.5	325	364	—	—	—	1 800	2 800	**7418BDB**	**7418BDF**	**7418BDT**	186.2	78.2	108	—	207	216.5	3	1.5	22.8
95	130	36	1.1	0.6	65.3	88.3	—	—	16.5	5 900	7 900	**7919CDB**	**7919CDF**	**7919CDT**	48.1	12.1	102	—	123	125.5	1	0.6	1.15
	130	36	1.1	0.6	28.1	32.1	—	—	8.8	7 400	11 000	**HAR919CDB**	**HAR919CDF**	**HAR919CDT**	48.1	12.1	102	—	123	125.5	1	0.6	1.25
	145	48	1.5	1	54.3	54.4	—	—	8.5	7 000	11 000	**HAR019CDB**	**HAR019CDF**	**HAR019CDT**	56.2	8.2	103.5	—	136.5	139.5	1.5	1	2.56
	145	48	1.5	1	108	134	—	—	—	3 900	4 800	**7019DB**	**7019DF**	**7019DT**	94.5	46.5	103.5	—	136.5	139.5	1.5	1	2.64

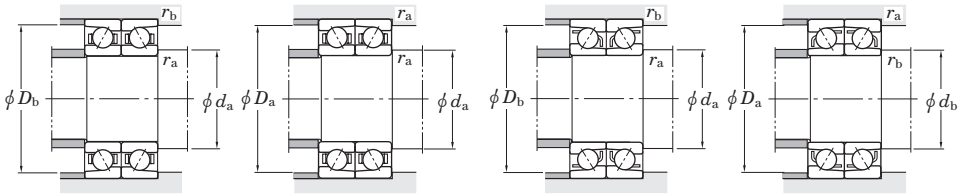
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (95) ~ (105) mm





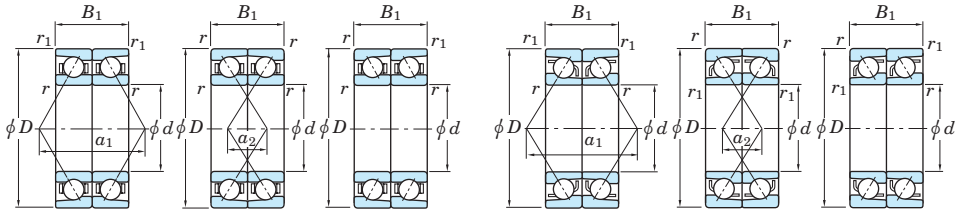
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
95	145	48	1.5	1	96.8	121	—	—	—	2 900	3 900	**7019BDB**	**7019BDF**	**7019BDT**	126.4	78.4	103.5	—	136.5	139.5	1.5	1	2.64
	145	48	1.5	1	119	147	—	—	15.9	5 300	7 100	**7019CDB**	**7019CDF**	**7019CDT**	56.7	8.7	103.5	—	136.5	139.5	1.5	1	2.64
	170	64	2.1	1.1	198	207	208	221	—	3 500	4 400	**7219DB**	**7219DF**	**7219DT**	108.5	44.5	107	102	158	163	2	1	5.56
	170	64	2.1	1.1	180	188	188	201	—	2 700	3 500	**7219BDB**	**7219BDF**	**7219BDT**	143.2	79.2	107	102	158	163	2	1	5.56
	170	64	2.1	1.1	216	224	226	240	14.6	4 900	6 500	**7219CDB**	**7219CDF**	**7219CDT**	67.5	3.5	107	102	158	163	2	1	5.56
	200	90	3	1.1	280	298	297	325	—	3 200	4 000	**7319DB**	**7319DF**	**7319DT**	130.2	40.2	109	102	186	193	2.5	1	12.2
	200	90	3	1.1	256	273	272	298	—	2 400	3 200	**7319BDB**	**7319BDF**	**7319BDT**	168.8	78.8	109	102	186	193	2.5	1	12.2
	200	90	3	1.1	300	319	318	348	13.5	4 400	5 800	**7319CDB**	**7319CDF**	**7319CDT**	84.5	5.5	109	102	186	193	2.5	1	12.2
100	140	40	1.1	0.6	90.2	117	—	—	16.3	5 500	7 400	**7920CDB**	**7920CDF**	**7920CDT**	52.1	12.1	107	—	133	135.5	1	0.6	1.55
	140	40	1.1	0.6	39.2	43.5	—	—	8.7	7 000	11 000	**HAR920CDB**	**HAR920CDF**	**HAR920CDT**	52.2	12.2	107	—	133	135.5	1	0.6	1.68
	150	48	1.5	1	55.2	56.7	—	—	8.5	6 700	10 000	**HAR020CDB**	**HAR020CDF**	**HAR020CDT**	57.5	9.5	108.5	—	141.5	144.5	1.5	1	2.64
	150	48	1.5	1	111	141	—	—	—	3 800	4 700	**7020DB**	**7020DF**	**7020DT**	96.2	48.2	108.5	—	141.5	144.5	1.5	1	2.74
	150	48	1.5	1	99.4	127	—	—	—	2 800	3 800	**7020BDB**	**7020BDF**	**7020BDT**	128.9	80.9	108.5	—	141.5	144.5	1.5	1	2.74
	150	48	1.5	1	122	154	—	—	16.0	5 200	6 900	**7020CDB**	**7020CDF**	**7020CDT**	57.5	9.5	108.5	—	141.5	144.5	1.5	1	2.74
	180	68	2.1	1.1	223	235	233	252	—	3 300	4 100	**7220DB**	**7220DF**	**7220DT**	115.4	47.4	112	—	168	173	2	1	6.64
	180	68	2.1	1.1	202	214	211	229	—	2 500	3 300	**7220BDB**	**7220BDF**	**7220BDT**	152.3	84.3	112	—	168	173	2	1	6.64
	180	68	2.1	1.1	242	254	254	273	14.6	4 600	6 100	**7220CDB**	**7220CDF**	**7220CDT**	71.8	3.8	112	107	168	173	2	1	6.64
	215	94	3	1.1	298	323	337	387	—	2 900	3 600	**7320DB**	**7320DF**	**7320DT**	138.8	44.8	114	—	201	208	2.5	1	15.1
	215	94	3	1.1	274	297	309	356	—	2 200	2 900	**7320BDB**	**7320BDF**	**7320BDT**	180.4	86.4	114	—	201	208	2.5	1	15.1
	215	94	3	1.1	320	346	361	415	13.4	4 000	5 300	**7320CDB**	**7320CDF**	**7320CDT**	89.6	4.4	114	107	201	208	2.5	1	15.1
105	145	40	1.1	0.6	92.1	123	—	—	16.4	5 300	7 100	**7921CDB**	**7921CDF**	**7921CDT**	53.5	13.5	112	—	138	140.5	1	0.6	1.62
	145	40	1.1	0.6	40.4	46.2	—	—	8.7	6 700	10 000	**HAR921CDB**	**HAR921CDF**	**HAR921CDT**	53.5	13.5	112	—	138	140.5	1	0.6	1.75
	160	52	2	1	62.6	65.1	—	—	8.5	6 300	9 800	**HAR021CDB**	**HAR021CDF**	**HAR021CDT**	61.5	9.5	115	—	150	154.5	2	1	3.37
	160	52	2	1	130	164	—	—	—	3 500	4 400	**7021DB**	**7021DF**	**7021DT**	103.7	51.7	115	—	150	154.5	2	1	3.46
	160	52	2	1	116	148	—	—	—	2 600	3 500	**7021BDB**	**7021BDF**	**7021BDT**	137.2	85.2	115	—	150	154.5	2	1	3.46
	160	52	2	1	143	179	—	—	15.9	4 800	6 400	**7021CDB**	**7021CDF**	**7021CDT**	62.0	10.0	115	—	150	154.5	2	1	3.46
	190	72	2.1	1.1	243	265	—	—	—	3 100	3 900	**7221DB**	**7221DF**	**7221DT**	122.1	50.1	117	—	178	183	2	1	7.90

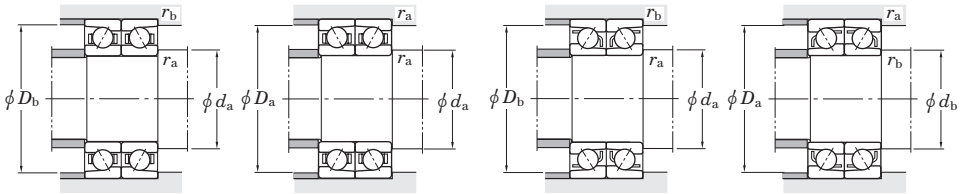
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (105) ~ (120) mm





Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
105	190	72	2.1	1.1	220	241	—	—	—	2 300	3 100	**7221BDB**	**7221BDF**	**7221BDT**	161.0	89.0	117	—	178	183	2	1	7.90
	190	72	2.1	1.1	264	287	—	—	14.6	4 300	5 700	**7221CDB**	**7221CDF**	**7221CDT**	75.9	3.9	117	—	178	183	2	1	7.90
	225	98	3	1.1	337	386	—	—	—	2 800	3 500	**7321DB**	**7321DF**	**7321DT**	144.3	46.3	119	—	211	218	2.5	1	17.2
	225	98	3	1.1	310	355	—	—	—	2 100	2 800	**7321BDB**	**7321BDF**	**7321BDT**	187.5	89.5	119	—	211	218	2.5	1	17.2
	225	98	3	1.1	362	413	—	—	13.4	3 900	5 100	**7321CDB**	**7321CDF**	**7321CDT**	93.2	4.8	119	—	211	218	2.5	1	17.2
110	150	40	1.1	0.6	93.8	129	—	—	16.5	5 100	6 800	**7922CDB**	**7922CDF**	**7922CDT**	54.8	14.8	117	—	143	145.5	1	0.6	1.68
	150	40	1.1	0.6	40.8	47.7	—	—	8.7	6 400	9 900	**HAR922CDB**	**HAR922CDF**	**HAR922CDT**	54.8	14.8	117	—	143	145.5	1	0.6	1.82
	170	56	2	1	70.5	73.9	—	—	8.5	6 000	9 200	**HAR022CDB**	**HAR022CDF**	**HAR022CDT**	65.5	9.5	120	—	160	164.5	2	1	4.22
	170	56	2	1	149	186	—	—	—	3 300	4 200	**7022DB**	**7022DF**	**7022DT**	108.9	52.9	120	—	160	164.5	2	1	4.28
	170	56	2	1	134	167	—	—	—	2 500	3 300	**7022BDB**	**7022BDF**	**7022BDT**	145.5	89.5	120	—	160	164.5	2	1	4.28
	170	56	2	1	164	203	—	—	15.7	4 600	6 100	**7022CDB**	**7022CDF**	**7022CDT**	65.5	9.5	120	—	160	164.5	2	1	4.28
	200	76	2.1	1.1	263	297	—	—	—	3 000	3 700	**7222DB**	**7222DF**	**7222DT**	128.7	52.7	122	—	188	193	2	1	9.30
	200	76	2.1	1.1	238	270	—	—	—	2 200	3 000	**7222BDB**	**7222BDF**	**7222BDT**	169.7	93.7	122	—	188	193	2	1	9.30
	200	76	2.1	1.1	286	321	—	—	14.5	4 100	5 400	**7222CDB**	**7222CDF**	**7222CDT**	80.1	4.1	122	—	188	193	2	1	9.30
	240	100	3	1.1	377	452	—	—	—	2 600	3 200	**7322DB**	**7322DF**	**7322DT**	152.7	52.7	124	—	226	233	2.5	1	20.2
	240	100	3	1.1	346	416	—	—	—	1 900	2 600	**7322BDB**	**7322BDF**	**7322BDT**	199.3	99.3	124	—	226	233	2.5	1	20.2
	240	100	3	1.1	404	484	—	—	13.4	3 500	4 700	**7322CDB**	**7322CDF**	**7322CDT**	97.7	2.3	124	—	226	233	2.5	1	20.2
120	165	44	1.1	0.6	117	162	—	—	16.5	4 700	6 200	**7924CDB**	**7924CDF**	**7924CDT**	60.2	16.2	127	—	158	160.5	1	0.6	2.30
	165	44	1.1	0.6	47.7	56.8	—	—	8.8	5 900	9 100	**HAR924CDB**	**HAR924CDF**	**HAR924CDT**	60.2	16.2	127	—	158	160.5	1	0.6	2.49
	180	56	2	1	72.9	79.9	—	—	8.5	5 600	8 600	**HAR024CDB**	**HAR024CDF**	**HAR024CDT**	68.2	12.2	130	—	170	174.5	2	1	4.52
	180	56	2	1	157	206	—	—	—	3 100	3 900	**7024DB**	**7024DF**	**7024DT**	114.6	58.6	130	—	170	174.5	2	1	4.54
	180	56	2	1	140	186	—	—	—	2 300	3 100	**7024BDB**	**7024BDF**	**7024BDT**	153.9	97.9	130	—	170	174.5	2	1	4.54
	180	56	2	1	173	226	—	—	16.0	4 300	5 700	**7024CDB**	**7024CDF**	**7024CDT**	68.2	12.2	130	—	170	174.5	2	1	4.54
	215	80	2.1	1.1	283	332	—	—	—	2 700	3 400	**7224DB**	**7224DF**	**7224DT**	137.0	57.0	132	—	203	208	2	1	11.0
	215	80	2.1	1.1	257	302	—	—	—	2 100	2 800	**7224BDB**	**7224BDF**	**7224BDT**	180.5	100.5	132	—	203	208	2	1	11.0
	215	80	2.1	1.1	308	359	—	—	14.6	3 800	5 000	**7224CDB**	**7224CDF**	**7224CDT**	85.0	5.0	132	—	203	208	2	1	11.0
	260	110	3	1.1	400	504	—	—	—	2 400	3 000	**7324DB**	**7324DF**	**7324DT**	164.7	54.7	134	—	246	253	2.5	1	25.2

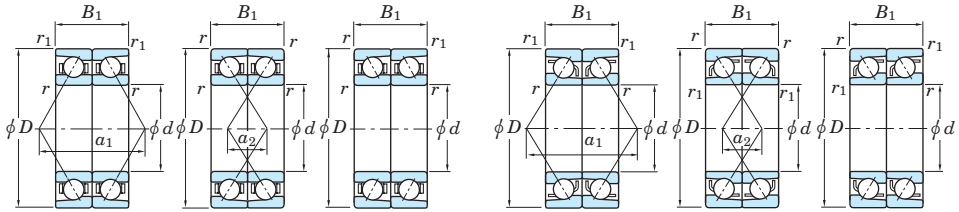
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

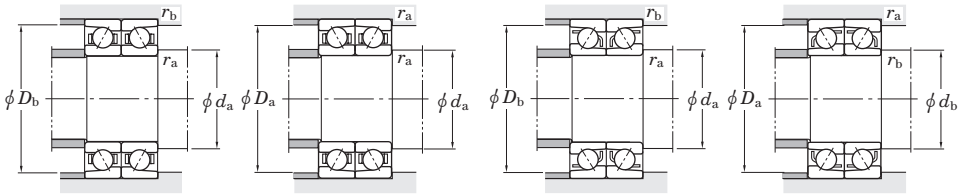
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Angular contact ball bearings (matched pair)

d (120) ~ (150) mm



(With machined cages) (With pressed cages)



(With machined cages) (With pressed cages)

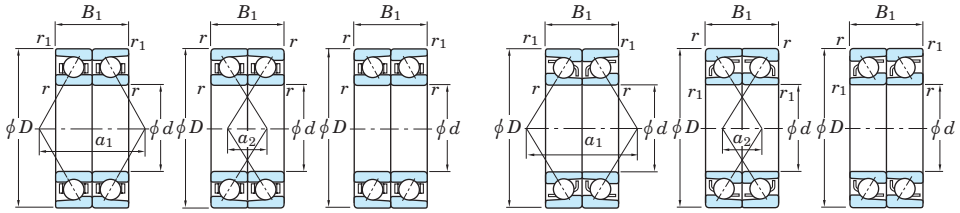
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
120	260	110	3	1.1	366	462	—	—	—	1 800	2 400	**7324BDB**	**7324BDF**	**7324BDT**	214.4	104.4	134	—	246	253	2.5	1	25.2
	260	110	3	1.1	431	542	—	—	13.7	3 300	4 400	**7324CDB**	**7324CDF**	**7324CDT**	105.9	4.1	134	—	246	253	2.5	1	25.2
130	180	48	1.5	1	142	200	—	—	16.4	4 300	5 700	**7926CDB**	**7926CDF**	**7926CDT**	65.5	17.5	138.5	—	171.5	174.5	1.5	1	3.00
	180	48	1.5	1	57.0	70.3	—	—	8.8	5 400	8 300	**HAR926CDB**	**HAR926CDF**	**HAR926CDT**	65.5	17.5	138.5	—	171.5	174.5	1.5	1	3.32
	200	66	2	1	91.5	96.7	—	—	8.5	5 100	7 800	**HAR026CDB**	**HAR026CDF**	**HAR026CDT**	77.2	11.2	140	—	190	194.5	2	1	6.77
	200	66	2	1	191	251	—	—	—	2 800	3 500	**7026DB**	**7026DF**	**7026DT**	128.3	62.3	140	—	190	194.5	2	1	6.86
	200	66	2	1	171	226	—	—	—	2 100	2 800	**7026BDB**	**7026BDF**	**7026BDT**	171.5	105.5	140	—	190	194.5	2	1	6.86
	200	66	2	1	210	274	—	—	15.9	3 900	5 100	**7026CDB**	**7026CDF**	**7026CDT**	77.2	11.2	140	—	190	194.5	2	1	6.86
	230	80	3	1.1	318	395	—	—	—	2 500	3 200	**7226DB**	**7226DF**	**7226DT**	143.9	63.9	144	—	216	223	2.5	1	12.4
	230	80	3	1.1	288	360	—	—	—	1 900	2 500	**7226BDB**	**7226BDF**	**7226BDT**	191.0	111.0	144	—	216	223	2.5	1	12.4
	230	80	3	1.1	346	428	—	—	14.7	3 500	4 700	**7226CDB**	**7226CDF**	**7226CDT**	88.2	8.2	144	—	216	223	2.5	1	12.4
	280	116	4	1.5	489	659	—	—	—	2 200	2 700	**7326DB**	**7326DF**	**7326DT**	177.5	61.5	148	—	262	271.5	3	1.5	30.8
	280	116	4	1.5	406	536	—	—	—	1 600	2 200	**7326BDB**	**7326BDF**	**7326BDT**	230.0	114.0	148	—	262	271.5	3	1.5	30.8
	280	116	4	1.5	478	629	—	—	13.7	3 000	4 000	**7326CDB**	**7326CDF**	**7326CDT**	112.9	3.1	148	—	262	271.5	3	1.5	30.8
140	190	48	1.5	1	143	210	—	—	16.6	4 000	5 400	**7928CDB**	**7928CDF**	**7928CDT**	68.2	20.2	148.5	—	181.5	184.5	1.5	1	3.18
	190	48	1.5	1	57.2	72.4	—	—	8.8	5 100	7 800	**HAR928CDB**	**HAR928CDF**	**HAR928CDT**	68.2	20.2	148.5	—	181.5	184.5	1.5	1	3.52
	210	66	2	1	99.6	112	—	—	8.5	4 800	7 400	**HAR028CDB**	**HAR028CDF**	**HAR028CDT**	79.9	13.9	150	—	200	204.5	2	1	7.24
	210	66	2	1	194	265	—	—	—	2 600	3 300	**7028DB**	**7028DF**	**7028DT**	134.1	68.1	150	—	200	204.5	2	1	7.28
	210	66	2	1	174	237	—	—	—	2 000	2 600	**7028BDB**	**7028BDF**	**7028BDT**	179.8	113.8	150	—	200	204.5	2	1	7.28
	210	66	2	1	214	290	—	—	16.0	3 600	4 800	**7028CDB**	**7028CDF**	**7028CDT**	79.9	13.9	150	—	200	204.5	2	1	7.28
	250	84	3	1.1	355	468	—	—	—	2 300	2 900	**7228DB**	**7228DF**	**7228DT**	154.6	70.6	154	—	236	243	2.5	1	15.5
	250	84	3	1.1	320	426	—	—	—	1 700	2 300	**7228BDB**	**7228BDF**	**7228BDT**	205.6	121.6	154	—	236	243	2.5	1	15.5
	250	84	3	1.1	386	508	—	—	14.8	3 200	4 300	**7228CDB**	**7228CDF**	**7228CDT**	94.2	10.2	154	—	236	243	2.5	1	15.5
	300	124	4	1.5	535	748	—	—	—	2 000	2 500	**7328DB**	**7328DF**	**7328DT**	189.0	65.0	158	—	282	291.5	3	1.5	37.6
	300	124	4	1.5	491	688	—	—	—	1 500	2 000	**7328BDB**	**7328BDF**	**7328BDT**	246.6	122.6	158	—	282	291.5	3	1.5	37.6
	300	124	4	1.5	573	802	—	—	13.4	2 800	3 700	**7328CDB**	**7328CDF**	**7328CDT**	120.9	3.1	158	—	282	291.5	3	1.5	37.6
150	210	56	2	1	187	263	—	—	16.3	3 700	4 900	**7930CDB**	**7930CDF**	**7930CDT**	76.2	20.2	160	—	200	204.5	2	1	4.94

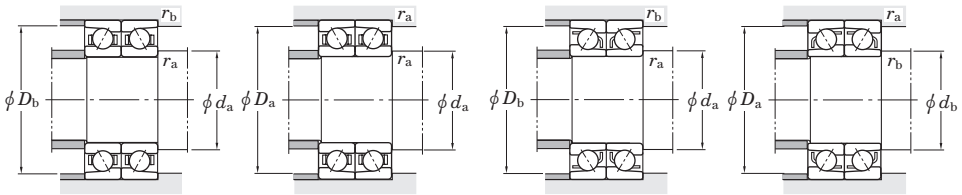
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (150) ~ (170) mm





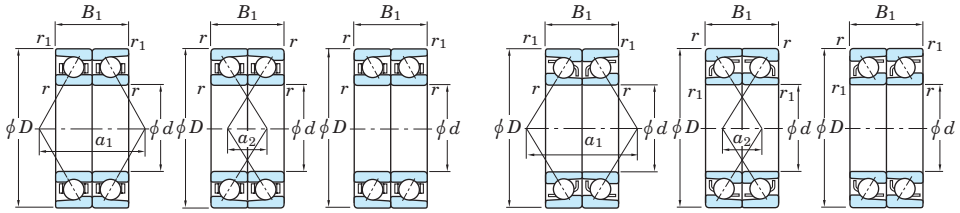
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
150	210	56	2	1	79.5	97.7	—	—	8.7	4 600	7 200	**HAR930CDB**	**HAR930CDF**	**HAR930CDT**	76.2	20.2	160	—	200	204.5	2	1	5.36
	225	70	2	1	117	132	—	—	8.5	4 200	6 500	**HAR030CDB**	**HAR030CDF**	**HAR030CDT**	85.2	15.2	160	—	215	219.5	2	1	8.72
	225	70	2.1	1.1	222	308	—	—	—	2 400	3 000	**7030DB**	**7030DF**	**7030DT**	144.2	74.2	162	—	213	218	2	1	8.86
	225	70	2.1	1.1	199	275	—	—	—	1 800	2 400	**7030BDB**	**7030BDF**	**7030BDT**	192.3	122.3	162	—	213	218	2	1	8.86
	225	70	2.1	1.1	245	337	—	—	16.1	3 300	4 400	**7030CDB**	**7030CDF**	**7030CDT**	85.6	15.6	162	—	213	218	2	1	8.86
	270	90	3	1.1	403	560	—	—	—	2 100	2 700	**7230DB**	**7230DF**	**7230DT**	166.3	76.3	164	—	256	263	2.5	1	19.5
	270	90	3	1.1	365	509	—	—	—	1 600	2 100	**7230BDB**	**7230BDF**	**7230BDT**	221.2	131.2	164	—	256	263	2.5	1	19.5
	270	90	3	1.1	439	607	—	—	14.7	2 900	3 900	**7230CDB**	**7230CDF**	**7230CDT**	101.3	11.3	164	—	256	263	2.5	1	19.5
	320	130	4	1.5	565	829	—	—	—	1 900	2 300	**7330DB**	**7330DF**	**7330DT**	200.7	70.7	168	—	302	311.5	3	1.5	44.8
	320	130	4	1.5	516	760	—	—	—	1 400	1 900	**7330BDB**	**7330BDF**	**7330BDT**	262.2	132.2	168	—	302	311.5	3	1.5	44.8
	320	130	4	1.5	607	891	—	—	13.7	2 600	3 400	**7330CDB**	**7330CDF**	**7330CDT**	128.0	2.0	168	—	302	311.5	3	1.5	44.8
160	220	56	2	1	196	289	—	—	16.5	3 500	4 700	**7932CDB**	**7932CDF**	**7932CDT**	78.9	22.9	170	—	210	214.5	2	1	5.20
	220	56	2	1	81.5	104	—	—	8.8	4 200	6 400	**HAR932CDB**	**HAR932CDF**	**HAR932CDT**	78.9	22.9	170	—	210	214.5	2	1	5.66
	240	76	2.1	1.1	127	145	—	—	8.5	4 000	6 100	**HAR032CDB**	**HAR032CDF**	**HAR032CDT**	91.6	15.6	172	—	228	233	2	1	10.8
	240	76	2.1	1.1	252	353	—	—	—	2 300	2 800	**7032DB**	**7032DF**	**7032DT**	153.5	77.5	172	—	228	233	2	1	10.9
	240	76	2.1	1.1	225	316	—	—	—	1 700	2 300	**7032BDB**	**7032BDF**	**7032BDT**	205.8	129.8	172	—	228	233	2	1	10.9
	240	76	2.1	1.1	278	386	—	—	16.0	3 100	4 100	**7032CDB**	**7032CDF**	**7032CDT**	91.6	15.6	172	—	228	233	2	1	10.9
	290	96	3	1.1	374	525	—	—	—	2 000	2 500	**7232DB**	**7232DF**	**7232DT**	177.9	81.9	174	—	276	283	2.5	1	24.2
	290	96	3	1.1	386	557	—	—	—	1 500	2 000	**7232BDB**	**7232BDF**	**7232BDT**	236.8	140.8	174	—	276	283	2.5	1	24.2
	290	96	3	1.1	465	665	—	—	15.2	2 700	3 600	**7232CDB**	**7232CDF**	**7232CDT**	108.3	12.3	174	—	276	283	2.5	1	24.2
	340	136	4	1.5	592	909	—	—	—	1 700	2 200	**7332DB**	**7332DF**	**7332DT**	212.3	76.3	178	—	322	331.5	3	1.5	52.8
	340	136	4	1.5	540	831	—	—	—	1 300	1 700	**7332BDB**	**7332BDF**	**7332BDT**	277.8	141.8	178	—	322	331.5	3	1.5	52.8
	340	136	4	1.5	640	980	—	—	14.0	2 400	3 200	**7332CDB**	**7332CDF**	**7332CDT**	135.0	1.0	168.5	—	322	331.5	3	1.5	52.8
170	230	56	2	1	199	302	—	—	16.6	3 100	4 100	**7934CDB**	**7934CDF**	**7934CDT**	81.6	25.6	180	—	220	224.5	2	1	6.42
	230	56	2	1	83.4	110	—	—	8.8	4 000	6 100	**HAR934CDB**	**HAR934CDF**	**HAR934CDT**	81.6	25.6	180	—	220	224.5	2	1	5.94
	260	84	2.1	1.1	149	173	—	—	8.5	3 700	5 700	**HAR034CDB**	**HAR034CDF**	**HAR034CDT**	99.6	15.6	182	—	248	253	2	1	14.6
	260	84	2.1	1.1	302	429	—	—	—	2 100	2 600	**7034DB**	**7034DF**	**7034DT**	166.2	82.2	182	—	248	253	2	1	15.2

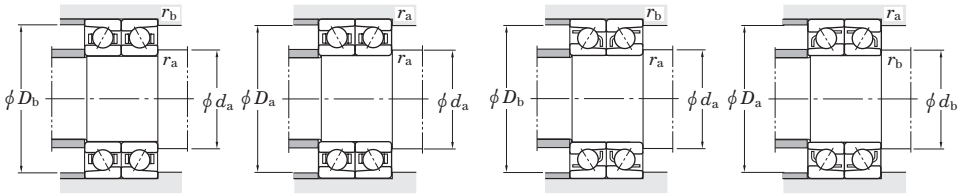
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (170) ~ 190 mm





Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
170	260	84	2.1	1.1	270	386	—	—	—	1 600	2 100	**7034BDB**	**7034BDF**	**7034BDT**	222.4	138.4	182	—	248	253	2	1	15.5
	260	84	2.1	1.1	332	469	—	—	15.9	2 900	3 800	**7034CDB**	**7034CDF**	**7034CDT**	99.6	15.6	182	—	248	253	2	1	15.1
	310	104	4	1.5	441	661	—	—	—	1 800	2 300	**7234DB**	**7234DF**	**7234DT**	190.6	86.6	188	—	292	301.5	3	1.5	30.2
	310	104	4	1.5	398	600	—	—	—	1 400	1 800	**7234BDB**	**7234BDF**	**7234BDT**	253.4	149.4	188	—	292	301.5	3	1.5	30.2
	310	104	4	1.5	482	719	—	—	15.1	2 500	3 300	**7234CDB**	**7234CDF**	**7234CDT**	116.3	12.3	188	—	292	301.5	3	1.5	30.2
	360	144	4	1.5	631	969	—	—	—	1 600	2 000	**7334DB**	**7334DF**	**7334DT**	225.0	81.0	188	—	342	351.5	3	1.5	62.4
	360	144	4	1.5	577	888	—	—	—	1 200	1 600	**7334BDB**	**7334BDF**	**7334BDT**	294.4	150.4	188	—	342	351.5	3	1.5	62.4
	360	144	4	1.5	679	1 040	—	—	13.8	2 200	3 000	**7334CDB**	**7334CDF**	**7334CDT**	143.0	1.0	188	—	342	351.5	3	1.5	62.4
180	250	66	2	1	253	375	—	—	16.4	2 800	3 700	**7936CDB**	**7936CDF**	**7936CDT**	90.6	24.6	190	—	240	244.5	2	1	9.36
	280	92	2.1	1.1	344	506	—	—	—	1 900	2 400	**7036DB**	**7036DF**	**7036DT**	178.8	86.8	192	—	268	273	2	1	20.2
	280	92	2.1	1.1	308	457	—	—	—	1 400	1 900	**7036BDB**	**7036BDF**	**7036BDT**	239.0	147.0	192	—	268	273	2	1	20.4
	280	92	2.1	1.1	378	553	—	—	15.7	2 600	3 500	**7036CDB**	**7036CDF**	**7036CDT**	107.6	15.6	192	—	268	273	2	1	19.9
	320	104	4	1.5	477	724	—	—	—	1 700	2 200	**7236DB**	**7236DF**	**7236DT**	196.3	92.3	198	—	302	311.5	3	1.5	31.4
	320	104	4	1.5	430	657	—	—	—	1 300	1 700	**7236BDB**	**7236BDF**	**7236BDT**	261.8	157.8	198	—	302	311.5	3	1.5	31.4
	320	104	4	1.5	520	786	—	—	14.9	2 400	3 200	**7236CDB**	**7236CDF**	**7236CDT**	119.0	15.0	198	—	302	311.5	3	1.5	31.4
	380	150	4	1.5	665	1 070	—	—	—	1 500	1 900	**7336DB**	**7336DF**	**7336DT**	236.7	86.7	198	—	362	371.5	3	1.5	80.0
	380	150	4	1.5	606	976	—	—	—	1 100	1 500	**7336BDB**	**7336BDF**	**7336BDT**	309.9	159.9	198	—	362	371.5	3	1.5	80.0
190	260	66	2	1	257	394	—	—	16.5	2 700	3 600	**7938CDB**	**7938CDF**	**7938CDT**	93.3	27.3	200	—	250	254.5	2	1	9.66
	290	92	2.1	1.1	353	535	—	—	—	1 800	2 300	**7038DB**	**7038DF**	**7038DT**	184.6	92.6	202	—	278	283	2	1	21.6
	290	92	2.1	1.1	316	483	—	—	—	1 400	1 800	**7038BDB**	**7038BDF**	**7038BDT**	247.4	155.4	202	—	278	283	2	1	21.6
	290	92	2.1	1.1	388	585	—	—	15.9	2 500	3 300	**7038CDB**	**7038CDF**	**7038CDT**	110.3	18.3	202	—	278	283	2	1	21.6
	340	110	4	1.5	493	779	—	—	—	1 600	2 000	**7238DB**	**7238DF**	**7238DT**	208.0	98.0	208	—	322	331.5	3	1.5	37.6
	340	110	4	1.5	443	706	—	—	—	1 200	1 600	**7238BDB**	**7238BDF**	**7238BDT**	277.4	167.4	208	—	322	331.5	3	1.5	37.6
	340	110	4	1.5	538	848	—	—	15.1	2 200	3 000	**7238CDB**	**7238CDF**	**7238CDT**	126.0	16.0	208	—	322	331.5	3	1.5	37.6
	400	156	5	2	731	1 200	—	—	—	1 400	1 800	**7338DB**	**7338DF**	**7338DT**	248.3	92.3	212	—	378	390	4	2	91.0
	400	156	5	2	668	1 100	—	—	—	1 100	1 400	**7338BDB**	**7338BDF**	**7338BDT**	325.5	169.5	212	—	378	390	4	2	91.0

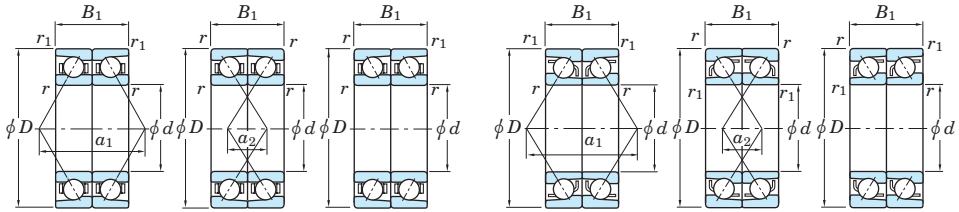
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

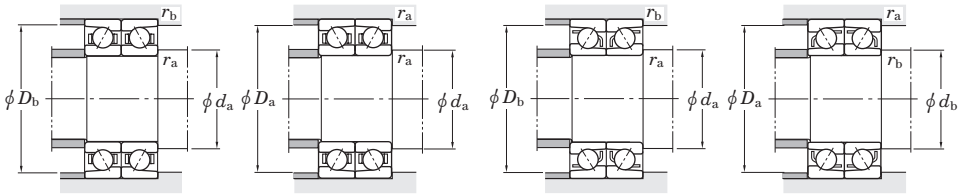
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Angular contact ball bearings (matched pair)

d 200 ~ (340) mm





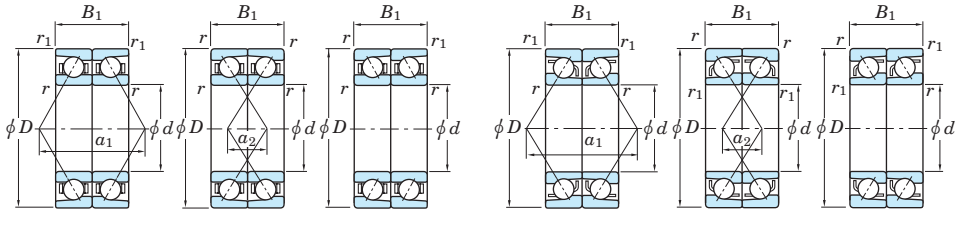
Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	(kg)
200	280	76	2.1	1.1	332	509	—	—	16.3	2 500	3 300	**7940CDB**	**7940CDF**	**7940CDT**	102.3	26.3	212	—	268	273	2	1	13.7
	310	102	2.1	1.1	396	618	—	—	—	1 700	2 100	**7040DB**	**7040DF**	**7040DT**	198.3	96.3	212	—	298	303	2	1	25.4
	310	102	2.1	1.1	355	558	—	—	—	1 300	1 700	**7040BDB**	**7040BDF**	**7040BDT**	265.0	163.0	212	—	298	303	2	1	25.4
	310	102	2.1	1.1	435	676	—	—	15.7	2 300	3 100	**7040CDB**	**7040CDF**	**7040CDT**	119.3	17.3	212	—	298	303	2	1	25.4
	360	116	4	1.5	526	847	—	—	—	1 500	1 900	**7240DB**	**7240DF**	**7240DT**	219.7	103.7	218	—	342	351.5	3	1.5	44.8
	360	116	4	1.5	474	768	—	—	—	1 100	1 500	**7240BDB**	**7240BDF**	**7240BDT**	292.9	176.9	218	—	342	351.5	3	1.5	44.8
	360	116	4	1.5	575	921	—	—	15.1	2 100	2 800	**7240CDB**	**7240CDF**	**7240CDT**	133.0	17.0	218	—	342	351.5	3	1.5	44.8
	420	160	5	2	770	1 320	—	—	—	1 300	1 700	**7340DB**	**7340DF**	**7340DT**	259.0	99.0	222	—	398	410	4	2	104
	420	160	5	2	702	1 200	—	—	—	1 000	1 300	**7340BDB**	**7340BDF**	**7340BDT**	340.1	180.1	222	—	398	410	4	2	104
220	340	112	3	1.1	434	705	—	—	—	1 500	1 900	**7044DB**	**7044DF**	—	217.8	105.8	234	—	326	333	2.5	1	37.0
	340	112	3	1.1	389	636	—	—	—	1 100	1 500	**7044BDB**	**7044BDF**	—	290.9	178.9	234	—	326	333	2.5	1	37.8
240	360	112	3	1.1	443	751	—	—	—	1 400	1 700	**7048DB**	**7048DF**	—	229.2	117.2	254	—	346	353	2.5	1	39.4
	360	112	3	1.1	397	677	—	—	—	1 000	1 400	**7048BDB**	**7048BDF**	—	307.7	195.7	254	—	346	353	2.5	1	40.2
	440	144	4	1.5	655	1 190	—	—	—	1 200	1 500	**7248DB**	**7248DF**	—	268.3	124.3	258	—	422	431.5	3	1.5	104
	440	144	4	1.5	589	1 080	—	—	—	890	1 200	**7248BDB**	**7248BDF**	—	357.3	213.3	258	—	422	431.5	3	1.5	106
260	400	130	4	1.5	529	956	—	—	—	1 200	1 500	**7052DB**	**7052DF**	—	256.7	126.7	278	—	382	391.5	3	1.5	57.4
	400	130	4	1.5	473	862	—	—	—	910	1 200	**7052BDB**	**7052BDF**	—	341.9	211.9	278	—	382	391.5	3	1.5	58.6
280	420	130	4	1.5	540	1 010	—	—	—	1 100	1 400	**7056DB**	**7056DF**	—	267.1	137.1	298	—	402	411.5	3	1.5	60.8
	420	130	4	1.5	483	906	—	—	—	850	1 100	**7056BDB**	**7056BDF**	—	358.7	228.7	298	—	402	411.5	3	1.5	62.0
300	460	148	4	1.5	693	1 360	—	—	—	1 000	1 300	**7060DB**	**7060DF**	—	293.4	145.4	318	—	442	451.5	3	1.5	87.4
	460	148	4	1.5	621	1 230	—	—	—	770	1 000	**7060BDB**	**7060BDF**	—	392.9	244.9	318	—	442	451.5	3	1.5	89.8
320	480	148	4	1.5	710	1 440	—	—	—	950	1 200	**7064DB**	**7064DF**	—	304.9	156.9	338	—	462	471.5	3	1.5	92.0
	480	148	4	1.5	636	1 300	—	—	—	710	950	**7064BDB**	**7064BDF**	—	409.6	261.6	338	—	462	471.5	3	1.5	94.4
340	520	164	5	2	816	1 720	—	—	—	860	1 100	**7068DB**	**7068DF**	—	330.3	166.3	362	—	498	510	4	2	124

[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

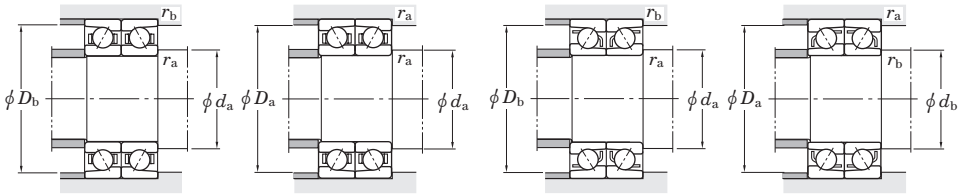
2) B, C or no indication after the bearing number indicates nominal contact angle of 40°, 15° and 30° respectively.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

d (340) ~ 380 mm



(With machined cages) (With pressed cages)



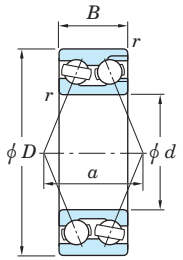
(With machined cages) (With pressed cages)

Boundary dimensions (mm)					Basic load ratings (kN)				Factor	Limiting speeds [1] (min^{-1})		Bearing No. [2]			Load center spread (mm)		Mounting dimensions (mm)						(Refer.) Mass (kg)
					With machined cages		With pressed cages																
d	D	B_1	r min.	r_1 min.	C_r	C_{0r}	C_r	C_{0r}	f_0	Grease lub.	Oil lub.	Back-to-back DB	Face-to-face DF	Tandem DT	a_1	a_2	d_a min.	d_b min.	D_a max.	D_b max.	r_a max.	r_b max.	
340	520	164	5	2	731	1 550	—	—	—	640	860	**7068BDB**	**7068BDF**	—	442.8	278.8	362	—	498	510	4	2	127
360	540	164	5	2	837	1 830	—	—	—	800	1 000	**7072DB**	**7072DF**	—	341.8	177.8	382	—	518	530	4	2	129
	540	164	5	2	750	1 650	—	—	—	600	800	**7072BDB**	**7072BDF**	—	459.6	295.6	382	—	518	530	4	2	132
380	560	164	5	2	858	1 930	—	—	—	750	940	**7076DB**	**7076DF**	—	353.4	189.4	402	—	538	550	4	2	134
	560	164	5	2	767	1 740	—	—	—	560	750	**7076BDB**	**7076BDF**	—	476.4	312.4	402	—	538	550	4	2	138

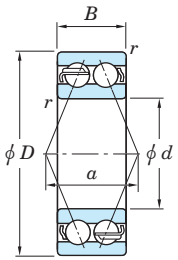
[Notes] 1) Limiting speeds shown above are applicable to machined cage bearings.
Limiting speeds of pressed cage bearings should be kept to under 80% of this value.
For bearings with 15° contact angle, this figure is applied to the high precision bearings ranked higher than class 5, used with machined cages or molded cages.

2) B or no indication after the bearing number indicates nominal contact angle of 40° and 30° respectively.
[Remark] Standard cage types used for the above bearings are described earlier in this section.

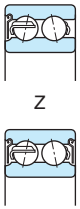
d 10 ~ (40) mm



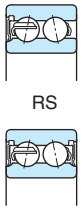
32, 33 series
(With filling slot)



Open

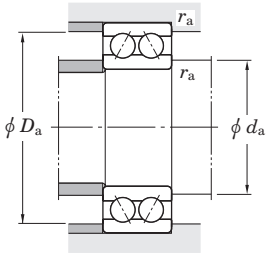


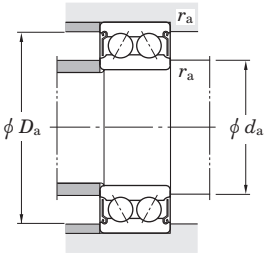
Shielded



Contact sealed

52, 53 series
(Without filling slot)





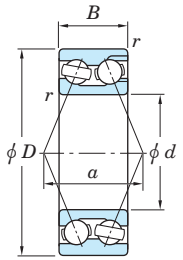
Boundary dimensions (mm)				Basic load ratings (kN)				Limiting speeds (min^{-1})			Bearing No.			Load center spread (mm)	Mounting dimensions [1] (mm)				(Refer.) Mass
				Open		Shielded/sealed		Grease lub.		Oil lub.									
d	D	B	r min.	C_r	C_{0r}	C_r	C_{0r}	Open Z, ZZ	(RS, 2RS)	Open Z	Open	Shielded	Sealed	Open a	d_a min.	d_a max.	D_a max.	r_a max.	(kg)
10	30	14.3	0.6	7.35	5.35	—	—	15 000	—	20 000	**3200**	—	—	19.5	14.5	—	25.5	0.6	0.052
12	32	15.9	0.6	9.70	7.15	—	—	14 000	—	18 000	**3201**	—	—	21.7	16.5	—	27.5	0.6	0.063
15	35	15.9	0.6	9.70	7.45	—	—	12 000	—	16 000	**3202**	—	—	23.6	19.5	—	30.5	0.6	0.072
	42	19	1	15.2	11.9	—	—	10 000	—	14 000	**3302**	—	—	27.6	20.5	—	36.5	1	0.132
17	40	17.5	0.6	13.8	10.8	—	—	11 000	—	14 000	**3203**	—	—	26.6	21.5	—	35.5	0.6	0.100
	40	17.5	0.6	13.2	8.15	12.7	8.35	11 000	11 000	14 000	**5203**	**5203 ZZ**	**5203 2RS**	20.0	21.5	23.5	35.5	0.6	0.091
	47	22.2	1	21.7	17.1	—	—	9 400	—	13 000	**3303**	—	—	31.0	22.5	—	41.5	1	0.192
20	47	20.6	1	17.2	15.0	—	—	9 000	—	12 000	**3204**	—	—	31.5	25.5	—	41.5	1	0.170
	47	20.6	1	19.7	12.5	16.0	10.8	8 800	8 800	12 000	**5204**	**5204 ZZ**	**5204 2RS**	23.5	25.5	26.6	41.5	1	0.120
	52	22.2	1.1	20.8	18.4	—	—	8 200	—	11 000	**3304**	—	—	33.8	27	—	45	1	0.230
	52	22.2	1.1	24.7	15.0	19.8	12.8	8 300	8 300	11 000	**5304**	**5304 ZZ**	**5304 2RS**	25.9	27	28.3	45	1	0.230
25	52	20.6	1	18.9	18.2	—	—	7 800	—	10 000	**3205**	—	—	34.4	30.5	—	46.5	1	0.190
	52	20.6	1	21.4	14.8	18.9	13.8	7 700	7 700	10 000	**5205**	**5205 ZZ**	**5205 2RS**	26.1	30.5	32.3	46.5	1	0.190
	62	25.4	1.1	28.9	26.5	—	—	6 800	—	9 100	**3305**	—	—	40.5	32	—	55	1	0.369
	62	25.4	1.1	32.7	20.8	27.5	18.5	6 900	6 900	9 200	**5305**	**5305 ZZ**	**5305 2RS**	31.1	32	33.4	55	1	0.340
30	62	23.8	1	27.3	27.0	—	—	6 500	—	8 700	**3206**	—	—	40.7	35.5	—	56.5	1	0.320
	62	23.8	1	29.7	21.3	25.4	18.3	6 400	6 400	8 600	**5206**	**5206 ZZ**	**5206 2RS**	30.8	35.5	38.6	56.5	1	0.290
	72	30.2	1.1	38.1	36.1	—	—	5 800	—	7 800	**3306**	—	—	47.2	37	—	65	1	0.585
	72	30.2	1.1	41.0	28.5	34.3	25.2	5 800	5 800	7 700	**5306**	**5306 ZZ**	**5306 2RS**	36.2	37	41.3	65	1	0.510
35	72	27	1.1	36.8	37.5	—	—	5 600	—	7 500	**3207**	—	—	46.9	42	—	65	1	0.480
	72	27	1.1	39.2	29.0	31.7	24.6	5 500	5 500	7 300	**5207**	**5207 ZZ**	**5207 2RS**	36.1	42	43.9	65	1	0.430
	80	34.9	1.5	48.6	46.8	—	—	5 200	—	7 000	**3307**	—	—	53.4	43.5	—	71.5	1.5	0.816
	80	34.9	1.5	51.2	36.2	46.1	32.8	5 100	5 100	6 800	**5307**	**5307 ZZ**	**5307 2RS**	41.0	43.5	45.5	71.5	1.5	0.790
40	80	30.2	1.1	42.0	43.9	—	—	5 000	—	6 700	**3208**	—	—	52.6	47	—	73	1	0.650

[Note] 1) The maximum value of d_a is applied to shielded and sealed type bearings.

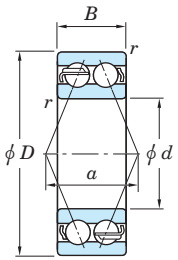
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Double-row angular contact ball bearings

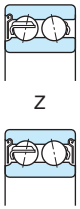
d (40) ~ (70) mm



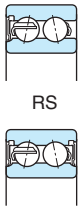
32, 33 series
(With filling slot)



Open

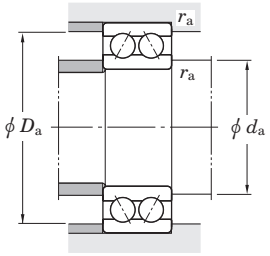


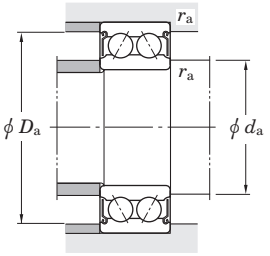
Shielded



Contact sealed

52, 53 series
(Without filling slot)



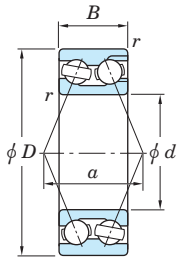


Boundary dimensions (mm)				Basic load ratings (kN)				Limiting speeds (min^{-1})			Bearing No.			Load center spread (mm)	Mounting dimensions [1] (mm)				(Refer.) Mass
				Open		Shielded/sealed		Grease lub.		Oil lub.									
d	D	B	r min.	C_r	C_{0r}	C_r	C_{0r}	Open Z, ZZ	(RS, 2RS)	Open Z	Open	Shielded	Sealed	Open a	d_a min.	d_a max.	D_a max.	r_a max.	(kg)
40	80	30.2	1.1	44.4	33.6	36.5	29.1	5 000	5 000	6 700	**5208**	**5208 ZZ**	**5208 2RS**	39.2	47	49.5	73	1	0.570
	90	36.5	1.5	54.1	53.8	—	—	4 600	—	6 100	**3308**	—	—	58.9	48.5	—	81.5	1.5	1.07
	90	36.5	1.5	62.7	45.4	51.4	37.8	4 600	4 600	6 100	**5308**	**5308 ZZ**	**5308 2RS**	44.9	48.5	52.1	81.5	1.5	1.05
45	85	30.2	1.1	45.4	51.4	—	—	4 600	—	6 100	**3209**	—	—	56.3	52	—	78	1	0.710
	85	30.2	1.1	49.9	38.4	41.7	33.9	4 600	4 600	6 100	**5209**	**5209 ZZ**	**5209 2RS**	42.2	52	55.3	78	1	0.620
	100	39.7	1.5	66.1	67.3	—	—	4 100	—	5 500	**3309**	—	—	65.6	53.5	—	91.5	1.5	1.42
	100	39.7	1.5	75.1	55.7	68.9	51.4	4 100	4 100	5 500	**5309**	**5309 ZZ**	**5309 2RS**	51.0	53.5	58.2	91.5	1.5	1.42
50	90	30.2	1.1	45.1	52.1	—	—	4 300	—	5 700	**3210**	—	—	58.8	57	—	83	1	0.760
	90	30.2	1.1	53.3	43.6	44.1	37.9	4 300	4 300	5 600	**5210**	**5210 ZZ**	**5210 2RS**	44.5	57	58.9	83	1	0.670
	110	44.4	2	86.1	88.6	—	—	3 800	—	5 000	**3310**	—	—	71.7	60	—	100	2	1.95
	110	44.4	2	88.5	67.0	81.8	62.2	3 600	3 600	4 800	**5310**	**5310 ZZ**	**5310 2RS**	56.6	60	64.4	100	2	1.93
55	100	33.3	1.5	50.9	60.2	—	—	3 900	—	5 100	**3211**	—	—	65.0	63.5	—	91.5	1.5	1.05
	100	33.3	1.5	65.9	55.2	52.9	44.7	3 800	3 800	5 100	**5211**	**5211 ZZ**	**5211 2RS**	50.2	63.5	66.2	91.5	1.5	0.960
	120	49.2	2	101	106	—	—	3 400	—	4 500	**3311**	—	—	79.3	65	—	110	2	2.53
	120	49.2	2	110	85.1	95.7	74.3	3 300	3 300	4 500	**5311**	**5311 ZZ**	**5311 2RS**	61.6	65	71.8	110	2	2.30
60	110	36.5	1.5	64.0	76.8	—	—	3 500	—	4 700	**3212**	—	—	71.3	68.5	—	101.5	1.5	1.40
	110	36.5	1.5	74.4	60.8	62.6	55.9	3 500	3 500	4 700	**5212**	**5212 ZZ**	**5212 2RS**	53.8	68.5	74.1	101.5	1.5	1.36
	130	54	2.1	125	132	—	—	3 100	—	4 200	**3312**	—	—	87.4	72	—	118	2	3.24
	130	54	2.1	126	98.7	110	87.1	3 100	3 100	4 100	**5312**	**5312 ZZ**	**5312 2RS**	67.2	72	79.2	118	2	3.16
65	120	38.1	1.5	76.4	97.4	—	—	3 200	—	4 300	**3213**	—	—	76.8	73.5	—	111.5	1.5	1.75
	120	38.1	1.5	86.9	75.3	69.2	63.1	3 200	3 200	4 300	**5213**	**5213 ZZ**	**5213 2RS**	58.8	73.5	79.0	111.5	1.5	1.66
	140	58.7	2.1	142	153	—	—	2 900	—	3 900	**3313**	—	—	92.7	77	—	128	2	4.08
	140	58.7	2.1	142	113	142	113	2 900	2 900	3 900	**5313**	**5313 ZZ**	**5313 2RS**	70.9	77	85.9	128	2	3.91
70	125	39.7	1.5	77.9	96.4	—	—	3 100	—	4 100	**3214**	—	—	80.7	78.5	—	116.5	1.5	1.92
	125	39.7	1.5	94.5	82.6	76.3	70.3	3 100	3 100	4 100	**5214**	**5214 ZZ**	**5214 2RS**	61.4	78.5	83.5	116.5	1.5	1.81
	150	63.5	2.1	151	160	—	—	2 700	—	3 600	**3314**	—	—	99.7	82	—	138	2	5.04

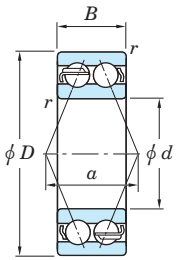
[Note] 1) The maximum value of d_a is applied to shielded and sealed type bearings.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

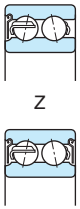
d (70) ~ 110 mm



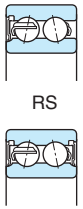
32, 33 series
(With filling slot)



Open

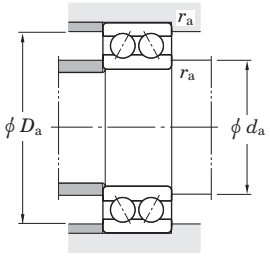


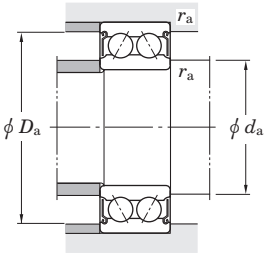
Shielded



Contact sealed

52, 53 series
(Without filling slot)



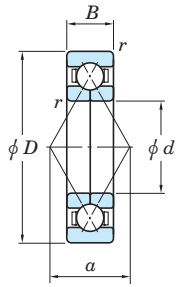


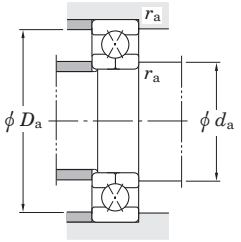
Boundary dimensions (mm)				Basic load ratings (kN)				Limiting speeds (min^{-1})			Bearing No.			Load center spread (mm)	Mounting dimensions [1] (mm)				(Refer.) Mass
				Open		Shielded/sealed		Grease lub.		Oil lub.				Open					
d	D	B	r min.	C_r	C_{0r}	C_r	C_{0r}	Open Z, ZZ	(RS, 2RS)	Open Z	Open	Shielded	Sealed	a	d_a min.	d_a max.	D_a max.	r_a max.	(kg)
70	150	63.5	2.1	160	129	160	129	2 700	2 700	3 600	**5314**	**5314 ZZ**	**5314 2RS**	76.0	82	92.9	138	2	4.89
75	130	41.3	1.5	92.4	120	—	—	2 900	—	3 900	**3215**	—	—	84.7	83.5	—	121.5	1.5	2.10
	160	68.3	2.1	169	189	—	—	2 500	—	3 300	**3315**	—	—	108.7	87	—	148	2	6.16
	160	68.3	2.1	174	147	174	147	2 500	2 500	3 300	**5315**	**5315 ZZ**	**5315 2RS**	81.5	87	99.6	148	2	5.97
80	140	44.4	2	97.5	121	—	—	2 700	—	3 600	**3216**	—	—	90.7	90	—	130	2	2.64
	170	68.3	2.1	184	213	—	—	2 400	—	3 100	**3316**	—	—	113.1	92	—	158	2	6.93
85	150	49.2	2	114	143	—	—	2 500	—	3 400	**3217**	—	—	98.4	95	—	140	2	3.39
	180	73	3	188	219	—	—	2 200	—	3 000	**3317**	—	—	118.8	99	—	166	2.5	8.30
90	160	52.4	2	132	167	—	—	2 400	—	3 100	**3218**	—	—	104.1	100	—	150	2	4.14
	190	73	3	205	242	—	—	2 100	—	2 800	**3318**	—	—	125.5	104	—	176	2.5	9.23
95	170	55.6	2.1	152	193	—	—	2 200	—	3 000	**3219**	—	—	110.6	107	—	158	2	5.00
	200	77.8	3	218	270	—	—	2 000	—	2 600	**3319**	—	—	132.2	109	—	186	2.5	10.9
100	180	60.3	2.1	172	221	—	—	2 100	—	2 800	**3220**	—	—	116.8	112	—	168	2	6.10
	215	82.6	3	249	324	—	—	1 800	—	2 500	**3320**	—	—	140.4	114	—	201	2.5	13.5
105	190	65.1	2.1	182	237	—	—	2 000	—	2 600	**3221**	—	—	124.2	117	—	178	2	7.37
	225	87.3	3	265	354	—	—	1 800	—	2 300	**3321**	—	—	148.1	119	—	211	2.5	15.6
110	200	69.8	2.1	201	263	—	—	1 900	—	2 500	**3222**	—	—	131.4	122	—	188	2	8.80
	240	92.1	3	281	388	—	—	1 600	—	2 200	**3322**	—	—	156.4	124	—	226	2.5	18.9

[Note] 1) The maximum value of d_a is applied to shielded and sealed type bearings.

[Remark] Standard cage types used for the above bearings are described earlier in this section.

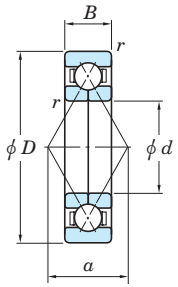
d 20 ~ 75 mm

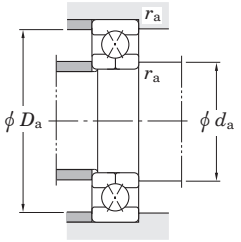




Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Load center spread (mm)		Mounting dimensions (mm)			(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.		a		d_a min.	D_a max.	r_a max.	(kg)
20	47	14	1	23.5	15.3	12 000	16 000	**6204BI**	23.5		25.5	41.5	1	0.129
	52	15	1.1	27.4	18.1	11 000	15 000	**6304BI**	25.2		27.0	45	1	0.179
25	52	15	1	26.7	18.8	10 000	14 000	**6205BI**	27.0		30.5	46.5	1	0.156
	62	17	1.1	40.8	28.0	9 200	13 000	**6305BI**	30.5		32	55	1	0.285
30	62	16	1	36.3	27.6	8 600	12 000	**6206BI**	32.6		35.5	56.5	1	0.241
	72	19	1.1	49.5	36.6	7 800	11 000	**6306BI**	35.7		37	65	1	0.426
35	72	17	1.1	47.1	36.7	7 500	10 000	**6207BI**	37.5		42	65	1	0.351
	80	21	1.5	61.2	46.4	7 000	9 600	**6307BI**	40.3		43.5	71.5	1.5	0.565
40	80	18	1.1	55.9	46.5	6 600	9 000	**6208BI**	42.7		47	73	1	0.451
	90	23	1.5	74.1	57.6	6 200	8 500	**6308BI**	45.5		48.5	81.5	1.5	0.778
45	85	19	1.1	58.7	51.3	6 100	8 400	**6209BI**	45.9		52	78	1	0.512
	100	25	1.5	87.9	70.0	5 500	7 600	**6309BI**	50.8		53.5	91.5	1.5	1.04
50	90	20	1.1	65.4	58.0	5 700	7 900	**6210BI**	49.0		57	83	1	0.575
	110	27	2	103	83.7	5 000	6 900	**6310BI**	56.0		60	100	2	1.35
55	100	21	1.5	80.0	72.3	5 200	7 100	**6211BI**	54.3		63.5	91.5	1.5	0.763
	120	29	2	119	98.5	4 500	6 200	**6311BI**	61.3		65	110	2	1.72
60	110	22	1.5	91.7	87.6	4 600	6 300	**6212BI**	60.6		68.5	101.5	1.5	0.983
	130	31	2.1	145	126	4 100	5 700	**6312BI**	67.2		72	118	2	2.17
65	120	23	1.5	95.1	90.1	4 300	5 900	**6213BI**	64.8		73.5	111.5	1.5	1.23
	140	33	2.1	164	145	3 800	5 300	**6313BI**	72.1		77	128	2	2.67
70	125	24	1.5	103	99.0	4 100	5 600	**6214BI**	68.3		78.5	116.5	1.5	1.35
	150	35	2.1	184	165	3 600	4 900	**6314BI**	77.0		82	138	2	3.25
75	130	25	1.5	108	108	3 900	5 300	**6215BI**	71.8		83.5	121.5	1.5	1.47
	160	37	2.1	200	187	3 400	4 600	**6315BI**	82.3		87	148	2	3.90

d 80 ~ 110 mm

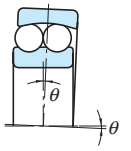




Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Load center spread (mm)		Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.		a		d_a min.	D_a max.	r_a max.	
80	140	26	2	126	128	3 600	4 900	**6216BI**	77.0		90	130	2	1.80
	170	39	2.1	217	210	3 100	4 300	**6316BI**	87.5		92	158	2	4.63
85	150	28	2	146	150	3 400	4 600	**6217BI**	82.3		95	140	2	2.25
	180	41	3	234	234	3 000	4 100	**6317BI**	92.8		99	166	2.5	5.45
90	160	30	2	167	173	3 100	4 300	**6218BI**	87.5		100	150	2	2.77
	190	43	3	252	260	2 800	3 800	**6318BI**	98.0		104	176	2.5	6.36
95	170	32	2.1	190	198	3 000	4 100	**6219BI**	92.8		107	158	2	3.37
	200	45	3	269	287	2 600	3 600	**6319BI**	103.3		109	186	2.5	7.37
100	180	34	2.1	201	213	2 800	3 800	**6220BI**	98.0		112	168	2	4.02
110	200	38	2.1	242	275	2 500	3 400	**6222BI**	108.5		122	188	2	5.64

Self-aligning ball bearings

Self-aligning ball bearings have a spherical outer ring raceway, the center of whose curvature meets that of the bearing itself, so that the inner ring, balls and cage continue to rotate, aligning themselves if they have become misaligned within design limits.



θ : Allowable aligning angle

This type of bearing is suitable when the displacement of the centers around which the shaft and housing rotate and shaft deflection are likely to occur.

Bearings with a tapered bore can easily be fit to the shaft with an adapter assembly.

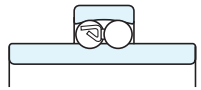
Self-aligning ball bearings

Cylindrical bore　Tapered bore

Bore diameter **5 – 110** mm

Sealed type

Bore diameter **10 – 110** mm



Extended inner ring type

Bore diameter **20 – 60** mm

Adapter assemblies

Bore diameter **17 – 100** mm

Boundary dimensions	The dimensions of standard series are as specified in JIS B 1512.
Tolerances	As specified in JIS B 1514-1, class 0. (refer to Table 7-3 on pp. A 54 – A 57.)
Radial internal clearance	As specified in JIS B 1520. (refer to Table 10-6 on p. A 99.)
Recommended fits	Refer to Table 9-4 on pp. A 85, 86.
Standard cages	● Staggered type pressed steel cage (application : all dimensional range of 12, 13, 112, 113, 22...2RS and 23...2RS series) ● Snap type pressed steel cage (application : all dimensional range of 22 series and those of No. 2300 thru 2316.) ● Copper alloy machined cage (application : bearings of No. 2317 thru 2322)
Allowable aligning angle	· 12 and 22 series ..... 0.044 rad (2.5°) · 13 and 23 series ..... 0.052 rad (3°) · 22...2RS and 23...2RS series ..... 0.026 rad (1.5°)

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$F_a/F_r \leqq e$		$F_a/F_r > e$	
X	Y	X	Y
1	Y_1	0.65	Y_2

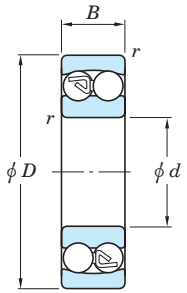
Static equivalent radial load

$P_{0r} = F_r + Y_0F_a$

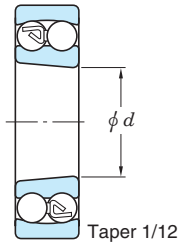
Refer to the bearing specification table for values of e, Y_1, Y_2 and Y_0.

Self-aligning ball bearings
open type

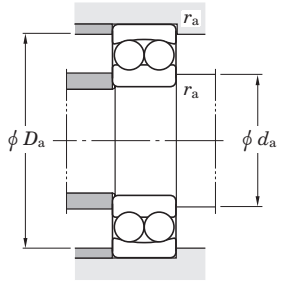
d 5 ~ (20) mm



Cylindrical bore



Tapered bore

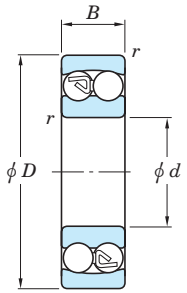


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
5	19	6	0.3	2.55	0.48	30 000	37 000	**135**	—	7	17	0.3	0.34	1.86	2.87	1.94	0.009	—
6	19	6	0.3	2.50	0.48	30 000	37 000	**126**	—	8	17	0.3	0.34	1.86	2.87	1.94	0.009	—
7	22	7	0.3	2.65	0.56	27 000	33 000	**127**	—	9	20	0.3	0.35	1.82	2.82	1.91	0.014	—
8	22	7	0.3	2.60	0.56	26 000	33 000	**108**	—	10	20	0.3	0.35	1.82	2.82	1.91	0.014	—
9	26	8	0.6	3.80	0.80	23 000	29 000	**129**	—	13	22	0.6	0.34	1.86	2.87	1.94	0.022	—
10	30	9	0.6	5.50	1.20	23 000	28 000	**1200**	—	14	26	0.6	0.33	1.92	2.97	2.01	0.034	—
	30	14	0.6	7.40	1.60	23 000	29 000	**2200**	—	14	26	0.6	0.59	1.07	1.65	1.12	0.047	—
	35	11	0.6	7.25	1.60	20 000	24 000	**1300**	—	14	31	0.6	0.34	1.85	2.87	1.94	0.058	—
	35	17	0.6	9.30	2.10	18 000	24 000	**2300**	—	14	31	0.6	0.59	1.07	1.66	1.13	0.085	—
12	32	10	0.6	5.60	1.25	21 000	26 000	**1201**	—	16	28	0.6	0.33	1.89	2.93	1.98	0.040	—
	32	14	0.6	7.65	1.75	21 000	26 000	**2201**	—	16	28	0.6	0.53	1.18	1.83	1.24	0.053	—
	37	12	1	9.40	2.15	18 000	22 000	**1301**	—	17	32	1	0.36	1.77	2.74	1.86	0.067	—
	37	17	1	9.70	2.30	16 000	22 000	**2301**	—	17	32	1	0.54	1.17	1.81	1.23	0.095	—
15	35	11	0.6	7.45	1.75	18 000	22 000	**1202**	—	19	31	0.6	0.33	1.90	2.95	2.00	0.049	—
	35	14	0.6	7.70	1.85	18 000	22 000	**2202**	—	19	31	0.6	0.50	1.27	1.97	1.33	0.060	—
	42	13	1	9.55	2.30	16 000	20 000	**1302**	—	20	37	1	0.34	1.86	2.88	1.95	0.094	—
	42	17	1	12.1	2.90	14 000	20 000	**2302**	—	20	37	1	0.50	1.27	1.96	1.33	0.114	—
17	40	12	0.6	7.90	2.00	16 000	20 000	**1203**	—	21	36	0.6	0.31	2.03	3.14	2.12	0.073	—
	40	16	0.6	9.80	2.40	16 000	20 000	**2203**	—	21	36	0.6	0.50	1.27	1.96	1.33	0.088	—
	47	14	1	12.5	3.20	14 000	17 000	**1303**	—	22	42	1	0.33	1.92	2.97	2.01	0.130	—
	47	19	1	14.5	3.60	13 000	18 000	**2303**	—	22	42	1	0.49	1.28	1.98	1.34	0.158	—
20	47	14	1	9.90	2.60	14 000	17 000	**1204**	**1204K**	25	42	1	0.29	2.16	3.35	2.27	0.120	0.118
	47	18	1	12.6	3.30	14 000	17 000	**2204**	**2204K**	25	42	1	0.48	1.31	2.02	1.37	0.140	0.136
	52	15	1.1	12.4	3.30	13 000	15 000	**1304**	**1304K**	26.5	45.5	1	0.30	2.12	3.28	2.22	0.163	0.161

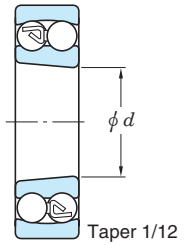
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings
open type

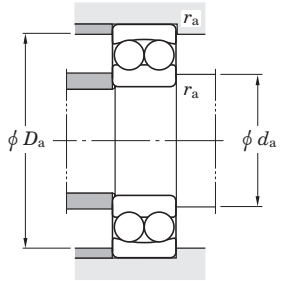
d (20) ~ 50 mm



Cylindrical bore



Tapered bore

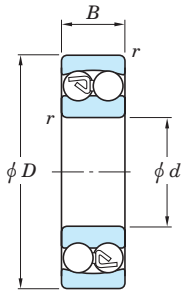


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore		d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
20	52	21	1.1	18.0	4.70	11 000	15 000	**2304**	**2304K**		26.5	45.5	1	0.49	1.29	2.00	1.35	0.209	0.205
25	52	15	1	12.1	3.30	12 000	14 000	**1205**	**1205K**		30	47	1	0.28	2.28	3.52	2.39	0.141	0.138
	52	18	1	12.6	3.50	12 000	15 000	**2205**	**2205K**		30	47	1	0.40	1.58	2.45	1.66	0.163	0.158
	62	17	1.1	18.0	5.00	9 900	12 000	**1305**	**1305K**		31.5	55.5	1	0.27	2.31	3.57	2.42	0.257	0.252
	62	24	1.1	24.4	6.60	9 400	13 000	**2305**	**2305K**		31.5	55.5	1	0.46	1.36	2.10	1.42	0.335	0.327
30	62	16	1	15.6	4.65	9 900	12 000	**1206**	**1206K**		35	57	1	0.25	2.55	3.94	2.67	0.220	0.216
	62	20	1	15.6	4.65	10 000	12 000	**2206**	**2206K**		35	57	1	0.35	1.79	2.77	1.87	0.260	0.254
	72	19	1.1	21.3	6.30	8 700	11 000	**1306**	**1306K**		36.5	65.5	1	0.26	2.40	3.72	2.52	0.387	0.381
	72	27	1.1	31.4	8.75	8 000	11 000	**2306**	**2306K**		36.5	65.5	1	0.44	1.44	2.23	1.51	0.500	0.489
35	72	17	1.1	15.8	5.10	8 500	10 000	**1207**	**1207K**		41.5	65.5	1	0.23	2.71	4.20	2.84	0.323	0.317
	72	23	1.1	21.6	6.60	8 500	10 000	**2207**	**2207K**		41.5	65.5	1	0.37	1.71	2.65	1.79	0.403	0.396
	80	21	1.5	25.1	7.85	7 600	9 300	**1307**	**1307K**		43	72	1.5	0.25	2.48	3.84	2.60	0.510	0.502
	80	31	1.5	39.4	11.3	7 100	9 800	**2307**	**2307K**		43	72	1.5	0.45	1.39	2.15	1.46	0.675	0.657
40	80	18	1.1	19.2	6.50	7 500	9 200	**1208**	**1208K**		46.5	73.5	1	0.22	2.83	4.38	2.97	0.417	0.411
	80	23	1.1	22.4	7.40	7 600	9 300	**2208**	**2208K**		46.5	73.5	1	0.33	1.92	2.96	2.01	0.505	0.494
	90	23	1.5	29.5	9.70	6 900	8 400	**1308**	**1308K**		48	82	1.5	0.25	2.57	3.98	2.69	0.715	0.704
	90	33	1.5	44.9	13.5	6 200	8 600	**2308**	**2308K**		48	82	1.5	0.43	1.47	2.27	1.54	0.925	0.903
45	85	19	1.1	21.8	7.35	7 000	8 500	**1209**	**1209K**		51.5	78.5	1	0.21	2.94	4.56	3.09	0.465	0.459
	85	23	1.1	23.3	8.15	7 000	8 500	**2209**	**2209K**		51.5	78.5	1	0.30	2.09	3.23	2.19	0.545	0.533
	100	25	1.5	38.1	12.7	6 100	7 500	**1309**	**1309K**		53	92	1.5	0.25	2.56	3.95	2.68	0.957	0.942
	100	36	1.5	54.4	16.7	5 600	7 700	**2309**	**2309K**		53	92	1.5	0.42	1.51	2.33	1.58	1.23	1.20
50	90	20	1.1	22.7	8.10	6 500	7 900	**1210**	**1210K**		56.5	83.5	1	0.21	3.07	4.76	3.22	0.525	0.515
	90	23	1.1	23.3	8.50	6 500	7 900	**2210**	**2210K**		56.5	83.5	1	0.27	2.33	3.61	2.45	0.590	0.577
	110	27	2	43.4	14.1	5 600	6 800	**1310**	**1310K**		59	101	2	0.23	2.70	4.17	2.83	1.21	1.19
	110	40	2	64.6	20.3	5 100	7 000	**2310**	**2310K**		59	101	2	0.40	1.56	2.41	1.63	1.64	1.60

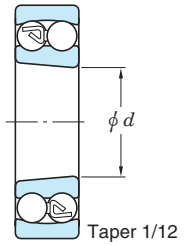
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings
open type

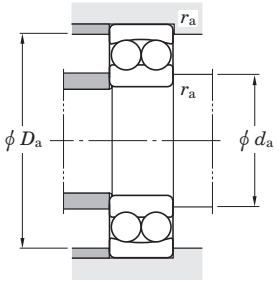
d 55 ~ (85) mm



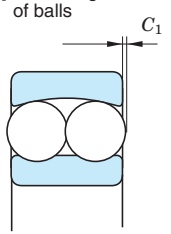
Cylindrical bore



Tapered bore



[Note] Protruding distance of balls



Balls of the following bearing protrude by C_1 from the bearing side.

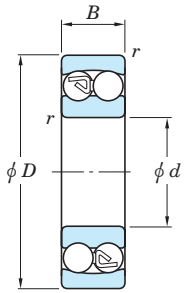
Bearing No.	C_1 (mm)
2216	0.2 (approx.)

Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
55	100	21	1.5	26.8	10.0	5 800	7 100	**1211**	**1211K**	63	92	1.5	0.20	3.19	4.94	3.34	0.705	0.693
	100	25	1.5	26.8	10.0	5 800	7 100	**2211**	**2211K**	63	92	1.5	0.27	2.35	3.64	2.47	0.810	0.792
	120	29	2	51.3	17.9	5 000	6 200	**1311**	**1311K**	64	111	2	0.23	2.70	4.18	2.83	1.58	1.56
	120	43	2	75.3	24.0	4 600	6 400	**2311**	**2311K**	64	111	2	0.41	1.53	2.37	1.60	2.10	2.05
60	110	22	1.5	30.2	11.5	5 200	6 400	**1212**	**1212K**	68	102	1.5	0.19	3.37	5.22	3.53	0.900	0.885
	110	28	1.5	34.1	12.6	5 300	6 500	**2212**	**2212K**	68	102	1.5	0.28	2.26	3.49	2.36	1.09	1.07
	130	31	2.1	57.2	20.8	4 500	5 500	**1312**	**1312K**	71	119	2	0.22	2.91	4.50	3.05	1.96	1.93
	130	46	2.1	87.2	28.3	4 200	5 800	**2312**	**2312K**	71	119	2	0.39	1.62	2.51	1.70	2.60	2.53
65	120	23	1.5	31.0	12.5	4 800	5 800	**1213**	**1213K**	73	112	1.5	0.17	3.67	5.68	3.84	1.15	1.13
	120	31	1.5	43.5	16.4	4 900	5 900	**2213**	**2213K**	73	112	1.5	0.28	2.24	3.47	2.35	1.46	1.43
	140	33	2.1	61.7	22.9	4 300	5 200	**1313**	**1313K**	76	129	2	0.23	2.73	4.23	2.86	2.45	2.41
	140	48	2.1	95.8	32.5	3 800	5 300	**2313**	**2313K**	76	129	2	0.38	1.66	2.58	1.74	3.23	3.15
70	125	24	1.5	34.6	13.8	4 600	5 700	**1214**	—	78	117	1.5	0.18	3.48	5.38	3.64	1.26	—
	125	31	1.5	43.9	17.1	4 600	5 600	**2214**	—	78	117	1.5	0.26	2.42	3.74	2.53	1.52	—
	150	35	2.1	74.0	27.7	4 000	4 900	**1314**	—	81	139	2	0.22	2.84	4.40	2.98	2.99	—
	150	51	2.1	89.6	31.7	3 600	4 900	**2314**	—	81	139	2	0.35	1.82	2.82	1.91	4.23	—
75	130	25	1.5	38.8	15.7	4 300	5 300	**1215**	**1215K**	83	122	1.5	0.17	3.60	5.58	3.77	1.36	1.34
	130	31	1.5	44.2	17.8	4 300	5 300	**2215**	**2215K**	83	122	1.5	0.25	2.49	3.85	2.61	1.62	1.58
	160	37	2.1	78.9	29.9	4 000	4 900	**1315**	**1315K**	86	149	2	0.23	2.80	4.33	2.93	3.56	3.51
	160	55	2.1	103	36.8	3 400	4 600	**2315**	**2315K**	86	149	2	0.34	1.86	2.88	1.95	5.13	5.01
80	140	26	2	39.8	17.0	4 000	4 900	**1216**	**1216K**	89	131	2	0.16	3.90	6.03	4.08	1.67	1.64
	140	33	2	49.0	19.9	4 100	5 000	**2216**	**2216K**	89	131	2	0.26	2.42	3.75	2.54	2.01	1.97
	170	39	2.1	88.1	33.1	3 500	4 300	**1316**	**1316K**	91	159	2	0.22	2.90	4.49	3.04	4.18	4.12
	170	58	2.1	129	45.7	3 100	4 300	**2316**	**2316K**	91	159	2	0.34	1.87	2.90	1.96	6.10	5.96
85	150	28	2	49.2	20.8	3 800	4 600	**1217**	**1217K**	94	141	2	0.17	3.61	5.59	3.78	2.07	2.04

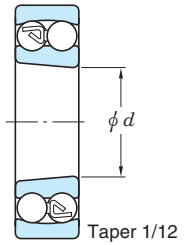
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings
open type

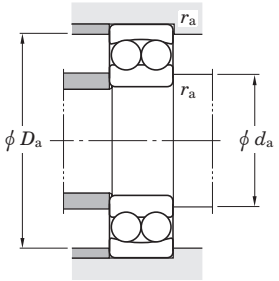
d (85) ~ 110 mm



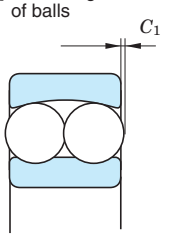
Cylindrical bore



Tapered bore



[Note] Protruding distance of balls



Balls of the following bearing protrude by C_1 from the bearing side.

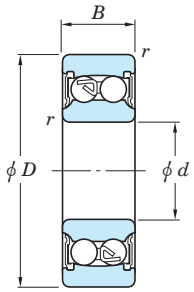
Bearing No.	C_1 (mm)
1319	1.6
1320	2.5
1321	2.5 (approx.)
1322	2.6

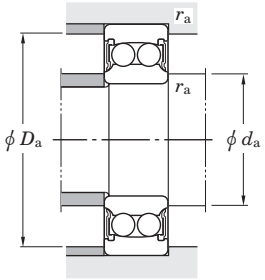
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
85	150	36	2	58.3	23.6	3 800	4 600	**2217**	**2217K**	94	141	2	0.25	2.49	3.85	2.61	2.52	2.46
	180	41	3	97.3	37.8	3 300	4 000	**1317**	**1317K**	98	167	2.5	0.22	2.93	4.53	3.07	4.98	4.91
	180	60	3	141	51.5	3 000	4 100	**2317**	**2317K**	98	167	2.5	0.35	1.82	2.82	1.91	7.05	6.89
90	160	30	2	56.8	23.4	3 500	4 300	**1218**	**1218K**	99	151	2	0.17	3.69	5.70	3.86	2.52	2.48
	160	40	2	67.7	27.2	3 500	4 300	**2218**	**2218K**	99	151	2	0.26	2.39	3.71	2.51	3.40	3.33
	190	43	3	116	44.4	3 100	3 800	**1318**	**1318K**	103	177	2.5	0.22	2.81	4.35	2.94	5.80	5.71
	190	64	3	153	57.9	2 800	3 900	**2318**	**2318K**	103	177	2.5	0.34	1.84	2.85	1.93	8.44	8.25
95	170	32	2.1	57.0	24.3	3 300	4 000	**1219**	**1219K**	106	159	2	0.17	3.63	5.62	3.80	3.10	3.05
	170	43	2.1	82.7	34.3	3 300	4 000	**2219**	**2219K**	106	159	2	0.26	2.43	3.76	2.55	4.10	4.00
	200	45	3	132	50.8	2 900	3 600	**1319**	**1319K**	108	187	2.5	0.23	2.73	4.23	2.86	6.69	6.59
	200	67	3	166	64.8	2 700	3 700	**2319**	**2319K**	108	187	2.5	0.35	1.82	2.82	1.91	9.79	9.57
100	180	34	2.1	69.0	29.7	3 100	3 800	**1220**	**1220K**	111	169	2	0.17	3.62	5.60	3.79	3.70	3.64
	180	46	2.1	80.9	34.0	3 100	3 800	**2220**	**2220K**	111	169	2	0.24	2.57	3.98	2.70	4.98	4.87
	215	47	3	143	57.3	2 800	3 400	**1320**	**1320K**	113	202	2.5	0.24	2.66	4.11	2.78	8.30	8.19
	215	73	3	183	73.4	2 400	3 400	**2320**	**2320K**	113	202	2.5	0.34	1.84	2.85	1.93	12.4	12.1
105	190	36	2.1	77.0	34.0	2 900	3 600	**1221**	—	116	179	2	0.18	3.56	5.51	3.73	4.37	—
	190	50	2.1	94.9	40.1	3 000	3 600	**2221**	—	116	179	2	0.26	2.43	3.76	2.55	6.07	—
	225	49	3	149	60.2	2 600	3 200	**1321**	—	118	212	2.5	0.23	2.73	4.22	2.86	10.0	—
	225	77	3	187	78.0	2 300	3 200	**2321**	—	118	212	2.5	0.36	1.75	2.71	1.83	14.3	—
110	200	38	2.1	80.2	35.2	2 800	3 400	**1222**	**1222K**	121	189	2	0.17	3.64	5.63	3.81	5.15	5.07
	200	53	2.1	120	48.9	2 800	3 400	**2222**	**2222K**	121	189	2	0.26	2.41	3.73	2.53	7.10	6.94
	240	50	3	150	63.2	2 400	3 000	**1322**	**1322K**	123	227	2.5	0.22	2.82	4.37	2.96	11.8	11.7
	240	80	3	200	85.7	2 200	3 000	**2322**	**2322K**	123	227	2.5	0.35	1.82	2.82	1.91	17.3	16.9

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings sealed type

d 10 ~ 55 mm



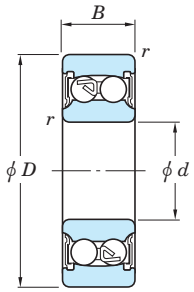


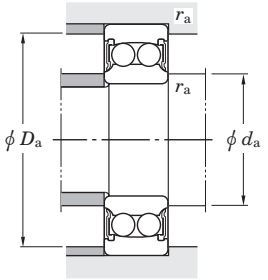
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speed (min^{-1})	Bearing No.		Mounting dimensions (mm)				Constant	Axial load factors			(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	Grease lub.			d_a min.	d_a max.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	(kg)
10	30	14	0.6	5.40	1.20	15 000	**2200 2RS**		13.7	13.7	25	0.6	0.33	1.92	2.97	2.01	0.047
	35	17	0.6	7.25	1.60	13 000	**2300 2RS**		15	15.7	30	0.6	0.34	1.85	2.87	1.94	0.085
12	32	14	0.6	5.60	1.25	14 000	**2201 2RS**		15.2	15.2	27	0.6	0.33	1.89	2.93	1.98	0.053
	37	17	1	9.40	2.15	12 000	**2301 2RS**		16.8	16.8	31	1	0.36	1.77	2.74	1.86	0.095
15	35	14	0.6	7.45	1.75	12 000	**2202 2RS**		18.0	18.0	30	0.6	0.33	1.90	2.95	2.00	0.060
	42	17	1	9.55	2.30	11 000	**2302 2RS**		20.0	20.0	36	1	0.34	1.86	2.88	1.95	0.114
17	40	16	0.6	7.90	2.00	11 000	**2203 2RS**		20.2	20.2	35	0.6	0.31	2.03	3.14	2.12	0.088
	47	19	1	12.5	3.20	9 400	**2303 2RS**		22.1	22.1	41	1	0.33	1.92	2.97	2.01	0.158
20	47	18	1	9.90	2.60	9 100	**2204 2RS**		24.1	24.1	41	1	0.29	2.16	3.35	2.27	0.140
	52	21	1.1	12.4	3.35	8 300	**2304 2RS**		26.2	26.2	45	1	0.30	2.12	3.28	2.22	0.209
25	52	18	1	12.1	3.30	7 900	**2205 2RS**		29.4	29.4	46	1	0.28	2.28	3.52	2.39	0.163
	62	24	1.1	17.6	4.95	6 600	**2305 2RS**		32	33.9	55	1	0.27	2.31	3.57	2.42	0.335
30	62	20	1	15.6	4.65	6 600	**2206 2RS**		35.5	35.5	56	1	0.25	2.55	3.94	2.67	0.260
	72	27	1.1	21.3	6.30	5 800	**2306 2RS**		37	37.8	65	1	0.26	2.40	3.72	2.52	0.500
35	72	23	1.1	15.8	5.10	5 700	**2207 2RS**		40.9	40.9	65	1	0.23	2.71	4.20	2.84	0.403
	80	31	1.5	25.1	7.85	5 100	**2307 2RS**		43.5	45.0	71.5	1.5	0.25	2.48	3.84	2.60	0.675
40	80	23	1.1	19.2	6.50	5 000	**2208 2RS**		47	48.1	73	1	0.22	2.83	4.38	2.97	0.505
	90	33	1.5	29.5	9.70	4 600	**2308 2RS**		48.5	49.6	81.5	1.5	0.25	2.57	3.98	2.69	0.925
45	85	23	1.1	21.8	7.35	4 600	**2209 2RS**		52	52.4	78	1	0.21	2.94	4.56	3.09	0.545
	100	36	1.5	38.1	12.7	4 100	**2309 2RS**		53.5	56.6	91.5	1.5	0.25	2.56	3.95	2.68	1.23
50	90	23	1.1	22.7	8.10	4 300	**2210 2RS**		56.5	56.5	83	1	0.21	3.07	4.76	3.22	0.590
	110	40	2	43.4	14.1	3 700	**2310 2RS**		60	62.5	100	2	0.23	2.70	4.17	2.83	1.64
55	100	25	1.5	26.8	10.0	3 900	**2211 2RS**		63.5	63.5	91.5	1.5	0.20	3.19	4.94	3.34	0.810
	120	43	2	51.3	17.9	3 400	**2311 2RS**		65	65	110	2	0.23	2.70	4.18	2.83	2.10

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings sealed type

d 60 ~ 110 mm



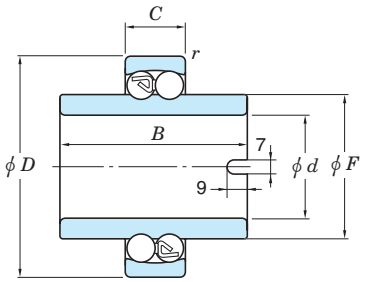


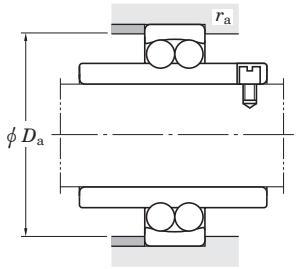
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speed (min^{-1})	Bearing No.		Mounting dimensions (mm)				Con-stant	Axial load factors			(Refer.) Mass
d	D	B	r min.	C_r	C_{0r}	Grease lub.			d_a min.	d_a max.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	(kg)
60	110	28	1.5	30.2	11.5	3 500	**2212 2RS**		68.5	68.5	101.5	1.5	0.19	3.37	5.22	3.53	1.09
	130	46	2.1	57.1	20.8	3 000	**2312 2RS**		72	72	118	2	0.22	2.91	4.50	3.05	2.60
65	120	31	1.5	31.0	12.5	3 200	**2213 2RS**		73.5	75.5	111.5	1.5	0.17	3.67	5.68	3.84	1.46
	140	48	2.1	62.1	22.9	2 900	**2313 2RS**		77	77	128	2	0.23	2.73	4.23	2.86	3.23
70	125	31	1.5	34.6	13.8	3 100	**2214 2RS**		78.5	78.5	116.5	1.5	0.18	3.48	5.38	3.64	1.52
	150	51	2.1	74.1	27.7	2 600	**2314 2RS**		82	82	138	2	0.22	2.84	4.40	2.98	4.23
75	130	31	1.5	38.8	15.7	2 900	**2215 2RS**		83.5	83.5	121.5	1.5	0.17	3.60	5.58	3.77	1.62
	160	55	2.1	81.8	30.5	2 600	**2315 2RS**		87	87	148	2	0.23	2.80	4.33	2.93	5.13
80	140	33	2	39.8	17.0	2 700	**2216 2RS**		90	90	130	2	0.16	3.90	6.03	4.08	2.01
	170	58	2.1	88.4	33.1	2 300	**2316 2RS**		92	92	158	2	0.22	2.90	4.49	3.04	6.10
85	150	36	2	49.2	20.8	2 500	**2217 2RS**		95	95	140	2	0.17	3.61	5.59	3.78	2.52
90	160	40	2	54.1	23.1	2 400	**2218 2RS**		100	100	150	2	0.17	3.69	5.70	3.86	3.40
95	170	43	2.1	60.8	26.8	2 200	**2219 2RS**		107	107	158	2	0.17	3.63	5.62	3.80	4.10
100	180	46	2.1	69.0	29.7	2 100	**2220 2RS**		112	112	168	2	0.17	3.62	5.60	3.79	4.98
105	190	50	2.1	77.0	34.0	2 000	**2221 2RS**		117	117	178	2	0.18	3.56	5.51	3.73	6.07
110	200	53	2.1	80.2	35.2	1 900	**2222 2RS**		122	122	188	2	0.17	3.64	5.63	3.81	7.10

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Self-aligning ball bearings extended inner ring type

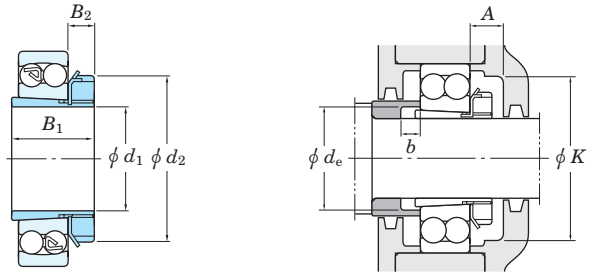
d 20 ~ 60 mm





Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)		Constant	Axial load factors			(Refer.) Mass (kg)
d	D	B	C	F	r min.	C_r	C_{0r}	Grease lub.	Oil lub.			D_a max.	r_a max.	e	Y_1	Y_2	Y_0	
20	47	40	14	29.2	1	9.90	2.60	14 000	17 000	**11204**		42	1	0.29	2.16	3.35	2.27	0.191
	52	44	15	31.5	1.1	12.4	3.35	13 000	15 000	**11304**		45.5	1	0.30	2.12	3.28	2.22	0.266
25	52	44	15	33.3	1	12.1	3.30	12 000	14 000	**11205**		47	1	0.28	2.28	3.52	2.39	0.226
	62	48	17	38	1.1	17.6	4.95	9 900	12 000	**11305**		55.5	1	0.27	2.31	3.57	2.42	0.445
30	62	48	16	40.1	1	15.6	4.65	9 900	12 000	**11206**		57	1	0.25	2.55	3.94	2.67	0.360
	72	52	19	45	1.1	21.3	6.30	8 700	11 000	**11306**		65.5	1	0.26	2.40	3.72	2.52	0.614
35	72	52	17	47.7	1.1	15.8	5.10	8 500	10 000	**11207**		65.5	1	0.23	2.71	4.20	2.84	0.556
	80	56	21	51.7	1.5	25.1	7.85	7 600	9 300	**11307**		72	1.5	0.25	2.48	3.84	2.60	0.821
40	80	56	18	54	1.1	19.2	6.50	7 500	9 200	**11208**		73.5	1	0.22	2.83	4.38	2.97	0.733
	90	58	23	57.7	1.5	29.5	9.70	6 900	8 400	**11308**		82	1.5	0.25	2.57	3.98	2.69	1.09
45	85	58	19	57.7	1.1	21.8	7.35	7 000	8 500	**11209**		78.5	1	0.21	2.94	4.56	3.09	0.793
	100	60	25	63.9	1.5	38.1	12.7	6 100	7 500	**11309**		92	1.5	0.25	2.56	3.95	2.68	1.40
50	90	58	20	62.7	1.1	22.7	8.10	6 500	7 900	**11210**		83.5	1	0.21	3.07	4.76	3.22	0.875
	110	62	27	70.3	2	43.4	14.1	5 600	6 800	**11310**		102	2	0.23	2.70	4.17	2.83	1.74
55	100	60	21	70.3	1.5	26.8	10.0	5 800	7 100	**11211**		93.5	1.5	0.20	3.19	4.94	3.34	1.16
60	110	62	22	78	1.5	30.2	11.5	5 200	6 400	**11212**		103.5	1.5	0.19	3.37	5.22	3.53	1.52

d_1 17 ~ (45) mm



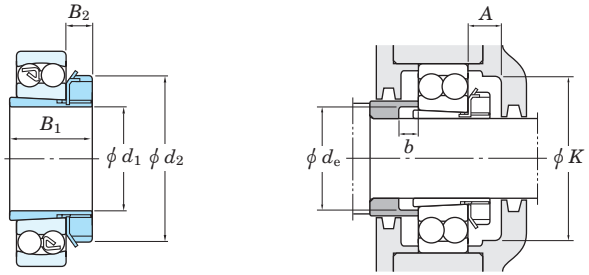
Boundary dimensions (mm) d_1	B_1	d_2	B_2	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
17	24	32	7	20	1204K+**H204X**	—	—	23	5	0.162	A204X	AN04
	28	32	7	20	2204K+**H304X**	—	—	24	5	0.185	A304X	AN04
	28	32	7	20	1304K+**H304X**	—	—	24	8	0.210	A304X	AN04
	31	32	7	20	2304K+**H2304X**	—	—	24	5	0.257	A2304X	AN04
20	26	38	8	25	1205K+**H205X**	15	45	28	5	0.218	A205X	AN05
	29	38	8	25	2205K+**H305X**	15	45	29	5	0.243	A305X	AN05
	29	38	8	25	1305K+**H305X**	15	45	29	6	0.337	A305X	AN05
	35	38	8	25	2305K+**H2305X**	15	45	29	5	0.424	A2305X	AN05
25	27	45	8	30	1206K+**H206X**	15	50	33	5	0.320	A206X	AN06
	31	45	8	30	2206K+**H306X**	15	50	34	5	0.368	A306X	AN06
	31	45	8	30	1306K+**H306X**	15	50	34	6	0.495	A306X	AN06
	38	45	8	30	2306K+**H2306X**	15	50	35	5	0.620	A2306X	AN06
30	29	52	9	35	1207K+**H207X**	17	58	38	5	0.462	A207X	AN07
	35	52	9	35	2207K+**H307X**	17	58	39	5	0.557	A307X	AN07
	35	52	9	35	1307K+**H307X**	17	58	39	7	0.663	A307X	AN07
	43	52	9	35	2307K+**H2307X**	17	58	40	5	0.843	A2307X	AN07
35	31	58	10	40	1208K+**H208X**	17	65	44	5	0.597	A208X	AN08
	36	58	10	40	2208K+**H308X**	17	65	44	5	0.696	A308X	AN08
	36	58	10	40	1308K+**H308X**	17	65	44	5	0.906	A308X	AN08
	46	58	10	40	2308K+**H2308X**	17	65	45	5	1.14	A2308X	AN08
40	33	65	11	45	1209K+**H209X**	17	72	49	5	0.701	A209X	AN09
	39	65	11	45	2209K+**H309X**	17	72	49	8	0.798	A309X	AN09
	39	65	11	45	1309K+**H309X**	17	72	49	5	1.21	A309X	AN09
	50	65	11	45	2309K+**H2309X**	17	72	50	5	1.51	A2309X	AN09
45	35	70	12	50	1210K+**H210X**	19	76	53	5	0.804	A210X	AN10
	42	70	12	50	2210K+**H310X**	19	76	54	10	0.896	A310X	AN10

d_1 (45) ~ 75 mm

Boundary dimensions (mm) d_1	B_1	d_2	B_2	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
45	42	70	12	50	1310K+**H310X**	19	76	54	5	1.51	A310X	AN10
	55	70	12	50	2310K+**H2310X**	19	76	56	5	1.98	A2310X	AN10
50	37	75	12	55	1211K+**H211X**	19	85	60	6	1.02	A211X	AN11
	45	75	12	55	2211K+**H311X**	19	85	60	11	1.16	A311X	AN11
	45	75	12	55	1311K+**H311X**	19	85	60	6	1.93	A311X	AN11
	59	75	12	55	2311K+**H2311X**	19	85	61	6	2.50	A2311X	AN11
55	38	80	13	60	1212K+**H212X**	20	90	61	5	1.25	A212X	AN12
	47	80	13	60	2212K+**H312X**	20	90	65	9	1.49	A312X	AN12
	47	80	13	60	1312K+**H312X**	20	90	65	5	2.35	A312X	AN12
	62	80	13	60	2312K+**H2312X**	20	90	66	5	3.04	A2312X	AN12
60	40	85	14	65	1213K+**H213X**	21	96	70	5	1.56	A213X	AN13
	50	85	14	65	2213K+**H313X**	21	96	70	8	1.92	A313X	AN13
	50	85	14	65	1313K+**H313X**	21	96	70	5	2.90	A313X	AN13
	65	85	14	65	2313K+**H2313X**	21	96	72	5	3.74	A2313X	AN13
65	43	98	15	75	1215K+**H215X**	23	110	80	5	2.09	A215X	AN15
	55	98	15	75	2215K+**H315X**	23	110	80	12	2.47	A315X	AN15
	55	98	15	75	1315K+**H315X**	23	110	80	5	4.40	A315X	AN15
	73	98	15	75	2315K+**H2315X**	23	110	82	5	6.12	A2315X	AN15
70	46	105	17	80	1216K+**H216X**	25	120	85	5	2.57	A216X	AN16
	59	105	17	80	2216K+**H316X**	25	120	86	12	3.06	A316X	AN16
	59	105	17	80	1316K+**H316X**	25	120	86	5	5.21	A316X	AN16
	78	105	17	80	2316K+**H2316X**	25	120	87	5	7.30	A2316X	AN16
75	50	110	18	85	1217K+**H217X**	27	128	90	6	3.11	A217X	AN17
	63	110	18	85	2217K+**H317X**	27	128	91	12	3.70	A317X	AN17
	63	110	18	85	1317K+**H317X**	27	128	91	6	6.15	A317X	AN17
	82	110	18	85	2317K+**H2317X**	27	128	94	6	8.41	A2317X	AN17

Adapter assemblies for self-aligning ball bearings

d_1 80 ~ 100 mm



Boundary dimensions (mm)				Brg. bore	Designations	Mounting dimensions (mm)				Mass	(Refer.)	
					Bearing + adapter ass'y					Brg.+adapter ass'y		
d_1	B_1	d_2	B_2	d (mm)		A min.	K min.	d_e min.	b min.	(kg)	Adapter sleeve No.	Locknut No.
80	52	120	18	90	1218K+**H218X**	28	139	95	6	3.75	A218X	AN18
	65	120	18	90	2218K+**H318X**	28	139	96	10	4.78	A318X	AN18
	65	120	18	90	1318K+**H318X**	28	139	96	6	7.16	A318X	AN18
	86	120	18	90	2318K+**H2318X**	28	139	99	6	9.95	A2318X	AN18
85	55	125	19	95	1219K+**H219X**	29	145	101	7	4.47	A219X	AN19
	68	125	19	95	2219K+**H319X**	29	145	102	9	5.62	A319X	AN19
	68	125	19	95	1319K+**H319X**	29	145	102	7	8.21	A319X	AN19
	90	125	19	95	2319K+**H2319X**	29	145	105	7	11.6	A2319X	AN19
90	58	130	20	100	1220K+**H220X**	30	150	106	7	5.23	A220X	AN20
	71	130	20	100	2220K+**H320X**	30	150	107	8	6.67	A320X	AN20
	71	130	20	100	1320K+**H320X**	30	150	107	7	9.99	A320X	AN20
	97	130	20	100	2320K+**H2320X**	30	150	110	7	14.4	A2320X	AN20
100	63	145	21	110	1222K+**H222X**	32	170	116	7	7.10	A222X	AN22
	77	145	21	110	2222K+**H322X**	32	170	117	6	9.23	A322X	AN22
	77	145	21	110	1322K+**H322X**	32	170	117	9	14.0	A322X	AN22
	105	145	21	110	2322K+**H2322X**	32	170	121	7	19.8	A2322X	AN22

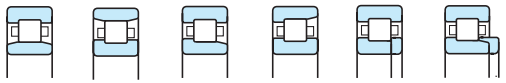
Cylindrical roller bearings

Cylindrical roller bearings feature high radial load capacity because the rollers and raceway are in linear contact. These bearings are suitable for applications that involve heavy radial and impact loading.

They are also appropriate for high-speed applications in that they can be machined very accurately due to their structure.

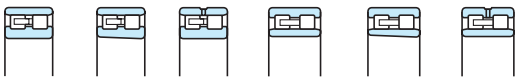
Having a separable inner ring or outer ring, these bearings can be mounted and dismounted easily.

Single-row cylindrical roller bearings



- The NU and N types exhibit their best performance when used as free side bearings since they adjust to the shaft's axial movement, to a certain extent, relative to the housing position.
- The NJ and NF types carry axial load in one direction, while the NUP and NH types can carry a certain degree of axial load in both directions.
- Type R cylindrical roller bearings feature enhanced load rating compared with standard series, though both have equal dimensions.
  This is because type R bearings have different internal design. They are identified by supplementary code "R".

Double-row cylindrical roller bearings



- Double-row cylindrical roller bearings come in two types : with a cylindrical bore, and with a tapered bore. As for those with a tapered bore, the specified amount of clearance can be obtained by adjusting the press-in distance. Some bearings have lubrication holes and lubrication grooves on the outer ring. They are identified by supplementary code "W".
- These bearings can accommodate high radial loads, and are often used on machine tool spindles.

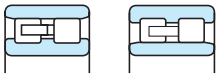
Single-row cylindrical roller bearings

Bore diameter **20** – **460** mm

Thrust collar

Bore diameter **20** – **320** mm

Double-row cylindrical roller bearings



Bore diameter **25** – **480** mm

Boundary dimensions

The dimensions of standard series are as specified in JIS B 1512.

Tolerances

As specified in JIS B 1514-1 (refer to Table 7-3 on pp. A 54 – A 57).

Tolerances of roller set bore diameter F_w and roller set outside diameter E_w of interchangeable bearings are as follows :

Unit : μm

Nominal bore diameter d (mm)		Δ_{Fw} Roller set bore diameter deviation		Δ_{Ew} Roller set outside diameter deviation	
over	up to	upper	lower	upper	lower
–	20	+ 10	0	0	– 10
20	50	+ 15	0	0	– 15
50	120	+ 20	0	0	– 20
120	200	+ 25	0	0	– 25
200	250	+ 30	0	0	– 30
250	315	+ 35	0	0	– 35
315	400	+ 40	0	0	– 40
400	500	+ 45	0	–	–

[Remark] Interchangeable bearings have an inner ring with rollers that can be matched with the outer ring, or an outer ring with rollers that can be matched with the inner ring, without affecting performance in the bearing that has the same bearing number in one category.

Tapered bore tolerance and allowable values of high precision double-row cylindrical roller bearings (classes 5 and 4) are provided in JTEKT standards (refer to Table 7-11 on p. A 70).

Radial internal clearance

· Cylindrical bore and tapered bore bearings
.....(refer to Table 10-8 on pp. A 100, 101.)
· Motor bearings.....(refer to Table 10-7 on p. A 99.)

Recommended fits

Refer to Table 9-4 on pp. A 85, 86.

Standard cages

■ For single-row cylindrical roller bearings :
· Pressed steel cage (supplementary code : //)
· Copper alloy machined cage (supplementary code : FY)
→ For application range, refer to Table 1.
Copper alloy machined cages without rivets (LY) are also used for some special purposes.

■ For double-row cylindrical roller bearings :
· Prong type copper alloy machined cage (supplementary code : FY)
· Separable prong type copper alloy machined cage (supplementary code : FW)
.....for class 5 or higher precision bearings

Allowable misalignment

Allowable misalignment of single-row cylindrical roller bearings depends on bearing type and specification.
General values are as follows :
1) When P_r / C_r is approx. 10% under load of normal use
.....0.000 6 rad (2') – 0.000 9 rad (3')
2) When P_r / C_r is approx. 6% under load lighter than 1)
.....0.001 2 rad (4')
When very large allowable misalignment is required, consult with JTEKT.

Equivalent radial load

Dynamic equivalent radial load $P_r = F_r$
Static equivalent radial load $P_{0r} = F_r$

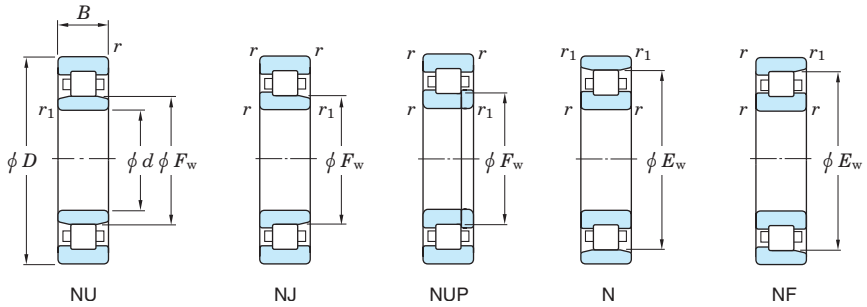
Allowable axial load

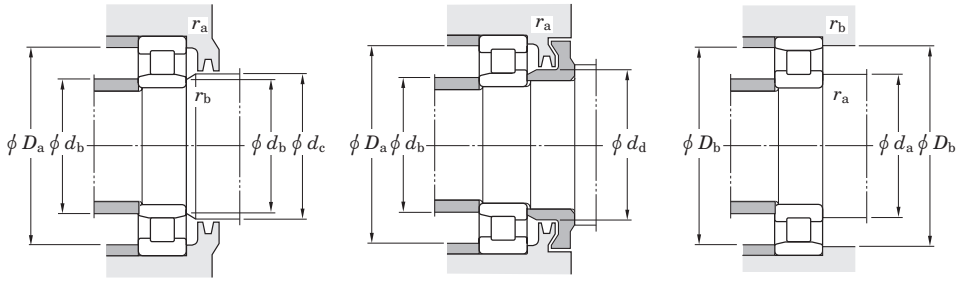
Cylindrical roller bearings with ribs, including loose rib and thrust collar, on both inner and outer rings accommodate axial load to a certain extent.
(NJ and NF types accommodate load applied in one direction : NUP and NH in both directions.)
For calculation of allowable axial load, refer to p. A 40.

Table 1 Application of standard cages

Bearing series	Pressed cage	Machined cage
NU, NUP 10	—	1005 – 1092
NU, NJ, NUP, NF 2	204 – 220	204 – 264
NU, NJ, NUP 2 R	204R – 220R	204R – 240R
NU, NJ, NUP 22	2204 – 2220	2204 – 2252
NU, NJ, NUP 22 R	2204R – 2220R	2204R – 2240R
NU 32	—	3206 – 3252
NU, NJ, NUP, NF 3	304 – 320	304 – 348
NU, NJ, NUP 3 R	304R – 320R	304R – 332R
NU, NJ, NUP 23	2304 – 2320	2304 – 2340
NU, NJ, NUP 23 R	2304R – 2320R	2304R – 2332R
NU 33	—	3306 – 3352
NU, NJ, NUP, NF 4	406 – 420	406 – 430

d 20 ~ (30) mm



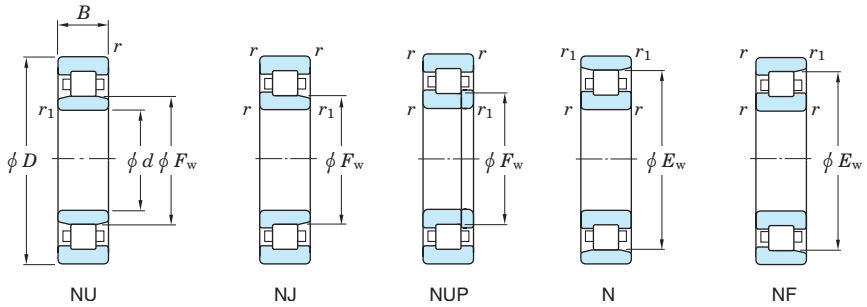


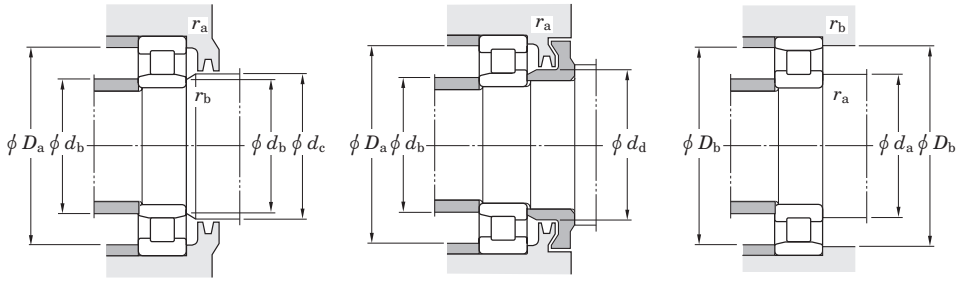
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.				Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
20	47	14	1	0.6	27	40	15.4	12.7	15 000	18 000	**NU204**	**NJ204**	**NUP204**	**N204**	**NF204**	25	24	26	29	32	42	43	42	1	0.6	0.108
	47	14	1	0.6	26.5	—	25.7	22.6	15 000	18 000	**NU204R**	**NJ204R**	**NUP204R**	—	—	25	24	26	29	32	42	—	—	1	0.6	0.112
	47	18	1	0.6	27	—	20.7	18.4	13 000	18 000	**NU2204**	**NJ2204**	**NUP2204**	—	—	25	24	26	29	32	42	—	—	1	0.6	0.146
	47	18	1	0.6	26.5	—	30.6	28.3	13 000	18 000	**NU2204R**	**NJ2204R**	**NUP2204R**	—	—	25	24	26	29	32	42	—	—	1	0.6	0.146
	52	15	1.1	0.6	28.5	44.5	23.1	19.2	12 000	16 000	**NU304**	**NJ304**	**NUP304**	**N304**	**NF304**	26.5	24	27	30	33	45.5	48	45.5	1	0.6	0.147
	52	15	1.1	0.6	27.5	—	31.5	26.9	12 000	16 000	**NU304R**	**NJ304R**	**NUP304R**	—	—	26.5	24	27	30	33	45.5	—	—	1	0.6	0.153
	52	21	1.1	0.6	28.5	—	32.9	30.2	11 000	16 000	**NU2304**	**NJ2304**	**NUP2304**	—	—	26.5	24	27	30	33	45.5	—	—	1	0.6	0.212
	52	21	1.1	0.6	27.5	—	42.0	38.8	11 000	16 000	**NU2304R**	**NJ2304R**	**NUP2304R**	—	—	26.5	24	27	30	33	45.5	—	—	1	1	0.215
25	47	12	0.6	0.3	30.5	—	14.3	13.1	15 000	18 000	**NU1005**	—	**NUP1005**	—	—	29	27	30	32	—	43	—	—	0.6	0.3	0.084
	52	15	1	0.6	32	45	17.7	15.7	13 000	16 000	**NU205**	**NJ205**	**NUP205**	**N205**	**NF205**	30	29	31	34	37	47	48	47	1	0.6	0.132
	52	15	1	0.6	31.5	—	29.3	27.7	13 000	15 000	**NU205R**	**NJ205R**	**NUP205R**	—	—	30	29	31	34	37	47	—	—	1	0.6	0.138
	52	18	1	0.6	32	—	23.7	22.8	12 000	16 000	**NU2205**	**NJ2205**	**NUP2205**	—	—	30	29	31	34	37	47	—	—	1	0.6	0.163
	52	18	1	0.6	31.5	—	34.9	34.6	12 000	15 000	**NU2205R**	**NJ2205R**	**NUP2205R**	—	—	30	29	31	34	37	47	—	—	1	0.6	0.166
	62	17	1.1	1.1	35	53	29.3	25.2	10 000	14 000	**NU305**	**NJ305**	**NUP305**	**N305**	**NF305**	31.5	31.5	33	37	40	55.5	55.5	55	1	1	0.241
	62	17	1.1	1.1	34	—	41.6	37.4	10 000	14 000	**NU305R**	**NJ305R**	**NUP305R**	—	—	31.5	31.5	33	37	40	55.5	—	—	1	1	0.243
	62	24	1.1	1.1	35	—	42.7	40.9	9 100	14 000	**NU2305**	**NJ2305**	**NUP2305**	—	—	31.5	31.5	33	37	40	55.5	—	—	1	1	0.340
	62	24	1.1	1.1	34	—	57.0	56.1	9 100	14 000	**NU2305R**	**NJ2305R**	**NUP2305R**	—	—	31.5	31.5	33	37	40	55.5	—	—	1	1	0.350
30	55	13	1	0.6	36.5	—	18.7	18.4	13 000	15 000	**NU1006**	—	**NUP1006**	—	—	35	34	35	38	—	50	—	—	1	0.6	0.121
	62	16	1	0.6	38.5	53.5	23.5	21.5	11 000	13 000	**NU206**	**NJ206**	**NUP206**	**N206**	**NF206**	35	34	37	40	44	57	58	56	1	0.6	0.200
	62	16	1	0.6	37.5	—	39.1	37.4	11 000	13 000	**NU206R**	**NJ206R**	**NUP206R**	—	—	35	34	37	40	44	57	—	—	1	0.6	0.209
	62	20	1	0.6	38.5	—	32.9	33.1	9 800	13 000	**NU2206**	**NJ2206**	**NUP2206**	—	—	35	34	37	40	44	57	—	—	1	0.6	0.262
	62	20	1	0.6	37.5	—	48.9	49.8	9 700	13 000	**NU2206R**	**NJ2206R**	**NUP2206R**	—	—	35	34	37	40	44	57	—	—	1	0.6	0.262
	62	23.8	1	1	38.5	—	42.7	46.4	8 700	13 000	**NU3206**	—	—	—	—	35	35	37	40	—	57	—	—	1	0.6	0.343
	72	19	1.1	1.1	42	62	38.6	35.2	8 700	12 000	**NU306**	**NJ306**	**NUP306**	**N306**	**NF306**	36.5	36.5	40	44	48	65.5	65.5	64	1	1	0.358
	72	19	1.1	1.1	40.5	—	53.1	50.2	8 700	12 000	**NU306R**	**NJ306R**	**NUP306R**	—	—	36.5	36.5	40	44	48	65.5	—	—	1	1	0.361
	72	27	1.1	1.1	42	—	51.4	50.8	7 700	12 000	**NU2306**	**NJ2306**	**NUP2306**	—	—	36.5	36.5	40	44	48	65.5	—	—	1	1	0.500
	72	27	1.1	1.1	40.5	—	74.6	77.6	7 800	12 000	**NU2306R**	**NJ2306R**	**NUP2306R**	—	—	36.5	36.5	40	44	48	65.5	—	—	1	1	0.534

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (30) ~ (45) mm



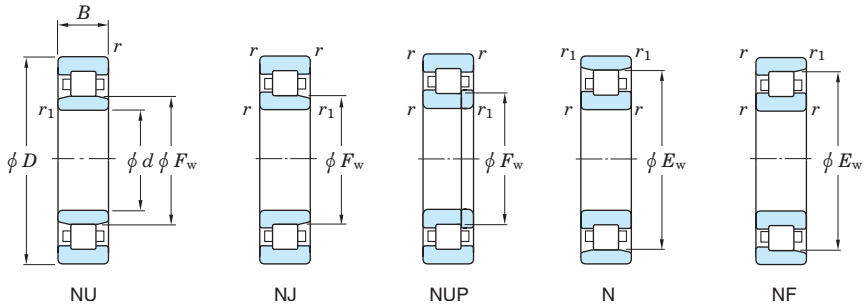


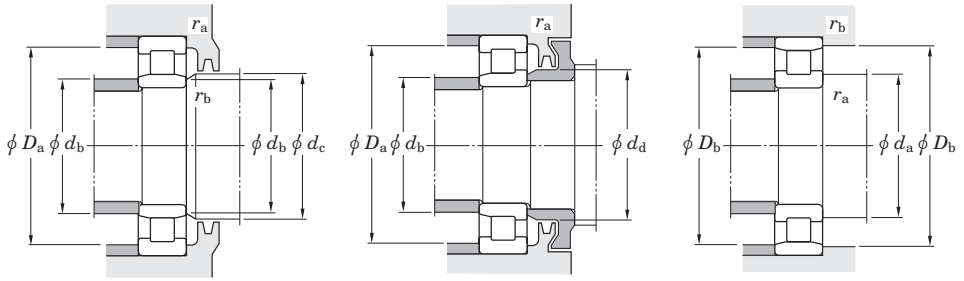
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
30	72	30.2	1.1	1.1	42	—	69.1	74.3	7 700	12 000	**NU3306**	—	—	—	—	36.5	36.5	40	44	—	65.5	—	—	1	1	0.650
	90	23	1.5	1.5	45	73	62.8	55.0	7 600	10 000	**NU406**	**NJ406**	**NUP406**	**N406**	**NF406**	38	38	44	47	52	82	82	74	1.5	1.5	0.753
35	62	14	1	0.6	42	—	22.6	23.2	11 000	13 000	**NU1007**	—	**NUP1007**	—	—	40	39	41	44	—	57	—	—	1	0.5	0.182
	72	17	1.1	0.6	43.8	61.8	33.6	31.5	9 500	11 000	**NU207**	**NJ207**	**NUP207**	**N207**	**NF207**	41.5	39	43	46	50	65.5	68	64	1	0.6	0.293
	72	17	1.1	0.6	44	—	50.2	50.2	9 300	11 000	**NU207R**	**NJ207R**	**NUP207R**	—	—	41.5	39	43	46	50	65.5	—	—	1	0.6	0.306
	72	23	1.1	0.6	43.8	—	49.0	51.2	8 500	11 000	**NU2207**	**NJ2207**	**NUP2207**	—	—	41.5	39	43	46	50	65.5	—	—	1	0.6	0.402
	72	23	1.1	0.6	44	—	61.6	65.3	8 300	11 000	**NU2207R**	**NJ2207R**	**NUP2207R**	—	—	41.5	39	43	46	50	65.5	—	—	1	0.6	0.404
	72	27	1.1	1.1	43.8	—	54.8	59.1	7 600	11 000	**NU3207**	—	—	—	—	41.5	41.5	43	46	—	65.5	—	—	1	0.6	0.524
	80	21	1.5	1.1	46.2	68.2	49.6	46.9	7 900	10 000	**NU307**	**NJ307**	**NUP307**	**N307**	**NF307**	43	41.5	45	48	53	72	73.5	71	1.5	1	0.477
	80	21	1.5	1.1	46.2	—	66.6	65.4	7 700	10 000	**NU307R**	**NJ307R**	**NUP307R**	—	—	43	41.5	45	48	53	72	—	—	1.5	1	0.482
	80	31	1.5	1.1	46.2	—	64.4	65.7	7 000	10 000	**NU2307**	**NJ2307**	**NUP2307**	—	—	43	41.5	45	48	53	72	—	—	1.5	1	0.696
	80	31	1.5	1.1	46.2	—	93.1	101	6 900	10 000	**NU2307R**	**NJ2307R**	**NUP2307R**	—	—	43	41.5	45	48	53	72	—	—	1.5	1	0.729
	80	34.9	1.5	1.5	46.2	—	81.7	89.1	7 000	10 000	**NU3307**	—	—	—	—	43	43	45	48	—	72	—	—	1.5	1	0.908
	100	25	1.5	1.5	53	83	75.2	68.9	6 600	8 800	**NU407**	**NJ407**	**NUP407**	**N407**	**NF407**	43	43	52	55	61	92	92	84	1.5	1.5	1.02
40	68	15	1	0.6	47	—	24.9	25.7	10 000	12 000	**NU1008**	—	**NUP1008**	—	—	45	44	46	49	—	63	—	—	1	0.6	0.223
	80	18	1.1	1.1	50	70	43.8	42.9	8 300	10 000	**NU208**	**NJ208**	**NUP208**	**N208**	**NF208**	46.5	46.5	49	52	56	73.5	73.5	72	1	1	0.366
	80	18	1.1	1.1	49.5	—	55.7	55.4	8 300	9 900	**NU208R**	**NJ208R**	**NUP208R**	—	—	46.5	46.5	49	52	56	73.5	—	—	1	1	0.384
	80	23	1.1	1.1	50	—	58.3	62.0	7 500	10 000	**NU2208**	**NJ2208**	**NUP2208**	—	—	46.5	46.5	49	52	56	73.5	—	—	1	1	0.490
	80	23	1.1	1.1	49.5	—	72.3	77.6	7 400	9 900	**NU2208R**	**NJ2208R**	**NUP2208R**	—	—	46.5	46.5	49	52	56	73.5	—	—	1	1	0.490
	80	30.2	1.1	1.1	50	—	78.3	90.6	6 700	10 000	**NU3208**	—	—	—	—	46.5	46.5	49	52	—	73.5	—	—	1	1	0.711
	90	23	1.5	1.5	53.5	77.5	58.6	56.9	6 900	9 100	**NU308**	**NJ308**	**NUP308**	**N308**	**NF308**	48	48	51	55	60	82	82	80	1.5	1.5	0.657
	90	23	1.5	1.5	52	—	83.1	81.5	6 800	9 100	**NU308R**	**NJ308R**	**NUP308R**	—	—	48	48	51	55	60	82	—	—	1.5	1.5	0.664
	90	33	1.5	1.5	53.5	—	82.2	88.0	6 100	9 100	**NU2308**	**NJ2308**	**NUP2308**	—	—	48	48	51	55	60	82	—	—	1.5	1.5	0.956
	90	33	1.5	1.5	52	—	114	122	6 100	9 100	**NU2308R**	**NJ2308R**	**NUP2308R**	—	—	48	48	51	55	60	82	—	—	1.5	1.5	0.962
	90	36.5	1.5	1.5	53.5	—	104	119	6 100	9 100	**NU3308**	—	—	—	—	48	48	51	55	—	82	—	—	1.5	1.5	1.19
	110	27	2	2	58	92	97.1	89.1	6 000	8 000	**NU408**	**NJ408**	**NUP408**	**N408**	**NF408**	49	49	57	60	67	101	101	93	2	2	1.30
45	75	16	1	0.6	52.5	—	31.0	33.8	9 200	11 000	**NU1009**	—	**NUP1009**	—	—	50	49	52	54	—	70	—	—	1	0.6	0.289

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (45) ~ (55) mm



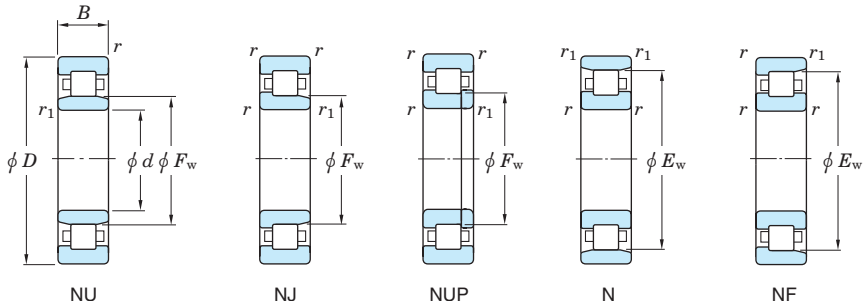


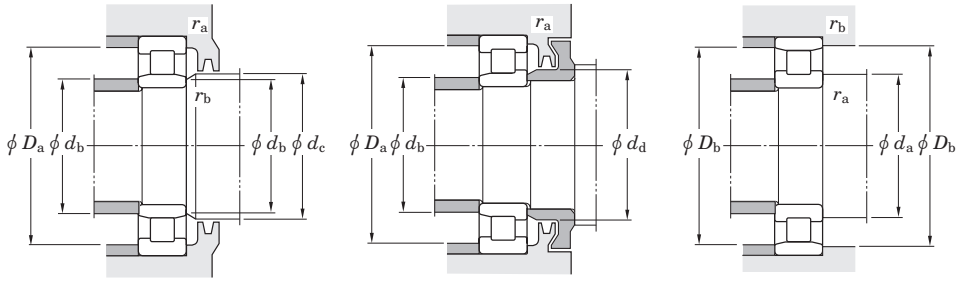
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
45	85	19	1.1	1.1	55	75	46.1	46.9	7 700	9 200	**NU209**	**NJ209**	**NUP209**	**N209**	**NF209**	51.5	51.5	54	57	61	78.5	78.5	77	1	1	0.427
	85	19	1.1	1.1	54.5	—	63.1	66.4	7 600	9 200	**NU209R**	**NJ209R**	**NUP209R**	—	—	51.5	51.5	54	57	61	78.5	—	—	1	1	0.439
	85	23	1.1	1.1	55	—	61.4	67.8	6 900	9 200	**NU2209**	**NJ2209**	**NUP2209**	—	—	51.5	51.5	54	57	61	78.5	—	—	1	1	0.536
	85	23	1.1	1.1	54.5	—	76.1	84.6	6 900	9 200	**NU2209R**	**NJ2209R**	**NUP2209R**	—	—	51.5	51.5	54	57	61	78.5	—	—	1	1	0.536
	85	30.2	1.1	1.1	55	—	82.4	99.0	6 100	9 200	**NU3209**	—	—	—	—	51.5	51.5	54	57	—	78.5	—	—	1	1	0.770
	100	25	1.5	1.5	58.5	86.5	78.8	77.5	6 200	8 300	**NU309**	**NJ309**	**NUP309**	**N309**	**NF309**	53	53	57	60	66	92	92	89	1.5	1.5	0.870
	100	25	1.5	1.5	58.5	—	97.4	98.3	6 100	8 200	**NU309R**	**NJ309R**	**NUP309R**	—	—	53	53	57	60	66	92	—	—	1.5	1.5	0.909
	100	36	1.5	1.5	58.5	—	106	113	5 500	8 300	**NU2309**	**NJ2309**	**NUP2309**	—	—	53	53	57	60	66	92	—	—	1.5	1.5	1.25
	100	36	1.5	1.5	58.5	—	137	153	5 400	8 200	**NU2309R**	**NJ2309R**	**NUP2309R**	—	—	53	53	57	60	66	92	—	—	1.5	1.5	1.32
	100	39.7	1.5	1.5	58.5	—	131	149	5 500	8 300	**NU3309**	—	—	—	—	53	53	57	60	—	92	—	—	1.5	1.5	1.59
	120	29	2	2	64.5	100.5	115	112	5 400	7 200	**NU409**	**NJ409**	**NUP409**	**N409**	**NF409**	54	54	63	66	74	111	111	102	2	2	1.64
50	80	16	1	0.6	57.5	—	33.6	36.8	8 400	9 900	**NU1010**	—	**NUP1010**	—	—	55	54	57	59	—	75	—	—	1	0.6	0.306
	90	20	1.1	1.1	60.4	80.4	48.2	51.0	7 100	8 500	**NU210**	**NJ210**	**NUP210**	**N210**	**NF210**	56.5	56.5	58	62	67	83.5	83.5	82	1	1	0.479
	90	20	1.1	1.1	59.5	—	66.1	71.9	7 100	8 500	**NU210R**	**NJ210R**	**NUP210R**	—	—	56.5	56.5	58	62	67	83.5	—	—	1	1	0.497
	90	23	1.1	1.1	60.4	—	64.2	73.6	6 400	8 500	**NU2210**	**NJ2210**	**NUP2210**	—	—	56.5	56.5	58	62	67	83.5	—	—	1	1	0.580
	90	23	1.1	1.1	59.5	—	79.7	91.5	6 400	8 500	**NU2210R**	**NJ2210R**	**NUP2210R**	—	—	56.5	56.5	58	62	67	83.5	—	—	1	1	0.580
	90	30.2	1.1	1.1	60.4	—	86.2	108	5 700	8 500	**NU3210**	—	—	—	—	56.5	56.5	58	62	—	83.5	—	—	1	1	0.829
	110	27	2	2	65	95	92.2	93.4	5 600	7 500	**NU310**	**NJ310**	**NUP310**	**N310**	**NF310**	59	59	63	67	73	101	101	98	2	2	1.15
	110	27	2	2	65	—	110	113	5 500	7 400	**NU310R**	**NJ310R**	**NUP310R**	—	—	59	59	63	67	73	101	—	—	2	2	1.15
	110	40	2	2	65	—	128	142	5 000	7 500	**NU2310**	**NJ2310**	**NUP2310**	—	—	59	59	63	67	73	101	—	—	2	2	1.69
	110	40	2	2	65	—	163	187	4 900	7 400	**NU2310R**	**NJ2310R**	**NUP2310R**	—	—	59	59	63	67	73	101	—	—	2	2	1.76
	110	44.4	2	2	65	—	156	183	5 000	7 500	**NU3310**	—	—	—	—	59	59	63	67	—	101	—	—	2	2	2.14
	130	31	2.1	2.1	70.8	110.8	139	136	4 900	6 600	**NU410**	**NJ410**	**NUP410**	**N410**	**NF410**	61	61	69	73	81	119	119	112	2	2	2.01
55	90	18	1.1	1	64.5	—	37.4	43.8	7 600	8 900	**NU1011**	—	**NUP1011**	—	—	61.5	60	63	66	—	83.5	—	—	1	1	0.445
	100	21	1.5	1.1	66.5	88.5	58.0	62.3	6 400	7 700	**NU211**	**NJ211**	**NUP211**	**N211**	**NF211**	63	61.5	65	68	73	92	93.5	91	1.5	1	0.640
	100	21	1.5	1.1	66	—	86.4	98.7	6 400	7 700	**NU211R**	**NJ211R**	**NUP211R**	—	—	63	61.5	65	68	73	92	—	—	1.5	1	0.650
	100	25	1.5	1.1	66.5	—	75.3	87.2	5 800	7 700	**NU2211**	**NJ2211**	**NUP2211**	—	—	63	61.5	65	68	73	92	—	—	1.5	1	0.780

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (55) ~ (65) mm



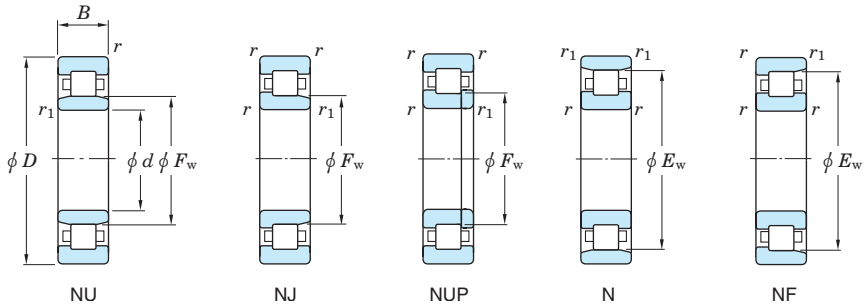


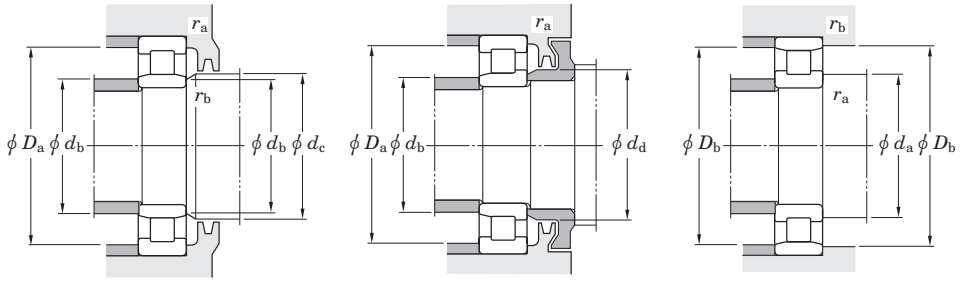
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
55	100	25	1.5	1.1	66	—	101	122	5 800	7 700	**NU2211R**	**NJ2211R**	**NUP2211R**	—	—	63	61.5	65	68	73	92	—	—	1.5	1	0.806
	100	33.3	1.5	1.5	66.5	—	95.5	118	5 100	7 700	**NU3211**	—	—	—	—	63	63	65	68	—	92	—	—	1.5	1	1.14
	120	29	2	2	70.5	104.5	111	111	5 100	6 800	**NU311**	**NJ311**	**NUP311**	**N311**	**NF311**	64	64	69	72	80	111	111	107	2	2	1.44
	120	29	2	2	70.5	—	137	143	5 100	6 700	**NU311R**	**NJ311R**	**NUP311R**	—	—	64	64	69	72	80	111	—	—	2	2	1.50
	120	43	2	2	70.5	—	148	162	4 500	6 800	**NU2311**	**NJ2311**	**NUP2311**	—	—	64	64	69	72	80	111	—	—	2	2	2.10
	120	43	2	2	70.5	—	201	233	4 500	6 700	**NU2311R**	**NJ2311R**	**NUP2311R**	—	—	64	64	69	72	80	111	—	—	2	2	2.25
	120	49.2	2	2	70.5	—	188	220	4 500	6 800	**NU3311**	—	—	—	—	64	64	69	72	—	111	—	—	2	2	2.81
	140	33	2.1	2.1	77.2	117.2	142	138	4 600	6 100	**NU411**	**NJ411**	**NUP411**	**N411**	**NF411**	66	66	76	79	87	129	129	119	2	2	2.51
60	95	18	1.1	1	69.5	—	42.1	50.0	7 000	8 300	**NU1012**	—	**NUP1012**	—	—	66.5	65	68	71	—	88.5	—	—	1	1	0.477
	110	22	1.5	1.5	73.5	97.5	71.9	79.9	5 800	7 000	**NU212**	**NJ212**	**NUP212**	**N212**	**NF212**	68	68	71	75	80	102	102	100	1.5	1.5	0.823
	110	22	1.5	1.5	72	—	97.7	107	5 800	6 900	**NU212R**	**NJ212R**	**NUP212R**	—	—	68	68	71	75	80	102	—	—	1.5	1.5	0.830
	110	28	1.5	1.5	73.5	—	101	123	5 200	7 000	**NU2212**	**NJ2212**	**NUP2212**	—	—	68	68	71	75	80	102	—	—	1.5	1.5	1.07
	110	28	1.5	1.5	72	—	131	157	5 200	6 900	**NU2212R**	**NJ2212R**	**NUP2212R**	—	—	68	68	71	75	80	102	—	—	1.5	1.5	1.09
	110	36.5	1.5	1.5	73.5	—	128	167	4 700	7 000	**NU3212**	—	—	—	—	68	68	71	75	—	102	—	—	1.5	1.5	1.52
	130	31	2.1	2.1	77	113	124	126	4 700	6 300	**NU312**	**NJ312**	**NUP312**	**N312**	**NF312**	71	71	75	79	86	119	119	116	2	2	1.83
	130	31	2.1	2.1	77	—	150	157	4 600	6 200	**NU312R**	**NJ312R**	**NUP312R**	—	—	71	71	75	79	86	119	—	—	2	2	1.87
	130	46	2.1	2.1	77	—	168	188	4 200	6 300	**NU2312**	**NJ2312**	**NUP2312**	—	—	71	71	75	79	86	119	—	—	2	2	2.69
	130	46	2.1	2.1	77	—	223	262	4 100	6 200	**NU2312R**	**NJ2312R**	**NUP2312R**	—	—	71	71	75	79	86	119	—	—	2	2	2.81
	130	54	2.1	2.1	77	—	220	265	4 200	6 300	**NU3312**	—	—	—	—	71	71	75	79	—	119	—	—	2	2	3.61
	150	35	2.1	2.1	83	127	178	184	4 200	5 700	**NU412**	**NJ412**	**NUP412**	**N412**	**NF412**	71	71	82	85	94	139	139	128	2	2	3.02
65	100	18	1.1	1	74.5	—	43.3	52.9	6 600	7 800	**NU1013**	—	**NUP1013**	—	—	71.5	70	73	76	—	93.5	—	—	1	1	0.506
	120	23	1.5	1.5	79.6	105.6	83.8	94.4	5 400	6 400	**NU213**	**NJ213**	**NUP213**	**N213**	**NF213**	73	73	77	81	87	112	112	108	1.5	1.5	1.05
	120	23	1.5	1.5	78.5	—	108	119	5 300	6 400	**NU213R**	**NJ213R**	**NUP213R**	—	—	73	73	77	81	87	112	—	—	1.5	1.5	1.05
	120	31	1.5	1.5	79.6	—	120	149	4 800	6 400	**NU2213**	**NJ2213**	**NUP2213**	—	—	73	73	77	81	87	112	—	—	1.5	1.5	1.43
	120	31	1.5	1.5	78.5	—	149	181	4 800	6 400	**NU2213R**	**NJ2213R**	**NUP2213R**	—	—	73	73	77	81	87	112	—	—	1.5	1.5	1.45
	120	38.1	1.5	1.5	79.6	—	148	197	4 300	6 400	**NU3213**	—	—	—	—	73	73	77	81	—	112	—	—	1.5	1.5	1.90
	140	33	2.1	2.1	83.5	121.5	137	139	4 300	5 800	**NU313**	**NJ313**	**NUP313**	**N313**	**NF313**	76	76	81	85	93	129	129	125	2	2	2.24

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (65) ~ (75) mm



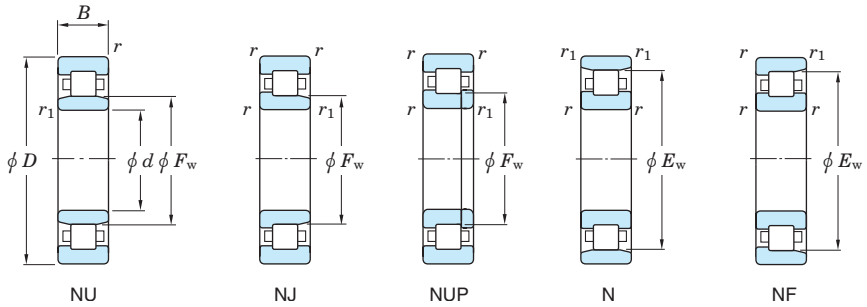


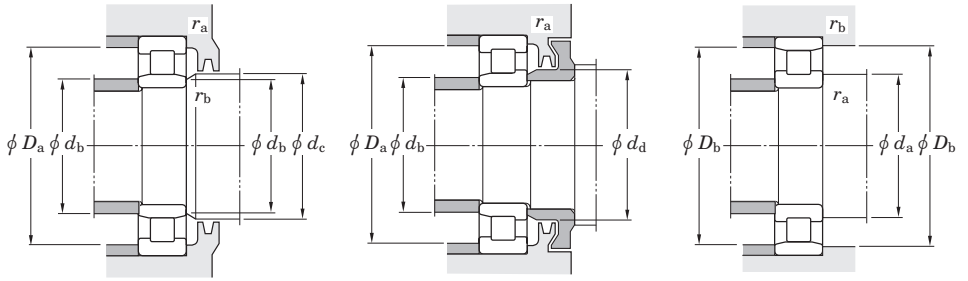
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.				Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
65	140	33	2.1	2.1	82.5	—	181	191	4 300	5 700	**NU313R**	**NJ313R**	**NUP313R**	—	—	76	76	81	85	93	129	—	—	2	2	2.31
	140	48	2.1	2.1	83.5	—	190	212	3 900	5 800	**NU2313**	**NJ2313**	**NUP2313**	—	—	76	76	81	85	93	129	—	—	2	2	3.25
	140	48	2.1	2.1	82.5	—	251	287	3 800	5 700	**NU2313R**	**NJ2313R**	**NUP2313R**	—	—	76	76	81	85	93	129	—	—	2	2	3.36
	140	58.7	2.1	2.1	83.5	—	241	294	3 900	5 800	**NU3313**	—	—	—	—	76	76	81	85	—	129	—	—	2	2	4.53
	160	37	2.1	2.1	89.3	135.3	198	203	4 000	5 300	**NU413**	**NJ413**	**NUP413**	**N413**	**NF413**	76	76	88	91	100	149	149	137	2	2	3.58
70	110	20	1.1	1	80	—	57.9	70.4	6 100	7 200	**NU1014**	—	**NUP1014**	—	—	76.5	75	78	82	—	103.5	—	—	1	1	0.702
	125	24	1.5	1.5	84.5	110.5	83.3	95.2	5 100	6 100	**NU214**	**NJ214**	**NUP214**	**N214**	**NF214**	78	78	82	86	92	117	117	114	1.5	1.5	1.15
	125	24	1.5	1.5	83.5	—	119	137	5 000	6 000	**NU214R**	**NJ214R**	**NUP214R**	—	—	78	78	82	86	92	117	—	—	1.5	1.5	1.16
	125	31	1.5	1.5	84.5	—	119	151	4 600	6 100	**NU2214**	**NJ2214**	**NUP2214**	—	—	78	78	82	86	92	117	—	—	1.5	1.5	1.52
	125	31	1.5	1.5	83.5	—	156	194	4 500	6 000	**NU2214R**	**NJ2214R**	**NUP2214R**	—	—	78	78	82	86	92	117	—	—	1.5	1.5	1.53
	125	39.7	1.5	1.5	84.5	—	147	198	4 100	6 100	**NU3214**	—	—	—	—	78	78	82	86	—	117	—	—	1.5	1.5	2.09
	150	35	2.1	2.1	90	130	162	168	4 000	5 400	**NU314**	**NJ314**	**NUP314**	**N314**	**NF314**	81	81	87	92	100	139	139	134	2	2	2.73
	150	35	2.1	2.1	89	—	205	222	4 000	5 300	**NU314R**	**NJ314R**	**NUP314R**	—	—	81	81	87	92	100	139	—	—	2	2	2.81
	150	51	2.1	2.1	90	—	224	262	3 600	5 400	**NU2314**	**NJ2314**	**NUP2314**	—	—	81	81	87	92	100	139	—	—	2	2	3.97
	150	51	2.1	2.1	89	—	275	323	3 600	5 300	**NU2314R**	**NJ2314R**	**NUP2314R**	—	—	81	81	87	92	100	139	—	—	2	2	4.08
	150	63.5	2.1	2.1	90	—	283	356	3 600	5 400	**NU3314**	—	—	—	—	81	81	87	92	—	139	—	—	2	2	5.62
	180	42	3	3	100	152	246	257	3 500	4 700	**NU414**	**NJ414**	**NUP414**	**N414**	**NF414**	83	83	99	102	112	167	167	153	2.5	2.5	5.26
75	115	20	1.1	1	85	—	63.6	78.1	5 700	6 800	**NU1015**	—	**NUP1015**	—	—	81.5	80	83	87	—	108.5	—	—	1	1	0.735
	130	25	1.5	1.5	88.5	116.5	101	118	4 800	5 800	**NU215**	**NJ215**	**NUP215**	**N215**	**NF215**	83	83	87	90	96	122	122	120	1.5	1.5	1.24
	130	25	1.5	1.5	88.5	—	130	156	4 800	5 700	**NU215R**	**NJ215R**	**NUP215R**	—	—	83	83	87	90	96	122	—	—	1.5	1.5	1.29
	130	31	1.5	1.5	88.5	—	135	172	4 300	5 800	**NU2215**	**NJ2215**	**NUP2215**	—	—	83	83	87	90	96	122	—	—	1.5	1.5	1.57
	130	31	1.5	1.5	88.5	—	162	207	4 300	5 700	**NU2215R**	**NJ2215R**	**NUP2215R**	—	—	83	83	87	90	96	122	—	—	1.5	1.5	1.61
	130	41.3	1.5	1.5	88.5	—	167	226	3 900	5 800	**NU3215**	—	—	—	—	83	83	87	90	—	122	—	—	1.5	1.5	2.28
	160	37	2.1	2.1	95.5	139.5	194	205	3 800	5 000	**NU315**	**NJ315**	**NUP315**	**N315**	**NF315**	86	86	93	97	106	149	149	143	2	2	3.24
	160	37	2.1	2.1	95	—	240	263	3 700	5 000	**NU315R**	**NJ315R**	**NUP315R**	—	—	86	86	93	97	106	149	—	—	2	2	3.37
	160	55	2.1	2.1	95.5	—	275	327	3 400	5 000	**NU2315**	**NJ2315**	**NUP2315**	—	—	86	86	93	97	106	149	—	—	2	2	4.84
	160	55	2.1	2.1	95	—	329	395	3 300	5 000	**NU2315R**	**NJ2315R**	**NUP2315R**	—	—	86	86	93	97	106	149	—	—	2	2	5.00

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (75) ~ (90) mm





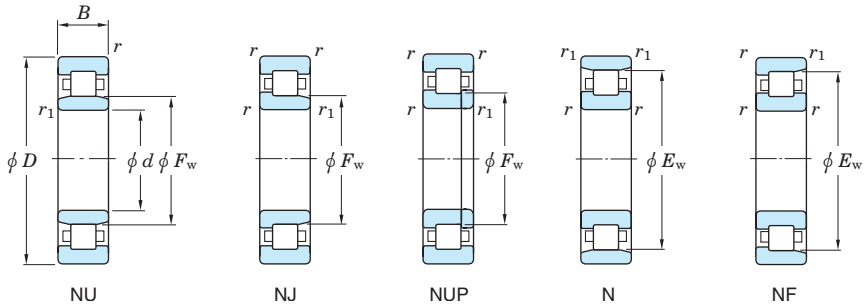
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
75	160	68.3	2.1	2.1	95.5	—	338	430	3 400	5 000	**NU3315**	—	—	—	—	86	86	93	97	—	149	—	—	2	2	6.86
	190	45	3	3	104.5	160.5	265	274	3 300	4 400	**NU415**	**NJ415**	**NUP415**	**N415**	**NF415**	88	88	103	107	118	177	177	162	2.5	2.5	6.25
80	125	22	1.1	1	91.5	—	69.3	86.4	5 300	6 300	**NU1016**	—	**NUP1016**	—	—	86.5	85	90	94	—	118.5	—	—	1	1	0.994
	140	26	2	2	95.3	125.3	106	122	4 500	5 400	**NU216**	**NJ216**	**NUP216**	**N216**	**NF216**	89	89	94	97	104	131	131	128	2	2	1.51
	140	26	2	2	95.3	—	139	167	4 400	5 300	**NU216R**	**NJ216R**	**NUP216R**	—	—	89	89	94	97	104	131	—	—	2	2	1.56
	140	33	2	2	95.3	—	148	186	4 000	5 400	**NU2216**	**NJ2216**	**NUP2216**	—	—	89	89	94	97	104	131	—	—	2	2	1.96
	140	33	2	2	95.3	—	186	243	4 000	5 300	**NU2216R**	**NJ2216R**	**NUP2216R**	—	—	89	89	94	97	104	131	—	—	2	2	2.03
	140	44.4	2	2	95.3	—	190	259	3 600	5 400	**NU3216**	—	—	—	—	89	89	94	97	—	131	—	—	2	2	2.87
	170	39	2.1	2.1	103	147	194	207	3 500	4 700	**NU316**	**NJ316**	**NUP316**	**N316**	**NF316**	91	91	99	105	114	159	159	151	2	2	3.92
	170	39	2.1	2.1	101	—	259	282	3 500	4 700	**NU316R**	**NJ316R**	**NUP316R**	—	—	91	91	99	105	114	159	—	—	2	2	4.00
	170	58	2.1	2.1	103	—	275	332	3 100	4 700	**NU2316**	**NJ2316**	**NUP2316**	—	—	91	91	99	105	114	159	—	—	2	2	5.83
	170	58	2.1	2.1	101	—	361	431	3 100	4 700	**NU2316R**	**NJ2316R**	**NUP2316R**	—	—	91	91	99	105	114	159	—	—	2	2	5.95
	170	68.3	2.1	2.1	103	—	338	436	3 100	4 700	**NU3316**	—	—	—	—	91	91	99	105	—	159	—	—	2	2	7.72
	200	48	3	3	110	170	302	315	3 100	4 200	**NU416**	**NJ416**	**NUP416**	**N416**	**NF416**	93	93	109	112	124	187	187	172	2.5	2.5	7.28
85	130	22	1.1	1	96.5	—	71.4	91.2	5 100	6 000	**NU1017**	—	**NUP1017**	—	—	91.5	90	95	99	—	123.5	—	—	1	1	1.04
	150	28	2	2	101.8	133.8	121	140	4 200	5 000	**NU217**	**NJ217**	**NUP217**	**N217**	**NF217**	94	94	99	104	110	141	141	137	2	2	1.90
	150	28	2	2	100.5	—	167	199	4 200	5 000	**NU217R**	**NJ217R**	**NUP217R**	—	—	94	94	99	104	110	141	—	—	2	2	1.94
	150	36	2	2	101.8	—	169	218	3 800	5 000	**NU2217**	**NJ2217**	**NUP2217**	—	—	94	94	99	104	110	141	—	—	2	2	2.50
	150	36	2	2	100.5	—	218	279	3 700	5 000	**NU2217R**	**NJ2217R**	**NUP2217R**	—	—	94	94	99	104	110	141	—	—	2	2	2.53
	150	49.2	2	2	101.8	—	215	296	3 300	5 000	**NU3217**	—	—	—	—	94	94	99	104	—	141	—	—	2	2	3.67
	180	41	3	3	108	156	225	247	3 300	4 500	**NU317**	**NJ317**	**NUP317**	**N317**	**NF317**	98	98	106	110	119	167	167	160	2.5	2.5	4.52
	180	41	3	3	108	—	291	330	3 300	4 400	**NU317R**	**NJ317R**	**NUP317R**	—	—	98	98	106	110	119	167	—	—	2.5	2.5	4.80
	180	60	3	3	108	—	315	382	3 000	4 500	**NU2317**	**NJ2317**	**NUP2317**	—	—	98	98	106	110	119	167	—	—	2.5	2.5	6.62
	180	60	3	3	108	—	394	485	2 900	4 400	**NU2317R**	**NJ2317R**	**NUP2317R**	—	—	98	98	106	110	119	167	—	—	2.5	2.5	6.98
	180	73	3	3	108	—	399	517	3 000	4 500	**NU3317**	—	—	—	—	98	98	106	110	—	167	—	—	2.5	2.5	9.23
	210	52	4	4	113	177	340	350	3 000	4 000	**NU417**	**NJ417**	**NUP417**	**N417**	**NF417**	101	101	111	115	128	194	194	179	3	3	8.68
90	140	24	1.5	1.1	103	—	84.7	109	4 700	5 600	**NU1018**	—	**NUP1018**	—	—	98	96.5	101	106	—	132	—	—	1.5	1	1.34

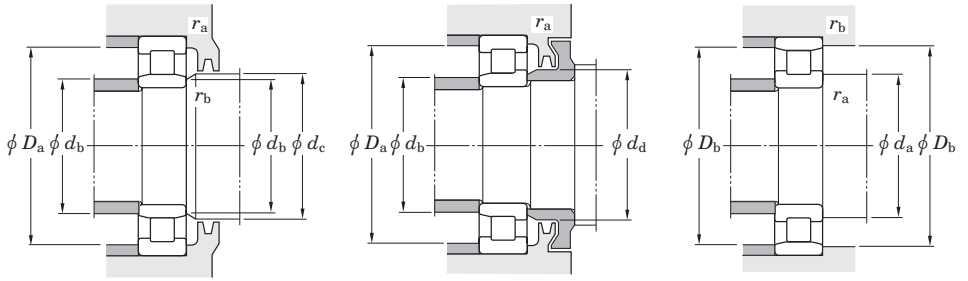
[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

Single-row cylindrical roller bearings

d (90) ~ (100) mm



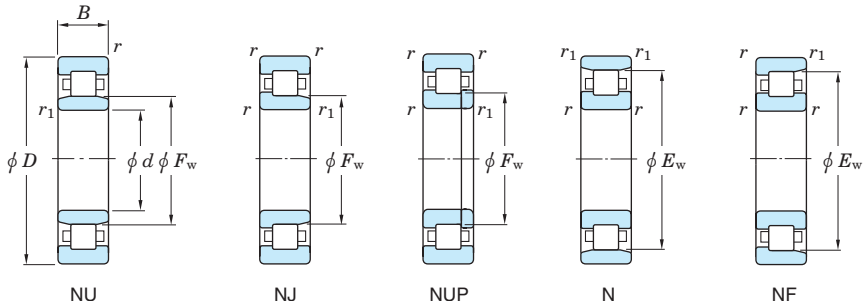


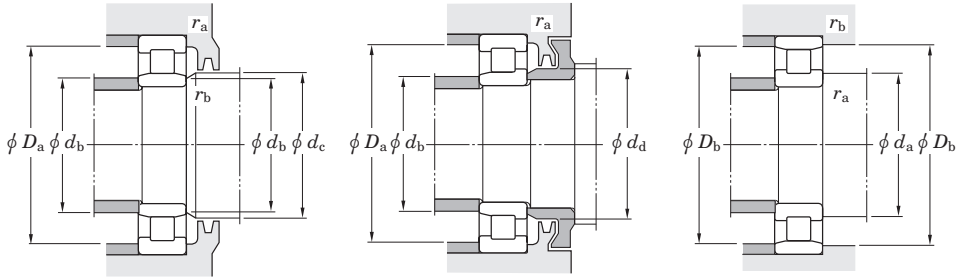
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
90	160	30	2	2	107	143	152	178	3 900	4 700	**NU218**	**NJ218**	**NUP218**	**N218**	**NF218**	99	99	105	109	116	151	151	146	2	2	2.28
	160	30	2	2	107	—	182	217	3 900	4 700	**NU218R**	**NJ218R**	**NUP218R**	—	—	99	99	105	109	116	151	—	—	2	2	2.38
	160	40	2	2	107	—	207	265	3 500	4 700	**NU2218**	**NJ2218**	**NUP2218**	—	—	99	99	105	109	116	151	—	—	2	2	3.10
	160	40	2	2	107	—	242	314	3 500	4 700	**NU2218R**	**NJ2218R**	**NUP2218R**	—	—	99	99	105	109	116	151	—	—	2	2	3.21
	160	52.4	2	2	107	—	270	373	3 100	4 700	**NU3218**	—	—	—	—	99	99	105	109	—	151	—	—	2	2	4.49
	190	43	3	3	115	165	243	265	3 100	4 200	**NU318**	**NJ318**	**NUP318**	**N318**	**NF318**	103	103	111	117	127	177	177	169	2.5	2.5	5.38
	190	43	3	3	113.5	—	316	355	3 100	4 100	**NU318R**	**NJ318R**	**NUP318R**	—	—	103	103	111	117	127	177	—	—	2.5	2.5	5.47
	190	64	3	3	115	—	329	395	2 800	4 200	**NU2318**	**NJ2318**	**NUP2318**	—	—	103	103	111	117	127	177	—	—	2.5	2.5	7.90
	190	64	3	3	113.5	—	437	534	2 800	4 100	**NU2318R**	**NJ2318R**	**NUP2318R**	—	—	103	103	111	117	127	177	—	—	2.5	2.5	8.12
	190	73	3	3	115	—	428	559	2 800	4 200	**NU3318**	—	—	—	—	103	103	111	117	—	177	—	—	2.5	2.5	10.3
	225	54	4	4	123.5	191.5	374	400	2 800	3 700	**NU418**	**NJ418**	**NUP418**	**N418**	**NF418**	106	106	122	125	139	209	209	194	3	3	10.3
95	145	24	1.5	1.1	108	—	87.2	115	4 500	5 300	**NU1019**	—	**NUP1019**	—	—	103	101.5	106	111	—	137	—	—	1.5	1	1.40
	170	32	2.1	2.1	113.5	151.5	165	195	3 700	4 400	**NU219**	**NJ219**	**NUP219**	**N219**	**NF219**	106	106	111	116	123	159	159	155	2	2	2.80
	170	32	2.1	2.1	112.5	—	221	265	3 700	4 400	**NU219R**	**NJ219R**	**NUP219R**	—	—	106	106	111	116	123	159	—	—	2	2	2.92
	170	43	2.1	2.1	113.5	—	230	298	3 300	4 400	**NU2219**	**NJ2219**	**NUP2219**	—	—	106	106	111	116	123	159	—	—	2	2	3.85
	170	43	2.1	2.1	112.5	—	287	371	3 300	4 400	**NU2219R**	**NJ2219R**	**NUP2219R**	—	—	106	106	111	116	123	159	—	—	2	2	3.93
	170	55.6	2.1	2.1	113.5	—	297	412	3 000	4 400	**NU3219**	—	—	—	—	106	106	111	116	—	159	—	—	2	2	5.42
	200	45	3	3	121.5	173.5	277	311	3 000	4 000	**NU319**	**NJ319**	**NUP319**	**N319**	**NF319**	108	108	119	124	134	187	187	178	2.5	2.5	6.20
	200	45	3	3	121.5	—	334	387	2 900	3 900	**NU319R**	**NJ319R**	**NUP319R**	—	—	108	108	119	124	134	187	—	—	2.5	2.5	6.42
	200	67	3	3	121.5	—	394	496	2 600	4 000	**NU2319**	**NJ2319**	**NUP2319**	—	—	108	108	119	124	134	187	—	—	2.5	2.5	9.39
	200	77.8	3	3	121.5	—	487	654	2 600	4 000	**NU3319**	—	—	—	—	108	108	119	124	—	187	—	—	2.5	2.5	12.1
	240	55	4	4	133.5	201.5	410	444	2 600	3 400	**NU419**	**NJ419**	**NUP419**	**N419**	**NF419**	111	111	132	136	149	224	224	204	3	3	13.6
100	150	24	1.5	1.1	113	—	91.0	120	4 300	5 100	**NU1020**	—	**NUP1020**	—	—	108	106.5	111	116	—	142	—	—	1.5	1	1.46
	180	34	2.1	2.1	120	160	183	217	3 500	4 200	**NU220**	**NJ220**	**NUP220**	**N220**	**NF220**	111	111	117	122	130	169	169	164	2	2	3.38
	180	34	2.1	2.1	119	—	250	306	3 500	4 200	**NU220R**	**NJ220R**	**NUP220R**	—	—	111	111	117	122	130	169	—	—	2	2	3.52
	180	46	2.1	2.1	120	—	259	338	3 100	4 200	**NU2220**	**NJ2220**	**NUP2220**	—	—	111	111	117	122	130	169	—	—	2	2	4.67
	180	46	2.1	2.1	119	—	334	444	3 100	4 200	**NU2220R**	**NJ2220R**	**NUP2220R**	—	—	111	111	117	122	130	169	—	—	2	2	4.82

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (100) ~ 110 mm



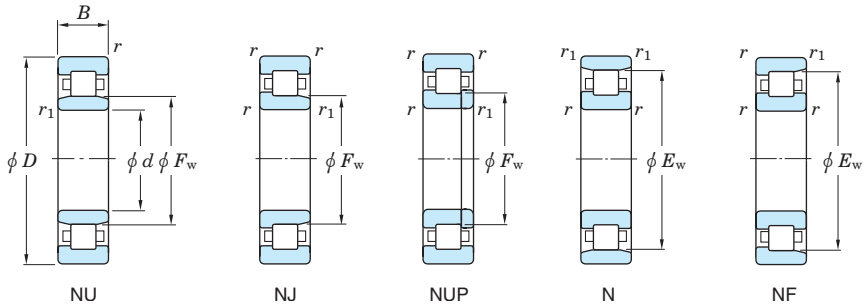


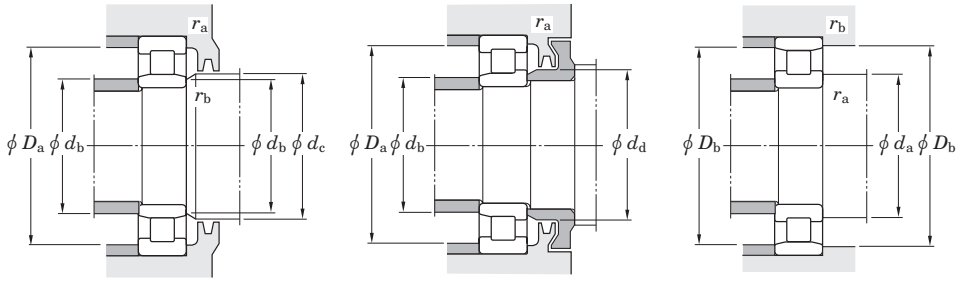
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
100	180	60.3	2.1	2.1	120	—	327	459	2 800	4 200	**NU3220**	—	—	—	—	111	111	117	122	—	169	—	—	2	2	6.62
	215	47	3	3	129.5	185.5	323	337	2 800	3 700	**NU320**	**NJ320**	**NUP320**	**N320**	**NF320**	113	113	125	132	143	202	202	190	2.5	2.5	7.70
	215	47	3	3	127.5	—	379	424	2 700	3 600	**NU320R**	**NJ320R**	**NUP320R**	—	—	113	113	125	132	143	202	—	—	2.5	2.5	7.75
	215	73	3	3	129.5	—	464	548	2 500	3 700	**NU2320**	**NJ2320**	**NUP2320**	—	—	113	113	125	132	143	202	—	—	2.5	2.5	11.9
	215	73	3	3	127.5	—	570	717	2 400	3 600	**NU2320R**	**NJ2320R**	**NUP2320R**	—	—	113	113	125	132	143	202	—	—	2.5	2.5	12.1
	215	82.6	3	3	129.5	—	530	706	2 500	3 700	**NU3320**	—	—	—	—	113	113	125	132	—	202	—	—	2.5	2.5	15.0
	250	58	4	4	139	211	458	498	2 500	3 300	**NU420**	**NJ420**	**NUP420**	**N420**	**NF420**	116	116	137	141	156	234	234	213	3	3	14.0
105	160	26	2	1.1	119.5	—	108	149	4 100	4 800	**NU1021**	—	**NUP1021**	—	—	114	111.5	118	122	—	151	—	—	2	1	1.85
	190	36	2.1	2.1	126.8	168.8	201	241	3 300	3 900	**NU221**	**NJ221**	**NUP221**	**N221**	**NF221**	116	116	124	129	137	179	179	173	2	2	4.00
	190	65.1	2.1	2.1	126.8	—	344	482	2 600	3 900	**NU3221**	—	—	—	—	116	116	124	129	—	179	—	—	2	2	8.00
	225	49	3	3	135	195	366	417	2 600	3 500	**NU321**	**NJ321**	**NUP321**	**N321**	**NF321**	118	118	132	137	149	212	212	199	2.5	2.5	8.76
	225	77	3	3	135	—	568	750	2 300	3 500	**NU2321**	—	**NUP2321**	—	—	118	118	131	138	—	212	—	—	2.5	2.5	15.6
	225	87.3	3	3	135	—	638	871	2 300	3 500	**NU3321**	—	—	—	—	118	118	132	137	—	212	—	—	2.5	2.5	17.4
	260	60	4	4	144.5	220.5	471	510	2 400	3 100	**NU421**	**NJ421**	**NUP421**	**N421**	**NF421**	121	121	143	147	162	244	244	223	3	3	19.1
110	170	28	2	1.1	125	—	134	171	3 800	4 500	**NU1022**	—	**NUP1022**	—	—	119	116.5	124	128	—	161	—	—	2	1	2.31
	200	38	2.1	2.1	132.5	178.5	241	290	3 100	3 700	**NU222**	**NJ222**	**NUP222**	**N222**	**NF222**	121	121	130	135	144	189	189	182	2	2	4.65
	200	38	2.1	2.1	132.5	—	293	365	3 100	3 700	**NU222R**	**NJ222R**	**NUP222R**	—	—	121	121	130	135	144	189	—	—	2	2	4.90
	200	53	2.1	2.1	132.5	—	334	442	2 800	3 700	**NU2222**	**NJ2222**	**NUP2222**	—	—	121	121	130	135	144	189	—	—	2	2	6.93
	200	53	2.1	2.1	132.5	—	384	517	2 800	3 700	**NU2222R**	**NJ2222R**	**NUP2222R**	—	—	121	121	130	135	144	189	—	—	2	2	6.93
	200	69.8	2.1	2.1	132.5	—	427	607	2 500	3 700	**NU3222**	—	—	—	—	121	121	130	135	—	189	—	—	2	2	9.55
	240	50	3	3	143	207	411	467	2 500	3 300	**NU322**	**NJ322**	**NUP322**	**N322**	**NF322**	123	123	140	145	158	227	227	211	2.5	2.5	10.4
	240	50	3	3	143	—	451	525	2 400	3 200	**NU322R**	**NJ322R**	**NUP322R**	—	—	123	123	140	145	158	227	—	—	2.5	2.5	10.7
	240	80	3	3	143	—	604	789	2 200	3 300	**NU2322**	**NJ2322**	**NUP2322**	—	—	123	123	140	145	158	227	—	—	2.5	2.5	18.8
	240	80	3	3	143	—	680	880	2 200	3 200	**NU2322R**	**NJ2322R**	**NUP2322R**	—	—	123	123	140	145	158	227	—	—	2.5	2.5	18.8
	240	92.1	3	3	143	—	678	918	2 200	3 300	**NU3322**	—	—	—	—	123	123	140	145	—	227	—	—	2.5	2.5	21.1
	280	65	4	4	155	235	550	621	2 200	2 900	**NU422**	**NJ422**	**NUP422**	**N422**	**NF422**	126	126	153	157	173	264	264	237	3	3	19.9

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d 120 ~ (140) mm



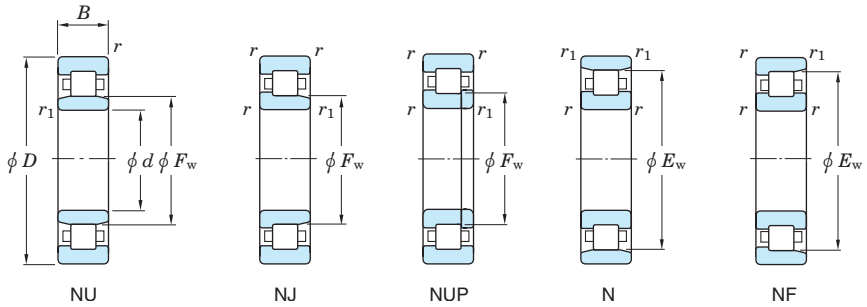


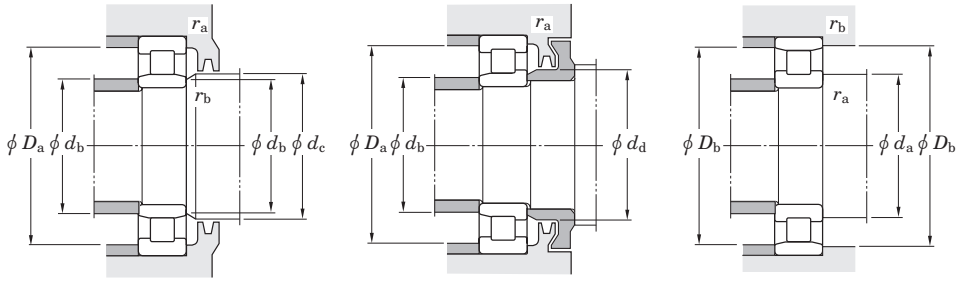
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
120	180	28	2	1.1	135	—	137	181	3 500	4 200	**NU1024**	—	**NUP1024**	—	—	129	126.5	134	138	—	171	—	—	2	1	2.47
	215	40	2.1	2.1	143.5	191.5	260	318	2 900	3 400	**NU224**	**NJ224**	**NUP224**	**N224**	**NF224**	131	131	141	146	156	204	204	196	2	2	5.65
	215	40	2.1	2.1	143.5	—	336	421	2 800	3 400	**NU224R**	**NJ224R**	**NUP224R**	—	—	131	131	141	146	156	204	—	—	2	2	5.85
	215	58	2.1	2.1	143.5	—	367	492	2 600	3 400	**NU2224**	**NJ2224**	**NUP2224**	—	—	131	131	141	146	156	204	—	—	2	2	8.56
	215	58	2.1	2.1	143.5	—	452	619	2 600	3 400	**NU2224R**	**NJ2224R**	**NUP2224R**	—	—	131	131	141	146	156	204	—	—	2	2	8.56
	215	76	2.1	2.1	143.5	—	477	695	2 300	3 400	**NU3224**	—	—	—	—	131	131	141	146	—	204	—	—	2	2	11.9
	260	55	3	3	154	226	485	551	2 200	3 000	**NU324**	**NJ324**	**NUP324**	**N324**	**NF324**	133	133	151	156	171	247	247	230	2.5	2.5	13.1
	260	55	3	3	154	—	528	610	2 200	3 000	**NU324R**	**NJ324R**	**NUP324R**	—	—	133	133	151	156	171	247	—	—	2.5	2.5	13.4
	260	86	3	3	154	—	708	918	2 000	3 000	**NU2324**	**NJ2324**	**NUP2324**	—	—	133	133	151	156	171	247	—	—	2.5	2.5	23.1
	260	86	3	3	154	—	793	1 030	2 000	3 000	**NU2324R**	**NJ2324R**	**NUP2324R**	—	—	133	133	151	156	172	247	—	—	2.5	2.5	23.1
	260	106	3	3	154	—	826	1 120	2 000	3 000	**NU3324**	—	—	—	—	133	133	151	156	—	247	—	—	2.5	2.5	28.3
	310	72	5	5	170	260	690	770	1 900	2 600	**NU424**	**NJ424**	**NUP424**	**N424**	**NF424**	140	140	168	172	190	290	290	262	4	4	28.0
130	200	33	2	1.1	148	—	171	238	3 200	3 800	**NU1026**	—	**NUP1026**	—	—	139	136.5	146	151	—	191	—	—	2	1	3.77
	230	40	3	3	156	204	282	362	2 700	3 200	**NU226**	**NJ226**	**NUP226**	**N226**	**NF226**	143	143	151	158	168	217	217	208	2.5	2.5	6.49
	230	40	3	3	153.5	—	364	453	2 600	3 200	**NU226R**	**NJ226R**	**NUP226R**	—	—	143	143	151	158	168	217	—	—	2.5	2.5	6.60
	230	64	3	3	156	—	395	560	2 400	3 200	**NU2226**	**NJ2226**	**NUP2226**	—	—	143	143	151	158	168	217	—	—	2.5	2.5	11.2
	230	64	3	3	153.5	—	530	737	2 400	3 200	**NU2226R**	**NJ2226R**	**NUP2226R**	—	—	143	143	151	158	168	217	—	—	2.5	2.5	11.2
	230	80	3	3	156	—	550	857	2 100	3 200	**NU3226**	—	—	—	—	143	143	151	158	—	217	—	—	2.5	2.5	14.1
	280	58	4	4	167	243	564	667	2 100	2 700	**NU326**	**NJ326**	**NUP326**	**N326**	**NF326**	146	146	164	169	184	264	264	247	3	3	16.4
	280	58	4	4	167	—	616	736	2 000	2 700	**NU326R**	**NJ326R**	**NUP326R**	—	—	146	146	164	169	184	264	—	—	3	3	16.7
	280	93	4	4	167	—	838	1 130	1 800	2 700	**NU2326**	**NJ2326**	**NUP2326**	—	—	146	146	164	169	184	264	—	—	3	3	29.1
	280	93	4	4	167	—	920	1 230	1 800	2 700	**NU2326R**	**NJ2326R**	**NUP2326R**	—	—	146	146	164	169	186	264	—	—	3	3	29.1
	280	112	4	4	167	—	936	1 290	1 800	2 700	**NU3326**	—	—	—	—	146	146	164	169	—	264	—	—	3	3	34.6
	340	78	5	5	185	285	771	876	1 800	2 300	**NU426**	**NJ426**	**NUP426**	**N426**	**NF426**	150	150	183	187	208	320	320	287	4	4	36.1
140	210	33	2	1.1	158	—	175	250	3 000	3 600	**NU1028**	—	**NUP1028**	—	—	149	146.5	156	161	—	201	—	—	2	1	4.00
	250	42	3	3	169	221	324	421	2 400	2 900	**NU228**	**NJ228**	**NUP228**	**N228**	**NF228**	153	153	166	171	182	237	237	228	2.5	2.5	8.27
	250	42	3	3	169	—	392	514	2 400	2 900	**NU228R**	**NJ228R**	**NUP228R**	—	—	153	153	166	171	182	237	—	—	2.5	2.5	8.50

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (140) ~ (160) mm



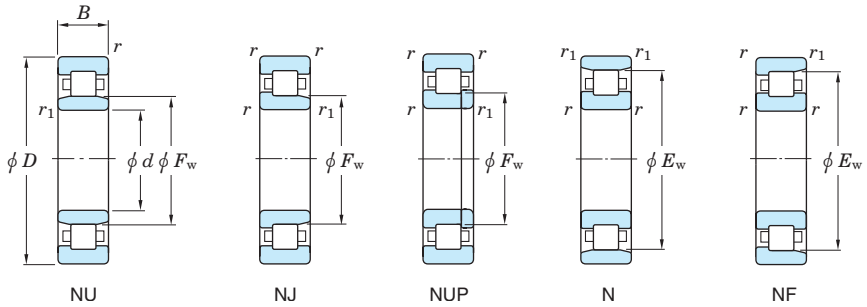


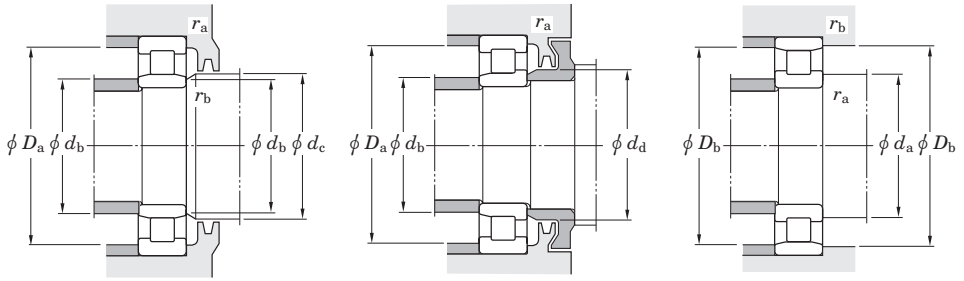
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
140	250	68	3	3	169	—	465	671	2 200	2 900	**NU2228**	**NJ2228**	**NUP2228**	—	—	153	153	166	171	182	237	—	—	2.5	2.5	14.3
	250	68	3	3	169	—	572	835	2 200	2 900	**NU2228R**	**NJ2228R**	**NUP2228R**	—	—	153	153	166	171	182	237	—	—	2.5	2.5	14.3
	250	88	3	3	169	—	604	939	1 900	2 900	**NU3228**	—	—	—	—	153	153	166	171	—	237	—	—	2.5	2.5	18.5
	300	62	4	4	180	260	623	746	1 900	2 500	**NU328**	**NJ328**	**NUP328**	**N328**	**NF328**	156	156	176	182	198	284	284	264	3	3	21.8
	300	62	4	4	180	—	663	797	1 900	2 500	**NU328R**	**NJ328R**	**NUP328R**	—	—	156	156	176	182	198	284	—	—	3	3	21.8
	300	102	4	4	180	—	920	1 250	1 700	2 500	**NU2328**	**NJ2328**	**NUP2328**	—	—	156	156	176	182	198	284	—	—	3	3	36.8
	300	102	4	4	180	—	1 020	1 380	1 700	2 500	**NU2328R**	**NJ2328R**	**NUP2328R**	—	—	156	156	176	182	200	284	—	—	3	3	36.8
	300	118	4	4	180	—	1 090	1 550	1 700	2 500	**NU3328**	—	—	—	—	156	156	176	182	—	284	—	—	3	3	41.5
	360	82	5	5	198	302	874	1 020	1 600	2 200	**NU428**	**NJ428**	**NUP428**	**N428**	**NF428**	160	160	195	200	222	340	340	304	4	4	46.8
150	225	35	2.1	1.5	169.5	—	201	281	2 800	3 300	**NU1030**	—	**NUP1030**	—	—	161	158	167	173	—	214	—	—	2	1.5	4.83
	270	45	3	3	182	238	374	492	2 200	2 700	**NU230**	**NJ230**	**NUP230**	**N230**	**NF230**	163	163	179	184	196	257	257	245	2.5	2.5	10.3
	270	45	3	3	182	—	448	594	2 200	2 600	**NU230R**	**NJ230R**	**NUP230R**	—	—	163	163	179	184	196	257	—	—	2.5	2.5	10.7
	270	73	3	3	182	—	545	800	2 000	2 700	**NU2230**	**NJ2230**	**NUP2230**	—	—	163	163	179	184	196	257	—	—	2.5	2.5	18.7
	270	73	3	3	182	—	662	982	2 000	2 600	**NU2230R**	**NJ2230R**	**NUP2230R**	—	—	163	163	179	184	196	257	—	—	2.5	2.5	18.7
	270	96	3	3	182	—	749	1 200	1 800	2 700	**NU3230**	—	—	—	—	163	163	179	184	—	257	—	—	2.5	2.5	23.7
	320	65	4	4	193	277	663	807	1 800	2 300	**NU330**	**NJ330**	**NUP330**	**N330**	**NF330**	166	166	190	195	213	304	304	281	3	3	26.4
	320	65	4	4	193	—	757	922	1 700	2 300	**NU330R**	**NJ330R**	**NUP330R**	—	—	166	166	190	195	213	304	—	—	3	3	27.0
	320	108	4	4	193	—	1 020	1 400	1 600	2 300	**NU2330**	**NJ2330**	**NUP2330**	—	—	166	166	190	195	213	304	—	—	3	3	44.7
	320	108	4	4	193	—	1 180	1 600	1 500	2 300	**NU2330R**	**NJ2330R**	**NUP2330R**	—	—	166	166	190	195	213	304	—	—	3	3	44.7
	320	128	4	4	193	—	1 290	1 890	1 600	2 300	**NU3330**	—	—	—	—	166	166	190	195	—	304	—	—	3	3	51.4
	380	85	5	5	213	317	930	1 120	1 500	2 000	**NU430**	**NJ430**	**NUP430**	**N430**	**NF430**	170	170	210	216	237	360	360	319	4	4	53.3
160	240	38	2.1	1.5	180	—	236	330	2 600	3 000	**NU1032**	—	**NUP1032**	—	—	171	168	178	184	—	229	—	—	2	1.5	5.93
	290	48	3	3	195	255	427	568	2 100	2 500	**NU232**	**NJ232**	**NUP232**	**N232**	**NF232**	173	173	192	197	210	277	277	262	2.5	2.5	14.4
	290	48	3	3	195	—	498	666	2 000	2 400	**NU232R**	**NJ232R**	**NUP232R**	—	—	173	173	192	197	210	277	—	—	2.5	2.5	14.8
	290	80	3	3	195	—	631	939	1 800	2 500	**NU2232**	**NJ2232**	**NUP2232**	—	—	173	173	192	197	210	277	—	—	2.5	2.5	23.6
	290	80	3	3	193	—	809	1 190	1 800	2 400	**NU2232R**	**NJ2232R**	**NUP2232R**	—	—	173	173	192	197	210	277	—	—	2.5	2.5	23.6
	290	104	3	3	195	—	857	1 390	1 600	2 500	**NU3232**	—	—	—	—	173	173	192	197	—	277	—	—	2.5	2.5	29.8

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (160) ~ (190) mm



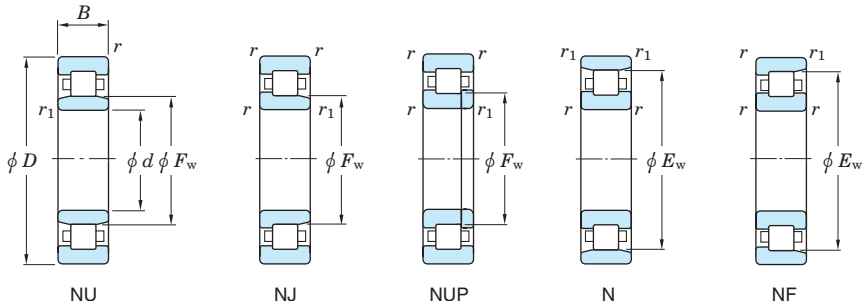


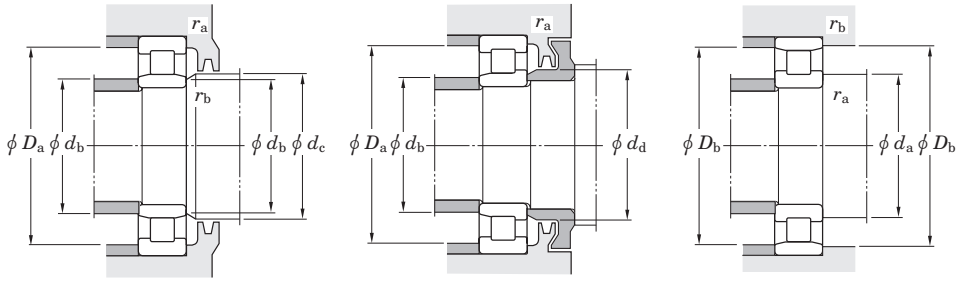
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
160	340	68	4	4	208	292	698	876	1 600	2 200	**NU332**	**NJ332**	**NUP332**	**N332**	**NF332**	176	176	200	211	228	324	324	296	3	3	31.7
	340	68	4	4	204	—	857	1 050	1 600	2 100	**NU332R**	**NJ332R**	**NUP332R**	—	—	176	176	200	211	228	324	—	—	3	3	32.0
	340	114	4	4	208	—	1 070	1 520	1 400	2 200	**NU2332**	**NJ2332**	**NUP2332**	—	—	176	176	200	211	228	324	—	—	3	3	53.1
	340	114	4	4	204	—	1 310	1 820	1 400	2 100	**NU2332R**	**NJ2332R**	**NUP2332R**	—	—	176	176	200	211	228	324	—	—	3	3	53.1
	340	136	4	4	208	—	1 270	1 890	1 400	2 200	**NU3332**	—	—	—	—	176	176	200	211	—	324	—	—	3	3	61.5
170	260	42	2.1	2.1	193	—	276	400	2 400	2 800	**NU1034**	—	**NUP1034**	—	—	181	181	190	197	—	249	—	—	2	2	7.90
	310	52	4	4	208	272	475	637	1 900	2 300	**NU234**	**NJ234**	**NUP234**	**N234**	**NF234**	186	186	204	211	223	294	294	280	3	3	18.4
	310	52	4	4	207	—	603	802	1 900	2 200	**NU234R**	**NJ234R**	**NUP234R**	—	—	186	186	204	211	223	294	—	—	3	3	18.6
	310	86	4	4	208	—	715	1 080	1 700	2 300	**NU2234**	**NJ2234**	**NUP2234**	—	—	186	186	204	211	223	294	—	—	3	3	29.2
	310	86	4	4	205	—	967	1 410	1 700	2 200	**NU2234R**	**NJ2234R**	**NUP2234R**	—	—	186	186	204	211	223	294	—	—	3	3	29.2
	310	110	4	4	208	—	964	1 580	1 500	2 300	**NU3234**	—	—	—	—	186	186	204	211	—	294	—	—	3	3	36.2
	360	72	4	4	220	310	809	1 010	1 500	2 000	**NU334**	**NJ334**	**NUP334**	**N334**	**NF334**	186	186	216	223	241	344	344	314	3	3	38.6
	360	120	4	4	220	—	1 220	1 750	1 300	2 000	**NU2334**	**NJ2334**	**NUP2334**	—	—	186	186	216	223	241	344	—	—	3	3	62.6
	360	140	4	4	220	—	1 420	2 120	1 300	2 000	**NU3334**	—	—	—	—	186	186	216	223	—	344	—	—	3	3	70.8
180	280	46	2.1	2.1	205	—	356	503	2 200	2 600	**NU1036**	—	**NUP1036**	—	—	191	191	203	209	—	269	—	—	2	2	10.5
	320	52	4	4	218	282	492	677	1 800	2 200	**NU236**	**NJ236**	**NUP236**	**N236**	**NF236**	196	196	214	221	233	304	304	290	3	3	19.3
	320	52	4	4	217	—	626	852	1 800	2 100	**NU236R**	**NJ236R**	**NUP236R**	—	—	196	196	214	221	233	304	—	—	3	3	19.3
	320	86	4	4	218	—	741	1 140	1 600	2 200	**NU2236**	**NJ2236**	**NUP2236**	—	—	196	196	214	221	233	304	—	—	3	3	30.4
	320	86	4	4	215	—	1 010	1 510	1 600	2 100	**NU2236R**	**NJ2236R**	**NUP2236R**	—	—	196	196	214	221	233	304	—	—	3	3	30.4
	320	112	4	4	218	—	999	1 680	1 400	2 200	**NU3236**	—	—	—	—	196	196	214	221	—	304	—	—	3	3	38.4
	380	75	4	4	232	328	917	1 150	1 400	1 900	**NU336**	**NJ336**	**NUP336**	**N336**	**NF336**	196	196	227	235	255	364	364	332	3	3	42.6
	380	126	4	4	232	—	1 350	1 940	1 300	1 900	**NU2336**	**NJ2336**	**NUP2336**	—	—	196	196	227	235	255	364	—	—	3	3	73.0
	380	150	4	4	232	—	1 660	2 520	1 300	1 900	**NU3336**	—	—	—	—	196	196	227	235	—	364	—	—	3	3	84.4
190	290	46	2.1	2.1	215	—	366	530	2 100	2 500	**NU1038**	—	**NUP1038**	—	—	201	201	213	219	—	279	—	—	2	2	10.9
	340	55	4	4	231	299	554	768	1 700	2 000	**NU238**	**NJ238**	**NUP238**	**N238**	**NF238**	206	206	227	234	247	324	324	310	3	3	23.2
	340	55	4	4	230	—	694	954	1 700	2 000	**NU238R**	**NJ238R**	**NUP238R**	—	—	206	206	227	234	247	324	—	—	3	3	23.3
	340	92	4	4	231	—	828	1 290	1 500	2 000	**NU2238**	**NJ2238**	**NUP2238**	—	—	206	206	227	234	247	324	—	—	3	3	37.0

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (190) ~ (240) mm



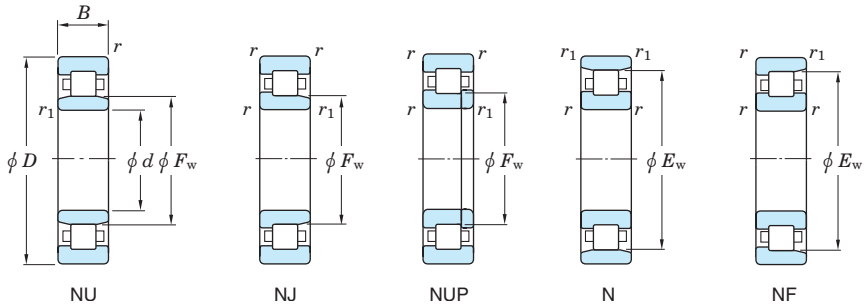


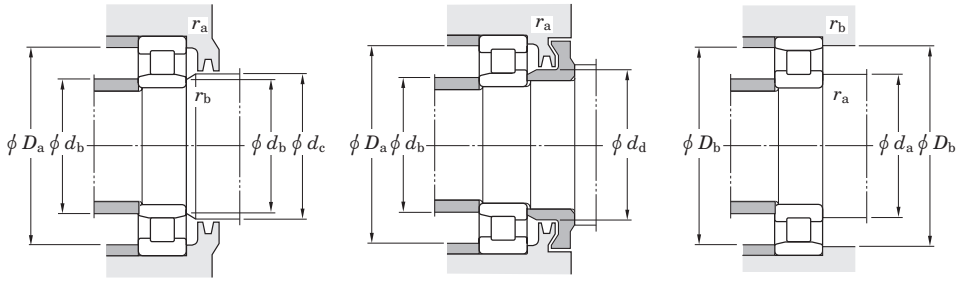
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
190	340	92	4	4	228	—	1 100	1 670	1 500	2 000	**NU2238R**	**NJ2238R**	**NUP2238R**	—	—	206	206	227	234	247	324	—	—	3	3	37.0
	340	120	4	4	231	—	1 310	1 930	1 300	2 000	**NU3238**	—	—	—	—	206	206	227	234	—	324	—	—	3	3	46.8
	400	78	5	5	245	345	987	1 260	1 300	1 800	**NU338**	**NJ338**	**NUP338**	**N338**	**NF338**	210	210	240	248	268	380	380	349	4	4	49.9
	400	132	5	5	245	—	1 520	2 220	1 200	1 800	**NU2338**	**NJ2338**	**NUP2338**	—	—	210	210	240	248	268	380	—	—	4	4	84.7
	400	155	5	5	245	—	1 870	2 910	1 200	1 800	**NU3338**	—	—	—	—	210	210	240	248	—	380	—	—	4	4	96.5
200	310	51	2.1	2.1	229	—	388	582	1 900	2 300	**NU1040**	—	**NUP1040**	—	—	211	211	226	233	—	299	—	—	2	2	14.1
	360	58	4	4	244	316	618	865	1 600	1 900	**NU240**	**NJ240**	**NUP240**	**N240**	**NF240**	216	216	240	247	261	344	344	328	3	3	26.8
	360	58	4	4	243	—	766	1 060	1 600	1 900	**NU240R**	**NJ240R**	**NUP240R**	—	—	216	216	240	247	261	344	—	—	3	3	27.2
	360	98	4	4	244	—	946	1 490	1 400	1 900	**NU2240**	**NJ2240**	**NUP2240**	—	—	216	216	240	247	261	344	—	—	3	3	44.4
	360	98	4	4	241	—	1 220	1 870	1 400	1 900	**NU2240R**	**NJ2240R**	**NUP2240R**	—	—	216	216	240	247	261	344	—	—	3	3	44.4
	360	128	4	4	244	—	1 200	2 020	1 300	1 900	**NU3240**	—	—	—	—	216	216	240	247	—	344	—	—	3	3	56.2
	420	80	5	5	260	360	987	1 270	1 200	1 700	**NU340**	**NJ340**	**NUP340**	**N340**	**NF340**	220	220	254	263	283	400	400	364	4	4	56.2
	420	138	5	5	260	—	1 520	2 240	1 100	1 700	**NU2340**	**NJ2340**	**NUP2340**	—	—	220	220	254	263	283	400	—	—	4	4	97.4
	420	165	5	5	260	—	1 870	2 930	1 100	1 700	**NU3340**	—	—	—	—	220	220	250	258	—	400	—	—	4	4	113
220	340	56	3	3	250	—	507	748	1 700	2 000	**NU1044**	—	**NUP1044**	—	—	233	233	248	254	—	327	—	—	2.5	2.5	18.5
	400	65	4	4	270	350	766	1 080	1 400	1 700	**NU244**	**NJ244**	**NUP244**	**N244**	**NF244**	236	236	266	273	289	384	384	362	3	3	38.5
	400	108	4	4	270	—	1 130	1 810	1 200	1 700	**NU2244**	**NJ2244**	—	—	—	236	236	266	273	289	384	—	—	3	3	60.9
	400	144	4	4	270	—	1 630	2 880	1 100	1 700	**NU3244**	—	—	—	—	236	236	266	273	—	384	—	—	3	3	78.8
	460	88	5	5	284	396	1 200	1 570	1 100	1 500	**NU344**	**NJ344**	**NUP344**	**N344**	**NF344**	240	240	279	287	309	440	440	400	4	4	74.4
	460	145	5	5	284	—	1 810	2 690	990	1 500	**NU2344**	—	**NUP2344**	—	—	240	240	276	287	—	440	—	—	4	4	119
	460	180	5	5	284	—	2 130	3 300	990	1 500	**NU3344**	—	—	—	—	240	240	279	287	—	440	—	—	4	4	148
240	360	56	3	3	270	—	535	822	1 600	1 900	**NU1048**	—	**NUP1048**	—	—	253	253	268	275	—	347	—	—	2.5	2.5	20.1
	440	72	4	4	295	385	949	1 340	1 200	1 500	**NU248**	**NJ248**	**NUP248**	**N248**	**NF248**	256	256	293	298	316	424	424	397	3	3	52.1
	440	120	4	4	295	—	1 430	2 320	1 100	1 500	**NU2248**	**NJ2248**	—	—	—	256	256	293	298	316	424	—	—	3	3	82.5
	440	160	4	4	295	—	1 950	3 460	990	1 500	**NU3248**	—	—	—	—	256	256	293	298	—	424	—	—	3	3	107
	500	95	5	5	310	430	1 430	1 950	990	1 300	**NU348**	**NJ348**	**NUP348**	**N348**	**NF348**	260	260	305	313	337	480	480	434	4	4	94.6
	500	155	5	5	310	—	2 170	3 320	880	1 300	**NU2348**	—	**NUP2348**	—	—	260	260	303	313	—	480	—	—	4	4	152

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d (240) ~ 460 mm



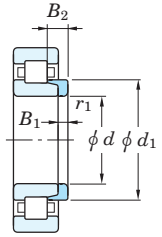


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.					Mounting dimensions (mm)										(Refer.) Mass
d	D	B	r min.	r_1 min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	NU	NJ	NUP	N	NF	d_a min.	d_b min.	d_b max.	d_c min.	d_d min.	D_a max.	D_b max.	D_b min.	r_a max.	r_b max.	NU (kg)
240	500	195	5	5	310	—	2 540	4 070	880	1 300	**NU3348**	—	—	—	—	260	260	305	313	—	480	—	—	4	4	189
260	400	65	4	4	296	—	651	979	1 400	1 700	**NU1052**	—	**NUP1052**	—	—	276	276	292	300	—	384	—	—	3	3	29.2
	480	80	5	5	320	420	1 100	1 580	1 100	1 300	**NU252**	**NJ252**	**NUP252**	**N252**	**NF252**	280	280	318	323	343	460	460	432	4	4	69.0
	480	130	5	5	320	—	1 790	2 950	990	1 300	**NU2252**	**NJ2252**	—	—	—	280	280	318	323	343	460	—	—	4	4	107
	480	174	5	5	320	—	2 140	3 680	880	1 300	**NU3252**	—	—	—	—	280	280	318	323	—	460	—	—	4	4	139
	540	165	6	6	336	—	2 430	3 750	790	1 200	**NU2352**	—	**NUP2352**	—	—	284	284	327	339	—	516	—	—	5	5	185
	540	206	6	6	336	—	2 940	4 790	790	1 200	**NU3352**	—	—	—	—	284	284	330	339	—	516	—	—	5	5	232
280	420	65	4	4	316	—	669	1 030	1 300	1 500	**NU1056**	—	**NUP1056**	—	—	296	296	313	320	—	404	—	—	3	3	35.2
	500	80	5	5	340	440	1 140	1 680	1 000	1 200	**NU256**	**NJ256**	**NUP256**	**N256**	**NF256**	300	300	336	343	365	480	480	452	4	4	72.7
300	460	74	4	4	340	—	890	1 380	1 200	1 400	**NU1060**	—	**NUP1060**	—	—	316	316	337	344	—	444	—	—	3	3	44.1
	540	85	5	5	364	476	1 350	1 960	920	1 100	**NU260**	**NJ260**	**NUP260**	**N260**	**NF260**	320	320	361	368	392	520	520	487	4	4	90.7
320	480	74	4	4	360	—	913	1 450	1 100	1 300	**NU1064**	—	**NUP1064**	—	—	336	336	356	365	—	464	—	—	3	3	48.4
	580	92	5	5	390	510	1 540	2 270	840	1 000	**NU264**	**NJ264**	**NUP264**	**N264**	**NF264**	340	340	386	393	419	560	560	522	4	4	114
	670	112	7.5	7.5	425	—	1 970	2 880	650	870	**NU364**	—	—	—	—	352	352	419	428	—	638	638	575	6	6	199
340	520	82	5	5	385	—	1 090	1 750	980	1 200	**NU1068**	—	**NUP1068**	—	—	360	360	381	390	—	500	—	—	4	4	64.1
360	540	82	5	5	405	—	1 120	1 830	920	1 100	**NU1072**	—	**NUP1072**	—	—	380	380	401	410	—	520	—	—	4	4	67.1
380	560	82	5	5	425	—	1 150	1 920	860	1 000	**NU1076**	—	**NUP1076**	—	—	400	400	421	430	—	540	—	—	4	4	70.1
400	600	90	5	5	450	—	1 400	2 310	780	920	**NU1080**	—	**NUP1080**	—	—	420	420	446	455	—	580	—	—	4	4	91.0
420	620	90	5	5	470	—	1 390	2 320	730	860	**NU1084**	—	**NUP1084**	—	—	440	440	466	475	—	600	—	—	4	4	94.6
440	650	94	6	6	493	—	1 490	2 520	680	800	**NU1088**	—	**NUP1088**	—	—	464	464	489	498	—	626	—	—	5	5	109
460	680	100	6	6	516	—	1 590	2 730	630	750	**NU1092**	—	**NUP1092**	—	—	484	484	512	520	—	656	—	—	5	5	127

[Remarks] 1) Standard cage types used for the above bearings are shown in Table 1 earlier in this section. Please note that basic load ratings and limiting speeds shown above indicate the value applicable to machined cage. Consult JTEKT about bearings with pressed cage, since they may be different from bearings with machined cage in values above.

2) Bearing numbers of NU and NJ type bearings with mounted thrust collar (refer to specification table shown after this specification table) are NUJ and NH.

d 20 ~ (35) mm



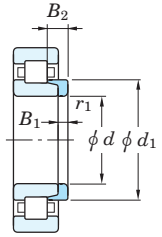
Thrust collar

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
20	29.7	3	6.75	0.6	**HJ204**	0.012	NJ204	NU204
	29.8	3	5.5	0.6	**HJ204R**	0.011	NJ204R	NU204R
	30	3	7.5	0.6	**HJ2204**	0.012	NJ2204	NU2204
	29.8	3	6.5	0.6	**HJ2204R**	0.012	NJ2204R	NU2204R
	31.8	4	7.5	0.6	**HJ304**	0.017	NJ304	NU304
	31.4	4	6.5	0.6	**HJ304R**	0.017	NJ304R	NU304R
	31.8	4	8.5	0.6	**HJ2304**	0.020	NJ2304	NU2304
	31.4	4	7.5	0.6	**HJ2304R**	0.018	NJ2304R	NU2304R
25	34.7	3	7.25	0.6	**HJ205**	0.015	NJ205	NU205
	34.8	3	6	0.6	**HJ205R**	0.014	NJ205R	NU205R
	34.7	3	7.5	0.6	**HJ2205**	0.015	NJ2205	NU2205
	34.8	3	6.5	0.6	**HJ2205R**	0.014	NJ2205R	NU2205R
	39	4	8	1.1	**HJ305**	0.025	NJ305	NU305
	38.2	4	7	1.1	**HJ305R**	0.025	NJ305R	NU305R
	39	4	9	1.1	**HJ2305**	0.025	NJ2305	NU2305
	38.2	4	8	1.1	**HJ2305R**	0.026	NJ2305R	NU2305R
30	41.8	4	8.25	0.6	**HJ206**	0.025	NJ206	NU206
	41.4	4	7	0.6	**HJ206R**	0.025	NJ206R	NU206R
	41.8	4	8.5	0.6	**HJ2206**	0.025	NJ2206	NU2206
	41.4	4	7.5	0.6	**HJ2206R**	0.025	NJ2206R	NU2206R
	45.9	5	9.5	1.1	**HJ306**	0.039	NJ306	NU306
	45.1	5	8.5	1.1	**HJ306R**	0.042	NJ306R	NU306R
	45.9	5	11.5	1.1	**HJ2306**	0.039	NJ2306	NU2306
	45.1	5	9.5	1.1	**HJ2306R**	0.043	NJ2306R	NU2306R
	50.5	7	11.5	1.5	**HJ406**	0.080	NJ406	NU406
35	47.6	4	8	0.6	**HJ207**	0.030	NJ207	NU207
	48.2	4	7	0.6	**HJ207R**	0.033	NJ207R	NU207R
	47.6	4	8.5	0.6	**HJ2207**	0.030	NJ2207	NU2207

d (35) ~ (50) mm

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
35	48.2	4	8.5	0.6	**HJ2207R**	0.035	NJ2207R	NU2207R
	50.8	6	11	1.1	**HJ307**	0.056	NJ307	NU307
	51.1	6	9.5	1.1	**HJ307R**	0.060	NJ307R	NU307R
	50.8	6	14	1.1	**HJ2307**	0.056	NJ2307	NU2307
	51.1	6	11	1.1	**HJ2307R**	0.062	NJ2307R	NU2307R
	59	8	13	1.5	**HJ407**	0.120	NJ407	NU407
40	54.2	5	9	1.1	**HJ208**	0.046	NJ208	NU208
	54.1	5	8.5	1.1	**HJ208R**	0.049	NJ208R	NU208R
	54.2	5	9.5	1.1	**HJ2208**	0.046	NJ2208	NU2208
	54.1	5	9	1.1	**HJ2208R**	0.050	NJ2208R	NU2208R
	58.4	7	12.5	1.5	**HJ308**	0.083	NJ308	NU308
	57.7	7	11	1.5	**HJ308R**	0.088	NJ308R	NU308R
	58.4	7	14.5	1.5	**HJ2308**	0.083	NJ2308	NU2308
	57.7	7	12.5	1.5	**HJ2308R**	0.091	NJ2308R	NU2308R
	64.8	8	13	2	**HJ408**	0.140	NJ408	NU408
45	59	5	9.5	1.1	**HJ209**	0.053	NJ209	NU209
	59.1	5	8.5	1.1	**HJ209R**	0.055	NJ209R	NU209R
	59	5	9.5	1.1	**HJ2209**	0.053	NJ2209	NU2209
	59.1	5	9	1.1	**HJ2209R**	0.055	NJ2209R	NU2209R
	64	7	12.5	1.5	**HJ309**	0.099	NJ309	NU309
	64.5	7	11.5	1.5	**HJ309R**	0.110	NJ309R	NU309R
	64	7	15	1.5	**HJ2309**	0.099	NJ2309	NU2309
	64.5	7	13	1.5	**HJ2309R**	0.113	NJ2309R	NU2309R
	71.8	8	13.5	2	**HJ409**	0.175	NJ409	NU409
50	64.6	5	10	1.1	**HJ210**	0.063	NJ210	NU210
	64.1	5	9	1.1	**HJ210R**	0.061	NJ210R	NU210R
	64.6	5	9.5	1.1	**HJ2210**	0.063	NJ2210	NU2210
	64.1	5	9	1.1	**HJ2210R**	0.061	NJ2210R	NU2210R
	71	8	14	2	**HJ310**	0.142	NJ310	NU310

d (50) ~ (65) mm



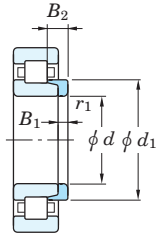
Thrust collar

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
50	71.4	8	13	2	**HJ310R**	0.151	NJ310R	NU310R
	71	8	17	2	**HJ2310**	0.142	NJ2310	NU2310
	71.4	8	14.5	2	**HJ2310R**	0.155	NJ2310R	NU2310R
	78.8	9	14.5	2.1	**HJ410**	0.230	NJ410	NU410
55	70.8	6	11	1.1	**HJ211**	0.084	NJ211	NU211
	70.9	6	9.5	1.1	**HJ211R**	0.087	NJ211R	NU211R
	70.8	6	11	1.1	**HJ2211**	0.084	NJ2211	NU2211
	70.9	6	10	1.1	**HJ2211R**	0.088	NJ2211R	NU2211R
	77.2	9	15	2	**HJ311**	0.182	NJ311	NU311
	77.6	9	14	2	**HJ311R**	0.195	NJ311R	NU311R
	77.2	9	18.5	2	**HJ2311**	0.182	NJ2311	NU2311
	77.6	9	15.5	2	**HJ2311R**	0.200	NJ2311R	NU2311R
	85.2	10	16.5	2.1	**HJ411**	0.290	NJ411	NU411
60	78.4	6	11	1.5	**HJ212**	0.108	NJ212	NU212
	77.7	6	10	1.5	**HJ212R**	0.108	NJ212R	NU212R
	78.4	6	11	1.5	**HJ2212**	0.108	NJ2212	NU2212
	77.7	6	10	1.5	**HJ2212R**	0.108	NJ2212R	NU2212R
	84.2	9	15.5	2.1	**HJ312**	0.220	NJ312	NU312
	84.5	9	14.5	2.1	**HJ312R**	0.231	NJ312R	NU312R
	84.2	9	19	2.1	**HJ2312**	0.220	NJ2312	NU2312
	84.5	9	16	2.1	**HJ2312R**	0.237	NJ2312R	NU2312R
	91.8	10	16.5	2.1	**HJ412**	0.340	NJ412	NU412
65	84.8	6	11	1.5	**HJ213**	0.123	NJ213	NU213
	84.5	6	10	1.5	**HJ213R**	0.129	NJ213R	NU213R
	84.8	6	11.5	1.5	**HJ2213**	0.123	NJ2213	NU2213
	84.5	6	10.5	1.5	**HJ2213R**	0.131	NJ2213R	NU2213R
	91	10	17	2.1	**HJ313**	0.280	NJ313	NU313
	90.6	10	15.5	2.1	**HJ313R**	0.288	NJ313R	NU313R

d (65) ~ (80) mm

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
65	91	10	20	2.1	**HJ2313**	0.280	NJ2313	NU2313
	90.6	10	18	2.1	**HJ2313R**	0.298	NJ2313R	NU2313R
	98.5	11	18	2.1	**HJ413**	0.420	NJ413	NU413
70	89.6	7	12.5	1.5	**HJ214**	0.150	NJ214	NU214
	89.5	7	11	1.5	**HJ214R**	0.157	NJ214R	NU214R
	89.6	7	12.5	1.5	**HJ2214**	0.150	NJ2214	NU2214
	89.5	7	11.5	1.5	**HJ2214R**	0.158	NJ2214R	NU2214R
	98	10	17.5	2.1	**HJ314**	0.330	NJ314	NU314
	97.5	10	15.5	2.1	**HJ314R**	0.330	NJ314R	NU314R
	98	10	20.5	2.1	**HJ2314**	0.330	NJ2314	NU2314
	97.5	10	18.5	2.1	**HJ2314R**	0.345	NJ2314R	NU2314R
	110.5	12	20	3	**HJ414**	0.605	NJ414	NU414
75	94	7	12.5	1.5	**HJ215**	0.156	NJ215	NU215
	94.5	7	11	1.5	**HJ215R**	0.166	NJ215R	NU215R
	94	7	12.5	1.5	**HJ2215**	0.156	NJ2215	NU2215
	94.5	7	11.5	1.5	**HJ2215R**	0.167	NJ2215R	NU2215R
	104.2	11	18.5	2.1	**HJ315**	0.400	NJ315	NU315
	104.2	11	16.5	2.1	**HJ315R**	0.410	NJ315R	NU315R
	104.2	11	21.5	2.1	**HJ2315**	0.400	NJ2315	NU2315
	104.2	11	19.5	2.1	**HJ2315R**	0.430	NJ2315R	NU2315R
	116	13	21.5	3	**HJ415**	0.710	NJ415	NU415
80	101.2	8	13.5	2	**HJ216**	0.207	NJ216	NU216
	101.6	8	12.5	2	**HJ216R**	0.222	NJ216R	NU216R
	101.2	8	13.5	2	**HJ2216**	0.207	NJ2216	NU2216
	101.6	8	12.5	2	**HJ2216R**	0.222	NJ2216R	NU2216R
	111.8	11	19.5	2.1	**HJ316**	0.470	NJ316	NU316
	110.6	11	17	2.1	**HJ316R**	0.460	NJ316R	NU316R
	111.8	11	23	2.1	**HJ2316**	0.470	NJ2316	NU2316
	110.6	11	20	2.1	**HJ2316R**	0.480	NJ2316R	NU2316R

d (80) ~ (100) mm



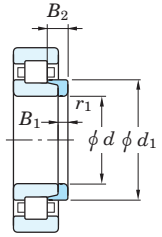
Thrust collar

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
80	122	13	22	3	**HJ416**	0.780	NJ416	NU416
85	108.2	8	14	2	**HJ217**	0.250	NJ217	NU217
	107.6	8	12.5	2	**HJ217R**	0.250	NJ217R	NU217R
	108.2	8	14	2	**HJ2217**	0.250	NJ2217	NU2217
	107.6	8	13	2	**HJ2217R**	0.252	NJ2217R	NU2217R
	117.5	12	20.5	3	**HJ317**	0.560	NJ317	NU317
	117.9	12	18.5	3	**HJ317R**	0.575	NJ317R	NU317R
	117.5	12	24	3	**HJ2317**	0.560	NJ2317	NU2317
	117.9	12	22	3	**HJ2317R**	0.595	NJ2317R	NU2317R
	126	14	24	4	**HJ417**	0.880	NJ417	NU417
90	114.2	9	15	2	**HJ218**	0.305	NJ218	NU218
	114.4	9	14	2	**HJ218R**	0.320	NJ218R	NU218R
	114.2	9	16	2	**HJ2218**	0.305	NJ2218	NU2218
	114.4	9	15	2	**HJ2218R**	0.325	NJ2218R	NU2218R
	125	12	21	3	**HJ318**	0.630	NJ318	NU318
	124.2	12	18.5	3	**HJ318R**	0.630	NJ318R	NU318R
	125	12	26	3	**HJ2318**	0.630	NJ2318	NU2318
	124.2	12	22	3	**HJ2318R**	0.660	NJ2318R	NU2318R
	137	14	24	4	**HJ418**	1.05	NJ418	NU418
95	121	9	15.5	2.1	**HJ219**	0.352	NJ219	NU219
	120.6	9	14	2.1	**HJ219R**	0.355	NJ219R	NU219R
	121	9	16.5	2.1	**HJ2219**	0.352	NJ2219	NU2219
	120.6	9	15.5	2.1	**HJ2219R**	0.365	NJ2219R	NU2219R
	132	13	22.5	3	**HJ319**	0.760	NJ319	NU319
	132.2	13	20.5	3	**HJ319R**	0.785	NJ319R	NU319R
	132	13	26.5	3	**HJ2319**	0.760	NJ2319	NU2319
	147	15	25.5	4	**HJ419**	1.30	NJ419	NU419
100	128	10	17	2.1	**HJ220**	0.444	NJ220	NU220

d (100) ~ 120 mm

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
100	127.5	10	15	2.1	**HJ220R**	0.435	NJ220R	NU220R
	128	10	18	2.1	**HJ2220**	0.444	NJ2220	NU2220
	127.5	10	16	2.1	**HJ2220R**	0.450	NJ2220R	NU2220R
	140.5	13	22.5	3	**HJ320**	0.895	NJ320	NU320
	139.6	13	20.5	3	**HJ320R**	0.890	NJ320R	NU320R
	140.5	13	27.5	3	**HJ2320**	0.895	NJ2320	NU2320
	139.6	13	23.5	3	**HJ2320R**	0.920	NJ2320R	NU2320R
	153.5	16	27	4	**HJ420**	1.50	NJ420	NU420
105	135	10	17.5	2.1	**HJ221**	0.505	NJ221	NU221
	147	13	22.5	3	**HJ321**	0.970	NJ321	NU321
	159.5	16	27	4	**HJ421**	1.65	NJ421	NU421
110	141.5	11	18.5	2.1	**HJ222**	0.615	NJ222	NU222
	141.7	11	17	2.1	**HJ222R**	0.620	NJ222R	NU222R
	141.5	11	20.5	2.1	**HJ2222**	0.615	NJ2222	NU2222
	141.7	11	19.5	2.1	**HJ2222R**	0.645	NJ2222R	NU2222R
	155.5	14	23	3	**HJ322**	1.17	NJ322	NU322
	155.8	14	22	3	**HJ322R**	1.21	NJ322R	NU322R
	155.5	14	28	3	**HJ2322**	1.17	NJ2322	NU2322
	155.8	14	26.5	3	**HJ2322R**	1.27	NJ2322R	NU2322R
	171	17	29.5	4	**HJ422**	2.10	NJ422	NU422
120	153	11	19	2.1	**HJ224**	0.715	NJ224	NU224
	153.4	11	17	2.1	**HJ224R**	0.710	NJ224R	NU224R
	153	11	22	2.1	**HJ2224**	0.715	NJ2224	NU2224
	153.4	11	20	2.1	**HJ2224R**	0.745	NJ2224R	NU2224R
	168.5	14	23.5	3	**HJ324**	1.40	NJ324	NU324
	168.6	14	22.5	3	**HJ324R**	1.41	NJ324R	NU324R
	168.5	14	28	3	**HJ2324**	1.40	NJ2324	NU2324
	168.6	14	26	3	**HJ2324R**	1.46	NJ2324R	NU2324R
	188	17	30.5	5	**HJ424**	2.60	NJ424	NU424

d 130 ~ (160) mm



Thrust collar

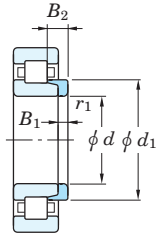
Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
130	165.5	11	19	3	**HJ226**	0.840	NJ226	NU226
	164.2	11	17	3	**HJ226R**	0.790	NJ226R	NU226R
	165.5	11	25	3	**HJ2226**	0.840	NJ2226	NU2226
	164.2	11	21	3	**HJ2226R**	0.840	NJ2226R	NU2226R
	182	14	24	4	**HJ326**	1.62	NJ326	NU326
	182.3	14	23	4	**HJ326R**	1.65	NJ326R	NU326R
	182	14	29.5	4	**HJ2326**	1.62	NJ2326	NU2326
	182.3	14	28	4	**HJ2326R**	1.73	NJ2326R	NU2326R
	205	18	32	5	**HJ426**	3.30	NJ426	NU426
140	179.5	11	19	3	**HJ228**	1.00	NJ228	NU228
	180	11	18	3	**HJ228R**	0.990	NJ228R	NU228R
	179.5	11	25	3	**HJ2228**	1.00	NJ2228	NU2228
	180	11	23	3	**HJ2228R**	1.07	NJ2228R	NU2228R
	196	15	26	4	**HJ328**	1.93	NJ328	NU328
	196	15	25	4	**HJ328R**	2.04	NJ328R	NU328R
	196	15	33.5	4	**HJ2328**	1.98	NJ2328	NU2328
	196	15	31	4	**HJ2328R**	2.14	NJ2328R	NU2328R
	219	18	33	5	**HJ428**	3.75	NJ428	NU428
150	193	12	20.5	3	**HJ230**	1.24	NJ230	NU230
	193.7	12	19.5	3	**HJ230R**	1.26	NJ230R	NU230R
	193	12	26.5	3	**HJ2230**	1.24	NJ2230	NU2230
	193.7	12	24.5	3	**HJ2230R**	1.35	NJ2230R	NU2230R
	210	15	26.5	4	**HJ330**	2.37	NJ330	NU330
	210	15	25	4	**HJ330R**	2.35	NJ330R	NU330R
	210	15	34	4	**HJ2330**	2.37	NJ2330	NU2330
	210	15	31.5	4	**HJ2330R**	2.48	NJ2330R	NU2330R
	234	20	36.5	5	**HJ430**	4.70	NJ430	NU430
160	207	12	21	3	**HJ232**	1.48	NJ232	NU232
	207.3	12	20	3	**HJ232R**	1.48	NJ232R	NU232R

d (160) ~ (200) mm

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
160	205	12	28	3	**HJ2232**	1.48	NJ2232	NU2232
	206.1	12	24.5	3	**HJ2232R**	1.55	NJ2232R	NU2232R
	225	15	28	4	**HJ332**	2.75	NJ332	NU332
	222.1	15	25	4	**HJ332R**	2.59	NJ332R	NU332R
	225	15	37	4	**HJ2332**	2.75	NJ2332	NU2332
	222.1	15	32	4	**HJ2332R**	2.76	NJ2332R	NU2332R
170	220.5	12	22	4	**HJ234**	1.70	NJ234	NU234
	220.8	12	20	4	**HJ234R**	1.70	NJ234R	NU234R
	219	12	29	4	**HJ2234**	1.70	NJ2234	NU2234
	219.5	12	24	4	**HJ2234R**	1.79	NJ2234R	NU2234R
	238	16	29.5	4	**HJ334**	3.25	NJ334	NU334
	238	16	38.5	4	**HJ2334**	3.25	NJ2334	NU2334
180	230.5	12	22	4	**HJ236**	1.80	NJ236	NU236
	230.8	12	20	4	**HJ236R**	1.79	NJ236R	NU236R
	229	12	29	4	**HJ2236**	1.80	NJ2236	NU2236
	229.5	12	24	4	**HJ2236R**	1.88	NJ2236R	NU2236R
	252	17	30.5	4	**HJ336**	3.85	NJ336	NU336
	252	17	40	4	**HJ2336**	3.85	NJ2336	NU2336
190	244.5	13	23.5	4	**HJ238**	2.20	NJ238	NU238
	244.5	13	21.5	4	**HJ238R**	2.19	NJ238R	NU238R
	243	13	31.5	4	**HJ2238**	2.20	NJ2238	NU2238
	243.2	13	26.5	4	**HJ2238R**	2.31	NJ2238R	NU2238R
	265	18	32	5	**HJ338**	4.45	NJ338	NU338
	265	18	41.5	5	**HJ2338**	4.45	NJ2338	NU2338
200	258	14	25	4	**HJ240**	2.60	NJ240	NU240
	258.2	14	23	4	**HJ240R**	2.65	NJ240R	NU240R
	258	14	34	4	**HJ2240**	2.60	NJ2240	NU2240
	256.9	14	28	4	**HJ2240R**	2.78	NJ2240R	NU2240R
	280	18	33	5	**HJ340**	5.00	NJ340	NU340

Thrust collars for cylindrical roller bearings

d (200) ~ 320 mm



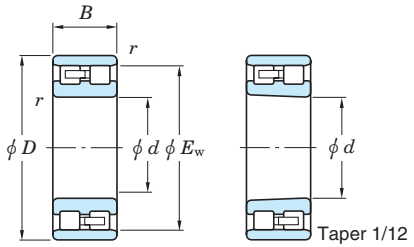
Thrust collar

Boundary dimensions (mm)					Thrust collar No.	(Refer.) Mass (kg)	Applicable bearing No.	
d	d_1	B_1	B_2	r_1 min.			NJ	NU
200	280	18	44.5	5	**HJ2340**	5.00	NJ2340	NU2340
220	286	15	27.5	4	**HJ244**	3.55	NJ244	NU244
	286	15	36.5	4	**HJ2244**	3.55	NJ2244	NU2244
	307	20	36	5	**HJ344**	7.05	NJ344	NU344
240	313	16	29.5	4	**HJ248**	4.65	NJ248	NU248
	313	16	38.5	4	**HJ2248**	4.65	NJ2248	NU2248
	335	22	39.5	5	**HJ348**	8.20	NJ348	NU348
260	340	18	33	5	**HJ252**	6.20	NJ252	NU252
	340	18	40.5	5	**HJ2252**	6.20	NJ2252	NU2252
280	360	18	33	5	**HJ256**	7.15	NJ256	NU256
300	387	20	34.5	5	**HJ260**	7.40	NJ260	NU260
320	415	21	37	5	**HJ264**	11.3	NJ264	NU264

Double-row cylindrical roller bearings

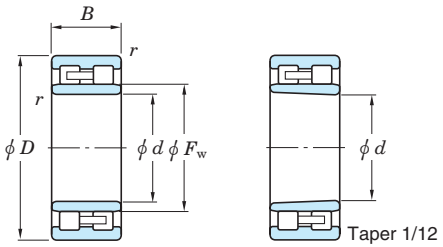
d 25 ~ (110) mm

NN

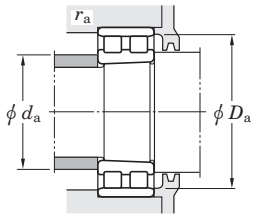


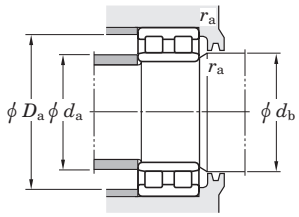
Cylindrical bore | Tapered bore

NNU



Cylindrical bore | Tapered bore



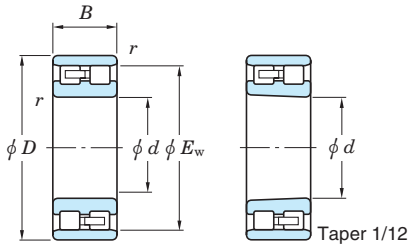


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. NN		Bearing No. NNU		Mounting dimensions (mm)						(Refer.) Mass (kg)	
d	D	B	r min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore	d_a min.	d_a max.	d_b min.	D_a max.	D_a min.	r_a max.	Cylindrical bore	Tapered bore
25	47	16	0.6	—	41.3	25.7	30.0	14 000	17 000	**NN3005**	**NN3005K**	—	—	29	—	—	43	42	0.6	0.127	0.123
30	55	19	1	—	48.5	36.8	44.1	12 000	14 000	**NN3006**	**NN3006K**	—	—	35	—	—	50	49	1	0.198	0.192
35	62	20	1	—	55	39.1	50.0	10 000	12 000	**NN3007**	**NN3007K**	—	—	40	—	—	57	56	1	0.253	0.246
40	68	21	1	—	61	41.3	55.9	9 100	11 000	**NN3008**	**NN3008K**	—	—	45	—	—	63	62	1	0.307	0.298
45	75	23	1	—	67.5	53.4	71.9	8 300	9 900	**NN3009**	**NN3009K**	—	—	50	—	—	70	69	1	0.404	0.382
50	80	23	1	—	72.5	52.8	72.6	7 600	9 100	**NN3010**	**NN3010K**	—	—	55	—	—	75	74	1	0.429	0.415
55	90	26	1.1	—	81	71.2	101	6 800	8 200	**NN3011**	**NN3011K**	—	—	61.5	—	—	83.5	82	1	0.637	0.618
60	95	26	1.1	—	86.1	72.8	106	6 400	7 700	**NN3012**	**NN3012K**	—	—	66.5	—	—	88.5	87	1	0.685	0.664
65	100	26	1.1	—	91	74.5	111	6 000	7 200	**NN3013**	**NN3013K**	—	—	71.5	—	—	93.5	92	1	0.728	0.705
70	110	30	1.1	—	100	96.9	148	5 500	6 500	**NN3014**	**NN3014K**	—	—	76.5	—	—	103.5	101	1	1.04	1.02
75	115	30	1.1	—	105	99.0	155	5 200	6 200	**NN3015**	**NN3015K**	—	—	81.5	—	—	108.5	106	1	1.11	1.08
80	125	34	1.1	—	113	119	186	4 800	5 800	**NN3016**	**NN3016K**	—	—	86.5	—	—	118.5	114	1	1.55	1.50
85	130	34	1.1	—	118	121	194	4 600	5 500	**NN3017**	**NN3017K**	—	—	91.5	—	—	123.5	119	1	1.63	1.58
90	140	37	1.5	—	127	142	228	4 200	5 100	**NN3018**	**NN3018K**	—	—	98	—	—	132	129	1.5	2.07	2.01
95	145	37	1.5	—	132	150	246	4 100	4 900	**NN3019**	**NN3019K**	—	—	103	—	—	137	134	1.5	2.17	2.10
100	140	40	1.1	113	—	139	258	4 000	4 800	—	—	**NNU4920**	**NNU4920K**	106.5	111	115	133.5	—	1	1.95	1.87
	150	37	1.5	—	137	157	265	3 900	4 700	**NN3020**	**NN3020K**	—	—	108	—	—	142	139	1.5	2.28	2.21
105	145	40	1.1	118	—	157	306	3 900	4 600	—	—	**NNU4921**	**NNU4921K**	111.5	116	120	138.5	—	1	2.00	1.91
	160	41	2	—	146	197	322	3 700	4 400	**NN3021**	**NN3021K**	—	—	114	—	—	151	148	2	2.88	2.81
110	150	40	1.1	123	—	163	326	3 700	4 500	—	—	**NNU4922**	**NNU4922K**	116.5	121	125	143.5	—	1	2.10	2.01

Double-row cylindrical roller bearings

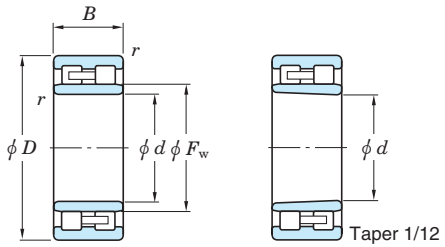
d (110) ~ (260) mm

NN

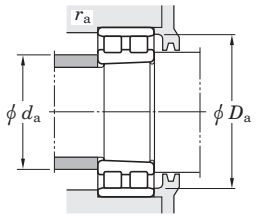


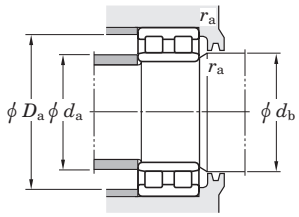
Cylindrical bore　　Tapered bore

NNU



Cylindrical bore　　Tapered bore

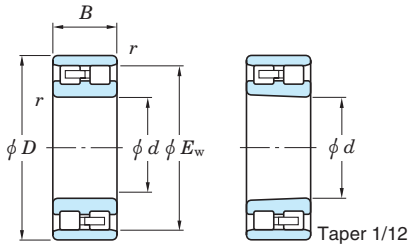




Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. NN		Bearing No. NNU		Mounting dimensions (mm)						(Refer.) Mass (kg)	
d	D	B	r min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore	d_a min.	d_a max.	d_b min.	D_a max.	D_a min.	r_a max.	Cylindrical bore	Tapered bore
110	170	45	2	—	155	221	361	3 500	4 200	**NN3022**	**NN3022K**	—	—	119	—	—	161	157	2	3.65	3.56
120	165	45	1.1	134.5	—	187	373	3 400	4 000	—	—	**NNU4924**	**NNU4924K**	126.5	132	137	158.5	—	1	2.90	2.77
	180	46	2	—	165	232	392	3 200	3 900	**NN3024**	**NN3024K**	—	—	129	—	—	171	167	2	4.00	3.87
130	180	50	1.5	146	—	216	428	3 100	3 700	—	—	**NNU4926**	**NNU4926K**	138	143.5	148	172	—	1.5	3.90	3.73
	200	52	2	—	182	283	476	2 900	3 500	**NN3026**	**NN3026K**	—	—	139	—	—	191	183	2	5.94	5.76
140	190	50	1.5	156	—	222	456	2 900	3 500	—	—	**NNU4928**	**NNU4928K**	148	153.5	158	182	—	1.5	4.15	3.97
	210	53	2	—	192	297	516	2 700	3 300	**NN3028**	**NN3028K**	—	—	149	—	—	201	194	2	6.41	6.21
150	210	60	2	168.5	—	343	692	2 600	3 100	—	—	**NNU4930**	**NNU4930K**	159	166	171	201	—	2	6.50	6.22
	225	56	2.1	—	206	334	587	2 500	3 000	**NN3030**	**NN3030K**	—	—	161	—	—	214	208	2	7.74	7.50
160	220	60	2	178.5	—	340	695	2 500	3 000	—	—	**NNU4932**	**NNU4932K**	169	176	182	211	—	2	6.95	6.65
	240	60	2.1	—	219	398	695	2 400	2 800	**NN3032**	**NN3032K**	—	—	171	—	—	229	221	2	9.38	9.08
170	230	60	2	188.5	—	361	763	2 300	2 800	—	—	**NNU4934**	**NNU4934K**	179	186	192	221	—	2	7.20	6.88
	260	67	2.1	—	236	471	824	2 200	2 600	**NN3034**	**NN3034K**	—	—	181	—	—	249	238	2	12.8	12.4
180	250	69	2	202	—	458	964	2 100	2 600	—	—	**NNU4936**	**NNU4936K**	189	199.5	205	241	—	2	10.5	10.1
	280	74	2.1	—	255	561	958	2 000	2 400	**NN3036**	**NN3036K**	—	—	191	—	—	269	257	2	16.8	16.3
190	260	69	2	210	—	465	996	2 000	2 400	—	—	**NNU4938**	**NNU4938K**	199	207	215	251	—	2	11.0	10.5
	290	75	2.1	—	265	598	1 020	1 900	2 300	**NN3038**	**NN3038K**	—	—	201	—	—	279	267	2	17.6	17.1
200	280	80	2.1	223	—	509	1 050	1 900	2 300	—	—	**NNU4940**	**NNU4940K**	211	219.5	228	269	—	2	15.4	14.7
	310	82	2.1	—	282	638	1 120	1 700	2 100	**NN3040**	**NN3040K**	—	—	211	—	—	299	285	2	22.5	21.8
220	300	80	2.1	244	—	561	1 220	1 700	2 000	—	—	**NNU4944**	**NNU4944K**	231	241	248	289	—	2	16.7	16.0
	340	90	3	—	310	752	1 370	1 600	1 900	**NN3044**	**NN3044K**	—	—	233	—	—	327	313	2.5	29.3	28.4
240	320	80	2.1	263	—	588	1 340	1 600	1 900	—	—	**NNU4948**	**NNU4948K**	251	260	269	309	—	2	18.0	17.2
	360	92	3	—	330	864	1 590	1 400	1 700	**NN3048**	**NN3048K**	—	—	253	—	—	347	333	2.5	32.8	31.8
260	360	100	2.1	287	—	941	2 050	1 400	1 700	—	—	**NNU4952**	**NNU4952K**	271	284	296	349	—	2	31.4	30.0

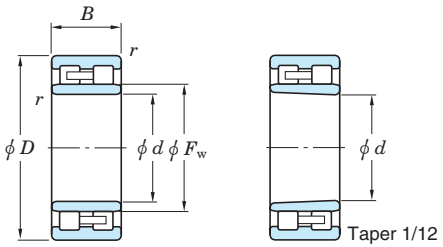
d (260) ~ 480 mm

NN

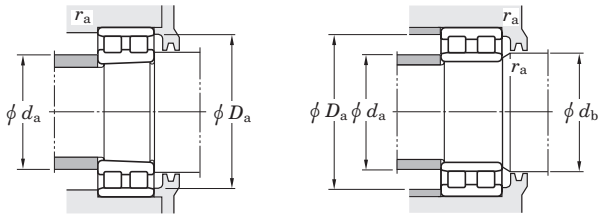


Cylindrical bore Tapered bore

NNU



Cylindrical bore Tapered bore



Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. NN		Bearing No. NNU		Mounting dimensions (mm)						(Refer.) Mass (kg)	
														d_a		d_b		D_a	r_a		
d	D	B	r min.	F_w	E_w	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	Cylindrical bore	Tapered bore	min.	max.	min.	max.	min.	max.	Cylindrical bore	Tapered bore
260	400	104	4	—	364	1 030	1 830	1 300	1 500	**NN3052**	**NN3052K**	—	—	276	—	—	384	367	3	47.4	46.0
280	380	100	2.1	308	—	976	2 200	1 300	1 500	—	—	**NNU4956**	**NNU4956K**	291	305	316	369	—	2	33.1	31.6
	420	106	4	—	384	1 090	2 010	1 200	1 400	**NN3056**	**NN3056K**	—	—	296	—	—	404	387	3	51.2	49.6
300	420	118	3	339	—	1 170	2 720	1 100	1 300	—	—	**NNU4960**	**NNU4960K**	313	335	343	407	—	2.5	51.9	49.7
	460	118	4	—	418	1 290	2 460	1 100	1 300	**NN3060**	**NN3060K**	—	—	316	—	—	444	421	3	70.8	68.7
320	440	118	3	352	—	1 220	2 750	1 100	1 300	—	—	**NNU4964**	**NNU4964K**	333	348	363	427	—	2.5	53.7	51.4
	480	121	4	—	438	1 350	2 670	980	1 200	**NN3064**	**NN3064K**	—	—	336	—	—	464	442	3	76.4	74.0
340	460	118	3	372	—	1 270	2 930	990	1 200	—	—	**NNU4968**	**NNU4968K**	353	368	383	447	—	2.5	56.8	54.3
	520	133	5	—	473	1 580	3 090	880	1 100	**NN3068**	**NN3068K**	—	—	360	—	—	500	477	4	101	97.8
360	540	134	5	—	493	1 560	3 090	830	990	**NN3072**	**NN3072K**	—	—	380	—	—	520	497	4	107	104
380	560	135	5	—	510	1 650	3 350	780	940	**NN3076**	**NN3076K**	—	—	400	—	—	540	514	4	113	109
400	600	148	5	—	548	2 030	4 140	700	850	**NN3080**	**NN3080K**	—	—	420	—	—	580	552	4	146	141
420	620	150	5	—	570	2 310	4 570	670	800	**NN3084**	**NN3084K**	—	—	440	—	—	600	574	4	154	149
440	650	157	6	—	597	2 520	5 060	620	740	**NN3088**	**NN3088K**	—	—	464	—	—	626	602	5	177	171
460	680	163	6	—	627	2 700	5 480	570	690	**NN3092**	**NN3092K**	—	—	484	—	—	656	632	5	201	195
480	700	165	6	—	642	2 770	5 710	540	650	**NN3096**	**NN3096K**	—	—	504	—	—	676	647	5	211	204

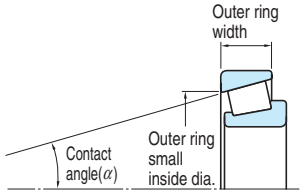
Tapered roller bearings

Tapered roller bearings are designed such that outer ring, inner ring and rollers have tapered surfaces whose apexes converge at a common point on the bearing axis. Along with metric series bearings, inch series bearings are also available.

This type of bearing is suitable for applications that involve heavy or impact loading.

Single-row tapered roller bearings

- Able to carry radial and axial load in one direction simultaneously.
  Because an axial component of force is produced when this type of bearing is loaded radially, two bearings are used together facing one another, or two or more bearings are matched and used.
- There are the standard, medium and steep type which are different in contact angle size.
  Medium-tapered metric series bearings are identified by the supplementary code "C" which is added as a suffix to bearing numbers.
- Bearings whose outer ring width, outer ring small inside diameter and contact angle are determined in accordance with ISO 355 specifications are identified by the supplementary code "J" as a suffix.
  Inner ring assemblies and the outer rings of such bearings are interchangeable with those of bearings produced abroad if the bearing numbers are the same.



ISO sub-unit specifications

[Note] When supplementary code "J" is added as a prefix (not a suffix) to bearing numbers (e.g. JHM720249/JHM720210), the bearings are not designed according to ISO 355.
Such bearings are called "J series metric tapered roller bearings," and are produced according to special tolerances.

Double-row tapered roller bearings

- These bearings are divided into the TDO type which has one double outer ring and two single-row inner rings, and the TDI type which has two single-row outer rings and one double inner ring. Both accommodate radial and axial loading in both directions.
  These two also carry moment loads, however, the TDO type is superior to the TDI type, because the distance between load centers (α) is longer in the TDO type.
- The spacer of the TDO type, or the TDI type, pre-adjusts the internal clearance to provide proper operating clearance after mounting.

Single-row tapered roller bearings

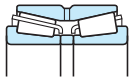
Metric series

Bore diameter **15** – **360** mm

Inch series
(including J series metric bearing)

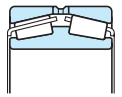
Bore diameter **9.525** – **292.100** mm

Double-row tapered roller bearings



TDO type

Bore diameter **25** – **500** mm



TDI type

Bore diameter **100** – **500** mm

Boundary dimensions

Metric single-row tapered roller bearings : as specified in JIS B 1512.

Reference JIS B 1512 specifies new dimension series which are based on ISO 355, as well as the conventional "3XX" dimension series. These new dimension series are as follows :

New dimension series

(1) Angle series

Angle series	Contact angle α	
	over	up to
2	10°	13° 52'
3	13° 52'	15° 59'
4	15° 59'	18° 55'
5	18° 55'	23°
6	23°	27°
7	27°	30°

(2) Diameter series

Diameter series	$D/(d^{0.77})$	
	over	up to
B	3.40	3.80
C	3.80	4.40
D	4.40	4.70
E	4.70	5.00
F	5.00	5.60
G	5.60	7.00

(3) Width series

Width series	$T/\{(D\text{-}d)^{0.95}\}$	
	over	up to
B	0.50	0.68
C	0.68	0.80
D	0.80	0.88
E	0.88	1.00

[Remarks]
1. Combine these series symbols in the listed order to make the dimension series numbers. (ex. 2BC)
2. Bearing numbers consist of a dimension series number and a bore diameter which is added as a suffix. (ex. 2BC080 : bore diameter 80 mm)

Tolerances

· Metric series single-row tapered roller bearings as specified in JIS B 1514-1. ..... (refer to Table 7-5 on pp. A 60 – A 62.)
· Metric series double-row tapered roller bearings as specified in BAS 1002. ..... (refer to Table 7-6 on p. A 63.)
· Inch series tapered roller bearings as specified in ABMA Section 19. ..... (refer to Table 7-7 on pp. A 64, 65.)
· J series metric tapered roller bearings the tolerance is specified separately. ..... (refer to Table 7-8 on pp. A 66, 67.)

Internal clearance

Radial internal clearance of double-row, four-row and matched pair tapered roller bearings ..... (refer to Table 10-10 on p. A 104.)

Recommended fits

· Metric series tapered roller bearings (classes 0, 6X and 6) ..... (refer to Table 9-4 on pp. A 85, 86.)
· Inch series tapered roller bearings ..... (refer to Table 9-7 on pp. A 90, 91.)
· J series metric tapered roller bearings ..... (refer to Table 9-6 on pp. A 88, 89.)

Standard cage

Pressed steel cage (supplementary code : //)
(Some large size bearings have a pin type cage (FP) instead. They are listed separately in the bearing specification table.)

Allowable misalignment

Single-row tapered roller bearings : 0.000 9 rad (3')
(If the misalignment exceeds this angle size, JTEKT is ready to design special bearings to order.)

Equivalent radial load

■ Single-row tapered roller bearings

Dynamic equivalent radial load
$\left(\text{when } \frac{F_a}{F_r} \leqq e\right) \quad P_r = F_r$
$\left(\text{when } \frac{F_a}{F_r} > e\right) \quad P_r = 0.4F_r + Y_1 F_a$

Static equivalent radial load $P_{0r} = 0.5F_r + Y_0 F_a$
when $P_{0r} < F_r$, $P_{0r} = F_r$

[Note]
Refer to the bearing specification table for the values of axial load factors Y_1, Y_2, Y_3 and Y_0 and constant e.

■ Double-row or four-row tapered roller bearings

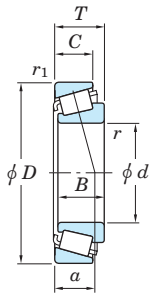
Dynamic equivalent radial load
$\left(\text{when } \frac{F_a}{F_r} \leqq e\right) \quad P_r = F_r + Y_2 F_a$
$\left(\text{when } \frac{F_a}{F_r} > e\right) \quad P_r = 0.67F_r + Y_3 F_a$

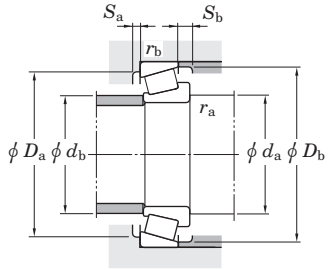
Static equivalent radial load $P_{0r} = F_r + Y_0 F_a$

[Remarks]
1. When two single-row tapered roller bearings are used together facing one another, an axial component of force is produced under radial load. In this case, refer to pp. A 34, 35 for calculation of the dynamic equivalent radial load.
2. When the load is too small, slippage occurs between the rollers and raceways, causing smearing to develop. This also occurs to matched pair bearings when the ratio of axial load to radial load exceeds the value e shown in the specification table ($F_a/F_r > e$). Consult with JTEKT on use of bearings under such conditions.

Single-row tapered roller bearings
metric series

d 15 ~ 22 mm

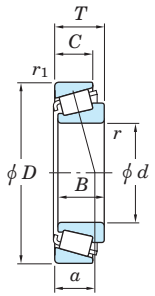


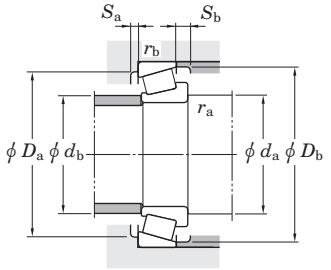


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
15	35	11.75	11	10	0.6	0.6	15.8	14.5	12 000	16 000	**30202R**		—	8.3	19.5	20	30.5	29	33	2	1.7	0.6	0.6	0.32	1.88	1.04	0.054
	42	14.25	13	11	1	1	21.9	19.2	10 000	14 000	**30302JR**		2FB	10.0	20.5	22	36.5	35	38	2	3	1	1	0.29	2.11	1.16	0.098
17	40	13.25	12	11	1	1	20.8	20.7	10 000	14 000	**30203JR**		2DB	10.1	22.5	23	34.5	33	37	2	2	1	1	0.35	1.74	0.96	0.081
	40	17.25	16	14	1	1	27.4	27.5	10 000	14 000	**32203JR**		2DD	11.4	22.5	23	34.5	33	37	2	3	1	1	0.31	1.92	1.06	0.104
	47	15.25	14	12	1	1	27.4	24.5	9 200	12 000	**30303JR**		2FB	11.0	22.5	25	41.5	40	42	2	3	1	1	0.29	2.11	1.16	0.133
	47	15.25	14	12	1	1	27.4	24.5	9 200	12 000	**30303R**		—	10.5	22.5	25	41.5	40	42	2	3	1	1	0.28	2.11	1.16	0.127
	47	20.25	19	16	1	1	31.9	29.9	9 400	13 000	**32303**		—	12.4	22.5	25	41.5	39	43	2	4	1	1	0.28	2.11	1.16	0.170
	47	20.25	19	16	1	1	36.6	35.9	9 400	13 000	**32303JR**		2FD	12.2	22.5	25	41.5	39	43	2	4	1	1	0.29	2.11	1.16	0.176
20	42	15	15	12	0.6	0.6	27.3	31.5	9 700	13 000	**32004JR**		3CC	10.5	24.5	25	37.5	35	39	3	3	0.6	0.6	0.37	1.60	0.88	0.102
	47	15.25	14	12	1	1	25.8	25.5	9 000	12 000	**57008R**		—	12.9	25.5	26	41.5	37	44	2	3	1	1	0.52	1.16	0.64	0.125
	47	15.25	14	12	1	1	27.0	27.2	8 700	12 000	**30204JR**		2DB	11.8	25.5	27	41.5	39	44	2	3	1	1	0.35	1.74	0.96	0.127
	47	19.25	18	15	1	1	33.1	34.7	8 900	12 000	**32204JR**		2DD	12.5	25.5	27	41.5	39	43	2	4	1	1	0.33	1.81	1.00	0.159
	47	19.25	18	16	1	1	33.3	37.0	9 100	12 000	**32204XR**		—	15.3	25.5	25	41.5	35	45	2	3	1	1	0.55	1.10	0.60	0.170
	52	16.25	16	12	1.5	1.5	30.5	28.4	8 300	11 000	**30304AC**		—	13.5	28.5	28	43.5	42	49	4	4	1.5	1.5	0.55	1.10	0.60	0.170
	52	16.25	16	13	1.5	1.5	36.2	35.1	8 300	11 000	**30304AJR**		—	11.1	28.5	28	44	44	47	2	3	1.5	1.5	0.30	2.00	1.10	0.179
	52	22.25	21	18	1.5	1.5	41.8	44.9	8 600	12 000	**32304CR**		—	16.5	28.5	25	43.5	37	48	3	4	1.5	1.5	0.55	1.10	0.60	0.250
	52	22.25	21	18	1.5	1.5	45.1	46.7	8 400	11 000	**32304JR**		2FD	14.4	28.5	27	43.5	43	47	3	4	1.5	1.5	0.30	2.00	1.10	0.244
22	44	15	15	11.5	0.6	0.6	28.3	33.6	9 100	12 000	**320/22JR**		3CC	11.0	26.5	27	39.5	38	41	3	3.5	0.6	0.6	0.40	1.51	0.83	0.108
	47	17	17.5	13.5	1	1	32.7	35.9	8 700	12 000	**T2CC022**		2CC	11.3	27.5	28	41.5	40	44	4	3.5	1	1	0.33	1.79	0.99	0.138
	50	15.25	14	12	1	1	29.2	28.6	8 400	11 000	**302/22CR**		—	13.9	27.5	28	44.5	40	47	2	3	1	1	0.55	1.10	0.60	0.140
	50	15.25	14	12	1	1	29.3	30.9	8 100	11 000	**302/22R**		—	12.2	27.5	30	44.5	41	46	2	3	1	1	0.37	1.60	0.88	0.144
	50	19.25	18	15	1	1	35.1	39.1	8 400	11 000	**322/22CR**		—	15.5	27.5	28	44.5	38	47	2	4	1	1	0.55	1.10	0.60	0.170
	50	19.25	18	15	1	1	36.8	41.6	8 100	11 000	**322/22R**		—	14.0	27.5	29	44.5	41	46	2	4	1	1	0.37	1.60	0.88	0.178
	56	17.25	16	13	1.5	1.5	36.3	36.6	7 700	10 000	**303/22XR**		—	15.7	30.5	31	47.5	44	52	3	4	1.5	1.5	0.59	1.02	0.56	0.210
	56	17.25	16	14	1.5	1.5	41.7	41.1	7 500	10 000	**303/22R**		—	12.2	30.5	32	47.5	47	51	2	3	1.5	1.5	0.31	1.97	1.08	0.216
	56	22.25	21	17	1.5	1.5	48.3	50.6	8 000	11 000	**323/22CR**		—	16.9	30.5	28	47.5	41	52	3	5	1.5	1.5	0.55	1.10	0.60	0.290
	56	22.25	21	18	1.5	1.5	50.6	52.7	7 600	10 000	**323/22R**		—	14.6	30.5	31	47.5	46	51	3	4	1.5	1.5	0.31	1.97	1.08	0.273

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

d 25 ~ (30) mm

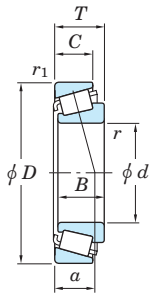


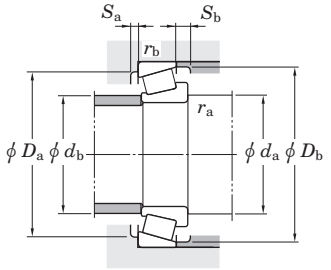


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)										Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
25	47	15	15	11.5	0.6	0.6	30.2	37.7	8 300	11 000	**32005JR**		4CC	11.8	29.5	30	42.5	40	44	3	3.5	0.6	0.6	0.43	1.39	0.77	0.118
	47	17	17	14	0.6	0.6	33.5	42.3	8 300	11 000	**33005JR**		2CE	10.9	29.5	30	42.5	41	44	3	3	0.6	0.6	0.29	2.07	1.14	0.131
	52	16.25	15	12	1	1	30.4	32.4	7 900	11 000	**30205XR**		—	14.9	30.5	30	46.5	41	49	2	4	1	1	0.58	1.04	0.57	0.155
	52	16.25	15	13	1	1	31.5	33.7	7 800	10 000	**30205JR**		3CC	12.9	30.5	31	46.5	44	48	2	3	1	1	0.37	1.60	0.88	0.156
	52	19.25	18	16	1	1	36.4	43.2	7 900	11 000	**32205XR**		—	16.2	30.5	30	46.5	40	50	2	3	1	1	0.55	1.10	0.60	0.200
	52	19.25	18	16	1	1	39.8	44.8	7 900	11 000	**32205JR**		2CD	13.5	30.5	31	46.5	43	48	2	4	1	1	0.36	1.67	0.92	0.188
	52	22	22	18	1	1	48.9	58.5	7 900	10 000	**33205JR**		2DE	14.1	30.5	30	46.5	43	49	4	4	1	1	0.35	1.71	0.94	0.225
	62	18.25	17	13	1.5	1.5	39.8	42.5	5 700	8 000	**30305DJR**		7FB	20.4	33.5	34	53.5	47	58.5	3	5	1.5	1.5	0.83	0.73	0.40	0.269
	62	18.25	17	14	1.5	1.5	45.0	45.8	6 700	9 000	**TR0506R**		—	16.3	33.5	35	53.5	50	58	3	4	1.5	1.5	0.55	1.10	0.60	0.275
	62	18.25	17	15	1.5	1.5	48.2	46.9	6 800	9 000	**30305JR**		2FB	12.9	33.5	34	54	54	57	2	3	1.5	1.5	0.30	2.00	1.10	0.273
	62	25.25	24	19	1.5	1.5	57.2	65.8	7 000	9 300	**32305XR**		—	18.9	33.5	33	53.5	46	58	3	6	1.5	1.5	0.55	1.10	0.60	0.390
	62	25.25	24	20	1.5	1.5	61.2	64.1	6 900	9 100	**32305JR**		2FD	16.6	33.5	33	53.5	52	57	3	5	1.5	1.5	0.30	2.00	1.10	0.386
28	52	16	16	12	1	1	35.2	44.0	7 500	10 000	**320/28JR**		4CC	12.7	33.5	33	46.5	45	49	3	4	1	1	0.43	1.39	0.77	0.150
	58	17.25	16	13	1	1	38.8	41.7	7 000	9 300	**302/28CR**		—	16.0	33.5	34	52.5	47	55	2	4	1	1	0.55	1.10	0.60	0.205
	58	17.25	16	14	1	1	38.8	42.0	7 000	9 300	**302/28R**		—	13.4	33.5	35	52.5	49	54	2	3	1	1	0.37	1.60	0.88	0.209
	58	20.25	19	16	1	1	44.9	54.1	7 100	9 400	**322/28CR**		—	17.0	33.5	33	52.5	45	55	3	4	1	1	0.55	1.10	0.60	0.255
	58	20.25	19	16	1	1	49.2	55.2	6 900	9 100	**322/28R**		—	15.0	33.5	35	52.5	49	54.5	2	4	1	1	0.37	1.60	0.88	0.244
	58	24	24	19	1	1	57.6	69.5	7 000	9 300	**332/28JR**		2DE	15.4	33.5	34	52.5	49	55	4	5	1	1	0.34	1.77	0.97	0.302
	68	19.75	18	14	1.5	1.5	51.7	50.2	6 200	8 200	**303/28CR**		—	17.8	36.5	37	59.5	55	64	3	4.5	1.5	1.5	0.55	1.10	0.60	0.332
	68	19.75	18	16	1.5	1.5	53.5	54.0	6 100	8 200	**303/28R**		—	14.9	36.5	38	59.5	58	63	2	3.5	1.5	1.5	0.32	1.88	1.04	0.345
	68	25.75	24	20	1.5	1.5	66.5	72.9	6 300	8 500	**323/28CR**		—	20.5	36.5	35	59.5	51	64	3	5.5	1.5	1.5	0.55	1.10	0.60	0.480
	68	25.75	24	21	1.5	1.5	69.6	75.6	6 100	8 100	**323/28R**		—	17.6	36.5	38	59.5	57	63	3	4.5	1.5	1.5	0.32	1.88	1.04	0.469
30	55	17	17	13	1	1	38.2	48.0	7 000	9 400	**32006JR**		4CC	13.6	35.5	35	49.5	47	52	3	4	1	1	0.43	1.39	0.77	0.177
	55	20	20	16	1	1	43.2	55.2	7 000	9 400	**33006JR**		2CE	13.0	35.5	36	49.5	48	52	3	4	1	1	0.29	2.06	1.13	0.203
	62	17.25	16	13	1	1	42.3	45.1	6 500	8 700	**30206CR**		—	16.5	35.5	36	56.5	51	59	2	4	1	1	0.55	1.10	0.60	0.230
	62	17.25	16	14	1	1	41.5	44.8	6 500	8 700	**30206JR**		3DB	14.1	35.5	37	56.5	53	57	2	3	1	1	0.37	1.60	0.88	0.236
	62	21.25	20	16	1	1	51.7	59.0	6 600	8 900	**32206XR**		—	18.0	35.5	36	56.5	49	59	3	5	1	1	0.55	1.10	0.60	0.300

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

d (30) ~ (35) mm



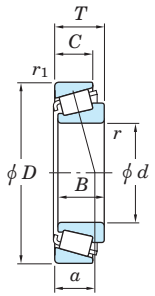


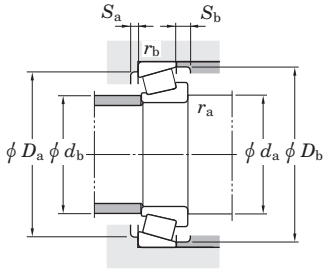
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)										Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
30	62	21.25	20	17	1	1	50.7	57.9	6 500	8 700	**32206JR**		3DC	15.9	35.5	37	56.5	52	58	2	4	1	1	0.37	1.60	0.88	0.292
	62	25	25	19.5	1	1	66.4	79.4	6 500	8 700	**33206JR**		2DE	16.3	35.5	36	56.5	53	59	5	5.5	1	1	0.34	1.76	0.97	0.359
	72	20.75	19	14	1.5	1.5	50.9	54.9	4 900	6 800	**30306DJR**		7FB	23.7	38.5	40	63.5	55	68	3	6.5	1.5	1.5	0.83	0.73	0.40	0.400
	72	20.75	19	16	1.5	1.5	56.9	55.6	5 900	7 900	**TRA0607R**		—	18.6	38.5	39	63.5	58	68	3	4.5	1.5	1.5	0.55	1.10	0.60	0.405
	72	20.75	19	16	1.5	1.5	59.6	60.1	5 800	7 700	**30306JR**		2FB	15.7	38.5	40	63.5	62	66	3	4.5	1.5	1.5	0.31	1.90	1.05	0.411
	72	28.75	27	23	1.5	1.5	80.0	93.8	6 000	8 000	**32306CR**		5FD	22.0	38.5	37	63.5	54	68	3	5.5	1.5	1.5	0.55	1.10	0.60	0.610
	72	28.75	27	23	1.5	1.5	82.2	91.6	5 900	7 900	**32306JR**		2FD	18.9	38.5	39	63.5	59	66	3	5.5	1.5	1.5	0.31	1.90	1.05	0.588
32	58	17	17	13	1	1	39.2	50.6	6 700	8 900	**320/32JR**		4CC	14.3	37.5	38	52.5	50	55	3	4	1	1	0.45	1.32	0.73	0.196
	65	18.25	17	14	1	1	47.5	51.5	6 200	8 300	**302/32CR**		—	17.2	37.5	38	59.5	53	62	3	4	1	1	0.55	1.10	0.60	0.275
	65	18.25	17	15	1	1	48.0	51.4	6 200	8 200	**302/32R**		—	14.9	37.5	39	59.5	55	61	3	3	1	1	0.37	1.60	0.88	0.266
	65	22.25	21	17	1	1	55.8	65.1	6 300	8 400	**322/32CR**		—	18.7	37.5	37	59.5	51	62	3	5	1	1	0.55	1.10	0.60	0.340
	65	22.25	21	18	1	1	51.6	57.7	6 200	8 200	**322/32**		—	16.3	37.5	40	59.5	55	61	2	4	1	1	0.37	1.60	0.88	0.330
	65	26	26	20.5	1	1	71.8	86.9	6 200	8 300	**332/32JR**		2DE	16.9	37.5	38	59.5	55	62	5	5.5	1	1	0.35	1.73	0.95	0.404
	75	21.75	20	16	1.5	1.5	63.4	66.3	5 600	7 400	**303/32CR**		—	19.7	40.5	42	66.5	60	70	3	5.5	1.5	1.5	0.55	1.10	0.60	0.465
	75	21.75	20	18	1.5	1.5	64.4	65.6	5 500	7 300	**303/32R**		—	16.0	40.5	43	66.5	64	70	3	3.5	1.5	1.5	0.32	1.88	1.04	0.461
	75	29.75	28	23	1.5	1.5	75.1	87.1	5 600	7 400	**TR0608A**		5FD	23.7	40.5	41	66.5	57	71	3	6.5	1.5	1.5	0.55	1.10	0.60	0.649
	75	29.75	28	25	1.5	1.5	89.6	101	5 600	7 400	**323/32R**		—	19.6	40.5	42	66.5	63	69	3	4.5	1.5	1.5	0.32	1.88	1.04	0.650
35	55	14	14	11.5	0.6	0.6	26.1	36.5	6 600	8 800	**32907JR-2**		2BD	10.9	39.5	40	50.5	49	52	2.5	2.5	0.6	0.6	0.29	2.06	1.13	0.120
	62	18	18	14	1	1	45.5	59.4	6 200	8 200	**32007JR**		4CC	15.1	40.5	40	56.5	54	59	4	4	1	1	0.45	1.32	0.73	0.231
	62	21	20	16	1	1	40.8	53.8	6 200	8 200	**33007**		—	14.8	40.5	41	56.5	55	59	3	4	1	1	0.33	1.80	0.99	0.250
	62	21	21	17	1	1	51.3	68.0	6 200	8 200	**33007JR**		2CE	14.2	40.5	41	56.5	55	59	3	4	1	1	0.31	1.97	1.08	0.263
	72	18.25	17	15	1.5	1.5	52.9	56.2	5 700	7 600	**30207CR**		—	17.9	43.5	43	63.5	59	68	3	3	1.5	1.5	0.55	1.10	0.60	0.350
	72	18.25	17	15	1.5	1.5	55.1	60.9	5 600	7 400	**30207JR**		3DB	15.3	43.5	44	63.5	62	67	3	3	1.5	1.5	0.37	1.60	0.88	0.344
	72	24.25	23	19	1.5	1.5	69.0	86.6	5 700	7 600	**32207-1R**		—	21.1	43.5	42	63.5	56	68	3	5	1.5	1.5	0.58	1.04	0.57	0.465
	72	24.25	23	19	1.5	1.5	69.6	82.4	5 600	7 500	**32207JR**		3DC	18.2	43.5	43	63.5	61	67	3	5	1.5	1.5	0.37	1.60	0.88	0.453
	72	28	28	22	1.5	1.5	87.6	107	5 700	7 500	**33207JR**		2DE	18.4	43.5	42	63.5	61	68	5	6	1.5	1.5	0.35	1.70	0.93	0.551
	80	22.75	21	15	2	1.5	63.1	69.1	4 300	6 000	**30307DJR**		7FB	26.8	45	44	70	66	76.5	3	7.5	2	1.5	0.83	0.73	0.40	0.536

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

Single-row tapered roller bearings
metric series

d (35) ~ (45) mm

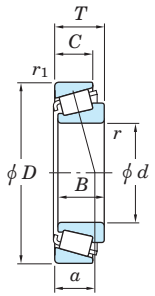


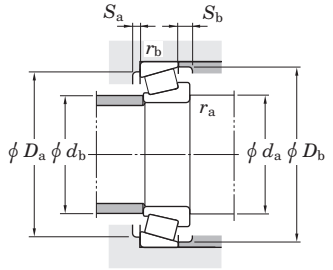


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
35	80	22.75	21	18	2	1.5	69.8	77.8	5 200	7 000	**30307XR**		—	20.5	45	45	70	63	74	3	4.5	2	1.5	0.55	1.10	0.60	0.560
	80	22.75	21	18	2	1.5	76.2	78.9	5 200	6 900	**30307JR-1**		2FB	16.9	45	45	70	70	74	3	4.5	2	1.5	0.31	1.90	1.05	0.527
	80	32.75	31	25	2	1.5	96.9	123	5 200	7 000	**TR0708-1R**		—	23.8	45	44	70	60	75	3	7.5	2	1.5	0.47	1.27	0.70	0.830
	80	32.75	31	25	2	1.5	101	114	5 300	7 000	**32307JR**		2FE	20.6	45	44	70	66	74	3	7.5	2	1.5	0.31	1.90	1.05	0.776
40	62	15	15	12	0.6	0.6	33.5	48.5	5 900	7 800	**32908JR**		2BC	11.9	44.5	45	57.5	55	59	3	3	0.6	0.6	0.29	2.07	1.14	0.164
	68	19	19	14.5	1	1	53.5	71.4	5 600	7 400	**32008JR**		3CD	15.1	45.5	46	62.5	60	65	4	4.5	1	1	0.38	1.58	0.87	0.282
	68	22	22	18	1	1	60.4	84.6	5 500	7 400	**33008JR**		2BE	14.7	45.5	46	62.5	60	65	3	4	1	1	0.28	2.12	1.17	0.326
	75	26	26	20.5	1.5	1.5	82.2	108	5 200	6 900	**33108JR**		2CE	18.3	48.5	47	66.5	65	71	4	5.5	1.5	1.5	0.36	1.69	0.93	0.508
	80	19.75	18	15	1.5	1.5	61.4	67.4	5 000	6 700	**30208CR**		—	20.2	48.5	49	71.5	66	76	3	4.5	1.5	1.5	0.55	1.10	0.60	0.445
	80	19.75	18	16	1.5	1.5	62.9	69.2	5 000	6 700	**30208JR**		3DB	17.0	48.5	49	71.5	69	75	3	3.5	1.5	1.5	0.37	1.60	0.88	0.434
	80	24.75	23	19	1.5	1.5	78.5	93.1	5 000	6 700	**32208CR**		5DC	22.0	48.5	48	71.5	64	76	3	5.5	1.5	1.5	0.55	1.10	0.60	0.570
	80	24.75	23	19	1.5	1.5	77.7	90.8	5 000	6 600	**32208JR**		3DC	19.4	48.5	48	71.5	68	75	3	5.5	1.5	1.5	0.37	1.60	0.88	0.554
	80	32	32	25	1.5	1.5	108	139	5 000	6 700	**33208JR**		2DE	20.7	48.5	47	71.5	67	76	5	7	1.5	1.5	0.36	1.68	0.92	0.758
	85	33	32.5	28	2.5	2	114	143	4 800	6 400	**T2EE040**		2EE	21.9	52	48	75	70	80	5	5	2	2	0.34	1.74	0.96	0.900
	90	25.25	23	17	2	1.5	80.5	90.2	3 800	5 300	**30308DJR**		7FB	29.9	50	51	80	71	86.5	3	8	2	1.5	0.83	0.73	0.40	0.757
	90	25.25	23	20	2	1.5	87.3	98.5	4 600	6 100	**30308XR**		—	23.8	50	53	80	72	84	3	5	2	1.5	0.55	1.10	0.60	0.780
	90	25.25	23	20	2	1.5	90.6	101	4 500	6 100	**30308JR**		2FB	19.9	50	52	80	77	82	3	5	2	1.5	0.35	1.74	0.96	0.757
	90	35.25	33	26	2	1.5	112	138	4 700	6 200	**TR0809AR**		—	27.5	50	49	80	67	85	3	9	2	1.5	0.55	1.10	0.60	1.10
	90	35.25	33	27	2	1.5	116	139	4 600	6 200	**32308JR**		2FD	24.3	50	50	80	73	82	3	8	2	1.5	0.35	1.74	0.96	1.06
45	68	15	15	12	0.6	0.6	34.7	52.4	5 300	7 100	**32909JR**		2BC	12.5	49.5	50	63.5	61	64	3	3	0.6	0.6	0.32	1.88	1.04	0.190
	75	20	20	15.5	1	1	62.8	86.5	5 000	6 600	**32009JR**		3CC	16.5	50.5	51	69.5	67	72	4	4.5	1	1	0.39	1.53	0.84	0.354
	75	24	24	19	1	1	69.6	101	5 000	6 700	**33009JR**		2CE	16.4	50.5	51	69.5	67	71	4	5	1	1	0.29	2.04	1.12	0.416
	80	26	26	20.5	1.5	1.5	87.5	120	4 800	6 400	**33109JR**		3CE	19.4	53.5	52	71.5	69	76.5	4	5.5	1.5	1.5	0.38	1.57	0.86	0.563
	85	20.75	19	15	1.5	1.5	69.4	81.5	4 600	6 100	**30209XR**		—	21.1	53.5	54	76.5	71	80	4	5.5	1.5	1.5	0.55	1.10	0.60	0.500
	85	20.75	19	16	1.5	1.5	67.2	77.4	4 600	6 100	**30209JR**		3DB	18.9	53.5	54	76.5	74	80	3	4.5	1.5	1.5	0.40	1.48	0.81	0.502
	85	24.75	23	19	1.5	1.5	80.7	102	4 600	6 200	**32209CR**		—	23.0	53.5	53	76.5	69	81	3	5.5	1.5	1.5	0.55	1.10	0.60	0.625
	85	24.75	23	19	1.5	1.5	84.2	104	4 600	6 100	**32209JR-1**		3DC	20.3	53.5	53	76.5	73	81	3	5.5	1.5	1.5	0.40	1.48	0.81	0.597

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

d (45) ~ (55) mm





Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
45	85	32	32	25	1.5	1.5	112	149	4 600	6 200	**33209JR**		3DE	21.8	53.5	52	76.5	72	81	5	7	1.5	1.5	0.39	1.56	0.86	0.818
	95	29	26.5	20	2.5	2.5	94.1	118	3 600	5 100	**T7FC045**		7FC	32.6	57	54	83	71	91	3	9	2	2	0.87	0.69	0.38	0.943
	95	36	35	30	2.5	2.5	140	177	4 300	5 700	**T2ED045**		2ED	23.8	57	55	83	80	89	6	6	2	2	0.32	1.86	1.02	1.20
	100	27.25	25	18	2	1.5	95.1	107	3 400	4 700	**30309DJR**		7FB	32.9	55	56	90	79	96	3	9	2	1.5	0.83	0.73	0.40	0.973
	100	27.25	25	20	2	1.5	109	119	4 100	5 500	**30309CR**		—	25.7	55	57	90	81	94	4	7	2	1.5	0.55	1.10	0.60	1.00
	100	27.25	25	22	2	1.5	113	128	4 100	5 400	**30309JR**		2FB	21.3	55	59	90	86	93	3	5	2	1.5	0.35	1.74	0.96	1.01
	100	38.25	36	29	2	1.5	145	182	4 200	5 600	**32309CR**		—	30.3	55	56	90	76	95	4	9	2	1.5	0.55	1.10	0.60	1.45
	100	38.25	36	30	2	1.5	146	180	4 100	5 500	**32309JR**		2FD	26.8	55	56	90	82	93	3	8	2	1.5	0.35	1.74	0.96	1.43
50	72	15	15	12	0.6	0.6	35.9	56.3	4 900	6 600	**32910JR**		2BC	13.7	54.5	55	67.5	65	69	3	3	0.6	0.6	0.34	1.76	0.97	0.195
	80	20	20	15.5	1	1	65.7	94.5	4 600	6 100	**32010JR**		3CC	17.7	55.5	56	74.5	72	77	4	4.5	1	1	0.42	1.42	0.78	0.389
	80	24	24	19	1	1	73.0	110	4 600	6 100	**33010JR**		2CE	17.4	55.5	56	74.5	72	76	4	5	1	1	0.32	1.90	1.04	0.451
	85	26	26	20	1.5	1.5	89.4	127	4 400	5 900	**33110JR**		3CE	20.6	58.5	56	76.5	74	81.5	4	6	1.5	1.5	0.41	1.46	0.80	0.594
	90	21.75	20	16	1.5	1.5	77.2	95.8	4 300	5 700	**30210CR**		—	22.7	58.5	58	81.5	76	86	4	5.5	1.5	1.5	0.55	1.10	0.60	0.590
	90	21.75	20	17	1.5	1.5	76.5	91.7	4 300	5 700	**30210JR**		3DB	20.1	58.5	58	81.5	79	85	3	4.5	1.5	1.5	0.42	1.43	0.79	0.566
	90	24.75	23	19	1.5	1.5	84.5	113	4 300	5 700	**32210CR**		—	24.0	58.5	58	81.5	74	86	3	5.5	1.5	1.5	0.55	1.10	0.60	0.675
	90	24.75	23	19	1.5	1.5	85.0	105	4 300	5 700	**32210JR**		3DC	20.6	58.5	58	81.5	78	85	3	5.5	1.5	1.5	0.42	1.43	0.79	0.643
	90	32	32	24.5	1.5	1.5	119	167	4 300	5 700	**33210JR**		3DE	23.1	58.5	57	81.5	77	86.5	5	7.5	1.5	1.5	0.41	1.45	0.80	0.887
	100	36	35	30	2.5	2.5	157	196	4 100	5 400	**T2ED050**		2ED	24.5	62	58	88	84	94	6	6	2	2	0.34	1.75	0.96	1.28
	105	32	29	22	3	3	113	140	3 300	4 600	**T7FC050**		7FC	35.9	64	59	91	78	100	4	10	2.5	2.5	0.87	0.69	0.38	1.25
	110	29.25	27	19	2.5	2	115	133	3 100	4 300	**30310DJR**		7FB	35.0	62	62	98	87	105	3	10	2	2	0.83	0.73	0.40	1.25
	110	29.25	27	20	2.5	2	124	143	3 700	4 900	**30310CR**		—	27.5	62	64	98	90	103	4	9	2	2	0.55	1.10	0.60	1.25
	110	29.25	27	23	2.5	2	137	152	3 700	4 900	**30310JR**		2FB	22.9	62	65	98	95	102	3	6	2	2	0.35	1.74	0.96	1.32
	110	42.25	40	33	2.5	2	171	234	3 800	5 100	**32310CR**		5FD	33.4	62	61	98	81	103	4	9	2	2	0.55	1.10	0.60	2.00
	110	42.25	40	33	2.5	2	176	220	3 700	5 000	**32310JR**		2FD	29.4	62	62	98	90	102	3	9	2	2	0.35	1.74	0.96	1.89
55	80	17	17	14	1	1	44.6	73.3	4 400	5 900	**32911JR**		2BC	14.5	61	61	74	72	76	3	3	1	1	0.31	1.94	1.07	0.285
	90	23	23	17.5	1.5	1.5	84.6	121	4 100	5 500	**32011JR**		3CC	19.8	63.5	63	81.5	81	86	4	5.5	1.5	1.5	0.41	1.48	0.81	0.569
	90	27	27	21	1.5	1.5	96.5	149	4 100	5 400	**33011JR**		2CE	19.3	63.5	63	81.5	81	86	5	6	1.5	1.5	0.31	1.92	1.06	0.672

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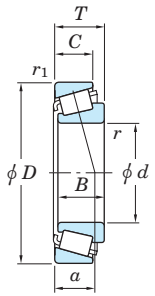
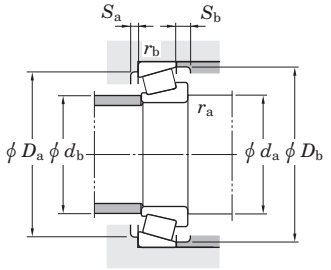
Single-row tapered roller bearings
metric series

d (55) ~ (60) mm





d	Boundary dimensions (mm) D	T	B	C	r min.	r1 min.	Basic load ratings (kN) Cr	C0r	Limiting speeds (min−1) Grease lub.	Oil lub.	Bearing No. 1)		Dimension series to ISO355 (Refer.)	Load center (mm) a	Mounting dimensions (mm) da min.	db max.	Da max.	Da min.	Db min.	Sa min.	Sb min.	ra max.	rb max.	Constant e	Axial load factors Y1	Y0	(Refer.) Mass (kg)
55	95	30	30	23	1.5	1.5	116	161	4 000	5 300	**33111JR**		3CE	22.5	63.5	62	86.5	83	91	5	7	1.5	1.5	0.37	1.60	0.88	0.868
	100	22.75	21	17	2	1.5	89.6	108	3 900	5 200	**30211CR**		—	24.3	65	63	90	84	95	4	5.5	2	1.5	0.55	1.10	0.60	0.750
	100	22.75	21	18	2	1.5	94.6	113	3 900	5 200	**30211JR**		3DB	20.7	65	64	90	88	94	4	4.5	2	1.5	0.40	1.48	0.81	0.732
	100	26.75	25	21	2	1.5	107	135	3 900	5 200	**32211CR**		—	25.9	65	64	90	83	96	4	5.5	2	1.5	0.55	1.10	0.60	0.875
	100	26.75	25	21	2	1.5	107	133	3 900	5 200	**32211JR-1**		3DC	23.0	65	63	90	87	95	4	5.5	2	1.5	0.40	1.48	0.81	0.863
	100	35	35	27	2	1.5	142	189	3 900	5 200	**33211JR**		3DE	25.3	65	62	90	85	96	6	8	2	1.5	0.40	1.50	0.83	1.18
	115	34	31	23.5	3	3	129	164	3 000	4 200	**T7FC055**		7FC	38.6	69	65	101	86	109	4	10.5	2.5	2.5	0.87	0.69	0.38	1.59
	120	31.5	29	21	2.5	2	129	148	2 900	4 000	**30311DJR**		7FB	38.4	67	68	108	94	113	4	10.5	2	2	0.83	0.73	0.40	1.59
	120	31.5	29	22	2.5	2	144	161	3 400	4 500	**30311CR**		—	29.8	67	70	108	97	112	4.5	9.5	2	2	0.55	1.10	0.60	1.58
	120	31.5	29	25	2.5	2	149	170	3 300	4 500	**30311JR**		2FB	25.5	67	71	108	104	111	4	6.5	2	2	0.35	1.74	0.96	1.65
	120	45.5	43	35	2.5	2	184	247	3 400	4 600	**32311C**		5FD	35.9	67	67	108	90	113	4	10	2	2	0.55	1.10	0.60	2.45
	120	45.5	43	35	2.5	2	171	203	3 400	4 500	**32311J**		2FD	32.4	67	68	108	99	111	4	10.5	2	2	0.35	1.74	0.96	2.24
	120	45.5	43	35	2.5	2	200	250	3 400	4 500	**32311JR**		2FD	32.4	67	68	108	99	111	4	10.5	2	2	0.35	1.74	0.96	2.38
60	85	17	17	14	1	1	46.2	78.2	4 100	5 500	**32912JR**		2BC	15.6	65.5	66	79.5	77	81	3	3	1	1	0.33	1.81	1.00	0.306
	95	23	23	17.5	1.5	1.5	86.1	127	3 900	5 200	**32012JR**		4CC	21.0	68.5	67	86.5	85	91	4	5.5	1.5	1.5	0.43	1.39	0.77	0.621
	95	27	27	21	1.5	1.5	101	162	3 900	5 200	**33012JR**		2CE	20.1	68.5	67	86.5	85	90	5	6	1.5	1.5	0.33	1.83	1.01	0.719
	100	30	30	23	1.5	1.5	118	170	3 700	5 000	**33112JR**		3CE	23.7	68.5	67	91.5	88	96	5	7	1.5	1.5	0.40	1.51	0.83	0.923
	110	23.75	22	17	2	1.5	102	123	3 500	4 700	**30212CR**		—	26.2	70	70	100	93	104	4	6.5	2	1.5	0.55	1.10	0.60	0.930
	110	23.75	22	19	2	1.5	106	127	3 500	4 700	**30212JR**		3EB	21.9	70	70	100	96	103	4	4.5	2	1.5	0.40	1.48	0.81	0.945
	110	29.75	28	22	2	1.5	128	164	3 600	4 700	**32212CR**		—	28.6	70	68	100	91	105	4	7.5	2	1.5	0.55	1.10	0.60	1.20
	110	29.75	28	24	2	1.5	132	167	3 500	4 700	**32212JR**		3EC	25.1	70	69	100	95	104	4	5.5	2	1.5	0.40	1.48	0.81	1.19
	110	38	38	29	2	1.5	174	239	3 600	4 700	**33212JR**		3EE	27.2	70	69	100	93	105	6	9	2	1.5	0.40	1.48	0.82	1.57
	115	39	38	31	4	2.5	158	227	3 400	4 600	**T5ED060**		5ED	32.4	78	70	103	92	110	5	8	3	2	0.53	1.13	0.62	1.81
	115	40	39	33	2.5	2.5	183	242	3 400	4 600	**T2EE060**		2EE	27.6	72	70	103	98	109	6	7	2	2	0.33	1.80	0.99	1.80
	125	37	33.5	26	3	3	153	194	2 800	3 900	**T7FC060**		7FC	40.8	74	71	111	94	119	4	11	2.5	2.5	0.82	0.73	0.40	2.03
	130	33.5	31	22	3	2.5	153	179	2 600	3 700	**30312DJR**		7FB	40.8	74	73	118	103	124	4	11.5	2.5	2	0.83	0.73	0.40	2.01
	130	33.5	31	23	3	2.5	169	196	3 100	4 200	**30312CR**		—	31.9	74	75	118	105	121	5	10.5	2.5	2	0.55	1.10	0.60	1.99

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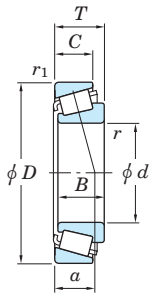
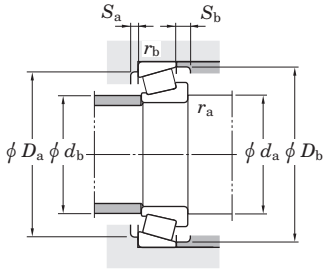
Single-row tapered roller bearings
metric series

d (60) ~ (70) mm



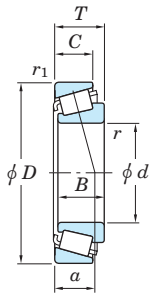


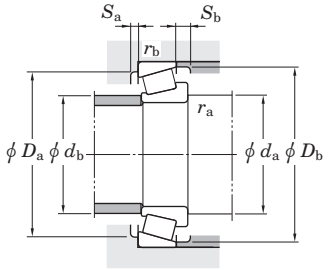
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
60	130	33.5	31	26	3	2.5	173	201	3 100	4 100	**30312JR**		2FB	26.9	74	77	118	112	120	4	7.5	2.5	2	0.35	1.74	0.96	2.08
	130	48.5	46	37	3	2.5	229	310	3 200	4 300	**32312CR**		5FD	38.3	74	73	118	98	122	5	11	2.5	2	0.55	1.10	0.60	3.15
	130	48.5	46	37	3	2.5	221	275	3 100	4 200	**32312J**		2FD	32.3	74	74	118	107	120	4	11.5	2.5	2	0.35	1.74	0.96	2.87
	130	48.5	46	37	3	2.5	244	315	3 100	4 200	**32312JR**		2FD	32.3	74	74	118	107	120	4	11.5	2.5	2	0.35	1.74	0.96	2.99
65	90	17	17	14	1	1	47.4	83.1	3 900	5 200	**32913JR**		2BC	16.8	70.5	70	84.5	81	86	3	3	1	1	0.35	1.70	0.93	0.327
	100	23	23	17.5	1.5	1.5	90.0	137	3 600	4 800	**32013JR**		4CC	22.5	73.5	72	91.5	90	97	4	5.5	1.5	1.5	0.46	1.31	0.72	0.664
	100	27	27	21	1.5	1.5	103	169	3 600	4 800	**33013JR**		2CE	21.1	73.5	72	91.5	89	96	5	6	1.5	1.5	0.35	1.72	0.95	0.762
	110	34	34	26.5	1.5	1.5	152	223	3 400	4 600	**33113JR**		3DE	25.9	73.5	73	101.5	96	106	6	7.5	1.5	1.5	0.39	1.55	0.85	1.33
	120	24.75	23	18	2	1.5	116	139	3 200	4 300	**30213CR**		—	28.1	75	77	110	102	114	4	6.5	2	1.5	0.55	1.10	0.60	1.15
	120	24.75	23	20	2	1.5	128	156	3 200	4 300	**30213JR**		3EB	24.2	75	77	110	106	113	4	4.5	2	1.5	0.40	1.48	0.81	1.18
	120	32.75	31	24	2	1.5	151	198	3 200	4 300	**32213CR**		—	31.3	75	75	110	99	114	4	8.5	2	1.5	0.55	1.10	0.60	1.55
	120	32.75	31	27	2	1.5	157	203	3 200	4 300	**32213JR**		3EC	26.6	75	76	110	104	115	4	5.5	2	1.5	0.40	1.48	0.81	1.58
	120	39	38	31	4	2.5	151	232	3 200	4 300	**T5ED065**		5ED	34.1	83	75	108	96	115	5	8	3	2	0.56	1.07	0.59	1.93
	120	41	41	32	2	1.5	200	277	3 200	4 300	**33213JR**		3EE	30.0	75	74	110	102	115	7	9	2	1.5	0.39	1.54	0.85	2.02
	130	37	33.5	26	3	3	148	211	2 600	3 600	**T7FC065**		7FC	44.4	79	78	116	98	124	4	11	2.5	2.5	0.87	0.69	0.38	2.17
	140	36	33	23	3	2.5	176	209	2 400	3 400	**30313DJR**		7GB	44.3	79	79	128	111	133	4	13	2.5	2	0.83	0.73	0.40	2.44
	140	36	33	25	3	2.5	193	227	2 900	3 900	**30313CR**		—	34.3	79	81	128	113	130	5	11	2.5	2	0.55	1.10	0.60	2.44
	140	36	33	28	3	2.5	204	239	2 800	3 800	**30313JR**		2GB	29.3	79	83	128	122	130	4	8	2.5	2	0.35	1.74	0.96	2.56
	140	51	48	39	3	2.5	258	361	2 900	3 900	**32313CR**		5GD	40.9	79	79	128	106	131	5	12	2.5	2	0.55	1.10	0.60	3.85
	140	51	48	39	3	2.5	250	312	2 900	3 900	**32313J**		2GD	34.7	79	80	128	117	130	4	12	2.5	2	0.35	1.74	0.96	3.49
	140	51	48	39	3	2.5	276	357	2 900	3 900	**32313JR**		2GD	34.7	79	80	128	117	130	4	12	2.5	2	0.35	1.74	0.96	3.64
70	100	20	20	16	1	1	71.0	115	3 500	4 700	**32914JR**		2BC	17.8	75.5	77	94.5	91	96	4	4	1	1	0.32	1.90	1.05	0.496
	110	25	25	19	1.5	1.5	108	163	3 300	4 400	**32014JR**		4CC	23.6	78.5	78	101.5	98	105	5	6	1.5	1.5	0.43	1.38	0.76	0.884
	110	31	31	25.5	1.5	1.5	134	208	3 300	4 400	**33014JR**		2CE	22.1	78.5	78	101.5	99	105	5	5.5	1.5	1.5	0.28	2.11	1.16	1.09
	120	37	37	29	2	1.5	181	266	3 100	4 200	**33114JR**		3DE	28.0	80	79	110	104	115	6	8	2	1.5	0.38	1.58	0.87	1.71
	125	26.25	24	19	2	1.5	126	158	3 000	4 000	**30214CR**		—	29.9	80	82	116.5	107	119	4	7	2	1.5	0.55	1.10	0.60	1.30
	125	26.25	24	21	2	1.5	138	173	3 100	4 100	**30214JR**		3EB	25.9	80	81	116.5	110	118	4	5	2	1.5	0.42	1.43	0.79	1.32

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

Single-row tapered roller bearings
metric series

d (70) ~ (75) mm



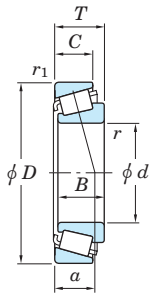


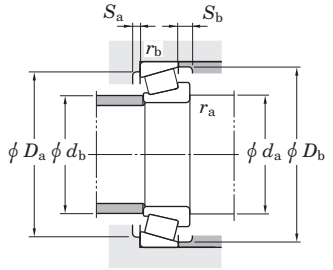
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
70	125	33.25	31	24	2	1.5	157	212	3 100	4 100	**32214CR**		—	32.6	80	80	116.5	104	120	4	9.5	2	1.5	0.55	1.10	0.60	1.65
	125	33.25	31	27	2	1.5	169	225	3 100	4 100	**32214JR**		3EC	29.2	80	80	116.5	108	119	4	6	2	1.5	0.42	1.43	0.79	1.71
	125	41	41	32	2	1.5	206	294	3 100	4 100	**33214JR**		3EE	31.2	80	79	116.5	107	120	7	9	2	1.5	0.41	1.47	0.81	2.16
	130	43	42	35	3	2.5	233	319	3 000	4 000	**T2ED070**		2ED	30.2	84	81	118	111	123	1	1	2.5	2	0.33	1.80	0.99	2.48
	140	39	35.5	27	3	3	177	242	2 400	3 400	**T7FC070**		7FC	46.5	84	82	126	106	133	5	12	2.5	2.5	0.87	0.69	0.38	2.64
	140	52	51	43	5	3	264	382	2 900	3 800	**T4FE070**		4FE	37.7	92	82	126	111	133	7	9	4	2.5	0.45	1.34	0.74	3.69
	150	38	35	25	3	2.5	197	235	2 300	3 200	**30314DJR**		7GB	47.1	84	84	138	118	142	4	13	2.5	2	0.83	0.73	0.40	2.97
	150	38	35	30	3	2.5	224	256	2 700	3 600	**30314CR**		—	37.0	84	87	138	123	141	6	8	2.5	2	0.55	1.10	0.60	3.10
	150	38	35	30	3	2.5	230	273	2 600	3 500	**30314JR**		2GB	30.5	84	89	138	130	140	4	8	2.5	2	0.35	1.74	0.96	3.08
	150	54	51	42	3	2.5	257	315	2 700	3 600	**32314**		—	37.0	84	86	138	125	140	4	12	2.5	2	0.35	1.73	0.95	4.11
	150	54	51	42	3	2.5	297	391	2 700	3 600	**32314C**		5GD	44.4	84	84	138	115	142	5	12	2.5	2	0.55	1.10	0.60	4.50
	150	54	51	42	3	2.5	317	414	2 700	3 600	**32314JR**		2GD	37.4	84	86	138	125	140	4	12	2.5	2	0.35	1.74	0.96	4.50
75	105	20	20	16	1	1	73.6	123	3 300	4 400	**32915JR**		2BC	18.9	80.5	81	99.5	96	101	4	4	1	1	0.33	1.80	0.99	0.526
	115	25	25	19	1.5	1.5	110	169	3 100	4 200	**32015JR**		4CC	25.1	83.5	83	106.5	103	110	5	6	1.5	1.5	0.46	1.31	0.72	0.930
	115	31	31	25.5	1.5	1.5	141	225	3 200	4 200	**33015JR**		2CE	22.9	83.5	83	106.5	104	110	6	5.5	1.5	1.5	0.30	2.01	1.11	1.16
	125	37	37	29	2	1.5	186	280	3 000	4 000	**33115JR**		3DE	29.3	85	84	116.5	109	120	6	8	2	1.5	0.40	1.51	0.83	1.84
	130	27.25	25	20	2	1.5	136	178	2 900	3 800	**30215CR**		—	31.0	85	87	121.5	111	124	5	7	2	1.5	0.55	1.10	0.60	1.40
	130	27.25	25	22	2	1.5	142	181	2 900	3 900	**30215JR**		4DB	27.6	85	86	121.5	115	124	4	5	2	1.5	0.44	1.38	0.76	1.42
	130	33.25	31	24	2	1.5	163	225	2 900	3 900	**32215CR**		—	33.7	85	85	121.5	109	125	4	9	2	1.5	0.55	1.10	0.60	1.75
	130	33.25	31	27	2	1.5	174	234	2 900	3 900	**32215JR**		4DC	30.2	85	85	121.5	114	125	4	6	2	1.5	0.44	1.38	0.76	1.77
	130	41	41	31	2	1.5	212	310	2 900	3 900	**33215JR**		3EE	32.5	85	83	121.5	111	125	7	10	2	1.5	0.43	1.40	0.77	2.26
	150	42	38	29	3	3	191	270	2 200	3 100	**T7FC075**		7FC	50.6	89	89	136	114	143	5	13	2.5	2.5	0.87	0.69	0.38	3.24
	160	40	37	26	3	2.5	213	254	2 100	2 900	**30315DJR**		7GB	49.9	89	91	148	127	151	6	14	2.5	2	0.83	0.73	0.40	3.45
	160	40	37	26	3	2.5	222	266	2 100	2 900	**30315DR**		—	48.8	89	91	148	127	151	6	14	2.5	2	0.81	0.74	0.41	3.48
	160	40	37	31	3	2.5	248	296	2 500	3 400	**30315CR**		—	39.2	89	94	148	130	150	6	9	2.5	2	0.55	1.10	0.60	3.80
	160	40	37	31	3	2.5	260	311	2 500	3 300	**30315JR**		2GB	32.5	89	95	148	139	149	4	9	2.5	2	0.35	1.74	0.96	3.65
	160	40	37	31	3	2.5	251	298	2 500	3 300	**30315R**		—	31.9	89	95	148	139	149	4	9	2.5	2	0.35	1.73	0.95	3.52

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

Single-row tapered roller bearings
metric series

d (75) ~ (85) mm

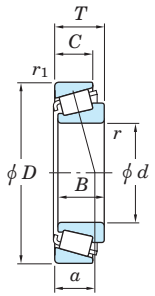


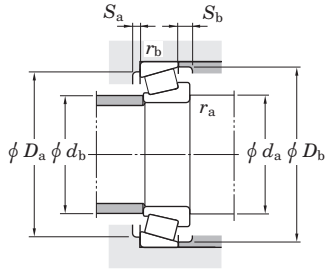


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	Mass (kg)
75	160	58	55	43	3	2.5	357	474	2 500	3 400	**32315CR**		—	46.6	89	90	148	125	154	6	15	2.5	2	0.55	1.10	0.60	5.50
	160	58	55	45	3	2.5	363	481	2 500	3 300	**32315JR**		2GD	40.0	89	91	148	133	149	4	13	2.5	2	0.35	1.74	0.96	5.41
	160	58	55	45	3	2.5	340	444	2 500	3 300	**32315R**		—	39.5	89	91	148	133	149	4	13	2.5	2	0.35	1.73	0.95	5.30
80	110	20	20	16	1	1	76.1	131	3 100	4 200	**32916JR**		2BC	20.1	85.5	86	104.5	101	106	4	4	1	1	0.35	1.71	0.94	0.556
	125	29	29	22	1.5	1.5	147	225	2 900	3 900	**32016JR**		3CC	26.7	88.5	89	116.5	112	120	6	7	1.5	1.5	0.42	1.42	0.78	1.32
	125	36	36	29.5	1.5	1.5	173	288	2 900	3 900	**33016JR**		2CE	25.1	88.5	90	116.5	112	119	6	6.5	1.5	1.5	0.28	2.16	1.19	1.63
	130	37	37	29	2	1.5	191	294	2 800	3 800	**33116JR**		3DE	30.5	90	89	121.5	114	126	6	8	2	1.5	0.42	1.44	0.79	1.93
	140	28.25	26	22	2.5	2	161	202	2 700	3 600	**30216JR**		3EB	28.6	92	91	130	124	132	4	6	2	2	0.42	1.43	0.79	1.72
	140	35.25	33	28	2.5	2	203	271	2 700	3 600	**32216JR**		3EC	31.7	92	90	130	122	134	4	7	2	2	0.42	1.43	0.79	2.17
	140	46	46	35	2.5	2	250	371	2 700	3 600	**33216JR**		3EE	35.7	92	89	130	119	135	7	11	2	2	0.43	1.41	0.78	2.99
	145	46	45	38	3	2.5	266	381	2 600	3 500	**T2ED080**		2ED	32.7	94	92	133	125	137	7	8	2.5	2	0.32	1.88	1.03	3.20
	170	42.5	39	27	3	2.5	236	282	2 000	2 800	**30316DJR**		7GB	53.5	94	97	158	134	159	6	15.5	2.5	2	0.83	0.73	0.40	4.12
	170	42.5	39	33	3	2.5	294	355	2 300	3 100	**30316JR**		2GB	34.8	94	102	158	148	159	4	9.5	2.5	2	0.35	1.74	0.96	4.46
	170	42.5	39	33	3	2.5	277	330	2 300	3 100	**30316R**		—	33.9	94	102	158	148	159	4	9.5	2.5	2	0.35	1.73	0.95	4.26
	170	61.5	58	48	3	2.5	347	440	2 300	3 100	**32316J**		2GD	43.5	94	98	158	142	159	4	13.5	2.5	2	0.35	1.74	0.96	6.04
	170	61.5	58	48	3	2.5	383	503	2 300	3 100	**32316JR**		2GD	43.5	94	98	158	142	159	4	13.5	2.5	2	0.35	1.74	0.96	6.31
85	120	23	23	18	1.5	1.5	97.1	165	2 900	3 900	**32917JR**		2BC	21.2	93.5	93	111.5	109	115	5	5	1.5	1.5	0.33	1.83	1.01	0.794
	130	29	29	22	1.5	1.5	150	234	2 800	3 700	**32017JR**		4CC	28.0	93.5	94	121.5	117	125	6	7	1.5	1.5	0.44	1.36	0.75	1.38
	130	36	36	29.5	1.5	1.5	177	300	2 800	3 700	**33017JR**		2CE	26.3	93.5	94	121.5	118	125	6	6.5	1.5	1.5	0.29	2.06	1.13	1.72
	140	41	41	32	2.5	2	224	346	2 600	3 500	**33117JR**		3DE	33.2	97	95	130	122	135	7	9	2	2	0.41	1.48	0.81	2.43
	150	30.5	28	24	2.5	2	182	231	2 500	3 400	**30217JR**		3EB	30.4	97	97	140	132	141	5	6.5	2	2	0.42	1.43	0.79	2.17
	150	38.5	36	30	2.5	2	232	315	2 500	3 400	**32217JR**		3EC	34.2	97	96	140	130	142	5	8.5	2	2	0.42	1.43	0.79	2.80
	150	49	49	37	2.5	2	294	439	2 500	3 400	**33217JR**		3EE	37.1	97	95	140	128	144	7	12	2	2	0.42	1.43	0.79	3.63
	180	44.5	41	28	4	3	231	265	1 900	2 600	**30317D**		—	56.0	103	103	166	143	169	6	16.5	3	2.5	0.81	0.74	0.41	4.54
	180	44.5	41	28	4	3	263	317	1 900	2 600	**30317DJR**		7GB	56.3	103	103	166	143	169	6	16.5	3	2.5	0.83	0.73	0.40	4.81
	180	44.5	41	34	4	3	316	384	2 200	2 900	**30317JR**		2GB	36.0	103	107	166	156	167	5	10.5	3	2.5	0.35	1.74	0.96	5.15
	180	44.5	41	34	4	3	305	367	2 200	2 900	**30317R**		—	35.8	103	107	166	156	167	5	10.5	3	2.5	0.35	1.73	0.95	4.97

[Note] 1) Please consult with JTEKT when using the bearings identified by suffix C. They are medium-tapered types especially designed for special purposes.

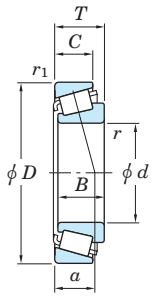
d (85) ~ 95 mm

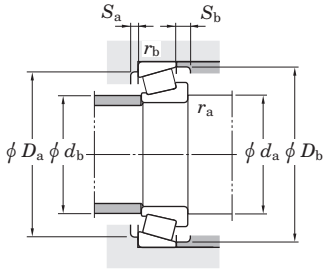




Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
85	180	63.5	60	49	4	3	439	587	2 200	3 000	**32317JR**		2GD	43.8	103	103	166	150	167	5	14.5	3	2.5	0.35	1.74	0.96	7.42
90	125	23	23	18	1.5	1.5	101	175	2 800	3 700	**32918JR**		2BC	22.3	98.5	97	116.5	114	120	5	5	1.5	1.5	0.34	1.75	0.96	0.834
	140	32	32	24	2	1.5	178	276	2 600	3 500	**32018JR**		3CC	29.8	100	100	131.5	125	134	6	8	2	1.5	0.42	1.42	0.78	1.80
	140	39	39	32.5	2	1.5	221	367	2 600	3 400	**33018JR**		2CE	27.1	100	100	131.5	127	135	7	6.5	2	1.5	0.27	2.23	1.23	2.22
	150	45	45	35	2.5	2	258	413	2 500	3 300	**33118JR**		3DE	35.4	102	100	140	130	144	7	10	2	2	0.40	1.51	0.83	3.13
	155	46	46	38	3	3	273	405	2 400	3 200	**T2ED090**		2ED	33.5	104	102	141	135	147	7	8	2.5	2.5	0.33	1.84	1.01	3.47
	160	32.5	30	26	2.5	2	204	261	2 400	3 200	**30218JR**		3FB	32.6	102	103	150	140	150	5	6.5	2	2	0.42	1.43	0.79	2.65
	160	42.5	40	34	2.5	2	263	362	2 400	3 200	**32218JR**		3FC	37.0	102	102	150	138	152	5	8.5	2	2	0.42	1.43	0.79	3.47
	160	55	55	42	2.5	2	343	527	2 400	3 200	**33218JR**		3FE	40.8	102	101	150	135	154	9	13	2	2	0.42	1.43	0.78	4.76
	190	46.5	43	30	4	3	288	350	1 700	2 400	**30318DJR**		7GB	59.6	108	109	176	151	179	6	16.5	3	2.5	0.83	0.73	0.40	5.57
	190	46.5	43	30	4	3	282	336	1 700	2 400	**30318DR**		—	59.1	108	109	176	151	179	6	16.5	3	2.5	0.81	0.74	0.41	5.60
	190	46.5	43	36	4	3	345	420	2 100	2 700	**30318JR**		2GB	38.1	108	113	176	165	177	5	10.5	3	2.5	0.35	1.74	0.96	6.04
	190	46.5	43	36	4	3	336	407	2 100	2 700	**30318R**		—	37.2	108	113	176	165	177	5	10.5	3	2.5	0.35	1.73	0.95	5.78
	190	67.5	64	53	4	3	461	614	2 100	2 800	**32318JR**		2GD	46.6	108	108	176	157	177	5	14.5	3	2.5	0.35	1.74	0.96	8.61
95	130	23	23	18	1.5	1.5	104	186	2 600	3 500	**32919JR**		2BC	23.5	103.5	102	121.5	119	125	5	5	1.5	1.5	0.36	1.68	0.92	0.876
	145	32	32	24	2	1.5	182	287	2 500	3 300	**32019JR**		4CC	31.2	105	105	136.5	130	140	6	8	2	1.5	0.44	1.36	0.75	1.88
	145	39	39	32.5	2	1.5	226	382	2 500	3 300	**33019JR**		2CE	27.8	105	104	136.5	131	139	7	6.5	2	1.5	0.28	2.16	1.19	2.31
	160	46	46	38	3	3	281	427	2 300	3 100	**T2ED095**		2ED	34.6	109	107	146	140	152	7	8	2.5	2.5	0.34	1.77	0.97	3.62
	160	49	49	38	2.5	2	304	473	2 300	3 100	**33119JR**		3EE	37.3	107	106	150	138	154	8	11	2	2	0.39	1.54	0.85	3.89
	170	34.5	32	27	3	2.5	231	299	2 200	3 000	**30219JR**		3FB	34.9	109	110	158	149	159	5	7.5	2.5	2	0.42	1.43	0.79	3.20
	170	45.5	43	37	3	2.5	311	439	2 200	3 000	**32219JR**		3FC	38.9	109	108	158	145	161	5	8.5	2.5	2	0.42	1.43	0.79	4.34
	170	58	58	44	3	2.5	374	582	2 200	2 900	**33219JR**		3FE	42.8	109	107	158	144	163	9	14	2.5	2	0.41	1.47	0.81	5.66
	200	49.5	45	32	4	3	319	391	1 700	2 300	**30319DJR**		7GB	62.7	113	113	186	157	187	6	17.5	3	2.5	0.83	0.73	0.40	6.68
	200	49.5	45	38	4	3	317	368	2 000	2 600	**30319**		—	39.8	113	118	186	172	186	5	11.5	3	2.5	0.35	1.73	0.95	6.32
	200	49.5	45	38	4	3	372	455	2 000	2 600	**30319JR**		2GB	40.8	113	118	186	172	186	5	11.5	3	2.5	0.35	1.74	0.96	6.96
	200	71.5	67	55	4	3	427	544	2 000	2 600	**32319**		—	49.1	113	115	186	166	186	5	16.5	3	2.5	0.35	1.73	0.95	9.35
	200	71.5	67	55	4	3	517	695	2 000	2 600	**32319JR**		2GD	49.8	113	115	186	166	186	5	16.5	3	2.5	0.35	1.74	0.96	10.1

d 100 ~ (105) mm

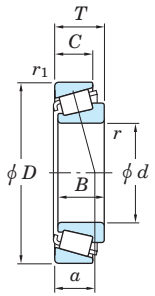


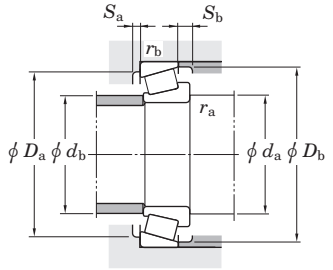


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
100	140	25	25	20	1.5	1.5	126	217	2 400	3 300	**32920JR**		2CC	24.0	109	108	131	128	135	5	5	1.5	1.5	0.33	1.82	1.00	1.19
	145	24	22.5	17.5	3	3	116	167	2 400	3 200	**T4CB100**		4CB	29.9	112	109	133	132	140	4	6.5	2.5	2.5	0.47	1.27	0.70	1.12
	150	32	32	24	2	1.5	185	298	2 400	3 200	**32020JR**		4CC	32.6	110	109	141	134	144	6	8	2	1.5	0.46	1.31	0.72	1.95
	150	39	39	32.5	2	1.5	231	397	2 400	3 200	**33020JR**		2CE	28.6	110	108	141	135	143	7	6.5	2	1.5	0.29	2.09	1.15	2.40
	165	47	46	39	3	3	293	458	2 200	3 000	**T2EE100**		2EE	35.1	114	112	151	145	157	7	8	2.5	2.5	0.32	1.88	1.04	3.86
	165	52	52	40	2.5	2	325	523	2 200	3 000	**33120JR**		3EE	40.1	112	111	155	142	159	8	12	2	2	0.41	1.48	0.81	4.29
	180	37	34	29	3	2.5	258	338	2 100	2 800	**30220JR**		3FB	36.8	114	116	168	157	168	5	8	2.5	2	0.42	1.43	0.79	3.83
	180	49	46	39	3	2.5	347	495	2 100	2 800	**32220JR**		3FC	42.1	114	114	168	154	171	5	10	2.5	2	0.42	1.43	0.79	5.21
	180	63	63	48	3	2.5	431	680	2 100	2 800	**33220JR**		3FE	45.7	114	112	168	151	172	10	15	2.5	2	0.40	1.48	0.82	6.92
	215	51.5	47	34	4	3	318	374	1 500	2 100	**30320D**		—	65.9	118	121	201	183	204	5	17	3	2.5	0.81	0.74	0.41	8.02
	215	51.5	47	39	4	3	344	400	1 800	2 400	**30320**		—	41.4	118	127	201	184	200	6	12.5	3	2.5	0.35	1.73	0.95	7.76
	215	51.5	47	39	4	3	422	521	1 800	2 400	**30320JR**		2GB	42.7	118	127	201	184	200	6	12.5	3	2.5	0.35	1.74	0.96	8.49
	215	56.5	51	35	4	3	373	459	1 500	2 200	**31320JR**		7GB	67.7	118	120	201	183	202	6	17.5	3	2.5	0.83	0.73	0.40	8.72
	215	77.5	73	60	4	3	491	637	1 800	2 400	**32320**		—	52.6	118	123	201	177	200	8	17.5	3	2.5	0.35	1.73	0.95	12.2
	215	77.5	73	60	4	3	579	783	1 800	2 400	**32320JR**		2GD	53.9	118	123	201	177	200	8	17.5	3	2.5	0.35	1.74	0.96	13.0
105	145	25	25	20	1.5	1.5	128	224	2 400	3 100	**32921JR**		2CC	25.1	113.5	113	136.5	133	140	5	5	1.5	1.5	0.34	1.75	0.96	1.23
	160	35	35	26	2.5	2	215	344	2 200	3 000	**32021JR**		4DC	34.5	117	116	150	143	154	6	9	2	2	0.44	1.35	0.74	2.45
	160	43	43	34	2.5	2	267	461	2 200	3 000	**33021JR**		2DE	30.9	117	116	150	145	153	7	9	2	2	0.28	2.12	1.17	3.08
	175	56	56	44	2.5	2	360	607	2 100	2 800	**33121JR**		3EE	43.2	117	116	165	150	169	9	12	2	2	0.40	1.48	0.82	5.33
	190	39	36	30	3	2.5	288	380	2 000	2 600	**30221JR**		3FB	39.0	119	122	178	165	178	6	9	2.5	2	0.42	1.43	0.79	4.49
	190	53	50	43	3	2.5	392	567	2 000	2 700	**32221JR**		3FC	44.8	119	120	178	161	180	6	10	2.5	2	0.42	1.43	0.79	6.37
	190	68	68	52	3	2.5	497	790	2 000	2 600	**33221JR**		3FE	48.8	119	117	178	159	182	10	16	2.5	2	0.40	1.49	0.82	8.43
	225	53.5	49	36	4	3	339	396	1 400	2 000	**30321D**		—	69.1	123	127	211	193	209	6	17	3	2.5	0.81	0.74	0.41	8.76
	225	53.5	49	41	4	3	371	432	1 700	2 300	**30321**		—	43.1	123	132	211	193	209	7	12.5	3	2.5	0.35	1.73	0.95	8.74
	225	53.5	49	41	4	3	464	578	1 700	2 300	**30321JR**		2GB	44.1	123	132	211	193	209	7	12.5	3	2.5	0.35	1.74	0.96	9.73
	225	58	53	36	4	3	397	489	1 500	2 100	**31321JR**		7GB	70.3	123	126	211	193	211	6	18	3	2.5	0.83	0.73	0.40	9.72
	225	81.5	77	63	4	3	543	707	1 800	2 300	**32321**		—	55.7	123	128	211	185	209	8	18.5	3	2.5	0.35	1.73	0.95	13.9

Single-row tapered roller bearings
metric series

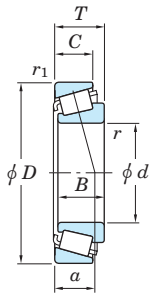
d (105) ~ 120 mm

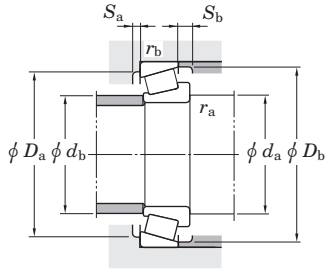




Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
105	225	81.5	77	63	4	3	635	866	1 800	2 300	**32321JR**		2GD	56.1	123	128	211	185	209	8	18.5	3	2.5	0.35	1.74	0.96	14.9
110	150	25	25	20	1.5	1.5	129	231	2 300	3 000	**32922JR**		2CC	26.3	119	118	141	138	145	5	5	1.5	1.5	0.36	1.69	0.93	1.28
	160	27	25.5	19.5	3	3	146	225	2 200	2 900	**T4CB110**		4CB	31.8	124	120	146	145	154	5	7.5	2.5	2.5	0.44	1.36	0.75	1.63
	170	38	38	29	2.5	2	248	395	2 100	2 800	**32022JR**		4DC	36.1	122	122	160	152	163	7	9	2	2	0.43	1.39	0.77	3.12
	170	47	47	37	2.5	2	287	502	2 100	2 800	**33022JR**		2DE	33.4	122	123	160	152	161	7	10	2	2	0.29	2.09	1.15	3.81
	180	56	56	43	2.5	2	369	634	2 000	2 700	**33122JR**		3EE	44.5	122	121	170	155	174	9	13	2	2	0.42	1.43	0.79	5.52
	200	41	38	32	3	2.5	324	434	1 900	2 500	**30222JR**		3FB	40.8	124	129	188	174	188	6	9	2.5	2	0.42	1.43	0.79	5.33
	200	56	53	46	3	2.5	438	640	1 900	2 500	**32222JR**		3FC	46.7	124	126	188	170	190	6	10	2.5	2	0.42	1.43	0.79	7.45
	240	54.5	50	36	4	3	365	429	1 400	1 900	**30322D**		—	71.5	128	135	226	205	222	6	18	3	2.5	0.81	0.74	0.41	10.2
	240	54.5	50	42	4	3	407	475	1 600	2 100	**30322**		—	44.8	128	141	226	206	222	8	12.5	3	2.5	0.35	1.73	0.95	10.4
	240	54.5	50	42	4	3	481	590	1 600	2 100	**30322JR**		2GB	46.3	128	141	226	206	222	8	12.5	3	2.5	0.35	1.74	0.96	11.4
	240	63	57	38	4	3	452	563	1 400	1 900	**31322JR**		7GB	76.2	128	135	226	205	224	6	21	3	2.5	0.83	0.73	0.40	12.2
	240	84.5	80	65	4	3	607	797	1 600	2 200	**32322**		—	57.3	128	137	226	198	222	9	19.5	3	2.5	0.35	1.73	0.95	16.6
	240	84.5	80	65	4	3	691	943	1 600	2 200	**32322JR**		2GD	59.3	128	137	226	198	222	9	19.5	3	2.5	0.35	1.74	0.96	17.8
120	165	29	29	23	1.5	1.5	172	298	2 100	2 700	**32924JR**		2CC	29.4	129	128	156	152	160	6	6	1.5	1.5	0.35	1.72	0.95	1.77
	170	27	25	19.5	3	3	164	262	2 000	2 700	**T4CB120**		4CB	34.6	134	130	156	155	164	4	7.5	2.5	2.5	0.47	1.27	0.70	1.76
	180	38	38	29	2.5	2	258	427	2 000	2 600	**32024JR**		4DC	38.8	132	131	170	161	173	7	9	2	2	0.46	1.31	0.72	3.34
	180	48	48	38	2.5	2	299	540	2 000	2 600	**33024JR**		2DE	36.2	132	132	170	160	171	6	10	2	2	0.31	1.97	1.08	4.16
	200	62	62	48	2.5	2	462	785	1 800	2 400	**33124JR**		3FE	47.8	132	133	190	172	192	9	14	2	2	0.40	1.51	0.83	7.73
	215	43.5	40	34	3	2.5	347	473	1 700	2 300	**30224JR**		4FB	44.2	134	140	203	187	203	6	9.5	2.5	2	0.44	1.38	0.76	6.36
	215	61.5	58	50	3	2.5	470	691	1 700	2 300	**32224JR**		4FD	51.6	134	136	203	181	204	7	11.5	2.5	2	0.44	1.38	0.76	9.04
	260	59.5	55	38	4	3	430	512	1 200	1 700	**30324D**		—	77.8	138	145	246	219	239	6	21	3	2.5	0.81	0.74	0.41	13.0
	260	59.5	55	46	4	3	505	611	1 500	2 000	**30324**		—	48.9	138	152	246	221	239	10	13.5	3	2.5	0.35	1.73	0.95	13.7
	260	59.5	55	46	4	3	569	714	1 500	2 000	**30324JR**		2GB	50.2	138	152	246	221	239	10	13.5	3	2.5	0.35	1.74	0.96	14.5
	260	68	62	42	4	3	526	665	1 300	1 800	**31324JR**		7GB	81.9	138	145	246	221	244	6	21	3	2.5	0.83	0.73	0.40	15.4
	260	90.5	86	69	4	3	800	1 110	1 500	2 000	**32324JR**		2GD	62.7	138	148	246	213	239	9	21.5	3	2.5	0.35	1.74	0.96	22.2
	260	90.5	86	69	4	3	797	1 110	1 500	2 000	**32324R**		—	61.1	138	148	246	213	239	9	21.5	3	2.5	0.35	1.73	0.95	21.8

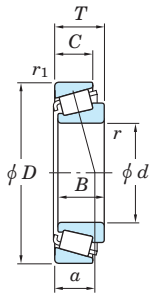
d 130 ~ (150) mm

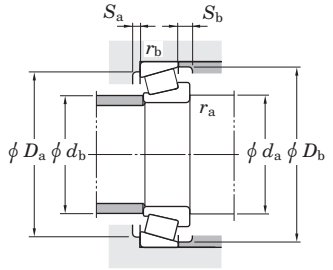




Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
130	180	32	32	25	2	1.5	200	368	1 900	2 500	**32926JR**		2CC	31.4	140	141	171	165	174	6	7	2	1.5	0.34	1.77	0.97	2.42
	185	29	27	21	3	3	183	282	1 800	2 500	**T4CB130**		4CB	37.8	144	141	171	170	179	5	8	2.5	2.5	0.47	1.27	0.70	2.22
	200	45	45	34	2.5	2	340	563	1 800	2 300	**32026JR**		4EC	42.9	142	144	190	178	192	8	11	2	2	0.43	1.38	0.76	5.04
	200	55	55	43	2.5	2	390	705	1 700	2 300	**33026JR**		2EE	42.5	142	143	190	178	192	8	12	2	2	0.34	1.76	0.97	6.19
	230	43.75	40	34	4	3	377	511	1 600	2 100	**30226JR**		4FB	46.2	148	152	216	203	218	7	9.5	3	2.5	0.44	1.38	0.76	7.24
	230	67.75	64	54	4	3	554	830	1 600	2 200	**32226JR**		4FD	56.0	148	146	216	193	219	7	13.5	3	2.5	0.44	1.38	0.76	11.5
	280	63.75	58	41	5	4	485	582	1 200	1 600	**30326D**		—	84.0	152	155	262	240	261	7	22	4	3	0.81	0.74	0.41	16.3
	280	63.75	58	49	5	4	657	834	1 400	1 800	**30326JR**		2GB	54.0	152	164	262	239	255	8	14.5	4	3	0.35	1.74	0.96	18.1
	280	72	66	44	5	4	589	748	1 200	1 600	**31326JR**		7GB	87.3	152	155	262	236	261	7	23	4	3	0.83	0.73	0.40	18.9
	280	98.75	93	78	5	4	852	1 160	1 400	1 800	**32326**		—	69.1	152	163	262	226	259	10	15	4	3	0.35	1.73	0.95	26.5
140	190	32	32	25	2	1.5	206	390	1 800	2 300	**32928JR**		2CC	33.6	150	150	181	174	184	6	7	2	1.5	0.36	1.67	0.92	2.57
	195	29	27	21	3	3	185	293	1 700	2 300	**T4CB140**		4CB	40.9	154	151	181	180	189	5	8	2.5	2.5	0.50	1.19	0.66	2.36
	210	45	45	34	2.5	2	346	585	1 700	2 200	**32028JR**		4DC	45.6	152	153	200	187	202	8	11	2	2	0.46	1.31	0.72	5.28
	210	56	56	44	2.5	2	406	758	1 600	2 200	**33028JR**		2DE	45.6	152	152	200	186	202	7	12	2	2	0.36	1.67	0.92	6.61
	250	45.75	42	36	4	3	420	570	1 500	1 900	**30228JR**		4FB	49.4	158	163	236	219	237	9	9.5	3	2.5	0.44	1.38	0.76	8.97
	250	71.75	68	58	4	3	636	961	1 500	2 000	**32228JR**		4FD	60.0	158	158	236	210	238	9	13.5	3	2.5	0.44	1.38	0.76	14.7
	300	67.75	62	44	5	4	525	627	1 100	1 500	**30328D**		—	90.2	162	169	282	254	280	7	23	4	3	0.81	0.74	0.41	20.0
	300	67.75	62	53	5	4	749	962	1 300	1 700	**30328JR**		2GB	56.9	162	179	282	254	273	10	14.5	4	3	0.35	1.74	0.96	22.6
	300	77	70	47	5	4	674	865	1 100	1 500	**31328JR**		7GB	93.8	162	167	282	254	280	8	26	4	3	0.83	0.73	0.40	23.3
	300	107.75	102	85	5	4	1 110	1 570	1 300	1 700	**32328R**		—	74.2	162	175	282	246	280	10	17	4	3	0.35	1.74	0.96	35.1
150	210	38	38	30	2.5	2	286	536	1 600	2 100	**32930JR**		2DC	36.1	162	163	200	194	202	7	8	2	2	0.33	1.83	1.01	3.96
	225	48	48	36	3	2.5	391	668	1 500	2 000	**32030JR**		4EC	48.8	164	164	213	200	216	8	12	2.5	2	0.46	1.31	0.72	6.41
	225	59	59	46	3	2.5	459	869	1 500	2 000	**33030JR**		2EE	47.8	164	164	213	200	217	8	13	2.5	2	0.36	1.65	0.90	8.09
	270	49	45	38	4	3	483	664	1 300	1 800	**30230JR**		4GB	52.4	168	175	256	234	255	9	11	3	2.5	0.44	1.38	0.76	11.6
	270	77	73	60	4	3	704	1 070	1 300	1 800	**32230JR**		4GD	65.2	168	170	256	226	254	8	17	3	2.5	0.44	1.38	0.76	18.2
	320	72	65	46	5	4	616	750	970	1 400	**30330D**		—	96.0	172	183	302	270	301	9	26	4	3	0.81	0.74	0.41	23.9
	320	72	65	55	5	4	837	1 080	1 200	1 500	**30330JR**		2GB	60.8	172	193	302	272	292	12	17	4	3	0.35	1.74	0.96	26.6

d (150) ~ (190) mm

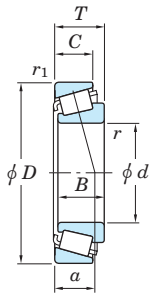


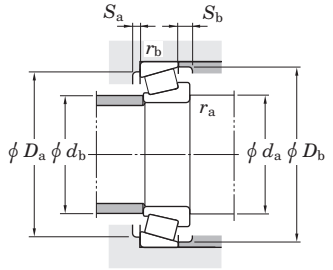


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)									Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
150	320	82	75	50	5	4	763	989	980	1 400	**31330JR**		7GB	100.1	172	179	302	272	301	9	27	4	3	0.83	0.73	0.40	28.0
	320	114	108	90	5	4	1 240	1 790	1 200	1 600	**32330R**		—	78.4	172	187	302	263	298	10	17	4	3	0.35	1.74	0.96	42.0
160	220	32	30	23	3	3	225	379	1 500	2 000	**T4DB160**		4DB	44.7	174	172	206	204	213	5	9	2.5	2.5	0.49	1.23	0.68	3.23
	220	38	38	30	2.5	2	295	568	1 500	2 000	**32932JR**		2DC	38.4	172	173	210	204	212	7	8	2	2	0.35	1.73	0.95	4.19
	240	51	51	38	3	2.5	440	758	1 400	1 900	**32032JR**		4EC	52.1	174	175	228	213	231	8	13	2.5	2	0.46	1.31	0.72	7.75
	290	52	48	40	4	3	542	750	1 200	1 600	**30232JR**		4GB	56.3	178	189	276	252	269	8	12	3	2.5	0.44	1.38	0.76	14.1
	290	84	80	67	4	3	795	1 210	1 200	1 700	**32232JR**		4GD	70.3	178	182	276	242	274	10	17	3	2.5	0.44	1.38	0.76	23.2
	340	75	68	48	5	4	742	933	900	1 300	**30332D**		—	101.8	182	195	322	290	320	9	27	4	3	0.81	0.74	0.41	29.1
	340	75	68	58	5	4	938	1 220	1 100	1 400	**30332JR**		2GB	63.3	182	205	322	289	310	12	17	4	3	0.35	1.74	0.96	31.8
	340	121	114	95	5	4	1 220	1 720	1 100	1 400	**32332**		—	83.0	182	200	322	277	316	10	18	4	3	0.35	1.73	0.95	47.9
170	230	38	38	30	2.5	2	296	606	1 400	1 900	**32934JR**		3DC	42.0	182	183	220	213	222	7	8	2	2	0.38	1.57	0.86	4.49
	260	57	57	43	3	2.5	526	905	1 300	1 700	**32034JR**		4EC	55.8	184	187	248	230	249	10	14	2.5	2	0.44	1.35	0.74	10.5
	310	57	52	43	5	4	620	867	1 100	1 500	**30234JR**		4GB	61.2	192	202	292	269	288	8	14	4	3	0.44	1.38	0.76	17.8
	310	91	86	71	5	4	898	1 380	1 100	1 500	**32234JR**		4GD	76.2	192	195	292	259	294	10	20	4	3	0.44	1.38	0.76	28.9
	360	80	72	50	5	4	762	1 040	830	1 200	**30334D**		—	108.3	192	211	342	310	333	9	30	4	3	0.81	0.74	0.41	34.3
	360	80	72	62	5	4	1 040	1 370	1 000	1 300	**30334JR**		2GB	67.9	192	218	342	306	329	13	18	4	3	0.35	1.74	0.96	37.5
	360	127	120	100	5	4	1 310	1 830	1 000	1 300	**32334**		—	86.1	192	200	342	295	337	14	26	4	3	0.35	1.73	0.95	56.9
180	250	45	45	34	2.5	2	357	735	1 300	1 700	**32936JR**		4DC	53.5	192	193	240	225	241	8	11	2	2	0.48	1.25	0.69	6.64
	280	64	64	48	3	2.5	644	1 100	1 200	1 600	**32036JR**		3FD	59.5	194	199	268	247	268	10	16	2.5	2	0.42	1.42	0.78	14.1
	320	57	52	43	5	4	615	870	1 100	1 400	**30236JR**		4GB	63.6	202	211	302	278	297	9	14	4	3	0.45	1.33	0.73	18.3
	320	91	86	71	5	4	957	1 520	1 100	1 500	**32236JR**		4GD	77.8	202	204	302	267	303	10	20	4	3	0.45	1.33	0.73	29.9
	380	83	75	52	5	4	833	1 150	780	1 100	**30336D**		—	112.8	202	225	362	330	351	10	31	4	3	0.81	0.74	0.41	40.1
	380	83	75	64	5	4	901	1 110	940	1 300	**30336**		—	71.0	202	227	362	318	346	13	19	4	3	0.35	1.73	0.95	39.7
	380	134	126	106	5	4	1 410	1 980	960	1 300	**32336**		—	91.8	202	215	362	310	355	14	27	4	3	0.35	1.73	0.95	67.0
190	260	45	45	34	2.5	2	366	789	1 200	1 600	**32938JR**		4DC	55.0	202	204	250	235	252	8	11	2	2	0.48	1.26	0.69	6.89
	290	64	64	48	3	2.5	654	1 170	1 100	1 500	**32038JR**		4FD	62.9	204	209	278	257	279	10	16	2.5	2	0.44	1.36	0.75	14.7

Single-row tapered roller bearings
metric series

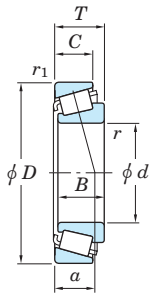
d (190) ~ 260 mm

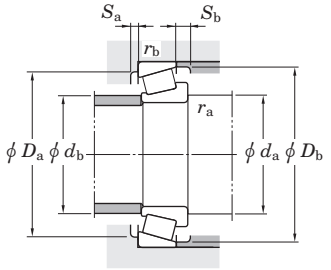




Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)								Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
190	340	60	55	46	5	4	729	1 030	1 000	1 300	**30238JR**		4GB	66.4	212	225	322	298	318	12	13	4	3	0.44	1.38	0.76	21.9
	340	97	92	75	5	4	1 090	1 740	1 000	1 300	**32238JR**		4GD	81.9	212	216	322	286	323	12	22	4	3	0.44	1.38	0.76	36.6
	400	86	78	52	6	5	950	1 210	740	1 000	**30338D**		—	119.2	218	232	378	350	372	11	34	5	4	0.81	0.74	0.41	44.8
	400	86	78	65	6	5	1 010	1 250	880	1 200	**30338**		—	73.2	218	241	378	342	370	10	20	5	4	0.35	1.73	0.95	46.2
	400	140	132	109	6	5	1 550	2 190	890	1 200	**32338**		—	96.5	218	225	378	330	375	14	30	5	4	0.35	1.73	0.95	76.6
200	280	51	51	39	3	2.5	486	958	1 100	1 500	**32940JR**		3EC	53.6	214	216	268	257	271	9	12	2.5	2	0.39	1.52	0.84	9.44
	310	70	70	53	3	2.5	755	1 340	1 100	1 400	**32040JR**		4FD	66.9	214	221	298	273	297	11	17	2.5	2	0.43	1.39	0.77	19.1
	360	64	58	48	5	4	792	1 120	940	1 200	**30240JR**		4GB	70.3	222	238	342	315	336	12	15	4	3	0.44	1.38	0.76	26.4
	360	104	98	82	5	4	1 240	1 880	960	1 300	**32240JR**		3GD	84.6	222	225	342	302	340	11	22	4	3	0.41	1.48	0.81	44.2
	420	89	80	56	6	5	904	1 230	690	970	**30340D**		—	122.6	228	248	398	365	385	11	33	5	4	0.81	0.74	0.41	50.6
	420	89	80	67	6	5	1 120	1 450	820	1 100	**30340**		—	79.8	228	255	398	354	385	11	21	5	4	0.35	1.73	0.95	53.5
	420	146	138	115	6	5	1 790	2 580	830	1 100	**32340**		—	102.9	228	240	398	345	395	16	30	5	4	0.35	1.73	0.95	91.0
220	300	51	51	39	3	2.5	498	1 010	1 000	1 400	**32944JR**		3EC	58.6	234	234	288	275	290	9	12	2.5	2	0.43	1.41	0.78	10.1
	340	76	76	57	4	3	894	1 620	940	1 300	**32044JR**		4FD	72.8	238	243	326	300	326	12	19	3	2.5	0.43	1.39	0.77	25.2
	400	72	65	54	5	4	1 010	1 440	830	1 100	**30244JR**		—	76.5	242	263	382	344	371	14	17	4	3	0.44	1.43	0.79	35.9
	400	114	108	90	5	4	1 190	1 930	830	1 100	**32244**		—	95.9	242	260	382	333	377	16	14	4	3	0.43	1.39	0.77	56.8
	460	97	88	73	6	5	1 260	1 680	730	980	**30344**		—	84.6	248	282	438	386	420	12	23	5	4	0.35	1.73	0.95	69.0
240	320	51	51	39	3	2.5	515	1 090	940	1 300	**32948JR**		4EC	64.5	254	254	308	294	311	9	12	2.5	2	0.46	1.31	0.72	10.9
	360	76	76	57	4	3	924	1 720	870	1 200	**32048JR**		4FD	78.5	258	261	346	318	346	12	19	3	2.5	0.46	1.31	0.72	26.8
	440	79	72	60	5	4	1 230	1 790	730	980	**30248R**		—	82.7	262	287	422	377	409	14	18	4	3	0.42	1.43	0.79	49.5
	440	127	120	100	5	4	1 530	2 480	740	980	**32248**		—	106.1	262	282	422	365	415	16	14	4	3	0.43	1.39	0.77	76.4
260	360	63.5	63.5	48	3	2.5	741	1 550	830	1 100	**32952JR**		3EC	69.6	274	279	348	328	347	11	15.5	2.5	2	0.41	1.48	0.81	18.9
	400	87	87	65	5	4	1 170	2 170	770	1 000	**32052JR**		4FC	85.0	282	287	382	352	383	14	22	4	3	0.43	1.38	0.76	39.5
	480	89	80	67	6	5	1 210	1 860	650	870	**30252**		—	93.6	288	310	458	415	450	14	21	5	4	0.42	1.44	0.79	64.9
	480	137	130	106	6	5	1 760	2 870	660	880	**32252**		—	115.2	288	300	458	400	455	16	30	5	4	0.43	1.39	0.77	102

d 280 ~ 360 mm

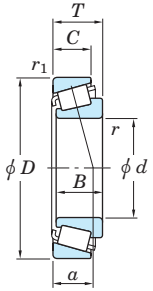


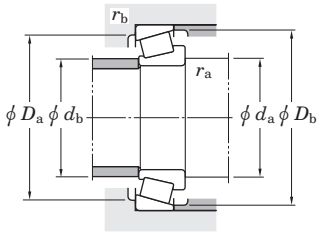


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimension series to ISO355 (Refer.)	Load center (mm)	Mounting dimensions (mm)										Constant	Axial load factors		(Refer.) Mass (kg)
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.				a	d_a min.	d_b max.	D_a max.	D_a min.	D_b min.	S_a min.	S_b min.	r_a max.	r_b max.	e	Y_1	Y_0	
280	380	63.5	63.5	48	3	2.5	760	1 630	770	1 000	**32956JR**		4EC	75.1	294	298	368	347	368	11	15.5	2.5	2	0.43	1.39	0.76	20.1
	420	87	87	65	5	4	1 200	2 280	720	960	**32056JR**		4FC	91.1	302	305	402	370	402	14	22	4	3	0.46	1.31	0.72	41.7
	500	89	80	67	6	5	1 260	1 920	610	810	**30256**		—	96.2	308	325	478	440	475	14	21	5	4	0.42	1.44	0.79	67.6
	500	137	130	106	6	5	1 860	3 150	610	810	**32256**		—	117.2	308	325	478	420	474	16	30	5	4	0.43	1.39	0.77	108
300	420	76	76	57	4	3	1 050	2 210	680	910	**32960JR**		3FD	79.9	318	324	406	383	405	12	19	3	2.5	0.39	1.52	0.84	32.4
	460	100	100	74	5	4	1 430	2 660	640	850	**32060JR**		4GD	97.9	322	329	442	404	439	15	26	4	3	0.43	1.38	0.76	57.5
	540	96	85	71	6	5	1 510	2 360	550	730	**30260**		—	103.9	328	350	518	475	505	14	24	5	4	0.42	1.44	0.79	84.7
320	440	76	76	57	4	3	1 060	2 270	640	850	**32964JR**		3FD	85.0	338	342	426	401	426	12	19	3	2.5	0.42	1.44	0.79	34.0
	480	100	100	74	5	4	1 510	2 810	600	800	**32064JR**		4GD	103.0	342	344	462	418	461	16	26	4	3	0.46	1.31	0.72	58.7
	580	104	92	75	6	5	1 740	2 770	490	660	**30264**		—	111.9	348	370	558	505	540	14	28	5	4	0.42	1.44	0.79	108
340	460	76	76	57	4	3	1 070	2 340	590	790	**32968JR**		4FD	90.5	358	361	446	420	446	12	19	3	2.5	0.44	1.37	0.75	35.6
360	480	76	76	57	4	3	1 080	2 400	560	740	**32972JR**		4FD	96.2	378	379	466	438	466	12	19	3	2.5	0.46	1.31	0.72	37.1

Single-row tapered roller bearings
inch series

d 9.525 ~ (22.225) mm



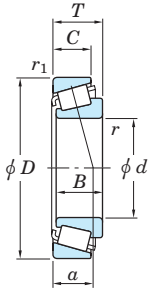


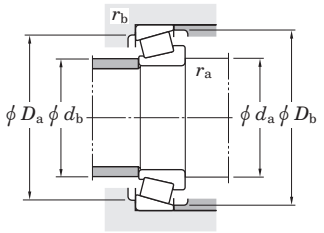
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
9.525	31.991	10.008	10.785	7.938	1.2	1.2	10.7	9.30	14 000	19 000	**A2037**	**A2126**	7.1	15.0	13.5	26.0	29.0	1.2	1.2	0.40	1.48	0.82	0.029	0.017
11.986	31.991	10.008	10.785	7.938	0.8	1.2	10.7	9.30	14 000	19 000	**A2047**	**A2126**	7.1	16.5	15.5	26.0	29.0	0.8	1.2	0.40	1.48	0.82	0.023	0.017
12.700	34.988	10.998	10.988	8.730	1.2	1.2	12.6	11.9	12 000	17 000	**A4050**	**A4138**	8.3	18.5	17.0	29.0	32.0	1.2	1.2	0.45	1.33	0.73	0.033	0.022
14.989	34.988	10.998	10.988	8.730	0.8	1.2	12.6	11.9	12 000	17 000	**A4059**	**A4138**	8.3	19.5	19.0	29.0	32.0	0.8	1.2	0.45	1.33	0.73	0.029	0.022
15.875	34.988	10.998	10.998	8.712	1.2	1.2	14.5	14.3	12 000	16 000	**L21549**	**L21511**	7.6	21.5	19.5	29.0	32.5	1.2	1.2	0.32	1.88	1.04	0.031	0.018
	41.275	14.288	14.681	11.112	1.2	2.0	21.8	20.5	11 000	14 000	**03062**	**03162**	9.3	21.5	20.0	34.0	37.5	1.2	2.0	0.31	1.93	1.06	0.060	0.035
	42.862	16.670	16.670	13.495	1.6	1.6	30.6	29.5	10 000	14 000	**17580R**	**17520**	10.9	23.0	21.0	36.5	39.0	1.6	1.6	0.33	1.81	1.00	0.078	0.048
	49.225	19.845	21.539	14.288	0.8	1.2	37.7	37.7	8 900	12 000	**09062**	**09195**	10.6	22.0	21.5	42.0	44.5	0.8	1.2	0.27	2.26	1.24	0.139	0.065
	53.975	22.225	21.839	15.875	0.8	2.4	42.0	41.2	8 400	11 000	**21063**	**21212**	16.6	29.0	26.5	43.0	50.0	0.8	2.4	0.59	1.02	0.56	0.163	0.097
16.000	47.000	21.000	21.000	16.000	1.0	2.0	36.3	37.7	9 800	13 000	**HM81649**	**HM81610**	15.0	27.5	23.0	37.5	43.0	1.0	2.0	0.55	1.10	0.60	0.111	0.080
17.462	39.878	13.843	14.605	10.668	1.2	1.2	25.4	26.0	11 000	14 000	**LM11749R**	**LM11710**	8.6	23.0	21.5	34.0	37.0	1.2	1.2	0.29	2.10	1.15	0.058	0.028
19.050	45.237	15.494	16.637	12.065	1.2	1.2	29.4	30.1	9 400	13 000	**LM11949**	**LM11910**	10.0	25.0	23.5	39.5	41.5	1.2	1.2	0.30	2.00	1.10	0.081	0.044
	49.225	19.845	21.539	14.288	1.2	1.2	37.7	37.7	8 900	12 000	**09078**	**09195**	10.6	25.5	24.0	42.0	44.5	1.2	1.2	0.27	2.26	1.24	0.124	0.065
	49.225	21.209	19.050	17.462	1.2	1.6	37.7	37.7	8 900	12 000	**09067**	**09196**	13.8	25.5	24.0	41.5	44.5	1.2	1.6	0.27	2.26	1.24	0.114	0.084
20.000	50.005	13.495	14.260	9.525	1.6	1.0	26.7	28.8	7 900	11 000	**07079**	**07196**	10.8	27.5	26.0	44.5	47.0	1.6	1.0	0.40	1.49	0.82	0.104	0.034
20.638	49.225	19.845	19.845	15.875	1.6	1.6	36.4	37.7	8 600	12 000	**12580**	**12520**	12.7	28.5	26.0	42.5	45.5	1.6	1.6	0.32	1.86	1.02	0.116	0.067
21.430	50.005	17.526	18.288	13.970	1.2	1.2	39.1	40.7	8 500	11 000	**M12649**	**M12610**	11.1	27.5	25.5	44.0	46.0	1.2	1.2	0.28	2.16	1.19	0.119	0.058
21.987	45.974	15.494	16.637	12.065	1.2	1.2	30.1	34.6	8 900	12 000	**LM12749**	**LM12711**	10.0	27.5	26.0	40.0	42.5	1.2	1.2	0.31	1.96	1.08	0.078	0.043
22.225	50.005	17.526	18.288	13.970	1.2	1.2	39.1	40.7	8 500	11 000	**M12648**	**M12610**	11.1	28.5	26.5	44.0	46.0	1.2	1.2	0.28	2.16	1.19	0.115	0.058
	52.388	19.368	20.168	14.288	1.6	1.6	36.7	37.9	8 000	11 000	**1380**	**1328**	11.6	29.5	29.5	45.0	48.5	1.6	1.6	0.29	2.05	1.13	0.132	0.066
	53.975	19.368	20.168	14.288	1.6	1.6	36.7	37.9	8 000	11 000	**1380**	**1329**	11.6	29.5	29.5	46.0	49.0	1.6	1.6	0.29	2.05	1.13	0.137	0.082

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (22.225) ~ (26.988) mm



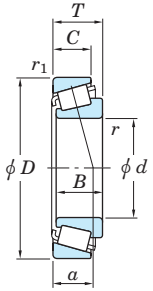


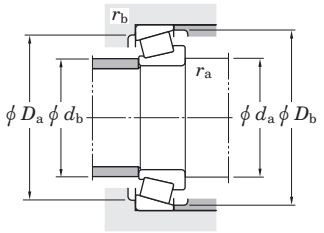
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
22.225	56.896	19.368	19.837	15.875	1.2	1.2	40.0	43.1	7 600	10 000	**1755**	**1729**	12.5	29.0	27.5	49.0	51.0	1.2	1.2	0.31	1.95	1.07	0.150	0.100
	57.150	22.225	22.225	17.462	0.8	1.6	52.6	55.7	7 600	10 000	**1280**	**1220**	15.3	29.5	29.0	49.0	52.0	0.8	1.6	0.35	1.73	0.95	0.189	0.105
	66.421	23.812	25.433	19.050	1.6	1.2	67.0	75.2	6 500	8 700	**2684**	**2631**	13.9	31.5	29.0	58.0	60.0	1.6	1.2	0.25	2.36	1.30	0.295	0.163
22.606	47.000	15.500	15.500	12.000	1.6	1.0	28.0	32.8	8 700	12 000	**LM72849**	**LM72810**	12.3	30.0	28.0	40.5	44.0	1.6	1.0	0.47	1.27	0.70	0.076	0.047
23.812	50.292	14.224	14.732	10.668	1.6	1.2	31.2	37.0	7 800	10 000	**L44640R**	**L44610**	10.8	30.5	28.5	44.5	47.0	1.6	1.2	0.37	1.60	0.88	0.099	0.034
	56.896	19.368	19.837	15.875	0.8	1.2	40.0	43.1	7 600	10 000	**1779**	**1729**	12.5	29.5	28.5	49.0	51.0	0.8	1.2	0.31	1.95	1.07	0.141	0.100
24.981	50.005	13.495	14.260	9.525	1.6	1.0	26.7	28.8	7 900	11 000	**07098**	**07196**	10.8	31.0	29.0	44.5	47.0	1.6	1.0	0.40	1.49	0.82	0.084	0.034
	62.000	16.002	16.566	14.288	1.6	1.6	38.0	40.6	6 700	8 900	**17098**	**17244**	12.7	33.0	30.5	54.0	57.0	1.6	1.6	0.38	1.57	0.86	0.162	0.090
25.000	50.005	13.495	14.260	9.525	1.6	1.0	26.7	28.8	7 900	11 000	**07097**	**07196**	10.8	31.0	29.0	44.5	47.0	1.6	1.0	0.40	1.49	0.82	0.085	0.035
25.400	50.005	13.495	14.260	9.525	1.0	1.0	26.7	28.8	7 900	11 000	**07100**	**07196**	10.8	30.5	29.5	44.5	47.0	1.0	1.0	0.40	1.49	0.82	0.084	0.035
	50.005	13.495	14.260	9.525	1.6	1.0	26.7	28.8	7 900	11 000	**07100S**	**07196**	10.8	31.5	29.5	44.5	47.0	1.6	1.0	0.40	1.49	0.82	0.082	0.035
	50.292	14.224	14.732	10.668	1.2	1.2	31.2	37.0	7 800	10 000	**L44643R**	**L44610**	10.8	31.5	29.5	44.5	47.0	1.2	1.2	0.37	1.60	0.88	0.092	0.039
	51.994	15.011	14.260	12.700	1.0	1.2	26.7	28.8	7 900	11 000	**07100**	**07204**	12.3	30.5	29.5	45.0	48.0	1.0	1.2	0.40	1.49	0.82	0.075	0.065
	58.738	19.050	19.355	15.080	1.2	1.2	48.8	57.1	7 000	9 300	**1986R**	**1932**	13.1	32.5	30.5	52.0	54.0	1.2	1.2	0.33	1.82	1.00	0.179	0.088
	59.530	23.368	23.114	18.288	0.8	1.6	50.4	57.1	7 200	9 600	**M84249**	**M84210**	18.2	36.0	32.5	49.5	56.0	0.8	1.6	0.55	1.10	0.60	0.194	0.128
	61.912	19.050	20.638	14.288	0.8	2.0	44.6	50.7	6 400	8 600	**15101**	**15243**	13.2	32.5	31.5	55.0	58.0	0.8	2.0	0.35	1.71	0.94	0.215	0.080
	62.000	19.050	20.638	14.288	3.6	1.2	44.6	50.7	6 400	8 600	**15100**	**15245**	13.2	38.0	31.5	55.0	58.0	3.6	1.2	0.35	1.71	0.94	0.215	0.081
	63.500	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15101**	**15250R**	13.2	32.5	31.5	55.0	59.0	0.8	1.2	0.35	1.71	0.94	0.215	0.097
	64.292	21.432	21.432	16.670	1.6	1.6	55.2	70.7	6 400	8 500	**M86643R**	**M86610**	18.0	38.0	36.5	54.0	61.0	1.6	1.6	0.55	1.10	0.60	0.248	0.127
	66.421	23.812	25.433	19.050	1.2	1.2	67.0	75.2	6 500	8 700	**2687**	**2631**	13.9	33.5	31.5	58.0	60.0	1.2	1.2	0.25	2.36	1.30	0.272	0.163
	68.262	22.225	22.225	17.462	0.8	1.6	51.0	61.1	6 000	8 000	**02473**	**02420**	17.1	34.5	33.5	59.0	63.0	0.8	1.6	0.42	1.44	0.79	0.275	0.150
	72.233	25.400	25.400	19.842	0.8	2.4	66.9	87.4	5 700	7 600	**HM88630**	**HM88610**	20.7	39.5	39.5	60.0	69.0	0.8	2.4	0.55	1.10	0.60	0.391	0.185
26.162	66.421	23.812	25.433	19.050	1.6	1.2	67.0	75.2	6 500	8 700	**2682**	**2631**	13.9	34.5	32.0	58.0	60.0	1.6	1.2	0.25	2.36	1.30	0.268	0.163
26.988	50.292	14.224	14.732	10.668	3.6	1.2	31.2	37.0	7 800	10 000	**L44649R**	**L44610**	10.8	37.5	31.0	44.5	47.0	3.6	1.2	0.37	1.60	0.88	0.083	0.039

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (26.988) ~ (30.162) mm



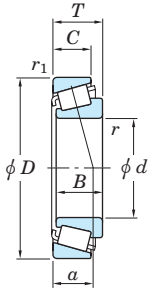


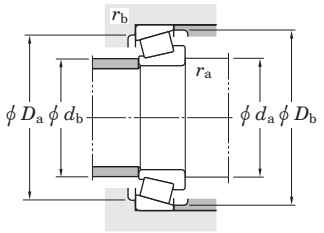
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
26.988	60.325	19.842	17.462	15.875	3.6	1.6	37.8	42.7	7 000	9 400	**15580**	**15523**	15.1	38.5	32.0	51.0	54.0	3.6	1.6	0.35	1.73	0.95	0.140	0.122
	62.000	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15106**	**15245**	13.2	33.5	33.0	55.0	58.0	0.8	1.2	0.35	1.71	0.94	0.206	0.081
	66.421	23.812	25.433	19.050	1.6	1.2	67.0	75.2	6 500	8 700	**2688**	**2631**	13.9	35.0	33.0	58.0	60.0	1.6	1.2	0.25	2.36	1.30	0.262	0.163
28.575	57.150	17.462	17.462	13.495	3.6	1.6	37.8	42.7	7 000	9 400	**15590**	**15520**	12.7	39.0	33.5	51.0	53.0	3.6	1.6	0.35	1.73	0.95	0.131	0.069
	57.150	19.845	19.355	15.875	3.6	1.6	48.8	57.1	7 000	9 300	**1988R**	**1922**	13.9	39.5	33.5	51.0	53.5	3.6	1.6	0.33	1.82	1.00	0.151	0.076
	62.000	19.050	20.638	14.288	3.6	1.2	44.6	50.7	6 400	8 600	**15112**	**15245**	13.2	40.0	34.0	55.0	58.0	3.6	1.2	0.35	1.71	0.94	0.193	0.081
	62.000	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15113**	**15245**	13.2	34.5	34.0	55.0	58.0	0.8	1.2	0.35	1.71	0.94	0.195	0.081
	64.292	21.432	21.432	16.670	1.6	1.6	55.2	70.7	6 400	8 500	**M86647R**	**M86610**	18.0	40.0	38.0	54.0	61.0	1.6	1.6	0.55	1.10	0.60	0.225	0.127
	66.421	23.812	25.433	19.050	1.2	1.2	67.0	75.2	6 500	8 700	**2689**	**2631**	13.9	36.0	34.0	58.0	60.0	1.2	1.2	0.25	2.36	1.30	0.249	0.165
	68.262	22.225	22.225	17.462	0.8	1.6	51.0	61.1	6 000	8 000	**02474**	**02420**	17.1	36.5	36.0	59.0	63.0	0.8	1.6	0.42	1.44	0.79	0.252	0.150
	72.000	19.000	18.923	15.875	1.6	1.6	47.5	49.6	5 900	7 800	**26112**	**26283**	15.3	37.0	35.0	62.0	65.0	1.6	1.6	0.36	1.67	0.92	0.217	0.163
	72.626	24.608	24.257	17.462	4.8	1.6	61.8	60.5	6 100	8 100	**41125**	**41286**	20.7	48.0	36.5	61.0	68.0	4.8	1.6	0.60	1.00	0.55	0.292	0.177
	72.626	24.608	24.257	17.462	1.6	1.6	61.8	60.5	6 100	8 100	**41126**	**41286**	20.7	41.5	36.5	61.0	68.0	1.6	1.6	0.60	1.00	0.55	0.295	0.177
	72.626	30.162	29.997	23.812	3.6	3.2	78.8	89.3	5 800	7 700	**3192**	**3120**	20.3	42.5	37.0	61.0	67.0	3.6	3.2	0.33	1.80	0.99	0.401	0.222
	72.626	30.162	29.997	23.812	1.2	3.2	78.8	89.3	5 800	7 700	**3198**	**3120**	20.3	39.0	37.0	61.0	67.0	1.2	3.2	0.33	1.80	0.99	0.410	0.222
	73.025	22.225	22.225	17.462	0.8	3.2	55.0	65.7	5 500	7 400	**02872**	**02820**	18.4	37.5	37.0	62.0	68.0	0.8	3.2	0.45	1.32	0.73	0.319	0.158
29.000	50.292	14.224	14.732	10.668	3.6	1.2	28.9	37.2	7 600	10 000	**L45449**	**L45410**	10.9	39.5	33.0	44.5	48.0	3.6	1.2	0.37	1.62	0.89	0.079	0.036
29.367	66.421	23.812	25.433	19.050	3.6	1.2	67.0	75.2	6 500	8 700	**2690**	**2631**	13.9	41.0	35.0	58.0	60.0	3.6	1.2	0.25	2.36	1.30	0.242	0.165
29.987	62.000	16.002	16.566	14.288	1.6	1.6	38.0	40.6	6 700	8 900	**17118**	**17244**	12.7	37.0	34.5	54.0	57.0	1.6	1.6	0.38	1.57	0.86	0.135	0.090
	62.000	19.050	20.638	14.288	1.2	1.2	44.6	50.7	6 400	8 600	**15117**	**15245**	13.2	36.5	35.0	55.0	58.0	1.2	1.2	0.35	1.71	0.94	0.184	0.081
30.000	69.012	19.845	19.583	15.875	3.6	1.2	46.1	55.0	5 900	7 800	**14117A**	**14276**	15.5	42.5	39.5	60.0	63.0	3.6	1.2	0.38	1.57	0.86	0.225	0.135
30.112	62.000	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15116**	**15245**	13.2	36.0	35.5	55.0	58.0	0.8	1.2	0.35	1.71	0.94	0.184	0.081
30.162	62.000	16.002	16.566	14.288	1.6	1.6	38.0	40.6	6 700	8 900	**17119**	**17244**	12.7	37.0	34.5	54.0	57.0	1.6	1.6	0.38	1.57	0.86	0.139	0.091
	64.292	21.432	21.432	16.670	1.6	1.6	55.2	70.7	6 400	8 500	**M86649R**	**M86610**	18.0	41.0	38.0	54.0	61.0	1.6	1.6	0.55	1.10	0.60	0.213	0.127

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (30.162) ~ (34.925) mm





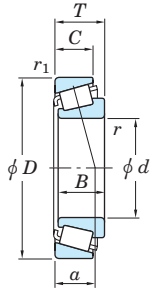
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	$r^{1)}$ min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
30.162	68.262	22.225	22.225	17.462	2.4	1.6	56.1	71.1	6 000	7 900	**M88043**	**M88010**	19.2	43.5	39.5	58.0	65.0	2.4	1.6	0.55	1.10	0.60	0.258	0.144
30.213	62.000	19.050	20.638	14.288	3.6	1.2	44.6	50.7	6 400	8 600	**15118**	**15245**	13.2	41.5	35.5	55.0	58.0	3.6	1.2	0.35	1.71	0.94	0.181	0.081
	62.000	19.050	20.638	14.288	1.6	1.2	44.6	50.7	6 400	8 600	**15119**	**15245**	13.2	37.5	35.5	55.0	58.0	1.6	1.2	0.35	1.71	0.94	0.183	0.081
	62.000	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15120**	**15245**	13.2	36.0	35.5	55.0	58.0	0.8	1.2	0.35	1.71	0.94	0.183	0.081
30.226	69.012	19.845	19.583	15.875	0.8	3.2	46.1	55.0	5 900	7 800	**14116**	**14274**	15.5	37.0	36.5	59.0	63.0	0.8	3.2	0.38	1.57	0.86	0.226	0.131
31.750	58.738	14.684	15.080	10.716	1.0	1.0	29.5	33.3	6 600	8 900	**08125**	**08231**	13.5	37.5	36.0	52.0	55.0	1.0	1.0	0.48	1.26	0.69	0.109	0.056
	59.131	15.875	16.764	11.811	SP	1.2	35.8	43.1	6 600	8 800	**LM67048**	**LM67010**	13.0	42.5	36.0	52.0	56.0	3.5	1.2	0.41	1.46	0.80	0.120	0.062
	62.000	18.161	19.050	14.288	SP	1.2	44.6	50.7	6 400	8 600	**15123**	**15245**	13.2	42.5	36.5	55.0	58.0	3.5	1.2	0.35	1.71	0.94	0.157	0.081
	62.000	19.050	20.638	14.288	3.6	1.2	44.6	50.7	6 400	8 600	**15125**	**15245**	13.2	42.5	36.5	55.0	58.0	3.6	1.2	0.35	1.71	0.94	0.169	0.081
	62.000	19.050	20.638	14.288	0.8	1.2	44.6	50.7	6 400	8 600	**15126**	**15245**	13.2	37.0	36.5	55.0	58.0	0.8	1.2	0.35	1.71	0.94	0.171	0.081
	66.421	25.400	25.357	20.638	0.8	3.2	71.4	85.1	6 000	8 000	**2580**	**2520**	16.0	38.5	37.5	57.0	62.5	0.8	3.2	0.27	2.19	1.21	0.281	0.123
	68.262	22.225	22.225	17.462	3.6	1.6	51.0	61.1	6 000	8 000	**02475**	**02420**	17.1	44.5	38.5	59.0	63.0	3.6	1.6	0.42	1.44	0.79	0.224	0.150
	68.262	22.225	22.225	17.462	0.8	1.6	51.0	61.1	6 000	8 000	**02476**	**02420**	17.1	39.0	38.5	59.0	63.0	0.8	1.6	0.42	1.44	0.79	0.226	0.150
	68.262	22.225	22.225	17.462	1.6	1.6	56.1	71.1	6 000	7 900	**M88046**	**M88010**	19.2	43.0	40.5	58.0	65.0	1.6	1.6	0.55	1.10	0.60	0.245	0.144
	73.025	22.225	22.225	17.462	3.6	3.2	55.0	65.7	5 600	7 400	**02875**	**02820**	17.1	45.5	39.5	62.0	68.0	3.6	3.2	0.45	1.32	0.73	0.293	0.158
	73.025	22.225	22.225	17.462	0.8	3.2	55.0	65.7	5 500	7 400	**02876**	**02820**	17.1	40.0	39.5	62.0	68.0	0.8	3.2	0.45	1.32	0.73	0.293	0.158
	73.025	29.370	27.783	23.020	1.2	3.2	74.3	101	5 600	7 500	**HM88542**	**HM88510**	23.4	45.5	42.5	59.0	70.0	1.2	3.2	0.55	1.10	0.60	0.377	0.238
	73.812	29.370	27.783	23.020	1.2	3.2	74.3	101	5 600	7 500	**HM88542**	**HM88512**	23.4	45.5	42.5	59.0	70.0	1.2	3.2	0.55	1.10	0.60	0.377	0.254
33.338	68.262	22.225	22.225	17.462	0.8	1.6	56.1	71.1	6 000	7 900	**M88048**	**M88010**	19.2	42.5	41.0	58.0	65.0	0.8	1.6	0.55	1.10	0.60	0.231	0.144
	72.000	19.000	18.923	15.875	3.6	1.6	47.5	49.6	5 900	7 800	**26131**	**26283**	15.3	44.5	38.5	62.0	65.0	3.6	1.6	0.36	1.67	0.92	0.200	0.163
	73.025	29.370	27.783	23.020	0.8	3.2	74.3	101	5 600	7 500	**HM88547**	**HM88510**	23.4	45.5	42.6	59.0	70.0	0.8	3.2	0.55	1.10	0.60	0.360	0.238
	76.200	29.370	28.575	23.020	0.8	3.2	79.5	107	5 400	7 200	**HM89443**	**HM89410**	23.9	46.5	44.6	62.0	73.0	0.8	3.2	0.55	1.10	0.60	0.415	0.254
34.925	65.088	18.034	18.288	13.970	SP	1.2	48.0	58.5	6 000	8 000	**LM48548**	**LM48510**	14.3	46.0	40.0	58.0	61.0	3.5	1.2	0.38	1.59	0.88	0.164	0.086
	69.012	26.982	26.721	15.875	0.8	1.2	46.1	55.0	5 900	7 800	**14136A**	**14276**	22.6	40.0	38.0	60.0	63.0	0.8	1.2	0.38	1.57	0.86	0.254	0.133
	72.233	25.400	25.400	19.842	2.4	2.4	66.9	87.4	5 700	7 600	**HM88649**	**HM88610**	20.7	48.5	42.5	60.0	69.0	2.4	2.4	0.55	1.10	0.60	0.301	0.185

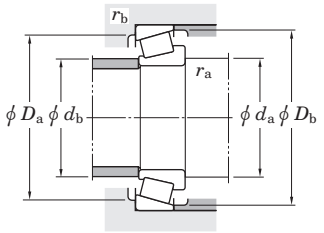
[Note] 1) SP indicates the specially chamfered from.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings inch series

d (34.925) ~ (38.100) mm



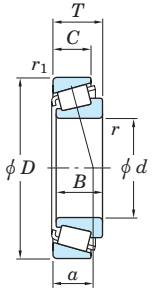


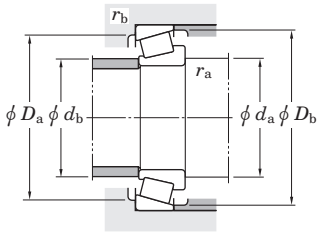
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [2]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r [1] min.	r_1 [1] min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
34.925	72.238	20.638	20.638	15.875	3.6	1.2	49.7	61.3	5 600	7 400	**16137**	**16284**	16.6	46.5	40.5	63.0	67.0	3.6	1.2	0.40	1.49	0.82	0.236	0.144
	73.025	22.225	22.225	17.462	3.6	3.2	55.0	65.7	5 500	7 400	**02877**	**02820**	18.4	48.5	42.0	62.0	68.0	3.6	3.2	0.45	1.32	0.73	0.262	0.158
	73.025	22.225	22.225	17.462	0.8	3.2	55.0	65.7	5 500	7 400	**02878**	**02820**	18.4	42.5	42.0	62.0	68.0	0.8	3.2	0.45	1.32	0.73	0.265	0.158
	73.025	23.812	24.608	19.050	1.6	0.8	72.2	87.3	5 600	7 400	**25877R**	**25821**	15.8	43.0	40.5	65.0	68.0	1.6	0.8	0.29	2.07	1.14	0.310	0.165
	73.025	26.988	26.975	22.225	3.6	1.6	77.8	94.1	5 700	7 600	**23690**	**23620**	18.8	49.0	42.0	64.0	68.0	3.6	1.6	0.37	1.62	0.89	0.326	0.212
	76.200	20.638	20.940	15.507	1.6	1.2	57.3	65.9	5 300	7 000	**28137**	**28300**	16.5	43.5	41.0	68.0	71.0	1.6	1.2	0.40	1.49	0.82	0.315	0.137
	76.200	23.812	25.654	19.050	3.6	3.2	74.1	92.2	5 400	7 200	**2796R**	**2720**	15.9	47.5	41.0	66.0	70.0	3.6	3.2	0.30	1.98	1.09	0.344	0.185
	76.200	29.370	28.575	23.812	1.6	3.2	80.9	97.4	5 400	7 200	**31594**	**31520**	21.6	46.0	43.5	64.0	72.0	1.6	3.2	0.40	1.49	0.82	0.388	0.232
	79.375	29.370	29.771	23.812	3.6	3.2	87.4	105	5 200	6 900	**3478**	**3420**	20.8	50.0	43.5	67.0	74.0	3.6	3.2	0.37	1.64	0.90	0.462	0.256
	87.312	30.162	30.886	23.812	3.6	3.2	95.8	120	4 600	6 200	**3581R**	**3525**	20.5	48.0	45.5	75.0	81.0	3.6	3.2	0.31	1.96	1.08	0.622	0.300
	95.250	27.783	29.901	22.225	0.8	2.4	103	122	4 500	5 900	**449**	**432**	18.4	44.0	43.5	83.0	87.0	0.8	2.4	0.28	2.11	1.16	0.686	0.384
34.980	59.131	15.875	16.764	11.938	SP	1.2	35.7	48.5	6 400	8 500	**L68149**	**L68110**	13.2	45.5	39.0	53.0	56.0	3.5	1.2	0.42	1.44	0.79	0.112	0.056
	59.975	15.875	16.764	11.938	SP	1.2	35.7	48.5	6 400	8 500	**L68149**	**L68111**	13.2	45.5	39.0	53.0	56.0	3.5	1.2	0.42	1.44	0.79	0.112	0.063
35.000	79.375	23.812	25.400	19.050	0.8	0.8	81.1	105	5 000	6 700	**26883R**	**26822**	16.4	42.5	42.0	71.0	74.0	0.8	0.8	0.32	1.88	1.04	0.414	0.186
	80.000	21.000	22.403	17.826	0.8	1.2	68.0	74.8	4 900	6 600	**339**	**332**	15.1	42.5	41.5	73.0	75.0	0.8	1.2	0.27	2.20	1.21	0.385	0.144
35.717	72.233	25.400	25.400	19.842	3.6	2.4	66.9	87.4	5 700	7 600	**HM88648**	**HM88610**	20.7	52.0	42.5	60.0	69.0	3.6	2.4	0.55	1.10	0.60	0.291	0.185
36.487	73.025	23.812	24.608	19.050	1.6	0.8	72.2	87.3	5 600	7 400	**25880R**	**25821**	15.8	44.0	42.0	65.0	68.0	1.6	0.8	0.29	2.07	1.14	0.294	0.165
	73.025	23.812	25.654	19.050	3.6	0.8	74.1	92.2	5 400	7 200	**2794R**	**2735X**	15.9	49.0	42.5	66.0	69.0	3.6	0.8	0.30	1.98	1.09	0.344	0.134
36.512	76.200	29.370	28.575	23.020	3.6	0.8	79.5	107	5 400	7 200	**HM89449**	**HM89411**	23.9	54.0	44.5	65.0	73.0	3.6	0.8	0.55	1.10	0.60	0.386	0.258
	79.375	23.812	25.400	19.050	0.8	0.8	81.1	105	5 000	6 700	**26877R**	**26822**	16.4	44.0	43.0	71.0	74.0	0.8	0.8	0.32	1.88	1.04	0.404	0.186
	79.375	29.370	29.771	23.812	0.8	3.2	87.4	105	5 200	6 900	**3479**	**3420**	20.8	45.5	44.5	67.0	74.0	0.8	3.2	0.37	1.64	0.90	0.429	0.259
	85.725	30.162	30.162	23.812	0.8	3.2	108	136	4 800	6 400	**3878**	**3820**	22.9	48.0	47.0	73.0	81.0	0.8	3.2	0.40	1.49	0.82	0.605	0.285
38.000	63.000	17.000	17.000	13.500	SP	SP	43.5	58.2	6 000	8 000	**JL69349**	**JL69310**	14.6	49.0	41.0	60.0	56.5	3.5	1.2	0.42	1.44	0.79	0.128	0.070
38.100	63.500	12.700	11.908	9.525	1.6	0.8	25.5	33.1	5 800	7 700	**13889**	**13830**	11.9	45.0	42.5	59.0	60.0	1.6	0.8	0.35	1.73	0.95	0.104	0.045

[Notes] 1) SP indicates the specially chamfered from.
2) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d (38.100) ~ (40.000) mm





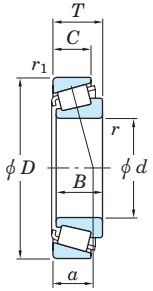
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	$r^{1)}$ min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
38.100	65.088	12.700	11.908	9.525	1.6	0.8	25.5	33.1	5 800	7 700	**13889**	**13836**	11.9	45.0	42.5	59.0	61.0	1.6	0.8	0.35	1.73	0.95	0.104	0.046
	65.088	18.034	18.288	13.970	SP	1.2	42.9	56.5	5 800	7 800	**LM29748**	**LM29710**	13.8	49.0	42.5	59.0	62.0	3.5	1.2	0.33	1.80	0.99	0.154	0.079
	65.088	19.812	18.288	15.748	2.4	1.2	42.9	56.5	5 800	7 800	**LM29749**	**LM29711**	15.6	46.0	42.5	58.0	62.0	2.4	1.2	0.33	1.80	0.99	0.159	0.092
	69.012	19.050	19.050	15.083	2.0	2.4	49.2	62.0	5 600	7 500	**13687**	**13621**	16.1	46.5	43.0	61.0	65.0	2.0	2.4	0.40	1.49	0.82	0.191	0.102
	71.438	15.875	16.520	11.908	1.6	1.0	46.1	53.8	5 700	7 600	**19150R**	**19281**	14.5	45.0	43.0	63.0	66.0	1.6	1.0	0.44	1.35	0.74	0.167	0.105
	71.996	17.018	16.520	14.288	1.6	1.6	46.1	53.8	5 700	7 600	**19150R**	**19283**	15.7	45.0	43.0	63.0	66.0	1.6	1.6	0.44	1.35	0.74	0.167	0.132
	71.996	19.000	20.638	14.237	3.6	1.6	49.7	61.3	5 600	7 400	**16150**	**16282**	15.0	49.5	43.0	63.0	67.0	3.6	1.6	0.40	1.49	0.82	0.207	0.121
	72.238	20.638	20.638	15.875	3.6	1.2	49.7	61.3	5 600	7 400	**16150**	**16284**	16.6	49.5	43.0	63.0	67.0	3.6	1.2	0.40	1.49	0.82	0.207	0.144
	72.238	23.812	20.638	19.050	3.6	2.4	49.7	61.3	5 600	7 400	**16150**	**16283**	19.8	49.5	43.0	61.0	67.0	3.6	2.4	0.40	1.49	0.82	0.207	0.183
	73.025	23.812	25.654	19.050	3.6	0.8	74.1	92.2	5 400	7 200	**2788R**	**2735X**	15.9	50.0	43.5	66.0	69.0	3.6	0.8	0.30	1.98	1.09	0.308	0.134
	76.200	23.812	25.654	19.050	3.6	0.8	74.1	92.2	5 400	7 200	**2788R**	**2729**	15.9	50.0	43.5	68.0	70.0	3.6	0.8	0.30	1.98	1.09	0.308	0.189
	79.375	29.370	29.771	23.812	3.6	3.2	87.4	105	5 200	6 900	**3490**	**3420**	20.8	52.0	45.9	67.0	74.0	3.6	3.2	0.37	1.64	0.90	0.419	0.256
	80.035	21.432	20.940	15.875	1.6	1.6	57.3	65.9	5 300	7 000	**28150**	**28317**	16.9	45.5	43.5	69.0	73.0	1.6	1.6	0.40	1.49	0.82	0.285	0.201
	80.035	24.608	23.698	18.512	0.8	1.6	73.2	91.6	5 200	6 900	**27880**	**27820**	22.2	48.0	47.0	68.0	75.0	0.8	1.6	0.56	1.07	0.59	0.378	0.208
	80.035	24.608	23.698	18.512	3.6	1.6	73.2	91.6	5 200	6 900	**27881**	**27820**	22.2	53.0	47.0	68.0	75.0	3.6	1.6	0.56	1.07	0.59	0.378	0.208
	82.550	29.370	28.575	23.020	0.8	3.2	87.3	117	4 900	6 600	**HM801346**	**HM801310**	24.4	51.0	49.0	68.0	78.0	0.8	3.2	0.55	1.10	0.60	0.483	0.282
	82.550	29.370	28.575	23.020	2.4	3.2	87.3	117	4 900	6 600	**HM801346X**	**HM801310**	24.4	54.0	49.0	68.0	78.0	2.4	3.2	0.55	1.10	0.60	0.483	0.282
	82.931	23.812	25.400	19.050	0.8	0.8	77.2	100	4 800	6 300	**25572**	**25520**	17.5	46.0	46.0	74.0	77.0	0.8	0.8	0.33	1.79	0.99	0.437	0.203
	88.501	26.988	29.083	22.225	3.6	1.6	98.2	112	4 900	6 500	**418**	**414**	16.9	51.0	44.5	77.0	80.0	3.6	1.6	0.26	2.28	1.25	0.523	0.325
	90.488	39.688	40.386	33.338	1.6	3.2	132	169	4 500	6 000	**4375**	**4335**	25.6	51.0	48.5	77.0	85.0	1.6	3.2	0.28	2.11	1.16	0.841	0.459
	101.600	34.925	36.068	26.988	3.6	3.2	131	159	4 000	5 300	**525**	**522**	22.2	54.0	48.0	89.0	95.0	3.6	3.2	0.29	2.10	1.16	1.05	0.411
39.688	73.025	16.667	17.462	12.700	0.8	1.6	45.9	55.8	5 200	6 900	**18587**	**18520**	14.5	46.0	46.0	66.0	69.0	0.8	1.6	0.35	1.71	0.94	0.215	0.085
	73.025	23.812	25.654	19.050	3.6	0.8	74.1	92.2	5 400	7 200	**2789R**	**2735X**	15.9	52.0	45.0	66.0	69.0	3.6	0.8	0.30	1.98	1.09	0.288	0.134
	80.167	29.370	30.391	23.812	0.8	3.2	91.0	106	5 000	6 700	**3386**	**3320**	18.7	46.5	45.5	70.0	75.0	0.8	3.2	0.27	2.20	1.21	0.442	0.217
	84.138	29.370	30.391	23.812	3.6	3.2	91.0	106	5 000	6 700	**3382**	**3328**	18.7	52.0	45.5	72.0	76.0	3.6	3.2	0.27	2.20	1.21	0.438	0.312
40.000	76.200	20.638	20.940	15.507	1.6	1.2	57.3	65.9	5 300	7 000	**28158**	**28300**	16.5	47.5	45.0	68.0	71.0	1.6	1.2	0.40	1.49	0.82	0.266	0.137
	80.000	21.000	22.403	17.826	3.6	1.2	68.0	74.8	4 900	6 600	**344**	**332**	15.1	52.0	45.5	73.0	75.0	3.6	1.2	0.27	2.20	1.21	0.334	0.144

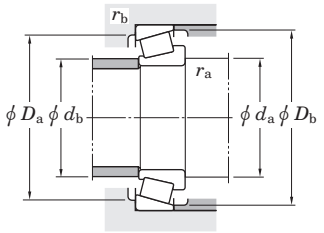
[Note] 1) SP indicates the specially chamfered from.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (40.000) ~ 42.070 mm



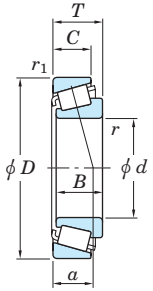


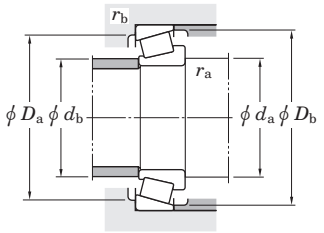
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
40.000	80.000	21.000	22.403	17.826	0.8	1.2	68.0	74.8	4 900	6 600	**344A**	**332**	15.1	46.0	45.5	73.0	75.0	0.8	1.2	0.27	2.20	1.21	0.334	0.144
	85.000	20.638	21.692	17.462	0.8	1.2	71.8	81.7	4 600	6 200	**350A**	**354A**	15.5	47.5	46.5	77.0	80.0	0.8	1.2	0.31	1.96	1.08	0.416	0.162
	88.501	26.988	29.083	22.225	3.6	1.6	98.2	112	4 900	6 500	**420**	**414**	16.9	52.0	46.0	77.0	80.0	3.6	1.6	0.26	2.28	1.25	0.465	0.325
	107.950	36.512	36.957	28.575	3.6	3.2	138	172	3 800	5 100	**543**	**532X**	23.9	57.0	50.0	94.0	100.0	3.6	3.2	0.30	2.03	1.11	1.17	0.570
40.483	82.550	29.370	28.575	23.020	3.6	3.2	87.3	117	4 900	6 600	**HM801349**	**HM801310**	24.4	58.0	49.0	68.0	78.0	3.6	3.2	0.55	1.10	0.60	0.450	0.282
41.275	73.025	16.667	17.462	12.700	3.6	1.6	45.9	55.8	5 200	6 900	**18590**	**18520**	14.5	53.0	46.0	66.0	69.0	3.6	1.6	0.35	1.71	0.94	0.199	0.085
	73.431	19.558	19.812	14.732	3.6	0.8	57.8	73.0	5 200	7 000	**LM501349**	**LM501310**	16.1	53.0	46.5	67.0	70.0	3.6	0.8	0.40	1.50	0.83	0.227	0.107
	73.431	21.430	19.812	16.604	3.6	0.8	57.8	73.0	5 200	7 000	**LM501349**	**LM501314**	18.0	53.0	46.5	66.0	70.0	3.6	0.8	0.40	1.50	0.83	0.227	0.126
	73.431	23.012	19.812	18.186	3.6	2.4	57.8	73.0	5 200	7 000	**LM501349**	**LM501311**	16.1	53.0	46.5	64.0	70.0	3.6	2.4	0.40	1.50	0.83	0.227	0.140
	76.200	18.009	17.384	14.288	1.6	1.6	51.6	63.3	5 200	6 900	**11162R**	**11300**	17.5	49.0	46.5	67.0	72.0	1.6	1.6	0.49	1.23	0.68	0.221	0.127
	76.200	22.225	23.020	17.462	3.6	0.8	66.3	83.3	5 200	6 900	**24780R**	**24720**	17.4	54.0	47.0	68.0	72.0	3.6	0.8	0.39	1.53	0.84	0.275	0.148
	80.000	21.000	22.403	17.826	0.8	1.2	68.0	74.8	4 900	6 600	**336**	**332**	15.1	47.0	46.0	73.0	75.0	0.8	1.2	0.27	2.20	1.21	0.325	0.144
	80.000	21.000	22.403	17.826	3.6	1.2	68.0	74.8	4 900	6 600	**342**	**332**	15.1	53.0	46.0	73.0	75.0	3.6	1.2	0.27	2.20	1.21	0.317	0.144
	82.550	26.543	25.654	20.193	3.6	3.2	83.7	105	4 900	6 500	**M802048**	**M802011**	23.3	57.0	50.6	70.0	79.0	3.6	3.2	0.55	1.10	0.60	0.403	0.227
	85.725	30.162	30.162	23.812	3.6	1.2	108	136	4 800	6 400	**3877**	**3821**	22.9	57.0	50.3	75.0	81.0	3.6	1.2	0.40	1.49	0.82	0.506	0.324
	87.312	30.162	30.886	23.812	0.8	3.2	95.8	120	4 600	6 200	**3576R**	**3525**	20.5	49.0	48.0	75.0	81.0	0.8	3.2	0.31	1.96	1.08	0.533	0.300
	88.501	26.988	29.083	22.225	3.6	1.6	98.2	112	4 900	6 500	**419**	**414**	16.9	54.0	47.0	77.0	80.0	3.6	1.6	0.26	2.28	1.25	0.441	0.325
	88.900	20.638	22.225	16.513	3.6	1.2	74.3	87.3	4 400	5 800	**365A**	**362A**	16.1	55.0	48.5	81.0	84.0	3.6	1.2	0.32	1.88	1.03	0.458	0.164
	88.900	30.162	29.370	23.020	0.8	3.2	99.6	125	4 600	6 100	**HM803145**	**HM803110**	26.1	54.0	53.0	74.0	85.0	0.8	3.2	0.55	1.10	0.60	0.577	0.318
	88.900	30.162	29.370	23.020	3.6	3.2	99.6	125	4 600	6 100	**HM803146**	**HM803110**	26.1	60.0	53.0	74.0	85.0	3.6	3.2	0.55	1.10	0.60	0.574	0.318
	90.488	39.688	40.386	33.338	3.6	3.2	132	169	4 500	6 000	**4388**	**4335**	25.6	57.0	51.0	77.0	85.0	3.6	3.2	0.28	2.11	1.16	0.775	0.454
	93.662	31.750	31.750	26.195	0.8	3.2	105	134	4 400	5 800	**46162**	**46368**	24.0	52.0	51.0	79.0	87.0	0.8	3.2	0.40	1.49	0.82	0.695	0.403
	95.250	30.162	29.370	23.020	3.6	3.2	104	140	3 300	4 400	**HM804840**	**HM804810**	26.5	61.0	54.0	81.0	91.0	3.6	3.2	0.55	1.10	0.60	0.719	0.351
	101.600	34.925	36.068	26.988	3.6	3.2	131	159	4 000	5 300	**526**	**522**	22.2	57.0	50.0	89.0	95.0	3.6	3.2	0.29	2.10	1.16	1.02	0.411
	104.775	36.512	36.512	28.575	1.6	3.2	141	195	3 800	5 100	**HM807035**	**HM807010**	29.3	60.0	57.0	89.0	100.0	1.6	3.2	0.49	1.23	0.68	1.19	0.497
42.070	90.488	39.688	40.386	33.338	3.6	3.2	132	169	4 500	6 000	**4395**	**4335**	25.6	58.0	51.0	77.0	85.0	3.6	3.2	0.28	2.11	1.16	0.751	0.459

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d 42.862 ~ 45.000 mm

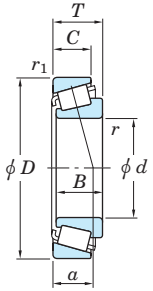


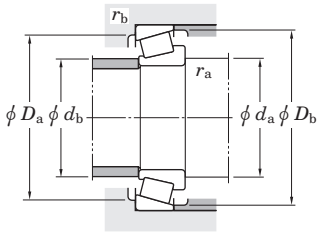


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
42.862	76.992	17.463	17.145	11.908	1.6	1.6	48.4	62.2	5 000	6 600	**12168**	**12303**	17.5	51.0	48.5	68.0	73.0	1.6	1.6	0.51	1.19	0.65	0.220	0.097
42.875	79.375	23.812	25.400	19.050	3.6	0.8	81.1	105	5 000	6 700	**26884R**	**26822**	16.1	55.0	48.5	71.0	74.0	3.6	0.8	0.32	1.88	1.04	0.314	0.186
	82.931	23.812	25.400	19.050	3.6	0.8	77.2	100	4 800	6 300	**25577**	**25520**	17.5	55.0	49.0	74.0	77.0	3.6	0.8	0.33	1.79	0.99	0.382	0.200
44.450	73.025	18.258	18.258	15.083	1.6	1.6	47.2	65.5	5 100	6 800	**L102849**	**L102810**	14.6	51.0	49.0	66.0	69.0	1.6	1.6	0.32	1.88	1.04	0.183	0.102
	76.992	17.463	17.145	11.908	1.6	1.6	48.4	62.2	5 000	6 600	**12175**	**12303**	17.5	52.0	49.5	68.0	73.0	1.6	1.6	0.51	1.19	0.65	0.206	0.097
	79.375	17.462	17.462	13.495	2.8	1.6	47.1	59.1	4 800	6 400	**18685**	**18620**	16.0	54.0	49.5	71.0	74.0	2.8	1.6	0.37	1.60	0.88	0.214	0.126
	82.931	23.812	25.400	19.050	5.2	0.8	77.2	100	4 800	6 300	**25582**	**25520**	17.5	59.0	51.0	74.0	77.0	5.2	0.8	0.33	1.79	0.99	0.361	0.200
	84.138	30.162	30.886	23.812	3.6	3.2	95.8	120	4 600	6 200	**3578R**	**3520**	20.5	57.0	51.0	74.0	79.5	3.6	3.2	0.31	1.96	1.08	0.479	0.221
	85.000	20.638	21.692	17.462	2.4	1.2	71.8	81.7	4 600	6 200	**355**	**354A**	15.5	54.0	50.0	77.0	80.0	2.4	1.2	0.31	1.96	1.08	0.344	0.160
	85.000	20.638	21.692	17.462	0.8	1.2	71.8	81.7	4 600	6 200	**355A**	**354A**	15.5	51.0	50.0	77.0	80.0	0.8	1.2	0.31	1.96	1.08	0.344	0.160
	88.900	30.162	29.370	23.020	3.6	3.2	99.6	125	4 600	6 100	**HM803149**	**HM803110**	26.1	62.0	53.4	74.0	85.0	3.6	3.2	0.55	1.10	0.60	0.525	0.318
	93.662	31.750	31.750	25.400	3.6	3.2	105	123	4 400	5 900	**49175**	**49368**	22.9	59.0	53.0	82.0	87.0	3.6	3.2	0.36	1.67	0.92	0.645	0.371
	93.662	31.750	31.750	26.195	0.8	3.2	105	134	4 400	5 800	**46175**	**46368**	24.0	55.0	54.0	79.0	87.0	0.8	3.2	0.40	1.49	0.82	0.609	0.403
	93.662	31.750	31.750	26.195	3.6	3.2	105	134	4 400	5 800	**46176**	**46368**	24.0	60.0	54.0	79.0	87.0	3.6	3.2	0.40	1.49	0.82	0.609	0.403
	95.250	27.783	28.575	22.225	0.8	2.4	108	141	4 100	5 400	**33885**	**33821**	20.4	53.0	53.0	85.0	90.0	0.8	2.4	0.33	1.82	1.00	0.714	0.264
	95.250	27.783	29.901	22.225	3.6	0.8	103	122	4 500	5 900	**438**	**432A**	18.4	57.0	51.0	84.0	87.0	3.6	0.8	0.28	2.11	1.16	0.555	0.375
	95.250	30.162	29.370	23.020	0.8	2.4	104	140	3 300	4 400	**HM804842**	**HM804810**	26.5	57.0	57.0	81.0	91.0	0.8	2.4	0.55	1.10	0.60	0.673	0.351
	95.250	30.162	29.370	23.020	3.6	2.4	104	140	3 300	4 400	**HM804843**	**HM804810**	26.5	63.0	57.0	81.0	91.0	3.6	2.4	0.55	1.10	0.60	0.670	0.351
	98.425	30.162	31.750	25.400	0.8	3.2	114	143	3 900	5 200	**49576**	**49520**	24.1	55.0	54.0	88.0	96.0	0.8	3.2	0.40	1.50	0.82	0.856	0.384
	101.600	34.925	36.068	26.988	3.6	3.2	131	159	4 000	5 300	**527**	**522**	22.2	59.0	53.0	89.0	95.0	3.6	3.2	0.29	2.10	1.16	0.939	0.411
	104.775	36.512	36.512	28.575	3.6	3.2	141	195	3 800	5 100	**HM807040**	**HM807010**	29.3	66.0	59.0	89.0	100.0	3.6	3.2	0.49	1.23	0.68	1.13	0.497
	111.125	38.100	36.957	30.162	3.6	3.2	138	172	3 800	5 100	**535**	**532A**	23.9	60.0	54.0	95.0	100.0	3.6	3.2	0.30	2.03	1.11	1.09	0.746
	120.650	41.275	41.275	31.750	3.6	3.2	174	217	3 500	4 600	**615**	**612**	27.3	62.0	56.0	105.0	110.0	3.6	3.2	0.31	1.91	1.05	1.48	0.853
44.983	93.264	30.162	30.302	23.812	3.6	3.2	103	137	4 200	5 500	**3776**	**3720**	22.2	59.0	53.0	82.0	88.0	3.6	3.2	0.34	1.77	0.97	0.650	0.288
45.000	85.000	20.638	21.692	17.462	1.6	1.2	71.8	81.7	4 600	6 200	**358**	**354A**	15.5	52.5	50.0	77.0	80.0	1.6	1.2	0.31	1.96	1.08	0.338	0.162

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d 45.242 ~ 49.212 mm

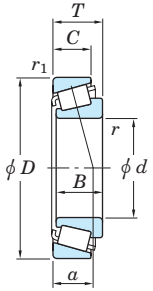


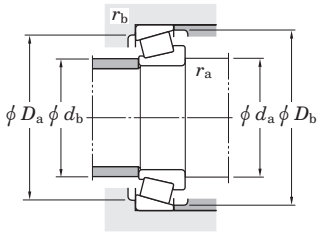


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
45.242	73.431	19.558	19.812	15.748	3.6	0.8	55.6	78.1	5 100	6 700	**LM102949**	**LM102910**	14.7	56.0	50.0	68.0	70.0	3.6	0.8	0.31	1.97	1.08	0.209	0.100
	77.788	19.842	19.842	15.080	3.6	0.8	57.1	73.5	4 900	6 500	**LM603049**	**LM603011**	17.5	57.0	50.0	71.0	74.0	3.6	0.8	0.43	1.41	0.77	0.243	0.120
	77.788	21.430	19.842	16.667	3.6	0.8	57.1	73.5	4 900	6 500	**LM603049**	**LM603012**	19.1	57.0	50.0	71.0	74.0	3.6	0.8	0.43	1.41	0.77	0.243	0.138
	79.974	19.842	19.842	15.080	3.6	0.8	57.1	73.5	4 900	6 500	**LM603049**	**LM603014**	17.5	57.0	50.0	71.0	74.0	3.6	0.8	0.43	1.41	0.77	0.243	0.152
45.618	85.000	23.812	25.400	19.050	3.6	2.4	77.2	100	4 800	6 300	**25590**	**25526**	17.5	58.0	51.0	74.0	78.0	3.6	2.4	0.33	1.79	0.99	0.344	0.241
45.987	74.976	18.000	18.000	14.000	2.4	1.6	52.6	74.6	5 000	6 600	**LM503349R**	**LM503310**	16.0	53.0	51.0	67.0	72.0	2.4	1.6	0.40	1.49	0.82	0.207	0.095
46.038	79.375	17.462	17.462	13.495	2.8	1.6	47.1	59.1	4 800	6 400	**18690**	**18620**	16.0	56.0	51.0	71.0	74.0	2.8	1.6	0.37	1.60	0.88	0.208	0.123
	85.000	20.638	21.692	17.462	3.6	1.2	71.8	81.7	4 600	6 200	**359A**	**354A**	15.5	57.0	51.0	77.0	80.0	3.6	1.2	0.31	1.96	1.08	0.323	0.160
	85.000	20.638	21.692	17.462	2.4	1.2	71.8	81.7	4 600	6 200	**359S**	**354A**	15.5	55.0	51.0	77.0	80.0	2.4	1.2	0.31	1.96	1.08	0.323	0.160
	85.000	25.400	25.608	20.638	3.6	1.2	80.0	106	4 600	6 100	**2984**	**2924**	18.9	58.0	52.0	76.0	80.0	3.6	1.2	0.35	1.73	0.95	0.389	0.220
47.625	88.900	20.638	22.225	16.513	3.6	1.2	74.3	87.3	4 400	5 800	**369A**	**362A**	16.1	60.0	53.0	81.0	84.0	3.6	1.2	0.32	1.88	1.03	0.373	0.164
	88.900	25.400	25.400	19.050	3.6	3.2	87.1	112	4 400	5 900	**M804049**	**M804010**	23.6	62.0	55.0	76.0	85.0	3.6	3.2	0.55	1.10	0.60	0.450	0.216
	95.250	30.162	29.370	23.020	3.6	3.2	104	140	3 300	4 400	**HM804846**	**HM804810**	26.5	64.0	57.0	81.0	91.0	3.6	3.2	0.55	1.10	0.60	0.617	0.351
	96.838	21.000	21.946	15.875	0.8	0.8	80.4	101	3 900	5 200	**386A**	**382A**	17.4	56.0	55.0	89.0	92.0	0.8	0.8	0.35	1.69	0.93	0.563	0.177
	101.600	34.925	36.068	26.988	3.6	3.2	131	159	4 000	5 300	**528**	**522**	22.2	62.0	55.0	89.0	95.0	3.6	3.2	0.29	2.10	1.16	0.871	0.411
	104.775	30.162	29.317	24.605	4.8	3.2	109	144	3 700	4 900	**463**	**453X**	23.6	65.0	56.0	92.0	98.0	4.8	3.2	0.34	1.79	0.98	0.838	0.372
	104.775	30.162	29.317	24.605	0.8	3.2	109	144	3 700	4 900	**467**	**453X**	23.6	57.0	56.0	92.0	98.0	0.8	3.2	0.34	1.79	0.98	0.844	0.372
	104.775	30.162	30.958	23.812	3.6	3.2	126	165	3 700	4 900	**45282**	**45220**	22.2	64.0	59.0	93.0	99.0	3.6	3.2	0.33	1.80	0.99	0.940	0.345
48.412	95.250	30.162	29.370	23.020	2.4	3.2	104	140	3 300	4 400	**HM804848**	**HM804810**	26.5	63.0	57.5	81.0	91.0	2.4	3.2	0.55	1.10	0.60	0.606	0.351
	95.250	30.162	29.370	23.020	3.6	3.2	104	140	3 300	4 400	**HM804849**	**HM804810**	26.5	66.0	57.5	81.0	91.0	3.6	3.2	0.55	1.10	0.60	0.604	0.351
49.212	88.900	20.638	22.225	16.513	0.8	1.2	74.3	87.3	4 400	5 800	**365S**	**362A**	16.1	55.0	54.0	81.0	84.0	0.8	1.2	0.32	1.88	1.03	0.366	0.164
	104.775	36.512	36.512	28.575	3.6	3.2	141	195	3 800	5 100	**HM807044**	**HM807010**	29.3	69.0	63.0	89.0	100.0	3.6	3.2	0.49	1.23	0.68	1.03	0.497
	114.300	44.450	44.450	34.925	3.6	3.2	189	230	3 800	5 000	**65390**	**65320**	31.7	70.0	60.0	97.0	107.0	3.6	3.2	0.43	1.40	0.77	1.28	0.894
	114.300	44.450	44.450	36.068	3.6	3.2	212	263	3 700	5 000	**HH506348**	**HH506310**	30.6	71.0	61.0	97.0	107.0	3.6	3.2	0.40	1.49	0.82	1.49	0.834

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d 49.987 ~ (50.800) mm



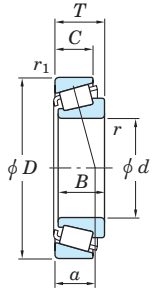


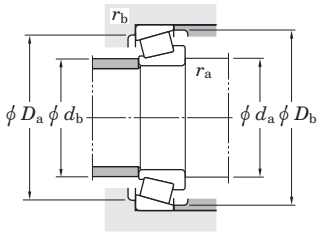
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
49.987	92.075	24.608	25.400	19.845	2.4	0.8	84.8	119	4 200	5 600	**28579R**	**28521**	19.9	60.0	56.0	83.0	87.0	2.4	0.8	0.38	1.59	0.87	0.463	0.247
50.000	82.000	21.501	21.501	17.000	3.0	0.5	71.7	97.9	4 500	6 000	**JLM104948**	**JLM104910**	16.2	60.0	55.0	76.0	78.0	3.0	0.5	0.31	1.97	1.08	0.304	0.128
	88.900	20.638	22.225	16.513	2.0	1.2	74.3	87.3	4 400	5 800	**365**	**362A**	16.1	58.0	55.0	81.0	84.0	2.0	1.2	0.32	1.88	1.03	0.346	0.164
	88.900	20.638	22.225	16.513	2.4	1.2	74.3	87.3	4 400	5 800	**366**	**362A**	16.1	59.0	55.0	81.0	84.0	2.4	1.2	0.32	1.88	1.03	0.351	0.166
	90.000	28.000	28.000	23.000	3.0	2.5	105	138	4 300	5 800	**JM205149**	**JM205110**	20.2	62.0	57.0	80.0	85.0	3.0	2.5	0.33	1.82	1.00	0.508	0.243
	105.000	37.000	36.000	29.000	3.0	2.8	149	205	3 800	5 100	**JHM807045**	**JHM807012**	29.4	69.0	63.0	90.0	100.0	3.0	2.8	0.49	1.23	0.68	1.01	0.523
	110.000	22.000	21.996	18.824	0.8	1.2	86.4	116	3 400	4 500	**396**	**394A**	21.3	61.0	60.0	101.0	105.0	0.8	1.2	0.40	1.49	0.82	0.777	0.264
50.800	80.962	18.258	18.258	14.288	1.6	1.6	54.0	81.1	4 600	6 100	**L305649R**	**L305610**	16.0	58.0	56.0	73.0	77.0	1.6	1.6	0.35	1.69	0.93	0.228	0.119
	82.550	21.590	22.225	16.510	3.6	1.2	61.2	84.3	4 500	6 000	**LM104949**	**LM104911**	16.4	62.0	55.0	75.0	78.0	3.6	1.2	0.31	1.97	1.08	0.287	0.131
	85.725	19.050	18.263	12.700	1.6	1.6	50.7	66.4	4 400	5 900	**18200**	**18337**	22.7	59.0	56.0	76.0	81.0	1.6	1.6	0.57	1.06	0.58	0.268	0.134
	88.900	17.462	17.462	13.495	3.6	1.2	49.7	65.5	4 400	5 900	**18790**	**18724**	17.4	62.0	56.0	78.0	82.0	3.6	1.2	0.41	1.48	0.81	0.226	0.190
	88.900	20.638	22.225	16.513	1.6	1.2	74.3	87.3	4 400	5 800	**368**	**362A**	16.1	58.0	56.0	81.0	84.0	1.6	1.2	0.32	1.88	1.03	0.333	0.164
	88.900	20.638	22.225	16.513	3.6	1.2	74.3	87.3	4 400	5 800	**368A**	**362A**	16.1	62.0	56.0	81.0	84.0	3.6	1.2	0.32	1.88	1.03	0.331	0.164
	88.900	20.638	22.225	16.513	5.2	1.2	74.3	87.3	4 400	5 800	**370A**	**362A**	16.1	65.0	56.0	81.0	84.0	5.2	1.2	0.32	1.88	1.03	0.326	0.164
	92.075	24.608	25.400	19.845	3.6	0.8	84.8	119	4 200	5 600	**28580R**	**28521**	19.9	63.0	57.0	83.0	87.0	3.6	0.8	0.38	1.59	0.87	0.453	0.247
	93.264	20.638	22.225	15.083	2.4	1.2	84.4	98.5	4 200	5 600	**375**	**374**	17.1	60.0	57.0	85.0	88.0	2.4	1.2	0.34	1.77	0.97	0.416	0.174
	93.264	30.162	30.302	23.812	3.6	3.2	103	137	4 200	5 500	**3780**	**3720**	22.2	64.0	58.0	82.0	88.0	3.6	3.2	0.34	1.77	0.97	0.547	0.288
	93.264	30.162	30.302	23.812	3.6	0.8	103	137	4 200	5 500	**3780**	**3730**	22.2	64.0	58.0	84.0	88.0	3.6	0.8	0.34	1.77	0.97	0.547	0.293
	95.250	27.783	28.575	22.225	3.6	0.8	108	141	4 100	5 400	**33889**	**33822**	20.4	64.0	58.0	86.0	90.0	3.6	0.8	0.33	1.82	1.00	0.604	0.267
	96.838	21.000	21.946	15.875	0.8	0.8	80.4	101	3 900	5 200	**385AX**	**382A**	17.4	59.0	58.0	89.0	92.0	0.8	0.8	0.35	1.69	0.93	0.521	0.177
	97.630	24.608	24.608	19.446	3.6	0.8	89.6	131	3 900	5 200	**28678**	**28622**	21.2	65.0	58.0	88.0	92.0	3.6	0.8	0.40	1.49	0.82	0.569	0.267
	98.425	30.162	30.302	23.812	3.6	3.2	103	137	4 200	5 500	**3780**	**3732**	22.2	64.0	58.0	84.0	90.0	3.6	3.2	0.34	1.77	0.97	0.547	0.433
	101.600	31.750	31.750	25.400	3.6	3.2	114	143	3 900	5 200	**49585**	**49520**	24.1	66.0	59.0	88.0	96.0	3.6	3.2	0.40	1.50	0.82	0.736	0.384
	101.600	34.925	36.068	26.988	0.8	3.2	131	159	4 000	5 300	**529**	**522**	22.2	59.0	58.0	89.0	95.0	0.8	3.2	0.29	2.10	1.16	0.806	0.411
	101.600	34.925	36.068	26.988	3.6	3.2	131	159	4 000	5 300	**529X**	**522**	22.2	65.0	58.0	89.0	95.0	3.6	3.2	0.29	2.10	1.16	0.802	0.411
	104.775	30.162	30.958	23.812	6.4	3.2	126	165	3 700	4 900	**45284**	**45220**	22.2	71.0	59.0	93.0	99.0	6.4	3.2	0.33	1.80	0.99	0.873	0.345
	104.775	36.512	36.512	28.575	3.6	3.2	148	187	3 900	5 100	**59200**	**59412**	26.9	68.0	61.0	92.0	99.0	3.6	3.2	0.40	1.49	0.82	0.767	0.623

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d (50.800) ~ (55.000) mm



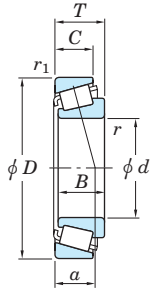


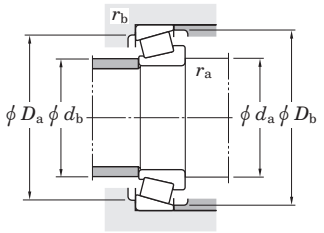
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
50.800	104.775	36.512	36.512	28.575	3.6	3.2	141	195	3 800	5 100	**HM807046**	**HM807010**	29.3	70.0	63.0	89.0	100.0	3.6	3.2	0.49	1.23	0.68	0.995	0.497
	104.775	39.688	40.157	33.338	3.6	3.2	151	211	3 800	5 100	**4580**	**4535**	27.3	67.0	61.0	90.0	99.0	3.6	3.2	0.34	1.79	0.98	1.06	0.576
	107.950	36.512	36.957	28.575	3.6	3.2	138	172	3 800	5 100	**537**	**532X**	23.9	65.0	59.0	94.0	100.0	3.6	3.2	0.30	2.03	1.11	0.969	0.569
	112.712	30.162	30.162	23.812	3.6	3.2	147	207	3 300	4 500	**39575**	**39520**	23.3	68.0	61.0	101.0	107.0	3.6	3.2	0.34	1.77	0.97	1.13	0.355
	120.650	41.275	41.275	31.750	3.6	3.2	174	217	3 500	4 600	**619**	**612**	27.3	67.0	61.0	105.0	110.0	3.6	3.2	0.31	1.91	1.05	1.44	0.853
	127.000	44.450	44.450	34.925	3.6	3.2	208	269	3 300	4 400	**65200**	**65500**	35.2	75.0	69.0	107.0	119.0	3.6	3.2	0.49	1.23	0.68	1.86	1.03
51.592	88.900	20.638	22.225	16.513	2.0	1.2	74.3	87.3	4 400	5 800	**368S**	**362A**	16.1	59.0	56.0	81.0	84.0	2.0	1.2	0.32	1.88	1.03	0.321	0.164
52.388	92.075	24.608	25.400	19.845	3.6	0.8	84.8	119	4 200	5 600	**28584R**	**28521**	19.9	65.0	58.0	83.0	87.0	3.6	0.8	0.38	1.59	0.87	0.435	0.247
	104.775	30.162	29.317	24.605	1.6	3.2	109	144	3 700	4 900	**468**	**453X**	23.6	62.0	60.0	92.0	98.0	1.6	3.2	0.34	1.79	0.98	0.748	0.372
53.975	88.900	19.050	19.050	13.492	2.4	2.0	62.9	86.8	4 200	5 600	**LM806649**	**LM806610**	21.5	63.0	60.0	80.0	85.0	2.4	2.0	0.55	1.10	0.60	0.312	0.135
	95.250	27.783	28.575	22.225	1.6	0.8	108	141	4 100	5 400	**33895**	**33822**	20.4	63.0	60.0	86.0	90.0	1.6	0.8	0.33	1.82	1.00	0.550	0.267
	104.775	30.162	29.317	24.605	3.6	3.2	109	144	3 700	4 900	**456**	**453X**	23.6	68.0	61.0	92.0	98.0	3.6	3.2	0.34	1.79	0.98	0.728	0.372
	104.775	36.512	36.512	28.575	3.6	3.2	141	195	3 800	5 100	**HM807049**	**HM807010**	29.3	73.0	63.0	89.0	100.0	3.6	3.2	0.49	1.23	0.68	0.921	0.497
	104.775	39.688	40.157	33.338	3.6	3.2	151	211	3 800	5 100	**4595**	**4535**	27.3	70.0	63.0	90.0	99.0	3.6	3.2	0.34	1.79	0.98	0.981	0.576
	107.950	36.512	36.957	28.575	3.6	3.2	138	172	3 800	5 100	**539**	**532X**	23.9	68.0	61.0	94.0	100.0	3.6	3.2	0.30	2.03	1.11	0.894	0.569
	107.950	36.512	36.957	28.575	5.6	3.2	138	172	3 800	5 100	**539A**	**532X**	23.9	72.0	61.0	94.0	100.0	5.6	3.2	0.30	2.03	1.11	0.861	0.569
	117.475	33.338	31.750	23.812	3.6	3.2	129	152	3 500	4 600	**66212R**	**66462**	33.2	73.0	67.0	100.0	111.0	3.6	3.2	0.63	0.96	0.53	1.03	0.552
	120.650	41.275	41.275	31.750	3.6	3.2	174	217	3 500	4 600	**621**	**612**	27.3	70.0	63.0	105.0	110.0	3.6	3.2	0.31	1.91	1.05	1.36	0.853
	122.238	33.338	31.750	23.812	3.6	3.2	128	153	3 300	4 300	**66584**	**66520**	35.4	75.0	68.0	105.0	116.0	3.6	3.2	0.67	0.90	0.50	1.25	0.551
	122.238	43.658	43.764	36.512	3.6	3.2	221	318	3 200	4 300	**5578R**	**5535**	31.1	73.0	67.0	106.0	116.0	3.6	3.2	0.36	1.67	0.92	1.84	0.807
	123.825	38.100	36.678	30.162	3.6	3.2	162	223	3 200	4 200	**557S**	**552A**	28.7	71.0	65.0	109.0	116.0	3.6	3.2	0.35	1.73	0.95	1.47	0.756
	127.000	44.450	44.450	34.925	3.6	3.2	208	269	3 300	4 400	**65212**	**65500**	35.2	77.0	71.0	107.0	119.0	3.6	3.2	0.49	1.23	0.68	1.78	1.02
54.988	104.775	30.162	29.317	24.605	2.4	3.2	109	144	3 700	4 900	**466**	**453X**	23.6	67.0	61.0	92.0	98.0	2.4	3.2	0.34	1.79	0.98	0.708	0.372
54.991	135.755	53.975	56.007	44.450	3.6	3.2	266	357	3 000	4 000	**6381**	**6320**	34.8	76.0	70.0	117.0	126.0	3.6	3.2	0.32	1.85	1.02	2.75	1.37
55.000	90.000	23.000	23.000	18.500	1.6	0.5	81.4	115	4 200	5 500	**JLM506849**	**JLM506810**	20.1	63.0	61.0	82.0	86.0	1.6	0.5	0.40	1.49	0.82	0.370	0.183

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d (55.000) ~ (60.000) mm





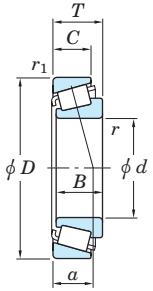
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
55.000	95.000	29.000	29.000	23.500	1.6	2.8	110	150	4 000	5 300	**JM207049**	**JM207010**	21.3	64.0	62.0	85.0	91.0	1.6	2.8	0.33	1.79	0.99	0.567	0.256
	96.838	21.000	21.946	15.875	2.4	0.8	80.4	101	3 900	5 200	**385**	**382A**	17.4	65.0	61.0	89.0	92.0	2.4	0.8	0.35	1.69	0.93	0.461	0.177
	96.838	21.000	21.946	15.875	3.6	0.8	80.4	101	3 900	5 200	**385X**	**382A**	17.4	67.0	61.0	89.0	92.0	3.6	0.8	0.35	1.69	0.93	0.459	0.177
	110.000	39.000	39.000	32.000	3.0	2.5	176	224	3 600	4 900	**JH307749**	**JH307710**	26.8	71.0	64.0	97.0	104.0	3.0	2.5	0.35	1.73	0.95	1.16	0.560
55.562	97.630	24.608	24.608	19.446	3.6	0.8	89.6	131	3 900	5 200	**28680**	**28622**	21.2	68.0	62.0	88.0	92.0	3.6	0.8	0.40	1.49	0.82	0.492	0.267
	122.238	43.658	43.764	36.512	1.2	3.2	221	318	3 200	4 300	**5566R**	**5535**	31.1	70.0	68.0	106.0	116.0	1.2	3.2	0.36	1.67	0.92	1.82	0.807
	127.000	36.512	36.512	26.988	3.6	3.2	166	235	3 000	4 000	**HM813840**	**HM813810**	32.9	76.0	70.0	111.0	121.0	3.6	3.2	0.50	1.20	0.66	1.72	0.606
55.575	96.838	21.000	21.946	15.875	2.4	0.8	80.4	101	3 900	5 200	**389**	**382A**	17.4	65.0	61.0	89.0	92.0	2.4	0.8	0.35	1.69	0.93	0.452	0.177
57.150	96.838	21.000	21.946	15.875	2.4	0.8	80.4	101	3 900	5 200	**387**	**382A**	17.4	66.0	62.0	89.0	92.0	2.4	0.8	0.35	1.69	0.93	0.428	0.177
	96.838	21.000	21.946	15.875	3.6	0.8	80.4	101	3 900	5 200	**387A**	**382A**	17.4	69.0	62.0	89.0	92.0	3.6	0.8	0.35	1.69	0.93	0.426	0.177
	96.838	21.000	21.946	15.875	5.2	0.8	80.4	101	3 900	5 200	**387AS**	**382A**	17.4	72.0	62.0	89.0	92.0	5.2	0.8	0.35	1.69	0.93	0.422	0.177
	96.838	21.000	21.946	15.875	0.8	0.8	80.4	101	3 900	5 200	**387S**	**382A**	17.4	63.0	62.0	89.0	92.0	0.8	0.8	0.35	1.69	0.93	0.431	0.177
	98.425	21.000	21.946	17.826	2.4	0.8	80.4	101	3 900	5 200	**387**	**382**	17.4	66.0	62.0	89.0	92.0	2.4	0.8	0.35	1.69	0.93	0.428	0.223
	104.775	30.162	29.317	24.605	2.4	3.2	109	144	3 700	4 900	**462**	**453X**	23.6	67.0	63.0	92.0	98.0	2.4	3.2	0.34	1.79	0.98	0.685	0.372
	104.775	30.162	29.317	24.605	3.6	3.2	109	144	3 700	4 900	**469**	**453X**	23.6	70.0	63.0	92.0	98.0	3.6	3.2	0.34	1.79	0.98	0.682	0.372
	104.775	30.162	30.958	23.812	6.4	0.8	126	165	3 700	4 900	**45291**	**45221**	22.2	76.0	65.0	95.0	99.0	6.4	0.8	0.33	1.80	0.99	0.742	0.350
	112.712	30.162	30.048	23.812	3.6	3.2	111	164	3 400	4 500	**3979**	**3920**	25.9	72.0	66.0	99.0	106.0	3.6	3.2	0.40	1.49	0.82	0.916	0.448
	112.712	30.162	30.162	23.812	3.6	3.2	147	207	3 300	4 500	**39580**	**39520**	23.3	72.0	66.0	101.0	107.0	3.6	3.2	0.34	1.77	0.97	1.05	0.355
	112.712	30.162	30.162	23.812	7.9	3.2	147	207	3 300	4 500	**39581**	**39520**	23.3	81.0	66.0	101.0	107.0	7.9	3.2	0.34	1.77	0.97	1.03	0.355
	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33225**	**33462**	27.8	74.0	68.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	1.13	0.442
	120.650	41.275	41.275	31.750	3.6	3.2	174	217	3 500	4 600	**623**	**612**	27.3	72.0	66.0	105.0	110.0	3.6	3.2	0.31	1.91	1.05	1.27	0.853
	127.000	44.450	44.450	34.925	3.6	3.2	208	269	3 300	4 400	**65225**	**65500**	35.2	80.0	71.0	107.0	119.0	3.6	3.2	0.49	1.23	0.68	1.69	1.02
57.531	96.838	21.000	21.946	15.875	3.6	0.8	80.4	101	3 900	5 200	**388A**	**382A**	17.4	69.0	63.0	89.0	92.0	3.6	0.8	0.35	1.69	0.93	0.420	0.177
59.972	122.238	33.338	31.750	23.812	0.8	3.2	128	153	3 300	4 300	**66589**	**66520**	35.4	74.0	73.0	105.0	116.0	0.8	3.2	0.67	0.90	0.50	1.11	0.551
60.000	95.000	24.000	24.000	19.000	5.0	2.5	86.1	125	3 900	5 200	**JLM508748**	**JLM508710**	21.2	75.0	66.0	85.0	91.0	5.0	2.5	0.40	1.49	0.82	0.402	0.196

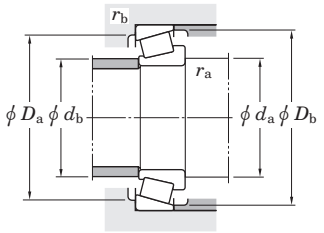
[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (60.000) ~ (65.000) mm





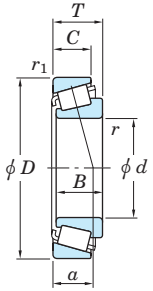
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
60.000	107.950	25.400	25.400	19.050	3.6	3.2	92.8	143	3 400	4 500	**29580**	**29520**	24.7	74.0	68.0	96.0	103.0	3.6	3.2	0.46	1.31	0.72	0.713	0.277
	110.000	22.000	21.996	18.824	0.8	1.2	86.4	116	3 400	4 500	**397**	**394A**	21.3	69.0	68.0	101.0	104.5	0.8	1.2	0.40	1.49	0.82	0.637	0.259
60.325	100.000	25.400	25.400	19.845	3.6	3.2	91.4	137	3 700	4 900	**28985**	**28921**	22.8	73.0	67.0	89.0	96.0	3.6	3.2	0.43	1.41	0.78	0.533	0.230
	101.600	25.400	25.400	19.845	3.6	3.2	91.4	137	3 700	4 900	**28985**	**28920**	22.8	73.0	67.0	89.0	96.0	3.6	3.2	0.43	1.41	0.78	0.533	0.269
	122.238	43.658	43.764	36.512	3.6	3.2	221	318	3 200	4 300	**5583R**	**5535**	31.1	78.0	72.0	106.0	116.0	3.6	3.2	0.36	1.67	0.92	1.66	0.807
	127.000	36.512	36.512	26.988	3.6	1.6	166	235	3 000	4 000	**HM813841**	**HM813811**	32.9	80.0	73.0	113.0	121.0	3.6	1.6	0.50	1.20	0.66	1.60	0.622
	127.000	36.512	36.512	26.988	1.6	3.2	166	235	3 000	4 000	**HM813841A**	**HM813810**	32.9	74.0	71.0	110.0	121.0	1.6	3.2	0.50	1.20	0.66	1.62	0.606
	127.000	44.450	44.450	34.925	3.6	3.2	208	269	3 300	4 400	**65237**	**65500**	35.2	82.0	71.0	107.0	119.0	3.6	3.2	0.49	1.23	0.68	1.59	1.02
	127.000	44.450	44.450	34.925	1.6	3.2	208	269	3 300	4 400	**65237A**	**65500**	35.2	78.0	71.0	107.0	119.0	1.6	3.2	0.49	1.23	0.68	1.59	1.02
	136.525	46.038	46.038	36.512	3.6	3.2	231	369	2 800	3 700	**H715332**	**H715311**	37.0	84.0	78.0	118.0	132.0	3.6	3.2	0.47	1.27	0.70	2.56	0.950
61.912	110.000	22.000	21.996	18.824	0.8	1.2	86.4	116	3 400	4 500	**392**	**394A**	21.3	70.0	69.0	101.0	104.5	0.8	1.2	0.40	1.49	0.82	0.606	0.259
63.500	107.950	25.400	25.400	19.050	1.6	3.2	92.8	143	3 400	4 500	**29586**	**29520**	24.7	73.0	71.0	96.0	103.0	1.6	3.2	0.46	1.31	0.72	0.649	0.277
	110.000	22.000	21.996	18.824	1.6	1.2	86.4	116	3 400	4 500	**390A**	**394A**	21.3	73.0	70.0	101.0	104.5	1.6	1.2	0.40	1.49	0.82	0.579	0.259
	110.000	22.000	21.996	18.824	3.6	1.2	86.4	116	3 400	4 500	**395**	**394A**	21.3	77.0	70.0	101.0	104.5	3.6	1.2	0.40	1.49	0.82	0.575	0.259
	110.000	25.400	25.400	19.050	3.6	1.2	92.8	143	3 400	4 500	**29585**	**29521**	24.7	77.0	71.0	99.0	104.0	3.6	1.2	0.46	1.31	0.72	0.644	0.333
	112.712	30.162	30.162	23.812	3.6	3.2	147	207	3 300	4 500	**39585**	**39520**	23.3	77.0	71.0	101.0	107.0	3.6	3.2	0.34	1.77	0.97	0.908	0.355
	120.000	29.794	29.007	24.237	0.8	2.0	118	161	3 200	4 200	**477**	**472**	25.7	73.0	72.0	108.0	113.0	0.8	2.0	0.38	1.56	0.86	0.967	0.493
	122.238	38.354	38.100	29.718	3.6	3.2	191	249	3 200	4 300	**HM212046**	**HM212011**	27.6	80.0	73.0	108.0	116.0	3.6	3.2	0.34	1.78	0.98	1.36	0.591
	122.238	43.658	43.764	36.512	3.6	3.2	221	318	3 200	4 300	**5584R**	**5535**	31.1	81.0	75.0	106.0	116.0	3.6	3.2	0.36	1.67	0.92	1.56	0.807
	127.000	36.512	36.170	28.575	3.6	3.2	156	226	3 000	4 000	**565**	**563**	28.6	80.0	73.0	112.0	120.0	3.6	3.2	0.36	1.65	0.91	1.43	0.648
	135.755	53.975	56.007	44.450	4.3	3.2	266	357	3 000	4 000	**6382**	**6320**	34.8	84.0	77.0	117.0	126.0	4.3	3.2	0.32	1.85	1.02	2.29	1.39
	136.525	41.275	41.275	31.750	3.6	3.2	241	308	2 900	3 800	**H414235**	**H414210**	30.3	82.0	78.0	121.0	129.0	3.6	3.2	0.36	1.67	0.92	2.11	0.796
64.986	112.712	30.162	30.924	23.812	2.4	3.2	147	207	3 300	4 500	**39586**	**39520**	23.3	76.0	72.0	101.0	107.0	2.4	3.2	0.34	1.77	0.97	0.845	0.355
65.000	105.000	24.000	23.000	18.500	3.0	1.0	95.3	129	3 500	4 700	**JLM710949**	**JLM710910**	23.8	77.0	71.0	96.0	100.5	3.0	1.0	0.45	1.32	0.73	0.513	0.234
	110.000	28.000	28.000	22.500	3.0	2.8	136	191	3 400	4 600	**JM511946**	**JM511910**	24.5	78.0	72.0	99.0	105.0	3.0	2.8	0.40	1.49	0.82	0.733	0.338

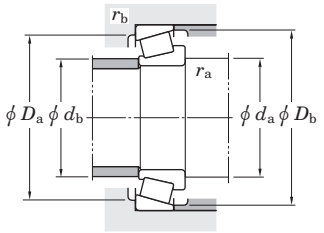
[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (65.000) ~ 68.262 mm



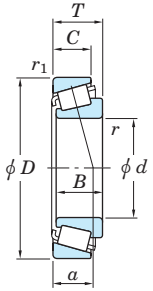


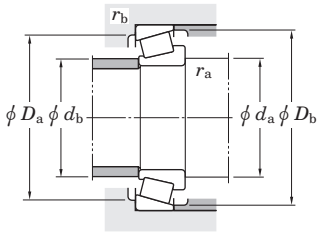
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
65.000	120.000	39.000	38.500	32.000	3.0	2.8	189	255	3 200	4 300	**JH211749**	**JH211710**	27.9	80.0	74.0	107.0	114.0	3.0	2.8	0.34	1.78	0.98	1.27	0.618
	120.000	39.000	38.500	32.000	7.1	2.8	189	255	3 200	4 300	**JH211749A**	**JH211710**	27.9	88.0	74.0	107.0	114.0	7.1	2.8	0.34	1.78	0.98	1.27	0.618
65.088	135.755	53.975	56.007	44.450	3.6	3.2	266	357	3 000	4 000	**6379**	**6320**	34.8	84.0	77.5	117.0	126.0	3.6	3.2	0.32	1.85	1.02	2.34	1.37
	136.525	46.038	46.038	36.512	3.6	3.2	231	369	2 800	3 700	**H715340**	**H715311**	37.0	88.0	82.0	118.0	132.0	3.6	3.2	0.47	1.27	0.70	2.39	0.950
65.883	122.238	43.658	43.764	36.512	3.6	3.2	221	318	3 200	4 300	**5595R**	**5535**	31.1	83.0	77.0	106.0	116.0	3.6	3.2	0.36	1.67	0.92	1.48	0.807
66.675	110.000	22.000	21.996	18.824	0.8	1.2	86.4	116	3 400	4 500	**395A**	**394A**	21.3	73.0	73.0	101.0	104.5	0.8	1.2	0.40	1.49	0.82	0.524	0.259
	110.000	22.000	21.996	18.824	3.6	1.2	86.4	116	3 400	4 500	**395S**	**394A**	21.3	79.0	73.0	101.0	104.5	3.6	1.2	0.40	1.49	0.82	0.519	0.259
	112.712	30.162	30.048	23.812	3.6	0.8	111	164	3 400	4 500	**3984**	**3925**	25.9	80.0	74.0	101.0	106.0	3.6	0.8	0.40	1.49	0.82	0.700	0.454
	112.712	30.162	30.162	23.812	3.6	3.2	147	207	3 300	4 500	**39590**	**39520**	23.3	80.0	74.0	101.0	107.0	3.6	3.2	0.34	1.77	0.97	0.832	0.355
	112.712	30.162	30.162	23.812	3.6	0.8	147	207	3 300	4 500	**39590**	**39521**	23.3	80.0	74.0	103.0	107.0	3.6	0.8	0.34	1.77	0.97	0.832	0.360
	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33262**	**33462**	27.8	81.0	75.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	0.910	0.436
	122.238	38.100	38.354	29.718	3.6	1.6	191	249	3 200	4 300	**HM212049**	**HM212010**	27.3	82.0	75.5	110.0	116.0	3.6	1.6	0.34	1.78	0.98	1.26	0.596
	127.000	36.512	36.512	26.988	3.6	1.6	166	235	3 000	4 000	**HM813844**	**HM813811**	32.9	85.0	78.0	113.0	121.0	3.6	1.6	0.50	1.20	0.66	1.42	0.622
	130.175	41.275	41.275	31.750	3.6	3.2	197	267	3 000	3 900	**641**	**633**	30.3	83.0	77.0	116.0	124.0	3.6	3.2	0.36	1.66	0.91	1.68	0.703
	135.755	53.975	56.007	44.450	4.3	3.2	266	357	3 000	4 000	**6386**	**6320**	34.8	87.0	77.5	117.0	126.0	4.3	3.2	0.32	1.85	1.02	2.27	1.37
	135.755	53.975	56.007	44.450	6.4	3.2	266	357	3 000	4 000	**6389**	**6320**	34.8	91.0	77.5	117.0	126.0	6.4	3.2	0.32	1.85	1.02	2.15	1.37
	136.525	41.275	41.275	31.750	3.6	3.2	241	308	2 900	3 800	**H414242**	**H414210**	30.3	85.0	81.0	121.0	129.0	3.6	3.2	0.36	1.67	0.92	2.01	0.796
	136.525	46.038	46.038	36.512	3.6	3.2	231	369	2 800	3 700	**H715341**	**H715311**	37.0	89.0	83.0	118.0	132.0	3.6	3.2	0.47	1.27	0.70	2.33	0.950
68.262	110.000	22.000	21.996	18.824	2.4	1.2	86.4	116	3 400	4 500	**399A**	**394A**	21.3	78.0	74.0	101.0	104.5	2.4	1.2	0.40	1.49	0.82	0.493	0.259
	110.000	22.000	21.996	18.824	5.2	1.2	86.4	116	3 400	4 500	**399AS**	**394A**	21.3	83.0	74.0	101.0	104.5	5.2	1.2	0.40	1.49	0.82	0.485	0.259
	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33269**	**33462**	27.8	82.0	76.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	0.870	0.436
	127.000	36.512	36.170	28.575	3.6	3.2	156	226	3 000	4 000	**570**	**563**	28.6	83.0	77.0	112.0	120.0	3.6	3.2	0.36	1.65	0.91	1.29	0.648
	136.525	41.275	41.275	31.750	3.6	3.2	241	308	2 900	3 800	**H414245**	**H414210**	30.3	86.0	82.0	121.0	129.0	3.6	3.2	0.36	1.67	0.92	1.92	0.788
	136.525	46.038	46.038	36.512	3.6	3.2	231	369	2 800	3 700	**H715343**	**H715311**	37.0	90.0	84.0	118.0	132.0	3.6	3.2	0.47	1.27	0.70	2.27	0.950
	152.400	47.625	46.038	31.750	3.6	3.2	244	278	2 700	3 600	**9185**	**9121**	44.5	94.0	81.5	130.0	145.0	3.6	3.2	0.66	0.91	0.50	2.67	1.20

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d 69.850 ~ (73.025) mm



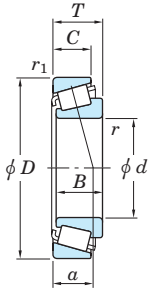


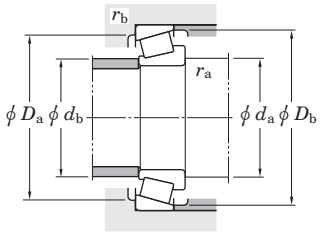
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
69.850	98.425	13.495	13.495	9.525	1.6	1.6	39.3	59.8	3 500	4 700	**LL713049**	**LL713010**	18.4	77.0	74.0	92.0	94.0	1.6	1.6	0.44	1.37	0.75	0.205	0.086
	112.712	22.225	21.996	15.875	1.6	0.8	91.6	127	3 300	4 400	**LM613449**	**LM613410**	21.9	78.0	76.0	104.0	107.0	1.6	0.8	0.42	1.44	0.79	0.562	0.238
	112.712	25.400	25.400	19.050	1.6	3.2	97.0	155	3 200	4 300	**29675**	**29620**	26.2	80.0	77.0	101.0	109.0	1.6	3.2	0.49	1.23	0.68	0.676	0.270
	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33275**	**33462**	27.8	84.0	77.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	0.830	0.436
	120.000	29.002	29.007	23.444	3.6	3.2	118	161	3 200	4 200	**482**	**472A**	24.9	83.0	77.0	106.0	114.0	3.6	3.2	0.38	1.56	0.86	0.791	0.462
	120.000	29.794	29.007	24.237	3.6	2.0	118	161	3 200	4 200	**482**	**472**	25.7	83.0	77.0	108.0	113.0	3.6	2.0	0.38	1.56	0.86	0.791	0.487
	120.000	32.545	32.545	26.195	3.6	3.2	150	218	3 100	4 200	**47487R**	**47420**	26.6	84.0	78.0	107.0	114.0	3.6	3.2	0.36	1.67	0.92	1.01	0.476
	120.650	32.545	32.545	26.195	3.6	0.8	150	218	3 100	4 200	**47487R**	**47423**	26.6	84.0	78.0	109.0	114.0	3.6	0.8	0.36	1.67	0.92	1.01	0.513
	123.825	30.162	29.007	24.605	3.6	3.2	118	161	3 200	4 200	**482**	**472X**	26.0	83.0	77.0	109.0	114.0	3.6	3.2	0.38	1.56	0.86	0.791	0.625
	127.000	36.512	36.170	28.575	3.6	3.2	156	226	3 000	4 000	**566**	**563**	28.6	85.0	78.0	112.0	120.0	3.6	3.2	0.36	1.65	0.91	1.24	0.648
	146.050	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**655**	**653**	33.4	88.0	82.0	131.0	139.0	3.6	3.2	0.41	1.47	0.81	2.35	0.891
	150.089	44.450	46.672	36.512	3.6	3.2	264	368	2 500	3 400	**745AR**	**742**	32.4	88.0	82.0	134.0	142.0	3.6	3.2	0.33	1.84	1.01	2.79	1.07
	168.275	53.975	56.363	41.275	3.6	3.2	344	467	2 300	3 100	**835R**	**832**	35.0	91.0	84.0	149.0	155.0	3.6	3.2	0.30	2.00	1.10	4.32	1.72
69.952	121.442	24.608	23.012	17.462	2.0	2.0	90.0	127	3 000	4 000	**34274**	**34478**	26.8	81.0	78.0	110.0	116.0	2.0	2.0	0.45	1.33	0.73	0.764	0.316
70.000	110.000	26.000	25.000	20.500	1.0	2.5	103	158	3 300	4 400	**JLM813049**	**JLM813010**	26.1	78.0	77.0	98.0	105.0	1.0	2.5	0.49	1.23	0.68	0.590	0.300
	115.000	29.000	29.000	23.000	3.0	2.5	123	173	3 200	4 300	**JM612949**	**JM612910**	26.2	83.0	77.0	103.0	110.0	3.0	2.5	0.43	1.39	0.77	0.776	0.358
71.438	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33281**	**33462**	27.8	85.0	79.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	0.789	0.436
	120.000	32.545	32.545	26.195	3.6	3.2	150	218	3 100	4 200	**47490R**	**47420**	26.6	86.0	79.0	107.0	114.0	3.6	3.2	0.36	1.67	0.92	0.964	0.476
	127.000	36.512	36.170	28.575	3.6	3.2	156	226	3 000	4 000	**567A**	**563**	28.6	86.0	80.0	112.0	120.0	3.6	3.2	0.36	1.65	0.91	1.19	0.648
	127.000	36.512	36.512	26.988	3.6	1.6	166	235	3 000	4 000	**HM813849**	**HM813811**	32.9	89.0	81.9	113.0	121.0	3.6	1.6	0.50	1.20	0.66	1.28	0.622
	136.525	41.275	41.275	31.750	3.6	3.2	241	308	2 900	3 800	**H414249**	**H414210**	30.3	89.0	83.3	121.0	129.0	3.6	3.2	0.36	1.67	0.92	1.80	0.788
	136.525	46.038	46.038	36.512	3.6	3.2	231	369	2 800	3 700	**H715345**	**H715311**	37.0	93.0	87.0	118.0	132.0	3.6	3.2	0.47	1.27	0.70	2.15	0.950
73.025	112.712	25.400	25.400	19.050	3.6	3.2	97.0	155	3 200	4 300	**29685**	**29620**	26.2	86.0	80.0	101.0	109.0	3.6	3.2	0.49	1.23	0.68	0.602	0.270
	117.475	30.162	30.162	23.812	3.6	3.2	118	179	3 200	4 200	**33287**	**33462**	27.8	87.0	80.0	104.0	112.0	3.6	3.2	0.44	1.38	0.76	0.747	0.436
	127.000	36.512	36.170	28.575	3.6	3.2	156	226	3 000	4 000	**567**	**563**	28.6	88.0	81.0	112.0	120.0	3.6	3.2	0.36	1.65	0.91	1.14	0.648
	139.992	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**576R**	**572**	31.0	90.0	83.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.74	0.779

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d (73.025) ~ 76.200 mm





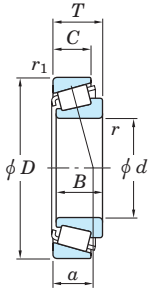
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
73.025	146.050	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**657**	**653**	33.4	90.0	85.0	131.0	139.0	3.6	3.2	0.41	1.47	0.81	2.28	0.880
	149.225	53.975	54.229	44.450	3.6	3.2	285	404	2 700	3 500	**6460**	**6420**	39.3	93.0	87.0	129.0	141.0	3.6	3.2	0.36	1.66	0.91	2.79	1.61
	150.089	44.450	46.672	36.512	3.6	3.2	264	368	2 500	3 400	**744R**	**742**	32.4	91.0	85.0	134.0	142.0	3.6	3.2	0.33	1.84	1.01	2.66	1.07
	161.925	47.625	48.260	38.100	3.6	3.2	273	391	2 400	3 200	**762**	**752**	35.5	92.0	97.0	144.0	150.0	3.6	3.2	0.34	1.76	0.97	3.18	1.61
73.817	112.712	25.400	25.400	19.050	1.6	3.2	97.0	155	3 200	4 300	**29688**	**29620**	26.2	83.0	81.0	101.0	109.0	1.6	3.2	0.49	1.23	0.68	0.588	0.270
	127.000	36.512	36.170	28.575	0.8	3.2	156	226	3 000	4 000	**568**	**563**	28.6	83.0	82.0	112.0	120.0	0.8	3.2	0.36	1.65	0.91	1.12	0.648
74.612	139.992	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**577R**	**572**	31.0	91.0	85.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.69	0.779
75.000	115.000	25.000	25.000	19.000	3.0	2.8	101	151	3 100	4 200	**JLM714149**	**JLM714110**	25.5	87.0	81.0	104.0	110.0	3.0	2.8	0.46	1.31	0.72	0.612	0.269
	120.000	31.000	29.500	25.000	3.0	2.8	145	216	3 100	4 100	**JM714249**	**JM714210**	30.0	88.0	82.9	108.0	115.0	3.0	2.8	0.44	1.35	0.74	0.846	0.430
	145.000	51.000	51.000	42.000	3.0	2.5	290	412	2 700	3 600	**JH415647**	**JH415610**	36.6	94.0	89.0	129.0	139.0	3.0	2.5	0.36	1.66	0.91	2.66	1.18
76.200	121.442	24.608	23.012	17.462	3.6	2.0	90.0	127	3 000	4 000	**34301**	**34478**	26.8	89.0	83.0	110.0	116.0	3.6	2.0	0.45	1.33	0.73	0.617	0.313
	127.000	30.162	31.000	22.225	3.6	3.2	143	225	2 400	3 200	**42687**	**42620**	27.1	90.0	84.0	114.0	121.0	3.6	3.2	0.42	1.43	0.79	1.05	0.434
	127.000	30.162	31.000	22.225	6.4	3.2	143	225	2 400	3 200	**42688**	**42620**	27.1	96.0	84.0	114.0	121.0	6.4	3.2	0.42	1.43	0.79	1.04	0.434
	133.350	30.162	29.769	22.225	6.4	3.2	133	198	2 700	3 600	**495AX**	**492A**	29.8	98.0	86.0	120.0	128.0	6.4	3.2	0.44	1.35	0.74	1.20	0.430
	133.350	33.338	33.338	26.195	6.4	3.2	154	245	2 700	3 700	**47678R**	**47620**	29.2	97.0	90.0	119.0	128.0	6.4	3.2	0.40	1.48	0.82	1.29	0.577
	133.350	33.338	33.338	26.195	0.8	3.2	154	245	2 700	3 700	**47680R**	**47620**	29.2	86.0	85.0	119.0	128.0	0.8	3.2	0.40	1.48	0.82	1.39	0.577
	135.733	44.450	46.101	34.925	3.6	3.2	213	337	2 800	3 700	**5760**	**5735**	33.0	94.0	88.0	119.0	130.0	3.6	3.2	0.41	1.48	0.81	1.85	0.877
	136.525	30.162	29.769	22.225	3.6	3.2	133	198	2 700	3 600	**495A**	**493**	29.8	92.0	86.0	122.0	130.0	3.6	3.2	0.44	1.35	0.74	1.26	0.544
	139.992	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**575R**	**572**	31.0	92.0	86.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.64	0.779
	139.992	36.512	36.098	28.575	6.7	3.2	175	262	2 700	3 600	**575SR**	**572**	31.0	99.0	86.0	125.0	133.0	6.7	3.2	0.40	1.49	0.82	1.61	0.779
	149.225	53.975	54.229	44.450	3.6	3.2	285	404	2 700	3 500	**6461**	**6420**	39.3	96.0	89.5	129.0	141.0	3.6	3.2	0.36	1.66	0.91	2.64	1.61
	149.225	53.975	54.229	44.450	9.5	3.2	285	404	2 700	3 500	**6461A**	**6420**	39.3	105.0	90.0	129.0	141.0	9.5	3.2	0.36	1.66	0.91	2.60	1.61
	150.089	44.450	46.672	36.512	3.6	3.2	264	368	2 500	3 400	**748SR**	**742**	32.4	93.0	87.0	134.0	142.0	3.6	3.2	0.33	1.84	1.01	2.51	1.06
	152.400	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**659**	**652**	33.4	93.0	87.0	134.0	141.0	3.6	3.2	0.41	1.47	0.81	2.16	1.25
	190.500	57.150	57.531	46.038	3.6	3.2	440	602	2 000	2 700	**HH221430**	**HH221410**	42.5	101.0	95.0	171.0	179.0	3.6	3.2	0.33	1.79	0.99	6.33	2.21

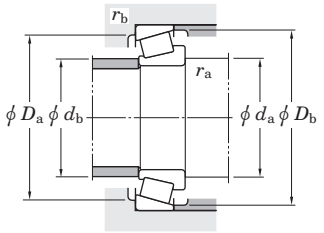
[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d 77.788 ~ (83.345) mm





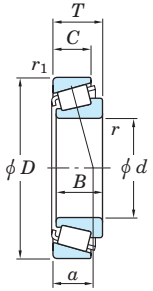
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
77.788	117.475	25.400	25.400	19.050	3.6	3.2	101	166	3 100	4 100	**LM814849**	**LM814810**	27.6	91.0	85.0	105.0	113.0	3.6	3.2	0.51	1.18	0.65	0.619	0.295
	121.442	24.608	23.012	17.462	3.6	2.0	90.0	127	3 000	4 000	**34306**	**34478**	26.8	90.0	84.0	110.0	116.0	3.6	2.0	0.45	1.33	0.73	0.583	0.313
	121.442	24.608	23.012	17.462	6.4	2.0	90.0	127	3 000	4 000	**34307**	**34478**	26.8	96.0	84.0	110.0	116.0	6.4	2.0	0.45	1.33	0.73	0.571	0.313
	127.000	30.162	31.000	22.225	3.6	3.2	143	225	2 400	3 200	**42690**	**42620**	27.1	91.0	85.0	114.0	121.0	3.6	3.2	0.42	1.43	0.79	1.00	0.434
79.375	146.050	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**661**	**653**	33.4	96.0	90.0	131.0	139.0	3.6	3.2	0.41	1.47	0.81	2.04	0.880
	161.925	47.625	48.260	38.100	7.9	3.2	273	391	2 400	3 200	**756A**	**752**	35.5	106.0	91.0	144.0	150.0	7.9	3.2	0.34	1.76	0.97	2.95	1.59
	190.500	57.150	57.531	46.038	3.6	3.2	440	602	2 000	2 700	**HH221431**	**HH221410**	42.5	103.0	97.0	171.0	179.0	3.6	3.2	0.33	1.79	0.99	6.16	2.21
80.000	130.000	35.000	34.000	28.500	3.2	2.5	168	256	2 800	3 800	**JM515649**	**JM515610**	29.6	94.0	88.0	117.0	125.0	3.2	2.5	0.39	1.54	0.85	1.19	0.575
	200.000	52.761	49.212	34.925	3.6	3.2	347	471	1 400	1 900	**98316**	**98788**	54.5	111.0	105.0	174.0	188.0	3.6	3.2	0.63	0.95	0.52	5.73	2.28
80.962	133.350	30.162	29.769	22.225	3.6	3.2	133	198	2 700	3 600	**496**	**492A**	29.8	95.0	89.0	120.0	128.0	3.6	3.2	0.44	1.35	0.74	1.12	0.429
	133.350	33.338	33.338	26.195	3.6	3.2	154	245	2 700	3 700	**47681R**	**47620**	29.2	95.0	89.0	119.0	128.0	3.6	3.2	0.40	1.48	0.82	1.17	0.577
	139.992	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**581R**	**572**	31.0	96.0	90.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.47	0.779
	150.089	44.450	46.672	36.512	5.2	3.2	264	368	2 500	3 400	**740R**	**742**	32.4	101.0	91.0	134.0	142.0	5.2	3.2	0.33	1.84	1.01	2.30	1.06
82.550	125.412	25.400	25.400	19.845	3.6	1.6	101	162	2 900	3 800	**27687**	**27620**	24.7	96.0	89.0	115.0	120.0	3.6	1.6	0.42	1.44	0.79	0.710	0.344
	133.350	30.162	29.769	22.225	3.6	3.2	133	198	2 700	3 600	**495**	**492A**	29.8	97.0	90.0	120.0	128.0	3.6	3.2	0.44	1.35	0.74	1.08	0.429
	133.350	33.338	33.338	26.195	3.6	0.8	154	245	2 700	3 700	**47686R**	**47620A**	29.2	97.0	90.0	121.0	128.0	3.6	0.8	0.40	1.48	0.82	1.13	0.577
	133.350	39.688	39.688	32.545	6.7	3.2	177	306	2 800	3 700	**HM516448**	**HM516410**	32.2	105.0	92.0	118.0	128.0	6.7	3.2	0.40	1.49	0.82	1.33	0.763
	139.700	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**580R**	**572X**	31.0	98.0	91.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.41	0.765
	139.992	36.512	36.098	28.575	3.6	3.2	175	262	2 700	3 600	**580R**	**572**	31.0	98.0	91.0	125.0	133.0	3.6	3.2	0.40	1.49	0.82	1.41	0.779
	139.992	36.512	36.098	28.575	6.7	3.2	175	262	2 700	3 600	**582R**	**572**	31.0	104.0	91.0	125.0	133.0	6.7	3.2	0.40	1.49	0.82	1.40	0.779
	146.050	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**663**	**653**	33.4	99.0	92.0	131.0	139.0	3.6	3.2	0.41	1.47	0.81	1.91	0.880
	150.089	44.450	46.672	36.512	3.6	3.2	264	368	2 500	3 400	**749AR**	**742**	32.4	99.0	93.0	134.0	142.0	3.6	3.2	0.33	1.84	1.01	2.23	1.06
	150.089	44.450	46.672	36.512	6.7	3.2	264	368	2 500	3 400	**750AR**	**742**	32.4	106.0	93.0	134.0	142.0	6.7	3.2	0.33	1.84	1.01	2.19	1.06
	161.925	47.625	48.260	38.100	3.6	3.2	273	391	2 400	3 200	**757**	**752**	35.5	100.0	94.0	144.0	150.0	3.6	3.2	0.34	1.76	0.97	2.83	1.59
83.345	125.412	25.400	25.400	19.845	0.8	1.6	101	162	2 900	3 800	**27689**	**27620**	24.7	90.0	90.0	115.0	120.0	0.8	1.6	0.42	1.44	0.79	0.746	0.344

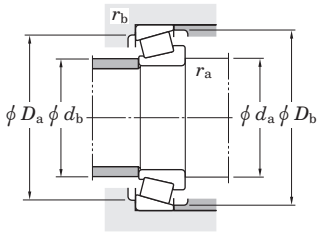
[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Single-row tapered roller bearings
inch series

d (83.345) ~ (88.900) mm

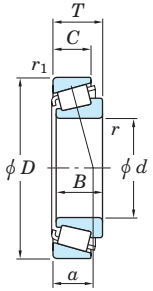


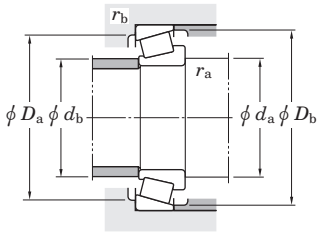


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
83.345	125.412	25.400	25.400	19.845	3.6	1.6	101	162	2 900	3 800	**27690**	**27620**	24.7	96.0	90.0	115.0	120.0	3.6	1.6	0.42	1.44	0.79	0.689	0.344
	125.412	25.400	25.400	19.845	6.4	1.6	101	162	2 900	3 800	**27691**	**27620**	24.7	102.0	90.0	115.0	120.0	6.4	1.6	0.42	1.44	0.79	0.646	0.344
84.138	133.350	30.162	29.769	22.225	3.6	3.2	133	198	2 700	3 600	**498**	**492A**	29.8	98.0	91.0	120.0	128.0	3.6	3.2	0.44	1.35	0.74	1.04	0.429
85.000	130.000	30.000	29.000	24.000	3.0	2.5	142	228	2 800	3 700	**JM716649**	**JM716610**	29.1	98.0	92.0	117.0	125.0	3.0	2.5	0.44	1.35	0.74	0.937	0.456
	140.000	39.000	38.000	31.500	3.0	2.5	203	308	2 700	3 500	**JHM516849**	**JHM516810**	32.8	100.0	93.9	125.0	134.0	3.0	2.5	0.41	1.47	0.81	1.54	0.759
	150.000	46.000	46.000	38.000	3.0	2.5	274	390	2 500	3 400	**JH217249**	**JH217210**	33.6	101.0	95.2	134.0	142.0	3.0	2.5	0.33	1.80	0.99	2.28	1.08
	200.000	52.761	49.212	34.925	3.6	3.2	347	471	1 400	1 900	**98335**	**98788**	54.5	115.0	109.0	174.0	188.0	3.6	3.2	0.63	0.95	0.52	5.47	2.28
85.026	150.089	44.450	46.672	36.512	3.6	3.2	264	368	2 500	3 400	**749R**	**742**	32.4	101.0	95.0	134.0	142.0	3.6	3.2	0.33	1.84	1.01	2.12	1.06
	150.089	44.450	46.672	36.512	5.2	3.2	264	368	2 500	3 400	**749SR**	**742**	32.4	104.0	95.0	134.0	142.0	5.2	3.2	0.33	1.84	1.01	2.08	1.06
85.725	133.350	30.162	29.769	22.225	3.6	3.2	133	198	2 700	3 600	**497**	**492A**	29.8	99.0	93.0	120.0	128.0	3.6	3.2	0.44	1.35	0.74	0.978	0.429
	136.525	30.162	29.769	22.225	6.4	3.2	133	198	2 700	3 600	**497A**	**493**	29.8	105.0	93.0	122.0	130.0	6.4	3.2	0.44	1.35	0.74	0.965	0.544
	142.138	42.862	42.862	34.133	4.8	3.2	219	351	2 600	3 500	**HM617049**	**HM617010**	35.2	106.0	95.7	125.0	137.0	4.8	3.2	0.43	1.39	0.76	1.72	0.902
	146.050	41.275	41.275	31.750	3.6	3.2	208	301	2 600	3 400	**665**	**653**	33.4	102.0	95.0	131.0	139.0	3.6	3.2	0.41	1.47	0.81	1.77	0.880
	146.050	41.275	41.275	31.750	6.4	3.2	208	301	2 600	3 400	**665A**	**653**	33.4	107.0	95.0	131.0	139.0	6.4	3.2	0.41	1.47	0.81	1.76	0.880
	152.400	39.688	36.322	30.162	3.6	3.2	183	287	2 400	3 300	**596**	**592A**	37.1	102.0	96.0	135.0	144.0	3.6	3.2	0.44	1.36	0.75	1.83	1.04
	161.925	47.625	48.260	38.100	3.6	3.2	273	391	2 400	3 200	**758**	**752**	35.5	103.0	97.0	144.0	150.0	3.6	3.2	0.34	1.76	0.97	2.67	1.59
	168.275	41.275	41.275	30.162	3.6	3.2	224	349	2 200	3 000	**677**	**672**	38.6	105.0	99.0	149.0	160.0	3.6	3.2	0.47	1.28	0.70	2.89	1.22
	168.275	53.975	56.363	41.275	3.6	3.2	344	467	2 300	3 100	**841R**	**832**	35.0	104.0	97.0	149.0	155.0	3.6	3.2	0.30	2.00	1.10	3.47	1.72
88.900	123.825	20.638	20.638	16.670	1.6	1.6	81.8	145	2 800	3 700	**L217849**	**L217810**	20.7	97.0	94.0	116.0	119.0	1.6	1.6	0.33	1.82	1.00	0.507	0.235
	152.400	39.688	39.688	30.162	6.4	3.2	248	359	2 400	3 200	**HM518445**	**HM518410**	33.1	110.0	98.0	135.0	114.0	6.4	3.2	0.40	1.49	0.82	2.10	0.768
	161.925	47.625	48.260	38.100	3.6	3.2	273	391	2 400	3 200	**759**	**752**	35.5	106.0	99.0	144.0	150.0	3.6	3.2	0.34	1.76	0.97	2.50	1.59
	161.925	47.625	48.260	38.100	7.1	3.2	273	391	2 400	3 200	**766**	**752**	35.5	113.0	99.0	144.0	150.0	7.1	3.2	0.34	1.76	0.97	2.48	1.59
	161.925	53.975	55.100	42.862	3.6	3.2	316	471	2 400	3 200	**6580R**	**6535**	49.8	109.0	98.0	141.0	154.0	3.6	3.2	0.40	1.50	0.82	3.09	1.65
	168.275	41.275	41.275	30.162	3.6	3.2	224	349	2 200	3 000	**679**	**672**	38.6	107.0	101.0	149.0	160.0	3.6	3.2	0.47	1.28	0.70	2.75	1.22
	190.500	57.150	57.531	44.450	7.9	3.2	385	565	2 100	2 700	**855R**	**854**	40.0	118.0	103.0	170.0	174.0	7.9	3.2	0.33	1.79	0.99	5.05	2.66

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".



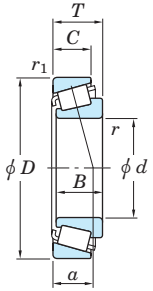


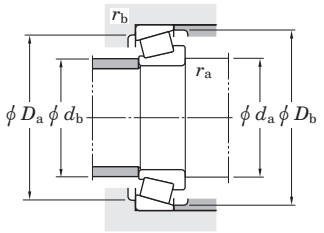
88.900	190.500	57.150	57.531	46.038	7.9	3.2	440	602	2 000	2 700
	200.000	52.761	49.212	34.925	3.6	3.2	347	471	1 400	1 900
89.974	146.975	40.000	40.000	32.500	7.1	3.6	206	310	2 500	3 300
90.000	145.000	35.000	34.000	27.000	3.0	2.5	194	291	2 500	3 400
	155.000	44.000	44.000	35.500	3.0	2.5	290	407	2 400	3 200
	161.925	53.975	55.100	42.862	3.0	3.2	316	471	2 400	3 200
90.488	161.925	47.625	48.260	38.100	3.6	3.2	273	391	2 400	3 200
92.075	146.050	33.338	34.925	26.195	3.6	3.2	178	293	2 500	3 300
	168.275	41.275	41.275	30.162	3.6	3.2	224	349	2 200	3 000
	168.275	41.275	41.275	30.162	6.4	3.2	224	349	2 200	3 000
	180.975	47.625	48.006	38.100	3.6	3.2	288	438	2 100	2 800
	190.500	57.150	57.531	44.450	7.9	3.2	385	565	2 100	2 700
95.000	150.000	35.000	34.000	27.000	3.0	2.5	187	294	2 400	3 300

HH221434	**HH221410**	42.5	120.0	105.0	171.0	179.0	7.9	3.2	0.33	1.79	0.99	5.57	2.21
98350	**98788**	54.5	118.0	112.0	174.0	188.0	3.6	3.2	0.63	0.95	0.52	5.27	2.28
HM218248	**HM218210**	30.8	112.0	99.0	133.0	141.0	7.1	3.6	0.33	1.80	0.99	1.66	0.784
JM718149	**JM718110**	32.7	105.0	99.0	131.0	139.0	3.0	2.5	0.44	1.35	0.74	1.47	0.652
JHM318448	**JHM318410**	34.5	106.0	100.0	140.0	148.0	3.0	2.5	0.34	1.76	0.97	2.37	1.00
6581XR	**6535**	41.0	102.0	98.0	141.0	154.0	3.0	3.2	0.40	1.50	0.82	3.02	1.65
760	**752**	35.5	107.0	101.0	144.0	150.0	3.6	3.2	0.34	1.76	0.97	2.42	1.59
47890R	**47820**	32.6	107.0	101.0	131.0	140.0	3.6	3.2	0.45	1.34	0.74	1.46	0.657
681	**672**	38.6	110.0	104.0	149.0	160.0	3.6	3.2	0.47	1.28	0.70	2.61	1.22
681A	**672**	38.6	116.0	104.0	149.0	160.0	6.4	3.2	0.47	1.28	0.70	2.60	1.22
778	**772**	39.5	111.0	105.0	161.0	168.0	3.6	3.2	0.39	1.56	0.86	3.65	1.92
857R	**854**	39.9	121.0	106.0	170.0	174.0	7.9	3.2	0.33	1.79	0.99	4.86	2.66

Single-row tapered roller bearings
inch series

d 99.982 ~ (107.950) mm



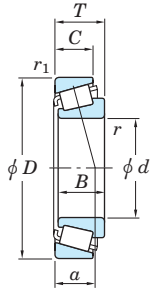


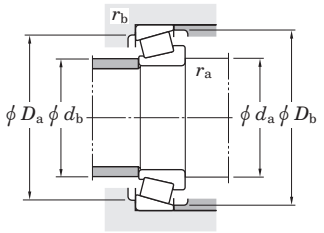
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
99.982	190.500	57.150	57.531	46.038	6.4	3.2	440	602	2 000	2 700	**HH221447**	**HH221410**	42.5	126.0	114.0	171.0	179.0	6.4	3.2	0.33	1.79	0.99	4.84	2.21
100.000	155.000	36.000	35.000	28.000	3.0	2.5	204	328	2 300	3 100	**JM720249**	**JM720210**	35.6	110.0	110.0	139.0	148.0	3.0	2.5	0.47	1.27	0.70	1.64	0.763
	160.000	41.000	40.000	32.000	3.0	2.5	237	378	2 300	3 000	**JHM720249**	**JHM720210**	38.3	110.0	111.0	143.0	153.0	3.0	2.5	0.47	1.28	0.70	2.11	0.964
100.012	157.162	36.512	36.116	26.195	3.6	3.2	180	288	2 300	3 000	**52393**	**52618**	36.0	113.0	115.0	142.0	150.0	3.6	3.2	0.47	1.26	0.69	1.74	0.694
101.600	157.162	36.512	36.116	26.195	3.6	3.2	180	288	2 300	3 000	**52400**	**52618**	36.0	114.0	115.0	142.0	150.0	3.6	3.2	0.47	1.26	0.69	1.67	0.694
	157.162	36.512	36.116	26.195	7.9	3.2	180	288	2 300	3 000	**52401**	**52618**	36.0	126.0	111.0	142.0	152.0	7.9	3.2	0.47	1.26	0.69	1.64	0.694
	168.275	41.275	41.275	30.162	3.6	3.2	224	349	2 200	3 000	**687**	**672**	38.6	114.0	115.0	146.0	156.0	3.6	3.2	0.47	1.28	0.70	2.15	1.22
	180.975	47.625	48.006	38.100	3.6	3.2	288	438	2 100	2 800	**780**	**772**	39.5	114.0	120.0	156.0	165.0	3.6	3.2	0.39	1.56	0.86	3.09	1.92
	190.500	57.150	57.531	44.450	7.9	3.2	385	565	2 100	2 700	**861R**	**854**	39.9	129.0	114.0	170.0	174.0	7.9	3.2	0.33	1.79	0.99	4.20	2.66
	190.500	57.150	57.531	46.038	7.9	3.2	440	602	2 000	2 700	**HH221449**	**HH221410**	42.5	123.0	119.0	168.0	178.0	7.9	3.2	0.33	1.79	0.99	4.72	2.21
	200.000	52.761	49.212	34.925	3.6	3.2	347	471	1 400	1 900	**98400**	**98788**	54.5	114.0	123.0	170.0	185.0	3.6	3.2	0.63	0.95	0.52	4.55	2.28
	212.725	66.675	66.675	53.975	7.1	3.2	450	674	1 800	2 400	**941**	**932**	47.6	121.0	135.0	181.0	192.0	7.1	3.2	0.33	1.84	1.01	7.07	4.07
	212.725	66.675	66.675	53.975	7.1	3.2	513	699	1 800	2 400	**HH224335**	**HH224310**	47.6	121.0	134.0	189.0	201.0	7.1	3.2	0.33	1.84	1.01	7.76	3.03
104.775	180.975	47.625	48.006	38.100	3.6	3.2	288	438	2 100	2 800	**782**	**772**	39.5	117.0	120.0	156.0	165.0	3.6	3.2	0.39	1.56	0.86	2.90	1.92
	180.975	47.625	48.006	38.100	6.4	3.2	288	438	2 100	2 800	**786**	**772**	39.5	123.0	120.0	156.0	165.0	6.4	3.2	0.39	1.56	0.86	2.88	1.92
	180.975	47.625	48.006	38.100	7.1	3.2	288	438	2 100	2 800	**787**	**772**	39.5	129.0	116.0	161.0	168.0	7.1	3.2	0.39	1.56	0.86	2.87	1.92
	190.500	47.625	49.212	34.925	3.6	3.2	303	483	1 900	2 600	**71412**	**71750**	40.9	117.0	131.0	167.0	177.0	3.6	3.2	0.42	1.44	0.79	3.96	1.72
106.362	165.100	36.512	36.512	26.988	3.6	3.2	195	325	2 200	2 900	**56418R**	**56650**	38.6	122.0	116.0	149.0	159.0	3.6	3.2	0.50	1.21	0.66	1.84	0.852
107.950	146.050	21.432	21.432	16.670	1.6	1.6	86.4	167	2 300	3 100	**L521949R**	**L521910**	26.2	116.0	114.0	136.0	141.0	1.6	1.6	0.39	1.53	0.84	0.665	0.325
	158.750	23.020	21.438	15.875	3.6	3.2	104	169	2 200	3 000	**37425**	**37625**	36.5	121.0	121.0	141.0	148.0	3.6	3.2	0.61	0.99	0.54	0.893	0.484
	159.987	34.925	34.925	26.988	3.6	3.2	184	319	2 200	2 900	**LM522546**	**LM522510**	32.9	122.0	116.0	146.0	154.0	3.6	3.2	0.40	1.50	0.82	1.64	0.784
	161.925	34.925	34.925	26.988	3.6	3.2	173	293	2 200	2 900	**48190**	**48120**	39.1	121.0	120.0	145.0	154.0	3.6	3.2	0.51	1.19	0.65	1.57	0.820
	165.100	36.512	36.512	26.988	3.6	3.2	195	325	2 200	2 900	**56425R**	**56650**	38.6	123.0	117.0	149.0	159.0	3.6	3.2	0.50	1.21	0.66	1.76	0.852
	168.275	36.512	36.512	26.988	3.6	3.2	195	325	2 200	2 900	**56425R**	**56662**	38.6	123.0	117.0	150.0	160.0	3.6	3.2	0.50	1.21	0.66	1.76	1.03
	190.500	47.625	49.212	34.925	3.6	3.2	303	483	1 900	2 600	**71425**	**71750**	40.9	121.0	131.0	167.0	177.0	3.6	3.2	0.42	1.44	0.79	3.76	1.72

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d (107.950) ~ 127.000 mm



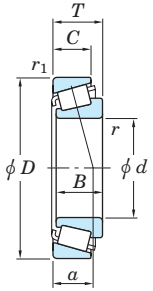


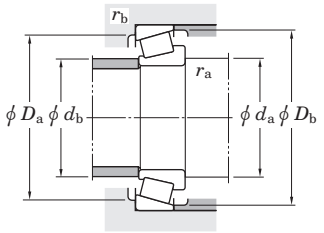
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
107.950	212.725	66.675	66.675	53.975	7.9	3.2	450	674	1 800	2 400	**936**	**932**	47.6	137.0	122.0	187.0	193.0	7.9	3.2	0.33	1.84	1.01	6.52	4.07
	212.725	66.675	66.675	53.975	7.9	3.2	513	699	1 800	2 400	**HH224340**	**HH224310**	47.6	129.0	134.0	189.0	201.0	7.9	3.2	0.33	1.84	1.01	7.21	3.03
109.538	158.750	23.020	21.438	15.875	6.4	6.4	104	169	2 200	3 000	**37431**	**37625**	36.5	123.0	116.0	143.0	152.0	6.4	6.4	0.61	0.99	0.54	0.848	0.484
109.987	159.987	34.925	34.925	26.988	7.9	3.2	184	319	2 200	2 900	**LM522548**	**LM522510**	32.9	131.0	121.0	146.0	153.0	7.9	3.2	0.40	1.50	0.82	1.52	0.784
	159.987	34.925	34.925	26.988	3.6	3.2	184	319	2 200	2 900	**LM522549**	**LM522510**	32.9	123.0	121.0	146.0	153.0	3.6	3.2	0.40	1.50	0.82	1.55	0.784
109.992	177.800	41.275	41.275	30.162	3.6	3.2	234	380	2 000	2 700	**64433R**	**64700**	42.8	128.0	121.0	160.0	172.6	3.6	3.2	0.52	1.16	0.64	2.69	1.10
110.000	165.000	35.000	35.000	26.500	3.0	2.5	195	325	2 200	2 900	**JM822049**	**JM822010**	38.1	121.0	121.0	148.0	157.0	3.0	2.5	0.50	1.21	0.66	1.64	0.826
	180.000	47.000	46.000	38.000	3.0	2.5	306	487	2 000	2 700	**JHM522649**	**JHM522610**	40.6	121.0	125.0	160.0	171.0	3.0	2.5	0.41	1.48	0.81	3.08	1.49
114.300	177.800	41.275	41.275	30.162	3.6	3.2	234	380	2 000	2 700	**64450R**	**64700**	42.8	131.0	125.0	160.0	172.0	3.6	3.2	0.52	1.16	0.64	2.45	1.10
	180.975	34.925	31.750	25.400	3.6	3.2	171	247	2 000	2 700	**68450**	**68712**	40.6	127.0	131.0	161.0	169.0	3.6	3.2	0.50	1.21	0.66	1.89	1.04
	190.500	47.625	49.212	34.925	3.6	3.2	303	483	1 900	2 600	**71450**	**71750**	40.9	127.0	131.0	167.0	177.0	3.6	3.2	0.42	1.44	0.79	3.33	1.72
	212.725	66.675	66.675	53.975	7.1	3.2	450	674	1 800	2 400	**938**	**932**	47.6	141.0	128.0	187.0	193.0	7.1	3.2	0.33	1.84	1.01	5.96	4.07
	212.725	66.675	66.675	53.975	7.1	3.2	513	699	1 800	2 400	**HH224346**	**HH224310**	47.6	134.0	134.0	189.0	201.0	7.1	3.2	0.33	1.84	1.01	6.64	3.03
	273.050	82.550	82.550	53.975	6.4	6.4	707	898	1 500	1 900	**HH926744**	**HH926710**	76.1	133.0	151.0	230.0	252.0	6.4	6.4	0.63	0.95	0.52	15.0	6.97
114.976	212.725	66.675	66.675	53.975	7.1	3.2	513	699	1 800	2 400	**HH224349**	**HH224310**	47.6	135.0	134.0	189.0	201.0	7.1	3.2	0.33	1.84	1.01	6.58	3.03
115.087	190.500	47.625	49.212	34.925	3.6	3.2	303	483	1 900	2 600	**71453**	**71750**	40.9	133.0	126.0	171.0	181.0	3.6	3.2	0.42	1.44	0.79	3.28	1.72
	190.500	47.625	49.212	34.925	7.9	3.2	303	483	1 900	2 600	**71455**	**71750**	40.9	136.0	131.0	167.0	177.0	7.9	3.2	0.42	1.44	0.79	3.25	1.72
117.475	180.975	34.925	31.750	25.400	3.6	3.2	171	247	2 000	2 700	**68462**	**68712**	40.6	130.0	131.0	161.0	169.0	3.6	3.2	0.50	1.21	0.66	1.75	1.04
	180.975	34.925	31.750	25.400	7.9	3.2	171	247	2 000	2 700	**68463**	**68712**	40.6	141.0	125.0	163.0	172.0	7.9	3.2	0.50	1.21	0.66	1.61	1.05
120.650	190.500	46.038	46.038	34.925	3.6	1.6	313	512	1 900	2 500	**HM624749**	**HM624710**	41.6	146.0	132.0	174.0	184.0	3.6	1.6	0.43	1.41	0.77	3.20	1.44
	254.000	77.788	82.550	61.912	9.5	6.4	717	1 050	1 500	2 000	**HH228340**	**HH228310**	54.3	158.0	142.0	223.0	234.0	9.5	6.4	0.32	1.87	1.03	12.6	6.00
127.000	254.000	77.788	82.550	61.912	9.5	6.4	717	1 050	1 500	2 000	**HH228349**	**HH228310**	54.3	164.0	148.0	223.0	234.0	9.5	6.4	0.32	1.87	1.03	11.8	6.00

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

d 133.350 ~ 292.100 mm



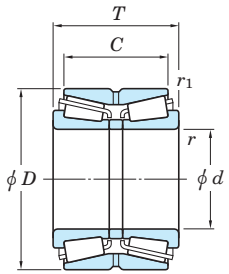


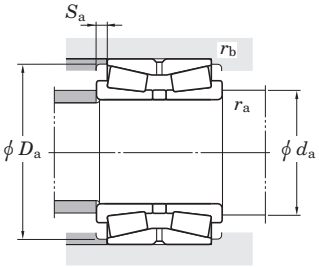
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]		Load center (mm)	Mounting dimensions (mm)						Constant	Axial load factors		(Refer.) Mass (kg)	
d	D	T	B	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.	Inner ring	Outer ring	a	d_a	d_b	D_a	D_b	r_a max.	r_b max.	e	Y_1	Y_0	Inner ring	Outer ring
133.350	177.008	25.400	26.195	20.638	1.6	1.6	141	278	1 900	2 500	**L327249**	**L327210**	29.1	142.0	145.0	164.0	169.0	1.6	1.6	0.35	1.72	0.95	1.14	0.543
142.875	200.025	41.275	39.688	34.130	7.9	3.3	246	491	1 700	2 200	**48684**	**48620**	38.4	166.0	151.0	185.0	193.0	7.9	3.3	0.34	1.78	0.98	2.43	1.38
	200.025	41.275	39.688	34.130	3.6	3.3	246	491	1 700	2 200	**48685**	**48620**	38.4	156.0	157.0	182.0	190.0	3.6	3.3	0.34	1.78	0.98	2.46	1.38
170.000	230.000	39.000	38.000	31.000	3.0	2.5	291	558	1 400	1 900	**JHM534149**	**JHM534110**	43.6	181.0	184.0	214.0	222.0	3.0	2.5	0.38	1.57	0.86	3.17	1.29
	240.000	46.000	44.500	37.000	3.0	2.5	353	666	1 400	1 800	**JM734449**	**JM734410**	50.6	181.0	184.0	220.0	231.0	3.0	2.5	0.44	1.37	0.75	4.31	2.00
171.450	222.250	25.400	24.608	19.050	1.6	1.6	157	299	1 400	1 900	**L435049**	**L435010**	36.0	181.0	179.0	211.0	215.0	1.6	1.6	0.38	1.60	0.88	1.63	0.697
180.000	250.000	47.000	45.000	37.000	3.0	2.5	365	705	1 300	1 700	**JM736149**	**JM736110**	55.2	191.0	193.0	230.0	242.0	3.0	2.5	0.48	1.25	0.69	4.47	2.10
190.000	260.000	46.000	44.000	36.500	3.0	2.5	369	723	1 200	1 700	**JM738249**	**JM738210**	56.0	201.0	203.0	240.0	251.0	3.0	2.5	0.48	1.26	0.69	4.71	2.18
196.850	254.000	28.575	27.783	21.433	1.6	1.6	188	387	1 200	1 600	**L540049**	**L540010**	43.1	206.0	214.0	238.0	243.0	1.6	1.6	0.40	1.51	0.83	2.34	1.02
200.000	300.000	65.000	62.000	51.000	3.6	2.5	617	1 140	1 100	1 500	**JHM840449**	**JHM840410**	72.1	213.0	218.0	270.0	288.0	3.6	2.5	0.52	1.15	0.63	9.97	5.13
220.878	317.500	47.625	52.388	36.513	3.2	3.2	488	928	970	1 300	**LM245833**	**LM245810**	50.5	234.0	253.0	296.0	304.0	3.2	3.2	0.33	1.80	0.99	9.56	2.78
228.600	358.775	71.438	71.438	53.975	3.6	3.2	773	1 590	840	1 100	**M249732**	**M249710**	64.4	242.0	279.0	330.0	342.0	3.6	3.2	0.33	1.80	0.99	20.1	6.44
230.188	317.500	47.625	52.388	36.513	3.2	3.2	488	928	970	1 300	**LM245846**	**LM245810**	50.5	242.0	238.0	309.0	312.0	3.2	3.2	0.33	1.80	0.99	8.25	2.78
231.775	317.500	47.625	52.388	36.513	3.2	3.2	488	928	970	1 300	**LM245848**	**LM245810**	50.5	244.0	240.0	309.0	312.0	3.2	3.2	0.33	1.80	0.99	8.02	2.78
	336.550	65.088	65.088	50.800	6.4	3.2	708	1 380	920	1 200	**M246942**	**M246910**	59.9	258.0	249.0	313.0	322.0	6.4	3.2	0.33	1.80	0.99	13.1	5.44
	358.775	71.438	71.438	53.975	6.4	3.2	773	1 590	920	1 200	**M249734**	**M249710**	64.4	258.0	253.0	335.0	343.0	6.4	3.2	0.33	1.80	0.99	19.9	6.44
254.000	358.775	71.438	71.438	53.975	3.6	3.2	773	1 590	840	1 100	**M249749**	**M249710**	64.4	268.0	279.0	330.0	342.0	3.6	3.2	0.33	1.80	0.99	14.8	6.44
257.175	342.900	57.150	57.150	44.450	6.4	3.2	612	1 280	870	1 200	**M349549**	**M349510**	60.1	276.0	276.0	320.0	330.0	6.4	3.2	0.35	1.73	0.95	9.27	3.99
292.100	374.650	47.625	47.625	34.925	3.6	3.2	468	971	760	1 000	**L555249**	**L555210**	64.7	306.0	309.0	351.0	360.0	3.6	3.2	0.40	1.49	0.82	7.97	3.53

[Note] 1) To the bearings with supplementary code "J" attached at the front of bearing number, tolerances shown in table 7-8 on page A66 are applied.

[Remark] Inch series tapered roller bearings with bore diameter larger than 100 mm are shown in catalog "large size ball & roller bearings".

Double-row tapered roller bearings
TDO type
d 25 ~ (60) mm

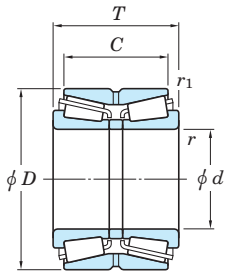


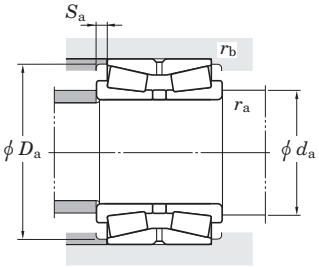


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
25	62	40	29.5	1.5	0.6	68.3	84.9	4 500	6 400	**46T30305DJR/29.5**	33.5	58.5	5	1.5	0.6	0.83	0.82	1.22	0.8	0.592
30	72	45	31.5	1.5	0.6	87.3	110	3 900	5 400	**46T30306DJR/31.5**	38.5	68	6.5	1.5	0.6	0.83	0.82	1.22	0.8	0.872
35	80	51	35.5	2	0.6	108	138	3 400	4 800	**46T30307DJR/35.5**	45	76.5	7.5	2	0.6	0.83	0.82	1.22	0.8	1.2
40	80	45	37.5	1.5	0.6	108	138	4 000	5 300	**46T30208JR/37.5**	48.5	75	3.5	1.5	0.6	0.37	1.8	2.68	1.76	0.954
	80	55	43.5	1.5	0.6	133	182	4 000	5 300	**46T32208JR/43.5**	48.5	75	5.5	1.5	0.6	0.37	1.8	2.68	1.76	1.19
	90	56	39.5	2	0.6	138	180	3 000	4 200	**46T30308DJR/39.5**	50	86.5	8	2	0.6	0.83	0.82	1.22	0.8	1.67
	90	56	45.5	2	0.6	155	202	3 600	4 900	**46T30308JR/45.5**	50	82	5	2	0.6	0.35	1.96	2.91	1.91	1.67
45	85	47	37.5	1.5	0.6	115	155	3 700	4 900	**46T30209JR/37.5**	53.5	80	4.5	1.5	0.6	0.4	1.67	2.48	1.63	1.1
	85	55	43.5	1.5	0.6	144	207	3 700	4 900	**46T32209JR-1/43.5**	53.5	81	5.5	1.5	0.6	0.4	1.67	2.48	1.63	1.31
	100	60	41.5	2	0.6	163	214	2 700	3 800	**46T30309DJR/41.5**	55	96	9	2	0.6	0.83	0.82	1.22	0.8	2.15
	100	60	49.5	2	0.6	193	256	3 300	4 300	**46T30309JR/49.5**	55	93	5	2	0.6	0.35	1.96	2.91	1.91	2.2
50	90	49	39.5	1.5	0.6	131	183	3 400	4 600	**46T30210JR/39.5**	58.5	85	4.5	1.5	0.6	0.42	1.61	2.39	1.57	1.22
	90	55	43.5	1.5	0.6	146	211	3 500	4 600	**46T32210JR/43.5**	58.5	85	5.5	1.5	0.6	0.42	1.61	2.39	1.57	1.39
	110	64	51.5	2	0.6	236	305	3 000	4 000	**46T30310JR/51.5**	62	102	6	2	0.6	0.35	1.96	2.91	1.91	2.68
	110	73	52.5	2	0.6	198	266	2 500	3 500	**46T30310DJR/52.5**	62	105	10	2	0.6	0.83	0.82	1.22	0.8	3.11
	110	90	71.5	2	0.6	302	440	3 000	4 000	**46T32310JR/71.5**	62	102	9	2	0.6	0.35	1.96	2.91	1.91	3.95
55	100	51	41.5	2	0.6	162	226	3 100	4 100	**46T30211JR/41.5**	65	94	4.5	2	0.6	0.4	1.67	2.48	1.63	1.6
	100	60	48.5	2	0.6	184	266	3 100	4 100	**46T32211JR-1/48.5**	65	95	5.5	2	0.6	0.4	1.67	2.48	1.63	1.87
	120	70	49	2	0.6	221	297	2 300	3 200	**46T30311DJR/49**	67	113	10.5	2	0.6	0.83	0.82	1.22	0.8	3.54
	120	70	57	2	0.6	256	341	2 700	3 600	**46T30311JR/57**	67	111	6.5	2	0.6	0.35	1.96	2.91	1.91	3.57
	120	97	76	2	0.6	343	500	2 700	3 600	**46T32311JR/76**	67	111	10.5	2	0.6	0.35	1.96	2.91	1.91	4.98
60	110	53	43.5	2	0.6	182	254	2 800	3 800	**46T30212JR/43.5**	70	103	4.5	2	0.6	0.4	1.67	2.48	1.63	2.04
	110	66	54.5	2	0.6	226	334	2 800	3 800	**46T32212JR/54.5**	70	104	5.5	2	0.6	0.4	1.67	2.48	1.63	—
	130	74	51	2.5	1	262	359	2 100	2 900	**46T30312DJR/51**	74	124	11.5	2.5	1	0.83	0.82	1.22	0.8	4.45
	130	74	59	2.5	1	297	401	2 500	3 300	**46T30312JR/59**	74	120	7.5	2.5	1	0.35	1.96	2.91	1.91	4.46

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

d (60) ~ (90) mm

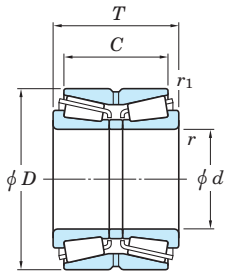


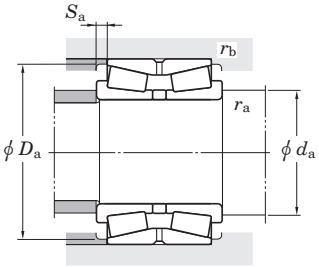


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
60	130	104	81	2.5	1	419	629	2 500	3 300	**46T32312JR/81**	74	120	11.5	2.5	1	0.35	1.96	2.91	1.91	6.45
65	120	56	46.5	2	0.6	220	311	2 600	3 400	**46T30213JR/46.5**	75	113	4.5	2	0.6	0.4	1.67	2.48	1.63	—
	120	73	61.5	2	0.6	270	406	2 600	3 400	**46T32213JR/61.5**	75	115	5.5	2	0.6	0.4	1.67	2.48	1.63	3.4
	140	79	53	2.5	1	302	417	1 900	2 700	**46T30313DJR/53**	79	133	13	2.5	1	0.83	0.82	1.22	0.8	5.3
	140	79	63	2.5	1	349	478	2 300	3 000	**46T30313JR/63**	79	130	8	2.5	1	0.35	1.96	2.91	1.91	5.51
	140	108	84	2.5	1	474	714	2 300	3 100	**46T32313JR/84**	79	130	12	2.5	1	0.35	1.96	2.91	1.91	7.71
70	125	59	48.5	2	0.6	236	346	2 400	3 300	**46T30214JR/48.5**	80	118	5	2	0.6	0.42	1.61	2.39	1.57	—
	125	74	61.5	2	0.6	290	450	2 400	3 300	**46T32214JR/61.5**	80	119	6	2	0.6	0.42	1.61	2.39	1.57	3.7
	150	83	57	2.5	1	338	470	1 800	2 500	**46T30314DJR/57**	84	142	13	2.5	1	0.83	0.82	1.22	0.8	6.48
	150	83	67	2.5	1	394	546	2 100	2 800	**46T30314JR/67**	84	140	8	2.5	1	0.35	1.96	2.91	1.91	6.65
	150	116	92	2.5	1	543	829	2 200	2 900	**46T32314JR/92**	84	140	12	2.5	1	0.35	1.96	2.91	1.91	9.46
75	115	30	26	1.5	0.6	71.7	105	2 500	3 300	**46215**	83.5	106.5	2	1.5	0.6	0.32	2.12	3.15	2.07	0.994
	115	38	30	1.5	0.6	122	207	2 500	3 300	**46215A**	83.5	107.4	4	1.5	0.6	0.32	2.12	3.15	2.07	1.32
	130	62	51.5	2	0.6	244	362	2 300	3 100	**46T30215JR/51.5**	85	124	5	2	0.6	0.44	1.55	2.31	1.52	3.12
	130	74	61.5	2	0.6	298	469	2 300	3 100	**46T32215JR/61.5**	85	125	6	2	0.6	0.44	1.55	2.31	1.52	3.85
	160	87	69	2.5	1	445	621	2 000	2 600	**46T30315JR/69**	89	149	9	2.5	1	0.35	1.96	2.91	1.91	7.8
	160	125	99	2.5	1	622	963	2 000	2 700	**46T32315JR/99**	89	149	13	2.5	1	0.35	1.96	2.91	1.91	11.5
80	125	34	30	1.5	0.6	108	155	2 300	3 100	**46216**	88.5	116.9	2	1.5	0.6	0.35	1.95	2.90	1.91	1.38
	140	64	51.5	2	0.6	277	405	2 200	2 900	**46T30216JR/51.5**	92	132	6	2	0.6	0.42	1.61	2.39	1.57	3.76
	140	78	63.5	2	0.6	347	542	2 200	2 900	**46T32216JR/63.5**	92	134	7	2	0.6	0.42	1.61	2.39	1.57	4.71
	170	92	73	2.5	1	504	711	1 800	2 500	**46T30316JR/73**	94	159	9.5	2.5	1	0.35	1.96	2.91	1.91	9.44
85	150	70	57	2	0.6	313	463	2 000	2 700	**46T30217JR/57**	97	141	6.5	2	0.6	0.42	1.61	2.39	1.57	4.79
	150	86	69	2	0.6	398	630	2 000	2 700	**46T32217JR/69**	97	142	8.5	2	0.6	0.42	1.61	2.39	1.57	6.05
	180	98	77	3	1	543	768	1 700	2 300	**46T30317JR/77**	103	167	10.5	3	1	0.35	1.96	2.91	1.91	11
	180	137	108	3	1	752	1 170	1 800	2 400	**46T32317JR/108**	103	167	14.5	3	1	0.35	1.96	2.91	1.91	16
90	140	37	33	2	0.6	136	199	2 100	2 800	**46218**	100	130.6	2	2	0.6	0.35	1.95	2.90	1.91	1.89

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

d (90) ~ 110 mm

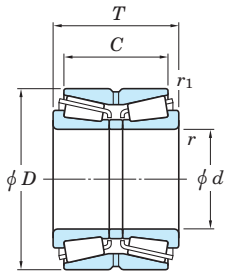


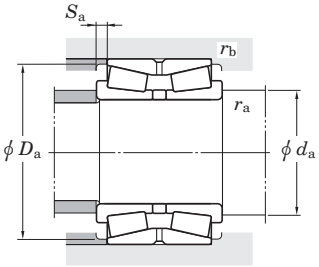


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
90	140	46	37	2	0.6	157	266	2 000	2 700	**46218A**	100	129.9	4.5	2	0.6	0.32	2.12	3.15	2.07	2.37
	160	74	61	2	0.6	350	522	1 900	2 500	**46T30218JR/61**	102	150	6.5	2	0.6	0.42	1.61	2.39	1.57	5.85
	160	94	77	2	0.6	451	724	1 900	2 500	**46T32218JR/77**	102	152	8.5	2	0.6	0.42	1.61	2.39	1.57	7.53
	190	102	81	3	1	592	841	1 600	2 200	**46T30318JR/81**	108	177	10.5	3	1	0.35	1.96	2.91	1.91	13
	190	144	115	3	1	791	1 230	1 700	2 200	**46T32318JR/115**	108	177	14.5	3	1	0.35	1.96	2.91	1.91	18.6
95	170	78	63	2.5	1	396	598	1 800	2 400	**46T30219JR/63**	109	159	7.5	2.5	1	0.42	1.61	2.39	1.57	7.01
	170	100	83	2.5	1	533	877	1 800	2 400	**46T32219JR/83**	109	161	8.5	2.5	1	0.42	1.61	2.39	1.57	9.25
	200	108	85	3	1	638	909	1 600	2 100	**46T30319JR/85**	113	186	11.5	3	1	0.35	1.96	2.91	1.91	14.8
	200	151	118	3	1	886	1 390	1 600	2 100	**46T32319JR/118**	113	186	16.5	3	1	0.35	1.96	2.91	1.91	21.4
100	150	46	37	2	0.6	180	293	1 900	2 500	**46220A**	110	142	4.5	2	0.6	0.35	1.95	2.90	1.91	2.53
	165	52	46	2.5	0.6	198	305	1 700	2 300	**46320**	112	154	3	2	0.6	0.35	1.95	2.90	1.91	4.03
	165	65	52	2.5	0.6	265	443	1 800	2 300	**46320A**	112	153	6.5	2	0.6	0.35	1.95	2.90	1.91	4.97
	180	83	67	2.5	1	443	676	1 700	2 200	**46T30220JR/67**	114	168	8	2.5	1	0.42	1.61	2.39	1.57	8.33
	180	107	87	2.5	1	596	990	1 700	2 200	**46T32220JR/87**	114	171	10	2.5	1	0.42	1.61	2.39	1.57	11.1
	215	112	87	3	1	724	1 040	1 500	1 900	**46T30320JR/87**	118	200	12.5	3	1	0.35	1.96	2.91	1.91	18.1
	215	162	127	3	1	993	1 570	1 500	2 000	**46T32320JR/127**	118	200	17.5	3	1	0.35	1.96	2.91	1.91	27.2
105	190	88	70	2.5	1	494	761	1 600	2 100	**46T30221JR/70**	119	178	9	2.5	1	0.42	1.61	2.39	1.57	9.87
	190	115	95	2.5	1	672	1 130	1 600	2 100	**46T32221JR/95**	119	180	10	2.5	1	0.42	1.61	2.39	1.57	13.5
	225	116	91	3	1	796	1 160	1 400	1 800	**46T30321JR/91**	123	209	12.5	3	1	0.35	1.96	2.91	1.91	20.7
	225	170	133	3	1	1 090	1 730	1 400	1 900	**46T32321JR/133**	123	209	18.5	3	1	0.35	1.96	2.91	1.91	30.9
110	170	45	40	2.5	0.6	175	304	1 700	2 200	**46222**	122	158	2.5	2	0.6	0.35	1.95	2.90	1.91	3.58
	180	56	50	2.5	0.6	245	388	1 600	2 100	**46322**	122	168	3	2	0.6	0.35	1.95	2.90	1.91	5.13
	180	70	56	2.5	0.6	324	533	1 600	2 100	**46322A**	122	168	7	2	0.6	0.35	1.92	2.86	1.88	6.43
	200	92	74	2.5	1	556	868	1 500	2 000	**46T30222JR/74**	124	188	9	2.5	1	0.42	1.61	2.39	1.57	11.6
	200	121	101	2.5	1	750	1 280	1 500	2 000	**46T32222JR/101**	124	190	10	2.5	1	0.42	1.61	2.39	1.57	15.9
	240	118	93	3	1	824	1 180	1 300	1 700	**46T30322JR/93**	128	222	12.5	3	1	0.35	1.96	2.91	1.91	23.8
	240	181	142	3	1	1 190	1 890	1 300	1 700	**46T32322JR/142**	128	222	19.5	3	1	0.35	1.96	2.91	1.91	37.3

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

d 120 ~ (150) mm

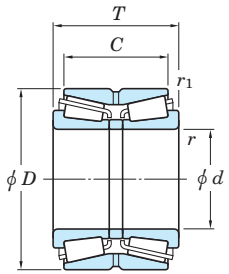


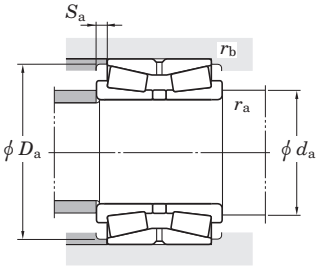


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
120	180	46	41	2.5	0.6	185	317	1 500	2 000	**46224**	132	170	2.5	2	0.6	0.35	1.95	2.90	1.91	3.81
	180	58	46	2.5	0.6	247	460	1 500	2 100	**46224A**	132	169	6	2	0.6	0.35	1.95	2.90	1.91	4.66
	200	62	55	2.5	0.6	292	470	1 400	1 900	**46324**	132	184	3.5	2	0.6	0.35	1.95	2.90	1.91	7.28
	200	78	62	2.5	0.6	387	672	1 400	1 900	**46324A**	132	185	8	2	0.6	0.35	1.95	2.90	1.91	9.14
	200	100	84	2.5	0.6	533	1 010	1 400	1 900	**46324AS**	132	190	8	2	0.6	0.35	1.95	2.90	1.91	12.0
	215	97	78	2.5	1	595	945	1 400	1 800	**46T30224JR/78**	134	203	9.5	2.5	1	0.44	1.55	2.31	1.52	13.9
	215	132	109	2.5	1	806	1 380	1 400	1 900	**46T32224JR/109**	134	204	11.5	2.5	1	0.44	1.55	2.31	1.52	19.8
	260	128	101	3	1	976	1 430	1 200	1 600	**46T30324JR/101**	138	239	13.5	3	1	0.35	1.96	2.91	1.91	30.6
	260	188	145	4	1.5	1 370	2 210	1 200	1 600	**46T32324JR/145**	142	239	21.5	4	1.5	0.35	1.96	2.91	1.91	45.9
130	200	52	46	2.5	0.6	239	425	1 400	1 800	**46226**	142	187	3	2	0.6	0.35	1.95	2.90	1.91	5.57
	200	65	52	2.5	0.6	319	618	1 400	1 900	**46226A**	142	185	6.5	2	0.6	0.35	1.95	2.90	1.91	7.06
	210	64	57	2.5	0.6	322	535	1 400	1 800	**46326**	142	196	3.5	2	0.6	0.36	1.87	2.79	1.83	7.81
	210	80	64	2.5	0.6	424	723	1 300	1 800	**46326A**	142	198	8	2	0.6	0.36	1.87	2.79	1.83	9.57
	230	98	78.5	3	1	646	1 020	1 300	1 700	**46T30226JR/78.5**	148	218	9.5	3	1	0.44	1.55	2.31	1.52	15.7
	230	145	117.5	3	1	949	1 660	1 300	1 700	**46T32226JR/117.5**	148	219	14	3	1	0.44	1.55	2.31	1.52	24.1
	280	137	107.5	4	1.5	1 130	1 670	1 100	1 400	**46T30326JR/107.5**	152	255	15	4	1.5	0.35	1.96	2.91	1.91	38.1
140	210	53	47	2.5	0.6	239	404	1 300	1 800	**46228**	152	196	3	2	0.6	0.33	2.03	3.02	1.98	5.85
	210	66	53	2.5	0.6	360	639	1 300	1 800	**46228A**	152	199	6.5	2	0.6	0.47	1.43	2.12	1.40	7.18
	225	68	61	3	1	360	564	1 200	1 700	**46328**	154	210	3.5	2.5	1	0.35	1.95	2.90	1.91	9.56
	225	85	68	3	1	475	836	1 200	1 700	**46328A**	154	212	8	2.5	1	0.35	1.95	2.90	1.91	11.8
	250	102	82.5	3	1	720	1 140	1 200	1 500	**46T30228JR/82.5**	158	237	9.5	3	1	0.44	1.55	2.31	1.52	19.7
	250	153	125.5	3	1	1 090	1 920	1 200	1 600	**46T32228JR/125.5**	158	238	14	3	1	0.44	1.55	2.31	1.52	30.2
	300	145	115.5	4	1.5	1 280	1 920	1 000	1 300	**46T30328JR/115.5**	162	273	15	4	1.5	0.35	1.96	2.91	1.91	46.6
150	225	56	50	3	1	278	476	1 200	1 600	**46230**	164	213	3	2.5	1	0.33	2.03	3.02	1.98	7.09
	225	70	56	3	1	377	703	1 200	1 600	**46230A**	164	213	7	2.5	1	0.33	2.03	3.02	1.98	8.82
	250	80	71	3	1	467	786	1 100	1 500	**46330**	164	233	4.5	2.5	1	0.35	1.95	2.90	1.91	14.6
	250	100	80	3	1	595	1 070	1 100	1 500	**46330A**	164	234	10	2.5	1	0.35	1.95	2.90	1.91	17.6
	270	109	87	3	1	827	1 330	1 100	1 400	**46T30230JR/87**	168	255	11	3	1	0.44	1.55	2.31	1.52	24.6

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

Double-row tapered roller bearings
TDO type
d (150) ~ (200) mm

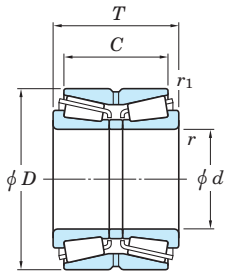


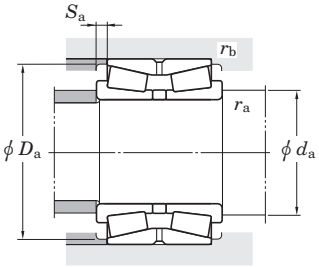


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
150	270	164	130	3	1	1 210	2 130	1 100	1 400	**46T32230JR/130**	168	254	17	3	1	0.44	1.55	2.31	1.52	38
	320	154	120	4	1.5	1 430	2 160	930	1 200	**46T30330JR/120**	172	292	17	4	1.5	0.35	1.96	2.91	1.91	56
160	240	60	53	3	1	324	565	1 100	1 500	**46232**	174	228	3.5	2.5	1	0.33	2.03	3.02	1.98	8.71
	240	75	60	3	1	406	756	1 100	1 500	**46232A**	174	226	7.5	2.5	1	0.33	2.03	3.02	1.98	10.6
	270	86	76	3	1	592	950	1 000	1 400	**46332**	174	252	5	2.5	1	0.35	1.95	2.90	1.91	18.8
	270	108	86	3	1	727	1 270	1 000	1 400	**46332A**	174	252	11	2.5	1	0.35	1.95	2.90	1.91	23.1
	290	115	91	3	1	929	1 500	980	1 300	**46T30232JR/91**	178	269	12	3	1	0.44	1.55	2.31	1.52	29.9
	290	178	144	3	1	1 360	2 420	1 000	1 300	**46T32232JR/144**	178	274	17	3	1	0.44	1.55	2.31	1.52	47.6
170	260	67	60	3	1	382	642	1 000	1 400	**46234**	184	243	3.5	2.5	1	0.33	2.03	3.02	1.98	11.4
	260	84	67	3	1	502	969	1 000	1 400	**46234A**	184	244	8.5	2.5	1	0.33	2.03	3.02	1.98	14.7
	280	88	78	3	1	599	1 050	970	1 300	**46334**	184	263	5	2.5	1	0.33	2.06	3.06	2.01	19.8
	280	110	88	3	1	776	1 390	980	1 300	**46334A**	184	260	11	2.5	1	0.33	2.06	3.06	2.01	24.7
	310	125	97	4	1.5	1 060	1 730	900	1 200	**46T30234JR/97**	192	288	14	4	1.5	0.44	1.55	2.31	1.52	37.5
	310	192	152	4	1.5	1 540	2 760	910	1 200	**46T32234JR/152**	192	294	20	4	1.5	0.44	1.55	2.31	1.52	58.8
180	280	74	66	3	1	464	801	950	1 300	**46236**	194	263	4	2.5	1	0.33	2.03	3.02	1.98	15.5
	280	93	74	3	1	584	1 080	960	1 300	**46236A**	194	261	9.5	2.5	1	0.33	2.03	3.02	1.98	19.0
	300	96	85	4	1.5	693	1 240	910	1 200	**46336**	198	277	5.5	3	1.5	0.33	2.06	3.06	2.01	25.8
	300	120	96	4	1.5	894	1 630	900	1 200	**46336A**	198	279	12	3	1.5	0.33	2.06	3.06	2.01	31.3
	320	127	99	4	1.5	1 060	1 740	860	1 200	**46T30236JR/99**	202	297	14	4	1.5	0.45	1.5	2.23	1.47	40.1
	320	192	152	4	1.5	1 640	3 030	880	1 200	**46T32236JR/152**	202	303	20	4	1.5	0.45	1.5	2.23	1.47	62.5
190	290	75	67	3	1	487	866	910	1 200	**46238**	204	272	4	2.5	1	0.32	2.12	3.15	2.07	16.5
	290	94	75	3	1	632	1 170	900	1 200	**46238A**	204	274	9.5	2.5	1	0.33	2.03	3.02	1.98	20.0
	320	104	92	4	1.5	808	1 450	830	1 100	**46338**	208	298	6	3	1.5	0.35	1.95	2.90	1.91	31.9
	320	130	104	4	1.5	1 020	1 860	840	1 100	**46338A**	208	298	13	3	1.5	0.35	1.95	2.90	1.91	39.0
	340	133	105	4	1.5	1 250	2 060	800	1 100	**46T30238JR/105**	212	318	14	4	1.5	0.44	1.55	2.31	1.52	47.8
	340	204	160	4	1.5	1 870	3 480	810	1 100	**46T32238JR/160**	212	323	22	4	1.5	0.44	1.55	2.31	1.52	75.1
200	310	82	73	3	1	572	1 040	850	1 100	**46240**	214	288	4.5	2.5	1	0.32	2.12	3.15	2.07	21.4

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

d (200) ~ (300) mm

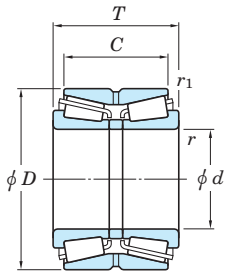


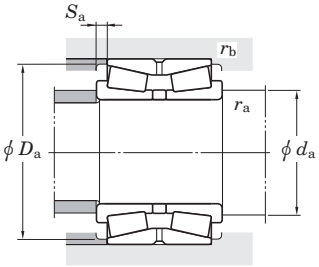


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
200	310	103	82	3	1	713	1 380	840	1 100	**46240A**	214	289	10.5	2.5	1	0.32	2.12	3.15	2.07	26.3
	340	112	100	4	1.5	939	1 580	780	1 000	**46340**	218	316	6	3	1.5	0.35	1.95	2.90	1.91	39.6
	340	140	112	4	1.5	1 110	2 040	770	1 000	**46340A**	218	319	14	3	1.5	0.35	1.95	2.90	1.91	48.2
	360	142	110	4	1.5	1 360	2 240	750	1 000	**46T30240JR/110**	222	336	16	4	1.5	0.44	1.55	2.31	1.52	56.5
	360	218	174	4	1.5	2 130	3 760	770	1 000	**46T32240JR/174**	222	340	22	4	1.5	0.41	1.66	2.47	1.62	88.2
220	340	90	80	4	1.5	677	1 240	750	990	**46244**	238	319	5	3	1.5	0.32	2.12	3.15	2.07	27.8
	340	113	90	4	1.5	832	1 620	750	1 000	**46244A**	238	318	11.5	3	1.5	0.32	2.12	3.15	2.07	34.2
	370	120	107	5	1.5	1 070	1 810	700	930	**46344**	242	346	6.5	4	1.5	0.35	1.95	2.90	1.91	49.1
	370	150	120	5	1.5	1 330	2 470	710	940	**46344A**	242	343	15	4	1.5	0.35	1.95	2.90	1.91	60.1
	400	150	114	4	1.5	1 730	2 880	660	890	**46T30244JR/114**	242	371	18	4	1.5	0.42	1.61	2.39	1.57	75.8
240	360	92	82	4	1.5	768	1 430	690	920	**46248**	258	338	5	3	1.5	0.32	2.12	3.15	2.07	29.6
	360	115	92	4	1.5	990	1 980	690	920	**46248A**	258	341	11.5	3	1.5	0.32	2.12	3.15	2.07	36.9
	400	128	114	5	1.5	1 190	2 180	630	840	**46348**	262	377	7	4	1.5	0.35	1.95	2.90	1.91	59.0
	400	160	128	5	1.5	1 540	3 060	630	850	**46348A**	262	373	16	4	1.5	0.35	1.95	2.90	1.91	76.2
260	400	104	92	5	1.5	935	1 830	610	820	**46252**	282	373	6	4	1.5	0.33	2.03	3.02	1.98	44.6
	400	130	104	5	1.5	1 210	2 480	610	810	**46252A**	282	376	13	4	1.5	0.32	2.12	3.15	2.07	54.8
	440	144	128	5	1.5	1 510	2 880	560	750	**46352**	282	410	8	4	1.5	0.35	1.95	2.90	1.91	83.8
	440	180	144	5	1.5	2 010	3 960	570	760	**46352A**	282	409	18	4	1.5	0.35	1.95	2.90	1.91	105
280	420	106	94	5	1.5	1 010	1 970	570	760	**46256**	302	395	6	4	1.5	0.33	2.03	3.02	1.98	46.9
	420	133	106	5	1.5	1 250	2 610	570	760	**46256A**	302	394	13.5	4	1.5	0.33	2.03	3.02	1.98	58.9
	460	146	130	6	2	1 550	2 930	530	700	**46356**	308	430	8	5	2	0.35	1.95	2.90	1.91	90.0
	460	183	146	6	2	2 040	3 940	520	690	**46356A**	308	434	18.5	5	2	0.35	1.95	2.90	1.91	111
300	460	118	105	5	1.5	1 290	2 400	500	670	**46260**	322	436	6.5	4	1.5	0.32	2.12	3.15	2.07	64.6
	460	148	118	5	1.5	1 630	3 230	510	680	**46260A**	322	433	15	4	1.5	0.32	2.12	3.15	2.07	80.2
	500	160	142	6	2	1 980	3 540	470	620	**46360**	328	469	9	5	2	0.35	1.95	2.90	1.91	116
	500	200	160	6	2	2 270	4 630	470	630	**46360A**	328	466	20	5	2	0.35	1.95	2.90	1.91	144

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

d (300) ~420 mm

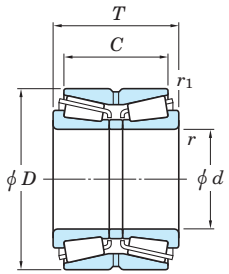


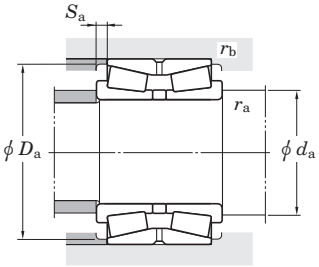


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Con-stant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
300	500	200	160	6	1.5	2 500	4 650	—	—	**46360D**	328	475	20	5	1.5	0.40	1.68	2.50	1.64	139
320	480	121	108	5	1.5	1 430	2 700	480	640	**46264**	342	452	6.5	4	1.5	0.32	2.12	3.15	2.07	71.6
	480	151	121	5	1.5	1 650	3 410	470	630	**46264A**	342	454	15	4	1.5	0.32	2.12	3.15	2.07	87.7
	540	176	157	6	2	2 440	4 570	420	560	**46364**	348	502	9.5	5	2	0.35	1.95	2.90	1.91	154
	540	220	176	6	2	2 610	5 390	430	570	**46364A**	348	497	22	5	2	0.35	1.95	2.90	1.91	190
340	520	133	118	6	2	1 550	3 070	420	570	**46268**	368	489	7.5	5	2	0.32	2.12	3.15	2.07	95.3
	520	165	133	6	2	1 930	4 060	420	560	**46268A**	368	491	16	5	2	0.32	2.12	3.15	2.07	117
	580	190	169	6	2	2 540	4 620	380	510	**46368**	368	539	10.5	5	2	0.35	1.95	2.90	1.91	198
	580	238	190	6	2	3 160	6 340	370	500	**46368A**	368	543	24	5	2	0.35	1.95	2.90	1.91	244
360	540	134	120	6	2	1 660	3 290	400	530	**46272**	388	510	7	5	2	0.32	2.12	3.15	2.07	93.0
	540	169	134	6	2	2 020	4 230	390	530	**46272A**	388	512	17.5	5	2	0.32	2.12	3.15	2.07	124
	600	192	171	6	2	2 680	4 880	360	480	**46372**	388	557	10.5	5	2	0.35	1.95	2.90	1.91	206
	600	240	192	6	2	3 660	7 230	360	480	**46372A**	388	568	24	5	2	0.39	1.74	2.59	1.70	254
380	560	135	122	6	2	1 740	3 560	370	500	**46276**	408	530	6.5	5	2	0.32	2.12	3.15	2.07	100
	560	171	135	6	2	2 240	4 670	380	500	**46276A**	408	531	18	5	2	0.39	1.74	2.59	1.70	129
	620	194	173	6	2	2 870	5 220	340	450	**46376**	408	582	10.5	5	2	0.39	1.74	2.59	1.70	215
	620	243	194	6	2	3 490	7 360	330	440	**46376A**	408	587	24.5	5	2	0.35	1.95	2.90	1.91	265
400	600	148	132	6	2	1 870	3 720	340	460	**46280**	428	560	8	5	2	0.32	2.12	3.15	2.07	135
	600	185	148	6	2	2 420	5 150	340	460	**46280A**	428	563	18.5	5	2	0.32	2.12	3.15	2.07	167
	650	200	178	6	3	2 980	5 920	320	420	**46380**	428	605	11	5	2.5	0.35	1.95	2.90	1.91	243
	650	250	200	6	3	4 060	8 850	310	420	**46380A**	428	610	25	5	2.5	0.35	1.95	2.90	1.91	306
420	620	150	134	6	2	2 010	4 130	320	420	**46284**	448	590	8	5	2	0.33	2.03	3.02	1.98	142
	620	188	150	6	2	2 700	5 660	320	430	**46284A**	448	589	19	5	2	0.39	1.74	2.59	1.70	176
	700	224	200	6	3	3 700	6 880	290	380	**46384**	448	656	12	5	2.5	0.39	1.74	2.59	1.70	325
	700	280	224	6	3	4 810	9 620	290	380	**46384A**	448	659	28	5	2.5	0.39	1.74	2.59	1.70	400

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

Double-row tapered roller bearings
TDO type
d 440 ~ 500 mm

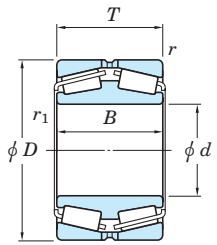


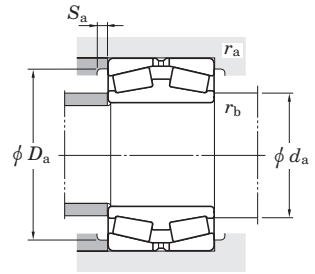


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)					Constant	Axial load factors			(Refer.) Mass
d	D	T	C	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a min.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
440	650	157	140	6	3	2 260	4 430	300	390	**46288**	468	622	8.5	5	2.5	0.33	2.03	3.02	1.98	156
	650	196	157	6	3	3 000	6 370	300	400	**46288A**	468	620	19.5	5	2.5	0.39	1.74	2.59	1.70	198
	720	226	201	6	3	3 940	8 110	270	360	**46388**	468	676	12.5	5	2.5	0.39	1.74	2.59	1.70	354
	720	283	226	6	3	4 940	10 100	270	360	**46388A**	468	679	28.5	5	2.5	0.40	1.68	2.51	1.65	418
460	680	163	145	6	3	2 500	5 340	280	370	**46292**	488	637	9	5	2.5	0.37	1.83	2.72	1.78	196
	680	204	163	6	3	3 220	6 850	280	370	**46292A**	488	646	20.5	5	2.5	0.39	1.74	2.59	1.70	232
	760	240	214	7.5	4	4 580	9 000	250	330	**46392**	496	710	13	6	3	0.39	1.74	2.59	1.70	424
	760	300	240	7.5	4	5 680	11 600	250	330	**46392A**	496	718	30	6	3	0.39	1.74	2.59	1.70	506
480	700	165	147	6	3	2 530	5 300	260	340	**46296**	508	672	9	5	2.5	0.33	2.03	3.02	1.98	186
	700	206	165	6	3	3 220	7 230	260	340	**46296A**	508	666	20.5	5	2.5	0.33	2.03	3.02	1.98	240
	790	248	221	7.5	4	4 640	8 920	230	310	**46396**	516	742	13.5	6	3	0.39	1.74	2.59	1.70	457
	790	310	248	7.5	4	5 990	12 400	230	310	**46396A**	516	749	31	6	3	0.39	1.74	2.59	1.70	560
500	720	167	149	6	3	2 580	5 690	250	330	**462/500**	528	679	9	5	2.5	0.40	1.71	2.54	1.67	210
	720	209	167	6	3	3 500	7 850	250	330	**462/500A**	528	690	21	5	2.5	0.42	1.62	2.41	1.58	258
	830	264	235	7.5	4	5 220	10 900	210	280	**463/500**	536	776	14.5	6	3	0.39	1.74	2.59	1.70	559
	830	330	264	7.5	4	6 780	14 000	210	280	**463/500A**	536	784	33	6	3	0.39	1.74	2.59	1.70	669

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

Double-row tapered roller bearings
TDI type
d 100 ~ (220) mm

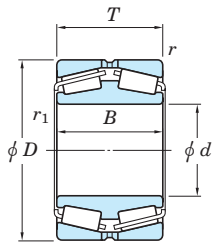


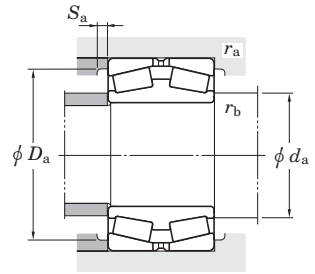


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	B	T	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a max.	D_a max.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
100	165	52	52	2	2.5	237	384	1 800	2 300	**45320**	119	155	148	3.9	2	2	0.35	1.95	2.90	1.91	4.26
110	180	56	56	2	2.5	300	505	1 600	2 100	**45322**	128	170	160	4	2	2	0.35	1.95	2.90	1.91	5.40
120	180	46	46	2	2.5	229	424	1 500	2 100	**45224**	138	170	163	4	2	2	0.26	2.55	3.80	2.50	4.08
	200	62	62	2	2.5	353	598	1 400	1 900	**45324**	142	190	178	4	2	2	0.35	1.95	2.90	1.91	7.92
130	200	52	52	2	2.5	300	548	1 400	1 800	**45226**	152	190	179	4	2	2	0.27	2.47	3.67	2.41	5.96
	210	64	64	2	2.5	412	657	1 300	1 800	**45326**	153	200	185	4	2	2	0.36	1.87	2.79	1.83	8.41
140	210	53	53	2	2.5	311	564	1 300	1 800	**45228**	159	200	188	4	2	2	0.27	2.47	3.67	2.41	6.45
	225	68	68	2.5	3	486	807	1 200	1 700	**45328**	160	213	210	4	2	2.5	0.40	1.68	2.50	1.64	10.0
150	225	56	56	2.5	3	355	686	1 200	1 600	**45230**	174	213	203	4	2	2.5	0.26	2.55	3.80	2.50	7.87
	250	80	80	2.5	3	593	955	1 100	1 500	**45330**	179	238	220	4	2	2.5	0.35	1.95	2.90	1.91	15.5
160	240	60	60	2.5	3	421	705	1 100	1 500	**45232**	184	228	217	5	2	2.5	0.24	2.79	4.15	2.73	9.22
	270	86	86	2.5	3	678	1 100	1 000	1 400	**45332**	193	258	237	4	2	2.5	0.35	1.95	2.90	1.91	19.8
170	260	67	67	2.5	3	521	956	1 000	1 400	**45234**	195	248	233	5	2	2.5	0.31	2.21	3.29	2.16	12.4
	280	88	88	2.5	3	723	1 210	970	1 300	**45334**	201	268	247	5	2	2.5	0.33	2.03	3.02	1.98	21.6
180	280	74	74	2.5	3	575	1 050	950	1 300	**45236**	208	268	250	5	2	2.5	0.28	2.43	3.61	2.37	16.8
	300	96	96	3	4	860	1 370	910	1 200	**45336**	210	286	263	5	2.5	3	0.35	1.95	2.90	1.91	26.5
190	290	75	75	2.5	3	599	1 130	900	1 200	**45238**	219	278	260	5	2	2.5	0.26	2.55	3.80	2.50	17.7
	320	104	104	3	4	981	1 590	840	1 100	**45338**	224	306	280	5	2.5	3	0.35	1.95	2.90	1.91	34.0
200	310	82	82	2.5	3	728	1 410	830	1 100	**45240**	234	298	280	5	2	2.5	0.26	2.55	3.80	2.50	22.9
	340	112	112	3	4	1 080	1 840	770	1 000	**45340**	244	326	300	5	2.5	3	0.35	1.95	2.90	1.91	41.9
220	340	90	90	3	4	805	1 460	740	990	**45244**	259	326	306	5	2.5	3	0.28	2.43	3.61	2.37	28.5

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

Double-row tapered roller bearings
TDI type
d (220) ~ (420) mm

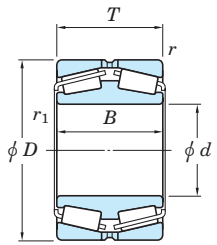


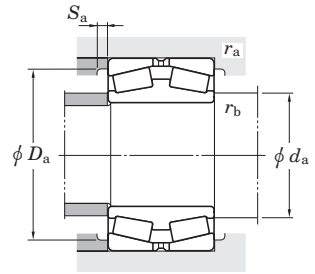


Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	B	T	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a max.	D_a max.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	(kg)
220	370	120	120	4	5	1 210	2 060	700	930	**45344**	263	352	324	5	3	4	0.35	1.95	2.90	1.91	50.8
230	350	90	90	3	4	791	1 560	710	950	**45246**	267	336	318	6	2.5	3	0.28	2.43	3.61	2.37	30.6
240	360	92	92	3	4	915	1 790	690	920	**45248**	271	346	325	5	2.5	3	0.32	2.12	3.15	2.07	32.2
	400	128	128	4	5	1 430	2 470	630	840	**45348**	286	382	354	5	3	4	0.35	1.95	2.90	1.91	65.4
260	400	104	104	4	5	1 140	2 120	610	810	**45252**	302	382	360	6	3	4	0.25	2.74	4.08	2.68	48.1
	440	144	144	4	5	1 890	3 440	560	750	**45352**	313	422	386	6	3	4	0.35	1.95	2.90	1.91	92.2
280	420	106	106	4	5	1 190	2 470	560	750	**45256**	321	402	370	6	3	4	0.25	2.69	4.00	2.63	51.9
	460	146	146	5	6	1 930	3 320	520	700	**45356**	323	438	409	6	4	5	0.39	1.74	2.59	1.70	93.1
300	460	118	118	4	5	1 610	3 150	500	670	**45260**	350	442	418	6	3	4	0.25	2.74	4.08	2.68	78.5
	500	160	160	5	6	2 120	4 240	470	630	**45360**	356	478	440	6	4	5	0.35	1.95	2.90	1.91	129
320	480	121	121	4	5	1 630	3 180	470	630	**45264**	368	462	434	6	3	4	0.26	2.55	3.80	2.50	77.8
	540	176	176	5	6	2 690	5 280	430	570	**45364R**	378	518	474	6	4	5	0.32	2.12	3.15	2.07	167
340	520	133	133	5	6	1 880	3 850	420	570	**45268**	398	498	464	6	4	5	0.26	2.55	3.80	2.50	104
	580	190	190	5	6	3 290	5 470	390	510	**45368**	401	558	515	6	4	5	0.32	2.12	3.15	2.07	202
360	540	134	134	5	6	2 050	3 910	400	540	**45272**	408	518	488	11	4	5	0.32	2.12	3.15	2.07	101
	600	192	192	5	6	3 360	6 750	360	490	**45372**	419	578	528	10	4	5	0.32	2.12	3.15	2.07	228
380	560	135	135	5	6	2 060	3 790	380	500	**45276**	428	538	510	6	4	5	0.27	2.47	3.67	2.41	112
	620	194	194	5	6	3 070	6 360	340	450	**45376**	445	598	545	6	4	5	0.32	2.12	3.15	2.07	234
400	600	148	148	5	6	2 410	4 960	340	450	**45280**	452	578	545	6	4	5	0.33	2.03	3.02	1.98	143
	650	200	200	6	6	3 850	7 810	320	420	**45380**	458	622	580	11	5	5	0.39	1.74	2.59	1.70	265
420	620	150	150	5	6	2 600	5 200	320	430	**45284**	475	598	564	6	4	5	0.33	2.03	3.02	1.98	152

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".

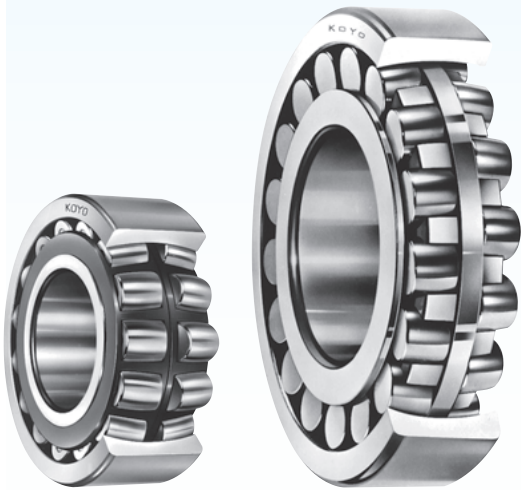
d (420) ~ 500 mm





Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass (kg)
d	D	B	T	r min.	r_1 min.	C_r	C_{0r}	Grease lub.	Oil lub.		d_a max.	D_a max.	D_a min.	S_a min.	r_a max.	r_b max.	e	Y_2	Y_3	Y_0	
420	700	224	224	6	6	4 710	8 380	280	380	**45384**	488	672	623	7	5	5	0.39	1.74	2.59	1.70	352
440	650	157	157	6	6	2 750	5 500	300	390	**45288**	500	622	592	10	5	5	0.28	2.43	3.61	2.37	182
	720	226	226	6	6	4 990	9 130	270	360	**45388**	506	692	642	7	5	5	0.39	1.74	2.59	1.70	367
460	680	163	163	6	6	3 000	5 660	280	370	**45292**	510	652	616	6	5	5	0.39	1.74	2.59	1.70	197
	760	240	240	7.5	7.5	5 230	10 400	250	330	**45392**	532	724	677	7	6	6	0.39	1.74	2.59	1.70	444
480	700	165	165	6	6	3 060	6 710	260	350	**45296**	531	672	625	6	5	5	0.40	1.68	2.50	1.64	215
	790	248	248	7.5	7.5	5 710	11 600	230	310	**45396**	555	754	703	7	6	6	0.39	1.74	2.59	1.70	494
500	720	167	167	6	6	3 430	7 350	250	330	**452/500**	545	692	645	8	5	5	0.39	1.74	2.59	1.70	222
	830	264	264	7.5	7.5	6 280	12 300	210	280	**453/500**	587	794	729	7	6	6	0.33	2.03	3.02	1.98	586

[Remark] Bearings not shown above (e.g. inch series) are shown in catalog "large size ball & roller bearings".



Spherical roller bearings

Spherical roller bearings feature a large load rating capacity and self-aligning capability.

This type of bearing is suitable for low- or medium-speed applications which involve heavy or impact loading.

- These bearings are divided into R(RR), RH(RHR) and RHA types, which differ in internal structure. (refer to Table 1.)
- Each type can be produced with a cylindrical bore or tapered bore.

  Bearings with a tapered bore can be fit and removed easily using an adapter assembly or withdrawal sleeve.

  The rate of taper is equivalent among all bearing series.

  240 and 241 series ... 1 : 30 (supplementary code "K30")

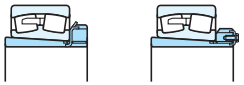
  Others ... 1 : 12 (supplementary code "K")

Spherical roller bearings

Cylindrical bore Tapered bore

Bore diameter **25 – 500** mm

Adapter assemblies

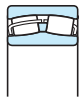


Bore diameter **20 – 470** mm

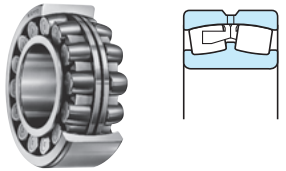
Withdrawal sleeves

Bore diameter **35 – 480** mm

Table 1 Spherical roller bearings : types and structures

Structure	 R, RR type	 RH, RHR type	 RHA type
Roller	Convex asymmetrical roller	Convex symmetrical roller	Convex symmetrical roller
Cage	Copper alloy prong type machined cage	Pressed steel cage	Copper alloy integral type machined cage
Inner ring (with or without rib)	With center rib	Without center rib (guide ring)	Without center rib (guide ring)
	With ribs on both sides (to prevent rollers from falling)	Without ribs on both sides	With ribs on both sides (to prevent rollers from falling)
Characteristics	Superior to RH, RHR and RHA types in high-speed performance.	The load rating capacity is larger than that of R and RR type. (There are some exceptional cases due to different interior specifications.)	

Spherical roller bearings for shaker screens



- These bearings consist of convex asymmetric rollers and a prong type, copper alloy, outer ring guided, machined cage. This cage possesses optimum characteristics for use with shaker screens.
- The bearings most commonly used with shaker screens are 223 series spherical roller bearings. They are identified by the supplementary code "ROVS W502." The outer ring outside diameter tolerance of these bearings is held to a small allowable variation.

■ Bearings with lubrication holes and a lubrication groove

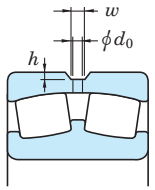
- Outer rings can be provided with lubrication holes, a lubrication groove and an anti-rotation pin hole. (Specifications are given in Table 4.)
- Inner rings can also be provided with lubrication holes and a lubrication groove.

Table 2 Supplementary codes for identification of bearings with lubrication holes, lubrication groove and anti-rotation pin hole (outer ring)

Supplementary code		Number of lubrication holes	Hole layout
With lubrication holes and lubrication groove	With lubrication holes, lubrication groove and anti-rotation pin hole		
W33	**W3N**	3[1)]	3 equally spaced positions[1)]
W33A	W3NA	4	4 equally spaced positions
–	W3NB	5	6 equally spaced positions[2)]
W33C	W3NC	6	6 equally spaced positions
–	W3ND	7	8 equally spaced positions[2)]
W33T	–	8	8 equally spaced positions

Table 3 Supplementary codes for identification of bearings with lubrication holes and/or lubrication groove

Supplementary code	Inner ring		Outer ring	
	Number of lubrication holes	Lubrication groove	Number of lubrication holes	Lubrication groove
W513	3	–	3	○
W518	3	–	3	–
W26	3	–	–	–



[Notes] 1) Also 4 or 6 holes are provided in smaller size bearings, consult with JTEKT.
2) One hole is used for the antirotation pin.
[Remark] Boldfaced codes indicate JTEKT standards.

Table 4 (1) Lubrication hole and lubrication groove dimensions Unit : mm

Bore diameter number	Nominal bore diameter d	239			230			240			231			241			222			232			213			223		
		d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h
5	25	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.7	–	–	–	–	–	–	–	–	–
6	30	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.7	–	–	–	3	4	0.7	–	–	–
7	35	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.8	–	–	–	3	4	0.7	3	4	1
8	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.8	–	–	–	3	4	0.7	4	5	1
9	45	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.8	–	–	–	3	4	0.7	4	6	1
10	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.8	–	–	–	3	4	0.7	4	6	1
11	55	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	0.8	–	–	–	3	4	0.7	4	6	1.1
12	60	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	1	–	–	–	3	4	1	4	6	1.1
13	65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	1	–	–	–	3	4	1	4	6	1.2
14	70	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	1	–	–	–	3	4	1	5	7	1.3
15	75	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	1	–	–	–	3	4	1	5	7	1.3
16	80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	1	4	6	1.2	4	6	1	5	7	1.3
17	85	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	5	1	4	6	1.2	4	6	1.2	6	8	1.3
18	90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	5	1	5	8	1.2	4	6	1.2	6	8	1.3
19	95	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	6	1.2	5	8	1.2	4	6	1.2	6	8	2
20	100	–	–	–	4	5	1	–	–	–	5	6	1.4	–	–	–	5	6	1.2	5	8	1.2	4	6	1.2	6	8	2
22	110	–	–	–	5	7	1	–	–	–	5	6	1.4	6	8	1.5	5	7	1.5	6	8	1.7	4	6	1.2	6	8	2
24	120	–	–	–	5	7	1	5	6	1.4	5	6	1.4	6	8	1.5	5	7	1.5	6	10	1.7	–	–	–	8	10	2.5
26	130	–	–	–	5	7	1.2	6	8	1.5	5	6	1.5	6	8	1.5	5	7	1.5	6	10	1.7	–	–	–	8	12	2.5
28	140	4	5	1	5	7	1.2	6	8	1.5	6	8	1.5	8	10	2	6	8	1.8	8	10	2.5	–	–	–	12	14	3
30	150	5	7	1	5	8	1.2	6	8	1.5	6	10	1.5	8	10	2	6	10	1.8	8	10	2.5	–	–	–	12	14	3
32	160	5	7	1.2	5	8	1.2	6	8	1.5	8	12	2	10	12	2	10	12	2.5	10	12	2.5	–	–	–	12	14	3
34	170	5	7	1.2	6	10	1.5	8	10	2	8	12	2	10	12	2	12	14	3	10	12	2.5	–	–	–	12	14	3
36	180	6	7	1.3	8	12	1.5	10	12	2.5	10	12	2.5	10	12	2	12	14	3	10	12	2.5	–	–	–	14	16.5	4
38	190	5	7	1.2	10	12	2.5	10	12	2.5	10	12	2.5	10	12	2	12	14	3	12	14	3	–	–	–	14	16.5	4
40	200	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	–	–	–	14	16.5	4
44	220	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	–	–	–	14	16.5	4
48	240	6	8	1.5	10	12	2.5	10	12	2.5	12	14	3	12	14	3	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
52	260	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
56	280	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
60	300	10	12	2.5	12	14	3	12	14	3	12	14	3	12	14	3	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
64	320	10	12	2.5	12	14	3	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
68	340	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4
72	360	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4

Table 4 (2) Lubrication hole and lubrication groove dimensions Unit : mm

Bore diameter number	Nominal bore diameter d	239			230			240			231			241			222			232			213			223		
		d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h	d_0	w	h
76	380	12	14	3	14	16.5	4	14	16.5	3	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
80	400	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
84	420	12	14	3	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
88	440	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
92	460	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
96	480	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	–	–	–	14	16.5	4	–	–	–	–	–	–
/500	500	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	4	14	16.5	5	–	–	–	14	16.5	4	–	–	–	–	–	–

Boundary dimensions	As specified in JIS B 1512.
Tolerances	As specified in JIS B 1514-1, class 0. (refer to Table 7-3 on pp. A 54 – A 57.) Refer to Table 7-11 on p. A 70 for the tolerance of tapered bores.
Radial internal clearance	As specified in JIS B 1520. (refer to Table 10-9 on p. A 102.)
Recommended fits	Refer to Table 9-4 on pp. A 85, 86.
Standard cages	Refer to Table 5.
Allowable aligning angle	Refer to Table 5. (varies depending on bearing series.)
Equivalent radial load	Dynamic equivalent radial load $\left(\text{When } \frac{F_a}{F_r} \leqq e\right) \quad P_r = F_r + Y_1 F_a \qquad \left(\text{When } \frac{F_a}{F_r} > e\right) \quad P_r = 0.67 F_r + Y_2 F_a$ Static equivalent radial load $P_{0r} = F_r + Y_0 F_a$ [Note] Refer to the specification table for the values of axial load factors Y_1, Y_2 and Y_0 and of constant e.

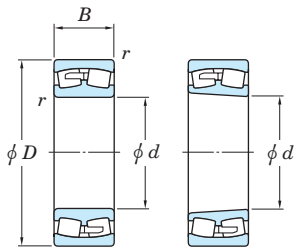
[Remark] If the ratio of axial load to radial load exceeds the value e given in the specification table ($F_a / F_r > e$), slippage occurs between rollers in rows that are not axial-loaded and the raceway. This may cause smearing, especially when the bearing is large. Consult with JTEKT on the use of bearings under such conditions.

Table 5 Application of standard cages and allowable aligning angle

Bearing series	Standard cages		Allowable aligning angle
	Pressed cage	Machined cage	
239 R	——	23930R – 239/500R	0.026 rad (1.5°)
230 R	——	23038R – 230/500R	0.026 rad (1.5°)
RH	23022RH – 23036RH	——	
RHA	——	23038RHA – 23096RHA	
240 R(RR)	——	24036R – 240/500R	0.035 rad (2°)
RH	24024RH – 24034RH	——	
RHA	——	24038RHA – 24096RHA	
231 R	——	23136R – 231/500R	0.026 rad (1.5°)
RH	23122RH – 23134RH	——	
RHA	——	23136RHA – 23196RHA	
241 R(RR)	——	24132R – 241/500R	0.044 rad (2.5°)
RH	24122RH – 24130RH	——	
RHA	——	24136RHA – 24196RHA	
222 R(RR)	——	22232RR – 22272R	0.026 rad (1.5°)
RH(RHR)	22205RHR – 22230RH	——	
RHA	——	22232RHA – 22260RHA	
232 R	——	23232R – 232/500R	0.044 rad (2.5°)
RH	23218RH – 23230RH	——	
RHA	——	23232RHA – 23296RHA	
213 R	——	21322R – 21328R	0.017 rad (1°)
RH	21311RH – 21322RH	——	
223 R(RR)	——	22328R – 22360R	0.035 rad (2°)
RH(RHR)	22308RHR – 22326RH	——	
RHA	——	22328RHA – 22356RHA	

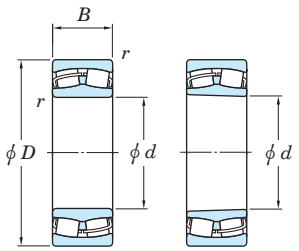
d 25 ~ 70 mm

R, RR



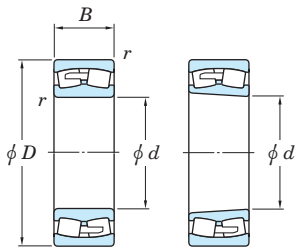
Cylindrical bore | Tapered bore

RH, RHR

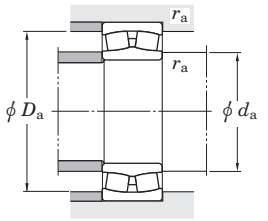


Cylindrical bore | Tapered bore

RHA



Cylindrical bore | Tapered bore

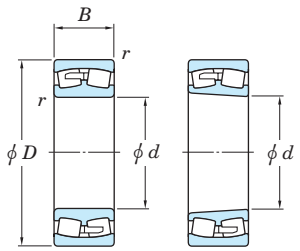


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
25	52	18	1	45.4	48.1	7 000	9 300	**22205RHR**	**22205RHRK**	31	46	1	0.35	1.91	2.85	1.87	0.188	0.184
30	62	20	1	61.2	65.9	5 900	7 900	**22206RHR**	**22206RHRK**	36	56	1	0.33	2.04	3.04	2.00	0.296	0.290
	72	19	1.1	59.3	62.7	5 200	7 000	**21306RH**	**21306RHK**	37	65	1	0.27	2.49	3.71	2.43	0.430	0.424
35	72	23	1.1	80.3	88.7	5 000	6 700	**22207RHR**	**22207RHRK**	42	65	1	0.32	2.09	3.11	2.04	0.459	0.449
	80	21	1.5	69.6	75.3	4 500	6 000	**21307RH**	**21307RHK**	43.5	71.5	1.5	0.27	2.49	3.71	2.43	0.572	0.564
40	80	23	1.1	90.9	102	4 500	6 000	**22208RHR**	**22208RHRK**	47	73	1	0.28	2.37	3.53	2.32	0.602	0.591
	90	23	1.5	85.7	95.5	4 100	5 500	**21308RH**	**21308RHK**	48.5	81.5	1.5	0.26	2.55	3.80	2.50	0.781	0.770
	90	33	1.5	136	152	4 100	5 500	**22308RHR**	**22308RHRK**	48.5	81.5	1.5	0.37	1.83	2.72	1.79	1.08	1.06
45	85	23	1.1	95.6	110	4 200	5 600	**22209RHR**	**22209RHRK**	52	78	1	0.26	2.55	3.80	2.50	0.602	0.590
	100	25	1.5	108	124	3 600	4 900	**21309RH**	**21309RHK**	53.5	91.5	1.5	0.26	2.62	3.90	2.56	1.05	1.04
	100	36	1.5	166	183	3 700	4 900	**22309RHR**	**22309RHRK**	53.5	91.5	1.5	0.37	1.83	2.72	1.79	1.42	1.39
50	90	23	1.1	103	122	3 900	5 200	**22210RHR**	**22210RHRK**	57	83	1	0.24	2.79	4.15	2.73	0.648	0.634
	110	27	2	128	151	3 300	4 400	**21310RH**	**21310RHK**	60	100	2	0.25	2.71	4.04	2.65	1.37	1.35
	110	40	2	204	237	3 300	4 500	**22310RHR**	**22310RHRK**	60	100	2	0.36	1.85	2.76	1.81	1.92	1.88
55	100	25	1.5	124	144	3 400	4 600	**22211RHR**	**22211RHRK**	63.5	91.5	1.5	0.24	2.84	4.23	2.78	0.867	0.849
	120	29	2	144	165	3 000	4 100	**21311RH**	**21311RHK**	65	110	2	0.25	2.71	4.03	2.65	1.69	1.67
	120	43	2	236	264	3 000	4 000	**22311RHR**	**22311RHRK**	65	110	2	0.36	1.85	2.76	1.81	2.40	2.35
60	110	28	1.5	153	181	3 100	4 200	**22212RHR**	**22212RHRK**	68.5	101.5	1.5	0.25	2.74	4.08	2.68	1.19	1.17
	130	31	2.1	168	193	2 800	3 700	**21312RH**	**21312RHK**	72	118	2	0.24	2.78	4.14	2.72	2.11	2.08
	130	46	2.1	283	334	2 800	3 700	**22312RHR**	**22312RHRK**	72	118	2	0.36	1.86	2.77	1.82	3.06	2.99
65	120	31	1.5	178	211	2 900	3 800	**22213RHR**	**22213RHRK**	73.5	111.5	1.5	0.25	2.69	4.00	2.63	1.55	1.52
	140	33	2.1	194	232	2 600	3 400	**21313RH**	**21313RHK**	77	128	2	0.24	2.83	4.21	2.76	2.62	2.58
	140	48	2.1	305	360	2 600	3 400	**22313RHR**	**22313RHRK**	77	128	2	0.34	1.98	2.94	1.93	3.66	3.58
70	125	31	1.5	187	222	2 700	3 600	**22214RHR**	**22214RHRK**	78.5	116.5	1.5	0.24	2.87	4.27	2.80	1.64	1.61
	150	35	2.1	215	260	2 400	3 200	**21314RH**	**21314RHK**	82	138	2	0.24	2.84	4.23	2.78	3.19	3.15
	150	51	2.1	348	413	2 400	3 200	**22314RHR**	**22314RHRK**	82	138	2	0.34	1.98	2.94	1.93	4.45	4.36

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

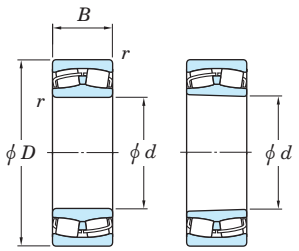
d 75 ~ (110) mm

R, RR



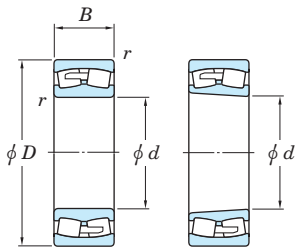
Cylindrical bore | Tapered bore

RH, RHR

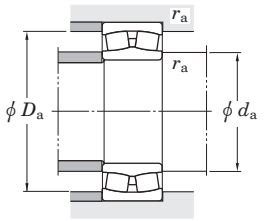


Cylindrical bore | Tapered bore

RHA



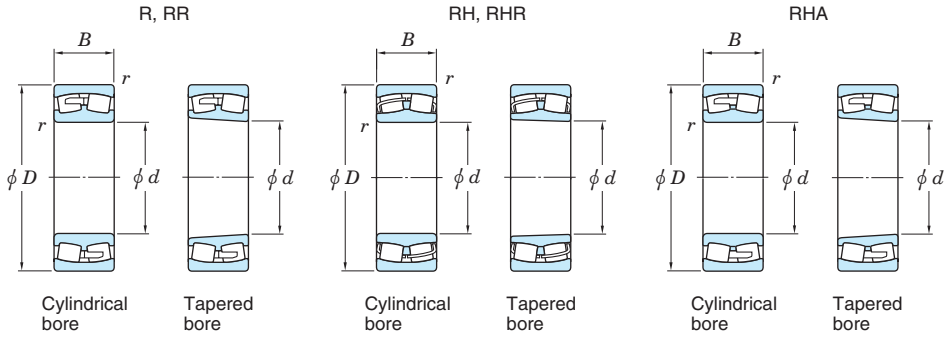
Cylindrical bore | Tapered bore

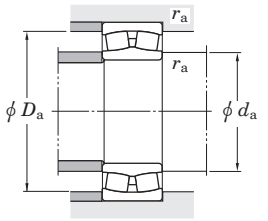


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
75	130	31	1.5	193	236	2 600	3 400	**22215RHR**	**22215RHRK**	83.5	121.5	1.5	0.22	3.07	4.57	3.00	1.73	1.69
	160	37	2.1	246	298	2 200	3 000	**21315RH**	**21315RHK**	87	148	2	0.24	2.87	4.27	2.80	3.81	3.76
	160	55	2.1	393	473	2 200	3 000	**22315RHR**	**22315RHRK**	87	148	2	0.35	1.95	2.90	1.91	5.45	5.33
80	140	33	2	217	271	2 400	3 200	**22216RHR**	**22216RHRK**	90	130	2	0.22	3.07	4.57	3.00	2.17	2.13
	170	39	2.1	275	339	2 100	2 800	**21316RH**	**21316RHK**	92	158	2	0.23	2.88	4.29	2.82	4.53	4.47
	170	58	2.1	431	521	2 100	2 800	**22316RHR**	**22316RHRK**	92	158	2	0.35	1.95	2.90	1.91	6.44	6.30
85	150	36	2	258	324	2 200	3 000	**22217RHR**	**22217RHRK**	95	140	2	0.22	3.01	4.48	2.94	2.75	2.69
	180	41	3	300	372	2 000	2 600	**21317RH**	**21317RHK**	99	166	2.5	0.23	2.89	4.33	2.83	5.32	5.25
	180	60	3	481	586	2 000	2 600	**22317RHR**	**22317RHRK**	99	166	2.5	0.33	2.02	3.00	1.97	7.47	7.31
90	160	40	2	298	381	2 100	2 800	**22218RHR**	**22218RHRK**	100	150	2	0.24	2.79	4.15	2.73	3.50	3.43
	160	52.4	2	336	482	2 100	2 800	**23218RH**	**23218RHK**	100	150	2	0.32	2.14	3.19	2.09	4.63	4.50
	190	43	3	330	416	1 900	2 500	**21318RH**	**21318RHK**	104	176	2.5	0.23	2.91	4.30	2.84	6.20	6.11
	190	64	3	538	662	1 900	2 500	**22318RHR**	**22318RHRK**	104	176	2.5	0.34	2.00	2.98	1.96	8.82	8.63
95	170	43	2.1	334	422	2 000	2 600	**22219RHR**	**22219RHRK**	107	158	2	0.24	2.76	4.11	2.70	4.24	4.15
	200	45	3	362	461	1 800	2 300	**21319RH**	**21319RHK**	109	186	2.5	0.23	2.92	4.35	2.86	7.16	7.06
	200	67	3	586	726	1 800	2 300	**22319RHR**	**22319RHRK**	109	186	2.5	0.33	2.02	3.00	1.97	10.2	9.98
100	150	37	1.5	208	332	2 100	2 800	**23020RH**	**23020RHK**	117	141	1.5	0.22	3.01	4.48	2.94	2.34	2.27
	180	46	2.1	377	481	1 900	2 500	**22220RHR**	**22220RHRK**	112	168	2	0.25	2.74	4.08	2.68	5.11	5.00
	180	60.3	2.1	425	629	1 900	2 500	**23220RH**	**23220RHK**	112	168	2	0.32	2.09	3.11	2.04	6.85	6.66
	215	47	3	416	524	1 600	2 200	**21320RH**	**21320RHK**	114	201	2.5	0.22	3.02	4.49	2.95	8.79	8.68
	215	73	3	700	877	1 600	2 200	**22320RHR**	**22320RHRK**	114	201	2.5	0.35	1.95	2.90	1.91	13.2	12.9
110	170	45	2	300	486	1 900	2 500	**23022RH**	**23022RHK**	120	160	2	0.24	2.84	4.23	2.78	3.85	3.74
	180	56	2	385	605	1 800	2 400	**23122RH**	**23122RHK**	120	170	2	0.29	2.36	3.51	2.31	5.72	5.54
	180	69	2	469	778	1 800	2 400	**24122RH**	**24122RHK30**	120	170	2	0.37	1.84	2.74	1.80	6.98	6.87
	200	53	2.1	491	642	1 700	2 200	**22222RHR**	**22222RHRK**	122	188	2	0.26	2.64	3.93	2.58	7.37	7.21
	200	69.8	2.1	537	792	1 700	2 200	**23222RH**	**23222RHK**	122	188	2	0.34	1.99	2.96	1.94	9.76	9.48
	240	50	3	484	616	1 400	1 900	**21322RH**	**21322RHK**	124	226	2.5	0.21	3.19	4.75	3.12	11.8	11.7

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d (110) ~ (150) mm

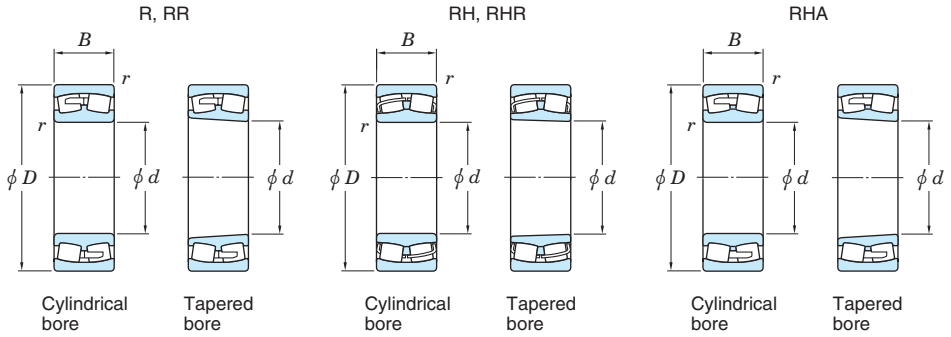


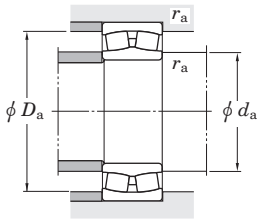


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
110	240	80	3	828	1 040	1 400	1 900	**22322RHR**	**22322RHRK**	124	226	2.5	0.33	2.03	3.02	1.98	18.1	17.7
120	180	46	2	314	524	1 700	2 300	**23024RH**	**23024RHK**	130	170	2	0.23	2.95	4.40	2.89	4.20	4.07
	180	60	2	397	709	1 700	2 300	**24024RH**	**24024RHK30**	130	170	2	0.30	2.23	3.32	2.18	5.43	5.34
	200	62	2	454	714	1 600	2 200	**23124RH**	**23124RHK**	130	190	2	0.29	2.34	3.49	2.29	7.98	7.74
	200	80	2	605	1 020	1 600	2 200	**24124RH**	**24124RHK30**	130	190	2	0.38	1.75	2.61	1.72	10.2	10.0
	215	58	2.1	565	764	1 500	2 000	**22224RHR**	**22224RHRK**	132	203	2	0.26	2.60	3.87	2.54	9.31	9.10
	215	76	2.1	616	956	1 500	2 100	**23224RH**	**23224RHK**	132	203	2	0.34	1.97	2.94	1.93	12.2	11.8
	260	86	3	896	1 130	1 300	1 800	**22324RHR**	**22324RHRK**	134	246	2.5	0.33	2.03	3.02	1.98	22.8	22.3
130	200	52	2	404	674	1 600	2 100	**23026RH**	**23026RHK**	140	190	2	0.24	2.87	4.27	2.80	6.15	5.97
	200	69	2	512	914	1 600	2 100	**24026RH**	**24026RHK30**	140	190	2	0.32	2.14	3.18	2.09	8.03	7.90
	210	64	2	494	799	1 500	2 000	**23126RH**	**23126RHK**	140	200	2	0.28	2.42	3.61	2.37	8.71	8.44
	210	80	2	620	1 080	1 500	2 000	**24126RH**	**24126RHK30**	140	200	2	0.36	1.90	2.83	1.86	10.8	10.6
	230	64	3	658	914	1 400	1 900	**22226RHR**	**22226RHRK**	144	216	2.5	0.26	2.55	3.80	2.50	11.6	11.3
	230	80	3	702	1 090	1 400	1 900	**23226RH**	**23226RHK**	144	216	2.5	0.33	2.05	3.05	2.00	14.4	14.0
	280	93	4	1 040	1 340	1 200	1 600	**22326RHR**	**22326RHRK**	148	262	3	0.33	2.03	3.02	1.98	28.5	27.9
140	210	53	2	422	723	1 500	2 000	**23028RH**	**23028RHK**	150	200	2	0.23	2.98	4.44	2.92	6.62	6.42
	210	69	2	524	957	1 500	2 000	**24028RH**	**24028RHK30**	150	200	2	0.30	2.28	3.39	2.23	8.49	8.35
	225	68	2.1	565	940	1 400	1 900	**23128RH**	**23128RHK**	152	213	2	0.28	2.45	3.65	2.40	10.6	10.3
	225	85	2.1	702	1 220	1 400	1 900	**24128RH**	**24128RHK30**	152	213	2	0.36	1.89	2.82	1.85	13.1	12.9
	250	68	3	759	1 030	1 300	1 700	**22228RHR**	**22228RHRK**	154	236	2.5	0.26	2.60	3.87	2.54	14.5	14.2
	250	88	3	811	1 290	1 300	1 700	**23228RH**	**23228RHK**	154	236	2.5	0.34	1.99	2.96	1.95	19.0	18.4
	300	102	4	1 170	1 570	1 100	1 500	**22328RH**	**22328RHK**	158	282	3	0.35	1.95	2.90	1.90	35.7	34.9
150	210	45	2	334	622	1 600	2 100	**23930R**	**23930RK**	160	200	2	0.20	3.44	5.12	3.36	5.09	4.93
	225	56	2.1	461	797	1 400	1 800	**23030RH**	**23030RHK**	162	213	2	0.22	3.04	4.53	2.97	8.01	7.77
	225	75	2.1	593	1 100	1 400	1 800	**24030RH**	**24030RHK30**	162	213	2	0.30	2.23	3.32	2.18	10.6	10.4
	250	80	2.1	717	1 230	1 300	1 700	**23130RH**	**23130RHK**	162	238	2	0.30	2.24	3.34	2.19	16.4	15.9
	250	100	2.1	915	1 590	1 300	1 700	**24130RH**	**24130RHK30**	162	238	2	0.38	1.77	2.64	1.73	19.9	19.6

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d (150) ~ (180) mm

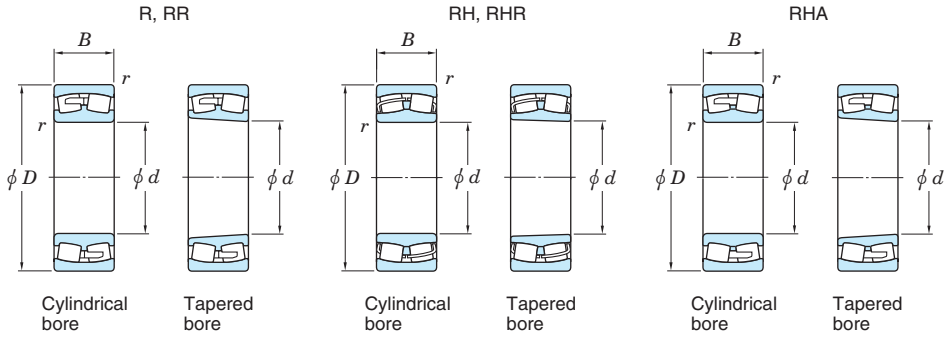


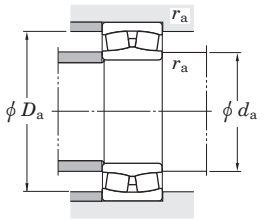


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
150	270	73	3	865	1 200	1 200	1 600	**22230RHR**	**22230RHRK**	164	256	2.5	0.25	2.69	4.00	2.63	18.9	18.5
	270	96	3	959	1 540	1 200	1 600	**23230RH**	**23230RHK**	164	256	2.5	0.34	1.96	2.93	1.92	24.5	23.8
	320	108	4	1 230	1 600	1 200	1 500	**22330R**	**22330RK**	168	302	3	0.38	1.78	2.64	1.74	43.6	42.7
	320	108	4	1 290	1 740	1 200	1 500	**22330RHA**	**22330RHAK**	168	302	3	0.35	1.93	2.87	1.88	40.3	39.4
160	220	45	2	341	649	1 500	2 000	**23932R**	**23932RK**	170	210	2	0.19	3.60	5.37	3.52	5.37	5.20
	240	60	2.1	531	924	1 300	1 700	**23032RH**	**23032RHK**	172	228	2	0.22	3.01	4.48	2.94	9.74	9.44
	240	80	2.1	679	1 270	1 300	1 700	**24032RH**	**24032RHK30**	172	228	2	0.30	2.24	3.34	2.19	12.9	12.7
	270	86	2.1	848	1 430	1 200	1 600	**23132RH**	**23132RHK**	172	258	2	0.30	2.22	3.30	2.17	20.8	20.2
	290	80	3	885	1 270	1 200	1 600	**22232R**	**22232RK**	174	276	2.5	0.28	2.40	3.57	2.35	23.4	22.9
	290	80	3	897	1 320	1 200	1 600	**22232RHA**	**22232RHAK**	174	276	2.5	0.27	2.49	3.71	2.44	21.9	21.4
	290	104	3	1 030	1 650	1 200	1 600	**23232R**	**23232RK**	174	276	2.5	0.38	1.79	2.66	1.75	31.0	30.1
	290	104	3	1 100	1 780	1 200	1 600	**23232RHA**	**23232RHAK**	174	276	2.5	0.36	1.87	2.78	1.83	29.4	28.5
	340	114	4	1 380	1 790	1 100	1 400	**22332R**	**22332RK**	178	322	3	0.38	1.76	2.62	1.72	51.9	51.0
	340	114	4	1 420	1 940	1 100	1 400	**22332RHA**	**22332RHAK**	178	322	3	0.35	1.94	2.89	1.90	48.0	47.1
170	230	45	2	353	691	1 400	1 900	**23934R**	**23934RK**	180	220	2	0.18	3.78	5.63	3.70	5.67	5.49
	260	67	2.1	632	1 090	1 200	1 600	**23034RH**	**23034RHK**	182	248	2	0.23	2.90	4.31	2.83	13.2	12.8
	260	90	2.1	828	1 540	1 200	1 600	**24034RH**	**24034RHK30**	182	248	2	0.32	2.11	3.15	2.07	17.5	17.2
	280	88	2.1	916	1 550	1 100	1 500	**23134RH**	**23134RHK**	182	268	2	0.29	2.30	3.43	2.25	21.9	21.2
	280	109	2.1	1 050	1 820	1 600	1 200	**24134RR**	**24134RRK30**	182	268	2	0.37	1.80	2.68	1.76	27.2	26.8
	310	86	4	952	1 390	1 100	1 500	**22234R**	**22234RK**	188	292	3	0.29	2.29	3.41	2.24	29.0	28.4
	310	86	4	1 010	1 490	1 100	1 500	**22234RHA**	**22234RHAK**	188	292	3	0.28	2.45	3.64	2.39	27.1	26.5
	310	110	4	1 150	1 870	1 100	1 500	**23234R**	**23234RK**	188	292	3	0.37	1.81	2.70	1.77	37.5	36.5
	310	110	4	1 210	1 940	1 100	1 500	**23234RHA**	**23234RHAK**	188	292	3	0.36	1.89	2.82	1.85	35.6	34.6
	360	120	4	1 460	1 920	1 000	1 300	**22334R**	**22334RK**	188	342	3	0.38	1.77	2.64	1.73	62.0	60.8
	360	120	4	1 590	2 200	1 000	1 300	**22334RHA**	**22334RHAK**	188	342	3	0.35	1.95	2.91	1.91	57.3	56.1
180	250	52	2	479	939	1 300	1 700	**23936R**	**23936RK**	190	240	2	0.19	3.55	5.29	3.48	8.22	7.97
	280	74	2.1	768	1 330	1 100	1 400	**23036RH**	**23036RHK**	192	268	2	0.24	2.84	4.23	2.78	17.4	16.9

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d (180) ~ (200) mm



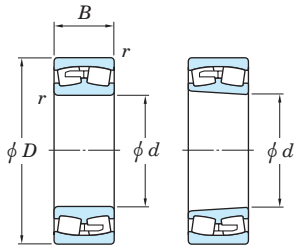


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
180	280	100	2.1	933	1 710	1 600	1 200	**24036RR**	**24036RRK30**	192	268	2	0.34	2.00	2.98	1.96	23.4	23.0
	300	96	3	1 000	1 800	1 100	1 500	**23136R**	**23136RK**	194	286	2.5	0.33	2.04	3.04	2.00	28.4	27.5
	300	96	3	1 060	1 790	1 100	1 500	**23136RHA**	**23136RHAK**	194	286	2.5	0.31	2.19	3.25	2.14	26.5	25.6
	300	118	3	1 220	2 120	1 100	1 500	**24136RR**	**24136RRK30**	194	286	2.5	0.38	1.78	2.65	1.74	34.4	33.9
	300	118	3	1 250	2 240	1 100	1 500	**24136RHA**	**24136RHAK30**	194	286	2.5	0.38	1.79	2.66	1.75	31.8	31.2
	320	86	4	978	1 450	1 100	1 400	**22236R**	**22236RK**	198	302	3	0.28	2.37	3.53	2.32	30.5	29.8
	320	86	4	1 060	1 610	1 100	1 400	**22236RHA**	**22236RHAK**	198	302	3	0.26	2.55	3.80	2.50	28.5	27.8
	320	112	4	1 190	1 980	1 100	1 400	**23236R**	**23236RK**	198	302	3	0.37	1.84	2.74	1.80	39.8	38.6
	320	112	4	1 320	2 170	1 100	1 400	**23236RHA**	**23236RHAK**	198	302	3	0.34	1.97	2.93	1.92	37.7	36.5
	380	126	4	1 740	2 360	920	1 200	**22336R**	**22336RK**	198	362	3	0.36	1.89	2.81	1.84	71.4	69.9
	380	126	4	1 740	2 410	930	1 200	**22336RHA**	**22336RHAK**	198	362	3	0.34	1.97	2.94	1.93	66.0	64.5
190	260	52	2	486	969	1 200	1 600	**23938R**	**23938RK**	200	250	2	0.18	3.69	5.50	3.61	8.40	8.10
	290	75	2.1	736	1 370	1 100	1 500	**23038R**	**23038RK**	202	278	2	0.25	2.67	3.97	2.61	18.8	18.2
	290	75	2.1	789	1 430	1 100	1 500	**23038RHA**	**23038RHAK**	202	278	2	0.25	2.75	4.10	2.69	17.2	16.6
	290	100	2.1	989	1 840	1 100	1 500	**24038RR**	**24038RRK30**	202	278	2	0.33	2.06	3.07	2.02	24.5	24.1
	290	100	2.1	1 010	1 920	1 100	1 500	**24038RHA**	**24038RHAK30**	202	278	2	0.32	2.14	3.19	2.09	22.4	22.0
	320	104	3	1 090	2 000	1 000	1 400	**23138R**	**23138RK**	204	306	2.5	0.34	1.96	2.92	1.92	35.5	34.4
	320	104	3	1 210	2 080	1 000	1 400	**23138RHA**	**23138RHAK**	204	306	2.5	0.31	2.14	3.19	2.10	33.2	32.1
	320	128	3	1 400	2 470	1 000	1 400	**24138RR**	**24138RRK30**	204	306	2.5	0.39	1.74	2.59	1.70	43.0	42.4
	320	128	3	1 460	2 630	1 000	1 400	**24138RHA**	**24138RHAK30**	204	306	2.5	0.38	1.76	2.63	1.72	40.1	39.5
	340	92	4	1 110	1 730	1 000	1 300	**22238R**	**22238RK**	208	322	3	0.29	2.29	3.41	2.24	37.4	36.6
	340	92	4	1 150	1 770	1 000	1 300	**22238RHA**	**22238RHAK**	208	322	3	0.27	2.52	3.76	2.46	34.9	34.1
	340	120	4	1 410	2 210	1 000	1 300	**23238R**	**23238RK**	208	322	3	0.36	1.87	2.79	1.83	47.4	46.0
	340	120	4	1 490	2 470	990	1 300	**23238RHA**	**23238RHAK**	208	322	3	0.35	1.94	2.89	1.90	44.9	43.5
	400	132	5	1 900	2 610	880	1 200	**22338R**	**22338RK**	212	378	4	0.38	1.79	2.66	1.75	84.1	82.4
	400	132	5	1 940	2 810	870	1 200	**22338RHA**	**22338RHAK**	212	378	4	0.34	1.99	2.97	1.95	77.7	76.0
200	280	60	2.1	601	1 190	1 100	1 500	**23940R**	**23940RK**	212	268	2	0.20	3.44	5.13	3.37	12.0	11.6
	310	82	2.1	890	1 670	1 000	1 400	**23040R**	**23040RK**	212	298	2	0.26	2.62	3.90	2.56	24.1	23.4
	310	82	2.1	940	1 680	1 100	1 400	**23040RHA**	**23040RHAK**	212	298	2	0.25	2.68	3.99	2.62	22.0	21.3

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

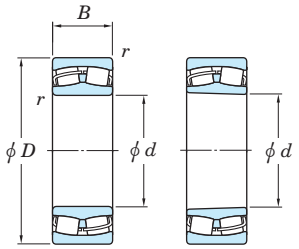
d (200) ~ (240) mm

R, RR



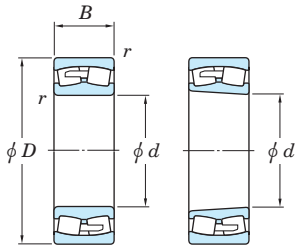
Cylindrical bore | Tapered bore

RH, RHR

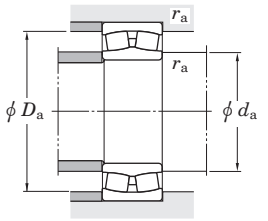


Cylindrical bore | Tapered bore

RHA



Cylindrical bore | Tapered bore

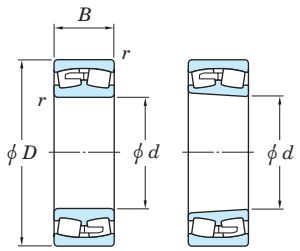


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
200	310	109	2.1	1 140	2 110	1 100	1 400	**24040RR**	**24040RRK30**	212	298	2	0.33	2.02	3.00	1.97	31.2	30.7
	310	109	2.1	1 180	2 230	1 100	1 400	**24040RHA**	**24040RHAK30**	212	298	2	0.33	2.06	3.07	2.02	28.5	28.0
	340	112	3	1 240	2 250	980	1 300	**23140R**	**23140RK**	214	326	2.5	0.34	1.97	2.94	1.93	43.7	42.4
	340	112	3	1 380	2 340	970	1 300	**23140RHA**	**23140RHAK**	214	326	2.5	0.32	2.10	3.13	2.06	40.8	39.5
	340	140	3	1 620	2 820	990	1 300	**24140RR**	**24140RRK30**	214	326	2.5	0.40	1.68	2.49	1.64	53.3	52.5
	340	140	3	1 660	2 970	990	1 300	**24140RHA**	**24140RHAK30**	214	326	2.5	0.41	1.65	2.46	1.62	49.5	48.7
	360	98	4	1 230	1 930	930	1 200	**22240R**	**22240RK**	218	342	3	0.30	2.26	3.36	2.21	45.0	44.0
	360	98	4	1 310	2 030	940	1 300	**22240RHA**	**22240RHAK**	218	342	3	0.27	2.50	3.72	2.45	42.0	41.0
	360	128	4	1 550	2 610	940	1 300	**23240R**	**23240RK**	218	342	3	0.38	1.79	2.67	1.75	58.1	56.4
	360	128	4	1 660	2 780	930	1 200	**23240RHA**	**23240RHAK**	218	342	3	0.35	1.92	2.86	1.88	55.1	53.4
	420	138	5	2 010	2 750	830	1 100	**22340R**	**22340RK**	222	398	4	0.38	1.80	2.68	1.76	95.4	93.5
	420	138	5	2 060	2 920	820	1 100	**22340RHA**	**22340RHAK**	222	398	4	0.34	1.99	2.97	1.95	88.1	86.2
220	300	60	2.1	634	1 300	1 000	1 400	**23944R**	**23944RK**	232	288	2	0.18	3.70	5.50	3.61	13.0	12.6
	340	90	3	984	1 890	940	1 300	**23044R**	**23044RK**	234	326	2.5	0.26	2.55	3.80	2.50	31.5	30.6
	340	90	3	1 090	1 950	940	1 200	**23044RHA**	**23044RHAK**	234	326	2.5	0.25	2.69	4.01	2.63	28.8	27.9
	340	118	3	1 320	2 480	950	1 300	**24044RR**	**24044RRK30**	234	326	2.5	0.33	2.04	3.04	2.00	40.5	39.8
	340	118	3	1 380	2 630	950	1 300	**24044RHA**	**24044RHAK30**	234	326	2.5	0.33	2.08	3.09	2.03	37.0	36.4
	370	120	4	1 440	2 700	880	1 200	**23144R**	**23144RK**	238	352	3	0.34	2.00	2.98	1.96	54.8	53.2
	370	120	4	1 590	2 790	870	1 200	**23144RHA**	**23144RHAK**	238	352	3	0.31	2.15	3.20	2.10	51.2	49.6
	370	150	4	1 880	3 390	880	1 200	**24144RR**	**24144RRK30**	238	352	3	0.39	1.71	2.55	1.67	67.3	66.2
	370	150	4	1 920	3 550	880	1 200	**24144RHA**	**24144RHAK30**	238	352	3	0.40	1.69	2.52	1.65	62.0	61.0
	400	108	4	1 560	2 400	820	1 100	**22244R**	**22244RK**	238	382	3	0.28	2.40	3.57	2.34	63.0	61.7
	400	108	4	1 590	2 440	820	1 100	**22244RHA**	**22244RHAK**	238	382	3	0.27	2.52	3.76	2.47	58.8	57.5
	400	144	4	1 880	3 200	830	1 100	**23244R**	**23244RK**	238	382	3	0.39	1.71	2.55	1.68	81.6	79.2
	400	144	4	2 020	3 350	810	1 100	**23244RHA**	**23244RHAK**	238	382	3	0.36	1.89	2.81	1.85	77.4	75.0
	460	145	5	2 380	3 380	720	960	**22344R**	**22344RK**	242	438	4	0.34	2.00	2.99	1.96	124	122
	460	145	5	2 370	3 470	730	970	**22344RHA**	**22344RHAK**	242	438	4	0.32	2.08	3.09	2.03	115	113
240	320	60	2.1	651	1 380	940	1 300	**23948R**	**23948RK**	252	308	2	0.17	3.95	5.88	3.86	14.0	13.5

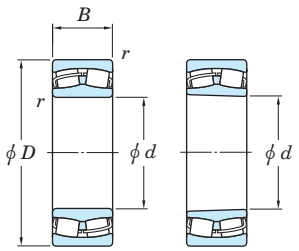
[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d (240) ~ 260 mm

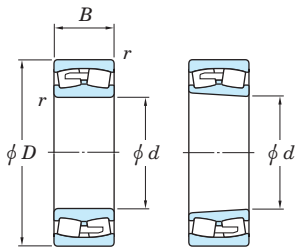
R, RR

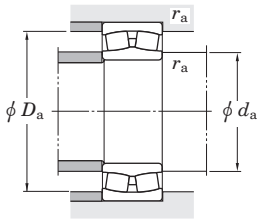


RH, RHR



RHA



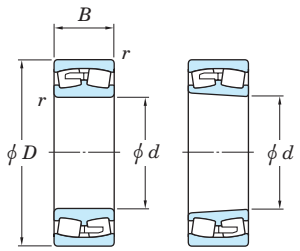


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
240	360	92	3	1 100	2 170	860	1 100	**23048R**	**23048RK**	254	346	2.5	0.25	2.71	4.04	2.65	34.9	33.8
	360	92	3	1 170	2 180	860	1 100	**23048RHA**	**23048RHAK**	254	346	2.5	0.24	2.83	4.21	2.77	31.9	30.9
	360	118	3	1 390	2 710	870	1 200	**24048RR**	**24048RRK30**	254	346	2.5	0.31	2.20	3.27	2.15	43.5	42.9
	360	118	3	1 430	2 840	870	1 200	**24048RHA**	**24048RHAK30**	254	346	2.5	0.30	2.24	3.33	2.19	39.6	39.0
	400	128	4	1 630	3 080	790	1 100	**23148R**	**23148RK**	258	382	3	0.33	2.05	3.05	2.00	67.6	65.6
	400	128	4	1 810	3 200	790	1 000	**23148RHA**	**23148RHAK**	258	382	3	0.31	2.19	3.25	2.14	63.1	61.1
	400	160	4	2 100	3 850	800	1 100	**24148RR**	**24148RRK30**	258	382	3	0.39	1.75	2.60	1.71	82.7	81.4
	400	160	4	2 200	4 130	800	1 100	**24148RHA**	**24148RHAK30**	258	382	3	0.39	1.72	2.56	1.68	76.6	75.3
	440	120	4	1 920	2 940	730	970	**22248R**	**22248RK**	258	422	3	0.29	2.35	3.50	2.30	85.0	83.2
	440	120	4	1 920	2 990	730	970	**22248RHA**	**22248RHAK**	258	422	3	0.27	2.49	3.71	2.43	79.4	77.6
	440	160	4	2 340	3 990	730	970	**23248R**	**23248RK**	258	422	3	0.39	1.73	2.57	1.69	110	107
	440	160	4	2 460	4 130	730	970	**23248RHA**	**23248RHAK**	258	422	3	0.36	1.87	2.78	1.83	104	101
	500	155	5	2 610	4 020	650	870	**22348R**	**22348RK**	262	478	4	0.35	1.94	2.89	1.90	157	154
	500	155	5	2 720	3 990	650	870	**22348RHA**	**22348RHAK**	262	478	4	0.32	2.12	3.16	2.07	145	142
260	360	75	2.1	914	1 880	820	1 100	**23952R**	**23952RK**	272	348	2	0.19	3.54	5.27	3.46	24.0	23.3
	400	104	4	1 330	2 570	760	1 000	**23052R**	**23052RK**	278	382	3	0.25	2.65	3.95	2.59	50.7	49.3
	400	104	4	1 470	2 720	760	1 000	**23052RHA**	**23052RHAK**	278	382	3	0.25	2.75	4.10	2.69	46.3	44.9
	400	140	4	1 810	3 570	770	1 000	**24052RR**	**24052RRK30**	278	382	3	0.33	2.02	3.01	1.98	66.3	65.2
	400	140	4	1 860	3 670	770	1 000	**24052RHA**	**24052RHAK30**	278	382	3	0.33	2.06	3.07	2.02	60.3	59.4
	440	144	4	2 100	3 860	710	940	**23152R**	**23152RK**	278	422	3	0.33	2.03	3.02	1.98	93.6	90.8
	440	144	4	2 220	4 000	700	930	**23152RHA**	**23152RHAK**	278	422	3	0.32	2.12	3.16	2.08	87.4	84.6
	440	180	4	2 590	4 700	720	950	**24152RR**	**24152RRK30**	278	422	3	0.40	1.69	2.51	1.65	114	112
	440	180	4	2 650	4 950	720	950	**24152RHA**	**24152RHAK30**	278	422	3	0.41	1.66	2.47	1.62	106	105
	480	130	5	2 240	3 460	650	870	**22252R**	**22252RK**	282	458	4	0.28	2.40	3.57	2.35	110	108
	480	130	5	2 230	3 430	650	870	**22252RHA**	**22252RHAK**	282	458	4	0.27	2.50	3.72	2.44	103	101
	480	174	5	2 750	4 640	640	860	**23252R**	**23252RK**	282	458	4	0.40	1.69	2.51	1.65	144	140
	480	174	5	2 870	4 900	650	860	**23252RHA**	**23252RHAK**	282	458	4	0.36	1.87	2.78	1.83	137	133
	540	165	6	2 830	4 380	590	780	**22352R**	**22352RK**	288	512	5	0.35	1.94	2.89	1.90	196	192
	540	165	6	3 120	4 620	580	780	**22352RHA**	**22352RHAK**	288	512	5	0.31	2.15	3.21	2.11	181	177

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

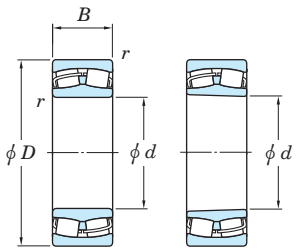
d 280 ~ 300 mm

R, RR



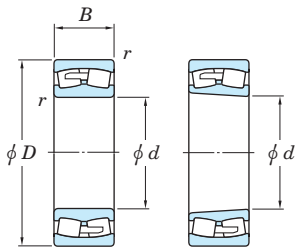
Cylindrical bore | Tapered bore

RH, RHR

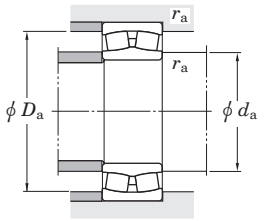


Cylindrical bore | Tapered bore

RHA



Cylindrical bore | Tapered bore

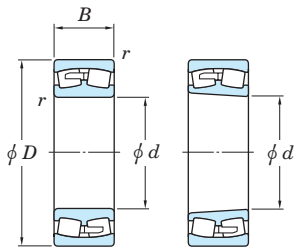


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
280	380	75	2.1	928	1 960	760	1 000	**23956R**	**23956RK**	292	368	2	0.18	3.74	5.57	3.66	26.0	25.2
	420	106	4	1 430	2 860	710	950	**23056R**	**23056RK**	298	402	3	0.25	2.74	4.08	2.68	54.5	52.9
	420	106	4	1 550	2 950	700	940	**23056RHA**	**23056RHAK**	298	402	3	0.24	2.87	4.27	2.80	49.8	48.2
	420	140	4	1 890	3 780	710	950	**24056RR**	**24056RRK30**	298	402	3	0.31	2.15	3.21	2.11	70.2	69.1
	420	140	4	1 960	4 000	710	950	**24056RHA**	**24056RHAK30**	298	402	3	0.31	2.20	3.28	2.15	64.0	62.9
	460	146	5	2 140	4 280	660	880	**23156R**	**23156RK**	302	438	4	0.33	2.04	3.03	1.99	100	96.9
	460	146	5	2 340	4 290	650	870	**23156RHA**	**23156RHAK**	302	438	4	0.30	2.22	3.30	2.17	93.4	90.3
	460	180	5	2 700	5 140	660	880	**24156RR**	**24156RRK30**	302	438	4	0.38	1.79	2.67	1.75	122	120
	460	180	5	2 740	5 240	660	880	**24156RHA**	**24156RHAK30**	302	438	4	0.38	1.76	2.62	1.72	113	112
	500	130	5	2 100	3 380	610	810	**22256R**	**22256RK**	302	478	4	0.28	2.42	3.60	2.37	114	112
	500	130	5	2 320	3 670	610	810	**22256RHA**	**22256RHAK**	302	478	4	0.26	2.64	3.93	2.58	106	104
	500	176	5	2 690	4 910	610	820	**23256R**	**23256RK**	302	478	4	0.37	1.83	2.72	1.79	153	149
	500	176	5	3 010	5 300	600	800	**23256RHA**	**23256RHAK**	302	478	4	0.35	1.95	2.91	1.91	145	141
	580	175	6	3 150	4 910	530	710	**22356R**	**22356RK**	308	552	5	0.34	1.98	2.95	1.93	229	225
	580	175	6	3 510	5 260	530	700	**22356RHA**	**22356RHAK**	308	552	5	0.31	2.19	3.25	2.14	212	208
300	420	90	3	1 280	2 610	680	910	**23960R**	**23960RK**	314	406	2.5	0.20	3.42	5.09	3.34	40.0	38.8
	460	118	4	1 750	3 480	630	840	**23060R**	**23060RK**	318	442	3	0.25	2.69	4.00	2.63	75.8	73.7
	460	118	4	1 940	3 700	630	840	**23060RHA**	**23060RHAK**	318	442	3	0.24	2.79	4.16	2.73	68.9	66.8
	460	160	4	2 350	4 690	640	850	**24060RR**	**24060RRK30**	318	442	3	0.33	2.04	3.04	2.00	99.5	97.9
	460	160	4	2 420	4 910	640	850	**24060RHA**	**24060RHAK30**	318	442	3	0.32	2.09	3.11	2.04	90.7	89.1
	500	160	5	2 490	4 850	590	790	**23160R**	**23160RK**	322	478	4	0.33	2.02	3.01	1.98	132	128
	500	160	5	2 730	4 970	580	780	**23160RHA**	**23160RHAK**	322	478	4	0.31	2.18	3.25	2.13	123	119
	500	200	5	3 320	6 280	590	790	**24160RR**	**24160RRK30**	322	478	4	0.40	1.67	2.49	1.63	162	160
	500	200	5	3 320	6 420	590	790	**24160RHA**	**24160RHAK30**	322	478	4	0.39	1.72	2.56	1.68	150	148
	540	140	5	2 690	4 330	550	740	**22260R**	**22260RK**	322	518	4	0.27	2.48	3.69	2.43	145	142
	540	140	5	2 650	4 360	550	740	**22260RHA**	**22260RHAK**	322	518	4	0.26	2.62	3.90	2.56	135	132
	540	192	5	3 430	5 910	540	720	**23260R**	**23260RK**	322	518	4	0.37	1.83	2.72	1.79	197	192
	540	192	5	3 540	6 310	540	720	**23260RHA**	**23260RHAK**	322	518	4	0.35	1.93	2.88	1.89	187	182
	620	185	7.5	3 910	5 430	470	630	**22360R**	**22360RK**	336	584	6	0.32	2.09	3.10	2.04	289	284

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

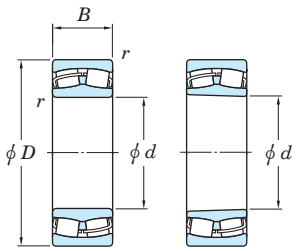
d 320 ~ (360) mm

R, RR



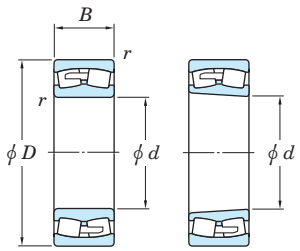
Cylindrical bore | Tapered bore

RH, RHR

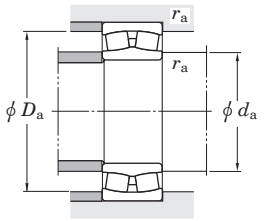


Cylindrical bore | Tapered bore

RHA



Cylindrical bore | Tapered bore

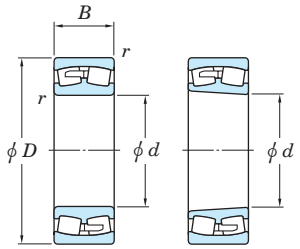


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
320	440	90	3	1 330	2 870	630	840	**23964R**	**23964RK**	334	426	2.5	0.19	3.61	5.38	3.53	43.0	41.7
	480	121	4	1 830	3 740	590	790	**23064R**	**23064RK**	338	462	3	0.24	2.76	4.11	2.70	81.2	78.8
	480	121	4	1 980	3 850	590	780	**23064RHA**	**23064RHAK**	338	462	3	0.24	2.87	4.27	2.80	74.5	72.1
	480	160	4	2 400	4 920	590	790	**24064RR**	**24064RRK30**	338	462	3	0.31	2.16	3.22	2.11	105	103
	480	160	4	2 510	5 230	590	790	**24064RHA**	**24064RHAK30**	338	462	3	0.31	2.21	3.29	2.16	93.4	91.4
	540	176	5	2 900	5 700	530	700	**23164R**	**23164RK**	342	518	4	0.33	2.04	3.04	2.00	171	166
	540	176	5	3 220	5 960	530	700	**23164RHA**	**23164RHAK**	342	518	4	0.32	2.13	3.17	2.08	160	155
	540	218	5	3 730	6 950	530	710	**24164RR**	**24164RRK30**	342	518	4	0.39	1.72	2.56	1.68	208	205
	540	218	5	3 760	7 190	530	710	**24164RHA**	**24164RHAK30**	342	518	4	0.40	1.70	2.52	1.66	199	196
	580	150	5	2 730	4 540	490	660	**22264R**	**22264RK**	342	558	4	0.28	2.41	3.59	2.35	175	171
	580	208	5	3 630	6 550	500	670	**23264R**	**23264RK**	342	558	4	0.38	1.76	2.62	1.72	249	242
	580	208	5	4 010	7 030	490	650	**23264RHA**	**23264RHAK**	342	558	4	0.36	1.90	2.83	1.86	236	229
340	460	90	3	1 350	2 980	590	790	**23968R**	**23968RK**	354	446	2.5	0.18	3.82	5.69	3.74	45.0	43.6
	520	133	5	2 130	4 330	530	710	**23068R**	**23068RK**	362	498	4	0.25	2.69	4.00	2.63	108	105
	520	133	5	2 330	4 470	530	710	**23068RHA**	**23068RHAK**	362	498	4	0.24	2.80	4.18	2.74	98.7	95.7
	520	180	5	2 920	5 970	530	710	**24068RR**	**24068RRK30**	362	498	4	0.33	2.06	3.06	2.01	142	140
	520	180	5	3 040	6 330	530	710	**24068RHA**	**24068RHAK30**	362	498	4	0.32	2.11	3.14	2.06	130	128
	580	190	5	3 280	6 430	480	640	**23168R**	**23168RK**	362	558	4	0.34	1.97	2.93	1.93	216	210
	580	190	5	3 680	6 720	480	640	**23168RHA**	**23168RHAK**	362	558	4	0.32	2.11	3.14	2.06	202	196
	580	243	5	4 440	8 400	490	650	**24168RR**	**24168RRK30**	362	558	4	0.41	1.64	2.45	1.61	270	266
	580	243	5	4 540	8 810	490	650	**24168RHA**	**24168RHAK30**	362	558	4	0.42	1.61	2.39	1.57	259	255
	620	165	6	3 550	5 430	440	590	**22268R**	**22268RK**	368	592	5	0.28	2.43	3.61	2.37	221	216
	620	224	6	4 090	7 560	450	600	**23268R**	**23268RK**	368	592	5	0.38	1.77	2.63	1.73	306	297
	620	224	6	4 550	8 030	440	590	**23268RHA**	**23268RHAK**	368	592	5	0.36	1.88	2.81	1.84	290	281
360	480	90	3	1 360	3 060	550	730	**23972R**	**23972RK**	374	466	2.5	0.17	3.95	5.88	3.86	46.5	45.0
	540	134	5	2 280	4 800	500	660	**23072R**	**23072RK**	382	518	4	0.24	2.76	4.11	2.70	115	111
	540	134	5	2 420	4 770	500	660	**23072RHA**	**23072RHAK**	382	518	4	0.23	2.92	4.34	2.85	105	101
	540	180	5	3 030	6 300	500	660	**24072RR**	**24072RRK30**	382	518	4	0.31	2.15	3.21	2.11	149	147
	540	180	5	3 120	6 620	500	660	**24072RHA**	**24072RHAK30**	382	518	4	0.30	2.22	3.30	2.17	135	133

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

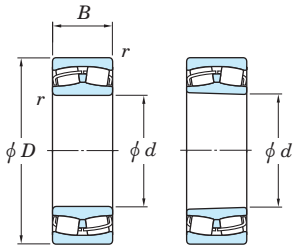
d (360) ~ (400) mm

R, RR



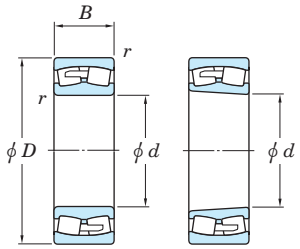
Cylindrical bore | Tapered bore

RH, RHR

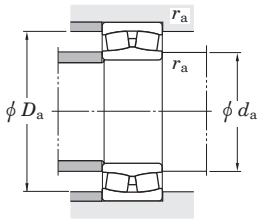


Cylindrical bore | Tapered bore

RHA



Cylindrical bore | Tapered bore

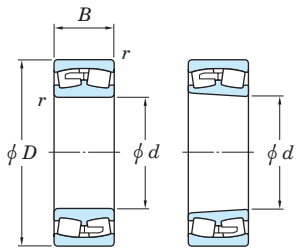


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Constant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
360	600	192	5	3 770	7 040	440	590	**23172R**	**23172RK**	382	578	4	0.33	2.07	3.09	2.03	228	221
	600	192	5	3 850	7 210	450	590	**23172RHA**	**23172RHAK**	382	578	4	0.31	2.19	3.25	2.14	213	206
	600	243	5	4 080	7 690	450	600	**24172R**	**24172RK30**	382	578	4	0.39	1.74	2.59	1.70	287	283
	600	243	5	4 600	9 180	460	610	**24172RHA**	**24172RHAK30**	382	578	4	0.40	1.69	2.51	1.65	274	270
	650	170	6	3 770	5 830	410	550	**22272R**	**22272RK**	388	622	5	0.27	2.47	3.68	2.42	248	243
	650	232	6	4 850	8 810	410	540	**23272R**	**23272RK**	388	622	5	0.37	1.83	2.72	1.79	346	336
	650	232	6	4 960	9 050	410	550	**23272RHA**	**23272RHAK**	388	622	5	0.35	1.92	2.85	1.87	328	318
380	520	106	4	1 780	3 940	500	660	**23976R**	**23976RK**	398	502	3	0.19	3.62	5.39	3.54	70.0	67.9
	560	135	5	2 320	4 970	470	630	**23076R**	**23076RK**	402	538	4	0.24	2.79	4.16	2.73	122	118
	560	135	5	2 520	5 080	460	620	**23076RHA**	**23076RHAK**	402	538	4	0.22	3.03	4.51	2.96	112	108
	560	180	5	3 110	6 590	470	620	**24076RR**	**24076RRK30**	402	538	4	0.30	2.26	3.36	2.21	156	154
	560	180	5	3 190	6 910	470	620	**24076RHA**	**24076RHAK30**	402	538	4	0.29	2.32	3.45	2.27	142	139
	620	194	5	3 590	7 320	420	560	**23176R**	**23176RK**	402	598	4	0.31	2.18	3.24	2.13	240	233
	620	194	5	4 000	7 700	420	560	**23176RHA**	**23176RHAK**	402	598	4	0.30	2.26	3.36	2.21	224	217
	620	243	5	4 220	8 220	430	570	**24176R**	**24176RK30**	402	598	4	0.38	1.78	2.65	1.74	302	297
	620	243	5	4 830	9 840	420	560	**24176RHA**	**24176RHAK30**	402	598	4	0.38	1.78	2.65	1.74	288	283
	680	240	6	5 200	9 500	380	500	**23276R**	**23276RK**	408	652	5	0.36	1.85	2.76	1.81	386	375
	680	240	6	5 320	9 760	380	510	**23276RHA**	**23276RHAK**	408	652	5	0.35	1.94	2.89	1.90	365	354
400	540	106	4	1 880	4 300	470	620	**23980R**	**23980RK**	418	522	3	0.18	3.76	5.59	3.67	73.0	70.7
	600	148	5	2 710	5 790	420	560	**23080R**	**23080RK**	422	578	4	0.24	2.84	4.23	2.78	155	151
	600	148	5	2 930	5 860	420	560	**23080RHA**	**23080RHAK**	422	578	4	0.23	2.94	4.37	2.87	142	138
	600	200	5	3 830	8 110	430	570	**24080R**	**24080RK30**	422	578	4	0.32	2.09	3.12	2.05	206	203
	600	200	5	3 780	8 140	420	570	**24080RHA**	**24080RHAK30**	422	578	4	0.31	2.21	3.29	2.16	192	189
	650	200	6	4 110	7 780	390	520	**23180R**	**23180RK**	428	622	5	0.31	2.19	3.25	2.14	273	265
	650	200	6	4 310	8 300	390	520	**23180RHA**	**23180RHAK**	428	622	5	0.29	2.30	3.43	2.25	255	247
	650	250	6	4 640	9 140	390	530	**24180R**	**24180RK30**	428	622	5	0.37	1.82	2.70	1.78	338	333
	650	250	6	5 180	10 600	390	520	**24180RHA**	**24180RHAK30**	428	622	5	0.37	1.82	2.71	1.78	322	317
	720	256	6	5 210	9 850	350	470	**23280R**	**23280RK**	428	692	5	0.37	1.80	2.69	1.76	468	454

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

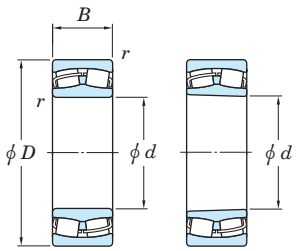
d (400) ~ (460) mm

R, RR



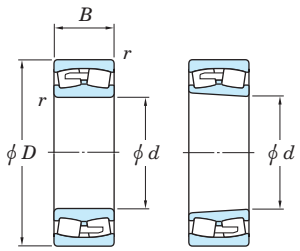
Cylindrical bore | Tapered bore

RH, RHR

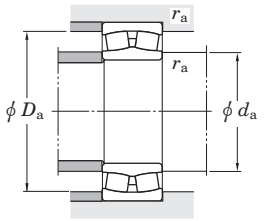


Cylindrical bore | Tapered bore

RHA



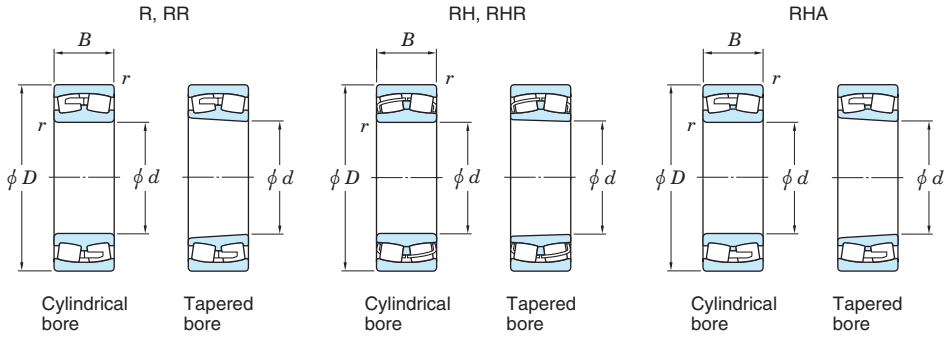
Cylindrical bore | Tapered bore

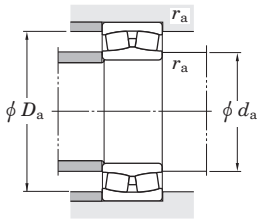


Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
400	720	256	6	5 850	10 600	350	460	**23280RHA**	**23280RHAK**	428	692	5	0.35	1.92	2.86	1.88	441	427
420	560	106	4	1 880	4 320	430	580	**23984R**	**23984RK**	438	542	3	0.17	3.91	5.82	3.82	76.0	73.6
	620	150	5	2 800	6 120	400	530	**23084R**	**23084RK**	442	598	4	0.23	2.90	4.31	2.83	164	159
	620	150	5	3 050	6 230	400	530	**23084RHA**	**23084RHAK**	442	598	4	0.22	3.02	4.49	2.95	150	145
	620	200	5	3 590	7 600	400	530	**24084R**	**24084RK30**	442	598	4	0.30	2.23	3.32	2.18	212	209
	620	200	5	3 870	8 490	400	530	**24084RHA**	**24084RHAK30**	442	598	4	0.29	2.31	3.44	2.26	198	195
	700	224	6	4 470	9 110	350	470	**23184R**	**23184RK**	448	672	5	0.33	2.03	3.02	1.98	363	352
	700	224	6	5 040	9 630	350	470	**23184RHA**	**23184RHAK**	448	672	5	0.31	2.19	3.25	2.14	339	328
	700	280	6	5 450	10 600	360	480	**24184R**	**24184RK30**	448	672	5	0.40	1.71	2.54	1.67	445	438
	700	280	6	6 120	12 400	350	470	**24184RHA**	**24184RHAK30**	448	672	5	0.39	1.72	2.56	1.68	425	418
	760	272	7.5	6 500	11 500	320	430	**23284R**	**23284RK**	456	724	6	0.37	1.84	2.74	1.80	556	540
	760	272	7.5	6 580	11 900	320	430	**23284RHA**	**23284RHAK**	456	724	6	0.36	1.90	2.83	1.86	525	508
440	600	118	4	2 330	5 330	400	530	**23988R**	**23988RK**	458	582	3	0.18	3.75	5.58	3.66	101	97.8
	650	157	6	3 030	6 540	370	500	**23088R**	**23088RK**	468	622	5	0.24	2.76	4.11	2.70	188	183
	650	157	6	3 370	6 910	370	490	**23088RHA**	**23088RHAK**	468	622	5	0.22	3.04	4.53	2.97	172	167
	650	212	6	3 910	8 320	370	490	**24088R**	**24088RK30**	468	622	5	0.29	2.35	3.50	2.30	247	243
	650	212	6	4 330	9 560	370	490	**24088RHA**	**24088RHAK30**	468	622	5	0.30	2.28	3.39	2.23	231	227
	720	226	6	5 040	9 600	330	440	**23188R**	**23188RK**	468	692	5	0.33	2.08	3.09	2.03	378	366
	720	226	6	5 250	10 300	330	440	**23188RHA**	**23188RHAK**	468	692	5	0.30	2.25	3.34	2.20	353	341
	720	280	6	5 640	11 200	340	450	**24188R**	**24188RK30**	468	692	5	0.38	1.76	2.62	1.72	460	453
	720	280	6	6 200	12 900	330	440	**24188RHA**	**24188RHAK30**	468	692	5	0.38	1.79	2.67	1.75	439	432
	790	280	7.5	6 860	12 300	300	400	**23288R**	**23288RK**	476	754	6	0.36	1.86	2.77	1.82	613	595
	790	280	7.5	6 930	12 700	300	390	**23288RHA**	**23288RHAK**	476	754	6	0.35	1.93	2.88	1.89	580	562
460	620	118	4	2 330	5 350	370	500	**23992R**	**23992RK**	478	602	3	0.17	3.89	5.79	3.80	107	104
	680	163	6	3 240	7 170	340	460	**23092R**	**23092RK**	488	652	5	0.23	2.92	4.34	2.85	215	209
	680	163	6	3 600	7 430	340	460	**23092RHA**	**23092RHAK**	488	652	5	0.22	3.04	4.53	2.97	197	191
	680	218	6	4 570	10 100	340	460	**24092R**	**24092RK30**	488	652	5	0.30	2.23	3.32	2.18	277	272

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d (460) ~ 500 mm

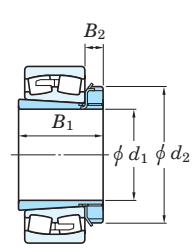




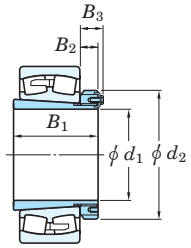
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Mounting dimensions (mm)			Con-stant	Axial load factors			(Refer.) Mass (kg)	
d	D	B	r min.	C_r	C_{0r}	Grease lub.	Oil lub.	Cylindrical bore	Tapered bore	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0	Cylindrical bore	Tapered bore
460	680	218	6	4 640	10 300	340	460	**24092RHA**	**24092RHAK30**	488	652	5	0.29	2.33	3.46	2.27	259	254
	760	240	7.5	5 180	10 800	310	410	**23192R**	**23192RK**	496	724	6	0.33	2.07	3.09	2.03	450	436
	760	240	7.5	5 760	11 200	300	400	**23192RHA**	**23192RHAK**	496	724	6	0.30	2.22	3.31	2.17	420	406
	760	300	7.5	6 040	12 200	310	410	**24192R**	**24192RK30**	496	724	6	0.35	1.95	2.90	1.91	550	541
	760	300	7.5	6 920	14 200	310	410	**24192RHA**	**24192RHAK30**	496	724	6	0.38	1.75	2.61	1.72	525	516
	830	296	7.5	7 610	13 700	270	370	**23292R**	**23292RK**	496	794	6	0.36	1.85	2.76	1.81	720	699
	830	296	7.5	7 670	14 200	270	360	**23292RHA**	**23292RHAK**	496	794	6	0.35	1.92	2.85	1.87	679	658
480	650	128	5	2 630	6 130	350	460	**23996R**	**23996RK**	502	628	4	0.18	3.75	5.59	3.67	123	119
	700	165	6	3 350	7 540	320	430	**23096R**	**23096RK**	508	672	5	0.22	3.01	4.47	2.94	225	218
	700	165	6	3 730	7 860	320	430	**23096RHA**	**23096RHAK**	508	672	5	0.22	3.12	4.64	3.05	206	199
	700	218	6	4 420	9 650	320	430	**24096R**	**24096RK30**	508	672	5	0.29	2.32	3.45	2.26	287	282
	700	218	6	4 750	10 700	320	430	**24096RHA**	**24096RHAK30**	508	672	5	0.28	2.41	3.59	2.35	268	263
	790	248	7.5	5 440	11 500	280	380	**23196R**	**23196RK**	516	754	6	0.32	2.09	3.12	2.05	503	488
	790	248	7.5	6 160	12 000	280	380	**23196RHA**	**23196RHAK**	516	754	6	0.30	2.24	3.34	2.19	470	455
	790	308	7.5	7 190	14 800	280	380	**24196R**	**24196RK30**	516	754	6	0.39	1.74	2.59	1.70	606	597
	790	308	7.5	7 360	15 200	290	380	**24196RHA**	**24196RHAK30**	516	754	6	0.38	1.78	2.65	1.74	580	568
	870	310	7.5	8 380	15 100	250	340	**23296R**	**23296RK**	516	834	6	0.36	1.85	2.75	1.81	831	807
	870	310	7.5	8 450	15 700	250	340	**23296RHA**	**23296RHAK**	516	834	6	0.35	1.91	2.85	1.87	785	761
500	670	128	5	2 670	6 310	330	440	**239/500R**	**239/500RK**	522	648	4	0.17	3.87	5.76	3.79	131	127
	720	167	6	3 580	8 090	310	410	**230/500R**	**230/500RK**	528	692	5	0.23	2.94	4.37	2.87	235	228
	720	218	6	4 600	10 300	310	410	**240/500R**	**240/500RK30**	528	692	5	0.28	2.39	3.56	2.34	297	292
	830	264	7.5	6 160	13 000	260	350	**231/500R**	**231/500RK**	536	794	6	0.33	2.05	3.05	2.00	595	577
	830	325	7.5	7 710	15 900	260	350	**241/500R**	**241/500RK30**	536	794	6	0.36	1.85	2.76	1.81	712	701
	920	336	7.5	8 770	16 700	230	310	**232/500R**	**232/500RK**	536	884	6	0.39	1.74	2.59	1.70	1 020	992

[Remark] Standard cage types used for the above bearings are shown in Table 5 earlier in this section.

d_1 20 ~ 65 mm



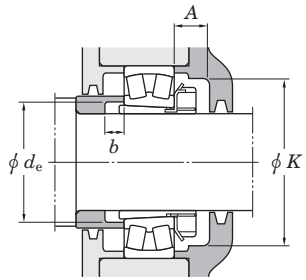
$d_1 \leq 180$ mm



$d_1 \geq 200$ mm

Boundary dimensions (mm) d_1	B_1	d_2	B_2	B_3	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
20	29	38	8	—	25	22205RHRK+**H305X**	15	45	29	5	0.269	A305X	AN05
25	31	45	8	—	30	22206RHRK+**H306X**	15	50	34	5	0.404	A306X	AN06
	31	45	8	—	30	21306RHK+**H306X**	15	50	34	6	0.538	A306X	AN06
30	35	52	9	—	35	22207RHRK+**H307X**	17	58	39	5	0.610	A307X	AN07
	35	52	9	—	35	21307RHK+**H307X**	17	58	39	7	0.725	A307X	AN07
35	36	58	10	—	40	22208RHRK+**H308X**	17	65	44	5	0.793	A308X	AN08
	36	58	10	—	40	21308RHK+**H308X**	17	65	44	5	0.972	A308X	AN08
	46	58	10	—	40	22308RHRK+**H2308X**	17	65	45	5	1.30	A2308X	AN08
40	39	65	11	—	45	22209RHRK+**H309X**	17	72	49	8	0.855	A309X	AN09
	39	65	11	—	45	21309RHK+**H309X**	17	72	49	5	1.31	A309X	AN09
	50	65	11	—	45	22309RHRK+**H2309X**	17	72	50	5	1.70	A2309X	AN09
45	42	70	12	—	50	22210RHRK+**H310X**	19	76	54	10	0.953	A310X	AN10
	42	70	12	—	50	21310RHK+**H310X**	19	76	54	5	1.67	A310X	AN10
	55	70	12	—	50	22310RHRK+**H2310X**	19	76	56	5	2.26	A2310X	AN10
50	45	75	12	—	55	22211RHRK+**H311X**	19	85	60	11	1.22	A311X	AN11
	45	75	12	—	55	21311RHK+**H311X**	19	85	60	6	2.04	A311X	AN11
	59	75	12	—	55	22311RHRK+**H2311X**	19	85	61	6	2.80	A2311X	AN11
55	47	80	13	—	60	22212RHRK+**H312X**	20	90	65	9	1.59	A312X	AN12
	47	80	13	—	60	21312RHK+**H312X**	20	90	65	5	2.50	A312X	AN12
	62	80	13	—	60	22312RHRK+**H2312X**	20	90	66	5	3.50	A2312X	AN12
60	50	85	14	—	65	22213RHRK+**H313X**	21	96	70	8	2.01	A313X	AN13
	50	85	14	—	65	21313RHK+**H313X**	21	96	70	5	3.07	A313X	AN13
	65	85	14	—	65	22313RHRK+**H2313X**	21	96	72	5	4.17	A2313X	AN13
65	55	98	15	—	75	22215RHRK+**H315X**	23	110	80	12	2.58	A315X	AN15
	55	98	15	—	75	21315RHK+**H315X**	23	110	80	5	4.65	A315X	AN15
	73	98	15	—	75	22315RHRK+**H2315X**	23	110	82	5	6.44	A2315X	AN15

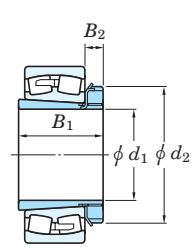
d_1 70 ~ 110 mm



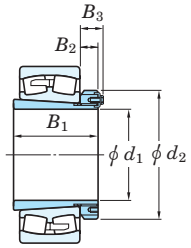
Boundary dimensions (mm) d_1	B_1	d_2	B_2	B_3	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
70	59	105	17	—	80	22216RHRK+**H316X**	25	120	86	12	3.22	A316X	AN16
	59	105	17	—	80	21316RHK+**H316X**	25	120	86	5	5.56	A316X	AN16
	78	105	17	—	80	22316RHRK+**H2316X**	25	120	87	5	7.64	A2316X	AN16
75	63	110	18	—	85	22217RHRK+**H317X**	27	128	91	12	3.93	A317X	AN17
	63	110	18	—	85	21317RHK+**H317X**	27	128	91	6	6.49	A317X	AN17
	82	110	18	—	85	22317RHRK+**H2317X**	27	128	94	6	8.83	A2317X	AN17
80	65	120	18	—	90	22218RHRK+**H318X**	28	139	96	10	4.88	A318X	AN18
	86	120	18	—	90	23218RHK+**H2318X**	28	139	99	18	6.20	A2318X	AN18
	65	120	18	—	90	21318RHK+**H318X**	28	139	96	6	7.56	A318X	AN18
	86	120	18	—	90	22318RHRK+**H2318X**	28	139	99	6	10.3	A2318X	AN18
85	68	125	19	—	95	22219RHRK+**H319X**	29	145	102	9	5.77	A319X	AN19
	68	125	19	—	95	21319RHK+**H319X**	29	145	102	7	8.68	A319X	AN19
	90	125	19	—	95	22319RHRK+**H2319X**	29	145	105	7	12.0	A2319X	AN19
90	71	130	20	—	100	22220RHRK+**H320X**	30	150	107	8	6.80	A320X	AN20
	97	130	20	—	100	23220RHK+**H2320X**	30	150	110	19	8.94	A2320X	AN20
	71	130	20	—	100	21320RHK+**H320X**	30	150	107	7	10.5	A320X	AN20
	97	130	20	—	100	22320RHRK+**H2320X**	30	150	110	7	15.2	A2320X	AN20
100	81	145	21	—	110	23122RHK+**H3122X**	32	170	117	7	7.91	A3122X	AN22
	77	145	21	—	110	22222RHRK+**H322X**	32	170	117	6	9.50	A322X	AN22
	105	145	21	—	110	23222RHK+**H2322X**	32	170	121	17	12.4	A2322X	AN22
	77	145	21	—	110	21322RHK+**H322X**	32	170	117	9	14.0	A322X	AN22
	105	145	21	—	110	22322RHRK+**H2322X**	32	170	121	7	20.6	A2322X	AN22
110	72	145	22	—	120	23024RHK+**H3024X**	33	180	127	7	6.12	A3024	ANL24
	88	155	22	—	120	23124RHK+**H3124X**	33	180	128	7	10.5	A3124	AN24
	88	155	22	—	120	22224RHRK+**H3124X**	33	180	128	11	11.9	A3124	AN24
	112	155	22	—	120	23224RHK+**H2324X**	33	180	131	17	15.1	A2324	AN24
	112	155	22	—	120	22324RHRK+**H2324X**	33	180	131	7	25.6	A2324	AN24

Adapter assemblies for spherical roller bearings

d_1 115 ~ (150) mm



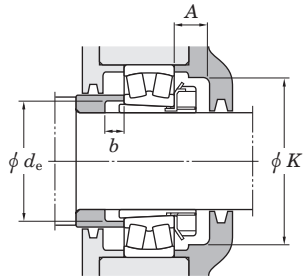
$d_1 \leq 180$ mm



$d_1 \geq 200$ mm

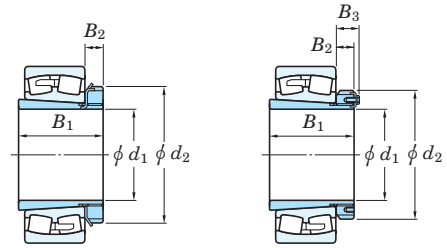
Boundary dimensions (mm) d_1	B_1	d_2	B_2	B_3	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
115	80	155	23	—	130	23026RHK+**H3026**	34	190	137	8	9.01	A3026	ANL26
	92	165	23	—	130	23126RHK+**H3126**	34	190	138	8	12.3	A3126	AN26
	92	165	23	—	130	22226RHRK+**H3126**	34	190	138	8	15.1	A3126	AN26
	121	165	23	—	130	23226RHK+**H2326**	34	190	142	21	18.8	A2326	AN26
	121	165	23	—	130	22326RHRK+**H2326**	34	190	142	8	32.7	A2326	AN26
125	82	165	24	—	140	23028RHK+**H3028**	36	205	147	8	9.79	A3028	ANL28
	97	180	24	—	140	23128RHK+**H3128**	36	205	149	8	14.9	A3128	AN28
	97	180	24	—	140	22228RHRK+**H3128**	36	205	149	8	18.8	A3128	AN28
	131	180	24	—	140	23228RHK+**H2328**	36	205	152	22	24.3	A2328	AN28
	131	180	24	—	140	22328RHK+**H2328**	36	205	152	8	40.8	A2328	AN28
135	87	180	26	—	150	23030RHK+**H3030**	37	220	158	8	11.9	A3030	ANL30
	111	195	26	—	150	23130RHK+**H3130**	37	220	160	8	21.7	A3130	AN30
	111	195	26	—	150	22230RHRK+**H3130**	37	220	160	15	24.3	A3130	AN30
	139	195	26	—	150	23230RHK+**H2330**	37	220	163	20	30.8	A2330	AN30
	139	195	26	—	150	22330RK+**H2330**	37	220	163	8	49.7	A2330	AN30
	139	195	26	—	150	22330RHAK+**H2330**	37	220	163	8	46.4	A2330	AN30
140	93	190	28	—	160	23032RHK+**H3032**	39	230	168	8	15.0	A3032	ANL32
	119	210	28	—	160	23132RHK+**H3132**	39	230	170	8	27.9	A3132	AN32
	119	210	28	—	160	22232RK+**H3132**	39	230	170	14	30.6	A3132	AN32
	119	210	28	—	160	22232RHAK+**H3132**	39	230	170	14	29.1	A3132	AN32
	147	210	28	—	160	23232RK+**H2332**	39	230	174	18	39.6	A2332	AN32
	147	210	28	—	160	23232RHAK+**H2332**	39	230	174	18	38.0	A2332	AN32
	147	210	28	—	160	22332RK+**H2332**	39	230	174	8	60.5	A2332	AN32
	147	210	28	—	160	22332RHAK+**H2332**	39	230	174	8	56.6	A2332	AN32
150	101	200	29	—	170	23034RHK+**H3034**	40	250	179	8	19.2	A3034	ANL34
	122	220	29	—	170	23134RHK+**H3134**	40	250	180	8	30.0	A3134	AN34
	122	220	29	—	170	22234RK+**H3134**	40	250	180	10	37.2	A3134	AN34
	122	220	29	—	170	22234RHAK+**H3134**	40	250	180	10	35.3	A3134	AN34

d_1 (150) ~ (180) mm



Boundary dimensions (mm) d_1	B_1	d_2	B_2	B_3	Brg. bore d (mm)	Designations Bearing + adapter ass'y	Mounting dimensions (mm) A min.	K min.	d_e min.	b min.	Mass Brg.+adapter ass'y (kg)	(Refer.) Adapter sleeve No.	Locknut No.
150	154	220	29	—	170	23234RK+**H2334**	40	250	185	18	47.2	A2334	AN34
	154	220	29	—	170	23234RHAK+**H2334**	40	250	185	18	45.3	A2334	AN34
	154	220	29	—	170	22334RK+**H2334**	40	250	185	8	71.5	A2334	AN34
	154	220	29	—	170	22334RHAK+**H2334**	40	250	185	8	66.8	A2334	AN34
160	109	210	30	—	180	23036RHK+**H3036**	41	260	189	8	24.2	A3036	ANL36
	131	230	30	—	180	23136RK+**H3136**	41	260	191	8	37.1	A3136	AN36
	131	230	30	—	180	23136RHAK+**H3136**	41	260	191	8	35.2	A3136	AN36
	131	230	30	—	180	22236RK+**H3136**	41	260	191	18	39.4	A3136	AN36
	131	230	30	—	180	22236RHAK+**H3136**	41	260	191	18	37.4	A3136	AN36
	161	230	30	—	180	23236RK+**H2336**	41	260	195	22	50.5	A2336	AN36
	161	230	30	—	180	23236RHAK+**H2336**	41	260	195	22	48.4	A2336	AN36
	161	230	30	—	180	22336RK+**H2336**	41	260	195	8	81.8	A2336	AN36
	161	230	30	—	180	22336RHAK+**H2336**	41	260	195	8	76.4	A2336	AN36
170	112	220	31	—	190	23038RK+**H3038**	43	270	199	9	26.1	A3038	ANL38
	112	220	31	—	190	23038RHAK+**H3038**	43	270	199	9	24.5	A3038	ANL38
	141	240	31	—	190	23138RK+**H3138**	43	270	202	9	45.3	A3138	AN38
	141	240	31	—	190	23138RHAK+**H3138**	43	270	202	9	43.0	A3138	AN38
	141	240	31	—	190	22238RK+**H3138**	43	270	202	21	47.5	A3138	AN38
	141	240	31	—	190	22238RHAK+**H3138**	43	270	202	21	45.0	A3138	AN38
	169	240	31	—	190	23238RK+**H2338**	43	270	206	21	59.2	A2338	AN38
	169	240	31	—	190	23238RHAK+**H2338**	43	270	206	21	56.7	A2338	AN38
	169	240	31	—	190	22338RK+**H2338**	43	270	206	9	95.6	A2338	AN38
	169	240	31	—	190	22338RHAK+**H2338**	43	270	206	9	89.2	A2338	AN38
180	120	240	32	—	200	23040RK+**H3040**	46	280	210	10	32.8	A3040	ANL40
	120	240	32	—	200	23040RHAK+**H3040**	46	280	210	10	30.7	A3040	ANL40
	150	250	32	—	200	23140RK+**H3140**	46	280	212	10	54.7	A3140	AN40
	150	250	32	—	200	23140RHAK+**H3140**	46	280	212	10	51.8	A3140	AN40
	150	250	32	—	200	22240RK+**H3140**	46	280	212	24	56.3	A3140	AN40
	150	250	32	—	200	22240RHAK+**H3140**	46	280	212	24	53.3	A3140	AN40

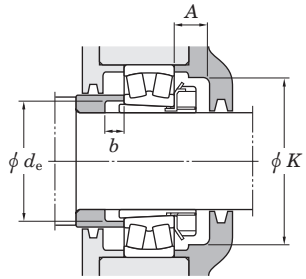
d_1 (180) ~ (240) mm



$d_1 \leq 180$ mm $\quad$ $d_1 \geq 200$ mm

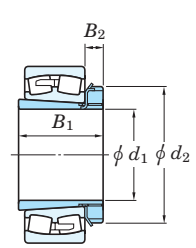
Boundary dimensions (mm)					Brg. bore	Designations	Mounting dimensions (mm)				Mass	(Refer.)	
d_1	B_1	d_2	B_2	B_3	d (mm)	Bearing + **adapter ass'y**	A min.	K min.	d_e min.	b min.	Brg.+adapter ass'y (kg)	Adapter sleeve No.	Locknut No.
180	176	250	32	—	200	23240RK+**H2340**	46	280	216	20	71.0	A2340	AN40
	176	250	32	—	200	23240RHAK+**H2340**	46	280	216	20	68.0	A2340	AN40
	176	250	32	—	200	22340RK+**H2340**	46	280	216	10	108	A2340	AN40
	176	250	32	—	200	22340RHAK+**H2340**	46	280	216	10	101	A2340	AN40
200	128	260	30	41	220	23044RK+**H3044**	—	—	231	12	41.4	A3044	ANL44
	128	260	30	41	220	23044RHAK+**H3044**	—	—	231	12	38.7	A3044	ANL44
	158	280	32	44	220	23144RK+**H3144**	—	—	233	10	68.4	A3144	AN44
	158	280	32	44	220	23144RHAK+**H3144**	—	—	233	10	64.8	A3144	AN44
	158	280	32	44	220	22244RK+**H3144**	—	—	233	22	76.9	A3144	AN44
	158	280	32	44	220	22244RHAK+**H3144**	—	—	233	22	72.7	A3144	AN44
	183	280	32	44	220	23244RK+**H2344**	—	—	236	11	96.5	A2344	AN44
	183	280	32	44	220	23244RHAK+**H2344**	—	—	236	11	92.3	A2344	AN44
	183	280	32	44	220	22344RK+**H2344**	—	—	236	10	139	A2344	AN44
	183	280	32	44	220	22344RHAK+**H2344**	—	—	236	10	130	A2344	AN44
220	133	290	34	46	240	23048RK+**H3048**	—	—	251	11	47.7	A3048	ANL48
	133	290	34	46	240	23048RHAK+**H3048**	—	—	251	11	44.8	A3048	ANL48
	169	300	34	46	240	23148RK+**H3148**	—	—	254	11	83.6	A3148	AN48
	169	300	34	46	240	23148RHAK+**H3148**	—	—	254	11	79.1	A3148	AN48
	169	300	34	46	240	22248RK+**H3148**	—	—	254	19	101	A3148	AN48
	169	300	34	46	240	22248RHAK+**H3148**	—	—	254	19	95.6	A3148	AN48
	196	300	34	46	240	23248RK+**H2348**	—	—	257	6	128	A2348	AN48
	196	300	34	46	240	23248RHAK+**H2348**	—	—	257	6	122	A2348	AN48
	196	300	34	46	240	22348RK+**H2348**	—	—	257	11	175	A2348	AN48
	196	300	34	46	240	22348RHAK+**H2348**	—	—	257	11	163	A2348	AN48
240	147	310	34	46	260	23052RK+**H3052**	—	—	272	13	65.4	A3052	ANL52
	147	310	34	46	260	23052RHAK+**H3052**	—	—	272	13	61.0	A3052	ANL52
	187	330	36	49	260	23152RK+**H3152**	—	—	276	11	114	A3152	AN52
	187	330	36	49	260	23152RHAK+**H3152**	—	—	276	11	108	A3152	AN52

d_1 (240) ~ (300) mm

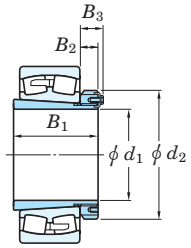


Boundary dimensions (mm)					Brg. bore	Designations	Mounting dimensions (mm)				Mass	(Refer.)	
d_1	B_1	d_2	B_2	B_3	d (mm)	Bearing + **adapter ass'y**	A min.	K min.	d_e min.	b min.	Brg.+adapter ass'y (kg)	Adapter sleeve No.	Locknut No.
240	187	330	36	49	260	22252RK+**H3152**	—	—	276	25	131	A3152	AN52
	187	330	36	49	260	22252RHAK+**H3152**	—	—	276	25	124	A3152	AN52
	208	330	36	49	260	23252RK+**H2352**	—	—	278	2	165	A2352	AN52
	208	330	36	49	260	23252RHAK+**H2352**	—	—	278	2	158	A2352	AN52
	208	330	36	49	260	22352RK+**H2352**	—	—	278	11	217	A2352	AN52
	208	330	36	49	260	22352RHAK+**H2352**	—	—	278	11	202	A2352	AN52
260	152	330	38	50	280	23056RK+**H3056**	—	—	292	12	71.5	A3056	ANL56
	152	330	38	50	280	23056RHAK+**H3056**	—	—	292	12	66.8	A3056	ANL56
	192	350	38	51	280	23156RK+**H3156**	—	—	296	12	123	A3156	AN56
	192	350	38	51	280	23156RHAK+**H3156**	—	—	296	12	116	A3156	AN56
	192	350	38	51	280	22256RK+**H3156**	—	—	296	28	138	A3156	AN56
	192	350	38	51	280	22256RHAK+**H3156**	—	—	296	28	130	A3156	AN56
	221	350	38	51	280	23256RK+**H2356**	—	—	299	11	178	A2356	AN56
	221	350	38	51	280	23256RHAK+**H2356**	—	—	299	11	170	A2356	AN56
	221	350	38	51	280	22356RK+**H2356**	—	—	299	12	254	A2356	AN56
	221	350	38	51	280	22356RHAK+**H2356**	—	—	299	12	237	A2356	AN56
280	168	360	42	54	300	23060RK+**H3060**	—	—	313	12	97.7	A3060	ANL60
	168	360	42	54	300	23060RHAK+**H3060**	—	—	313	12	90.8	A3060	ANL60
	208	380	40	53	300	23160RK+**H3160**	—	—	317	12	159	A3160	AN60
	208	380	40	53	300	23160RHAK+**H3160**	—	—	317	12	150	A3160	AN60
	208	380	40	53	300	22260RK+**H3160**	—	—	317	32	173	A3160	AN60
	208	380	40	53	300	22260RHAK+**H3160**	—	—	317	32	163	A3160	AN60
	240	380	40	53	300	23260RK+**H3260**	—	—	321	12	227	A3260	AN60
	240	380	40	53	300	23260RHAK+**H3260**	—	—	321	12	217	A3260	AN60
300	171	380	42	55	320	23064RK+**H3064**	—	—	334	13	105	A3064	ANL64
	171	380	42	55	320	23064RHAK+**H3064**	—	—	334	13	98.1	A3064	ANL64
	226	400	42	56	320	23164RK+**H3164**	—	—	339	13	202	A3164	AN64
	226	400	42	56	320	23164RHAK+**H3164**	—	—	339	13	191	A3164	AN64
	226	400	42	56	320	22264RK+**H3164**	—	—	339	39	207	A3164	AN64

d_1 (300) ~ (400) mm



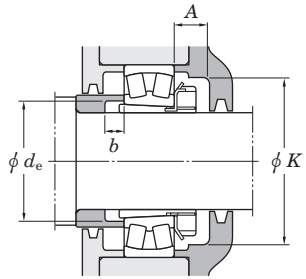
$d_1 \leq 180$ mm



$d_1 \geq 200$ mm

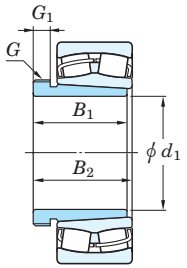
Boundary dimensions (mm)					Brg. bore	Designations	Mounting dimensions (mm)				Mass	(Refer.)	
d_1	B_1	d_2	B_2	B_3	d (mm)	Bearing + **adapter ass'y**	A min.	K min.	d_e min.	b min.	Brg.+adapter ass'y (kg)	Adapter sleeve No.	Locknut No.
300	258	400	42	56	320	23264RK+**H3264**	—	—	343	13	283	A3264	AN64
	258	400	42	56	320	23264RHAK+**H3264**	—	—	343	13	270	A3264	AN64
320	187	400	45	58	340	23068RK+**H3068**	—	—	355	14	135	A3068	ANL68
	187	400	45	58	340	23068RHAK+**H3068**	—	—	355	14	126	A3068	ANL68
	254	440	55	72	340	23168RK+**H3168**	—	—	360	14	262	A3168	AN68
	254	440	55	72	340	23168RHAK+**H3168**	—	—	360	14	248	A3168	AN68
	288	440	55	72	340	23268RK+**H3268**	—	—	364	14	355	A3268	AN68
	288	440	55	72	340	23268RHAK+**H3268**	—	—	364	14	339	A3268	AN68
340	188	420	45	58	360	23072RK+**H3072**	—	—	375	14	143	A3072	ANL72
	188	420	45	58	360	23072RHAK+**H3072**	—	—	375	14	133	A3072	ANL72
	259	460	58	75	360	23172RK+**H3172**	—	—	380	14	278	A3172	AN72
	259	460	58	75	360	23172RHAK+**H3172**	—	—	380	14	263	A3172	AN72
	299	460	58	75	360	23272RK+**H3272**	—	—	385	14	400	A3272	AN72
	299	460	58	75	360	23272RHAK+**H3272**	—	—	385	14	382	A3272	AN72
360	193	450	48	62	380	23076RK+**H3076**	—	—	396	15	156	A3076	ANL76
	193	450	48	62	380	23076RHAK+**H3076**	—	—	396	15	146	A3076	ANL76
	264	490	60	77	380	23176RK+**H3176**	—	—	401	15	298	A3176	AN76
	264	490	60	77	380	23176RHAK+**H3176**	—	—	401	15	282	A3176	AN76
	310	490	60	77	380	23276RK+**H3276**	—	—	405	15	448	A3276	AN76
	310	490	60	77	380	23276RHAK+**H3276**	—	—	405	15	427	A3276	AN76
380	210	470	52	66	400	23080RK+**H3080**	—	—	417	15	195	A3080	ANL80
	210	470	52	66	400	23080RHAK+**H3080**	—	—	417	15	182	A3080	ANL80
	272	520	62	82	400	23180RK+**H3180**	—	—	421	15	339	A3180	AN80
	272	520	62	82	400	23180RHAK+**H3180**	—	—	421	15	321	A3180	AN80
	328	520	62	82	400	23280RK+**H3280**	—	—	427	15	539	A3280	AN80
	328	520	62	82	400	23280RHAK+**H3280**	—	—	427	15	512	A3280	AN80
400	212	490	52	66	420	23084RK+**H3084**	—	—	437	16	205	A3084	ANL84
	212	490	52	66	420	23084RHAK+**H3084**	—	—	437	16	191	A3084	ANL84

d_1 (400) ~ 470 mm



Boundary dimensions (mm)					Brg. bore	Designations	Mounting dimensions (mm)				Mass	(Refer.)	
d_1	B_1	d_2	B_2	B_3	d (mm)	Bearing + **adapter ass'y**	A min.	K min.	d_e min.	b min.	Brg.+adapter ass'y (kg)	Adapter sleeve No.	Locknut No.
400	304	540	70	90	420	23184RK+**H3184**	—	—	443	16	441	A3184	AN84
	304	540	70	90	420	23184RHA+**H3184**	—	—	443	16	417	A3184	AN84
	352	540	70	90	420	23284RK+**H3284**	—	—	448	16	639	A3284	AN84
	352	540	70	90	420	23284RHAK+**H3284**	—	—	448	16	607	A3284	AN84
410	228	520	60	77	440	23088RK+**H3088**	—	—	458	17	252	A3088	ANL88
	228	520	60	77	440	23088RHAK+**H3088**	—	—	458	17	236	A3088	ANL88
	307	560	70	90	440	23188RK+**H3188**	—	—	464	17	474	A3188	AN88
	307	560	70	90	440	23188RHAK+**H3188**	—	—	464	17	449	A3188	AN88
	361	560	70	90	440	23288RK+**H3288**	—	—	469	17	718	A3288	AN88
	361	560	70	90	440	23288RHAK+**H3288**	—	—	469	17	685	A3288	AN88
430	234	540	60	77	460	23092RK+**H3092**	—	—	478	17	283	A3092	ANL92
	234	540	60	77	460	23092RHAK+**H3092**	—	—	478	17	265	A3092	ANL92
	326	580	75	95	460	23192RK+**H3192**	—	—	485	17	559	A3192	AN92
	326	580	75	95	460	23192RHAK+**H3192**	—	—	485	17	529	A3192	AN92
	382	580	75	95	460	23292RK+**H3292**	—	—	491	17	838	A3292	AN92
	382	580	75	95	460	23292RHAK+**H3292**	—	—	491	17	797	A3292	AN92
450	237	560	60	77	480	23096RK+**H3096**	—	—	499	18	295	A3096	ANL96
	237	560	60	77	480	23096RHAK+**H3096**	—	—	499	18	276	A3096	ANL96
	335	620	75	95	480	23196RK+**H3196**	—	—	505	18	628	A3196	AN96
	335	620	75	95	480	23196RHAK+**H3196**	—	—	505	18	595	A3196	AN96
	397	620	75	95	480	23296RK+**H3296**	—	—	512	18	966	A3296	AN96
	397	620	75	95	480	23296RHAK+**H3296**	—	—	512	18	920	A3296	AN96
470	247	580	68	85	500	230/500RK+**H30/500**	—	—	519	18	315	A30/500	ANL100
	356	630	80	100	500	231/500RK+**H31/500**	—	—	527	18	727	A31/500	AN100
	428	630	80	100	500	232/500RK+**H32/500**	—	—	534	18	1 167	A32/500	AN100

d_1 35 ~ (75) mm



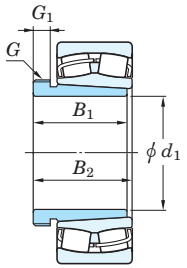
Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + withdrawal sleeve	Mass Brg.+withdrawal sleeve (kg)	(Refer.) Applicable locknut No.
35	29	32	M45×1.5	6	40	22208RHRK+**AH308**	0.681	AN09
	29	32	M45×1.5	6	40	21308RHK+**AH308**	0.860	AN09
	40	43	M45×1.5	7	40	22308RHRK+**AH2308**	1.19	AN09
40	31	34	M50×1.5	6	45	22209RHRK+**AH309**	0.699	AN10
	31	34	M50×1.5	6	45	21309RHK+**AH309**	1.14	AN10
	44	47	M50×1.5	7	45	22309RHRK+**AH2309**	1.55	AN10
45	35	38	M55×2	7	50	22210RHRK+**AHX310**	0.771	AN11
	35	38	M55×2	7	50	21310RHK+**AHX310**	1.49	AN11
	50	53	M55×2	9	50	22310RHRK+**AHX2310**	2.09	AN11
50	37	40	M60×2	7	55	22211RHRK+**AHX311**	1.01	AN12
	37	40	M60×2	7	55	21311RHK+**AHX311**	1.83	AN12
	54	57	M60×2	10	55	22311RHRK+**AHX2311**	2.60	AN12
55	40	43	M65×2	8	60	22212RHRK+**AHX312**	1.35	AN13
	40	43	M65×2	8	60	21312RHK+**AHX312**	2.27	AN13
	58	61	M65×2	11	60	22312RHRK+**AHX2312**	3.29	AN13
60	42	45	M75×2	8	65	22213RHRK+**AH313**	1.77	AN15
	42	45	M75×2	8	65	21313RHK+**AH313**	2.84	AN15
	61	64	M75×2	12	65	22313RHRK+**AH2313**	3.98	AN15
65	43	47	M80×2	8	70	22214RHRK+**AH314**	1.89	AN16
	43	47	M80×2	8	70	21314RHK+**AH314**	3.43	AN16
	64	68	M80×2	12	70	22314RHRK+**AHX2314**	4.82	AN16
70	45	49	M85×2	8	75	22215RHRK+**AH315**	2.01	AN17
	45	49	M85×2	8	75	21315RHK+**AH315**	4.07	AN17
	68	72	M85×2	12	75	22315RHRK+**AHX2315**	5.87	AN17
75	48	52	M90×2	8	80	22216RHRK+**AH316**	2.49	AN18
	48	52	M90×2	8	80	21316RHK+**AH316**	4.83	AN18

[Note] 1) Basic profile and dimensions of screw thread identified by prefix M are in accordance with JIS B 0205.
Basic profile and dimensions of screw thread identified by prefix Tr are in accordance with JIS B 0216.

d_1 (75) ~ (115) mm

Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + withdrawal sleeve	Mass Brg.+withdrawal sleeve (kg)	(Refer.) Applicable locknut No.
75	71	75	M90×2	12	80	22316RHRK+**AHX2316**	6.90	AN18
80	52	56	M95×2	9	85	22217RHRK+**AHX317**	3.12	AN19
	52	56	M95×2	9	85	21317RHK+**AHX317**	5.68	AN19
	74	78	M95×2	13	85	22317RHRK+**AHX2317**	7.98	AN19
85	53	57	M100×2	9	90	22218RHRK+**AHX318**	3.89	AN20
	63	67	M100×2	10	90	23218RHK+**AHX3218**	5.08	AN20
	53	57	M100×2	9	90	21318RHK+**AHX318**	6.58	AN20
	79	83	M100×2	14	90	22318RHRK+**AHX2318**	9.41	AN20
90	57	61	M105×2	10	95	22219RHRK+**AHX319**	4.68	AN21
	57	61	M105×2	10	95	21319RHK+**AHX319**	7.59	AN21
	85	89	M105×2	16	95	22319RHRK+**AHX2319**	10.9	AN21
95	59	63	M110×2	10	100	22220RHRK+**AHX320**	5.58	AN22
	73	77	M110×2	11	100	23220RHK+**AHX3220**	7.43	AN22
	59	63	M110×2	10	100	21320RHK+**AHX320**	9.26	AN22
	90	94	M110×2	16	100	22320RHRK+**AHX2320**	13.9	AN22
105	68	72	M120×2	11	110	23122RHK+**AHX3122**	6.30	AN24
	82	91	M115×2	13	110	24122RHK30+**AH24122**	7.60	AN23
	68	72	M120×2	11	110	22222RHRK+**AHX3122**	7.97	AN24
	82	86	M125×2	11	110	23222RHK+**AHX3222**	10.5	AN25
	63	67	M120×2	12	110	21322RHK+**AHX322**	12.3	AN24
	98	102	M125×2	16	110	22322RHRK+**AHX2322**	19.1	AN25
115	60	64	M130×2	13	120	23024RHK+**AHX3024**	4.82	AN26
	73	82	M125×2	13	120	24024RHK30+**AH24024**	5.99	AN25
	75	79	M130×2	12	120	23124RHK+**AHX3124**	8.69	AN26
	93	102	M130×2	13	120	24124RHK30+**AH24124**	11.0	AN26
	75	79	M130×2	12	120	22224RHRK+**AHX3124**	10.1	AN26

d_1 (115) ~ (150) mm



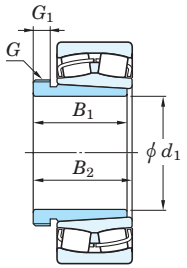
Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + withdrawal sleeve	Mass Brg.+withdrawal sleeve (kg)	(Refer.) Applicable locknut No.
115	90	94	M135×2	13	120	23224RHK+**AHX3224**	13.1	AN27
	105	109	M135×2	17	120	22324RHRK+**AHX2324**	23.9	AN27
125	67	71	M140×2	14	130	23026RHK+**AHX3026**	6.90	AN28
	83	93	M135×2	14	130	24026RHK30+**AH24026**	8.74	AN27
	78	82	M140×2	12	130	23126RHK+**AHX3126**	9.52	AN28
	94	104	M140×2	14	130	24126RHK30+**AH24126**	11.7	AN28
	78	82	M140×2	12	130	22226RHRK+**AHX3126**	12.4	AN28
	98	102	M145×2	15	130	23226RHK+**AHX3226**	15.6	AN29
	115	119	M145×2	19	130	22326RHRK+**AHX2326**	29.9	AN29
135	68	73	M150×2	14	140	23028RHK+**AHX3028**	7.43	AN30
	83	93	M145×2	14	140	24028RHK30+**AH24028**	9.26	AN29
	83	88	M150×2	14	140	23128RHK+**AHX3128**	11.5	AN30
	99	109	M150×2	14	140	24128RHK30+**AH24128**	14.1	AN30
	83	88	M150×2	14	140	22228RHRK+**AHX3128**	15.4	AN30
	104	109	M155×3	15	140	23228RHK+**AHX3228**	20.3	AN31
	125	130	M155×3	20	140	22328RHK+**AHX2328**	35.0	AN31
145	72	77	M160×3	15	150	23030RHK+**AHX3030**	8.92	AN32
	90	101	M155×3	15	150	24030RHK30+**AH24030**	11.4	AN31
	96	101	M165×3	15	150	23130RHK+**AHX3130**	17.7	AN33
	115	126	M160×3	15	150	24130RHK30+**AH24130**	21.2	AN32
	96	101	M165×3	15	150	22230RHRK+**AHX3130**	20.3	AN33
	114	119	M165×3	17	150	23230RHK+**AHX3230**	26.0	AN33
	135	140	M165×3	24	150	22330RK+**AHX2330**	45.5	AN33
	135	140	M165×3	24	150	22330RHAK+**AHX2330**	42.2	AN33
150	77	82	M170×3	16	160	23032RHK+**AH3032**	11.5	AN34
	95	106	M170×3	15	160	24032RHK30+**AH24032**	15.0	AN34
	103	108	M180×3	16	160	23132RHK+**AH3132**	23.4	AN36

[Note] 1) Basic profile and dimensions of screw thread identified by prefix M are in accordance with JIS B 0205.
Basic profile and dimensions of screw thread identified by prefix Tr are in accordance with JIS B 0216.

d_1 (150) ~ 170 mm

Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + withdrawal sleeve	Mass Brg.+withdrawal sleeve (kg)	(Refer.) Applicable locknut No.
150	103	108	M180×3	16	160	22232RK+**AH3132**	26.1	AN36
	103	108	M180×3	16	160	22232RHAK+**AH3132**	24.6	AN36
	124	130	M180×3	20	160	23232RK+**AH3232**	35.1	AN36
	124	130	M180×3	20	160	23232RHAK+**AH3232**	32.6	AN36
	140	146	M180×3	24	160	22332RK+**AH2332**	55.7	AN36
	140	146	M180×3	24	160	22332RHAK+**AH2332**	51.8	AN36
160	85	90	M180×3	17	170	23034RHK+**AH3034**	15.2	AN36
	106	117	M180×3	16	170	24034RHK30+**AH24034**	20.0	AN36
	104	109	M190×3	16	170	23134RHK+**AH3134**	24.6	AN38
	125	136	M180×3	16	170	24134RRK30+**AH24134**	30.0	AN36
	104	109	M190×3	16	170	22234RK+**AH3134**	31.8	AN38
	104	109	M190×3	16	170	22234RHAK+**AH3134**	29.9	AN38
	134	140	M190×3	24	170	23234RK+**AH3234**	42.3	AN38
	134	140	M190×3	24	170	23234RHAK+**AH3234**	39.4	AN38
	146	152	M190×3	24	170	22334RK+**AH2334**	66.1	AN38
	146	152	M190×3	24	170	22334RHAK+**AH2334**	61.4	AN38
170	92	98	M190×3	17	180	23036RHK+**AH3036**	19.7	AN38
	116	127	M190×3	16	180	24036RRK30+**AH24036**	26.1	AN38
	116	122	M200×3	19	180	23136RK+**AH3136**	31.7	AN40
	116	122	M200×3	19	180	23136RHAK+**AH3136**	29.8	AN40
	134	145	M190×3	16	180	24136RRK30+**AH24136**	37.6	AN38
	134	145	M190×3	16	180	24136RHAK30+**AH24136**	34.9	AN38
	105	110	M200×3	17	180	22236RK+**AH2236**	33.5	AN40
	105	110	M200×3	17	180	22236RHAK+**AH2236**	31.5	AN40
	140	146	M200×3	24	180	23236RK+**AH3236**	45.1	AN40
	140	146	M200×3	24	180	23236RHAK+**AH3236**	41.8	AN40
	154	160	M200×3	24	180	22336RK+**AH2336**	75.7	AN40
	154	160	M200×3	24	180	22336RHAK+**AH2336**	70.3	AN40

d_1 180 ~ 190 mm



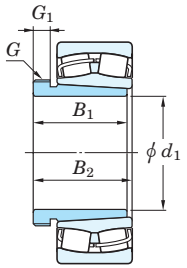
Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
180	96	102	Tr205×4	18	190	23038RK+**AH3038**	21.5	HNL41
	96	102	Tr205×4	18	190	23038RHAK+**AH3038**	19.9	HNL41
	118	131	M200×3	18	190	24038RRK30+**AH24038**	27.6	AN40
	118	131	M200×3	18	190	24038RHAK30+**AH24038**	25.5	AN40
	125	131	Tr210×4	20	190	23138RK+**AH3138**	39.3	HN42
	125	131	Tr210×4	20	190	23138RHAK+**AH3138**	37.0	HN42
	146	159	M200×3	18	190	24138RRK30+**AH24138**	46.7	AN40
	146	159	M200×3	18	190	24138RHAK30+**AH24138**	43.8	AN40
	112	117	Tr210×4	18	190	22238RK+**AH2238**	40.9	HN42
	112	117	Tr210×4	18	190	22238RHAK+**AH2238**	38.4	HN42
	145	152	Tr210×4	25	190	23238RK+**AH3238**	53.3	HN42
	145	152	Tr210×4	25	190	23238RHAK+**AH3238**	49.4	HN42
	160	167	Tr210×4	26	190	22338RK+**AH2338**	89.0	HN42
	160	167	Tr210×4	26	190	22338RHAK+**AH2338**	82.6	HN42
190	102	108	Tr215×4	19	200	23040RK+**AH3040**	27.2	HNL43
	102	108	Tr215×4	19	200	23040RHAK+**AH3040**	25.1	HNL43
	127	140	Tr210×4	18	200	24040RRK30+**AH24040**	34.6	HN42
	127	140	Tr210×4	18	200	24040RHAK30+**AH24040**	31.9	HN42
	134	140	Tr220×4	21	200	23140RK+**AH3140**	47.9	HN44
	134	140	Tr220×4	21	200	23140RHAK+**AH3140**	45.0	HN44
	158	171	Tr210×4	18	200	24140RRK30+**AH24140**	57.6	HN42
	158	171	Tr210×4	18	200	24140RHAK30+**AH24140**	53.8	HN42
	118	123	Tr220×4	19	200	22240RK+**AH2240**	48.7	HN44
	118	123	Tr220×4	19	200	22240RHAK+**AH2240**	45.7	HN44
	153	160	Tr220×4	25	200	23240RK+**AH3240**	64.7	HN44
	153	160	Tr220×4	25	200	23240RHAK+**AH3240**	60.1	HN44
	170	177	Tr220×4	26	200	22340RK+**AH2340**	101	HN44
	170	177	Tr220×4	26	200	22340RHAK+**AH2340**	93.4	HN44

[Note] 1) Basic profile and dimensions of screw thread identified by prefix M are in accordance with JIS B 0205.
Basic profile and dimensions of screw thread identified by prefix Tr are in accordance with JIS B 0216.

d_1 200 ~ 220 mm

Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
200	111	117	Tr235×4	20	220	23044RK+**AH3044**	38.0	HNL47
	111	117	Tr235×4	20	220	23044RHAK+**AH3044**	35.3	HNL47
	138	152	Tr230×4	20	220	24044RRK30+**AH24044**	48.1	—
	138	152	Tr230×4	20	220	24044RHAK30+**AH24044**	44.7	—
	145	151	Tr240×4	23	220	23144RK+**AH3144**	63.6	HN48
	145	151	Tr240×4	23	220	23144RHAK+**AH3144**	60.0	HN48
	170	184	Tr230×4	20	220	24144RRK30+**AH24144**	76.4	—
	170	184	Tr230×4	20	220	24144RHAK30+**AH24144**	71.2	—
	130	136	Tr240×4	20	220	22244RK+**AH2244**	70.8	HN48
	130	136	Tr240×4	20	220	22244RHAK+**AH2244**	66.6	HN48
	181	189	Tr240×4	30	220	23244RK+**AH2344**	95.1	HN48
	181	189	Tr240×4	30	220	23244RHAK+**AH2344**	88.5	HN48
	181	189	Tr240×4	30	220	22344RK+**AH2344**	136	HN48
	181	189	Tr240×4	30	220	22344RHAK+**AH2344**	127	HN48
220	116	123	Tr260×4	21	240	23048RK+**AH3048**	42.6	HNL52
	116	123	Tr260×4	21	240	23048RHAK+**AH3048**	39.7	HNL52
	138	153	Tr250×4	20	240	24048RRK30+**AH24048**	51.9	—
	138	153	Tr250×4	20	240	24048RHAK30+**AH24048**	48.0	—
	154	161	Tr260×4	25	240	23148RK+**AH3148**	77.6	HN52
	154	161	Tr260×4	25	240	23148RHAK+**AH3148**	73.1	HN52
	180	195	Tr260×4	20	240	24148RRK30+**AH24148**	94.0	HN52
	180	195	Tr260×4	20	240	24148RHAK30+**AH24148**	87.9	HN52
	144	150	Tr260×4	21	240	22248RK+**AH2248**	94.3	HN52
	144	150	Tr260×4	21	240	22248RHAK+**AH2248**	88.7	HN52
	189	197	Tr260×4	30	240	23248RK+**AH2348**	126	HN52
	189	197	Tr260×4	30	240	23248RHAK+**AH2348**	117	HN52
	189	197	Tr260×4	30	240	22348RK+**AH2348**	170	HN52
	189	197	Tr260×4	30	240	22348RHAK+**AH2348**	158	HN52

d_1 240 ~ 260 mm



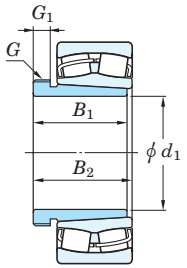
Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
240	128	135	Tr280×4	23	260	23052RK+**AH3052**	60.0	HNL56
	128	135	Tr280×4	23	260	23052RHAK+**AH3052**	55.6	HNL56
	162	178	Tr270×4	22	260	24052RRK30+**AH24052**	77.0	—
	162	178	Tr270×4	22	260	24052RHAK30+**AH24052**	71.2	—
	172	179	Tr290×4	26	260	23152RK+**AH3152**	107	HN58
	172	179	Tr290×4	26	260	23152RHAK+**AH3152**	101	HN58
	202	218	Tr280×4	22	260	24152RRK30+**AH24152**	128	—
	202	218	Tr280×4	22	260	24152RHAK30+**AH24152**	120	—
	155	161	Tr290×4	23	260	22252RK+**AH2252**	122	HN58
	155	161	Tr290×4	23	260	22252RHAK+**AH2252**	115	HN58
	205	213	Tr290×4	30	260	23252RK+**AH2352**	164	HN58
	205	213	Tr290×4	30	260	23252RHAK+**AH2352**	153	HN58
	205	213	Tr290×4	30	260	22352RK+**AH2352**	212	HN58
	205	213	Tr290×4	30	260	22352RHAK+**AH2352**	197	HN58
260	131	139	Tr300×4	24	280	23056RK+**AH3056**	64.9	HNL60
	131	139	Tr300×4	24	280	23056RHAK+**AH3056**	60.2	HNL60
	162	179	Tr290×4	22	280	24056RRK30+**AH24056**	81.9	HN58
	162	179	Tr290×4	22	280	24056RHAK30+**AH24056**	75.7	HN58
	175	183	Tr310×5	28	280	23156RK+**AH3156**	114	HN62
	175	183	Tr310×5	28	280	23156RHAK+**AH3156**	108	HN62
	202	219	Tr300×4	22	280	24156RRK30+**AH24156**	136	—
	202	219	Tr300×4	22	280	24156RHAK30+**AH24156**	128	—
	155	163	Tr310×5	24	280	22256RK+**AH2256**	127	HN62
	155	163	Tr310×5	24	280	22256RHAK+**AH2256**	119	HN62
	212	220	Tr310×5	30	280	23256RK+**AH2356**	175	HN62
	212	220	Tr310×5	30	280	23256RHAK+**AH2356**	163	HN62
	212	220	Tr310×5	30	280	22356RK+**AH2356**	247	HN62
	212	220	Tr310×5	30	280	22356RHAK+**AH2356**	230	HN62

[Note] 1) Basic profile and dimensions of screw thread identified by prefix M are in accordance with JIS B 0205.
Basic profile and dimensions of screw thread identified by prefix Tr are in accordance with JIS B 0216.

d_1 280 ~ (320) mm

Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
280	145	153	Tr320×5	26	300	23060RK+**AH3060**	88.1	HNL64
	145	153	Tr320×5	26	300	23060RHAK+**AH3060**	81.2	HNL64
	184	202	Tr310×5	24	300	24060RRK30+**AH24060**	112	HN62
	184	202	Tr310×5	24	300	24060RHAK30+**AH24060**	105	HN62
	192	200	Tr330×5	30	300	23160RK+**AH3160**	149	HN66
	192	200	Tr330×5	30	300	23160RHAK+**AH3160**	140	HN66
	224	242	Tr320×5	24	300	24160RRK30+**AH24160**	180	—
	224	242	Tr320×5	24	300	24160RHAK30+**AH24160**	168	—
	170	178	Tr330×5	26	300	22260RK+**AH2260**	160	HN66
	170	178	Tr330×5	26	300	22260RHAK+**AH2260**	150	HN66
	228	236	Tr330×5	34	300	23260RK+**AH3260**	223	HN66
	228	236	Tr330×5	34	300	23260RHAK+**AH3260**	208	HN66
300	149	157	Tr345×5	27	320	23064RK+**AH3064**	94.8	HNL69
	149	157	Tr345×5	27	320	23064RHAK+**AH3064**	88.1	HNL69
	184	202	Tr330×5	24	320	24064RRK30+**AH24064**	120	HN66
	184	202	Tr330×5	24	320	24064RHAK30+**AH24064**	108	HN66
	209	217	Tr350×5	31	320	23164RK+**AH3164**	191	HN70
	209	217	Tr350×5	31	320	23164RHAK+**AH3164**	180	HN70
	242	260	Tr340×5	24	320	24164RRK30+**AH24164**	226	—
	242	260	Tr340×5	24	320	24164RHAK30+**AH24164**	217	—
	180	190	Tr350×5	27	320	22264RK+**AH2264**	191	HN70
	246	254	Tr350×5	36	320	23264RK+**AH3264**	280	HN70
	246	254	Tr350×5	36	320	23264RHAK+**AH3264**	260	HN70
320	162	171	Tr365×5	28	340	23068RK+**AH3068**	125	HNL73
	162	171	Tr365×5	28	340	23068RHAK+**AH3068**	115	HNL73
	225	234	Tr370×5	33	340	23168RK+**AH3168**	239	HN74
	225	234	Tr370×5	33	340	23168RHAK+**AH3168**	225	HN74
	269	288	Tr360×5	26	340	24168RRK30+**AH24168**	293	—

d_1 (320) ~ 380 mm



Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
320	269	288	Tr360×5	26	340	24168RHAK30+**AH24168**	282	—
	264	273	Tr370×5	38	340	23268RK+**AH3268**	342	HN74
	264	273	Tr370×5	38	340	23268RHAK+**AH3268**	317	HN74
340	167	176	Tr385×5	30	360	23072RK+**AH3072**	132	HNL77
	167	176	Tr385×5	30	360	23072RHAK+**AH3072**	122	HNL77
	229	238	Tr400×5	35	360	23172RK+**AH3172**	254	HN80
	232	238	Tr400×5	35	360	23172RHAK+**AH3172**	239	HN80
	269	289	Tr380×5	26	360	24172RK30+**AH24172**	313	—
	269	289	Tr380×5	26	360	24172RHAK30+**AH24172**	300	—
	274	283	Tr400×5	40	360	23272RK+**AH3272**	388	HN80
	274	283	Tr400×5	40	360	23272RHAK+**AH3272**	360	HN80
360	170	180	Tr410×5	31	380	23076RK+**AH3076**	141	HNL82
	170	180	Tr410×5	31	380	23076RHAK+**AH3076**	131	HNL82
	232	242	Tr420×5	36	380	23176RK+**AH3176**	269	HN84
	240	242	Tr420×5	36	380	23176RHAK+**AH3176**	253	HN84
	271	291	Tr400×5	28	380	24176RK30+**AH24176**	328	HN80
	271	291	Tr400×5	28	380	24176RHAK30+**AH24176**	314	HN80
	284	294	Tr420×5	42	380	23276RK+**AH3276**	432	HN84
	284	294	Tr420×5	42	380	23276RHAK+**AH3276**	400	HN84
380	183	193	Tr430×5	33	400	23080RK+**AH3080**	178	HNL86
	183	193	Tr430×5	33	400	23080RHAK+**AH3080**	165	HNL86
	240	250	Tr440×5	38	400	23180RK+**AH3180**	305	HN88
	266	250	Tr440×5	38	400	23180RHAK+**AH3180**	287	HN88
	278	298	Tr420×5	28	400	24180RK30+**AH24180**	368	HN84
	278	298	Tr420×5	28	400	24180RHAK30+**AH24180**	352	HN84
	302	312	Tr440×5	44	400	23280RK+**AH3280**	521	HN88
	302	312	Tr440×5	44	400	23280RHAK+**AH3280**	480	HN88

[Note] 1) Basic profile and dimensions of screw thread identified by prefix M are in accordance with JIS B 0205.
Basic profile and dimensions of screw thread identified by prefix Tr are in accordance with JIS B 0216.

d_1 400 ~ 480 mm

Boundary dimensions (mm) d_1	B_1	B_2	G [1] Screw size	G_1	Brg. bore d (mm)	Designations Bearing + **withdrawal sleeve**	Mass Brg.+withdrawal sleeve (kg)	(Refer.) **Applicable locknut No.**
400	186	196	Tr450×5	34	420	23084RK+**AH3084**	188	HNL90
	186	196	Tr450×5	34	420	23084RHAK+**AH3084**	174	HNL90
	266	276	Tr460×5	40	420	23184RK+**AH3184**	399	HN92
	270	276	Tr460×5	40	420	23184RHAK+**AH3184**	375	HN92
	321	331	Tr460×5	46	420	23284RK+**AH3284**	673	HN92
	321	331	Tr460×5	46	420	23284RHAK+**AH3284**	568	HN92
420	194	205	Tr470×5	35	440	23088RK+**AHX3088**	215	HNL94
	194	205	Tr470×5	35	440	23088RHAK+**AHX3088**	199	HNL94
	270	281	Tr480×5	42	440	23188RK+**AHX3188**	416	HN96
	285	281	Tr480×5	42	440	23188RHAK+**AHX3188**	391	HN96
	330	341	Tr480×5	48	440	23288RK+**AHX3288**	678	HN96
	330	341	Tr480×5	48	440	23288RHAK+**AHX3288**	627	HN96
440	202	213	Tr490×5	37	460	23092RK+**AHX3092**	244	HNL98
	202	213	Tr490×5	37	460	23092RHAK+**AHX3092**	226	HNL98
	285	296	Tr510×6	43	460	23192RK+**AHX3192**	494	HN102
	295	296	Tr510×6	43	460	23192RHAK+**AHX3192**	464	HN102
	349	360	Tr510×6	50	460	23292RK+**AHX3292**	795	HN102
	349	360	Tr510×6	50	460	23292RHAK+**AHX3292**	733	HN102
460	205	217	Tr520×6	38	480	23096RK+**AHX3096**	257	HNL104
	205	217	Tr520×6	38	480	23096RHAK+**AHX3096**	238	HNL104
	295	307	Tr530×6	45	480	23196RK+**AHX3196**	551	HN106
	313	307	Tr530×6	45	480	23196RHAK+**AHX3196**	518	HN106
	364	376	Tr530×6	52	480	23296RK+**AHX3296**	914	HN106
	364	376	Tr530×6	52	480	23296RHAK+**AHX3296**	844	HN106
480	209	221	Tr540×6	40	500	230/500RK+**AHX30/500**	271	HNL108
	313	325	Tr550×6	47	500	231/500RK+**AHX31/500**	648	HN110
	393	405	Tr550×6	54	500	232/500RK+**AHX32/500**	1 015	HN110

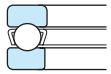
Thrust ball bearings

Thrust ball bearings are divided into single and double direction types. The former is able to accommodate axial load in one direction, while the latter is able to accommodate it in both directions.

Neither is suitable for applications that involve radial load or high-speed rotation.

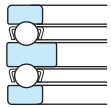
Bearings whose housing race back face is spherical (with a spherical back face or aligning seat race) are designed with a self-aligning capability and can accommodate the effects of inaccurate mounting.

Single direction thrust ball bearings



Bore diameter **10 – 360** mm

Double direction thrust ball bearings



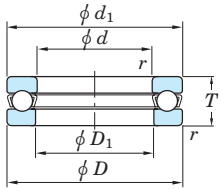
Bore diameter **10 – 190** mm

Boundary dimensions	As specified in JIS B 1512.
Tolerances	As specified in JIS B 1514-2. (refer to Table 7-9 on p. A 68.)
Recommended fits	Refer to Table 9-8 on p. A 92.
Standard cages	● Pressed steel cage (supplementary code : //) ● Copper alloy or carbon steel machined cage (supplementary code : FY or FC) ● Polyamide resin molded cage (supplementary code : MG)
Required minimum axial load	A certain degree of load is necessary in order for bearings to operate satisfactorily. (refer to p. A 110.)
Allowable misalignment	Misalignment not allowed. (for flat back face type.)
Equivalent axial load	Dynamic equivalent axial load $P_a = F_a$ Static equivalent axial load $P_{0a} = F_a$

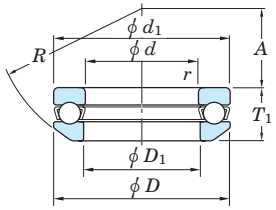
Application of standard cages

Bearing series	Molded cage	Pressed cage	Machined cage
511	51100 – 51107	51108 – 51132	51134 – 51172
512	51200 – 51207	51208 – 51224	51226 – 51272
532	53200 – 53207	53208 – 53224	53226 – 53272
532 U	53200U – 53207U	53208U – 53224U	53226U – 53272U
513	–	51305 – 51313	51314 – 51340
533	–	53305 – 53313	53314 – 53340
533 U	–	53305U – 53313U	53314U – 53340U
514	–	51405 – 51416	51417 – 51436
534	–	53405 – 53416	53417 – 53420
534 U	–	53405U – 53416U	53417U – 53420U
522	–	52202 – 52224	52226 – 52244
542	–	54202 – 54224	54226 – 54244
542 U	–	54205U – 54224U	54226U – 54244U
523	–	52305 – 52313	52314 – 52340
543	–	54305 – 54313	54314 – 54324
543 U	–	54305U – 54313U	54314U – 54324U
524	–	52405 – 52411	52412 – 52444
544	–	54405 – 54411	54412 – 54420
544 U	–	54405U – 54411U	54412U – 54420U

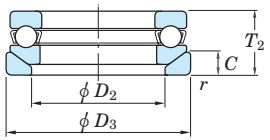
d 10 ~ (40) mm



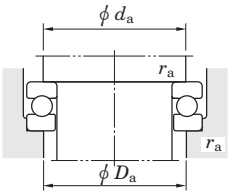
With flat back faces

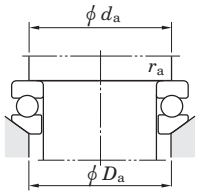


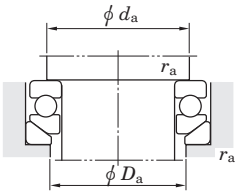
With spherical back face



With aligning seat race



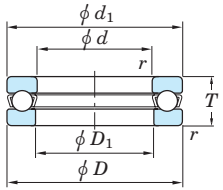




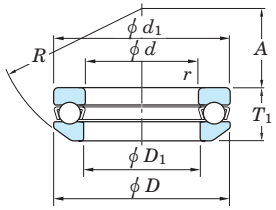
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T_1	T_2	r min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d_1 max.	D_1 min.	D_2	D_3	A	R	C	d_a min.	D_a max.	r_a max.	With flat back faces	With spherical back face	With aligning seat race
10	24	9	—	—	0.3	10.0	14.0	6 500	10 000	**51100**	—	—	24	11	—	—	—	—	—	18	16	0.3	0.020	—	—
	26	11	11.6	13	0.6	12.7	17.1	5 700	8 800	**51200**	**53200**	**53200U**	26	12	18	28	8.5	22	3.5	20	16	0.6	0.030	0.029	0.037
12	26	9	—	—	0.3	9.65	14.0	6 500	10 000	**51101**	—	—	26	13	—	—	—	—	—	20	18	0.3	0.022	—	—
	28	11	11.4	13	0.6	13.2	19.0	5 400	8 300	**51201**	**53201**	**53201U**	28	14	20	30	11.5	25	3.5	22	18	0.6	0.034	0.031	0.043
15	28	9	—	—	0.3	9.95	15.4	6 100	9 400	**51102**	—	—	28	16	—	—	—	—	—	23	20	0.3	0.024	—	—
	32	12	13.3	15	0.6	16.6	24.8	4 900	7 500	**51202**	**53202**	**53202U**	32	17	24	35	12	28	4	25	22	0.6	0.046	0.048	0.062
17	30	9	—	—	0.3	10.8	18.2	6 100	9 400	**51103**	—	—	30	18	—	—	—	—	—	25	22	0.3	0.028	—	—
	35	12	13.2	15	0.6	17.2	27.3	4 900	7 500	**51203**	**53203**	**53203U**	35	19	26	38	16	32	4	28	24	0.6	0.053	0.055	0.070
20	35	10	—	—	0.3	14.2	24.7	5 100	7 900	**51104**	—	—	35	21	—	—	—	—	—	29	26	0.3	0.040	—	—
	40	14	14.7	17	0.6	22.3	37.7	3 900	6 000	**51204**	**53204**	**53204U**	40	22	30	42	18	36	5	32	28	0.6	0.082	0.080	0.100
25	42	11	—	—	0.6	19.5	37.2	4 400	6 800	**51105**	—	—	42	26	—	—	—	—	—	35	32	0.6	0.059	—	—
	47	15	16.7	19	0.6	27.8	50.4	3 600	5 500	**51205**	**53205**	**53205U**	47	27	36	50	19	40	5.5	38	34	0.6	0.120	0.120	0.152
	52	18	19.8	22	1	35.7	61.4	3 100	4 800	**51305**	**53305**	**53305U**	52	27	38	55	21	45	6	41	36	1	0.180	0.180	0.224
	60	24	26.4	29	1	55.6	89.4	2 600	4 000	**51405**	**53405**	**53405U**	60	27	42	62	19	50	8	46	39	1	0.340	0.350	0.442
30	47	11	—	—	0.6	20.4	42.2	4 300	6 600	**51106**	—	—	47	32	—	—	—	—	—	40	37	0.6	0.068	—	—
	52	16	17.8	20	0.6	29.4	58.2	3 400	5 200	**51206**	**53206**	**53206U**	52	32	42	55	22	45	5.5	43	39	0.6	0.150	0.160	0.193
	60	21	22.6	25	1	42.8	78.7	2 700	4 200	**51306**	**53306**	**53306U**	60	32	45	62	22	50	7	48	42	1	0.270	0.270	0.326
	70	28	30.1	33	1	72.8	126	2 200	3 400	**51406**	**53406**	**53406U**	70	32	50	75	20	56	9	54	46	1	0.530	0.530	0.660
35	52	12	—	—	0.6	21.2	47.2	3 900	6 000	**51107**	—	—	52	37	—	—	—	—	—	45	42	0.6	0.090	—	—
	62	18	19.9	22	1	39.2	78.2	2 900	4 500	**51207**	**53207**	**53207U**	62	37	48	65	24	50	7	51	46	1	0.220	0.220	0.277
	68	24	25.6	28	1	55.5	105	2 400	3 700	**51307**	**53307**	**53307U**	68	37	52	72	24	56	7.5	55	48	1	0.390	0.400	0.484
	80	32	34	37	1.1	87.1	155	1 900	2 900	**51407**	**53407**	**53407U**	80	37	58	85	23	64	10	62	53	1	0.790	0.790	0.960
40	60	13	—	—	0.6	26.9	62.8	3 400	5 300	**51108**	—	—	60	42	—	—	—	—	—	52	48	0.6	0.120	—	—
	68	19	20.3	23	1	47.0	98.3	2 700	4 200	**51208**	**53208**	**53208U**	68	42	55	72	28.5	56	7	57	51	1	0.270	0.270	0.340
	78	26	28.5	31	1	69.3	135	2 100	3 300	**51308**	**53308**	**53308U**	78	42	60	82	28	64	8.5	63	55	1	0.550	0.570	0.690

[Remark] Standard cage types used for the above bearings are described earlier in this section.

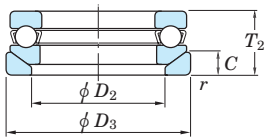
d (40) ~ 70 mm



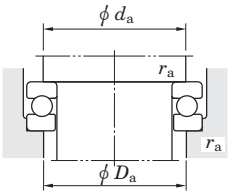
With flat back faces

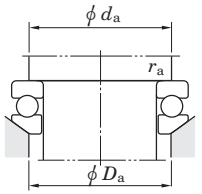


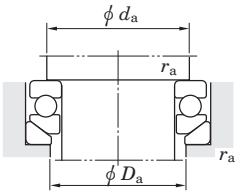
With spherical back face



With aligning seat race



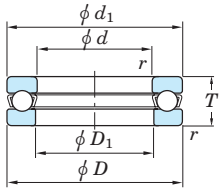




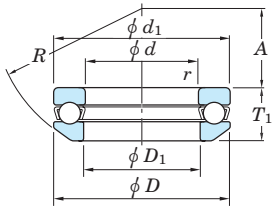
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T_1	T_2	r min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d_1 max.	D_1 min.	D_2	D_3	A	R	C	d_a min.	D_a max.	r_a max.	With flat back faces	With spherical back face	With aligning seat race
40	90	36	38.2	42	1.1	113	205	1 700	2 600	**51408**	**53408**	**53408U**	90	42	65	95	26	72	12	70	60	1	1.14	1.12	1.37
45	65	14	—	—	0.6	27.8	69.1	3 200	5 000	**51109**	—	—	65	47	—	—	—	—	—	57	53	0.6	0.150	—	—
	73	20	21.3	24	1	47.7	105	2 600	4 000	**51209**	**53209**	**53209U**	73	47	60	78	26	56	7.5	62	56	1	0.320	0.310	0.397
	85	28	30.1	33	1	80.0	163	1 900	3 000	**51309**	**53309**	**53309U**	85	47	65	90	25	64	10	69	61	1	0.690	0.680	0.850
	100	39	42.4	46	1.1	130	242	1 500	2 300	**51409**	**53409**	**53409U**	100	47	72	105	29	80	12.5	78	67	1	1.47	1.50	1.82
50	70	14	—	—	0.6	28.8	75.4	3 100	4 800	**51110**	—	—	70	52	—	—	—	—	—	62	58	0.6	0.160	—	—
	78	22	23.5	26	1	48.5	111	2 300	3 600	**51210**	**53210**	**53210U**	78	52	62	82	32.5	64	7.5	67	61	1	0.390	0.380	0.480
	95	31	34.3	37	1.1	96.6	202	1 800	2 700	**51310**	**53310**	**53310U**	95	52	72	100	28	72	11	77	68	1	1.00	1.01	1.24
	110	43	45.6	50	1.5	148	283	1 400	2 100	**51410**	**53410**	**53410U**	110	52	80	115	35	90	14	86	74	1.5	1.99	1.97	2.38
55	78	16	—	—	0.6	34.8	93.1	2 800	4 300	**51111**	—	—	78	57	—	—	—	—	—	69	64	0.6	0.240	—	—
	90	25	27.3	30	1	69.4	159	2 100	3 200	**51211**	**53211**	**53211U**	90	57	72	95	35	72	9	76	69	1	0.610	0.620	0.770
	105	35	39.3	42	1.1	119	246	1 600	2 400	**51311**	**53311**	**53311U**	105	57	80	110	30	80	11.5	85	75	1	1.34	1.41	1.69
	120	48	50.5	55	1.5	178	359	1 200	1 900	**51411**	**53411**	**53411U**	120	57	88	125	28	90	15.5	94	81	1.5	2.64	2.57	3.10
60	85	17	—	—	1	41.4	113	2 600	4 000	**51112**	—	—	85	62	—	—	—	—	—	75	70	1	0.290	—	—
	95	26	28	31	1	73.6	179	1 900	3 000	**51212**	**53212**	**53212U**	95	62	78	100	32.5	72	9	81	74	1	0.690	0.690	0.850
	110	35	38.3	42	1.1	124	267	1 500	2 300	**51312**	**53312**	**53312U**	110	62	85	115	41	90	11.5	90	80	1	1.43	1.47	1.78
	130	51	54	58	1.5	214	437	1 100	1 700	**51412**	**53412**	**53412U**	130	62	95	135	34	100	16	102	88	1.5	3.51	3.44	4.13
65	90	18	—	—	1	41.7	117	2 400	3 700	**51113**	—	—	90	67	—	—	—	—	—	80	75	1	0.340	—	—
	100	27	28.7	32	1	74.9	189	1 900	2 900	**51213**	**53213**	**53213U**	100	67	82	105	40	80	9	86	79	1	0.770	0.750	0.930
	115	36	39.4	43	1.1	128	287	1 400	2 200	**51313**	**53313**	**53313U**	115	67	90	120	38.5	90	12.5	95	85	1	1.57	1.61	1.95
	140	56	60.2	65	2	232	493	1 000	1 600	**51413**	**53413**	**53413U**	140	68	100	145	40	112	17.5	110	95	2	4.47	4.47	5.28
70	95	18	—	—	1	43.1	127	2 300	3 600	**51114**	—	—	95	72	—	—	—	—	—	85	80	1	0.360	—	—
	105	27	28.8	32	1	76.1	199	1 800	2 800	**51214**	**53214**	**53214U**	105	72	88	110	38	80	9	91	84	1	0.810	0.800	0.990
	125	40	44.2	48	1.1	134	291	1 300	2 000	**51314**	**53314**	**53314U**	125	72	98	130	43	100	13	103	92	1	2.06	2.15	2.56
	150	60	63.6	69	2	250	553	940	1 450	**51414**	**53414**	**53414U**	150	73	110	155	34	112	19.5	118	102	2	5.48	5.38	6.37

[Remark] Standard cage types used for the above bearings are described earlier in this section.

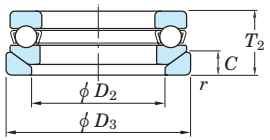
d 75 ~ (120) mm



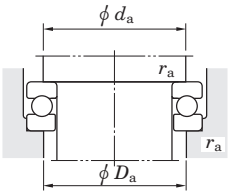
With flat back faces

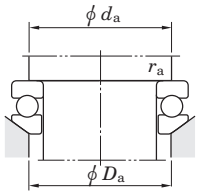


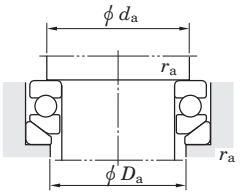
With spherical back face



With aligning seat race



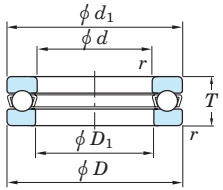




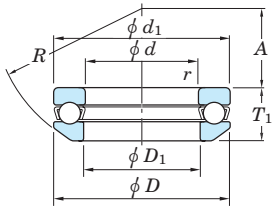
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T_1	T_2	r min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d_1 max.	D_1 min.	D_2	D_3	A	R	C	d_a min.	D_a max.	r_a max.	With flat back faces	With spherical back face	With aligning seat race
75	100	19	—	—	1	44.4	136	2 200	3 400	**51115**	—	—	100	77	—	—	—	—	—	90	85	1	0.420	—	—
	110	27	28.3	32	1	77.4	209	1 800	2 700	**51215**	**53215**	**53215U**	110	77	92	115	49	90	9.5	96	89	1	0.860	0.850	1.06
	135	44	48.1	52	1.5	154	339	1 200	1 900	**51315**	**53315**	**53315U**	135	77	105	140	37	100	15	111	99	1.5	2.68	2.72	3.27
	160	65	69	75	2	252	560	880	1 350	**51415**	**53415**	**53415U**	160	78	115	165	42	125	21	125	110	2	6.75	6.64	7.87
80	105	19	—	—	1	44.7	141	2 100	3 300	**51116**	—	—	105	82	—	—	—	—	—	95	90	1	0.430	—	—
	115	28	29.5	33	1	78.5	218	1 700	2 600	**51216**	**53216**	**53216U**	115	82	98	120	46	90	10	101	94	1	0.950	0.930	1.15
	140	44	47.6	52	1.5	160	368	1 200	1 800	**51316**	**53316**	**53316U**	140	82	110	145	50	112	15	116	104	1.5	2.82	2.86	3.43
	170	68	72.2	78	2.1	270	621	810	1 250	**51416**	**53416**	**53416U**	170	83	125	175	36	125	22	133	117	2	7.97	7.84	9.22
85	110	19	—	—	1	45.9	150	2 100	3 200	**51117**	—	—	110	87	—	—	—	—	—	100	95	1	0.460	—	—
	125	31	33.1	37	1	95.4	264	1 500	2 300	**51217**	**53217**	**53217U**	125	88	105	130	52	100	11	109	101	1	1.29	1.28	1.57
	150	49	53.1	58	1.5	186	419	1 100	1 700	**51317**	**53317**	**53317U**	150	88	115	155	43	112	17.5	124	111	1.5	3.66	3.63	4.44
	180	72	77	83	2.1	307	753	780	1 200	**51417**	**53417**	**53417U**	177	88	130	185	47	140	23	141	124	2	9.29	9.20	10.8
90	120	22	—	—	1	59.7	190	1 900	2 900	**51118**	—	—	120	92	—	—	—	—	—	108	102	1	0.680	—	—
	135	35	38.5	42	1.1	117	326	1 400	2 100	**51218**	**53218**	**53218U**	135	93	110	140	45	100	13.5	117	108	1	1.77	1.77	2.19
	155	50	54.6	59	1.5	193	454	1 000	1 600	**51318**	**53318**	**53318U**	155	93	120	160	40	112	18	129	116	1.5	3.88	3.87	4.71
	190	77	81.2	88	2.1	327	826	710	1 100	**51418**	**53418**	**53418U**	187	93	140	195	40	140	25.5	149	131	2	11.0	10.7	12.6
100	135	25	—	—	1	85.0	268	1 600	2 500	**51120**	—	—	135	102	—	—	—	—	—	121	114	1	0.990	—	—
	150	38	40.9	45	1.1	146	410	1 200	1 900	**51220**	**53220**	**53220U**	150	103	125	155	52	112	14	130	120	1	2.36	2.34	2.84
	170	55	59.2	64	1.5	236	595	940	1 450	**51320**	**53320**	**53320U**	170	103	135	175	46	125	18	142	128	1.5	5.11	5.10	6.05
	210	85	90	98	3	368	983	620	950	**51420**	**53420**	**53420U**	205	103	155	220	50	160	27	165	145	2.5	14.6	14.5	17.4
110	145	25	—	—	1	87.0	288	1 600	2 400	**51122**	—	—	145	112	—	—	—	—	—	131	124	1	1.08	—	—
	160	38	40.2	45	1.1	152	450	1 200	1 800	**51222**	**53222**	**53222U**	160	113	135	165	65	125	14	140	130	1	2.57	2.50	3.06
	190	63	67.2	72	2	267	704	810	1 250	**51322**	**53322**	**53322U**	187	113	150	195	51	140	20.5	158	142	2	7.72	7.63	8.90
	230	95	—	—	3	379	1 070	550	850	**51422**	—	—	225	113	—	—	—	—	—	181	159	2.5	19.8	—	—
120	155	25	—	—	1	89.0	305	1 500	2 300	**51124**	—	—	155	122	—	—	—	—	—	141	134	1	1.16	—	—

[Remark] Standard cage types used for the above bearings are described earlier in this section.

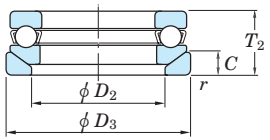
d (120) ~ (180) mm



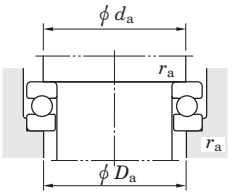
With flat back faces

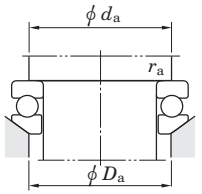


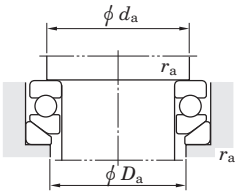
With spherical back face



With aligning seat race



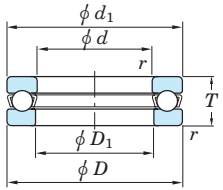




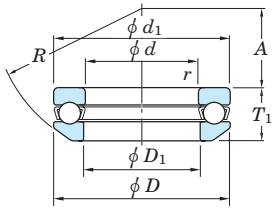
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T_1	T_2	r min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d_1 max.	D_1 min.	D_2	D_3	A	R	C	d_a min.	D_a max.	r_a max.	With flat back faces	With spherical back face	With aligning seat race
120	170	39	40.8	46	1.1	154	470	1 100	1 700	**51224**	**53224**	**53224U**	170	123	145	175	61	125	15	150	140	1	2.86	2.81	3.46
	210	70	74.1	80	2.1	311	869	710	1 100	**51324**	**53324**	**53324U**	205	123	165	220	63	160	22	173	157	2	10.6	10.4	12.4
	250	102	—	—	4	480	1 460	520	800	**51424**	—	—	245	123	—	—	—	—	—	196	174	3	25.0	—	—
130	170	30	—	—	1	104	350	1 300	2 000	**51126**	—	—	170	132	—	—	—	—	—	154	146	1	1.87	—	—
	190	45	47.9	53	1.5	203	620	970	1 500	**51226**	**53226**	**53226U**	187	133	160	195	67	140	17	166	154	1.5	4.09	3.98	4.88
	225	75	80.3	86	2.1	330	958	650	1 000	**51326**	**53326**	**53326U**	220	134	177	235	53	160	26	186	169	2	13.0	12.7	15.2
	270	110	—	—	4	498	1 540	490	750	**51426**	—	—	265	134	—	—	—	—	—	212	188	3	31.4	—	—
140	180	31	—	—	1	107	375	1 200	1 900	**51128**	—	—	178	142	—	—	—	—	—	164	156	1	2.02	—	—
	200	46	48.6	55	1.5	205	650	940	1 450	**51228**	**53228**	**53228U**	197	143	170	210	87	160	17	176	164	1.5	4.46	4.35	5.89
	240	80	84.9	92	2.1	365	1 130	620	950	**51328**	**53328**	**53328U**	235	144	190	250	68	180	26	199	181	2	15.5	15.1	18.0
	280	112	—	—	4	520	1 680	450	700	**51428**	—	—	275	144	—	—	—	—	—	222	198	3	33.9	—	—
150	190	31	—	—	1	109	400	1 200	1 900	**51130**	—	—	188	152	—	—	—	—	—	174	166	1	2.15	—	—
	215	50	53.3	60	1.5	213	652	840	1 300	**51230**	**53230**	**53230U**	212	153	180	225	79	160	20.5	189	176	1.5	5.64	5.45	7.14
	250	80	83.7	92	2.1	361	1 130	580	900	**51330**	**53330**	**53330U**	245	154	200	260	89.5	200	26	209	191	2	16.3	15.7	18.8
	300	120	—	—	4	568	1 910	420	650	**51430**	—	—	295	154	—	—	—	—	—	238	212	3	41.6	—	—
160	200	31	—	—	1	112	425	1 200	1 800	**51132**	—	—	198	162	—	—	—	—	—	184	176	1	2.28	—	—
	225	51	54.7	61	1.5	223	718	810	1 250	**51232**	**53232**	**53232U**	222	163	190	235	74	160	21	199	186	1.5	6.53	6.09	7.90
	270	87	91.7	100	3	410	1 340	550	850	**51332**	**53332**	**53332U**	265	164	215	280	77	200	29	225	205	2.5	21.0	21.0	23.4
	320	130	—	—	5	681	2 410	390	600	**51432**	—	—	315	164	—	—	—	—	—	254	226	4	51.2	—	—
170	215	34	—	—	1.1	134	510	1 100	1 700	**51134**	—	—	213	172	—	—	—	—	—	197	188	1	3.25	—	—
	240	55	58.7	65	1.5	261	834	750	1 150	**51234**	**53234**	**53234U**	237	173	200	250	91	180	21.5	212	198	1.5	8.12	7.69	9.83
	280	87	91.3	100	3	463	1 570	520	800	**51334**	**53334**	**53334U**	275	174	220	290	105	225	29	235	215	2.5	22.0	22.0	24.5
	340	135	—	—	5	755	2 730	360	550	**51434**	—	—	335	174	—	—	—	—	—	270	240	4	60.0	—	—
180	225	34	—	—	1.1	135	525	1 000	1 600	**51136**	—	—	222	183	—	—	—	—	—	207	198	1	3.39	—	—
	250	56	58.2	66	1.5	265	874	710	1 100	**51236**	**53236**	**53236U**	247	183	210	260	112	200	21.5	222	208	1.5	8.68	8.08	10.4
	300	95	99.3	109	3	463	1 580	490	750	**51336**	**53336**	**53336U**	295	184	240	310	91	225	32	251	229	2.5	28.1	26.9	29.9

[Remark] Standard cage types used for the above bearings are described earlier in this section.

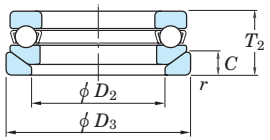
d (180) ~ 360 mm



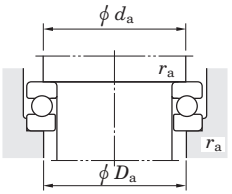
With flat back faces

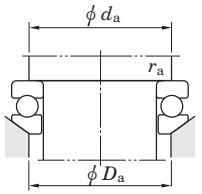


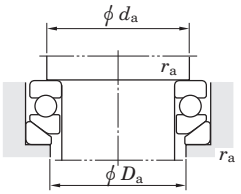
With spherical back face



With aligning seat race



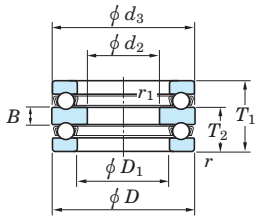




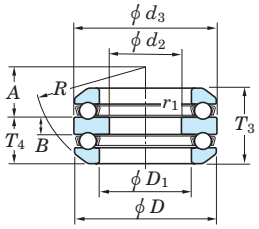
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)							Mounting dimensions (mm)			(Refer.) Mass (kg)		
d	D	T	T_1	T_2	r min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat race	d_1 max.	D_1 min.	D_2	D_3	A	R	C	d_a min.	D_a max.	r_a max.	With flat back faces	With spherical back face	With aligning seat race
180	360	140	—	—	5	742	2 730	320	500	**51436**	—	—	355	184	—	—	—	—	—	286	254	4	69.5	—	—
190	240	37	—	—	1.1	170	655	970	1 500	**51138**	—	—	237	193	—	—	—	—	—	220	210	1	3.95	—	—
	270	62	65.7	73	2	308	1 060	650	1 000	**51238**	**53238**	**53238U**	267	194	230	280	98	200	23	238	222	2	11.7	11.2	13.9
	320	105	111	121	4	543	1 950	440	680	**51338**	**53338**	**53338U**	315	195	255	330	104	250	33	266	244	3	36.0	36.3	39.7
200	250	37	—	—	1.1	172	675	940	1 450	**51140**	—	—	247	203	—	—	—	—	—	230	220	1	4.13	—	—
	280	62	65.3	74	2	314	1 110	620	950	**51240**	**53240**	**53240U**	277	204	240	290	125	225	23	248	232	2	12.2	11.6	14.8
	340	110	118.4	130	4	596	2 220	420	650	**51340**	**53340**	**53340U**	335	205	270	350	92	250	38	282	258	3	42.9	42.7	46.7
220	270	37	—	—	1.1	177	740	880	1 350	**51144**	—	—	267	223	—	—	—	—	—	250	240	1	4.50	—	—
	300	63	65.6	75	2	342	1 310	580	900	**51244**	**53244**	**53244U**	297	224	260	310	118	225	25	268	252	2	13.5	12.6	15.9
240	300	45	—	—	1.5	241	1 020	750	1 150	**51148**	—	—	297	243	—	—	—	—	—	276	264	1.5	7.38	—	—
	340	78	81.6	92	2.1	442	1 800	520	800	**51248**	**53248**	**53248U**	335	244	290	350	122	250	30	299	281	2	23.1	20.9	25.6
260	320	45	—	—	1.5	231	990	710	1 100	**51152**	—	—	317	263	—	—	—	—	—	296	284	1.5	7.93	—	—
	360	79	82.8	93	2.1	445	1 880	490	750	**51252**	**53252**	**53252U**	355	264	305	370	152	280	30	319	301	2	25.0	22.6	28.5
280	350	53	—	—	1.5	329	1 430	640	900	**51156**	—	—	347	283	—	—	—	—	—	322	308	1.5	12.0	—	—
300	380	62	—	—	2	363	1 610	540	810	**51160**	—	—	376	304	—	—	—	—	—	348	332	2	17.5	—	—
	420	95	100.5	112	3	570	2 600	400	600	**51260**	**53260**	**53260U**	415	304	360	430	164	320	34	371	349	2.5	42.5	39.5	48.0
320	400	63	—	—	2	379	1 760	540	810	**51164**	—	—	396	324	—	—	—	—	—	368	352	2	19.0	—	—
	440	95	100.5	112	3	577	2 710	400	600	**51264**	**53264**	**53264U**	435	325	380	450	157	320	36	391	369	2.5	45.0	42.0	52.0
340	420	64	—	—	2	387	1 860	500	770	**51168**	—	—	416	344	—	—	—	—	—	388	372	2	20.5	—	—
	460	96	100.3	113	3	584	2 830	380	570	**51268**	**53268**	**53268U**	455	345	400	470	199	360	36	411	389	2.5	48.0	45.0	55.0
360	440	65	—	—	2	394	1 960	500	720	**51172**	—	—	436	364	—	—	—	—	—	408	392	2	21.5	—	—
	500	110	116.7	130	4	701	3 500	340	500	**51272**	**53272**	**53272U**	495	365	430	510	172	360	43	443	417	3	70.0	65.0	82.0

[Remark] Standard cage types used for the above bearings are described earlier in this section.

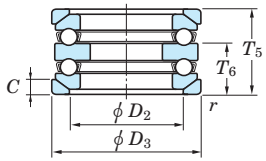
d_2 10 ~ (50) mm



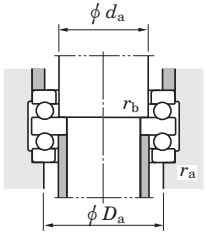
With flat back faces

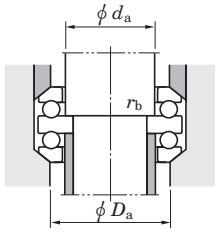


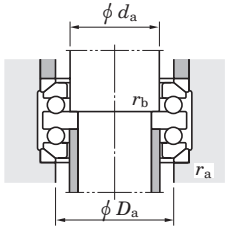
With spherical back face



With aligning seat races



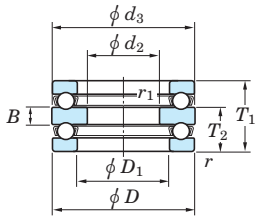




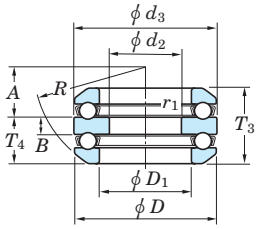
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)									Mounting dimensions (mm)				(Refer.) Mass (kg)	
d_2	D	T_1	T_3	T_5	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back face	With aligning seat races	d_3 max.	D_1 min.	D_2	D_3	T_2	T_4	T_6	A	R	B	C	d_a min.	D_a max.	r_a max.	r_b max.	With flat back faces	With aligning seat races
10	32	22	24.6	28	0.6	0.3	16.6	24.8	4 900	7 500	**52202**	**54202**	**54202U**	32	17	24	35	13.5	14.8	16.5	10.5	28	5	4	15	24	0.6	0.3	0.085	0.118
15	40	26	27.4	32	0.6	0.3	22.3	37.7	3 900	6 000	**52204**	**54204**	**54204U**	40	22	30	42	16	16.7	19	16	36	6	5	20	30	0.6	0.3	0.150	0.190
	60	45	49.8	55	1	0.6	55.6	89.4	2 600	4 000	**52405**	**54405**	**54405U**	60	27	42	62	28	30.4	33	15	50	11	8	25	42	1	0.6	0.630	0.804
20	47	28	31.4	36	0.6	0.3	27.7	50.4	3 600	5 500	**52205**	**54205**	**54205U**	47	27	36	50	17.5	19.2	21.5	16.5	40	7	5.5	25	36	0.6	0.3	0.230	0.304
	52	34	37.6	42	1	0.3	35.7	61.4	3 100	4 800	**52305**	**54305**	**54305U**	52	27	38	55	21	22.8	25	18	45	8	6	25	38	1	0.3	0.330	0.428
	70	52	56.2	62	1	0.6	72.8	126	2 200	3 400	**52406**	**54406**	**54406U**	70	32	50	75	32	34.1	37	16	56	12	9	30	50	1	0.6	1.00	1.25
25	52	29	32.6	37	0.6	0.3	28.1	54.3	3 400	5 200	**52206**	**54206**	**54206U**	52	32	42	55	18	19.8	22	20	45	7	5.5	30	42	0.6	0.3	0.270	0.346
	60	38	41.2	46	1	0.3	42.8	78.7	2 700	4 200	**52306**	**54306**	**54306U**	60	32	45	62	23.5	25.1	27.5	19.5	50	9	7	30	45	1	0.3	0.490	0.602
	80	59	63	69	1.1	0.6	87.1	155	1 900	2 900	**52407**	**54407**	**54407U**	80	37	58	85	36.5	38.5	41.5	18.5	64	14	10	35	58	1	0.6	1.44	1.79
30	62	34	37.8	42	1	0.3	40.7	83.8	2 900	4 500	**52207**	**54207**	**54207U**	62	37	48	65	21	22.9	25	21	50	8	7	35	48	1	0.3	0.420	0.544
	68	36	38.6	44	1	0.6	46.9	98.3	2 700	4 200	**52208**	**54208**	**54208U**	68	42	55	72	22.5	23.8	26.5	25	56	9	7	40	55	1	0.6	0.540	0.680
	68	44	47.2	52	1	0.3	55.5	105	2 400	3 700	**52307**	**54307**	**54307U**	68	37	52	72	27	28.6	31	21	56	10	7.5	35	52	1	0.3	0.710	0.898
	78	49	54	59	1	0.6	69.3	135	2 100	3 300	**52308**	**54308**	**54308U**	78	42	60	82	30.5	33	35.5	23.5	64	12	8.5	40	60	1	0.6	1.06	1.34
	90	65	69.4	77	1.1	0.6	113	205	1 700	2 600	**52408**	**54408**	**54408U**	90	42	65	95	40	42.2	46	22	72	15	12	40	65	1	0.6	2.03	2.55
35	73	37	39.6	45	1	0.6	47.7	105	2 600	4 000	**52209**	**54209**	**54209U**	73	47	60	78	23	24.3	27	23	56	9	7.5	45	60	1	0.6	0.620	0.784
	85	52	56.2	62	1	0.6	80.0	163	1 900	3 000	**52309**	**54309**	**54309U**	85	47	65	90	32	34.1	37	21	64	12	10	45	65	1	0.6	1.29	1.62
	100	72	78.8	86	1.1	0.6	130	242	1 500	2 300	**52409**	**54409**	**54409U**	100	47	72	105	44.5	47.9	51.5	23.5	80	17	12.5	45	72	1	0.6	2.91	3.42
40	78	39	42	47	1	0.6	48.5	111	2 300	3 600	**52210**	**54210**	**54210U**	78	52	62	82	24	25.5	28	30.5	64	9	7.5	50	62	1	0.6	0.710	0.890
	95	58	64.6	70	1.1	0.6	91.6	186	1 800	2 700	**52310**	**54310**	**54310U**	95	52	72	100	36	39.3	42	23	72	14	11	50	72	1	0.6	1.86	2.35
	110	78	83.2	92	1.5	0.6	148	283	1 400	2 100	**52410**	**54410**	**54410U**	110	52	80	115	48	50.6	55	30	90	18	14	50	80	1.5	0.6	3.56	4.39
45	90	45	49.6	55	1	0.6	69.4	159	2 100	3 200	**52211**	**54211**	**54211U**	90	57	72	95	27.5	29.8	32.5	32.5	72	10	9	55	72	1	0.6	1.12	1.44
	105	64	72.6	78	1.1	0.6	119	246	1 600	2 400	**52311**	**54311**	**54311U**	105	57	80	110	39.5	43.8	46.5	25.5	80	15	11.5	55	80	1	0.6	2.51	3.21
	120	87	92	101	1.5	0.6	178	359	1 200	1 900	**52411**	**54411**	**54411U**	120	57	88	125	53.5	56	60.5	22.5	90	20	15.5	55	88	1.5	0.6	4.70	5.62
50	95	46	50	56	1	0.6	73.6	179	1 900	3 000	**52212**	**54212**	**54212U**	95	62	78	100	28	30	33	30.5	72	10	9	60	78	1	0.6	1.25	1.57
	110	64	70.6	78	1.1	0.6	124	267	1 500	2 300	**52312**	**54312**	**54312U**	110	62	85	115	39.5	42.8	46.5	36.5	90	15	11.5	60	85	1	0.6	2.68	3.37
	130	93	99	107	1.5	0.6	201	397	1 100	1 700	**52412**	**54412**	**54412U**	130	62	95	135	57	60	64	28	100	21	16	60	95	1.5	0.6	6.33	7.60

[Remark] Standard cage types used for the above bearings are described earlier in this section.

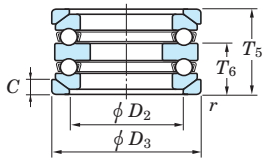
d_2 (50) ~ 95 mm



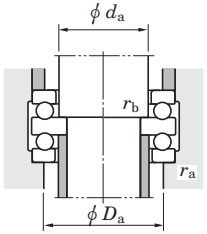
With flat back faces

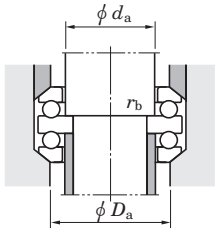


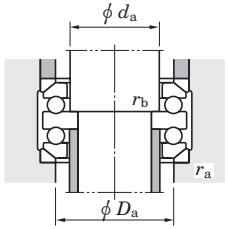
With spherical back face



With aligning seat races





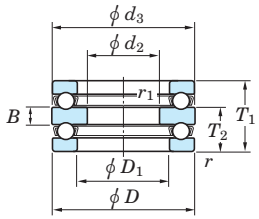


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)									Mounting dimensions (mm)				(Refer.) Mass (kg)	
d_2	D	T_1	T_3	T_5	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back faces	With aligning seat races	d_3 max.	D_1 min.	D_2	D_3	T_2	T_4	T_6	A	R	B	C	d_a min.	D_a max.	r_a max.	r_b max.	With flat back faces	With aligning seat races
50	140	101	109.4	119	2	1	232	493	1 000	1 600	**52413**	**54413**	**54413U**	140	68	100	145	62	66.2	71	34	112	23	17.5	65	100	2	1	8.03	9.72
55	100	47	50.4	57	1	0.6	74.8	189	1 900	2 900	**52213**	**54213**	**54213U**	100	67	82	105	28.5	30.2	33.5	38.5	80	10	9	65	82	1	0.6	1.36	1.70
	105	47	50.6	57	1	1	73.6	189	1 800	2 800	**52214**	**54214**	**54214U**	105	72	88	110	28.5	30.3	33.5	36.5	80	10	9	70	88	1	1	1.48	1.84
	115	65	71.8	79	1.1	0.6	128	287	1 400	2 200	**52313**	**54313**	**54313U**	115	67	90	120	40	43.4	47	34.5	90	15	12.5	65	90	1	0.6	2.90	3.66
	125	72	80.4	88	1.1	1	148	339	1 300	2 000	**52314**	**54314**	**54314U**	125	72	98	130	44	48.2	52	39	100	16	13	70	98	1	1	3.90	4.78
	150	107	114.2	125	2	1	250	553	940	1 450	**52414**	**54414**	**54414U**	150	73	110	155	65.5	69.1	74.5	28.5	112	24	19.5	70	110	2	1	9.71	11.6
60	110	47	49.6	57	1	1	77.4	209	1 800	2 700	**52215**	**54215**	**54215U**	110	77	92	115	28.5	29.8	33.5	47.5	90	10	9.5	75	92	1	1	1.57	1.96
	135	79	87.2	95	1.5	1	171	396	1 200	1 900	**52315**	**54315**	**54315U**	135	77	105	140	48.5	52.6	56.5	32.5	100	18	15	75	105	1.5	1	4.83	6.08
	160	115	123	135	2	1	252	560	880	1 350	**52415**	**54415**	**54415U**	160	78	115	165	70.5	74.5	80.5	36.5	125	26	21	75	115	2	1	11.8	14.3
65	115	48	51	58	1	1	78.5	218	1 700	2 600	**52216**	**54216**	**54216U**	115	82	98	120	29	30.5	34	45	90	10	10	80	98	1	1	1.69	2.09
	140	79	86.2	95	1.5	1	176	424	1 200	1 800	**52316**	**54316**	**54316U**	140	82	110	145	48.5	52.1	56.5	45.5	112	18	15	80	110	1.5	1	5.06	6.36
	170	120	128.4	140	2.1	1	270	621	810	1 250	**52416**	**54416**	**54416U**	170	83	125	175	73.5	77.7	83.5	30.5	125	27	22	80	125	2	1	14.0	16.6
	180	128	138	150	2.1	1.1	307	753	780	1 200	**52417**	**54417**	**54417U**	179.5	88	130	185	78.5	83.5	89.5	40.5	140	29	23	85	130	2	1	17.5	19.7
70	125	55	59.2	67	1	1	92.3	251	1 500	2 300	**52217**	**54217**	**54217U**	125	88	105	130	33.5	35.6	39.5	49.5	100	12	11	85	105	1	1	2.34	2.90
	150	87	95.2	105	1.5	1	206	489	1 100	1 700	**52317**	**54317**	**54317U**	150	88	115	155	53	57.1	62	39	112	19	17.5	85	115	1.5	1	6.43	8.03
	190	135	143.4	157	2.1	1.1	327	826	710	1 100	**52418**	**54418**	**54418U**	189.5	93	140	195	82.5	86.7	93.5	34.5	140	30	25.5	90	140	2	1	19.6	22.8
75	135	62	69	76	1.1	1	117	326	1 400	2 100	**52218**	**54218**	**54218U**	135	93	110	140	38	41.5	45	42	100	14	13.5	90	110	1	1	3.22	4.07
	155	88	97.2	106	1.5	1	213	524	1 000	1 600	**52318**	**54318**	**54318U**	155	93	120	160	53.5	58.1	62.5	36.5	112	19	18	90	120	1.5	1	6.60	8.44
80	210	150	160	176	3	1.1	368	983	620	950	**52420**	**54420**	**54420U**	209.5	103	155	220	91.5	96.5	104.5	43.5	160	33	27	100	155	2.5	1	26.6	32.0
85	150	67	72.8	81	1.1	1	147	410	1 200	1 900	**52220**	**54220**	**54220U**	150	103	125	155	41	43.9	48	49	112	15	14	100	125	1	1	4.29	5.25
	170	97	105.4	115	1.5	1	236	596	940	1 450	**52320**	**54320**	**54320U**	170	103	135	175	59	63.2	68	42	125	21	18	100	135	1.5	1	8.90	10.8
90	230	166	—	—	3	1.1	379	1 070	550	850	**52422**	—	—	229	113	—	—	101.5	—	—	—	—	37	—	110	170	2.5	1	34.9	—
95	160	67	71.4	81	1.1	1	148	431	1 200	1 800	**52222**	**54222**	**54222U**	160	113	135	165	41	43.2	48	62	125	15	14	110	135	1	1	4.68	5.66
	190	110	118.4	128	2	1	280	754	810	1 250	**52322**	**54322**	**54322U**	189.5	113	150	195	67	71.2	76	47	140	24	20.5	110	150	2	1	13.8	16.3
	250	177	—	—	4	1.5	480	1 460	520	800	**52424**	—	—	249	123	—	—	108.5	—	—	—	—	40	—	120	185	3	1.5	44.2	—

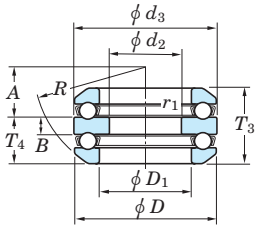
[Remark] Standard cage types used for the above bearings are described earlier in this section.

Double direction thrust ball bearings

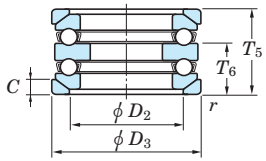
d_2 100 ~ 190 mm



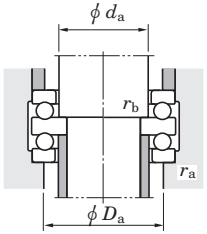
With flat back faces

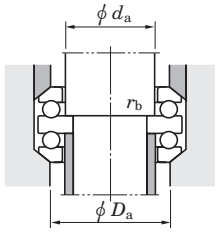


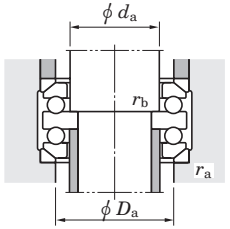
With spherical back face



With aligning seat races





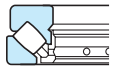


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.			Dimensions (mm)										Mounting dimensions (mm)				(Refer.) Mass (kg)	
d_2	D	T_1	T_3	T_5	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.	With flat back faces	With spherical back faces	With aligning seat races	d_3 max.	D_1 min.	D_2	D_3	T_2	T_4	T_6	A	R	B	C	d_a min.	D_a max.	r_a max.	r_b max.	With flat back faces	With aligning seat races
100	170	68	71.6	82	1.1	1.1	154	472	1 100	1 700	**52224**	**54224**	**54224U**	170	123	145	175	41.5	43.3	48.5	58.5	125	15	15	120	145	1	1	5.24	6.44
	210	123	131.2	143	2.1	1.1	325	931	710	1 100	**52324**	**54324**	**54324U**	209.5	123	165	220	75	79.1	85	58	160	27	22	120	165	2	1	17.2	22.9
	270	192	—	—	4	2	498	1 540	490	750	**52426**	—	—	269	134	—	—	117	—	—	—	—	42	—	130	200	3	2	56.5	—
110	190	80	85.8	96	1.5	1.1	203	622	970	1 500	**52226**	**54226**	**54226U**	189.5	133	160	195	49	51.9	57	63	140	18	17	130	160	1.5	1	7.72	9.29
	225	130	—	—	2.1	1.1	346	1 030	650	1 000	**52326**	—	—	224	134	—	—	80	—	—	—	—	30	—	130	177	2	1	22.1	—
	280	196	—	—	4	2	520	1 680	450	700	**52428**	—	—	279	144	—	—	120	—	—	—	—	44	—	140	206	3	2	60.6	—
120	200	81	86.2	99	1.5	1.1	215	669	940	1 450	**52228**	**54228**	**54228U**	199.5	143	170	210	49.5	52.1	58.5	83.5	160	18	17	140	170	1.5	1	8.31	10.5
	240	140	—	—	2.1	1.1	367	1 130	620	950	**52328**	—	—	239	144	—	—	85.5	—	—	—	—	31	—	140	190	2	1	27.8	—
	300	209	—	—	4	2	568	1 910	420	650	**52430**	—	—	299	154	—	—	127.5	—	—	—	—	46	—	150	225	3	2	73.9	—
130	215	89	95.6	109	1.5	1.1	244	768	840	1 300	**52230**	**54230**	**54230U**	214.5	153	180	225	54.5	57.8	64.5	74.5	160	20	20.5	150	180	1.5	1	10.6	13.6
	250	140	—	—	2.1	1.1	377	1 200	580	900	**52330**	—	—	249	154	—	—	85.5	—	—	—	—	31	—	150	200	2	1	29.2	—
	320	226	—	—	5	2	681	2 410	390	600	**52432**	—	—	319	164	—	—	138	—	—	—	—	50	—	160	240	4	2	90.3	—
135	340	236	—	—	5	2.1	755	2 730	360	550	**52434**	—	—	339	174	—	—	143	—	—	—	—	50	—	170	255	4	2	108	—
140	225	90	97.4	110	1.5	1.1	247	803	810	1 250	**52232**	**54232**	**54232U**	224.5	163	190	235	55	58.7	65	70	160	20	21	160	190	1.5	1	12.2	14.6
	270	153	—	—	3	1.1	470	1 570	550	850	**52332**	—	—	269	164	—	—	93	—	—	—	—	33	—	160	215	2.5	1	37.7	—
	360	245	—	—	5	3	742	2 730	320	500	**52436**	—	—	359	184	—	—	148.5	—	—	—	—	52	—	180	270	4	2.5	126	—
150	240	97	104.4	117	1.5	1.1	269	874	750	1 150	**52234**	**54234**	**54234U**	239.5	173	200	250	59	62.7	69	87	180	21	21.5	170	200	1.5	1	15.2	17.8
	250	98	102.4	118	1.5	2	294	986	710	1 100	**52236**	**54236**	**54236U**	249	183	210	260	59.5	61.7	69.5	108.5	200	21	21.5	180	210	1.5	2	15.9	19.6
	280	153	—	—	3	1.1	463	1 570	520	800	**52334**	—	—	279	174	—	—	93	—	—	—	—	33	—	170	220	2.5	1	39.6	—
	300	165	—	—	3	2	463	1 580	490	750	**52336**	—	—	299	184	—	—	101	—	—	—	—	37	—	180	240	2.5	2	50.9	—
160	270	109	116.4	131	2	2	298	1 010	650	1 000	**52238**	**54238**	**54238U**	269	194	220	280	66.5	70.2	77.5	93.5	200	24	23	190	230	2	2	21.6	25.2
	320	183	—	—	4	2	543	1 950	440	680	**52338**	—	—	319	195	—	—	111.5	—	—	—	—	40	—	190	255	3	2	64.9	—
170	280	109	115.6	133	2	2	314	1 110	620	950	**52240**	**54240**	**54240U**	279	204	240	290	66.5	69.8	78.5	120.5	225	24	23	200	240	2	2	22.7	27.3
	340	192	—	—	4	2	596	2 220	420	650	**52340**	—	—	339	205	—	—	117	—	—	—	—	42	—	200	270	3	2	77.8	—
190	300	110	115.2	134	2	2	342	1 310	580	900	**52244**	**54244**	**54244U**	299	224	260	310	67	69.6	79	114	225	24	25	220	260	2	2	23.9	29.5

[Remark] Standard cage types used for the above bearings are described earlier in this section.

Spherical thrust roller bearings

Spherical thrust roller bearings



Bore diameter **60** – **500** mm

Spherical thrust roller bearings are designed to carry high axial loads. They can also support radial load if magnitude is no more than 55 % of the axial load being carried.

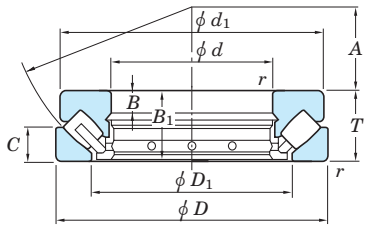
These bearings are not suitable for high-speed rotation.

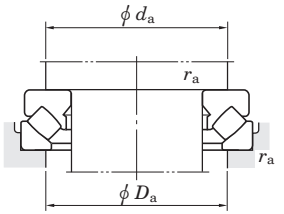
Having a spherical housing race raceway surface, these bearings are self-alignings, adjusting to axial inclination.

They are usually used with oil lubrication.

Boundary dimensions	As specified in JIS B 1512.
Tolerances	As specified in JIS B 1514-2, class 0. (refer to table 7-10 on p. A 69.)
Recommended fits	Refer to Table 9-8 on p. A 92.
Required minimum axial load	A certain degree of load is necessary in order for bearings to operate satisfactorily. (refer to p. A 110.)
Standard cage	Copper alloy machined cage (supplementary code : FY)
Allowable aligning angle	0.035 – 0.052 rad (2° – 3°) in general, depending on bearing series.
Equivalent axial load	Dynamic equivalent axial load $P_a = 1.2F_r + F_a$ Static equivalent axial load $P_{0a} \fallingdotseq 2.7F_r + F_a$ (Note : $F_r / F_a \leqq 0.55$)

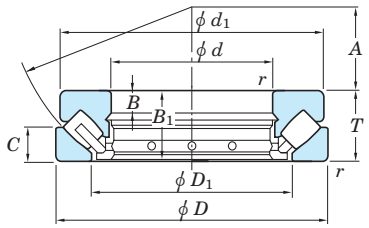
d 60 ~ 160 mm

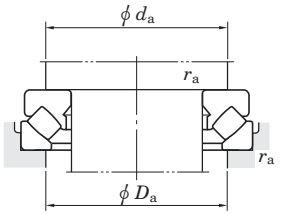




Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speed (min^{-1})	Bearing No.		Dimensions (mm)						Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	T	r min.	C_a	C_{0a}	Oil lub.			d_1	D_1	B	B_1	C	A	d_a min.	D_a max.	r_a max.	
60	130	42	1.5	319	884	2 700	**29412R**		123	89	15	39.5	20	38	90	108	1.5	2.75
65	140	45	2	360	1 020	2 500	**29413R**		133	96	16	42.5	21	42	100	115	2	3.41
70	150	48	2	387	1 100	2 300	**29414R**		142	103	17	45.5	23	44	105	125	2	4.16
75	160	51	2	468	1 360	2 100	**29415R**		152	109	18	48	24	47	115	132	2	4.98
80	170	54	2.1	505	1 480	2 000	**29416R**		162	117	19	51	26	50	120	140	2	5.95
85	150	39	1.5	321	1 000	2 600	**29317R**		143.5	114	13	37	19	50	115	135	1.5	2.87
	180	58	2.1	572	1 700	1 900	**29417R**		170	125	21	55	28	54	130	150	2	7.19
90	155	39	1.5	330	1 050	2 500	**29318R**		148.5	117	13	37	19	52	120	140	1.5	3.06
	190	60	2.1	658	2 010	1 800	**29418R**		180	132	22	57	29	56	135	157	2	8.28
100	170	42	1.5	385	1 270	2 300	**29320R**		163	129	14	40	20.8	58	130	150	1.5	3.91
	210	67	3	730	2 220	1 650	**29420R**		200	146	24	64	32	62	150	175	2.5	11.2
110	190	48	2	502	1 690	2 000	**29322R**		182	143	16	45.5	23	64	145	165	2	5.67
	230	73	3	896	2 810	1 500	**29422R**		220	162	26	69	35	69	165	190	2.5	14.7
120	210	54	2.1	565	2 030	1 800	**29324R**		200	159	18	51	26	70	160	180	2	7.90
	250	78	4	1 040	3 270	1 350	**29424R**		236	174	29	74	37	74	180	205	3	18.5
130	225	58	2.1	715	2 440	1 700	**29326R**		215	171	19	55	28	76	170	195	2	9.45
	270	85	4	1 200	3 870	1 250	**29426R**		255	189	31	81	41	81	195	225	3	23.5
140	240	60	2.1	707	2 490	1 600	**29328**		230	183	20	57	29	82	185	205	2	11.1
	280	85	4	1 260	4 080	1 250	**29428R**		268	199	31	81	41	86	205	235	3	24.6
150	250	60	2.1	767	2 740	1 550	**29330R**		240	194	20	57	29	87	195	215	2	11.7
	300	90	4	1 380	4 620	1 100	**29430R**		285	214	32	86	44	92	220	250	3	29.6
160	270	67	3	862	3 070	1 400	**29332**		260	208	23	64	32	92	210	235	2.5	15.4
	320	95	5	1 590	5 370	1 050	**29432R**		306	229	34	91	45	99	230	265	4	35.9

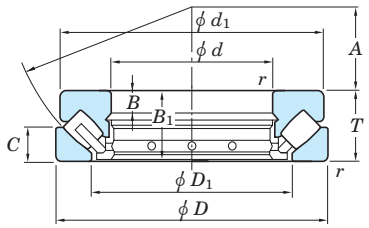
d 170 ~ 320 mm

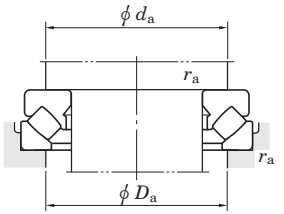




Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speed (min^{-1})	Bearing No.		Dimensions (mm)						Mounting dimensions (mm)			(Refer.) Mass
d	D	T	r min.	C_a	C_{0a}	Oil lub.			d_1	D_1	B	B_1	C	A	d_a min.	D_a max.	r_a max.	(kg)
170	280	67	3	922	3 180	1 350	**29334A**		270	216	23	64	32	96	220	245	2.5	15.4
	340	103	5	1 740	5 880	950	**29434R**		324	243	37	99	50	104	245	285	4	44.0
180	300	73	3	896	3 170	1 250	**29336**		290	232	25	69	35	103	235	260	2.5	20.7
	360	109	5	1 960	6 590	900	**29436R**		342	255	39	105	52	110	260	300	4	52.2
190	320	78	4	1 170	4 230	1 150	**29338**		308	246	27	74	38	110	250	275	3	25.1
	380	115	5	2 230	7 690	850	**29438R**		360	271	41	111	55	117	275	320	4	61.4
200	280	48	2	513	2 170	1 600	**29240**		271	236	15	45	24	108	235	255	2	8.90
	340	85	4	1 360	5 040	1 050	**29340**		325	261	29	81	41	116	265	295	3	31.2
	400	122	5	2 460	8 470	800	**29440R**		380	286	43	117	59	122	290	335	4	73.0
220	300	48	2	536	2 340	1 550	**29244**		292	254	15	45	24	117	260	275	2	10.0
	360	85	4	1 380	5 240	1 000	**29344**		345	280	29	81	41	125	285	315	3	33.3
	420	122	6	2 540	8 990	750	**29444R**		400	308	43	117	58	132	310	355	5	74.2
240	340	60	2.1	822	3 670	1 250	**29248**		330	283	19	57	30	130	285	305	2	16.7
	380	85	4	1 430	5 330	950	**29348A**		365	300	29	81	41	135	300	330	3	35.5
	440	122	6	2 610	9 510	700	**29448R**		420	326	43	117	59	142	330	375	5	83.0
260	360	60	2.1	838	3 720	1 200	**29252**		350	302	19	57	30	139	305	325	2	18.5
	420	95	5	1 540	6 040	850	**29352**		405	329	32	91	45	148	330	365	4	51.5
	480	132	6	3 100	11 100	650	**29452R**		460	357	48	127	64	154	360	405	5	110
280	380	60	2.1	826	3 730	1 150	**29256**		370	323	19	57	30	150	325	345	2	19.5
	440	95	5	1 760	6 870	800	**29356**		423	348	32	91	46	158	350	390	4	53.2
	520	145	6	3 650	13 600	550	**29456R**		495	387	52	140	68	166	390	440	5	137
300	420	73	3	1 060	4 880	950	**29260**		405	353	21	69	38	162	355	380	2.5	30.5
	480	109	5	1 970	7 780	700	**29360**		460	379	37	105	50	168	380	420	4	74.9
	540	145	6	3 880	14 900	550	**29460R**		515	402	52	140	70	175	410	460	5	146
320	440	73	3	1 430	6 480	900	**29264R**		430	372	21	69	38	172	375	400	2.5	32.7
	500	109	5	2 310	9 380	650	**29364**		482	399	37	105	53	180	400	440	4	78.0
	580	155	7.5	4 160	16 100	500	**29464R**		555	435	55	149	75	191	435	495	6	179

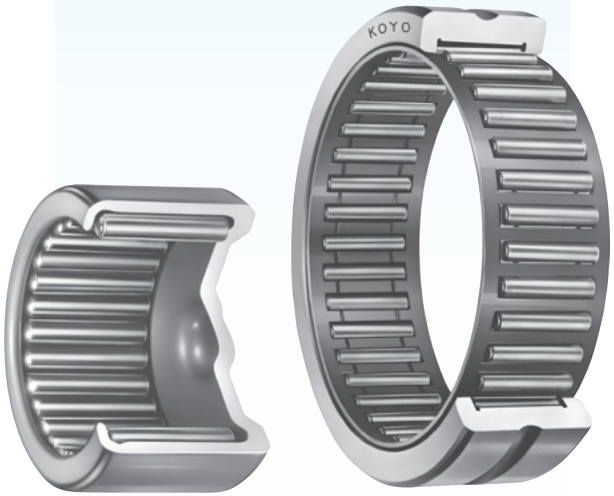
d 340 ~ 500 mm





Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speed (min^{-1})	Bearing No.		Dimensions (mm)						Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	T	r min.	C_a	C_{0a}	Oil lub.			d_1	D_1	B	B_1	C	A	d_a min.	D_a max.	r_a max.	
340	460	73	3	1 390	6 420	900	**29268R**		445	395	21	69	37	183	395	420	2.5	34.7
	540	122	5	3 050	12 700	600	**29368R**		520	428	41	117	59	192	430	470	4	106
	620	170	7.5	4 960	19 400	450	**29468R**		590	462	61	164	82	201	465	530	6	224
360	500	85	4	1 310	6 080	750	**29272**		485	423	25	81	44	194	420	455	3	51.8
	560	122	5	3 120	13 200	550	**29372R**		540	448	41	117	59	202	450	495	4	110
	640	170	7.5	5 150	20 600	450	**29472R**		610	480	61	164	82	210	485	550	6	231
380	520	85	4	1 380	6 610	700	**29276**		505	441	27	81	42	202	440	475	3	52.8
	600	132	6	3 540	15 000	500	**29376R**		580	477	44	127	63	216	480	525	5	141
	670	175	7.5	5 420	22 000	410	**29476R**		640	504	63	168	85	230	510	575	6	263
400	540	85	4	1 580	7 610	700	**29280**		526	460	27	81	42	212	460	490	3	55.3
	620	132	6	3 700	16 100	500	**29380R**		596	494	44	127	64	225	500	550	5	144
	710	185	7.5	6 200	25 300	380	**29480R**		680	534	67	178	89	236	540	610	6	315
420	580	95	5	1 850	8 750	600	**29284**		564	489	30	91	46	225	490	525	4	75.4
	650	140	6	4 060	17 700	450	**29384R**		626	520	48	135	68	235	525	575	5	169
	730	185	7.5	6 380	26 500	370	**29484R**		700	556	67	178	89	244	560	630	6	330
440	600	95	5	1 870	8 970	600	**29288**		585	508	30	91	49	235	510	545	4	77.9
	680	145	6	4 290	18 800	420	**29388R**		655	548	49	140	70	245	550	600	5	190
	780	206	9.5	7 290	30 000	320	**29488R**		745	588	74	199	100	260	595	670	8	423
460	620	95	5	1 950	9 620	550	**29292**		605	530	30	91	46	245	530	570	4	81.0
	710	150	6	3 680	15 800	400	**29392**		685	567	51	144	72	257	575	630	5	216
	800	206	9.5	7 520	31 600	300	**29492R**		765	608	74	199	100	272	615	690	8	438
480	650	103	5	2 300	11 600	500	**29296**		635	556	33	99	55	259	555	595	4	89.0
	730	150	6	3 650	15 800	390	**29396**		705	590	51	144	72	270	595	650	5	218
	850	224	9.5	8 690	36 300	270	**29496R**		810	638	81	216	108	280	645	730	8	548
500	870	224	9.5	8 650	36 400	270	**294/500R**		830	661	81	216	107	290	670	750	8	562

Needle roller bearings



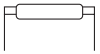
Needle roller bearings are small in sectional height, therefore useful in making machinery smaller and lighter. This type of bearing is used in a wide range of machinery, such as automobiles, motor cycles, electric machines, machine tools, aerospace and office equipment.

- Compact, highly rigid and superior in load carrying performance, compared with other types of bearings.
- Excellent for carrying oscillating loads; contains many small diameter rollers.

- Widely employed in stud type and yoke type track rollers used as guide rollers in cam mechanisms or linear motion units.
  Also used in miniature one-way clutches in the clutch mechanisms of office equipment, such as copying machines.

The catalog also covers bearings employing rollers other than those prescribed in JIS B 1506 "rollers for roller bearings".

Needle roller and cage assemblies



Bore diameter of a needle roller and cage assembly
6 – 95 mm

Drawn cup needle roller bearings

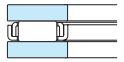
Full complement type | With cage

Roller set bore diameter
4 – 50 mm

Machined ring needle roller bearings

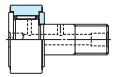
Roller set bore diameter
12 – 160 mm

Needle roller thrust bearings



Bore diameter **10 – 100** mm

Stud type track rollers (cam followers)



Outside diameter **13 – 90** mm

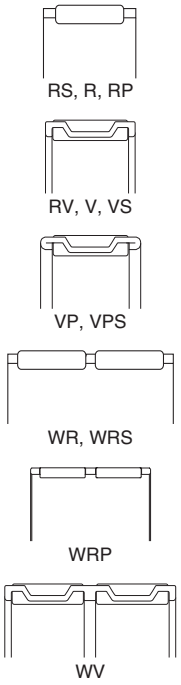
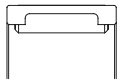
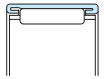
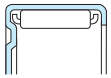
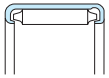
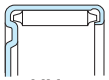
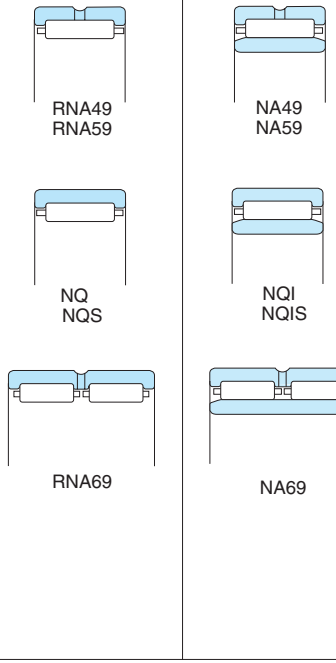
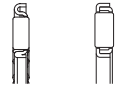
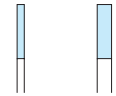
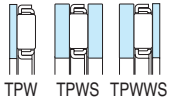
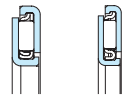
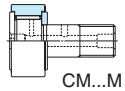
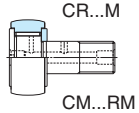
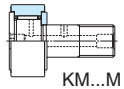
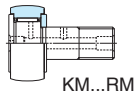
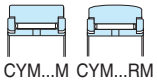
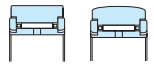
Yoke type track rollers (roller followers)

Outside diameter **16 – 90** mm

Miniature one-way clutches (Refer.)

Roller set bore diameter **4 – 12** mm

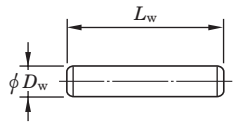
Table 1 Types of needle roller bearing

	Needle roller and cage assemblies		Drawn cup needle roller bearings		Machined ring needle roller bearings		Needle roller thrust bearings	Stud type track rollers (cam followers)	Yoke type track rollers (roller followers)
	For general use	For use with connecting rods	With cage	Full complement type	Without inner ring	With inner ring			
Basic type		● For use at large end (for crank pin)   ● For use at small end (for piston pin) 	● Open ends type  ● Closed end type 	● Open ends type   ● Closed end type 		● Needle roller and cage assembly  ● Race*  ● Combination type (separable type)  ● One-piece (non-separable type) 	● Full complement type   ● With cage  	● Full complement type  ● With cage 
Tolerances	● The tolerances of needle roller are as specified in JIS B 1506. (refer to Table 2.) ● Cage width tolerance is given in Table 3.		● This type of bearing becomes accurate in terms of performance and dimensions when it is press-fit inside the housing at a specified interference. Therefore, its roller set bore diameter should be measured with the bearing press-fit inside a ring gauge. (refer to Tables 4 and 5.)		● As specified in JIS B 1536-1. (refer to Table 6 and 7.)		● The dimensional tolerance is given in Table 8 – 11.	● As specified in JIS B 1536 for the stud type track roller outer ring outside diameter and width tolerances, as well as the dimensional and running accuracy of yoke type track rollers. ● The tolerances of stud type track rollers are as shown in Table 12 – 14. The tolerances of yoke type track rollers are as shown in Table 15.	
Recommended fits and radial internal clearance	Recommended fit is given in Table 16.	To be determined according to engine type and operating conditions.	Recommended fit is given in Table 17.		● Recommended fit is as shown in Table 18. ● Radial internal clearance is as shown in Table 10-8 on p. A 100. ● For bearings which do not have an inner ring, the tolerance class of the roller set and roller complement bore diameters is F 6. Therefore, the radial internal clearance can be determined by choosing the shaft tolerance class. (refer to Table 19.)		Recommended fit is as shown in Table 20.	Fix the stud type track rollers to the stud tightly so that there will be no play between them. Recommended mounting holes of stud are as shown in Table 21.	Recommended fit is as shown in Table 22.
	The radial internal clearance of these bearings becomes accurate when they are mounted to shafts or housings that have been finished to the specified tolerance.								
Shaft and housing specifications	Table 23 gives the requirements for shafts and housings to which needle roller radial bearings are mounted. (for needle roller and cage assemblies used on connecting rods, refer to JTEKT separate catalog.				As shown in Table 23.		Table 24 gives the specifications for the fitting face.		

[Remark] *-marked item indicates the thrust washer or washer specified in JIS.

[Tolerances of needle roller bearings]

Table 2 Tolerance grades of needle rollers (JIS B 1506)



Unit : μm

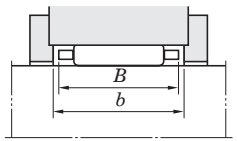
Class	Single [1] plane diameter variation V_{Dwp} max.	Deviation [1] from circular form Δ_{Rw} max.	Gauge lot [1] diameter variation V_{DwL} max.
2	1	1	2
3	1.5	1.5	3
5	2	2.5	5

Class	Actual [2] length deviation Δ_{Lws}	Recommended gauge S
2	h 13	0/– 2, – 1/– 3, – 2/– 4, – 3/– 5, – 4/– 6, – 5/– 7, – 6/– 8, – 7/– 9, – 8/– 10
3		0/– 3, – 1.5/– 4.5, – 3/– 6, – 4.5/– 7.5, – 6/– 9,– 7/– 10
5		0/– 5, – 3/– 8, – 5/– 10

[Notes] 1) Values apply only at middle of roller length.
2) Applied tolerance differs according to L_w division.

[Remark] Along the entire length of the roller, all the actually measured diameters should not exceed the actual maximum diameter at the middle of the entire length of the roller by the lengths shown below.
a) Class 2 : 0.5 μm b) Class 3 : 0.8 μm
c) Class 5 : 1 μm

Table 3 Tolerance of needle roller cage width B



Bearing type	B deviation (mm)	
	upper	lower
R, RS, RP (Welded type), RV, V, VS, WR, WRS, WRP, WV	– 0.2	– 0.55
VP, VPS	*– 0.2*	*– 0.7*

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

[Reference] The guide width (b) should satisfy the equation : $b = B + x$ (x : 0.2 to 0 mm)

Table 4 Metric series drawn cup needle roller bearing inspecting gauge specifications

Unit : mm

Nominal bore diameter of rolling element complement F_w	Ring gauge	Plug gauge	
		Go end	No-go end
4	7.996	4.023	4.048
5	8.996	5.023	5.048
6	9.996	6.028	6.053
7	10.995	7.031	7.056
8	11.995 14.995	8.031	8.056
9	12.995 15.995	9.031	9.056
10	13.995 16.995	10.031	10.056
12	15.995 17.995 18.993	12.031	12.056
13	18.993	13.034	13.059
14	18.993 19.993 21.993	14.034	14.059
15	19.993 20.993 21.993	15.034	15.059
16	21.993 23.993	16.034	16.059
17	21.972 22.972 23.972	17.013	17.038
18	23.972 24.972	18.013	18.038
19	26.972	19.013	19.038
20	25.972 26.972	20.013	20.038
22	27.972 28.972 29.972	22.013	22.038
24	29.972 30.967 34.967	24.013	24.038
25	31.967 32.967	25.013	25.038
26	33.967	26.013	26.038
28	33.967 34.967 36.967	28.013	28.038
30	36.967 37.967 39.967	30.013	30.038
32	37.967 39.967 41.967	32.013	32.038
35	41.967 44.967	35.013	35.038
36	41.967 43.967 47.967	36.013	36.038
37	42.967 46.967	37.013	37.038
38	47.967	38.013	38.038
40	46.967 49.967	40.013	40.043
45	51.961 54.961	45.013	45.043
50	57.961 61.961	50.013	50.043
55	62.961	55.013	55.051

Table 5 Ring gauge specifications and roller set bore diameter tolerance (for bearings designed according to ISO standards)

Unit : mm

Nominal bore diameter of rolling element complement F_w	Nominal outside diameter D	Ring gauge	Nominal bore diameter of rolling element complement F_w tolerance	
			lower	upper
4	8	7.984	4.010	4.028
5	9	8.984	5.010	5.028
6	10	9.984	6.010	6.028
7	11	10.980	7.013	7.031
8	12 14	11.980 13.980	8.013	8.031
9	13 15	12.980 14.980	9.013	9.031
10	14 16	13.980 15.980	10.013	10.031
12	16 18	15.980 17.980	12.016	12.034
14	20 22	19.976 21.976	14.016	14.034
15	21 23	20.976 22.976	15.016	15.034
16	22 24	21.976 23.976	16.016	16.034
17	23 25	22.976 24.976	17.016	17.034
18	24 26	23.976 25.976	18.016	18.034
20	26 28	25.976 27.976	20.020	20.041
22	28 30	27.976 29.976	22.020	22.041
25	32 35	31.972 34.972	25.020	25.041
28	35 38	34.972 37.972	28.020	28.041
30	37 40	36.972 39.972	30.020	30.041
32	39 42	38.972 41.972	32.025	32.050
35	42 45	41.972 44.972	35.025	35.050
38	45 48	44.972 47.972	38.025	38.050
40	47 50	46.972 49.972	40.025	47.050
42	49 52	48.972 51.967	42.025	42.050
45	52 55	51.967 54.967	45.025	45.050
50	58	57.967	32.025	32.050
55	63	62.967	55.030	55.060
60	68	67.967	60.030	60.060
65	73	72.967	65.030	65.060
70	78	77.967	70.030	70.060

[Remark] The supplementary code "J" is added as a suffix to the bearing numbers that are designed according to ISO standards.

Table 6 Machined ring needle roller bearings variation of smallest single bore diameter of rolling element complement $F_{ws\ min}$ [1] (for interchangeable bearings [2] and bearings without inner ring)

Unit : μm

Nominal bore diameter of rolling element complement F_w (mm)		$F_{ws\ min}$ tolerance (F 6)	
over	up to	upper	lower
6	10	+ 22	+ 13
10	18	+ 27	+ 16
18	30	+ 33	+ 20
30	50	+ 41	+ 25
50	80	+ 49	+ 30
80	120	+ 58	+ 36
120	180	+ 68	+ 43
180	250	+ 79	+ 50

[Notes] 1) The smallest single bore diameter of rolling element complement is the diameter of a cylinder whose radial internal clearance disappears completely, at least in one radial direction.
2) A group of bearings with inner rings that have the same bearing number. Outer ring, cage and needle roller assemblies and inner rings are interchangeable among them.

Table 7 Radial bearing tolerances = JIS B 1536 =

(1) Inner ring

Unit : μm

Nominal bore diameter d (mm)		Single plane mean bore diameter deviation Δ_{dmp}								Single plane bore diameter variation V_{dsp}				Mean bore diameter variation V_{dmp}				Radial runout of assembled bearing inner ring K_{ia}				S_d		Single inner ring width deviation Δ_{Bs}								Inner ring width variation V_{Bs}				
		class 0		class 6		class 5		class 4		Diameter series 9																											
										class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 0	class 6	class 5	class 4	class 5	class 4	class 0		class 6		class 5		class 4		class 0	class 6	class 5	class 4	class 2
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	max.				max.				max.				max.		upper	lower	upper	lower	upper	lower	upper	lower	max.				
2.5	10	0	− 8	*0*	*− 7*	*0*	*− 5*	*0*	*− 4*	*10*	*9*	*5*	*4*	6	*5*	*3*	*2*	10	*6*	*4*	*2.5*	*7*	*3*	0	−120	*0*	*−120*	*0*	*− 40*	*0*	*− 40*	15	*15*	*5*	*2.5*	*1.5*
10	18	0	− 8	*0*	*− 7*	*0*	*− 5*	*0*	*− 4*	*10*	*9*	*5*	*4*	6	*5*	*3*	*2*	10	*7*	*4*	*2.5*	*7*	*3*	0	−120	*0*	*−120*	*0*	*− 80*	*0*	*− 80*	20	*20*	*5*	*2.5*	*1.5*
18	30	0	−10	*0*	*− 8*	*0*	*− 6*	*0*	*− 5*	*13*	*10*	*6*	*5*	8	*6*	*3*	*2.5*	13	*8*	*4*	*3*	*8*	*4*	0	−120	*0*	*−120*	*0*	*−120*	*0*	*−120*	20	*20*	*5*	*2.5*	*1.5*
30	50	0	−12	*0*	*−10*	*0*	*− 8*	*0*	*− 6*	*15*	*13*	*8*	*6*	9	*8*	*4*	*3*	15	*10*	*5*	*4*	*8*	*4*	0	−120	*0*	*−120*	*0*	*−120*	*0*	*−120*	20	*20*	*5*	*3*	*1.5*
50	80	0	−15	*0*	*−12*	*0*	*− 9*	*0*	*− 7*	*19*	*15*	*9*	*7*	11	*9*	*5*	*3.5*	20	*10*	*5*	*4*	*8*	*5*	0	−150	*0*	*−150*	*0*	*−150*	*0*	*−150*	25	*25*	*6*	*4*	*1.5*
80	120	0	−20	*0*	*−15*	*0*	*−10*	*0*	*− 8*	*25*	*19*	*10*	*8*	15	*11*	*5*	*4*	25	*13*	*6*	*5*	*9*	*5*	0	−200	*0*	*−200*	*0*	*−200*	*0*	*−200*	25	*25*	*7*	*4*	*2.5*
120	150	0	−25	*0*	*−18*	*0*	*−13*	*0*	*−10*	*31*	*23*	*13*	*10*	19	*14*	*7*	*5*	30	*18*	*8*	*6*	*10*	*6*	0	−250	*0*	*−250*	*0*	*−250*	*0*	*−250*	30	*30*	*8*	*5*	*2.5*
150	180	0	−25	*0*	*−18*	*0*	*−13*	*0*	*−10*	*31*	*23*	*13*	*10*	19	*14*	*7*	*5*	30	*18*	*8*	*6*	*10*	*6*	0	−250	*0*	*−250*	*0*	*−250*	*0*	*−250*	30	*30*	*8*	*5*	*4*
180	250	0	−30	*0*	*−22*	*0*	*−15*	*0*	*−12*	*38*	*28*	*15*	*12*	23	*17*	*8*	*6*	40	*20*	*10*	*8*	*11*	*7*	0	−300	*0*	*−300*	*0*	*−300*	*0*	*−300*	30	*30*	*10*	*6*	*5*

[Remark] Values in Italics are prescribed in JTEKT standards.
S_d : Perpendicularity of inner ring face with respect to the bore

(2) Outer ring

Unit : μm

Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}								Single plane outside diameter variation V_{Dsp}				Mean outside diameter variation V_{Dmp}				Radial runout of assembled bearing outer ring K_{ea}				S_D		Δ_{Cs}		Ring width variation V_{Cs}			
		class 0		class 6		class 5		class 4		Diameter series 9																			
										class 0[1)]	class 6[1)]	class 5	class 4	class 0[1)]	class 6[1)]	class 5	class 4	class 0	class 6	class 5	class 4	class 5	class 4	class 0, 6, 5, 4		class 0	class 6	class 5	class 4
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	max.				max.				max.				max.		upper	lower	max.			
6	18	0	− 8	*0*	*− 7*	*0*	*− 5*	*0*	*− 4*	*10*	*9*	*5*	*4*	6	*5*	*3*	*2*	15	*8*	*5*	*3*	*8*	*4*					*5*	*2.5*
18	30	0	− 9	*0*	*− 8*	*0*	*− 6*	*0*	*− 5*	*12*	*10*	*6*	*5*	7	*6*	*3*	*2.5*	15	*9*	*6*	*4*	*8*	*4*	Shall conform to the tolerance Δ_{Bs} on d of the same bearing		Shall conform to the tolerance V_{Bs} on d of the same bearing		*5*	*2.5*
30	50	0	−11	*0*	*− 9*	*0*	*− 7*	*0*	*− 6*	*14*	*11*	*7*	*6*	8	*7*	*4*	*3*	20	*10*	*7*	*5*	*8*	*4*					*5*	*2.5*
50	80	0	−13	*0*	*−11*	*0*	*− 9*	*0*	*− 7*	*16*	*14*	*9*	*7*	10	*8*	*5*	*3.5*	25	*13*	*8*	*5*	*8*	*4*					*6*	*3*
80	120	0	−15	*0*	*−13*	*0*	*−10*	*0*	*− 8*	*19*	*16*	*10*	*8*	11	*10*	*5*	*4*	35	*18*	*10*	*6*	*9*	*5*					*8*	*4*
120	150	0	−18	*0*	*−15*	*0*	*−11*	*0*	*− 9*	*23*	*19*	*11*	*9*	14	*11*	*6*	*5*	40	*20*	*11*	*7*	*10*	*5*					*8*	*5*
150	180	0	−25	*0*	*−18*	*0*	*−13*	*0*	*−10*	*31*	*23*	*13*	*10*	19	*14*	*7*	*5*	45	*23*	*13*	*8*	*10*	*5*					*8*	*5*
180	250	0	−30	*0*	*−20*	*0*	*−15*	*0*	*−11*	*38*	*25*	*15*	*11*	23	*15*	*8*	*6*	50	*25*	*15*	*10*	*11*	*7*					*10*	*7*
250	315	0	−35	*0*	*−25*	*0*	*−18*	*0*	*−13*	*44*	*31*	*18*	*13*	26	*19*	*9*	*7*	60	*30*	*18*	*11*	*13*	*8*					*11*	*7*

[Note] 1) Shall be applied when locating snap ring is not fitted.
[Remark] Values in Italics are prescribed in JTEKT standards.
S_D : Perpendicularity of outer ring outside surface with respect to the face
Δ_{Cs} : Deviation of a single outer ring width

Table 8 Tolerances for needle roller and cage thrust assemblies (type code : TV, TP) = JIS B 1536 =

(1) Bore diameter

Unit : μm

Cage bore diameter d_c (mm)		Smallest single bore ($d_{cs\,min}$) diameter tolerance[1]		Single plane bore diameter variation V_{dcsp}
over	up to	upper	lower	max.
6	10	+115	+25	90
10	18	+142	+32	110
18	30	+170	+40	130
30	50	+210	+50	160
50	80	+250	+60	190
80	120	+292	+72	220

[Note] 1) The tolerances indicate the limits of differences between $d_{cs\,min}$ and d_c.
[Remark] The tolerances of thickness conform to JIS B 1506 in a similar manner to roller diameter (D_w) (refer to page B 378).

(2) Outside diameter

Unit : μm

Cage outside diameter D_c (mm)		Largest single outside ($D_{cs\,max}$) diameter tolerance[1]		Single plane outside diameter variation V_{Dcsp}
over	up to	upper	lower	max.
18	30	−110	−320	210
30	40	−120	−370	250
40	50	−130	−380	250
50	65	−140	−440	300
65	80	−150	−450	300
80	100	−170	−520	350
100	120	−180	−530	350
120	140	−200	−600	400

[Note] 1) The tolerances indicate the limits of differences between $D_{cs\,max}$ and D_c.
[Remark] The tolerances of thickness conform to JIS B 1506 in a similar manner to roller diameter (D_w) (refer to page B 378).

Table 9 Tolerances for races = JIS B 1536 = (Indicates the thrust washer specified in JIS)

(1) Bore diameter (type code : W)

Unit : μm

Race bore diameter d (mm)		Smallest single bore ($d_{s\,min}$) diameter tolerance[1]		Single plane bore diameter variation V_{dsp}
over	up to	upper	lower	max.
6	10	+175	+25	120
10	18	+212	+32	180
18	30	+250	+40	210
30	50	+300	+50	250
50	80	+360	+60	300
80	120	+422	+72	350

[Note] 1) The tolerances indicate the limits of differences between $d_{s\,min}$ and d.
[Remark] Tolerances of thickness (S) shall be equivalent to tolerance class js12 of JIS B 0401-2.

(2) Outside diameter (type code : W)

Unit : μm

Race outside diameter D (mm)		Largest single outside ($D_{s\,max}$) diameter tolerance[1]		Single plane outside diameter variation V_{Dsp}
over	up to	upper	lower	max.
18	30	−40	*−250*	330
30	50	−50	*−300*	390
50	80	−60	*−360*	460
80	120	−72	*−422*	540
120	180	−85	*−485*	630

[Note] 1) The tolerances indicate the limits of differences between $D_{s\,max}$ and D.
[Remarks] 1. Tolerances of thickness (S) shall be equivalent to tolerance class js12 of JIS B 0401-2.
2. Values in Italics are prescribed in JTEKT standards.

Table 10 Tolerances for races (Indicates the washer specified in JIS)

(1) Bore diameter (type code : WS)

Unit : μm

Race bore diameter d (mm)		Smallest single bore ($d_{s\,min}$) diameter tolerance[1]		Single plane bore diameter variation V_{dsp}
over	up to	upper	lower	max.
6	10	*+175*	*+25*	*120*
10	18	*+212*	*+32*	*180*
18	30	*+250*	*+40*	*210*
30	50	*+300*	*+50*	*250*
50	80	*+360*	*+60*	*300*
80	120	*+422*	*+72*	*350*

[Note] 1) The tolerances indicate the limits of differences between $d_{s\,min}$ and d.
[Remarks] 1. Tolerances of thickness (S) shall be equivalent to tolerance class js12 of JIS B 0401-2.
2. Values in Italics are prescribed in JTEKT standards.

(2) Outside diameter (type code : WS)

Unit : μm

Race outside diameter D (mm)		Largest single outside ($D_{s\,max}$) diameter tolerance[1]		Single plane outside diameter variation V_{Dsp}
over	up to	upper	lower	max.
18	30	*−40*	*−250*	*330*
30	50	*−50*	*−300*	*390*
50	80	*−60*	*−360*	*460*
80	120	*−72*	*−422*	*540*
120	180	*−85*	*−485*	*630*

[Note] 1) The tolerances indicate the limits of differences between $D_{s\,max}$ and D.
[Remarks] 1. Tolerances of thickness (S) shall be equivalent to tolerance class js12 of JIS B 0401-2.
2. Values in Italics are prescribed in JTEKT standards.

Table 11 Tolerances for non-separable needle roller thrust bearings (type code : TVK, TPK)

(1) Bore diameter

Unit : μm

Race bore diameter d (mm)		Smallest single bore ($d_{s\,min}$) diameter tolerance[1]		Single plane bore diameter variation V_{dsp}
over	up to	upper	lower	max.
18	30	*+250*	*+40*	*210*
30	50	*+300*	*+50*	*250*
50	80	*+360*	*+60*	*300*

[Note] 1) The tolerances indicate the limits of differences between $d_{s\,min}$ and d.
[Remark] Values in Italics are prescribed in JTEKT standards.

(2) Outside diameter

Unit : μm

Race outside diameter D (mm)		Largest single outside ($D_{s\,max}$) diameter tolerance[1]		Single plane outside diameter variation V_{Dsp}
over	up to	upper	lower	max.
30	50	*−50*	*−300*	*250*
50	80	*−60*	*−360*	*300*
80	120	*−72*	*−422*	*350*

[Note] 1) The tolerances indicate the limits of differences between $D_{s\,max}$ and D.
[Remark] Values in Italics are prescribed in JTEKT standards.

Table 12 Outer ring tolerance of stud type track rollers (cam followers) = JIS B 1536 =

(1) Metric series

Unit : μm

Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}				Single outer ring width deviation Δ_{Cs}		Radial runout of assembled bearing outer ring K_{ea}
		Cylindrical outside surface		Crowning outside surface				
over	up to	upper	lower	upper	lower	upper	lower	max.
10	18	0	*− 8*	0	−50	0	−120	15
18	30	0	*− 9*	0	−50	0	−120	15
30	50	0	*−11*	0	−50	0	−120	20
50	80	0	*−13*	0	−50	0	−120	25
80	120	0	*−15*	0	−50	0	−120	*35*

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

Table 13 Tolerances of shank diameter

(1) Metric series

Unit : μm

Shank diameter d_1 (mm)		Deviation of a single shank diameter Δ_{d1s}	
over	up to	upper	lower
3	6	0	−12
6	10	0	−15
10	18	0	−18
18	30	0	−21

Table 14 Tolerances of shank length

Unit : μm

Shank length B_2 (mm)	Deviation of a single shank length Δ_{B2s}	
	upper	lower
Total dimensions	*+0.8*	*−0.8*

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

Table 15 Tolerances of yoke type track rollers (metric series) = JIS B 1536 =

(1) Inner ring

Unit : μm

Nominal bore diameter d (mm)		Single plane mean bore diameter deviation Δ_{dmp}		Single inner ring width deviation Δ_{Bs}	
over	up to	upper	lower	upper	lower
2.5	10	0	*− 8*	0	*−180*
10	18	0	*− 8*	0	*−210*
18	30	0	−10	0	*−210*
30	50	0	−12	0	*−250*

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

(2) Outer ring

Unit : μm

Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}				Single outer ring width deviation Δ_{Cs}		Radial runout of assembled bearing outer ring K_{ea}
		Cylindrical outside surface		Crowning outside surface				
over	up to	upper	lower	upper	lower	upper	lower	max.
10	18	0	*− 8*	0	−50	0	−120	15
18	30	0	*− 9*	0	−50	0	−120	15
30	50	0	*−11*	0	−50	0	−120	20
50	80	0	*−13*	0	−50	0	−120	25
80	120	0	*−15*	0	−50	0	−120	35

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

[Recommended fit and internal clearance]

Table 16 Recommended fit for needle roller and cage assemblies

Conditions	Tolerance class		
	Shaft		Housing bore
	$F_w \leqq 50$mm	$F_w > 50$mm	
High accuracy, impact load, oscillating motion	js 5	h 5	G 6
General	h 5	g 5	
High temperature, large shaft deflection, large misalignment	f 6		

Table 17 Recommended fit for drawn cup needle roller bearings

Distinction	Tolerance class		
	Shaft	Housing bore	
		Steel or cast iron	Light alloy, or steel or cast iron of 6 mm or less in thickness
Inner ring rotation	h 6	N 7	R 7 or S 7
Outer ring rotation	f 6	R 7	

[Remarks] 1. When the shaft makes oscillatory motions, the shaft diameter should be 0.013 mm larger than the recommended tolerance.
2. When the bearing is provided with an inner ring, the shaft tolerance class j 6 should be selected.

Table 18 Recommended fit for machined ring needle roller bearings

(1) Recommended fits of inner ring and shaft

Operating condition		Shaft diameter (mm)	Class of shaft tolerance range	Applications (for reference)
Stationary inner ring load	Inner ring needs to move smoothly on shaft.	All shaft diameters	g 6	Stationary shaft wheels, tension pulleys, rope sheaves etc.
	Inner ring does not need to move smoothly on shaft.		h 6	
	High accuracy or noiseless rotation is required.		h 5	
Rotating inner ring load	Light load	40 mm or less	js 6	Electric appliances, machine tools, pumps, blowers, carriers etc.
	Normal load	40 mm or less	k 5	Electric motors, turbines, internal combustion engines, wood-working machines etc.
		over 40 100 mm or less	m 5	
		over 100 mm	m 6	
	Heavy load or impact load	140 mm or less	n 6	Railway rolling stock axle journals, traction motors
		over 140 mm	p 6	

(2) Recommended fits of the outer ring and housing

Operating condition		Class of housing bore tolerance range	Applications (for reference)
Rotating outer ring load	Heavy load with shock	P 7	Fly wheels
	Normal load	N 7	Loose wheels, crank shaft, gears
	Light fluctuating load	M 7	Rope pulley, jockey puller
Indeterminate direction load	Extreme impact load		Eccentric pump wheel
	Normal load	K 7	Compressor
	Light load	J 7	Compressor, crank shaft
Stationary outer ring load	Split housing, normal load	H 7	General use
	High accuracy and rigidity are required	K 6	Machine tool spindle

[Notes] 1) This table is applicable to cast iron or steel housing. For light alloy housings, somewhat more interference fits than shown are recommended.
2) Interference fits larger than J 7 should not be used in split housings.

Table 19 Relation between tolerance class of a shaft provided with a machined ring needle roller bearing (without inner ring) and radial internal clearance

Roller set/roller complement bore diameter (mm)	C 2	C N	C 3	C 4
Over 3 up to 180	k 5	h 5	f 6	e 6

Table 20 Recommended fit for needle roller thrust bearings

Distinction	Type code	Guide	Tolerance class	
			Shaft	Housing bore
Needle roller and cage thrust assembly	TV TP	Inside	h 8	–
		Outside	–	H 8
Race[1) 2)]	W WS	Inside	h 8	–
		Outside	–	H 8
Non-separable bearing	TVK (TPK) ...JL TVK (TPK) ...J TVK (TPK) ...L	Inside	h 8	–
		Outside	–	H 8

[Notes] 1) Type code W indicates the thrust washer specified in JIS.
2) Type code WS indicates the washer specified in JIS.
[Remark] This tolerance class is applicable when the tolerances of bore and outside diameters of bearings are standard.

Table 21 Tolerances for stud fitting bore

Bearing type	Tolerance class
CM, KM	H 7

Table 22 Recommended fit for yoke type track rollers (roller followers)

Degree of loading	Shaft tolerance class
Light or medium load	g 6 or h 6
Heavy load	k 6

[Remark] Because yoke type track rollers (roller followers) are generally used with the outer ring rotation, they should be attached to the shaft by transition fitting or clearance fitting. If the application involves heavy loading, the shaft should be hardened and the track roller should be attached by interference fitting.

[Shaft and housing specifications]

Table 23 Specifications of needle roller bearing shafts and housings

Item	Shaft		Housing bore	
	Raceway surface	Fitting surface	Raceway surface	Fitting surface
Roundness	Best if less than one half or one third of the shaft diameter tolerance		Best if less than one half or one third of the bore diameter tolerance	
Cylindricity	5 μm or less per 25 mm, or one half or less of the shaft diameter tolerance		5 μm or less per 25 mm, or one half or less of the bore diameter tolerance	
Roughness (Ra)	0.4 a or less	0.8 a or less	0.6 a or less	1.6 a or less
Hardness	58 HRC or harder [1] (60 to 64 HRC are best.)	–	58 HRC or harder [1] (60 to 64 HRC are best.)	–

[Note] 1) Case hardened steel which is carburized or induction-hardened should not only meet the surface hardness requirement specified above but also have a case depth of 52.3 HRC (550 HV) to a depth in the range (0.08 to 0.1) $\times D_w$ mm. (D_w : roller diameter)
In general, 30 thru 45 HRC is best for the center hardness.

Table 24 Needle roller thrust bearing mounting surface specifications

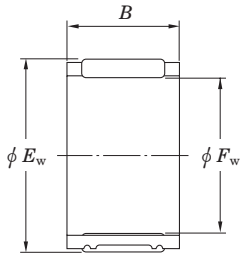
Squareness		25 μm or less per 25 mm
		12.5 μm or less per 25 mm
Roughness (Ra)		0.4 a or less
Hardness		58 HRC or harder (60 thru 64 HRC is best.) (refer to the note for Table 23 above regarding depth.)

Table 25 Track capacity of stud type and yoke type track rollers (cam and roller followers)

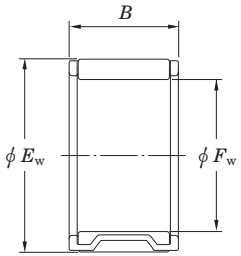
- Track capacity is the maximum load receivable without deformation or indentation of track surfaces contacted by the outer rings of track rollers to allow the track to be used continuously. The values in the specification table are track capacities obtained using track rollers with cylindrical outside surfaces made of HRC 40 steel.
- Track capacity of the type track rollers with spherical outside surface is 80% of the values listed in the specification table.
- To obtain track capacity for hardness out of standard, multiply the track capacities by track capacity coefficient listed in the table at right.

Hardness (HRC)	Track capacity coefficient
26	0.48
32	0.64
36	0.79
40	1
44	1.31
47	1.59
50	1.99
53	2.43
56	2.90
58	3.23

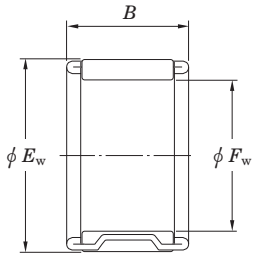
F_W 9 ~ (15) mm



RS, R, RP



RV, V, VS



VP, VPS

Boundary dimensions (mm) F_w	E_w	B	Basic load ratings (kN) C_r	C_{0r}	Limiting speeds (min^{-1}) Oil lub.	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
9	12	10	3.8	4.0	43 000	**RS091210**	—	2.9
	14	18	9.1	9.0	41 000	**RF091418**	Polyamide	5.3
10	13	13	5.8	7.0	41 000	**R10/13**	—	4.0
	13	20	5.0	5.8	41 000	**RF101320**	Polyamide	2.4
	14	8	4.5	4.3	40 000	**RS10/8-1**	—	3.5
	14	10	5.1	5.0	40 000	**RS10/10**	—	4.3
	14	13	7.0	7.4	40 000	**RS10/13**	—	5.5
	15	18	10.5	10.9	37 000	**RP101518**	Welded	7.8
12	15	13	6.3	8.2	36 000	**R12/13**	—	4.7
	16	20	9.5	11.5	35 000	**12R1620A**	—	10
	17	11.5	8.2	8.3	34 000	**RV121712A-2**	—	6.6
13	17	10	5.9	6.4	33 000	**RS131710-2**	—	5.5
	17	12	7.3	8.4	33 000	**RS131712**	—	6.5
	18	15	10.2	11.2	32 000	**13R1815**	—	10
14	18	10	5.8	6.5	31 000	**RS141810Q2**	—	6.0
	18	15	9.6	12.3	31 000	**RS141815**	—	8.5
	18	17	10.1	13.2	31 000	**R14/17A**	—	10
	19	9	7.0	7.1	30 000	**RV141909P1**	—	5.7
	19	18	12.3	14.6	30 000	**RS141918**	—	13
15	19	7.8	4.7	5.0	29 000	**RS151908A**	—	5.0
	19	10	6.3	7.2	29 000	**R15/10-1**	—	6.1
	19	13	8.7	10.9	29 000	**R15/13**	—	7.9
	19	17	10.5	14.0	29 000	**R15/17**	—	10
	19	20	12.6	17.7	29 000	**R15/20**	—	12
	20	13	10.4	11.9	29 000	**VS15/13**	—	8.6
	20	18	13.8	17.2	29 000	**RS15/18A**	—	14
	20	20	16.2	21.2	29 000	**VS15/20**	—	12

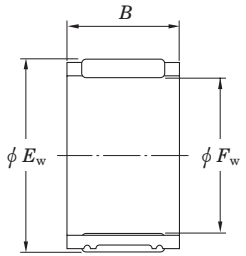
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (15) ~ (20) mm

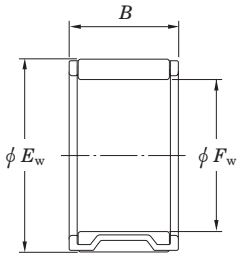
ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm) F_w	E_w	B	Basic load ratings (kN) C_r	C_{0r}	Limiting speeds (min^{-1}) Oil lub.	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
15	21	9	7.4	6.9	28 000	**RV152109-4**	—	7.8
	21	17	13.4	14.8	28 000	**RS152117**	—	16
16	20	13	9.4	12.5	28 000	**R16/13**	Width tolerance special [1]	8.5
	21	26	19.9	28.0	27 000	**16VP2126**	Width tolerance special [1]	16
	22	12	9.6	9.6	26 000	**16VS2212-2**	—	11
	22	24	20.4	25.6	26 000	**RS16/24**	Width tolerance special [1]	23
	22	28.4	21.7	27.9	26 000	**VPS16/28A**	—	24
17	20	6	3.1	3.6	27 000	**RF172006**	With single split polyamide	1.3
	20	8	3.8	4.7	27 000	**RF172008A-2**	With single split polyamide	1.7
	21	10	6.8	8.3	26 000	**R17/10**	—	6.8
	21	13	9.4	12.6	26 000	**R17/13**	—	8.8
	21	15	10.7	15.0	26 000	**R17/15**	—	10
	21	17	11.3	16.1	26 000	**RS172117**	—	11
	22	20	15.2	20.2	26 000	**17R2220**	—	17
	23	13	11.4	12.4	25 000	**RS17/13**	—	14
18	22	13	9.5	13.1	25 000	**R18/13**	—	9.2
	22	16	11.1	16.0	25 000	**R18/16-8**	—	11
	22	17	11.9	17.4	25 000	**R18/17**	—	12
	24	17	15.1	17.9	24 000	**RS182417**	Width tolerance special [1]	19
	25	17	17.8	20.1	23 000	**RP182517**	Welded	19
	26	21.9	19.1	20.3	23 000	**RF182622A-1**	Polyamide	19
	26	21.9	22.7	25.5	23 000	**RV182622A-2**	—	31
19	24	22	16.6	23.3	23 000	**RS192422**	—	21
20	24	10	7.2	9.4	23 000	**R20/10**	—	7.9
	24	13	9.8	14.0	23 000	**R20/13P**	—	10
	25	25	18.8	27.9	22 000	**RF202525**	Polyamide	14

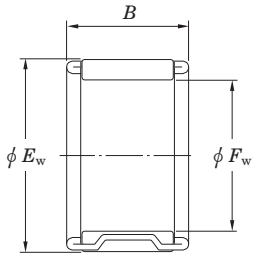
F_W (20) ~ (22) mm



RS, R, RP



RV, V, VS



VP, VPS

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
20	26	11.6	10.7	11.9	22 000	**20VS2612**	Width tolerance special [1]	12
	26	12	12.8	15.1	22 000	**RV202612-4**	—	14
	26	14	14.1	17.0	22 000	**VS20/14A**	—	15
	26	17	15.8	19.6	22 000	**RS20/17**	—	21
	26	18.8	17.4	22.3	22 000	**RP202619A**	—	17
	26	20	18.9	24.7	22 000	**VP20/20-1**	Width tolerance special [1]	19
	26	30	26.8	38.9	22 000	**RS202630**	Welded	39
	27	15	16.2	18.3	21 000	**20V2715**	—	19
	27	29	25.4	32.6	21 000	**20V2729**	—	37
	28	20	24.1	28.2	21 000	**RP202820**	—	28
	28	25	28.8	35.4	21 000	**20V2825B**	—	37
	30	15	18.2	17.1	20 000	**RV203015**	—	30
21	29	22.5	23.7	27.6	20 000	**RF212923A**	Polyamide	24
22	26	12	9.6	14.1	21 000	**RS222612**	—	10
	26	13	10.4	15.6	21 000	**R22/13-1**	—	11
	26	17	13.0	20.7	21 000	**R22/17**	—	14
	27	20	17.0	25.2	20 000	**RS222720**	—	21
	28	11	9.5	10.5	20 000	**RS222811**	—	15
	28	14	13.2	15.9	20 000	**22VS2814E**	—	16
	28	17	16.1	20.7	20 000	**RS22/17**	—	22
	28	22.5	21.3	29.6	20 000	**RP222823A**	Welded, Width tolerance special [1]	25
	28	23	24.2	35.1	20 000	**VS22/23B**	Width tolerance special [1]	25
	29	17	17.0	20.0	20 000	**RV222917**	—	23
	30	15	16.7	17.9	19 000	**RV223015**	—	25
	30	18	21.8	25.2	19 000	**RV223018**	—	30
	30	20	24.1	28.8	19 000	**RV223020-1**	—	31
	32	15	21.1	21.3	19 000	**RV223215**	—	32
	32	16	21.1	21.3	19 000	**RV223216**	—	35

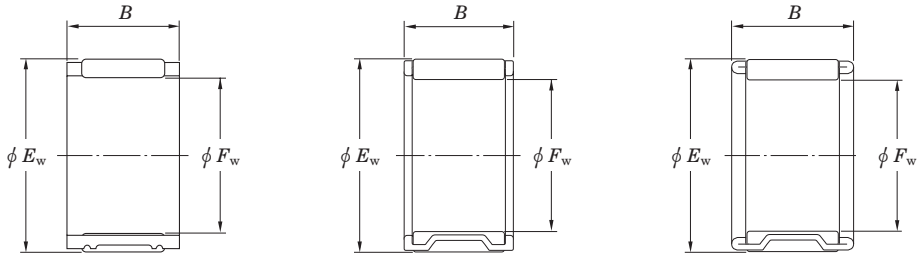
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (22) ~ (25) mm

ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
22	32	30	40.4	48.9	19 000	**RV223230**	—	62
23	29	30	26.0	39.0	19 000	**23V2930**	Width tolerance special [1]	35
	30	15	17.4	21.0	19 000	**RV233015**	—	21
	33	20	27.0	29.4	18 000	**23V3320-1**	Width tolerance special [1]	44
24	28	13	11.1	17.4	19 000	**RS242813**	—	12
	28	17	13.7	22.8	19 000	**R24/17A**	—	16
	28	23	18.2	32.9	19 000	**RS242823**	—	21
	32	15	20.0	23.2	18 000	**RV243215-4**	—	27
25	29	9.9	7.1	9.8	19 000	**R25/10A**	Width tolerance special [1]	10
	29	13	11.5	18.4	19 000	**R25/13-1**	—	13
	30	9.9	9.3	12.0	18 000	**25R3010A**	Width tolerance special [1]	13
	30	12	10.5	14.1	18 000	**25R3012**	—	15
	30	17	15.7	23.6	18 000	**25V3017**	—	18
	30	20	19.0	30.1	18 000	**25R3020-1**	—	24
	30	20	16.6	25.3	18 000	**25VPU3020B**	Double split	16
	31	17.5	17.4	23.8	18 000	**VPS25/18**	—	18
	31	18	17.4	23.8	18 000	**RS25/18**	—	27
	31	20	21.0	30.5	18 000	**VS25/20**	Width tolerance special [1]	26
	31	24	24.9	37.8	18 000	**25R3124**	—	35
	32	16	18.9	23.8	18 000	**25V3216**	—	25
	32	24	26.4	36.7	18 000	**RS253224**	—	43
	32	32	37.8	58.4	18 000	**RPU253232F-1**	Double split	51
	32	32	39.6	62.0	18 000	**RV253232**	—	49
	33	20	24.1	29.8	17 000	**RV253320**	—	35
	33	23.8	30.2	40.0	17 000	**25R3324B-1**	Width tolerance special [1]	48
	33	30	38.6	54.8	17 000	**RF253330**	Polyamide	41
	35	25	32.5	38.0	17 000	**25R3525**	—	65

F_W (25) ~ 29 mm



RS, R, RP　　RV, V, VS　　VP, VPS

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
25	35	30	39.6	49.0	17 000	**25V3530A**	—	69
	37	24	34.1	36.2	16 000	**25V3724**	—	69
	37	25	38.3	42.2	16 000	**25V3725A**	—	77
	37	33	47.5	55.7	16 000	**RV253733**	—	96
26	30	20	16.9	30.6	18 000	**RS263020**	—	20
	30	21.9	16.9	30.4	18 000	**RS263022A**	—	22
	31	16	15.7	23.8	18 000	**RS263116**	—	20
	31	19	18.5	29.5	18 000	**RS263119**	—	24
	33	34	30.4	44.0	17 000	**RPU263334F**	Double split	42
	34	17	23.9	30.0	17 000	**RV263417**	—	32
27	32	27	26.2	46.6	17 000	**RFN27/27**	Polyamide, Width tolerance special [1]	20
	33	28.6	30.0	49.2	17 000	**VPSU27/29AF**	Double split	33
28	32	26	17.1	31.5	17 000	**28R3226**	—	27
	32	29	17.1	31.5	17 000	**28R3229**	—	32
	33	17	17.9	29.0	16 000	**28R3317**	—	22
	33	23	22.8	39.6	16 000	**R28/23A**	—	31
	33	27	25.0	44.5	16 000	**R28/27**	—	36
	36	20	23.2	29.3	16 000	**28R3620**	—	45
	38	24	31.2	37.1	15 000	**RS283824**	—	70
	40	28	49.1	59.5	15 000	**RV284028**	—	90
	41	25	40.2	43.6	14 000	**RV284125**	—	86
	42	50.5	88.9	116.5	14 000	**RF284251A**	Polyamide	182
29	34	22	17.3	27.6	16 000	**R29/22A**	—	30
	34	24.4	19.7	32.8	16 000	**RFU293424A**	With double split polyamide	17
	34	27	25.7	46.7	16 000	**29R3427A-1**	—	37
	43	43	73.7	92.2	14 000	**RV294343**	—	177

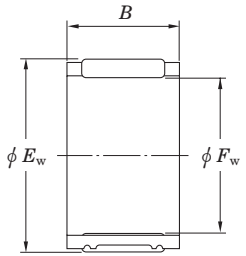
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W 30 ~ (32) mm

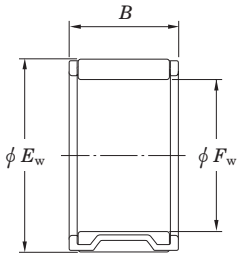
ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
30	34	14	7.7	11.4	16 000	**30R3414A**	—	16
	34	14	7.7	11.5	16 000	**RFN303414**	Polyamide	6.1
	34	29	18.1	34.8	16 000	**30R3429**	—	34
	34	29	20.4	40.8	16 000	**RSU303429**	Double split	33
	35	17	17.7	29.2	15 000	**R30/17-1**	—	24
	35	21.1	22.2	39.0	15 000	**RS303521A**	—	30
	35	24	24.9	45.1	15 000	**RS303524**	—	34
	37	16	21.8	30.3	15 000	**RV303716**	—	29
	37	20	25.2	36.6	15 000	**RS30/20A**	—	41
	37	26	34.7	55.3	15 000	**RV303726**	—	47
	38	22.1	27.7	37.5	15 000	**RP303822A**	Welded	45
	38	28.3	33.5	47.8	15 000	**RPU303828AF**	Double split	47
	39	27	34.2	45.6	14 000	**RP303927**	—	51
	39	30	38.3	52.8	14 000	**30VP3930A**	Width tolerance special [1]	58
	39	32	42.6	60.5	14 000	**RP303932**	Welded, Width tolerance special [1]	63
	40	15.5	26.7	31.1	14 000	**RV304016A-4**	—	46
	40	20	32.0	39.1	14 000	**30V4020**	—	55
	42	15	27.0	28.0	14 000	**RF304215**	Polyamide	36
	42	25	44.0	52.3	14 000	**RV304225**	—	84
	42	32	52.7	66.0	14 000	**30V4232**	Width tolerance special [1]	108
	45	30	54.4	60.2	13 000	**30V4530**	—	135
31	36	20.3	19.9	34.2	15 000	**RFU313620A-1**	With double split polyamide	17
32	36	15	10.8	18.3	15 000	**32R3615A**	—	19
	37	17	19.0	32.6	14 000	**R32/17-1**	—	26
	37	20	22.3	39.9	14 000	**R32/20**	—	30
	37	23.8	22.6	40.5	14 000	**RF323724A-1**	With single split polyamide	20
	37	26	26.2	49.0	14 000	**RF323726**	Polyamide, Width tolerance special [1]	24
	37	29.5	31.1	61.2	14 000	**VP32/30A**	—	32

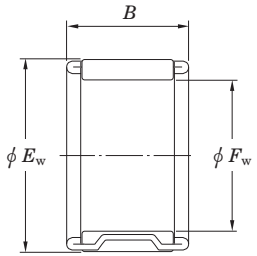
F_W (32) ~ (35) mm



RS, R, RP



RV, V, VS



VP, VPS

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
32	38	20	24.9	40.6	14 000	**32VP3820A**	Welded	27
	38	26	27.3	45.6	14 000	**RP323826**	Width tolerance special [1]	34
	38	27	29.6	50.7	14 000	**32VP3827**	Width tolerance special [1]	38
	39	16	21.2	29.8	14 000	**RS323916**	—	35
	42	16	27.5	32.9	14 000	**RV324216**	—	49
	42	20.5	33.5	42.2	14 000	**RV324221-1**	—	64
	45	28	47.9	56.5	13 000	**32V4528**	—	112
	46	18	37.0	38.8	13 000	**RF324618**	Polyamide	57
	46	18	30.3	29.8	13 000	**RV324618-1**	—	71
33	37	22	18.5	37.2	14 000	**RSU333722F**	Double split	27
34	39	20.3	19.6	34.4	14 000	**RFU343920A**	With double split polyamide	18
	42	38	49.2	81.9	13 000	**34R4238**	Width tolerance special [1]	98
	44	40	64.1	99.1	13 000	**34VP4440-1**	—	101
35	39	25	22.0	47.4	14 000	**RF353925**	With single split polyamide	24
	40	13	14.2	23.0	13 000	**RS354013**	—	22
	40	17	18.4	32.0	13 000	**RS354017**	—	29
	40	22	23.6	44.4	13 000	**RS354022**	—	37
	40	24	25.9	49.9	13 000	**RS354024**	—	39
	40	24.8	23.7	44.4	13 000	**RSU354025AF**	Double split	39
	40	25	27.0	52.7	13 000	**RS354025-1**	—	41
	40	26	28.7	56.9	13 000	**RS354026**	—	41
	40	28	28.7	56.9	13 000	**RF354028**	Polyamide	27
	40	29	30.6	61.7	13 000	**RP354029-1**	Width tolerance special [1]	33
	40	30	30.6	61.7	13 000	**VP35/30**	—	34
	40	31	30.6	61.6	13 000	**RP354031**	Welded, Width tolerance special [1]	37
	40	33	31.1	63.2	13 000	**RP354033-1**	—	39
	40	35	31.8	64.9	13 000	**RF354035**	Polyamide	32

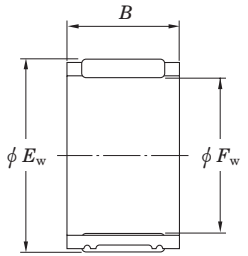
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (35) ~ 37 mm

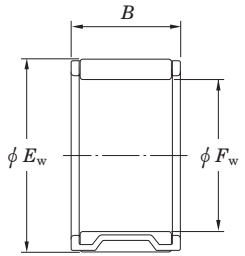
ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
35	41	35	40.4	78.0	13 000	**35VP4135A**	—	51
	41	40	42.4	82.6	13 000	**35VP4140A**	—	59
	42	20	27.2	42.0	13 000	**VS35/20**	—	42
	42	30	39.9	68.8	13 000	**VS35/30**	Width tolerance special [1]	59
	48	17.5	37.8	42.7	12 000	**RV354818A-4**	—	81
	49	25	53.4	63.4	12 000	**RV354925-1**	—	120
36	40	10	9.6	16.5	13 000	**36R4010**	—	14
	41	20	21.7	40.3	13 000	**RS364120**	—	34
	41	25	29.9	60.6	13 000	**36RFN4125A**	Polyamide	27
	41	30.5	33.1	69.2	13 000	**R36/31**	—	51
	42	17	20.5	32.8	13 000	**RS364217-K**	—	35
	42	19	23.2	38.6	13 000	**RS364219-K**	—	39
	42	21	25.9	44.4	13 000	**RS364221-K**	—	44
	42	25	33.1	60.9	13 000	**RF364225-1**	Polyamide	34
	48	25	54.0	71.7	12 000	**RF364825-1**	Polyamide	80
	52	30	73.9	89.9	11 000	**RF365230**	Polyamide	139
37	42	11.6	11.3	17.5	13 000	**RS374212A**	—	23
	42	12.8	14.0	23.2	13 000	**VP37/13A**	Width tolerance special [1]	14
	42	17.3	21.3	39.7	13 000	**VP37/17**	Width tolerance special [1]	21
	42	22	24.0	46.3	13 000	**37R4222**	—	38
	42	23	23.8	45.5	13 000	**RF374223-1**	With single split polyamide	22
	42	27	30.8	63.6	13 000	**RS374227**	—	46
	42	27	30.0	61.5	13 000	**RSU374227**	Double split	45
	42	29	31.9	66.5	13 000	**VP37/29**	—	35
	42	31	33.9	72.1	13 000	**RS374231**	Welded	52
	42	32	31.2	64.3	13 000	**VP37/32**	—	37
	43	32	39.1	75.8	13 000	**37R4332**	—	66
	43	36.8	40.0	77.9	13 000	**RPU374337F**	Double split	60

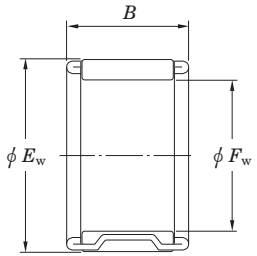
F_W 38 ~ 41 mm



RS, R, RP



RV, V, VS



VP, VPS

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
38	42	10	8.9	15.2	13 000	**RF384210**	Polyamide	6.6
	44	23.4	25.1	43.1	12 000	**RF384423A**	Polyamide	26
	44	24.5	27.5	48.4	12 000	**RSU384425AF**	Double split	51
	44	26	28.7	51.1	12 000	**RF384426**	Polyamide	29
	44	33	37.9	73.4	12 000	**RP384433**	—	64
	44	36.2	39.9	78.1	12 000	**RP384436A**	—	57
	44	39.8	43.7	88.1	12 000	**RP384440A**	—	65
	52	39	74.8	99.2	11 000	**RP385239**	—	155
39	46	32.8	42.4	76.9	12 000	**39R4633**	—	82
	55	20.5	55.0	62.6	11 000	**RF395521A**	Polyamide	98
	59	23	63.8	66.3	10 000	**RV395923-1**	—	196
40	45	13	17.1	30.8	12 000	**RV404513**	—	22
	45	17	19.9	37.4	12 000	**R40/17-1**	—	32
	45	21.2	23.6	46.6	12 000	**RS404521A**	—	40
	45	27	29.9	63.0	12 000	**RS404527**	—	49
	45	30	30.5	64.4	12 000	**R40/30**	—	55
	45	32	14.3	23.3	12 000	**R40/32A**	—	53
	46	14.5	21.2	35.5	12 000	**RP404615A**	Welded	31
	46	29	36.4	70.6	12 000	**RS404629**	—	65
	47	20	27.6	44.8	11 000	**RS40/20**	—	54
	47	28.5	38.0	67.6	11 000	**RS40/29A**	—	77
	48	34	50.4	88.3	11 000	**40V4834**	—	87
	55	27.5	68.0	85.6	11 000	**RF405528A-1**	Polyamide	124
	56	20	50.8	56.7	10 000	**RV405620-4**	—	122
	57	31.5	83.4	103	10 000	**RF405732A**	Polyamide	168
	60	31.5	94.1	110	10 000	**RF406032A**	Polyamide	214
41	46	24	11.0	16.8	11 000	**41R4624A**	—	44

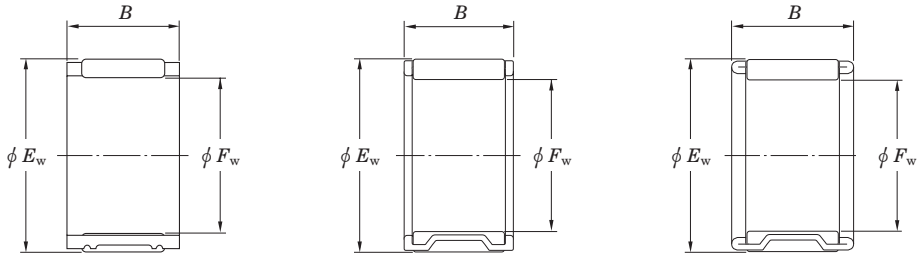
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W 42 ~ (45) mm

ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
42	47	10	13.9	23.8	11 000	**RS424710-1**	Welded	21
	47	25	29.5	63.1	11 000	**RS424725**	—	52
	47	27	32.3	70.8	11 000	**RS424727**	—	51
	47	30	31.9	69.8	11 000	**RSU424730**	Double split	58
	47	30	36.3	82.4	11 000	**VP42/30**	—	44
	49	22	29.3	49.0	11 000	**RF424922**	Polyamide	35
43	48	18	21.9	43.2	11 000	**RS434818**	—	36
	48	18.5	22.1	43.7	11 000	**RS434819A-2**	—	38
	48	21.2	25.0	51.5	11 000	**RS434821A**	—	46
	48	23.3	29.4	63.2	11 000	**RS434823A**	—	46
	48	24.4	28.2	59.9	11 000	**RS434824A**	—	49
	48	30	34.1	76.5	11 000	**RS434830**	Welded	58
	49	31	40.1	82.5	11 000	**43VP4931E**	—	55
	52	39.9	65.2	116	11 000	**43VP5240**	—	114
44	50	27.5	36.0	72.2	11 000	**44RFN5028**	Polyamide	39
	50	39	46.4	100	11 000	**RP445039**	—	71
45	50	13	16.0	29.4	11 000	**R45/13**	—	28
	50	17	22.7	46.1	11 000	**RS455017**	—	35
	50	19	24.1	49.7	11 000	**R45/19**	—	39
	50	20.2	24.1	49.6	11 000	**RS455020A**	—	46
	50	24	29.3	63.9	11 000	**RS455024**	—	50
	50	26	31.8	70.9	11 000	**R45/26**	—	54
	50	33	37.3	87.0	11 000	**RS455033-1**	—	69
	51	28.6	34.1	67.7	10 000	**45RFN5129**	Polyamide	40
	51	28.9	37.5	76.9	10 000	**RP455129A**	Welded	65
	51	28.9	37.5	76.9	10 000	**RPU455129AF**	Double split	67
	52	22	35.4	63.9	10 000	**RS455222**	—	66

F_W (45) ~ (50) mm



RS, R, RP　　RV, V, VS　　VP, VPS

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
45	53	25	41.4	71.1	10 000	**RV455325P**	—	73
	53	26	41.4	71.1	10 000	**45V5326P**	—	77
	53	28	42.3	73.2	10 000	**45VP5328**	Width tolerance special [1]	66
	64	23	64.0	70.4	9 200	**RV456423-7**	—	191
46	52	20	25.9	48.2	10 000	**46VP5220**	—	34
	52	37	45.8	100	10 000	**46VP5237B**	—	67
47	52	30	36.4	85.4	10 000	**R47/30H**	—	62
	52	30	35.1	81.7	10 000	**RSU475230F-1**	Double split	62
	53	28.8	35.3	72.3	10 000	**RP475329A**	—	55
	53	30	42.6	92.1	10 000	**RP475330-1**	Welded	74
	53	36	47.0	104	10 000	**RP475336**	—	68
48	53	13	16.1	30.1	9 900	**RS485313**	—	30
	53	28	34.1	79.2	9 900	**48R5328**	—	60
	54	20	29.3	57.3	9 800	**48R5420-1**	—	54
	54	27	38.1	80.4	9 800	**48R5427**	—	72
	54	28	37.8	79.3	9 800	**RS485428**	Welded	72
	54	29	39.5	84.3	9 800	**48R5429**	—	78
	54	30.2	43.8	96.2	9 800	**RP485430A-1**	Welded	72
	54	39	47.9	108	9 800	**48R5439**	—	106
	55	21	32.4	58.1	9 700	**RP485521**	Welded	60
49	56	44.6	61.2	133	9 500	**RP495645A**	Welded	120
	56	44.6	61.2	133	9 500	**RS495645A**	—	146
50	55	17.5	22.3	46.5	9 500	**RS505518A**	Welded	39
	55	20	25.1	54.3	9 500	**RS505520-1**	—	47
	55	27	11.5	18.9	9 500	**R50/27A**	—	56
	56	13	16.7	28.2	9 400	**RF505613**	Polyamide	18

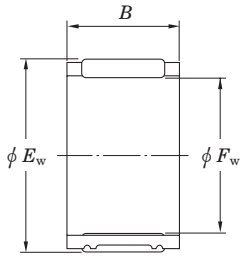
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (50) ~ (58) mm

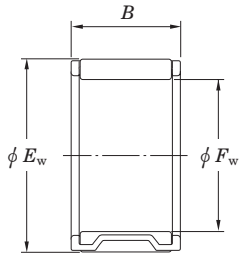
ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
50	56	28	39.5	85.5	9 400	**RP505628**	Welded	69
	56	30	41.0	89.6	9 400	**RF505630**	Polyamide	50
	57	33.5	47.8	97.1	9 300	**RP505734A**	—	79
	57	38.9	58.3	126	9 300	**RS505739A**	—	133
	57	40.8	60.9	133	9 300	**RS505741A**	—	127
	58	25	38.5	66.9	9 300	**RF505825**	Polyamide	53
	70	36	114	147	8 300	**RF507036**	Polyamide	277
51	56	28	34.8	83.0	9 300	**VP51/28**	—	45
52	72	32	108	138	8 100	**RF527232**	Polyamide	259
53	58	25	32.2	76.0	9 000	**RF535825**	Polyamide	35
54	60	31.1	45.3	104	8 800	**RP546031A**	Welded	83
	60	36	45.5	105	8 800	**RP546036**	Welded, Width tolerance special [1]	82
	61	34.7	60.2	135	8 700	**RPU546135AF**	Double split	116
	61	41.3	63.3	143	8 700	**RS546141A**	—	145
55	59	13	10.8	21.9	8 800	**55RFN5913A**	Polyamide	11
	60	20	26.7	60.6	8 700	**R55/20**	—	52
	60	28	35.8	88.4	8 700	**RS556028**	—	69
56	60	20	24.0	62.4	8 600	**RF566020**	Polyamide	23
	61	11	13.6	25.6	8 500	**RF566111**	Polyamide	14
	61	30	39.7	102	8 500	**RS566130**	Welded	75
	61	33.5	42.5	111	8 500	**R56/34**	—	85
58	65	26	42.1	87.1	8 100	**58R6526**	Width tolerance special [1]	99
	65	36.6	55.7	125	8 100	**58RFN6537A**	Polyamide	80
	65	36.6	56.4	127	8 100	**RS586537A-2**	—	145

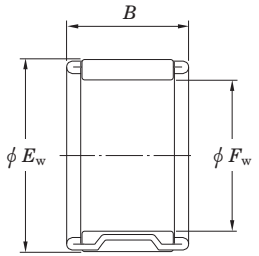
F_W (58) ~ 78 mm



RS, R, RP



RV, V, VS



VP, VPS

ϕE_w : Roller set outside diameter
ϕF_w : Roller set bore diameter

Boundary dimensions (mm)			Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.	Special series (Cage)	(Refer.) Mass (g)
F_w	E_w	B	C_r	C_{0r}	Oil lub.			
58	65	37.5	57.7	131	8 100	**RP586538A**	Welded, Width tolerance special [1]	108
	80	72	233	359	7 200	**RV588072**	—	889
60	65	30	40.0	105	8 000	**R60/30**	—	81
	66	19	31.5	67.8	7 900	**RS606619**	—	63
	67	23	40.1	82.8	7 900	**60V6723**	—	77
	82	30	118	152	7 000	**RF608230**	Polyamide	316
63	68	30	40.9	110	7 600	**R63/30**	—	83
64	70	24.5	39.4	92.4	7 500	**64R7025A**	—	86
	70	35	55.7	144	7 500	**64R7035**	—	122
65	70	20	12.1	22.3	7 400	**R65/20A**	—	57
	70	24	12.5	22.9	7 400	**R65/24A**	—	67
70	76	20	34.7	80.8	6 800	**70R7620**	—	77
	76	32	55.1	147	6 800	**RP707632**	Welded	116
	78	30	59.4	132	6 800	**70R7830**	—	154
71	79	30.15	61.3	138	6 700	**71V7930B**	—	135
	79	39.5	75.3	179	6 700	**RS717940AZ**	—	203
72	79	21	39.6	86.6	6 600	**72V7921**	—	84
73	79	20	36.3	86.8	6 600	**R73/20**	—	84
78	85	33.75	62.3	159	6 100	**78R8534A**	—	168

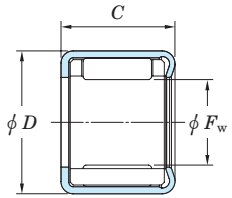
[Note] 1) For further information, consult with JTEKT.
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

Drawn cup needle roller bearings

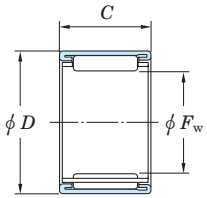
F_W 4 ~ (12) mm

Caged type

With open ends

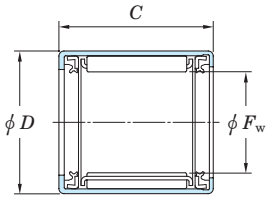


BFNM

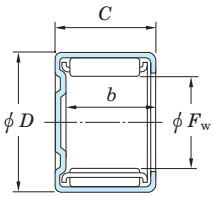


BTM, BHTM

With closed end



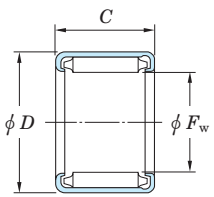
BKM



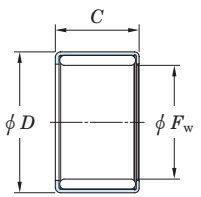
MKM, MHKM

Full complement type

With open ends

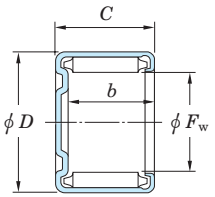


BM, BHM

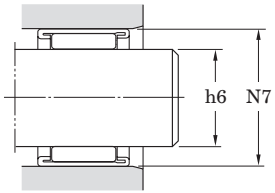


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
4	8	8	—	1.60	1.25	47 000	**4BFNM88**	—	—	—	3.992	4.000	7.981	7.996	1.3	—
5	9	9	—	2.40	2.15	44 000	**5BFNM99**	—	—	—	4.992	5.000	8.981	8.996	1.8	—
6	10	9	6	2.40	2.40	42 000	**6BTM109**	—	—	—	5.992	6.000	9.981	9.996	2.5	—
7	11	9	—	2.55	2.70	39 000	**7BTM119**	—	—	—	6.991	7.000	10.977	10.995	2.9	—
8	12	10	8.4	3.25	3.85	37 000	**8BTM1210**	**8MKM1210**	—	—	7.991	8.000	11.977	11.995	3.6	4.1
	12	10	7.8	4.95	7.50	13 000	—	—	**BM081210**	**8MM1210**	7.991	8.000	11.977	11.995	3.7	4.2
	12	10	—	5.25	8.60	13 000	—	—	**YM081210**	—	7.991	8.000	11.977	11.995	4.0	—
	15	10	8.4	4.00	3.30	34 000	**BHTM810**	**MHKM810**	—	—	7.991	8.000	14.977	14.995	6.5	7.3
	15	15	—	7.45	6.50	34 000	**BHTM815**	—	—	—	7.991	8.000	14.977	14.995	9.4	—
	15	20	17.3	9.25	9.70	34 000	**BHTM820**	**MHKM820**	—	—	7.991	8.000	14.977	14.995	13	14
9	13	10	7.8	4.90	8.05	12 000	—	—	**9BM1310**	**9MM1310**	8.991	9.000	12.977	12.995	4.0	4.6
	13	10	8.4	3.35	4.10	35 000	**9BTM1310A**	**9MKM1310**	—	—	8.991	9.000	12.977	12.995	3.8	4.3
	13	12	10.4	4.20	5.50	35 000	**9BTM1312**	**9MKM1312**	—	—	8.991	9.000	12.977	12.995	4.6	5.2
	16	12	10.4	5.35	5.05	32 000	**BHTM912-1**	**MHKM912**	—	—	8.991	9.000	15.977	15.995	8.8	9.9
	16	16	13.3	7.55	7.90	32 000	**BHTM916**	**MHKM916**	—	—	8.991	9.000	15.977	15.995	12	13
10	14	10	7.8	5.70	9.35	11 000	—	—	**10BM1410**	**10MM1410**	9.991	10.000	13.977	13.995	4.2	4.8
	14	10	8.4	3.55	4.55	33 000	**10BTM1410**	**10MKM1410**	—	—	9.991	10.000	13.977	13.995	4.2	4.8
	14	12	10.4	4.40	6.00	33 000	**10BTM1412**	**10MKM1412**	—	—	9.991	10.000	13.977	13.995	5.0	5.7
	14	15	11.8	5.65	8.25	33 000	**BTM101415**	—	—	—	9.991	10.000	13.977	13.995	6.4	—
	17	10	8.4	4.65	4.25	30 000	**BHTM1010**	**MHKM1010**	—	—	9.991	10.000	16.977	16.995	7.8	8.9
	17	12	10.4	6.00	5.90	30 000	**BHTM1012-1**	**MHKM1012**	—	—	9.991	10.000	16.977	16.995	9.4	11
	17	15	—	7.85	8.45	30 000	**BHTM1015**	—	—	—	9.991	10.000	16.977	16.995	12	—
	17	20	17.3	10.7	12.5	30 000	**BHTM1020**	**MHKM1020**	—	—	9.991	10.000	16.977	16.995	16	18
12	16	10	8.4	4.00	5.60	29 000	**12BTM1610**	**12MKM1610**	—	—	11.989	12.000	15.977	15.995	5.0	5.6

[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

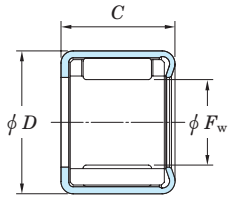
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

Drawn cup needle roller bearings

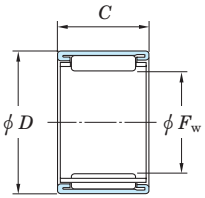
F_W (12) ~ 14.50 mm

Caged type

With open ends

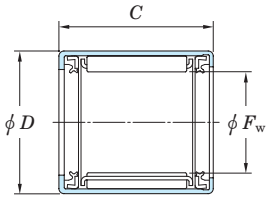


BFNM

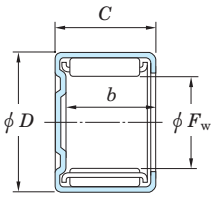


BTM, BHTM

With closed end



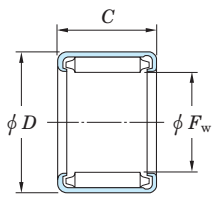
BKM



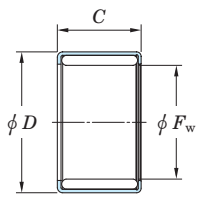
MKM, MHKM

Full complement type

With open ends

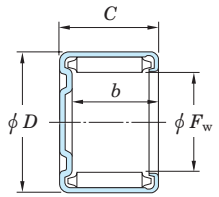


BM, BHM

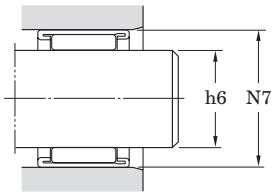


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
12	18	10	8.4	4.60	4.80	27 000	**12BTM1810**	**12MKM1810**	—	—	11.989	12.000	17.977	17.995	7.2	8.2
	18	12	9.6	8.40	12.6	9 400	—	—	**12BM1812**	**12MM1812**	11.989	12.000	17.977	17.995	9.7	11
	18	12	9.3	5.95	6.70	27 000	**12BTM1812**	**12MKM1812**	—	—	11.989	12.000	17.977	17.995	7.6	8.5
	18	15	—	6.10	7.32	27 000	**12BTM1815A**	—	—	—	11.989	12.000	17.991 [4]	18.012 [4]	12	—
	18	16	—	5.65	6.25	16 000 [1]	**12BKM1816UU**	—	—	—	11.989	12.000	17.977	17.995	11	—
	19	12	9.3	6.70	6.95	26 000	**BHTM1212-1**	**MHKM1212**	—	—	11.989	12.000	18.972	18.993	10	12
	19	15	—	8.85	9.95	26 000	**BHTM1215-1**	**MKM121915**	—	—	11.989	12.000	18.972	18.993	13	—
	19	20	17.3	12.1	14.9	26 000	**BHTM1220**	**MHKM1220**	—	—	11.989	12.000	18.972	18.993	17	19
	19	25	—	15.0	19.6	26 000	**BHTM1225**	—	—	—	11.989	12.000	18.972	18.993	21	—
13	17	15	—	5.10	7.85	27 000	**BKM131715J**	—	—	—	12.989	12.000	16.977	16.995	7.1	—
	19	12	—	8.55	13.4	9 100	—	—	**13BM1912**	—	12.989	13.000	18.972	18.993	10	—
	19	12	9.3	5.85	6.70	26 000	**13BTM1912**	**13MKM1912**	—	—	12.989	13.000	18.972	18.993	9.5	11
	19	14	—	7.65	9.60	26 000	**BKM131914J**	—	—	—	12.989	13.000	18.972	18.993	11	—
	20	12	—	7.50	8.40	25 000	**13BTM2012J**	—	—	—	12.989	13.000	19.972	19.993	11	—
	21	14	—	9.75	10.5	25 000	**BKM132114BJ**	—	—	—	12.989	13.000	20.972	20.993	15	—
13.50	19	12	—	6.25	7.95	25 000	**BTM141912A**	—	—	—	13.447 [3]	13.460 [3]	19.000 [4]	19.021 [4]	9.5	—
14	19	16	13.7	11.7	23.3	8 800	—	—	**14BM1916**	**14MM1916**	13.989	14.000	18.972	18.993	12	14
	19	16	13.3	7.85	11.7	25 000	**14BTM1916B**	**14MKM1916**	—	—	13.983 [3]	13.994 [3]	18.972	18.993	11	12
	20	12	9.6	9.15	14.6	8 600	—	—	**14BM2012**	**14MM2012**	13.989	14.000	19.972	19.993	11	12
	20	12	9.3	6.10	7.20	25 000	**14BTM2012**	**14MKM2012**	—	—	13.989	14.000	19.972	19.993	9.8	11
	20	16	13.7	12.7	22.4	8 600	—	—	**14BM2016**	**14MM2016**	13.989	14.000	19.972	19.993	15	17
	20	16	13.3	8.75	11.4	25 000	**14BTM2016**	**14MKM2016**	—	—	13.989	14.000	19.972	19.993	13	15
	20	25	—	12.2	15.5	14 000 [1]	**14BKM2025JUU**	—	—	—	13.989	14.000	19.972	19.993	20	—
	22	16	13.3	11.1	12.6	23 000	**BHTM1416**	**MHKM1416**	—	—	13.989	14.000	21.972	21.993	19	21
	22	20	17.3	14.4	17.5	23 000	**BHTM1420**	**MHKM1420**	—	—	13.989	14.000	21.972	21.993	23	26
14.50	19.50	13.50	—	7.55	10.9	25 000	**BTM152014A**	—	—	—	14.489	14.500	19.472	19.493	9.5	—

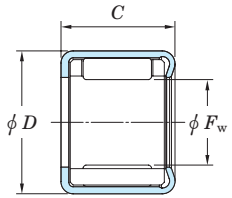
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

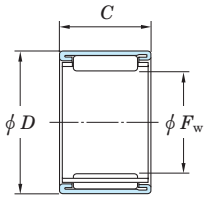
F_W 15 ~ (17) mm

Caged type

With open ends

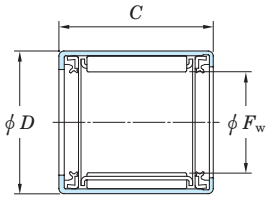


BFNM

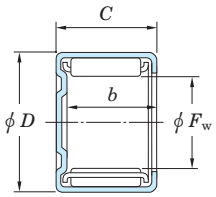


BTM, BHTM

With closed end



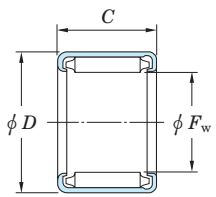
BKM



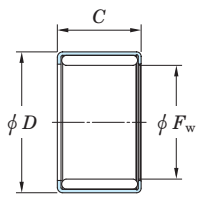
MKM, MHKM

Full complement type

With open ends

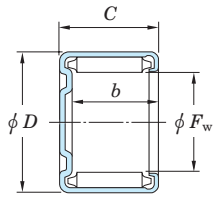


BM, BHM

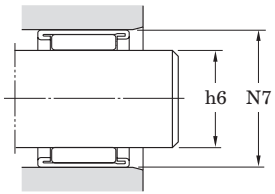


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
15	20	16	—	8.15	12.6	24 000	**15BTM2016C-2**	—	—	—	14.989	15.000	19.991 [4]	20.012 [4]	12	—
	21	10	—	7.70	11.8	8 100	—	—	**15BM2110**	—	14.989	15.000	20.972	20.993	9.4	—
	21	10	—	5.25	6.25	23 000	**15BTM2110JA**	—	—	—	14.989	15.000	20.991 [4]	21.012 [4]	9.5	—
	21	12	9.6	9.70	15.9	8 100	—	—	**15BM2112**	**15MM2112**	14.989	15.000	20.972	20.993	12	13
	21	12	9.3	7.00	8.80	23 000	**15BTM2112-1**	**15MKM2112**	—	—	14.989	15.000	20.972	20.993	11	12
	21	16	13.7	13.4	24.2	8 100	—	—	**15BM2116**	**15MM2116**	14.989	15.000	20.972	20.993	16	18
	21	16	13.3	9.80	13.6	23 000	**15BTM2116**	**15MKM2116**	—	—	14.989	15.000	20.972	20.993	14	16
	21	22	—	13.0	19.5	23 000	**15BTM2122**	—	—	—	14.989	15.000	20.991 [4]	21.012 [4]	20	—
	22	10	8.4	6.15	6.45	23 000	**BHTM1510**	**MHKM1510**	—	—	14.989	15.000	21.972	21.993	9.9	11
	22	12	9.3	6.90	7.95	23 000	**BHTM1512A**	**MHKM1512**	—	—	14.989	15.000	21.991 [4]	22.012 [4]	12	14
	22	15	—	10.9	13.3	23 000	**BHTM1515-1**	—	—	—	14.989	15.000	21.972	21.993	10	—
	22	20	17.3	14.2	18.8	23 000	**BHTM1520**	**MHKM1520**	—	—	14.989	15.000	21.972	21.993	20	23
	22	25	—	17.7	25.0	23 000	**BHTM1525**	—	—	—	14.989	15.000	21.972	21.993	26	—
16	22	12	9.6	10.2	17.1	7 700	—	—	**16BM2212**	**16MM2212**	15.989	16.000	21.972	21.993	12	14
	22	12	9.3	7.60	9.80	22 000	**16BTM2212A**	**16MKM2212**	—	—	15.989	16.000	21.991 [4]	22.012 [4]	11	12
	22	16	13.7	14.1	25.9	7 700	—	—	**16BM2216**	**16MM2216**	15.989	16.000	21.972	21.993	17	19
	22	16	13.3	10.7	15.1	22 000	**16BTM2216**	**16MKM2216**	—	—	15.989	16.000	21.972	21.993	15	17
	22	22	—	16.2	22.9	22 000	**16BTM2222B**	—	—	—	15.989	16.000	21.991 [4]	22.012 [4]	20	—
	24	12	—	8.00	8.45	21 000	**BHTM1612**	—	—	—	15.989	16.000	23.972	23.993	15	—
	24	16	13.3	12.2	14.9	21 000	**BHTM1616A**	**MHKM1616**	—	—	15.989	16.000	23.991 [4]	24.012 [4]	20	23
	24.15	14	12.6	8.45	9.05	12 000 [1]	—	**MKM162414U**	—	—	15.989	16.000	24.122	24.143	—	19
17	21.50	15	10.6	6.15	9.60	22 000	**17BTM2215**	—	—	—	16.989	17.000	21.472	21.493	10	—
	22	10	—	5.05	6.90	21 000	**BTM1710**	—	—	—	16.989	17.000	21.972	21.993	8.2	—
	22	13	—	10.6	21.6	7 500	—	—	**BM1713-1**	—	16.989	17.000	21.972	21.993	12	—
	23	12	9.6	10.3	17.9	7 300	—	—	**17BM2312**	**17MM2312**	16.989	17.000	22.972	22.993	13	15
	23	12	—	7.65	10.2	21 000	**BTM172312**	—	—	—	16.989	17.000	22.972	22.993	12	—
	23	20	—	18.0	36.7	7 300	—	—	**17BM2320**	—	16.989	17.000	22.972	22.993	23	—

[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

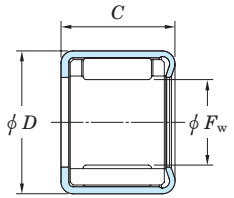
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

Drawn cup needle roller bearings

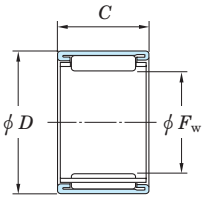
F_W (17) ~ 19 mm

Caged type

With open ends

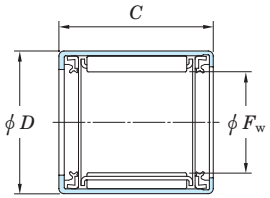


BFNM

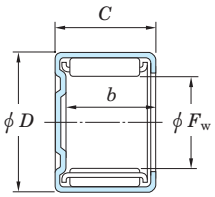


BTM, BHTM

With closed end



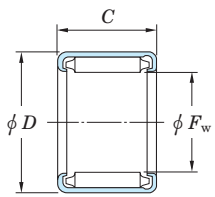
BKM



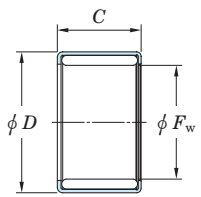
MKM, MHKM

Full complement type

With open ends

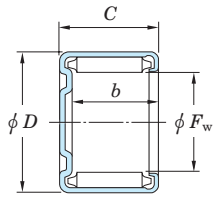


BM, BHM

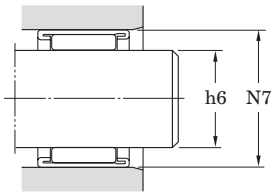


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
17	24	12	—	12.8	21.0	7 200	—	—	**YM172412-1**	—	16.983 [3]	16.994 [3]	23.985 [4]	24.006 [4]	17	—
	24	15	—	11.2	14.8	20 000	**BHTM1715-1**	—	—	—	16.989	17.000	23.972	23.993	17	—
	24	17	—	16.0	27.9	7 200	—	—	**BM172417-1**	—	16.989	17.000	23.991 [4]	24.012 [4]	23	—
	24	20	—	12.9	17.6	11 000 [1]	**BHKM1720JBU**	—	—	—	16.989	17.000	23.972	23.993	22	—
	24	20	—	19.0	21.9	7 200	—	—	**BHM1720A**	—	16.983 [3]	16.994 [3]	23.985 [4]	24.006 [4]	27	—
	24	20	17.3	15.1	21.6	20 000	**BHTM1720-1**	**MHKM1720**	—	—	16.989	17.000	23.972	23.993	24	27
	24	25	—	23.8	46.6	7 200	—	—	**BHM1725**	—	16.989	17.000	23.991 [4]	24.012 [4]	35	—
	24	25	—	19.0	29.0	20 000	**BTM172425**	—	—	—	16.983 [3]	16.994 [3]	23.972	23.993	22	—
	24	26	—	16.0	23.3	11 000 [1]	**BHKM1726JUU**	—	—	—	16.999	17.000	23.972	23.993	29	—
	24	30	—	20.1	31.3	11 000 [1]	**BHKM1730JU**	—	—	—	16.989	17.000	23.972	23.993	35	—
	25	14	—	7.30	7.90	11 000 [1]	**BKM172514UH-1**	—	—	—	16.989	17.000	24.991 [4]	25.012 [4]	18	—
	25	15	—	10.9	13.1	20 000	**BKM172515**	—	—	—	16.989	17.000	24.991 [4]	25.012 [4]	20	—
	25	16.70	—	7.30	7.90	11 000 [1]	**17BKM2517JBUUH**	—	—	—	16.989	17.000	24.972	24.993	20	—
	25	18	—	10.9	13.1	11 000 [1]	**BKM172518UH**	—	—	—	16.989	17.000	24.991 [4]	25.012 [4]	24	—
	25	20	—	12.9	16.3	11 000 [1]	**BKM172520UH-1**	—	—	—	16.989	17.000	24.991 [4]	25.012 [4]	27	—
18	24	12	9.6	10.8	19.2	6 900	—	—	**18BM2412**	**18MM2412**	17.989	18.000	23.972	23.993	17	20
	24	12	—	7.90	10.9	20 000	**18BTM2412**	—	—	—	17.989	18.000	23.991 [4]	24.012 [4]	12	—
	24	16	13.7	16.5	29.1	6 900	—	—	**18BM2416**	**18MM2416**	17.989	18.000	23.972	23.993	18	21
	24	16	—	17.2	30.7	6 900	—	—	**18YM2416**	—	17.989	18.000	23.972	23.993	19	—
	24	16	—	11.1	16.8	20 000	**BTM182416**	—	—	—	17.989	18.000	23.972	23.993	17	—
	25	13	—	9.40	11.8	19 000	**BTM1813**	—	—	—	17.989	18.000	24.972	24.993	15	—
	25	15	—	10.4	9.25	19 000	**BTM1815**	—	—	—	17.989	18.000	24.972	24.993	18	—
	25	17	—	12.2	17.7	19 000	**BTM1817A**	—	—	—	17.989	18.000	24.991 [4]	25.012 [4]	20	—
	25	19	—	14.4	20.5	19 000	**BTM1819**	—	—	—	17.989	18.000	24.972	24.993	22	—
	25	20	17.3	15.2	22.1	19 000	**BTM182520**	**MKM1820**	—	—	17.989	18.000	24.972	24.993	24	27
	25	25	—	18.9	29.2	19 000	**BTM1825A**	—	—	—	17.989	18.000	24.972	24.993	29	—
19	27	20	—	17.0	23.4	18 000	**BHTM1920**	—	—	—	18.987	19.000	26.972	26.993	30	—

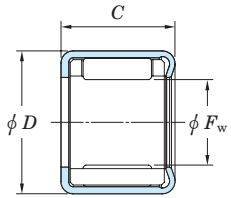
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

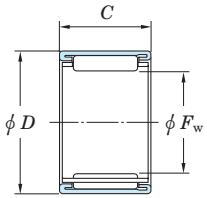
F_W 19.50 ~ (22) mm

Caged type

With open ends

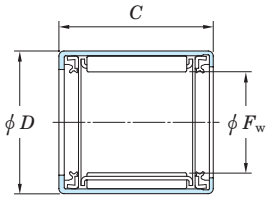


BFNM

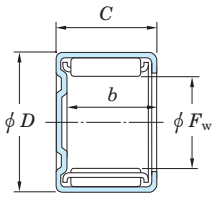


BTM, BHTM

With closed end



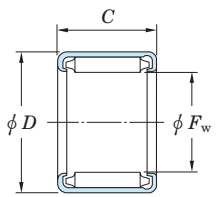
BKM



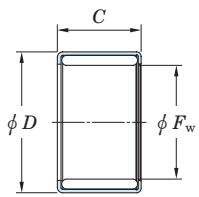
MKM, MHKM

Full complement type

With open ends

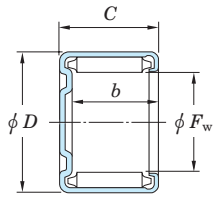


BM, BHM

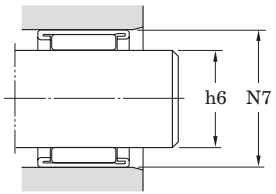


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
19.50	29	20	—	18.8	23.6	17 000	**20BTM2920**	—	—	—	19.487	19.500	28.972	28.993	36	—
20	26	12	9.6	10.6	20.4	6 300	—	—	**20BM2612**	**20MM2612**	19.987	20.000	25.972	25.993	15	17
	26	12	9.3	8.50	12.6	18 000	**20BTM2612**	**20MKM2612**	—	—	19.987	20.000	25.972	25.993	14	16
	26	14	—	15.1	31.4	6 300	—	—	**YM202614**	—	19.987	20.000	25.972	25.993	19	—
	26	16	13.7	14.8	31.4	6 300	—	—	**20BM2616**	**20MM2616**	19.987	20.000	25.972	25.993	21	23
	26	16	13.3	12.4	20.3	18 000	**BTM202616**	**20MKM2616**	—	—	19.987	20.000	25.972	25.993	19	21
	26	20	17.2	18.8	42.5	6 300	—	—	**20BM2620**	**20MM2620**	19.987	20.000	25.972	25.993	26	30
	26	20	—	15.2	26.4	18 000	**20BTM2620A**	—	—	—	19.987	20.000	25.972	25.993	24	—
	27	13	10.6	13.1	22.2	6 200	—	—	**BM2013**	**MM2013**	19.987	20.000	26.972	26.993	18	21
	27	15	—	15.6	27.7	6 200	—	—	**BM2015**	—	19.987	20.000	26.972	26.993	22	—
	27	15	—	13.1	18.7	18 000	**BTM2015**	—	—	—	19.870	20.000	26.972	26.993	20	—
	27	20	17.3	17.7	27.6	18 000	**BTM202720-1**	**MKM2020**	—	—	19.987	20.000	26.972	26.993	25	28
	27	23.50	—	18.4	28.8	10 000 [1]	**BKM2024JAU**	—	—	—	19.987	20.000	26.972	26.993	32	—
	27	25	—	22.1	36.6	18 000	**BTM202725**	—	—	—	19.987	20.000	26.972	26.993	33	—
	27	26	—	18.4	28.8	10 000 [1]	**BKM2026JUU**	—	—	—	19.987	20.000	26.972	26.993	33	—
	27	26	—	27.6	58.0	6 200	—	—	**BM2026**	—	19.987	20.000	26.972	26.993	40	—
	27	30	—	21.8	36.0	10 000 [1]	**BKM2030JUU**	—	—	—	19.987	20.000	26.972	26.993	38	—
	27	30	27.3	25.4	43.8	18 000	**BTM202730**	**MKM2030**	—	—	19.987	20.000	26.972	26.993	40	45
	27	35	—	28.7	45.4	10 000 [1]	**BKM2035JUU**	—	—	—	19.987	20.000	26.972	26.993	45	—
	28	20	—	17.4	22.3	17 000	**20BTM2820A**	—	—	—	19.987	20.000	27.991 [4]	28.012 [4]	31	—
21	27	20	—	20.5	47.6	6 100	—	—	**21YM2720J**	—	20.987	21.000	26.972	26.993	29	—
22	28	12	9.6	11.6	22.9	5 800	—	—	**22BM2812**	**22MM2812**	21.987	22.000	27.972	27.993	16	18
	28	12	9.3	9.10	13.5	16 000	**22BTM2812**	**22MKM2812**	—	—	21.987	22.000	27.972	27.993	14	16
	28	16	13.7	16.1	35.0	5 800	—	—	**22BM2816**	**22MM2816**	21.987	22.000	27.972	27.993	22	25
	28	16	13.3	12.7	20.8	16 000	**22BTM2816A**	**22MKM2816**	—	—	21.987	22.000	27.972	27.993	19	22
	28	20	17.2	20.3	47.2	5 800	—	—	**22BM2820**	**22MM2820**	21.987	22.000	27.972	27.993	29	32

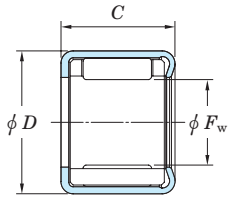
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

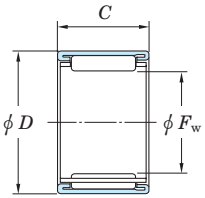
F_W (22) ~ (25) mm

Caged type

With open ends

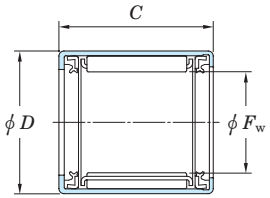


BFNM

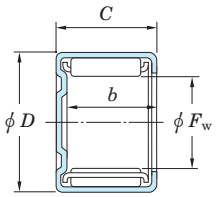


BTM, BHTM

With closed end



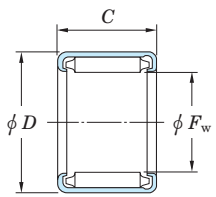
BKM



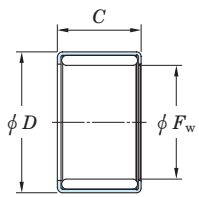
MKM, MHKM

Full complement type

With open ends

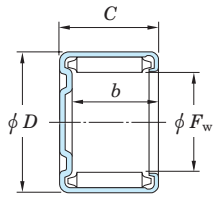


BM, BHM

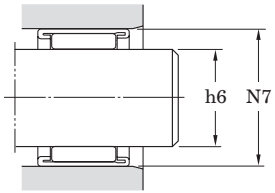


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
22	28	20	17.3	14.9	26.5	17 000	**22BTM2820**	**22MKM2820**	—	—	21.987	22.000	27.972	27.993	25	28
	28	20	—	21.0	49.5	5 800	—	—	**YM222820**	—	21.987	22.000	27.972	27.993	30	—
	29	12	—	9.22	13.0	16 000	**BTM2212**	—	—	—	21.987	22.000	28.972	28.993	19	—
	29	15	—	12.0	18.3	16 000	**BTM2215**	—	—	—	21.987	22.000	28.972	28.993	22	—
	29	20	—	21.9	45.2	5 700	—	—	**BM2220B**	—	21.987	22.000	28.972	28.993	33	—
	29	20	17.3	16.2	26.7	16 000	**BTM2220A**	**MKM2220**	—	—	21.987	22.000	28.972	28.993	30	33
	29	25	—	20.4	36.1	16 000	**BTM2225**	—	—	—	21.987	22.000	28.972	28.993	37	—
	30	18	—	16.7	24.5	16 000	**22BTM3018**	—	—	—	21.987	22.000	29.972	29.993	31	—
24	30	13	—	9.55	15.7	15 000	**BTM243013J**	—	—	—	23.987	24.000	29.991 [4]	30.012 [4]	47	—
	31	20	17.3	17.7	29.4	15 000	**BTM2420**	**MKM2420**	—	—	23.987	24.000	30.967	30.992	31	35
	31	25	—	31.6	65.4	5 200	—	—	**BM2425A**	—	23.987	24.000	30.989 [4]	31.014 [4]	45	—
	31	28	—	23.9	43.0	15 000	**BTM2428**	—	—	—	23.987	24.000	30.967	30.992	44	—
	35	20	18.0	21.0	25.8	14 000	—	**24MKM3520**	—	—	23.987	24.000	34.967	34.992	—	52
25	31	19	—	16.3	30.1	15 000	**25BTM3119A**	—	—	—	24.987	25.000	30.967	30.992	26	—
	32	12	9.3	9.05	12.4	14 000	**BTM2512**	**MKM2512**	—	—	24.987	25.000	31.967	31.992	19	21
	32	16	—	18.7	37.9	5 100	—	—	**BM2516**	—	24.987	25.000	31.967	31.992	28	—
	32	16	13.3	15.3	24.6	14 000	**BTM2516**	**MKM2516**	—	—	24.987	25.000	31.967	31.992	26	30
	32	20	17.2	23.8	51.7	5 100	—	—	**BM2520**	**MM2520**	24.987	25.000	31.967	31.992	36	41
	32	20	—	19.1	32.5	14 000	**BTM2520A**	**MTM2520M**	—	—	24.987	25.000	31.967	31.992	33	—
	32	26	—	30.9	72.4	5 100	—	—	**BM2526**	—	24.987	25.000	31.967	31.992	48	—
	32	26	23.3	23.7	43.1	14 000	**BTM2526**	**MKM2526**	—	—	24.987	25.000	31.967	31.992	42	48
	33	10	—	8.50	10.3	14 000	**BHTM2510A**	—	—	—	24.987	25.000	32.989 [4]	33.014 [4]	18	—
	33	15	—	19.5	32.0	5 000	—	—	**BHM2515**	—	24.987	25.000	32.989 [4]	33.014 [4]	30	—
	33	15	—	13.9	19.7	14 000	**BHTM2515-1**	—	—	—	24.987	25.000	32.967	32.992	27	—
	33	20	17.3	19.2	29.7	14 000	**BHTM2520-1**	**MHKM2520**	—	—	24.987	25.000	32.967	32.992	37	41
	33	25	—	31.3	66.3	5 000	—	—	**BHM2525**	—	24.987	25.000	32.967	32.992	53	—
	33	25	—	24.5	40.6	14 000	**BHTM2525**	—	—	—	24.987	25.000	32.967	32.992	46	—

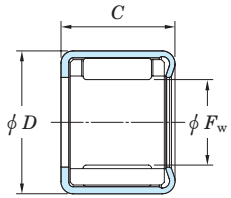
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (25) ~ (30) mm

Caged type

With open ends



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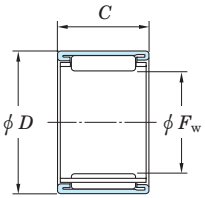
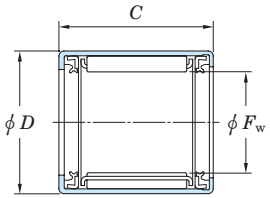
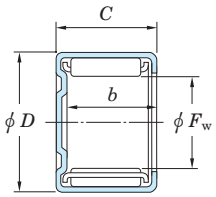


BTM, BHTM

With closed end



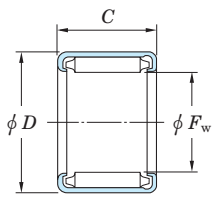
BKM



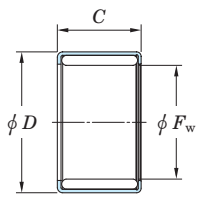
MKM, MHKM

Full complement type

With open ends

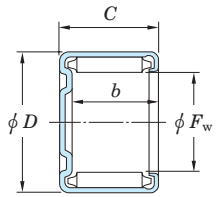


BM, BHM

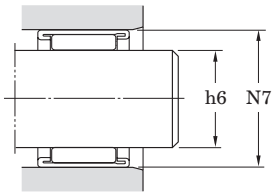


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
25	33	30	—	37.4	83.3	5 000	—	—	**BHM2530**	—	24.987	25.000	32.989 [4]	33.014 [4]	65	—
	33	30	27.3	27.7	47.4	14 000	**BHTM2530-1**	**MHKM2530**	—	—	24.987	25.000	32.967	32.992	54	61
	33	35	—	29.8	52.3	8 000 [1]	**BHKM2535JU**	—	—	—	24.987	25.000	32.967	32.992	62	—
25.80	33	16	—	14.2	22.4	14 000	**BTM263316A**	—	—	—	25.787	25.800	32.967	32.992	28	—
26	31.40	12	—	8.60	14.5	14 000	**BKM263112A**	—	—	—	25.987	26.000	31.389 [4]	31.414 [4]	14	—
	34	16	13.3	15.3	22.5	14 000	**BHTM2616**	**MHKM2616**	—	—	25.987	26.000	33.967	33.992	30	34
	34	20	17.3	20.0	31.6	14 000	**BHTM2620A**	**MHKM2620**	—	—	25.987	26.000	33.967	33.992	38	43
28	34	17	—	16.8	49.7	4 600	—	—	**BM2817**	—	27.987	28.000	33.967	33.992	29	—
	34	24	—	29.0	76.7	4 600	—	—	**BM2824**	—	27.987	28.000	33.967	33.992	42	—
	34	25	—	34.8	85.9	4 600	—	—	**YM2825B**	—	27.991 [3]	28.000 [3]	33.975 [4]	34.000 [4]	45	—
	35	16	13.7	20.2	42.9	4 600	—	—	**28BM3516**	**28MM3516**	27.987	28.000	34.967	34.992	95	107
	35	16	13.3	15.9	26.2	13 000	**28BTM3516**	**28MKM3516**	—	—	27.987	28.000	34.967	34.992	28	31
	35	20	17.2	25.7	58.3	4 600	—	—	**28BM3520**	**28MM3520**	27.987	28.000	34.967	34.992	118	133
	35	20	17.3	19.0	33.1	13 000	**28BTM3520**	**28MKM3520**	—	—	27.987	28.000	34.967	34.992	35	39
	36	20.75	—	22.8	39.3	13 000	**BTM283621JA**	—	—	—	27.987	28.000	35.967	35.992	43	—
	36	23	—	22.8	39.3	13 000	**BTM283623J**	—	—	—	27.987	28.000	35.967	35.992	49	—
	37	20	17.3	21.6	33.0	13 000	**BTM283720**	**MHKM2820**	—	—	27.987	28.000	36.967	36.992	46	52
	37	30	—	43.7	94.7	4 400	—	—	**28BHM3730**	—	27.980 [3]	27.993 [3]	36.989 [4]	37.014 [4]	80	—
	37	30	27.3	32.8	56.5	13 000	**BHTM2830**	**MHKM2830**	—	—	27.987	28.000	36.967	36.992	70	79
	39	30	—	44.5	85.9	4 300	—	—	**BM283930A**	—	27.980 [3]	27.993 [3]	38.989 [4]	39.014 [4]	100	—
30	37	12	9.3	12.1	18.8	12 000	**BTM303712**	**30MKM3712**	—	—	29.987	30.000	36.967	36.992	22	25
	37	16	—	21.1	28.2	4 300	—	—	**30BM3716**	—	29.987	30.000	36.967	36.992	33	—
	37	16	13.3	17.1	29.3	12 000	**30BTM3716BM**	**30MKM3716**	—	—	29.987	30.000	36.967	36.992	30	33
	37	20	17.2	26.8	62.5	4 300	—	—	**30BM3720**	**30MM3720**	29.987	30.000	36.967	36.992	42	48
	37	20	17.3	20.7	40.4	12 000	**30BTM3720**	**30MKM3720**	—	—	29.987	30.000	36.967	36.992	40	45
	37	20	—	32.2	70.1	4 300	—	—	**30YM3720**	—	29.987	30.000	36.967	36.992	45	—

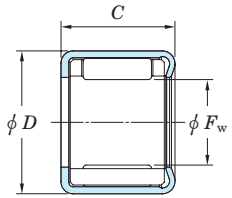
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (30) ~ (35) mm

Caged type

With open ends



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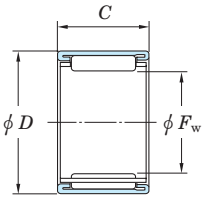
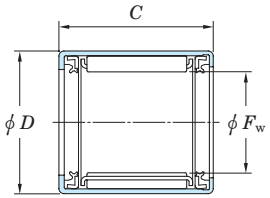


BTM, BHTM

With closed end



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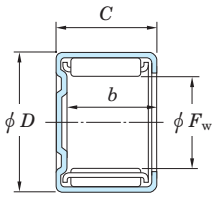
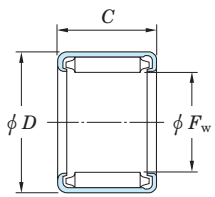


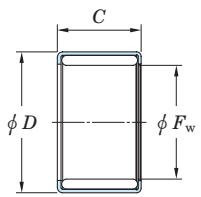
MKM, MHKM

Full complement type

With open ends

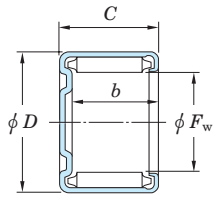


BM, BHM

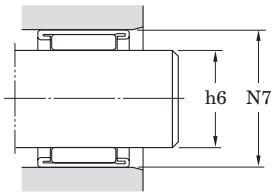


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
30	37	26	—	34.8	87.3	4 300	—	—	**30BM3726**	—	29.987	30.000	36.967	36.992	56	—
	37	26	23.3	26.7	52.0	12 000	**30BTM3726**	**30MKM3726**	—	—	29.987	30.000	36.967	36.992	48	55
	37	26	—	37.1	94.9	4 300	—	—	**30YM3726**	—	29.987	30.000	36.967	36.992	60	—
	38	21	—	23.4	40.4	12 000	**BTM3021A**	—	—	—	29.987	30.000	37.967	37.992	45	—
	38	25	—	38.0	79.8	4 200	—	—	**BM3025**	—	29.987	30.000	37.989 [4]	38.014 [4]	62	—
	40	15	—	16.6	22.3	12 000	**BHTM3015**	—	—	—	29.987	30.000	39.967	39.992	41	—
	40	20	17.3	23.1	34.0	12 000	**BHTM3020**	**MHKM3020**	—	—	29.987	30.000	39.967	39.992	55	62
	40	25	—	37.3	75.4	4 100	—	—	**BHM3025**	—	29.987	30.000	39.987 [4]	40.013 [4]	80	—
	40	25	—	29.4	46.5	12 000	**BHTM3025-1**	—	—	—	29.987	30.000	39.967	39.992	69	—
	40	30	27.3	35.3	58.8	12 000	**BHTM3030-1A**	**MHKM3030**	—	—	29.987	30.000	39.967	39.992	83	94
	40	30	—	30.8	49.3	6 600 [1]	**BKM304030JU**	—	—	—	29.987	30.000	39.967	39.992	77	—
31	39	17.80	—	20.6	34.6	12 000	**31BTM3918A**	—	—	—	30.984	31.000	38.967	38.992	39	—
32	38	11	—	4.90	6.75	12 000	**32BTM3811A**	—	—	—	31.975 [3]	31.991 [3]	38.000 [4]	38.025 [4]	15	—
	40	20	—	31.9	73.3	4 000	—	—	**32YM4020P**	—	31.984	32.000	39.989 [4]	40.014 [4]	56	—
	40	25	—	27.6	50.8	11 000	**32BTM4025PL**	—	—	—	31.984	32.000	39.989 [4]	40.014 [4]	57	—
	42	20	17.3	23.4	34.8	11 000	**BHTM3220A**	**MHKM3220**	—	—	31.984	32.000	41.989 [4]	42.014 [4]	57	64
	42	20	—	37.4	69.1	3 900	—	—	**YM3220**	—	31.995 [3]	32.011 [3]	41.989 [4]	42.014 [4]	71	—
	42	30	27.3	36.6	61.9	11 000	**BHTM3230**	**MHKM3230**	—	—	31.984	32.000	41.967	41.992	86	98
	42	30	—	55.0	113	3 900	—	—	**YM3230**	—	31.995 [3]	32.011 [3]	41.989 [4]	42.014 [4]	109	—
33.50	40	17	—	16.8	33.5	11 000	**BTM344017A**	—	—	—	33.484	33.500	39.967	39.992	34	—
34	40	12	—	7.30	11.7	11 000	**34BTM4012A**	—	—	—	33.984	34.000	39.967	39.992	20	—
	42	25	—	37.2	94.1	3 800	—	—	**34YM4225**	—	33.959 [3]	33.975 [3]	41.967	41.992	74	—
35	40.50	26	—	22.7	56.0	11 000	**BSM354126AJ**	—	—	—	34.984	35.000	40.467	40.492	44	—
	42	12	—	13.3	22.8	11 000	**BTM3512**	—	—	—	34.984	35.000	41.967	41.992	26	—
	42	16	—	22.2	52.9	3 700	—	—	**BM3516**	—	34.984	35.000	41.967	41.992	38	—

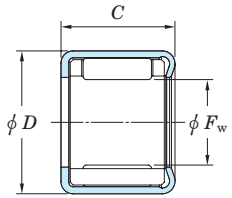
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (35) ~ (40) mm

Caged type

With open ends



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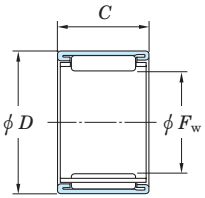
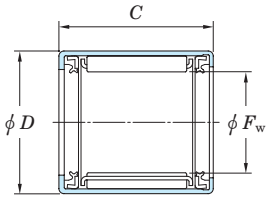


BTM, BHTM

With closed end



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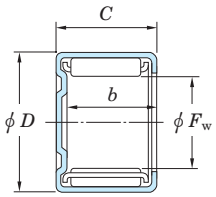
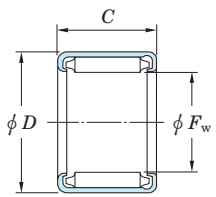


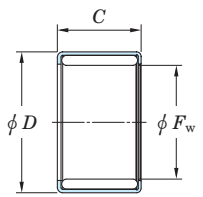
MKM, MHKM

Full complement type

With open ends

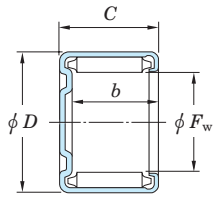


BM, BHM

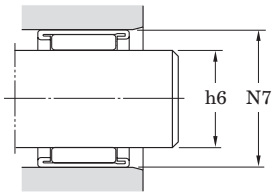


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
35	42	16	13.3	18.5	34.7	11 000	**BTM3516**	**MKM3516**	—	—	34.984	35.000	41.967	41.992	35	39
	42	20	—	13.3	22.8	5 700 [1]	**BKM354220-1UU**	—	—	—	34.984	35.000	41.967	41.992	38	—
	42	20	17.2	28.2	72.2	3 700	—	—	**BM3520**	**MM3520**	34.984	35.000	41.967	41.992	49	56
	42	20	17.3	23.4	47.0	11 000	**BTM3520**	**MKM3520**	—	—	34.984	35.000	41.989 [4]	42.014 [4]	43	49
	42	21	—	28.8	79.2	3 700	—	—	**YM3521A**	—	34.984	35.000	41.989 [4]	42.014 [4]	55	—
	42	26	—	36.7	101	3 700	—	—	**BM3526**	—	34.984	35.000	41.967	41.992	66	—
	42	26	23.3	30.1	65.2	11 000	**BTM3526**	**MKM3526**	—	—	34.984	35.000	41.967	41.992	57	64
	42	28	—	31.3	68.6	11 000	**BTM3528**	—	—	—	34.984	35.000	41.967	41.992	63	—
	42	46	—	26.2	57.5	5 700 [1]	**BKM354246UUH**	—	—	—	34.984	35.000	41.967	41.992	101	—
	45	15	—	18.4	26.6	10 000	**BHTM3515**	—	—	—	34.984	35.000	44.967	44.992	47	—
	45	18	—	20.5	33.4	3 600	—	—	**BHM3518**	—	34.984	35.000	44.967	44.992	62	—
	45	20	17.3	26.0	41.7	10 000	**BHTM3520**	**MHKM3520**	—	—	34.984	35.000	44.967	44.992	64	72
	45	25	—	32.8	56.2	10 000	**BHTM3525**	—	—	—	34.984	35.000	44.967	44.992	80	—
	45	30	27.3	39.4	71.0	10 000	**BHTM3530**	**MHKM3530**	—	—	34.984	35.000	44.967	44.992	96	109
36	42	16	—	19.6	55.9	3 700	—	—	**36BM4216**	—	35.984	36.000	41.967	41.992	35	—
	44	25	—	42.0	99.2	3 600	—	—	**36YM4425L**	—	35.975 [3]	35.991 [3]	43.967	43.992	78	—
	48	24	—	33.2	48.7	9 800	**36BTM4824**	—	—	—	35.984	36.000	47.967	47.992	95	—
37	43	12	—	8.00	13.6	10 000	**37BTM4312A**	—	—	—	36.984	37.000	42.967	42.992	23	—
	47	20	17.3	25.1	39.9	9 800	**BTM3720**	**MKM3720**	—	—	36.984	37.000	46.967	46.992	64	72
	47	30	27.3	38.2	68.4	9 800	**BTM3730**	**MKM3730**	—	—	36.984	37.000	46.967	46.992	96	109
38	45	12	—	12.7	23.0	9 800	**BTM384512A**	—	—	—	37.984	38.000	44.967	44.992	29	—
	48	20	17.3	27.1	44.5	9 500	**BTM3820A**	**MKM3820**	—	—	37.984	38.000	47.967	47.992	67	76
	48	20	—	42.0	82.8	3 300	—	—	**YM3820P**	—	37.984	38.000	47.967	47.992	82	—
	48	30	27.3	41.2	76.2	9 500	**BTM3830PL**	**MKM3830**	—	—	37.984	38.000	47.967	47.992	102	115
	48	45	—	58.9	121	9 500	**BTM3845-OH**	—	—	—	37.984	38.000	47.967	47.992	151	—
40	47	12	—	9.75	10.4	9 400	**40BTM4712A**	—	—	—	39.984	40.000	46.967	46.992	27	—

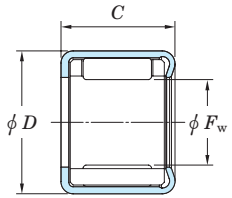
[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W (40) ~ 45 mm

Caged type

With open ends



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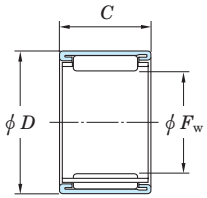
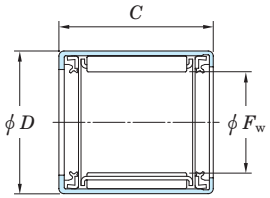
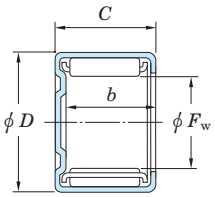


BTM, BHTM

With closed end



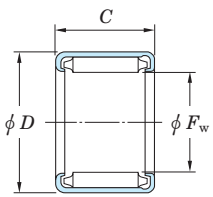
BKM



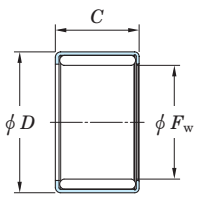
MKM, MHKM

Full complement type

With open ends

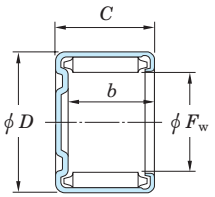


BM, BHM

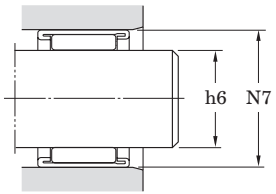


YM

With closed end



MM



Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
40	47	16	—	23.8	60.5	3 300	—	—	**40BM4716**	—	39.984	40.000	46.967	46.992	43	—
	47	16	13.3	18.7	37.1	9 400	**40BTM4716**	**40MKM4716**	—	—	39.984	40.000	46.967	46.992	39	44
	47	20	17.2	30.3	82.6	3 300	—	—	**40BM4720**	**40MM4720**	39.984	40.000	46.967	46.992	56	63
	47	20	17.3	23.7	50.4	9 400	**40BTM4720**	**40MKM4720**	—	—	39.984	40.000	46.967	46.992	48	55
	50	15	—	23.4	45.2	3 200	—	—	**BM4015-1**	—	39.984	40.000	49.967	49.992	55	—
	50	15	—	20.2	31.2	9 100	**BTM4015**	—	—	—	39.984	40.000	49.967	49.992	54	—
	50	20	17.3	28.5	48.5	9 100	**BTM4020**	**MKM4020**	—	—	39.984	40.000	49.967	49.992	73	82
	50	25	—	36.2	66.2	9 100	**BTM4025**	—	—	—	39.984	40.000	49.967	49.992	91	—
	50	30	27.3	43.0	82.5	9 100	**BTM4030-1**	**MKM4030**	—	—	39.984	40.000	49.967	49.992	109	123
	50	40	—	54.8	113	9 100	**BTM4040-OH**	—	—	—	39.984	40.000	49.967	49.992	141	—
	51	20	—	40.2	84.7	3 200	—	—	**YM405120J**	—	39.984	40.000	50.961	50.991	96	—
	51	30	—	43.5	76.6	9 000	**40BTM5130J**	—	—	—	39.984	40.000	50.961	50.991	112	—
	53	20	—	46.7	87.3	3 100	—	—	**YM405320JM**	—	39.984	40.000	52.961	52.991	114	—
41.50	46.50	8.50	—	7.00	13.9	9 200	**BTM424709AJ**	—	—	—	41.484	41.500	46.467	46.492	15	—
42	53	30	—	45.7	83.9	8 600	**BTM425330J**	—	—	—	41.984	42.000	52.961	52.991	121	—
43	49	12	—	8.35	15.1	8 800	**43BTM4912A**	—	—	—	42.984	43.000	48.989 [4]	49.014 [4]	25	—
43.52	48.52	14	—	12.0	29.0	8 800	**44BTM4914A**	—	—	—	43.504	43.520	48.487	48.512	28	—
45	52	12	—	13.7	26.9	8 400	**45BTM5212A**	—	—	—	44.984	45.000	51.961	51.991	34	—
	52	16	—	23.8	65.9	2 900	—	—	**45BM5216**	—	44.984	45.000	51.961	51.991	49	—
	52	16	13.3	19.1	41.3	8 400	**45BTM5216**	**45MKM5216**	—	—	44.984	45.000	51.961	51.991	45	51
	52	20	17.2	30.4	90.1	2 900	—	—	**45BM5220**	**45MM5220**	44.984	45.000	51.961	51.991	62	71
	52	20	17.3	23.3	33.4	8 200	**45BTM5220A**	**MKM4520**	—	—	44.984	45.000	54.961	54.991	79	90
	52	30	27.3	45.3	91.7	8 200	**BTM4530**	**MKM4530**	—	—	44.984	45.000	54.961	54.991	120	136
	55	20	—	30.0	53.9	8 200	**BTM4520A**	—	—	—	44.984	45.000	54.961	54.991	79	—

[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

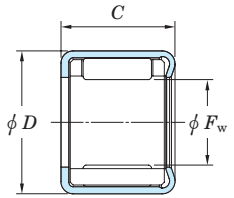
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

Drawn cup needle roller bearings

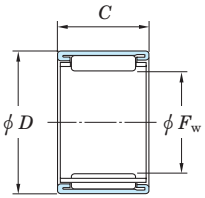
F_W 48 ~ 76.50 mm

Caged type

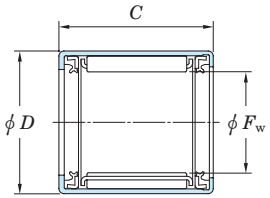
With open ends



BFNM

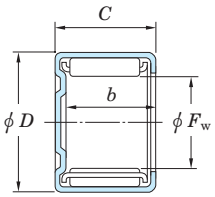


BTM, BHTM



BKM

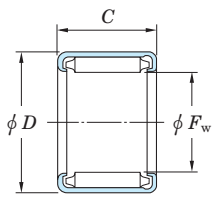
With closed end



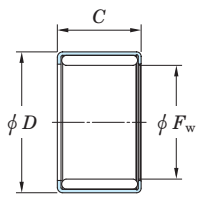
MKM, MHKM

Full complement type

With open ends

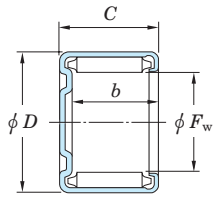


BM, BHM

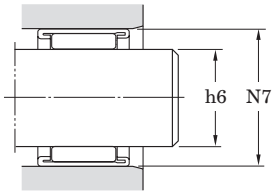


YM

With closed end



MM



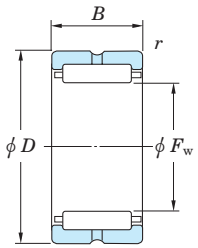
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No. [2]				Recommended dimensions (mm)				(Refer.) Mass (g)	
							Caged type		Full complement type		Shaft dia. (h6)		Housing bore dia. (N7)			
F_w	D	C	b min.	C_r	C_{0r}	Oil lub.	With open ends	With closed end	With open ends	With closed end	min.	max.	min.	max.	With open ends	With closed end
48	56	30	—	41.0	100	7 800	**BTM485630J**	—	—	—	47.984	48.000	55.961	55.991	102	—
50	58	16	—	21.9	43.8	7 500	**BTM505816J**	—	—	—	49.984	50.000	57.961	57.991	54	—
	58	20	—	35.8	98.0	2 600	—	—	**50BM5820**	—	49.984	50.000	57.961	57.991	78	—
	58	20	17.3	28.4	61.0	7 500	**50BTM5820J**	**50MKM5820**	—	—	49.984	50.000	57.961	57.991	68	76
	58	25	—	45.2	133	2 600	—	—	**50BM5825**	—	49.984	50.000	57.961	57.991	98	—
	58	25	22.3	35.9	82.5	7 500	**50BTM5825**	**50MKM5825**	—	—	49.984	50.000	57.961	57.991	86	97
	62	15	—	24.3	36.4	7 300	**BTM5015**	—	—	—	49.984	50.000	61.961	61.991	73	—
	62	20	17.3	34.5	57.1	7 300	**BTM5020**	**MKM5020**	—	—	49.984	50.000	61.961	61.991	99	112
	62	25	—	43.9	77.8	7 300	**BTM5025**	—	—	—	49.984	50.000	61.961	61.991	125	—
	62	30	27.3	52.8	98.5	7 300	**BTM5030**	**MKM5030**	—	—	49.984	50.000	61.961	61.991	153	173
55	63	20	—	29.1	65.1	6 900	**55BTM6320**	—	—	—	54.981	55.000	62.961	62.991	73	—
	67	20	—	36.4	63.1	6 700	**55BTM6720A**	—	—	—	54.981	55.000	66.961	62.991	110	—
64	73.178	21.10	—	36.1	83.8	5 900	**64BTM7321A**	—	—	—	63.981	64.000	73.139	73.129	110	—
66	72	16	—	21.9	61.1	5 900	**BTM667216J**	—	—	—	65.981	66.000	71.961	71.991	54	—
71.60	78.60	15	—	22.9	61.9	5 400	**BTM727915AJ**	—	—	—	71.581	71.600	78.561	78.591	66	—
76.50	83.50	15	—	23.5	65.4	5 000	**BTM778415AJ**	—	—	—	76.481	76.500	83.455	83.490	70	—

[Notes] 1) The limiting speeds shown above are applicable when oil seal is used and the bearing is lubricated with grease.
2) FN in bearing number indicates a bearing comprising polyamide molded cage.
3) The recommended dimensional tolerances of shaft shown above are applicable except h6.
4) The recommended dimensional tolerances of housing bore shown above are applicable except N7.

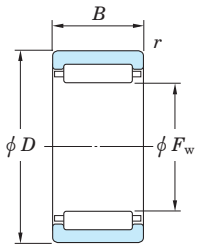
[Remark] Limiting speed of grease lubrication should be kept to under 60 % of that for oil lubrication.

F_W 12 ~ 17 mm

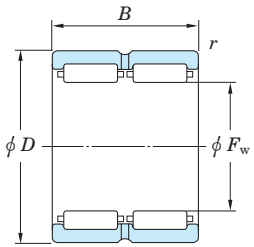
Without inner ring



RNA49, RNA59

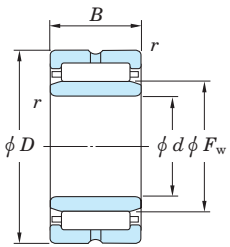


NQ, NQS

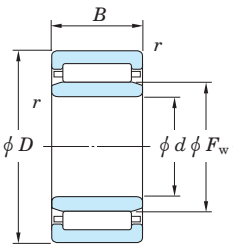


RNA69

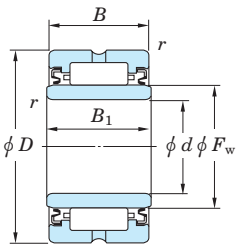
With inner ring



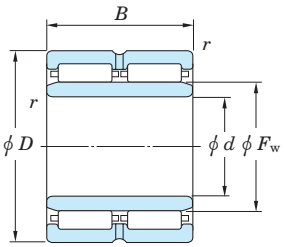
NA49, NA59



NQI, NQIS

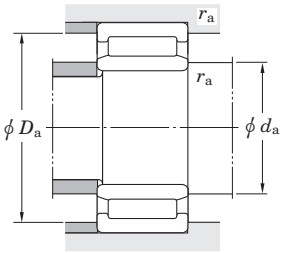


NA49...UU



NA69

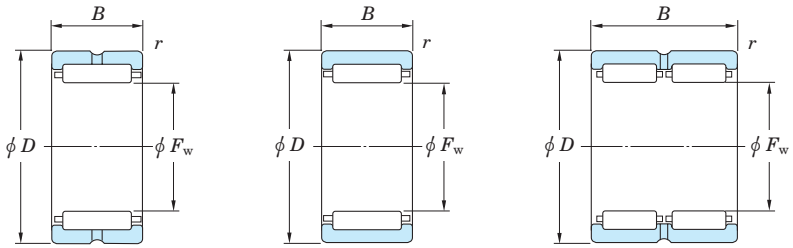
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
12	—	19	10	—	0.3	5.9	6.3	35 000	**NQ12/10**	—	—	17	0.3	0.010	—	—
	—	24	9.8	—	0.3	5.9	6.3	35 000	**12NQ2410A**	—	—	22	0.3	0.023	—	—
14	10	22	13	14	0.3	7.5	7.7	14 000	—	**NA4900UU**	12	20	0.3	—	0.025	IRM101414
	10	22	13	—	0.3	7.6	9.1	31 000	**RNA4900**	**NA4900**	12	20	0.3	0.017	0.025	IRM101413
	10	22	13	—	0.3	9.3	10.1	30 000	**RNA4900R**	**NA4900R**	12	20	0.3	0.016	0.023	IRM101413
	—	22	16	—	0.5	11.7	13.7	30 000	**NQ14/16D**	—	—	19	0.5	0.021	—	—
15	—	23	12	—	0.3	8.8	9.7	29 000	**NQ15/12**	—	—	21	0.3	0.017	—	—
	—	24	10	—	0.3	8.5	8.2	28 000	**15NQ2410D**	—	—	22	0.3	0.016	—	—
	—	25	12	—	0.6	10.5	10.8	28 000	**NQ152512**	—	—	21	0.6	0.022	—	—
	—	26	16	—	0.3	13.4	14.8	28 000	**NQS15/16**	—	—	24	0.3	0.034	—	—
	—	28	15	—	1	7.9	9.8	28 000	**15NQ2815**	—	—	23	1	0.043	—	—
16	—	23	16	—	0.5	13.1	16.4	27 000	**16NQ2316**	—	—	20	0.5	0.018	—	—
	—	23	16	—	0.5	15.2	17.4	28 000	**NQ15/16B**	—	—	20	0.5	0.020	—	—
	—	23	22	—	0.5	17.1	23.0	27 000	**16NQ2322A**	—	—	20	0.5	0.025	—	—
	—	24	12	—	0.3	7.7	9.6	28 000	**NQ16/12**	—	—	22	0.3	0.019	—	—
	12	24	13	14	0.3	8.3	9.2	12 000	—	**NA4901UU**	14	22	0.3	—	0.028	IRM121614
	12	24	13	—	0.3	8.6	11.1	28 000	**RNA4901**	**NA4901**	14	22	0.3	0.019	0.028	IRM121613
	12	24	13	—	0.3	10.2	11.8	27 000	**RNA4901R**	**NA4901R**	14	22	0.3	0.018	0.027	IRM121613
	—	24	16	—	0.3	10.9	15.2	28 000	**NQ16/16D**	—	—	22	0.3	0.025	—	—
	12	24	16	16	0.3	10.9	15.2	28 000	—	**NQI12/16D**	14	22	0.3	—	0.036	—
	—	24	20	—	0.3	13.1	19.1	28 000	**NQ16/20**	—	—	22	0.3	0.032	—	—
	12	24	22	—	0.3	16.3	21.7	27 000	**RNA6901**	**NA6901**	14	22	0.3	0.030	0.045	IRM121622
17	—	25	16	—	0.5	11.3	16.2	26 000	**NQ17/16D**	—	—	22	0.5	0.026	—	—
	—	25	20	—	0.3	13.7	20.6	26 000	**17NQ2520**	—	—	23	0.3	0.033	—	—
	—	30	13	—	0.3	10.0	10.5	25 000	**17NQ3013D**	—	—	28	0.3	0.041	—	—
	—	32	16	—	0.6	18.0	16.5	23 000	**17NQ3216D**	—	—	28	0.6	0.053	—	—



[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

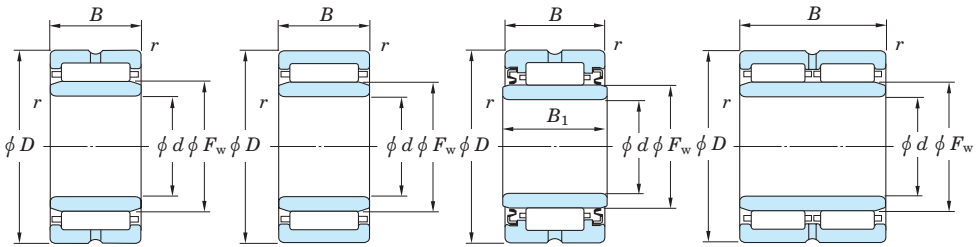
F_W 18 ~ (22) mm

Without inner ring



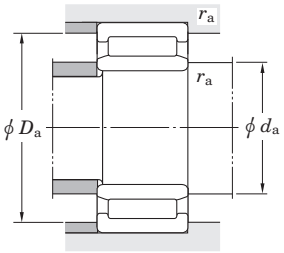
RNA49, RNA59 | NQ, NQS | RNA69

With inner ring



NA49, NA59 | NQI, NQIS | NA49...UU | NA69

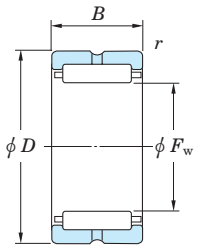
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
18	—	25	16	—	0.3	11.7	17.2	25 000	**18NQ2516**	—	—	23	0.3	0.023	—	—
	—	26	13	—	0.3	11.0	13.6	24 000	**RNA49/14R**	—	—	24	0.3	0.020	—	—
	—	26	16	—	0.3	11.7	17.2	25 000	**NQ18/16**	—	—	24	0.3	0.027	—	—
	—	26	20	—	0.3	14.1	21.7	25 000	**NQ18/20**	—	—	24	0.3	0.035	—	—
	—	28	19	—	0.3	16.9	20.9	24 000	**18NQ2819**	—	—	26	0.3	0.042	—	—
	12	30	16	—	0.3	13.7	14.3	23 000	**NQS18/16**	**NQIS12/16**	14	28	0.3	0.044	0.057	—
19	15	27	16	—	0.3	12.1	18.2	24 000	—	**NQI15/16**	17	25	0.3	0.042	—	—
20	—	27	17	—	0.3	14.7	20.4	22 000	**20NQ2717**	—	—	25	0.3	0.024	—	—
	15	28	13	14	0.3	9.2	11.1	10 000	—	**NA4902UU**	17	26	0.3	—	0.037	IRM152014
	15	28	13	—	0.3	9.2	12.8	23 000	**RNA4902**	**NA4902**	17	26	0.3	0.023	0.036	IRM152013
	15	28	13	—	0.3	11.3	14.6	22 000	**RNA4902R**	**NA4902R**	17	26	0.3	0.021	0.035	IRM152013
	—	28	16	—	0.3	12.0	18.2	23 000	**NQ20/16D**	—	—	26	0.3	0.030	—	—
	15	28	18	—	0.3	14.7	20.4	22 000	**RNA5902**	**NA5902**	17	26	0.3	0.029	0.048	IRM152018
	—	28	20	—	0.3	14.4	23.0	23 000	**NQ20/20**	—	—	26	0.3	0.038	—	—
	—	28	23	—	0.3	18.4	27.1	22 000	**NQ202823**	—	—	26	0.3	0.040	—	—
	—	30	20	—	0.3	19.8	26.4	22 000	**20NQ3020**	—	—	28	0.3	0.048	—	—
	—	32	12	—	0.3	11.9	11.3	21 000	**20NQ3212**	—	—	30	0.3	0.033	—	—
	—	32	18	—	0.3	21.0	26.1	21 000	**NQ203218**	—	—	30	0.3	0.053	—	—
	—	33	15	—	0.6	14.0	16.9	21 000	**20NQ3315D**	—	—	29	0.6	0.052	—	—
	—	34	18	—	0.6	21.1	20.8	20 000	**20NQ3418D**	—	—	30	0.6	0.060	—	—
21	—	38	17	—	0.6	21.1	21.1	19 000	**21NQ3817**	—	—	34	0.6	0.082	—	—
22	17	30	13	14	0.3	9.4	11.8	9 100	—	**NA4903UU**	19	28	0.3	—	0.040	IRM172214
	17	30	13	—	0.3	9.6	14.0	21 000	**RNA4903D**	**NA4903**	19	28	0.3	0.025	0.040	IRM172213
	17	30	13	—	0.3	12.1	16.4	20 000	**RNA4903R**	**NA4903R**	19	28	0.3	0.023	0.038	IRM172213
	—	30	16	—	0.3	12.7	20.2	21 000	**NQ22/16**	—	—	28	0.3	0.032	—	—
	17	30	18	—	0.3	15.2	21.9	20 000	**RNA5903**	**NA5903**	19	28	0.3	0.031	0.052	IRM172218
	—	30	20	—	0.3	15.3	25.6	21 000	**NQ22/20**	—	—	28	0.3	0.040	—	—



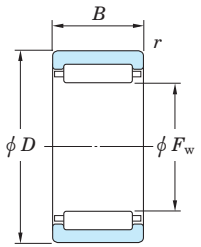
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W (22) ~ 28 mm

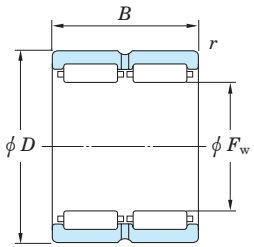
Without inner ring



RNA49, RNA59

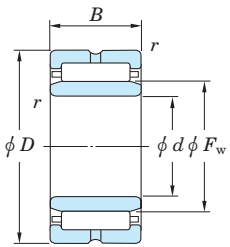


NQ, NQS

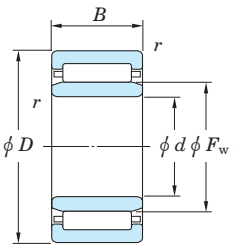


RNA69

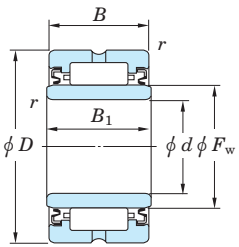
With inner ring



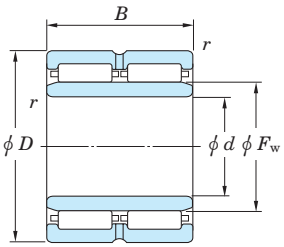
NA49, NA59



NQI, NQIS

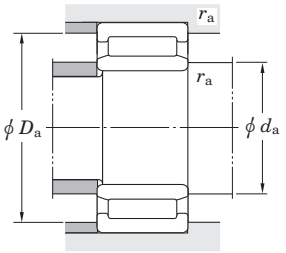


NA49...UU



NA69

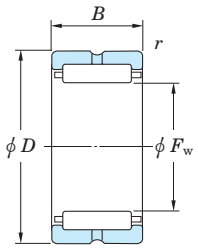
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
22	17	30	23	—	0.3	18.9	29.0	20 000	**RNA6903**	**NA6903**	19	28	0.3	0.040	0.067	IRM172223
	—	32	25	—	0.3	22.4	31.7	20 000	**22NQ3225**	—	—	30	0.3	0.063	—	—
24	20	32	12	—	0.3	9.6	14.4	19 000	**NQ24/12**	**NQI20/12**	22	30	0.3	0.025	0.038	—
	20	32	16	—	0.3	13.4	22.2	19 000	**NQ24/16**	**NQI20/16**	22	30	0.3	0.035	0.052	—
	—	32	20	—	0.3	17.3	26.5	19 000	**NQ24/20AD**	—	—	30	0.3	0.040	—	—
	20	32	20	20	0.3	17.3	26.5	19 000	—	**NQI203220AD**	22	30	0.3	—	0.062	20IRM2420AD
25	—	33	16	—	0.3	14.1	20.6	18 000	**NQ25/16**	—	—	31	0.3	0.034	—	—
	—	33	20	—	0.3	18.9	30.0	18 000	**NQ25/20**	—	—	31	0.3	0.043	—	—
	20	37	14	—	0.3	17.1	19.1	17 000	—	**20NQI3714**	22	35	0.3	—	0.066	—
	—	37	17	—	1	19.3	22.5	17 000	**25NQ3717AD-1**	—	—	32	1	0.056	—	—
	20	37	17	18	0.3	16.4	18.2	8 000	—	**NA4904UU**	22	35	0.3	—	0.078	IRM202518
	20	37	17	—	0.3	15.9	21.1	18 000	**RNA4904**	**NA4904**	22	35	0.3	0.058	0.081	IRM202517
	—	37	17	—	0.9	21.5	25.7	17 000	**RNA4904ARD-1**	—	—	32	0.9	0.054	—	—
	20	37	23	—	0.3	28.0	36.1	17 000	**RNA5904**	**NA5904**	22	35	0.3	0.073	0.104	IRM202523
	20	37	30	—	0.3	35.4	48.9	17 000	**RNA6904**	**NA6904**	22	35	0.3	0.096	0.137	IRM202530
26	22	34	16	—	0.3	14.1	24.2	18 000	**NQ26/16**	**NQI22/16**	24	32	0.3	0.037	0.056	—
	—	34	20	—	0.3	14.2	28.9	18 000	**26NQ3420**	—	—	32	0.3	0.042	—	—
	—	47	17	—	0.6	21.4	23.6	16 000	**26NQ4717**	—	—	43	0.6	0.113	—	—
	—	52	14	—	0.6	18.0	18.9	16 000	**26NQ5214**	—	—	48	0.6	0.136	—	—
28	—	37	20	—	0.3	20.6	34.7	16 000	**NQ283720D**	—	—	35	0.3	0.056	—	—
	—	37	30	—	0.3	29.1	54.1	16 000	**NQ28/30**	—	—	35	0.3	0.083	—	—
	22	39	17	—	0.3	17.8	25.4	16 000	**RNA49/22**	**NA49/22**	24	37	0.3	0.056	0.086	IRM222817
	—	39	17	—	0.3	21.8	29.8	16 000	**RNA49/22R**	—	—	37	0.3	0.055	—	—
	22	39	30	—	0.3	36.8	53.1	16 000	**RNA69/22**	**NA69/22**	24	37	0.3	0.100	0.154	IRM222830
	—	40	17	—	0.3	15.1	27.4	16 000	**28NQ4017**	—	—	38	0.3	0.068	—	—
	—	40	20	—	0.3	20.6	34.7	16 000	**28NQ4020**	—	—	38	0.3	0.087	—	—



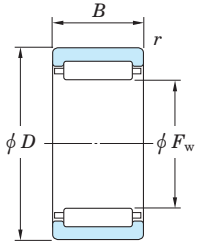
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W 29 ~ 37 mm

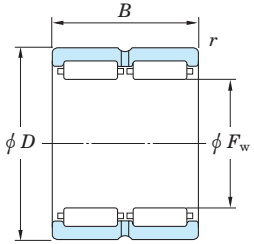
Without inner ring



RNA49, RNA59

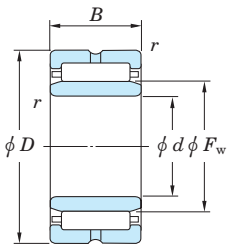


NQ, NQS

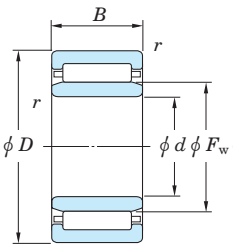


RNA69

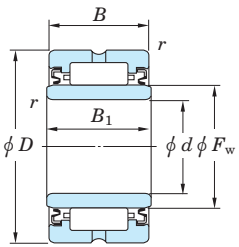
With inner ring



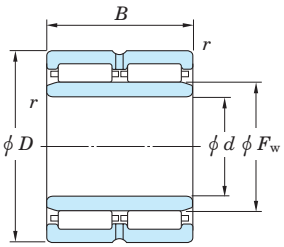
NA49, NA59



NQI, NQIS

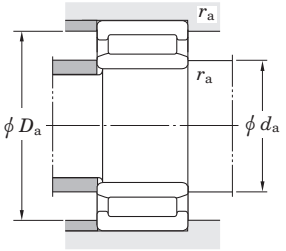


NA49...UU



NA69

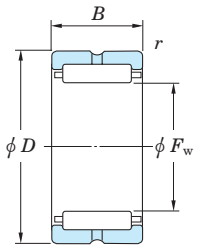
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
29	25	38	15	—	0.6	14.6	22.6	16 000	—	**NQI25/15**	29	34	0.6	—	0.061	—
	—	38	20	—	0.6	20.4	34.8	16 000	**NQ29/20**	—	—	34	0.6	0.056	—	—
	25	38	30	—	0.3	28.9	54.3	16 000	**NQ29/30**	**NQI25/30**	27	36	0.3	0.085	0.125	—
30	—	40	20	—	0.3	23.7	37.5	15 000	**NQ30/20**	—	—	38	0.3	0.066	—	—
	—	40	30	—	0.3	33.5	58.5	15 000	**NQ30/30**	—	—	38	0.3	0.099	—	—
	25	42	17	18	0.3	18.4	22.4	6 600	—	**NA4905UU**	27	40	0.3	—	0.092	IRM253018
	25	42	17	—	0.3	18.6	27.4	15 000	**RNA4905**	**NA4905**	27	40	0.3	0.065	0.096	IRM253017
	25	42	17	—	0.3	24.2	31.7	15 000	**RNA4905R**	**NA4905R**	27	40	0.3	0.065	0.092	IRM253017
	25	42	23	—	0.3	31.7	44.9	15 000	**RNA5905**	**NA5905**	27	40	0.3	0.085	0.124	IRM253023
	—	42	30	—	0.6	40.1	60.7	15 000	**NQ304230**	—	—	38	0.6	0.116	—	—
	25	42	30	—	0.3	40.1	60.7	15 000	**RNA6905**	**NA6905**	27	40	0.3	0.112	0.162	IRM253030
	25	44	25	25.5	0.3	36.0	48.8	14 000	—	**25NQI4425A**	27	42	0.3	—	0.161	—
32	28	42	20	—	0.3	24.3	39.4	14 000	**NQ32/20**	**NQI28/20**	30	40	0.3	0.070	0.098	—
	28	42	30	—	0.3	34.4	61.6	14 000	**NQ32/30**	**NQI28/30**	30	40	0.3	0.104	0.141	—
	28	45	17	—	0.3	25.0	33.8	14 000	**RNA49/28R**	**NA49/28R**	30	43	0.3	0.075	0.099	IRM283217
	25	47	22	—	0.3	31.2	41.4	14 000	**NQS32/22**	**NQIS25/22**	27	45	0.3	0.123	0.167	—
35	—	45	14	—	0.6	16.9	29.0	13 000	**NQ354514**	—	—	41	0.6	0.055	—	—
	30	45	20	—	0.3	24.7	41.4	13 000	—	**NQI30/20**	32	43	0.3	—	0.108	—
	30	47	17	18	0.3	19.5	25.3	5 700	—	**NA4906UU**	32	45	0.3	—	0.105	IRM303518
	30	47	17	17	0.3	20.0	31.6	13 000	**RNA4906D**	**NA4906D**	32	45	0.3	0.081	0.114	IRM303517D
	30	47	17	—	0.3	26.4	34.4	13 000	**RNA4906R**	**NA4906R**	32	45	0.3	0.070	0.103	IRM303517
	30	47	23	—	0.3	33.8	51.0	13 000	**RNA5906**	**NA5906**	32	45	0.3	0.096	0.141	IRM303523
	—	47	30	—	0.3	42.7	69.0	13 000	**RNA6906**	—	—	45	0.3	0.131	—	—
	—	48	24	—	0.3	33.9	51.3	13 000	**35NQ4824D**	—	—	46	0.3	0.123	—	—
37	32	47	20	—	0.3	26.0	45.1	13 000	**NQ37/20**	**NQI32/20**	34	45	0.3	0.079	0.114	—
	—	47	20	—	0.3	26.0	45.1	13 000	**NQ37/20D**	—	—	45	0.3	0.079	—	—



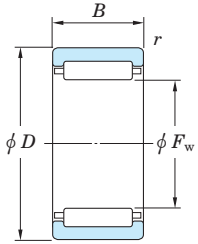
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W 38 ~ 48 mm

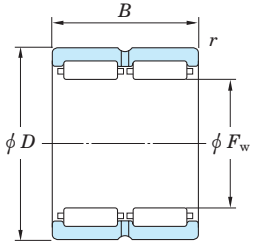
Without inner ring



RNA49, RNA59

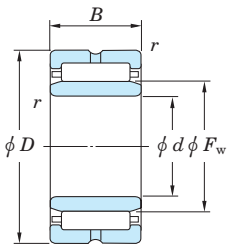


NQ, NQS

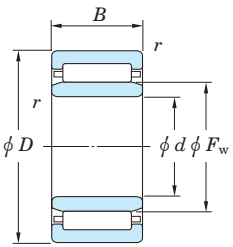


RNA69

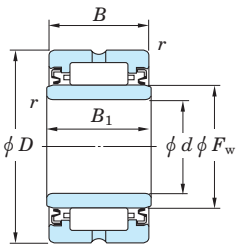
With inner ring



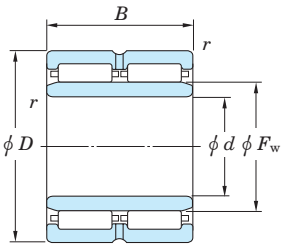
NA49, NA59



NQI, NQIS

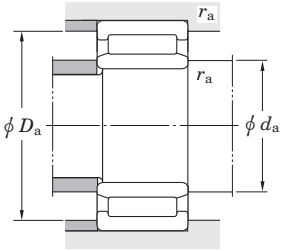


NA49...UU



NA69

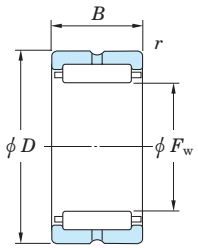
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
38	—	47	20	—	0.3	23.6	45.8	12 000	**38NQ4720**	—	—	45	0.3	0.073	—	—
	—	52	35	—	1	49.3	84.7	12 000	**38NQ5235**	—	—	47	1	0.203	—	—
40	—	48	20	—	0.3	20.9	39.8	12 000	**NQ404820**	—	—	46	0.3	0.064	—	—
	—	50	15	—	0.3	21.0	35.1	12 000	**NQ40/15AD**	—	—	48	0.3	0.063	—	—
	35	50	20	—	0.3	27.2	48.8	12 000	**NQ40/20**	**NQI35/20**	37	48	0.3	0.085	0.129	—
	35	50	30	—	0.3	39.8	79.8	12 000	**NQ40/30**	**NQI35/30**	37	48	0.3	0.120	0.192	—
	—	52	20	—	0.6	31.9	49.3	11 000	**RNA49/32R-1**	—	—	48	0.6	0.098	—	—
	—	52	30	—	0.6	47.0	81.0	11 000	**40NQ5230**	—	—	48	0.6	0.148	—	—
42	—	52	20	—	0.6	28.6	53.3	11 000	**NQ425220D**	—	—	48	0.6	0.087	—	—
	35	55	20	21	0.6	29.0	40.9	4 700	—	**NA4907UU**	39	51	0.6	—	0.173	IRM354221
	35	55	20	—	0.6	26.9	49.0	11 000	**RNA4907**	**NA4907**	39	51	0.6	0.122	0.186	IRM354220
	35	55	20	—	0.6	35.1	52.2	11 000	**RNA4907R**	**NA4907R**	39	51	0.6	0.104	0.168	IRM354220
	35	55	27	—	0.6	42.9	67.6	11 000	**RNA5907**	**NA5907**	39	51	0.6	0.138	0.225	IRM354227
	35	55	36	—	0.6	51.4	85.1	11 000	**RNA6907**	**NA6907**	39	51	0.6	0.182	0.297	IRM354236
43	38	53	30	30	0.6	41.3	85.9	10 000	—	**NQI38/30**	—	51	0.6	—	0.205	—
45	—	55	20	—	0.6	27.9	52.7	10 000	**NQ45/20**	—	—	51	0.6	0.100	—	—
	40	55	30	—	0.6	40.9	86.1	10 000	**NQ45/30**	**NQI40/30**	44	51	0.6	0.138	0.214	—
	—	58	20	—	0.6	36.0	55.0	10 000	**RNA49/38R-1**	—	—	54	0.6	0.116	—	—
47	42	57	20	—	0.6	29.0	56.4	10 000	—	**NQI42/20**	46	53	0.6	—	0.143	—
	42	57	30	—	0.6	44.0	96.1	10 000	—	**NQI42/30**	46	53	0.6	—	0.219	—
48	40	62	22	23	0.6	35.7	51.7	4 100	—	**NA4908UU**	44	58	0.6	—	0.235	IRM404823
	40	62	22	—	0.6	32.6	58.5	9 700	**RNA4908**	**NA4908**	44	58	0.6	0.157	0.249	IRM404822
	—	62	22	—	0.6	43.2	66.1	9 400	**RNA4908R-2**	—	—	58	0.6	0.142	—	—
	40	62	30	—	0.6	55.5	91.2	9 400	**RNA5908**	**NA5908**	44	58	0.6	0.187	0.313	IRM404830
	40	62	40	—	0.6	66.7	115.0	9 400	**RNA6908**	**NA6908**	44	58	0.6	0.256	0.415	IRM404840



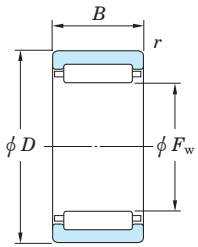
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W 50 ~ 63 mm

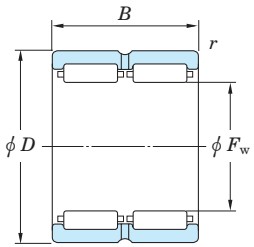
Without inner ring



RNA49, RNA59

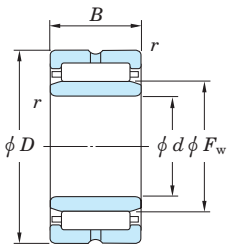


NQ, NQS

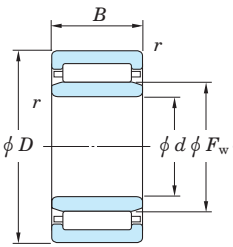


RNA69

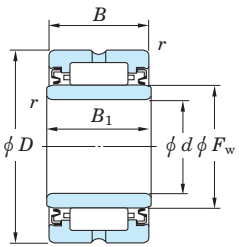
With inner ring



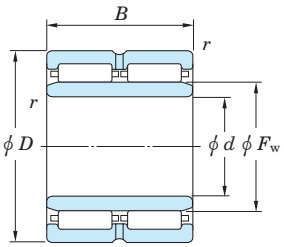
NA49, NA59



NQI, NQIS

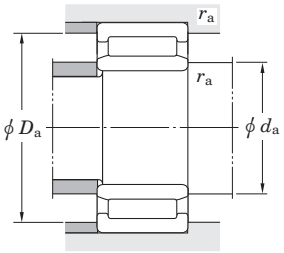


NA49...UU



NA69

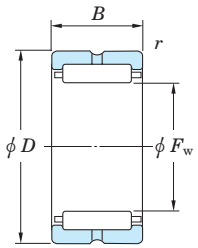
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
50	—	62	20	—	0.6	24.8	46.0	9 400	**NQ50/20A**	—	—	58	0.6	0.126	—	—
	45	62	25	—	0.6	41.9	82.5	9 300	—	**NQI45/25**	49	58	0.6	—	0.223	—
	45	62	35	—	0.6	58.2	126.0	9 300	—	**NQI45/35**	49	58	0.6	—	0.316	—
	—	65	25	—	0.6	48.3	77.8	9 100	**NQ506525**	—	—	61	0.6	0.190	—	—
52	45	68	22	23	0.6	37.7	56.8	3 800	—	**NA4909UU**	49	64	0.6	—	0.285	IRM455223
	45	68	22	—	0.6	33.2	61.9	9 000	**RNA4909**	**NA4909**	49	64	0.6	0.205	0.294	IRM455222
	45	68	22	—	0.6	45.8	72.9	8 800	**RNA4909R**	**NA4909R**	49	64	0.6	0.185	0.274	IRM455222
	45	68	30	—	0.6	58.9	101.0	8 800	**RNA5909**	**NA5909**	49	64	0.6	0.252	0.365	IRM455230
	45	68	40	—	0.6	70.7	127.0	8 800	**RNA6909**	**NA6909**	49	64	0.6	0.334	0.496	IRM455240
53	—	68	24.5	—	0.6	47.1	81.7	8 700	**NQ536825A**	—	—	64	0.6	0.207	—	—
55	—	67	20	—	0.6	24.1	46.2	8 600	**55NQ6720A**	—	—	63	0.6	0.136	—	—
	50	68	25	—	0.6	47.4	90.4	8 500	—	**NQI50/25**	54	64	0.6	—	0.255	—
	—	70	22	—	0.6	46.9	76.5	8 300	**RNA49/48R**	—	—	66	0.6	0.174	—	—
	—	72	14	—	0.6	12.5	19.6	8 600	**55NQ7214**	—	—	68	0.6	0.149	—	—
	45	72	22	—	0.6	44.6	71.6	8 300	**NQS55/22**	**NQIS45/22**	49	68	0.6	0.210	0.341	—
58	50	72	22	—	0.6	35.7	70.6	8 100	**RNA4910**	**NA4910**	54	68	0.6	0.191	0.298	IRM505822
	50	72	22	—	0.6	48.0	80.0	7 900	**RNA4910R**	**NA4910R**	54	68	0.6	0.172	0.276	IRM505822
	50	72	30	—	0.6	61.6	110.0	7 900	**RNA5910**	**NA5910**	54	68	0.6	0.221	0.375	IRM505830
	50	72	40	—	0.6	74.0	140.0	7 900	**RNA6910**	**NA6910**	54	68	0.6	0.291	0.497	IRM505840
60	—	72	25	—	0.6	45.4	97.3	7 900	**NQ60/25**	—	—	68	0.6	0.164	—	—
	—	75	22	—	0.6	49.1	83.4	7 700	**RNA49/52R**	—	—	71	0.6	0.188	—	—
63	55	80	25	—	1	44.4	87.2	7 500	**RNA4911**	**NA4911**	60	75	1	0.287	0.428	IRM556325
	55	80	25	—	1	58.4	99.0	7 300	**RNA4911R**	**NA4911R**	60	75	1	0.260	0.401	IRM556325
	55	80	34	—	1	75.6	138.0	7 300	**RNA5911**	**NA5911**	60	75	1	0.354	0.546	IRM556334
	55	80	45	—	1	86.7	165.0	7 300	**RNA6911**	**NA6911**	60	75	1	0.458	0.711	IRM556345



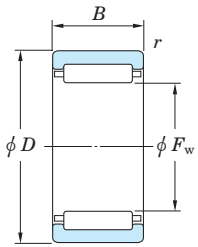
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W 65 ~ 105 mm

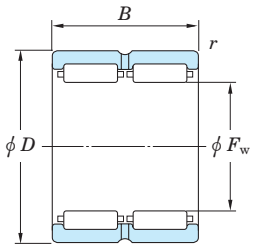
Without inner ring



RNA49, RNA59

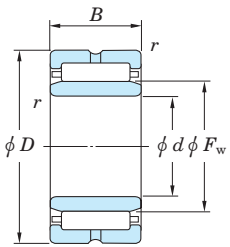


NQ, NQS

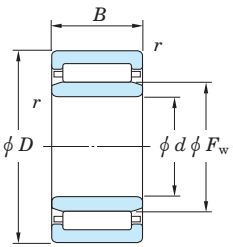


RNA69

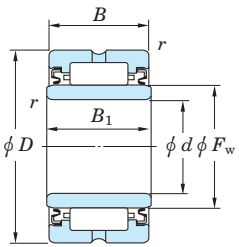
With inner ring



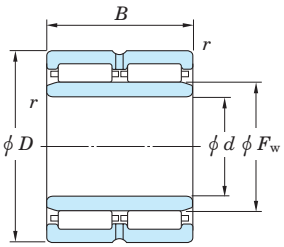
NA49, NA59



NQI, NQIS

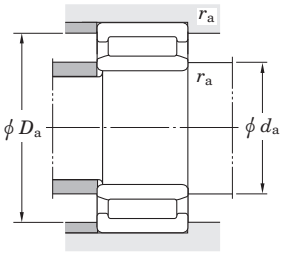


NA49...UU



NA69

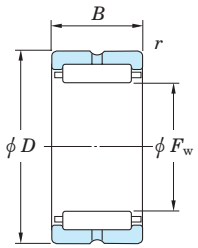
Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
65	—	82	25	—	1	59.9	103.0	7 100	**RNA49/58R**	—	—	77	1	0.277	—	—
68	60	85	25	—	1	45.8	93.3	6 900	**RNA4912**	**NA4912**	65	80	1	0.310	0.459	IRM606825
	60	85	34	—	1	79.2	150.0	6 800	**RNA5912**	**NA5912**	65	80	1	0.380	0.587	IRM606834
70	—	88	25	—	1	64.5	109.0	6 600	**RNA49/62**	—	—	83	1	0.298	—	—
72	65	90	25	—	1	66.1	114.0	6 400	**RNA4913**	**NA4913**	70	85	1	0.307	0.450	IRM657225
	65	90	34	—	1	85.4	158.0	6 400	**RNA5913**	**NA5913**	70	85	1	0.419	0.613	IRM657234
	65	90	45	—	1	98.4	190.0	6 400	**RNA6913**	**NA6913**	70	85	1	0.541	0.798	IRM657245
75	—	95	30	—	1	82.3	145.0	6 100	**RNA49/68**	—	—	90	1	0.437	—	—
80	70	100	30	—	1	86.4	157.0	5 700	**RNA4914**	**NA4914**	75	95	1	0.483	0.733	IRM708030
	70	100	40	—	1	107.0	207.0	5 700	**RNA5914**	**NA5914**	75	95	1	0.615	0.973	IRM708040
	70	100	54	—	1	132.0	271.0	5 700	**RNA6914**	**NA6914**	75	95	1	0.895	1.37	IRM708054
85	75	105	30	—	1	88.0	164.0	5 400	**RNA4915**	**NA4915**	80	100	1	0.507	0.773	IRM758530
	75	105	40	—	1	109.0	216.0	5 400	**RNA5915**	**NA5915**	80	100	1	0.644	1.03	IRM758540
	75	105	54	—	1	135.0	283.0	5 400	**RNA6915**	**NA6915**	80	100	1	0.866	1.44	IRM758554
90	80	110	30	—	1	91.6	176.0	5 100	**RNA4916**	**NA4916**	85	105	1	0.540	0.819	IRM809030
	80	110	40	—	1	114.0	232.0	5 100	**RNA5916**	**NA5916**	85	105	1	0.681	1.09	IRM809040
	80	110	54	—	1	140.0	304.0	5 100	**RNA6916**	**NA6916**	85	105	1	0.916	1.46	IRM809054
95	—	115	30	—	1.1	92.8	183.0	4 900	**RNA49/82**	—	—	108.5	1	0.537	—	—
100	85	120	35	—	1.1	110.0	230.0	4 600	**RNA4917**	**NA4917**	91.5	113.5	1	0.669	1.25	IRM8510035
	85	120	46	—	1.1	126.0	293.0	4 700	**RNA5917**	**NA5917**	91.5	113.5	1	0.952	1.65	IRM8510046
	85	120	63	—	1.1	165.0	390.0	4 600	**RNA6917**	**NA6917**	91.5	113.5	1	1.17	2.29	IRM8510063
105	90	125	35	—	1.1	111.0	238.0	4 400	**RNA4918**	**NA4918**	96.5	118.5	1	0.695	1.31	IRM9010535
	90	125	46	—	1.1	137.0	311.0	4 400	**RNA5918**	**NA5918**	96.5	118.5	1	0.898	1.70	IRM9010546
	90	125	63	—	1.1	167.0	403.0	4 400	**RNA6918**	**NA6918**	96.5	118.5	1	1.21	2.31	IRM9010563



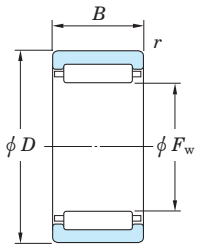
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

F_W 110 ~ 160 mm

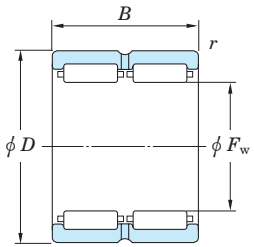
Without inner ring



RNA49, RNA59

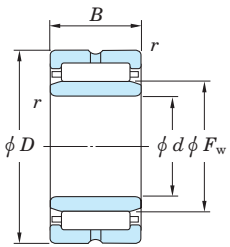


NQ, NQS

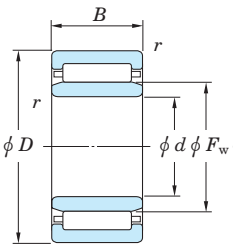


RNA69

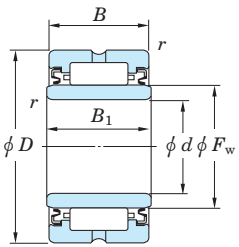
With inner ring



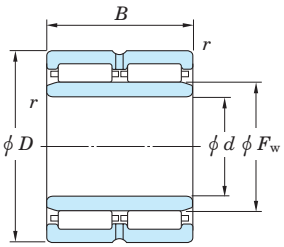
NA49, NA59



NQI, NQIS

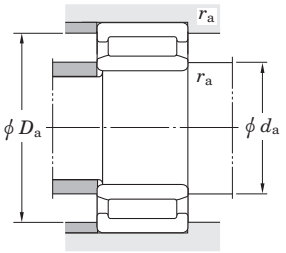


NA49...UU



NA69

Boundary dimensions (mm)						Basic load ratings (kN)		Limiting speeds [1] (min^{-1})	Bearing No.		Mounting dimensions (mm)			(Refer.) Mass (kg)		(Refer.) Applicable inner ring No.
F_w	d	D	B	B_1	r min.	C_r	C_{0r}	Oil lub.	Without inner ring	With inner ring	d_a min.	D_a max.	r_a max.	Without inner ring	With inner ring	
110	95	130	35	—	1.1	115.0	253.0	4 200	**RNA4919**	**NA4919**	101.5	123.5	1	0.728	1.37	IRM9511035
	95	130	46	—	1.1	141.0	331.0	4 200	**RNA5919**	**NA5919**	101.5	123.5	1	0.940	1.78	IRM9511046
	95	130	63	—	1.1	173.0	428.0	4 200	**RNA6919**	**NA6919**	101.5	123.5	1	1.27	2.43	IRM9511063
115	100	140	40	—	1.1	144.0	296.0	4 000	**RNA4920**	**NA4920**	106.5	133.5	1	1.160	1.86	IRM10011540
	100	140	54	—	1.1	189.0	418.0	4 000	**RNA5920**	**NA5920**	106.5	133.5	1	1.49	2.53	IRM10011554
125	110	150	40	—	1.1	149.0	317.0	3 700	**RNA4922**	**NA4922**	116.5	143.5	1	1.17	2.01	IRM11012540
	110	150	54	—	1.1	195.0	448.0	3 700	**RNA5922**	**NA5922**	116.5	143.5	1	1.690	2.74	IRM11012554
135	120	165	45	—	1.1	192.0	398.0	3 400	**RNA4924**	**NA4924**	126.5	158.5	1	1.75	2.78	IRM12013545
	120	165	60	—	1.1	244.0	564.0	3 400	**RNA5924**	**NA5924**	126.5	158.5	1	2.43	3.80	IRM12013560
150	130	180	50	—	1.5	225.0	508.0	3 000	**RNA4926**	**NA4926**	138	172	1.5	2.21	3.83	IRM13015050
	130	180	67	—	1.5	274.0	655.0	3 000	**RNA5926**	**NA5926**	138	172	1.5	3.000	5.09	IRM13015067
160	140	190	50	—	1.5	232.0	540.0	2 800	**RNA4928**	**NA4928**	148	182	1.5	2.350	4.08	IRM14016050
	140	190	67	—	1.5	283.0	696.0	2 800	**RNA5928**	**NA5928**	148	182	1.5	3.02	5.42	IRM14016067



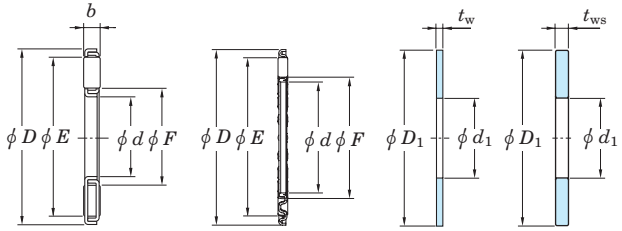
[Note] 1) Limiting speeds of bearing number NA49...UU indicates the value of sealed and grease lubricated bearings.
[Remark] Limiting speed of grease lubrication should be kept to unber 60 % of that for oil lubrication.

$d\ (d_1)$ 10 ~ 22.2 mm

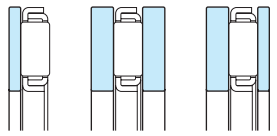
Separable type

Needle roller and cage thrust assembly

Race

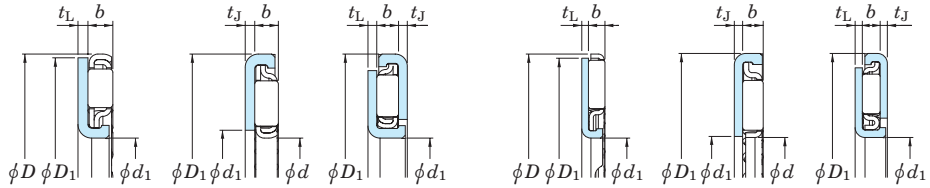


TP TV W WS



TPW...F TPWS...FF TPWWS...FF

Non-separable type



TPK...L TPK...J TPK...JL TVK...L TVK...J TVK...JL

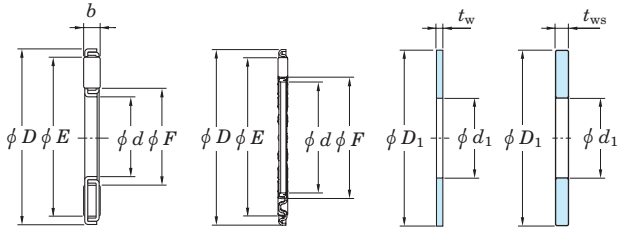
Boundary dimensions (mm)									Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.				Dimensions (mm)		(Refer.) Mass (g)			
d	d_1	D	D_1	b	t_w	t_J	t_{ws}	t_L	C_a	C_{0a}	Oil lub.	Needle roller and cage thrust ass'y Separable type	Needle roller and cage thrust ass'y Non-separable type	Thin plate race (pressed)	Thick plate race (machined)	E	F	TP TV	TPK TVK	(W)	(WS)
10	**10**	24	24	2	1.0	—	2	—	6.35	18.3	12 000	**TP1024-1**	—	**W1024F**	**WS1024F**	15.2	21.8	3.5	—	2.9	5.8
	—	23	—	2	—	—	—	—	8	24	12 000	**TV1023**	—	—	—	12.6	21.8	2.5	—	—	—
12	—	24	—	2	—	—	—	—	3.75	9	12 000	**TP1224**	—	—	—	14.1	22.1	3.0	—	—	—
	12	25.8	26	2	1.0	—	2	—	6.55	19.79	11 000	**TP1226B**	—	**W1226F**	**WS1226F**	17.3	23.5	3.6	—	3.3	6.6
	12	26	26	2	1.0	—	2	—	8.6	27.5	11 000	**TV1226**	—	**W1226F**	**WS1226BF**	14.6	23.8	3.8	—	3.3	6.6
14	**14**	27	27	2	1	—	2.75	—	6.55	19.8	11 000	**TP1427**	—	**W1427F**	**WS1427F**	24.5	16.5	3.6	—	3.2	9.0
15	**15**	32.3	32	2	1.0	—	—	—	11	42.1	10 000	**TP1532-1**	—	**W1532F**	—	22.3	30.3	6.1	—	4.6	—
	15	28	28	2	1.0	—	2	—	9.85	34.3	11 000	**TV1528**	—	**W1528F**	**WS1528F**	17.6	26.8	4.1	—	3.4	6.8
16	**16**	29	29	2	1.5	—	2.75	—	9.15	31.4	11 000	**TP1629**	—	**W1629AF**	**WS1629F**	26.5	18.5	4.4	—	5.4	9.9
17	**17**	30	30	2	0.8	—	2.75	—	9.40	32.9	10 000	**TP1730**	—	**W1730F**	**WS1730F**	27.5	19.5	4.4	—	3.0	10
	17	40	40	2.5	—	—	3	—	17.9	69.3	8 000	**TP1740**	—	—	**WS1740F**	36.5	22.7	11	—	—	24
	17	34	34	2.5	—	—	2.155	—	14.1	49.5	8 700	**TV1734**	—	—	**WS1734-2F**	21.1	32.5	8.2	—	—	11
18	**18**	31	31	2	1.0	—	2	—	9.65	34.4	10 200	**TP1831**	—	**W1831F**	**WS1831F**	20.4	28.4	5.0	—	3.9	7.8
—	**18.1**	31.6	31	2	—	—	—	0.8	7.45	25.2	10 000	—	**TPK1832L**	—	—	22.8	29.4	—	8	—	—
—	**18.75**	—	39.7	1.984	—	0.8	—	0.8	9.8	37.4	9 000	—	**TVK1940JL**	—	—	25	34.2	—	17	—	—
19.6	**21**	—	35.9	2	—	0.8	—	—	6	18.7	9 400	—	**TPK2036J-1**	—	—	21.8	28	—	10	—	—
20	**20**	35	35	2	1	—	2.75	—	13.2	53.6	9 600	**TP2035-1**	—	**W2035F**	**WS2035F**	32.5	22.9	5.9	—	5.1	14
20.9	—	32	—	2	—	—	—	—	8.4	29.7	10 000	**TP2132D**	—	—	—	23.5	29.7	4.6	—	—	—
21.9	—	34	—	2	—	—	—	—	8.05	28.6	9 700	**TP2234**	—	—	—	25	31.2	5.1	—	—	—
22	**22**	37	37	2	1	—	2.75	—	12.6	51.7	9 300	**TP2237-1**	—	**W2237F**	**WS2237F**	34.5	22.9	6.4	—	5.4	15
—	**22**	41	41	2	—	—	—	0.8	13.2	56.8	8 800	—	**TPK2241L**	—	—	28	38	—	15	—	—
22.2	—	36.1	—	1.984	—	—	—	—	9.95	38.2	9 500	**TP2236A-1**	—	—	—	25.3	33.3	6.1	—	—	—

$d\ (d_1)$ 22.7 ~ 32.9 mm

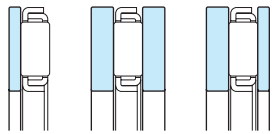
Separable type

Needle roller and cage thrust assembly

Race

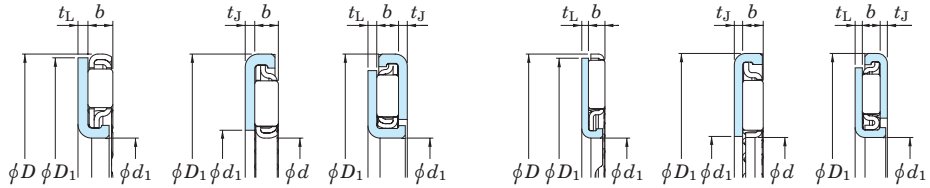


TP TV W WS



TPW...F TPWS...FF TPWWS...FF

Non-separable type



TPK...L TPK...J TPK...JL TVK...L TVK...J TVK...JL

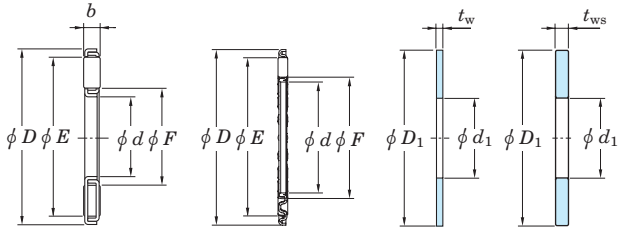
Boundary dimensions (mm)									Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.				Dimensions (mm)		(Refer.) Mass (g)			
d	d_1	D	D_1	b	t_w	t_J	t_{ws}	t_L	C_a	C_{0a}	Oil lub.	Needle roller and cage thrust ass'y Separable type	Needle roller and cage thrust ass'y Non-separable type	Thin plate race (pressed)	Thick plate race (machined)	E	F	TP TV	TPK TVK	(W)	(WS)
22.7	**22**	—	35.1	2	—	0.8	—	—	8.3	29.7	9 500	—	**TPK2235J**	—	—	25	31.2	—	9.1	—	—
22.8	**22**	—	37.95	1.984	—	0.8	—	—	10.6	40.9	9 200	—	**TVK2238J**	—	—	24	33.2	—	11	—	—
25	**25**	42	42	2	1.0	—	3	—	14.8	66.2	8 700	**TP2542**	—	**W2542F**	**WS2542KF**	28.6	39.2	8.6	—	7	21
	25	—	39.5	2.5	—	0.8	—	—	14	51.5	8 100	—	**TVK2540J**	—	—	26.2	35.4	—	12.4	—	—
25.8	**26**	—	42	1.984	—	0.8	—	—	12.8	54.4	8 800	—	**TVK2642J**	—	—	27	37	—	13	—	—
26	—	38.66	—	2	—	—	—	—	10.4	41.2	9 100	**TV2639-1**	—	—	—	28.2	37.4	5.5	—	—	—
—	**26**	—	43.4	1.984	—	0.8	—	0.8	11.5	49	8 600	—	**TPK2643JL**	—	—	30.6	38.6	—	19	—	—
28	—	41	—	2	—	—	—	—	9.4	37.4	8 800	**TP2841C**	—	—	—	31.5	37.7	6.7	—	—	—
	28	45	45	2	0.8	—	3	—	15.1	70.3	8 400	**TP2845**	—	**W2845F**	**WS2845F**	42.5	31.9	9.0	—	6.1	19
	28	—	42.6	2	—	0.8	—	—	9.4	37.4	8 700	—	**TPK2843AJ**	—	—	31.5	37.7	—	13	—	—
28.5	**28.5**	46.15	46.15	2	0.8	—	—	—	12.1	52.4	8 300	**TP2946A**	—	**W2946AF**	—	32.4	40.4	9.3	—	6.5	—
28.9	—	42	—	1.984	—	—	—	—	11.7	50.4	8 800	**TP2942A-1**	—	—	—	31.6	39.6	7.2	—	—	—
—	**29**	47.21	47	2	—	—	—	1	15.9	76	8 300	—	**TVK2947L**	—	—	34	45	—	18	—	—
—	**29**	48.4	49	3	—	—	—	0.8	21.8	87.4	6 600	—	**TVK2949L**	—	—	35	47	—	22	—	—
30	**30**	47	47	2	1.0	—	2	—	16.2	78.6	8 300	**TP3047-1**	—	**W3047F**	**WS3047F**	34	44.6	10	—	8.1	16.2
—	**30.1**	45.5	45.5	1.984	—	—	—	0.8	12.4	55.9	8 400	—	**TPK3046L**	—	—	35	42.6	—	14	—	—
—	**30.1**	—	47.3	1.984	—	0.8	—	0.8	12.4	55.9	8 300	—	**TPK3047JL-1**	—	—	35	42.6	—	21	—	—
—	**30.7**	—	46.02	1.984	—	0.8	—	0.8	12.5	56.2	8 400	—	**TPK3146JL-4**	—	—	34.5	42.3	—	19	—	—
—	**30.7**	—	46.43	1.984	—	1	—	0.8	12.5	56.2	8 300	—	**TPK3146JL-5**	—	—	34.5	42.3	—	21	—	—
—	**31.85**	45.1	45.2	1.984	—	—	—	0.8	12.1	54.7	8 400	—	**TVK3245L**	—	—	36.2	44.2	—	12	—	—
32	**32**	49	49	2	1	—	3	—	17.3	86.2	8 100	**TP3249**	—	**W3249F**	**WS3249F**	46.5	35.9	10	—	8.5	25
—	**32.9**	53.1	53.1	1.984	—	—	—	0.8	18.4	97.2	7 800	—	**TVK3353L**	—	—	39.8	51.8	—	20	—	—

$d\ (d_1)$ 33.5 ~ 45 mm

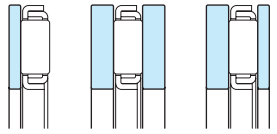
Separable type

Needle roller and cage thrust assembly

Race

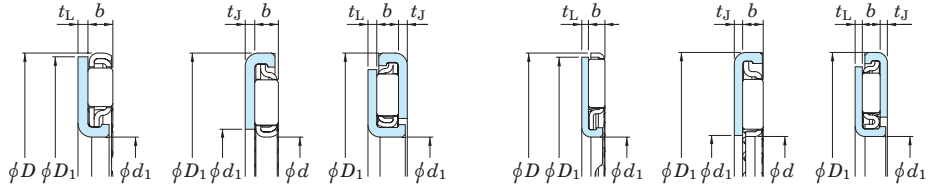


TP TV W WS



TPW...F TPWS...FF TPWWS...FF

Non-separable type



TPK...L TPK...J TPK...JL TVK...L TVK...J TVK...JL

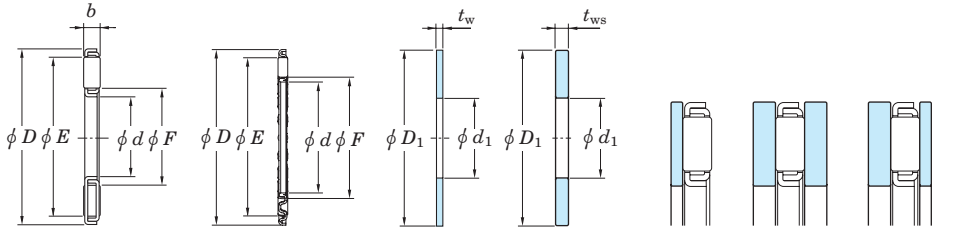
Boundary dimensions (mm)									Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.				Dimensions (mm)		(Refer.) Mass (g)			
d	d_1	D	D_1	b	t_w	t_J	t_{ws}	t_L	C_a	C_{0a}	Oil lub.	Needle roller and cage thrust ass'y Separable type	Needle roller and cage thrust ass'y Non-separable type	Thin plate race (pressed)	Thick plate race (machined)	E	F	TP TV	TPK TVK	(W)	(WS)
33.5	—	45	—	2	—	—	—	—	8.5	34.3	8 400	**TP3445A**	—	—	—	37	42.6	6.8	—	—	—
33.7	**33.8**	—	48.2	1.984	—	0.8	—	—	13.6	63	8 200	—	**TVK3448J-1**	—	—	35	44.2	—	14	—	—
—	**34**	—	51.4	2	—	0.8	—	0.8	12.6	58.1	7 900	—	**TPK3451JL**	—	—	38.6	46.6	—	23	—	—
34.65	**35**	52	52	2	1.0	—	3	—	17.1	86.9	7 800	**TP3552B**	—	**W3552F**	**WS3552AF**	38.4	49	11	—	9.1	27
	34.6	58.4	58.2	2	0.8	—	—	—	20.5	114	7 400	**TP3558**	—	**W3558F**	—	44	56	16	—	11	—
	34.6	58.4	58.2	2	0.8	—	—	—	22.4	128	7 400	**TP3558-1**	—	**W3558F**	—	42	56	16	—	11	—
—	**37.4**	57.3	57.3	1.984	—	—	—	0.8	19.3	106	7 500	—	**TVK3757L**	—	—	44	56	—	23	—	—
—	**38**	—	53	2	—	0.8	—	0.8	11.6	53.8	7 800	—	**TPK3853JL**	—	—	42.4	49	—	22	—	—
—	**38**	—	58	3	—	0.8	—	1	24.9	91.5	6 100	—	**TPK3858JL**	—	—	43.2	53.2	—	41	—	—
38.07	**38**	—	52	2	—	0.8	—	—	12	55.2	7 800	—	**TVK3852J-1**	—	—	39.8	47.8	—	15	—	—
38.15	**38.15**	55.29	55.29	1.984	0.8	—	3.0	—	19.9	108	7 600	**TP3855A**	—	**W3855F**	**WS3855F**	40.59	52.59	13	—	13	49
39.6	—	58.1	—	3	—	—	—	—	25.8	115	6 100	**TP4058-1**	—	—	—	43.3	55.3	22	—	—	—
40	**40**	60	60	3	1.0	—	2	—	23.5	103	6 000	**TP4060**	—	**W4060F**	**WS4060F**	44.4	56	23	—	12	24
41	—	68	—	9	—	—	—	—	75.8	222	3 200	**TP4168**	—	—	—	45.4	63.8	104	—	—	—
42	—	62	—	3	—	—	—	—	17.5	71.4	5 900	**TP4262**	—	—	—	47.8	56.4	23	—	—	—
—	**42.5**	—	61.2	1.984	—	0.8	—	0.8	15.5	81.7	7 300	—	**TVK4361JL-2**	—	—	47.6	56.8	—	29	—	—
—	**43.45**	—	61.2	1.984	—	0.8	—	0.8	14.6	74.9	7 300	—	**TVK4361JL**	—	—	47.6	56.8	—	29	—	—
—	**43.45**	—	61.74	1.984	—	1.1	—	0.8	14.6	74.9	7 200	—	**TVK4362JL**	—	—	47.6	56.8	—	32	—	—
45	**45.24**	62.19	62.2	1.984	0.8	—	2	—	20.3	115	7 200	**TV4562**	—	**W4562F**	**WS4562AF**	46.2	58.6	14	—	8.8	22
	45	56	56	2	1.0	—	2	—	9	39.6	7 600	**TP4556**	—	**W4556F**	**WS4556F**	47.5	53.7	8.4	—	6.8	13.6
	45	65	65	3	1.5	—	2	—	25.2	116	5 700	**TP4565A**	—	**W4565AF**	**WS4565F**	49.4	61	26	—	20	27

$d\ (d_1)$ 46.4 ~ 70.03 mm

Separable type

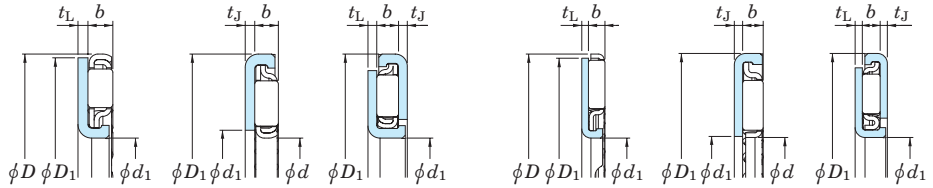
Needle roller and cage thrust assembly

Race



TP TV W WS TPW...F TPWS...FF TPWWS...FF

Non-separable type



TPK...L TPK...J TPK...JL TVK...L TVK...J TVK...JL

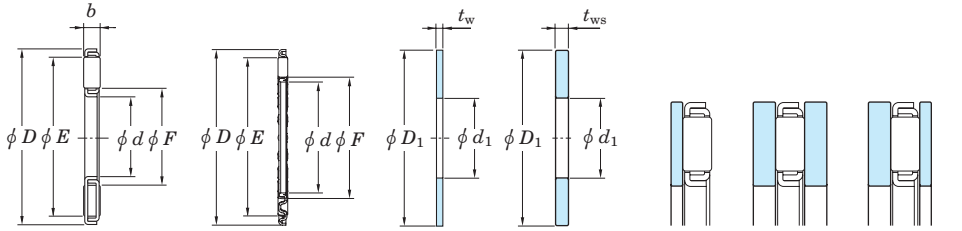
Boundary dimensions (mm)									Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.				Dimensions (mm)		(Refer.) Mass (g)			
d	d_1	D	D_1	b	t_w	t_J	t_{ws}	t_L	C_a	C_{0a}	Oil lub.	Needle roller and cage thrust ass'y Separable type	Needle roller and cage thrust ass'y Non-separable type	Thin plate race (pressed)	Thick plate race (machined)	E	F	TP TV	TPK TVK	(W)	(WS)
46.4	—	68	—	3.5	—	—	—	—	38.4	182	5 200	**TP4668-2**	—	—	—	49.4	65	35	—	—	—
—	**48.25**	—	72	3	—	0.8	—	0.8	30.9	129	5 400	—	**TVK4872JL**	—	—	54	66	—	56	—	—
49	**49.1**	70.65	71	1.984	0.8	—	1.84	—	18	105	6 800	**TV4971**	—	**W4971AF**	**WS4971F-1**	58.4	68.4	17	—	13	30
50	**50**	70	70	3	1.0	—	2	—	26.7	129	5 500	**TP5070**	—	**W5070F**	**WS5070F**	54.4	66	28	—	15	30
52	—	72.6	—	1.984	—	—	—	—	26	169	6 700	**TV5273**	—	—	—	56	71.2	19	—	—	—
—	**53.6**	—	69.6	1.984	—	0.8	—	0.8	15.9	89.3	6 800	—	**TPK5470JL-3**	—	—	57.4	65.2	—	32	—	—
—	**53.6**	—	70.18	1.984	—	1.1	—	0.8	15.9	89.3	6 800	—	**TPK5470JL-4**	—	—	57.4	65.2	—	36	—	—
55	**55**	78	78	3	1	—	4	—	32.4	171	5 200	**TP5578**	—	**W5578F**	**WS5578F**	60.4	74	33	—	19	75
55.48	**56.8**	—	69.6	1.984	—	0.8	—	—	15.9	89.3	6 800	—	**TPK5570J**	—	—	57.4	65.2	—	20	—	—
—	**55.9**	—	76	1.984	—	0.8	—	0.8	16.2	91.9	6 500	—	**TVK5676JL**	—	—	60.6	69.8	—	40	—	—
—	**55.9**	—	76.6	1.984	—	1.1	—	0.8	16.2	91.9	6 500	—	**TVK5677JL**	—	—	60.6	69.8	—	41	—	—
—	**57**	70.8	71	1.984	—	—	—	0.8	14.6	80.7	6 700	—	**TVK5771L**	—	—	61.8	69.8	—	20	—	—
60	**60**	85	85	3	1	—	5	—	38.3	218	5 000	**TP6085**	—	**W6085F**	**WS6085F**	81	65.4	40	—	22	112
—	**60.4**	—	78	2	—	0.8	—	0.8	17.9	107	6 400	—	**TPK6078JL**	—	—	65.6	73.6	—	38	—	—
62	—	80.25	—	2	—	—	—	—	23.3	151	6 300	**TP6280A**	—	—	—	65.2	76.8	20	—	—	—
—	**63**	77.73	78	2	—	—	—	0.8	13.6	75.5	6 400	—	**TVK6378L**	—	—	68	76	—	23	—	—
65	**65**	90	90	3	1	—	5	—	40.1	236	4 900	**TP6590**	—	**W6590F**	**WS6590F**	86	70.4	43	—	24	119
70	**70**	95	95	4	1	—	3	—	52.1	275	4 100	**TP7095**	—	**W7095F**	**WS7095F**	74.2	90.2	70	—	25	75
70.03	—	92.37	—	3.175	—	—	—	—	33.4	181	4 700	**TV7092A**	—	—	—	75	87.4	34	—	—	—

$d\ (d_1)$ 71.9 ~ 100 mm

Separable type

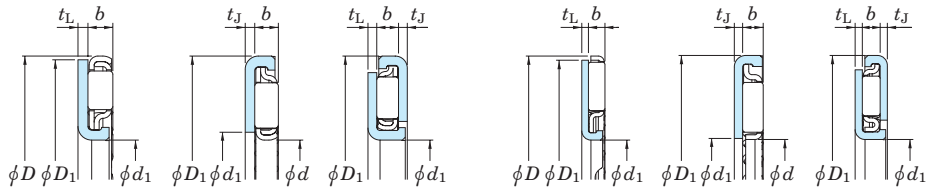
Needle roller and cage thrust assembly

Race



TP TV W WS TPW...F TPWS...FF TPWWS...FF

Non-separable type

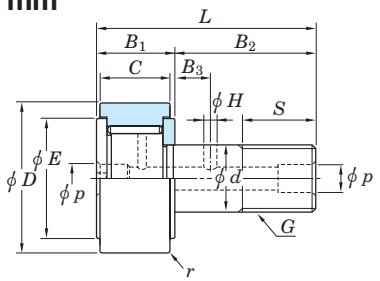


TPK...L TPK...J TPK...JL TVK...L TVK...J TVK...JL

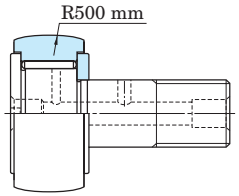
Boundary dimensions (mm)									Basic load ratings (kN)		Limiting speeds (min^{-1})	Bearing No.				Dimensions (mm)		(Refer.) Mass (g)			
d	d_1	D	D_1	b	t_w	t_J	t_{ws}	t_L	C_a	C_{0a}	Oil lub.	Needle roller and cage thrust ass'y Separable type	Needle roller and cage thrust ass'y Non-separable type	Thin plate race (pressed)	Thick plate race (machined)	E	F	TP TV	TPK TVK	(W)	(WS)
—	**71.9**	85.6	85.5	2	—	0.8	—	—	14.1	82.4	6 100	—	**TPK7286L**	—	—	76.5	83.1	—	27	—	—
—	**73.6**	—	89.6	2	—	0.8	—	0.8	10	52.6	6 000	—	**TPK7490JL**	—	—	78	84.6	—	41	—	—
75	**75**	100	100	4	2	—	5	—	46.7	243	4 000	**TP75100**	—	**W75100F**	**WS75100F**	95	79.4	63	—	54	135
80	**80**	105	105	4	1	—	6	—	47.8	255	3 900	**TP80105**	—	**W80105F**	**WS80105F**	100	84.4	67	—	29	171
82.68	—	114.3	—	9.525	—	—	—	—	117	453	2 400	**TP83114**	—	—	—	88.6	109	218	—	—	—
—	**83.1**	—	104	2	—	2	—	0.8	14.7	90	5 500	—	**TVK83104JL**	—	—	88.8	96.8	—	77	—	—
85	**85**	110	110	4	1	—	6	—	48.9	266	3 800	**TP85110**	—	**W85110F**	**WS85110F**	105	89.4	70	—	30	180
90	**90**	120	120	4	1	—	6	—	60.9	362	3 600	**TP90120**	—	**W90120F**	**WS90120F**	115	95.4	92	—	39	234
100	**100**	135	135	4	1	—	6	—	76.3	503	3 400	**TP100135**	—	**W100135F**	**WS100135F**	130	106.4	122	—	51	304

D 16 ~ 90 mm

Without seals

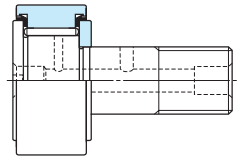


CM...M

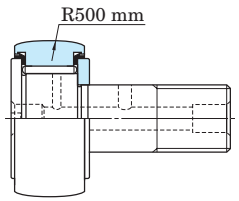


CM...RM

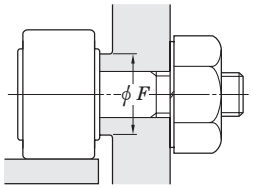
With seals



CM...UUM



CM...UURM



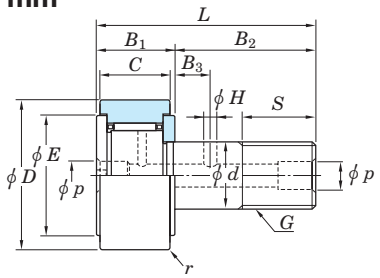
Boundary dimensions (mm)													Bearing No.				Clamping dia.	Track roller load ratings [2]		JIS Basic load ratings [3]		Track capacity [4]	Limiting speeds [5] (min^{-1})		Tightening torque [6]	(Refer.) Mass
Outer ring			Stud					Thread		Lubrication hole			Without seals		With seals											
D	C	r min.	d	L	B_1	B_2	E	G	S	B_3	H	p	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring	Crowned outer ring	F (mm)	C_t (kN)	P_{max} (kN)	C_r (kN)	C_{0r} (kN)	(kN)	Grease lub.	Oil lub.	(N·m) max.	(kg) (CM...M type)
16	11	0.3	6	28	12	16	12	M6×1	9	—	—	4 [1]	**CM6M**	**CM6RM**	**CM6UUM**	**CM6UURM**	10.5	5.85	2.25	7.00	8.25	3.55	9 200	13 000	3.0	0.019
19	11	0.3	8	32	12	20	15	M8×1.25	11	—	—	4 [1]	**CM8M**	**CM8RM**	**CM8UUM**	**CM8UURM**	12.5	6.70	5.20	8.05	10.4	4.25	8 200	12 000	7.3	0.029
22	12	0.5	10	36	13	23	17	M10×1.25	13	—	—	4	**CM10M**	**CM10RM**	**CM10UUM**	**CM10UURM**	15	7.80	9.30	9.35	12.3	5.20	7 200	10 000	15	0.044
26	12	0.5	10	36	13	23	17	M10×1.25	13	—	—	4	**CM10-1M**	**CM10-1RM**	**CM10-1UUM**	**CM10-1UURM**	15	7.80	9.30	9.35	12.3	6.15	7 200	10 000	15	0.056
30	14	1	12	40	15	25	22	M12×1.5	14	6	3	6	**CM12M**	**CM12RM**	**CM12UUM**	**CM12UURM**	19	11.0	13.9	13.2	18.0	7.75	5 900	8 300	26	0.089
32	14	1	12	40	15	25	22	M12×1.5	14	6	3	6	**CM12-1M**	**CM12-1RM**	**CM12-1UUM**	**CM12-1UURM**	19	11.0	13.9	13.2	18.0	8.25	5 900	8 300	26	0.099
35	18	1	16	52	19.5	32.5	27	M16×1.5	18	8	3	6	**CM16M**	**CM16RM**	**CM16UUM**	**CM16UURM**	24	16.8	25.7	20.2	33.9	12.0	4 600	6 400	64	0.171
40	20	1.5	18	58	21.5	36.5	32	M18×1.5	20	8	3	6	**CM18M**	**CM18RM**	**CM18UUM**	**CM18UURM**	27	19.2	31.9	23.1	38.2	14.6	4 000	5 700	92	0.248
47	24	1.5	20	66	25.5	40.5	36	M20×1.5	22	9	4	8	**CM20M**	**CM20RM**	**CM20UUM**	**CM20UURM**	30.5	25.6	39.1	30.7	57.2	21.2	3 600	5 000	130	0.393
52	24	1.5	20	66	25.5	40.5	36	M20×1.5	22	9	4	8	**CM20-1M**	**CM20-1RM**	**CM20-1UUM**	**CM20-1UURM**	30.5	25.6	39.1	30.7	57.2	23.5	3 600	5 000	130	0.455
62	29	1.5	24	80	30.5	49.5	44	M24×1.5	25	11	4	8	**CM24M**	**CM24RM**	**CM24UUM**	**CM24UURM**	37.5	38.8	55.7	46.5	92.0	34.6	2 900	4 100	220	0.810
72	29	2	24	80	30.5	49.5	44	M24×1.5	25	11	4	8	**CM24-1M**	**CM24-1RM**	**CM24-1UUM**	**CM24-1UURM**	37.5	38.8	55.7	46.5	92.0	38.7	2 900	4 100	220	1.05
80	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**CM30M**	**CM30RM**	**CM30UUM**	**CM30UURM**	51	64.0	95.2	76.8	159	53.3	2 100	3 000	440	1.64
85	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**CM30-1M**	**CM30-1RM**	**CM30-1UUM**	**CM30-1UURM**	51	64.0	95.2	76.8	159	56.6	2 100	3 000	440	1.81
90	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**CM30-2M**	**CM30-2RM**	**CM30-2UUM**	**CM30-2UURM**	51	64.0	95.2	76.8	159	60.0	2 100	3 000	440	2.00

[Notes] 1) Stud type track rollers with no lubrication hole on the stud threaded end.
2) To calculate track roller rated service life, use these track roller load rating (C_t).
Numerical values P_{max} refer to maximum load track roller can accommodate. If track roller is fixed in housing as with regular type bearings, JIS basic static load rating values (C_{0r}) may apply.
3) If track roller is fixed in housing, as with regular type bearings, rated service life can be calculated using JIS basic dynamic load rating values (C_r).
4) Track capacity is described earlier in this section (p. B 386).
The values listed in the table are the capacities of cylindrical track rollers.
5) Limiting speeds are applicable to without seals type.
6) Tightening torque apply when threaded portion is dry; if thread is wet with oil or other fluid, torque is half these values.

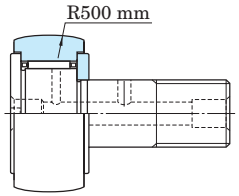
KM (caged type)

D 13 ~ 90 mm

Without seals

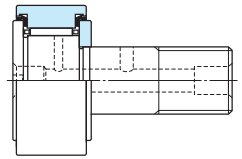


KM...M

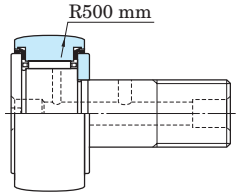


KM...RM

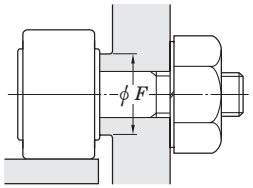
With seals



KM...UUM



KM...UURM



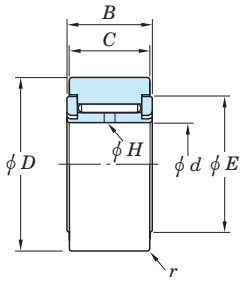
Boundary dimensions (mm)												Bearing No.				Clamping dia.	Track roller load ratings [2]		JIS Basic load ratings [3]		Track capacity [4]	Limiting speeds [5] (min^{-1})		Tightening torque [6]	(Refer.) Mass
Outer ring			Stud					Thread		Lubrication hole															
												Without seals		With seals											
D	C	r min.	d	L	B_1	B_2	E	G	S	B_3	H	p	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring	Crowned outer ring	F (mm)	C_t (kN)	P_{max} (kN)	C_r (kN)	C_{0r} (kN)	(kN)	Grease lub.	Oil lub.	(N·m) max.	(kg)
13	9	0.3	5	23	10	13	10	M5×0.8	7.5	—	—	3 [1]	**KM5M**	**KM5RM**	**KM5UUM**	**KM5UURM**	9.0	2.20	1.60	2.65	2.45	2.35	16 000	22 000	1.8	0.010
16	11	0.3	6	28	12	16	12	M6×1	9	—	—	4 [1]	**KM6M**	**KM6RM**	**KM6UUM**	**KM6UURM**	10.5	3.40	2.25	4.10	4.05	3.55	15 000	20 000	3.0	0.018
19	11	0.3	8	32	12	20	15	M8×1.25	11	—	—	4 [1]	**KM8M**	**KM8RM**	**KM8UUM**	**KM8UURM**	12.5	3.80	4.10	4.55	4.90	4.25	13 000	18 000	7.3	0.028
22	12	0.5	10	36	13	23	17	M10×1.25	13	—	—	4	**KM10M**	**KM10RM**	**KM10UUM**	**KM10UURM**	15	5.20	6.05	6.25	7.25	5.20	11 000	16 000	15	0.043
26	12	0.5	10	36	13	23	17	M10×1.25	13	—	—	4	**KM10-1M**	**KM10-1RM**	**KM10-1UUM**	**KM10-1UURM**	15	5.20	6.05	6.25	7.25	6.15	11 000	16 000	15	0.055
30	14	1	12	40	15	25	22	M12×1.5	14	6	3	6	**KM12M**	**KM12RM**	**KM12UUM**	**KM12UURM**	19	6.80	8.00	8.20	9.60	7.75	9 500	13 000	26	0.087
32	14	1	12	40	15	25	22	M12×1.5	14	6	3	6	**KM12-1M**	**KM12-1RM**	**KM12-1UUM**	**KM12-1UURM**	19	6.80	8.00	8.20	9.60	8.25	9 500	13 000	26	0.096
35	18	1	16	52	19.5	32.5	27	M16×1.5	18	8	3	6	**KM16M**	**KM16RM**	**KM16UUM**	**KM16UURM**	24	10.8	15.8	13.0	18.9	12.0	7 400	10 000	64	0.166
40	20	1.5	18	58	21.5	36.5	32	M18×1.5	20	8	3	6	**KM18M**	**KM18RM**	**KM18UUM**	**KM18UURM**	27	13.3	19.6	15.9	23.5	14.6	6 500	8 900	92	0.245
47	24	1.5	20	66	25.5	40.5	36	M20×1.5	22	9	4	8	**KM20M**	**KM20RM**	**KM20UUM**	**KM20UURM**	30.5	17.7	29.5	21.3	35.4	21.2	5 700	7 900	130	0.387
52	24	1.5	20	66	25.5	40.5	36	M20×1.5	22	9	4	8	**KM20-1M**	**KM20-1RM**	**KM20-1UUM**	**KM20-1UURM**	30.5	17.7	29.5	21.3	35.4	23.5	5 700	7 900	130	0.453
62	29	1.5	24	80	30.5	49.5	44	M24×1.5	25	11	4	8	**KM24M**	**KM24RM**	**KM24UUM**	**KM24UURM**	37.5	26.3	46.1	31.6	55.3	34.6	4 600	6 400	220	0.801
72	29	2	24	80	30.5	49.5	44	M24×1.5	25	11	4	8	**KM24-1M**	**KM24-1RM**	**KM24-1UUM**	**KM24-1UURM**	37.5	26.3	46.1	31.6	55.3	38.7	4 600	6 400	220	1.04
80	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**KM30M**	**KM30RM**	**KM30UUM**	**KM30UURM**	51	46.5	86.9	55.8	104	53.3	3 400	4 700	440	1.62
85	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**KM30-1M**	**KM30-1RM**	**KM30-1UUM**	**KM30-1UURM**	51	46.5	86.9	55.8	104	56.6	3 400	4 700	440	1.79
90	35	2	30	100	37	63	58	M30×1.5	32	15	4	8	**KM30-2M**	**KM30-2RM**	**KM30-2UUM**	**KM30-2UURM**	51	46.5	86.9	55.8	104	60.0	3 400	4 700	440	1.98

[Notes] 1) Stud type track rollers with no lubrication hole on the stud threaded end.
2) To calculate track roller rated service life, use these track roller load rating (C_t).
Numerical values P_{max} refer to maximum load track roller can accommodate. If track roller is fixed in housing as with regular type bearings, JIS basic static load rating values (C_{0r}) may apply.
3) If track roller is fixed in housing, as with regular type bearings, rated service life can be calculated using JIS basic dynamic load rating values (C_r).
4) Track capacity is described earlier in this section (p. B 386).
The values listed in the table are the capacities of cylindrical track rollers.
5) Limiting speeds are applicable to without seals type.
6) Tightening torque apply when threaded portion is dry; if thread is wet with oil or other fluid, torque is half these values.

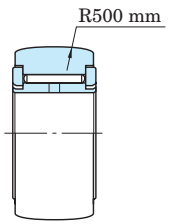
Yoke type track rollers (roller followers)
CYM (full complement type)

d 5 ~ 50 mm

Without seals

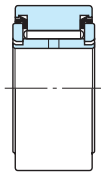


CYM...M

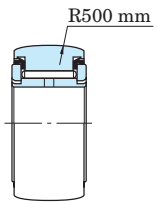


CYM...RM

With seals



CYM...UUM



CYM...UURM

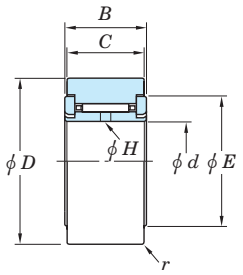
Boundary dimensions (mm)							Bearing No. Without seals		With seals		Track roller load ratings [2]		JIS Basic load ratings [3]		Track capacity [4]	Limiting speeds [5] (min^{-1})		(Refer.) Mass
d	D	B	C	r min.	E	H [1]	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring	Crowned outer ring	C_t (kN)	P_{max} (kN)	C_r (kN)	C_{0r} (kN)	(kN)	Grease lub.	Oil lub.	(CYM...M type) (kg)
5	16	12	11	0.3	12	2	**CYM5M**	**CYM5RM**	**CYM5UUM**	**CYM5UURM**	5.85	6.85	7.00	8.25	3.55	9 200	13 000	0.014
6	19	12	11	0.3	15	2	**CYM6M**	**CYM6RM**	**CYM6UUM**	**CYM6UURM**	6.70	8.70	8.05	10.4	4.25	8 200	12 000	0.021
8	24	15	14	0.5	18	2	**CYM8M**	**CYM8RM**	**CYM8UUM**	**CYM8UURM**	9.55	12.6	11.5	15.1	6.70	6 800	9 500	0.043
10	30	15	14	1	22	2	**CYM10M**	**CYM10RM**	**CYM10UUM**	**CYM10UURM**	11.1	15.1	13.3	18.1	7.75	5 900	8 300	0.062
12	32	15	14	1	24	2	**CYM12M**	**CYM12RM**	**CYM12UUM**	**CYM12UURM**	11.9	17.3	14.3	20.7	8.25	5 300	7 400	0.069
15	35	19	18	1	27	2	**CYM15M**	**CYM15RM**	**CYM15UUM**	**CYM15UURM**	16.8	28.2	20.2	33.9	12.0	4 600	6 400	0.105
17	40	21	20	1.5	32	2.4	**CYM17M**	**CYM17RM**	**CYM17UUM**	**CYM17UURM**	19.2	31.8	23.1	38.2	14.6	4 000	5 700	0.153
20	47	25	24	1.5	36	2.4	**CYM20M**	**CYM20RM**	**CYM20UUM**	**CYM20UURM**	25.6	47.7	30.7	57.3	21.2	3 600	5 000	0.255
25	52	25	24	1.5	41	2.4	**CYM25M**	**CYM25RM**	**CYM25UUM**	**CYM25UURM**	28.4	58.2	34.1	69.8	23.5	3 000	4 200	0.284
30	62	29	28	1.5	51	3.2	**CYM30M**	**CYM30RM**	**CYM30UUM**	**CYM30UURM**	41.5	88.8	49.8	107	33.3	2 400	3 400	0.476
35	72	29	28	2	58	3.2	**CYM35M**	**CYM35RM**	**CYM35UUM**	**CYM35UURM**	47.4	99.4	56.9	119	37.1	2 100	2 900	0.649
40	80	32	30	2	63	3.2	**CYM40M**	**CYM40RM**	**CYM40UUM**	**CYM40UURM**	58.3	122	70.0	147	44.7	1 900	2 600	0.845
45	85	32	30	2	69	3.2	**CYM45M**	**CYM45RM**	**CYM45UUM**	**CYM45UURM**	61.4	135	73.7	162	47.5	1 700	2 400	0.924
50	90	32	30	2	75	3.2	**CYM50M**	**CYM50RM**	**CYM50UUM**	**CYM50UURM**	64.2	148	77.0	177	50.3	1 600	2 200	0.984

[Notes] 1) Lubrication hole is provided on inner ring internal surface.
2) To calculate track roller rated service life, use these track roller load rating values (C_t).
Numerical values P_{max} refer to maximum load track roller can accommodate. If track roller is fixed in housing as with regular type bearings, JIS basic static load rating values (C_{0r}) may apply.
3) If track roller is fixed in housing, as with regular type bearings, rated service life can be calculated using JIS basic dynamic load rating values (C_r).
4) Track capacity is described earlier in this section (p. B 386).
The values listed in the above table are the capacities of cylindrical track rollers.
The track capacities of crowned track rollers are 80 % of these values.
5) Limiting speeds are as measured with no seals.

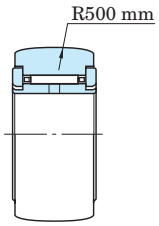
Yoke type track rollers (roller followers)
CXM (caged type)

d 5 ~ 50 mm

Without seals

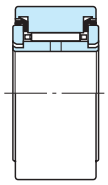


CXM...M

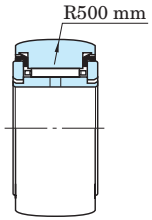


CXM...RM

With seals



CXM...UUM



CXM...UURM

Boundary dimensions (mm)							Bearing No.				Track roller load ratings [2]		JIS Basic load ratings [3]		Track capacity [4]	Limiting speeds [5] (min^{-1})		(Refer.) Mass
							Without seals		With seals									
d	D	B	C	r min.	E	H [1]	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring	Crowned outer ring	C_t (kN)	P_{max} (kN)	C_r (kN)	C_{0r} (kN)	(kN)	Grease lub.	Oil lub.	(CXM...M type) (kg)
5	16	12	11	0.3	12	2	**CXM5M**	**CXM5RM**	**CXM5UUM**	**CXM5UURM**	3.40	3.40	4.10	4.05	3.55	15 000	20 000	0.011
6	19	12	11	0.3	15	2	**CXM6M**	**CXM6RM**	**CXM6UUM**	**CXM6UURM**	3.80	4.10	4.55	4.90	4.25	13 000	18 000	0.018
8	24	15	14	0.5	18	2	**CXM8M**	**CXM8RM**	**CXM8UUM**	**CXM8UURM**	5.70	6.40	6.85	7.65	6.70	11 000	15 000	0.040
10	30	15	14	1	22	2	**CXM10M**	**CXM10RM**	**CXM10UUM**	**CXM10UURM**	6.80	8.00	8.20	9.60	7.75	9 500	13 000	0.060
12	32	15	14	1	24	2	**CXM12M**	**CXM12RM**	**CXM12UUM**	**CXM12UURM**	7.25	9.05	8.70	10.8	8.25	8 400	12 000	0.067
15	35	19	18	1	27	2	**CXM15M**	**CXM15RM**	**CXM15UUM**	**CXM15UURM**	10.8	15.8	13.0	18.9	12.0	7 400	10 000	0.102
17	40	21	20	1.5	32	2.4	**CXM17M**	**CXM17RM**	**CXM17UUM**	**CXM17UURM**	13.3	19.6	15.9	23.5	14.6	6 500	8 900	0.150
20	47	25	24	1.5	36	2.4	**CXM20M**	**CXM20RM**	**CXM20UUM**	**CXM20UURM**	17.7	29.5	21.3	35.4	21.2	5 700	7 900	0.252
25	52	25	24	1.5	41	2.4	**CXM25M**	**CXM25RM**	**CXM25UUM**	**CXM25UURM**	19.2	34.6	23.0	41.5	23.5	4 800	6 600	0.278
30	62	29	28	1.5	51	3.2	**CXM30M**	**CXM30RM**	**CXM30UUM**	**CXM30UURM**	28.4	53.9	34.0	64.7	33.3	3 900	5 300	0.465
35	72	29	28	2	58	3.2	**CXM35M**	**CXM35RM**	**CXM35UUM**	**CXM35UURM**	32.4	60.3	38.9	72.4	37.1	3 300	4 600	0.636
40	80	32	30	2	63	3.2	**CXM40M**	**CXM40RM**	**CXM40UUM**	**CXM40UURM**	41.4	78.1	49.7	93.7	44.7	3 000	4 100	0.825
45	85	32	30	2	69	3.2	**CXM45M**	**CXM45RM**	**CXM45UUM**	**CXM45UURM**	42.7	83.6	51.2	100	47.5	2 700	3 700	0.901
50	90	32	30	2	75	3.2	**CXM50M**	**CXM50RM**	**CXM50UUM**	**CXM50UURM**	45.5	93.9	54.6	113	50.3	2 500	3 400	0.960

[Notes] 1) Lubrication hole is provided on inner ring internal surface.
2) To calculate track roller rated service life, use these track roller load rating values (C_t).
Numerical values P_{max} refer to maximum load track roller can accommodate. If track roller is fixed in housing as with regular type bearings, JIS basic static load rating values (C_{0r}) may apply.
3) If track roller is fixed in housing, as with regular type bearings, rated service life can be calculated using JIS basic dynamic load rating values (C_r).
4) Track capacity is described earlier in this section (p. B 386).
The values listed in the above table are the capacities of cylindrical track rollers.
The track capacities of crowned track rollers are 80 % of these values.
5) Limiting speeds are as measured with no seals.

Miniature one-way clutches

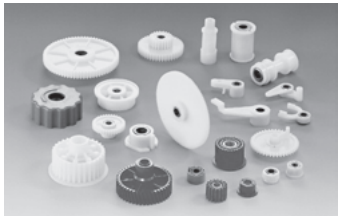
Miniature one-way clutches consist of a case carburizing steel drawn cup, metal or synthetic resin spring, synthetic resin cage and needle rollers.

They are used in clutch mechanisms of various machines. Use in office automation equipment such as copying and facsimile machines is especially common.

- Useful for making equipment smaller and lighter, due to a drawn cup made of thin sheet steel.
- Locking protrusions are provided around the drawn cup, so that creeping can be prevented without having to hold the surface dimensional accuracy precisely.
- Pre-lubricated with optimum grease, so that no lubrication is necessary under normal operating conditions.
- Unit products with a synthetic resin housing are also available.
  They are compatible with components of various types, such as gears, timing pulleys, cams and rubber rollers.
  Consult with JTEKT for further information.
  Refer to JTEKT catalog "miniature one-way clutch".

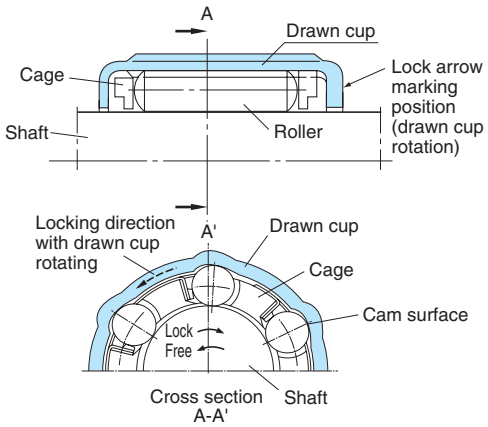
1WC series

EWC series



Various housings and unit products

Structure and principles



[When the clutch system works]

When the shaft rotates clockwise as in cross section A-A', rollers are locked while engaged with the drawn cup cam surfaces by the effect of springs (wedging of the shaft by the cam surfaces). The drawn cup is driven as a consequence.

[Clutch idle running]

When the shaft rotates counter-clockwise as in cross section A-A', rollers move away from the drawn cup cam surfaces and rotate freely.

Miniature one-way clutch types and characteristics

	1WC series (with metal springs)	EWC series (with synthetic resin springs)	
	Heavy load type	Heavy load type	Light load type
	1WC...	EWC...C	EWC...A
Torque capacity	Heavy load	Heavy load	Light load
Operating temperature range	– 10 to + 90℃	– 10 to + 70℃	
Locking life	Locking system can function more than one million. (Note : this estimation is valid as long as torque magnitude does not exceed the torque capacity shown in the specification table.)		
Insert molding	Possible	Impossible	
Delivery of clutch only	Possible		
Unit delivery	Possible		

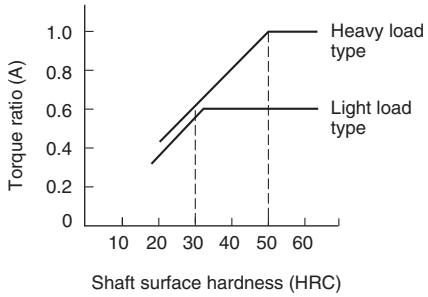
Shaft tolerance

	Heavy load type (1WC... , EWC...C)	Light load type (EWC...A)
Shaft tolerance class	h 8	
Surface hardness	50 HRC or harder	30 HRC or harder
Roughness (Ra)	0.3 a or less	0.8 a or less
Roundness and cylindricity	0.005 mm or less	

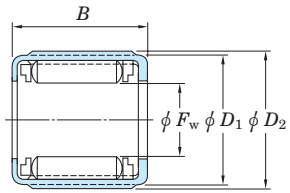
[Remarks] In some operating conditions, shafts need not be as accurate as shown here.
For example :

1. When clutch engaging accuracy is considered unimportant, or when a radial load or moment is not generated, the shaft diameter tolerance can be :
   shaft diameter 6 mm or less, and EWC0809 (C, A) : 0 to – 0.040 mm
   shaft diameter 8 mm or more : h 10
2. When the loaded torque is smaller than the torque capacity, shaft surface hardness can be determined as follows :
   * The diagram on the right shows approximate shaft surface hardness relative to torque ratio A.

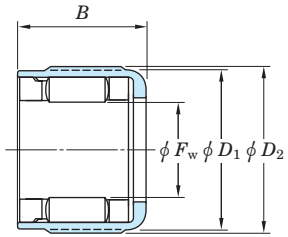
$$\text{Torque ratio (A)} = \frac{\text{Loaded torque}}{\text{Heavy load type torque capacity}}$$



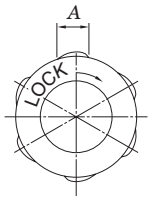
d 4 ~ 12 mm

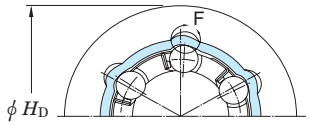


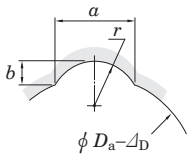
1WC series



EWC series







Details of section F

Shaft dia. (mm)	Boundary dimensions (mm)					Torque capacity	Designations			No. of [1] outer ring protrusion	Recommended housing dimensions (mm)						(Refer.) Mass (g)	
d	F_w	D_1	D_2	B	A	(N·m)	1WC series (With metal springs)	EWC series (With resin spring)			H_D	a	b	r	D_a	Δ_D [2]	1WC	EWC
4	4	8	8.4	6	2.6	0.08	—	**EWC0406A**		4	12	2.65	0.50	2	8	0.06	—	1.0
	4	8	8.4	6	2.6	0.15	—	**EWC0406C**		4	12	2.65	0.50	2	8	0.06	—	1.0
6	6	10	10.4	8	2.8	0.25	—	**EWC0608A**		6	14	2.8	0.57	2	10	0.08	—	1.7
	6	10	10.4	8	2.8	0.44	—	**EWC0608C**		6	14	2.8	0.57	2	10	0.08	—	1.7
	6	10	10.4	8	2.8	0.44	**1WC0608**	—		6	14	2.8	0.57	2	10	0.08	2.0	—
	6	10	10.4	12	2.8	0.88	**1WC0612**	—		6	14	2.8	0.57	2	10	0.08	3.0	—
8	8	12	12.4	9	2.6	0.49	—	**EWC0809A**		6	16	2.6	0.48	2	12	0.10	—	2.4
	8	12	12.4	9	2.6	0.88	—	**EWC0809C**		6	16	2.6	0.48	2	12	0.10	—	2.4
	8	14.2	15	12	3.6	1.18	—	**EWC0812A**		6	18.5	3.6	0.87	2.3	14.2	0.11	—	5.8
	8	14.2	15	12	3.6	1.96	—	**EWC0812C**		6	18.5	3.6	0.87	2.3	14.2	0.11	—	5.8
	8	14.2	15	12	3.6	1.96	**1WC0812**	—		6	18.5	3.6	0.87	2.3	14.2	0.11	7.0	—
	8	14.2	15	14.5	3.6	2.65	**1WC0815**	—		6	18.5	3.6	0.87	2.3	14.2	0.11	8.0	—
10	10	16	17	10	5	1.18	—	**EWC1010A**		6	21	5.0	1.20	3.2	16	0.13	—	6.0
	10	16	17	10	5	1.96	—	**EWC1010C**		6	21	5.0	1.20	3.2	16	0.13	—	6.0
	10	16	17	12	5	1.37	—	**EWC1012A**		6	21	5.0	1.20	3.2	16	0.13	—	6.8
	10	16	17	12	5	2.35	—	**EWC1012C**		6	21	5.0	1.20	3.2	16	0.13	—	6.8
	10	16	17	12	5	2.35	**1WC1012**	—		6	21	5.0	1.20	3.2	16	0.13	8.0	—
12	12	18	19	16	5.1	6.28	**1WC1216**	—		8	23	5.1	1.20	3.3	18	0.14	12	—

[Notes] 1) Provided at equal intervals.
2) Recommended interference when polyacetal resin housing is used.

Ball bearing units

Ball bearing units consist of pre-lubricated sealed ball bearings and a housing which varies in shape.

They are capable of aligning themselves efficiently using the spherical fitting surface between the bearing and housing, effectively preventing overloads due to misalignment.

Koyo ball bearing units are highly accurate and feature excellent load resistance. They are completely sealed, and provided with a relubrication feature.

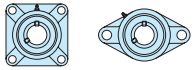
Ball bearing units without a relubrication feature are also available.

For details, refer to JTEKT separate catalog “Ball bearing units” (CAT. NO. B2007E).

Pillow block type

Bore diameter **12 – 140** mm

Flanged type



Bore diameter **12 – 140** mm

Flanged type with spigot joint

Bore diameter **12 – 140** mm

Take-up type

Bore diameter **12 – 140** mm

Cartridge type

Bore diameter **12 – 140** mm

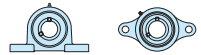
Light duty units

Bore diameter **12 – 40** mm

"Compact" series (made from light alloy)

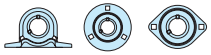
Bore diameter **10 – 30** mm

Stainless-series



Bore diameter **12 – 50** mm

Pressed steel units



Bore diameter **12 – 35** mm

Ball bearings for units

Bore diameter **10 – 140** mm

Typical types of ball bearing unit

(1) Cast iron units

Pillow block type
- ● UCP 2·X·3
- ▲ UKP 2·X·3
- ■ NAP 2

Square-flanged type
- ● UCF 2·X·3
- ▲ UKF 2·X·3
- ■ NANF 2

Square-flanged type with spigot joint
- ● UCFS 3
- ▲ UKFS 3

Rhombic-flanged type
- ● UCFL 2·X·3
- ▲ UKFL 2·X·3
- ■ NANFL 2

Round-flanged type with spigot joint
- ● UCFC 2·X
- ▲ UKFC 2·X
- ■ NAFC 2

Take-up type
- ● UCT 2·X·3
- ▲ UKT 2·X·3
- ■ NAT 2

Cartridge type
- ● UCC 2·X·3
- ▲ UKC 2·X·3
- ■ NAC 2

Special pillow block types

● UCPH 2 ● UCPA 2

Thick section pillow block type

- ● UCIP 2·3
- ▲ UKIP 2·3

Flanged types

● UCFA 2 ● UCFB 2

Hanger type

● UCHA 2

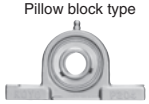
(2) Light duty units (cast iron)

Pillow block type	Rhombic-flanged type
	
■ BLP 2	■ BLF 2

(3) "Compact" series units (special light alloy)

Pillow block type	Rhombic-flanged type
	
● UP 0	● UFL 0

(4) Stainless-series units (stainless steel)

Pillow block type	Rhombic-flanged type
	
● UCSP 2...H1S6	● UCSFL 2...H1S6
	
● USP 0...S6	● USFL 0...S6

(5) Pressed steel units

● SBPP2

● SBPFL2

● SBPF2

(6) Take-up units with frame

● UCTH 2
(● SBNPTH 2
● SBPTH 2)

● UCTL 2
● UCTU 2
● UCTU 3

(7) Ball bearings for units

Cylindrical bore type
(with set screws)
- ● UC 2·X·3
- ● SB 2
- ● SU 0

Tapered bore type
(with adapter)
- ▲ UK 2·X·3

Cylindrical bore type
(with eccentric locking collar)
- ■ NA 2

Cylindrical bore type
(with set screws)
- ● RB 2

(Sealed deep groove ball bearings having an extended inner ring.)

Cylindrical bore type
(with set screws)
- ● ER 2

(Sealed deep groove ball bearings having an extended inner ring and an outer ring provided with a locating snap ring, lubrication groove and lubrication holes.)

[Note] This catalog includes the specifications of major units and bearings which are boxed in the table.
For further details, refer to a separate catalog.
Marks ●, ▲ and ■ indicate, respectively, that the unit or bearing is fixed with a set screw, adapter, or eccentric locking collar.

Tolerances	· Ball bearings ..... as specified in JIS B 1558 (Tables 1 and 2). (refer to Table 7-11, class 0 on p. A 70 for the tapered bore tolerance.) · Housings.....as specified in JIS B 1559. (the internal spherical diameter tolerance is given in Table 3. For other tolerances, refer to a separate catalog.)
Bearing radial internal clearance	As specified in JIS B 1520 (Table 10-2 on p. A 96). JTEKT provides cylindrical bore bearings with standard radial internal clearance. Tapered bore bearings are provided with a C 3 radial internal clearance in consideration of possible inner ring expansion caused by tightening of an adapter.
Recommended fits of inner ring and shaft (indicated by the tolerance class)	· Cylindrical bore bearings.....h 6, h 7, h 8, j 6 (k 6, k 7 and m 6 when heavy or impact load is to be supported.) · Tapered bore bearings.....h 8, h 9 · High-speed blower bearings (S5)...h 5, j 5
Rotational speed limits	See Table 4.
Allowable aligning angle	· 0.052 rad (3°) · For units with a cover, it is best if the misalignment is 0.017 rad (1°) or less to prevent the rubber seal lip on the cover and the shaft contact from distorting the seal lip.

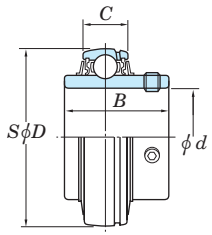
Table 1 Cylindrical bore bearings for units : inner ring tolerance Unit : μm

Nominal bore diameter d (mm)		UC, SA, NA, SU, SB, RB and ER types			Bearings for blower (S5)			Single inner (outer) ring width deviation Δ_{Bs} (Δ_{Cs})		Radial runout of assembled bearing inner ring K_{ia}
		Single plane mean bore diameter deviation Δ_{dmp}		Single plane bore diameter variation V_{dsp}	Single plane mean bore diameter deviation Δ_{dmp}		Single plane bore diameter variation V_{dsp}			
over	up to	upper	lower	max.	upper	lower	max.	upper	lower	max.
10 more	18	+ 15	0	10	+ 13	0	6	0	– 120	15
18	31.75	+ 18	0	12	+ 13	0	6	0	– 120	18
31.75	50.8	+ 21	0	14	+ 13	0	10	0	– 120	20
50.8	80	+ 24	0	16	+ 15	0	10	0	– 150	25
80	120	+ 28	0	19	+ 18	0	14	0	– 200	30
120	180	+ 33	0	22	+ 23	0	14	0	– 250	35

Table 2 Ball bearings for units : outer ring tolerance Unit : μm

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

[Note] The lower value of mean outside diameter deviation does not apply to the sides of outer rings up to the extent of a quarter of the outer ring width from the side faces.



UC type

Table 3 Housing bore internal spherical diameter tolerance Unit : μm

Nominal spherical bore diameter D_a (mm)		Tolerance class H		Tolerance class J		Tolerance class K	
		Deviation of spherical bearing seat dia. Δ_{Dam}		Deviation of spherical bearing seat dia. Δ_{Dam}		Deviation of spherical bearing seat dia. Δ_{Dam}	
over	up to	upper	lower	upper	lower	upper	lower
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.

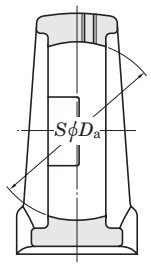


Table 4 Limiting speed of ball bearing units Unit : min^{-1}

Bore diameter No.	Standard Cold resistant type (D2K2)			Triple-lip sealed (L3)			For high speed rotation (K3 and S5)			Heat resistant type (D1K2)
	Diameter series			Diameter series			Diameter series			Diameter series
	2	X	3	2	X	3	2	X	3	2, X, 3
01	5 800			2 300			8 700			3 800
02	5 800			2 300			8 700			3 800
03	5 800			2 300			8 700			3 800
04	5 800	–	–	2 300	–		8 700	–	–	3 800
05	5 100	4 300	4 600	2 100	960		7 700	6 400	6 700	3 000
06	4 300	3 700	3 900	960	830	–	6 400	5 500	5 800	2 500
07	3 700	3 300	3 400	830	750	770	5 500	5 000	5 100	2 100
08	3 300	3 100	3 100	750	690	690	5 000	4 600	4 600	1 900
09	3 100	2 800	2 700	690	640	620	4 600	4 300	4 100	1 700
10	2 800	2 500	2 400	640	570	550	4 300	3 800	3 700	1 500
11	2 500	2 300	2 300	570	520	510	3 800	3 500	3 400	1 400
12	2 300	2 200	2 100	520	490	470	3 500	3 200	3 100	1 300
13	2 200	2 100	1 900	490	460	440	3 200	3 100	2 900	1 200
14	2 100	2 000	1 800	460	440	410	3 100	2 900	2 700	1 100
15	2 000	1 800	1 700	440	410	380	2 900	2 700	2 600	1 000
16	1 800	1 700	1 600	410	380	360	2 700	2 600	2 400	940
17	1 700	1 600	1 500	380	360	340	2 600	2 400	2 300	880
18	1 600	1 500	1 400	360	340	320	2 400	2 300	2 100	830
19		–	1 400		–	310		–	2 000	790
20		1 300	1 300		300	280		2 000	1 900	750
21		–	1 200		–	270		–	1 800	710
22			1 100			250			1 700	680
24			1 100			240			1 600	630
26			1 000			220			1 500	580
28			910			200			1 400	540

[Remarks] 1. The rotational speed limits of units with a cover are 80 % of the values given in the table above.
2. When bearings are fit loosely, rotational speed limits should be compensated for by the fitting coefficient given below.

Bearing type	Fitting coefficient					
	Shaft tolerance class					
	h5, j5	j6	h6	h7	h8	h9
Standard	–	1.0	1.0	0.8	0.5	0.2
Triple-lip sealed (L3)	–	–	–	1.0	1.0	0.9
For high speed rotation (K3)	–	1.0	0.8	0.6	–	–
For blower (S5)	1.0	–	0.8	0.6	–	–
Heat-resistant type B (D1K2)	–	–	–	1.0	1.0	0.7

[Recommended shaft design]

Table 5 Shaft fits for cylindrical bore bearing -Clearance fit or transition fit-

Unit : μm

Shaft diameter (mm)		Tolerance of shaft							
		j6		h6		h7		h8	
over	up to	upper	lower	upper	lower	upper	lower	upper	lower
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
Operating speed dn 1)		120 000 over		100 000 over 120 000 up to		60 000 over 100 000 up to		60 000 up to	

[Note] 1) $dn = d$ (Bearing bore, mm) × n (Rotating speed, min^{-1})

Table 6 Shaft fits for cylindrical bore bearing -Transition fit or Interference fit-

Unit : μm

Shaft diameter (mm)		Tolerance of shaft					
		k6		k7		m6	
over	up to	upper	lower	upper	lower	upper	lower
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 7 Shaft fits for bearings for blower

Unit : μm

Shaft diameter (mm)		Tolerance of shaft			
		h5		j5	
over	up to	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

Table 8 Shaft fits for tapered bore bearing

Unit : μm

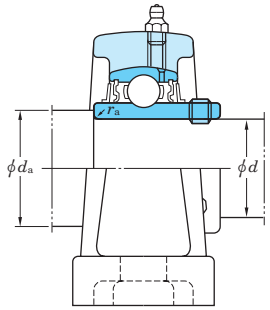
Shaft diameter (mm)		Tolerance of shaft			
		h8		h9	
over	up to	upper	lower	upper	lower
10	18	0	− 27	0	− 43
18	30	0	− 33	0	− 52
30	50	0	− 39	0	− 62
50	80	0	− 46	0	− 74
80	120	0	− 54	0	− 87
120	180	0	− 63	0	− 100

Table 9 Recommended tolerances of shaft used for ball bearing units

Unit : μm

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

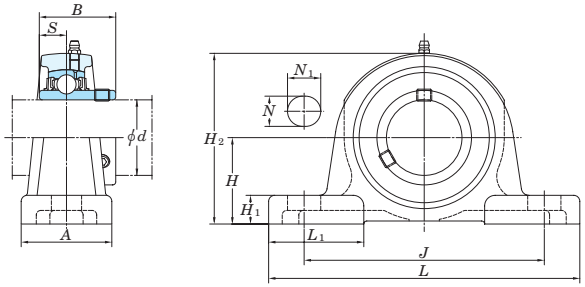
Table 10 Shaft shoulder dia. and fillet radious



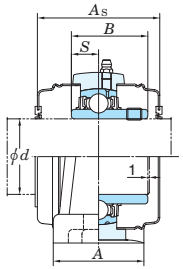
Unit : μm

Bore No.	Nominal bore dia.	UC200, UCX00		UC300	
		d_a	r_a (max.)	d_a	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

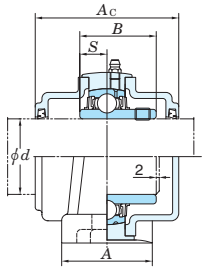
Ball bearing units
pillow block type
UCP (with set screws)
d 12 ~ (55) mm



Pressed steel covers



Cast iron covers



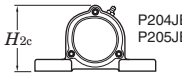
Tolerance for housing

unit : mm

housing No.			Δ_{Hs}
P203~P210	PX05~PX10	P305~P310	±0.15
P211~P218	PX11~PX18	P311~P318	±0.2
	PX20	P319~P328	±0.3

Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.

P204JE3, P205JE3 (with cast iron covers) are shown below.



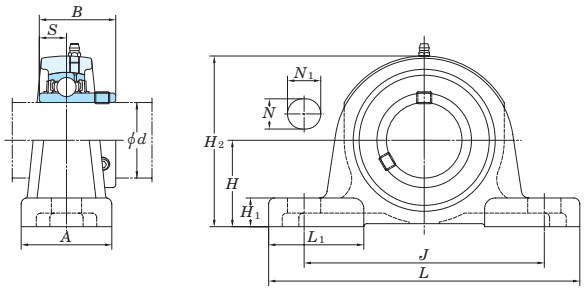
P204JE3 H_{2c} = 70 mm
P205JE3 H_{2c} = 77 mm

Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
															No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	H	L	A	J	N	N_1	H_1	H_2	L_1	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
12	30.2	127	38	95	13	18	12	60	38	31	12.7	M10	**UCP201**	P203	UC201	12.8	6.65	13.2	UCP201C	UCP201CD	—	—	44	—	0.63	—
15	30.2	127	38	95	13	18	12	60	38	31	12.7	M10	**UCP202**	P203	UC202	12.8	6.65	13.2	UCP202C	UCP202CD	—	—	44	—	0.61	—
17	30.2	127	38	95	13	18	12	60	38	31	12.7	M10	**UCP203**	P203	UC203	12.8	6.65	13.2	UCP203C	UCP203CD	—	—	44	—	0.60	—
20	33.3	127	38	95	13	18	13	64	38	31	12.7	M10	**UCP204**	P204	UC204	12.8	6.65	13.2	UCP204C	UCP204CD	UCP204FC	UCP204FCD	44	62	0.66	0.96
25	36.5	140	38	105	13	18	13	71	43	34.1	14.3	M10	**UCP205**	P205	UC205	14.0	7.85	13.9	UCP205C	UCP205CD	UCP205FC	UCP205FCD	48	66	0.80	1.2
	44.4	159	51	119	17	25	16	86	47	38.1	15.9	M14	**UCPX05**	PX05	UCX05	19.5	11.3	13.9	UCPX05C	UCPX05CD	—	—	52	—	1.5	—
	45	175	45	132	17	20	16	85	55	38	15	M14	**UCP305**	P305	UC305	21.2	10.9	12.6	—	—	UCP305C	UCP305CD	—	76	1.7	2.3
30	42.9	165	48	121	17	21	15	84	53	38.1	15.9	M14	**UCP206**	P206	UC206	19.5	11.3	13.9	UCP206C	UCP206CD	UCP206FC	UCP206FCD	52	70	1.3	1.8
	47.6	175	57	127	17	25	17	93	55	42.9	17.5	M14	**UCPX06**	PX06	UCX06	25.7	15.4	13.9	UCPX06C	UCPX06CD	—	—	59	—	2.1	—
	50	180	50	140	17	20	17	95	53	43	17	M14	**UCP306**	P306	UC306	26.7	15.0	13.3	—	—	UCP306C	UCP306CD	—	82	2.2	2.8
35	47.6	167	48	127	17	21	16	93	51	42.9	17.5	M14	**UCP207**	P207	UC207	25.7	15.4	13.9	UCP207C	UCP207CD	UCP207FC	UCP207FCD	59	78	1.6	2.3
	54	203	57	144	17	30	19	105	64	49.2	19	M14	**UCPX07**	PX07	UCX07	29.1	17.8	14.0	UCPX07C	UCPX07CD	—	—	68	—	2.7	—
	56	210	56	160	17	25	19	107	65	48	19	M14	**UCP307**	P307	UC307	33.4	19.3	13.2	—	—	UCP307C	UCP307CD	—	88	3.0	3.8
40	49.2	184	54	137	17	21	17	98	57	49.2	19	M14	**UCP208**	P208	UC208	29.1	17.8	14.0	UCP208C	UCP208CD	UCP208FC	UCP208FCD	68	86	2.0	2.8
	58.7	222	67	156	20	32	21	114	71	49.2	19	M16	**UCPX08**	PX08	UCX08	32.7	20.3	14.0	UCPX08C	UCPX08CD	—	—	68	—	3.5	—
	60	220	60	170	17	27	19	118	65	52	19	M14	**UCP308**	P308	UC308	40.7	24.0	13.2	—	—	UCP308C	UCP308CD	—	96	3.8	4.8
45	54	190	54	146	17	21	17	106	60	49.2	19	M14	**UCP209**	P209	UC209	32.7	20.3	14.0	UCP209C	UCP209CD	UCP209FC	UCP209FCD	68	88	2.2	3.0
	58.7	222	67	156	20	33	21	116	71	51.6	19	M16	**UCPX09**	PX09	UCX09	35.1	23.3	14.4	UCPX09C	UCPX09CD	—	—	73	—	3.7	—
	67	245	67	190	20	30	21	132	75	57	22	M16	**UCP309**	P309	UC309	48.9	29.5	13.3	—	—	UCP309C	UCP309CD	—	102	4.9	6.2
50	57.2	206	60	159	20	22	19	113	63	51.6	19	M16	**UCP210**	P210	UC210	35.1	23.3	14.4	UCP210C	UCP210CD	UCP210FC	UCP210FCD	73	97	2.9	3.9
	63.5	241	73	171	20	36	22	126	76	55.6	22.2	M16	**UCPX10**	PX10	UCX10	43.4	29.4	14.4	UCPX10C	UCPX10CD	—	—	75	—	4.6	—
	75	275	75	212	20	35	24	148	88	61	22	M16	**UCP310**	P310	UC310	62.0	38.3	13.2	—	—	UCP310C	UCP310CD	—	110	6.6	8.2
55	63.5	219	60	171	20	22	19	125	70	55.6	22.2	M16	**UCP211**	P211	UC211	43.4	29.4	14.4	UCP211C	UCP211CD	UCP211FC	UCP211FCD	75	99	3.6	4.8

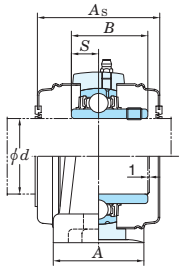
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3.
3) For more detailed information, refer to ball bearing for unit specification tables.

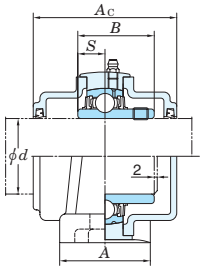
Ball bearing units
pillow block type
UCP (with set screws)
d (55) ~ 95 mm



Pressed steel covers



Cast iron covers



Tolerance for housing

unit : mm

housing No.			Δ_{Hs}
P203~P210	PX05~PX10	P305~P310	±0.15
P211~P218	PX11~PX18	P311~P318	±0.2
	PX20	P319~P328	±0.3

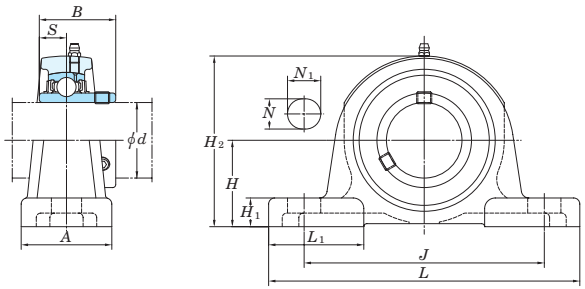
Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.

Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
															No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	H	L	A	J	N	N_1	H_1	H_2	L_1	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
55	69.8	260	79	184	25	36	28	139	83	65.1	25.4	M20	**UCPX11**	PX11	UCX11	52.4	36.2	14.4	UCPX11C	UCPX11CD	—	—	88	—	6.5	—
	80	310	80	236	20	38	27	158	90	66	25	M16	**UCP311**	P311	UC311	71.6	45.0	13.2	—	—	UCP311C	UCP311CD	—	114	7.9	9.7
60	69.8	241	70	184	20	25	22	138	76	65.1	25.4	M16	**UCP212**	P212	UC212	52.4	36.2	14.4	UCP212C	UCP212CD	UCP212FC	UCP212FCD	88	114	4.9	6.4
	76.2	286	83	203	25	40	28	152	88	65.1	25.4	M20	**UCPX12**	PX12	UCX12	57.2	40.1	14.4	UCPX12C	UCPX12CD	—	—	88	—	7.7	—
	85	330	85	250	25	38	29	167	103	71	26	M20	**UCP312**	P312	UC312	81.9	52.2	13.2	—	—	UCP312C	UCP312CD	—	124	9.5	11.8
65	76.2	265	70	203	25	30	25	150	78	65.1	25.4	M20	**UCP213**	P213	UC213	57.2	40.1	14.4	UCP213C	UCP213CD	UCP213FC	UCP213FCD	88	114	5.9	7.6
	76.2	286	83	203	25	40	28	155	88	74.6	30.2	M20	**UCPX13**	PX13	UCX13	62.2	44.1	14.5	UCPX13C	UCPX13CD	—	—	98	—	8.1	—
	90	340	90	260	25	38	32	176	110	75	30	M20	**UCP313**	P313	UC313	92.7	59.9	13.2	—	—	UCP313C	UCP313CD	—	122	10.7	12.8
70	79.4	266	72	210	25	30	28	156	78	74.6	30.2	M20	**UCP214**	P214	UC214	62.2	44.1	14.5	UCP214C	UCP214CD	UCP214FC	UCP214FCD	98	124	6.8	8.7
	88.9	330	89	229	27	50	32	171	98	77.8	33.3	M22	**UCPX14**	PX14	UCX14	67.4	48.3	14.5	UCPX14C	UCPX14CD	—	—	98	—	10.2	—
	95	360	90	280	27	40	35	186	110	78	33	M22	**UCP314**	P314	UC314	104	68.2	13.2	—	—	UCP314C	UCP314CD	—	124	12.4	14.7
75	82.6	275	74	217	25	30	28	162	80	77.8	33.3	M20	**UCP215**	P215	UC215	67.4	48.3	14.5	UCP215C	UCP215CD	UCP215FC	UCP215FCD	98	124	7.4	9.3
	88.9	330	89	229	27	50	32	175	99	82.6	33.3	M22	**UCPX15**	PX15	UCX15	72.7	53.0	14.6	UCPX15C	UCPX15CD	—	—	108	—	10.8	—
	100	380	100	290	27	40	35	198	107	82	32	M22	**UCP315**	P315	UC315	113	77.2	13.2	—	—	UCP315C	UCP315CD	—	134	14.8	17.3
80	88.9	292	78	232	25	35	32	174	86	82.6	33.3	M20	**UCP216**	P216	UC216	72.7	53.0	14.6	UCP216C	UCP216CD	UCP216FC	UCP216FCD	108	138	9.0	11.4
	101.6	381	102	283	27	58	34	195	116	85.7	34.1	M22	**UCPX16**	PX16	UCX16	84.0	61.9	14.5	UCPX16C	UCPX16CD	—	—	112	—	15.3	—
	106	400	110	300	27	40	35	209	120	86	34	M22	**UCP316**	P316	UC316	123	86.7	13.3	—	—	UCP316C	UCP316CD	—	138	18.5	21.4
85	95.2	310	83	247	25	40	32	185	90	85.7	34.1	M20	**UCP217**	P217	UC217	84.0	61.9	14.5	UCP217C	UCP217CD	UCP217FC	UCP217FCD	112	142	10.8	13.5
	101.6	381	102	283	27	60	34	200	116	96	39.7	M22	**UCPX17**	PX17	UCX17	96.1	71.5	14.5	UCPX17C	UCPX17CD	—	—	122	—	16.1	—
	112	420	110	320	33	45	40	220	120	96	40	M27	**UCP317**	P317	UC317	133	96.8	13.3	—	—	UCP317C	UCP317CD	—	146	20.3	23.6
90	101.6	327	88	262	27	45	34	198	104	96	39.7	M22	**UCP218**	P218	UC218	96.1	71.5	14.5	UCP218C	UCP218CD	UCP218FC	UCP218FCD	122	152	13.9	17.0
	101.6	381	111	283	27	60	38	204	116	104	42.9	M22	**UCPX18**	PX18	UCX18	109	81.9	14.4	—	—	UCPX18C	UCPX18CD	—	158	19.1	22.5
	118	430	110	330	33	45	40	234	120	96	40	M27	**UCP318**	P318	UC318	143	107	13.3	—	—	UCP318C	UCP318CD	—	150	22.8	26.6
95	125	470	120	360	36	50	46	248	125	103	41	M30	**UCP319**	P319	UC319	153	119	13.3	—	—	UCP319C	UCP319CD	—	162	29.0	33.3

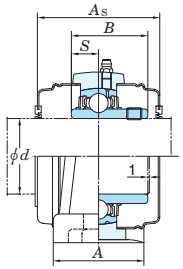
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3.
3) For more detailed information, refer to ball bearing for unit specification tables.

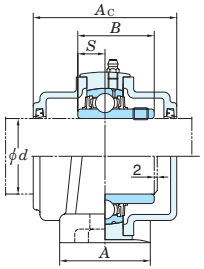
Ball bearing units
pillow block type
UCP (with set screws)
d 100 ~ 140 mm



Pressed steel covers



Cast iron covers



Tolerance for housing

unit : mm

housing No.			Δ_{Hs}
P203~P210	PX05~PX10	P305~P310	±0.15
P211~P218	PX11~PX18	P311~P318	±0.2
	PX20	P319~P328	±0.3

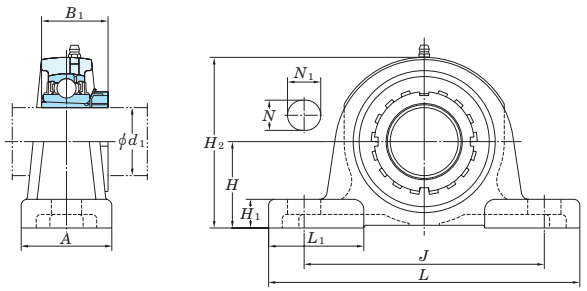
Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.

Shaft dia. (mm) d	Dimensions (mm) H	L	A	J	N	N_1	H_1	H_2	L_1	B	S	Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers: Pressed steel covers Open ends	Pressed steel covers Closed end	Cast iron covers Open ends	Cast iron covers Closed end	Cover dimensions (mm) A_s	A_c	(Refer.) Unit mass (kg): Pressed steel covers	Cast iron covers
100	127	432	121	337	33	65	45	245	126	117.5	49.2	M27	**UCPX20**	PX20	UCX20	133	105	14.4	—	—	UCPX20C	UCPX20CD	—	186	30.4	34.9
	140	490	120	380	36	50	46	273	140	108	42	M30	**UCP320**	P320	UC320	173	141	13.2	—	—	UCP320C	UCP320CD	—	174	35.1	40.7
105	140	490	120	380	36	50	46	278	140	112	44	M30	**UCP321**	P321	UC321	184	153	13.2	—	—	UCP321C	UCP321CD	—	178	37.6	43.6
110	150	520	140	400	40	55	50	296	150	117	46	M33	**UCP322**	P322	UC322	205	180	13.2	—	—	UCP322C	UCP322CD	—	188	44.0	50.8
120	160	570	140	450	40	55	50	316	160	126	51	M33	**UCP324**	P324	UC324	207	185	13.5	—	—	UCP324C	UCP324CD	—	196	55.4	64.9
130	180	600	140	480	40	55	50	355	195	135	54	M33	**UCP326**	P326	UC326	229	214	13.6	—	—	UCP326C	UCP326CD	—	214	72.1	84.2
140	200	620	140	500	40	55	60	393	185	145	59	M33	**UCP328**	P328	UC328	253	246	13.6	—	—	UCP328C	UCP328CD	—	222	92.5	108

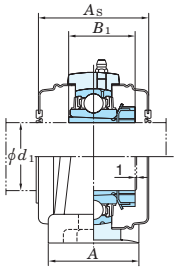
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3.
3) For more detailed information, refer to ball bearing for unit specification tables.

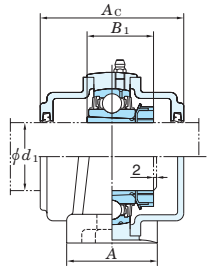
Ball bearing units
pillow block type
UKP (with adapter)
d_1 20 ~ 55 mm



Pressed steel covers



Cast iron covers



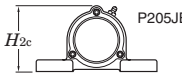
Tolerance for housing

unit : mm

housing No.			Δ_{Hs}
P205~P210	PX05~PX10	P305~P310	±0.15
P211~P218	PX11~PX18	P311~P318	±0.2
	PX20	P319~P328	±0.3

Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.

P205JE3 (with cast iron covers) are shown below.



P205JE3 H_{2c} = 77 mm

Shaft dia. (mm) d_1	Dimensions (mm) H	L	A	J	N	N_1	H_1	H_2	L_1	B_1 1)	Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Applicable 1) adapter No.	Unit No. with covers: Pressed steel covers Open ends	Pressed steel covers Closed end	Cast iron covers Open ends	Cast iron covers Closed end	Cover dimensions (mm) A_s	A_c	(Refer.) Unit mass (kg) Pressed steel covers	Cast iron covers
20	36.5	140	38	105	13	18	13	71	43	29(35)	M10	**UKP205**	P205	UK205	14.0	7.85	13.9	H305X(H2305X)	UKP205C	UKP205CD	UKP205FC	UKP205FCD	48	66	0.84	1.3
	44.4	159	51	119	17	25	16	86	47	35	M14	**UKPX05**	PX05	UKX05	19.5	11.3	13.9	H2305X	UKPX05C	UKPX05CD	—	—	52	—	1.5	—
	45	175	45	132	17	20	16	85	55	35	M14	**UKP305**	P305	UK305	21.2	10.9	12.6	H2305X	—	—	UKP305C	UKP305CD	—	76	1.7	2.3
25	42.9	165	48	121	17	21	15	84	53	31(38)	M14	**UKP206**	P206	UK206	19.5	11.3	13.9	H306X(H2306X)	UKP206C	UKP206CD	UKP206FC	UKP206FCD	52	70	1.4	1.9
	47.6	175	57	127	17	25	17	93	55	38	M14	**UKPX06**	PX06	UKX06	25.7	15.4	13.9	H2306X	UKPX06C	UKPX06CD	—	—	59	—	2.1	—
	50	180	50	140	17	20	17	95	53	38	M14	**UKP306**	P306	UK306	26.7	15.0	13.3	H2306X	—	—	UKP306C	UKP306CD	—	82	2.3	2.9
30	47.6	167	48	127	17	21	16	93	51	35(43)	M14	**UKP207**	P207	UK207	25.7	15.4	13.9	H307X(H2307X)	UKP207C	UKP207CD	UKP207FC	UKP207FCD	59	78	1.7	2.5
	54	203	57	144	17	30	19	105	64	43	M14	**UKPX07**	PX07	UKX07	29.1	17.8	14.0	H2307X	UKPX07C	UKPX07CD	—	—	68	—	2.7	—
	56	210	56	160	17	25	19	107	65	43	M14	**UKP307**	P307	UK307	33.4	19.3	13.2	H2307X	—	—	UKP307C	UKP307CD	—	88	3.0	3.9
35	49.2	184	54	137	17	21	17	98	57	36(46)	M14	**UKP208**	P208	UK208	29.1	17.8	14.0	H308X(H2308X)	UKP208C	UKP208CD	UKP208FC	UKP208FCD	68	86	2.0	2.9
	58.7	222	67	156	20	32	21	114	71	46	M16	**UKPX08**	PX08	UKX08	32.7	20.3	14.0	H2308X	UKPX08C	UKPX08CD	—	—	68	—	3.5	—
	60	220	60	170	17	27	19	118	65	46	M14	**UKP308**	P308	UK308	40.7	24.0	13.2	H2308X	—	—	UKP308C	UKP308CD	—	96	3.8	5.2
40	54	190	54	146	17	21	17	106	60	39(50)	M14	**UKP209**	P209	UK209	32.7	20.3	14.0	H309X(H2309X)	UKP209C	UKP209CD	UKP209FC	UKP209FCD	68	88	2.3	3.2
	58.7	222	67	156	20	33	21	116	71	50	M16	**UKPX09**	PX09	UKX09	35.1	23.3	14.4	H2309X	UKPX09C	UKPX09CD	—	—	73	—	3.7	—
	67	245	67	190	20	30	21	132	75	50	M16	**UKP309**	P309	UK309	48.9	29.5	13.3	H2309X	—	—	UKP309C	UKP309CD	—	102	5.0	6.3
45	57.2	206	60	159	20	22	19	113	63	42(55)	M16	**UKP210**	P210	UK210	35.1	23.3	14.4	H310X(H2310X)	UKP210C	UKP210CD	UKP210FC	UKP210FCD	73	97	3.0	4.1
	63.5	241	73	171	20	36	22	126	76	55	M16	**UKPX10**	PX10	UKX10	43.4	29.4	14.4	H2310X	UKPX10C	UKPX10CD	—	—	75	—	4.6	—
	75	275	75	212	20	35	24	148	88	55	M16	**UKP310**	P310	UK310	62.0	38.3	13.2	H2310X	—	—	UKP310C	UKP310CD	—	110	6.7	8.4
50	63.5	219	60	171	20	22	19	125	70	45(59)	M16	**UKP211**	P211	UK211	43.4	29.4	14.4	H311X(H2311X)	UKP211C	UKP211CD	UKP211FC	UKP211FCD	75	99	3.7	5.0
	69.8	260	79	184	25	36	28	139	83	59	M20	**UKPX11**	PX11	UKX11	52.4	36.2	14.4	H2311X	UKPX11C	UKPX11CD	—	—	88	—	6.2	—
	80	310	80	236	20	38	27	158	90	59	M16	**UKP311**	P311	UK311	71.6	45.0	13.2	H2311X	—	—	UKP311C	UKP311CD	—	114	8.1	10.0
55	69.8	241	70	184	20	25	22	138	76	47(62)	M16	**UKP212**	P212	UK212	52.4	36.2	14.4	H312X(H2312X)	UKP212C	UKP212CD	UKP212FC	UKP212FCD	88	114	4.8	6.3
	76.2	286	83	203	25	40	28	152	88	62	M20	**UKPX12**	PX12	UKX12	57.2	40.1	14.4	H2312X	UKPX12C	UKPX12CD	—	—	88	—	7.5	—
	85	330	85	250	25	38	29	167	103	62	M20	**UKP312**	P312	UK312	81.9	52.2	13.2	H2312X	—	—	UKP312C	UKP312CD	—	124	9.4	11.8

[Note] 1) ( ) Shown for use triple lipseal bearing and applicable adapter No.(H2300X series).

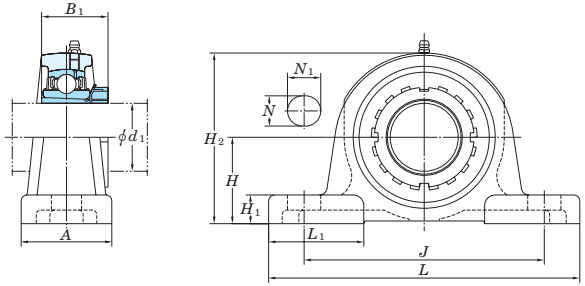
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 205~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) Unit No. means housing and bearing assembly, whole complete unit No. is given follows. (UKP206+H306X,UK206+H306X)

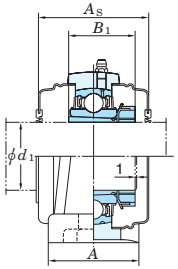
3) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UKP206JL3+H2306X, UK206L3+H2306X)

4) For more detailed information, refer to ball bearing for unit specification tables. Not applied to UKX series.

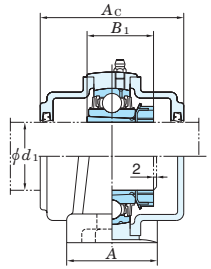
Ball bearing units
pillow block type
UKP (with adapter)
d_1 60 ~ 125 mm



Pressed steel covers



Cast iron covers



Tolerance for housing

unit : mm

housing No.			Δ_{Hs}
P205~P210	PX05~PX10	P305~P310	±0.15
P211~P218	PX11~PX18	P311~P318	±0.2
	PX20	P319~P328	±0.3

Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.

Shaft dia. (mm)	Dimensions (mm)										Bolt size	Unit No.	Housing No.	Applicable bearing				Applicable [1] adapter No.	Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
															Basic load ratings (kN)		Factor		Pressed steel covers		Cast iron covers					
d_1	H	L	A	J	N	N_1	H_1	H_2	L_1	B_1 [1]				No.	C_r	C_{0r}	f_0		Open ends	Closed end	Open ends	Closed end	A_s	A_c	Pressed steel covers	Cast iron covers
60	76.2	265	70	203	25	30	25	150	78	50(65)	M20	UKP213	P213	UK213	57.2	40.1	14.4	H313X(H2313X)	UKP213C	UKP213CD	UKP213FC	UKP213FCD	88	114	5.8	7.5
	76.2	286	83	203	25	40	28	155	88	65	M20	UKPX13	PX13	UKX13	62.2	44.1	14.5	H2313X	UKPX13C	UKPX13CD	—	—	98	—	7.8	—
	90	340	90	260	25	38	32	176	110	65	M20	UKP313	P313	UK313	92.7	59.9	13.2	H2313X	—	—	UKP313C	UKP313CD	—	122	10.8	13.2
65	82.6	275	74	217	25	30	28	162	80	55(73)	M20	UKP215	P215	UK215	67.4	48.3	14.5	H315X(H2315X)	UKP215C	UKP215CD	UKP215FC	UKP215FCD	98	124	7.5	9.5
	88.9	330	89	229	27	50	32	175	99	73	M22	UKPX15	PX15	UKX15	72.7	53.0	14.6	H2315X	UKPX15C	UKPX15CD	—	—	108	—	10.5	—
	100	380	100	290	27	40	35	198	107	73	M22	UKP315	P315	UK315	113	77.2	13.2	H2315X	—	—	UKP315C	UKP315CD	—	134	14.9	17.7
70	88.9	292	78	232	25	35	32	174	86	59(78)	M20	UKP216	P216	UK216	72.7	53.0	14.6	H316X(H2316X)	UKP216C	UKP216CD	UKP216FC	UKP216FCD	108	138	9.2	11.7
	101.6	381	102	283	27	58	34	195	116	78	M22	UKPX16	PX16	UKX16	84.0	61.9	14.5	H2316X	UKPX16C	UKPX16CD	—	—	112	—	15.4	—
	106	400	110	300	27	40	35	209	120	78	M22	UKP316	P316	UK316	123	86.7	13.3	H2316X	—	—	UKP316C	UKP316CD	—	138	18.6	21.7
75	95.2	310	83	247	25	40	32	185	90	63(82)	M20	UKP217	P217	UK217	84.0	61.9	14.5	H317X(H2317X)	UKP217C	UKP217CD	UKP217FC	UKP217FCD	112	142	11.0	13.8
	101.6	381	102	283	27	60	34	200	116	82	M22	UKPX17	PX17	UKX17	96.1	71.5	14.5	H2317X	UKPX17C	UKPX17CD	—	—	122	—	15.8	—
	112	420	110	320	33	45	40	220	120	82	M27	UKP317	P317	UK317	133	96.8	13.3	H2317X	—	—	UKP317C	UKP317CD	—	146	20.2	23.7
80	101.6	327	88	262	27	45	34	198	104	65(86)	M22	UKP218	P218	UK218	96.1	71.5	14.5	H318X(H2318X)	UKP218C	UKP218CD	UKP218FC	UKP218FCD	122	152	13.8	18.8
	101.6	381	111	283	27	60	38	204	116	86	M22	UKPX18	PX18	UKX18	109	81.9	14.4	H2318X	—	—	UKPX18C	UKPX18CD	—	158	18.6	22.4
	118	430	110	330	33	45	40	234	120	86	M27	UKP318	P318	UK318	143	107	13.3	H2318X	—	—	UKP318C	UKP318CD	—	150	22.8	27.0
85	125	470	120	360	36	50	46	248	125	90	M30	UKP319	P319	UK319	153	119	13.3	H2319X	—	—	UKP319C	UKP319CD	—	162	29.3	34.0
90	127	432	121	337	33	65	45	245	126	97	M27	UKPX20	PX20	UKX20	133	105	14.4	H2320X	—	—	UKPX20C	UKPX20CD	—	186	29.3	34.3
	140	490	120	380	36	50	46	273	140	97	M30	UKP320	P320	UK320	173	141	13.2	H2320X	—	—	UKP320C	UKP320CD	—	174	34.8	41.0
100	150	520	140	400	40	55	50	296	150	105	M33	UKP322	P322	UK322	205	180	13.2	H2322X	—	—	UKP322C	UKP322CD	—	188	43.9	50.8
110	160	570	140	450	40	55	50	316	160	112	M33	UKP324	P324	UK324	207	185	13.5	H2324	—	—	UKP324C	UKP324CD	—	196	55.7	66.0
115	180	600	140	480	40	55	50	355	195	121	M33	UKP326	P326	UK326	229	214	13.6	H2326	—	—	UKP326C	UKP326CD	—	214	71.9	85.2
125	200	620	140	500	40	55	60	393	185	131	M33	UKP328	P328	UK328	253	246	13.6	H2328	—	—	UKP328C	UKP328CD	—	222	92.5	109

[Note] 1) ( ) Shown for use triple lipseal bearing and applicable adapter No.(H2300X series).

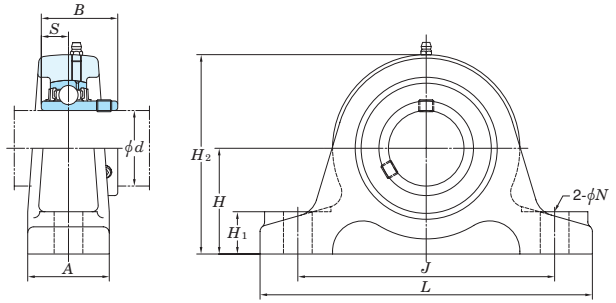
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 205~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) Unit No. means housing and bearing assembly, whole complete unit No. is given follows. (UKP206+H306X,UK206+H306X)

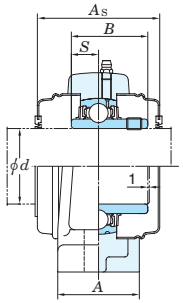
3) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UKP206JL3+H2306X, UK206L3+H2306X)

4) For more detailed information, refer to ball bearing for unit specification tables. Not applied to UKX series.

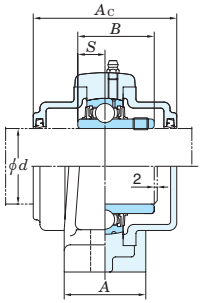
Ball bearing units
thick section pillow block type
UCIP (with set screws)
d 40 ~ 140 mm



Pressed steel covers



Cast iron covers



Tolerances for housing

unit : mm

housing No.		Δ_{Hs}	X
IP208~ IP210		±0.15	1
IP211~ IP213	IP313~ IP318	±0.2	1.4
	IP319~ IP328	±0.3	

Δ_{Hs} : deviation of distance from mounting base to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

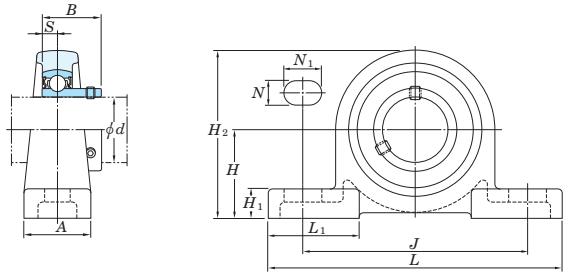
Shaft dia. (mm)	Dimensions (mm)									Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
														Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers					
d	H	L	A	J	N	H_1	H_2	B	S				No.	C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c	Pressed steel covers	Cast iron covers
40	60	200	60	150	19	25	115	49.2	19	M16	**UCIP208**	IP208	UC208	29.1	17.8	14.0	UCIP208C	UCIP208CD	UCIP208FC	UCIP208FCD	68	86	3.4	4.2
45	70	210	60	160	19	25	128	49.2	19	M16	**UCIP209**	IP209	UC209	32.7	20.3	14.0	UCIP209C	UCIP209CD	UCIP209FC	UCIP209FCD	68	88	3.9	4.7
50	70	220	60	170	19	28	132	51.6	19	M16	**UCIP210**	IP210	UC210	35.1	23.3	14.4	UCIP210C	UCIP210CD	UCIP210FC	UCIP210FCD	73	97	4.8	5.8
55	80	230	60	180	19	28	148	55.6	22.2	M16	**UCIP211**	IP211	UC211	43.4	29.4	14.4	UCIP211C	UCIP211CD	UCIP211FC	UCIP211FCD	75	99	5.3	6.3
60	80	260	70	200	22	30	155	65.1	25.4	M20	**UCIP212**	IP212	UC212	52.4	36.2	14.4	UCIP212C	UCIP212CD	UCIP212FC	UCIP212FCD	88	114	7.2	8.7
65	90	280	70	220	22	30	172	65.1	25.4	M20	**UCIP213**	IP213	UC213	57.2	40.1	14.4	UCIP213C	UCIP213CD	UCIP213FC	UCIP213FCD	88	114	8.8	10.5
	110	310	70	250	22	30	208	75	30	M20	**UCIP313**	IP313	UC313	92.7	59.9	13.2	—	—	UCIP313C	UCIP313CD	—	122	13.4	15.5
70	110	330	75	270	25	35	215	78	33	M22	**UCIP314**	IP314	UC314	104	68.2	13.2	—	—	UCIP314C	UCIP314CD	—	124	15.3	17.6
75	120	340	75	280	25	35	230	82	32	M22	**UCIP315**	IP315	UC315	113	77.2	13.2	—	—	UCIP315C	UCIP315CD	—	134	17.6	20.1
80	120	350	85	290	25	40	235	86	34	M22	**UCIP316**	IP316	UC316	123	86.7	13.3	—	—	UCIP316C	UCIP316CD	—	138	20.3	23.2
85	130	370	85	310	25	40	255	96	40	M22	**UCIP317**	IP317	UC317	133	96.8	13.3	—	—	UCIP317C	UCIP317CD	—	146	25.9	29.2
90	130	400	85	330	29	45	260	96	40	M27	**UCIP318**	IP318	UC318	143	107	13.3	—	—	UCIP318C	UCIP318CD	—	150	28.6	32.4
95	150	410	85	340	29	45	285	103	41	M27	**UCIP319**	IP319	UC319	153	119	13.3	—	—	UCIP319C	UCIP319CD	—	162	31.7	36.0
100	150	430	85	360	29	45	295	108	42	M27	**UCIP320**	IP320	UC320	173	141	13.2	—	—	UCIP320C	UCIP320CD	—	174	36.9	42.5
110	170	490	100	410	32	50	335	117	46	M30	**UCIP322**	IP322	UC322	205	180	13.2	—	—	UCIP322C	UCIP322CD	—	188	52.4	59.2
120	170	510	100	430	32	50	345	126	51	M30	**UCIP324**	IP324	UC324	207	185	13.5	—	—	UCIP324C	UCIP324CD	—	196	58.7	68.2
130	200	550	110	470	32	50	390	135	54	M30	**UCIP326**	IP326	UC326	229	214	13.6	—	—	UCIP326C	UCIP326CD	—	214	76.2	88.3
140	200	590	110	500	35	55	400	145	59	M33	**UCIP328**	IP328	UC328	253	246	13.6	—	—	UCIP328C	UCIP328CD	—	222	87.0	102

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF..... 208~210
A-PT 1/8 ..... 211~213, 313~328

2) Bearings with triple-lip seals are indicated by L3 after the bearing and unit number.
(UCIP208JL3, UC208L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

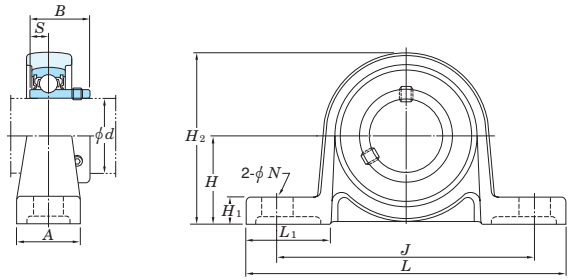
Ball bearing units
light duty pillow block type
BLP (with set screws)
d 12 ~ 40 mm



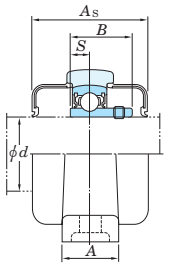
Shaft dia. (mm) d	Dimensions (mm) H ±0.15	L	A	J	N	N_1	H_1	H_2	L_1	B	S	Bolt size	Unit No.		Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	30.2	114	25	87	11	16	12	57	35	22	6	M10	**BLP201**		LP203	SB201	9.55	4.80	13.2	0.36
15	30.2	114	25	87	11	16	12	57	35	22	6	M10	**BLP202**		LP203	SB202	9.55	4.80	13.2	0.36
17	30.2	114	25	87	11	16	12	57	35	22	6	M10	**BLP203**		LP203	SB203	9.55	4.80	13.2	0.36
20	33.3	125	27	97	11	16	13	65	38	25	7	M10	**BLP204**		LP204	SB204	12.8	6.65	13.2	0.51
25	36.5	130	29	100	11	16	13	71	39	27	7.5	M10	**BLP205**		LP205	SB205	14.0	7.85	13.9	0.57
30	42.9	156	33	120	14	21	14	83	47	30	8	M12	**BLP206**		LP206	SB206	19.5	11.3	13.9	0.69
35	47.6	165	35	127	14	21	16	93	50	32	8.5	M12	**BLP207**		LP207	SB207	25.7	15.4	13.9	0.94
40	50.8	184	37	140	14	22	18	102	55	34	9	M12	**BLP208**		LP208	SB208	29.1	17.8	14.0	1.8

[Remarks] 1) The radial loading on housing shoud not exceed 50% of the basic load rating (C_r).
2) For more detailed information, refer to ball bearing for unit specification tables.

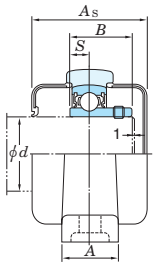
Ball bearing units
"compact" series pillow block type
UP (with set screws)
d 10 ~ 30 mm



Open ends type



Closed end type



Tolerance for housing

unit : mm

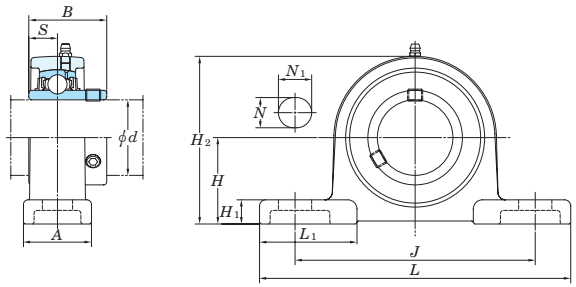
housing No.	X
P000~P006	0.6

X : positional tolerance of bolt hole.

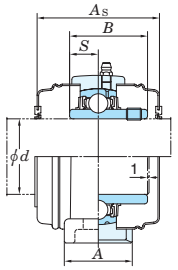
Shaft dia. (mm) d	Dimensions (mm) H ±0.15	L	A	J	N ±0.2	H_1	H_2	L_1	B	S	Bolt size	Unit No.		Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers Open ends	Closed end	Cover dimension (mm) A_s	(Refer.) Unit mass (kg)
10	18	67	16	53	7	6	35	18	15	5	M6	**UP000**		P000	SU000	4.55	1.95	12.3	UP000C	UP000CD	29	0.070
12	19	71	16	56	7	6	38	19	15	5	M6	**UP001**		P001	SU001	5.10	2.40	13.2	UP001C	UP001CD	29	0.090
15	22	80	16	63	7	7	43	21	16.5	5.5	M6	**UP002**		P002	SU002	5.60	2.85	13.9	UP002C	UP002CD	31	0.11
17	24	85	18	67	7	7	47	21	17.5	6	M6	**UP003**		P003	SU003	6.00	3.25	14.4	UP003C	UP003CD	33	0.15
20	28	100	20	80	10	9	55	25	21	7	M8	**UP004**		P004	SU004	9.40	5.05	13.9	UP004C	UP004CD	38	0.23
25	32	112	20	90	10	10	62	28	22	7	M8	**UP005**		P005	SU005	10.1	5.85	14.5	UP005C	UP005CD	40	0.28
30	36	132	26	106	13	11	70	34	24.5	7.5	M10	**UP006**		P006	SU006	13.2	8.25	14.7	UP006C	UP006CD	44	0.42

[Remarks] 1) Housing is made from special light alloy.
2) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
stainless-series pillow block type
UCSP-H1S6 (with set screws)
d 12 ~ 50 mm



Pressed stainless steel covers

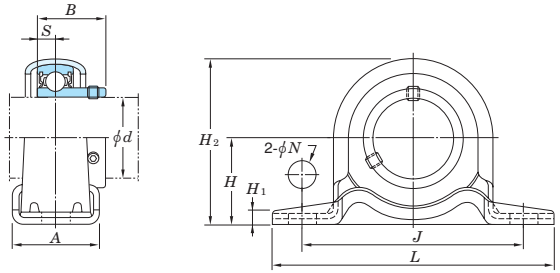


Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.		Applicable bearing				Unit No. with covers		Cover dimension (mm)	(Refer.) Unit mass (kg)
																No.	Basic load ratings (kN)		Factor				
d	H ±0.15	L	A	J	N	N_1	H_1	H_2	L_1	B	S						C_r	C_{0r}	f_0	Open ends	Closed end	A_s	Pressed steel covers
12	30.2	127	30	95	13	18	11	56	42	27.4	11.5	M10	**UCSP201XH1S6**	SP203H1		UC201XS6	8.15	3.85	13.2	—	—	—	0.42
15	30.2	127	30	95	13	18	11	56	42	27.4	11.5	M10	**UCSP202XH1S6**	SP203H1		UC202XS6	8.15	3.85	13.2	—	—	—	0.42
17	30.2	127	30	95	13	18	11	56	42	27.4	11.5	M10	**UCSP203XH1S6**	SP203H1		UC203XS6	8.15	3.85	13.2	—	—	—	0.42
20	33.3	127	30	95	13	18	11	63	42	31	12.7	M10	**UCSP204H1S6**	SP204H1		UC204S6	10.9	5.35	13.2	UCSP204H1CS6	UCSP204H1CDS6	45	0.54
25	36.5	140	30	105	13	19	12	69	46	34.1	14.3	M10	**UCSP205H1S6**	SP205H1		UC205S6	11.9	6.30	13.9	UCSP205H1CS6	UCSP205H1CDS6	49	0.70
30	42.9	165	36	121	17	21	13	81	54	38.1	15.9	M14	**UCSP206H1S6**	SP206H1		UC206S6	16.5	9.05	13.9	UCSP206H1CS6	UCSP206H1CDS6	53	1.0
35	47.6	167	38	127	17	21	14	91	51	42.9	17.5	M14	**UCSP207H1S6**	SP207H1		UC207S6	21.8	12.3	13.9	UCSP207H1CS6	UCSP207H1CDS6	60	1.4
40	49.2	184	40	137	17	21	14	97	60	49.2	19	M14	**UCSP208H1S6**	SP208H1		UC208S6	24.8	14.3	14.0	UCSP208H1CS6	UCSP208H1CDS6	69	1.7
45	54	190	40	146	17	21	15	104	61	49.2	19	M14	**UCSP209H1S6**	SP209H1		UC209S6	27.8	16.2	14.0	UCSP209H1CS6	UCSP209H1CDS6	69	1.8
50	57.2	206	45	159	20	22	16	111	65	51.6	19	M16	**UCSP210H1S6**	SP210H1		UC210S6	29.8	18.6	14.4	UCSP210H1CS6	UCSP210H1CDS6	74	2.3

[Remarks] 1) Applicable size of grease nipples is A-1/4-28UNF.

2) For more detailed information, refer to ball bearing for unit specification tables.

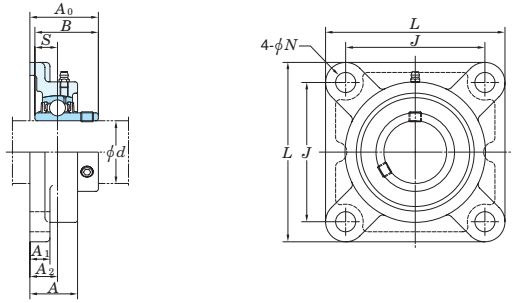
Ball bearing units
pressed steel pillow block type
SBPP
d 12 ~ 35 mm



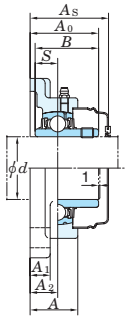
Shaft dia. (mm) d	Dimensions (mm) H	L	A	J ±0.4	N ±0.5	H_1	H_2	B	S	Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	22.2	86	25	68	9.5	3.2	43.8	22	6	M8	**SBPP201**	PP203F		SB201	9.55	4.80	13.2	0.16
15	22.2	86	25	68	9.5	3.2	43.8	22	6	M8	**SBPP202**	PP203F		SB202	9.55	4.80	13.2	0.16
17	22.2	86	25	68	9.5	3.2	43.8	22	6	M8	**SBPP203**	PP203F		SB203	9.55	4.80	13.2	0.16
20	25.4	98	32	76	9.5	3.2	50.5	25	7	M8	**SBPP204**	PP204F		SB204	12.8	6.65	13.2	0.23
25	28.6	108	32	86	11.5	4	56.6	27	7.5	M10	**SBPP205**	PP205F		SB205	14.0	7.85	13.9	0.28
30	33.3	117	38	95	11.5	4	66.3	30	8	M10	**SBPP206**	PP206F		SB206	19.5	11.3	13.9	0.47
35	39.7	129	41	106	11.5	4.6	78	32	8.5	M10	**SBPP207**	PP207F		SB207	25.7	15.4	13.9	0.67

[Remark] 1) For more detailed information, refer to ball bearing for unit specification tables.

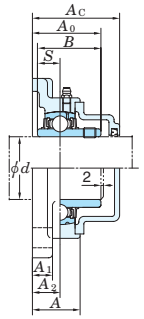
Ball bearing units
square-flanged type
UCF (with set screws)
d 12 ~ (55) mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.			Δ_{A2s}	X
F204~ F210	FX05~ FX10	F305~ F310	±0.5	0.7
F211~ F218	FX11~ FX20	F311~ F328	±0.8	1

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

unit : mm

housing No.			Δ_{Ns}
F204~ F218	FX05~ FX18	F305~ F315	±0.2
	FX20	F316~ F328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

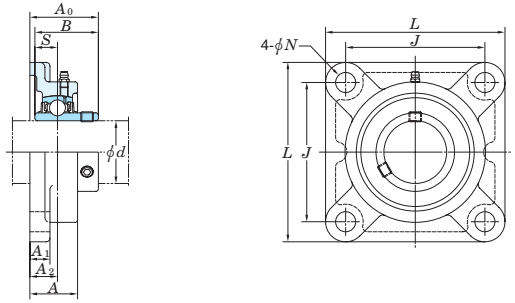
Shaft dia. (mm)	Dimensions (mm)									Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN)		Factor	Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
																	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	L	A	J	N	A_1	A_2	A_0	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
12	86	25.5	64	12	11	15	33.3	31	12.7	M10	**UCF201**	F204	UC201	12.8	6.65	13.2	UCF201C	UCF201D	—	—	37	—	0.64	—
15	86	25.5	64	12	11	15	33.3	31	12.7	M10	**UCF202**	F204	UC202	12.8	6.65	13.2	UCF202C	UCF202D	—	—	37	—	0.62	—
17	86	25.5	64	12	11	15	33.3	31	12.7	M10	**UCF203**	F204	UC203	12.8	6.65	13.2	UCF203C	UCF203D	—	—	37	—	0.61	—
20	86	25.5	64	12	11	15	33.3	31	12.7	M10	**UCF204**	F204	UC204	12.8	6.65	13.2	UCF204C	UCF204D	UCF204FC	UCF204FD	37	46	0.59	0.74
25	95	27	70	12	13	16	35.8	34.1	14.3	M10	**UCF205**	F205	UC205	14.0	7.85	13.9	UCF205C	UCF205D	UCF205FC	UCF205FD	40	49	0.83	1.0
	108	30	83	12	13	18	40.2	38.1	15.9	M10	**UCFX05**	FX05	UCX05	19.5	11.3	13.9	UCFX05C	UCFX05D	—	—	44	—	1.2	—
	110	29	80	16	13	16	39	38	15	M14	**UCF305**	F305	UC305	21.2	10.9	12.6	—	—	UCF305C	UCF305D	—	54	1.3	1.6
30	108	31	83	12	13	18	40.2	38.1	15.9	M10	**UCF206**	F206	UC206	19.5	11.3	13.9	UCF206C	UCF206D	UCF206FC	UCF206FD	44	53	1.1	1.4
	117	34	92	16	14	19	44.4	42.9	17.5	M14	**UCFX06**	FX06	UCX06	25.7	15.4	13.9	UCFX06C	UCFX06D	—	—	49	—	1.6	—
	125	32	95	16	15	18	44	43	17	M14	**UCF306**	F306	UC306	26.7	15.0	13.3	—	—	UCF306C	UCF306D	—	59	1.9	2.2
35	117	34	92	14	15	19	44.4	42.9	17.5	M12	**UCF207**	F207	UC207	25.7	15.4	13.9	UCF207C	UCF207D	UCF207FC	UCF207FD	49	58	1.5	1.9
	130	38	102	16	14	21	51.2	49.2	19	M14	**UCFX07**	FX07	UCX07	29.1	17.8	14.0	UCFX07C	UCFX07D	—	—	55	—	2.0	—
	135	36	100	19	16	20	49	48	19	M16	**UCF307**	F307	UC307	33.4	19.3	13.2	—	—	UCF307C	UCF307D	—	64	2.3	2.7
40	130	36	102	16	15	21	51.2	49.2	19	M14	**UCF208**	F208	UC208	29.1	17.8	14.0	UCF208C	UCF208D	UCF208FC	UCF208FD	55	64	1.9	2.3
	137	40	105	19	14	22	52.2	49.2	19	M16	**UCFX08**	FX08	UCX08	32.7	20.3	14.0	UCFX08C	UCFX08D	—	—	56	—	2.4	—
	150	40	112	19	17	23	56	52	19	M16	**UCF308**	F308	UC308	40.7	24.0	13.2	—	—	UCF308C	UCF308D	—	71	3.1	3.6
45	137	38	105	16	16	22	52.2	49.2	19	M14	**UCF209**	F209	UC209	32.7	20.3	14.0	UCF209C	UCF209D	UCF209FC	UCF209FD	56	66	2.2	2.6
	143	40	111	19	14	23	55.6	51.6	19	M16	**UCFX09**	FX09	UCX09	35.1	23.3	14.4	UCFX09C	UCFX09D	—	—	60	—	2.7	—
	160	44	125	19	18	25	60	57	22	M16	**UCF309**	F309	UC309	48.9	29.5	13.3	—	—	UCF309C	UCF309D	—	76	4.0	4.6
50	143	40	111	16	16	22	54.6	51.6	19	M14	**UCF210**	F210	UC210	35.1	23.3	14.4	UCF210C	UCF210D	UCF210FC	UCF210FD	59	70.5	2.5	3.0
	162	44	130	19	20	26	59.4	55.6	22.2	M16	**UCFX10**	FX10	UCX10	43.4	29.4	14.4	UCFX10C	UCFX10D	—	—	64	—	3.7	—
	175	48	132	23	19	28	67	61	22	M20	**UCF310**	F310	UC310	62.0	38.3	13.2	—	—	UCF310C	UCF310D	—	83	5.1	5.9
55	162	43	130	19	18	25	58.4	55.6	22.2	M16	**UCF211**	F211	UC211	43.4	29.4	14.4	UCF211C	UCF211D	UCF211FC	UCF211FD	63	74.5	3.4	4.0

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

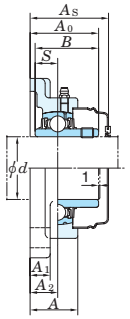
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCF206JL3, UC206L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

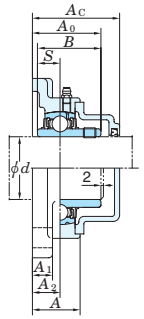
Ball bearing units
square-flanged type
UCF (with set screws)
d (55) ~ 95 mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.			Δ_{A2s}	X
F204~ F210	FX05~ FX10	F305~ F310	±0.5	0.7
F211~ F218	FX11~ FX20	F311~ F328	±0.8	1

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

unit : mm

housing No.			Δ_{Ns}
F204~ F218	FX05~ FX18	F305~ F315	±0.2
	FX20	F316~ F328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

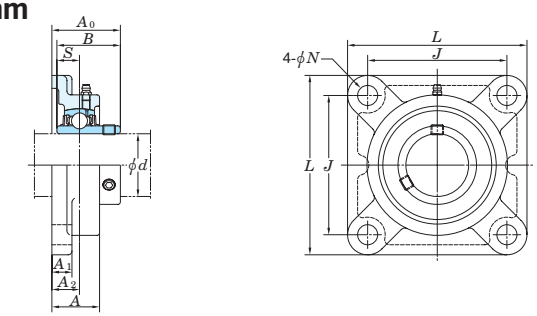
Shaft dia. (mm)	Dimensions (mm)									Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN)		Factor	Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
																	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	L	A	J	N	A_1	A_2	A_0	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
55	175	49	143	19	20	29	68.7	65.1	25.4	M16	**UCFX11**	FX11	UCX11	52.4	36.2	14.4	UCFX11C	UCFX11D	—	—	73	—	4.9	—
	185	52	140	23	20	30	71	66	25	M20	**UCF311**	F311	UC311	71.6	45.0	13.2	—	—	UCF311C	UCF311D	—	87	5.6	6.5
60	175	48	143	19	18	29	68.7	65.1	25.4	M16	**UCF212**	F212	UC212	52.4	36.2	14.4	UCF212C	UCF212D	UCF212FC	UCF212FD	73	86	4.2	5.0
	187	59	149	19	21	34	73.7	65.1	25.4	M16	**UCFX12**	FX12	UCX12	57.2	40.1	14.4	UCFX12C	UCFX12D	—	—	78	—	5.7	—
	195	56	150	23	22	33	78	71	26	M20	**UCF312**	F312	UC312	81.9	52.2	13.2	—	—	UCF312C	UCF312D	—	95	6.9	8.1
65	187	50	149	19	22	30	69.7	65.1	25.4	M16	**UCF213**	F213	UC213	57.2	40.1	14.4	UCF213C	UCF213D	UCF213FC	UCF213FD	74	87	5.2	6.0
	187	59	149	19	21	34	78.4	74.6	30.2	M16	**UCFX13**	FX13	UCX13	62.2	44.1	14.5	UCFX13C	UCFX13D	—	—	83	—	6.3	—
	208	58	166	23	22	33	78	75	30	M20	**UCF313**	F313	UC313	92.7	59.9	13.2	—	—	UCF313C	UCF313D	—	94	7.8	8.9
70	193	54	152	19	22	31	75.4	74.6	30.2	M16	**UCF214**	F214	UC214	62.2	44.1	14.5	UCF214C	UCF214D	UCF214FC	UCF214FD	80	93	5.9	6.8
	197	60	152	23	22	37	81.5	77.8	33.3	M20	**UCFX14**	FX14	UCX14	67.4	48.3	14.5	UCFX14C	UCFX14D	—	—	86	—	7.0	—
	226	61	178	25	25	36	81	78	33	M22	**UCF314**	F314	UC314	104	68.2	13.2	—	—	UCF314C	UCF314D	—	98	10.1	11.2
75	200	56	159	19	22	34	78.5	77.8	33.3	M16	**UCF215**	F215	UC215	67.4	48.3	14.5	UCF215C	UCF215D	UCF215FC	UCF215FD	83	96	6.4	7.4
	197	68	152	23	24	40	89.3	82.6	33.3	M20	**UCFX15**	FX15	UCX15	72.7	53.0	14.6	UCFX15C	UCFX15D	—	—	94	—	8.4	—
	236	66	184	25	25	39	89	82	32	M22	**UCF315**	F315	UC315	113	77.2	13.2	—	—	UCF315C	UCF315D	—	106	11.6	12.9
80	208	58	165	23	22	34	83.3	82.6	33.3	M20	**UCF216**	F216	UC216	72.7	53.0	14.6	UCF216C	UCF216D	UCF216FC	UCF216FD	88	103	7.3	8.5
	214	70	171	23	24	40	91.6	85.7	34.1	M20	**UCFX16**	FX16	UCX16	84.0	61.9	14.5	UCFX16C	UCFX16D	—	—	96	—	9.4	—
	250	68	196	31	27	38	90	86	34	M27	**UCF316**	F316	UC316	123	86.7	13.3	—	—	UCF316C	UCF316D	—	107	12.8	14.2
85	220	63	175	23	24	36	87.6	85.7	34.1	M20	**UCF217**	F217	UC217	84.0	61.9	14.5	UCF217C	UCF217D	UCF217FC	UCF217FD	92	107	8.9	10.3
	214	70	171	23	24	40	96.3	96	39.7	M20	**UCFX17**	FX17	UCX17	96.1	71.5	14.5	UCFX17C	UCFX17D	—	—	101	—	10.8	—
	260	74	204	31	27	44	100	96	40	M27	**UCF317**	F317	UC317	133	96.8	13.3	—	—	UCF317C	UCF317D	—	117	15.3	16.9
90	235	68	187	23	25	40	96.3	96	39.7	M20	**UCF218**	F218	UC218	96.1	71.5	14.5	UCF218C	UCF218D	UCF218FC	UCF218FD	101	116	11.4	12.9
	214	76	171	23	24	45	106.1	104	42.9	M20	**UCFX18**	FX18	UCX18	109	81.9	14.4	—	—	UCFX18C	UCFX18D	—	124	11.9	13.6
	280	76	216	35	30	44	100	96	40	M30	**UCF318**	F318	UC318	143	107	13.3	—	—	UCF318C	UCF318D	—	119	18.9	20.8
95	290	94	228	35	30	59	121	103	41	M30	**UCF319**	F319	UC319	153	119	13.3	—	—	UCF319C	UCF319D	—	140	21.6	23.8

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

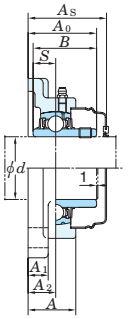
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCF206JL3, UC206L3)
3) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
square-flanged type
UCF (with set screws)

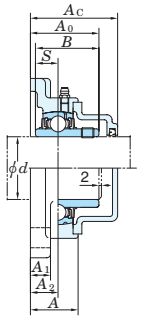
d 100 ~ 140 mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.			Δ_{A2s}	X
F204~F210	FX05~FX10	F305~F310	±0.5	0.7
F211~F218	FX11~FX20	F311~F328	±0.8	1

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

unit : mm

housing No.			Δ_{Ns}
F204~F218	FX05~FX18	F305~F315	±0.2
	FX20	F316~F328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

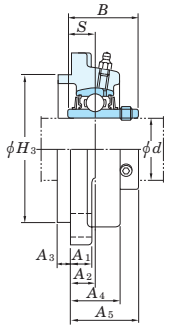
Shaft dia. (mm) d	Dimensions (mm) L	A	J	N	A_1	A_2	A_0	B	S	Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers: Pressed steel covers Open ends	Pressed steel covers Closed end	Cast iron covers Open ends	Cast iron covers Closed end	Cover dimensions (mm) A_s	A_c	(Refer.) Unit mass (kg) Pressed steel covers	Cast iron covers
100	268	97	211	31	28	59	127.3	117.5	49.2	M27	**UCFX20**	FX20	UCX20	133	105	14.4	—	—	UCFX20C	UCFX20D	—	152	19.4	21.6
	310	94	242	38	32	59	125	108	42	M33	**UCF320**	F320	UC320	173	141	13.2	—	—	UCF320C	UCF320D	—	146	25.8	28.6
105	310	94	242	38	32	59	127	112	44	M33	**UCF321**	F321	UC321	184	153	13.2	—	—	UCF321C	UCF321D	—	148	30.2	33.2
110	340	96	266	41	35	60	131	117	46	M36	**UCF322**	F322	UC322	205	180	13.2	—	—	UCF322C	UCF322D	—	154	35.3	41.7
120	370	110	290	41	40	65	140	126	51	M36	**UCF324**	F324	UC324	207	185	13.5	—	—	UCF324C	UCF324D	—	163	47.3	52.1
130	410	115	320	41	45	65	146	135	54	M36	**UCF326**	F326	UC326	229	214	13.6	—	—	UCF326C	UCF326D	—	172	65.5	71.6
140	450	125	350	41	55	75	161	145	59	M36	**UCF328**	F328	UC328	253	246	13.6	—	—	UCF328C	UCF328D	—	186	93.4	101

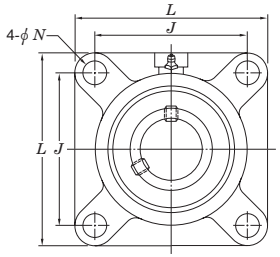
[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~218, X10~X20, 309~328

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCF206JL3, UC206L3)

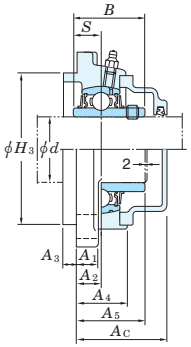
3) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
square-flanged type with spigot joint
UCFS (with set screws)
d 25 ~ 105 mm





Cast iron cover



Tolerances for housing

unit : mm

housing No.	Δ_{H3s}	Δ_{A2s}	X	Y
FS305	0 -0.046	±0.5	0.7	0.2
FS306~ FS308	0 -0.054			
FS309~ FS310	0 -0.063			0.3 ~FS318
FS311~ FS313		±0.8	1	FS319~ 0.4
FS314~ FS319	0 -0.072			
FS320~ FS322	0 -0.081			
FS324~ FS328	0 -0.089			

unit : mm

housing No.	Δ_{Ns}
FS305~315	±0.2
FS316~328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

Δ_{H3s} : deviation of spigot joint outside diameter.

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.

X : positional tolerance of bolt hole.

Y : circumferential runout tolerance of spigot joint in respect to axial line of spherical bearing seating.

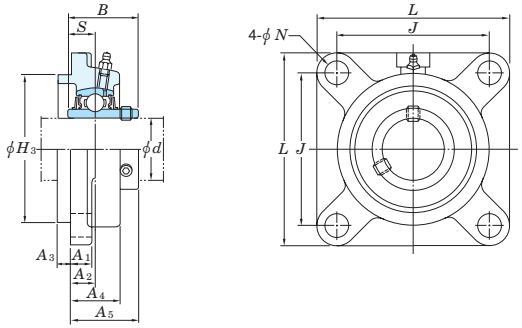
Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers		Cover dimensions (mm)	(Refer.) Unit mass (kg)	
															No.	Basic load ratings (kN)		Factor	Open ends	Closed end		No cover	Cast iron covers
d	L	H_3	J	N	A_1	A_2	A_3	A_4	A_5	B	S					C_r	C_{0r}	f_0			A_c		
25	110	80	80	16	13	9	7	22	32	38	15	M14	UCFS305	FS305	UC305	21.2	10.9	12.6	UCFS305C	UCFS305D	47	1.4	1.7
30	125	90	95	16	15	10	8	24	36	43	17	M14	UCFS306	FS306	UC306	26.7	15.0	13.3	UCFS306C	UCFS306D	51	1.9	2.2
35	135	100	100	19	16	11	9	27	40	48	19	M16	UCFS307	FS307	UC307	33.4	19.3	13.2	UCFS307C	UCFS307D	55	2.3	2.7
40	150	115	112	19	17	13	10	30	46	52	19	M16	UCFS308	FS308	UC308	40.7	24.0	13.2	UCFS308C	UCFS308D	61	3.4	3.9
45	160	125	125	19	18	14	11	33	49	57	22	M16	UCFS309	FS309	UC309	48.9	29.5	13.3	UCFS309C	UCFS309D	65	4.4	5.0
50	175	140	132	23	19	16	12	36	55	61	22	M20	UCFS310	FS310	UC310	62.0	38.3	13.2	UCFS310C	UCFS310D	71	5.3	6.1
55	185	150	140	23	20	17	13	39	58	66	25	M20	UCFS311	FS311	UC311	71.6	45.0	13.2	UCFS311C	UCFS311D	74	6.1	7.0
60	195	160	150	23	22	19	14	42	64	71	26	M20	UCFS312	FS312	UC312	81.9	52.2	13.2	UCFS312C	UCFS312D	81	7.4	8.6
65	208	175	166	23	22	15	18	40	60	75	30	M20	UCFS313	FS313	UC313	92.7	59.9	13.2	UCFS313C	UCFS313D	76	8.8	9.9
70	226	185	178	25	25	18	18	43	63	78	33	M22	UCFS314	FS314	UC314	104	68.2	13.2	UCFS314C	UCFS314D	80	11.2	12.3
75	236	200	184	25	25	21	18	48	71	82	32	M22	UCFS315	FS315	UC315	113	77.2	13.2	UCFS315C	UCFS315D	88	13.7	15.0
80	250	210	196	31	27	18	20	48	70	86	34	M27	UCFS316	FS316	UC316	123	86.7	13.3	UCFS316C	UCFS316D	87	15.1	16.5
85	260	220	204	31	27	24	20	54	80	96	40	M27	UCFS317	FS317	UC317	133	96.8	13.3	UCFS317C	UCFS317D	97	17.3	18.9
90	280	240	216	35	30	24	20	56	80	96	40	M30	UCFS318	FS318	UC318	143	107	13.3	UCFS318C	UCFS318D	99	21.3	23.2
95	290	250	228	35	30	39	20	74	101	103	41	M30	UCFS319	FS319	UC319	153	119	13.3	UCFS319C	UCFS319D	120	24.5	26.7
100	310	260	242	38	32	39	20	74	105	108	42	M33	UCFS320	FS320	UC320	173	141	13.2	UCFS320C	UCFS320D	126	29.5	32.3
105	310	260	242	38	32	39	20	74	107	112	44	M33	UCFS321	FS321	UC321	184	153	13.2	UCFS321C	UCFS321D	128	32.7	35.7

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 305~308
A-PT 1/8 ..... 309~328

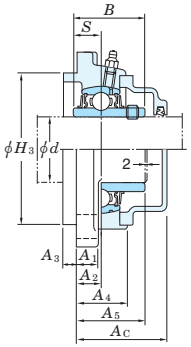
2) Bearings with triple-lip seals are indicated by L3 after the bearing and unit number. (UCFS307JL3, UC307L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
square-flanged type with spigot joint
UCFS (with set screws)
d 110 ~ 140 mm



Cast iron cover



Tolerances for housing

unit : mm

housing No.	Δ_{H3s}	Δ_{A2s}	X	Y
FS305	0 -0.046	±0.5	0.7	0.2
FS306~ FS308	0 -0.054			
FS309~ FS310	0 -0.063			
FS311~ FS313		±0.8	1	0.3 ~FS318 / 0.4 FS319~
FS314~ FS319	0 -0.072			
FS320~ FS322	0 -0.081			
FS324~ FS328	0 -0.089			

unit : mm

housing No.	Δ_{Ns}
FS305~315	±0.2
FS316~328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

Δ_{H3s} : deviation of spigot joint outside diameter.

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.

X : positional tolerance of bolt hole.

Y : circumferential runout tolerance of spigot joint in respect to axial line of spherical bearing seating.

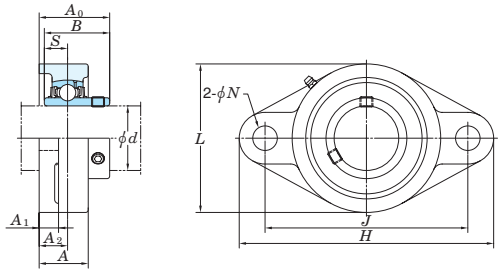
Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN)		Factor	Unit No. with covers		Cover dimensions (mm)	(Refer.) Unit mass (kg)	
d	L	H_3	J	N	A_1	A_2	A_3	A_4	A_5	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	A_c	No cover	Cast iron covers
110	340	300	266	41	35	35	25	71	106	117	46	M36	**UCFS322**	FS322	UC322	205	180	13.2	UCFS322C	UCFS322D	129	39.0	42.4
120	370	330	290	41	40	35	30	80	110	126	51	M36	**UCFS324**	FS324	UC324	207	185	13.5	UCFS324C	UCFS324D	133	50.6	55.4
130	410	360	320	41	45	35	30	85	116	135	54	M36	**UCFS326**	FS326	UC326	229	214	13.6	UCFS326C	UCFS326D	142	67.7	73.8
140	450	400	350	41	55	45	30	95	131	145	59	M36	**UCFS328**	FS328	UC328	253	246	13.6	UCFS328C	UCFS328D	156	94.0	102

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 305~308
A-PT 1/8 ..... 309~328

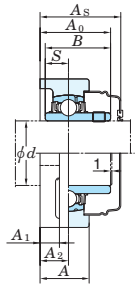
2) Bearings with triple-lip seals are indicated by L3 after the bearing and unit number. (UCFS307JL3, UC307L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

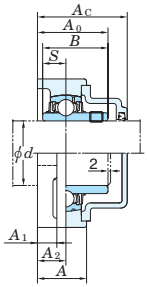
Ball bearing units
rhombic-flanged type
UCFL (with set screws)
d 12 ~ 55 mm



Pressed steel cover



Cast iron cover



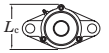
Tolerances for housing

unit : mm

housing No.			Δ_{Ns}
FL204~FL218	FLX05~FLX10	FL305~FL311	±0.2
		FL312~FL328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

FL204JE3, FL205JE3 (with cast iron covers) are shown below.



FL204JE3 L_c = 65 mm
FL205JE3 L_c = 73 mm

unit : mm

housing No.			Δ_{A2s}	X
FL204~FL210	FLX05~FLX10	FL305~FL310	±0.5	0.7
FL211~FL218		FL311~FL328	±0.8	1

Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

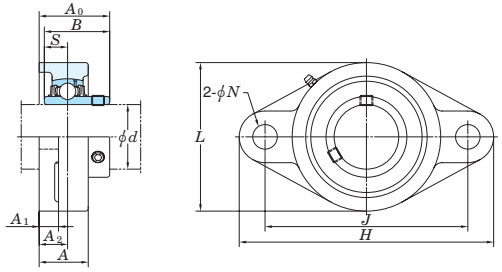
Shaft dia. (mm) d	Dimensions (mm) H	L	A	J	N	A_1	A_2	A_0	B	S	Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers: Pressed steel covers Open ends	Closed end	Cast iron covers Open ends	Closed end	Cover dimensions (mm) A_s	A_c	(Refer.) Unit mass (kg) Pressed steel covers	Cast iron covers
12	113	60	25.5	90	12	11	15	33.3	31	12.7	M10	**UCFL201**	FL204	UC201	12.8	6.65	13.2	UCFL201C	UCFL201D	—	—	37	—	0.50	—
15	113	60	25.5	90	12	11	15	33.3	31	12.7	M10	**UCFL202**	FL204	UC202	12.8	6.65	13.2	UCFL202C	UCFL202D	—	—	37	—	0.48	—
17	113	60	25.5	90	12	11	15	33.3	31	12.7	M10	**UCFL203**	FL204	UC203	12.8	6.65	13.2	UCFL203C	UCFL203D	—	—	37	—	0.47	—
20	113	60	25.5	90	12	11	15	33.3	31	12.7	M10	**UCFL204**	FL204	UC204	12.8	6.65	13.2	UCFL204C	UCFL204D	UCFL204FC	UCFL204FD	37	46	0.45	0.60
25	130	68	27	99	16	13	16	35.8	34.1	14.3	M14	**UCFL205**	FL205	UC205	14.0	7.85	13.9	UCFL205C	UCFL205D	UCFL205FC	UCFL205FD	40	49	0.64	0.83
	141	83	30	117	12	13	18	40.2	38.1	15.9	M10	**UCFLX05**	FLX05	UCX05	19.5	11.3	13.9	UCFLX05C	UCFLX05D	—	—	44	—	1.1	—
	150	80	29	113	19	13	16	39	38	15	M16	**UCFL305**	FL305	UC305	21.2	10.9	12.6	—	—	UCFL305C	UCFL305D	—	54	1.1	1.4
30	148	80	31	117	16	13	18	40.2	38.1	15.9	M14	**UCFL206**	FL206	UC206	19.5	11.3	13.9	UCFL206C	UCFL206D	UCFL206FC	UCFL206FD	44	53	0.93	1.2
	156	95	34	130	16	14	19	44.4	42.9	17.5	M14	**UCFLX06**	FLX06	UCX06	25.7	15.4	13.9	UCFLX06C	UCFLX06D	—	—	49	—	1.5	—
	180	90	32	134	23	15	18	44	43	17	M20	**UCFL306**	FL306	UC306	26.7	15.0	13.3	—	—	UCFL306C	UCFL306D	—	59	1.5	1.8
35	161	90	34	130	16	14	19	44.4	42.9	17.5	M14	**UCFL207**	FL207	UC207	25.7	15.4	13.9	UCFL207C	UCFL207D	UCFL207FC	UCFL207FD	49	58	1.2	1.6
	171	105	38	144	16	14	21	51.2	49.2	19	M14	**UCFLX07**	FLX07	UCX07	29.1	17.8	14.0	UCFLX07C	UCFLX07D	—	—	55	—	1.9	—
	185	100	36	141	23	16	20	49	48	19	M20	**UCFL307**	FL307	UC307	33.4	19.3	13.2	—	—	UCFL307C	UCFL307D	—	64	1.8	2.2
40	175	100	36	144	16	14	21	51.2	49.2	19	M14	**UCFL208**	FL208	UC208	29.1	17.8	14.0	UCFL208C	UCFL208D	UCFL208FC	UCFL208FD	55	64	1.6	2.0
	179	111	40	148	16	14	22	52.2	49.2	19	M14	**UCFLX08**	FLX08	UCX08	32.7	20.3	14.0	UCFLX08C	UCFLX08D	—	—	56	—	2.1	—
	200	112	40	158	23	17	23	56	52	19	M20	**UCFL308**	FL308	UC308	40.7	24.0	13.2	—	—	UCFL308C	UCFL308D	—	71	2.5	3.0
45	188	108	38	148	19	15	22	52.2	49.2	19	M16	**UCFL209**	FL209	UC209	32.7	20.3	14.0	UCFL209C	UCFL209D	UCFL209FC	UCFL209FD	56	66	1.9	2.3
	189	116	40	157	16	14	23	55.6	51.6	19	M14	**UCFLX09**	FLX09	UCX09	35.1	23.3	14.4	UCFLX09C	UCFLX09D	—	—	60	—	2.4	—
	230	125	44	177	25	18	25	60	57	22	M22	**UCFL309**	FL309	UC309	48.9	29.5	13.3	—	—	UCFL309C	UCFL309D	—	76	3.5	4.1
50	197	115	40	157	19	15	22	54.6	51.6	19	M16	**UCFL210**	FL210	UC210	35.1	23.3	14.4	UCFL210C	UCFL210D	UCFL210FC	UCFL210FD	59	70.5	2.2	2.7
	216	133	44	184	19	20	26	59.4	55.6	22.2	M16	**UCFLX10**	FLX10	UCX10	43.4	29.4	14.4	UCFLX10C	UCFLX10D	—	—	64	—	3.8	—
	240	140	48	187	25	19	28	67	61	22	M22	**UCFL310**	FL310	UC310	62.0	38.3	13.2	—	—	UCFL310C	UCFL310D	—	83	4.4	5.2
55	224	130	43	184	19	18	25	58.4	55.6	22.2	M16	**UCFL211**	FL211	UC211	43.4	29.4	14.4	UCFL211C	UCFL211D	UCFL211FC	UCFL211FD	63	74.5	3.3	3.9
	250	150	52	198	25	20	30	71	66	25	M22	**UCFL311**	FL311	UC311	71.6	45.0	13.2	—	—	UCFL311C	UCFL311D	—	87	5.3	6.2

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~217, X10~X17, 309~328

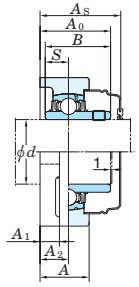
2) Bearings with triple-lip seals are indicated by L3 after the bearing and unit number.
(UCFS307JL3, UC307L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

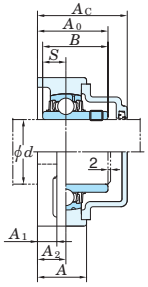
Ball bearing units
rhombic-flanged type
UCFL (with set screws)
d 60 ~ 140 mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.			Δ_{Ns}
FL204~ FL218	FLX05~ FLX10	FL305~ FL311	±0.2
		FL312~ FL328	±0.3

Δ_{Ns} : deviation of bolt hole diameter.

unit : mm

housing No.			Δ_{A2s}	X
FL204~ FL210	FLX05~ FLX10	FL305~ FL310	±0.5	0.7
FL211~ FL218		FL311~ FL328	±0.8	1

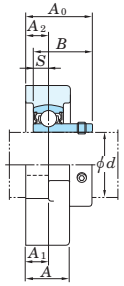
Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.

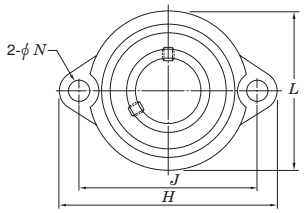
Shaft dia. (mm) d	Dimensions (mm) H	L	A	J	N	A_1	A_2	A_0	B	S	Bolt size	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers: Pressed steel covers Open ends	Closed end	Cast iron covers Open ends	Closed end	Cover dimensions (mm) A_s	A_c	(Refer.) Unit mass (kg) Pressed steel covers	Cast iron covers
60	250	140	48	202	23	18	29	68.7	65.1	25.4	M20	**UCFL212**	FL212	UC212	52.4	36.2	14.4	UCFL212C	UCFL212D	UCFL212FC	UCFL212FD	73	86	4.2	5.0
	270	160	56	212	31	22	33	78	71	26	M27	**UCFL312**	FL312	UC312	81.9	52.2	13.2	—	—	UCFL312C	UCFL312D	—	95	6.5	7.7
65	258	155	50	210	23	20	30	69.7	65.1	25.4	M20	**UCFL213**	FL213	UC213	57.2	40.1	14.4	UCFL213C	UCFL213D	UCFL213FC	UCFL213FD	74	87	5.1	5.9
	295	175	58	240	31	25	33	78	75	30	M27	**UCFL313**	FL313	UC313	92.7	59.9	13.2	—	—	UCFL313C	UCFL313D	—	94	8.5	9.6
70	265	160	54	216	23	20	31	75.4	74.6	30.2	M20	**UCFL214**	FL214	UC214	62.2	44.1	14.5	UCFL214C	UCFL214D	UCFL214FC	UCFL214FD	80	93	5.7	6.6
	315	185	61	250	35	28	36	81	78	33	M30	**UCFL314**	FL314	UC314	104	68.2	13.2	—	—	UCFL314C	UCFL314D	—	98	9.7	10.8
75	275	165	56	225	23	20	34	78.5	77.8	33.3	M20	**UCFL215**	FL215	UC215	67.4	48.3	14.5	UCFL215C	UCFL215D	UCFL215FC	UCFL215FD	83	96	6.4	7.4
	320	195	66	260	35	30	39	89	82	32	M30	**UCFL315**	FL315	UC315	113	77.2	13.2	—	—	UCFL315C	UCFL315D	—	106	11.3	12.6
80	290	180	58	233	25	20	34	83.3	82.6	33.3	M22	**UCFL216**	FL216	UC216	72.7	53.0	14.6	UCFL216C	UCFL216D	UCFL216FC	UCFL216FD	88	103	7.8	9.0
	355	210	68	285	38	32	38	90	86	34	M33	**UCFL316**	FL316	UC316	123	86.7	13.3	—	—	UCFL316C	UCFL316D	—	107	14.4	15.8
85	305	190	63	248	25	22	36	87.6	85.7	34.1	M22	**UCFL217**	FL217	UC217	84.0	61.9	14.5	UCFL217C	UCFL217D	UCFL217FC	UCFL217FD	92	107	9.8	11.2
	370	220	74	300	38	32	44	100	96	40	M33	**UCFL317**	FL317	UC317	133	96.8	13.3	—	—	UCFL317C	UCFL317D	—	117	16.0	17.6
90	320	205	68	265	25	23	40	96.3	96	39.7	M22	**UCFL218**	FL218	UC218	96.1	71.5	14.5	UCFL218C	UCFL218D	UCFL218FC	UCFL218FD	101	116	12.3	13.8
	385	235	76	315	38	36	44	100	96	40	M33	**UCFL318**	FL318	UC318	143	107	13.3	—	—	UCFL318C	UCFL318D	—	119	19.0	20.9
95	405	250	94	330	41	40	59	121	103	41	M36	**UCFL319**	FL319	UC319	153	119	13.3	—	—	UCFL319C	UCFL319D	—	140	24.6	26.8
100	440	270	94	360	44	40	59	125	108	42	M39	**UCFL320**	FL320	UC320	173	141	13.2	—	—	UCFL320C	UCFL320D	—	146	29.4	32.2
105	440	270	94	360	44	40	59	127	112	44	M39	**UCFL321**	FL321	UC321	184	153	13.2	—	—	UCFL321C	UCFL321D	—	148	34.4	37.4
110	470	300	96	390	44	42	60	131	117	46	M39	**UCFL322**	FL322	UC322	205	180	13.2	—	—	UCFL322C	UCFL322D	—	154	36.2	39.6
120	520	330	110	430	47	48	65	140	126	51	M42	**UCFL324**	FL324	UC324	207	185	13.5	—	—	UCFL324C	UCFL324D	—	163	51.6	56.4
130	550	360	115	460	47	50	65	146	135	54	M42	**UCFL326**	FL326	UC326	229	214	13.6	—	—	UCFL326C	UCFL326D	—	172	61.6	67.7
140	600	400	125	500	51	60	75	161	145	59	M45	**UCFL328**	FL328	UC328	253	246	13.6	—	—	UCFL328C	UCFL328D	—	186	68.4	76.1

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09, 305~308
A-PT 1/8 ..... 211~217, X10~X17, 309~328

2) Bearings with triple-lip seals are indicated by L3 after the bearing and unit number. (UCFS307JL3, UC307L3)
3) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
light duty rhombic-flanged type
BLF (with set screws)
d 12 ~ 35 mm

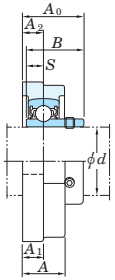


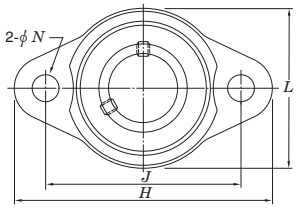


Shaft dia. (mm) d	Dimensions (mm) H	L	A	J ±0.7	N ±0.2	A_1	A_2 ±0.5	A_0	B	S	Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	81	52	18	63.5	8	9.5	9.5	25.5	22	6	M6	**BLF201**	LF203		SB201	9.55	4.80	13.2	0.25
15	81	52	18	63.5	8	9.5	9.5	25.5	22	6	M6	**BLF202**	LF203		SB202	9.55	4.80	13.2	0.25
17	81	52	18	63.5	8	9.5	9.5	25.5	22	6	M6	**BLF203**	LF203		SB203	9.55	4.80	13.2	0.25
20	90	60	20	71.5	10	11	11	29	25	7	M8	**BLF204**	LF204		SB204	12.8	6.65	13.2	0.33
25	95	64	20	76	10	11	11	30.5	27	7.5	M8	**BLF205**	LF205		SB205	14.0	7.85	13.9	0.38
30	113	76	22.5	90.5	12	12	12	34	30	8	M10	**BLF206**	LF206		SB206	19.5	11.3	13.9	0.57
35	122	89	24	100	12	13	13	36.5	32	8.5	M10	**BLF207**	LF207		SB207	25.7	15.4	13.9	0.77

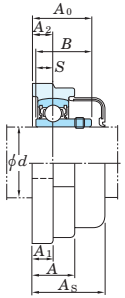
[Remarks] 1) The radial loading on housing shoud not exceed 50% of the basic load rating (C_r).
2) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
"compact" series rhombic-flanged type
UFL (with set screws)
d 8 ~ 30 mm

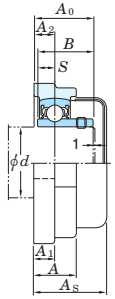




Open ends type



Closed end type



Tolerance for housing

unit : mm

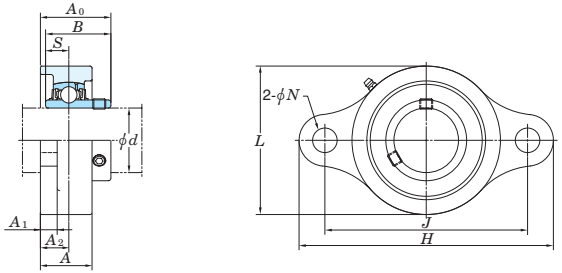
housing No.	X
FL000~FL006	0.6

X : positional tolerance of bolt hole.

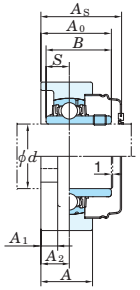
Shaft dia. (mm) d	Dimensions (mm) H	L	A	J	N ±0.2	A_1	A_2 ±0.5	A_0	B	S	Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Unit No. with covers Open ends	Closed end	Cover dimension (mm) A_s	(Refer.) Unit mass (kg)
8	48	27	8.5	37	4.8	4	4	12.5	12	3.5	M4	**UFL08**	FL08		SU08	3.27	1.37	12.4	—	—	—	0.030
10	60	36	12	45	7	6	6	16	15	5	M6	**UFL000**	FL000		SU000	4.55	1.95	12.3	UFL000C	UFL000D	20.5	0.050
12	63	38	12	48	7	6	6	16	15	5	M6	**UFL001**	FL001		SU001	5.10	2.40	13.2	UFL001C	UFL001D	20.5	0.065
15	67	42	13	53	7	6.5	6.5	17.5	16.5	5.5	M6	**UFL002**	FL002		SU002	5.60	2.85	13.9	UFL002C	UFL002D	22	0.085
17	71	46	14	56	7	7	7	18.5	17.5	6	M6	**UFL003**	FL003		SU003	6.00	3.25	14.4	UFL003C	UFL003D	23.5	0.11
20	90	55	16	71	10	8	8	22	21	7	M8	**UFL004**	FL004		SU004	9.40	5.05	13.9	UFL004C	UFL004D	27	0.18
25	95	60	16	75	10	8	8	23	22	7	M8	**UFL005**	FL005		SU005	10.1	5.85	14.5	UFL005C	UFL005D	28	0.23
30	112	70	18	85	13	9	9	26	24.5	7.5	M10	**UFL006**	FL006		SU006	13.2	8.25	14.7	UFL006C	UFL006D	31	0.31

[Remarks] 1) Housing is made from special light alloy.
2) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
stainless-series rhombic-flanged type
UCSFL-H1S6 (with set screws)
d 12 ~ 50 mm



Pressed stainless steel covers



Tolerance for housing

unit : mm

housing No.	X
SFL203 H1~210 H1	0.7

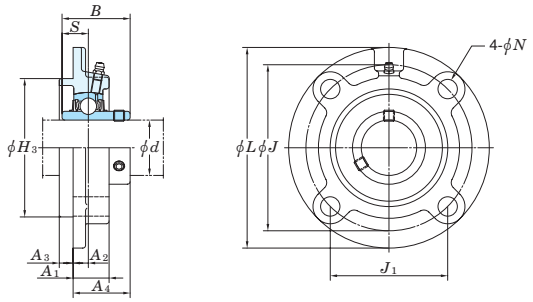
X : positional tolerance of bolt hole.

Shaft dia. (mm)	Dimensions (mm)										Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN)		Factor	Unit No. with covers		Cover dimension (mm)	(Refer.) Unit mass (kg)
d	H	L	A	J	N ±0.2	A_1	A_2 ±0.5	A_0	B	S						C_r	C_{0r}	f_0	Open ends	Closed end	A_s	Pressed steel covers
12	98	54	24	76.5	12	10	14	29.9	27.4	11.5	M10	**UCSFL201XH1S6**	SFL203H1		UC201XS6	8.15	3.85	13.2	—	—	—	0.31
15	98	54	24	76.5	12	10	14	29.9	27.4	11.5	M10	**UCSFL202XH1S6**	SFL203H1		UC202XS6	8.15	3.85	13.2	—	—	—	0.31
17	98	54	24	76.5	12	10	14	29.9	27.4	11.5	M10	**UCSFL203XH1S6**	SFL203H1		UC203XS6	8.15	3.85	13.2	—	—	—	0.31
20	113	60	26	90	12	10	15	33.3	31	12.7	M10	**UCSFL204H1S6**	SFL204H1		UC204S6	10.9	5.35	13.2	UCSFL204H1CS6	UCSFL204H1DS6	38	0.43
25	130	68	27.5	99	16	10	16	35.8	34.1	14.3	M14	**UCSFL205H1S6**	SFL205H1		UC205S6	11.9	6.30	13.9	UCSFL205H1CS6	UCSFL205H1DS6	40	0.60
30	148	80	31	117	16	10	18	40.2	38.1	15.9	M14	**UCSFL206H1S6**	SFL206H1		UC206S6	16.5	9.05	13.9	UCSFL206H1CS6	UCSFL206H1DS6	45	0.86
35	161	90	34	130	16	11	19	44.4	42.9	17.5	M14	**UCSFL207H1S6**	SFL207H1		UC207S6	21.8	12.3	13.9	UCSFL207H1CS6	UCSFL207H1DS6	49	1.1
40	175	100	36	144	16	12	21	51.2	49.2	19	M14	**UCSFL208H1S6**	SFL208H1		UC208S6	24.8	14.3	14.0	UCSFL208H1CS6	UCSFL208H1DS6	56	1.5
45	188	108	38	148	19	13	22	52.2	49.2	19	M16	**UCSFL209H1S6**	SFL209H1		UC209S6	27.8	16.2	14.0	UCSFL209H1CS6	UCSFL209H1DS6	57	1.8
50	197	115	40	157	19	13	22	54.6	51.6	19	M16	**UCSFL210H1S6**	SFL210H1		UC210S6	29.8	18.6	14.4	UCSFL210H1CS6	UCSFL210H1DS6	59	2.1

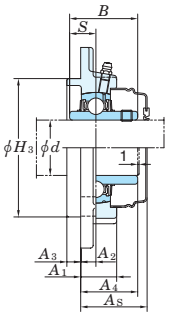
[Remarks] 1) Applicable size of grease nipples is A-1/4-28UNF.

2) For more detailed information, refer to ball bearing for unit specification tables.

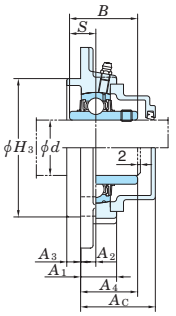
Ball bearing units
round-flanged type with spigot joint
UCFC (with set screws)
d 12 ~ 65 mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.		Δ_{H3s}	Δ_{A2s}	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	0 -0.072			
	FCX20				0.4

Δ_{H3s} : deviation of spigot joint outside diameter.
Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.
Y : circumferential runout tolerance of spigot joint in respect to axial line of spherical bearing seating.

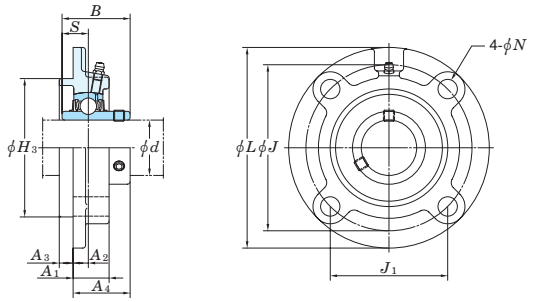
Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit Mass (kg)	
															No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	L	H_3	J	J_1	N ±0.2	A_1	A_2	A_3	A_4	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
12	100	62	78	55.1	12	20.5	10	5	28.3	31	12.7	M10	**UCFC201**	FC204	UC201	12.8	6.65	13.2	UCFC201C	UCFC201D	—	—	32	—	0.78	—
15	100	62	78	55.1	12	20.5	10	5	28.3	31	12.7	M10	**UCFC202**	FC204	UC202	12.8	6.65	13.2	UCFC202C	UCFC202D	—	—	32	—	0.76	—
17	100	62	78	55.1	12	20.5	10	5	28.3	31	12.7	M10	**UCFC203**	FC204	UC203	12.8	6.65	13.2	UCFC203C	UCFC203D	—	—	32	—	0.75	—
20	100	62	78	55.1	12	20.5	10	5	28.3	31	12.7	M10	**UCFC204**	FC204	UC204	12.8	6.65	13.2	UCFC204C	UCFC204D	UCFC204FC	UCFC204FD	32	38.5	0.73	0.84
25	115	70	90	63.6	12	21	10	6	29.8	34.1	14.3	M10	**UCFC205**	FC205	UC205	14.0	7.85	13.9	UCFC205C	UCFC205D	UCFC205FC	UCFC205FD	34	42	0.95	1.1
	111	76	92	65	9.5	24	10	6	32.2	38.1	15.9	M8	**UCFCX05**	FCX05	UCX05	19.5	11.3	13.9	UCFCX05C	UCFCX05D	—	—	36	—	1.2	—
30	125	80	100	70.7	12	23	10	8	32.2	38.1	15.9	M10	**UCFC206**	FC206	UC206	19.5	11.3	13.9	UCFC206C	UCFC206D	UCFC206FC	UCFC206FD	36	45	1.3	1.6
	127	85	105	74.2	12	22.5	8	9.5	33.4	42.9	17.5	M10	**UCFCX06**	FCX06	UCX06	25.7	15.4	13.9	UCFCX06C	UCFCX06D	—	—	38	—	1.5	—
35	135	90	110	77.8	14	26	11	8	36.4	42.9	17.5	M12	**UCFC207**	FC207	UC207	25.7	15.4	13.9	UCFC207C	UCFC207D	UCFC207FC	UCFC207FD	41	50	1.7	2.1
	133	92	111	78.5	12	26	9	11	39.2	49.2	19	M10	**UCFCX07**	FCX07	UCX07	29.1	17.8	14.0	UCFCX07C	UCFCX07D	—	—	43	—	1.9	—
40	145	100	120	84.8	14	26	11	10	41.2	49.2	19	M12	**UCFC208**	FC208	UC208	29.1	17.8	14.0	UCFC208C	UCFC208D	UCFC208FC	UCFC208FD	45	54	2.0	2.4
	133	92	111	78.5	12	26	9	11	39.2	49.2	19	M10	**UCFCX08**	FCX08	UCX08	32.7	20.3	14.0	UCFCX08C	UCFCX08D	—	—	43	—	2.0	—
45	160	105	132	93.3	16	26	10	12	40.2	49.2	19	M14	**UCFC209**	FC209	UC209	32.7	20.3	14.0	UCFC209C	UCFC209D	UCFC209FC	UCFC209FD	44	54	2.6	3.0
	155	108	130	91.9	14	25	8	12	40.6	51.6	19	M12	**UCFCX09**	FCX09	UCX09	35.1	23.3	14.4	UCFCX09C	UCFCX09D	—	—	45	—	2.6	—
50	165	110	138	97.6	16	28	10	12	42.6	51.6	19	M14	**UCFC210**	FC210	UC210	35.1	23.3	14.4	UCFC210C	UCFC210D	UCFC210FC	UCFC210FD	47	58.5	2.9	3.4
	162	118	136	96.2	14	25	7	16	40.4	55.6	22.2	M12	**UCFCX10**	FCX10	UCX10	43.4	29.4	14.4	UCFCX10C	UCFCX10D	—	—	45	—	3.2	—
55	185	125	150	106.1	19	31	13	12	46.4	55.6	22.2	M16	**UCFC211**	FC211	UC211	43.4	29.4	14.4	UCFC211C	UCFC211D	UCFC211FC	UCFC211FD	51	62.5	4.2	4.8
	180	127	152	107.5	16	26	4	22	43.7	65.1	25.4	M14	**UCFCX11**	FCX11	UCX11	52.4	36.2	14.4	UCFCX11C	UCFCX11D	—	—	48	—	4.3	—
60	195	135	160	113.1	19	36	17	12	56.7	65.1	25.4	M16	**UCFC212**	FC212	UC212	52.4	36.2	14.4	UCFC212C	UCFC212D	UCFC212FC	UCFC212FD	61	74	5.0	5.8
	194	140	165	116.7	16	33	11	20	50.7	65.1	25.4	M14	**UCFCX12**	FCX12	UCX12	57.2	40.1	14.4	UCFCX12C	UCFCX12D	—	—	55	—	5.3	—
65	205	145	170	120.2	19	36	16	14	55.7	65.1	25.4	M16	**UCFC213**	FC213	UC213	57.2	40.1	14.4	UCFC213C	UCFC213D	UCFC213FC	UCFC213FD	60	73	5.6	6.4
	194	140	165	116.7	16	33	11	20	55.4	74.6	30.2	M14	**UCFCX13**	FCX13	UCX13	62.2	44.1	14.5	UCFCX13C	UCFCX13D	—	—	60	—	5.7	—

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09
A-PT 1/8 ..... 211~218, X10~X20

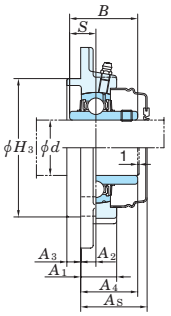
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCFC206JL3, UC206L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

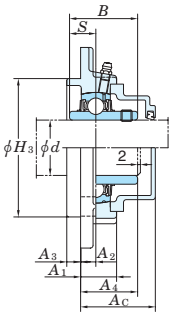
Ball bearing units
round-flanged type with spigot joint
UCFC (with set screws)
d 70 ~ 100 mm



Pressed steel cover



Cast iron cover



Tolerances for housing

unit : mm

housing No.		Δ_{H3s}	Δ_{A2s}	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	0 -0.072			
	FCX20				0.4

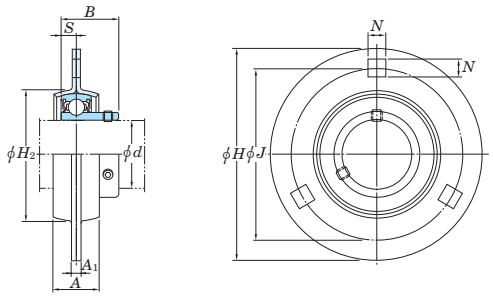
Δ_{H3s} : deviation of spigot joint outside diameter.
Δ_{A2s} : deviation of distance from mounting face to centre of spherical bearing seating.
X : positional tolerance of bolt hole.
Y : circumferential runout tolerance of spigot joint in respect to axial line of spherical bearing seating.

Shaft dia. (mm)	Dimensions (mm)											Bolt size	Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit Mass (kg)	
															No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	L	H_3	J	J_1	N ±0.2	A_1	A_2	A_3	A_4	B	S					C_r	C_{0r}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
70	215	150	177	125.1	19	40	17	14	61.4	74.6	30.2	M16	**UCFC214**	FC214	UC214	62.2	44.1	14.5	UCFC214C	UCFC214D	UCFC214FC	UCFC214FD	66	79	6.8	7.7
	222	164	190	134.3	19	36	14	20	58.5	77.8	33.3	M16	**UCFCX14**	FCX14	UCX14	67.4	48.3	14.5	UCFCX14C	UCFCX14D	—	—	63	—	7.3	—
75	220	160	184	130.1	19	40	18	16	62.5	77.8	33.3	M16	**UCFC215**	FC215	UC215	67.4	48.3	14.5	UCFC215C	UCFC215D	UCFC215FC	UCFC215FD	67	80	7.2	8.2
	222	164	190	134.3	19	35	12	22	61.3	82.6	33.3	M16	**UCFCX15**	FCX15	UCX15	72.7	53.0	14.6	UCFCX15C	UCFCX15D	—	—	66	—	8.0	—
80	240	170	200	141.4	23	42	18	16	67.3	82.6	33.3	M20	**UCFC216**	FC216	UC216	72.7	53.0	14.6	UCFC216C	UCFC216D	UCFC216FC	UCFC216FD	72	87	8.7	9.9
	260	186	219	154.8	23	36	10	25	61.6	85.7	34.1	M20	**UCFCX16**	FCX16	UCX16	84.0	61.9	14.5	UCFCX16C	UCFCX16D	—	—	66	—	11.3	—
85	250	180	208	147.1	23	45	18	18	69.6	85.7	34.1	M20	**UCFC217**	FC217	UC217	84.0	61.9	14.5	UCFC217C	UCFC217D	UCFC217FC	UCFC217FD	74	89	10.3	11.7
	260	186	219	154.8	23	36	10	25	66.3	96	39.7	M20	**UCFCX17**	FCX17	UCX17	96.1	71.5	14.5	UCFCX17C	UCFCX17D	—	—	71	—	12.9	—
90	265	190	220	155.5	23	50	22	18	78.3	96	39.7	M20	**UCFC218**	FC218	UC218	96.1	71.5	14.5	UCFC218C	UCFC218D	UCFC218FC	UCFC218FD	83	98	13.3	14.8
	260	186	219	154.8	23	43	12	28	73.1	104	42.9	M20	**UCFCX18**	FCX18	UCX18	109	81.9	14.4	—	—	UCFCX18C	UCFCX18D	—	92	13.5	15.4
100	276	206	238	168.3	23	66	22	28	90.3	117.5	49.2	M20	**UCFCX20**	FCX20	UCX20	133	105	14.4	—	—	UCFCX20C	UCFCX20D	—	116	18.2	20.7

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~210, X05~X09
A-PT 1/8 ..... 211~218, X10~X20

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCFC206JL3, UC206L3)
3) For more detailed information, refer to ball bearing for unit specification tables.

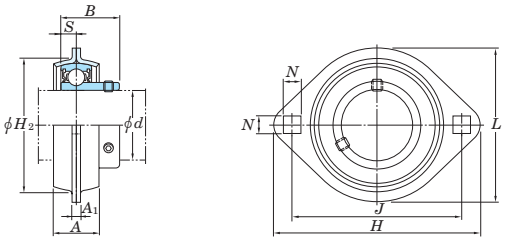
Ball bearing units
pressed steel round-flanged type
SBPF (with set screws)
d 12 ~ 35 mm



Shaft dia. (mm) d	Dimensions (mm) H	A	A_1	J ±0.4	N ±0.25	H_2 1)	B	S	Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	81	14	4	63.5	7.1	49	22	6	M6	**SBPF201**	PF203		SB201	9.55	4.80	13.2	0.27
15	81	14	4	63.5	7.1	49	22	6	M6	**SBPF202**	PF203		SB202	9.55	4.80	13.2	0.27
17	81	14	4	63.5	7.1	49	22	6	M6	**SBPF203**	PF203		SB203	9.55	4.80	13.2	0.27
20	90	16	4	71.5	9	55	25	7	M8	**SBPF204**	PF204		SB204	12.8	6.65	13.2	0.33
25	95	18	4	76	9	60	27	7.5	M8	**SBPF205**	PF205		SB205	14.0	7.85	13.9	0.38
30	113	19	5.2	90.5	11	71	30	8	M10	**SBPF206**	PF206		SB206	19.5	11.3	13.9	0.62
35	122	22	5.2	100	11	81	32	8.5	M10	**SBPF207**	PF207		SB207	25.7	15.4	13.9	0.82

[Note] 1) H_2 shows minimum dimension of mounting hole.
[Remark] For more detailed information, refer to ball bearing for unit specification tables.

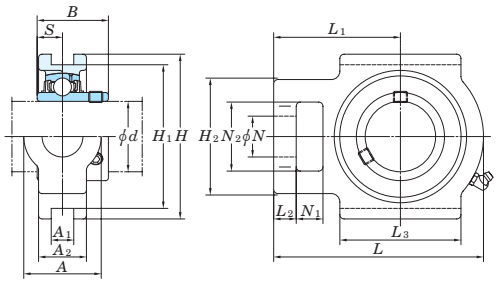
Ball bearing units
pressed steel rhombic-flanged type
SBPFL (with set screws)
d 12 ~ 35 mm



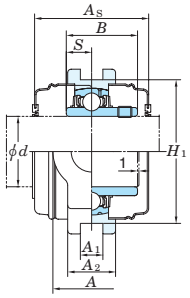
Shaft dia. (mm) d	Dimensions (mm) H	L	A	A_1	J ±0.4	N ±0.25	H_2 1)	B	S	Bolt size	Unit No.	Housing No.		Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	81	59	14	4	63.5	7.1	49	22	6	M6	**SBPFL201**	PFL203		SB201	9.55	4.80	13.2	0.19
15	81	59	14	4	63.5	7.1	49	22	6	M6	**SBPFL202**	PFL203		SB202	9.55	4.80	13.2	0.19
17	81	59	14	4	63.5	7.1	49	22	6	M6	**SBPFL203**	PFL203		SB203	9.55	4.80	13.2	0.19
20	90	67	16	4	71.5	9	55	25	7	M8	**SBPFL204**	PFL204		SB204	12.8	6.65	13.2	0.24
25	95	71	18	4	76	9	60	27	7.5	M8	**SBPFL205**	PFL205		SB205	14.0	7.85	13.9	0.28
30	113	84	19	5.2	90.5	11	71	30	8	M10	**SBPFL206**	PFL206		SB206	19.5	11.3	13.9	0.38
35	122	94	22	5.2	100	11	81	32	8.5	M10	**SBPFL207**	PFL207		SB207	25.7	15.4	13.9	0.66

[Note] 1) H_2 shows minimum dimension of mounting hole.
[Remark] For more detailed information, refer to ball bearing for unit specification tables.

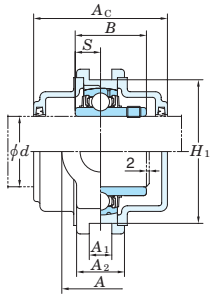
Ball bearing units
take-up type
UCT (with set screws)
d 12 ~ (55) mm



Pressed steel covers



Cast iron covers

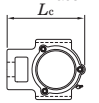


Tolerances for housing

unit : mm

housing No.			Δ_{A1s}	Δ_{H1s}	X
T204~ 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
		T319~ T322			0.7
		T324~ T328			0.8

Δ_{A1s} : deviation of nominal raceway groove width.
Δ_{H1s} : deviation of distance between both groove bottoms.
X : symmetricity tolerance of both groove-side face.



T204JE3, T205JE3 (with cast iron covers) are shown below.

T204JE3 L_c = 97 mm
T205JE3 L_c = 102 mm

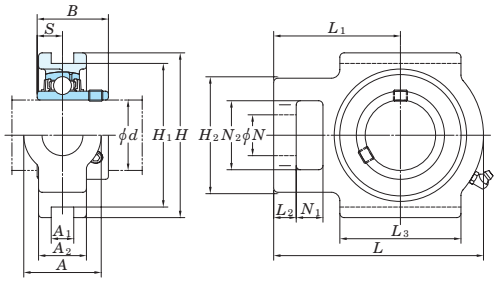
Shaft dia. (mm)	Dimensions (mm)															Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
																		No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	A	A_1	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}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
12	32	12	21	89	76	51	94	61	10	51	19	16	32	31	12.7	**UCT201**	T204	UC201	12.8	6.65	13.2	UCT201C	UCT201CD	—	—	44	—	0.81	—
15	32	12	21	89	76	51	94	61	10	51	19	16	32	31	12.7	**UCT202**	T204	UC202	12.8	6.65	13.2	UCT202C	UCT202CD	—	—	44	—	0.79	—
17	32	12	21	89	76	51	94	61	10	51	19	16	32	31	12.7	**UCT203**	T204	UC203	12.8	6.65	13.2	UCT203C	UCT203CD	—	—	44	—	0.78	—
20	32	12	21	89	76	51	94	61	10	51	19	16	32	31	12.7	**UCT204**	T204	UC204	12.8	6.65	13.2	UCT204C	UCT204CD	UCT204FC	UCT204FCD	44	62	0.76	1.1
25	32	12	24	89	76	51	97	62	10	51	19	16	32	34.1	14.3	**UCT205**	T205	UC205	14.0	7.85	13.9	UCT205C	UCT205CD	UCT205FC	UCT205FCD	48	66	0.84	1.2
	37	12	28	102	89	56	113	70	10	57	22	16	37	38.1	15.9	**UCTX05**	TX05	UCX05	19.5	11.3	13.9	UCTX05C	UCTX05CD	—	—	52	—	1.4	—
	36	12	26	89	80	62	122	76	12	65	26	16	36	38	15	**UCT305**	T305	UC305	21.2	10.9	12.6	—	—	UCT305C	UCT305CD	—	76	1.4	2.0
30	37	12	28	102	89	56	113	70	10	57	22	16	37	38.1	15.9	**UCT206**	T206	UC206	19.5	11.3	13.9	UCT206C	UCT206CD	UCT206FC	UCT206FCD	52	70	1.3	1.8
	37	12	30	102	89	64	129	78	13	64	22	16	37	42.9	17.5	**UCTX06**	TX06	UCX06	25.7	15.4	13.9	UCTX06C	UCTX06CD	—	—	59	—	1.7	—
	41	16	28	100	90	70	137	85	14	74	28	18	41	43	17	**UCT306**	T306	UC306	26.7	15.0	13.3	—	—	UCT306C	UCT306CD	—	82	1.8	2.4
35	37	12	30	102	89	64	129	78	13	64	22	16	37	42.9	17.5	**UCT207**	T207	UC207	25.7	15.4	13.9	UCT207C	UCT207CD	UCT207FC	UCT207FCD	59	78	1.6	2.3
	49	16	36	114	102	83	144	88	15	83	29	19	49	49.2	19	**UCTX07**	TX07	UCX07	29.1	17.8	14.0	UCTX07C	UCTX07CD	—	—	68	—	2.7	—
	45	16	32	111	100	75	150	94	15	80	30	20	45	48	19	**UCT307**	T307	UC307	33.4	19.3	13.2	—	—	UCT307C	UCT307CD	—	88	2.3	3.1
40	49	16	33	114	102	83	144	88	16	83	29	19	49	49.2	19	**UCT208**	T208	UC208	29.1	17.8	14.0	UCT208C	UCT208CD	UCT208FC	UCT208FCD	68	86	2.5	3.3
	49	16	36	117	102	83	144	87	15	83	29	19	49	49.2	19	**UCTX08**	TX08	UCX08	32.7	20.3	14.0	UCTX08C	UCTX08CD	—	—	68	—	2.6	—
	50	18	34	124	112	83	162	100	17	89	32	22	50	52	19	**UCT308**	T308	UC308	40.7	24.0	13.2	—	—	UCT308C	UCT308CD	—	96	3.0	4.0
45	49	16	35	117	102	83	144	87	16	83	29	19	49	49.2	19	**UCT209**	T209	UC209	32.7	20.3	14.0	UCT209C	UCT209CD	UCT209FC	UCT209FCD	68	88	2.4	3.2
	49	16	38	117	102	83	149	90	16	86	29	19	49	51.6	19	**UCTX09**	TX09	UCX09	35.1	23.3	14.4	UCTX09C	UCTX09CD	—	—	73	—	2.9	—
	55	18	38	138	125	90	178	110	18	97	34	24	55	57	22	**UCT309**	T309	UC309	48.9	29.5	13.3	—	—	UCT309C	UCT309CD	—	102	4.1	5.4
50	49	16	37	117	102	83	149	90	16	86	29	19	49	51.6	19	**UCT210**	T210	UC210	35.1	23.3	14.4	UCT210C	UCT210CD	UCT210FC	UCT210FCD	73	97	2.6	3.6
	64	22	42	146	130	102	171	106	19	95	35	25	64	55.6	22.2	**UCTX10**	TX10	UCX10	43.4	29.4	14.4	UCTX10C	UCTX10CD	—	—	75	—	4.4	—
	61	20	40	151	140	98	191	117	20	106	37	27	61	61	22	**UCT310**	T310	UC310	62.0	38.3	13.2	—	—	UCT310C	UCT310CD	—	110	4.9	6.5
55	64	22	38	146	130	102	171	106	19	95	35	25	64	55.6	22.2	**UCT211**	T211	UC211	43.4	29.4	14.4	UCT211C	UCT211CD	UCT211FC	UCT211FCD	75	99	4.0	5.2

[Remarks] 1) Applicable sizes of grease nipples are shown below.
B-1/4-28UNF ..... 201~210, X05~X09, 305~308
B-PT 1/8 ..... 211~217, X10~X17, 309~328

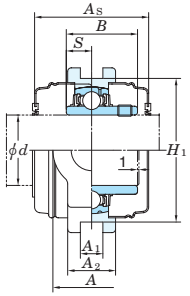
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCT206JL3, UC206L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

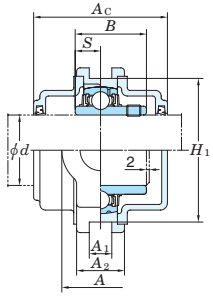
Ball bearing units
take-up type
UCT (with set screws)
d (55) ~ 100 mm



Pressed steel covers



Cast iron covers



Tolerances for housing

unit : mm

housing No.			Δ_{A1s}	Δ_{H1s}	X
T204~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
		T319~T322			0.7
		T324~T328			0.8

Δ_{A1s} : deviation of nominal raceway groove width.
Δ_{H1s} : deviation of distance between both groove bottoms.
X : symmetricity tolerance of both groove-side face.

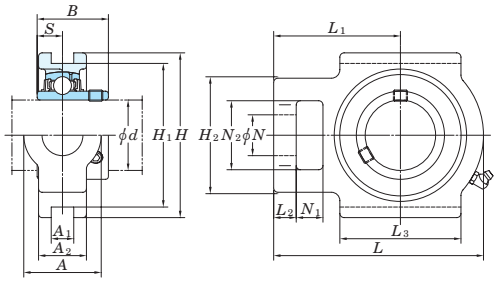
Shaft dia. (mm)	Dimensions (mm)															Unit No.	Housing No.	Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
																		No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	A	A_1	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}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
55	64	22	44	146	130	102	194	119	19	102	35	32	64	65.1	25.4	**UCTX11**	TX11	UCX11	52.4	36.2	14.4	UCTX11C	UCTX11CD	—	—	88	—	5.3	—
	66	22	44	163	150	105	207	127	21	115	39	29	66	66	25	**UCT311**	T311	UC311	71.6	45.0	13.2	—	—	UCT311C	UCT311CD	—	114	6.1	7.9
60	64	22	42	146	130	102	194	119	19	102	35	32	64	65.1	25.4	**UCT212**	T212	UC212	52.4	36.2	14.4	UCT212C	UCT212CD	UCT212FC	UCT212FCD	88	114	4.9	6.4
	70	26	48	167	151	111	224	137	21	121	41	32	70	65.1	25.4	**UCTX12**	TX12	UCX12	57.2	40.1	14.4	UCTX12C	UCTX12CD	—	—	88	—	7.4	—
	71	22	46	178	160	113	220	135	23	123	41	31	71	71	26	**UCT312**	T312	UC312	81.9	52.2	13.2	—	—	UCT312C	UCT312CD	—	124	7.6	9.9
65	70	26	44	167	151	111	224	137	21	121	41	32	70	65.1	25.4	**UCT213**	T213	UC213	57.2	40.1	14.4	UCT213C	UCT213CD	UCT213FC	UCT213FCD	88	114	6.9	8.6
	70	26	48	167	151	111	224	137	21	121	41	32	70	74.6	30.2	**UCTX13**	TX13	UCX13	62.2	44.1	14.5	UCTX13C	UCTX13CD	—	—	98	—	7.6	—
	80	26	50	190	170	116	238	146	25	134	43	32	70	75	30	**UCT313**	T313	UC313	92.7	59.9	13.2	—	—	UCT313C	UCT313CD	—	122	9.3	11.4
70	70	26	46	167	151	111	224	137	21	121	41	32	70	74.6	30.2	**UCT214**	T214	UC214	62.2	44.1	14.5	UCT214C	UCT214CD	UCT214FC	UCT214FCD	98	124	7.0	8.9
	70	26	48	167	151	111	232	140	21	121	41	32	70	77.8	33.3	**UCTX14**	TX14	UCX14	67.4	48.3	14.5	UCTX14C	UCTX14CD	—	—	98	—	7.9	—
	90	26	52	202	180	130	252	155	25	140	46	36	85	78	33	**UCT314**	T314	UC314	104	68.2	13.2	—	—	UCT314C	UCT314CD	—	124	11.1	13.4
75	70	26	48	167	151	111	232	140	21	121	41	32	70	77.8	33.3	**UCT215**	T215	UC215	67.4	48.3	14.5	UCT215C	UCT215CD	UCT215FC	UCT215FCD	98	124	7.3	9.2
	70	28	48	184	165	111	235	140	21	121	41	32	70	82.6	33.3	**UCTX15**	TX15	UCX15	72.7	53.0	14.6	UCTX15C	UCTX15CD	—	—	108	—	8.7	—
	90	26	55	216	192	132	262	160	25	150	46	36	85	82	32	**UCT315**	T315	UC315	113	77.2	13.2	—	—	UCT315C	UCT315CD	—	134	13.0	15.5
80	70	26	51	184	165	111	235	140	21	121	41	32	70	82.6	33.3	**UCT216**	T216	UC216	72.7	53.0	14.6	UCT216C	UCT216CD	UCT216FC	UCT216FCD	108	138	8.2	10.6
	73	28	54	198	173	124	260	162	28	157	48	38	73	85.7	34.1	**UCTX16**	TX16	UCX16	84.0	61.9	14.5	UCTX16C	UCTX16CD	—	—	112	—	11.7	—
	102	30	60	230	204	150	282	174	28	160	53	42	98	86	34	**UCT316**	T316	UC316	123	86.7	13.3	—	—	UCT316C	UCT316CD	—	138	16.2	19.1
85	73	30	54	198	173	124	260	162	29	157	48	38	73	85.7	34.1	**UCT217**	T217	UC217	84.0	61.9	14.5	UCT217C	UCT217CD	UCT217FC	UCT217FCD	112	142	11.0	13.7
	73	28	54	198	173	124	260	162	28	157	48	38	73	96	39.7	**UCTX17**	TX17	UCX17	96.1	71.5	14.5	UCTX17C	UCTX17CD	—	—	122	—	11.7	—
	102	32	64	240	214	152	298	183	30	170	53	42	98	96	40	**UCT317**	T317	UC317	133	96.8	13.3	—	—	UCT317C	UCT317CD	—	146	19.0	22.3
90	110	32	66	255	228	160	312	192	30	175	57	46	106	96	40	**UCT318**	T318	UC318	143	107	13.3	—	—	UCT318C	UCT318CD	—	150	21.6	25.4
95	110	35	72	270	240	165	322	197	31	180	57	46	106	103	41	**UCT319**	T319	UC319	153	119	13.3	—	—	UCT319C	UCT319CD	—	162	24.9	29.2
100	120	35	75	290	260	175	345	210	32	200	59	48	115	108	42	**UCT320**	T320	UC320	173	141	13.2	—	—	UCT320C	UCT320CD	—	174	30.7	36.3

[Remarks] 1) Applicable sizes of grease nipples are shown below.
B-1/4-28UNF..... 201~210, X05~X09, 305~308
B-PT 1/8 ..... 211~217, X10~X17, 309~328

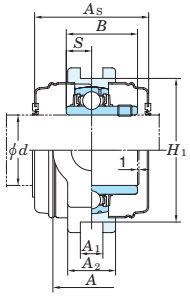
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCT206JL3, UC206L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

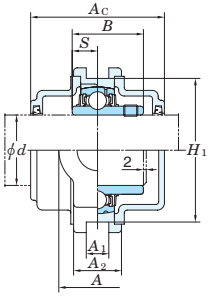
Ball bearing units
take-up type
UCT (with set screws)
d 105 ~ 140 mm



Pressed steel covers



Cast iron covers



Tolerances for housing

unit : mm

housing No.			Δ_{A1s}	Δ_{H1s}	X
T204~ 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
		T319~ T322			0.7
		T324~ T328			0.8

Δ_{A1s} : deviation of nominal raceway groove width.
Δ_{H1s} : deviation of distance between both groove bottoms.
X : symmetricity tolerance of both groove-side face.

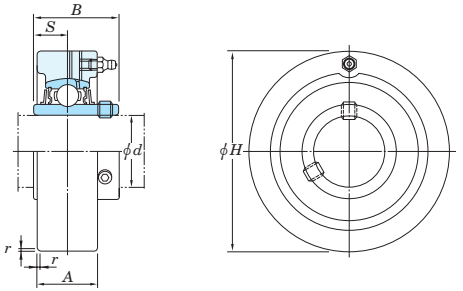
Shaft dia. (mm)	Dimensions (mm)															Unit No.	Housing No.		Applicable bearing				Unit No. with covers				Cover dimensions (mm)		(Refer.) Unit mass (kg)	
																			No.	Basic load ratings (kN)		Factor	Pressed steel covers		Cast iron covers				Pressed steel covers	Cast iron covers
d	A	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}	f_0	Open ends	Closed end	Open ends	Closed end	A_s	A_c		
105	120	35	75	290	260	175	345	210	32	200	59	48	115	112	44	**UCT321**	T321		UC321	184	153	13.2	—	—	UCT321C	UCT321CD	—	178	36.7	42.7
110	130	38	80	320	285	185	385	235	38	215	65	52	125	117	46	**UCT322**	T322		UC322	205	180	13.2	—	—	UCT322C	UCT322CD	—	188	39.7	46.5
120	140	45	90	355	320	210	432	267	42	230	70	60	140	126	51	**UCT324**	T324		UC324	207	185	13.5	—	—	UCT324C	UCT324CD	—	196	54.4	63.9
130	150	50	100	385	350	220	465	285	45	240	75	65	150	135	54	**UCT326**	T326		UC326	229	214	13.6	—	—	UCT326C	UCT326CD	—	214	69.3	81.4
140	155	50	100	415	380	230	515	315	50	255	80	70	160	145	59	**UCT328**	T328		UC328	253	246	13.6	—	—	UCT328C	UCT328CD	—	222	85.1	101

[Remarks] 1) Applicable sizes of grease nipples are shown below.
B-1/4-28UNF..... 201~210, X05~X09, 305~308
B-PT 1/8 ..... 211~217, X10~X17, 309~328

2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCT206JL3, UC206L3)

3) For more detailed information, refer to ball bearing for unit specification tables.

Ball bearing units
cartridge type
UCC (with set screws)
d 12 ~ 50 mm



Shaft dia. (mm) d	Dimensions (mm) H	A	r	B	S	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
12	72	20	1.5	31	12.7	**UCC201**	C204	UC201	12.8	6.65	13.2	0.52
15	72	20	1.5	31	12.7	**UCC202**	C204	UC202	12.8	6.65	13.2	0.50
17	72	20	1.5	31	12.7	**UCC203**	C204	UC203	12.8	6.65	13.2	0.49
20	72	20	1.5	31	12.7	**UCC204**	C204	UC204	12.8	6.65	13.2	0.47
25	80	22	1.5	34.1	14.3	**UCC205**	C205	UC205	14.0	7.85	13.9	0.64
	90	27	1.5	38.1	15.9	**UCCX05**	CX05	UCX05	19.5	11.3	13.9	1.0
	90	26	2	38	15	**UCC305**	C305	UC305	21.2	10.9	12.6	1.5
30	85	27	1.5	38.1	15.9	**UCC206**	C206	UC206	19.5	11.3	13.9	0.81
	100	30	2	42.9	17.5	**UCCX06**	CX06	UCX06	25.7	15.4	13.9	1.3
	100	28	2	43	17	**UCC306**	C306	UC306	26.7	15.0	13.3	1.7
35	90	28	2	42.9	17.5	**UCC207**	C207	UC207	25.7	15.4	13.9	0.93
	110	34	2	49.2	19	**UCCX07**	CX07	UCX07	29.1	17.8	14.0	1.7
	110	32	3	48	19	**UCC307**	C307	UC307	33.4	19.3	13.2	2.2
40	100	30	2	49.2	19	**UCC208**	C208	UC208	29.1	17.8	14.0	1.2
	120	38	2	49.2	19	**UCCX08**	CX08	UCX08	32.7	20.3	14.0	2.3
	120	34	3	52	19	**UCC308**	C308	UC308	40.7	24.0	13.2	2.2
45	110	31	2	49.2	19	**UCC209**	C209	UC209	32.7	20.3	14.0	1.5
	120	38	2	51.6	19	**UCCX09**	CX09	UCX09	35.1	23.3	14.4	2.3
	130	38	3	57	22	**UCC309**	C309	UC309	48.9	29.5	13.3	2.8
50	120	33	2	51.6	19	**UCC210**	C210	UC210	35.1	23.3	14.4	2.0
	130	40	2.5	55.6	22.2	**UCCX10**	CX10	UCX10	43.4	29.4	14.4	2.8
	140	40	3	61	22	**UCC310**	C310	UC310	62.0	38.3	13.2	3.2

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~213, X05~X12, 305~308
A-PT 1/8 ..... 309~328
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCC206JL3, UC206L3)
3) For more detailed information, refer to ball bearing for unit specification tables.

d 55 ~ 130 mm

Tolerances for housing

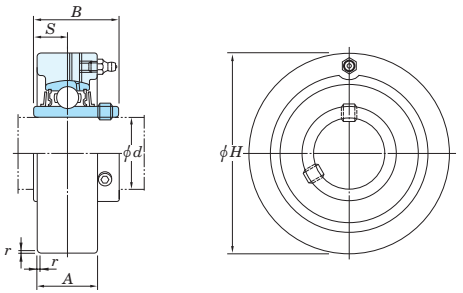
unit : mm

housing No.			Δ_{Hs}	Δ_{As}	Y
C204~ C205			0 -0.030	±0.2	0.2
C206~ C210	CX05~ CX08	C305~ C308	0 -0.035		
	CX09~ CX10	C309~ C310	0 -0.040		
C211~ C213	CX11~ CX12	C311~ C314		±0.3	0.3
		C315~ C318	0 -0.046		
		C319			0.4
		C320~ C322	0 -0.052		
		C324~ C328	0 -0.057		

Δ_{Hs} : deviation of outside diameter.
Δ_{As} : deviation of width.
Y : circumferential runout tolerances of outside diameter in respect to shaft straight line of spherical bearing seating.

Shaft dia. (mm) d	Dimensions (mm) H	A	r	B	S	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
55	125	35	2.5	55.6	22.2	**UCC211**	C211	UC211	43.4	29.4	14.4	2.2
	150	42	2.5	65.1	25.4	**UCCX11**	CX11	UCX11	52.4	36.2	14.4	4.0
	150	44	3	66	25	**UCC311**	C311	UC311	71.6	45.0	13.2	3.9
60	130	38	2.5	65.1	25.4	**UCC212**	C212	UC212	52.4	36.2	14.4	2.6
	160	44	2.5	65.1	25.4	**UCCX12**	CX12	UCX12	57.2	40.1	14.4	4.6
	160	46	3	71	26	**UCC312**	C312	UC312	81.9	52.2	13.2	4.8
65	140	40	2.5	65.1	25.4	**UCC213**	C213	UC213	57.2	40.1	14.4	3.0
	170	50	3	75	30	**UCC313**	C313	UC313	92.7	59.9	13.2	5.7
70	180	52	3	78	33	**UCC314**	C314	UC314	104	68.2	13.2	6.7
75	190	55	4	82	32	**UCC315**	C315	UC315	113	77.2	13.2	7.8
80	200	60	4	86	34	**UCC316**	C316	UC316	123	86.7	13.3	9.2
85	215	64	4	96	40	**UCC317**	C317	UC317	133	96.8	13.3	11.7
90	225	66	4	96	40	**UCC318**	C318	UC318	143	107	13.3	13.1
95	240	72	4	103	41	**UCC319**	C319	UC319	153	119	13.3	15.8
100	260	75	4	108	42	**UCC320**	C320	UC320	173	141	13.2	19.6
105	260	75	4	112	44	**UCC321**	C321	UC321	184	153	13.2	27.0
110	300	80	5	117	46	**UCC322**	C322	UC322	205	180	13.2	29.2
120	320	90	5	126	51	**UCC324**	C324	UC324	207	185	13.5	35.9
130	340	100	6	135	54	**UCC326**	C326	UC326	229	214	13.6	43.0

Ball bearing units
cartridge type
UCC (with set screws)
d 140 mm



Shaft dia. (mm) d	Dimensions (mm) H	A	r	B	S	Unit No.	Housing No.	Applicable bearing No.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	(Refer.) Unit mass (kg)
140	360	100	6	145	59	**UCC328**	C328	UC328	253	246	13.6	52.9

[Remarks] 1) Applicable sizes of grease nipples are shown below.
A-1/4-28UNF ..... 201~213, X05~X12, 305~308
A-PT 1/8 ..... 309~328
2) For bearings with double- or triple-lip seals, unit and bearing number are suffixed by L2 or L3. (UCC206JL3, UC206L3)
3) For more detailed information, refer to ball bearing for unit specification tables.

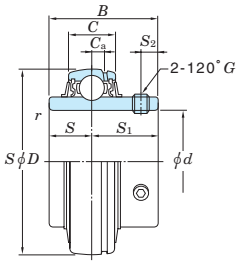
Tolerances for housing

unit : mm

housing No.			Δ_{Hs}	Δ_{As}	Y
C204~ C205			0 -0.030	±0.2	0.2
C206~ C210	CX05~ CX08	C305~ C308	0 -0.035		
	CX09~ CX10	C309~ C310	0 -0.040		
C211~ C213	CX11~ CX12	C311~ C314		±0.3	0.3
		C315~ C318	0 -0.046		
		C319			0.4
		C320~ C322	0 -0.052		
		C324~ C328	0 -0.057		

Δ_{Hs} : deviation of outside diameter.
Δ_{As} : deviation of width.
Y : circumferential runout tolerances of outside diameter in respect to shaft straight line of spherical bearing seating.

Ball bearings for units
cylindrical bore type (with set screws)
d 8 ~ (35) mm



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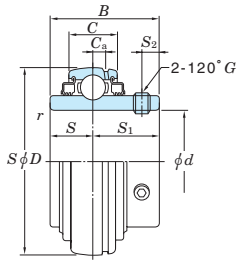
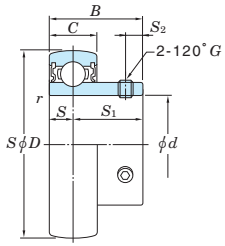
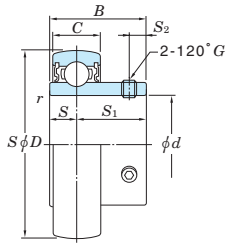


UC-L3



SB

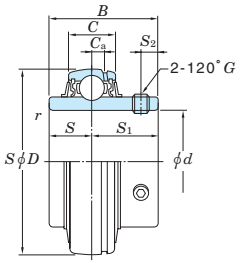


SU

Shaft dia. (mm) d	Boundary dimensions (mm) D	B	C	r min.	Basic load ratings (kN) C_r	C_{0r}	Factor f_0	Bearing No. With standard seals	With triple-lip seals	Dimensions (mm) C_a	S	S_1	S_2	Set screw size G	(Refer.) Mass (kg)
8	22	12	7	0.3	3.27	1.37	12.4	**SU08**	—	—	3.5	8.5	2.8	M3×0.35	0.012
10	26	15	8	0.3	4.55	1.95	12.3	**SU000**	—	—	5	10	3	M3×0.35	0.024
12	28	15	8	0.3	5.10	2.40	13.2	**SU001**	—	—	5	10	3	M3×0.35	0.026
	40	22	12	0.6	9.55	4.80	13.2	**SB201**	—	—	6	16	4	M5×0.5	0.10
	47	31	16	0.6	12.8	6.65	13.2	**UC201**	**UC201L2**	4	12.7	18.3	5	M6×0.75	0.21
15	32	16.5	9	0.3	5.60	2.85	13.9	**SU002**	—	—	5.5	11	3.3	M4×0.5	0.038
	40	22	12	0.6	9.55	4.80	13.2	**SB202**	—	—	6	16	4	M5×0.5	0.10
	47	31	16	0.6	12.8	6.65	13.2	**UC202**	**UC202L2**	4	12.7	18.3	5	M6×0.75	0.19
17	35	17.5	10	0.3	6.00	3.25	14.4	**SU003**	—	—	6	11.5	3.3	M4×0.5	0.050
	40	22	12	0.6	9.55	4.80	13.2	**SB203**	—	—	6	16	4	M5×0.5	0.10
	47	31	16	0.6	12.8	6.65	13.2	**UC203**	**UC203L2**	4	12.7	18.3	5	M6×0.75	0.18
20	42	21	12	0.6	9.40	5.05	13.9	**SU004**	—	—	7	14	4	M5×0.5	0.080
	47	25	14	1	12.8	6.65	13.2	**SB204**	—	—	7	18	5	M6×0.75	0.15
	47	31	16	1	12.8	6.65	13.2	**UC204**	**UC204L2**	4	12.7	18.3	5	M6×0.75	0.16
25	47	22	12	0.6	10.1	5.85	14.5	**SU005**	—	—	7	15	4.5	M5×0.5	0.10
	52	27	15	1	14.0	7.85	13.9	**SB205**	—	—	7.5	19.5	5.5	M6×0.75	0.18
	52	34.1	17	1	14.0	7.85	13.9	**UC205**	**UC205L2**	3.5	14.3	19.8	5.5	M6×0.75	0.20
	62	38	22	1.1	21.2	10.9	13.2	**UC305**	—	5	15	23	6	M6×0.75	0.45
	62	38.1	19	1	19.5	11.3	13.9	**UCX05**	**UCX05L3**	4.5	15.9	22.2	6	M6×0.75	0.39
30	55	24.5	13	1	13.2	8.25	14.7	**SU006**	—	—	7.5	17	5.5	M5×0.5	0.15
	62	30	16	1	19.5	11.3	13.9	**SB206**	—	—	8	22	6	M6×0.75	0.27
	62	38.1	19	1	19.5	11.3	13.9	**UC206**	**UC206L3**	4.5	15.9	22.2	6	M6×0.75	0.32
	72	42.9	20	1	25.7	15.4	13.9	**UCX06**	**UCX06L3**	4.5	17.5	25.4	6.5	M8×1	0.58
	72	43	24	1.1	26.7	15.0	13.3	**UC306**	—	5.5	17	26	6	M6×0.75	0.56
35	72	32	17	1.1	25.7	15.4	13.9	**SB207**	—	—	8.5	23.5	6	M6×0.75	0.42

[Remarks] 1) SU type bearings are ball bearings for compact series units.
2) UC201 to UC205 are with double-lip seals.

Ball bearings for units
cylindrical bore type (with set screws)
d (35) ~ (75) mm



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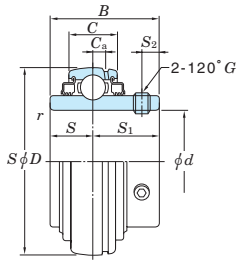
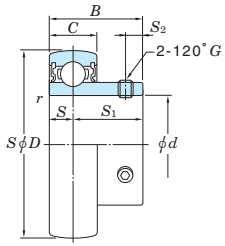


UC-L3



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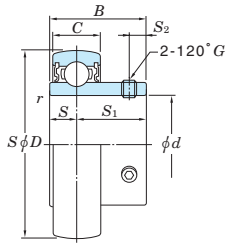
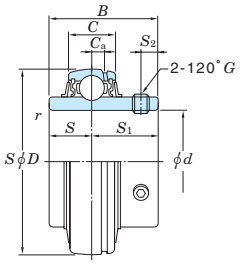


SU

Shaft dia. (mm)	Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Bearing No.		Dimensions (mm)				Set screw size	(Refer.) Mass
d	D	B	C	r min.	C_r	C_{0r}	f_0	With standard seals	With triple-lip seals	C_a	S	S_1	S_2	G	(kg)
35	72	42.9	20	1.1	25.7	15.4	13.9	**UC207**	**UC207L3**	4.5	17.5	25.4	6.5	M8×1	0.48
	80	48	26	1.5	33.4	19.3	13.2	**UC307**	**UC307L3**	5.5	19	29	8	M8×1	0.71
	80	49.2	21	1.1	29.1	17.8	14.0	**UCX07**	**UCX07L3**	4.5	19	30.2	8	M8×1	0.75
40	80	34	18	1.1	29.1	17.8	14.0	**SB208**	—	—	9	25	8	M8×1	0.60
	80	49.2	21	1.1	29.1	17.8	14.0	**UC208**	**UC208L3**	4.5	19	30.2	8	M8×1	0.64
	85	49.2	22	1.1	32.7	20.3	14.0	**UCX08**	**UCX08L3**	5	19	30.2	8	M8×1	0.83
	90	52	28	1.5	40.7	24.0	13.2	**UC308**	**UC308L3**	6	19	33	10	M10×1.25	1.00
45	85	49.2	22	1.1	32.7	20.3	14.0	**UC209**	**UC209L3**	5	19	30.2	8	M8×1	0.68
	90	51.6	24	1.1	35.1	23.3	14.4	**UCX09**	**UCX09L3**	6	19	32.6	9	M10×1.25	0.95
	100	57	30	1.5	48.9	29.5	13.3	**UC309**	**UC309L3**	6.5	22	35	10	M10×1.25	1.33
50	90	51.6	24	1.1	35.1	23.3	14.4	**UC210**	**UC210L3**	6	19	32.6	9	M10×1.25	0.80
	100	55.6	25	1.1	43.4	29.4	14.4	**UCX10**	**UCX10L3**	5.5	22.2	33.4	9	M10×1.25	1.29
	110	61	32	2	62.0	38.3	13.2	**UC310**	**UC310L3**	7	22	39	12	M12×1.5	1.69
55	100	55.6	25	1.5	43.4	29.4	14.4	**UC211**	**UC211L3**	5.5	22.2	33.4	9	M10×1.25	1.11
	110	65.1	27	1.5	52.4	36.2	14.4	**UCX11**	**UCX11L3**	6	25.4	39.7	10.5	M10×1.25	1.80
	120	66	34	2	71.6	45.0	13.2	**UC311**	**UC311L3**	7	25	41	12	M12×1.5	1.90
60	110	65.1	27	1.5	52.4	36.2	14.4	**UC212**	**UC212L3**	6	25.4	39.7	10.5	M10×1.25	1.54
	120	65.1	28	1.5	57.2	40.1	14.4	**UCX12**	**UCX12L3**	6.5	25.4	39.7	12	M12×1.5	2.05
	130	71	36	2.1	81.9	52.2	13.2	**UC312**	**UC312L3**	6.5	26	45	12	M12×1.5	2.60
65	120	65.1	28	1.5	57.2	40.1	14.4	**UC213**	**UC213L3**	6.5	25.4	39.7	12	M12×1.5	1.86
	125	74.6	30	1.5	62.2	44.1	14.5	**UCX13**	**UCX13L3**	6	30.2	44.4	12	M12×1.5	2.52
	140	75	38	2.1	92.7	59.9	13.2	**UC313**	**UC313L3**	7	30	45	12	M12×1.5	3.16
70	125	74.6	30	1.5	62.2	44.1	14.5	**UC214**	**UC214L3**	6	30.2	44.4	12	M12×1.5	2.05
	130	77.8	32	1.5	67.4	48.3	14.5	**UCX14**	**UCX14L3**	7	33.3	44.5	12	M12×1.5	2.74
	150	78	40	2.1	104	68.2	13.2	**UC314**	**UC314L3**	7.5	33	45	12	M12×1.5	3.90
75	130	77.8	32	1.5	67.4	48.3	14.5	**UC215**	**UC215L3**	7	33.3	44.5	12	M12×1.5	2.21

Ball bearings for units
cylindrical bore type (with set screws)
d (75) ~ 140 mm



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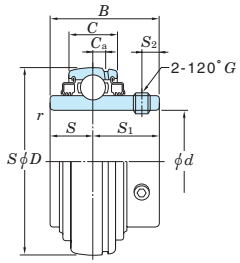

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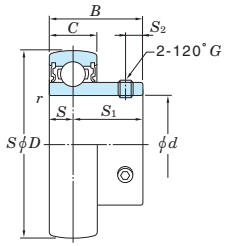

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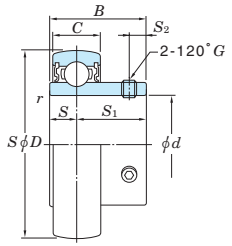
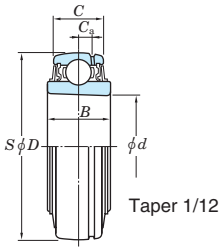


SU

Shaft dia. (mm)	Boundary dimensions (mm)				Basic load ratings (kN)		Factor	Bearing No.		Dimensions (mm)				Set screw size	(Refer.) Mass
d	D	B	C	r min.	C_r	C_{0r}	f_0	With standard seals	With triple-lip seals	C_a	S	S_1	S_2	G	(kg)
75	140	82.6	33	1.5	72.7	53.0	14.6	**UCX15**	**UCX15L3**	7.5	33.3	49.3	14	M12×1.5	3.41
	160	82	42	2.1	113	77.2	13.2	**UC315**	**UC315L3**	6.5	32	50	14	M14×1.5	4.70
80	140	82.6	33	2	72.7	53.0	14.6	**UC216**	**UC216L3**	7.5	33.3	49.3	14	M12×1.5	2.79
	150	85.7	35	2	84.0	61.9	14.5	**UCX16**	**UCX16L3**	7.5	34.1	51.6	14	M12×1.5	3.87
	170	86	44	2.1	123	86.7	13.3	**UC316**	**UC316L3**	7	34	52	14	M14×1.5	5.60
85	150	85.7	35	2	84.0	61.9	14.5	**UC217**	**UC217L3**	7.5	34.1	51.6	14	M12×1.5	3.45
	160	96	38	2	96.1	71.5	14.5	**UCX17**	**UCX17L3**	8	39.7	56.3	15	M12×1.5	5.05
	180	96	46	3	133	96.8	13.3	**UC317**	**UC317L3**	8	40	56	16	M16×1.5	6.90
90	160	96	38	2	96.1	71.5	14.5	**UC218**	**UC218L3**	8	39.7	56.3	15	M12×1.5	4.35
	170	104	40	2	109	81.9	14.4	**UCX18**	—	8.5	42.9	61.1	16	M14×1.5	6.00
	190	96	48	3	143	107	13.3	**UC318**	**UC318L3**	8.5	40	56	16	M16×1.5	7.87
95	200	103	50	3	153	119	13.3	**UC319**	**UC319L3**	8.5	41	62	18	M16×1.5	8.91
100	190	117.5	43	2.1	133	105	14.4	**UCX20**	—	8.5	49.2	68.3	18	M16×1.5	8.56
	215	108	54	3	173	141	13.2	**UC320**	**UC320L3**	9	42	66	20	M18×1.5	11.2
105	225	112	56	3	184	153	13.2	**UC321**	—	9	44	68	20	M18×1.5	12.7
110	240	117	60	3	205	180	13.2	**UC322**	**UC322L3**	10	46	71	20	M18×1.5	15.1
120	260	126	64	3	207	185	13.5	**UC324**	**UC324L3**	11	51	75	20	M18×1.5	19.0
130	280	135	68	4	229	214	13.6	**UC326**	**UC326L3**	12	54	81	20	M20×1.5	23.6
140	300	145	72	4	253	246	13.6	**UC328**	**UC328L3**	13	59	86	20	M20×1.5	29.4

Ball bearings for units
tapered bore type (with adapter)

d_1 20 ~ 55 mm



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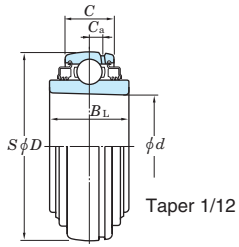
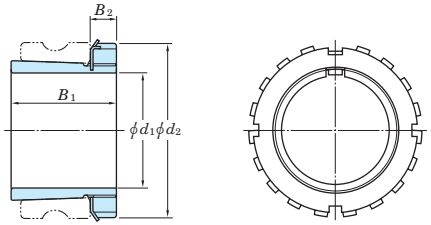


UK...L3
(with triple-lip seals)



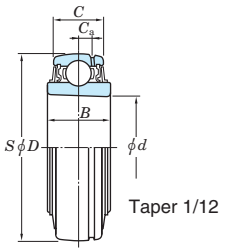
Adapter assembly

Shaft dia. (mm)	Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Bearing No.		(Refer.) Mass (kg)		Applicable adapter assembly (H3 series [1])						Applicable adapter assembly (H23 series [1])					
										With standard seals	With triple-lip seals	With standard seals	With triple-lip seals	No.	Dimensions (mm) B_1	B_2	d_2	Mass (kg)	Sleeve No.	No.	Dimensions (mm) B_1	B_2	d_2	Mass (kg)	Sleeve No.
d_1	d	D	B	B_L	C	C_a	C_r	C_{0r}	f_0																
20	25	52	21	24	17	5	14.0	7.85	13.9	**UK205**	**UK205L2**	0.16	0.18	H305X	29	8	38	0.085	A305X	H2305X	35	8	38	0.097	A2305X
	25	62	23	—	19	5	19.5	11.3	13.9	**UKX05**	—	0.27	—	—	—	—	—	—	—	H2305X	35	8	38	0.097	A2305X
	25	62	27	—	22	6	21.2	10.9	12.6	**UK305**	—	0.40	—	—	—	—	—	—	—	H2305X	35	8	38	0.097	A2305X
25	30	62	23	27	19	5	19.5	11.3	13.9	**UK206**	**UK206L3**	0.25	0.29	H306X	31	8	45	0.11	A306X	H2306X	38	8	45	0.13	A2306X
	30	72	26	—	20	5.5	25.7	15.4	13.9	**UKX06**	—	0.43	—	—	—	—	—	—	—	H2306X	38	8	45	0.13	A2306X
	30	72	30	—	24	6.5	26.7	15.0	13.3	**UK306**	—	0.47	—	—	—	—	—	—	—	H2306X	38	8	45	0.13	A2306X
30	35	72	26	30	20	5.5	25.7	15.4	13.9	**UK207**	**UK207L3**	0.37	0.43	H307X	35	9	52	0.16	A307X	H2307X	43	9	52	0.19	A2307X
	35	80	27	—	21	6	29.1	17.8	14.0	**UKX07**	—	0.53	—	—	—	—	—	—	—	H2307X	43	9	52	0.19	A2307X
	35	80	33	33	26	7.5	33.4	19.3	13.2	**UK307**	**UK307L3**	0.60	—	—	—	—	—	—	—	H2307X	43	9	52	0.19	A2307X
35	40	80	27	34	21	6	29.1	17.8	14.0	**UK208**	**UK208L3**	0.47	0.58	H308X	36	10	58	0.20	A308X	H2308X	46	10	58	0.24	A2308X
	40	85	29	—	22	6	32.7	20.3	14.0	**UKX08**	—	0.58	—	—	—	—	—	—	—	H2308X	46	10	58	0.24	A2308X
	40	90	35	35	28	8	40.7	24.0	13.2	**UK308**	**UK308L3**	0.80	—	—	—	—	—	—	—	H2308X	46	10	58	0.24	A2308X
40	45	85	29	36	22	6	32.7	20.3	14.0	**UK209**	**UK209L3**	0.52	0.65	H309X	39	11	65	0.27	A309X	H2309X	50	11	65	0.31	A2309X
	45	90	29	—	24	6	35.1	23.3	14.4	**UKX09**	—	0.67	—	—	—	—	—	—	—	H2309X	50	11	65	0.31	A2309X
	45	100	38	38	30	8.5	48.9	29.5	13.3	**UK309**	**UK309L3**	1.08	—	—	—	—	—	—	—	H2309X	50	11	65	0.31	A2309X
45	50	90	29	36	24	6	35.1	23.3	14.4	**UK210**	**UK210L3**	0.59	0.65	H310X	42	12	70	0.32	A310X	H2310X	55	12	70	0.39	A2310X
	50	100	31	—	25	7	43.4	29.4	14.4	**UKX10**	—	0.89	—	—	—	—	—	—	—	H2310X	55	12	70	0.39	A2310X
	50	110	40	40	32	9	62.0	38.3	13.2	**UK310**	**UK310L3**	1.38	—	—	—	—	—	—	—	H2310X	55	12	70	0.39	A2310X
50	55	100	31	40	25	7	43.4	29.4	14.4	**UK211**	**UK211L3**	0.80	1.09	H311X	45	12	75	0.37	A311X	H2311X	59	12	75	0.45	A2311X
	55	110	33	—	27	7.5	52.4	36.2	14.4	**UKX11**	—	1.15	—	—	—	—	—	—	—	H2311X	59	12	75	0.45	A2311X
	55	120	43	43	34	10	71.6	45.0	13.2	**UK311**	**UK311L3**	1.78	—	—	—	—	—	—	—	H2311X	59	12	75	0.45	A2311X
55	60	110	33	47	27	7.5	52.4	36.2	14.4	**UK212**	**UK212L3**	1.02	1.41	H312X	47	13	80	0.42	A312X	H2312X	62	13	80	0.51	A2312X
	60	120	36	—	28	7.5	57.2	40.1	14.4	**UKX12**	—	1.45	—	—	—	—	—	—	—	H2312X	62	13	80	0.51	A2312X
	60	130	47	47	36	11.5	81.9	52.2	13.2	**UK312**	**UK312L3**	2.06	—	—	—	—	—	—	—	H2312X	62	13	80	0.51	A2312X

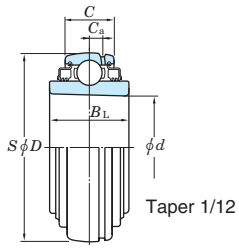
[Remarks] 1) For bearings with adapters, bearing numbers shown in dimension tables are suffixed by applicable adapter assembly numbers.
(UK206+H306X, UK206L3+H2306X)
2) Adapter assemblies applicable to UK 2 series are classified as follows.
UK2..... H3 series
UK2...L3 ..... H23 series
3) UK205 is with double-lip seals.
4) Please consult with JTEKT when using adapter with inch series bore diameter.

Koyo

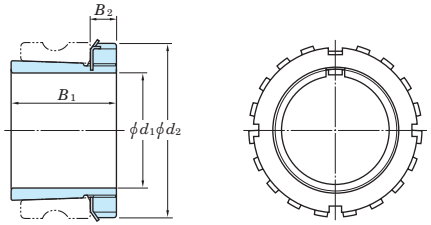
d_1 60 ~ 125 mm



UK



UK...L3
(with triple-lip seals)

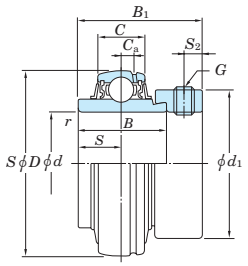


Adapter assembly

Shaft dia. (mm)	Boundary dimensions (mm)						Basic load ratings (kN)		Factor	Bearing No.		(Refer.) Mass (kg)		Applicable adapter assembly (H3 series [1])						Applicable adapter assembly (H23 series [1])					
										With standard seals	With triple-lip seals	With standard seals	With triple-lip seals	No.	Dimensions (mm)			Mass (kg)	Sleeve No.	No.	Dimensions (mm)			Mass (kg)	Sleeve No.
d_1	d	D	B	B_L	C	C_a	C_r	C_{0r}	f_0						B_1	B_2	d_2				B_1	B_2	d_2		
60	65	120	36	47	28	7.5	57.2	40.1	14.4	**UK213**	**UK213L3**	1.34	1.67	H313X	50	14	85	0.49	A313X	H2313X	65	14	85	0.59	A2313X
	65	125	40	—	30	9	62.2	44.1	14.5	**UKX13**	—	1.62	—	—	—	—	—	—	—	H2313X	65	14	85	0.59	A2313X
	65	140	49	49	38	12	92.7	59.9	13.2	**UK313**	**UK313L3**	2.71	—	—	—	—	—	—	—	H2313X	65	14	85	0.59	A2313X
65	75	130	40	51	32	9	67.4	48.3	14.5	**UK215**	**UK215L3**	1.50	1.99	H315X	55	15	98	0.89	A315X	H2315X	73	15	98	1.11	A2315X
	75	140	42	—	33	9	72.7	53.0	14.6	**UKX15**	—	2.10	—	—	—	—	—	—	—	H2315X	73	15	98	1.11	A2315X
	75	160	55	55	42	14.5	113	77.2	13.2	**UK315**	**UK315L3**	3.80	—	—	—	—	—	—	—	H2315X	73	15	98	1.11	A2315X
70	80	140	42	55	33	9	72.7	53.0	14.6	**UK216**	**UK216L3**	1.96	2.56	H316X	59	17	105	1.09	A316X	H2316X	78	17	105	1.34	A2316X
	80	150	44	—	35	10	84.0	61.9	14.5	**UKX16**	—	2.64	—	—	—	—	—	—	—	H2316X	78	17	105	1.34	A2316X
	80	170	55	55	44	15	123	86.7	13.3	**UK316**	**UK316L3**	4.39	—	—	—	—	—	—	—	H2316X	78	17	105	1.34	A2316X
75	85	150	44	57	35	10	84.0	61.9	14.5	**UK217**	**UK217L3**	2.42	3.10	H317X	63	18	110	1.24	A317X	H2317X	82	18	110	1.52	A2317X
	85	160	48	—	38	11	96.1	71.5	14.5	**UKX17**	—	3.25	—	—	—	—	—	—	—	H2317X	82	18	110	1.52	A2317X
	85	180	60	60	46	15	133	96.8	13.3	**UK317**	**UK317L3**	5.30	—	—	—	—	—	—	—	H2317X	82	18	110	1.52	A2317X
80	90	160	48	63	38	11	96.1	71.5	14.5	**UK218**	**UK218L3**	2.90	3.77	H318X	65	18	120	1.45	A318X	H2318X	86	18	120	1.70	A2318X
	90	170	50	—	40	11.5	109	81.9	14.4	**UKX18**	—	3.80	—	—	—	—	—	—	—	H2318X	86	18	120	1.70	A2318X
	90	190	60	60	48	15.5	143	107	13.3	**UK318**	**UK318L3**	6.20	—	—	—	—	—	—	—	H2318X	86	18	120	1.70	A2318X
85	95	200	66	66	50	16.5	153	119	13.3	**UK319**	**UK319L3**	7.31	—	—	—	—	—	—	—	H2319X	90	19	125	1.99	A2319X
90	100	190	54	—	43	13	133	105	14.4	**UKX20**	—	5.36	—	—	—	—	—	—	—	H2320X	97	20	130	2.28	A2320X
	100	215	68	68	54	18	173	141	13.2	**UK320**	**UK320L3**	8.70	—	—	—	—	—	—	—	H2320X	97	20	130	2.28	A2320X
100	110	240	78	78	60	20	205	180	13.2	**UK322**	**UK322L3**	12.2	—	—	—	—	—	—	—	H2322X	105	21	145	2.87	A2322X
110	120	260	87	87	64	21	207	185	13.5	**UK324**	**UK324L3**	16.1	—	—	—	—	—	—	—	H2324X	112	22	155	3.32	A2324X
115	130	280	87	87	68	22	229	214	13.6	**UK326**	**UK326L3**	18.8	—	—	—	—	—	—	—	H2326	121	23	165	4.82	A2326
125	140	300	97	97	72	23	253	246	13.6	**UK328**	**UK328L3**	23.9	—	—	—	—	—	—	—	H2328	131	24	180	5.86	A2328

[Remarks] 1) For bearings with adapters, bearing numbers shown in dimension tables are suffixed by applicable adapter assembly numbers.
(UK206+H306X, UK206L3+H2306X)
2) Adapter assemblies applicable to UK 2 series are classified as follows.
UK2 ..... H3 series
UK2...L3 ..... H23 series
3) Please consult with JTEKT when using adapter with inch series bore diameter.

Ball bearings for units
cylindrical bore type (with eccentric locking collar)
d 20 ~ 60 mm

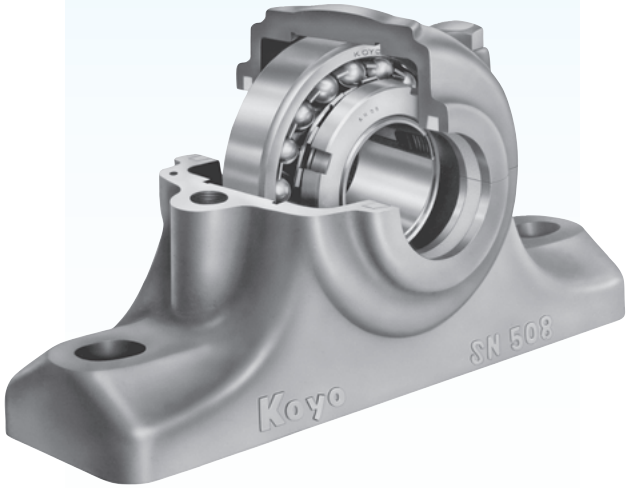


NA

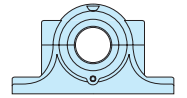
Shaft dia. (mm)	Boundary dimensions (mm)					Basic load ratings (kN)		Factor	Bearing No.		Dimensions (mm)				Set screw size	(Refer.) Mass (kg)
d	D	B	B_1	C	r min.	C_r	C_{0r}	f_0			C_a	S	S_2	d_1	G	
20	47	34.2	43.7	16	1	12.8	6.65	13.2	**NA204**		4	17.1	4.8	33.3	M6×0.75	0.22
25	52	34.9	44.4	17	1	14.0	7.85	13.9	**NA205**		5	17.5	4.8	38.1	M6×0.75	0.25
30	62	36.5	48.4	19	1	19.5	11.3	13.9	**NA206**		5	18.3	6	44.5	M8×1	0.41
35	72	37.6	51.1	20	1.1	25.7	15.4	13.9	**NA207**		5.5	18.8	6.8	55.6	M8×1	0.61
40	80	42.8	56.3	21	1.1	29.1	17.8	14.0	**NA208**		6	21.4	6.8	60.3	M8×1	0.78
45	85	42.8	56.3	22	1.1	32.7	20.3	14.0	**NA209**		6	21.4	6.8	63.5	M8×1	0.85
50	90	49.2	62.7	24	1.1	35.1	23.3	14.4	**NA210**		6	24.6	6.8	69.9	M8×1	1.01
55	100	55.5	71.4	25	1.5	43.4	29.4	14.4	**NA211**		7	27.8	8	76.2	M10×1.25	1.39
60	110	61.9	77.8	27	1.5	52.4	36.2	14.4	**NA212**		7.5	31	8	84.2	M10×1.25	1.87

Plummer blocks

Plummer blocks consist of self-aligning ball bearings or spherical roller bearings, and a housing in which the bearings are installed. The housing varies in shape. Having a large load capacity and being easy to handle, plummer blocks are employed in a variety of industrial machines, such as carrying machines.

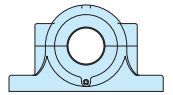


Split type : standard



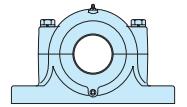
Bore diameter **20 – 170** mm

Split type : flat bottom



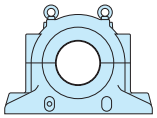
Bore diameter **20 – 140** mm

Split type : flat bottom
(different bore diameter type/
large bore diameter type)



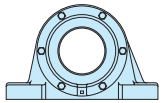
Bore diameter **25 – 160** mm

Split type : large size



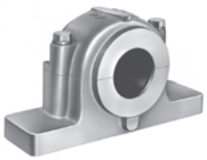
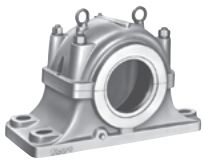
Bore diameter **150 – 360** mm

One-piece type



Bore diameter **20 – 170** mm

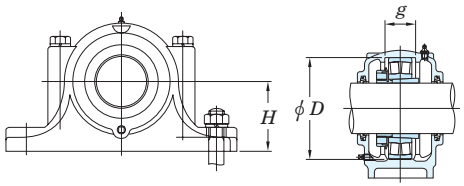
Table 1 Plummer block types

Housing type		Applicable bearing series (plummer block unit series number)	
		Self-aligning ball bearing	Spherical roller bearing
Split type : standard (SN) 	SN5	12K(SN15), 22K(SN25)	222K(SN225), 232K(SN235)
	SN6	13K(SN16), 23K(SN26)	213K(SN216), 223K(SN226)
	SN33	—	230K(SN233)
	SN34	—	231K(SN234)
	Small-or medium-size ; most general		
Split type : flat bottom (SSN) 	SSN5	12K(SSN15), 22K(SSN25)	222K(SSN225), 232K(SSN235)
	SSN6	13K(SSN16), 23K(SSN26)	213K(SSN216), 223K(SSN226)
	* SSN2	12 (SSN12), 22 (SSN22)	222 (SSN222), 232 (SSN232)
	* SSN3	13 (SSN13), 23 (SSN23)	213 (SSN213), 223 (SSN223)
	** SSN2B	12 (SSN12B), 22 (SSN22B)	222 (SSN222B), 232 (SSN232B)
	** SSN3B	13 (SSN13B), 23 (SSN23B)	213 (SSN213B), 223 (SSN223B)
	● Has a flat bottom and is more heavy-duty than the SN type. ● Optionally, bolt holes can be provided.		
Split type : large size (SD) 	SD5	—	222K(SD225)
	SD6	—	223K(SD226)
	SD31L	—	231K(SD231L)
	SD33	—	230K(SD233)
	SD34	—	231K(SD234)
	Large size and most suitable for applications which involve heavy loading.		
One-piece type (V) 	V5	12K(V15), 22K(V25)	222K(V225), 232K(V235)
	V6	13K(V16), 23K(V26)	213K(V216), 223K(V226)
	* V2	12 (V12), 22 (V22)	222 (V222), 232 (V232)
	* V3	13 (V13), 23 (V23)	213 (V213), 223 (V223)
	● Has a monolithic housing. ● Excellent processing performance and high rigidity.		

[Notes] * "Different bore diameter type," whose bore diameter of housing or cover differs from side to side. A cylindrical bore bearing is attached to a stepped shaft with a locknut and lockwasher.
** "Large bore diameter type," whose housing or cover has a large-diameter bore. A cylindrical bore bearing is attached to the small side of a stepped shaft with a concentric collar.

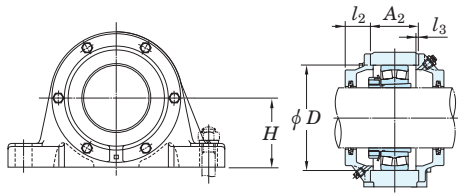
[Remark] This catalog includes major types of plummer blocks which are boxed in the table above. For other series and special series, refer to separate catalogs.

Table 2 Split plummer block housing dimensional tolerance (JIS B 1551)



Housing series	Bearing seating bore diameter D	Bearing seating width g	Center height H
SN5, SN6 SN33, SN34 SSN5, SSN6 SSN2, SSN3 SD5, SD6 SD33, SD34 SD31L	H8	H13	h13

Table 3 One-piece plummer block housing dimensional tolerance (BAS 188)

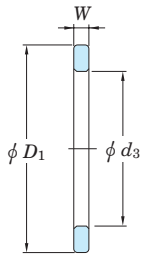


Unit : mm

Housing series	Bearing seating bore diameter D	Bearing seating width A_2	Center height H	Cover size l_2	Cover spigot joint height l_3
V5, V6 V2, V3	H7	+0.2 0	h11	±1	0 −0.2

[Remark] The degree of parallelism between the bottom surface and bearing seating center line should be 1/2 000 or less.

Table 4 Stabilizing ring dimensional tolerance



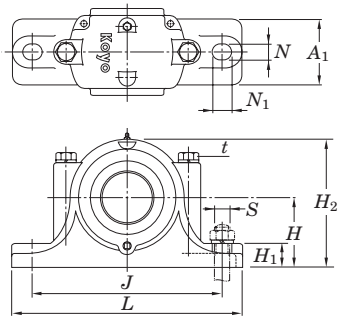
Unit : mm

Outside diameter D_1	Bore diameter d_3	Width W
h12	(SR47 × 5 to SR130 × 12.5) ±0.8	0 −0.2
	(SR140 × 8.5 to SR340 × 10) ±1.2	

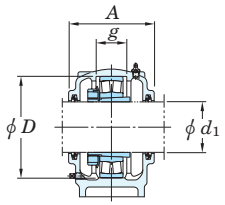
[Remark] Stabilizing ring is installed in bearing seating of plummer block, on the fixed side. It prevents bearing from moving in the axial direction.

Refer to Table 7-3 on pp. A 54 to A 57 for the dimensional tolerance of self-aligning ball bearings and spherical roller bearings which are used with plummer blocks. Refer to Table 7-11 on p. A 70 for tapered bore tolerances.

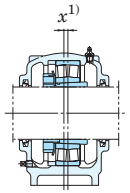
Plummer blocks
split type, standard
SN 5, 6, 33, 34
d_1 20 ~ (60) mm



Free side



Fixed side
(When one stabilizing ring used



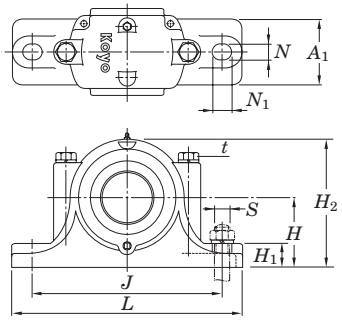
Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)												Bolt size	Housing No.		(Refer.) Housing mass	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring		Applicable oil seal No.
d_1	D	H	J	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	S			(kg)			Self-aligning ball brg.	Spherical roller brg.		No. Outside dia.×Width	Qty.	MZ
20	52	40	130	165	67	46	22	75	15	20	25	M8	M12	**SN505**		1.2	R 1/8	R 1/8	1205K 2205K	— 22205RHRK	H205X H305X	SR52×5 SR52×7	2 1	MZ05
	62	50	150	185	80	52	22	90	15	20	34	M8	M12	**SN605**		1.8	R 1/8	R 1/8	1305K 2305K	—	H305X H2305X	SR62×8.5 SR62×10	2 1	MZ05
25	62	50	150	185	77	52	22	90	15	20	30	M8	M12	**SN506**		1.9	R 1/8	R 1/8	1206K 2206K	— 22206RHRK	H206X H306X	SR62×7 SR62×10	2 1	MZ06
	72	50	150	185	82	52	22	95	15	20	37	M10	M12	**SN606**		2.1	R 1/8	R 1/8	1306K 2306K	—	H306X H2306X	SR72×9 SR72×10	2 1	MZ06
30	72	50	150	185	82	52	22	95	15	20	33	M10	M12	**SN507**		2.3	R 1/8	R 1/8	1207K 2207K	— 22207RHRK	H207X H307X	SR72×8 SR72×10	2 1	MZ07
	80	60	170	205	90	60	25	110	15	20	41	M10	M12	**SN607**		2.6	R 1/8	R 1/8	1307K 2307K	—	H307X H2307X	SR80×10 SR80×10	2 1	MZ07
35	80	60	170	205	85	60	25	110	15	20	33	M10	M12	**SN508**		2.4	R 1/8	R 1/8	1208K 2208K	— 22208RHRK	H208X H308X	SR80×7.5 SR80×10	2 1	MZ08
	90	60	170	205	95	60	25	115	15	20	43	M10	M12	**SN608**		2.8	R 1/8	R 1/8	1308K 2308K	21308RHK 22308RHRK	H308X H2308X	SR90×10 SR90×10	2 1	MZ08
40	85	60	170	205	85	60	25	112	15	20	31	M10	M12	**SN509**		2.7	R 1/8	R 1/8	1209K 2209K	— 22209RHRK	H209X H309X	SR85×6 SR85×8	2 1	MZ09
	100	70	210	255	105	70	28	130	18	23	46	M12	M16	**SN609**		4.3	R 1/8	R 1/8	1309K 2309K	21309RHK 22309RHRK	H309X H2309X	SR100×10.5 SR100×10	2 1	MZ09
45	90	60	170	205	90	60	25	115	15	20	33	M10	M12	**SN510**		3.5	R 1/8	R 1/8	1210K 2210K	— 22210RHRK	H210X H310X	SR90×6.5 SR90×10	2 1	MZ10
	110	70	210	255	115	70	30	135	18	23	50	M12	M16	**SN610**		4.7	R 1/8	R 1/8	1310K 2310K	21310RHK 22310RHRK	H310X H2310X	SR110×11.5 SR110×10	2 1	MZ10
50	100	70	210	255	95	70	28	130	18	23	33	M12	M16	**SN511**		3.7	R 1/8	R 1/8	1211K 2211K	— 22211RHRK	H211X H311X	SR100×6 SR100×8	2 1	MZ11
	120	80	230	275	120	80	30	150	18	23	53	M12	M16	**SN611**		5.8	R 1/8	R 1/8	1311K 2311K	21311RHK 22311RHRK	H311X H2311X	SR120×12 SR120×10	2 1	MZ11
55	110	70	210	255	105	70	30	135	18	23	38	M12	M16	**SN512**		4.4	R 1/8	R 1/8	1212K 2212K	— 22212RHRK	H212X H312X	SR110×8 SR110×10	2 1	MZ12
	130	80	230	280	125	80	30	155	18	23	56	M12	M16	**SN612**		6.4	R 1/8	R 1/8	1312K 2312K	21312RHK 22312RHRK	H312X H2312X	SR130×12.5 SR130×10	2 1	MZ12
60	120	80	230	275	110	80	30	150	18	23	43	M12	M16	**SN513**		5.4	R 1/8	R 1/8	1213K 2213K	— 22213RHRK	H213X H313X	SR120×10 SR120×12	2 1	MZ13

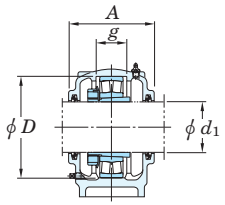
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
SN524~SN532, SN620~SN632, SN3328~SN3338, SN3426~SN3438

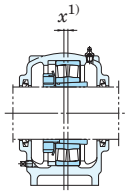
Plummer blocks
split type, standard
SN 5, 6, 33, 34
d_1 (60) ~ (110) mm



Free side



Fixed side
(When one stabilizing ring used)



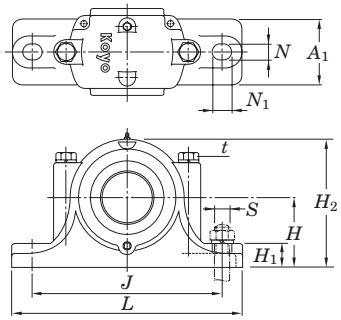
Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)												Bolt size	Housing No.		(Refer.) Housing mass	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring		Applicable oil seal No.
d_1	D	H	J	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	S			(kg)			Self-aligning ball brg.	Spherical roller brg.		No. Outside dia.×Width	Qty.	MZ
60	140	95	260	315	130	90	32	175	22	27	58	M16	M20	**SN613**		8.6	R 1/8	R 1/8	1313K 2313K	21313RHK 22313RHRK	H313X H2313X	SR140×12.5 SR140×10	2 1	MZ13
65	130	80	230	280	115	80	30	155	18	23	41	M12	M16	**SN515**		6.1	R 1/8	R 1/8	1215K 2215K	— 22215RHRK	H215X H315X	SR130×8 SR130×10	2 1	MZ15
	160	100	290	345	140	100	35	195	22	27	65	M16	M20	**SN615**		11.8	R 1/8	R 1/8	1315K 2315K	21315RHK 22315RHRK	H315X H2315X	SR160×14 SR160×10	2 1	MZ15
70	140	95	260	315	120	90	32	175	22	27	43	M16	M20	**SN516**		8.2	R 1/8	R 1/8	1216K 2216K	— 22216RHRK	H216X H316X	SR140×8.5 SR140×10	2 1	MZ16
	170	112	290	345	145	100	35	212	22	27	68	M16	M20	**SN616**		13.6	R 1/8	R 1/8	1316K 2316K	21316RHK 22316RHRK	H316X H2316X	SR170×14.5 SR170×10	2 1	MZ16
75	150	95	260	320	125	90	32	185	22	27	46	M16	M20	**SN517**		9.3	R 1/8	R 1/8	1217K 2217K	— 22217RHRK	H217X H317X	SR150×9 SR150×10	2 1	MZ17
	180	112	320	380	155	110	40	223	26	32	70	M20	M24	**SN617**		16.8	R 1/8	R 1/8	1317K 2317K	21317RHK 22317RHRK	H317X H2317X	SR180×14.5 SR180×10	2 1	MZ17
80	160	100	290	345	145	100	35	195	22	27	62.4	M16	M20	**SN518**		12	R 1/8	R 1/8	1218K 2218K —	— 22218RHRK 23218RHK	H218X H318X H2318X	SR160×16.2 SR160×11.2 SR160×10	2 2 1	MZ18
	190	112	320	380	160	110	40	230	26	32	74	M20	M24	**SN618**		21	R 1/4	R 1/4	1318K 2318K	— 22318RHRK	H318X H2318X	SR190×15.5 SR190×10	2 1	MZ18
85	170	112	290	345	140	100	35	210	22	27	53	M16	M20	**SN519**		13	R 1/8	R 1/8	1219K 2219K	— 22219RHRK	H219X H319X	SR170×10.5 SR170×10	2 1	MZ19
	200	125	350	410	170	120	45	250	26	32	77	M20	M24	**SN619**		23	R 1/4	R 1/4	1319K 2319K	— 22319RHRK	H319X H2319X	SR200×16 SR200×10	2 1	MZ19
90	180	112	320	380	160	110	40	223	26	32	70.3	M20	M24	**SN520**		17	R 1/4	R 1/4	1220K 2220K —	— 22220RHRK 23220RHK	H220X H320X H2320X	SR180×18.1 SR180×12.1 SR180×10	2 2 1	MZ20
	215	140	350	410	175	120	45	270	26	32	83	M20	M24	**SN620**		31	R 1/4	R 1/4	1320K 2320K	— 22320RHRK	H320X H2320X	SR215×18 SR215×10	2 1	MZ20
100	180	112	320	380	155	110	40	223	26	32	66	M20	M24	**SN3422**		20	R 1/4	R 1/4	—	23122RHK	H3122X	SR180×10	1	MZ22
	200	125	350	410	175	120	45	245	26	32	80	M20	M24	**SN522**		20	R 1/4	R 1/4	1222K 2222K —	— 22222RHRK 23222RHK	H222X H322X H2322X	SR200×21 SR200×13.5 SR200×10	2 2 1	MZ22
	240	150	390	450	190	130	50	300	28	36	90	M24	M24	**SN622**		38	R 1/4	R 1/4	1322K 2322K	— 22322RHRK	H322X H2322X	SR240×20 SR240×10	2 1	MZ22
110	180	112	320	380	150	110	40	223	26	32	56	M20	M24	**SN3324**		19	R 1/4	R 1/4	—	23024RHK	H3024	SR180×10	1	MZ24

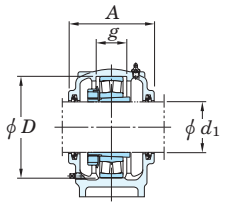
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
SN524~SN532, SN620~SN632, SN3328~SN3338, SN3426~SN3438

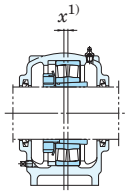
Plummer blocks
split type, standard
SN 5, 6, 33, 34
d_1 (110) ~ (140) mm



Free side



Fixed side
(When one stabilizing ring used)



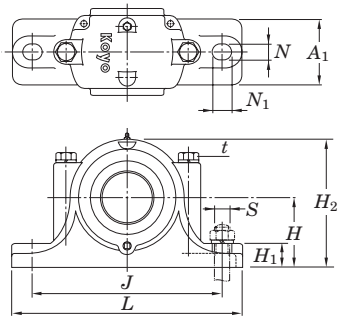
Stabilizing ring

Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	Bolt size S	Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No. Self-aligning ball brg.	Spherical roller brg.	Applicable adapter ass'y No.	Applicable stabilizing ring No. Outside dia.×Width	Qty.	Applicable oil seal No. MZ
110	200	125	350	410	165	120	45	245	26	32	72	M20	M24	**SN3424**		22	R 1/4	R 1/4	—	23124RHK	H3124	SR200×10	1	MZ24
	215	140	350	410	185	120	45	270	26	32	86	M20	M24	**SN524**		23	R 1/4	R 1/4	—	22224RHRK 23224RHK	H3124 H2324	SR215×14 SR215×10	2 1	MZ24
	260	160	450	530	200	160	60	320	33	42	96	M24	M30	**SN624**		48	R 1/4	R 1/4	—	22324RHRK	H2324	SR260×10	1	MZ24
115	200	125	350	410	160	120	45	245	26	32	62	M20	M24	**SN3326**		21	R 1/4	R 1/4	—	23026RHK	H3026	SR200×10	1	MZ26
	210	140	350	410	170	120	45	270	26	32	74	M20	M24	**SN3426**		29	R 1/4	R 1/4	—	23126RHK	H3126	SR210×10	1	MZ26
	230	150	380	445	190	130	50	290	28	36	90	M24	M24	**SN526**		33	R 1/4	R 1/4	—	22226RHRK 23226RHK	H3126 H2326	SR230×13 SR230×10	2 1	MZ26
	280	170	470	550	210	160	60	340	33	42	103	M24	M30	**SN626**		78	R 1/4	R 1/4	—	22326RHRK	H2326	SR280×10	1	MZ26
125	210	140	350	410	170	120	45	270	26	32	63	M20	M24	**SN3328**		28	R 1/4	R 1/4	—	23028RHK	H3028	SR210×10	1	MZ28
	225	150	380	445	180	130	50	290	28	36	78	M24	M24	**SN3428**		36	R 1/4	R 1/4	—	23128RHK	H3128	SR225×10	1	MZ28
	250	150	420	500	205	150	50	305	33	42	98	M24	M30	**SN528**		40	R 1/4	R 1/4	—	22228RHRK 23228RHK	H3128 H2328	SR250×15 SR250×10	2 1	MZ28
	300	180	520	610	235	170	65	365	35	45	112	M30	M30	**SN628**		97	R 1/4	R 1/4	—	22328RK	H2328	SR300×10	1	MZ28
135	225	150	380	445	175	130	50	290	28	36	66	M24	M24	**SN3330**		32	R 1/4	R 1/4	—	23030RHK	H3030	SR225×10	1	MZ30
	250	150	420	500	200	150	50	305	33	42	90	M24	M30	**SN3430**		42	R 1/4	R 1/4	—	23130RHK	H3130	SR250×10	1	MZ30
	270	160	450	530	220	160	60	325	33	42	106	M24	M30	**SN530**		45	R 1/4	R 1/4	—	22230RHRK 23230RHK	H3130 H2330	SR270×16.5 SR270×10	2 1	MZ30
	320	190	560	650	245	180	65	385	35	45	118	M30	M30	**SN630**		110	R 1/4	R 1/4	—	22330RK	H2330	SR320×10	1	MZ30
140	240	150	390	450	190	130	50	300	28	36	70	M24	M24	**SN3332**		36	R 1/4	R 1/4	—	23032RHK	H3032	SR240×10	1	MZ32
	270	160	450	530	215	160	60	325	33	42	96	M24	M30	**SN3432**		53	R 1/4	R 1/4	—	23132RHK	H3132	SR270×10	1	MZ32

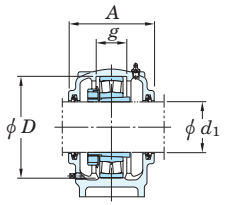
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
SN524~SN532, SN620~SN632, SN3328~SN3338, SN3426~SN3438

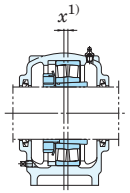
Plummer blocks
split type, standard
SN 5, 6, 33, 34
d_1 (140) ~ 170 mm



Free side



Fixed side
(When one stabilizing ring used)



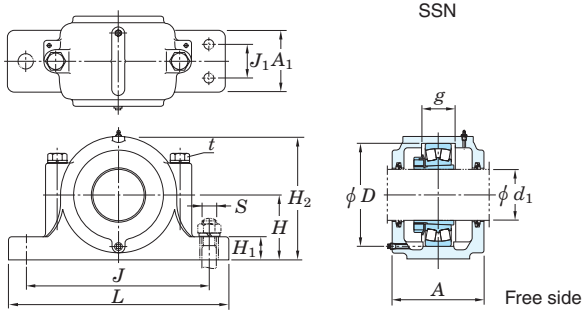
Stabilizing ring

Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	Bolt size S	Housing No.	(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No. Self-aligning ball brg.	Applicable bearing No. Spherical roller brg.	Applicable adapter ass'y No.	Applicable stabilizing ring No. Outside dia.×Width	Applicable stabilizing ring Qty.	Applicable oil seal No. MZ
140	290	170	470	550	235	160	60	345	33	42	114	M24	M30	**SN532**	51	R 1/4	R 1/4	—	22232RK 23232RK	H3132 H2332	SR290×17 SR290×10	2 1	MZ32
	340	200	580	680	255	190	70	405	42	50	124	M30	M36	**SN632**	120	R 1/4	R 1/4	—	22332RK	H2332	SR340×10	1	MZ32
150	260	160	450	530	200	160	60	320	33	42	77	M24	M30	**SN3334**	45	R 1/4	R 1/4	—	23034RHK	H3034	SR260×10	1	MZ34
	280	170	470	550	220	160	60	340	33	42	98	M24	M30	**SN3434**	61	R 1/4	R 1/4	—	23134RHK	H3134	SR280×10	1	MZ34
160	280	170	470	550	210	160	60	340	33	42	84	M24	M30	**SN3336**	57	R 1/4	R 1/4	—	23036RHK	H3036	SR280×10	1	MZ36
	300	180	520	610	230	170	65	365	35	45	106	M30	M30	**SN3436**	80	R 1/4	R 1/4	—	23136RK	H3136	SR300×10	1	MZ36
170	290	170	470	550	210	160	60	345	33	42	85	M24	M30	**SN3338**	59	R 1/4	R 1/4	—	23038RK	H3038	SR290×10	1	MZ38
	320	190	560	650	240	180	65	385	35	45	114	M30	M30	**SN3438**	95	R 1/4	R 1/4	—	23138RK	H3138	SR320×10	1	MZ38

[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

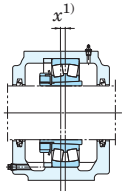
[Remark] Housings shown below are equipped with eyebolts.
SN524~SN532, SN620~SN632, SN3328~SN3338, SN3426~SN3438

Plummer blocks
split type, flat bottom
SSN 5, 6
d_1 20 ~ (60) mm



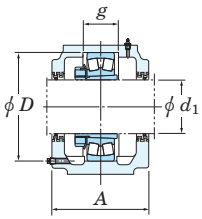
SSN

Free side

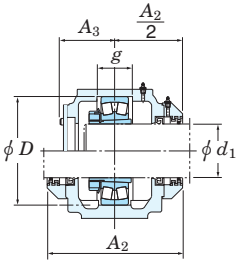


Fixed side
(When one stabilizing ring used)

SSN...TS
(with labyrinth seals)



SSN...TAC
(with taconite seal(s))



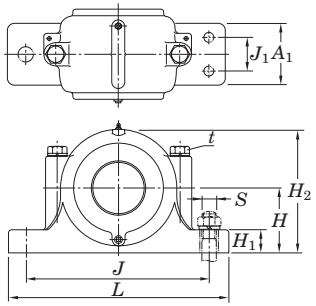
Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)													Bolt size		Housing No.	(Refer.) Housing mass	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring		Applicable oil seal No.
d_1	D	H	J	J_1	L	A	A_1	A_2	A_3	H_1	H_2	g	t Bolt size	S (Two)	S (Four)		(kg)			Self-aligning ball brg.	Spherical roller brg.		No. Outside dia.×Width	Qty.	MZ
20	52	40	130	25	165	67	46	—	—	22	75	25	M8	M12	M10	SSN505	1.8	R 1/8	R 1/8	1205K 2205K	— 22205RHRK	H205X H305X	SR52×5 SR52×7	2 1	MZ05
	62	50	150	25	185	80	52	—	—	22	90	34	M8	M12	M10	SSN605	2.6	R 1/8	R 1/8	1305K 2305K	—	H305X H2305X	SR62×8.5 SR62×10	2 1	MZ05
25	62	50	150	25	185	77	52	—	—	22	90	30	M8	M12	M10	SSN506	2.7	R 1/8	R 1/8	1206K 2206K	— 22206RHRK	H206X H306X	SR62×7 SR62×10	2 1	MZ06
	72	50	150	25	185	82	52	—	—	22	95	37	M10	M12	M10	SSN606	2.8	R 1/8	R 1/8	1306K 2306K	—	H306X H2306X	SR72×9 SR72×10	2 1	MZ06
30	72	50	150	25	185	82	52	—	—	22	95	33	M10	M12	M10	SSN507	3.0	R 1/8	R 1/8	1207K 2207K	— 22207RHRK	H207X H307X	SR72×8 SR72×10	2 1	MZ07
	80	60	170	30	205	90	60	—	—	25	110	41	M10	M12	M10	SSN607	3.8	R 1/8	R 1/8	1307K 2307K	—	H307X H2307X	SR80×10 SR80×10	2 1	MZ07
35	80	60	170	30	205	85	60	—	—	25	110	33	M10	M12	M10	SSN508	3.8	R 1/8	R 1/8	1208K 2208K	— 22208RHRK	H208X H308X	SR80×7.5 SR80×10	2 1	MZ08
	90	60	170	30	205	95	60	—	—	25	115	43	M10	M12	M10	SSN608	3.9	R 1/8	R 1/8	1308K 2308K	21308RHK 22308RHRK	H308X H2308X	SR90×10 SR90×10	2 1	MZ08
40	85	60	170	30	205	85	60	—	—	25	112	31	M10	M12	M10	SSN509	4.3	R 1/8	R 1/8	1209K 2209K	— 22209RHRK	H209X H309X	SR85×6 SR85×8	2 1	MZ09
	100	70	210	35	255	105	70	—	—	28	130	46	M12	M16	M12	SSN609	6.2	R 1/8	R 1/8	1309K 2309K	21309RHK 22309RHRK	H309X H2309X	SR100×10.5 SR100×10	2 1	MZ09
45	90	60	170	30	205	90	60	—	—	25	115	33	M10	M12	M10	SSN510	5.2	R 1/8	R 1/8	1210K 2210K	— 22210RHRK	H210X H310X	SR90×6.5 SR90×10	2 1	MZ10
	110	70	210	35	255	115	70	—	—	30	135	50	M12	M16	M12	SSN610	6.5	R 1/8	R 1/8	1310K 2310K	21310RHK 22310RHRK	H310X H2310X	SR110×11.5 SR110×10	2 1	MZ10
50	100	70	210	35	255	95	70	160	57	28	130	33	M12	M16	M12	SSN511	5.5	R 1/8	R 1/8	1211K 2211K	— 22211RHRK	H211X H311X	SR100×6 SR100×8	2 1	MZ11
	120	80	230	40	275	120	80	185	70	30	150	53	M12	M16	M12	SSN611	8.5	R 1/8	R 1/8	1311K 2311K	21311RHK 22311RHRK	H311X H2311X	SR120×12 SR120×10	2 1	MZ11
55	110	70	210	35	255	105	70	164	62	30	135	38	M12	M16	M12	SSN512	6.3	R 1/8	R 1/8	1212K 2212K	— 22212RHRK	H212X H312X	SR110×8 SR110×10	2 1	MZ12
	130	80	230	40	280	125	80	184	72	30	155	56	M12	M16	M12	SSN612	8.9	R 1/8	R 1/8	1312K 2312K	21312RHK 22312RHRK	H312X H2312X	SR130×12.5 SR130×10	2 1	MZ12
60	120	80	230	40	275	110	80	168	65	30	150	43	M12	M16	M12	SSN513	6.8	R 1/8	R 1/8	1213K 2213K	— 22213RHRK	H213X H313X	SR120×10 SR120×12	2 1	MZ13

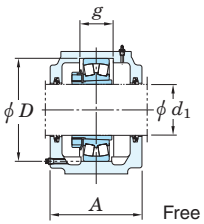
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remarks] 1) Use of labyrinth or taconite seals are indicated by TS or TAC suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN524~SSN532, SSN618~SSN632

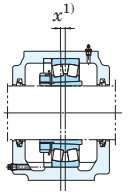
Plummer blocks
split type, flat bottom
SSN 5, 6
d_1 (60) ~ 110 mm



SSN

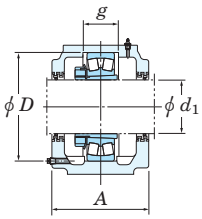


Free side

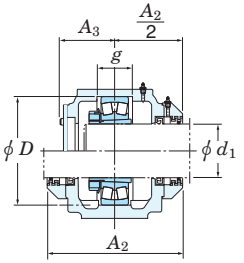


Fixed side
(When one stabilizing ring used)

SSN...TS
(with labyrinth seals)



SSN...TAC
(with taconite seal(s))



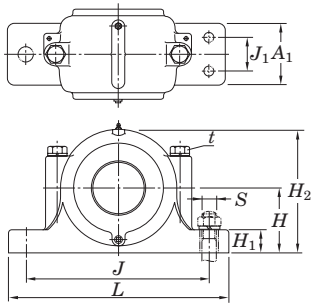
Stabilizing ring

Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	J_1	L	A	A_1	A_2	A_3	H_1	H_2	g	t Bolt size	Bolt size S (Two)	S (Four)	Housing No.	(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No. Self-aligning ball brg.	Spherical roller brg.	Applicable adapter ass'y No.	Applicable stabilizing ring No. Outside dia.×Width	Qty.	Applicable oil seal No. MZ
60	140	95	260	50	315	130	90	188	75	32	175	58	M16	M20	M16	**SSN613**	12.9	R 1/8	R 1/8	1313K 2313K	21313RHK 22313RHRK	H313X H2313X	SR140×12.5 SR140×10	2 1	MZ13
65	130	80	230	40	280	115	80	172	67	30	155	41	M12	M16	M12	**SSN515**	7.9	R 1/8	R 1/8	1215K 2215K	— 22215RHRK	H215X H315X	SR130×8 SR130×10	2 1	MZ15
	160	100	290	50	345	140	100	197	80	35	195	65	M16	M20	M16	**SSN615**	16.5	R 1/8	R 1/8	1315K 2315K	21315RHK 22315RHRK	H315X H2315X	SR160×14 SR160×10	2 1	MZ15
70	140	95	260	50	315	120	90	190	70	32	175	43	M16	M20	M16	**SSN516**	12	R 1/8	R 1/8	1216K 2216K	— 22216RHRK	H216X H316X	SR140×8.5 SR140×10	2 1	MZ16
	170	112	290	50	345	145	100	215	83	35	212	68	M16	M20	M16	**SSN616**	18	R 1/8	R 1/8	1316K 2316K	21316RHK 22316RHRK	H316X H2316X	SR170×14.5 SR170×10	2 1	MZ16
75	150	95	260	50	320	125	90	194	75	32	185	46	M16	M20	M16	**SSN517**	13	R 1/8	R 1/8	1217K 2217K	— 22217RHRK	H217X H317X	SR150×9 SR150×10	2 1	MZ17
	180	112	320	60	380	155	110	224	90	40	223	70	M20	M24	M20	**SSN617**	25.8	R 1/8	R 1/8	1317K 2317K	21317RHK 22317RHRK	H317X H2317X	SR180×14.5 SR180×10	2 1	MZ17
80	160	100	290	50	345	145	100	214	85	35	195	62.4	M16	M20	M16	**SSN518**	17	R 1/8	R 1/8	1218K 2218K —	— 22218RHRK 23218RHK	H218X H318X H2318X	SR160×16.2 SR160×11.2 SR160×10	2 2 1	MZ18
	190	112	320	60	380	160	110	229	93	40	230	74	M20	M24	M20	**SSN618**	28	R 1/4	R 1/4	1318K 2318K	— 22318RHRK	H318X H2318X	SR190×15.5 SR190×10	2 1	MZ18
85	170	112	290	50	345	140	100	214	85	35	210	53	M16	M20	M16	**SSN519**	18	R 1/8	R 1/8	1219K 2219K	— 22219RHRK	H219X H319X	SR170×10.5 SR170×10	2 1	MZ19
	200	125	350	70	410	170	120	235	98	45	250	77	M20	M24	M20	**SSN619**	31	R 1/4	R 1/4	1319K 2319K	— 22319RHRK	H319X H2319X	SR200×16 SR200×10	2 1	MZ19
90	180	112	320	60	380	160	110	220	92	40	223	70.3	M20	M24	M16	**SSN520**	24	R 1/4	R 1/4	1220K 2220K —	— 22220RHRK 23220RHK	H220X H320X H2320X	SR180×18.1 SR180×12.1 SR180×10	2 2 1	MZ20
	215	140	350	70	410	175	120	235	100	45	270	83	M20	M24	M20	**SSN620**	41	R 1/4	R 1/4	1320K 2320K	— 22320RHRK	H320X H2320X	SR215×18 SR215×10	2 1	MZ20
100	200	125	350	70	410	175	120	240	100	45	245	80	M20	M24	M16	**SSN522**	28	R 1/4	R 1/4	1222K 2222K —	— 22222RHRK 23222RHK	H222X H322X H2322X	SR200×21 SR200×13.5 SR200×10	2 2 1	MZ22
	240	150	390	70	450	190	130	255	108	50	300	90	M24	M24	M24	**SSN622**	51	R 1/4	R 1/4	1322K 2322K	— 22322RHRK	H322X H2322X	SR240×20 SR240×10	2 1	MZ22
110	215	140	350	70	410	185	120	254	110	45	270	86	M20	M24	M16	**SSN524**	33	R 1/4	R 1/4	—	22224RHRK 23224RHK	H3124 H2324	SR215×14 SR215×10	2 1	MZ24
	260	160	450	90	530	200	160	269	118	60	320	96	M24	M30	M24	**SSN624**	63	R 1/4	R 1/4	—	22324RHRK	H2324	SR260×10	1	MZ24

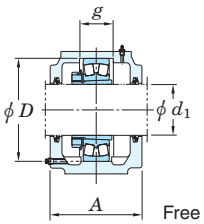
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remarks] 1) Use of labyrinth or taconite seals are indicated by TS or TAC suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN524~SSN532, SSN618~SSN632

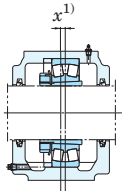
Plummer blocks
split type, flat bottom
SSN 5, 6
d_1 115 ~ 140 mm



SSN

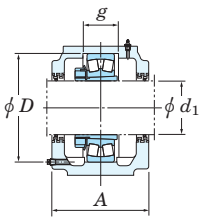


Free side

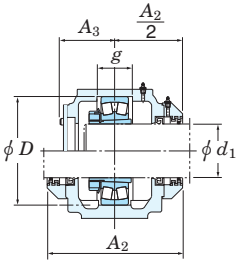


Fixed side
(When one stabilizing ring used)

SSN...TS
(with labyrinth seals)



SSN...TAC
(with taconite seal(s))



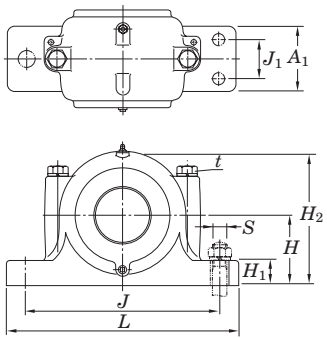
Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)													Bolt size		Housing No.	(Refer.) Housing mass	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring		Applicable oil seal No.
d_1	D	H	J	J_1	L	A	A_1	A_2	A_3	H_1	H_2	g	t Bolt size	S (Two)	S (Four)		(kg)			Self-aligning ball brg.	Spherical roller brg.		No. Outside dia.×Width	Qty.	MZ
115	230	150	380	70	445	190	130	260	112	50	290	90	M24	M24	M20	**SSN526**	45	R 1/4	R 1/4	—	22226RHRK 23226RHK	H3126 H2326	SR230×13 SR230×10	2 1	MZ26
	280	170	470	90	550	210	160	280	122	60	340	103	M24	M30	M24	**SSN626**	96	R 1/4	R 1/4	—	22326RHRK	H2326	SR280×10	1	MZ26
125	250	150	420	80	500	205	150	274	120	50	305	98	M24	M30	M24	**SSN528**	54	R 1/4	R 1/4	—	22228RHRK 23228RHK	H3128 H2328	SR250×15 SR250×10	2 1	MZ28
	300	180	520	100	610	235	170	304	135	65	365	112	M30	M30	M24	**SSN628**	117	R 1/4	R 1/4	—	22328RK	H2328	SR300×10	1	MZ28
135	270	160	450	90	530	220	160	280	127	60	325	106	M24	M30	M24	**SSN530**	60	R 1/4	R 1/4	—	22230RHRK 23230RHK	H3130 H2330	SR270×16.5 SR270×10	2 1	MZ30
	320	190	560	110	650	245	180	310	140	65	385	118	M30	M30	M24	**SSN630**	132	R 1/4	R 1/4	—	22330RK	H2330	SR320×10	1	MZ30
140	290	170	470	90	550	235	160	300	135	60	345	114	M24	M30	M24	**SSN532**	69	R 1/4	R 1/4	—	22232RK 23232RK	H3132 H2332	SR290×17 SR290×10	2 1	MZ32
	340	200	580	110	680	255	190	320	145	70	405	124	M30	M36	M30	**SSN632**	145	R 1/4	R 1/4	—	22332RK	H2332	SR340×10	1	MZ32

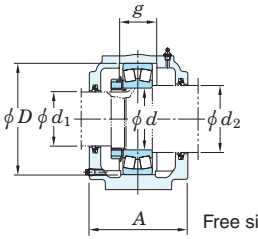
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remarks] 1) Use of labyrinth or taconite seals are indicated by TS or TAC suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN524~SSN532, SSN618~SSN632

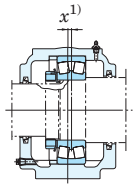
Plummer blocks
split type, flat bottom
different bore type
SSN 2, 3
large bore type
SSN 2B, 3B
d_1 20 ~ (60) mm



SSN 2, 3
Different bore type
(locknut locking)

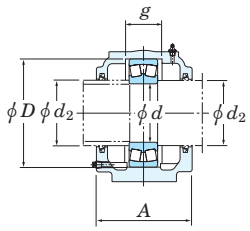


Free side

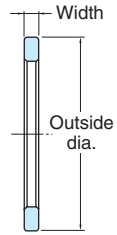


Fixed side
(When one stabilizing ring used)

SSN 2B, 3B
Large bore type
(concentric collar locking)



Stabilizing ring

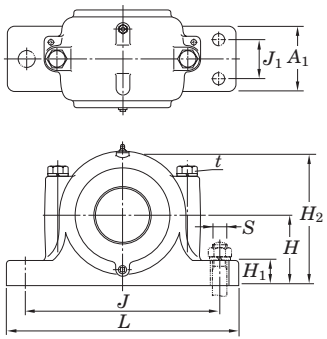


Shaft diameter (mm)			Dimensions (mm)											Bolt size		Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable stabilizing ring		Applicable oil seal No.	
													t	S								No.			
d_1	d	d_2 [2]	D	H	J	J_1	L	A	A_1	H_1	H_2	g	Bolt size	(Two)	(Four)						Self-aligning ball brg.	Spherical roller brg.	Outside dia.×Width	Qty.	d_1 side	d_2 side
20	25	*30	52	40	130	25	165	67	46	22	75	25	M8	M12	M10	**SSN205**		1.8	R 1/8	R 1/8	1205 2205	— 22205RHR	SR52×5 SR52×7	2 1	MZ05	MZ07
	25	30	62	50	150	25	185	80	52	22	90	34	M8	M12	M10	**SSN305**		2.6	R 1/8	R 1/8	1305 2305	—	SR62×8.5 SR62×10	2 1	MZ05	MZ07
25	30	*35	62	50	150	25	185	77	52	22	90	30	M8	M12	M10	**SSN206**		2.7	R 1/8	R 1/8	1206 2206	— 22206RHR	SR62×7 SR62×10	2 1	MZ06	MZ08
	30	35	72	50	150	25	185	82	52	22	95	37	M10	M12	M10	**SSN306**		2.8	R 1/8	R 1/8	1306 2306	—	SR72×9 SR72×10	2 1	MZ06	MZ08
30	35	45	72	50	150	25	185	82	52	22	95	33	M10	M12	M10	**SSN207**		3.0	R 1/8	R 1/8	1207 2207	— 22207RHR	SR72×8 SR72×10	2 1	MZ07	MZ10
	35	45	80	60	170	30	205	90	60	25	110	41	M10	M12	M10	**SSN307**		3.8	R 1/8	R 1/8	1307 2307	—	SR80×10 SR80×10	2 1	MZ07	MZ10
35	40	50	80	60	170	30	205	85	60	25	110	33	M10	M12	M10	**SSN208**		3.8	R 1/8	R 1/8	1208 2208	— 22208RHR	SR80×7.5 SR80×10	2 1	MZ08	MZ11
	40	50	90	60	170	30	205	95	60	25	115	43	M10	M12	M10	**SSN308**		3.9	R 1/8	R 1/8	1308 2308	21308RH 22308RHR	SR90×10 SR90×10	2 1	MZ08	MZ11
40	45	55	85	60	170	30	205	85	60	25	112	31	M10	M12	M10	**SSN209**		4.3	R 1/8	R 1/8	1209 2209	— 22209RHR	SR85×6 SR85×8	2 1	MZ09	MZ12
	45	55	100	70	210	35	255	105	70	28	130	46	M12	M16	M12	**SSN309**		6.2	R 1/8	R 1/8	1309 2309	21309RH 22309RHR	SR100×10.5 SR100×10	2 1	MZ09	MZ12
45	50	60	90	60	170	30	205	90	60	25	115	33	M10	M12	M10	**SSN210**		5.2	R 1/8	R 1/8	1210 2210	— 22210RHR	SR90×6.5 SR90×10	2 1	MZ10	MZ13
	50	60	110	70	210	35	255	115	70	30	135	50	M12	M16	M12	**SSN310**		6.5	R 1/8	R 1/8	1310 2310	21310RH 22310RHR	SR110×11.5 SR110×10	2 1	MZ10	MZ13
50	55	65	100	70	210	35	255	95	70	28	130	33	M12	M16	M12	**SSN211**		5.5	R 1/8	R 1/8	1211 2211	— 22211RHR	SR100×6 SR100×8	2 1	MZ11	MZ15
	55	65	120	80	230	40	275	120	80	30	150	53	M12	M16	M12	**SSN311**		8.5	R 1/8	R 1/8	1311 2311	21311RH 22311RHR	SR120×12 SR120×10	2 1	MZ11	MZ15
55	60	70	110	70	210	35	255	105	70	30	135	38	M12	M16	M12	**SSN212**		6.3	R 1/8	R 1/8	1212 2212	— 22212RHR	SR110×8 SR110×10	2 1	MZ12	MZ16
	60	*70	130	80	230	40	280	125	80	30	155	56	M12	M16	M12	**SSN312**		8.9	R 1/8	R 1/8	1312 2312	21312RH 22312RHR	SR130×12.5 SR130×10	2 1	MZ12	MZ16
60	65	75	120	80	230	40	275	110	80	30	150	43	M12	M16	M12	**SSN213**		6.8	R 1/8	R 1/8	1213 2213	— 22213RHR	SR120×10 SR120×12	2 1	MZ13	MZ17

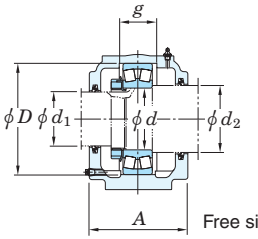
[Notes] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.
2) If bearing of shaft diameter marked with * (shoulder diameter) receives large axial load, the use of spacers is recommended.

[Remarks] 1) Large bore diameter types (concentric collar locking) are identified by B suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN224~SSN232, SSN318~SSN332

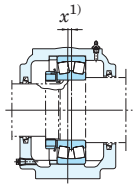
Plummer blocks
split type, flat bottom
different bore type
SSN 2, 3
large bore type
SSN 2B, 3B
d_1 (60) ~ (105) mm



SSN 2, 3
Different bore type
(locknut locking)

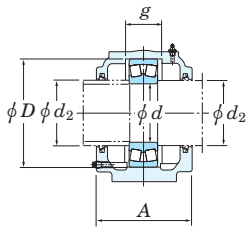


Free side

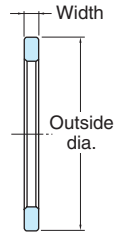


Fixed side
(When one stabilizing ring used)

SSN 2B, 3B
Large bore type
(concentric collar locking)



Stabilizing ring

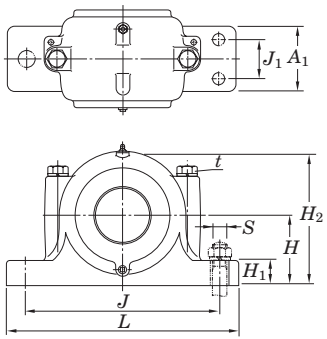


Shaft diameter (mm)			Dimensions (mm)										Bolt size		Housing No.	(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable stabilizing ring		Applicable oil seal No.	
													S						Self-aligning ball brg.	Spherical roller brg.	No. Outside dia.×Width	Qty.		
d_1	d	d_2 2)	D	H	J	J_1	L	A	A_1	H_1	H_2	g	t Bolt size	(Two)	(Four)								d_1 side	d_2 side
60	65	*75	140	95	260	50	315	130	90	32	175	58	M16	M20	M16	**SSN313**	12.9	R 1/8	R 1/8	1313 2313	21313RH 22313RHR	SR140×12.5 SR140×10	2 1	MZ13	MZ17
65	70	80	125	80	230	40	275	115	80	30	155	44	M12	M16	M12	**SSN214**	7.5	R 1/8	R 1/8	1214 2214	— 22214RHR	SR125×10 SR125×13	2 1	MZ15	MZ18
	70	*80	150	95	260	50	320	130	90	32	185	61	M16	M20	M16	**SSN314**	15	R 1/8	R 1/8	1314 2314	21314RH 22314RHR	SR150×13 SR150×10	2 1	MZ15	MZ18
70	75	85	130	80	230	40	280	115	80	30	155	41	M12	M16	M12	**SSN215**	7.9	R 1/8	R 1/8	1215 2215	— 22215RHR	SR130×8 SR130×10	2 1	MZ16	MZ19
	75	*85	160	100	290	50	345	140	100	35	195	65	M16	M20	M16	**SSN315**	16.5	R 1/8	R 1/8	1315 2315	21315RH 22315RHR	SR160×14 SR160×10	2 1	MZ16	MZ19
75	80	90	140	95	260	50	315	120	90	32	175	43	M16	M20	M16	**SSN216**	12	R 1/8	R 1/8	1216 2216	— 22216RHR	SR140×8.5 SR140×10	2 1	MZ17	MZ20
	80	*90	170	112	290	50	345	145	100	35	212	68	M16	M20	M16	**SSN316**	18	R 1/8	R 1/8	1316 2316	21316RH 22316RHR	SR170×14.5 SR170×10	2 1	MZ17	MZ20
80	85	95	150	95	260	50	320	125	90	32	185	46	M16	M20	M16	**SSN217**	13	R 1/8	R 1/8	1217 2217	— 22217RHR	SR150×9 SR150×10	2 1	MZ18	MZ21
	85	95	180	112	320	60	380	155	110	40	223	70	M20	M24	M20	**SSN317**	25.8	R 1/8	R 1/8	1317 2317	21317RH 22317RHR	SR180×14.5 SR180×10	2 1	MZ18	MZ21
85	90	100	160	100	290	50	345	145	100	35	195	62.4	M16	M20	M16	**SSN218**	17	R 1/8	R 1/8	1218 2218 —	— 22218RHR 23218RH	SR160×16.2 SR160×11.2 SR160×10	2 2 1	MZ19	MZ22
	90	105	190	112	320	60	380	160	110	40	230	74	M20	M24	M20	**SSN318**	28	R 1/4	R 1/4	1318 2318	— 22318RHR	SR190×15.5 SR190×10	2 1	MZ19	MZ23
90	95	110	170	112	290	50	345	140	100	35	210	53	M16	M20	M16	**SSN219**	18	R 1/8	R 1/8	1219 2219	— 22219RHR	SR170×10.5 SR170×10	2 1	MZ20	MZ24
	95	110	200	125	350	70	410	170	120	45	250	77	M20	M24	M20	**SSN319**	31	R 1/4	R 1/4	1319 2319	— 22319RHR	SR200×16 SR200×10	2 1	MZ20	MZ24
95	100	115	180	112	320	60	380	160	110	40	223	70.3	M20	M24	M16	**SSN220**	24	R 1/4	R 1/4	1220 2220 —	— 22220RHR 23220RH	SR180×18.1 SR180×12.1 SR180×10	2 2 1	MZ21	MZ26
	100	115	215	140	350	70	410	175	120	45	270	83	M20	M24	M20	**SSN320**	41	R 1/4	R 1/4	1320 2320	— 22320RHR	SR215×18 SR215×10	2 1	MZ21	MZ26
105	110	125	200	125	350	70	410	175	120	45	245	80	M20	M24	M16	**SSN222**	28	R 1/4	R 1/4	1222 2222 —	— 22222RHR 23222RH	SR200×21 SR200×13.5 SR200×10	2 2 1	MZ23	MZ28

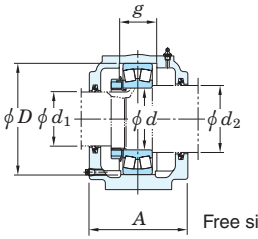
[Notes] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.
2) If bearing of shaft diameter marked with * (shoulder diameter) receives large axial load, the use of spacers is recommended.

[Remarks] 1) Large bore diameter types (concentric collar locking) are identified by B suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN224~SSN232, SSN318~SSN332

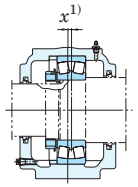
Plummer blocks
split type, flat bottom
different bore type
SSN 2, 3
large bore type
SSN 2B, 3B
d_1 (105) ~ 150 mm



SSN 2, 3
Different bore type
(locknut locking)

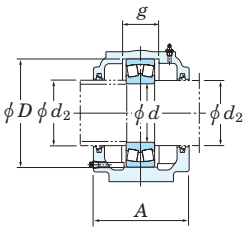


Free side

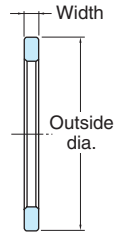


Fixed side
(When one stabilizing ring used)

SSN 2B, 3B
Large bore type
(concentric collar locking)



Stabilizing ring

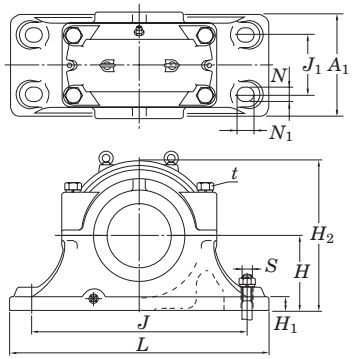


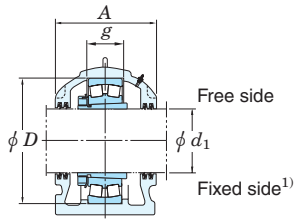
Shaft diameter (mm)			Dimensions (mm)											Bolt size		Housing No.	(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No.		Applicable stabilizing ring		Applicable oil seal No.	
d_1	d	d_2 2)	D	H	J	J_1	L	A	A_1	H_1	H_2	g	t Bolt size	S (Two)	S (Four)					Self-aligning ball brg.	Spherical roller brg.	No. Outside dia.×Width	Qty.	d_1 side	d_2 side
105	110	125	240	150	390	70	450	190	130	50	300	90	M24	M24	M24	**SSN322**	51	R 1/4	R 1/4	1322 2322	— 22322RHR	SR240×20 SR240×10	2 1	MZ23	MZ28
115	120	135	215	140	350	70	410	185	120	45	270	86	M20	M24	M16	**SSN224**	33	R 1/4	R 1/4	—	22224RHR 23224RH	SR215×14 SR215×10	2 1	MZ26	MZ30
	120	135	260	160	450	90	530	200	160	60	320	96	M24	M30	M24	**SSN324**	63	R 1/4	R 1/4	—	22324RHR	SR260×10	1	MZ26	MZ30
125	130	145	230	150	380	70	445	190	130	50	290	90	M24	M24	M20	**SSN226**	45	R 1/4	R 1/4	—	22226RHR 23226RH	SR230×13 SR230×10	2 1	MZ28	MZ33
	130	150	280	170	470	90	550	210	160	60	340	103	M24	M30	M24	**SSN326**	96	R 1/4	R 1/4	—	22326RHR	SR280×10	1	MZ28	MZ34
135	140	155	250	150	420	80	500	205	150	50	305	98	M24	M30	M24	**SSN228**	54	R 1/4	R 1/4	—	22228RHR 23228RH	SR250×15 SR250×10	2 1	MZ30	MZ35
	140	160	300	180	520	100	610	235	170	65	365	112	M30	M30	M24	**SSN328**	117	R 1/4	R 1/4	—	22328R	SR300×10	1	MZ30	MZ36
145	150	165	270	160	450	90	530	220	160	60	325	106	M24	M30	M24	**SSN230**	60	R 1/4	R 1/4	—	22230RHR 23230RH	SR270×16.5 SR270×10	2 1	MZ33	MZ37
	150	170	320	190	560	110	650	245	180	65	385	118	M30	M30	M24	**SSN330**	132	R 1/4	R 1/4	—	22330R	SR320×10	1	MZ33	MZ38
150	160	175	290	170	470	90	550	235	160	60	345	114	M24	M30	M24	**SSN232**	69	R 1/4	R 1/4	—	22232R 23232R	SR290×17 SR290×10	2 1	MZ34	MZ39
	160	180	340	200	580	110	680	255	190	70	405	124	M30	M36	M30	**SSN332**	145	R 1/4	R 1/4	—	22332R	SR340×10	1	MZ34	MZ40

[Notes] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.
2) If bearing of shaft diameter marked with * (shoulder diameter) receives large axial load, the use of spacers is recommended.

[Remarks] 1) Large bore diameter types (concentric collar locking) are identified by B suffixed to housing numbers.
2) Housings shown below are equipped with eyebolts.
SSN224~SSN232, SSN318~SSN332

Plummer blocks
split type, large size
SD 5, 6
SD 33, 34
d_1 150 ~ 240 mm



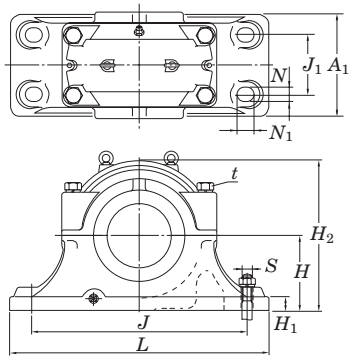


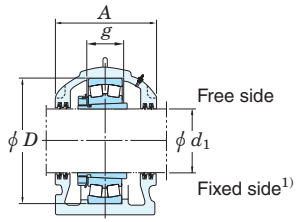
Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	J_1	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	Bolt size S	Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No.	Applicable adapter ass'y No.	Applicable oil seal No. MZ
150	260	160	450	110	540	230	200	50	315	36	46	77	M24	M30	**SD3334**		70	R 3/8	R 3/8	23034RHK	H3034	MZ34
	310	180	510	140	620	270	250	60	360	36	46	96	M24	M30	**SD534**		105	R 3/8	R 3/8	22234RK	H3134	MZ34
	360	210	610	170	740	300	290	65	420	36	46	130	M30	M30	**SD634**		165	R 3/8	R 3/8	22334RK	H2334	MZ34
160	280	170	470	120	560	250	220	50	335	36	46	84	M24	M30	**SD3336**		80	R 3/8	R 3/8	23036RHK	H3036	MZ36
	320	190	540	150	650	280	260	60	380	36	46	96	M24	M30	**SD536**		120	R 3/8	R 3/8	22236RK	H3136	MZ36
	380	225	640	180	780	320	310	70	450	43	59	136	M30	M36	**SD636**		200	R 3/8	R 3/8	22336RK	H2336	MZ36
170	290	170	470	120	560	250	220	50	340	36	46	85	M24	M30	**SD3338**		90	R 3/8	R 3/8	23038RK	H3038	MZ38
	340	200	570	160	700	290	280	65	400	36	46	102	M30	M30	**SD538**		145	R 3/8	R 3/8	22238RK	H3138	MZ38
	400	240	680	190	820	330	320	70	475	43	59	142	M30	M36	**SD638**		220	R 3/8	R 3/8	22338RK	H2338	MZ38
180	310	180	510	140	620	270	250	60	360	36	46	92	M24	M30	**SD3340**		100	R 3/8	R 3/8	23040RK	H3040	MZ40
	340	200	570	160	700	310	280	65	400	36	46	122	M30	M30	**SD3440**		135	R 3/8	R 3/8	23140RK	H3140	MZ40
	360	210	610	170	740	300	290	65	420	36	46	108	M30	M30	**SD540**		170	R 3/8	R 3/8	22240RK	H3140	MZ40
	420	250	710	200	860	350	340	85	500	43	59	148	M36	M36	**SD640**		250	R 3/8	R 1/2	22340RK	H2340	MZ40
200	340	200	570	160	700	290	280	65	400	36	46	100	M30	M30	**SD3344**		130	R 3/8	R 3/8	23044RK	H3044	MZ44
	370	225	640	180	780	320	310	70	445	43	59	130	M30	M36	**SD3444**		185	R 3/8	R 3/8	23144RK	H3144	MZ44
	400	240	680	190	820	330	320	70	475	43	59	118	M30	M36	**SD544**		220	R 3/8	R 3/8	22244RK	H3144	MZ44
	460	280	770	210	920	360	350	85	550	43	59	155	M36	M36	**SD644**		320	R 3/8	R 1/2	22344RK	H2344	MZ44
220	360	210	610	170	740	300	290	65	420	36	46	102	M30	M30	**SD3348**		160	R 3/8	R 3/8	23048RK	H3048	MZ48
	400	240	680	190	820	330	320	70	475	43	59	138	M30	M36	**SD3448**		210	R 3/8	R 3/8	23148RK	H3148	MZ48
	440	260	740	200	880	340	330	85	515	43	59	130	M36	M36	**SD548**		260	R 3/8	R 1/2	22248RK	H3148	MZ48
	500	300	830	230	990	390	380	100	590	50	67	165	M36	M42	**SD648**		415	R 3/8	R 1/2	22348RK	H2348	MZ48
240	400	240	680	190	820	340	320	70	475	43	59	114	M30	M36	**SD3352**		215	R 3/8	R 3/8	23052RK	H3052	MZ52
	440	260	740	200	880	360	350	85	515	43	59	154	M36	M36	**SD3452**		245	R 3/8	R 1/2	23152RK	H3152	MZ52
	480	280	790	210	940	370	360	85	560	43	59	140	M36	M36	**SD552**		325	R 3/8	R 1/2	22252RK	H3152	MZ52
	540	325	890	250	1 060	410	400	100	640	50	67	175	M36	M42	**SD652**		490	R 3/8	R 3/4	22352RK	H2352	MZ52

[Note] 1) Since bearings are designed to be locked by housing, stabilizing rings are unnecessary.

[Remark] The structure of certain housings may differ from those shown in the figures.

Plummer blocks
split type, large size
SD 5, 6
SD 33, 34
d_1 260 ~ 360 mm



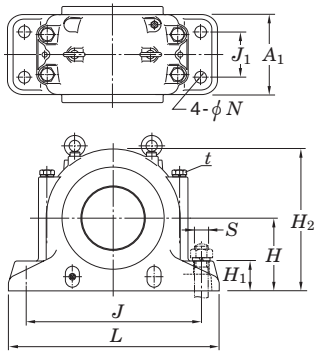


Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	J_1	L	A	A_1	H_1	H_2	N	N_1	g	t Bolt size	Bolt size S	Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Applicable bearing No.	Applicable adapter ass'y No.	Applicable oil seal No. MZ
260	420	250	710	200	860	350	340	85	500	43	59	116	M36	M36	**SD3356**		245	R 3/8	R 1/2	23056RK	H3056	MZ56
	460	280	770	210	920	360	350	85	550	43	59	156	M36	M36	**SD3456**		320	R 3/8	R 1/2	23156RK	H3156	MZ56
	500	300	830	230	990	390	380	100	590	50	67	140	M36	M42	**SD556**		395	R 3/8	R 1/2	22256RK	H3156	MZ56
	580	355	930	270	1 110	440	430	110	690	57	77	185	M42	M48	**SD656**		615	R 3/8	R 3/4	22356RK	H2356	MZ56
280	460	280	770	210	920	360	350	85	550	43	59	128	M36	M36	**SD3360**		305	R 3/8	R 1/2	23060RK	H3060	MZ60
	500	300	830	230	990	390	380	100	590	50	67	170	M36	M42	**SD3460**		400	R 3/8	R 1/2	23160RK	H3160	MZ60
	540	325	890	250	1 060	410	400	100	640	50	67	150	M36	M42	**SD560**		490	R 3/8	R 3/4	22260RK	H3160	MZ60
300	480	280	790	210	940	380	360	85	560	43	59	131	M36	M36	**SD3364**		325	R 3/8	R 1/2	23064RK	H3064	MZ64
	540	325	890	250	1 060	430	400	100	640	50	67	186	M36	M42	**SD3464**		480	R 3/8	R 3/4	23164RK	H3164	MZ64
	580	355	930	270	1 110	440	430	110	690	57	77	160	M42	M48	**SD564**		600	R 3/8	R 3/4	22264RK	H3164	MZ64
320	520	310	860	230	1 020	400	370	100	615	50	67	143	M36	M42	**SD3368**		420	R 3/8	R 3/4	23068RK	H3068	MZ68
	580	355	930	270	1 110	470	450	110	690	57	77	200	M42	M48	**SD3468**		645	R 3/8	R 3/4	23168RK	H3168	MZ68
340	540	325	890	250	1 060	410	390	100	640	50	67	144	M36	M42	**SD3372**		470	R 3/8	R 3/4	23072RK	H3072	MZ72
360	560	340	900	260	1 080	410	390	100	665	50	67	145	M36	M42	**SD3376**		485	R 3/8	R 3/4	23076RK	H3076	MZ76

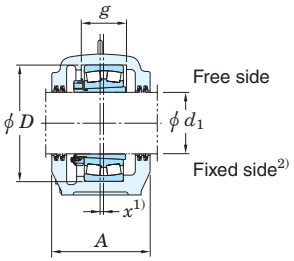
[Note] 1) Since bearings are designed to be locked by housing, stabilizing rings are unnecessary.

[Remark] The structure of certain housings may differ from those shown in the figures.

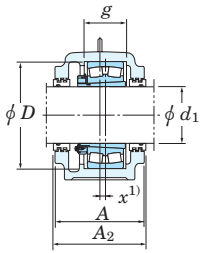
Plummer blocks
split type, large size
SD 31
d_1 150 ~ 300 mm



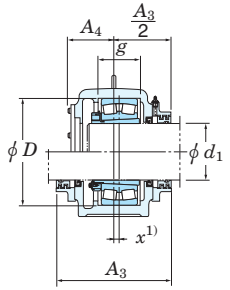
SD31...L



SD31...TS
(With labyrinth seals)



SD31...TAC
(With taconite seal(s))



Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)																Housing No.		Bolt size	(Refer.) Housing mass	Grease nipple size	Drain plug size	Applicable bearing No.	Applicable adapter ass'y No.	Applicable stabilizing ring 2)	
d_1	D	H	J	J_1	L	A	A_1	A_2	A_3	A_4	H_1	H_2	N	g	t Bolt size	x 1)			S	(kg)					No. Outside dia.×Width	Qty.
150	280	170	430	100	510	230	180	240	300	120	70	335	28	108	M20	14	**SD3134L**		M24	65	R 3/8	R 3/8	23134RHK	H3134	SR280×10	2
160	300	180	450	110	530	240	190	250	310	125	75	355	28	116	M20	15	**SD3136L**		M24	75	R 3/8	R 3/8	23136RK	H3136	SR300×10	2
170	320	190	480	120	560	260	210	270	330	135	80	375	28	124	M24	10	**SD3138L**		M24	95	R 3/8	R 3/8	23138RK	H3138	SR320×10	2
180	340	210	510	130	610	280	230	290	350	145	85	410	35	132	M24	10	**SD3140L**		M30	120	R 3/8	R 3/8	23140RK	H3140	SR340×10	2
200	370	220	540	140	640	290	240	300	360	152	90	435	35	140	M24	12	**SD3144L**		M30	140	R 3/8	R 3/8	23144RK	H3144	SR370×10	2
220	400	240	600	150	700	310	260	320	380	162	95	475	35	148	M30	12	**SD3148L**		M30	180	R 3/8	R 3/8	23148RK	H3148	SR400×10	2
240	440	260	650	160	770	320	280	330	396	170	100	515	42	164	M30	13	**SD3152L**		M36	220	R 3/8	R 1/2	23152RK	H3152	SR440×10	2
260	460	280	670	160	790	320	280	330	396	170	105	550	42	166	M30	16	**SD3156L**		M36	250	R 3/8	R 1/2	23156RK	H3156	SR460×10	2
280	500	300	710	190	830	350	310	360	420	193	110	590	42	180	M30	22	**SD3160L**		M36	300	R 3/8	R 1/2	23160RK	H3160	SR500×10	2
300	540	320	750	200	880	370	330	380	440	203	115	630	42	196	M30	23	**SD3164L**		M36	340	R 3/8	R 3/4	23164RK	H3164	SR540×10	2

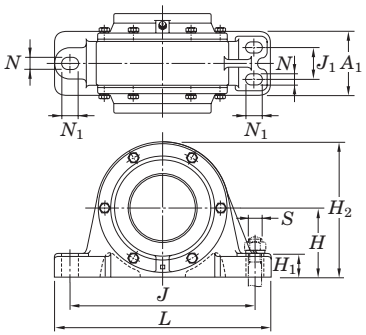
[Notes] 1) Dimension x shows the shear between center of bearing and housing.
2) Stabilizing rings are mounted to the fixed side of the SD 31...TS and SD 31 ...TAC series (both sides of bearings).
SD31...L series are locked by housings.

[Remark] Use of labyrinth or taconite seals are indicated by TS or TAC suffixed to housing numbers.

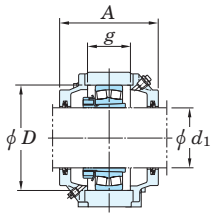
Plummer blocks one-piece type

V 5, 6

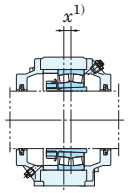
d_1 30 ~ 65 mm



Free side



Fixed side
(When one stabilizing ring used)



Stabilizing ring

Shaft dia. (mm)	Dimensions (mm)												Bolt size S		Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Housing No.	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring		Applicable oil seal No.
																					Self-aligning ball brg.	Spherical roller brg.		No. Outside dia.×Width	Qty.	
d_1	D	H	J	J_1	L	A	A_1	H_1	H_2	N	N_1	g	(Two)	(Four)												
30	80	60	170	—	205	95	60	25	118	16	20	37	M14	—	**V607**		4.8	R 1/8	R 1/8	V080	1307K 2307K	—	H307X H2307X	SR80×8 SR80×6	2 1	MZ07
35	80	60	170	—	205	95	60	25	118	16	20	37	M14	—	**V508**		4.4	R 1/8	R 1/8	V080	1208K 2208K	— 22208RHRK	H208X H308X	SR80×9.5 SR80×7	2 2	MZ08
	90	67	170	—	205	100	60	25	128	16	20	39	M14	—	**V608**		5.1	R 1/8	R 1/8	V090	1308K 2308K	21308RHK 22308RHRK	H308X H2308X	SR90×8 SR90×6	2 1	MZ08
40	85	63	170	—	205	98	60	25	125	16	20	39	M14	—	**V509**		4.6	R 1/8	R 1/8	V085	1209K 2209K	— 22209RHRK	H209X H309X	SR85×10 SR85×8	2 2	MZ09
	100	71	210	—	255	106	70	28	140	16	23	42	M14	—	**V609**		6.6	R 1/8	R 1/8	V100	1309K 2309K	21309RHK 22309RHRK	H309X H2309X	SR100×8.5 SR100×6	2 1	MZ09
45	90	67	170	—	205	100	60	25	128	16	20	39	M14	—	**V510**		4.7	R 1/8	R 1/8	V090	1210K 2210K	— 22210RHRK	H210X H310X	SR90×9.5 SR90×8	2 2	MZ10
	110	80	210	—	255	112	70	30	155	21	25	46	M18	—	**V610**		8.3	R 1/8	R 1/8	V110	1310K 2310K	21310RHK 22310RHRK	H310X H2310X	SR110×9.5 SR110×6	2 1	MZ10
50	100	71	210	—	255	106	70	28	140	16	23	42	M14	—	**V511**		6.2	R 1/8	R 1/8	V100	1211K 2211K	— 22211RHRK	H211X H311X	SR100×10.5 SR100×8.5	2 2	MZ11
	120	85	230	—	275	118	80	30	165	21	25	49	M18	—	**V611**		10	R 1/8	R 1/8	V120	1311K 2311K	21311RHK 22311RHRK	H311X H2311X	SR120×10 SR120×6	2 1	MZ11
55	110	80	210	—	255	112	70	30	155	21	25	46	M18	—	**V512**		7.6	R 1/8	R 1/8	V110	1212K 2212K	— 22212RHRK	H212X H312X	SR110×12 SR110×9	2 2	MZ12
	130	90	230	—	280	118	80	30	175	21	25	50	M18	—	**V612**		11	R 1/8	R 1/8	V130	1312K 2312K	21312RHK 22312RHRK	H312X H2312X	SR130×9.5 SR130×4	2 1	MZ12
60	120	85	230	—	275	118	80	30	165	21	25	49	M18	—	**V513**		9.9	R 1/8	R 1/8	V120	1213K 2213K	— 22213RHRK	H213X H313X	SR120×13 SR120×9	2 2	MZ13
	125	90	230	—	280	118	80	30	175	21	25	50	M18	—	**V514**		10	R 1/8	R 1/8	V125	—	22214RHRK	H314X	SR125×9.5	2	MZ13
	140	100	260	—	315	136	90	32	195	25	30	56	M22	—	**V613**		17	R 1/8	R 1/8	V140	1313K 2313K	21313RHK 22313RHRK	H313X H2313X	SR140×11.5 SR140×8	2 1	MZ13
	150	100	260	—	315	140	90	32	195	25	30	56	M22	—	**V614**		16	R 1/8	R 1/8	V150	—	21314RHK 22314RHRK	H314X H2314X	SR150×10.5 SR150×5	2 1	MZ13
65	130	90	230	—	280	118	80	30	175	21	25	50	M18	—	**V515**		10	R 1/8	R 1/8	V130	1215K 2215K	— 22215RHRK	H215X H315X	SR130×12.5 SR130×9.5	2 2	MZ15
	160	112	290	—	345	150	100	35	224	25	30	62	M22	—	**V615**		23	R 1/8	R 1/8	V160	1315K 2315K	21315RHK 22315RHRK	H315X H2315X	SR160×12.5 SR160×7	2 1	MZ15

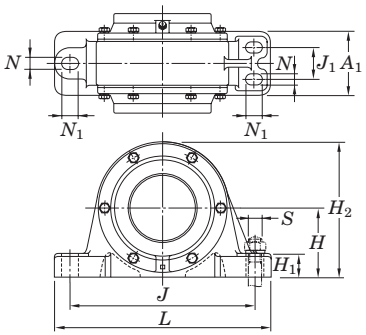
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
V180~V340 (V520~V538 and V617~V632)

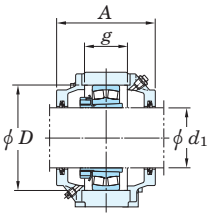
Plummer blocks one-piece type

V 5, 6

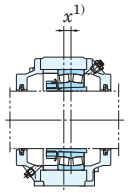
d_1 70 ~ (125) mm



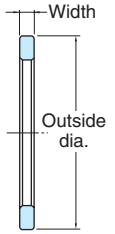
Free side



Fixed side
(When one stabilizing ring used)



Stabilizing ring



Shaft dia. (mm)	Dimensions (mm)												Bolt size S		Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Housing No.	Applicable bearing No.		Applicable adapter ass'y No.	Applicable stabilizing ring No.		Applicable oil seal No.
																					Self-aligning ball brg.	Spherical roller brg.		Outside dia.×Width	Qty.	
d_1	D	H	J	J_1	L	A	A_1	H_1	H_2	N	N_1	g	(Two)	(Four)												
70	140	100	260	—	315	136	90	32	195	25	30	56	M22	—	**V516**		16	R 1/8	R 1/8	V140	1216K 2216K	— 22216RHRK	H216X H316X	SR140×15 SR140×11.5	2 2	MZ16
	170	112	290	—	345	165	100	35	224	25	30	62	M22	—	**V616**		22	R 1/8	R 1/8	V170	1316K 2316K	21316RHK 22316RHRK	H316X H2316X	SR170×11.5 SR170×4	2 1	MZ16
75	150	100	260	—	315	140	90	32	195	25	30	56	M22	—	**V517**		15	R 1/8	R 1/8	V150	1217K 2217K	— 22217RHRK	H217X H317X	SR150×14 SR150×10	2 2	MZ17
	180	125	320	56	380	170	110	40	243	23	32	70	—	M20	**V617**		28	R 1/4	R 1/4	V180	1317K 2317K	21317RHK 22317RHRK	H317X H2317X	SR180×14.5 SR180×10	2 1	MZ17
80	160	112	290	—	345	150	100	35	224	25	30	62	M22	—	**V518**		22	R 1/8	R 1/8	V160	1218K 2218K —	— 22218RHRK 23218RHK	H218X H318X H2318X	SR160×16 SR160×11 SR160×9.6	2 2 1	MZ18
	190	125	320	56	380	170	110	40	243	23	32	70	—	M20	**V618**		27	R 1/4	R 1/4	V190	1318K 2318K	21318RHK 22318RHRK	H318X H2318X	SR190×13.5 SR190×6	2 1	MZ18
85	170	112	290	—	345	165	100	35	224	25	30	62	M22	—	**V519**		21	R 1/8	R 1/8	V170	1219K 2219K	— 22219RHRK	H219X H319X	SR170×11 SR170×9.5	2 2	MZ19
	200	132	350	60	410	190	120	45	265	23	32	82	—	M20	**V619**		37	R 1/4	R 1/4	V200	1319K 2319K	21319RHK 22319RHRK	H319X H2319X	SR200×18.5 SR200×15	2 1	MZ19
90	180	125	320	56	380	170	110	40	243	23	32	70	—	M20	**V520**		27	R 1/4	R 1/4	V180	1220K 2220K —	— 22220RHRK 23220RHK	H220X H320X H2320X	SR180×18 SR180×12 SR180×9.7	2 2 1	MZ20
	215	140	350	60	410	190	120	45	280	23	32	82	—	M20	**V620**		40	R 1/4	R 1/4	V215	1320K 2320K	21320RHK 22320RHRK	H320X H2320X	SR215×17.5 SR215×9	2 1	MZ20
100	200	132	350	60	410	190	120	45	265	23	32	82	—	M20	**V522**		36	R 1/4	R 1/4	V200	1222K 2222K —	— 22222RHRK 23222RHK	H222X H322X H2322X	SR200×22 SR200×14.5 SR200×12.2	2 2 1	MZ22
	240	160	390	80	470	218	150	50	315	23	32	96	—	M20	**V622**		56	R 1/4	R 1/4	V240	1322K 2322K	21322RHK 22322RHRK	H322X H2322X	SR240×23 SR240×16	2 1	MZ22
110	215	140	350	60	410	190	120	45	280	23	32	82	—	M20	**V524**		39	R 1/4	R 1/4	V215	—	22224RHRK 23224RHK	H3124 H2324	SR215×12 SR215×6	2 1	MZ24
	260	170	450	92	540	236	160	60	335	29	42	103	—	M24	**V624**		71	R 1/4	R 1/4	V260	—	22324RHRK	H2324	SR260×17	1	MZ24
115	230	150	380	65	450	200	130	50	300	23	32	86	—	M20	**V526**		48	R 1/4	R 1/4	V230	—	22226RHRK 23226RHK	H3126 H2326	SR230×11 SR230×6	2 1	MZ26
	280	180	470	92	560	243	160	60	355	29	42	103	—	M24	**V626**		82	R 1/4	R 1/4	V280	—	22326RHRK	H2326	SR280×15	1	MZ26
125	250	160	420	80	500	218	150	50	315	23	32	94	—	M20	**V528**		54	R 1/4	R 1/4	V250	—	22228RHRK 23228RHK	H3128 H2328	SR250×13 SR250×6	2 1	MZ28

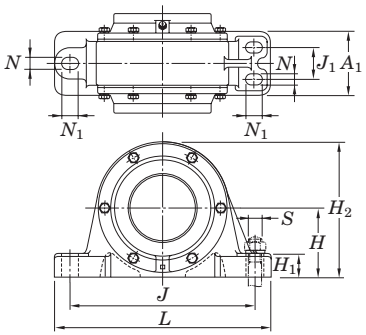
[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
V180~V340 (V520~V538 and V617~V632)

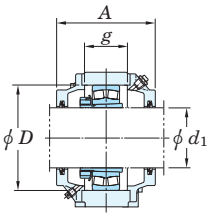
Plummer blocks one-piece type

V 5, 6

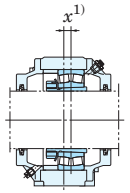
d_1 (125) ~ 170 mm



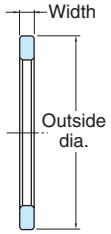
Free side



Fixed side
(When one stabilizing ring used)



Stabilizing ring



Shaft dia. (mm) d_1	Dimensions (mm) D	H	J	J_1	L	A	A_1	H_1	H_2	N	N_1	g	Bolt size S (Two)	(Four)	Housing No.		(Refer.) Housing mass (kg)	Grease nipple size	Drain plug size	Housing No.	Applicable bearing No. Self-aligning ball brg.	Spherical roller brg.	Applicable adapter ass'y No.	Applicable stabilizing ring No. Outside dia.×Width	Qty.	Applicable oil seal No. MZ
125	300	190	520	92	610	250	170	65	375	29	50	113	—	M24	**V628**		101	R 1/4	R 1/4	V300	—	22328RK	H2328	SR300×11	1	MZ28
135	270	170	450	92	540	236	160	60	335	29	42	103	—	M24	**V530**		64	R 1/4	R 1/4	V270	—	22230RHRK 23230RHK	H3130 H2330	SR270×15 SR270×7	2 1	MZ30
	320	200	560	92	660	258	180	65	405	29	50	122	—	M24	**V630**		129	R 1/4	R 1/4	V320	—	22330RK	H2330	SR320×14	1	MZ30
140	290	190	470	92	560	250	170	60	375	29	50	113	—	M24	**V532**		92	R 1/4	R 1/4	V290	—	22232RK 23232RK	H3132 H2332	SR290×16.5 SR290×9	2 1	MZ32
	340	212	580	104	680	300	190	65	425	33	54	130	—	M27	**V632**		149	R 1/4	R 1/4	V340	—	22332RK	H2332	SR340×16	1	MZ32
150	310	200	560	92	660	258	180	65	405	29	50	122	—	M24	**V534**		110	R 1/4	R 1/4	V310	—	22234RK 23234RK	H3134 H2334	SR310×18 SR310×12	2 1	MZ34
160	320	200	560	92	660	258	180	65	405	29	50	122	—	M24	**V536**		110	R 1/4	R 1/4	V320	—	22236RK 23236RK	H3136 H2336	SR320×18 SR320×10	2 1	MZ36
170	340	212	580	104	680	300	190	65	425	33	54	130	—	M27	**V538**		130	R 1/4	R 1/4	V340	—	22238RK 23238RK	H3138 H2338	SR340×19 SR340×10	2 1	MZ38

[Note] 1) Dimension x shows the shear between center of bearing and housing when one stabilizing ring is used. The value is 1/2 the width dimension of stabilizing ring.
When mounting two stabilizing rings, x becomes equal to 0, since they are mounted to each side of bearing.

[Remark] Housings shown below are equipped with eyebolts.
V180~V340 (V520~V538 and V617~V632)

Ceramic&Exsev bearing series

More and more bearings are being used in extreme special environments, such as in a vacuum, or in a clean, corrosive, or heated place. In some cases bearings are required to be insulated or antimagnetic.

Applications of bearings in such environments are increasing in the field of state-of-the-art technology, e.g. vacuum equipment, aerospace equipment and semi-conductor production facilities. Bearings made of conventional materials and lubricants can hardly meet these new needs.

JTEKT has succeeded in developing a series of bearings for use in extreme special environments, having started from the study of the very basics of materials and testing of their performance under various severe conditions.

JTEKT has standardized the following bearings as the "Koyo ***EXSEV*** bearing series".

- Exsev bearings for use in a clean environment
  Designed for use in a vacuum.
  The friction surface of the bearing interior is coated with solid lubricant (or soft metal). Bearings pre-lubricated with special grease are also available.

- Exsev bearings for use in a vacuum environment
  Produce insignificant contamination, provided with rolling elements and a cage made of self-lubricating materials. Optimal for use in environments which need to be clean.

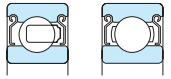
- Ceramic bearings
  Ceramic rings and rolling elements (silicon nitride Si_3N_4) ensure excellent performance in various extreme special environments.

- For details, refer to JTEKT separate catalog "Ceramic bearings and ***EXSEV*** bearings for extreme special environments" (CAT. NO. B2004E).

Exsev bearings for use in a vacuum environment

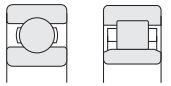
Bore diameter **4 – 40** mm

Exsev bearings for use in a clean environment



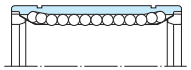
Bore diameter **4 – 40** mm

Ceramic bearings



Bore diameter **4 – 120** mm

Linear ball bearings for vacuum



Ball complement bore diameter **3 – 40** mm

The chart below summarizes the EXSEV bearing series and the conditions in which each operates successfully.

Materials and lubricants which are resistant to certain special conditions are listed in Tables 1 and 2.

Major Koyo EXSEV bearing series made of these materials and lubricants are listed in Table 3.

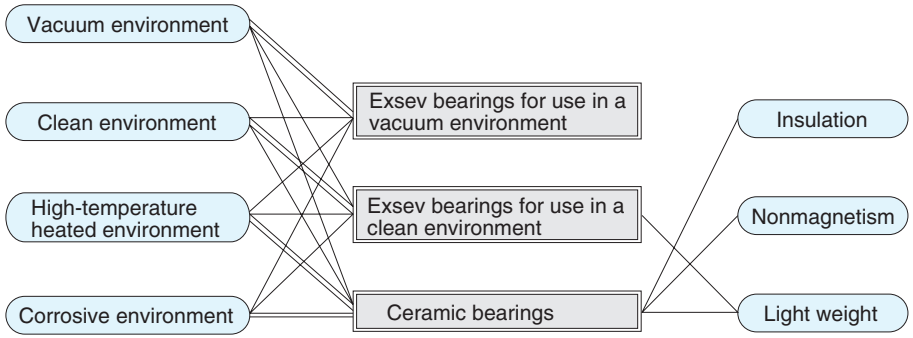


Table 2 EXSEV bearing lubricants

Lubricant		Operating temperature range ℃	Vacuum resistance (room temperature) Pa	Steam pressure at high temperature Pa	Remarks
Vacuum grease		− 30 to + 200	Atmospheric pressure(10^5) to 10^{-5}	−	Not to be used when grease affects operating environment.
Solid lubricant	Polytetrafluoroethylene resin (PTFE)	− 100 to + 200	Atmospheric pressure to 10^{-5}	−	Highly resistant to chemicals and highly insulating. Suitable when the environment repeats alternation between the atmosphere and a vacuum.
	Molybdenum disulfide (MoS_2)	− 100 to + 300	Atmospheric pressure to 10^{-5}	−	Friction torque is low even in a vacuum. Not suitable for use in air at high temperature.
	Lead[1] (Pb)	− 200 to + 300	10^{-3} to 10^{-10}	10^{-6} (300°C)	Low friction torque. Not suitable for use in air.
	Silver[1] (Ag)	− 200 to + 600	10^{-3} to 10^{-10}	10^{-5} (550°C)	Not suitable for use in air or in corrosive gas.

[Note] 1) Rolling elements or bearing rings are coated using the special ion plating method JTEKT developed.

[Remark] The lubricants in the table above are usually applied to bearings for use in a vacuum. The most suitable one should be selected in consideration of the vacuum condition, temperature, and whether reactive gas or inert gas exists.

○ Good △ Fair × No good

Table 1 EXSEV bearing materials

Bearing material	Component: Bearing ring	Component: Rolling element	Component: Cage	Component: Shield	Operating temperature range ℃	Vacuum resistance (room temperature) Pa	Density g/cm³	Young's[1] modulus GPa	Coefficient[2] of linear thermal expansion ×10⁻⁶/℃	Self-lubrication	Insulation	Nonmagnetism	Corrosion resistance: Water	Sea water	Alkalescent liquid	Weak acid liquid	Strong alkali liquid	Strong acid liquid: Sulfuric acid	Strong acid liquid: Hydrochloric acid	Molten metal: Al Zn	Molten metal: Fe	Hydrogen fluoride	Used to produce: Vacuum bearings	Used to produce: Ceramic bearings	Used to produce: Clean bearings
Martensitic stainless steel	□	□			− 250 to + 400	Atmospheric pressure(10^5)to 10^{-8}	7.7	208	10.5	×	×	×	△	×	○	×	×	×	×	×	×	×	□	□	□
Precipitation hardening stainless steel	□	□			− 250 to + 400	Atmospheric pressure to 10^{-8}	7.8	196	11.0	×	×	×	○	△	○	○	○	○	×	×	×	×		□	□
High speed tool steel	□	□			− 250 to + 550	Atmospheric pressure to 10^{-8}	8.5	207	12.0	×	×	×	△	×	○	×	×	×	×	×	×	×	□	□	
Ceramics (Si_3N_4)	□	□			− 270 to + 800	Atmospheric pressure to 10^{-8}	3.2	320	3.2	×	○	○	○	○	○	○	△	○	○	○	×	×		□	
Graphite (GF)			□		+ 500 max.	−	2.15	−	5.5	○	×	○	○	○	○	○	○	○	○	○	○	○		□	
Reinforced fluorocarbon resin (FA)			□		− 100 to + 200	Atmospheric pressure to 10^{-6}	1.9	−	−	○	○	○	○	○	○	○	○	○	○	×	×	○		□	□
Reinforced fluorocarbon resin (PT)			□		− 100 to + 200	Atmospheric pressure to 10^{-4}	2.15	−	−	○	○	○	○	○	○	○	○	○	○	×	×	○		□	
Reinforced PEEK resin (PN)			□		− 100 to + 300	Atmospheric pressure to 10^{-6}	1.54	−	−	○	○	○	○	○	○	○	○	○	○	×	×	○	□	□	
Austenitic stainless steel			□	□	− 200 to + 300	Atmospheric pressure to 10^{-8}	8.0	193	16.3	×	×	○	○	○	○	△	×	×	×	×	×	×	□	□	□
(Ref.) High carbon chromium bearing steel	□	□			− 200 to + 120	Atmospheric pressure to 10^{-8}	7.8	208	12.5	×	×	×	×	×	×	×	×	×	×	×	×	×	—		

[Notes] 1) A larger Young's modulus indicates higher rigidity.

2) A smaller coefficient of linear thermal expansion indicates a greater dimensional stability under heating.

Table 3 Koyo EXSEV bearing series models and types

		Exsev bearings for use in a vacuum environment				Exsev bearings for use in a clean environment			Ceramic bearings [4]			
Characteristics(selective points)	Vacuum resistance [1]	Repeated alternation between atmospheric pressure and medium vacuum environments	Repeated alternation between atmospheric pressure and high vacuum environments		From high vacuum to ultra-high vacuum	Repeated alternation between atmospheric pressure and medium vacuum environments			Repeated alternation between atmospheric pressure and medium vacuum environments		atmospheric pressure	
	Operating temperature range, ℃	− 30 to + 200	− 100 to + 300	− 100 to + 350	− 200 to + 350	− 30 to + 120	− 120 to + 200	+ 200 to + 260	− 100 to + 200		− 30 to + 120	+ 500 max.
	Cleanness	(class 100[5])	−	−	−	class 10[5]			−	−	−	−
	Corrosion resistance [2]	○	○	○	−	○			◎	−	−	−
	Running friction torque	−	Low torque	Low torque	−	Extremely low torque			−	−	−	−
	Others	−	−	−	Unstable for use with oxygen or corrosive gas	−	−	−	Corrosion resistant	nonmagnetism	Insulation	High temperature
Bearing types		DL bearing	MO bearing	WS bearing	MG bearing	Clean pro PRA bearing	Clean pro bearing	High temperature clean pro bearing	Hybrid ceramic bearing	Hybrid ceramic bearing	Hybrid ceramic bearing	Hybrid ceramic bearing
												
		SV...ST	SE...STMSA7	SE...STWS	SE...STMG3	SE...STPRA	SE...STPR	SE...STPRB	3NC...MD4FA	3NC...YH4FA	3NC...FG	3NC...HT4GF
Materials	Inner ring and outer ring	Martensitic stainless steel				Martensitic stainless steel			Precipitation hardening stainless steel	Non-magnetic stainless steel	High carbon chrome bearing steel	High speed tool steel
	Rolling elements (balls or rollers)					Martensitic stainless steel			Ceramics			
	Cage	Austenitic stainless steel		Tungsten disulfide (WS)	Austenitic stainless steel	Austenitic stainless steel			Fluorocarbon resin (FA)		Polyamide resin	Graphite (GF)
Lubricant		Vacuum grease	Cage coated with molybdenum disulfide(MoS_2)	Self-lubrication[6]	Balls coated with [3] silver(Ag)	Fluorocarbon-base polymeric coating			Self-lubrication[6]		Vacuum grease	Self-lubrication[6]
Applications		Vacuum pump, general vacuum equipment	P-CVD equipment for manufacture of semiconductors and electronic parts, spattering equipment		Electron beam epitaxial equipment	Semiconductor manufacturing			Food or chemical manufacturing equipment	Vacuum equipment	Motors	Heat roll heat treatment furnaces

[Notes] 1) Vacuum (pressure) is generally graded as follows :
Low vacuum·····$10^5 - 10^2$Pa
Medium vacuum·····$10^2 - 10^{-1}$Pa
High vacuum·····$10^{-1} - 10^{-5}$Pa
Ultra-high vacuum·····10^{-5}Pa or less
Extremely high vacuum·····10^{-8}Pa or less
(Atmospheric pressure ≒ 10^5Pa)

2) The corrosion resistance column shows general evaluations.
Marks "◎" and "○", respectively, denote "excellent", "good", and "fair".
Refer to Table 1 for the corrosive materials concerned.

3) These soft metals are applied by the special ion plating method JTEKT developed, so that they feature excellent bonding strength, extending the service life of bearings.

4) When higher corrosion resistance, nonmagnetism and heat resistance are required, Full Ceramic Bearings should be used. Please consult with JTEKT for details.
Ceramics can also be used to produce many types of bearings, such as angular contact ball bearings and cylindrical roller bearings.

5) These evaluations indicate the cleanness around the bearing, or in the equipment interior. Cleanness is largely dependent on the amount of dirt produced by operation of the bearing. The suffixed numbers refer to amounts of dirt, and the smaller the number is, the less dirt produced by the bearing.
[Ex.] Class 10·····there are less than 10 particles 0.5 μm or larger in diameter in a 1-cubic-foot space.(as specified in USA standards FED-STD-209D.)

6) Because the cage is made from self-lubricating material.

■ Life of EXSEV Bearings

EXSEV bearings, lubricated with a solid lubricant, are usually used under relatively light load conditions, such as 10% of their static load ratings or less.
These bearings can maintain stable performance as long as the solid lubricant is maintained. Once the lubricant wears out, metallic contact occurs, which increases rotational friction torque and shortens service life.

Service life depends on use conditions. At present, it is not possible to predict their service life under varied use conditions.

However, based on a variety of experiments and tests, JTEKT has established an experimental formulae to predict the lives of bearings. The formulae is described in the following subsections for reference only.

(1) Life of MG bearings consisting of silver-coated balls

The life of MG bearings (JTEKT serial number, SE...STMG3) can be predicted according to the following formula;

$$L_{vh}=b_1 \cdot b_2 \cdot b_3 (C_v/P)^q \times 16\,667/n \quad \cdots\cdots\cdots\cdots (1)$$

where,
L_{vh} : 90% reliable life, h
C_v : Basic dynamic load rating of vacuum-resistant ball bearings (1/13 of basic dynamic load rating of steel bearings of equal size), N
P : Dynamic equivalent load, N
q : Index, $q = 1$
n : Rotational speed, min^{-1}, limited to $10 \leqq n \leqq 10\,000$
b_1 : Rotational speed-dependant coefficient
$b_1 = 1.5 \times 10^{-3} n + 1$
b_2 : Material coefficient
$b_2 = 1$ (for bearings ion-plated with silver by the special ion-plating process)
b_3 : Coefficient for atmospheric pressure and temperature
$b_3 = 1$ (for 10^{-3} Pa and room temperature)

(2) For bearings coated with PTFE or special polymeric fluoride

For those bearings coated with PTFE (MP7) or those coated with the special polymeric fluoride (PR), the following formula gives their mean life for reference only. (See Fig. 3.8.)

$$L_{av} = b_2 \cdot (C_e/P)^d \times 0.016667/n \quad \cdots\cdots\cdots\cdots (2)$$

where,
L_{av} : Average life, h
b_2 : Lubrication coefficient
6 for bearings coated with PTFE
42 for bearings coated with special polymeric fluoride
C_e : 0.85 times the basic dynamic load rating of steel bearings of equal size, N
P : Dynamic equivalent load, N
d : Coefficient, $d = 3$
n : Rotational speed, min^{-1}

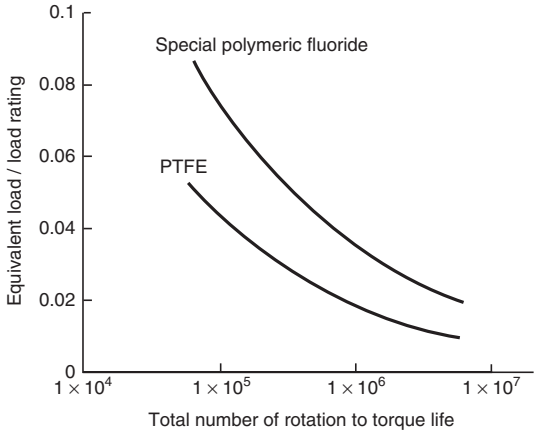


Fig. 1 Mean life of Coated Bearings

(3) Ceramic bearing service life

Ceramic bearings are used for a variety of pur-poses, and their specifications differ case by case. Therefore, there is no common system for estimating their service lives.

The estimation of full ceramic bearing service life is especially difficult at present for theoretical reasons, and requires further study.

JTEKT estimates the full ceramic bearing service life on a case by case basis according to the customer request, based on experience and experimental data.

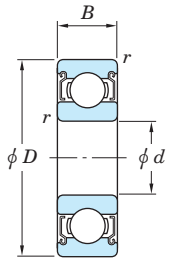
For hybrid ceramic bearings, in many cases the conventional equation (2) below based on rolling contact fatigue is used to estimate service life, where grease or oil can be used for lubrication and, at the same time, bearings are required to be insulating and antimagnetic, or to be highly rigid and have excellent high-speed performance.

This equation is called the corrected rated life estimation equation. (refer to p. A 26.)

$$L_{na} = a_1 a_2 a_3 L_{10} = a_1 a_2 a_3 (C/P)^p \quad \cdots\cdots\cdots\cdots (3)$$

- In an environment where a lubricating film is formed properly, the bearing characteristic coefficient a_2 is expected to be equivalent to or larger than that of conventional steel bearings. However, given current conditions, coefficient a_2 is counted as : $a_2 = 1$. Basic dynamic load rating C is treated as being equivalent to that of steel bearings of the same type and size.
- When a satisfactory oil film is formed, the operating condition coefficient a_3 is counted as : $a_3 > 1$.

EXSEV bearing series
for use in a vacuum environment
d 4 ~ 17 mm



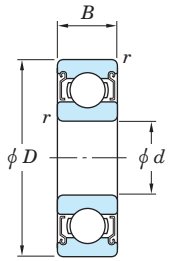
(Refer.)

Open type	Full complement type
	 Designed to accommodate only radial load. Therefore, most suitable for high-speed rotation.

Boundary dimensions (mm)				Bearing No. Atmospheric pressure to 10^{-5} Pa			Bearing No. 10^{-3} to 10^{-10} Pa	(Refer.) Basic bearing		
				With vacuum grease filled	MoS_2 coating (cage)		Ag ion-plating (balls)	Bearing No.	Basic load ratings (kN)	
d	D	B	r [1] min.						C_r	C_{0r}
4	10	4	0.1(0.15)	**SVWML 4010 ZZST**	**SEWML 4010 ZZSTMSA7**		—	WML4010	0.65	0.23
	12	4	0.2	**SV 604 ZZST**	**SE 604 ZZSTMSA7**		**SE 604 ZZSTMG3**	604	0.97	0.36
	13	5	0.2	**SV 624 ZZST**	**SE 624 ZZSTMSA7**		**SE 624 ZZSTMG3**	624	1.30	0.49
5	14	5	0.2	**SV 605 ZZST**	**SE 605 ZZSTMSA7**		**SE 605 ZZSTMG3**	605	1.30	0.49
	16	5	0.3	**SV 625 ZZST**	**SE 625 ZZSTMSA7**		**SE 625 ZZSTMG3**	625	1.75	0.67
6	10	3	0.08(0.1)	**SVWML 6010 ZZST**	**SEWML 6010 ZZSTMSA7**		—	WML6010	0.36	0.16
	12	4	0.1(0.15)	**SVWML 6012 ZZST**	**SEWML 6012 ZZSTMSA7**		—	WML6012	0.71	0.29
	13	5	0.15	**SV 686 ZZST**	**SE 686 ZZSTMSA7**		**SE 686 ZZSTMG3**	686	1.10	0.44
	17	6	0.3	**SV 606 ZZST**	**SE 606 ZZSTMSA7**		**SE 606 ZZSTMG3**	606	1.95	0.74
	19	6	0.3	**SV 626 ZZST**	**SE 626 ZZSTMSA7**		**SE 626 ZZSTMG3**	626	2.60	1.05
7	19	6	0.3	**SV 607 ZZST**	**SE 607 ZZSTMSA7**		**SE 607 ZZSTMG3**	607	2.60	1.05
	22	7	0.3	**SV 627 ZZST**	**SE 627 ZZSTMSA7**		**SE 627 ZZSTMG3**	627	3.30	1.35
8	22	7	0.3	**SV 608 ZZST**	**SE 608 ZZSTMSA7**		**SE 608 ZZSTMG3**	608	3.30	1.35
	24	8	0.3	**SV 628 ZZST**	**SE 628 ZZSTMSA7**		**SE 628 ZZSTMG3**	628	3.35	1.40
9	24	7	0.3	**SV 609 ZZST**	**SE 609 ZZSTMSA7**		**SE 609 ZZSTMG3**	609	3.35	1.40
	26	8	0.6	**SV 629 ZZST**	**SE 629 ZZSTMSA7**		**SE 629 ZZSTMG3**	629	4.55	1.95
10	26	8	0.3	**SV 6000 ZZST**	**SE 6000 ZZSTMSA7**		**SE 6000 ZZSTMG3**	6000	4.55	1.95
	30	9	0.6	**SV 6200 ZZST**	**SE 6200 ZZSTMSA7**		**SE 6200 ZZSTMG3**	6200	5.10	2.40
12	28	8	0.3	**SV 6001 ZZST**	**SE 6001 ZZSTMSA7**		**SE 6001 ZZSTMG3**	6001	5.10	2.40
	32	10	0.6	**SV 6201 ZZST**	**SE 6201 ZZSTMSA7**		**SE 6201 ZZSTMG3**	6201	6.80	3.05
15	32	9	0.3	**SV 6002 ZZST**	**SE 6002 ZZSTMSA7**		**SE 6002 ZZSTMG3**	6002	5.60	2.85
	35	11	0.6	**SV 6202 ZZST**	**SE 6202 ZZSTMSA7**		**SE 6202 ZZSTMG3**	6202	7.65	3.75
17	35	10	0.3	**SV 6003 ZZST**	**SE 6003 ZZSTMSA7**		**SE 6003 ZZSTMG3**	6003	6.00	3.25
	40	12	0.6	**SV 6203 ZZST**	**SE 6203 ZZSTMSA7**		**SE 6203 ZZSTMG3**	6203	9.55	4.80

[Note] 1) The value in ( ) shows the minimum chamfer dimension of open type bearings. If there is no indication, the value is the same as that of the shielded type (zz).

EXSEV bearing series
for use in a vacuum environment
d 20 ~ 40 mm



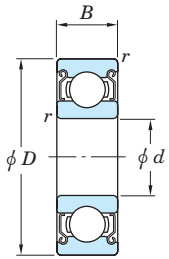
(Refer.)

Open type	Full complement type
	 Designed to accommodate only radial load. Therefore, most suitable for high-speed rotation.

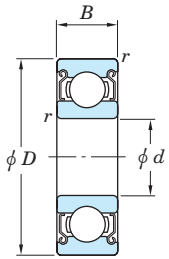
Boundary dimensions (mm)				Bearing No.			(Refer.) Basic bearing		
				Atmospheric pressure to 10^{-5} Pa		10^{-3} to 10^{-10} Pa		Basic load ratings (kN)	
d	D	B	r [1] min.	With vacuum grease filled	MoS_2 coating (cage)	Ag ion-plating (balls)	Bearing No.	C_r	C_{0r}
20	42	12	0.6	**SV 6004 ZZST**	**SE 6004 ZZSTMSA7**	**SE 6004 ZZSTMG3**	6004	9.40	5.05
	47	14	1	**SV 6204 ZZST**	**SE 6204 ZZSTMSA7**	**SE 6204 ZZSTMG3**	6204	12.8	6.65
25	47	12	0.6	**SV 6005 ZZST**	**SE 6005 ZZSTMSA7**	**SE 6005 ZZSTMG3**	6005	10.1	5.85
	52	15	1	**SV 6205 ZZST**	**SE 6205 ZZSTMSA7**	**SE 6205 ZZSTMG3**	6205	14.0	7.85
30	55	13	1	**SV 6006 ZZST**	**SE 6006 ZZSTMSA7**	**SE 6006 ZZSTMG3**	6006	13.2	8.25
	62	16	1	**SV 6206 ZZST**	**SE 6206 ZZSTMSA7**	**SE 6206 ZZSTMG3**	6206	19.5	11.3
35	62	14	1	**SV 6007 ZZST**	**SE 6007 ZZSTMSA7**	**SE 6007 ZZSTMG3**	6007	15.9	10.3
	72	17	1.1	**SV 6207 ZZST**	**SE 6207 ZZSTMSA7**	**SE 6207 ZZSTMG3**	6207	25.7	15.4
40	68	15	1	**SV 6008 ZZST**	**SE 6008 ZZSTMSA7**	**SE 6008 ZZSTMG3**	6008	16.7	11.5
	80	18	1.1	**SV 6208 ZZST**	**SE 6208 ZZSTMSA7**	**SE 6208 ZZSTMG3**	6208	29.1	17.8

[Note] 1) The value in ( ) shows the minimum chamfer dimension of open type bearings. If there is no indication, the value is the same as that of the shielded type (zz).

EXSEV bearing series
for use in a clean environment
d 4 ~ (25) mm

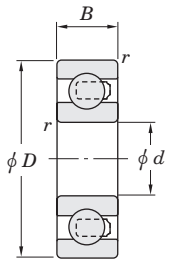


Boundary dimensions (mm)				Bearing No.			
				<120°C Clean Class10	<200°C Clean Class10		<260°C Clean Class10
d	D	B	r min.				
4	12	4	0.2	**SE 604 ZZSTPRA**	**SE 604 ZZSTPR**		**SE 604 ZZSTPRB**
	13	5	0.2	**SE 624 ZZSTPRA**	**SE 624 ZZSTPR**		**SE 624 ZZSTPRB**
5	14	5	0.2	**SE 605 ZZSTPRA**	**SE 605 ZZSTPR**		**SE 605 ZZSTPRB**
	16	5	0.3	**SE 625 ZZSTPRA**	**SE 625 ZZSTPR**		**SE 625 ZZSTPRB**
6	12	4	—	**SEWML6012-1 ZZSTPRA**	**SEWML6012-1 ZZSTPR**		**SEWML6012-1 ZZSTPRB**
	13	5	—	**SEW686 ZZSTPRA**	**SEW686 ZZSTPR**		**SEW686 ZZSTPRB**
	17	6	0.3	**SE 606 ZZSTPRA**	**SE 606 ZZSTPR**		**SE 606 ZZSTPRB**
	19	6	0.3	**SE 626 ZZSTPRA**	**SE 626 ZZSTPR**		**SE 626 ZZSTPRB**
7	19	6	0.3	**SE 607 ZZSTPRA**	**SE 607 ZZSTPR**		**SE 607 ZZSTPRB**
	22	7	0.3	**SE 627 ZZSTPRA**	**SE 627 ZZSTPR**		**SE 627 ZZSTPRB**
8	22	7	0.3	**SE 608 ZZSTPRA**	**SE 608 ZZSTPR**		**SE 608 ZZSTPRB**
	24	8	0.3	**SE 628 ZZSTPRA**	**SE 628 ZZSTPR**		**SE 628 ZZSTPRB**
9	24	7	0.3	**SE 609 ZZSTPRA**	**SE 609 ZZSTPR**		**SE 609 ZZSTPRB**
	26	8	0.6	**SE 629 ZZSTPRA**	**SE 629 ZZSTPR**		**SE 629 ZZSTPRB**
10	26	8	0.3	**SE 6000 ZZSTPRA**	**SE 6000 ZZSTPR**		**SE 6000 ZZSTPRB**
	30	9	0.6	**SE 6200 ZZSTPRA**	**SE 6200 ZZSTPR**		**SE 6200 ZZSTPRB**
12	28	8	0.3	**SE 6001 ZZSTPRA**	**SE 6001 ZZSTPR**		**SE 6001 ZZSTPRB**
	32	10	0.6	**SE 6201 ZZSTPRA**	**SE 6201 ZZSTPR**		**SE 6201 ZZSTPRB**
15	32	9	0.3	**SE 6002 ZZSTPRA**	**SE 6002 ZZSTPR**		**SE 6002 ZZSTPRB**
	35	11	0.6	**SE 6202 ZZSTPRA**	**SE 6202 ZZSTPR**		**SE 6202 ZZSTPRB**
17	35	10	0.3	**SE 6003 ZZSTPRA**	**SE 6003 ZZSTPR**		**SE 6003 ZZSTPRB**
	40	12	0.6	**SE 6203 ZZSTPRA**	**SE 6203 ZZSTPR**		**SE 6203 ZZSTPRB**
20	42	12	0.6	**SE 6004 ZZSTPRA**	**SE 6004 ZZSTPR**		**SE 6004 ZZSTPRB**
	47	14	1	**SE 6204 ZZSTPRA**	**SE 6204 ZZSTPR**		**SE 6204 ZZSTPRB**
25	47	12	0.6	**SE 6005 ZZSTPRA**	**SE 6005 ZZSTPR**		**SE 6005 ZZSTPRB**



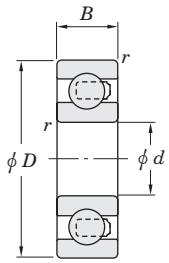
Boundary dimensions (mm)				Bearing No.			
				<120°C Clean Class10	<200°C Clean Class10		<260°C Clean Class10
d	D	B	r min.				
25	52	15	1	**SE 6205 ZZSTPRA**	**SE 6205 ZZSTPR**		**SE 6205 ZZSTPRB**
30	55	13	1	**SE 6006 ZZSTPRA**	**SE 6006 ZZSTPR**		**SE 6006 ZZSTPRB**
	62	16	1	**SE 6206 ZZSTPRA**	**SE 6206 ZZSTPR**		**SE 6206 ZZSTPRB**
35	62	14	1	**SE 6007 ZZSTPRA**	**SE 6007 ZZSTPR**		**SE 6007 ZZSTPRB**
	72	17	1.1	**SE 6207 ZZSTPRA**	**SE 6207 ZZSTPR**		**SE 6207 ZZSTPRB**
40	68	15	1	**SE 6008 ZZSTPRA**	**SE 6008 ZZSTPR**		**SE 6008 ZZSTPRB**
	80	18	1.1	**SE 6208 ZZSTPRA**	**SE 6208 ZZSTPR**		**SE 6208 ZZSTPRB**

d 4 ~ 25 mm



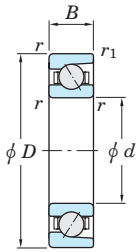
Boundary dimensions (mm)				Bearing No. Hybrid ceramic type					Full ceramic type	
d	D	B	r min.	High temperature (up to 500°C)	For corrosion resistance	Non magnetism	Insulation		High temperature (up to 800°C)	For corrosion resistance/ Non magnetism/Insulation
4	12	4	0.2	—	**3NC604MD4**	**3NC604YH4**	**3NC604ST4**		—	**NC604**
	13	5	0.2	—	**3NC624MD4**	**3NC624YH4**	**3NC624ST4**		—	**NC624**
5	14	5	0.2	—	**3NC605MD4**	**3NC605YH4**	**3NC605ST4**		—	**NC605**
	16	5	0.3	—	**3NC625MD4**	**3NC625YH4**	**3NC625ST4**		—	**NC625**
6	17	6	0.3	**3NC606HT4 GF**	**3NC606MD4**	**3NC606YH4**	**3NC606ST4**		**NC706V**	**NC606**
	19	6	0.3	**3NC626HT4 GF**	**3NC626MD4**	**3NC626YH4**	**3NC626ST4**		**NC726V**	**NC626**
7	19	6	0.3	**3NC607HT4 GF**	**3NC607MD4**	**3NC607YH4**	**3NC607ST4**		**NC707V**	**NC607**
	22	7	0.3	**3NC627HT4 GF**	**3NC627MD4**	**3NC627YH4**	**3NC627ST4**		**NC727V**	**NC627**
8	22	7	0.3	**3NC608HT4 GF**	**3NC608MD4**	**3NC608YH4**	**3NC608ST4**		**NC708V**	**NC608**
	24	8	0.3	**3NC628HT4 GF**	**3NC628MD4**	**3NC628YH4**	**3NC628ST4**		**NC728V**	**NC628**
9	24	7	0.3	**3NC609HT4 GF**	**3NC609MD4**	**3NC609YH4**	**3NC609ST4**		**NC709V**	**NC609**
	26	8	0.6	**3NC629HT4 GF**	**3NC629MD4**	**3NC629YH4**	**3NC629ST4**		**NC729V**	**NC629**
10	26	8	0.3	**3NC6000HT4 GF**	**3NC6000MD4**	**3NC6000YH4**	**3NC6000ST4**		**NC7000V**	**NC6000**
	30	9	0.6	**3NC6200HT4 GF**	**3NC6200MD4**	**3NC6200YH4**	**3NC6200ST4**		**NC7200V**	**NC6200**
12	28	8	0.3	**3NC6001HT4 GF**	**3NC6001MD4**	**3NC6001YH4**	**3NC6001ST4**		**NC7001V**	**NC6001**
	32	10	0.6	**3NC6201HT4 GF**	**3NC6201MD4**	**3NC6201YH4**	**3NC6201ST4**		**NC7201V**	**NC6201**
15	32	9	0.3	**3NC6002HT4 GF**	**3NC6002MD4**	**3NC6002YH4**	**3NC6002ST4**		**NC7002V**	**NC6002**
	35	11	0.6	**3NC6202HT4 GF**	**3NC6202MD4**	**3NC6202YH4**	**3NC6202ST4**		**NC7202V**	**NC6202**
17	35	10	0.3	**3NC6003HT4 GF**	**3NC6003MD4**	**3NC6003YH4**	**3NC6003ST4**		**NC7003V**	**NC6003**
	40	12	0.6	**3NC6203HT4 GF**	**3NC6203MD4**	**3NC6203YH4**	**3NC6203ST4**		**NC7203V**	**NC6203**
20	42	12	0.6	**3NC6004HT4 GF**	**3NC6004MD4**	**3NC6004YH4**	**3NC6004ST4**		**NC7004V**	**NC6004**
	47	14	1	**3NC6204HT4 GF**	**3NC6204MD4**	**3NC6204YH4**	**3NC6204ST4**		**NC7204V**	**NC6204**
25	47	12	0.6	**3NC6005HT4 GF**	**3NC6005MD4**	**3NC6005YH4**	**3NC6005ST4**		**NC7005V**	**NC6005**
	52	15	1	**3NC6205HT4 GF**	**3NC6205MD4**	**3NC6205YH4**	**3NC6205ST4**		**NC7205V**	**NC6205**

d 30 ~ 40 mm

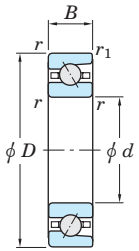


Boundary dimensions (mm)				Bearing No. Hybrid ceramic type					Full ceramic type	
d	D	B	r min.	High temperature (up to 500°C)	For corrosion resistance	Non magnetism	Insulation		High temperature (up to 800°C)	For corrosion resistance/ Non magnetism/Insulation
30	55	13	1	**3NC6006HT4 GF**	**3NC6006MD4**	**3NC6006YH4**	**3NC6006ST4**		**NC7006V**	**NC6006**
	62	16	1	**3NC6206HT4 GF**	**3NC6206MD4**	**3NC6206YH4**	**3NC6206ST4**		**NC7206V**	**NC6206**
35	62	14	1	**3NC6007HT4 GF**	**3NC6007MD4**	**3NC6007YH4**	**3NC6007ST4**		**NC7007V**	**NC6007**
	72	17	1.1	**3NC6207HT4 GF**	**3NC6207MD4**	**3NC6207YH4**	**3NC6207ST4**		**NC7207V**	**NC6207**
40	68	15	1	**3NC6008HT4 GF**	**3NC6008MD4**	**3NC6008YH4**	**3NC6008ST4**		**NC7008V**	**NC6008**
	80	18	1.1	**3NC6208HT4 GF**	**3NC6208MD4**	**3NC6208YH4**	**3NC6208ST4**		**NC7208V**	**NC6208**

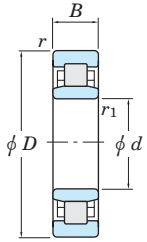
d 15 ~ (75) mm



70,72 series



HAR 0,9 series

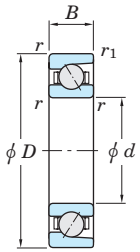


NU 10 series

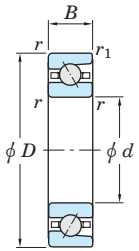
* This type of bearing is mainly used in high speed rotating parts such as machine tool spindles. Since rolling elements are made of ceramics, this type of bearing is shown here, even though not designed as EXSEV bearing series.
(Bearing rings are made of high carbon chromium bearing steel)

Boundary dimensions (mm)					Bearing No.				(Refer.) Basic bearing								
					Angular contact ball bearings		Cylindrical roller bearings		Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)	
d	D	B	r min.	r_1 min.	70,72 series	HAR 0,9 series	NU 10 series		70,72	C_r	C_{0r}	HAR 0,9	C_r	C_{0r}	NU 10	C_r	C_{0r}
15	32	9	0.3	0.15	**3NC 7002 FT**	—	—		7002	6.10	3.45	—	—	—	—	—	—
	35	11	0.6	0.3	**3NC 7202 FT**	—	—		7202	8.10	4.25	—	—	—	—	—	—
20	42	12	0.6	0.3	**3NC 7004 FT**	—	—		7004	10.3	6.10	—	—	—	—	—	—
	47	14	1	0.6	**3NC 7204 FT**	—	—		7204	14.5	8.40	—	—	—	—	—	—
25	47	12	0.6	0.3	**3NC 7005 FT**	—	—		7005	11.3	7.40	—	—	—	—	—	—
	52	15	1	0.6	**3NC 7205 FT**	—	—		7205	15.3	9.50	—	—	—	—	—	—
30	55	13	1	0.6	**3NC 7006 FT**	**3NC HAR006C FT**	—		7006	14.5	10.1	HAR006C	8.7	4.85	—	—	—
	62	16	1	0.6	**3NC 7206 FT**	—	—		7206	21.3	13.7	—	—	—	—	—	—
35	62	14	1	0.6	**3NC 7007 FT**	**3NC HAR007C FT**	—		7007	17.5	12.6	HAR007C	9.25	5.55	—	—	—
	72	17	1.1	0.6	**3NC 7207 FT**	—	—		7207	28.1	18.6	—	—	—	—	—	—
40	68	15	1	0.6	**3NC 7008 FT**	**3NC HAR008C FT**	—		7008	18.7	14.6	HAR008C	9.70	6.20	—	—	—
	80	18	1.1	0.6	**3NC 7208 FT**	—	—		7208	33.6	23.3	—	—	—	—	—	—
45	75	16	1	0.6	**3NC 7009 FT**	**3NC HAR009C FT**	—		7009	22.2	17.7	HAR009C	10.9	7.1	—	—	—
50	72	12	0.6	0.3	—	**3NC HAR910C FT**	—		—	—	—	HAR910C	9.10	6.30	—	—	—
	80	16	1	0.6	**3NC 7010 FT**	**3NC HAR010C FT**	**3NC NU1010 FY**		7010	23.6	20.1	HAR010C	11.4	7.85	NU1010	33.6	36.8
55	80	13	1	0.6	—	**3NC HAR911C FT**	—		—	—	—	HAR911C	10.1	7.65	—	—	—
	90	18	1.1	0.6	**3NC 7011 FT**	**3NC HAR011C FT**	**3NC NU1011 FY**		7011	31.1	26.3	HAR011C	14.1	9.9	NU1011	37.4	43.8
60	85	13	1	0.6	—	**3NC HAR912C FT**	—		—	—	—	HAR912C	9.95	7.75	—	—	—
	95	18	1.1	0.6	**3NC 7012 FT**	**3NC HAR012C FT**	**3NC NU1012 FY**		7012	31.9	28.1	HAR012C	14.7	10.8	NU1012	42.1	50.0
65	90	13	1	0.6	—	**3NC HAR913C FT**	—		—	—	—	HAR913C	11.8	9.45	—	—	—
	100	18	1.1	0.6	**3NC 7013 FT**	**3NC HAR013C FT**	**3NC NU1013 FY**		7013	33.7	31.4	HAR013C	15.3	11.8	NU1013	43.3	52.9
70	100	16	1	0.6	—	**3NC HAR914C FT**	—		—	—	—	HAR914C	12.9	10.5	—	—	—
	110	20	1.1	0.6	**3NC 7014 FT**	**3NC HAR014C FT**	**3NC NU1014 FY**		7014	42.7	39.4	HAR014C	20.7	15.5	NU1014	57.9	70.4
75	105	16	1	0.6	—	**3NC HAR915C FT**	—		—	—	—	HAR915C	13.3	11.2	—	—	—

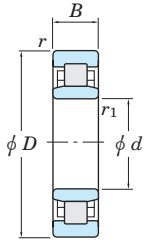
d (75) ~ 120 mm



70,72 series



HAR 0,9 series



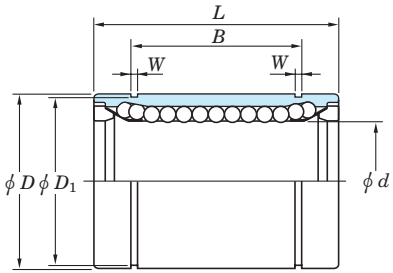
NU 10 series

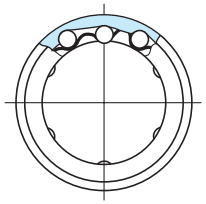
* This type of bearing is mainly used in high speed rotating parts such as machine tool spindles. Since rolling elements are made of ceramics, this type of bearing is shown here, even though not designed as EXSEV bearing series.
(Bearing rings are made of high carbon chromium bearing steel)

Boundary dimensions (mm)					Bearing No.				(Refer.) Basic bearing								
					Angular contact ball bearings		Cylindrical roller bearings		Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)	
d	D	B	r min.	r_1 min.	70,72 series	HAR 0,9 series	NU 10 series		70,72	C_r	C_{0r}	HAR 0,9	C_r	C_{0r}	NU 10	C_r	C_{0r}
75	115	20	1.1	0.6	**3NC 7015 FT**	**3NC HAR015C FT**	**3NC NU1015 FY**		7015	43.6	41.7	HAR015C	21.1	16.2	NU1015	63.6	78.1
80	110	16	1	0.6	—	**3NC HAR916C FT**	—		—	—	—	HAR916C	13.6	11.9	—	—	—
	125	22	1.1	0.6	—	**3NC HAR016C FT**	**3NC NU1016 FY**		—	—	—	HAR016C	24.7	19.2	NU1016	69.3	86.4
85	120	18	1.1	0.6	—	**3NC HAR917C FT**	—		—	—	—	HAR917C	16.3	14.2	—	—	—
	130	22	1.1	0.6	—	**3NC HAR017C FT**	**3NC NU1017 FY**		—	—	—	HAR017C	25.1	20.1	NU1017	71.4	91.2
90	125	18	1.1	0.6	—	**3NC HAR918C FT**	—		—	—	—	HAR918C	16.8	15.1	—	—	—
	140	24	1.5	1	—	**3NC HAR018C FT**	**3NC NU1018 FY**		—	—	—	HAR018C	32.8	26.1	NU1018	84.7	109
95	130	18	1.1	0.6	—	**3NC HAR919C FT**	—		—	—	—	HAR919C	17.3	16.0	—	—	—
	145	24	1.5	1	—	**3NC HAR019C FT**	**3NC NU1019 FY**		—	—	—	HAR019C	33.4	27.2	NU1019	87.2	115
100	140	20	1.1	0.6	—	**3NC HAR920C FT**	—		—	—	—	HAR920C	24.2	21.7	—	—	—
	150	24	1.5	1	—	**3NC HAR020C FT**	**3NC NU1020 FY**		—	—	—	HAR020C	34.0	28.4	NU1020	91.0	120
105	145	20	1.1	0.6	—	**3NC HAR921C FT**	—		—	—	—	HAR921C	24.9	23.1	—	—	—
	160	26	2	1	—	**3NC HAR021C FT**	—		—	—	—	HAR021C	38.6	32.5	—	—	—
110	150	20	1.1	0.6	—	**3NC HAR922C FT**	—		—	—	—	HAR922C	25.1	23.8	—	—	—
	170	28	2	1	—	**3NC HAR022C FT**	—		—	—	—	HAR022C	43.4	37.0	—	—	—
120	165	22	1.1	0.6	—	**3NC HAR924C FT**	—		—	—	—	HAR924C	29.4	28.4	—	—	—
	180	28	2	1	—	**3NC HAR024C FT**	—		—	—	—	HAR024C	44.9	39.9	—	—	—

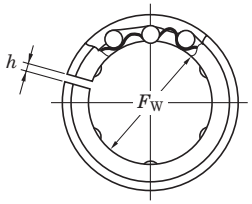
Linear ball bearings for vacuum

d 3 ~ 60 mm

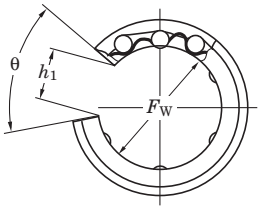




Standard type



Clearance adjustable type (AJ)



Open type (OP)

Shaft dia. (mm)	Boundary dimensions (mm)								Bearing No.			Basic load ratings (kN)		No. of ball rows		
d	D	L	B	W	D_1	h	h_1	θ	Standard type	Clearance adjustable type	Open type	C	C_0	Standard type	Clearance adjustable type	Open type
3	7	10	—	—	—	—	—	—	**SESDM 3**	—	—	69	105	4	—	—
4	8	12	—	—	—	—	—	—	**SESDM 4**	—	—	88	127	4	—	—
5	10	15	10.2	1.1	9.6	—	—	—	**SESDM 5**	—	—	167	206	4	—	—
6	12	19	13.5	1.1	11.5	—	—	—	**SESDM 6**	—	—	206	265	4	—	—
8	15	17	11.5	1.1	14.3	—	—	—	**SESDM 8S**	—	—	176	216	4	—	—
	15	24	17.5	1.1	14.3	—	—	—	**SESDM 8**	—	—	274	392	4	—	—
10	19	29	22	1.3	18	—	—	—	**SESDM10**	—	—	372	549	4	—	—
12	21	30	23	1.3	20	1.5	8	80°	**SESDM12**	**SESDM12 AJ**	**SESDM12 OP**	510	784	4	4	3
13	23	32	23	1.3	22	1.5	9	80°	**SESDM13**	**SESDM13 AJ**	**SESDM13 OP**	510	784	4	4	3
16	28	37	26.5	1.6	27	1.5	11	80°	**SESDM16**	**SESDM16 AJ**	**SESDM16 OP**	774	1 180	4	4	3
20	32	42	30.5	1.6	30.5	1.5	11	60°	**SESDM20**	**SESDM20 AJ**	**SESDM20 OP**	882	1 370	5	5	4
25	40	59	41	1.85	38	2	12	50°	**SESDM25**	**SESDM25 AJ**	**SESDM25 OP**	980	1 570	6	6	5
30	45	64	44.5	1.85	43	2.5	15	50°	**SESDM30**	**SESDM30 AJ**	**SESDM30 OP**	1 570	2 740	6	6	5
35	52	70	49.5	2.1	49	2.5	17	50°	**SESDM35**	**SESDM35 AJ**	**SESDM35 OP**	1 670	3 140	6	6	5
40	60	80	60.5	2.1	57	3	20	50°	**SESDM40**	**SESDM40 AJ**	**SESDM40 OP**	2 160	4 020	6	6	5
50	80	100	74	2.6	76.5	3	25	50°	**SESDM50**	**SESDM50 AJ**	**SESDM50 OP**	3 820	7 940	6	6	5
60	90	110	85	3.15	86.5	3	30	50°	**SESDM60**	**SESDM60 AJ**	**SESDM60 OP**	4 700	10 000	6	6	5

K-series super thin section ball bearings

Koyo K-series super thin section ball bearings were developed to meet current engineering needs for thinner, lighter bearings. They are used extensively in automation and labor saving equipment, such as industrial robots.

These bearings are sorted into nine dimension series according to cross-sectional area.

Those of the same dimension series have an equivalent cross-sectional area irrespective of the bore diameter.

They are available in three types that differ in structure.

■ Deep groove type

Carries radial load, axial load in both directions, and combined loads.

■ Angular contact type

Has a 30° contact angle, and carries radial load and axial load in one direction.
Two bearings are usually used together facing one another.

■ Four-point contact type

Has a contact angle of 30° both to the right and to the left.
Able to carry axial load in both directions. Also able to support moment and radial loads.

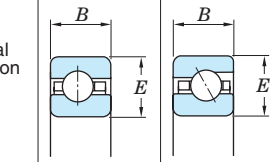
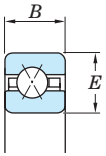
		Bearing type code			
		C (Deep groove type)	A (Angular contact type)	X (Four-point contact type)	
Dimension series code	Cross-sectional dimension $B = E$ (mm)				Bore diameter (mm)
T	4.762	K T C	K T A	K T X	25.4 to 38.1
A	6.35	K A C	K A A	K A X	50.8 to 304.8
B	7.938	K B C	K B A	K B X	50.8 to 508
C	9.525	K C C	K C A	K C X	101.6 to 762
D	12.7	K D C	K D A	K D X	
F	19.05	K F C	K F A	K F X	101.6 to 1 016
G	25.4	K G C	K G A	K G X	
J	$B = 11.1$ $E = 9.525$	–	KJA...RD 	–	101.6 to 304.8
U	$B = 12.7$ $E = 9.525$	KUC...2RD 	–	KUX...2RD 	

Table 1 K-series super thin section ball bearings : tolerance

Unit : μm

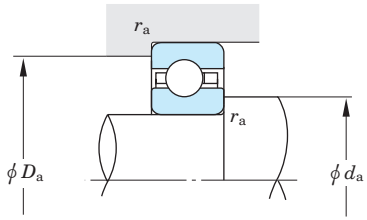
Bore diameter number	Single plane mean bore diameter deviation Δ_{dmp}					Single plane mean outside diameter deviation Δ_{Dmp}					Single inner (outer) ring width deviation Δ_{Bs}, Δ_{Cs}			Radial runout of assembled bearing ring, max.										Assembled bearing ring face runout with raceway, max.				Bore diameter number
														Inner ring K_{ia}					Outer ring K_{ea}						Inner ring S_{ia}		Outer ring S_{ea}		
	classes K0, K1, K2		class K3	class K4	class K6	classes K0, K1, K2		class K3	class K4	class K6	classes K0, K1, K2	classes K3, K4	class K6	class K0		class K3	classes K1, K4	classes K2, K6	class K0		class K3	classes K1, K4	classes K2, K6	classes K1, K4	classes K0, K2 K3, K6	classes K1, K4	classes K0, K2 K3, K6	
	div. Ⅰ	div. Ⅱ				div. Ⅰ	div. Ⅱ							div. Ⅰ	div. Ⅱ				div. Ⅰ	div. Ⅱ									
010	0 −10		0 −5	0 −5	0 −4	0 −13		0 −8	0 −5	0 −5	0 −127			13	8	8	5	4	20	10	10	5	5	8	Same as limit values for radial runout of assembled bearing inner ring	8	Same as limit values for radial runout of assembled bearing outer ring	010
015	0 −13		0 −8											15	10	10												015
020	0 −15		0 −10	0 −8	0 −5			0 −10	0 −8	0 −8				20	13	10			25	13	13	8				10		020
025																												025
030						0 −15									15					15	15	10				13		030
035	0 −20		0 −13	0 −8	0 −6									25		13	8	5	30					10				035
040																												040
042						0 −20		0 −13	0 −10	0 −10					20				36	20	20		8			13		042
045																												045
047	0 −25		0 −15	0 −10	0 −8									30		15												047
050															25													050
055						0 −25		0 −15		0 −10									41	25	23					15		055
060																												060
065									0 −13																			065
070						0 −30		0 −18													25	13	10					070
075	0 −30		0 −18	0 −13	0 −10									41	30	20	10	8	46	30				13				075
080																												080
090																							10					090
100	0 −36	0 −36	0 −20		0 −13	0 −36	0 −36	0 −20		0 −13				46	36	25	13	10	51	36	30	15		15		18		100
110																												110
120								0 −23	0 −15	0 −15											36	18	13			20		120
140	0 −41			0 −15		0 −41						0 −254				30								18				140
160	0 −46	0 −41	0 −23			0 −46	0 −41	0 −25	0 −18			0 −254			41	36	18			41	41	20		20		23		160
180														51														180
200	0 −51	0 −46	0 −25	0 −18		0 −51	0 −46	0 −30	0 −20		0 −254				46	41	20			46	46	23			23		25		200
250	0 −76					0 −76																						250
300															51					51								300
350	0 −102	0 −51				0 −102	0 −51																					350
400																												400

[Notes] Division Ⅰ is for deep groove type ball bearings.
Division Ⅱ is for angular contact type and four-point contact type ball bearings.

Table 2 Standard radil internal clearance of deep groove and four-point contact type ball bearings Unit : μm

Bore diameter number	Radial internal clearance				
	classes K0, K1, K2		class K3	class K4	class K6
	Deep groove type	Four-point contact type			
010	25 – 41	25 – 38	18 – 28	13 – 23	10 – 20
015	30 – 46	30 – 43	20 – 30		13 – 23
020	30 – 61	30 – 56	20 – 46	15 – 30	10 – 25
025					
030					15 – 30
035	41 – 71	41 – 66	25 – 51		
040					
042				20 – 36	20 – 36
045					
047	51 – 86	51 – 76	30 – 56		
050					
055				25 – 41	
060					
065					
070			36 – 61		
075	61 – 107	61 – 86			
080					
090					
100	71 – 122	71 – 97	41 – 66		25 – 41
110					
120			46 – 71	30 – 46	
140	81 – 132				30 – 46
160	91 – 142	81 – 107	51 – 76	36 – 51	
180					
200	102 – 152	91 – 117	61 – 86	36 – 56	
250	152 – 203				
300					
350	203 – 254	102 – 127			
400					

Table 3 Mounting dimensions



Unit : mm

Dimension series	Bearing type			ϕd_a		ϕD_a		r_a
				max.	min.	min.	max.	max.
T	KTC	KTA	KTX	d + 5.3	d + 3.4	d + 4.2	d + 6.1	0.2
A	KAC	KAA	KAX	d + 7.3	d + 4.6	d + 5.4	d + 8.2	0.4
B	KBC	KBA	KBX	d + 9.3	d + 5.7	d + 6.6	d + 10.2	0.8
C	KCC	KCA	KCX	d + 11.3	d + 6.9	d + 7.7	d + 12.2	0.8
D	KDC	KDA	KDX	d + 15.3	d + 9.2	d + 10.1	d + 16.2	1.3
F	KFC	KFA	KFX	d + 23.3	d + 13.9	d + 14.8	d + 24.2	1.8
G	KGC	KGA	KGX	d + 31.3	d + 18.7	d +19.5	d + 32.1	1.8
J	–	KJA	–	d + 11.3	d + 6.9	d + 7.7	d + 12.2	0.2
U	KUC	–	KUX					

Table 4 Shaft diameter and housing bore diameter tolerance

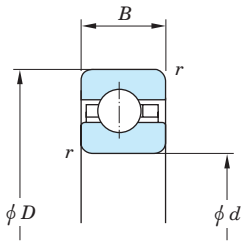
Unit : μm

Bore diameter number	Inner ring rotation									Outer ring rotation									Bore diameter number
	Shaft diameter tolerance					Housing bore diameter tolerance				Shaft diameter tolerance					Housing bore diameter tolerance				
	classes K0, K1, K2		class K3	class K4	class K6	classes K0, K1, K2		class K3	class K4	class K6	classes K0, K1, K2		class K3	class K4	class K6	classes K0, K1, K2		class K3	class K4	class K6	
	div. Ⅰ	div. Ⅱ				div. Ⅰ	div. Ⅱ				div. Ⅰ	div. Ⅱ				div. Ⅰ	div. Ⅱ				
010	+10 0		+5 0	+5 0	+4 0	+13 0	+13 0	+8 0	+5 0	+5 0	−10 −20		−5 −10	−5 −10	−4 −8	−13 −25	−13 −25	−8 −15	−5 −10	−5 −10	010
015	+13 0		+8 0		+5 0						−13 −25		−8 −15		−5 −10						015
020	+15 0		+10 0	+8 0		+15 0		+10 0	+8 0		−15 −30		−10 −20	−8 −15		−15 −30	−15 −25	−10 −20	−8 −15		020
025																					025
030							+15 0			+8 0											030
035	+20 0		+13 0		+6 0						−20 −40		−13 −25		−6 −13						035
040																					040
042						+20 0		+13 0	+10 0							−20 −40		−13 −25	−10 −20		042
045																					045
047	+25 0		+15 0	+10 0	+8 0						−25 −50		−15 −30	−10 −20	−8 −15						047
050																					050
055						+25 0		+15 0		+10 0						−25 −50		−15 −30		−10 −20	055
060																					060
065																					065
070						+30 0		+18 0	+13 0							−30 −60		−18 −35	−13 −25		070
075	+30 0		+18 0	+13 0	+10 0						−30 −60		−18 −35	−13 −25	−10 −20						075
080																					080
090																					090
100	+35 0	+35 0	+20 0		+13 0	+35 0	+35 0	+20 0		+13 0	−35 −70	−35 −70	−20 −40		−13 −25	−35 −70	−35 −70	−20 −40		−13 −25	100
110																					110
120								+23 0	+15 0									−23 −45	−15 −30		120
140	+40 0			+15 0		+40 0				+15 0	−48 −80			−15 −30		−40 −80				−15 −30	140
160	+45 0	+40 0	+23 0			+45 0	+40 0	+25 0	+18 0		−45 −90	−40 −80	−23 −45			−45 −90	−40 −80	−25 −50	−18 −35		160
180																					180
200	+50 0	+45 0	+25 0	+18 0		+50 0	+45 0	+30 0	+20 0		−50 −100	−45 −90	−25 −50	−15 −35		−50 −100	−45 −90	−30 −60	−18 −40		200
250	+75 0					+75 0					−75 −150					−75 −150					250
300																					300
350	+100 0	+50 0				+100 0	+50 0				−100 −200	−50 −100				−100 −200	−50 −100				350
400																					400

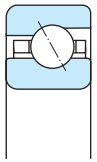
[Notes] Division Ⅰ is for deep groove type ball bearings.
Division Ⅱ is for angular contact type and four-point contact type ball bearings.

K-series super thin section ball bearings open type

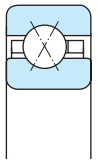
d 25.4 ~ (114.3) mm



Deep groove type



Angular contact type

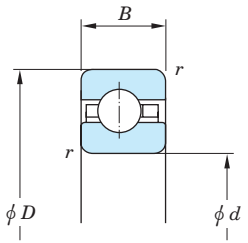


Four-point contact type

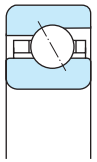
Boundary dimensions (mm)				Deep groove type			Angular contact type					Four-point contact type				(Refer.) Mass (kg)		
				Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)				Bearing No.	Basic load ratings (kN)						
d	D	B	r min.		C_r	C_{0r}		C_r	C_{0r}	C_a	C_{0a}		C_r	C_{0r}	C_a	C_{0a}	Deep groove type	Angular contact type	Four-point contact type
25.4	34.925	4.762	0.4	**KTC010**	2.50	1.95	**KTA010**	2.65	2.20	3.45	6.70	**KTX010**	2.15	1.65	3.70	7.15	0.012	0.011	0.012
38.1	47.625	4.762	0.4	**KTC015**	2.90	2.70	**KTA015**	3.05	3.10	4.00	9.35	**KTX015**	2.50	2.30	4.20	10.5	0.018	0.017	0.018
50.8	63.5	6.35	0.6	**KAC020**	4.50	4.30	**KAA020**	4.75	4.95	6.25	14.9	**KAX020**	3.90	3.70	6.60	16.9	0.045	0.045	0.045
	66.675	7.938	1	**KBC020**	6.35	5.85	**KBA020**	6.75	6.70	8.90	20.4	**KBX020**	5.55	5.00	9.35	22.0	0.073	0.068	0.073
63.5	76.2	6.35	0.6	**KAC025**	4.85	5.20	**KAA025**	5.10	5.95	6.75	18.0	**KAX025**	4.20	4.45	7.05	20.9	0.059	0.054	0.059
	79.375	7.938	1	**KBC025**	6.90	7.00	**KBA025**	7.35	8.15	9.65	24.6	**KBX025**	6.00	6.00	10.0	27.3	0.086	0.086	0.086
76.2	88.9	6.35	0.6	**KAC030**	5.20	6.10	**KAA030**	5.45	7.00	7.15	21.2	**KAX030**	4.50	5.25	7.45	24.9	0.068	0.064	0.068
	92.075	7.938	1	**KBC030**	7.35	8.15	**KBA030**	7.70	9.35	10.2	28.3	**KBX030**	6.35	7.00	10.6	32.5	0.109	0.100	0.109
88.9	101.6	6.35	0.6	**KAC035**	5.45	7.00	**KAA035**	5.75	8.00	7.55	24.3	**KAX035**	4.75	6.00	7.80	29.0	0.082	0.077	0.082
	104.775	7.938	1	**KBC035**	7.75	9.30	**KBA035**	8.20	10.7	10.8	32.5	**KBX035**	6.70	8.00	11.1	37.8	0.122	0.122	0.122
101.6	114.3	6.35	0.6	**KAC040**	5.75	7.85	**KAA040**	6.00	9.05	7.90	27.4	**KAX040**	4.95	6.80	8.10	33.0	0.086	0.086	0.086
	117.475	7.938	1	**KBC040**	8.10	10.5	**KBA040**	8.60	12.1	11.3	36.8	**KBX040**	7.05	9.00	11.6	43.1	0.136	0.136	0.136
	120.65	9.525	1	**KCC040**	10.3	12.4	**KCA040**	11.2	14.9	14.7	45.1	**KCX040**	8.95	10.6	14.8	50.0	0.204	0.200	0.204
	127	12.7	1.5	**KDC040**	15.7	17.2	**KDA040**	16.5	19.7	21.7	59.8	**KDX040**	13.6	14.8	22.6	67.4	0.354	0.363	0.354
	139.7	19.05	2	**KFC040**	28.2	28.1	**KFA040**	30.3	32.9	39.8	99.6	**KFX040**	24.6	24.0	41.0	103	0.862	0.871	0.862
	152.4	25.4	2	**KGC040**	42.6	39.6	**KGA040**	45.2	46.0	59.5	139	**KGX040**	37.3	34.5	62.4	141	1.63	1.64	1.63
107.95	120.65	6.35	0.6	**KAC042**	5.85	8.30	**KAA042**	6.15	9.55	8.10	29.0	**KAX042**	5.10	7.15	8.25	35.0	0.091	0.091	0.091
	123.825	7.938	1	**KBC042**	8.25	10.9	**KBA042**	8.75	12.7	11.5	38.6	**KBX042**	7.15	9.40	11.7	45.2	0.141	0.141	0.141
	127	9.525	1	**KCC042**	10.5	13.0	**KCA042**	11.5	15.8	15.1	47.8	**KCX042**	9.15	11.2	15.0	53.0	0.213	0.209	0.213
	133.35	12.7	1.5	**KDC042**	15.8	17.8	**KDA042**	16.8	20.8	22.1	62.9	**KDX042**	13.7	15.3	22.8	70.2	0.376	0.381	0.376
	146.05	19.05	2	**KFC042**	28.8	29.4	**KFA042**	30.6	34.0	40.3	103	**KFX042**	25.1	25.2	41.8	109	0.907	0.925	0.907
	158.75	25.4	2	**KGC042**	42.2	39.9	**KGA042**	46.2	48.0	60.8	146	**KGX042**	36.9	34.3	61.8	142	1.72	1.74	1.72
114.3	127	6.35	0.6	**KAC045**	6.00	8.75	**KAA045**	6.25	10.1	8.25	30.5	**KAX045**	5.20	7.55	8.40	37.0	0.100	0.095	0.100
	130.175	7.938	1	**KBC045**	8.45	11.6	**KBA045**	8.90	13.3	11.7	40.4	**KBX045**	7.35	10.0	12.0	48.3	0.150	0.154	0.150
	133.35	9.525	1	**KCC045**	10.7	13.7	**KCA045**	11.7	16.6	15.4	50.4	**KCX045**	9.30	11.8	15.3	56.1	0.218	0.222	0.218
	139.7	12.7	1.5	**KDC045**	16.3	19.0	**KDA045**	17.2	21.8	22.6	66.0	**KDX045**	14.2	16.3	23.4	75.5	0.399	0.399	0.399

K-series super thin section ball bearings
open type

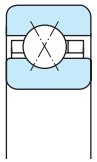
d (114.3) ~ (165.1) mm



Deep groove type



Angular contact type

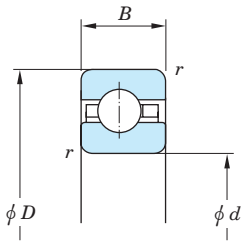


Four-point contact type

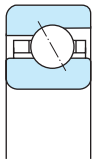
Boundary dimensions (mm)				Deep groove type			Angular contact type					Four-point contact type				(Refer.) Mass (kg)		
				Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)				Bearing No.	Basic load ratings (kN)						
d	D	B	r min.		C_r	C_{0r}		C_r	C_{0r}	C_a	C_{0a}		C_r	C_{0r}	C_a	C_{0a}	Deep groove type	Angular contact type	Four-point contact type
114.3	152.4	19.05	2	**KFC045**	29.4	30.8	**KFA045**	31.7	36.4	41.7	110	**KFX045**	25.6	26.3	42.6	115	0.953	0.971	0.953
	165.1	25.4	2	**KGC045**	43.6	42.7	**KGA045**	47.1	50.1	62.0	152	**KGX045**	38.1	36.4	63.6	152	1.81	1.79	1.81
120.65	133.35	6.35	0.6	**KAC047**	6.10	9.20	**KAA047**	6.40	10.6	8.40	32.1	**KAX047**	5.30	7.95	8.55	39.0	0.104	0.100	0.104
	136.525	7.938	1	**KBC047**	8.55	12.1	**KBA047**	9.10	14.2	12.0	42.9	**KBX047**	7.45	10.4	12.1	50.4	0.154	0.159	0.154
	139.7	9.525	1	**KCC047**	10.9	14.4	**KCA047**	12.0	17.5	15.7	53.0	**KCX047**	9.50	12.4	15.5	59.1	0.227	0.231	0.227
	146.05	12.7	1.5	**KDC047**	16.5	19.6	**KDA047**	17.5	22.8	23.0	69.1	**KDX047**	14.3	16.8	23.6	78.2	0.426	0.422	0.426
	158.75	19.05	2	**KFC047**	29.9	32.1	**KFA047**	32.0	37.5	42.2	114	**KFX047**	26.1	27.5	43.3	121	0.998	1.03	0.998
	171.45	25.4	2	**KGC047**	44.9	45.2	**KGA047**	48.0	52.1	63.1	158	**KGX047**	39.2	38.6	65.4	162	1.86	1.89	1.86
127	139.7	6.35	0.6	**KAC050**	6.20	9.65	**KAA050**	6.50	11.1	8.55	33.6	**KAX050**	5.35	8.35	8.65	41.1	0.109	0.104	0.109
	142.875	7.938	1	**KBC050**	8.80	12.8	**KBA050**	9.25	14.8	12.2	44.7	**KBX050**	7.60	11.0	12.4	53.6	0.172	0.168	0.172
	146.05	9.525	1	**KCC050**	11.1	15.0	**KCA050**	12.2	18.4	16.0	55.7	**KCX050**	9.65	12.9	15.8	62.1	0.263	0.245	0.263
	152.4	12.7	1.5	**KDC050**	16.9	20.8	**KDA050**	17.8	23.8	23.4	72.2	**KDX050**	14.7	17.9	24.2	83.5	0.454	0.445	0.454
	165.1	19.05	2	**KFC050**	30.5	33.4	**KFA050**	32.4	38.6	42.6	117	**KFX050**	26.5	28.7	44.0	127	1.04	1.08	1.04
	177.8	25.4	2	**KGC050**	46.2	47.6	**KGA050**	48.8	54.2	64.3	164	**KGX050**	40.3	40.7	67.1	173	1.95	2.00	1.95
139.7	152.4	6.35	0.6	**KAC055**	6.40	10.5	**KAA055**	6.75	12.1	8.85	36.8	**KAX055**	5.55	9.10	8.90	45.1	0.113	0.113	0.113
	155.575	7.938	1	**KBC055**	9.10	13.9	**KBA055**	9.60	16.2	12.6	49.0	**KBX055**	7.85	12.0	12.7	58.8	0.186	0.181	0.186
	158.75	9.525	1	**KCC055**	11.5	16.4	**KCA055**	12.5	19.8	16.5	60.0	**KCX055**	10.0	14.1	16.2	68.2	0.268	0.263	0.268
	165.1	12.7	1.5	**KDC055**	17.5	22.6	**KDA055**	18.4	25.9	24.2	78.5	**KDX055**	15.2	19.4	24.9	91.6	0.481	0.481	0.481
	177.8	19.05	2	**KFC055**	31.5	36.1	**KFA055**	33.6	42.1	44.3	128	**KFX055**	27.4	31.0	45.3	140	1.13	1.17	1.13
	190.5	25.4	2	**KGC055**	47.0	49.8	**KGA055**	50.5	58.3	66.4	177	**KGX055**	41.0	42.6	68.0	184	2.13	2.15	2.13
152.4	165.1	6.35	0.6	**KAC060**	6.60	11.4	**KAA060**	6.95	13.2	9.15	39.9	**KAX060**	5.75	9.85	9.15	49.1	0.127	0.127	0.127
	168.275	7.938	1	**KBC060**	9.35	15.1	**KBA060**	9.90	17.6	13.0	53.3	**KBX060**	8.10	13.0	13.1	64.1	0.200	0.200	0.200
	171.45	9.525	1	**KCC060**	11.9	17.7	**KCA060**	12.9	21.5	17.0	65.3	**KCX060**	10.3	15.3	16.7	74.2	0.286	0.290	0.286
	177.8	12.7	1.5	**KDC060**	18.0	24.4	**KDA060**	19.0	27.9	24.9	84.7	**KDX060**	15.7	21.0	25.5	99.7	0.526	0.522	0.526
	190.5	19.05	2	**KFC060**	32.5	38.8	**KFA060**	34.8	45.6	45.8	138	**KFX060**	28.2	33.3	46.5	152	1.22	1.23	1.22
	203.2	25.4	2	**KGC060**	49.3	54.7	**KGA060**	52.0	62.4	68.4	189	**KGX060**	42.9	46.8	71.1	205	2.31	2.30	2.31
165.1	177.8	6.35	0.6	**KAC065**	6.80	12.3	**KAA065**	7.15	14.2	9.40	43.0	**KAX065**	5.90	10.6	9.40	53.2	0.136	0.136	0.136
	180.975	7.938	1	**KBC065**	9.65	16.3	**KBA065**	10.1	18.8	13.3	56.9	**KBX065**	8.35	14.0	13.4	69.3	0.213	0.213	0.213

K-series super thin section ball bearings open type

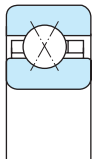
d (165.1) ~ 228.6 mm



Deep groove type



Angular contact type

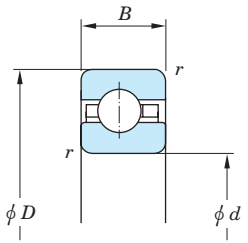


Four-point contact type

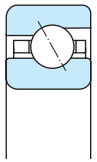
Boundary dimensions (mm)				Deep groove type			Angular contact type				Four-point contact type				(Refer.) Mass (kg)		
				Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)			Bearing No.	Basic load ratings (kN)					
d	D	B	r min.		C_r	C_{0r}		C_r	C_{0r}	C_a	C_{0a}		C_r	C_{0r}	C_a	C_{0a}	Deep groove type	Angular contact type	Four-point contact type
165.1	184.15	9.525	1	**KCC065**	12.2	19.0	**KCA065**	13.4	23.3	17.6	70.6	**KCX065**	10.6	16.4	17.1	80.3	0.308	0.308	0.308
	190.5	12.7	1.5	**KDC065**	18.6	26.1	**KDA065**	19.5	30.0	25.6	90.9	**KDX065**	16.1	22.5	26.2	108	0.553	0.562	0.553
	203.2	19.05	2	**KFC065**	33.4	41.5	**KFA065**	36.0	49.1	47.3	149	**KFX065**	29.0	35.6	47.7	164	1.32	1.33	1.32
	215.9	25.4	2	**KGC065**	50.0	57.0	**KGA065**	53.5	66.5	70.3	202	**KGX065**	43.5	48.8	71.8	216	2.45	2.45	2.45
177.8	190.5	6.35	0.6	**KAC070**	7.00	13.2	**KAA070**	7.35	15.2	9.65	46.1	**KAX070**	6.05	11.4	9.60	57.2	0.141	0.145	0.141
	193.675	7.938	1	**KBC070**	9.90	17.4	**KBA070**	10.4	20.2	13.7	61.2	**KBX070**	8.55	15.0	13.7	74.6	0.227	0.227	0.227
	196.85	9.525	1	**KCC070**	12.5	20.4	**KCA070**	13.6	24.7	17.9	74.9	**KCX070**	10.9	17.6	17.5	86.3	0.331	0.336	0.331
	203.2	12.7	1.5	**KDC070**	19.0	27.9	**KDA070**	20.0	32.1	26.3	97.2	**KDX070**	16.5	24.0	26.7	116	0.594	0.603	0.594
	215.9	19.05	2	**KFC070**	34.3	44.1	**KFA070**	37.0	52.6	48.7	159	**KFX070**	29.8	37.9	48.7	176	1.45	1.43	1.45
	228.6	25.4	2	**KGC070**	52.1	61.8	**KGA070**	54.8	70.7	72.2	214	**KGX070**	45.3	53.0	74.5	237	2.63	2.66	2.63
190.5	203.2	6.35	0.6	**KAC075**	7.15	14.1	**KAA075**	7.50	16.2	9.90	49.2	**KAX075**	6.20	12.2	9.80	61.3	0.154	0.154	0.154
	206.375	7.938	1	**KBC075**	10.1	18.6	**KBA075**	10.7	21.6	14.1	65.4	**KBX075**	8.80	16.0	14.0	79.8	0.240	0.245	0.240
	209.55	9.525	1	**KCC075**	12.8	21.7	**KCA075**	14.0	26.5	18.4	80.2	**KCX075**	11.1	18.7	17.8	92.4	0.354	0.354	0.354
	215.9	12.7	1.5	**KDC075**	19.5	29.7	**KDA075**	20.5	34.1	27.0	103	**KDX075**	16.9	25.6	27.3	124	0.640	0.644	0.640
	228.6	19.05	2	**KFC075**	35.1	46.8	**KFA075**	37.5	54.8	49.3	166	**KFX075**	30.5	40.2	49.8	188	1.54	1.54	1.54
	241.3	25.4	2	**KGC075**	52.6	64.1	**KGA075**	56.2	74.8	73.9	227	**KGX075**	45.8	55.0	75.2	249	2.77	2.81	2.77
203.2	215.9	6.35	0.6	**KAC080**	7.35	15.0	**KAA080**	7.70	17.3	10.1	52.3	**KAX080**	6.35	13.0	10.0	65.3	0.172	0.163	0.172
	219.075	7.938	1	**KBC080**	10.4	19.7	**KBA080**	11.0	23.0	14.4	69.7	**KBX080**	9.00	17.0	14.3	85.1	0.259	0.259	0.259
	222.25	9.525	1	**KCC080**	13.1	23.1	**KCA080**	14.4	28.2	18.9	85.5	**KCX080**	11.4	19.9	18.2	98.5	0.381	0.381	0.381
	228.6	12.7	1.5	**KDC080**	20.0	31.5	**KDA080**	21.0	36.2	27.6	110	**KDX080**	17.3	27.1	27.9	132	0.694	0.689	0.694
	241.3	19.05	2	**KFC080**	35.9	49.5	**KFA080**	38.5	58.3	50.6	177	**KFX080**	31.2	42.5	50.7	200	1.59	1.64	1.59
	254	25.4	2	**KGC080**	54.5	69.0	**KGA080**	57.4	78.9	75.5	239	**KGX080**	47.4	59.2	77.6	270	2.95	2.97	2.95
228.6	241.3	6.35	0.6	**KAC090**	7.65	16.8	**KAA090**	8.00	19.3	10.5	58.6	**KAX090**	6.60	14.5	10.4	73.4	0.200	0.186	0.200
	244.475	7.938	1	**KBC090**	10.8	22.1	**KBA090**	11.4	25.6	15.0	77.6	**KBX090**	9.35	19.1	14.8	95.6	0.299	0.290	0.299
	247.65	9.525	1	**KCC090**	13.7	25.7	**KCA090**	14.9	31.4	19.6	95.1	**KCX090**	11.9	22.2	18.9	111	0.426	0.445	0.426
	254	12.7	1.5	**KDC090**	20.8	35.0	**KDA090**	21.8	40.3	28.7	122	**KDX090**	18.0	30.2	28.9	148	0.780	0.767	0.780
	266.7	19.05	2	**KFC090**	37.4	54.8	**KFA090**	40.3	65.3	53.1	198	**KFX090**	32.5	47.2	52.6	224	1.77	1.79	1.77
	279.4	25.4	2	**KGC090**	56.8	76.1	**KGA090**	59.8	87.1	78.7	264	**KGX090**	49.4	65.3	80.5	302	3.27	3.27	3.27

K-series super thin section ball bearings open type

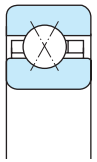
d 254 ~ 406.4 mm



Deep groove type



Angular contact type

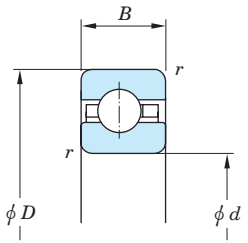


Four-point contact type

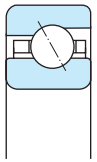
Boundary dimensions (mm)				Deep groove type			Angular contact type				Four-point contact type				(Refer.) Mass (kg)		
				Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)			Bearing No.	Basic load ratings (kN)					
d	D	B	r min.		C_r	C_{0r}		C_r	C_{0r}	C_a	C_{0a}		C_r	C_{0r}	C_a	C_{0a}	Deep groove type	Angular contact type	Four-point contact type
254	266.7	6.35	0.6	**KAC100**	7.95	18.6	**KAA100**	8.30	21.4	11.0	64.8	**KAX100**	6.85	16.0	10.7	81.4	0.227	0.204	0.227
	269.875	7.938	1	**KBC100**	11.2	24.4	**KBA100**	11.9	28.4	15.6	86.1	**KBX100**	9.75	21.1	15.3	106	0.331	0.322	0.331
	273.05	9.525	1	**KCC100**	14.2	28.4	**KCA100**	15.6	34.9	20.5	106	**KCX100**	12.3	24.5	19.5	123	0.481	0.472	0.481
	279.4	12.7	1.5	**KDC100**	21.6	38.6	**KDA100**	22.7	44.4	29.8	135	**KDX100**	18.7	33.3	29.8	164	0.853	0.848	0.853
	292.1	19.05	2	**KFC100**	38.8	60.2	**KFA100**	41.6	71.1	54.7	215	**KFX100**	33.7	51.8	54.3	249	1.95	2.00	1.95
	304.8	25.4	2	**KGC100**	59.0	83.2	**KGA100**	62.0	95.3	81.6	289	**KGX100**	51.2	71.5	83.1	334	3.58	3.63	3.58
279.4	292.1	6.35	0.6	**KAC110**	8.20	20.3	**KAA110**	8.60	23.4	11.3	71.0	**KAX110**	7.10	17.6	11.1	89.5	0.236	0.227	0.236
	295.275	7.938	1	**KBC110**	11.6	26.7	**KBA110**	12.3	31.0	16.1	94.0	**KBX110**	10.1	23.1	15.7	117	0.340	0.354	0.340
	298.45	9.525	1	**KCC110**	14.7	31.1	**KCA110**	16.1	38.0	21.1	115	**KCX110**	12.7	26.8	20.1	135	0.526	0.517	0.526
	304.8	12.7	1.5	**KDC110**	22.3	42.2	**KDA110**	23.4	48.5	30.8	147	**KDX110**	19.3	36.4	30.7	180	0.934	0.930	0.934
	317.5	19.05	2	**KFC110**	40.2	65.5	**KFA110**	43.2	78.0	56.9	236	**KFX110**	34.8	56.4	55.9	273	2.18	2.15	2.18
	330.2	25.4	2	**KGC110**	61.0	90.3	**KGA110**	64.1	104	84.3	314	**KGX110**	52.9	77.7	85.5	366	3.90	3.94	3.90
304.8	317.5	6.35	0.6	**KAC120**	8.45	22.1	**KAA120**	8.90	25.5	11.7	77.3	**KAX120**	7.35	19.1	11.4	97.6	0.254	0.245	0.254
	320.675	7.938	1	**KBC120**	12.0	29.0	**KBA120**	12.7	33.8	16.7	103	**KBX120**	10.4	25.1	16.2	127	0.376	0.386	0.376
	323.85	9.525	1	**KCC120**	15.2	33.8	**KCA120**	16.5	41.2	21.8	125	**KCX120**	13.1	29.2	20.6	147	0.567	0.558	0.567
	330.2	12.7	1.5	**KDC120**	23.0	45.7	**KDA120**	24.2	52.6	31.8	160	**KDX120**	20.0	39.5	31.5	197	1.02	1.01	1.02
	342.9	19.05	2	**KFC120**	41.4	70.9	**KFA120**	44.3	83.8	58.3	254	**KFX120**	35.9	61.1	57.4	297	2.36	2.36	2.36
	355.6	25.4	2	**KGC120**	62.9	97.5	**KGA120**	66.0	112	86.9	339	**KGX120**	54.5	83.9	87.8	399	4.22	4.30	4.22
355.6	371.475	7.938	1	**KBC140**	12.7	33.7	**KBA140**	13.4	39.1	17.6	118	**KBX140**	11.0	29.1	17.0	148	0.476	0.445	0.476
	374.65	9.525	1	**KCC140**	16.0	39.1	**KCA140**	17.5	47.9	23.0	145	**KCX140**	13.9	33.8	21.6	171	0.689	0.649	0.689
	381	12.7	1.5	**KDC140**	24.3	52.9	**KDA140**	25.5	60.9	33.6	184	**KDX140**	21.1	45.7	33.1	229	1.24	1.17	1.24
	393.7	19.05	2	**KFC140**	43.7	81.5	**KFA140**	46.8	96.5	61.6	293	**KFX140**	37.9	70.3	60.2	345	2.72	2.61	2.72
	406.4	25.4	2	**KGC140**	66.3	112	**KGA140**	69.7	128	91.7	389	**KGX140**	57.5	96.2	92.0	463	4.90	4.94	4.90
406.4	422.275	7.938	1	**KBC160**	13.3	38.3	**KBA160**	14.0	44.5	18.4	135	**KBX160**	11.5	33.1	17.7	169	0.544	0.508	0.544
	425.45	9.525	1	**KCC160**	16.8	44.4	**KCA160**	18.4	54.5	24.2	165	**KCX160**	14.6	38.4	22.6	195	0.785	0.739	0.785
	431.8	12.7	1.5	**KDC160**	25.5	60.0	**KDA160**	26.8	69.1	35.2	209	**KDX160**	22.1	51.8	34.5	261	1.41	1.33	1.41
	444.5	19.05	2	**KFC160**	45.8	92.2	**KFA160**	49.0	109	64.5	331	**KFX160**	39.7	79.6	62.7	394	3.22	3.08	3.22
	457.2	25.4	2	**KGC160**	69.5	126	**KGA160**	73.0	145	96.0	439	**KGX160**	60.3	109	95.9	528	5.58	5.62	5.58

K-series super thin section ball bearings
open type

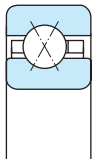
d 457.2 ~ 1 016 mm



Deep groove type



Angular contact type

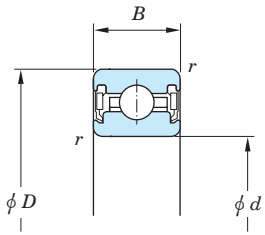


Four-point contact type

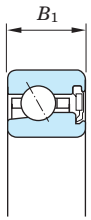
Boundary dimensions (mm)				Deep groove type			Angular contact type					Four-point contact type				(Refer.) Mass (kg)		
				Bearing No.	Basic load ratings (kN)		Bearing No.	Basic load ratings (kN)				Bearing No.	Basic load ratings (kN)					
d	D	B	r min.		C_r	C_{0r}		C_r	C_{0r}	C_a	C_{0a}		C_r	C_{0r}	C_a	C_{0a}	Deep groove type	Angular contact type	Four-point contact type
457.2	473.075	7.938	1	**KBC180**	13.9	42.9	**KBA180**	14.6	49.9	19.2	151	**KBX180**	12.0	37.1	18.4	190	0.612	0.572	0.612
	476.25	9.525	1	**KCC180**	17.5	49.8	**KCA180**	19.2	61.2	25.3	185	**KCX180**	15.2	43.0	23.4	220	0.880	0.830	0.880
	482.6	12.7	1.5	**KDC180**	26.6	67.1	**KDA180**	27.6	77.3	36.3	234	**KDX180**	23.0	58.0	35.8	293	1.58	1.49	1.58
	495.3	19.05	2	**KFC180**	47.8	103	**KFA180**	51.5	123	67.7	373	**KFX180**	41.4	88.8	65.0	442	3.58	3.48	3.58
	508	25.4	2	**KGC180**	72.5	140	**KGA180**	76.0	161	100	488	**KGX180**	62.8	121	99.4	592	6.21	6.26	6.21
508	523.875	7.938	1	**KBC200**	14.4	47.6	**KBA200**	15.2	55.3	20.0	168	**KBX200**	12.5	41.2	19.0	211	0.680	0.635	0.680
	527.05	9.525	1	**KCC200**	18.2	55.1	**KCA200**	19.9	67.5	26.2	205	**KCX200**	15.8	47.7	24.2	244	0.980	0.921	0.980
	533.4	12.7	1.5	**KDC200**	27.6	74.3	**KDA200**	29.0	85.6	38.1	259	**KDX200**	23.9	64.2	37.0	326	1.75	1.66	1.75
	546.1	19.05	2	**KFC200**	49.6	114	**KFA200**	53.4	136	70.3	412	**KFX200**	43.0	98.1	67.2	491	4.04	3.84	4.04
	558.8	25.4	2	**KGC200**	75.2	154	**KGA200**	78.9	178	104	538	**KGX200**	65.2	133	103	657	8.53	6.89	8.53
635	654.05	9.525	1	**KCC250**	19.7	68.5	**KCA250**	21.6	84.0	28.4	255	**KCX250**	17.1	59.2	26.0	304	1.22	1.14	1.22
	660.4	12.7	1.5	**KDC250**	29.9	92.1	**KDA250**	31.4	106	41.3	322	**KDX250**	25.9	79.6	39.7	407	2.17	2.06	2.17
	673.1	19.05	2	**KFC250**	53.7	140	**KFA250**	57.6	167	75.8	506	**KFX250**	46.5	121	72.0	612	4.94	4.76	4.94
	685.8	25.4	2	**KGC250**	81.4	190	**KGA250**	85.4	219	112	663	**KGX250**	70.5	164	110	819	8.85	8.53	8.85
762	781.05	9.525	1	**KCC300**	21.1	81.9	**KCA300**	23.1	101	30.3	305	**KCX300**	18.3	70.8	27.6	365	1.46	1.37	1.46
	787.4	12.7	1.5	**KDC300**	32.0	110	**KDA300**	33.5	127	44.1	384	**KDX300**	27.7	95.0	42.1	487	2.60	2.47	2.60
	800.1	19.05	2	**KFC300**	57.3	167	**KFA300**	61.6	200	81.0	605	**KFX300**	49.6	144	76.3	733	5.90	5.67	5.90
	812.8	25.4	2	**KGC300**	86.8	226	**KGA300**	91.1	260	120	788	**KGX300**	75.2	195	116	980	10.6	10.2	10.6
889	927.1	19.05	2	**KFC350**	60.6	194	**KFA350**	65.2	232	85.8	703	**KFX350**	52.5	168	80.1	854	6.85	6.62	6.85
	939.8	25.4	2	**KGC350**	91.7	261	**KGA350**	96.2	301	127	912	**KGX350**	79.4	226	122	1 140	12.3	11.9	12.3
1 016	1 054.1	19.05	2	**KFC400**	63.5	221	**KFA400**	68.4	264	90.0	801	**KFX400**	55.0	191	83.6	975	7.80	7.53	7.80
	1 066.8	25.4	2	**KGC400**	96.2	297	**KGA400**	101	342	133	1 040	**KGX400**	83.3	257	128	1 300	14.0	13.5	14.0

K-series super thin section ball bearings sealed type

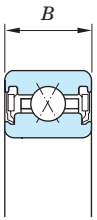
d 101.6 ~ 304.8 mm



Deep groove type
U size
(With seals)



Angular contact type
J size
(With seal)



Four-point contact type
U size
(With seals)

Boundary dimensions (mm)					Deep groove type Basic load ratings			Angular contact type Basic load ratings					Four-point contact type Basic load ratings				(Refer.) Mass (kg)		
d	D	B	B_1	r min.	Bearing No.	C_r (kN)	C_{0r} (kN)	Bearing No.	C_r (kN)	C_{0r} (kN)	C_a (kN)	C_{0a} (kN)	Bearing No.	C_r (kN)	C_{0r} (kN)	C_a (kN)	C_{0a} (kN)	Deep groove type	Angular contact type	Four-point contact type
101.6	120.65	12.7	11.1	0.4	**KUC040 2RD**	10.3	12.4	**KJA040 RD**	11.2	14.9	14.7	45.1	**KUX040 2RD**	8.95	10.6	14.8	50.0	0.249	0.222	0.249
107.95	127	12.7	11.1	0.4	**KUC042 2RD**	10.5	13.0	**KJA042 RD**	11.5	15.8	15.1	47.8	**KUX042 2RD**	9.15	11.2	15.0	53.0	0.263	0.236	0.263
114.3	133.35	12.7	11.1	0.4	**KUC045 2RD**	10.7	13.7	**KJA045 RD**	11.7	16.6	15.4	50.4	**KUX045 2RD**	9.30	11.8	15.3	56.1	0.277	0.254	0.277
120.65	139.7	12.7	11.1	0.4	**KUC047 2RD**	10.9	14.4	**KJA047 RD**	12.0	17.5	15.7	53.0	**KUX047 2RD**	9.50	12.4	15.5	59.1	0.295	0.268	0.295
127	146.05	12.7	11.1	0.4	**KUC050 2RD**	11.1	15.0	**KJA050 RD**	12.2	18.4	16.0	55.7	**KUX050 2RD**	9.65	12.9	15.8	62.1	0.308	0.281	0.308
139.7	158.75	12.7	11.1	0.4	**KUC055 2RD**	11.5	16.4	**KJA055 RD**	12.5	19.8	16.5	60.0	**KUX055 2RD**	10.0	14.1	16.2	68.2	0.336	0.304	0.336
152.4	171.45	12.7	11.1	0.4	**KUC060 2RD**	11.9	17.7	**KJA060 RD**	12.9	21.5	17.0	65.3	**KUX060 2RD**	10.3	15.3	16.7	74.2	0.367	0.331	0.367
165.1	184.15	12.7	11.1	0.4	**KUC065 2RD**	12.2	19.0	**KJA065 RD**	13.4	23.3	17.6	70.6	**KUX065 2RD**	10.6	16.4	17.1	80.3	0.395	0.354	0.395
177.8	196.85	12.7	11.1	0.4	**KUC070 2RD**	12.5	20.4	**KJA070 RD**	13.6	24.7	17.9	74.9	**KUX070 2RD**	10.9	17.6	17.5	86.3	0.422	0.381	0.422
190.5	209.55	12.7	11.1	0.4	**KUC075 2RD**	12.8	21.7	**KJA075 RD**	14.0	26.5	18.4	80.2	**KUX075 2RD**	11.1	18.7	17.8	92.4	0.449	0.404	0.449
203.2	222.25	12.7	11.1	0.4	**KUC080 2RD**	13.1	23.1	**KJA080 RD**	14.4	28.2	18.9	85.5	**KUX080 2RD**	11.4	19.9	18.2	98.5	0.481	0.431	0.481
228.6	247.65	12.7	11.1	0.4	**KUC090 2RD**	13.7	25.7	**KJA090 RD**	14.9	31.4	19.6	95.1	**KUX090 2RD**	11.9	22.2	18.9	111	0.535	0.499	0.535
254	273.05	12.7	11.1	0.4	**KUC100 2RD**	14.2	28.4	**KJA100 RD**	15.6	34.9	20.5	106	**KUX100 2RD**	12.3	24.5	19.5	123	0.594	0.531	0.594
279.4	298.45	12.7	11.1	0.4	**KUC110 2RD**	14.7	31.1	**KJA110 RD**	16.1	38.0	21.1	115	**KUX110 2RD**	12.7	26.8	20.1	135	0.649	0.581	0.649
304.8	323.85	12.7	11.1	0.4	**KUC120 2RD**	15.2	33.8	**KJA120 RD**	16.5	41.2	21.8	125	**KUX120 2RD**	13.1	29.2	20.6	147	0.708	0.630	0.708

Bearings for machine tool spindles (for support of axial loading)

JTEKT supplies double direction angular contact thrust ball bearings and ACT type matched pair angular contact ball bearings which are used with machine tool spindles to support axial loading.

These bearings were developed to meet needs which have grown as machine tool spindle rotation has become faster and more accurate.

Several dimension series are available for selection according to operating conditions.

For details, refer to JTEKT separate catalog "Precision Ball and Roller Bearings for Machine Tools" (CAT. NO. B2005E).

See also the catalog for high ability bearings, CAT NO. B2006 for High Ability Ball Bearing Series Angular Contact Ball Bearings for Machining Tools.

Double direction angular contact thrust ball bearings

Bore diameter **25** – **340** mm

Matched pair angular contact ball bearing (ACT type)

Bore diameter **50** – **170** mm

(Reference)

Major bearing types which are used to carry radial loading of machine tool spindles are shown below.

For further details, refer to the specification table for each type.

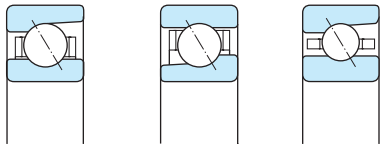
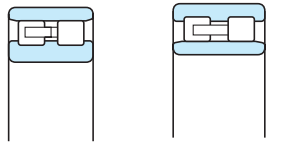
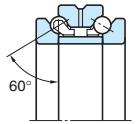
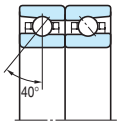
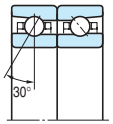
Angular contact ball bearings			Double-row cylindrical roller bearings
 (for high-speed applications)			
79 C 70, 70 B, 70 C 72, 72 B, 72 C	79 CPA 70 CPA 72 CPA	HAR 9 C HAR 0 C (high ability ball bearing)	NN 30 NN 30 K (Tapered bore) NNU 49 NNU 49 K (Tapered bore)
Refer to p. B 92.	(for bearings with ceramic balls, refer to p. C 21.)		Refer to p. B 194.

Table 1 Bearing types for support of axial loading

Type / Diameter series	Double direction angular contact thrust ball bearings	Matched pair angular contact ball bearings		Types of[1] arrangement with a double-row cylindrical roller bearing
				
0	2344 B 2347 B	ACT 0 B DB ——	ACT 0 DB ——	① ②
9	2394 B 2397 B	—— ——	—— ——	③ ④
Characteristics	● Supports axial loading in both directions. Highly rigid in the axial direction. ● Bearings with a larger contact angle feature higher rigidity, while those with a smaller contact angle feature better high-speed performance.	● For support of axial loading only. Negative tolerances are specified for the outside diameter. ● Excellent high-speed performance is achieved because of the small contact angle. ● Interchangeable with 2344 B series bearings. [2]		——

[Notes]

1) These bearings are usually used in arrangement with a double-row cylindrical roller bearing which carries a radial load. There are four arrangement types (① to ④) as follows :

① Mounted with an NN30K tapered bore bearing or with an NN30 cylindrical bore bearing. The tapered bore bearing is combined at its smaller side.

② Mounted with an NN30K tapered bore bearing, which is combined at its larger side.

③ Mounted with an NNU49K tapered bore bearing or with an NNU49 cylindrical bore bearing. The tapered bore bearing is combined at its smaller side.

④ Mounted with an NNU49K tapered bore bearing, which is combined at its larger side.

2) The overall width "2 B" of ACT0 DB and ACT0B DB bearings is equivalent to dimension "C_1" of 2344B bearings. Therefore, when a 2344B bearing is replaced with an ACT0 DB or ACT0B DB bearing, change the width of spacer "A" only. No change is necessary to the spindle or housing dimensions.

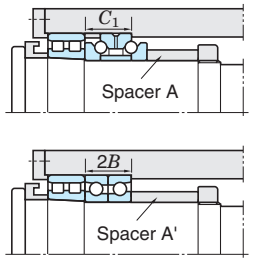


Table 2 Double direction angular contact thrust ball bearing tolerance

(1) Inner ring and assembled bearing width

Unit : μm

Nominal bore diameter d (mm)		Δ_{dmp} or Δ_{ds}[1]				Actual bearing width deviation Δ_{Ts}		Inner ring width variation V_{Bs}		Perpendicularity of inner ring face with respect to the bore S_d		Assembled bearing inner ring face runout with raceway S_{ia}	
		class 5 or equivalent		class 4 or equivalent		classes 4 and 5, or equivalent		class 5 or equivalent	class 4 or equivalent	class 5 or equivalent	class 4 or equivalent	class 5 or equivalent	class 4 or equivalent
over	up to	upper	lower	upper	lower	upper	lower	max.		max.		max.	
18	30	0	− 6	0	− 5	0	− 300	5	2.5	8	4	5	3
30	50	0	− 8	0	− 6	0	− 400	5	3	8	4	5	3
50	80	0	− 9	0	− 7	0	− 500	6	4	8	4	6	5
80	120	0	− 10	0	− 8	0	− 600	7	4	9	5	6	5
120	180	0	− 13	0	− 10	0	− 700	8	5	10	6	8	6
180	250	0	− 15	0	− 12	0	− 800	10	6	11	7	8	6
250	315	0	− 18	0	− 15	0	− 900	13	7	13	8	10	8
315	400	0	− 23	0	− 18	0	− 1 000	15	9	15	9	13	10

(2) Outer ring

Unit : μm

Nominal outside diameter D (mm)		Δ_{Dmp} or Δ_{Ds}[2]		Outer ring width variation V_{Cs}		Perpendicularity of outer ring outside surface with respect to the face S_D		Assembled bearing outer ring face runout with raceway S_{ea}
		classes 5 and 4, or equivalent		class 5 or equivalent	class 4 or equivalent	class 5 or equivalent	class 4 or equivalent	classes 5 and 4, or equivalent
over	up to	upper	lower	max.		max.		max.
30	50	− 30	− 40	5	2.5	8	4	Shall conform to the tolerance S_{ia} on d of the same bearing
50	80	− 40	− 50	6	3	8	4	
80	120	− 50	− 60	8	4	9	5	
120	150	− 60	− 75	8	5	10	5	
150	180	− 60	− 75	8	5	10	5	
180	250	− 75	− 90	10	7	11	7	
250	315	− 90	− 105	11	7	13	8	
315	400	− 110	− 125	13	8	13	10	
400	500	− 120	− 140	15	10	15	13	

[Notes] 1) Single plane mean bore diameter deviation or single bore diameter deviation

2) Single plane mean outside diameter deviation or single outside diameter deviation

Table 3 ACT 0 series angular contact ball bearing outside diameter tolerance

Unit : μm

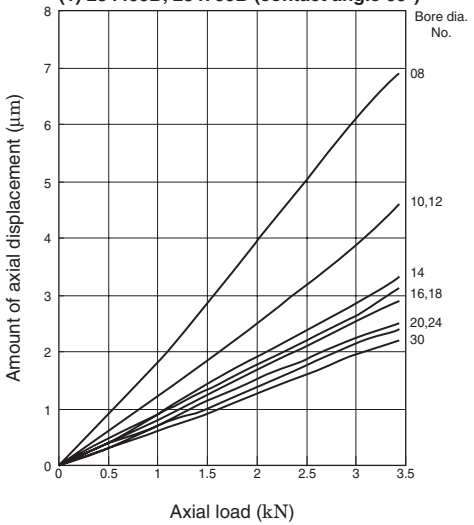
Nominal outside diameter D (mm)		Single outside diameter deviation Δ_{Ds}	
over	up to	upper	lower
50	80	− 32	− 47
80	120	− 39	− 56
120	150	− 44	− 66
150	180	− 44	− 68
180	250	− 51	− 79
250	315	− 56	− 89

[Remark] Refer to JIS B 1514 "radial bearing tolerance" class 4 and class 5 (pp. A 54 to A 57, Table 7-3) for the accuracy of dimensions other than outside diameter and for running accuracy.

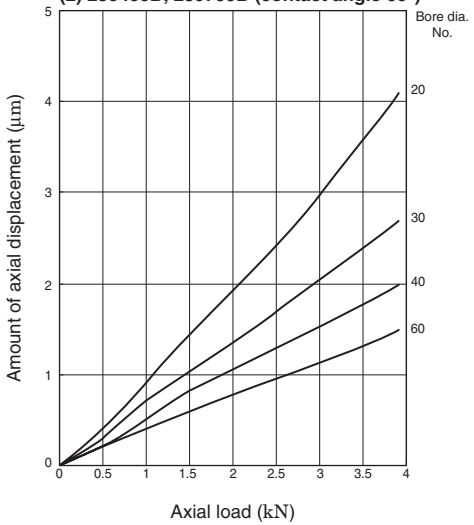
[Reference] Axial load and axial displacement

The relationship between axial loading and the axial displacement of double direction angular contact thrust ball bearings and ACT type angular contact ball bearings is shown below :

(1) 234400B, 234700B (contact angle 60°)

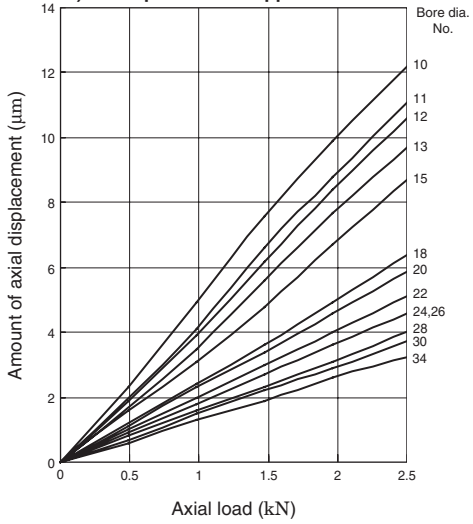


(2) 239400B, 239700B (contact angle 60°)

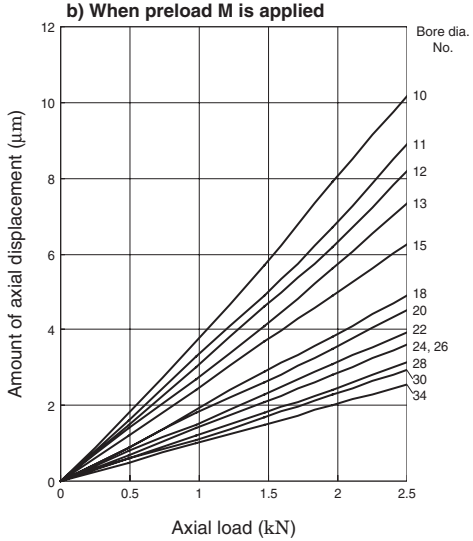


(3) ACT000 (contact angle 30°)

a) When preload L is applied

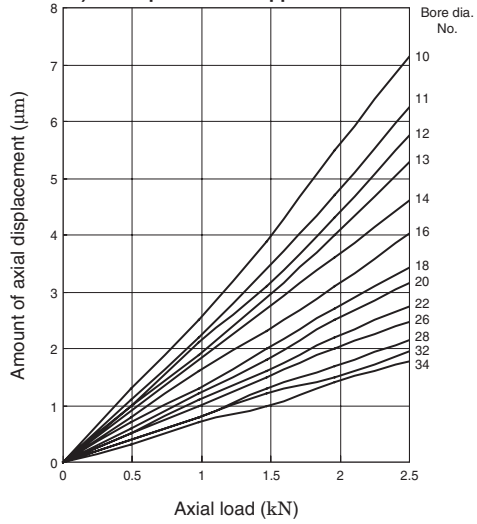


b) When preload M is applied

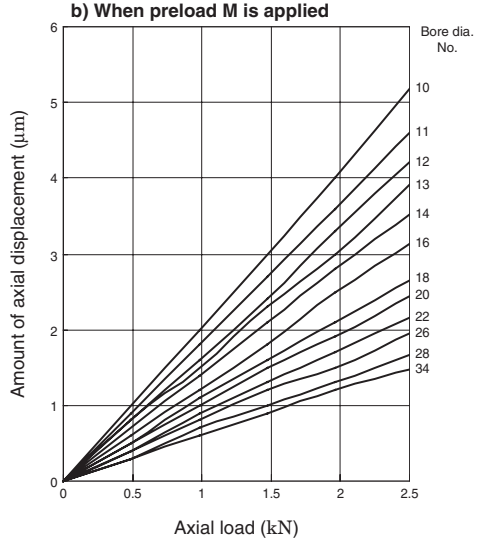


(4) ACT000B (contact angle 40°)

a) When preload L is applied

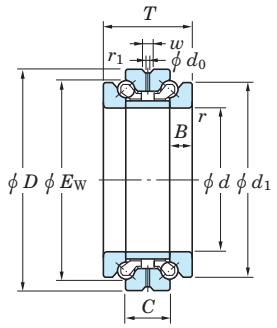


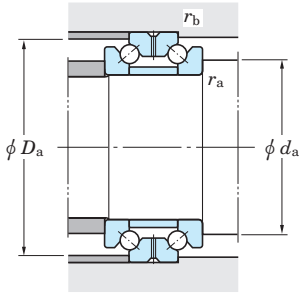
b) When preload M is applied



Double direction angular contact thrust ball bearings

d 25 ~ 105 mm

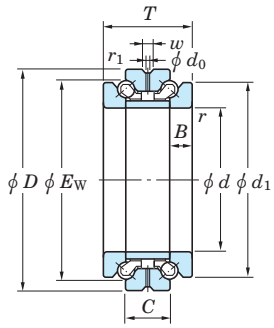


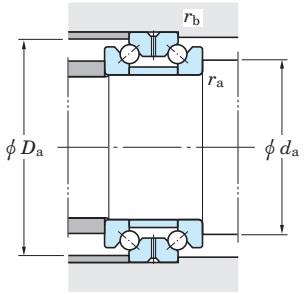


Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimensions (mm)					Mounting dimensions (mm)				Amount of grease fill (cm^3/row)	(Refer.) Mass (kg)	
d Small bore type	d Large bore type	D	T	C	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.	Small bore type	Large bore type	E_w [1]	d_1	B	d_0	w	d_a min.	D_a max.	r_a max.	r_b max.		Small bore type	Large bore type
25	—	47	28	14	0.6	0.3	13.2	19.9	7 700	11 000	**234405B**	—	41.3	40	7	2	4.5	33	44	0.6	0.3	0.18 ~ 0.26	0.194	—
30	32	55	32	16	1	0.6	14.0	23.6	6 700	9 500	**234406B**	**234706B**	48.5	47	8	2	4.5	40	50.5	1	0.6	0.30 ~ 0.45	0.296	0.272
35	37	62	34	17	1	0.6	20.8	34.8	6 100	8 700	**234407B**	**234707B**	55	53	8.5	2	4.5	45.5	57.5	1	0.6	0.40 ~ 0.60	0.388	0.357
40	42	68	36	18	1	0.6	23.9	41.7	5 700	8 100	**234408B**	**234708B**	61	58.5	9	2	4.5	50	63.5	1	0.6	0.50 ~ 0.75	0.475	0.437
45	47	75	38	19	1	0.6	26.0	50.1	5 200	7 500	**234409B**	**234709B**	67.5	65	9.5	2	4.5	56.5	70.5	1	0.6	0.65 ~ 0.98	0.602	0.554
50	52	80	38	19	1	0.6	26.8	54.4	5 100	7 300	**234410B**	**234710B**	72.5	70	9.5	2	4.5	61.5	75.5	1	0.6	0.70 ~ 1.1	0.654	0.602
55	57	90	44	22	1.1	0.6	37.2	71.7	4 400	6 400	**234411B**	**234711B**	81	78	11	4	8	67.5	84	1	0.6	1.0 ~ 1.5	0.978	0.900
60	62	95	44	22	1.1	0.6	37.6	75.2	4 300	6 200	**234412B**	**234712B**	86.1	83	11	4	8	72.5	89	1	0.6	1.1 ~ 1.7	1.04	0.957
65	67	100	44	22	1.1	0.6	39.0	81.8	4 200	6 000	**234413B**	**234713B**	91	88	11	4	8	77.5	94	1	0.6	1.2 ~ 1.7	1.11	1.02
70	73	110	48	24	1.1	0.6	47.5	103	3 800	5 500	**234414B**	**234714B**	100	97	12	4	8	85	104	1	0.6	1.7 ~ 2.5	1.52	1.40
75	78	115	48	24	1.1	0.6	49.1	111	3 700	5 300	**234415B**	**234715B**	105	102	12	4	8	90	109	1	0.6	1.8 ~ 2.6	1.62	1.49
80	83	125	54	27	1.1	0.6	57.6	132	3 400	4 800	**234416B**	**234716B**	113	110	13.5	4	8	96.5	119	1	0.6	2.4 ~ 3.6	2.19	2.03
85	88	130	54	27	1.1	0.6	58.2	137	3 300	4 700	**234417B**	**234717B**	118	115	13.5	4	8	102	124	1	0.6	2.5 ~ 3.8	2.30	2.12
90	93	140	60	30	1.5	1	67.4	160	3 000	4 300	**234418B**	**234718B**	127	123	15	4	8	109	133.5	1.5	1	3.3 ~ 4.9	3.03	2.79
95	98	145	60	30	1.5	1	68.0	166	3 000	4 200	**234419B**	**234719B**	132	128	15	4	8	114	138.5	1.5	1	3.4 ~ 5.0	3.17	2.92
100	—	140	48	24	1.1	0.6	52.2	135	2 800	3 800	**239420B**	—	131	126	12	4	8	114	134	1	0.6	3.1 ~ 4.6	2.08	—
	103	150	60	30	1.5	1	68.7	172	2 900	4 100	**234420B**	**234720B**	137	133	15	4	8	119	143.5	1.5	1	3.4 ~ 5.1	3.33	3.06
105	—	145	48	24	1.1	0.6	53.6	143	2 700	3 800	**239421B**	—	136	131	12	4	8	119	139	1	0.6	3.1 ~ 4.6	2.16	—
	109	160	66	33	2	1	78.8	199	2 700	3 800	**234421B**	**234721B**	146	142	16.5	6	12	127	152	2	1	4.7 ~ 7.1	4.15	3.82

[Note] 1) The dimension E_w is used as a reference for the ball set outside diameter.

d 110 ~ (240) mm



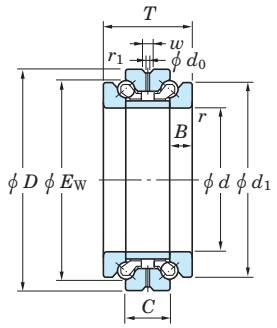


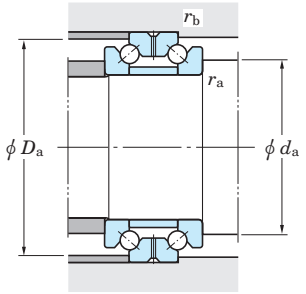
d Small bore type	d Large bore type	Boundary dimensions (mm) D	T	C	r min.	r1 min.	Basic load ratings (kN) Ca	C0a	Limiting speeds (min−1) Grease lub.	Oil lub.	Bearing No. Small bore type	Large bore type	Dimensions (mm) Ew 1)	d1	B	d0	w	Mounting dimensions (mm) da min.	Da max.	ra max.	rb max.	Amount of grease fill (cm3/row)	(Refer.) Mass (kg) Small bore type	Large bore type
110	—	150	48	24	1.1	0.6	53.9	148	2 700	3 700	**239422B**	—	141	136	12	4	8	124	144	1	0.6	3.0 ~ 4.5	2.25	—
	114	170	72	36	2	1	95.9	235	2 500	3 500	**234422B**	**234722B**	155	150	18	6	12	133	162	2	1	5.9 ~ 8.8	5.38	4.95
120	124	165	54	27	1.1	0.6	64.9	185	2 400	3 300	**239424B**	**239724B**	154.5	150	13.5	4	8	138	160	1	0.6	4.2 ~ 6.3	3.12	2.81
	124	180	72	36	2	1	98.3	252	2 400	3 400	**234424B**	**234724B**	165	160	18	6	12	143	172	2	1	6.4 ~ 9.5	5.77	5.31
130	134	180	60	30	1.5	1	75.0	217	2 100	3 000	**239426B**	**239726B**	168	163	15	4	8	150	172	1.5	1	5.8 ~ 8.7	4.19	3.77
	135	200	84	42	2	1	139	340	2 100	3 000	**234426B**	**234726B**	182	177	21	6	12	155	192	2	1	9.3 ~ 13.9	8.63	7.94
140	144	190	60	30	1.5	1	75.9	229	2 100	2 900	**239428B**	**239728B**	178	173	15	4	8	160	182	1.5	1	6.3 ~ 9.4	4.47	4.03
	145	210	84	42	2	1	144	366	2 000	2 900	**234428B**	**234728B**	192	187	21	6	12	165	202	2	1	9.7 ~ 14.5	9.18	8.44
150	155	210	72	36	2	1	107	312	1 800	2 500	**239430B**	**239730B**	196.5	190	18	4	8	174	200	2	1	9.6 ~ 14.4	7.01	6.31
	155	225	90	45	2.1	1.1	147	394	1 900	2 700	**234430B**	**234730B**	206	200	22.5	6	14	178	215	2	1	12.0 ~ 17.9	11.3	10.4
160	165	220	72	36	2	1	109	329	1 700	2 400	**239432B**	**239732B**	206.5	200	18	4	8	184	210	2	1	9.3 ~ 14.0	7.40	6.66
	165	240	96	48	2.1	1.1	173	460	1 700	2 500	**234432B**	**234732B**	219	212	24	6	14	189	230	2	1	14.1 ~ 21.1	13.3	12.2
170	175	230	72	36	2	1	111	346	1 700	2 300	**239434B**	**239734B**	216.5	210	18	4	8	194	220	2	1	10.8 ~ 16.2	7.79	7.01
	176	260	108	54	2.1	1.1	203	547	1 600	2 200	**234434B**	**234734B**	236	230	27	6	14	203	250	2	1	18.6 ~ 27.8	18.1	16.6
180	186	250	84	42	2	1	157	460	1 500	2 100	**239436B**	**239736B**	234	227	21	4	8	207	240	2	1	14.9 ~ 22.3	11.3	10.2
	187	280	120	60	2.1	1.1	234	642	1 400	2 000	**234436B**	**234736B**	255	248	30	8	16	219	270	2	1	23.4 ~ 35.1	24.9	22.9
190	196	260	84	42	2	1	157	474	1 400	2 000	**239438B**	**239738B**	242	237	21	4	8	217	250	2	1	15.7 ~ 23.5	11.9	10.7
	197	290	120	60	2.1	1.1	237	665	1 400	1 900	**234438B**	**234738B**	265	258	30	8	16	229	280	2	1	24.7 ~ 37.1	25.0	23.0
200	207	280	96	48	2.1	1.1	185	557	1 300	1 800	**239440B**	**239740B**	259	252	24	4	8	231	268	2	1	23.5 ~ 35.2	16.6	14.9
	207	310	132	66	2.1	1.1	279	771	1 200	1 800	**234440B**	**234740B**	282	274	33	8	16	243	300	2	1	31.8 ~ 47.7	32.1	29.5
220	227	300	96	48	2.1	1.1	191	606	1 200	1 700	**239444B**	**239744B**	280	272	24	6	12	251	288	2	1	24.7 ~ 37.0	18.0	16.2
	228	340	144	72	3	1.1	334	939	1 100	1 600	**234444B**	**234744B**	310	304	36	12	22	267	330	2.5	1	43.0 ~ 64.4	42.0	38.6
240	247	320	96	48	2.1	1.1	196	655	1 200	1 600	**239448B**	**239748B**	299	292	24	6	12	271	308	2	1	26.4 ~ 39.5	19.1	17.2

[Note] 1) The dimension E_w is used as a reference for the ball set outside diameter.

Double direction angular contact thrust ball bearings

d (240) ~ 340 mm



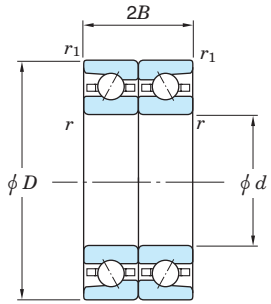


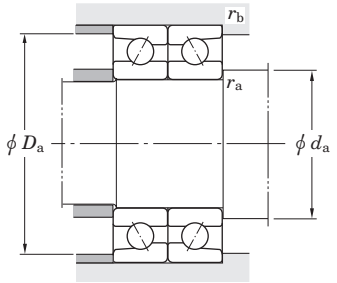
Boundary dimensions (mm)							Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No.		Dimensions (mm)					Mounting dimensions (mm)				Amount of grease fill (cm^3/row)	(Refer.) Mass (kg)	
d Small bore type	d Large bore type	D	T	C	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.	Small bore type	Large bore type	E_w [1]	d_1	B	d_0	w	d_a min.	D_a max.	r_a max.	r_b max.		Small bore type	Large bore type
240	248	360	144	72	3	1.1	342	1 010	1 100	1 500	**234448B**	**234748B**	330	322	36	12	22	287	350	2.5	1	47.7 ~ 71.6	45.0	41.4
260	269	360	120	60	2.1	1.1	261	869	950	1 300	**239452B**	**239752B**	335	328	30	6	12	299	344	2	1	43.7 ~ 65.5	33.5	30.2
	269	400	164	82	4	1.5	406	1 270	920	1 300	**234452B**	**234752B**	364	354	41	12	22	315	388	3	1.5	67.0 ~ 101	65.8	60.5
280	289	380	120	60	2.1	1.1	265	915	910	1 300	**239456B**	**239756B**	356	348	30	6	14	319	363	2	1	49.1 ~ 73.7	35.7	32.1
	289	420	164	82	4	1.5	417	1 360	880	1 300	**234456B**	**234756B**	384	374	41	12	22	335	408	3	1.5	73.5 ~ 110	69.8	64.2
300	310	420	144	72	3	1.1	352	1 150	770	1 100	**239460B**	**239760B**	391	384	36	6	14	349	398	2.5	1	71.5 ~ 107	56.1	50.5
	310	460	190	95	4	1.5	476	1 630	760	1 100	**234460B**	**234760B**	418	406	47.5	12	22	364	448	3	1.5	98.0 ~ 147	100	91.8
320	330	440	144	72	3	1.1	361	1 220	740	1 000	**239464B**	**239764B**	408	404	36	6	14	369	419	2.5	1	81.5 ~ 122	59.2	53.3
	330	480	190	95	4	1.5	479	1 680	730	1 000	**234464B**	**234764B**	438	426	47.5	12	22	384	468	3	1.5	108 ~ 162	106	97.5
340	—	460	144	72	3	1.1	368	1 290	710	980	**239468B**	—	428	424	36	8	16	389	438	2.5	1	84.5 ~ 127	63.1	—

[Note] 1) The dimension E_w is used as a reference for the ball set outside diameter.

Matched pair angular contact ball bearings

d 30 ~ 85 mm

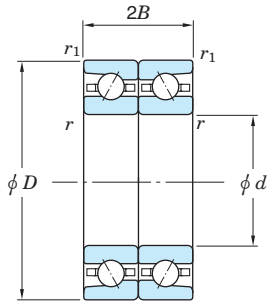


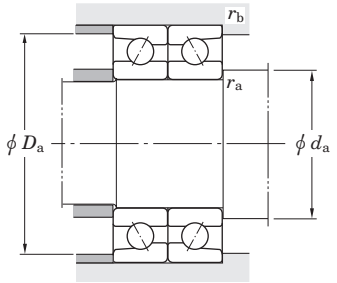


Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]	Permissble axial loads (kN)	Mounting dimensions (mm)				Envelope volume (cm^3/row)	(Refer.) Mass (kg/row)
d	D	$2B$	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.		(static)	d_a min.	D_a max.	r_a max.	r_b max.		
30	55	24	1	0.6	15.1	26.6	15 000	20 000	**ACT006DB**	2.92	41	50	1	0.6	3.0	0.235
	55	24	1	0.6	18.1	30.5	13 000	18 000	**ACT006BDB**	9.86	41	50	1	0.6	3.0	0.235
35	62	25.5	1	0.6	15.8	30.2	13 000	17 000	**ACT007DB**	3.25	46	57	1	0.6	4.2	0.312
	62	25.5	1	0.6	18.9	34.5	12 000	15 000	**ACT007BDB**	10.9	46	57	1	0.6	4.2	0.312
40	68	27	1	0.6	16.5	33.8	12 000	15 000	**ACT008DB**	3.58	51	63	1	0.6	5.0	0.391
	68	27	1	0.6	19.6	37.7	11 000	14 000	**ACT008BDB**	12.1	51	63	1	0.6	5.0	0.391
45	75	28.5	1	0.6	18.4	38.6	11 000	14 000	**ACT009DB**	3.84	56	70	1	0.6	5.7	0.536
	75	28.5	1	0.6	21.8	42.7	9 500	13 000	**ACT009BDB**	13.2	56	70	1	0.6	5.7	0.536
50	80	28.5	1	0.6	19.1	41.7	9 700	13 000	**ACT010DB**	4.20	61	75	1	0.6	8.0	0.551
	80	28.5	1	0.6	22.7	46.3	8 800	12 000	**ACT010BDB**	14.5	61	75	1	0.6	8.0	0.551
55	90	33	1.1	0.6	23.7	52.8	8 700	11 000	**ACT011DB**	5.63	68	84	1	0.6	12	0.831
	90	33	1.1	0.6	28.1	58.6	7 900	10 000	**ACT011BDB**	19.0	68	84	1	0.6	12	0.831
60	95	33	1.1	0.6	24.6	56.9	8 100	11 000	**ACT012DB**	6.11	73	89	1	0.6	13	0.887
	95	33	1.1	0.6	29.1	63.1	7 400	9 700	**ACT012BDB**	20.6	73	89	1	0.6	13	0.887
65	100	33	1.1	0.6	25.4	60.9	7 600	10 000	**ACT013DB**	6.59	78	94	1	0.6	14	0.943
	100	33	1.1	0.6	30.1	67.6	6 900	9 000	**ACT013BDB**	22.2	78	94	1	0.6	14	0.945
70	110	36	1.1	0.6	34.8	82.1	7 000	9 200	**ACT014DB**	8.39	85	104	1	0.6	16	1.33
	110	36	1.1	0.6	41.3	91.1	6 300	8 300	**ACT014BDB**	28.8	85	104	1	0.6	16	1.33
75	115	36	1.1	0.6	35.3	84.9	6 600	8 700	**ACT015DB**	8.74	90	109	1	0.6	20	1.35
	115	36	1.1	0.6	41.8	94.2	6 000	7 800	**ACT015BDB**	30.0	90	109	1	0.6	20	1.35
80	125	40.5	1.1	0.6	41.3	101	6 100	8 000	**ACT016DB**	10.8	97	118	1	0.6	27	1.86
	125	40.5	1.1	0.6	49.1	112	5 500	7 200	**ACT016BDB**	36.6	97	118	1	0.6	27	1.86
85	130	40.5	1.1	0.6	41.9	105	5 800	7 600	**ACT017DB**	11.2	102	123	1	0.6	29	1.94
	130	40.5	1.1	0.6	49.7	116	5 200	6 900	**ACT017BDB**	38.0	102	123	1	0.6	29	1.94

[Note] 1) B and no indication before matching code in bearing numbers represent nominal contact angle of 40° and 30° respectively.

d 90 ~ 180 mm

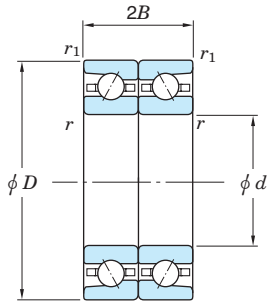


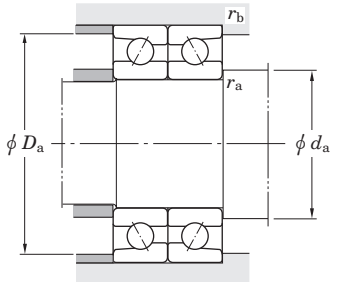


Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]	Permissble axial loads (kN)	Mounting dimensions (mm)				Envelope volume (cm^3/row)	(Refer.) Mass (kg/row)
d	D	$2B$	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.		(static)	d_a min.	D_a max.	r_a max.	r_b max.		
90	140	45	1.5	1	55.0	138	5 400	7 100	**ACT018DB**	14.2	109	132	1.5	1	39	2.55
	140	45	1.5	1	65.3	153	4 900	6 400	**ACT018BDB**	48.7	109	132	1.5	1	39	2.55
95	145	45	1.5	1	55.8	143	5 200	6 800	**ACT019DB**	14.8	114	137	1.5	1	40	2.62
	145	45	1.5	1	66.3	159	4 700	6 200	**ACT019BDB**	50.6	114	137	1.5	1	40	2.62
100	150	45	1.5	1	56.6	148	5 000	6 500	**ACT020DB**	15.3	119	143	1.5	1	42	2.77
	150	45	1.5	1	67.2	164	4 500	5 900	**ACT020BDB**	52.5	119	143	1.5	1	42	2.77
105	160	49.5	2	1	64.4	170	4 700	6 100	**ACT021DB**	18.2	125	151	2	1	50	3.61
	160	49.5	2	1	76.4	188	4 200	5 500	**ACT021BDB**	63.2	125	151	2	1	50	3.61
110	170	54	2	1	72.4	193	4 400	5 800	**ACT022DB**	19.6	132	160	2	1	64	4.52
	170	54	2	1	86.0	214	4 000	5 200	**ACT022BDB**	71.3	132	160	2	1	64	4.52
120	180	54	2	1	74.6	206	4 100	5 400	**ACT024DB**	21.0	142	170	2	1	69	4.83
	180	54	2	1	88.4	228	3 700	4 900	**ACT024BDB**	76.4	142	170	2	1	69	4.83
130	200	63	2	1	94.2	253	3 700	4 800	**ACT026DB**	25.9	156	188	2	1	106	7.21
	200	63	2	1	112	281	3 300	4 400	**ACT026BDB**	93.0	156	188	2	1	106	7.21
140	210	63	2	1	102	290	3 400	4 500	**ACT028DB**	29.9	166	198	2	1	110	7.69
	210	63	2	1	121	323	3 100	4 100	**ACT028BDB**	107	166	198	2	1	110	7.65
150	225	67.5	2.1	1.1	120	344	3 200	4 200	**ACT030DB**	34.7	178	213	2	1	138	9.39
	225	67.5	2.1	1.1	143	382	2 900	3 800	**ACT030BDB**	125	178	213	2	1	138	9.39
160	240	72	2.1	1.1	130	377	3 000	3 900	**ACT032DB**	39.1	190	227	2	1	167	11.4
	240	72	2.1	1.1	155	419	2 700	3 500	**ACT032BDB**	139	190	227	2	1	167	11.4
170	260	81	2.1	1.1	153	449	2 700	3 600	**ACT034DB**	45.7	204	245	2	1	221	15.7
	260	81	2.1	1.1	181	499	2 500	3 200	**ACT034BDB**	163	204	245	2	1	221	15.7
180	280	90	2.1	1.1	173	510	2 500	3 300	**ACT036DB**	54.0	216	264	2	1	313	22.2
	280	90	2.1	1.1	205	566	2 300	3 000	**ACT036BDB**	183	216	264	2	1	313	22.2

[Note] 1) B and no indication before matching code in bearing numbers represent nominal contact angle of 40° and 30° respectively.

d 190 ~ 320 mm

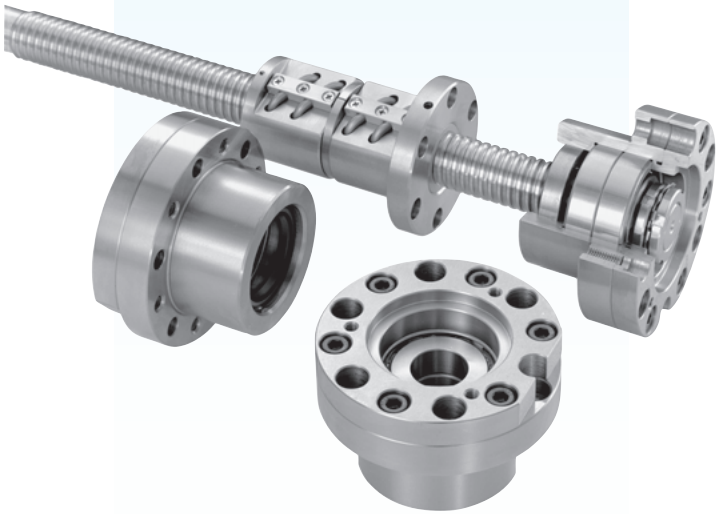




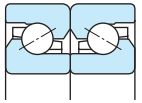
Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (min^{-1})		Bearing No. [1]	Permissble axial loads (kN)	Mounting dimensions (mm)				Envelope volume (cm^3/row)	(Refer.) Mass (kg/row)
d	D	$2B$	r min.	r_1 min.	C_a	C_{0a}	Grease lub.	Oil lub.		(static)	d_a min.	D_a max.	r_a max.	r_b max.		
190	290	90	2.1	1.1	179	544	2 400	3 100	**ACT038DB**	57.9	226	275	2	1	329	23.0
	290	90	2.1	1.1	213	604	2 200	2 800	**ACT038BDB**	196	226	275	2	1	329	23.0
200	310	99	2.1	1.1	215	633	2 200	2 900	**ACT040DB**	64.8	240	293	2	1	421	29.5
	310	99	2.1	1.1	255	702	2 000	2 600	**ACT040BDB**	229	240	293	2	1	421	29.5
220	340	108	3	1.1	252	773	2 000	2 600	**ACT044DB**	81.9	263	321	2.5	1	566	38.5
	340	108	3	1.1	299	858	1 800	2 400	**ACT044BDB**	278	263	321	2.5	1	566	38.5
240	360	108	3	1.1	260	823	1 800	2 400	**ACT048DB**	87.9	283	343	2.5	1	605	41.1
	360	108	3	1.1	308	914	1 600	2 200	**ACT048BDB**	298	283	343	2.5	1	605	41.1
260	400	123	4	1.5	321	1 090	1 600	2 100	**ACT052DB**	111	310	379	3	1.5	866	60.5
	400	123	4	1.5	381	1 210	1 500	1 900	**ACT052BDB**	393	310	379	3	1.5	866	60.5
280	420	123	4	1.5	332	1 160	1 500	2 000	**ACT056DB**	119	330	401	3	1.5	915	64.1
	420	123	4	1.5	393	1 290	1 400	1 800	**ACT056BDB**	421	330	401	3	1.5	915	64.1
300	460	142.5	4	1.5	375	1 370	1 300	1 800	**ACT060DB**	143	358	435	3	1.5	1 320	92.1
	460	142.5	4	1.5	444	1 530	1 200	1 600	**ACT060BDB**	501	358	435	3	1.5	1 320	92.1
320	480	142.5	4	1.5	378	1 420	1 200	1 600	**ACT064DB**	148	378	457	3	1.5	1 400	96.9
	480	142.5	4	1.5	449	1 570	1 100	1 500	**ACT064BDB**	518	378	457	3	1.5	1 400	96.9

[Note] 1) B and no indication before matching code in bearing numbers represent nominal contact angle of 40° and 30° respectively.

Precision ball screw support bearings and bearing units

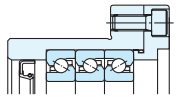


Support bearings



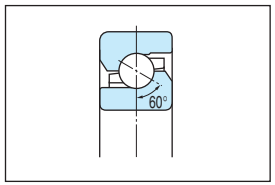
Bore diameter **17 – 60** mm

Support bearing units



Bore diameter **17 – 40** mm

■ Support bearings were developed to support precision ball screw shafts. They have the same structure as angular contact thrust ball bearings with a contact angle of 60°.



- Have a large axial load carrying capacity. Also able to carry a certain degree of radial load.
- Highly rigid in the axial direction.
- Starting torque is small.

■ Support bearing units consist of the bearings described above and a precisely processed housing. Units with a Koyo precision ball screw are also available.

■ For details, refer to JTEKT separate catalog "Precision Ball and Roller Bearings for Machine Tools" (CAT. NO. B2005E).

Table 1 Support bearing tolerance

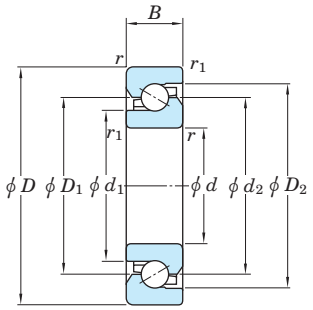
(1) Inner ring Unit : μm

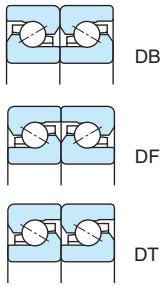
Nominal bore diameter d (mm)		Single plane mean bore diameter deviation Δ_{dmp}				Single bore diameter deviation Δ_{ds}				Single inner ring width deviation Δ_{Bs}		Inner ring width variation V_{Bs}		Radial runout of assembled bearing inner ring K_{ia}		Perpendicularity of inner ring face with respect to the bore S_d		Assembled bearing inner ring face runout with raceway S_{ia}	
		class 5Z		class 4Z		class 5Z		class 4Z		classes 5Z, 4Z		class 5Z	class 4Z	class 5Z	class 4Z	class 5Z	class 4Z	class 5Z	class 4Z
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.		max.		max.		max.	
10	18	0	−5	0	−4	0	−5	0	−4	0	−80	5	2.5	4	2.5	7	3	5	3
18	30	0	−6	0	−5	0	−6	0	−5	0	−120	5	2.5	4	3	8	4	5	3
30	50	0	−8	0	−6	0	−8	0	−6	0	−120	5	3	5	4	8	4	6	3
50	80	0	−9	0	−7	0	−9	0	−7	0	−150	6	4	5	4	8	5	7	4

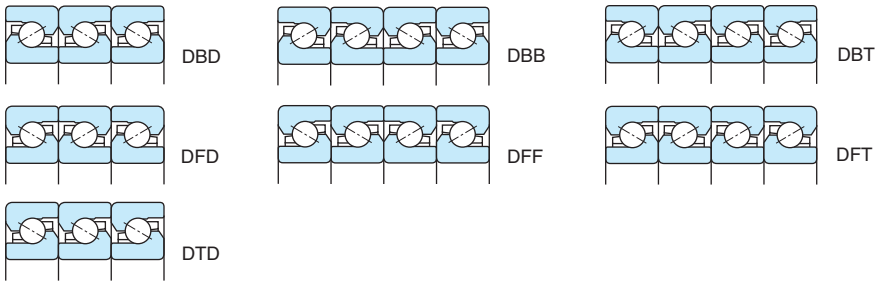
(2) Outer ring Unit : μm

Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}				Single outside diameter deviation Δ_{Ds}				Single outer ring width deviation Δ_{Cs}		Outer ring width variation V_{Cs}		Radial runout of assembled bearing outer ring K_{ea}		Perpendicularity of outer ring outside surface with respect to the face S_D		Assembled bearing outer ring face runout with raceway S_{ea}	
		class 5Z		class 4Z		class 5Z		class 4Z		classes 5Z, 4Z		class 5Z	class 4Z	class 5Z	class 4Z	class 5Z	class 4Z	class 5Z	class 4Z
over	up to	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.		max.		max.		max.	
30	50	0	−7	0	−6	0	−7	0	−6	Equivalent to Δ_{Bs} tolerances of a bearing of the same d		5	2.5	7	5	8	4	Equivalent to S_{ia} tolerances of a bearing of the same d	
50	80	0	−9	0	−7	0	−9	0	−7			6	3	8	5	8	4		
80	120	0	−10	0	−8	0	−10	0	−8			8	4	10	6	9	5		

d 17 ~ 60 mm







Boundary dimensions (mm)					Basic dynamic load rating [1]	Max. axial loadings (kN)			Limiting speeds (min^{-1})		Bearing No. [2]	Envelope volume	Dimensions (mm)				Standard preload (kN) Matching types			Starting torque (mN·m) Matching types			Axial rigidity (N/μm) Matching types			(Refer.) Mass
d	D	B	r min.	r_1 min.	C_a (kN)	Single-row	Double-row	Triple-row	Grease lub.	Oil lub.		(cm^3/row)	d_1	d_2	D_1	D_2	Two bearings	Three bearings	Four bearings	Two bearings	Three bearings	Four bearings	Two bearings	Three bearings	Four bearings	(kg/row)
17	47	15	1	0.6	26.0	34.3	68.6	103	6 300	8 000	**SAC1747B**	3.7	25.5	33.7	33.5	41	2.15	2.92	4.30	140	180	280	695	1 030	1 390	0.13
20	47	15	1	0.6	26.0	34.3	68.6	103	6 300	8 000	**SAC2047B**	3.7	26.8	33.7	33.5	41	2.15	2.92	4.30	140	180	280	695	1 030	1 390	0.12
25	62	15	1	0.6	30.2	48.1	96.2	144	4 600	6 000	**SAC2562B**	4.9	38	46.2	46	53.5	3.04	4.13	6.08	200	260	400	970	1 440	1 940	0.24
30	62	15	1	0.6	30.2	48.1	96.2	144	4 600	6 000	**SAC3062B**	4.9	38	46.2	46	53.5	3.04	4.13	6.08	200	260	400	970	1 440	1 940	0.21
35	72	15	1	0.6	32.8	58.8	118	176	3 700	5 000	**SAC3572B**	6.2	48	56.3	55.9	63.5	3.73	5.07	7.46	240	320	480	1 180	1 760	2 360	0.29
40	72	15	1	0.6	32.8	58.8	118	176	3 700	4 800	**SAC4072B**	6.2	48	56.3	55.9	63.5	3.73	5.07	7.46	240	320	480	1 180	1 760	2 360	0.26
	90	20	1	0.6	65.4	122	244	366	3 100	4 000	**SAC4090B**	15	54.5	67.5	66.8	78.5	5.00	6.80	10.0	440	610	880	1 270	1 890	2 540	0.62
45	75	15	1	0.6	34.0	64.4	129	193	3 400	4 300	**SAC4575B**	6.9	54	61.7	61.5	69	3.89	5.29	7.78	250	330	500	1 270	1 890	2 540	0.25
	100	20	1	0.6	68.8	137	274	411	2 800	3 600	**SAC45100B**	16	61.5	74.2	74	85.5	5.95	8.09	11.9	540	730	1 080	1 450	2 150	2 900	0.79
50	100	20	1	0.6	70.3	144	288	432	2 700	3 400	**SAC50100B**	17	65.8	78.2	78	89.5	6.00	8.15	12.0	540	730	1 080	1 500	2 230	3 000	0.65
55	120	20	1	0.6	73.9	166	332	498	2 300	3 000	**SAC55120B**	20	79.5	92.2	92	103.6	7.08	9.62	14.2	640	860	1 280	1 740	2 590	3 480	1.15
60	120	20	1	0.6	73.9	166	332	498	2 300	3 000	**SAC60120B**	20	78.3	92.2	92	103.6	7.08	9.62	14.2	640	860	1 280	1 740	2 590	3 480	1.15

[Notes] 1) The basic dynamic load ratings of a single-row bearing are shown in this column. Those of matched pair and stack bearings are as shown below.

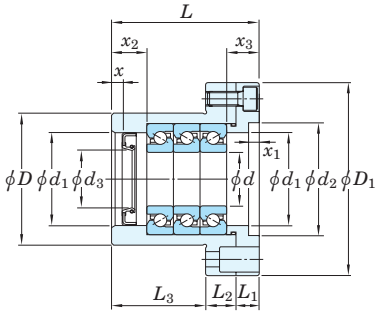
Number of rows which support axial loading	Basic dynamic load rating	Matching types (the arrow denotes the load direction.)
One	C_a	DB DF DBD DFD
Two	$C_a \times 1.625$	DT DBD DFD DFF
Three	$C_a \times 2.16$	DTD DBT DFT

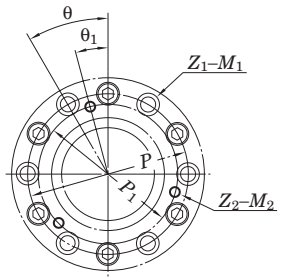
2) Matched bearing numbers consist of a single-row bearing number and a matching code such as DB or DF which is shown as a suffix.

Dynamic equivalent load $P_a = XF_r + YF_a$

Matching Types		Two bearings		Three bearings			Four bearings		
		DB DF	DT	DBD DFD		DTD	DBT DFT	DBB DFF	DBT DFT
Number of rows which support axial loading		One	Two	One	Two	Three	One	Two	Three
$\frac{F_a}{F_r} \leqq 2.17$	X	1.9	—	1.43	2.33	—	1.17	2.33	2.53
	Y	0.54	—	0.77	0.35	—	0.89	0.35	0.26
$\frac{F_a}{F_r} > 2.17$	X	0.92							
	Y	1							

d 17 ~ 40 mm

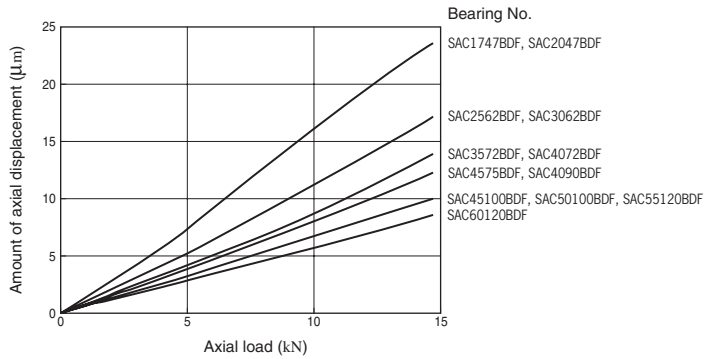


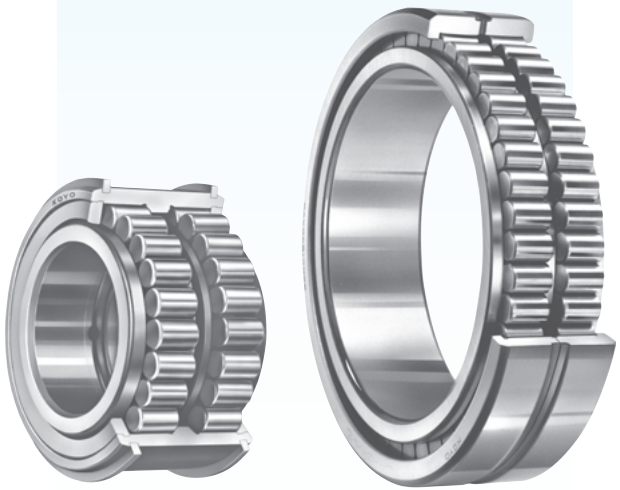


Dimensions (mm)													Applicable shaft dia.	Unit No. [1]		Bearing qty.	Drilled-hole of housing			Tapped-hole for dust-cover			Standard preload	Starting torque	(Refer.) Mass
d	D	D_1	L	L_1	L_2	L_3	d_1	d_2	x	x_1	x_2	x_3	d_3 (mm)				P (mm)	θ (°)	Z_1-M_1 Hole No.-thread	P_1 (mm)	θ_1 (°)	Z_2-M_2 Hole No.-thread	(kN)	(mN·m)	(kg)
17	60	90	65	15	15	35	38	47	6	6	15	20	28	**BSU1747BDF**		2	75	45	4-M6	75	22.5	4-M6	2.15	140	1.72
20	60	90	65	15	15	35	38	47	6	6	15	20	28	**BSU2047BDF**		2	75	45	4-M6	75	22.5	4-M6	2.15	140	1.70
25	74	108	68	13	17	38	52	63	6	6	20	18	32	**BSU2562BDF**		2	90	30	6-M8	78	15	3-M6	3.04	200	2.45
	74	108	83	13	17	53	52	63	6	6	20	18	32	**BSU2562BDFD**		3	90	30	6-M8	78	15	3-M6	4.13	260	2.85
30	74	108	68	13	17	38	52	63	6	6	20	18	40	**BSU3062BDF**		2	90	30	6-M8	78	15	3-M6	3.04	200	2.38
	74	108	83	13	17	53	52	63	6	6	20	18	40	**BSU3062BDFD**		3	90	30	6-M8	78	15	3-M6	4.13	260	2.74
35	84	118	68	13	17	38	60	73	6	6	20	18	45	**BSU3572BDF**		2	100	30	6-M8	88	15	3-M6	3.73	240	2.81
	84	118	83	13	17	53	60	73	6	6	20	18	45	**BSU3572BDFD**		3	100	30	6-M8	88	15	3-M6	5.07	320	3.28
	84	118	98	13	17	68	60	73	6	6	20	18	45	**BSU3572BDFF**		4	100	30	6-M8	88	15	3-M6	7.46	480	3.74
40	84	118	68	13	17	38	60	73	6	6	20	18	50	**BSU4072BDF**		2	100	30	6-M8	88	15	3-M6	3.73	240	2.77
	84	118	83	13	17	53	60	73	6	6	20	18	50	**BSU4072BDFD**		3	100	30	6-M8	88	15	3-M6	5.07	320	3.20
	84	118	98	13	17	68	60	73	6	6	20	18	50	**BSU4072BDFF**		4	100	30	6-M8	88	15	3-M6	7.46	480	3.64

[Note] 1) Diagrams show a unit mounted with triple-row matched bearing DFD.
Specifications of each bearing are shown in the former pages. (BSU1747BDF → SAC1747BDF)

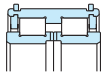
[Refer.] Relationship between axial load and axial displacement





Full complement type cylindrical roller bearings for crane sheaves

Shielded type



Bore diameter **40 – 440** mm

Open type

Bore diameter **50 – 440** mm

Crane rope sheaves and running wheels which are operated at low or medium speed are generally equipped with full complement type cylindrical roller bearings because the operation of these machines involves heavy, impact loading.

These bearings are divided into shielded and open types. The shielded type is often used with the outer ring rotation.

Shielded type

- The shielded type was developed for use with rope sheaves. It is shielded, non-separable and pre-lubricated with grease.
- Bearings with locating snap rings around the outer ring can be positioned and fit to sheaves with ease.
- The bearing surface is coated with phosphate for rust prevention.

Open type

- Open type bearings are further divided into those used on the fixed side and those used on the free side. The former carry axial load in both directions. The relative position of the latter's inner ring and outer ring can be adjusted by moving them along the axis.
- Open type bearings are separable because the outer ring divided into two annular pieces in a plane perpendicular to its axis. Triple-row and four-row bearings are available along with double-row types.

Tolerances

As specified in JIS B 1514-1, classes 0 and 6 (ref. Table 7-3 on pp. A 54-A 57).

Recommended fits and radial internal clearance

- Recommended fits: refer to Table 9-4 on pp. A 85, 86.

■ Fits and clearance of full complement type cylindrical roller bearings for use with crane sheaves with the rotating outer ring load

Condition		Shaft tolerance class	Housing bore tolerance class	Bearing radial internal clearance
Rotating outer ring load	Light or fluctuating load	g 6 or h 6	M 7	CN clearance
	Normal or heavy load		N 7	C3 clearance
	Heavy load on thin section housing		P 7	C3 clearance

- Radial internal clearance : Refer to Table 10-8 (1) on p. A 100.
  As for the nominal bore dia. up to 140mm shielded type (DC5000 series), the corresponding CN clearance are shown below.

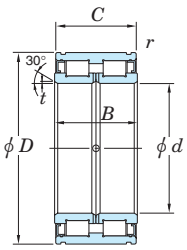
■ CN clearance of shielded type roller bearings for nominal diameter up to 140mm

Nominal bore dia. d(mm)		CN clearance (μm)	
over	up to	min.	max.
30	40	35	70
40	50	40	75
50	65	45	90
65	80	55	105
80	100	65	115
100	120	80	120
120	140	90	130

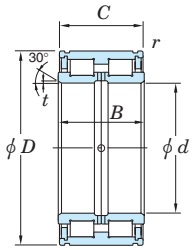
Full complement type cylindrical roller bearings for crane sheaves

shielded type

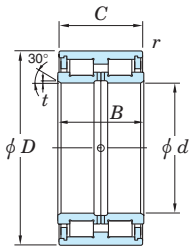
d 40 ~ 150 mm



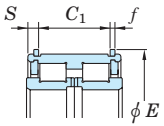
Design 1



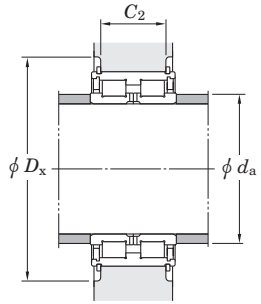
Design 2



Design 3



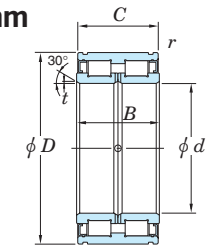
With locating snap rings



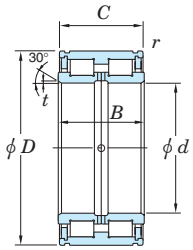
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No.		Design		Locating snap ring specifications (mm)				Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	C	t	r min.	C_r	C_{0r}	Without locating snap rings	With locating snap rings			C_1 [1]	S	E	f	d_a min.	D_x min.	C_2 [2]	
40	68	38	37	0.9	0.6	87.8	125	**DC5008N**	**DC5008NR**	1		28	4.5	71.8	2	46	80	28	0.55
45	75	40	39	0.9	0.6	95.1	144	**DC5009N**	**DC5009NR**	1		30	4.5	78.8	2	51	87	30	0.70
50	80	40	39	0.9	0.6	99.7	158	**DC5010N**	**DC5010NR**	1		30	4.5	83.8	2	56	92	30	0.75
55	90	46	45	1.2	0.6	118	193	**DC5011N**	**DC5011NR**	1		34	5.5	94.8	2.5	63	104	34	1.19
60	95	46	45	1.2	0.6	123	208	**DC5012N**	**DC5012NR**	1		34	5.5	99.8	2.5	68	109	34	1.27
65	100	46	45	1.2	0.6	128	224	**DC5013N**	**DC5013NR**	1		34	5.5	104.8	2.5	73	114	34	1.30
70	110	54	53	1.2	0.6	170	285	**DC5014N**	**DC5014NR**	1		42	5.5	114.5	2.5	78	124	42	1.94
75	115	54	53	1.2	0.6	178	307	**DC5015N**	**DC5015NR**	1		42	5.5	119.5	2.5	83	129	42	2.11
80	125	60	59	1.2	0.6	250	429	**DC5016N**	**DC5016NR**	1		48	5.5	129.5	2.5	88	146	48	2.65
85	130	60	59	1.2	0.6	255	446	**DC5017N**	**DC5017NR**	1		48	5.5	134.5	2.5	93	155	48	2.80
90	140	67	66	1.4	0.6	303	541	**DC5018N**	**DC5018NR**	1		54	6	145.4	2.5	100	165	54	3.70
95	145	67	66	1.4	0.6	310	562	**DC5019N**	**DC5019NR**	1		54	6	150.4	2.5	105	175	54	3.90
100	150	67	66	1.4	0.6	316	584	**DC5020N**	**DC5020NR**	1		54	6	155.4	2.5	110	180	54	4.05
110	170	80	79	1.7	1	382	697	**DC5022N**	**DC5022NR**	1		65	7	175.4	2.5	122	200	65	6.50
120	180	80	79	1.7	1	398	750	**DC5024N**	**DC5024NR**	1		65	7	188.4	3	132	210	65	6.95
130	200	95	94	1.7	1	534	1 000	**DC5026N**	**DC5026NR**	1		77	8.5	208.4	3	142	230	77	10.5
140	210	95	94	1.7	1	540	1 070	**DC5028N**	**DC5028NR**	1		77	8.5	218.4	3	152	245	77	11.0
150	225	100	99	2	1	682	1 400	**DC5030N**	**DC5030NR**	2		81	9	233	3	178.5	244	81	13.9

[Notes] 1) Dimensional tolerance of C_1 is +0.4/0 when bore diameter is not more than 170mm, while +0.6/0 when bore diameter is not more than 170mm.
2) Dimensional tolerance of C_2 is –0.1/–0.5 when bore diameter is not more than 170mm, while –0.1/–0.7 when bore diameter is not more than 170mm.

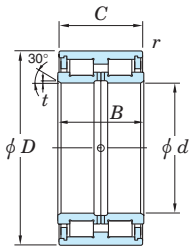
Full complement type cylindrical roller bearings for crane sheaves
shielded type
d 160 ~ 440 mm



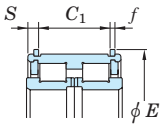
Design 1

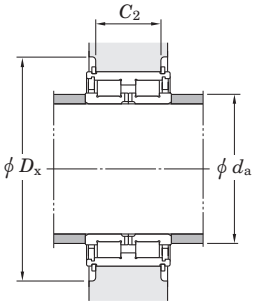


Design 2



Design 3





With locating snap rings

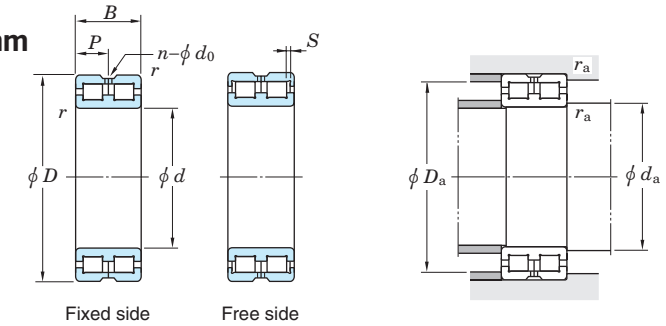
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No.		Design		Locating snap ring specifications (mm)				Mounting dimensions (mm)			(Refer.) Mass (kg)
d	D	B	C	t	r min.	C_r	C_{0r}	Without locating snap rings	With locating snap rings			C_1 [1]	S	E	f	d_a min.	D_x min.	C_2 [2]	
160	240	109	108	2	1.1	786	1 640	**DC5032N**	**DC5032NR**	2		89	9.5	248	3	190	259	89	17.2
170	260	122	121	2	1.1	977	2 020	**DC5034N**	**DC5034NR**	2		99	11	270	4	204	286	99	23.1
180	280	136	135	2	1.1	1 150	2 440	**DC5036N**	**DC5036NR**	2		110	12.5	290	4	217.5	306	110	30.8
190	290	136	135	2	1.1	1 180	2 530	**DC5038N**	**DC5038NR**	2		110	12.5	300	4	225	316	110	32.4
200	310	150	149	2	1.1	1 390	2 980	**DC5040N**	**DC5040NR**	2		120	14.5	320	4	240	336	120	41.7
220	340	160	159	2.5	1.1	1 620	3 590	**DC5044N**	**DC5044NR**	2		130	14.5	356	6	266.5	380	130	53.5
240	360	160	159	2.5	1.1	1 690	3 850	**DC5048N**	**DC5048NR**	2		130	14.5	376	6	284.5	400	130	57.3
260	400	190	189	3	1.5	2 230	4 980	**DC5052N**	**DC5052NR**	2		154	17.5	416	7	312.5	444	154	87.2
280	420	190	189	3	1.5	2 330	5 350	**DC5056N**	**DC5056NR**	2		154	17.5	436	7	334.5	464	154	93.0
300	460	218	216	3	1.5	2 860	6 610	**DC5060**	—	3		—	—	—	—	361	—	—	134
320	480	218	216	3	1.5	2 950	6 930	**DC5064**	—	3		—	—	—	—	378.5	—	—	140
340	520	243	241	3.5	2	3 590	8 420	**DC5068**	—	3		—	—	—	—	413	—	—	189
360	540	243	241	3.5	2	3 660	8 720	**DC5072**	—	3		—	—	—	—	427	—	—	197
380	560	243	241	3.5	2	3 730	9 020	**DC5076**	—	3		—	—	—	—	441	—	—	207
400	600	272	270	3.5	2	4 510	11 000	**DC5080**	—	3		—	—	—	—	475.5	—	—	281
420	620	272	270	3.5	2	4 650	11 400	**DC5084**	—	3		—	—	—	—	496	—	—	290
440	650	280	278	4.5	3	4 940	12 200	**DC5088**	—	3		—	—	—	—	521	—	—	330

[Notes] 1) Dimensional tolerance of C_1 is +0.4/0 when bore diameter is not more than 170mm, while +0.6/0 when bore diameter is not more than 170mm.
2) Dimensional tolerance of C_2 is –0.1/–0.5 when bore diameter is not more than 170mm, while –0.1/–0.7 when bore diameter is not more than 170mm.

Full complement type cylindrical roller bearings for crane sheaves

open type

d 50 ~ 200 mm



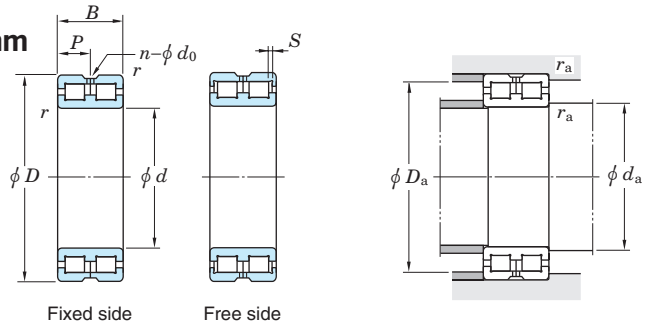
Boundary dimensions (mm)				S [1]	Basic load ratings (kN)		Bearing No.		Lubrication hole (mm)			Mounting dimensions (mm)			Mass
d	D	B	r min.	(mm)	C_r	C_{0r}	Fixed side	Free side	P	n qty	d_0	d_a min.	D_a max.	r_a max.	Fixed side (kg)
50	72	22	0.6	1	49.1	82.9	**DC4910AVW**	**DC4910VW**	11	4	2	55	67	0.6	0.30
60	85	25	1	1	72.7	136	**DC4912AVW**	**DC4912VW**	12.5	4	2	66	79	1	0.46
70	100	30	1	1	105	193	**DC4914AVW**	**DC4914VW**	15	4	2	76	94	1	0.78
80	110	30	1	1	114	218	**DC4916AVW**	**DC4916VW**	15	4	2	86	104	1	0.88
90	125	35	1.1	1.5	150	301	**DC4918AVW**	**DC4918VW**	17.5	4	2.5	97	118	1	1.35
100	140	40	1.1	2	194	400	**DC4920AVW**	**DC4920VW**	20	4	2.5	107	133	1	1.95
110	150	40	1.1	2	202	431	**DC4922AVW**	**DC4922VW**	20	4	2.5	117	143	1	2.15
120	165	45	1.1	3	226	479	**DC4924AVW**	**DC4924VW**	22.5	4	3	127	158	1	2.95
130	180	50	1.5	4	276	560	**DC4926AVW**	**DC4926VW**	25	4	3	138.5	171.5	1.5	3.95
140	190	50	1.5	4	284	589	**DC4928AVW**	**DC4928VW**	25	4	3	148.5	181.5	1.5	4.20
150	190	40	1.1	2	234	575	**DC4830AVW**	**DC4830VW**	20	4	3	157	183	1	2.90
	210	60	2	4	406	842	**DC4930AVW**	**DC4930VW**	30	6	4	160	200	2	6.65
160	200	40	1.1	2	242	616	**DC4832AVW**	**DC4832VW**	20	4	3	167	193	1	3.05
	220	60	2	4	428	895	**DC4932AVW**	**DC4932VW**	30	6	4	170	210	2	7.00
170	215	45	1.1	3	269	655	**DC4834AVW**	**DC4834VW**	22.5	4	3	177	208	1	4.10
	230	60	2	4	440	944	**DC4934AVW**	**DC4934VW**	30	6	4	180	220	2	7.35
180	225	45	1.1	3	276	690	**DC4836AVW**	**DC4836VW**	22.5	4	4	187	218	1	4.30
	250	69	2	4	547	1 140	**DC4936AVW**	**DC4936VW**	34.5	6	4	190	240	2	10.7
190	240	50	1.5	4	327	782	**DC4838AVW**	**DC4838VW**	25	4	4	198.5	231.5	1.5	5.65
	260	69	2	4	555	1 200	**DC4938AVW**	**DC4938VW**	34.5	6	5	200	250	2	11.2
200	250	50	1.5	4	337	826	**DC4840AVW**	**DC4840VW**	25	4	4	208.5	241.5	1.5	5.90
	280	80	2.1	5	667	1 500	**DC4940AVW**	**DC4940VW**	40	6	6	212	268	2	15.7

[Note] 1) Effective movement of the bearing on the free side in an axial direction.

Full complement type cylindrical roller bearings for crane sheaves

open type

d 220 ~ 440 mm



Boundary dimensions (mm)				S [1]	Basic load ratings (kN)		Bearing No.			Lubrication hole (mm)			Mounting dimensions (mm)			Mass
d	D	B	r min.	(mm)	C_r	C_{0r}	Fixed side	Free side		P	n qty	d_0	d_a min.	D_a max.	r_a max.	Fixed side (kg)
220	270	50	1.5	4	355	971	**DC4844AVW**	**DC4844VW**		25	6	4	228.5	261.5	1.5	6.40
	300	80	2.1	5	707	1 600	**DC4944AVW**	**DC4944VW**		40	6	6	232	288	2	17.1
240	300	60	2	4	509	1 330	**DC4848AVW**	**DC4848VW**		30	6	5	250	290	2	10.2
	320	80	2.1	5	735	1 720	**DC4948AVW**	**DC4948VW**		40	6	6	252	308	2	18.4
260	320	60	2	4	532	1 450	**DC4852AVW**	**DC4852VW**		30	6	5	270	310	2	11.0
	360	100	2.1	6	1 070	2 520	**DC4952AVW**	**DC4952VW**		50	8	6	272	348	2	32.0
280	350	69	2	4	663	1 720	**DC4856AVW**	**DC4856VW**		34.5	6	5	290	340	2	16.0
	380	100	2.1	6	1 130	2 700	**DC4956AVW**	**DC4956VW**		50	8	6	292	368	2	33.9
300	380	80	2.1	6	802	2 160	**DC4860AVW**	**DC4860VW**		40	8	6	312	368	2	23.0
	420	118	3	6	1 560	3 710	**DC4960AVW**	**DC4960VW**		59	8	8	314	406	2.5	53.0
320	400	80	2.1	6	832	2 310	**DC4864AVW**	**DC4864VW**		40	8	6	332	388	2	24.3
	440	118	3	6	1 620	3 940	**DC4964AVW**	**DC4964VW**		59	8	8	334	426	2.5	56.0
340	420	80	2.1	6	853	2 430	**DC4868AVW**	**DC4868VW**		40	8	6	352	408	2	25.6
	460	118	3	6	1 660	4 150	**DC4968AVW**	**DC4968VW**		59	8	8	354	446	2.5	59.0
360	440	80	2.1	6	880	2 580	**DC4872AVW**	**DC4872VW**		40	8	6	372	428	2	27.0
	480	118	3	6	1 700	4 390	**DC4972AVW**	**DC4972VW**		59	8	8	374	466	2.5	62.0
380	480	100	2.1	6	1 310	3 570	**DC4876AVW**	**DC4876VW**		50	8	6	392	468	2	45.3
	520	140	4	7	2 290	5 600	**DC4976AVW**	**DC4976VW**		70	8	8	398	502	3	92.3
400	540	140	4	7	2 380	5 990	**DC4980AVW**	**DC4980VW**		70	8	8	418	522	3	96.4
420	560	140	4	7	2 440	6 270	**DC4984AVW**	**DC4984VW**		70	8	8	438	542	3	101
440	600	160	4	7	2 970	7 390	**DC4988AVW**	**DC4988VW**		80	8	8	458	582	3	139

[Note] 1) Effective movement of the bearing on the free side in an axial direction.

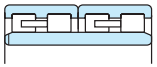
Rolling mill roll neck bearings

Rolling mill roll neck four-row cylindrical roller bearings and tapered roller bearings are designed to achieve the maximum load rating capacity in a limited space.

■ Four-row cylindrical roller bearings
- Suitable for high-speed rotation. Thin section designs are also available.
- The inner ring raceway surface and the roll can be finished simultaneously after the inner ring is mounted on the roll neck. This feature is useful in improving rolling mill accuracy.

■ Four-row tapered roller bearings
- Suitable for low- and medium-speed rotation. Available in both metric and inch series.
- The internal clearance is preadjusted, facilitating mounting.
- More sealed type four-row tapered roller bearings are being used currently.

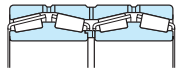
Four-row cylindrical roller bearings



Cylindrical bore

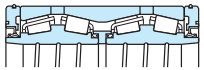
Bore diameter **100 – 500** mm

Four-row tapered roller bearings



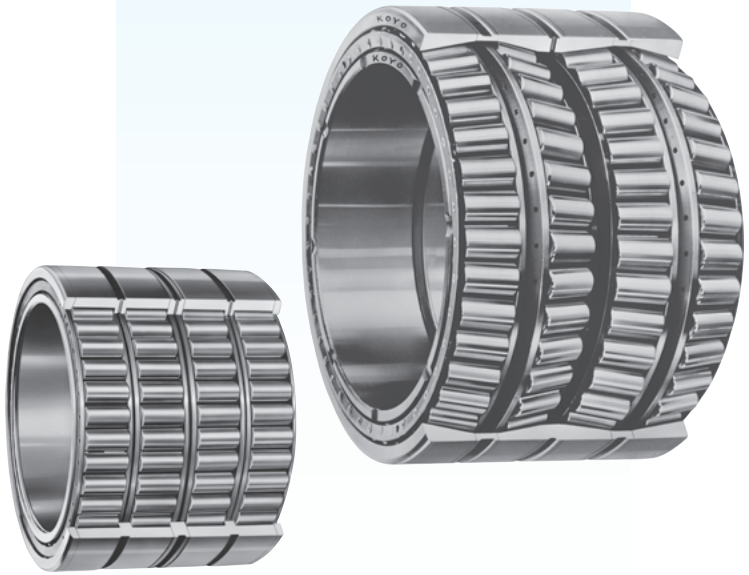
Open type

Bore diameter **65 – 500** mm



Sealed type

Bore diameter **75 – 800** mm



	Four-row cylindrical roller bearings	Four-row tapered roller bearings
Tolerances	As specified in JIS B 1514-1. (refer to Table 7-3 on pp. A 54-A 57.)	● Metric series : as specified in BAS 1002. (refer to Table 7-6 on p. A 63.) ● Inch series : as specified in ABMA Section 19. (refer to Table 7-7 on pp. A 64, 65.) ● Special series (47T···, 4TR···) : Special allowances are applied to these series. For details, consult with JTEKT.
Recommended fits	Refer to Table 1.	● Metric series : refer to Table 2. ● Inch series : refer to Table 3.
Internal clearance	Refer to Table 10-8 on pp. A 100, 101. (JTEKT should be consulted to determine the clearance according to application conditions.)	Refer to Table 10-10 on p. A 104.
Equivalent load	Dynamic equivalent radial load : $P_r = F_r$ Static equivalent radial load : $P_{0r} = F_r$	Dynamic equivalent radial load : $\left[\text{when } \frac{F_a}{F_r} \leqq e\right]$ $P_r = F_r + Y_2 F_a$ $\left[\text{when } \frac{F_a}{F_r} > e\right]$ $P_r = 0.67F_r + Y_3 F_a$ Static equivalent radial load : $P_{0r} = F_r + Y_0 F_a$

[Note] For axial load factor Y_2, Y_3 and Y_0, and the constant e, use values listed in the specification table.

Table 1 Roll neck four-row cylindrical roller bearing recommended fits Unit : μm

Inner ring and roll neck (shaft)						Outer ring and chock (housing)					
Nominal bore diameter d (mm)		Single plane mean bore diameter deviation Δ_{dmp}		Roll neck diameter deviation		Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}		Chock bore diameter deviation	
over	up to	upper	lower	upper	lower	over	up to	upper	lower	upper	lower
80	120	0	− 20	+ 59	+ 37	120	150	0	− 18	+ 40	0
120	180	0	− 25	+ 68	+ 43 (p6)	150	180	0	− 25	+ 40	0 (H7)
180	250	0	− 30	+ 79	+ 50	180	250	0	− 30	+ 46	0
250	280	0	− 35	+ 126	+ 94	250	315	0	− 35	+ 52	0 (H7)
280	315	0	− 35	+ 130	+ 98 (r6)	315	400	0	− 40	+ 75	+ 18 (G7)
315	355	0	− 40	+ 144	+ 108	400	500	0	− 45	+ 83	+ 20
355	400	0	− 40	+ 150	+ 114						
400	450	0	− 45	+ 166	+ 126 (r6)	500	630	0	− 50	+ 92	+ 22 (G7)
450	500	0	− 45	+ 172	+ 132						
500	560	0	− 50	+ 194	+ 150 (r6)						
560	630	0	− 50	+ 354	+ 310 (s6)	630	800	0	− 75	+ 160	+ 80 (F7)
630	710	0	− 75	+ 390	+ 340						
710	800	0	− 75	+ 430	+ 380						
800	900	0	− 100	+ 486	+ 430 (s6)	800	1 000	0	− 100	+ 176	+ 86 (F7)
900	1 000	0	− 100	+ 526	+ 470						
1 000	1 120	0	− 125	+ 588	+ 520 (s6)						
1 120	1 250	0	− 125	+ 646	+ 580	1 000	1 250	0	− 125	+ 203	+ 98 (F7)
						1 250	1 400	0	− 160	+ 235	+ 110 (F7)
						1 400	1 600	0	− 160	+ 345	+ 220 (E7)

[Note] The table above shows general values. JTEKT determines recommended fit on a case by case basis according to bearing materials and operating conditions to prevent the inner ring from creeping. Consult with JTEKT when referring to this table.

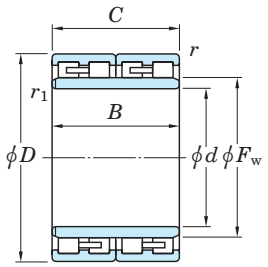
Table 2 Roll neck metric series four-row tapered roller bearing recommended fits Unit : μm

Double inner ring and roll neck (shaft)						Outer ring and chock (housing)					
Nominal bore diameter d (mm)		Single plane mean bore diameter deviation Δ_{dmp}		Roll neck diameter deviation		Nominal outside diameter D (mm)		Single plane mean outside diameter deviation Δ_{Dmp}		Chock bore diameter deviation	
over	up to	upper	lower	upper	lower	over	up to	upper	lower	upper	lower
80	120	0	− 20	− 120	− 150	120	150	0	− 20	+ 57	+ 25
120	180	0	− 25	− 150	− 175	150	180	0	− 25	+ 100	+ 50
180	250	0	− 30	− 175	− 200	180	250	0	− 30	+ 120	+ 50
250	315	0	− 35	− 210	− 250	250	315	0	− 35	+ 115	+ 50
315	400	0	− 40	− 240	− 300	315	400	0	− 40	+ 110	+ 50
400	500	0	− 45	− 245	− 300	400	500	0	− 45	+ 105	+ 50
500	630	0	− 50	− 250	− 300	500	630	0	− 50	+ 100	+ 50
630	800	0	− 75	− 325	− 400	630	800	0	− 75	+ 150	+ 75
800	1 000	0	− 100	− 350	− 425	800	1 000	0	− 100	+ 150	+ 75
1 000	1 250	0	− 125	− 425	− 500	1 000	1 250	0	− 125	+ 175	+ 100
1 250	1 600	0	− 160	− 510	− 600	1 250	1 600	0	− 160	+ 215	+ 125
						1 600	2 000	0	− 200	+ 250	+ 150

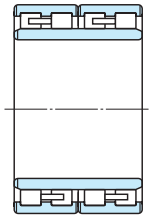
Table 3 Roll neck inch series four-row tapered roller bearing recommended fits Unit : μm

Double inner ring and roll neck (shaft)						Outer ring and chock (housing)					
Nominal bore diameter d (mm)(1/25.4)		Single plane mean bore diameter deviation Δ_{dmp}		Roll neck diameter deviation		Nominal outside diameter D (mm)(1/25.4)		Single plane mean outside diameter deviation Δ_{Dmp}		Chock bore diameter deviation	
over	up to	upper	lower	upper	lower	over	up to	upper	lower	upper	lower
76.2 (3.0)	101.6 (4.0)	+ 25	0	− 75	− 100	−	304.8 (12.0)	+ 25	0	+ 75	+ 50
101.6 (4.0)	127.0 (5.0)	+ 25	0	− 100	− 125	304.8 (12.0)	609.6 (24.0)	+ 51	0	+ 150	+ 100
127.0 (5.0)	152.4 (6.0)	+ 25	0	− 125	− 150	609.6 (24.0)	914.4 (36.0)	+ 76	0	+ 225	+ 150
152.4 (6.0)	203.2 (8.0)	+ 25	0	− 150	− 175	914.4 (36.0)	1 219.2 (48.0)	+ 102	0	+ 300	+ 200
203.2 (8.0)	304.8 (12.0)	+ 25	0	− 175	− 200	1 219.2 (48.0)	1 524.0 (60.0)	+ 127	0	+ 375	+ 250
304.8 (12.0)	609.6 (24.0)	+ 51	0	− 200	− 250	1 524.0 (60.0)	−	+ 127	0	+ 450	+ 300
609.6 (24.0)	914.4 (36.0)	+ 76	0	− 250	− 325						
914.4 (36.0)	1 219.2 (48.0)	+ 102	0	− 300	− 400						
1 219.2 (48.0)	−	+ 127	0	− 375	− 475						

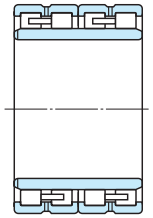
d 100 ~ (160) mm



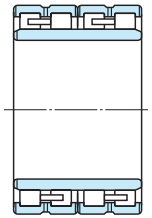
Design 1-1



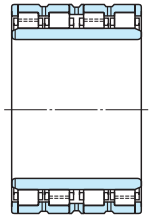
Design 1-2



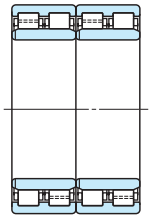
Design 1-3



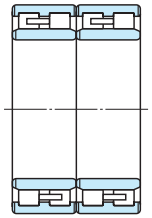
Design 1-4



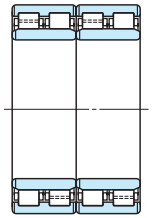
Design 1-6P



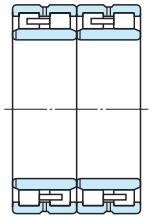
Design 2-1P



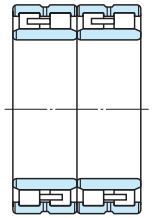
Design 2-2



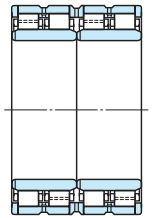
Design 2-2P



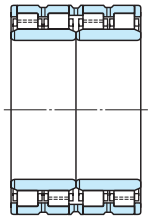
Design 2-3



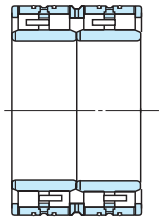
Design 2-4



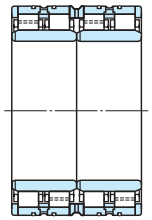
Design 2-5P



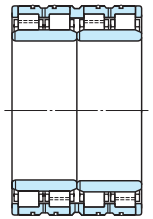
Design 2-6P



Design 3-1



Design 3-1P



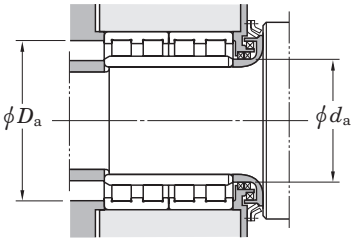
Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1 min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
100	140	120	120	110	1.1	1.1	485	945	**20FC14120**		2-2	107	133	131	1	1	5.6
110	170	90	90	127	2	2	428	692	**22FC1790**		1-2	120	160	155	2	2	7.4
	180	120	120	128	2	2	636	971	**22FC18120**		2-2	119	170	164	2	1.5	12
115	165	90	90	132.5	1.1	1.1	398	751	**23FC1690**		1-1	122	158	154	1	1	6.5
120	165	87	87	134.5	1.1	1.1	374	745	**24FC1787**		1-2	127	158	154	1	1	5.6
	180	105	105	135	2	1.1	487	796	**4CR120**		1-2	127	170	165	2	1	9.3
127	174.65	150.812	150.812	139.5	1.1	1.1	630	1 300	**25FC17150**		2-2	134	167	163	1	1	10.5
	203.2	127	127	147	2	2	740	1 180	**25FC20127**		1-3	137	193	185	2	2	15.4
130	200	104	104	150	2	2	566	953	**26FC20104**		1-2	140	190	182	2	2	11.8
	200	125	125	149	2	2	752	1 310	**26FC20125**		1-2	140	190	183	2	2	14.4
140	190	119	119	154	1.5	1.5	565	1 160	**28FC19119W**		1-3	149	181	178	1.5	1.5	9.6
	210	116	116	158	2	2	675	1 120	**28FC21116**		1-2	150	200	194	2	2	13.5
145	210	155	155	166	1.1	1.1	845	1 710	**29FC21155**		1-2	152	203	196	1	1	17.8
	225	156	156	169	2	2	912	1 680	**313924**		1-2	155	215	205	2	2	22.9
150	200	120	120	162	2	2	672	1 400	**30FC20120**		1-2	160	190	188	2	2	10.1
	210	120	120	168.5	2	2	686	1 380	**30FC21120**		2-2	160	200	196	2	2	12.8
	210	150	150	165	2	2	872	1 780	**30FC21150**		1-2	160	200	195	2	2	15.9
	220	150	150	170	2	2	887	1 760	**30FC22150**		1-2	160	210	202	2	2	19.2
	220	150	150	168	2	2	889	1 760	**30FC22150A**		1-2	160	210	200	2	2	19.5
	230	156	156	174	2	2	961	1 810	**313891-1**		1-2	160	220	210	2	2	23.8
160	220	180	180	177	2	2	964	2 170	**32FC22180**		1-2	170	210	205	2	2	20.5
	230	130	130	180	2.1	2.1	867	1 740	**314190**		1-2	172	218	212	2	2	17.7

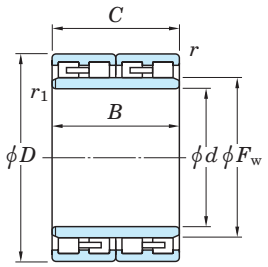
[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

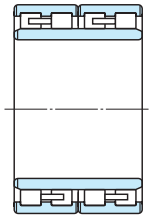
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.

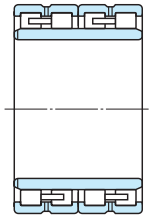


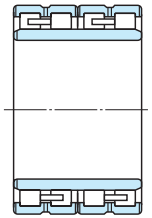
d (160) ~ 190 mm

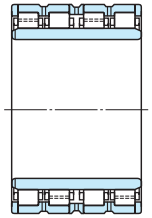


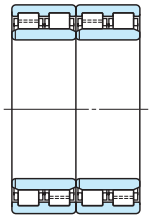
Design 1-1

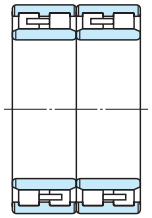

Design 1-2

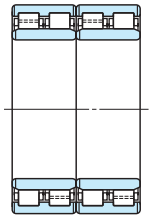

Design 1-3

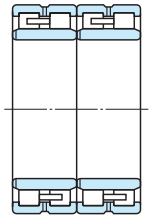

Design 1-4

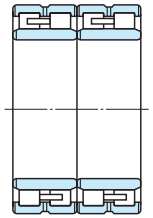

Design 1-6P

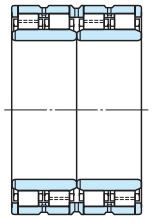

Design 2-1P

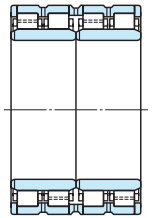

Design 2-2

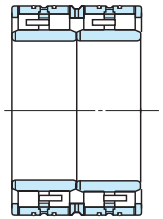

Design 2-2P

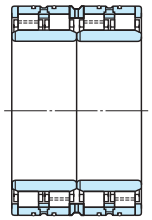

Design 2-3

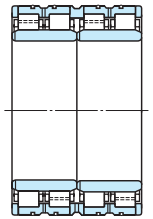

Design 2-4


Design 2-5P

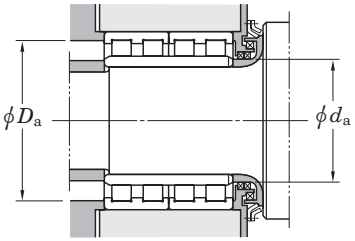

Design 2-6P


Design 3-1


Design 3-1P


Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1 min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
160	230	168	168	182	1.1	1.1	1 040	2 210	**32FC23170**		1-2	167	223	214	1	1	22.8
	230	168	168	180	2	2	1 040	2 200	**32FC23170A**		1-2	170	220	212	2	2	23.1
	230	168	168	179	2	2	1 110	2 210	**32FC23170B**		1-4	170	220	215	2	2	22.6
	230	180	180	177	2	2	1 140	2 270	**32FC23180A**		1-2	170	220	213	2	2	24.1
	240	120	120	183	2.1	2.1	663	1 140	**32FC24120W**		1-3	172	228	219	2	2	18.5
	240	170	170	183	2.1	2.1	1 180	2 220	**32FC24170**		1-2	172	228	223	2	2	26.8
170	230	120	120	187	2	2	782	1 680	**34FC23120**		1-2	180	220	215	2	2	14.4
	240	156	156	190	2	2	972	2 050	**34FC24156A**		1-2	180	230	222	2	2	22.4
	240	156	156	189	2	2	1 060	2 100	**34FC24156B**		1-2	180	230	225	2	2	21.8
	240	190	190	187	1.5	1.5	1 260	2 620	**34FC24190**		1-2	179	231	223	1.5	1.5	26.9
	250	168	168	192	2.1	2.1	1 170	2 230	**34FC25168**		1-2	182	238	232	2	2	27.6
	250	170	170	192	2.1	2.1	1 170	2 230	**34FC25170**		1-2	182	238	232	2	2	27.8
	260	150	150	195	2.1	2.1	1 100	2 000	**34FC26150**		1-2	182	248	237	2	2	28.8
178	258.75	150	150	199	1.5	1.5	1 090	2 070	**36FC26150**		1-2	187	250	239	1.5	1.5	25.8
180	250	156	156	200	2	2	1 020	2 130	**36FC25156A**		1-2	190	240	234	2	2	23.3
	260	168	168	202	2.1	2.1	1 150	2 390	**313812W**		1-4	192	248	238	2	2	29.7
	260	168	168	202	2.1	2.1	1 230	2 420	**36FC26168**		1-2	192	248	242	2	2	29.3
	265	180	180	203	2	2	1 300	2 600	**36FC27180**		1-2	190	255	243	2	2	33.6
190	260	168	168	212	2.1	2.1	1 140	2 600	**38FC26168-1**		1-2	202	248	244	2	2	26.5
	270	170	170	212	2	2	1 140	2 310	**38FC27170**		1-2	200	260	250	2	2	30.8
	270	170	170	213	2	2	1 140	2 310	**38FC27170A**		1-2	200	260	251	2	2	31.0
	270	200	200	212	2	2	1 460	3 080	**314199**		1-2	200	260	252	2	2	36.1
	280	200	200	214	2.1	2.1	1 550	3 100	**38FC28200**		1-2	202	268	258	2	2	42
	290	190	190	215	2.1	2.1	1 550	2 860	**38FC29190**		1-2	202	278	265	2	2	44.9

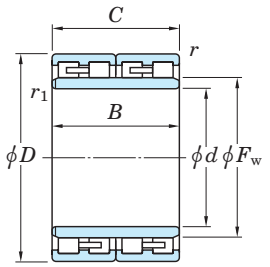


[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

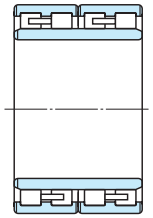
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

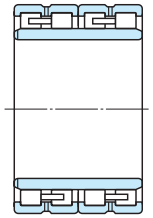
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.

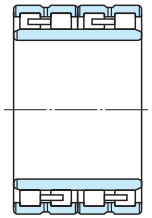
d 195 ~ 230 mm

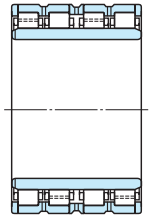


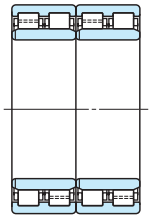
Design 1-1

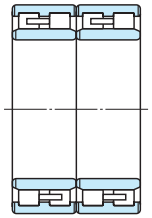

Design 1-2

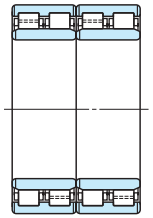

Design 1-3

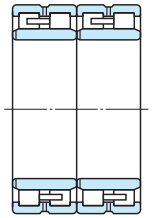

Design 1-4

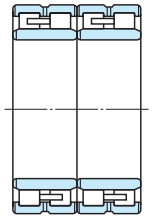

Design 1-6P

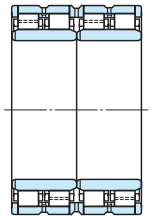

Design 2-1P

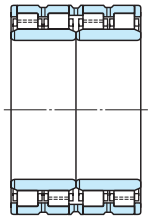

Design 2-2

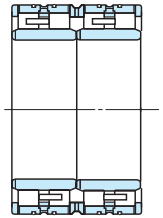

Design 2-2P

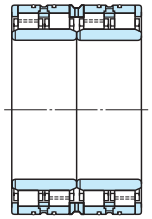

Design 2-3

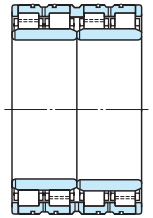

Design 2-4


Design 2-5P


Design 2-6P


Design 3-1


Design 3-1P

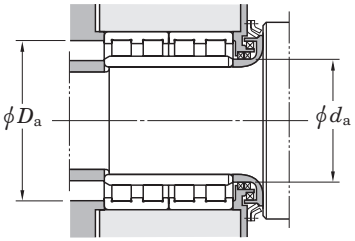

Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1 min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
195	300	226	226	220	2.1	2.1	1 960	3 690	**39FC30226**		1-2	207	288	274	2	2	57.9
200	270	170	170	222	2	2.1	1 190	2 780	**314553**		1-2	212	260	254	2	2	28.0
	280	152	152	222	2.1	2.1	1 100	2 150	**40FC28152BW**		1-3	212	268	262	2	2	28.0
	280	170	170	222	2.1	2.1	1 280	2 620	**40FC28170**		1-2	212	268	262	2	2	31.7
	280	188	188	222	2.1	2.1	1 350	2 810	**40FC28188**		1-2	212	268	262	2	2	35.0
	280	190	190	223	3	3	1 460	3 100	**40FC28190A**		1-2	214	266	263	2.5	2.5	36.0
	280	200	200	222	2	2	1 450	3 090	**313893-1**		1-2	210	270	262	2	2	37.7
	280	200	200	224	2.1	2.1	1 450	3 330	**40FC28200**		1-2	212	268	260	2	2	38.7
	290	192	192	226	2.1	2.1	1 460	3 030	**313811**		1-2	212	278	268	2	2	42.0
	310	160	160	232	2.1	2.1	1 260	2 240	**40FC31160**		1-1	212	298	282	2	2	44.6
	310	206	206	227	2.1	2.1	1 790	3 240	**40FC31206**		1-2	212	298	283	2	2	56.6
206	299.97	170	170	229	2	2	1 470	2 780	**41FC30170**		1-2	216	289	277	2	2	39.2
210	290	192	192	236	2.1	2.1	1 460	3 270	**42FC29192**		1-2	222	278	274	2	2	38.1
	300	210	210	234	2.1	2.1	1 660	3 490	**42FC30210**		1-2	222	288	278	2	2	47.3
220	300	150	150	240	2.1	2.1	1 210	2 500	**44FC30150W**		1-3	232	288	280	2	2	30.7
	310	192	192	247	2.1	2.1	1 520	3 270	**313837-1**		1-2	232	298	289	2	2	45.5
	310	192	192	246	2	2	1 630	3 420	**313837A**		1-2	230	300	291	2	2	44.9
	310	192	192	245	3	2.1	1 450	2 980	**44FC31192W**		1-3	232	296	289	2.5	2	43.9
	310	225	225	244	2.1	2.1	1 880	4 160	**44FC31225A**		1-2	232	298	288	2	2	53.5
	320	210	210	246	2.1	2.1	1 760	3 490	**44FC32210**		1-2	232	308	296	2	2	55.4
	320	210	210	248	2.1	2.1	1 810	3 740	**44FC32210-1**		1-4	232	308	296	2	2	56.7
	340	180	180	256	3	3	1 500	2 750	**44FC34180A**		1-4	234	326	310	2.5	2.5	59.0
230	330	206	206	260	2.1	2.1	1 880	3 980	**313824A**		1-2	242	318	308	2	2	57.5
	340	260	260	261	3	3	2 310	4 900	**46FC34260**		1-2	244	326	313	2.5	2.5	81.2

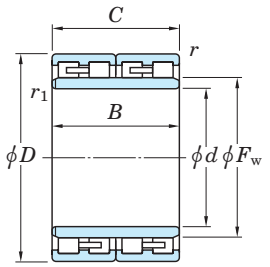
[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

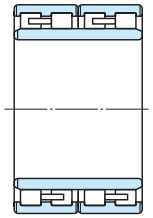
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.

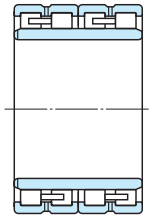


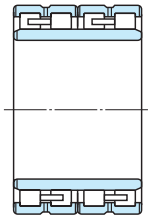
d 237 ~ (280) mm

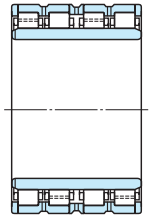


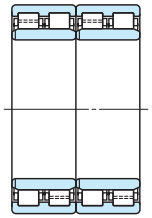
Design 1-1

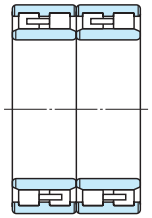

Design 1-2

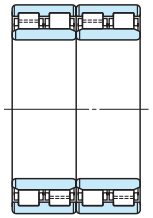

Design 1-3

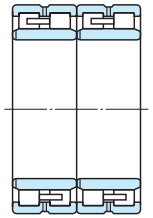

Design 1-4

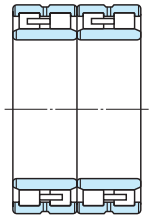

Design 1-6P

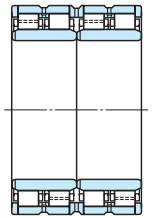

Design 2-1P

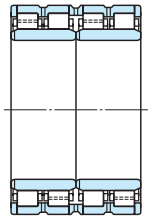

Design 2-2

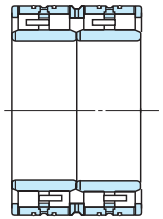

Design 2-2P

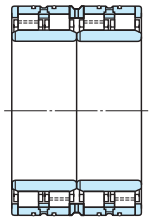

Design 2-3

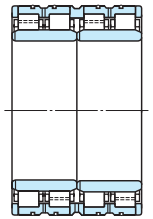

Design 2-4


Design 2-5P

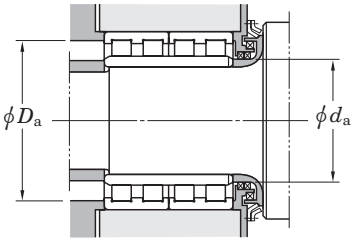

Design 2-6P


Design 3-1


Design 3-1P


Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1 min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
237	339.67	200	200	264	2	2	1 840	3 780	**47FC34200**		1-2	247	329	314	2	2	58.0
240	330	220	220	270	3	3	1 780	4 250	**312943/1YD**		1-4	254	316	310	2.5	2.5	55.5
	330	220	220	264	2.1	2.1	1 830	4 120	**48FC33220**		1-2	252	318	308	2	2	54.3
	330	220	220	268	3	3	1 770	4 070	**48FC33220BW**		1-4	254	316	310	2.5	2.5	55.5
	330	250	250	263	2.1	2.1	2 160	4 910	**48FC33250W**		1-3	252	318	309	2	2	63.7
	340	200	200	266	3	3	1 880	3 780	**48FC34200**		1-2	254	326	318	2.5	2.5	56.3
	340	220	220	268	3	3	2 000	4 240	**48FC34220**		1-2	254	326	318	2.5	2.5	63.4
250	350	220	220	278	3	3	1 930	4 200	**50FC35220**		1-2	264	336	326	2.5	2.5	64.6
260	355	260	260	286	2.1	2.1	2 290	5 440	**52FC35260**		2-2	272	343	332	2	2	75.0
	360	192	192	287	2.1	2.1	1 750	3 740	**52FC36192W**		1-3	272	348	335	2	2	59.8
	360	200	200	287	2.1	2.1	1 880	4 110	**52FC36200**		1-2	272	348	335	2	2	62.0
	360	230	230	292.5	2.1	2.1	2 140	4 900	**52FC36230CW**		1-4	272	348	340	2	2	69.7
	360	230	230	292	2.1	2.1	2 020	4 790	**52FC36230D**		1-2	272	348	336	2	2	72.6
	360	260	260	287	2.1	2.1	2 300	5 320	**52FC36260**		2-2	272	348	335	2	2	80.0
	368	268	268	288	2.1	2.1	2 740	5 990	**52FC37268W**		1-4	272	356	344	2	2	89.9
	370	220	220	292	3	3	2 000	4 330	**313823**		1-2	274	356	342	2.5	2.5	76.0
	370	220	220	290	3	3	2 180	4 480	**313823A**		1-2	274	356	346	2.5	2.5	75.0
	370	260	260	290	2.1	2.1	2 640	5 740	**52FC37260**		1-2	272	358	346	2	2	88.5
265	370	234	234	292	1.5	1.5	2 290	4 910	**53FC37234A**		1-2	274	361	346	1.5	1.5	76.3
	370	234	234	300	1.5	1.5	2 270	5 290	**53FC37234B**		2-2	274	361	348	1.5	1.5	78.5
270	380	230	230	298	2.1	2.1	2 330	4 910	**54FC38230**		1-2	282	368	354	2	2	80.0
280	380	170	170	306	2.1	2.1	1 710	3 590	**56FC38170W**		1-3	292	368	356	2	2	55.0
	390	220	220	312	3	3	2 070	4 640	**313822**		1-2	294	376	362	2.5	2.5	81.8
	390	220	220	308	3	3	2 180	4 670	**313822A**		1-2	294	376	362	2.5	2.5	79.7

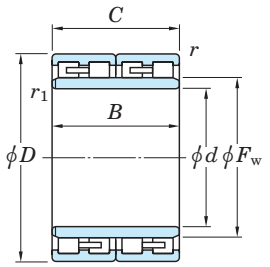


[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

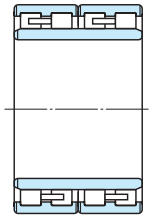
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

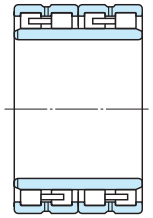
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.

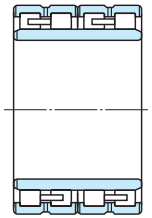
d (280) ~ (320) mm

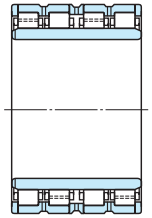


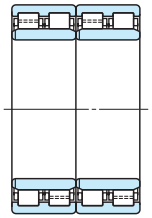
Design 1-1

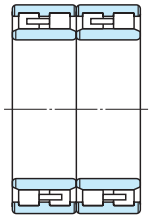

Design 1-2

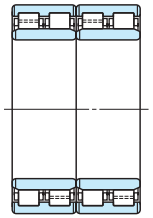

Design 1-3

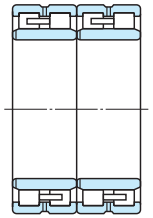

Design 1-4

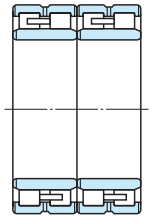

Design 1-6P

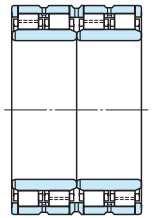

Design 2-1P

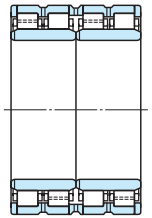

Design 2-2

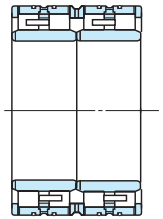

Design 2-2P

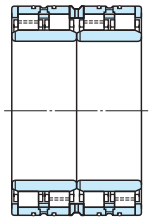

Design 2-3

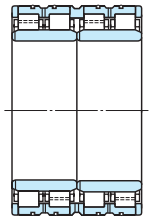

Design 2-4


Design 2-5P

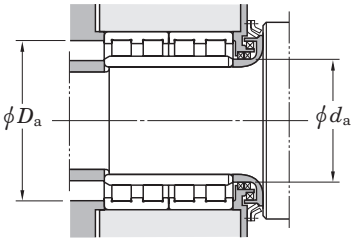

Design 2-6P


Design 3-1


Design 3-1P


Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1 min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
280	390	220	220	306	3	2.1	2 520	5 350	**313822C**		1-2	292	376	364	2.5	2	79.7
	390	220	220	312	3	3	2 320	5 100	**313822D**		1-2	294	376	366	2.5	2.5	80.1
	390	240	240	312	3	3	2 460	5 620	**56FC39240**		1-2	294	376	364	2.5	2.5	88.1
	390	275	275	309	2.1	2.1	2 680	6 110	**56FC39275B**		1-2	292	378	363	2	2	100
	390	275	275	308	3	2.1	3 040	6 850	**56FC39275J**		2-4	292	376	366	2.5	2	102
	410	300	300	314	3	3	3 730	8 400	**56FC41300**		2-6P	294	396	378	2.5	2.5	137
290	390	234	234	320	3	3	2 300	5 500	**58FC39234**		1-2	304	376	368	2.5	2.5	80.0
	400	180	180	320	3	3	1 880	4 010	**58FC40180W**		1-2	304	386	372	2.5	2.5	68.3
	410	240	240	320	3	3	2 610	5 540	**58FC41240**		1-2	304	396	380	2.5	2.5	99.0
	420	300	300	327	3	3	3 100	6 960	**58FC42300**		1-2	304	406	387	2.5	2.5	138
300	400	300	300	328	3	3	2 920	7 310	**60FC40300A**		1-2	314	386	378	2.5	2.5	103
	420	218	218	332	3	3	2 350	5 010	**60FC42218**		1-1	314	406	390	2.5	2.5	93.0
	420	240	240	332	3	3	2 660	5 750	**60FC42240**		1-1	314	406	392	2.5	2.5	102
	420	300	300	332	3	3	3 370	7 840	**4CR300**		3-2P	314	406	392	2.5	2.5	125
	420	300	300	331	1.5	1.5	3 420	7 750	**60FC42300DW**		2-4	309	411	395	1.5	1.5	127
	420	300	300	332	2	2	3 750	8 690	**60FC42300L-2**		2-6P	310	410	395	2	2	129
	420	300	300	332	3	3	3 250	7 270	**60FC42300W**		2-3	314	406	394	2.5	2.5	127
310	420	300	300	338	3	3	3 090	7 370	**62FC42300**		1-2	324	406	394	2.5	2.5	119
	430	240	240	344.5	3	3	2 640	5 770	**62FC43240**		1-2	324	416	404	2.5	2.5	105
	440	240	240	341	3	3	2 820	5 730	**62FC44240**		1-2	324	426	409	2.5	2.5	113
320	440	230	230	351	3	3	2 530	5 490	**64FC44230/240**		1-2	334	426	411	2.5	2.5	103
	450	240	240	358	3	3	2 700	5 740	**4CR320**		1-2	334	436	422	2.5	2.5	119
	450	240	240	355	3	3	2 700	5 730	**64FC45240**		1-2	334	436	419	2.5	2.5	117
	450	240	240	358	3	3	2 770	5 930	**64FC45240CW**		1-4	334	436	422	2.5	2.5	118
	460	340	340	360	3	3	3 860	8 730	**64FC46340A**		1-4	334	446	428	2.5	2.5	187

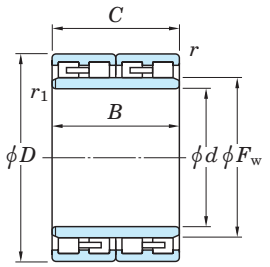


[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

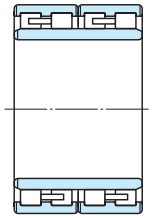
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

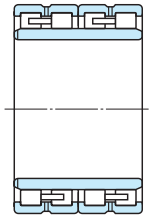
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.

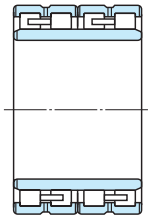
d (320) ~ 370 mm

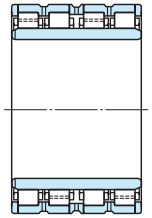


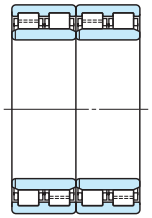
Design 1-1

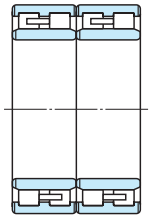

Design 1-2

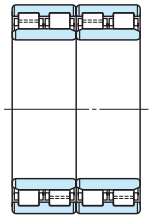

Design 1-3

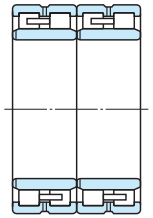

Design 1-4

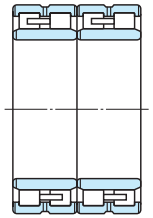

Design 1-6P

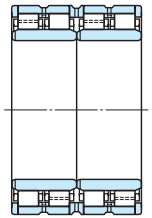

Design 2-1P

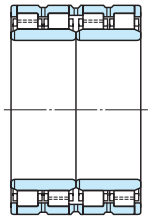

Design 2-2

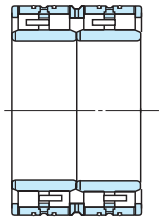

Design 2-2P

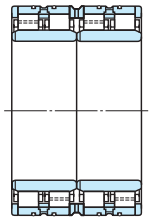

Design 2-3

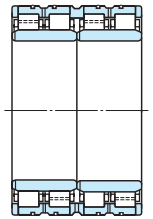

Design 2-4


Design 2-5P

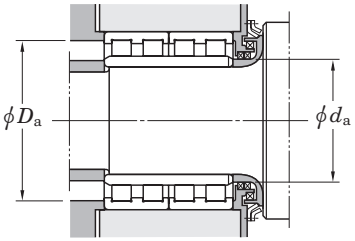

Design 2-6P


Design 3-1


Design 3-1P


Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass
d	D	B	C	F_w	r min.	r_1[3] min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	(kg)
320	480	290	290	361	4	4	4 080	8 450	**64FC48290**		2-6P	338	462	441	3	3	189
	480	350	350	364	2.1	2.1	5 010	11 000	**314274A**		2-6P	332	468	444	2	2	227
330	440	200	200	358	3	3	2 340	5 220	**66FC44200AW**		1-3	344	426	414	2.5	2.5	83.4
	440	200	200	360	3	5	2 050	4 670	**66FC44200W**		1-3	352	426	412	2.5	4	83.0
	460	340	340	364	2.1	2.1	3 860	9 150	**66FC46340**		1-2	342	448	428	2	2	172
	460	340	340	368	4	4	4 060	9 800	**66FC46340B**		1-2	348	442	432	3	3	176
	460	380	380	364	2.1	2.1	4 380	10 800	**66FC46380W**		1-4	342	448	428	2	2	195
340	445	250	250	367	2.1	4	2 510	6 110	**68FC45250W**		1-3	358	433	419	2	3	100
	450	250	250	368	2.1	2.1	2 750	6 480	**68FC45250BW**		1-3	352	438	424	2	2	106
	480	350	350	378	4	SP	4 580	11 100	**68FC48350-2**		2-4	354	462	446	3	2	211
	480	350	350	378	3	SP	4 780	11 500	**68FC48350D**		3-2P	354	466	448	2.5	2	201
	480	350	350	376	4	4	4 840	11 400	**68FC48350L**		3-2P	358	462	448	3	3	201
	480	385	350	378	2.1	SP	4 780	11 500	**68FC48350N**		2-6P	358	468	448	2	3	209
	490	300	300	380	5	5	3 500	7 690	**68FC49300**		1-2	362	468	450	4	4	187
	490	300	300	379	5	5	3 680	7 850	**68FC49300A**		1-2	362	468	453	4	4	182
343.052	457.098	254	254	374	3	3	2 640	6 190	**69FC46254W**		1-4	358	443	430	2.5	2.5	112
350	500	460	460	388	2	2	6 570	16 500	**70FC50460**		2-6P	360	490	464	2	2	296
360	480	290	290	392	3	3	3 470	8 510	**72FC48290**		1-2	374	466	452	2.5	2.5	145
	500	250	250	394	3	3	3 510	7 340	**72FC50250**		2-2	374	486	470	2.5	2.5	145
	510	370	370	400	4	4	4 590	11 000	**72FC51370**		1-2	378	492	470	3	3	241
	520	380	380	405	2	5	5 800	13 700	**72FC52380**		2-6P	382	510	485	2	4	270
370	520	380	380	409	5	5	5 320	13 200	**74FC52380**		2-6P	392	498	481	4	4	257
	520	400	400	413	5	5	4 740	11 900	**74FC52400W**		2-4	392	498	481	4	4	268
	540	400	400	415	4	4	5 190	11 500	**74FC54400A**		1-2	388	522	499	3	3	311



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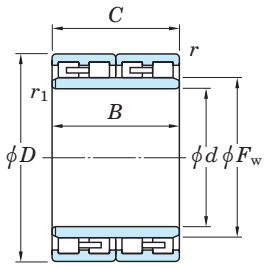
without P..... machined cages

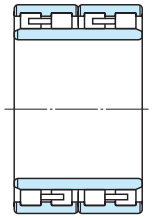
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.
3) SP indicates the specially chamfered form.

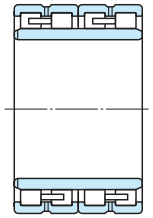
d 375 ~ (420) mm



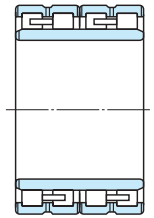
Design 1-1



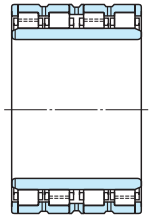
Design 1-2



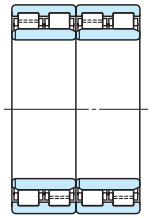
Design 1-3



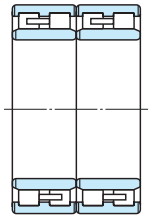
Design 1-4



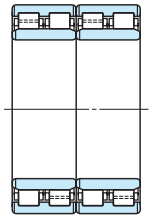
Design 1-6P



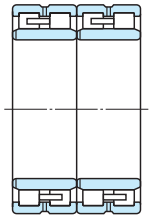
Design 2-1P



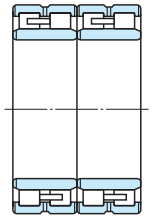
Design 2-2



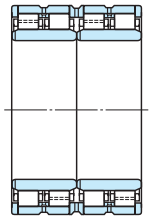
Design 2-2P



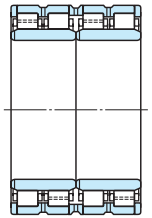
Design 2-3



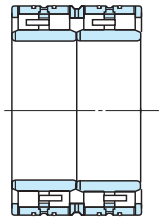
Design 2-4



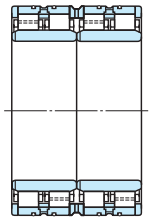
Design 2-5P



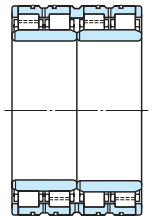
Design 2-6P



Design 3-1



Design 3-1P



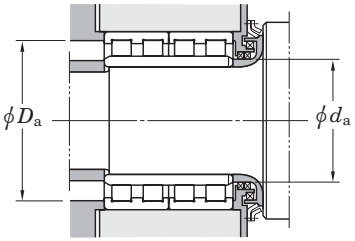
Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1[3] min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
375	545	400	400	417	4	4	6 310	14 500	**75FC55400**		3-2P	393	527	505	3	3	315
380	520	280	280	417	4	4	3 720	8 550	**76FC52280**		1-2	398	502	487	3	3	173
	520	290	290	418	4	4	3 760	8 840	**76FC52290**		1-2	398	502	486	3	3	181
	540	300	300	421	3	3	4 650	10 100	**76FC54300**		2-6P	394	526	505	2.5	2.5	222
	540	340	340	422	4	4	4 600	10 300	**76FC54340W**		3-1	398	522	502	3	3	256
	540	360	360	422	4	4	5 480	12 900	**76FC54360**		2-6P	398	522	502	3	3	266
	540	400	380	422	4	4	6 010	14 300	**76FC54380**		2-6P	398	522	504	3	3	287
	540	400	400	422	4	4	6 040	14 600	**76FC54400BW**		2-6P	398	522	502	3	3	298
	540	400	400	422	4	4	6 040	14 600	**76FC54400DW**		3-2P	398	522	502	3	3	298
390	550	400	400	434	5	SP	5 130	12 400	**78FC55400AW**		2-3	410	528	510	4	4	296
400	520	250	250	432	4	4	2 920	7 100	**80FC52250W**		1-3	418	502	492	3	3	133
	560	360	360	441	5	5	5 570	13 400	**80FC56360**		2-6P	422	538	521	4	4	277
	560	410	410	445	5	5	6 330	15 800	**4CR400**		3-2P	422	538	525	4	4	310
	560	410	410	445	2	5	6 470	16 300	**80FC56410**		2-6P	422	550	525	2	4	315
	600	380	380	450	5	5	6 610	14 300	**80FC60380**		2-6P	422	578	552	4	4	388
406.4	609.6	304.8	304.8	460	5	5	4 380	8 750	**81FC6130W**		1-4	429	587	556	4	4	307
410	546	400	400	448	5	5	5 010	13 000	**82FC55400**		2-2	432	524	516	4	4	256
	600	440	440	460	5	5	8 070	18 800	**82FC60440**		2-6P	432	578	560	4	4	432
418.5	600	410	410	470	5	5	6 630	15 700	**84FC60410A**		2-6P	441	578	560	4	4	385
419	592	350	350	462	4	4	5 690	12 900	**84FC59350**		1-6P	437	574	552	3	3	304
420	560	280	280	457	4	4	3 930	9 410	**84FC56280**		1-1	438	542	527	3	3	189
	560	400	400	458	4	4	4 870	12 700	**84FC56400**		2-4	438	542	526	3	3	270

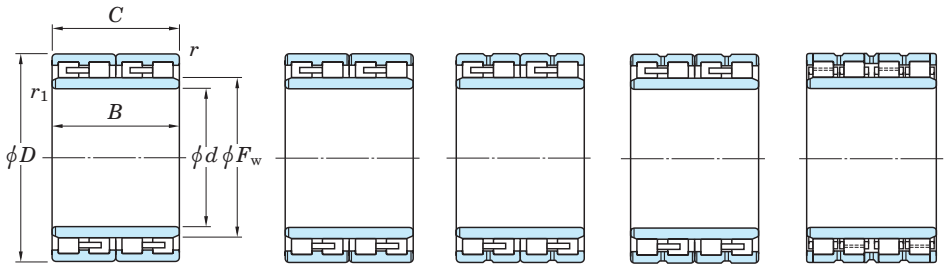
[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

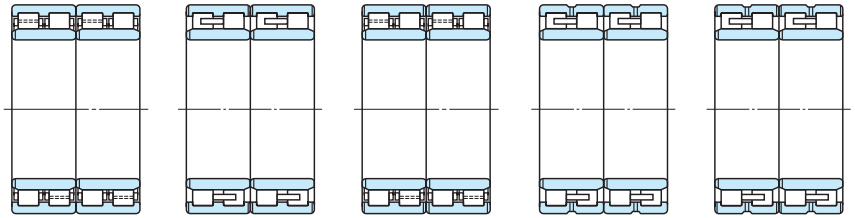
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.
3) SP indicates the specially chamfered form.



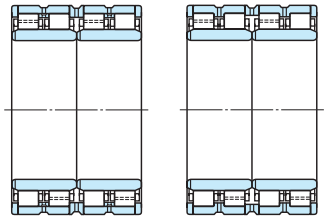
d (420) ~ (480) mm



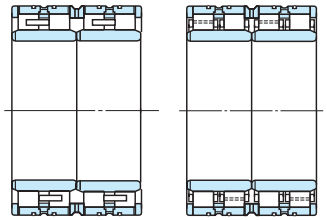
Design 1-1 | Design 1-2 | Design 1-3 | Design 1-4 | Design 1-6P



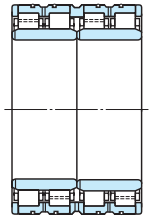
Design 2-1P | Design 2-2 | Design 2-2P | Design 2-3 | Design 2-4



Design 2-5P | Design 2-6P

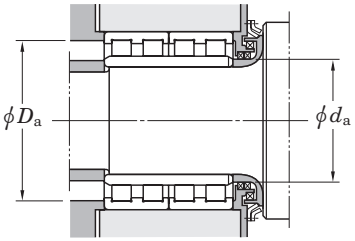


Design 3-1 | Design 3-1P



Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1[3] min.	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a[2] max.	r_b[2] max.	
420	580	320	320	463	4	4	4 760	11 000	**84FC58320**		2-4	438	562	543	3	3	249
	600	440	440	470	5	5	7 240	17 700	**4CR420A**		3-1P	442	578	560	4	4	420
430	591	420	420	472	5	5	6 550	16 800	**86FC59420**		2-2P	452	569	552	4	4	345
	591	420	420	476	4	4	6 520	17 400	**86FC59420-2**		2-6P	448	573	552	3	3	349
	591	420	420	476	4	4	5 910	14 700	**86FC59420A-1**		1-3	448	573	552	3	3	340
	600	450	450	475	5	5	7 460	19 300	**86FC60450**		2-6P	452	578	559	4	4	405
440	590	270	270	482	4	4	3 620	8 460	**88FC59270W**		1-3	458	572	554	3	3	207
	620	450	450	487	4	4	7 900	20 000	**4CR440**		3-1P	458	602	577	3	3	440
	620	450	450	487	4	4	7 900	20 000	**88FC62450AW**		2-6P	458	602	577	3	3	440
	640	420	420	492	5	5	7 820	18 400	**88FC64420**		2-6P	462	618	592	4	4	470
	720	452	452	512	6	6	8 570	16 600	**88FC72452**		1-6P	468	692	652	5	5	740
444.5	660.4	323.85	323.85	500	4	4	6 040	12 600	**89FC66324**		1-6P	463	642	608	3	3	400
445	635	375	375	496	4	4	6 240	14 600	**4CR445**		3-1P	463	617	588	3	3	385
450	630	450	450	500	4	4	6 820	16 600	**90FC63450A**		2-2	468	612	590	3	3	433
460	600	400	400	497	4	SP	5 300	14 300	**92FC60400**		2-4	478	582	567	3	3	287
	620	400	400	504	4	4	6 850	18 200	**4CR460C**		3-1P	478	602	584	3	3	350
	620	400	400	502	4	4	6 510	17 000	**92FC62400BW**		1-6P	478	602	582	3	3	350
	620	400	400	502	4	4	5 900	14 800	**92FC62400D**		1-4	478	602	583	3	3	340
	650	470	470	509	6	6	8 990	22 200	**92FC65470W**		1-6P	488	622	609	5	5	494
	660	500	500	512	4	4	9 310	23 300	**4CR460**		3-1P	478	642	612	3	3	590
	660	500	500	510	5	5	9 540	23 400	**92FC66500**		2-6P	482	638	614	4	4	573
	680	400	400	504	4	4	7 910	16 600	**4CR460D**		3-1P	478	662	624	3	3	510
480	650	450	450	525	5	5	8 480	22 400	**96FC65450B**		2-6P	502	628	615	4	4	440

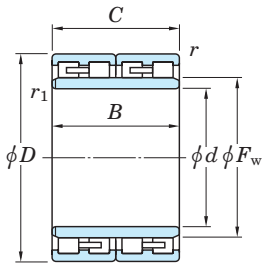


[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

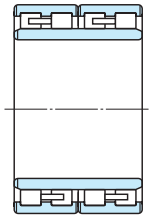
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

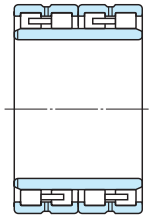
2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.
3) SP indicates the specially chamfered form.

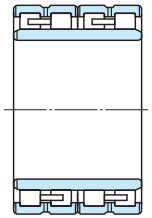
d (480) ~500 mm

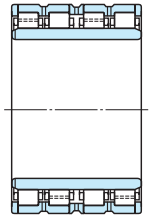


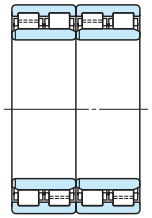
Design 1-1

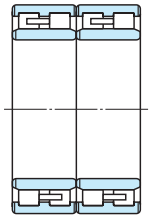

Design 1-2

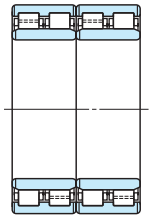

Design 1-3

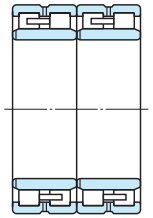

Design 1-4

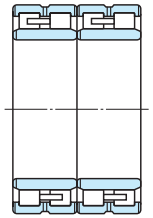

Design 1-6P

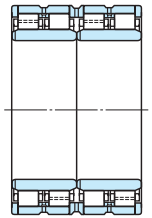

Design 2-1P

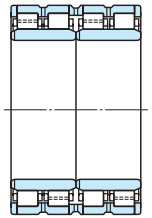

Design 2-2

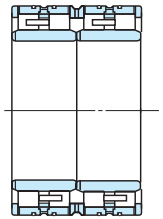

Design 2-2P

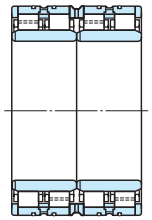

Design 2-3

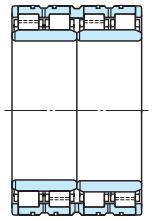

Design 2-4


Design 2-5P


Design 2-6P


Design 3-1


Design 3-1P

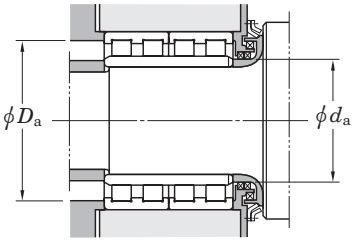

Design 3-2P

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.		Design[1]	Mounting dimensions (mm)					(Refer.) Mass (kg)
d	D	B	C	F_w	r min.[3]	r_1 min.[3]	C_r	C_{0r}				d_a min.	D_a max.	D_a min.	r_a max.[2]	r_b max.[2]	
480	650	460	460	526	5	5	7 730	20 800	**96FC65460**		2-6P	502	628	610	4	4	443
	680	460	460	532	5	5	8 620	21 300	**96FC68460**		2-6P	502	658	632	4	4	545
	680	500	500	534	5	5	8 620	22 000	**4CR480**		3-1P	502	658	630	4	4	580
	680	500	500	534	5	5	8 620	22 000	**4CR480B**		3-2P	502	658	630	4	4	580
	680	500	500	532	5	5	9 550	24 300	**96FC68500A**		2-6P	502	658	632	4	4	595
495	615	360	360	530	SP	SP	4 030	12 000	**99FC62360**		2-4	511	597	586	3	3	235
500	670	450	450	540	5	SP	8 460	22 500	**100FC67450A-3**		2-6P	522	648	630	4	4	451
	680	420	405	550	5	5	6 710	17 600	**100FC68405**		2-6P	522	658	634	4	4	442
	680	450	450	542.5	4	4	8 980	23 100	**100FC68450**		2-6P	518	662	639	3	3	495
	690	510	510	550	5	5	9 350	24 600	**100FC69510A**		3-2P	522	668	646	4	4	562
	710	480	480	558	6	6	9 770	24 800	**100FC71480**		2-6P	528	682	662	5	5	631
	720	400	400	558	5	6	8 320	18 900	**100FC72400**		1-6P	528	698	672	4	5	549
	720	530	530	560	6	6	10 800	26 500	**100FC72530**		2-6P	528	692	674	5	5	725
	720	530	530	568	5	4	11 000	28 900	**100FC72530C**		2-6P	518	698	672	4	3	742
	720	530	530	560	6	6	10 800	26 500	**100FC72530W**		3-2P	528	692	674	5	5	725

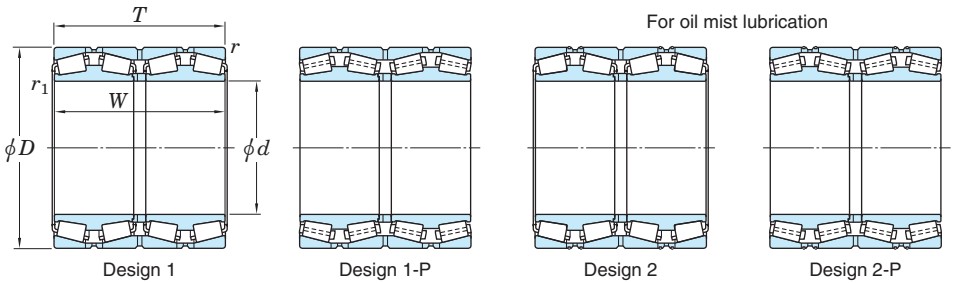
[Notes] 1) Design numbers indicate the following meanings
with P ..... pin type cages
without P ..... machined cages

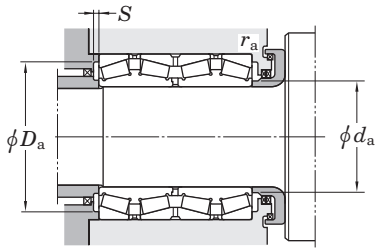
	Outer ring with rib	Outer ring with loose rib
One inner ring	1-1, 1-2, 1-3, 1-4	1-6P
Two inner rings	2-1P, 2-2, 2-2P, 2-3, 2-4	2-5P, 2-6P
Extended inner ring		3-1, 3-1P, 3-2P

2) r_a indicates housing chamfer dimension corresponding to outer ring chamfer dimension r. r_b indicates the shaft chamfer dimension corresponding to inner ring chamfer dimension r_1.
3) SP indicates the specially chamfered form.



d 65 ~ 133.350 mm



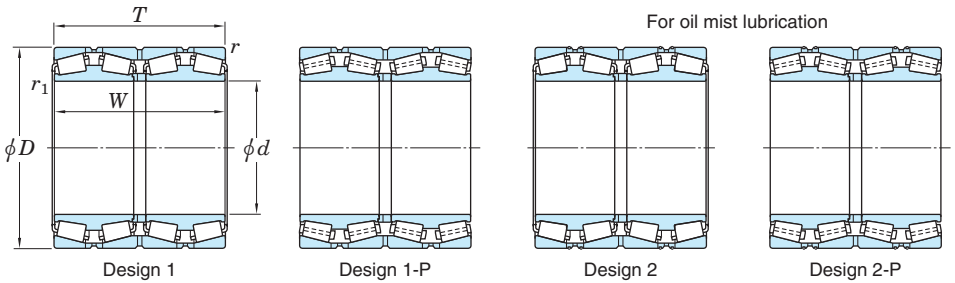


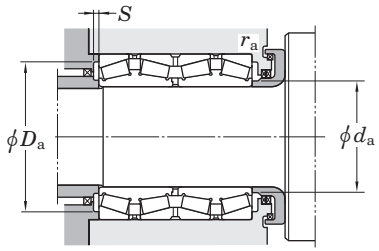
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
65	100	98	98	1.5	0.3	309	550	**47T131010**		1	73	91.5	87	3.6	1.5	0.3	0.46	1.47	2.19	1.44	2.82
80	115	88	88	1.5	1.5	265	543	**47T1611**		1	91	106.5	102	3.4	1.5	1.5	0.33	2.03	3.02	1.98	2.99
95	130	100	100	1.5	1.5	347	729	**47T191310**		1	104	121.5	117	3.5	1.5	1.5	0.33	2.03	3.02	1.98	3.83
100	140	104	104	2	2.5	338	661	**37220**		1	112	130	125	3.8	2	2	0.28	2.37	3.53	2.32	4.6
	140	104	104	2	1	407	852	**37220A**		1	110	130	125	4.1	2	1	0.40	1.68	2.50	1.64	4.8
	170	155	155	2	2.5	787	1 470	**47T2017**		1	119	160	149	5.7	2	2	0.35	1.95	2.90	1.91	14.7
105	160	150	150	1.5	1	747	1 420	**47T211615**		1	118	151.5	146	5.9	1.5	1	0.33	2.03	3.02	1.98	10.6
110	155	114	114	2	2.5	475	955	**37222**		1	121	145	140	4.8	2	2	0.33	2.03	3.02	1.98	6.45
	160	115	115	1.5	1	548	1 030	**47T221612**		1	121	151.5	146	5.2	1.5	1	0.43	1.57	2.34	1.53	7.63
	180	154	154	2	2.5	882	1 530	**47T221815**		1	127	170	162	5.9	2	2	0.39	1.74	2.59	1.70	15.4
	180	170	170	1	1	989	1 770	**47T221817**		1	126	174.5	162	6.5	1	1	0.33	2.03	3.02	1.98	17
115	155	115	115	1.5	0.6	437	1 020	**47T231612A**		1	126	146.5	142	3.4	1.5	0.6	0.40	1.68	2.50	1.64	6.12
	160	120	120	1.5	0.6	560	1 160	**47T231612**		1	124	151.5	147	5.7	1.5	0.6	0.35	1.95	2.90	1.91	7.2
120	170	124	124	2	2.5	472	943	**37224**		1	135	160	155	4.1	2	2	0.28	2.37	3.53	2.32	8.56
	170	130	130	1.5	2	591	1 290	**47T241713**		1	133	161.5	155	4.4	1.5	2	0.40	1.68	2.50	1.64	9.38
	200	132	132	2	2.5	706	1 200	**47324**		1	143	190	178	5.7	2	2	0.35	1.95	2.90	1.91	16.5
	210	174	174	2.5	3	1 110	1 770	**47T242117**		1	143	198	188	4	2	2.5	0.33	2.03	3.02	1.98	24.5
120.650	161.925	106.365	106.365	1.6	1.6	322	771	**L624549D/514/514D**		1	130	153	147	5.1	1.6	1.6	0.43	1.56	2.32	1.52	6.24
	166.688	152.414	152.400	3.3	1.6	637	1 460	**LM124449D/410/410D**		1	132	155	150	2.3	3.3	1.6	0.29	2.30	3.42	2.25	9.84
	174.625	139.703	141.288	1.6	0.8	712	1 450	**M224749D/710/710D**		1	133	166	159	4.9	1.6	0.8	0.33	2.03	3.02	1.98	11.1
127.000	182.563	158.750	158.750	3.2	1.6	778	1 720	**48290D/20/20D**		1	140	171	166	3.7	3.2	1.6	0.31	2.21	3.29	2.16	13.6
130	184	134	134	2	2.5	645	1 330	**37226**		1	143	174	169	4.3	2	2	0.33	2.03	3.02	1.98	11
133.350	196.850	193.675	193.675	3.2	1.6	1 070	2 240	**67390D/22/22D**		1	148	185	180	5.6	3.2	1.6	0.34	1.96	2.92	1.92	19.8

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 135 ~ 170 mm



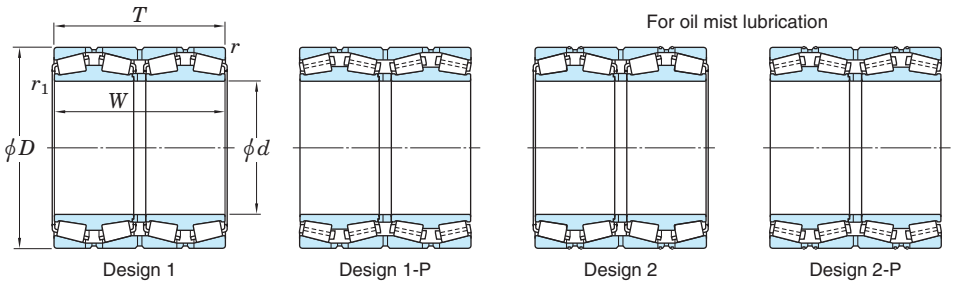


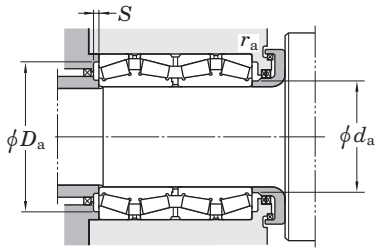
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
135	180	160	160	1.5	1	559	1 290	**47T271816**		1	146	171.5	166	1.4	1.5	1	0.33	2.03	3.02	1.98	10.7
	195	160	160	1.5	0.6	938	1 930	**47T272016**		1	147	186.5	179	3.9	1.5	0.6	0.33	2.03	3.02	1.98	15.4
136.525	190.500	161.925	161.925	3.2	1.6	809	1 890	**47T271916**		2	150	179	174	4.8	3.2	1.6	0.32	2.10	3.13	2.06	14.3
	190.500	161.925	161.925	3.2	1.6	809	1 890	**48393D/20/20D**		1	150	179	174	4.8	3.2	1.6	0.32	2.10	3.13	2.06	14.3
139.700	200.025	160.340	157.166	3.3	0.8	844	1 960	**48680D/20/20D**		1	157	187	182	4	3.3	0.8	0.34	2.01	2.99	1.96	16.6
140	198	144	144	2	2.5	770	1 650	**37228**		1	157	188	183	5.3	2	2	0.28	2.43	3.61	2.37	13.6
	210	114	114	2	2.5	623	1 130	**47228**		1	160	200	190	6	2	2	0.27	2.47	3.67	2.41	13.7
	225	145	145	2.5	3	973	1 610	**47328**		1	161	213	203	6.5	2	2.5	0.40	1.68	2.50	1.64	21.2
145	195	130	130	1.5	0.6	641	1 550	**47T292013**		1	158	186.5	177	5.1	1.5	0.6	0.40	1.68	2.50	1.64	11.1
150	210	190	190	2	0.6	993	2 270	**47T302119**		1	163	200	190	5	2	0.6	0.39	1.74	2.59	1.70	20.2
	212	155	155	2.5	3	774	1 640	**37230**		1	168	200	190	6	2	2.5	0.28	2.37	3.53	2.32	16.7
152.400	222.250	174.625	174.625	1.6	1.6	1 080	2 390	**M231649D/610/610D**		1	168	213	201	6	1.6	1.6	0.33	2.03	3.02	1.98	22.8
160	226	165	165	2.5	3	873	1 870	**37232**		1	178	214	204	6	2	2.5	0.28	2.37	3.53	2.32	20.1
	250	145	145	2.5	3	1 090	1 870	**47T322515**		1	182	238	226	6.5	2	2.5	0.33	2.03	3.02	1.98	25.4
	265	173	173	2.5	1	1 320	2 400	**47T322717**		1	193	253	241	7	2	1	0.35	1.95	2.90	1.91	37.6
165.100	225.425	168.275	165.100	3.2	0.8	868	2 140	**46791D/20/21D**		1	180	213	203	4.5	3.2	0.8	0.38	1.77	2.63	1.73	19.7
168.275	247.650	192.088	192.088	3.2	1.6	1 190	2 800	**67782D/20/21D**		1	189	236	226	5	3.2	1.6	0.44	1.54	2.29	1.50	31.7
170	230	175	175	2	1	1 030	2 370	**47T342318**		1	183	220	210	6	2	1	0.40	1.68	2.50	1.64	19.9
	240	175	175	2.5	3	1 020	2 310	**37234A**		1	189	228	218	5	2	2.5	0.33	2.03	3.02	1.98	24.2
	240	175	175	2.5	1.5	1 120	2 340	**47T342418A**		2	184	228	218	7.5	2	1.5	0.40	1.68	2.50	1.64	24.7
	260	160	160	2.5	3	1 110	1 900	**47T342616**		1	194	248	238	6	2	2.5	0.35	1.95	2.90	1.91	28.5
	280	181	181	2.5	3	1 330	2 420	**47334/181**		1	202	268	250	6	2	2.5	0.33	2.03	3.02	1.98	44
	280	185	185	2.5	3	1 330	2 420	**47334**		1	202	268	250	6	2	2.5	0.33	2.03	3.02	1.98	44.8

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 177.800 ~ 205 mm



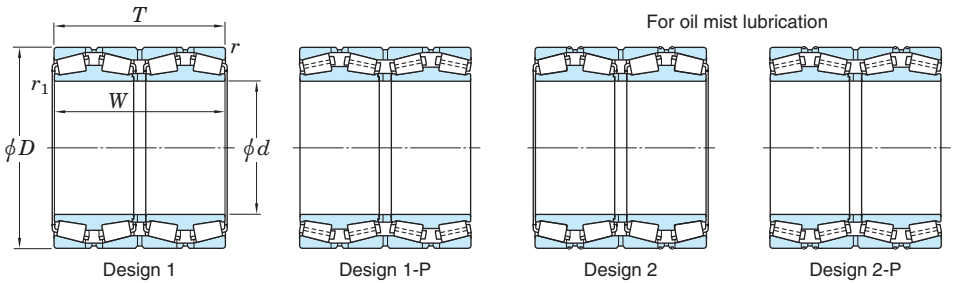


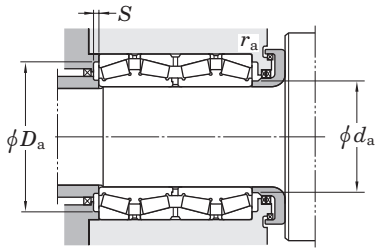
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
177.800	247.650	192.088	192.088	3.2	1.6	1 190	2 800	**67791D/20/21D**		1	189	235	225	5	3.2	1.6	0.44	1.54	2.29	1.50	28.4
	279.400	234.948	234.950	3.2	1.6	1 660	3 290	**82681D/20/20D**		1	197	267	251	6.5	3.2	1.6	0.52	1.29	1.92	1.26	52.5
	285.750	222.245	222.500	3.2	1.6	1 520	2 860	**EE91700D/112/113XD**		1	201	273	251	3.5	3.2	1.6	0.43	1.57	2.34	1.53	53.7
180	250	185	185	2.5	3	1 140	2 550	**47T362519**		1	198	238	228	6	2	2.5	0.33	2.03	3.02	1.98	26.9
	254	185	185	2.5	3	1 140	2 550	**37236**		1	198	242	232	6	2	2.5	0.33	2.03	3.02	1.98	29.1
	260	160	160	2.5	1	1 090	2 090	**47T362616**		1	198	248	238	5	2	1	0.37	1.80	2.69	1.76	26.4
	260	200	200	2	2.5	1 390	2 950	**47T362620**		1	200	250	240	4.5	2	2	0.31	2.15	3.20	2.10	33.6
	280	181	181	2.5	3	1 510	2 830	**47T362818A**		1	204	268	253	8	2	2.5	0.33	2.03	3.02	1.98	40.8
	300	202	202	3	4	1 580	2 750	**47336**		1	211	286	267	5.5	2.5	3	0.35	1.95	2.90	1.91	54.9
	300	280	280	3	4	2 400	4 430	**47T363028**		1	211	286	270	6	2.5	3	0.33	2.03	3.02	1.98	78.4
187	270	210	210	2.5	1	1 660	3 570	**47T372721B**		1	205	258	248	8	2	1	0.33	2.03	3.02	1.98	39.1
187.325	269.875	211.138	211.138	3.2	1.6	1 410	3 220	**M238849D/810/810D**		1	206	257	245	5	3.2	1.6	0.33	2.03	3.02	1.98	39.5
190	268	196	196	2.5	3	1 210	2 760	**37238**		1	210	256	246	6	2	2.5	0.33	2.03	3.02	1.98	33.4
	270	160	160	2.5	1	1 170	2 370	**47T382716**		1	208	258	248	7	2	1	0.40	1.68	2.50	1.64	28.3
190.000	270.000	190.000	190.000	3.2	1.6	1 160	2 810	**4TR3827**		1	208	257	244	6	3.2	1.6	0.48	1.42	2.11	1.38	34.7
190.500	266.700	188.913	187.325	3.2	1.6	1 160	2 810	**67885D/67820/67820D**		1	208.5	255.3	245.1	6	3.2	1.6	0.48	1.42	2.11	1.38	32.4
198.438	284.163	225.425	225.425	3.2	1.6	1 740	3 780	**M240648D/611/611D**		1	215	271	260	5	3.2	1.6	0.33	2.03	3.02	1.98	44.7
200	280	206	206	2.5	1.5	1 670	3 830	**47T402821**		1	216	268	258	6.5	2	1.5	0.39	1.71	2.54	1.67	39.7
	282	206	206	2.5	3	1 490	3 380	**37240**		1	223	270	260	5.5	2	2.5	0.28	2.43	3.61	2.37	39.6
	340	234	234	3	4	2 340	4 150	**47T403423**		1	234	326	302	6	2.5	4	0.40	1.68	2.50	1.64	86
203.200	317.500	209.550	215.900	3.2	3.2	1 510	2 900	**EE132082D/125/126D**		1	235	304	284	7	3.2	3.2	0.31	2.15	3.21	2.11	61
	317.500	266.700	266.700	3.2	1.6	2 070	4 540	**93800D/125/127D**		1	223	304	278	6.5	3.2	1.6	0.52	1.29	1.92	1.26	78.8
205	320	205	205	3	4	1 740	3 030	**47T413221**		1	230	306	292	7.5	2.5	3	0.46	1.46	2.17	1.42	58.9

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 206.375 ~ 235 mm



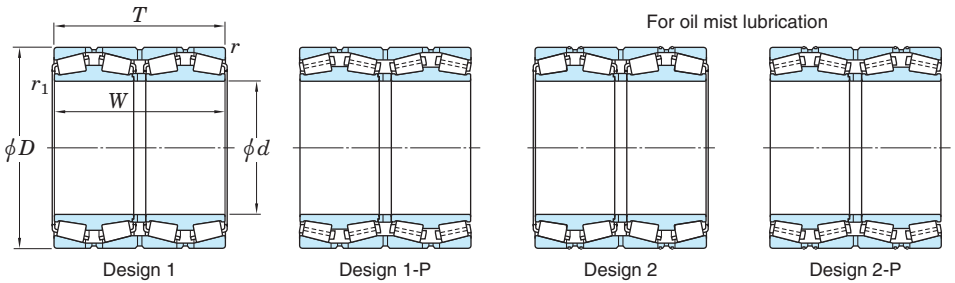


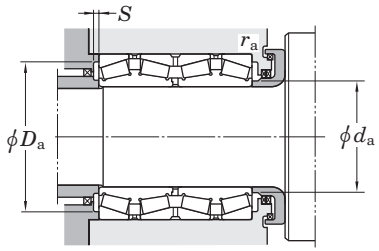
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
206.375	282.575	184.150	184.150	3.2	0.8	1 200	2 830	**67985D/20/20D**		1	219	270	259	7	3.2	0.8	0.51	1.33	1.97	1.30	33.9
	282.575	190.500	190.500	3.2	0.8	1 200	2 830	**67986D/20/21D**		1	222	270	259	7	3.2	0.8	0.51	1.33	1.97	1.30	34.8
	282.575	210.000	210.000	3.2	0.8	1 380	3 010	**47T412821A**		1	219	270	260	3.5	3.2	0.8	0.43	1.57	2.34	1.53	36.2
215.090	311.150	228.600	228.600	3.2	1.6	1 750	4 040	**47T433123**		1	233	297	278	7	3.2	1.6	0.40	1.68	2.50	1.64	57.5
215.900	288.925	177.800	177.800	3.2	0.8	1 220	3 120	**LM742749D/714/714D**		1	229	276	265	5.5	3.2	0.8	0.48	1.40	2.09	1.37	32.8
	336.550	266.700	266.700	3.2	6.4	2 430	4 760	**47T433427**		1	238	323	304	6.5	3.2	6.4	0.50	1.34	2.00	1.32	85.1
216.103	330.200	269.875	263.525	3.2	1.6	2 500	5 120	**47T433327**		1	237	316	300	7	3.2	1.6	0.46	1.47	2.19	1.44	81.6
220	300	230	230	2.5	3	1 750	4 040	**47T443023**		1	231	288	278	6.5	2	2.5	0.40	1.68	2.50	1.64	45.1
	310	226	226	3	4	1 690	3 880	**37244**		1	242	296	285	6	2.5	3	0.33	2.03	3.02	1.98	52
	320	201	201	3	3	1 660	3 760	**47T443220**		1	247	306	290	5.5	2.5	2.5	0.33	2.03	3.02	1.98	52.4
	320	250	250	2.5	3	1 930	4 230	**47T443225**		1	244	308	293	6.5	2	2.5	0.35	1.95	2.90	1.91	64.7
	330	260	260	3	1	2 350	5 070	**47T443326A**		1	243	316	299	9	2.5	1	0.40	1.68	2.50	1.64	78.4
	330	260	260	3	1	2 330	4 860	**47T443326B**		2	238	316	300	8	2.5	1	0.55	1.24	1.84	1.21	77.5
	340	190	190	3	4	1 490	2 910	**47244**		1	260	326	308	6	2.5	3	0.28	2.43	3.61	2.37	62.2
	340	280	280	3	1	2 720	5 580	**47T443428-1**		1	247	326	308	10	2.5	1	0.33	2.03	3.02	1.98	95.1
	340	305	305	3	4	2 910	5 940	**47T443431**		1	244	326	307	8	2.5	3	0.35	1.95	2.90	1.91	99.6
220.662	314.325	290.000	290.000	3.2	1.6	2 300	5 050	**47T443129A**		1	240	300	289	4.5	3.2	1.6	0.33	2.03	3.02	1.98	70
220.663	314.325	239.713	239.713	3.2	1.6	2 100	4 890	**M244249D/210/210D**		1	241	300	288	5	3.2	1.6	0.33	2.03	3.02	1.98	59
225	320	230	230	2	2.5	1 670	3 730	**4TR225A**		1	246	310	293	5	2	2	0.37	1.80	2.69	1.76	57
228.600	311.150	200.025	200.025	3.2	1.6	1 660	3 760	**LM245149D/110/110D**		1	247	297	287	5.5	3.2	1.6	0.33	2.03	3.02	1.98	41.8
230	315	190	190	2	2.5	1 510	3 470	**47T463119**		1	248	305	290	7.5	2	2	0.37	1.80	2.69	1.76	43
234.950	327.025	196.850	196.850	3.2	1.6	1 600	3 720	**8576D/20/20D**		1	255	313	299	5.5	3.2	1.6	0.41	1.66	2.47	1.62	50.1
235	325	240	240	2.5	1.5	2 200	5 310	**47T473324**		1	254	313	301	8.5	2	1.5	0.33	2.03	3.02	1.98	60.5

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 240 ~ (260) mm

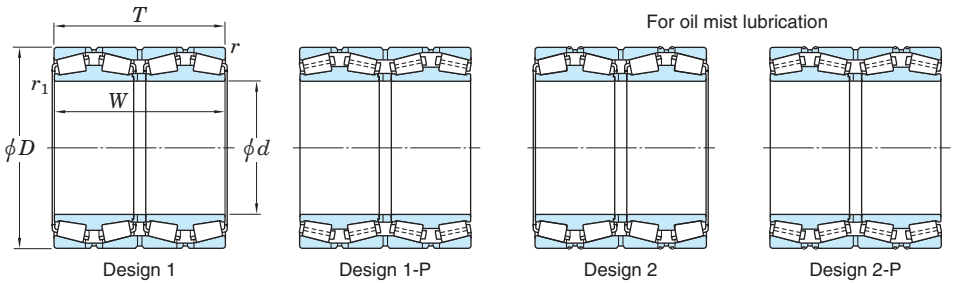


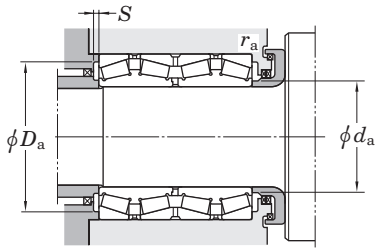


Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [2]	Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 [1] min.	C_r	C_{0r}			d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [3] max.	e	Y_2	Y_3	Y_0	(kg)
240	320	250	250	2	1	1 880	4 760	**47T483225B**	1	257	310	299	7.5	2	1	0.33	2.03	3.02	1.98	54.2
	338	248	248	3	4	2 360	5 360	**37248**	1	259	324	312	8.5	2.5	3	0.39	1.74	2.59	1.70	68.4
	338	248	248	3	4	2 360	5 360	**37248/DP1**	2	259	324	312	8.5	2.5	3	0.39	1.74	2.59	1.70	68.4
	360	194	194	3	4	1 830	3 580	**47248**	1	272	346	327	8.5	2.5	3	0.32	2.12	3.15	2.07	66.5
	360	214	214	3	2.5	2 170	4 340	**47T483621**	1	268	346	328	9	2.5	2.5	0.40	1.68	2.50	1.64	75.4
	360	308.5	308.5	3	2.5	3 320	7 400	**47T483631A**	1	268	346	329	9.5	2.5	2.5	0.26	2.55	3.80	2.50	112
	365	290	290	2	SP	2 870	5 930	**47T483729**	1	265	355	333	9	2	0.8	0.46	1.47	2.19	1.44	108
	410	270	270	4	2.5	3 220	5 520	**47T484127A**	1	281	392	369	8.5	3	2	0.40	1.68	2.50	1.64	144
241.478	349.148	228.600	228.600	3.2	1.6	2 190	4 920	**47T483523A**	1	267	335	319	8.5	3.2	1.6	0.35	1.91	2.84	1.86	72.9
	349.148	228.600	228.600	3.2	1.6	1 900	4 100	**EE127097D/135/136D**	1	267	335	319	5.5	3.2	1.6	0.35	1.91	2.84	1.86	70.4
244.475	327.025	193.675	193.675	3.2	1.6	1 470	3 500	**47T493319**	1	259	313	303	5.5	3.2	1.6	0.55	1.24	1.84	1.21	44.4
	327.025	193.675	193.675	3.2	1.6	1 570	3 780	**LM247748D/710/710D**	1	265	313	305	7.5	3.2	1.6	0.32	2.10	3.13	2.06	44.4
	381.000	304.800	304.800	4.8	3.2	2 700	5 870	**EE126096D/150/151D**	1	269	364	336	6	4.8	3.2	0.52	1.31	1.95	1.28	129
247.650	400.050	253.995	249.235	6.4	1.6	2 600	5 140	**EE220975D/1575/1576D**	1	292	379	359	7.5	6.4	1.6	0.39	1.71	2.54	1.67	123
250	350	240	240	2.5	1	2 180	4 970	**47T503524**	1	270	338	324	6	2	1	0.40	1.68	2.50	1.64	70
	365	270	270	3	1.5	2 650	6 340	**47T503627**	1	277	351	330	8	2.5	1.5	0.33	2.03	3.02	1.98	96.7
254.000	358.775	147.000	147.000	3.2	1.6	1 320	2 910	**47T513615**	1	290	345	331	7	3.2	1.6	0.33	2.03	3.02	1.98	46.9
	358.775	269.875	269.875	3.2	1.6	2 650	6 340	**47T513627A**	2	277	345	330	8	3.2	1.6	0.33	2.03	3.02	1.98	85.8
	358.775	269.875	269.875	3.2	1.6	2 630	6 030	**47T513627B**	1	272	345	331	7.5	3.2	1.6	0.46	1.47	2.19	1.44	85.5
	358.775	269.875	269.875	3.2	1.6	2 630	6 030	**47T513627C**	2	272	345	331	7.5	3.2	1.6	0.46	1.47	2.19	1.44	86.1
	358.775	269.875	269.875	3.2	3.2	2 650	6 340	**M249748D/710/710D**	1	277	345	330	8	3.2	3.2	0.33	2.03	3.02	1.98	86
260	360	272	272	3	1	2 910	7 020	**47T523627A**	1	280	346	335	9	2.5	1	0.33	2.03	3.02	1.98	83.6
	368	268	268	4	5	2 510	6 020	**37252**	1	286	350	338	6	3	4	0.33	2.03	3.02	1.98	88.4
	400	220	220	4	1.5	2 390	4 520	**47T524022**	1	295	382	364	7.5	3	1.5	0.40	1.68	2.50	1.64	98.5
	400	255	255	7.5	5	2 620	5 400	**47T524026**	1	296	400	360	9	6	4	0.39	1.72	2.56	1.68	113
	400	320	320	4	5	3 270	7 070	**47T524032**	1	294	382	361	8.5	3	4	0.33	2.03	3.02	1.98	145

[Notes] 1) SP indicates the specially chamfered form.
2) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.
3) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d (260) ~ 288.925 mm



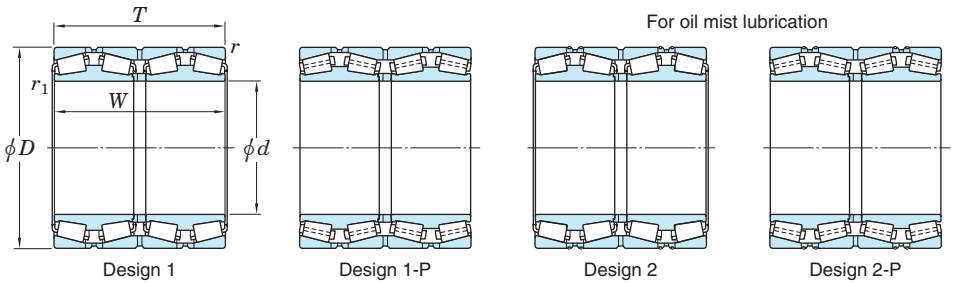


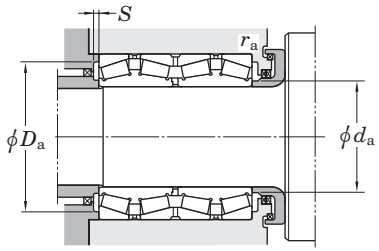
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
260	440	300	300	4	5	3 470	6 880	**47352**		1	311	422	392	10	3	4	0.35	1.95	2.90	1.91	188
260.350	422.275	317.500	314.325	3.2	6.4	3 470	6 720	**HM252348D/310/310D**		1	304	407	384	1	3.2	6.4	0.33	2.03	3.02	1.98	167
266.700	335.600	228.600	230.188	3.2	1.6	1 850	5 260	**47T533423**		1	281	322	312	7	3.2	1.6	0.28	2.43	3.61	2.37	46.4
	355.600	228.600	230.188	3.2	1.6	2 230	5 690	**47T533623B**		1	285	342	332	8	3.2	1.6	0.36	1.87	2.79	1.83	62.7
	355.600	228.600	230.188	3.2	1.6	1 980	4 830	**76589D/20/20D**		1	285	342	331	7	3.2	1.6	0.37	1.83	2.73	1.79	59.8
	393.700	269.878	269.878	6.4	1.6	2 990	6 460	**47T533927-1**		1	294	373	361	8.5	6.4	1.6	0.40	1.68	2.50	1.64	112
269.875	381.000	282.575	282.575	3.2	3.2	2 930	6 690	**M252349D/310/310D**		1	291	367	350	6	3.2	3.2	0.33	2.03	3.02	1.98	98.4
270	364	260	260	3	1.5	2 370	5 720	**47T543626**		1	285	350	338	4.5	2.5	1.5	0.42	1.59	2.37	1.56	72.8
	410	222	222	4	5	2 250	4 380	**47254**		1	308	392	372	6.5	3	4	0.27	2.51	3.74	2.45	100
276.225	393.700	269.878	269.878	6.4	1.6	2 730	5 830	**47T553927**		1	299	373	363	4.5	6.4	1.6	0.40	1.68	2.50	1.64	101
279.400	393.700	269.875	269.875	6.4	1.6	2 660	5 990	**47T563927A**		2	305	373	363	9.5	6.4	1.6	0.40	1.68	2.50	1.64	101
	393.700	269.875	269.875	6.4	1.6	2 660	5 990	**47T563927B**		1	305	373	363	9.5	6.4	1.6	0.40	1.68	2.50	1.64	101
	410.000	310.000	310.000	6.4	1.6	3 120	7 290	**47T564131**		2	308	389	374	8	6.4	1.6	0.40	1.68	2.50	1.64	140
279.578	380.898	244.475	244.475	3.2	1.6	2 280	5 650	**LM654644D/610/610D**		1	303	367	356	6.5	3.2	1.6	0.43	1.57	2.34	1.53	80.4
280	380	290	290	2	2	2 810	6 940	**47T563829**		1	300	370	354	6	2	2	0.33	2.03	3.02	1.98	91.8
	380	290	290	2	1	2 810	6 940	**47T563829A**		2	300	370	354	6	2	1	0.33	2.03	3.02	1.98	92.1
	395	288	288	4	2	2 880	6 900	**37256X**		1	303	377	363	8	3	2	0.40	1.68	2.50	1.64	110
	395	288	288	4	2	2 880	6 900	**47T564029A**		2	303	377	363	8	3	2	0.40	1.68	2.50	1.64	110
	420	225	225	4	5	2 390	4 950	**47256**		1	322	402	382	8.5	3	4	0.25	2.69	4.00	2.63	104
	460	324	324	5	6	4 300	8 230	**47T564632**		1-P	321	438	415	10.5	4	5	0.46	1.47	2.19	1.44	214
280.268	379.887	244.475	244.475	3.2	1.6	2 280	5 650	**47T563824**		1	303	366	355	6.5	3.2	1.6	0.43	1.57	2.34	1.53	80
285.750	380.898	244.475	244.475	3.2	1.6	2 280	5 650	**LM654648D/610/610D**		1	303	367	356	6.5	3.2	1.6	0.43	1.57	2.34	1.53	75.6
288.925	406.400	298.450	298.450	3.2	3.2	3 450	8 840	**M255449D/410/410D**		1	316	392	373	9	3.2	3.2	0.34	2.00	2.97	1.95	127

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 292.100 ~ (320) mm

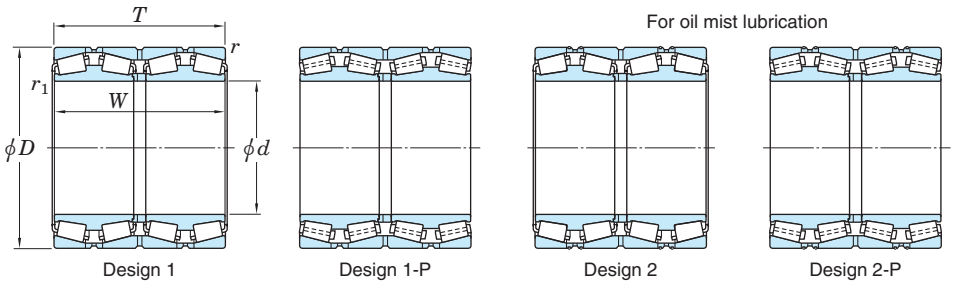


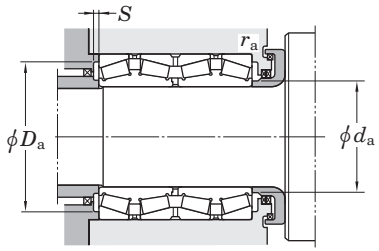


Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [2]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 [1] min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [3] max.	e	Y_2	Y_3	Y_0	(kg)
292.100	422.275	269.875	269.875	3.2	6.4	3 170	6 830	**EE330116D/166/167D**		1	321	407	387	7.5	3.2	6.4	0.32	2.11	3.14	2.06	124
300	420	310	310	3	1	3 390	8 050	**47T604231**		1	325	406	388	8.5	2.5	1	0.34	2.00	2.98	1.96	132
	424	310	310	4	5	3 000	6 570	**37260**		1	334	406	391	6	3	4	0.28	2.37	3.53	2.32	134
	430	300	300	3	4	3 320	7 630	**47T604330**		1	328	416	393	10	2.5	3	0.35	1.95	2.90	1.91	141
	430	310	310	3	2.5	3 520	8 420	**47T604331**		1	332	416	399	10	2.5	2	0.40	1.68	2.50	1.64	146
	460	248	248	4	1.5	3 060	6 300	**47T604625**		1	342	442	416	8.5	3	1.5	0.40	1.68	2.50	1.64	149
	460	360	360	4	5	4 300	9 550	**47T604636**		1	339	442	416	9	3	4	0.33	2.03	3.02	1.98	220
	470	270	270	4	5	3 500	6 440	**47T604727A**		1	338	452	426	8	3	4	0.40	1.68	2.50	1.64	165
	470	292	292	4	SP	3 980	7 870	**47T604729B**		1-P	341	452	428	8.5	3	2	0.40	1.68	2.50	1.64	193
	470	292	292	4	1.5	4 120	8 210	**47T604729C**		1-P	343	452	428	9.5	3	1.5	0.33	2.03	3.02	1.98	198
	500	350	350	4	2.5	5 010	9 290	**47T605035**		1	346	482	451	8	3	2	0.40	1.68	2.50	1.64	270
300.038	422.275	311.150	311.150	3.2	3.2	3 390	8 050	**HM256849D/810/810D**		1	325	407	388	7	3.2	3.2	0.34	2.00	2.98	1.96	136
304.648	438.048	279.400	280.990	4.8	3.2	3 230	6 980	**47T614428C**		2	331	420	403	7	4.8	3.2	0.47	1.44	2.15	1.41	133
	438.048	279.400	280.990	4.8	3.2	3 230	6 980	**M757448D/410/410D**		1	331	420	403	7	4.8	3.2	0.47	1.44	2.15	1.41	132
304.800	419.100	269.875	269.875	6.4	1.6	2 840	6 950	**M257149D/110/110D**		1	331	398	387	7	6.4	1.6	0.33	2.03	3.02	1.98	110
	482.600	377.825	365.125	6.4	3.2	4 820	9 800	**47T614838A**		1-P	343	461	437	1	6.4	3.2	0.47	1.43	2.12	1.40	250
	495.300	349.250	342.900	6.4	3.2	4 370	9 370	**EE724121D/195/196D**		1	355	474	438	7	6.4	3.2	0.40	1.68	2.50	1.64	267
304.902	412.648	266.7	266.7	3.2	3.2	2 990	7 280	**M257248D/210/210D**		1	328	398	383	7	3.2	3.2	0.32	2.12	3.15	2.07	101
310	430	310	310	3	3	3 520	8 420	**47T624331A**		1	332	416	399	10	2.5	2.5	0.40	1.68	2.50	1.64	135
	460	325	325	4	5	4 200	9 500	**47T6246A**		1	346	442	421	12	3	4	0.32	2.12	3.15	2.07	188
317.500	422.275	269.875	269.875	3.2	1.6	2 930	7 450	**LM258649D/610/610D**		1	341	407	392	8.5	3.2	1.6	0.32	2.12	3.15	2.07	104
	447.675	327.025	327.025	6.4	1.6	4 120	9 820	**47T644533J**		1-P	341	426	411	7.5	6.4	1.6	0.33	2.02	3.00	1.97	161
	447.675	327.025	327.025	6.4	1.6	4 280	10 100	**47T644533L**		1	344	426	411	11.5	6.4	1.6	0.33	2.03	3.02	1.98	161
320	440	335	335	2	2.5	3 590	8 750	**47T644434**		1	341	430	408	5.5	2	2	0.40	1.68	2.50	1.64	149

[Notes] 1) SP indicates the specially chamfered form.
2) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.
3) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d (320) ~ (355.600) mm



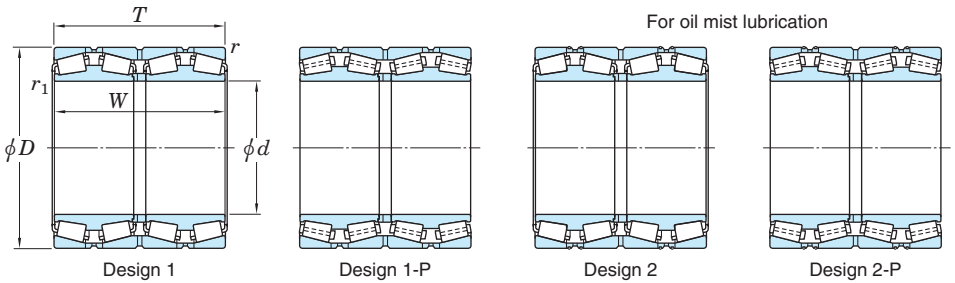


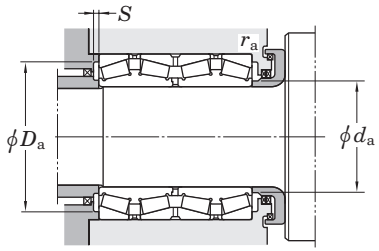
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]	Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}			d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
320	460	325	325	4	2.5	4 030	9 420	**47T644633**	1	349	442	424	10	3	2.5	0.42	1.62	2.42	1.59	175
	460	338	338	4	5	3 500	8 590	**37264**	1	356	442	421	8.5	3	4	0.33	2.03	3.02	1.98	183
	480	254	254	4	2.5	3 400	6 940	**47T644825**	1-P	358	462	437	9	3	2	0.40	1.68	2.50	1.64	161
	480	260	260	4	5	3 360	6 890	**47T644826**	1	359	462	437	11.5	3	5	0.40	1.68	2.50	1.64	165
	480	360	360	4	1	4 970	11 000	**47T644836-1**	1-P	352	462	442	9	3	1	0.47	1.43	2.12	1.40	229
	500	380	380	4	1.5	5 540	11 900	**47T645038**	1-P	363	482	454	11.5	3	1.5	0.33	2.03	3.02	1.98	284
	540	364	364	5	6	5 380	10 600	**47364**	1	376	518	479	8.5	4	5	0.32	2.12	3.15	2.07	340
325	430	230	230	3	1	2 410	5 800	**47T654323**	1	347	416	401	8.5	2.5	1	0.40	1.68	2.50	1.64	88.5
327	445	230	230	3	1	2 620	6 080	**47T654523**	1	353	431	413	9	2.5	1	0.40	1.68	2.50	1.64	102
330.200	444.500	301.625	301.625	3.2	3.2	3 550	9 260	**47T664430**	1	357	430	414	10	3.2	3.2	0.26	2.55	3.80	2.50	134
	508.000	307.975	307.975	6.4	1.6	4 320	8 500	**47T665131A**	1	372	486	462	8	6.4	1.6	0.33	2.03	3.02	1.98	219
335.000	460.000	342.900	342.900	3.2	1.6	3 960	9 390	**47T674634/DP**	2	361	445	428	7.5	3.2	1.6	0.40	1.68	2.50	1.64	165
337.375	469.900	342.900	342.900	3.2	1.6	4 630	11 400	**HM261049D/010/010D**	1-P	360	455	432	9	3.2	1.6	0.33	2.02	3.01	1.97	190
340	480	350	350	5	6	4 700	11 700	**37268A**	1-P	371	458	443	9.5	4	6	0.33	2.03	3.02	1.98	198
	520	278	278	5	6	4 040	8 110	**47T685228**	1	384	498	473	9	4	6	0.40	1.68	2.50	1.64	212
	520	323	323	5	6	4 380	8 930	**47T685232**	1	381	498	473	10	4	5	0.40	1.68	2.50	1.64	242
343.052	457.098	254.000	254.000	3.2	1.6	2 850	6 950	**47T694625**	1	363	442	425	6	3.2	1.6	0.47	1.43	2.12	1.40	111
	457.098	254.000	254.000	3.2	1.6	2 850	6 950	**47T694625/DP3**	2	363	442	425	6	3.2	1.6	0.47	1.43	2.12	1.40	111
346.075	488.950	358.775	358.775	3.2	3.2	4 620	11 600	**HM262749D/10/10D**	1	378	474	449	8	3.2	3.2	0.33	2.02	3.00	1.97	214
347.663	469.900	292.100	292.100	3.2	3.2	3 600	9 040	**M262449D/10/10D**	1	374	455	436	10	3.2	3.2	0.33	2.03	3.02	1.98	145
355	490	316	316	2	2.5	4 160	10 000	**47T714932**	1	385	480	455	12.5	2	2	0.33	2.03	3.02	1.98	180
355.600	482.600	269.875	265.113	3.2	1.6	3 390	7 860	**47T714827-1**	1	386	468	450	8	3.2	1.6	0.26	2.55	3.80	2.50	139
	482.600	269.875	265.112	3.2	1.6	3 060	7 020	**LM763449D/410/410D**	1	381	468	450	3.5	3.2	1.6	0.47	1.43	2.14	1.40	136

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d (355.600) ~ (380) mm



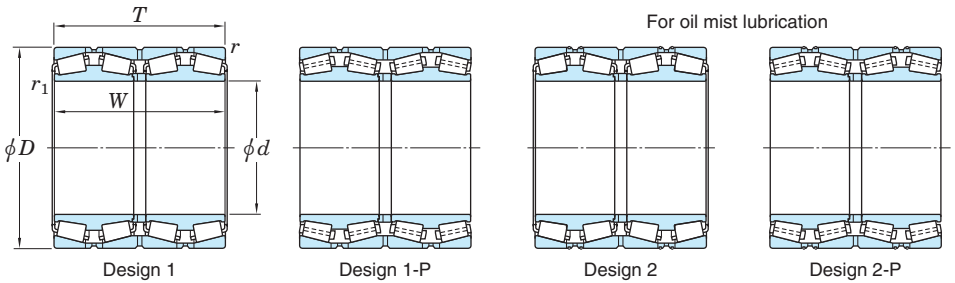


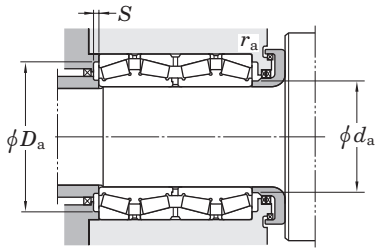
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
355.600	488.950	317.500	317.500	3.2	1.6	4 370	10 900	**M263349D/310/310D**		1-P	383	474	452	7.5	3.2	1.6	0.33	2.03	3.02	1.98	182
360	480	375	375	3	4	3 930	9 910	**47T724838A**		1	383	466	446	3.5	2.5	3	0.40	1.68	2.50	1.64	177
	480	375	375	3	1	4 190	11 100	**47T724838C**		1	381	466	448	5	2.5	1	0.33	2.03	3.02	1.98	183
	508	370	370	5	6	4 840	11 500	**47T725137**		1	392	486	471	7	4	6	0.33	2.03	3.02	1.98	232
	520	370	370	5	6	4 920	11 400	**47T725237**		1	395	498	476	8.5	4	5	0.33	2.03	3.02	1.98	259
	520	410	410	5	6	5 970	14 300	**47T725241**		1-P	395	498	479	8.5	4	5	0.33	2.03	3.02	1.98	292
	540	280	280	5	6	3 790	7 820	**47272**		1	406	518	490	10	4	5	0.32	2.12	3.15	2.07	221
	540	280	280	5	6	3 760	8 000	**47T725428**		1	402	518	489	10.5	4	5	0.55	1.24	1.84	1.21	224
	540	460	460	4	5	6 440	15 800	**47T7254**		1	408	522	492	9.5	3	4	0.27	2.47	3.67	2.41	373
368.300	523.875	382.588	382.588	6.4	3.2	5 530	13 600	**47T745238B**		1-P	404	502	483	9	6.4	3.2	0.29	2.32	3.45	2.26	269
	523.875	382.588	382.588	3.2	1.6	5 620	14 100	**47T745238D**		1	403	508	483	7.5	3.2	1.6	0.33	2.03	3.02	1.98	265
	523.875	382.588	382.588	6.4	3.2	5 920	14 500	**47T745238J**		1-P	401	502	485	10.5	6.4	3.2	0.33	2.03	3.02	1.98	268
	523.875	382.588	382.588	6.4	3.2	5 460	13 600	**HM265049D/010/010D**		1-P	403	502	483	7	6.4	3.2	0.33	2.03	3.02	1.98	269
	563.000	382.588	382.588	6.4	3.2	6 300	13 600	**47T745638**		1-P	417	541	516	10.5	6.4	3.2	0.29	2.32	3.45	2.26	344
370	516	346	346	4	1.5	4 880	11 700	**47T745235**		1-P	398	498	479	9	3	1.5	0.40	1.68	2.50	1.64	216
374.650	501.650	260.350	260.350	3.2	1.6	2 930	7 750	**47T745026**		1	399	486	459	7	3.2	1.6	0.43	1.56	2.32	1.52	145
380	520	360	360	5	6	4 610	12 200	**47T765236**		1	417	498	484	11	4	5	0.32	2.12	3.15	2.07	225
	520	400	400	4	2.5	5 020	13 000	**47T765240**		1	404	502	482	9.5	3	2	0.40	1.68	2.50	1.64	248
	536	390	390	5	6	5 760	12 900	**37276**		1	415	514	496	7.5	4	5	0.40	1.68	2.50	1.64	268
	560	282	282	5	6	3 670	7 580	**47276**		1	429	538	511	9	4	5	0.27	2.47	3.67	2.41	232
	560	285	285	4	5	4 600	10 000	**47T765629**		1-P	428	542	513	11	3	4	0.27	2.47	3.67	2.41	246
	560	285	285	4	5	4 420	9 240	**47T765629A**		1	427	542	515	11	3	5	0.27	2.47	3.67	2.41	244
	560	325	325	5	6	5 330	11 900	**47T765633A**		1-P	427	538	514	11	4	5	0.27	2.47	3.67	2.41	278
	560	360	390	4	1.5	5 310	11 800	**47T765639**		1	422	542	514	9	3	1.5	0.35	1.95	2.90	1.91	307
	560	370	370	5	6	5 910	13 600	**47T765637**		1-P	423	538	515	10	4	5	0.33	2.03	3.02	1.98	312
	580	500	500	5	6	7 410	17 500	**47T765850**		1	427	558	529	10.5	4	5	0.33	2.03	3.02	1.98	478

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d (380) ~ 430 mm



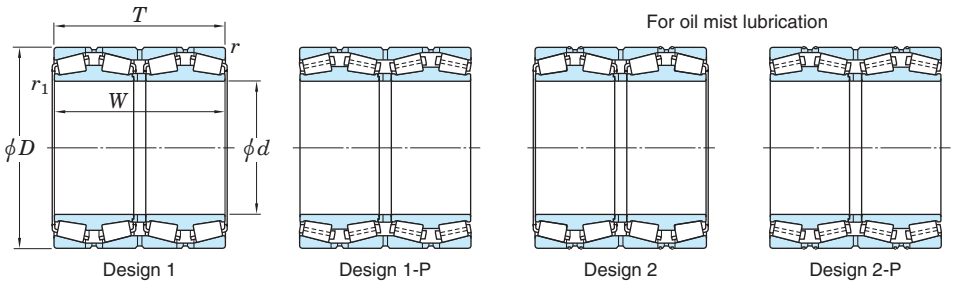


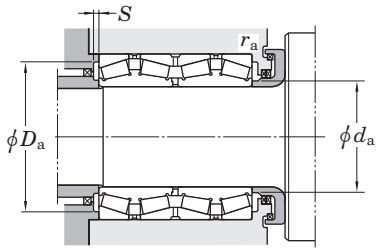
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
380	620	400	400	5	6	6 130	12 700	**47376**		1	445	598	552	6.5	4	5	0.32	2.12	3.15	2.07	476
	620	418.5	418.5	5	6	7 080	14 000	**47T766242**		1-P	435	598	561	10	4	5	0.46	1.47	2.19	1.44	499
384.175	546.100	400.050	400.050	6.4	3.2	6 530	16 900	**HM266449D/410/410D**		1-P	418	524	502	10.5	6.4	3.2	0.33	2.03	3.02	1.98	315
	546.100	470.000	470.000	6.4	3.2	6 220	16 200	**47T775547**		1	418	524	503	7.5	6.4	3.2	0.33	2.03	3.02	1.98	360
390	510	350	350	3	1.5	4 300	11 700	**47T785135A**		1	413	496	478	10.5	2.5	1.5	0.33	2.03	3.02	1.98	186
	510	350	350	3	1	4 150	11 200	**47T785135B**		1	415	496	479	5.5	2.5	1	0.29	2.32	3.45	2.26	183
395	545	288.7	270.3	7.5	5	3 330	7 680	**47T795529**		1	433	509	494	3	6	4	0.43	1.57	2.34	1.53	190
400	560	380	380	4	1.5	5 970	15 200	**47T805638A**		1-P	435	542	519	10	3	1.5	0.33	2.03	3.02	1.98	296
	564	412	412	4	2.5	6 470	16 500	**47T805641**		1-P	432	546	522	9	3	2.5	0.40	1.68	2.50	1.64	329
	590	304	304	4	1.5	4 760	10 200	**47T805930A**		1-P	449	572	540	7.5	3	1.5	0.33	2.03	3.02	1.98	289
	600	308	308	5	6	4 810	9 930	**47280**		1	452	578	548	9	4	5	0.33	2.03	3.02	1.98	310
406.400	546.100	288.925	288.925	6.4	1.6	3 960	9 540	**47T815529**		1	435	524	509	9.5	6.4	1.6	0.47	1.43	2.12	1.40	184
	546.100	330.000	330.000	6.4	3.2	4 800	12 400	**47T815533B**		1-P	434	524	509	8.5	6.4	3.2	0.40	1.68	2.50	1.64	214
	562.000	381.000	381.000	6.4	3.2	5 990	15 000	**47T815638**		1	439	540	524	9.5	6.4	3.2	0.33	2.03	3.02	1.98	284
	565.150	381.000	381.000	6.4	3.2	5 990	15 000	**M267949D/910/910XD**		1	438.3	544	524	9.5	6.4	3.2	0.33	2.03	3.02	1.98	291
409.575	546.100	334.963	334.963	6.4	1.6	4 570	11 500	**M667947D/911/911D**		1	432	524	509	8.5	6.4	1.6	0.42	1.62	2.42	1.59	213
415.925	590.550	434.975	434.975	6.4	3.2	7 060	18 800	**47T835943A**		1-P	455	568	543	10	6.4	3.2	0.33	2.03	3.02	1.98	391
420	560	370	370	5	6	4 950	13 600	**47T845637**		1	459	538	527	12	4	5	0.32	2.12	3.15	2.07	252
	560	437	437	4	1.5	5 620	14 900	**47T845644**		1	450	542	526	4	3	1.5	0.26	2.55	3.80	2.50	283
	592	432	432	5	6	6 030	15 700	**37284**		1	460	570	544	7.5	4	5	0.33	2.03	3.02	1.98	374
	620	312	312	5	6	4 810	10 400	**47284**		1	473.5	598	567	10	4	5	0.33	2.03	3.02	1.98	328
	650	460	460	6	6	8 560	18 300	**47T846546**		1	468	622	595	8.5	5	5	0.40	1.68	2.50	1.64	558
430	570	336	336	4	1.5	4 790	12 500	**47T865734C**		1	460	552	536	10	3	1.5	0.36	1.87	2.79	1.83	232
	570	380	380	4	1.5	5 640	15 900	**47T865738**		1	463	552	534	10.5	3	1.5	0.26	2.55	3.80	2.50	269

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 431.800 ~ 475.000 mm



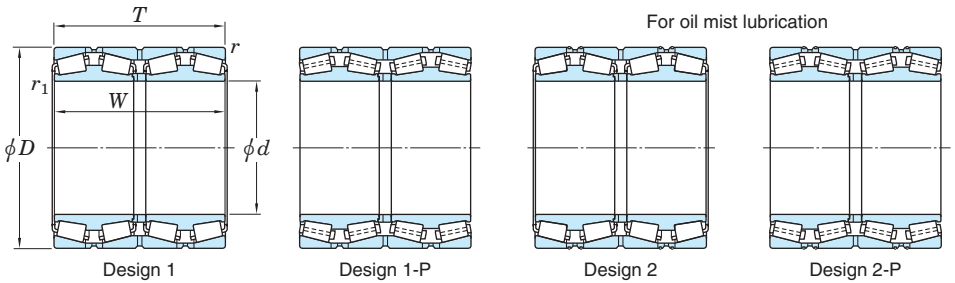


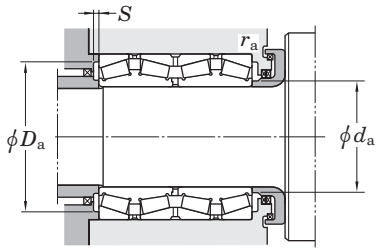
Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [1]		Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass
d	D	T	W	r min.	r_1 min.	C_r	C_{0r}				d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [2] max.	e	Y_2	Y_3	Y_0	(kg)
431.800	571.500	336.550	336.550	6.4	1.6	5 070	13 500	**47T865734**		1-P	460	549	534	10	6.4	1.6	0.36	1.87	2.79	1.83	232
	571.500	336.550	336.550	6.4	1.6	4 290	11 300	**LM769349D/310/310D**		1	463	549	534	7	6.4	1.6	0.48	1.41	2.10	1.38	231
	635.000	355.600	355.600	6.4	6.4	6 310	13 700	**EE931170D/250/251XD**		1-P	481	612	586	8	6.4	6.4	0.32	2.10	3.13	2.06	385
432.003	609.524	317.500	317.500	6.4	3.6	5 210	12 100	**EE736173D/238/239D**		1-P	474	586	562	9	6.4	3.6	0.35	1.94	2.89	1.90	291
440	580	420	420	4	1.5	5 730	15 400	**47T885842**		1-P	467	562	544	1.5	3	1.5	0.26	2.55	3.80	2.50	288
	620	454	454	6	6	7 110	17 500	**37288**		1	482	592	576	9	5	5	0.40	1.68	2.50	1.64	417
	620	454	454	4	5	7 610	19 800	**47T886246**		1-P	474	602	573	10.5	3	5	0.40	1.68	2.50	1.64	436
	635	430	430	5	6	7 560	18 000	**47T886443**		1-P	485	613	587	9.5	4	5	0.33	2.03	3.02	1.98	450
	635	470	470	5	2.5	8 510	20 900	**47T886447**		1-P	483	613	588	10.5	4	2	0.33	2.03	3.02	1.98	500
	650	326	326	6	6	5 080	11 000	**47288**		1-P	500	622	595	11	5	5	0.28	2.43	3.61	2.37	361
	650	334	334	6	6	5 490	12 200	**47288A**		1	500	622	595	9.5	5	5	0.28	2.43	3.61	2.37	375
	660	450	450	5	2	8 690	19 000	**47T886645**		1	489	638	610	9.5	4	2	0.32	2.12	3.15	2.07	532
447.675	635.000	463.550	463.550	6.4	3.2	7 860	21 000	**M270749D/710/710D**		1-P	491	612	584	8	6.4	3.2	0.33	2.03	3.02	1.98	472
449.949	594.949	368.000	368.000	5	2.5	5 980	16 200	**M270449D/10/10D**		1-P	478	573	557	9	5	2	0.33	2.03	3.02	1.98	278
450	580	450	450	6	1.5	5 130	14 600	**47T905845**		1	475	552	537	2	5	1.5	0.26	2.55	3.80	2.50	286
457.200	596.900	279.400	276.225	3.2	1.6	4 260	11 400	**47T916028A**		1-P	485	581	560	8.5	3.2	1.6	0.47	1.43	2.12	1.40	307
	660.400	323.847	323.850	6.4	3.2	5 700	12 700	**EE737179D/260/261D**		1-P	501	637	603	9	6.4	3.2	0.37	1.80	2.69	1.76	365
460	586	280	280	3	1	3 710	9 810	**47T925928**		1	483	572	555	10.5	2.5	1	0.44	1.52	2.26	1.49	177
	615	360	360	3	1	5 000	13 300	**47T926236**		1	490	601	572	8	2.5	1	0.47	1.43	2.12	1.40	292
	625	421	421	4	1.5	6 920	18 800	**47T926342**		1-P	495	607	582	8	3	1.5	0.33	2.03	3.02	1.98	386
	650	474	474	6	6	7 680	19 400	**37292**		1	500	622	598	8	5	5	0.33	2.03	3.02	1.98	495
	680	375	375	5	2	6 500	15 200	**47T926838**		1	515	658	618	10.5	4	2	0.36	1.87	2.79	1.83	475
	730	440	440	6	3	8 650	17 700	**47T927344**		1-P	519	702	662	13	5	2.5	0.47	1.43	2.12	1.40	710
475.000	600.000	368.000	368.000	4.8	1.6	4 970	15 100	**47T956037A**		1	501	581	566	10.5	4.8	1.6	0.26	2.55	3.80	2.50	246

[Notes] 1) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.

2) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

d 479.425 ~ 500 mm



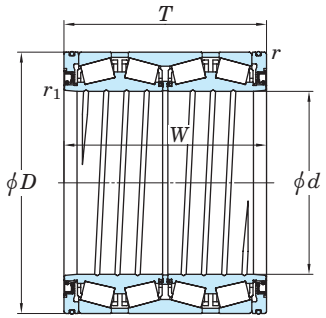


Boundary dimensions (mm)						Basic load ratings (kN)		Bearing No. [2]	Design	Mounting dimensions (mm)						Constant	Axial load factors			(Refer.) Mass (kg)
d	D	T	W	r min.	r_1 [1] min.	C_r	C_{0r}			d_a max.	D_a max.	D_a min.	S min.	r_a max.	r_b [3] max.	e	Y_2	Y_3	Y_0	
479.425	679.450	495.300	495.300	6.4	3.2	9 660	25 400	**47T966850**	1-P	523	656	641	12.5	6.4	3.2	0.33	2.03	3.02	1.98	591
	679.450	495.300	495.300	6.4	3.2	8 480	22 200	**M272749D/710/710D**	1-P	524	656	627	7.5	6.4	3.2	0.33	2.03	3.02	1.98	575
480	678	494	494	6	6	9 160	23 300	**37296**	1-P	520	650	629	9.5	5	5	0.33	2.03	3.02	1.98	563
	700	390	390	5	6	7 400	16 800	**47T967039**	1-P	536	678	647	11	4	6	0.33	2.03	3.02	1.98	508
480.000	700.000	420.000	420.000	6.4	3.2	8 060	18 800	**47T967042C**	1	531	677	644	10.5	6.4	3.2	0.35	1.95	2.90	1.91	540
482.600	615.950	330.200	330.200	6.4	6.4	4 830	13 400	**47T976233**	2-P	512	593	573	6	6.4	6.4	0.44	1.54	2.30	1.51	240
	615.950	330.200	330.200	6.4	6.4	4 830	13 400	**4TR19A**	1-P	512	593	573	6.5	6.4	6.4	0.44	1.54	2.30	1.51	240
	615.950	330.200	330.200	6.4	4.8	5 270	15 000	**4TR19B**	1-P	509	593	573	10.5	6.4	4.8	0.33	2.03	3.02	1.98	243
	615.950	330.200	330.200	6.4	3.2	5 210	15 000	**4TR19D**	1	508	593	573	10	6.4	3.2	0.36	1.87	2.79	1.83	240
	615.950	420.000	420.000	4	2.5	5 810	16 700	**47T976242**	1	508	597	577	6	4	2.5	0.26	2.55	3.80	2.50	296
	647.700	417.512	417.512	6.4	3.2	7 390	20 300	**47T976542A**	2-P	514	624	603	9.5	6.4	3.2	0.33	2.03	3.02	1.98	397
	647.700	417.512	417.512	6.4	3.2	7 390	20 300	**M272647D/610/610D**	1-P	514	624	604	9.5	6.4	3.2	0.33	2.03	3.02	1.98	395
488.950	622.300	365.125	365.125	3.6	3.6	4 950	13 900	**47T986236**	1	516	605	585	7.5	3.6	3.6	0.33	2.03	3.02	1.98	262
	660.400	361.950	365.125	6.4	7.9	6 200	15 800	**EE640193D/260/261D**	1-P	527	637	616	11	6.4	7.9	0.31	2.20	3.27	2.15	357
489.026	634.873	320.675	320.675	3.2	3.2	4 520	13 200	**EE243193D/250/251D**	1	526	618	595	9.5	3.2	3.2	0.34	1.97	2.93	1.93	263
	634.873	320.675	320.675	3.2	3.2	4 930	13 700	**LM772749D/710/710D**	1	513	618	594	9.5	3.2	3.2	0.47	1.43	2.12	1.40	261
490	625	385	385	4	1.5	5 690	17 200	**47T986339A**	1	520	607	587	9.5	3	1.5	0.28	2.43	3.61	2.37	290
	625	385	385	4	1.5	5 540	16 600	**47T986339B**	1	517	607	587	4.5	3	1.5	0.32	2.12	3.15	2.07	285
500	640	450	450	4	1.5	7 050	20 300	**4TR500M**	2-P	527	622	602	10.5	3	1.5	0.24	2.84	4.23	2.78	352
	670	515	515	5	6	9 110	25 700	**4TR500B**	1-P	530	648	626	11	4	5	0.32	2.12	3.15	2.07	510
	705	515	515	6	SP	9 530	24 500	**372/500**	1-P	544	677	651	8.5	5	6	0.37	1.80	2.69	1.76	641
	710	430	425	5	3	8 170	20 000	**4TR500T**	1	547	688	658	12	4	3	0.37	1.80	2.69	1.76	528
	720	400	400	6	6	7 990	18 700	**4TR500J**	1-P	552	692	663	12.5	5	5	0.33	2.03	3.02	1.98	547
	760	420	420	2	6	8 730	19 300	**4TR500Q**	1-P	566	750	696	11.5	2	6	0.39	1.74	2.59	1.70	698

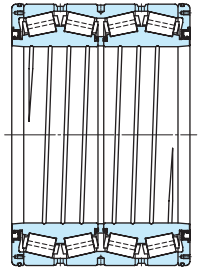
[Notes] 1) SP indicates the specially chamfered form.
2) While metric series bearings have minus tolerances for bore and OD, inch series have plus tolerances. Refer to page C 82 for details of applicable tolerance standards.
3) r_b indicates the shaft chamfer dimension corresponding to cone chamfer dimension r_1.

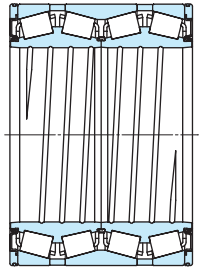
Sealed type four-row tapered roller bearings

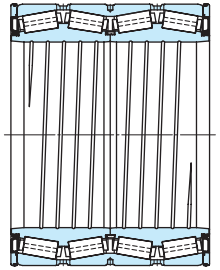
d 75 ~ 234.950 mm



Design 1


Design 1-P


Design 2

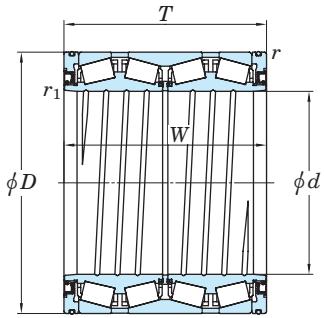

Design 2-P

Boundary dimensions										Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r 1) min.	r_1 1) min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
75	—	120	—	150	—	150	—	2	1	424	764		**47TS151215**	1	0.33	2.03	3.02	6.4
	—	135	—	180	—	187	—	1.5	1.5	455	776		**47TS151418**	1	0.87	0.78	1.16	10.7
140	—	198	—	174	—	174	—	4	1	803	1 630		**47TS282017**	1	0.47	1.43	2.12	16.3
150	—	210	—	240	—	240	—	1.5	0.5	993	2 270		**47TS302124**	1	0.39	1.74	2.59	23.5
170	—	240	—	175	—	175	—	2.5	1.5	980	1 990		**47TS342418**	1	0.26	2.55	3.8	23.9
	—	250	—	230	—	230	—	2.5	1.5	1 370	2 860		**47TS342523**	1	0.26	2.55	3.8	37.7
190.500	7.5000	266.700	10.5000	188.913	7.4375	187.325	7.3750	3.2	1	1 060	2 270		**47TS382719A**	1	0.46	1.47	2.19	27.6
195	—	270	—	250	—	250	—	2.5	1	1 420	3 550		**47TS392725-1**	1	0.4	1.68	2.5	43.6
200	—	300	—	300	—	300	—	4	1.6	2 260	4 900		**47TS403030**	1	0.26	2.55	3.8	73.5
203.200	8.0000	317.500	12.5000	266.700	10.5000	266.700	10.5000	5	1.6	2 060	4 010		**47TS413227**	1	0.4	1.68	2.5	76.8
206.375	8.1250	282.575	11.1250	190.500	7.5000	190.500	7.5000	3.2	1	1 100	2 240		**47TS412819**	1	0.51	1.33	1.97	33.5
	8.1250	282.575	11.1250	240.000	9.4488	210.000	8.2677	3	1	1 450	3 380		**47TS412824**	1	0.43	1.57	2.34	39.6
215.900	8.5000	288.925	11.3750	177.800	7.0000	177.800	7.0000	3.2	1	1 060	2 350		**47TS432918**	1	0.4	1.68	2.5	30.6
220	—	295	—	315	—	315	—	SP	SP	1 540	3 910		**47TS443032A**	1	0.4	1.68	2.5	55.8
	—	320	—	290	—	290	—	3	2	2 200	4 700		**47TS443229B**	1	0.39	1.74	2.59	73.9
	—	330	—	260	—	260	—	5	2.5	2 100	4 220		**47TS443326**	1	0.4	1.68	2.5	79.5
220.663	8.6875	314.325	12.3750	239.713	9.4375	239.713	9.4375	3.2	3	1 680	3 410		**47TS443124**	1	0.33	2.03	3.02	51.9
	8.6875	314.325	12.3750	330.000	12.9921	330.000	12.9921	3.2	3	2 360	5 650		**47TS443133**	1	0.26	2.55	3.8	79.2
225	—	320	—	230	—	230	—	3	1.5	1 630	3 350		**47TS453223A**	1	0.47	1.43	2.12	56.9
228.600	9.0000	311.150	12.2500	200.025	7.8750	200.025	7.8750	3.2	SP	1 330	2 850		**47TS463120-1**	1	0.4	1.68	2.5	41.3
234.950	9.2500	327.025	12.8750	196.850	7.7500	196.850	7.7500	3.2	1	1 490	3 310		**47TS473320A**	2	0.4	1.68	2.5	48.1

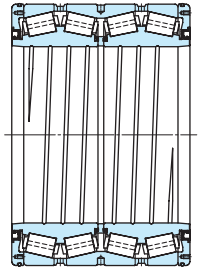
[Note] 1) SP indicates the specially chamfered form.

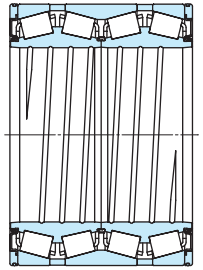
Sealed type four-row tapered roller bearings

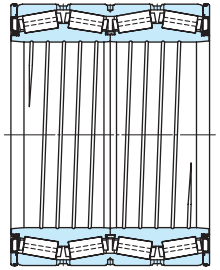
d 240 ~ (280) mm



Design 1


Design 1-P


Design 2

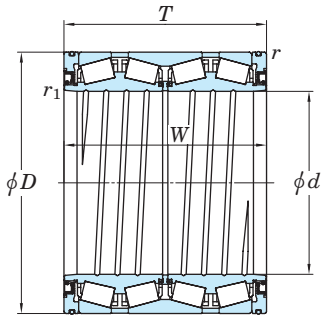

Design 2-P

Boundary dimensions										Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r min.	r_1 [1] min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
240	—	320	—	294	—	294	—	4	1	1 880	4 760		**47TS483229-1**	1	0.33	2.03	3.02	63.6
	—	338	—	248	—	248	—	3	1.5	1 890	4 120		**47TS483425B**	1	0.47	1.43	2.12	66
	—	338	—	290	—	290	—	3	1	2 360	5 360		**47TS483429**	1	0.39	1.74	2.59	78
	—	338	—	320	—	320	—	3	1	2 430	5 890		**47TS483432**	1	0.28	2.43	3.61	87.3
	—	338	—	340	—	340	—	3	1	2 450	5 930		**47TS483434A**	1	0.4	1.68	2.5	88
241.478	9.5070	349.148	13.7460	228.600	9.0000	228.600	9.0000	3.2	SP	2 000	4 110		**47TS483523A**	2	0.35	1.91	2.84	67.5
244.475	9.6250	327.025	12.8750	193.675	7.6250	193.675	7.6250	5	1.5	1 280	2 790		**47TS493319**	1	0.33	2.03	3.02	41.5
	9.6250	381.000	15.0000	304.800	12.0000	304.800	12.0000	5	1.6	2 700	5 240		**47TS493830**	1	0.47	1.43	2.12	124
245	—	345	—	310	—	310	—	3	1.5	2 520	6 020		**47TS493531-2**	1	0.4	1.68	2.5	89.9
250	—	365	—	270	—	270	—	3	1.5	2 260	4 730		**47TS503727A-1**	1	0.4	1.68	2.5	94.2
254.000	10.0000	358.775	14.1250	269.875	10.6250	269.875	10.6250	3.2	1.6	2 130	4 760		**47TS513627A-1**	1	0.55	1.24	1.84	82
	10.0000	358.775	14.1250	269.875	10.6250	269.875	10.6250	3.2	1.5	2 520	6 010		**47TS513627B**	2	0.4	1.68	2.5	85
260	—	365	—	340	—	340	—	3.5	1.6	2 800	6 530		**47TS523734-5**	1	0.4	1.68	2.5	110
	—	370	—	354	—	354	—	4	1.5	3 100	7 410		**47TS523735**	1	0.26	2.55	3.8	120
266.700	10.5000	355.600	14.0000	228.600	9.0000	230.188	9.0625	3.2	1.6	1 940	4 880		**47TS533623B**	2	0.36	1.87	2.79	60
275	—	385	—	340	—	340	—	3	1.5	2 970	7 400		**47TS553934**	1	0.4	1.68	2.5	121
276.225	10.8750	393.700	15.5000	269.875	10.6250	269.875	10.6250	3.2	1.6	2 350	5 040		**47TS553927-4**	1	0.47	1.43	2.12	100
	10.8750	393.700	15.5000	269.875	10.6250	269.875	10.6250	3.2	SP	2 770	6 510		**47TS553927A**	2	0.4	1.68	2.5	105
279.400	11.0000	393.700	15.5000	269.875	10.6250	269.875	10.6250	3.2	1.6	2 350	5 040		**47TS563927**	1	0.47	1.43	2.12	99.5
	11.0000	393.700	15.5000	269.875	10.6250	269.875	10.6250	3.2	SP	2 770	6 510		**47TS563927B**	2	0.4	1.68	2.5	101
	11.0000	393.700	15.5000	320.000	12.5984	320.000	12.5984	3.2	1.5	2 880	6 900		**47TS563932-2**	1	0.4	1.68	2.5	124
279.578	11.0070	380.898	14.9960	244.475	9.6250	244.475	9.6250	3.2	SP	2 270	5 360		**47TS563824**	2	0.4	1.68	2.5	78.3
280	—	380	—	290	—	290	—	3.2	SP	2 720	6 940		**47TS563829A**	2	0.33	2.03	3.02	93.8

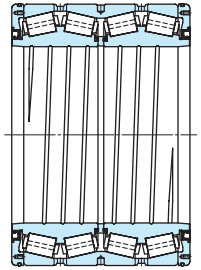
[Note] 1) SP indicates the specially chamfered form.

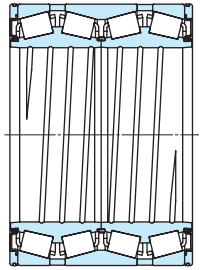
Sealed type four-row tapered roller bearings

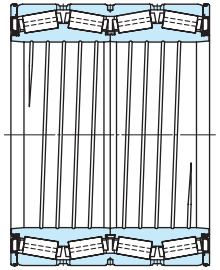
d (280) ~ 317.500 mm



Design 1


Design 1-P

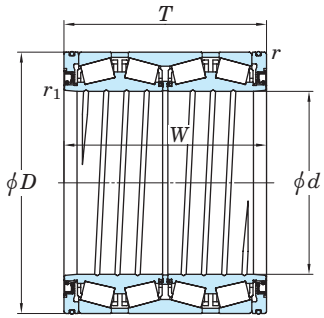

Design 2


Design 2-P

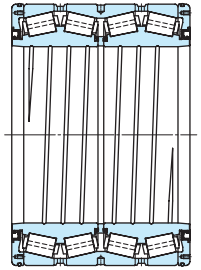
Boundary dimensions									Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r min.	r_1 [1] min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
280	—	395	—	290	—	290	—	3	2.5	2 640	5 940		**47TS564029**	1	0.4	1.68	2.5	110
	—	395	—	340	—	340	—	3	1.5	2 960	7 110		**47TS564034A**	1	0.4	1.68	2.5	130
	—	410	—	268	—	268	—	5.4	1.6	2 240	4 510		**47TS564127**	1	0.33	2.03	3.02	118
	—	412	—	340	—	340	—	4	2	3 350	7 220		**47TS564134**	1	0.28	2.43	3.61	154
	—	430	—	350	—	350	—	3.5	1.5	3 940	8 190		**47TS564335**	1	0.4	1.68	2.5	178
285	—	400	—	340	—	340	—	3	1.5	3 190	7 610		**47TS574034**	1	0.4	1.68	2.5	131
285.750	11.2500	380.898	14.9960	244.475	9.6250	244.475	9.6250	3.2	1	2 000	4 600		**47TS573824A**	1	0.43	1.57	2.34	73.2
290	—	400	—	346	—	346	—	4	1.5	3 070	7 860		**47TS584035**	1	0.4	1.68	2.5	128
	—	400	—	420	—	420	—	4	1.5	3 070	7 860		**47TS584042C**	1	0.4	1.68	2.5	155
	—	420	—	380	—	380	—	3	1.2	3 640	8 260		**47TS584238**	1	0.4	1.68	2.5	175
	—	450	—	415	—	415	—	4	1.5	4 460	9 460		**47TS584542**	1	0.47	1.43	2.12	238
300	—	400	—	254	—	254	—	4	5	2 220	5 300		**47TS604025**	1	0.28	2.43	3.61	84.6
	—	420	—	310	—	310	—	4	3.5	2 890	6 670		**47TS604231**	1	0.4	1.68	2.5	128
304.648	11.9940	438.048	17.2460	279.400	11.0000	280.990	11.0626	4	1.6	2 570	5 380		**47TS614428B-10**	1	0.47	1.44	2.15	135
	11.9940	438.048	17.2460	279.400	11.0000	279.400	11.0000	3.2	1.6	3 140	6 860		**47TS614428C-1**	2	0.4	1.68	2.5	135
304.800	12.0000	419.100	16.5000	269.875	10.6250	269.875	10.6250	6.4	2	2 490	5 420		**47TS614227**	1	0.33	2.03	3.02	100
	12.0000	501.650	19.7500	336.550	13.2500	296.550	11.6752	4	4	4 280	8 570		**47TS615034**	1-P	0.33	2.03	3.02	257
304.902	12.0040	412.648	16.2460	266.700	10.5000	266.700	10.5000	3.2	0.8	2 750	6 820		**47TS614127D**	2	0.39	1.74	2.59	99.5
310	—	430	—	310	—	310	—	3	1	3 010	6 880		**47TS624331-4**	1	0.4	1.68	2.5	131
	—	430	—	350	—	350	—	3.5	1.5	3 280	7 870		**47TS624335A**	1	0.4	1.68	2.5	148
	—	430	—	350	—	350	—	3.5	SP	3 280	7 870		**47TS624335B-2**	1	0.4	1.68	2.5	148
	—	457.098	—	390	—	390	—	4	1.5	4 200	9 500		**47TS624639**	1	0.32	2.12	3.15	220
317.500	12.5000	447.675	17.6250	367.000	14.4488	367.000	14.4488	4	1.6	3 680	8 500		**47TS644537-1**	1	0.4	1.68	2.5	176

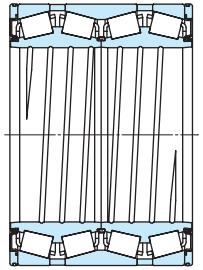
[Note] 1) SP indicates the specially chamfered form.

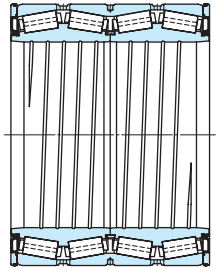
d 320 ~ 410 mm



Design 1


Design 1-P


Design 2

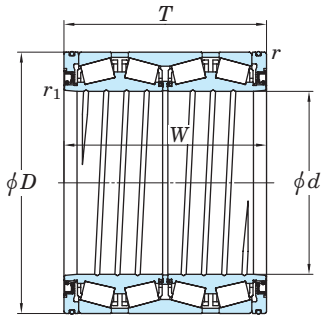

Design 2-P

Boundary dimensions										Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r 1) min.	r_1 1) min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
320	—	440	—	335	—	335	—	4	1	3 140	7 330		**47TS644434**	1	0.4	1.68	2.5	146
	—	480	—	360	—	360	—	4	1.5	4 210	8 800		**47TS644836B**	1-P	0.47	1.43	2.12	220
	—	480	—	420	—	420	—	4	1.5	5 470	12 100		**47TS644842**	1-P	0.26	2.55	3.8	262
330.302	13.0040	438.023	17.2450	254.000	10.0000	247.650	9.7500	3.2	1.6	2 190	4 960		**47TS664425**	1	0.46	1.47	2.19	95.8
335.000	13.1890	460.000	18.1102	342.900	13.5000	342.900	13.5000	3.3	1.5	3 740	9 290		**47TS674634A**	1	0.4	1.68	2.5	167
342.875	13.4990	488.900	19.2480	410.000	16.1417	410.000	16.1417	4	2	4 620	11 600		**47TS684941**	1	0.33	2.02	3	233
342.875	—	560	—	500	—	500	—	5	2.5	7 210	15 000		**47TS685650**	1-P	0.33	2.03	3.02	495
343.052	13.5060	457.098	17.9960	254.000	10.0000	254.000	10.0000	3.2	0.8	2 870	7 030		**47TS694625D-1**	2	0.4	1.68	2.5	110
	13.5060	457.098	17.9960	299.000	11.7717	299.000	11.7717	3.2	SP	3 310	9 010		**47TS694630B**	2	0.4	1.68	2.5	135
346.075	13.6250	488.950	19.2500	358.775	14.1250	358.775	14.1250	4	2	3 780	8 310		**47TS694936**	1	0.33	2.03	3.02	210
350	—	480	—	420	—	420	—	SP	1.5	3 700	9 100		**45DS704842C**	1-P	0.4	1.68	2.5	217
355	—	490	—	316	—	316	—	2	1.6	3 540	7 920		**47TS714932**	1	0.33	2.03	3.02	169
355.600	14.0000	482.600	19.0000	269.875	10.6250	265.112	10.4375	3.2	1.5	2 680	6 090		**47TS714827**	1-P	0.47	1.43	2.12	134
360	—	480	—	375	—	375	—	3	1	4 120	10 600		**47TS724838A**	1	0.4	1.68	2.5	181
374.650	14.7500	501.650	19.7500	260.350	10.2500	250.825	9.8750	3.2	1.6	3 120	7 470		**47TS755026A**	2	0.33	2.03	3.02	136
380	—	580	—	370	—	370	—	3	SP	5 690	12 300		**47TS765837**	1-P	0.33	2.03	3.02	353
395	—	545	—	360	—	360	—	6	1.6	3 790	8 930		**47TS795536A**	1	0.47	1.43	2.12	242
406.400	16.0000	546.100	21.5000	288.925	11.3750	288.925	11.3750	6.4	1	3 620	8 190		**47TS815529D-2**	2-P	0.47	1.43	2.12	195
	16.0000	546.100	21.5000	330.000	12.9921	330.000	12.9921	4	1.5	4 310	10 500		**47TS815533A**	2-P	0.43	1.57	2.34	204
	16.0000	546.100	21.5000	357.400	14.0709	357.400	14.0709	3.2	1.6	3 960	9 540		**47TS815536A**	1	0.47	1.43	2.12	220
410	—	546	—	400	—	400	—	4	1.5	4 630	12 000		**47TS825540**	1	0.26	2.55	3.8	255

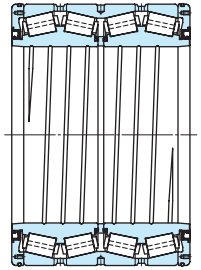
[Note] 1) SP indicates the specially chamfered form.

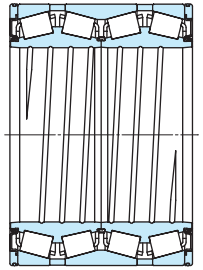
Sealed type four-row tapered roller bearings

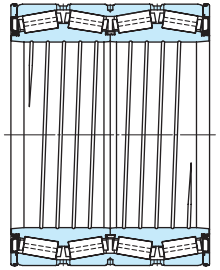
d 415.925 ~ 482.600 mm



Design 1


Design 1-P


Design 2

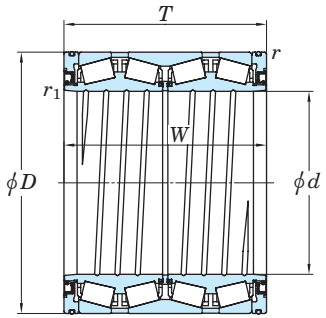

Design 2-P

Boundary dimensions									Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r [1] min.	r_1 [1] min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
415.925	16.3750	590.550	23.2500	434.975	17.1250	434.975	17.1250	4	1.5	6 390	15 600		**47TS835944A**	2-P	0.4	1.68	2.5	377
420	—	560	—	437	—	437	—	4	3	5 620	14 900		**47TS845644**	1	0.26	2.55	3.8	298
	—	574	—	480	—	480	—	3	1.6	6 730	17 800		**47TS845748**	1-P	0.28	2.43	3.61	352
	—	620	—	395	—	320	—	SP	SP	5 160	11 600		**47TS846240**	1-P	0.47	1.43	2.12	390
430	—	575	—	380	—	380	—	3.2	SP	5 200	14 300		**47TS865838A**	2-P	0.26	2.55	3.8	276
431.800	17.0000	571.500	22.5000	336.550	13.2500	336.550	13.2500	3.2	1.5	4 440	11 600		**47TS865734A**	2	0.4	1.68	2.5	229
440	—	590	—	480	—	480	—	4	SP	6 870	18 700		**47TS885948A-3**	2-P	0.26	2.55	3.8	362
	—	620	—	454	—	454	—	4	1.5	6 580	16 100		**47TS886245-1**	1-P	0.33	2.03	3.02	430
	—	635	—	470	—	413	—	5	2	6 870	15 700		**47TS886447**	1	0.33	2.03	3.02	461
450	—	595	—	420	—	420	—	5	1.5	6 110	16 300		**47TS906042**	1-P	0.26	2.55	3.8	308
457.200	18.0000	596.900	23.5000	279.400	11.0000	276.225	10.8750	3.2	1.6	3 760	9 520		**47TS916028C**	2-P	0.47	1.43	2.12	191
	18.0000	596.900	23.5000	279.400	11.0000	276.225	10.8750	3.2	1.6	3 300	8 180		**47TS916028D**	2-P	0.7	0.97	1.44	187
460	—	620	—	470	—	470	—	4	1.5	7 060	19 300		**47TS926247**	1-P	0.26	2.55	3.8	412
479.425	18.8750	679.450	26.7500	495.300	19.5000	495.300	19.5000	6.4	2	8 030	19 600		**47TS966850**	1-P	0.33	2.03	3.02	562
480.000	18.8976	647.700	25.5000	417.512	16.4375	417.512	16.4375	6.4	SP	6 680	17 400		**47TS966542**	1-P	0.33	2.03	3.02	391
480	—	700	—	470	—	470	—	5	1.5	8 080	18 800		**47TS967047**	1-P	0.32	2.12	3.15	621
482.600	19.0000	615.950	24.2500	330.200	13.0000	330.200	13.0000	6.4	1.6	4 310	11 700		**4TRS19B**	1-P	0.44	1.54	2.3	240
	19.0000	615.950	24.2500	330.200	13.0000	330.200	13.0000	3.2	1.6	4 360	11 800		**4TRS19C**	2	0.4	1.68	2.5	229
	19.0000	615.950	24.2500	330.200	13.0000	330.200	13.0000	3.2	1.6	4 510	12 400		**4TRS19D**	2-P	0.4	1.68	2.5	239
	19.0000	615.950	24.2500	385.000	15.1575	385.000	15.1575	6.4	1.6	5 270	15 000		**47TS976239**	1-P	0.33	2.03	3.02	278
	19.0000	615.950	24.2500	420.000	16.5354	420.000	16.5354	6.4	1.6	5 090	14 500		**47TS976242**	1	0.33	2.03	3.02	302
	19.0000	615.950	24.2500	425.000	16.7323	425.000	16.7323	6.4	1.6	5 090	14 500		**47TS976243**	1	0.33	2.03	3.02	306
	19.0000	647.700	25.5000	417.512	16.4375	417.512	16.4375	6.4	1.6	6 680	17 400		**47TS976542A**	1-P	0.33	2.03	3.02	382

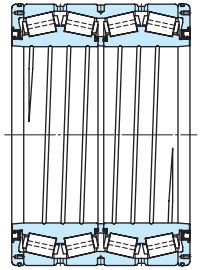
[Note] 1) SP indicates the specially chamfered form.

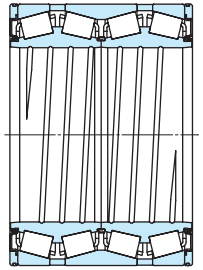
Sealed type four-row tapered roller bearings

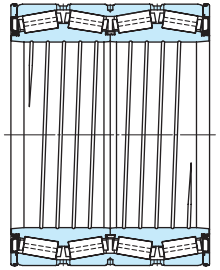
d 488.950 ~ 800 mm



Design 1


Design 1-P

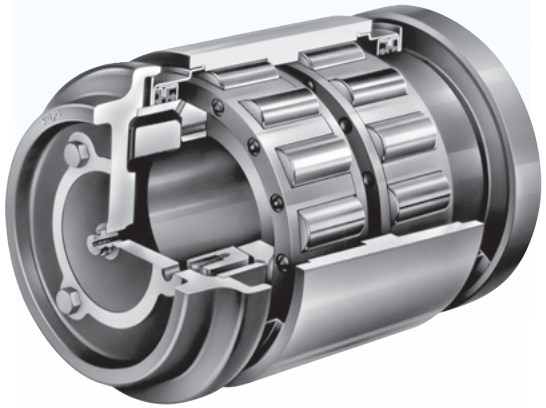

Design 2


Design 2-P

Boundary dimensions										Basic load ratings (kN)			Bearing No.	Design	Constant	Axial load factors		(Refer.) Mass
d mm	1/25.4	D mm	1/25.4	T mm	1/25.4	W mm	1/25.4	r min.	r_1 [1] min.	C_r	C_{0r}				e	Y_2	Y_3	(kg)
488.950	19.2500	622.300	24.5000	365.125	14.3750	365.125	14.3750	6.4	1.5	4 320	12 200		**47TS986236**	1	0.4	1.68	2.5	270
492	—	655	—	480	—	480	—	5	1.5	7 450	21 200		**47TS986648**	1-P	0.33	2.03	3.02	449
509.948	20.0767	654.924	25.7844	379.000	14.9213	377.000	14.8425	6.4	1.5	5 370	15 200		**4TRS510B**	1-P	0.41	1.64	2.44	320
530	—	715	—	590	—	590	—	5	1.5	10 300	28 900		**4TRS530A**	1-P	0.26	2.55	3.8	664
558.800	22.0000	736.600	29.0000	372.263	14.6560	372.263	14.6560	7	SP	6 910	16 100		**4TRS559J**	1-P	0.34	1.97	2.93	425
	22.0000	736.600	29.0000	409.575	16.1250	409.575	16.1250	6	1.5	6 850	18 600		**4TRS559C**	1-P	0.35	1.95	2.9	475
	22.0000	736.600	29.0000	450.000	17.7165	450.000	17.7165	6	1.5	7 180	19 700		**4TRS559A**	1-P	0.35	1.95	2.9	507
	22.0000	736.600	29.0000	480.000	18.8976	480.000	18.8976	6	1.5	7 960	22 700		**4TRS559B**	1-P	0.4	1.68	2.5	547
	22.0000	736.600	29.0000	500.000	19.6850	500.000	19.6850	6	1.6	8 220	23 100		**4TRS559**	1-P	0.35	1.95	2.9	560
585.788	23.0625	771.525	30.3750	479.425	18.8750	479.425	18.8750	6.4	1.5	8 730	24 400		**4TRS586A**	1-P	0.33	2.03	3.02	613
595.312	23.4375	844.550	33.2500	615.950	24.2500	615.950	24.2500	6.4	3.6	12 700	32 200		**4TRS595B**	1-P	0.33	2.03	3.02	1 120
600	—	870	—	700	—	700	—	5	4	15 100	39 400		**4TRS600A**	1-P	0.33	2.03	3.02	1 370
609.600	24.0000	787.400	31.0000	361.950	14.2500	361.950	14.2500	6.4	3.2	5 920	14 900		**4TRS610**	1-P	0.4	1.68	2.5	430
	24.0000	813.562	32.0300	540.000	21.2598	540.000	21.2598	6.4	1.5	10 200	28 500		**4TRS610A**	1-P	0.33	2.03	3.02	775
679.450	26.7500	901.700	35.5000	552.450	21.7500	552.450	21.7500	6.4	3	11 100	30 600		**4TRS679**	1-P	0.33	2.03	3.02	951
685.800	27.000	876.300	34.5000	355.600	14.0000	352.425	13.8750	6.4	3.2	6 130	16 300		**4TRS686A**	1-P	0.42	1.62	2.42	520
704.850	27.7500	914.400	36.0000	552.450	21.7500	552.450	21.7500	6.4	3.2	11 300	33 400		**4TRS705**	1-P	0.33	2.03	3.02	940
711.200	28.0000	914.400	36.0000	317.500	12.5000	317.500	12.5000	3.2	SP	6 070	16 700		**4TRS711N**	2-P	0.46	1.47	2.19	507
	28.0000	914.400	36.0000	387.350	15.2500	387.350	15.2500	6.4	3.2	7 160	19 400		**4TRS711A**	1-P	0.38	1.78	2.65	615
	28.0000	914.400	36.0000	410.000	16.1417	410.000	16.1417	6.4	3.2	7 610	20 500		**4TRS711**	1-P	0.44	1.54	2.29	670
	28.0000	914.400	36.0000	420.000	16.5354	420.000	16.5354	6.4	3.2	7 870	22 200		**4TRS711L**	1-P	0.4	1.68	2.5	678
800	—	1 130	—	780	—	780	—	6	1.5	21 900	58 800		**4TRS800**	1-P	0.26	2.55	3.8	2 520

[Note] 1) SP indicates the specially chamfered form.

Bearings for railway rolling stock axle journals



Bearings used to support rolling stock axle journals are required to be very strong and, at the same time, to be small because of limited space.

Double-row bearings that are larger in width than general bearings are popular in that they are compact and have high load ratings.

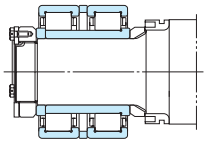
■ Cylindrical roller bearings

- Feature good high-speed performance, and can be maintained and inspected easily because of their separable structure.
  Most commonly used bearing.
- Those with a rib next to the inner ring are able to support not only radial load but also a certain degree of axial load, so that a ball bearing is not required to accommodate the axial load.

■ Sealed type cylindrical roller bearing units and tapered roller bearing units

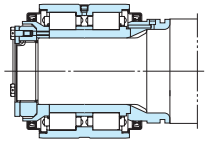
- Maintenance-free : pre-lubricated with grease and provided with oil seals.
- Can be used with a simplified axle box, or with an adapter instead.
- The inch series axle bearing units (ABU) are as specified in the "association of american rail-roads".

Cylindrical roller bearings



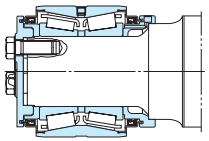
Bore diameter **85 – 133** mm

Sealed type cylindrical roller bearing units



Bore diameter **95 – 120** mm

Sealed type tapered roller bearing units(ABU)



Bore diameter **101.600 – 177.787** mm

Tolerances	● Cylindrical roller and axial load support ball bearings : as specified in JIS B 1514-1, class 0 (Table 7-3 on pp. A 54–A 57). (The tolerances for cylindrical roller bearing width and overall width are as shown in Table 1.) ● Metric series ABU bearings: refer to Table 2. ● Inch series ABU bearings : refer to Table 3.
Recommended fits	Refer to Table 4.
Radial internal clearance	● Cylindrical roller bearings : class C 3 UIC* standard cylindrical roller bearings : class C 4 (refer to Table 10-8 on p. A 100.) ● Axial load support ball bearings : class C 5 However, the clearance class should be adjusted according to the axle box structure. Consult with JTEKT for further information. ● ABU bearings : class C 3 (refer to Table 10-10 on p. A 104) *Denotes that the bearings are compatible with axle journals and axle boxes standardized by the UIC.

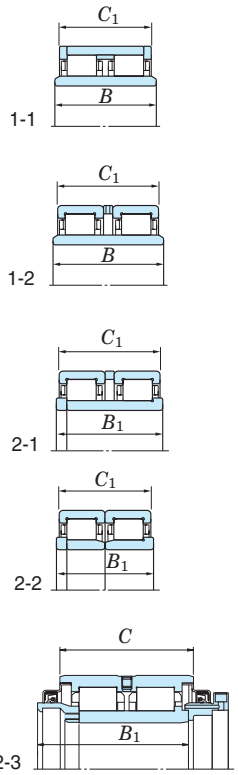
Table 1 Cylindrical roller bearings for axle journals : tolerances for inner ring width, outer ring width and overall width

(1) Tolerances for inner ring width and inner ring overall width Unit : μm

Bearing type	Design	Nominal bore diameter d (mm) over	up to	Δ_{Bs} or Δ_{B1s} upper	lower
Inner ring one-piece type, Inner ring with a rib and loose rib	1-1, 1-2 2-1, 2-3	80	120	0	− 400
		120	180	0	− 500
Two inner rings and spacer	2-2	80	120	0	− 600
		120	180	0	− 700

(2) Tolerances for outer ring width and outer ring overall width Unit : μm

Bearing type	Design	Nominal bore diameter d (mm) over	up to	Δ_{Cs} or Δ_{C1s} upper	lower
Outer ring one-piece type	2-3	80	120	0	− 300
		120	180	0	− 350
Outer ring and two loose ribs	1-1	80	120	+ 100	− 200
		120	180	+ 100	− 250
Two outer rings	2-1[1)]	120	180	0	− 500
Two outer rings and spacer	1-2 2-1, 2-2	80	120	0	− 500
		120	180	0	− 600



[Note] 1) (2-1) means that spacer shown in Design 2-1 is removed.

Table 2 Metric series ABU bearing tolerances Unit : μm

Nominal bore diameter d (mm)	Single plane mean bore diameter deviation Δ_{dmp} upper	lower	Single plane mean outside diameter deviation Δ_{Dmp} upper	lower	Single outer ring width deviation Δ_{Cs} upper	lower	Actual overall width of inner rings deviation Δ_{B1s} upper	lower
110	0	− 20	0	− 125	+ 50	− 50	+ 500	− 500
120	0	− 20			+ 100	− 100		
130	0	− 25			+ 100	− 100		

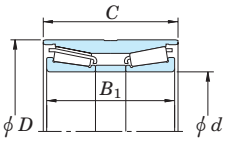


Table 3 Inch series ABU bearing tolerances Unit : μm

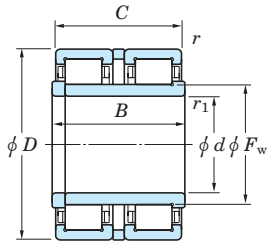
Nominal bore diameter d (mm)	Single plane mean bore diameter deviation Δ_{dmp} upper	lower	Single plane mean outside diameter deviation Δ_{Dmp} upper	lower	Single outer ring width deviation Δ_{Cs} upper	lower	Actual overall width of inner rings deviation Δ_{B1s} upper	lower
101.6to177.8	+ 25	0	+ 127	0	+ 50	− 250	+ 710	− 510

Table 4 Axle journal bearing recommended fits

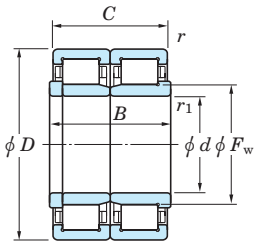
Bearing type	Axle journal diameter (mm) over	up to	Axle journal tolerance class	Axle box bore tolerance class
Cylindrical roller bearing Tapered roller bearing	50	100	(m 6), n 6	H 7
	100	140	n 6	
	140	240	p 6	
Axial load support deep groove ball bearing	All diameters		k 5	Clearance fit (clearance of approx. 0.2 to 0.6 mm)

Cylindrical roller bearings for railway rolling stock axle journals

d 85 ~ (120) mm



Design 1

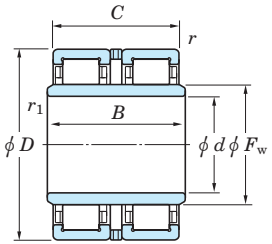


Design 2

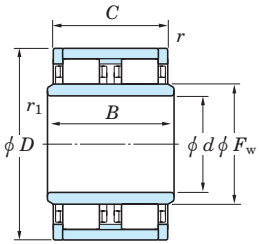
Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.[2]	Design[3]	(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1[1] min.	C_r	C_{0r}			
85	150	130	120	101.5	1.1	(7)	369	592	**2U2217SC**	3	8.6
90	160	88	80	107	2	2	355	529	**2CR90D**	1	7.2
95	170	120	105	114	1.1	(10)	497	804	**2UJ95**	4	10.9
	170	125	115	113.5	2.5	(7)	441	687	**2CR95A**	1	11.5
	170	130	130	114	2	2	441	688	**2UJ1917**	3	11.4
	170	140	125	114	1.1	(10)	555	926	**4UJ95**	5	12.7
100	180	150	134	120	1.1	(10)	594	990	**4UJ100**	5	15.1
	190	140	130	122	2.5	(7)	697	1 120	**20DC19130/140**	3	16.9
	200	170	170	125	2	(7)	755	1 160	**2CR100**	1	23.7
	200	170	170	125	2	(10)	755	1 160	**20DC20170**	3	23.2
110	200	180	160	134	1.1	(7)	721	1 190	**JC3**	5	22.6
	220	180	160	138	2.5	(7)	789	1 190	**JC6**	1	30.0
	220	185	180	138	2	(7)	922	1 460	**2CR110**	1	31.3
	225	150	140	138	1.1	(7)	833	1 230	**JC1A**	4	27.7
	225	150	140	138	2.5	(7)	897	1 350	**22DC23140/150**	3	26.7
	235	180	160	141	2.5	(7)	934	1 430	**JC2A**	3	35.3
116	220	185	180	142	2	(7)	891	1 470	**2CR116**	1	30.5
	225	150	140	197.5	1.1	(7)	786	1 220	**2UJ116**	4	26.0
120	225	170	165	145	3	(10)	876	1 380	**JC35**	1	29.4
	230	170	165	145	3	(10)	943	1 460	**JC34**	1	30.8
	230	177	150	145	3	(30)	943	1 460	**JC27X**	(1)	29.7
	240	160	160	150	3	7.5	961	1 500	**(24NJ/NJP2480)**	2	33.9
	240	180	160	150	1.1	(10)	1 020	1 580	**JC11**	4	35.5
	240	180	176	150	3	(7)	1 020	1 580	**JC12**	1	37.7

[Notes] 1) Values in ( ) indicate axial chamfer dimension.
2) Bearings indicated in ( ) are in accordance with UIC standards.
3) (1) means that the inner ring (rib side) shown in Design 1 has a special form.
(2) means that loose rib shown in Design 2 is replaced with thrust collar.

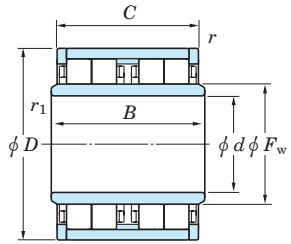
d (120) ~ 133 mm



Design 3



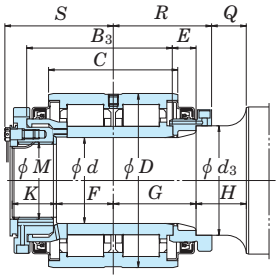
Design 4



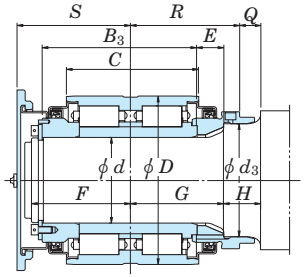
Design 5

Boundary dimensions (mm)							Basic load ratings (kN)		Bearing No.[2]	Design[3]	(Refer.) Mass (kg)
d	D	B	C	F_w	r min.	r_1[1] min.	C_r	C_{0r}			
120	240	185	180	150	2	(7)	983	1 600	**2CR120A**	1	37.8
130	220	170	160	152	1.1	0.6	865	1 520	**4UJ130B**	5	25.2
	240	160	160	157	3	5	867	1 390	**(2CR2624A)**	2	32.0
	240	180	160	158	1.1	(10)	970	1 610	**4UJ130A**	5	35.8
	240	204	198	157	3	5	867	1 390	**(2CR2624)**	2	35.4
	250	160	160	158	3	7.5	1 090	1 720	**(26NJ/NJP2580)**	2	36.4
	260	180	160	163	1.1	(10)	1 080	1 710	**JC5**	4	42.7
	260	185	180	163	3	(7)	1 030	1 610	**2CR130A**	1	44.2
	260	186	172	164	3	7.5	1 220	1 930	**26NJ/NUJ2686**	(2)	44.6
	260	205.5	180	163	3	(30)	1 030	1 610	**JC21**	(1)	45.1
	270	215	210	164	4	(15)	1 280	2 000	**JC29**	3	55.1
	280	215	210	167	4	(15)	1 440	2 250	**JC9-1**	3	61.4
133	280	215	210	167	4	(15)	1 440	2 250	**JC9-2**	3	59.8

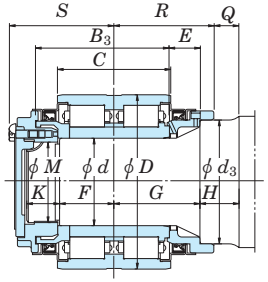
d 95 ~ 120 mm



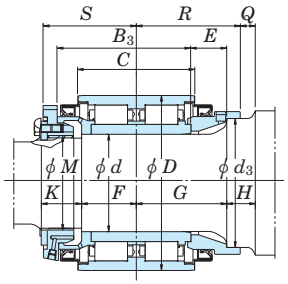
Design 1



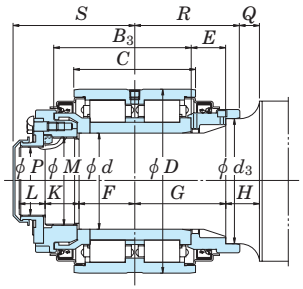
Design 2



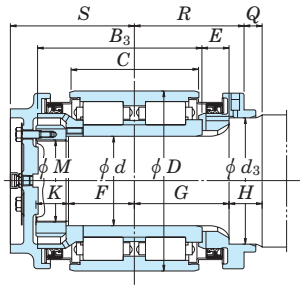
Design 3



Design 4

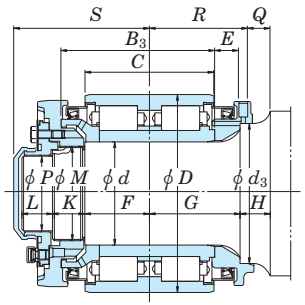


Design 5

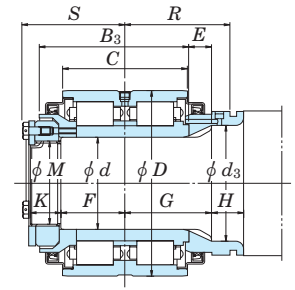


Design 6

Shaft dia. (mm) d	Unit No.	Design	Boundary dimensions (mm) d Brg.	D	C	B_3	d_3	E	F	G	H	K	L	M	P	Q	R	S	Bearing No.	Basic load ratings (kN) C_r	C_{0r}	(Refer.) Unit Mass (kg)
95	JB1425	1	95	190	140	158	120	25	62	90	35	48	—	M85×4	—	18	107	119	19RDC19140/158	610	910	24.5
100	JB1199B	2	100	195	150	175	130	30	120	105	42	—	—	—	—	24	123	130	20RDC20150/133B	673	1 040	27.5
110	JB1462	3	110	220	145	171	155	39	70	110	50	42	—	M100×2	—	33	127	134	S-JC33	789	1 190	35.9
120	JB1356	4	120	220	150	170	158	46	70	116	36	51	—	M115×4	—	19	133	131	24RDC22150/170	702	1 110	34.9
	JB1380D	5	120	230	150	171	155	43	70	113	42	42	33	M110×2	85	25	130	152	JC32	831	1 290	39.0
	JB1010	6	120	240	170	218	168	35	87	125	45	43	—	M110×2	—	25	145	164	JC17	1 020	1 580	57.7
	JB1240	7	120	240	160	193	168	31	80	113	38	40	38	M110×2	85	27	128	169	JC26	935	1 420	51.1
	JB1377	8	120	240	160	192	150	30	83	112	40	38	—	M110×4	—	—	135	131	24RDC24160/192A	935	1 420	42.0



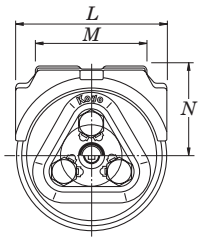
Design 7

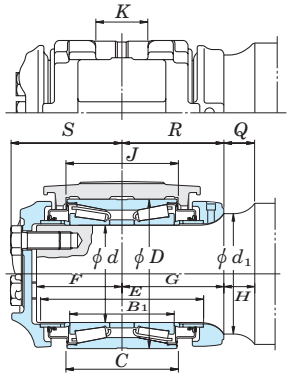


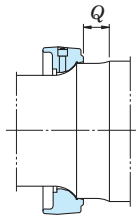
Design 8

Sealed type tapered roller bearings for railway rolling stock axle journals (ABU bearing)

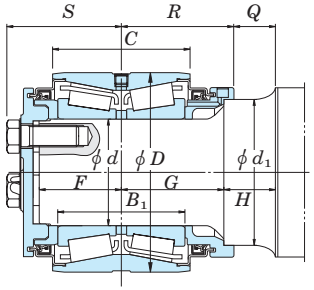
d 101.6 ~ 177.787 mm
110 ~ 130 mm



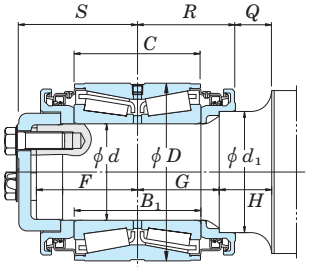




The shape of the backing ring used for JB1204P, JB1205P and JB1206P.



JB1486



JB1450

Dynamic equivalent load
(when $F_a/F_r \leqq e$)
$P=F_r+Y_2F_a$
(when $F_a/F_r > e$)
$P=0.67F_r+Y_3F_a$
Static equivalent load
$P_0=F_r+Y_0F_a$

Class	Axle size	Unit No.	Boundary dimensions (mm) d Brg.	d Axle[1]	D	B_1	C	d_1[1]	E	F	G	H	Q	R	S	Adapter No.	Dimensions of adapter (mm) J	K	L	M	N	Bolt size	Dimensions (mm) p	Bearing No.	Basic load ratings (kN) C_r	C_{0r}	Constant e	Axial load factors Y_2	Y_3	Y_0	(Refer.) Mass (kg) Unit	Adapter
B	4 1/4×8	JB1201	101.600	101.702 101.676	165.100	106.362	114.300	127.0	182.6	101.6	117.5	41.3	41.3	117.5	134.8	JB701	117.5	68.3	165.9	124.6	101.6	3/4-10 UNC	61.9	HM120848/ HM120817XD	402	769	0.26	2.55	3.80	2.50	17.3	3.8
C	5 ×9	JB1202	119.062	119.164 119.139	195.262	136.525	142.875	149.2	217.5	112.7	134.9	36.5	36.5	134.9	147.0	JB702	146.0	74.6	196.1	143.7	117.5	7/8-9 UNC	76.2	HM124646/ HM124618XD	626	1 200	0.26	2.55	3.80	2.50	25.3	6.1
D	5 1/2×10	JB1203	131.750	131.864 131.839	207.962	146.050	152.400	161.9	227.0	115.9	139.7	44.5	44.5	139.7	150.5	JB703	155.6	74.6	208.8	156.4	123.8	7/8-9 UNC	88.9	HM127446/ HM127415XD	641	1 270	0.26	2.55	3.80	2.50	28.3	7.4
E	6 ×11	JB1204	144.450	144.564 144.539	220.662	155.575	163.512	177.8	241.3	127.0	150.8	46.0	46.0	150.8	164.1	JB704	166.7	96.8	221.5	181.8	136.5	1-8 UNC	98.4	HM129848/ HM129814XD	667	1 380	0.26	2.55	3.80	2.50	34.3	10.8
		JB1204P	144.450	144.564 144.539	220.662	155.575	163.512	178.613 178.562	241.3	127.0	150.8	46.0	36.8	160.0	164.1	JB704	166.7	96.8	221.5	181.8	136.5	1-8 UNC	98.4	HM129848/ HM129814XD	667	1 380	0.26	2.55	3.80	2.50	35.0	10.8
F	6 1/2×12	JB1205	157.150	157.264 157.239	252.412	177.800	184.150	190.5	273.0	134.9	163.5	46.0	46.0	163.5	176.6	JB705	187.3	96.8	253.2	194.5	152.4	1 1/8-7 UNC	108.0	HM133444/ HM133416XD	910	1 890	0.26	2.55	3.80	2.50	51.6	16.3
		JB1205P	157.150	157.264 157.239	252.412	177.800	184.150	191.313 191.262	273.0	134.9	163.5	46.0	36.7	172.8	176.6	JB705	187.3	96.8	253.2	194.5	152.4	1 1/8-7 UNC	108.0	HM133444/ HM133416XD	910	1 890	0.26	2.55	3.80	2.50	52.4	16.3
G	7 ×12	JB1206P	177.787	177.902 177.876	276.225	180.975	185.738	203.251 203.200	269.9	130.2	150.8	58.7	46.0	163.5	180.1	JB706[2]	189.7	181.0	—	279.4	168.3	1 1/4-7 UNC	117.5	HM136948/ HM136916XD	1 080	2 220	0.26	2.55	3.80	2.50	59.2	23
—	110	JB558	110	110.076 110.054	175	125	130	155	206	105	135	30	30	135	136.4	JB558	134	70	175	135	110	M22	75	JT9	481	972	0.26	2.55	3.80	2.50	22.0	5.6
—		JB1486	110	110.059 110.037	205	130	140	150.068 150.043	—	85	105	53	43	115	118.4	—	—	—	—	—	—	M22	75	JT13	743	1 220	0.26	2.55	3.80	2.50	27.3	—
—	120	JB613	120	120.076 120.054	195	136	142	155	217	113	135	30	30	135	147.5	JB613	146	74.5	196	142.5	118	M22	75	JT10	626	1 200	0.26	2.55	3.80	2.50	27.0	6.2
—		JB1450	120	120.059 120.037	220	155	155	150.068 150.043	—	125	100	55	35	120	164.4	—	—	—	—	—	—	M22	75	JT12	907	1 670	0.26	2.55	3.80	2.50	36.6	—
—	130	JB633	130	130.076 130.054	208	146	152	165	227	139	139	26	26	139	149.2	JB633[2]	156	110	255	232	130	M22	89	JT11	641	1 270	0.26	2.55	3.80	2.50	30.0	14.3

[Notes] 1) Upper figures : max. value ; lower : min.value

2) JB706 and JB633 indicate the specifications of wide adapters.
Others indicate narrow adapters (shown in figures above).

Linear ball bearings

Linear ball bearings have an outer cylinder and a cage with three or more elliptic raceways inside.
Balls are aligned on these raceways.

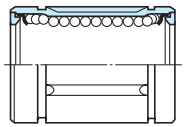
	Ball complement bore diameter (mm)
SDM series	6 –120
SDMF, SDMK series	6 – 80
SDE series	5 – 80

Standard type	Clearance adjustable type	Open type
		
Suitable for a wide range of applications and widely used in practice. The upper-class type is used for general purposes. The precision-class type is used when the bearing is required to be highly accurate.	The outer cylinder and side plate are slit axially so that the clearance between the bearing and shaft can be adjusted. Together with the use of a boreadjustable housing, a no-clearance state or light-preloaded state can be realized without fitting.	The outer cylinder and side plate each have a slit which is equivalent in size to a recirculating ball row raceway, so that the bearing does not interfere with a shaft strut during operation. This type is suitable for use with very long shafts. The bore diameter is adjustable.

Flanged type

Can be fit quickly, and helps make equipment smaller and lighter in weight. Helps reduce cost.

Sealed type



One or both side(s) is/are sealed with special synthetic rubber so that foreign material cannot enter the bearing while the grease is kept from leaking. This sealing can be provided on all bearings of the standard, clearance adjustable, open, and flanged types.

Bearing numbering system

SDM	35	UU	AJ	□□	□
Series code	Ball complement bore diameter number	Seal code	Shape code	Material code	Tolerance code

Series code		SDM : metric series SDMF : metric series (flanged type) SDMK : metric series (flanged type) SDE : metric series (popular ones in europe) SDB : inch series
Ball complement bore diameter number	Metric series	35 : ball complement bore diameter 35 mm
	Inch series	4 : ball complement bore diameter 4/16 = 1/4 inch
Seal code		UU : both sides sealed U : single side sealed Not specified : not sealed
Shape code		Not specified : standard type AJ : clearance adjustable type OP : open type
Material code	Outer cylinder and balls	Not specified : high carbon chrome bearing steel
	Cage	Not specified : cold rolled steel sheet MG : synthetic resin
Tolerance code		Not specified : upper-class P : precision-class

Linear ball bearing service life

Linear ball bearing service life refers to the distance that the bearing travels until the outer cylinder, balls or shaft become damaged because of rolling contact fatigue from repeated stress.

The basic dynamic load rating refers to the magnitude of a constant load which makes a bearing's service life end after it travels a distance of 50 km.

The linear ball bearing service life and the basic dynamic load rating bear the relation shown below :

$$L = 50\left(\frac{C}{P}\right)^3$$

where :

L : service life km
P : radial load on the bearing N
C : bearing basic dynamic load rating N
(refer to the specification table.)

Shaft surface hardness is closely related to running performance. In general, it is best for the hardness to be 60 thru 64 HRC.

If the hardness is 60 HRC or lower, the basic dynamic load rating (C) should be corrected by multiplying it by the appropriate hardness coefficient selected from Table 1.

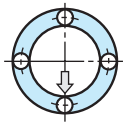
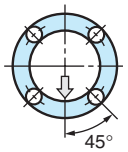
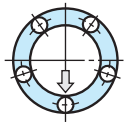
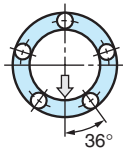
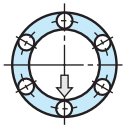
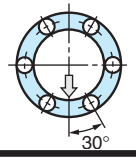
Table 1 Hardness coefficients

Shaft hardness HRC	Hardness coefficient f_H
60	1
59	0.97
57	0.88
55	0.76
53	0.64
51	0.52

● Ball row arrangement and load rating

The basic load ratings given in the specification table are those measured when a load is applied directly above a ball row (Q_1). When the load is applied between two ball rows, the load ratings become larger (Q_2). Table 2 lists the ratios of Q_2 ratings to Q_1 ratings.

Table 2 Ball row arrangement and the comparison of load ratings

Number of ball rows	When a load is applied directly above a row (Q_1)	When a load is applied between two rows (Q_2)	Ratios of Q_2 to Q_1
4			1.414
5			1.463
6			1.280

[Note] When there are only three rows, $Q_2 / Q_1 = 1$

Recommended fits for linear ball bearings

Table 3 lists the recommended fits for linear ball bearings.

When a bearing is mounted with a housing, the normal clearance fit should be selected. When the application is highly precise or special, the transition fit should be selected.

For the clearance adjustable and open type bearings, it is best for the shaft diameter to be smaller than the ball complement bore diameter lower deviation, and for the housing bore diameter to be larger than the bearing outside diameter upper deviation.

Table 3 Linear ball bearing recommended fits

Bearing	Tolerance	Shaft tolerance class		Housing bore tolerance class	
		Normal clearance	Close clearance	Clearance fit	Transition fit
SDM, SDB	Upper-class	f 6, g 6	h 6	H 7	JS 7 (J 7)
	Precision-class	f 5, g 5	h 5	H 6	JS 6 (J 6)
SDE	–	h 6	js 6 (j 6)	H 7	JS 7 (J 7)

Linear ball bearing clearance

Linear ball bearings provide linear motion smoothly with little wear when the clearance is 0.003 to 0.012 mm. However, when clearance increase due to wear is considered critical, e.g. when the bearing is provided to press die sets, precision machine tools or precision testers; when the bearing becomes unable to slide because of moment; or when smooth bearing operation is needed with no clearance provided, the clearance is adjusted to zero or negative.

In such a case, shafts generally need to be mounted by "selective fitting."

They should be handled carefully so as not to be preloaded excessively.

As Fig. 1 shows, the clearance of bearings with numbers SDM 6 thru SDM 10 can be easily set to zero or negative, by adjusting one of the three ball rows with a bolt.

Consult with JTEKT on the gauging of linear ball bearings and shafts which should be mounted by "selective fitting," as well as on the whole design of shafts.

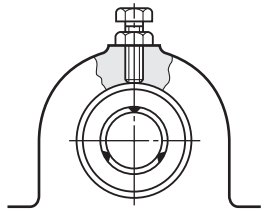


Fig. 1 Clearance adjustment

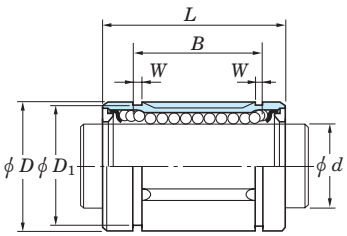
Table 4 SDM series linear ball bearing tolerances Unit : μm

Bearing number SDM	Ball complement bore diameter (F_w) deviation				Outside diameter (D) deviation		Overall length (L) deviation		B deviation		Eccentricity	
	Precision-class		Upper-class								Precision-class	Upper-class
	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	max.	
6, 8	0	– 6	0	– 9	0	– 11	0	– 200	0	– 200	8	12
10, 12, 13, 16	0	– 6	0	– 9	0	– 13	0	– 200	0	– 200	8	12
20	0	– 7	0	– 10	0	– 16	0	– 200	0	– 200	10	15
25, 30	0	– 7	0	– 10	0	– 16	0	– 300	0	– 300	10	15
35, 38, 40, 50	0	– 8	0	– 12	0	– 19	0	– 300	0	– 300	12	20
60	0	– 9	0	– 15	0	– 22	0	– 300	0	– 300	17	25
80	0	– 9	0	– 15	0	– 22	0	– 400	0	– 400	17	25
100, 120	0	– 10	0	– 20	0	– 25	0	– 400	0	– 400	20	30

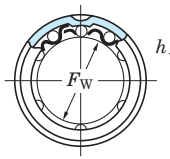
Table 5 SDE series linear ball bearing tolerances Unit : μm

Bearing number SDE	Ball complement bore diameter (F_w) deviation		Outside diameter (D) deviation		Overall length (L) deviation		B deviation		Eccentricity
	upper	lower	upper	lower	upper	lower	upper	lower	max.
5, 8	+ 8	0	0	– 8	0	– 200	0	– 200	12
10, 12	+ 8	0	0	– 9	0	– 200	0	– 200	12
16	+ 9	– 1	0	– 9	0	– 200	0	– 200	12
20	+ 9	– 1	0	– 11	0	– 200	0	– 200	15
25, 30	+ 11	– 1	0	– 11	0	– 300	0	– 300	15
40, 50	+ 13	– 2	0	– 13	0	– 300	0	– 300	17
60	+ 13	– 2	0	– 15	0	– 400	0	– 400	20
80	+ 16	– 4	0	– 15	0	– 400	0	– 400	20

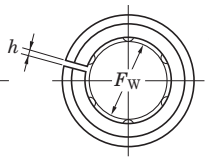
d 5 ~ (20) mm



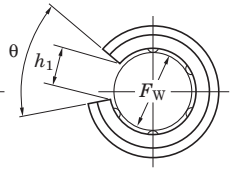
SDM, SDE



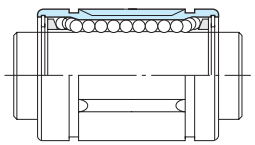
Standard type

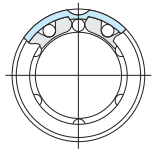


Clearance adjustable type (...AJ)



Open type (...OP)



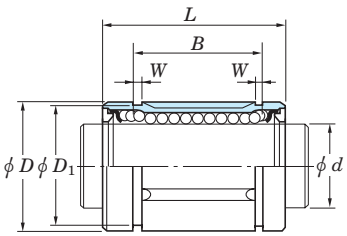


SDM...MD

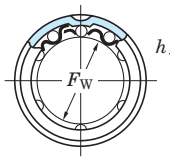
Shaft dia. (mm)	Dimensions (mm)									Bearing No.[1]				No. of ball rows			Basic load ratings (N)		(Refer.) Mass (g)
d	F_w	D	L	B	W	D_1	h	h_1	θ	Standard type	Clearance adjustable type	Open type		Standard type	Clearanece adjustable type	Open type	C_r	C_{0r}	Standard type
5	5	12	22	14.5	1.1	11.5	—	—	—	**SDE5**	—	—		3	—	—	108	183	10
6	6	12	19	13.5	1.1	11.5	1	—	—	**SDM6**	**SDM6AJ**	—		3	3	—	108	186	7
	6	12	19	13.5	1.1	11.5	1	—	—	**SDM6MG**	**SDM6AJMG**	—		4	4	—	108	186	6
8	8	15	17	11.5	1.1	14.3	1	—	—	**SDM8S**	**SDM8SAJ**	—		3	3	—	96	160	10
	8	15	17	11.5	1.1	14.3	1	—	—	**SDM8SMG**	**SDM8SAJMG**	—		4	4	—	96	160	9
	8	15	24	17.5	1.1	14.3	1	—	—	**SDM8**	**SDM8AJ**	—		3	3	—	122	223	14
	8	15	24	17.5	1.1	14.3	1	—	—	**SDM8MG**	**SDM8AJMG**	—		4	4	—	134	255	13
	8	16	25	16.5	1.1	15.2	1	—	—	**SDE8**	**SDE8AJ**	—		3	3	—	122	223	20
	8	16	25	16.5	1.1	15.2	1	—	—	**SDE8MG**	**SDE8AJMG**	—		4	4	—	134	255	18
10	10	19	29	22	1.3	18	1	6.8	80°	**SDM10**	**SDM10AJ**	**SDM10OP**		4	4	3	259	424	27
	10	19	29	22	1.3	18	1	—	—	**SDM10MG**	**SDM8AJMG**	—		4	4	—	259	424	23
	10	19	29	22	1.3	18	1	6.8	80°	**SDE10**	**SDE10AJ**	**SDE10OP**		4	4	3	259	424	27
	10	19	29	22	1.3	18	1	—	—	**SDE10MG**	**SDE10AJMG**	—		4	4	—	259	424	23
12	12	21	30	23	1.3	20	1.5	8	80°	**SDM12**	**SDM12AJ**	**SDM12OP**		4	4	3	260	431	31
	12	21	30	23	1.3	20	1.5	—	—	**SDM12MG**	**SDM12AJMG**	—		4	4	—	260	431	27
	12	22	32	22.9	1.3	21	1.5	7.5	78°	**SDE12**	**SDE12AJ**	**SDE12OP**		4	4	3	289	503	42
	12	22	32	22.9	1.3	21	1.5	—	—	**SDE12MG**	**SDM12AJMG**	—		4	4	—	289	503	37
13	13	23	32	23	1.3	22	1.5	9	80°	**SDM13**	**SDM13AJ**	**SDM13OP**		4	4	3	289	506	41
	13	23	32	23	1.3	22	1.5	—	—	**SDM13MG**	**SDM13AJMG**	—		4	4	—	289	506	35
16	16	26	36	24.9	1.3	24.9	1.5	10	78°	**SDE16**	**SDE16AJ**	**SDE16OP**		4	4	3	319	587	53
	16	26	36	24.9	1.3	24.9	1.5	—	—	**SDE16MG**	**SDE16AJMG**	—		4	4	—	319	587	47
	16	28	37	26.5	1.6	27	1.5	11	80°	**SDM16**	**SDM16AJ**	**SDM16OP**		4	4	3	480	766	69
	16	28	37	26.5	1.6	27	1.5	—	—	**SDM16MG**	**SDM16AJMG**	—		4	4	—	480	766	59
20	20	32	42	30.5	1.6	30.5	1.5	11	60°	**SDM20**	**SDM20AJ**	**SDM20OP**		5	5	4	590	1 010	92
	20	32	42	30.5	1.6	30.5	1.5	—	—	**SDM20MG**	**SDM20AJMG**	—		5	5	—	590	1 010	79

[Note] 1) JTEKT also manufactures sealed types, which are identified by U (one side sealed) or UU (both sides sealed) after ball complement bore diameter number.

d (20) ~ 80 mm



SDM, SDE



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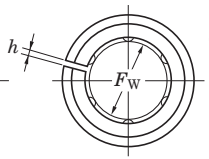
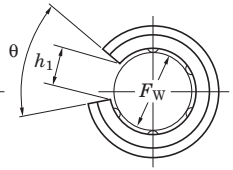
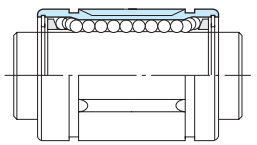
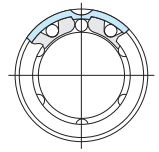


Clearance adjustable type (...AJ)



Open type (...OP)



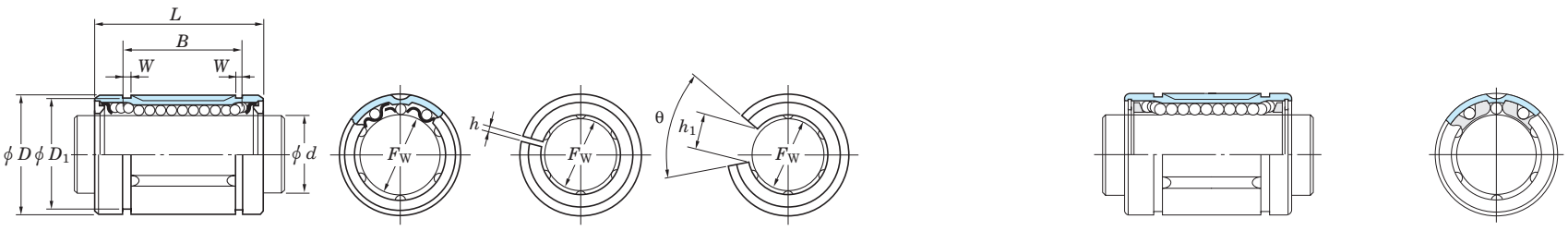


SDM...MD

Shaft dia. (mm)	Dimensions (mm)									Bearing No.[1]			No. of ball rows			Basic load ratings (N)		(Refer.) Mass (g)
d	F_w	D	L	B	W	D_1	h	h_1	θ	Standard type	Clearance adjustable type	Open type	Standard type	Clearanece adjustable type	Open type	C_r	C_{0r}	Standard type
20	20	32	45	31.5	1.6	30.3	2	10	60°	**SDE20**	**SDE20AJ**	**SDE20OP**	5	5	4	590	1 010	96
	20	32	45	31.5	1.6	30.3	2	—	—	**SDE20MG**	**SDE20AJMG**	—	5	5	—	590	1 010	88
25	25	40	58	44.1	1.85	37.5	2	12.5	60°	**SDE25**	**SDE25AJ**	**SDE25OP**	5	5	4	1 130	2 030	190
	25	40	58	44.1	1.85	37.5	2	—	—	**SDE25MG**	**SDE25AJMG**	—	5	5	—	1 130	2 030	170
	25	40	59	41	1.85	38	2	12	60°	**SDM25**	**SDM25AJ**	**SDM25OP**	5	5	4	1 130	2 030	200
	25	40	59	41	1.85	38	2	—	—	**SDM25MG**	**SDM25AJMG**	—	5	5	—	1 130	2 030	170
30	30	45	64	44.5	1.85	43	2.5	15	50°	**SDM30**	**SDM30AJ**	**SDM30OP**	6	6	5	1 470	2 770	250
	30	45	64	44.5	1.85	43	2.5	—	—	**SDM30MG**	**SDM30AJMG**	—	6	6	—	1 470	2 770	220
	30	47	68	52.1	1.85	44.5	2	12.5	50°	**SDE30**	**SDE30AJ**	**SDE30OP**	6	6	5	1 470	2 770	340
	30	47	68	52.1	1.85	44.5	2	—	—	**SDE30MG**	**SDE30AJMG**	—	6	6	—	1 470	2 770	320
35	35	52	70	49.5	2.1	49	2.5	17	50°	**SDM35**	**SDM35AJ**	**SDM35OP**	6	6	5	1 580	3 070	370
	35	52	70	49.5	2.1	49	2.5	—	—	**SDM35MG**	**SDM35AJMG**	—	6	6	—	1 580	3 070	330
38	38	57	76	58.5	2.1	54.5	3	18	50°	**SDM38**	**SDM38AJ**	**SDM38OP**	6	6	5	2 020	3 600	490
40	40	60	80	60.5	2.1	57	3	20	50°	**SDM40**	**SDM40AJ**	**SDM40OP**	6	6	5	2 180	4 010	590
	40	60	80	60.5	2.1	57	3	—	—	**SDM40MG**	**SDM40AJMG**	—	6	6	—	2 180	4 010	530
	40	62	80	60.6	2.15	59	3	16.8	50°	**SDE40**	**SDE40AJ**	**SDE40OP**	6	6	5	2 180	4 010	710
	40	62	80	60.6	2.15	59	3	—	—	**SDE40MG**	**SDE40AJMG**	—	6	6	—	2 180	4 010	650
50	50	75	100	77.6	2.65	72	3	21	50°	**SDE50**	**SDE50AJ**	**SDE50OP**	6	6	5	4 020	7 110	1 050
	50	80	100	74	2.6	76.5	3	25	50°	**SDM50**	**SDM50AJ**	**SDM50OP**	6	6	5	4 420	7 150	1 500
60	60	90	110	85	3.15	86.5	3	30	50°	**SDM60**	**SDM60AJ**	**SDM60OP**	6	6	5	5 170	9 030	1 850
	60	90	125	101.7	3.15	86.5	3	27.2	54°	**SDE60**	**SDE60AJ**	**SDE60OP**	6	6	5	6 470	11 100	1 900
80	80	120	140	105.5	4.15	116	3	40	50°	**SDM80**	**SDM80AJ**	**SDM80OP**	6	6	5	8 180	12 800	4 200
	80	120	165	133.7	4.15	116	3	36.3	54°	**SDE80**	**SDE80AJ**	**SDE80OP**	6	6	5	8 890	14 500	4 800

[Note] 1) JTEKT also manufactures sealed types, which are identified by U (one side sealed) or UU (both sides sealed) after ball complement bore diameter number.

d 100 ~ 120 mm

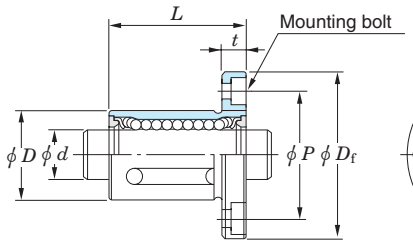


SDM, SDE | Standard type | Clearance adjustable type (...AJ) | Open type (...OP) | SDM...MD

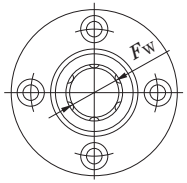
Shaft dia. (mm)	Dimensions (mm)									Bearing No.[1]				No. of ball rows			Basic load ratings (N)		(Refer.) Mass (g)
d	F_w	D	L	B	W	D_1	h	h_1	θ	Standard type	Clearance adjustable type	Open type		Standard type	Clearanece adjustable type	Open type	C_r	C_{0r}	Standard type
100	100	150	175	125.5	4.15	145	3	50	50°	**SDM100**	**SDM100AJ**	**SDM100OP**		6	6	5	12 300	19 700	8 200
120	120	180	200	158.6	4.15	175	4	85	80°	**SDM120**	**SDM120AJ**	**SDM120OP**		8	8	6	22 300	39 100	15 500

[Note] 1) JTEKT also manufactures sealed types, which are identified by U (one side sealed) or UU (both sides sealed) after ball complement bore diameter number.

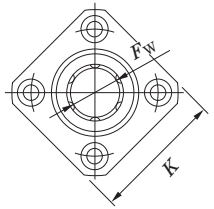
d 6 ~ 50 mm



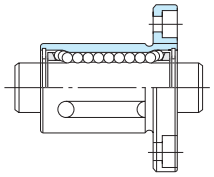
SDMF, SDMK



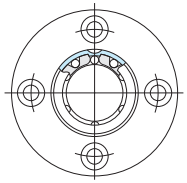
Round-flanged



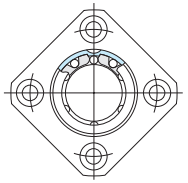
Square-flanged



SDMF...MG
SDMK...MG (Synthetic resin)



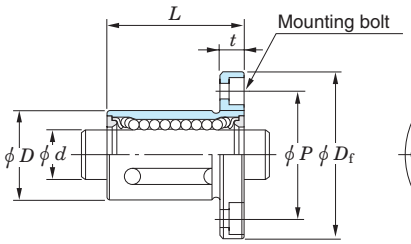
Round-flanged



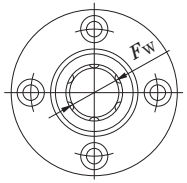
Square-flanged

Shaft dia. (mm)	Dimensions (mm)							Bolt size	Bearing No.			No. of ball rows	Basic load ratings (N)		(Refer.) Mass (g)
									Round-flanged type	Square-flanged type					Round-flanged type
d	F_w	D	L	D_f	K	t	P						C_r	C_{0r}	
6	6	12	19	28	22	5	20	M3	**SDMF6**	**SDMK6**		3	108	186	23
	6	12	19	28	22	5	20	M3	**SDMF6MG**	**SDMK6MG**		4	108	186	22
8	8	15	24	32	25	5	24	M3	**SDMF8**	**SDMK8**		3	122	223	35
	8	15	24	32	25	5	24	M3	**SDMF8MG**	**SDMK8MG**		4	134	255	34
10	10	19	29	40	30	6	29	M4	**SDMF10**	**SDMK10**		4	259	424	65
	10	19	29	40	30	6	29	M4	**SDMF10MG**	**SDMK10MG**		4	259	424	61
12	12	21	30	42	32	6	32	M4	**SDMF12**	**SDMK12**		4	260	431	72
	12	21	30	42	32	6	32	M4	**SDMF12MG**	**SDMK12MG**		4	260	431	68
13	13	23	32	43	34	6	33	M4	**SDMF13**	**SDMK13**		4	289	506	83
	13	23	32	43	34	6	33	M4	**SDMF13MG**	**SDMK13MG**		4	289	506	77
16	16	28	37	48	37	6	38	M4	**SDMF16**	**SDMK16**		4	480	766	120
	16	28	37	48	37	6	38	M4	**SDMF16MG**	**SDMK16MG**		4	480	766	110
20	20	32	42	54	42	8	43	M5	**SDMF20**	**SDMK20**		5	590	1 010	170
	20	32	42	54	42	8	43	M5	**SDMF20MG**	**SDMK20MG**		5	590	1 010	160
25	25	40	59	62	50	8	51	M5	**SDMF25**	**SDMK25**		5	1 130	2 030	290
	25	40	59	62	50	8	51	M5	**SDMF25MG**	**SDMK25MG**		5	1 130	2 030	270
30	30	45	64	74	58	10	60	M6	**SDMF30**	**SDMK30**		6	1 470	2 770	440
	30	45	64	74	58	10	60	M6	**SDMF30MG**	**SDMK30MG**		6	1 470	2 770	410
35	35	52	70	82	64	10	67	M6	**SDMF35**	**SDMK35**		6	1 580	3 070	610
	35	52	70	82	64	10	67	M6	**SDMF35MG**	**SDMK35MG**		6	1 580	3 070	560
40	40	60	80	96	75	13	78	M8	**SDMF40**	**SDMK40**		6	2 180	4 010	1 000
	40	60	80	96	75	13	78	M8	**SDMF40MG**	**SDMK40MG**		6	2 180	4 010	930
50	50	80	100	116	92	13	98	M8	**SDMF50**	**SDMK50**		6	4 420	7 150	2 000

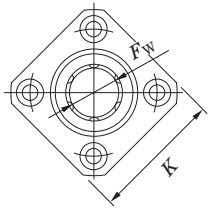
d 60 ~ 80 mm



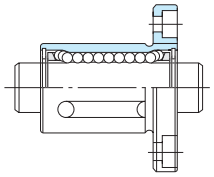
SDMF, SDMK



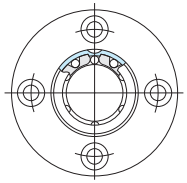
Round-flanged



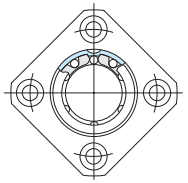
Square-flanged



SDMF...MG
SDMK...MG (Synthetic resin)



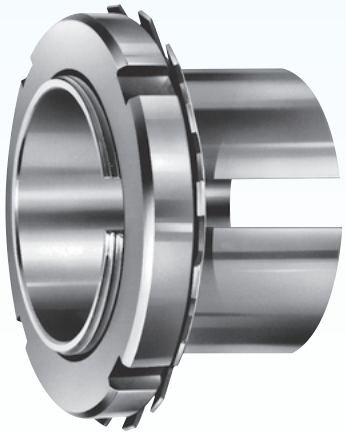
Round-flanged



Square-flanged

Shaft dia. (mm)	Dimensions (mm)							Bolt size	Bearing No.			No. of ball rows	Basic load ratings (N)		(Refer.) Mass (g)
d	F_w	D	L	D_f	K	t	P		Round-flanged type	Square-flanged type			C_r	C_{0r}	Round-flanged type
60	60	90	110	134	106	18	112	M10	**SDMF60**	**SDMK60**		6	5 170	9 030	2 800
80	80	120	140	164	136	18	142	M10	**SDMF80**	**SDMK80**		6	8 180	12 800	5 400

Locknuts, lockwashers & lock plates



Bearings are often fit to a shaft with an adapter sleeve, locknut, lockwasher or lock plate.

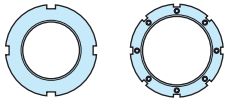
These accessories make it easy to attach and remove bearings.

They are standardized in JIS.

- Locknuts are standardized such that they can be used with either adapter sleeves, withdrawal sleeves or shafts.
- Lockwashers and lock plates are used as locks on locknuts.

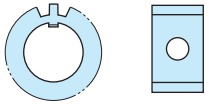
Lockwashers are used with bearings of bore diameter number 40 or lower. Lock plates are used with those of bore diameter 44 or higher.

Locknuts



AN (ANL)	02 – 100
HN (HNL)	41 – 110

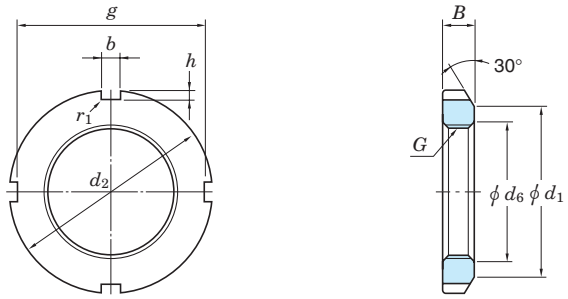
Lockwashers and lock plates



AW (AWL)	00 – 40(X)
AL (ALL)	44 – 100

Locknuts for adapter sleeves and shafts

AN02 ~ 25



Locknut No.	Thread size[1] G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	(Refer.) Mass (kg)	Applicable[2] adapter sleeve (bore No.)	Applicable[3] lockwasher No.
AN 02	M 15×1	25	21	21	15.5	4	2	5	0.4	0.010	—	AW 02
03	M 17×1	28	24	24	17.5	4	2	5	0.4	0.013	—	03
04	M 20×1	32	26	28	20.5	4	2	6	0.4	0.019	04	04
AN 05	M 25×1.5	38	32	34	25.8	5	2	7	0.4	0.025	05	AW 05
06	M 30×1.5	45	38	41	30.8	5	2	7	0.4	0.043	06	06
07	M 35×1.5	52	44	48	35.8	5	2	8	0.4	0.053	07	07
AN 08	M 40×1.5	58	50	53	40.8	6	2.5	9	0.5	0.085	08	AW 08
09	M 45×1.5	65	56	60	45.8	6	2.5	10	0.5	0.119	09	09
10	M 50×1.5	70	61	65	50.8	6	2.5	11	0.5	0.148	10	10
AN 11	M 55×2	75	67	69	56	7	3	11	0.5	0.158	11	AW 11
12	M 60×2	80	73	74	61	7	3	11	0.5	0.174	12	12
13	M 65×2	85	79	79	66	7	3	12	0.5	0.203	13	13
AN 14	M 70×2	92	85	85	71	8	3.5	12	0.5	0.242	14	AW 14
15	M 75×2	98	90	91	76	8	3.5	13	0.5	0.287	15	15
16	M 80×2	105	95	98	81	8	3.5	15	0.6	0.397	16	16
AN 17	M 85×2	110	102	103	86	8	3.5	16	0.6	0.451	17	AW 17
18	M 90×2	120	108	112	91	10	4	16	0.6	0.556	18	18
19	M 95×2	125	113	117	96	10	4	17	0.6	0.658	19	19
AN 20	M100×2	130	120	122	101	10	4	18	0.6	0.698	20	AW 20
21	M105×2	140	126	130	106	12	5	18	0.7	0.845	21	21
22	M110×2	145	133	135	111	12	5	19	0.7	0.965	22	22
AN 23	M115×2	150	137	140	116	12	5	19	0.7	1.01	—	AW 23
24	M120×2	155	138	145	121	12	5	20	0.7	1.08	24	24
25	M125×2	160	148	150	126	12	5	21	0.7	1.19	—	25

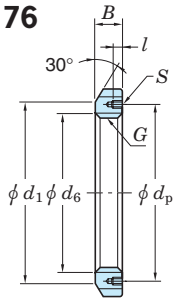
[Notes] 1) Basic profile and dimension of screw thread are in accordance with JIS B 0205.
2) Applicable to adapter sleeve series A31, A2, A3 and A23.
3) Applicable to lockwashers with flat inner tongue.
[Remark] Locknut series AN is used for adapter assembly series H2, H3, H23 and H31, while locknut series ANL is used for adapter assembly series H30.

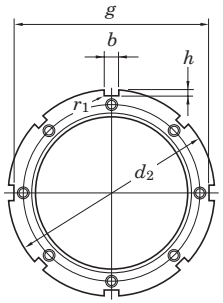
AN 26 ~ 40
ANL24 ~ 40

Locknut No.	Thread size[1] G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	(Refer.) Mass (kg)	Applicable[2] adapter sleeve (bore No.)	Applicable[3] lockwasher No.
AN 26	M130×2	165	149	155	131	12	5	21	0.7	1.25	26	AW 26
AN 27	M135×2	175	160	163	136	14	6	22	0.7	1.55	—	AW 27
28	M140×2	180	160	168	141	14	6	22	0.7	1.56	28	28
AN 29	M145×2	190	172	178	146	14	6	24	0.7	1.80	—	AW 29
30	M150×2	195	171	183	151	14	6	24	0.7	2.03	30	30
31	M155×3	200	182	186	156.5	16	7	25	0.7	2.30	—	—
AN 32	M160×3	210	182	196	161.5	16	7	25	0.7	2.59	32	AW 32
33	M165×3	210	193	196	166.5	16	7	26	0.7	2.70	—	—
34	M170×3	220	193	206	171.5	16	7	26	0.7	2.80	34	34
AN 36	M180×3	230	203	214	181.5	18	8	27	0.7	3.07	36	AW 36
38	M190×3	240	214	224	191.5	18	8	28	0.7	3.39	38	38
40	M200×3	250	226	234	201.5	18	8	29	0.7	3.69	40	40
ANL24	M120×2	145	133	135	121	12	5	20	0.7	0.78	24	AWL24
26	M130×2	155	143	145	131	12	5	21	0.7	0.88	26	26
28	M140×2	165	151	153	141	14	6	22	0.7	0.99	28	28
ANL30	M150×2	180	164	168	151	14	6	24	0.7	1.33	30	AWL30
32	M160×3	190	174	176	161.5	16	7	25	0.7	1.56	32	32
34	M170×3	200	184	186	171.5	16	7	26	0.7	1.72	34	34
ANL36	M180×3	210	192	194	181.5	18	8	27	0.7	1.95	36	AWL36
38	M190×3	220	202	204	191.5	18	8	28	0.7	2.08	38	38
40	M200×3	240	218	224	201.5	18	8	29	0.7	2.98	40	40

Locknuts for adapter sleeves and shafts

AN 44 ~ 100
ANL 44 ~ 76





Locknut No.	Thread[1] size G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	Tapped hole[2] (mm) l	S Thread size	d_p	(Refer.) Mass (kg)	Applicable adapter sleeve[3] (bore No.)	Applicable lock plate No.
AN 44	Tr220×4	280	250	260	222	20	10	32	0.8	15	M 8×1.25	238	5.16	44	AL 44
48	Tr240×4	300	270	280	242	20	10	34	0.8	15	M 8×1.25	258	5.91	48	44
52	Tr260×4	330	300	306	262	24	12	36	0.8	18	M10×1.5	281	7.99	52	52
AN 56	Tr280×4	350	320	326	282	24	12	38	0.8	18	M10×1.5	301	8.99	56	AL 52
60	Tr300×4	380	340	356	302	24	12	40	0.8	18	M10×1.5	326	11.7	60	60
64	Tr320×5	400	360	376	322.5	24	12	42	0.8	18	M10×1.5	345	13.0	64	64
AN 68	Tr340×5	440	400	410	342.5	28	15	55	1	21	M12×1.75	372	23.0	68	AL 68
72	Tr360×5	460	420	430	362.5	28	15	58	1	21	M12×1.75	392	25.0	72	68
76	Tr380×5	490	450	454	382.5	32	18	60	1	21	M12×1.75	414	30.8	76	76
AN 80	Tr400×5	520	470	484	402.5	32	18	62	1	27	M16×2	439	36.7	80	AL 80
84	Tr420×5	540	490	504	422.5	32	18	70	1	27	M16×2	459	43.3	84	80
88	Tr440×5	560	510	520	442.5	36	20	70	1	27	M16×2	477	45.1	88	88
AN 92	Tr460×5	580	540	540	462.5	36	20	75	1	27	M16×2	497	50.2	92	AL 88
96	Tr480×5	620	560	580	482.5	36	20	75	1	27	M16×2	527	62.0	96	96
100	Tr500×5	630	580	584	502.5	40	23	80	1	27	M16×2	539	63.1	/500	100
ANL44	Tr220×4	260	242	242	222	20	9	30	0.8	12	M 6×1	229	3.09	44	ALL44
48	Tr240×4	290	270	270	242	20	10	34	0.8	15	M 8×1.25	253	5.16	48	48
52	Tr260×4	310	290	290	262	20	10	34	0.8	15	M 8×1.25	273	5.67	52	48
ANL56	Tr280×4	330	310	310	282	24	10	38	0.8	15	M 8×1.25	293	6.78	56	ALL56
60	Tr300×4	360	336	336	302	24	12	42	0.8	15	M 8×1.25	316	9.62	60	60
64	Tr320×5	380	356	356	322.5	24	12	42	0.8	15	M 8×1.25	335	9.94	64	64
ANL68	Tr340×5	400	376	376	342.5	24	12	45	1	15	M 8×1.25	355	11.7	68	ALL64
72	Tr360×5	420	394	394	362.5	28	13	45	1	15	M 8×1.25	374	12.0	72	72
76	Tr380×5	450	422	422	382.5	28	14	48	1	18	M10×1.5	398	14.9	76	76

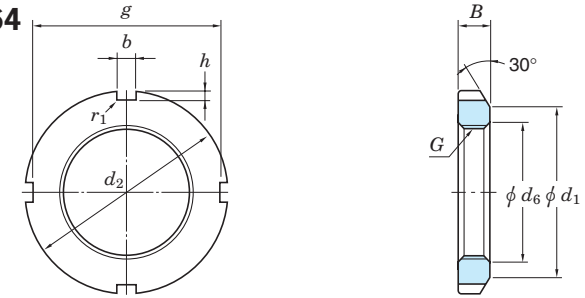
[Notes] 1) Basic profile and dimension of screw thread are in accordance with JIS B 0216.
2) Basic profile and dimension of bore with internal thread are in accordance with JIS B 0205.
3) Applicable to adapter sleeve series A31, A32, A23 and A30.

ANL 80 ~ 100

Locknut No.	Thread[1] size G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	Tapped hole[2] (mm) l	S Thread size	d_p	(Refer.) Mass (kg)	Applicable adapter sleeve[3] (bore No.)	Applicable lock plate No.
ANL80	Tr400×5	470	442	442	402.5	28	14	52	1	18	M10×1.5	418	16.9	80	ALL76
84	Tr420×5	490	462	462	422.5	32	14	52	1	18	M10×1.5	438	17.4	84	84
88	Tr440×5	520	490	490	442.5	32	15	60	1	21	M12×1.75	462	26.2	88	88
ANL92	Tr460×5	540	510	510	462.5	32	15	60	1	21	M12×1.75	482	26.9	92	ALL88
96	Tr480×5	560	530	530	482.5	36	15	60	1	21	M12×1.75	502	28.3	96	96
100	Tr500×5	580	550	550	502.5	36	15	68	1	21	M12×1.75	522	33.6	/500	96

Locknuts for withdrawal sleeves

HN 42 ~ 110
HNL 41 ~ 64



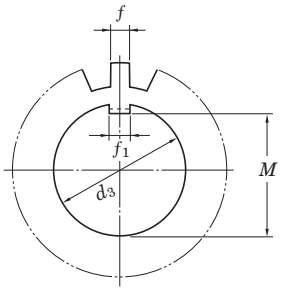
Locknut No.	Thread[1] size G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	(Refer.) Mass (kg)	Withdrawal sleeve No.			
HN 42	Tr210×4	270	238	250	212	20	10	30	0.8	4.75	AH3138	AH2238	AH3238	AH2338
44	Tr220×4	280	250	260	222	20	10	32	0.8	5.35	3140	2240	3240	2340
48	Tr240×4	300	270	280	242	20	10	34	0.8	6.20	3144	2244	—	2344
HN 52	Tr260×4	330	300	306	262	24	12	36	0.8	8.55	AH3148	AH2248	—	AH2348
58	Tr290×4	370	330	346	292	24	12	40	0.8	11.8	3152	2252	—	2352
62	Tr310×5	390	350	366	312.5	24	12	42	0.8	13.4	3156	2256	—	2356
HN 66	Tr330×5	420	380	390	332.5	28	15	52	1	20.4	AH3160	AH2260	AH3260	—
70	Tr350×5	450	410	420	352.5	28	15	55	1	25.2	3164	2264	3264	—
74	Tr370×5	470	430	440	372.5	28	15	58	1	28.2	3168	—	3268	—
HN 80	Tr400×5	520	470	484	402.5	32	18	62	1	40.0	AH3172	—	AH3272	—
84	Tr420×5	540	490	504	422.5	32	18	70	1	46.9	3176	—	3276	—
88	Tr440×5	560	510	520	442.5	36	20	70	1	48.5	3180	—	3280	—
HN 92	Tr460×5	580	540	540	462.5	36	20	75	1	55.0	AH3184	—	AH3284	—
96	Tr480×5	620	560	580	482.5	36	20	75	1	67.0	X3188	—	X3288	—
102	Tr510×6	650	590	604	513	40	23	80	1	75.0	X3192	—	X3292	—
HN 106	Tr530×6	670	610	624	533	40	23	80	1	78.0	AHX3196	—	AHX3296	—
110	Tr550×6	700	640	654	553	40	23	80	1	92.5	X31/500	—	X32/500	—
HNL 41	Tr205×4	250	232	234	207	18	8	30	0.8	3.43	AH3038	AH238	—	—
43	Tr215×4	260	242	242	217	20	9	30	0.8	3.72	3040	240	—	—
47	Tr235×4	280	262	262	237	20	9	34	0.8	4.60	3044	244	—	—
HNL 52	Tr260×4	310	290	290	262	20	10	34	0.8	5.80	AH3048	AH248	—	—
56	Tr280×4	330	310	310	282	24	10	38	0.8	6.72	3052	252	—	—
60	Tr300×4	360	336	336	302	24	12	42	0.8	9.60	3056	256	—	—
HNL 64	Tr320×5	380	356	356	322.5	24	12	42	1	10.3	AH3060	—	—	—

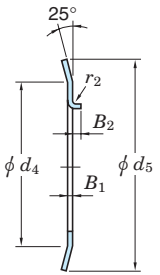
[Note] 1) Basic profile and dimension of screw thread are in accordance with JIS B 0216.
[Remark] Number of slots on nut may sometimes exceed that shown in the figure.

HNL 69 ~ 108

Locknut No.	Thread[1] size G	Standard dimensions (mm) d_2	d_1	g	d_6	b	h	B	r_1 max.	(Refer.) Mass (kg)	Withdrawal sleeve No.			
HNL 69	Tr345×5	410	384	384	347.5	28	13	45	1	11.5	3064	—	—	—
73	Tr365×5	430	404	404	367.5	28	13	48	1	14.2	3068	—	—	—
HNL 77	Tr385×5	450	422	422	387.5	28	14	48	1	15.0	AH3072	—	—	—
82	Tr410×5	480	452	452	412.5	32	14	52	1	19.0	3076	—	—	—
86	Tr430×5	500	472	472	432.5	32	14	52	1	19.8	3080	—	—	—
HNL 90	Tr450×5	520	490	490	452.5	32	15	60	1	23.8	AH3084	—	—	—
94	Tr470×5	540	510	510	472.5	32	15	60	1	25.0	X3088	—	—	—
98	Tr490×5	580	550	550	492.5	36	15	60	1	34.0	X3092	—	—	—
HNL104	Tr520×6	600	570	570	523	36	15	68	1	37.0	AHX3096	—	—	—
108	Tr540×6	630	590	590	543	40	20	68	1	43.5	X30/500	—	—	—

AW 00 ~ 24(X)





With bent inner tongue

With flat inner tongue

Lockwasher No. With bent inner tongue	Lockwasher No. With flat inner tongue	Standard dimensions (mm) d_3	M	f_1	B_1	f	d_4	d_5	r_2	B_2	No. of tooth	(Refer.) Mass (kg/100pcs.)	Applicable adapter sleeve (bore No.)	Applicable locknut No.
AW 00	AW 00X	10	8.5	3	1	3	13	21	0.5	2	9	0.131	—	AN 00
01	01X	12	10.5	3	1	3	17	25	0.5	2	9	0.192	—	01
02	02X	15	13.5	4	1	4	21	28	1	2.5	13	0.253	—	02
AW 03	AW 03X	17	15.5	4	1	4	24	32	1	2.5	13	0.313	—	AN 03
04	04X	20	18.5	4	1	4	26	36	1	2.5	13	0.350	04	04
05	05X	25	23	5	1.2	5	32	42	1	2.5	13	0.640	05	05
AW 06	AW 06X	30	27.5	5	1.2	5	38	49	1	2.5	13	0.780	06	AN 06
07	07X	35	32.5	6	1.2	5	44	57	1	2.5	15	1.04	07	07
08	08X	40	37.5	6	1.2	6	50	62	1	2.5	15	1.23	08	08
AW 09	AW 09X	45	42.5	6	1.2	6	56	69	1	2.5	17	1.52	09	AN 09
10	10X	50	47.5	6	1.2	6	61	74	1	2.5	17	1.60	10	10
11	11X	55	52.5	8	1.2	7	67	81	1	4	17	1.96	11	11
AW 12	AW 12X	60	57.5	8	1.5	7	73	86	1.2	4	17	2.53	12	AN 12
13	13X	65	62.5	8	1.5	7	79	92	1.2	4	19	2.90	13	13
14	14X	70	66.5	8	1.5	8	85	98	1.2	4	19	3.34	14	14
AW 15	AW 15X	75	71.5	8	1.5	8	90	104	1.2	4	19	3.56	15	AN 15
16	16X	80	76.5	10	1.8	8	95	112	1.2	4	19	4.64	16	16
17	17X	85	81.5	10	1.8	8	102	119	1.2	4	19	5.24	17	17
AW 18	AW 18X	90	86.5	10	1.8	10	108	126	1.2	4	19	6.23	18	AN 18
19	19X	95	91.5	10	1.8	10	113	133	1.2	4	19	6.70	19	19
20	20X	100	96.5	12	1.8	10	120	142	1.2	6	19	7.65	20	20
AW 21	AW 21X	105	100.5	12	1.8	12	126	145	1.2	6	19	8.26	21	AN 21
22	22X	110	105.5	12	1.8	12	133	154	1.2	6	19	9.40	22	22
23	23X	115	110.5	12	2	12	137	159	1.5	6	19	10.8	—	23
AW 24	AW 24X	120	115	14	2	12	138	164	1.5	6	19	10.5	24	AN 24

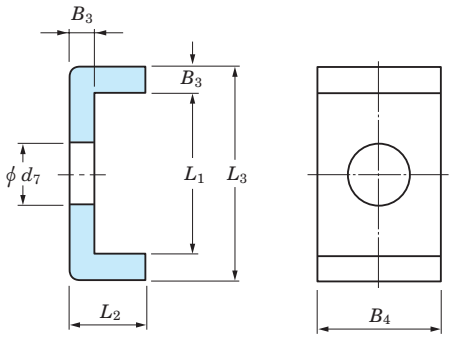
[Remark] 1) AW00~AW40, AW00X~AW40X are applicable to adapter assembly series H31, H2, H3 and H23.
2) AWL24~AWL40, AWL24X~AWL40X are applied to adapter assembly series H30.
3) For adapter sleeves with narrow slits, lockwashers with flat inner tongue should be used. Either type of lockwasher can be used for adapter sleeves with wide slits.

AW 25 ~ 40(X)
AWL24 ~ 40(X)

Lockwasher No. With bent inner tongue	Lockwasher No. With flat inner tongue	Standard dimensions (mm) d_3	M	f_1	B_1	f	d_4	d_5	r_2	B_2	No. of tooth	(Refer.) Mass (kg/100pcs.)	Applicable adapter sleeve (bore No.)	Applicable locknut No.
AW 25	AW 25X	125	120	14	2	12	148	170	1.5	6	19	11.8	—	25
26	26X	130	125	14	2	12	149	175	1.5	6	19	11.3	26	26
AW 27	AW 27X	135	130	14	2	14	160	185	1.5	6	19	14.4	—	AN 27
28	28X	140	135	16	2	14	160	192	1.5	8	19	14.2	28	28
29	29X	145	140	16	2	14	172	202	1.5	8	19	16.8	—	29
AW 30	AW 30X	150	145	16	2	14	171	205	1.5	8	19	15.5	30	AN 30
31	31X	155	147.5	16	2.5	16	182	212	1.5	8	19	20.9	—	31
32	32X	160	154	18	2.5	16	182	217	1.5	8	19	22.2	32	32
AW 33	AW 33X	165	157.5	18	2.5	16	193	222	1.5	8	19	24.1	—	AN 33
34	34X	170	164	18	2.5	16	193	232	1.5	8	19	24.7	34	34
36	36X	180	174	20	2.5	18	203	242	1.5	8	19	26.8	36	36
AW 38	AW 38X	190	184	20	2.5	18	214	252	1.5	8	19	27.8	38	AN 38
40	40X	200	194	20	2.5	18	226	262	1.5	8	19	29.3	40	40
AWL24	AWL24X	120	115	14	2	12	133	155	1.5	6	19	7.70	24	ANL24
26	26X	130	125	14	2	12	143	165	1.5	6	19	8.70	26	26
28	28X	140	135	16	2	14	151	175	1.5	8	19	10.9	28	28
AWL30	AWL30X	150	145	16	2	14	164	190	1.5	8	19	11.3	30	ANL30
32	32X	160	154	18	2.5	16	174	200	1.5	8	19	16.2	32	32
34	34X	170	164	18	2.5	16	184	210	1.5	8	19	19.0	34	34
AWL36	AWL36X	180	174	20	2.5	18	192	220	1.5	8	19	18.0	36	ANL36
38	38X	190	184	20	2.5	18	202	230	1.5	8	19	20.5	38	38
40	40X	200	194	20	2.5	18	218	250	1.5	8	19	21.4	40	40

Lock plates

AL 44 ~ 100
ALL44 ~ 96



Lock plate No.	Standard dimensions (mm) B_3	B_4	L_2	d_7	L_1	L_3	(Refer.) Mass (kg/100pcs.)	Applicable locknut No.
AL 44	4	20	12	9	22.5	30.5	2.60	AN 44,48
52	4	24	12	12	25.5	33.5	3.39	52,56
60	4	24	12	12	30.5	38.5	3.79	60
AL 64	5	24	15	12	31	41	5.35	AN 64
68	5	28	15	14	38	48	6.65	68,72
76	5	32	15	14	40	50	7.96	76
AL 80	5	32	15	18	45	55	8.20	AN 80,84
88	5	36	15	18	43	53	9.00	88,92
96	5	36	15	18	53	63	10.4	96
100	5	40	15	18	45	55	10.5	100
ALL44	4	20	12	7	13.5	21.5	2.12	ANL44
48	4	20	12	9	17.5	25.5	2.29	48,52
56	4	24	12	9	17.5	25.5	2.92	56
ALL60	4	24	12	9	20.5	28.5	3.16	ANL60
64	5	24	15	9	21	31	4.56	64,68
72	5	28	15	9	20	30	5.03	72
ALL76	5	28	15	12	24	34	5.28	ANL76,80
84	5	32	15	12	24	34	6.11	84
88	5	32	15	14	28	38	6.45	88,92
96	5	36	15	14	28	38	7.29	96,100

[Remark] Lock plate series AL are applicable to adapter assembly series H31, H32 and H23, while lock plate series ALL are applicable to H30.

Supplementary table 1 (1) Boundary dimensions of radial bearings (except tapered roller bearings) – diameter series 7, 8, 9, 0 –

Unit : mm

Deep groove ball brg.							68										69									160	60						
Angular contact ball brg.																											70						
Self-aligning ball brg.																																	
Cylindrical roller brg.																N 19	N 29		NNU 49								NU 10		NN 30				
Needle roller brg.									NA 48										NA 49	NA 59	NA 69												
Spherical roller brg.										238								239											230	240			

Bore dia. No.	Bore dia.	Diameter series 7					Diameter series 8									Diameter series 9										Diameter series 0								
		Outside dia.	Dimension series				Outside dia.	Dimension series								Outside dia.	Dimension series									Outside dia.	Dimension series							
			17	27	37	17~37		08	18	28	38	48	58	68	08	18~68		09	19	29	39	49	59	69	09	19~39	49~69		00	10	20	30	40	50	60	00	10~60
	d	D	Width B			r min.	D	Width B							r min.		D	Width B							r min.			D	Width B							r min.	
–	0.6	2	0.8	–	–	0.05	2.5	–	1	–	1.4				0.05	–	–	–	–	–					–	–	–	–	–	–	–	–	–	–	–	–	–
1	1	2.5	1	–	–	0.05	3	–	1	–	1.5				0.05	4	–	1.6	–	2.3					0.1	–	–	–	–	–	–	–	–	–	–	–	–
–	1.5	3	1	–	1.8	0.05	4	–	1.2	–	2				0.05	5	–	2	–	2.6					0.15	–	6	–	2.5	–	3						0.15
2	2	4	1.2	–	2	0.05	5	–	1.5	–	2.3				0.08	6	–	2.3	–	3					0.15	–	7	–	2.8	–	3.5						0.15
–	2.5	5	1.5	–	2.3	0.08	6	–	1.8	–	2.6				0.08	7	–	2.5	–	3.5					0.15	–	8	–	2.8	–	4						0.15
3	3	6	2	2.5	3	0.08	7	–	2	–	3				0.1	8	–	3	–	4					0.15	–	9	–	3	–	5						0.15
4	4	7	2	2.5	3	0.08	9	–	2.5	3.5	4				0.1	11	–	4	–	5	–	–	–	–	0.15	–	12	–	4	–	6						0.2
5	5	8	2	2.5	3	0.08	11	–	3	4	5				0.15	13	–	4	–	6	10	–	–	–	0.2	0.15	14	–	5	–	7						0.2
6	6	10	2.5	3	3.5	0.1	13	–	3.5	5	6				0.15	15	–	5	–	7	10	–	–	–	0.2	0.15	17	–	6	–	9						0.3
7	7	11	2.5	3	3.5	0.1	14	–	3.5	5	6	–	–	–	0.15	17	–	5	–	7	10	–	–	–	0.3	0.15	19	–	6	8	10	–	–	–	–	0.3
8	8	12	2.5	–	3.5	0.1	16	–	4	5	6	8	–	–	0.2	19	–	6	–	9	11	–	–	–	0.3	0.2	22	–	7	9	11	14	19	25	–	0.3
9	9	14	3	–	4.5	0.1	17	–	4	5	6	8	–	–	0.2	20	–	6	–	9	11	–	–	–	0.3	0.3	24	–	7	10	12	15	20	27	–	0.3
00	10	15	3	–	4.5	0.1	19	–	5	6	7	9	–	–	0.3	22	–	6	8	10	13	16	22	–	0.3	0.3	26	–	8	10	12	16	21	29	–	0.3
01	12	18	4	–	5	0.2	21	–	5	6	7	9	–	–	0.3	24	–	6	8	10	13	16	22	–	0.3	0.3	28	7	8	10	12	16	21	29	0.3	0.3
02	15	21	4	–	5	0.2	24	–	5	6	7	9	–	–	0.3	28	–	7	8.5	10	13	18	23	–	0.3	0.3	32	8	9	11	13	17	23	30	0.3	0.3
03	17	23	4	–	5	0.2	26	–	5	6	7	9	–	–	0.3	30	–	7	8.5	10	13	18	23	–	0.3	0.3	35	8	10	12	14	18	24	32	0.3	0.3
04	20	27	4	–	5	0.2	32	4	7	8	10	12	16	22	0.3	0.3	37	7	9	11	13	17	23	30	0.3	0.3	0.3	42	8	12	14	16	22	30	40	0.3	0.6
/22	22	–	–	–	–	–	34	4	7	–	10	–	16	22	0.3	0.3	39	7	9	11	13	17	23	30	0.3	0.3	0.3	44	8	12	14	16	22	30	40	0.3	0.6
05	25	32	4	–	5	0.2	37	4	7	8	10	12	16	22	0.3	0.3	42	7	9	11	13	17	23	30	0.3	0.3	0.3	47	8	12	14	16	22	30	40	0.3	0.6
/28	28	–	–	–	–	–	40	4	7	–	10	–	16	22	0.3	0.3	45	7	9	11	13	17	23	30	0.3	0.3	0.3	52	8	12	15	18	24	32	43	0.3	0.6
06	30	37	4	–	5	0.2	42	4	7	8	10	12	16	22	0.3	0.3	47	7	9	11	13	17	23	30	0.3	0.3	0.3	55	9	13	16	19	25	34	45	0.3	1
/32	32	–	–	–	–	–	44	4	7	–	10	–	16	22	0.3	0.3	52	7	10	13	15	20	27	36	0.3	0.6	0.6	58	9	13	16	20	26	35	47	0.3	1
07	35	–	–	–	–	–	47	4	7	8	10	12	16	22	0.3	0.3	55	7	10	13	15	20	27	36	0.3	0.6	0.6	62	9	14	17	20	27	36	48	0.3	1
08	40	–	–	–	–	–	52	4	7	8	10	12	16	22	0.3	0.3	62	8	12	14	16	22	30	40	0.3	0.6	0.6	68	9	15	18	21	28	38	50	0.3	1
09	45						58	4	7	8	10	13	18	23	0.3	0.3	68	8	12	14	16	22	30	40	0.3	0.6	0.6	75	10	16	19	23	30	40	54	0.6	1
10	50						65	5	7	10	12	15	20	27	0.3	0.3	72	8	12	14	16	22	30	40	0.3	0.6	0.6	80	10	16	19	23	30	40	54	0.6	1
11	55						72	7	9	11	13	17	23	30	0.3	0.3	80	9	13	16	19	25	34	45	0.3	1	1	90	11	18	22	26	35	46	63	0.6	1.1
12	60						78	7	10	12	14	18	24	32	0.3	0.3	85	9	13	16	19	25	34	45	0.3	1	1	95	11	18	22	26	35	46	63	0.6	1.1
13	65						85	7	10	13	15	20	27	36	0.3	0.6	90	9	13	16	19	25	34	45	0.3	1	1	100	11	18	22	26	35	46	63	0.6	1.1
14	70						90	8	10	13	15	20	27	36	0.3	0.6	100	10	16	19	23	30	40	54	0.6	1	1	110	13	20	24	30	40	54	71	0.6	1.1
15	75						95	8	10	13	15	20	27	36	0.3	0.6	105	10	16	19	23	30	40	54	0.6	1	1	115	13	20	24	30	40	54	71	0.6	1.1
16	80						100	8	10	13	15	20	27	36	0.3	0.6	110	10	16	19	23	30	40	54	0.6	1	1	125	14	22	27	34	45	60	80	0.6	1.1
17	85						110	9	13	16	19	25	34	45	0.3	1	120	11	18	22	26	35	46	63	0.6	1.1	1.1	130	14	22	27	34	45	60	80	0.6	1.1
18	90						115	9	13	16	19	25	34	45	0.3	1	125	11	18	22	26	35	46	63	0.6	1.1	1.1	140	16	24	30	37	50	67	90	1	1.5
19	95						120	9	13	16	19	25	34	45	0.3	1	130	11	18	22	26	35	46	63	0.6	1.1	1.1	145	16	24	30	37	50	67	90	1	1.5
20	100						125	9	13	16	19	25	34	45	0.3	1	140	13	20	24	30	40	54	71	0.6	1.1	1.1	150	16	24	30	37	50	67	90	1	1.5
21	105						130	9	13	16	19	25	34	45	0.3	1	145	13	20	24	30	40	54	71	0.6	1.1	1.1	160	18	26	33	41	56	75	100	1	2
22	110						140	10	16	19	23	30	40	54	0.6	1	150	13	20	24	30	40	54	71	0.6	1.1	1.1	170	19	28	36	45	60	80	109	1	2
24	120						150	10	16	19	23	30	40	54	0.6	1	165	14	22	27	34	45	60	80	0.6	1.1	1.1	180	19	28	36	46	60	80	109	1	2
26	130						165	11	18	22	26	35	46	63	0.6	1.1	180	16	24	30	37	50	67	90	1	1.5	1.5	200	22	33	42	52	69	95	125	1.1	2
28	140						175	11	18	22	26	35	46	63	0.6	1.1	190	16	24	30	37	50	67	90	1	1.5	1.5	210	22	33	42	53	69	95	125	1.1	2
30	150						190	13	20	24	30	40	54	71	0.6	1.1	210	19	28	36	45	60	80	109	1	2	2	225	24	35	45	56	75	100	136	1.1	2.1
32	160						200	13	20	24	30	40	54	71	0.6	1.1	220	19	28	36	45	60	80	109	1	2	2	240	25	38	48	60	80	109	145	1.5	2.1
34	170						215	14	22	27	34	45	60	80	0.6	1.1	230	19	28	36	45	60	80	109	1	2	2	260	28	42	54	67	90	122	160	1.5	2.1
36	180						225	14	22	27	34	45	60	80	0.6	1.1	250	22	33	42	52	69	95	125	1.1	2	2	280	31	46	60	74	100	136	180	2	2.1
38	190						240	16	24	30	37	50	67	90	1	1.5	260	22	33	42	52	69	95	125	1.1	2	2	290	31	46	60	75	100	136	180	2	2.1
40	200						250	16	24	30	37	50	67	90	1	1.5	280	25	38	48	60	80	109	145	1.5	2.1	2.1	310	34	51	66	82	109	150	200	2	2.1
44	220						270	16	24	30	37	50	67	90	1	1.5	300	25	38	48	60	80	109	145	1.5	2.1	2.1	340	37	56	72	90	118	160	218	2.1	3
48	240						300	19	28	36	45	60	80	109	1	2	320	25	38	48	60	80	109	145	1.5	2.1	2.1	360	37	56	72	92	118	160	218	2.1	3
52	260						320	19	28	36	45	60	80	109	1	2	360	31	46	60	75	100	136	180	2	2.1	2.1	400	44	65	82	104	140	190	250	3	4
56	280						350	22	33	42	52	69	95	125	1.1	2	380	31	46	60	75	100	136	180	2	2.1	2.1	420	44	65	82	106	140	190	250	3	4
60	300						380	25	38	48	60	80	109	145	1.5	2.1	420	37	56	72	90	118	160	218	2.1	3	3	460	50	74	95	118	160	218	290	4	4
64	320						400	25	38	48	60	80	109	145	1.5	2.1	440	37	56	72	90	118	160	218	2.1	3	3	480	50	74	95	121	160	218	290	4	4
68	340						420	25	38	48	60	80	109	145	1.5	2.1	460	37	56	72	90	118	160	218	2.1	3	3	520	57	82	106	133	180	243	325	4	5
72	360						440	25	38	48	60	80	109	145	1.5	2.1	480	37	56	72	90	118	160	218	2.1	3	3	540	57	82	106	134	180	243	325	4	5
76	380						480	31	46	60	75	100	136	180	2	2.1	520	44	65	82	106	140	190	250	3	4	4	560	57	82	106	135	180	243	325	4	5
80	400						500	31	46	60	75	100	136	180	2	2.1	540	44	65	82	106	140	190	250	3	4	4	600	63	90	118	148	200	272	355	5	5
84	420						520	31	46	60	75	100	136	180	2	2.1	560	44	65	82	106	140	190	250	3	4	4	620	63	90	118	150	200	272	355	5	5
88	440						540	31	46	60	75	100	136	180	2	2.1	600	50	74	95	118	160	218	290	4	4	4	650	67	94	122	157	212	280	375	5	6
92	460						580	37	56	72	90	118	160	218	2.1	3	620	50	74	95	118	160	218	290	4	4	4	680	71	100	128	163	218	300	400	5	6
96	480						600	37	56	72	90	118	160	218	2.1	3	650	54	78	100	128	170	230	308	4	5	5	700	71	100	128	165	218	300	400	5	6
/500	500						620	37	56	72	90	118	160	218	2.1	3	670	54	78	100	128	170	230	308	4	5	5	720	71	100	128	167	218	300	400	5	6
/530	530						650	37	56	72	90	118	160	218	2.1	3	710	57	82	106	136	180	243	325	4	5	5	780	80	112	145	185	250	335	450	6	6
/560	560						680	37	56	72	90	118	160	218	2.1	3	750	60	85	112	140	190	258	345	5	5	5	820	82	115	150	195	258	355	462	6	6
/600	600						730	42	60	78	98	128	175	236	3	3	800	63	90	118	150	200	272	355	5	5	5	870	85	118	155	200	272	365	488	6	6
/630	630						780	48	69	88	112	150	200	272	3	4	850	71	100	128	165	218	300	400	5	6	6	920	92	128	170	212	290	388	515	6	7.5
/670	670						820	48	69	88	112	150	200	272	3	4	900	73	103	136	170	230	308	412	5	6	6	980	100	136	180	230	308	425	560	6	7.5
/710	710						870	50	74	95	118	160	218	290	4	4	950	78	106	140	180	243	325	438	5	6	6	1030	103	140	185	236	315	438	580	6	7.5
/750	750						920	54	78	100	128	170	230	308	4	5	1000	80	112	145	185	250	335	450	6	6	6	1090	109	150	195	250	335	462	615	7.5	7.5
/800	800						980	57	82	106	136	180	243	325	4	5	1060	82	115	150	195	258	355	462	6	6	6	1150	112	155	200	258	345	475	630	7.5	7.5
/850	850						1030	57	82	106	136	180	243	325	4	5	1120	85	118	155	200	272	365	488	6	6	6	1220	118	165	212	272	365	500	670	7.5	7.5
/900	900						1090	60	85	112	140	190	258	345	5	5	1180	88	122	165	206	280	375	500	6	6	6	1280	122	170	218	280	375	515	690	7.5	7.5
/950	950						1150	63	90	118	150	200	272	355	5	5	1250	95	132	175	224	300	400	545	6	7.5	7.5	1360	132	180	236	300	412	560	730	7.5	7.5
/1000	1000						1220	71	100	128	165	218	300	400	5	6	1320	103	140	185	236	315	438	580	6	7.5	7.5	1420	136	185	243	308	412	560	750	7.5	7.5
/1060	1060						1280	71	100	128	165	218	300	400	5	6	1400	109	150	195	250	335	462	615	7.5	7.5	7.5	1500	140	195	250	325	438	600	800	9.5	9.5
/1120	1120						1360	78	106	140	180	243	325	438	5	6	1460	109	150	195	250	335	462	615	7.5	7.5	7.5	1580	145	200	265	345	462	615	825	9.5	9.5
/1180	1180						1420	78	106	140	180	243	325	438	5	6	1540	115	160	206	272	355	488	650	7.5	7.5	7.5	1660	155	212	272	355	475	650	875	9.5	9.5
/1250	1250						1500	80	112	145	185	250	335	450	6	6	1630	122	170	218	280	375	515	690	7.5	7.5	7.5	1750	–	218	290	375	500	–	–	–	9.5
/1320	1320						1600	88	122	165	206	280	375	500	6	6	1720	128	175	230	300	400	545	710	7.5	7.5	7.5	1850	–	230	300	400	530	–	–	–	12
/1400	1400						1700	95	132	175	224	300	400	545	6	7.5	1820	–	185	243	315	425	–	–	–	9.5	9.5	1950	–	243	315	412	545	–	–	–	12
/1500	1500						1820	–	140	185	243	315	–	–	–	7.5	1950	–	195	258	335	450	–	–	–	9.5	9.5	2120	–	272	355	462	615	–	–	–	12
/1600	1600						1950	–	155	200	265	345	–	–	–	7.5	2060	–	200	265	345	462	–	–	–	9.5	9.5	2240	–	280	365	475	630	–	–	–	12
/1700	1700						2060	–	160	206	272	355	–	–	–	7.5	2180	–	212	280	355	475	–	–	–	9.5	9.5	2360	–	290	375	500	650	–	–	–	15
/1800	1800						2180	–	165	218	290	375	–	–	–	9.5	2300	–	218	290	375	500	–	–	–	12	12	2500	–	308	400	530	690	–	–	–	15
/1900	1900						2300	–	175	230	300	400	–	–	–	9.5	2430	–	230	308	400	530	–	–	–	12	12	–	–	–	–	–	–	–	–	–	–
/2000	2000						2430	–	190	250	325	425	–	–	–	9.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[Remark] The chamfer dimensions (r) in this table are not always applicable to the following corners. (a) Snap ring groove side corner of outer ring with snap ring groove. (b) No-rib side bearing ring corner of thin section cylindrical roller bearing. (c) Front bearing ring corner of angular contact ball bearing. (d) Inner ring corner of tapered bore bearing.

D 1

D 2

Koyo

Supplementary table 1 (2) Boundary dimensions of radial bearings (except tapered roller bearings) – diameter series 1, 2, 3, 4 –

Unit : mm

Deep groove ball bearing										62		42								63		43					64		
Angular contact ball bearing										72			32 52							73			33 53				74		
Self-aligning ball bearing										12		22								13		23							
Cylindrical roller bearing				NN 31						NU 2		NU 22	NU 32							NU 3		NU 23	NU 33				NU 4		
Needle roller bearing																													
Spherical roller bearing				231	241							222	232							213		223							

Bore dia. No.	Bore dia.	Diameter series 1								Diameter series 2								Diameter series 3								Diameter series 4			
		Outside dia.	Dimension series							Outside dia.	Dimension series							Outside dia.	Dimension series							Outside dia.	Dimension series		
			01	11	21	31	41	01	11~41		82	02	12	22	32	42	82	02~42		83	03	13	23	33	83	03~33		04	24	04. 24
	d	D	Width B					r min.		D	Width B						r min.		D	Width B					r min.		D	Width B		$r_{min.}$
–	0.6																												
1	1																												
–	1.5																												
2	2									–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
–	2.5									–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
3	3									10	2.5	4	–	–	5	–	0.1	0.15	13	–	5	–	–	7	–	0.2				
4	4									13	3	5	–	–	7	–	0.15	0.2	16	–	5	–	–	9	–	0.3				
5	5									16	3.5	5	–	–	8	–	0.15	0.3	19	–	6	–	–	10	–	0.3				
6	6									19	4	6	–	–	10	–	0.2	0.3	22	–	7	–	11	13	–	0.3				
7	7									22	5	7	–	–	11	–	0.3	0.3	26	–	9	–	13	15	–	0.3	–	–	–	–
8	8									24	5	8	–	–	12	–	0.3	0.3	28	–	9	–	13	15	–	0.3	30	10	14	0.6
9	9									26	6	8	–	–	13	–	0.3	0.3	30	–	10	–	14	16	–	0.6	32	11	15	0.6
00	10									30	7	9	–	14	14.3	–	0.3	0.6	35	9	11	–	17	19	0.3	0.6	37	12	16	0.6
01	12									32	7	10	–	14	15.9	–	0.3	0.6	37	9	12	–	17	19	0.3	1	42	13	19	1
02	15									35	8	11	–	14	15.9	20	0.3	0.6	42	9	13	–	17	19	0.3	1	52	15	24	1.1
03	17									40	8	12	–	16	17.5	22	0.3	0.6	47	10	14	–	19	22.2	0.6	1	62	17	29	1.1
04	20									47	9	14	–	18	20.6	27	0.3	1	52	10	15	–	21	22.2	0.6	1.1	72	19	33	1.1
/22	22									50	9	14	–	18	20.6	27	0.3	1	56	11	16	–	21	25	0.6	1.1	–	–	–	–
05	25									52	10	15	–	18	20.6	27	0.3	1	62	12	17	–	24	25.4	0.6	1.1	80	21	36	1.5
/28	28									58	10	16	–	19	23	30	0.6	1	68	13	18	–	24	30	0.6	1.1	–	–	–	–
06	30									62	10	16	–	20	23.8	32	0.6	1	72	13	19	–	27	30.2	0.6	1.1	90	23	40	1.5
/32	32									65	11	17	–	21	25	33	0.6	1	75	14	20	–	28	32	0.6	1.1	–	–	–	–
07	35									72	12	17	–	23	27	37	0.6	1.1	80	14	21	–	31	34.9	0.6	1.5	100	25	43	1.5
08	40									80	13	18	–	23	30.2	40	0.6	1.1	90	16	23	–	33	36.5	1	1.5	110	27	46	2
09	45									85	13	19	–	23	30.2	40	0.6	1.1	100	17	25	–	36	39.7	1	1.5	120	29	50	2
10	50									90	13	20	–	23	30.2	40	0.6	1.1	110	19	27	–	40	44.4	1	2	130	31	53	2.1
11	55									100	14	21	–	25	33.3	45	0.6	1.5	120	21	29	–	43	49.2	1.1	2	140	33	57	2.1
12	60									110	16	22	–	28	36.5	50	1	1.5	130	22	31	–	46	54	1.1	2.1	150	35	60	2.1
13	65									120	18	23	–	31	38.1	56	1	1.5	140	24	33	–	48	58.7	1.1	2.1	160	37	64	2.1
14	70									125	18	24	–	31	39.7	56	1	1.5	150	25	35	–	51	63.5	1.5	2.1	180	42	74	3
15	75									130	18	25	–	31	41.3	56	1	1.5	160	27	37	–	55	68.3	1.5	2.1	190	45	77	3
16	80									140	19	26	–	33	44.4	60	1	2	170	28	39	–	58	68.3	1.5	2.1	200	48	80	3
17	85									150	21	28	–	36	49.2	65	1.1	2	180	30	41	–	60	73	2	3	210	52	86	4
18	90	150	–	–	–	–	60	–	2	160	22	30	–	40	52.4	69	1.1	2	190	30	43	–	64	73	2	3	225	54	90	4
19	95	160	–	–	–	–	65	–	2	170	24	32	–	43	55.6	75	1.1	2.1	200	33	45	–	67	77.8	2	3	240	55	95	4
20	100	165	21	30	39	52	65	1.1	2	180	25	34	–	46	60.3	80	1.5	2.1	215	36	47	51	73	82.6	2.1	3	250	58	98	4
21	105	175	22	33	42	56	69	1.1	2	190	27	36	–	50	65.1	85	1.5	2.1	225	37	49	53	77	87.3	2.1	3	260	60	100	4
22	110	180	22	33	42	56	69	1.1	2	200	28	38	–	53	69.8	90	1.5	2.1	240	42	50	57	80	92.1	3	3	280	65	108	4
24	120	200	25	38	48	62	80	1.5	2	215	–	40	42	58	76	95	–	2.1	260	44	55	62	86	106	3	3	310	72	118	5
26	130	210	25	38	48	64	80	1.5	2	230	–	40	46	64	80	100	–	3	280	48	58	66	93	112	3	4	340	78	128	5
28	140	225	27	40	50	68	85	1.5	2.1	250	–	42	50	68	88	109	–	3	300	50	62	70	102	118	4	4	360	82	132	5
30	150	250	31	46	60	80	100	2	2.1	270	–	45	54	73	96	118	–	3	320	–	65	75	108	128	–	4	380	85	138	5
32	160	270	34	51	66	86	109	2	2.1	290	–	48	58	80	104	128	–	3	340	–	68	79	114	136	–	4	400	88	142	5
34	170	280	34	51	66	88	109	2	2.1	310	–	52	62	86	110	140	–	4	360	–	72	84	120	140	–	4	420	92	145	5
36	180	300	37	56	72	96	118	2.1	3	320	–	52	62	86	112	140	–	4	380	–	75	88	126	150	–	4	440	95	150	6
38	190	320	42	60	78	104	128	3	3	340	–	55	65	92	120	150	–	4	400	–	78	92	132	155	–	5	460	98	155	6
40	200	340	44	65	82	112	140	3	3	360	–	58	70	98	128	160	–	4	420	–	80	97	138	165	–	5	480	102	160	6
44	220	370	48	69	88	120	150	3	4	400	–	65	78	108	144	180	–	4	460	–	88	106	145	180	–	5	540	115	180	6
48	240	400	50	74	95	128	160	4	4	440	–	72	85	120	160	200	–	4	500	–	95	114	155	195	–	5	580	122	190	6
52	260	440	57	82	106	144	180	4	4	480	–	80	90	130	174	218	–	5	540	–	102	123	165	206	–	6	620	132	206	7.5
56	280	460	57	82	106	146	180	4	5	500	–	80	90	130	176	218	–	5	580	–	108	132	175	224	–	6	670	140	224	7.5
60	300	500	63	90	118	160	200	5	5	540	–	85	98	140	192	243	–	5	620	–	109	140	185	236	–	7.5	710	150	236	7.5
64	320	540	71	100	128	176	218	5	5	580	–	92	105	150	208	258	–	5	670	–	112	155	200	258	–	7.5	750	155	250	9.5
68	340	580	78	106	140	190	243	5	5	620	–	92	118	165	224	280	–	6	710	–	118	165	212	272	–	7.5	800	165	265	9.5
72	360	600	78	106	140	192	243	5	5	650	–	95	122	170	232	290	–	6	750	–	125	170	224	290	–	7.5	850	180	280	9.5
76	380	620	78	106	140	194	243	5	5	680	–	95	132	175	240	300	–	6	780	–	128	175	230	300	–	7.5	900	190	300	9.5
80	400	650	80	112	145	200	250	6	6	720	–	103	140	185	256	315	–	6	820	–	136	185	243	308	–	7.5	950	200	315	12
84	420	700	88	122	165	224	280	6	6	760	–	109	150	195	272	335	–	7.5	850	–	136	190	250	315	–	9.5	980	206	325	12
88	440	720	88	122	165	226	280	6	6	790	–	112	155	200	280	345	–	7.5	900	–	145	200	265	345	–	9.5	1030	212	335	12
92	460	760	95	132	175	240	300	6	7.5	830	–	118	165	212	296	365	–	7.5	950	–	155	212	280	365	–	9.5	1060	218	345	12
96	480	790	100	136	180	248	308	6	7.5	870	–	125	170	224	310	388	–	7.5	980	–	160	218	290	375	–	9.5	1120	230	365	15
/500	500	830	106	145	190	264	325	7.5	7.5	920	–	136	185	243	336	412	–	7.5	1030	–	170	230	300	388	–	12	1150	236	375	15
/530	530	870	109	150	195	272	335	7.5	7.5	980	–	145	200	258	355	450	–	9.5	1090	–	180	243	325	412	–	12	1220	250	400	15
/560	560	920	115	160	206	280	355	7.5	7.5	1030	–	150	206	272	365	475	–	9.5	1150	–	190	258	335	438	–	12	1280	258	412	15
/600	600	980	122	170	218	300	375	7.5	7.5	1090	–	155	212	280	388	488	–	9.5	1220	–	200	272	355	462	–	15	1360	272	438	15
/630	630	1030	128	175	230	315	400	7.5	7.5	1150	–	165	230	300	412	515	–	12	1280	–	206	280	375	488	–	15	1420	280	450	15
/670	670	1090	136	185	243	336	412	7.5	7.5	1220	–	175	243	315	438	545	–	12	1360	–	218	300	400	515	–	15	1500	290	475	15
/710	710	1150	140	195	250	345	438	9.5	9.5	1280	–	180	250	325	450	560	–	12	1420	–	224	308	412	530	–	15	–	–	–	–
/750	750	1220	150	206	272	365	475	9.5	9.5	1360	–	195	265	345	475	615	–	15	1500	–	236	325	438	560	–	15	–	–	–	–
/800	800	1280	155	212	272	375	475	9.5	9.5	1420	–	200	272	355	488	615	–	15	1600	–	258	355	462	600	–	15				
/850	850	1360	165	224	290	400	500	12	12	1500	–	206	280	375	515	650	–	15	1700	–	272	375	488	630	–	19				
/900	900	1420	165	230	300	412	515	12	12	1580	–	218	300	388	515	670	–	15	1780	–	280	388	500	650	–	19				
/950	950	1500	175	243	315	438	545	12	12	1660	–	230	315	412	530	710	–	15	1850	–	290	400	515	670	–	19				
/1000	1000	1580	185	258	335	462	580	12	12	1750	–	243	330	425	560	750	–	15	1950	–	300	412	545	710	–	19				
/1060	1060	1660	190	265	345	475	600	12	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
/1120	1120	1750	–	280	365	475	630	–	15																				
/1180	1180	1850	–	290	388	500	670	–	15																				
/1250	1250	1950	–	308	400	530	710	–	15																				
/1320	1320	2060	–	325	425	560	750	–	15																				
/1400	1400	2180	–	345	450	580	775	–	19																				
/1500	1500	2300	–	355	462	600	800	–	19																				

[Remark] The chamfer dimensions (r) in this table are not always applicable to the following corners.
(a) Snap ring groove side corner of outer ring with snap ring groove. (b) No-rib side bearing ring corner of thin section cylindrical roller bearing.
(c) Front bearing ring corner of angular contact ball bearing. (d) Inner ring corner of tapered bore bearing.

Supplementary table 2 Boundary dimensions of tapered roller bearings

Unit : mm

Tapered roller bearing	329						320				330				331					
Bore dia. No.	Bore dia.	Diameter series 9						Diameter series 0								Diameter series 1					
		Outside dia.	Dimension series 29			Chamfer		Outside dia.	Dimension series 20			Dimension series 30			Chamfer	Outside dia.	Dimension series 31			Chamfer	
						Inner ring	Outer ring								Inner ring	Outer ring				Inner ring	Outer ring
	d	D	T	B	C	r min.		D	T	B	C	T	B	C	r min.		D	T	B	C	r min.	
00	10																					
01	12																					
02	15																					
03	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
04	20	37	12	12	9	0.3	0.3	42	15	15	12	–	–	–	0.6	0.6						
/22	22	40	12	12	9	0.3	0.3	44	15	15	11.5	–	–	–	0.6	0.6						
05	25	42	12	12	9	0.3	0.3	47	15	15	11.5	17	17	14	0.6	0.6						
/28	28	45	12	12	9	0.3	0.3	52	16	16	12	–	–	–	1	1						
06	30	47	12	12	9	0.3	0.3	55	17	17	13	20	20	16	1	1						
/32	32	52	14	15	10	0.6	0.6	58	17	17	13	–	–	–	1	1	–	–	–	–	–	–
07	35	55	14	14	11.5	0.6	0.6	62	18	18	14	21	21	17	1	1	–	–	–	–	–	–
08	40	62	15	15	12	0.6	0.6	68	19	19	14.5	22	22	18	1	1	75	26	26	20.5	1.5	1.5
09	45	68	15	15	12	0.6	0.6	75	20	20	15.5	24	24	19	1	1	80	26	26	20.5	1.5	1.5
10	50	72	15	15	12	0.6	0.6	80	20	20	15.5	24	24	19	1	1	85	26	26	20	1.5	1.5
11	55	80	17	17	14	1	1	90	23	23	17.5	27	27	21	1.5	1.5	95	30	30	23	1.5	1.5
12	60	85	17	17	14	1	1	95	23	23	17.5	27	27	21	1.5	1.5	100	30	30	23	1.5	1.5
13	65	90	17	17	14	1	1	100	23	23	17.5	27	27	21	1.5	1.5	110	34	34	26.5	1.5	1.5
14	70	100	20	20	16	1	1	110	25	25	19	31	31	25.5	1.5	1.5	120	37	37	29	2	1.5
15	75	105	20	20	16	1	1	115	25	25	19	31	31	25.5	1.5	1.5	125	37	37	29	2	1.5
16	80	110	20	20	16	1	1	125	29	29	22	36	36	29.5	1.5	1.5	130	37	37	29	2	1.5
17	85	120	23	23	18	1.5	1.5	130	29	29	22	36	36	29.5	1.5	1.5	140	41	41	32	2.5	2
18	90	125	23	23	18	1.5	1.5	140	32	32	24	39	39	32.5	2	1.5	150	45	45	35	2.5	2
19	95	130	23	23	18	1.5	1.5	145	32	32	24	39	39	32.5	2	1.5	160	49	49	38	2.5	2
20	100	140	25	25	20	1.5	1.5	150	32	32	24	39	39	32.5	2	1.5	165	52	52	40	2.5	2
21	105	145	25	25	20	1.5	1.5	160	35	35	26	43	43	34	2.5	2	175	56	56	44	2.5	2
22	110	150	25	25	20	1.5	1.5	170	38	38	29	47	47	37	2.5	2	180	56	56	43	2.5	2
24	120	165	29	29	23	1.5	1.5	180	38	38	29	48	48	38	2.5	2	200	62	62	48	2.5	2
26	130	180	32	32	25	2	1.5	200	45	45	34	55	55	43	2.5	2	–	–	–	–	–	–
28	140	190	32	32	25	2	1.5	210	45	45	34	56	56	44	2.5	2	–	–	–	–	–	–
30	150	210	38	38	30	2.5	2	225	48	48	36	59	59	46	3	2.5	–	–	–	–	–	–
32	160	220	38	38	30	2.5	2	240	51	51	38	–	–	–	3	2.5						
34	170	230	38	38	30	2.5	2	260	57	57	43	–	–	–	3	2.5						
36	180	250	45	45	34	2.5	2	280	64	64	48	–	–	–	3	2.5						
38	190	260	45	45	34	2.5	2	290	64	64	48				3	2.5						
40	200	280	51	51	39	3	2.5	310	70	70	53				3	2.5						
44	220	300	51	51	39	3	2.5	340	76	76	57				4	3						
48	240	320	51	51	39	3	2.5	360	76	76	57				4	3						
52	260	360	63.5	63.5	48	3	2.5	400	87	87	65				5	4						
56	280	380	63.5	63.5	48	3	2.5	420	87	87	65				5	4						
60	300	420	76	76	57	4	3	460	100	100	74				5	4						
64	320	440	76	76	57	4	3	480	100	100	74				5	4						
68	340	460	76	76	57	4	3	–	–	–	–				–	–						
72	360	480	76	76	57	4	3	–	–	–	–				–	–						

Tapered roller bearing	302				322			332				303 , 303D					313			323				Tapered roller bearing
Bore dia. No.	Diameter series 2											Diameter series 3												Bore dia. No.
	Outside dia.	Dimension series 02			Dimension series 22			Dimension series 32			Chamfer	Outside dia.	Dimension series 03				Dimension series 13			Dimension series 23			Chamfer	
											Inner ring / Outer ring												Inner ring / Outer ring	
	D	T	B	C	T	B	C	T	B	C	r min.	D	T	B	C_{303}	C_{303D}	T	B	C	T	B	C	r min.	
00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–	–	–	10
01	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–	–	–	12
02	(35	11.75	11	10)	–	–	–	–	–	–	–	42	14.25	13	11	–				–	–	–	1	15
03	40	13.25	12	11	17.25	16	14	–	–	–	1	47	15.25	14	12	–				20.25	19	16	1	17
04	47	15.25	14	12	19.25	18	15	–	–	–	1	52	16.25	15	13	–				22.25	21	18	1.5	20
/22	50	–	–	–	–	–	–	–	–	–	–	56	–	–	–	–				–	–	–	–	22
05	52	16.25	15	13	19.25	18	16 [2]	22	22	18	1	62	18.25	17	15	13				25.25	24	20	1.5	25
/28	58	–	–	–	(20.25	19	16) [1]	24	24	19	1	68	–	–	–	–				–	–	–	–	28
06	62	17.25	16	14	21.25	20	17	25	25	19.5	1	72	20.75	19	16	14				28.75	27	23	1.5	30
/32	65	18.25	17	15	(22	21.5	17) [1]	26	26	20.5	1	75	–	–	–	–				29.75	28	23	1.5	32
07	72	18.25	17	15	24.25	23	19	28	28	22	1.5	80	22.75	21	18	15				32.75	31	25	2	35
08	80	19.75	18	16	24.75	23	19	32	32	25	1.5	90	25.25	23	20	17				35.25	33	27	2	40
09	85	20.75	19	16	24.75	23	19	32	32	25	1.5	100	27.25	25	22	18				38.25	36	30	2	45
10	90	21.75	20	17	24.75	23	19 [3]	32	32	24.5	1.5	110	29.25	27	23	19				42.25	40	33	2.5	50
11	100	22.75	21	18	26.75	25	21	35	35	27	2	120	31.5	29	25	21				45.5	43	35	2.5	55
12	110	23.75	22	19	29.75	28	24	38	38	29	2	130	33.5	31	26	22				48.5	46	37	3	60
13	120	24.75	23	20	32.75	31	27	41	41	32	2	140	36	33	28	23				51	48	39	3	65
14	125	26.25	24	21	33.25	31	27	41	41	32	2	150	38	35	30	25				54	51	42	3	70
15	130	27.25	25	22	33.25	31	27	41	41	31	2	160	40	37	31	26				58	55	45	3	75
16	140	28.25	26	22	35.25	33	28	46	46	35	2.5	170	42.5	39	33	27				61.5	58	48	3	80
17	150	30.5	28	24	38.5	36	30	49	49	37	2.5	180	44.5	41	34	28				63.5	60	49	4	85
18	160	32.5	30	26	42.5	40	34	55	55	42	2.5	190	46.5	43	36	30	–	–	–	67.5	64	53	4	90
19	170	34.5	32	27	45.5	43	37	58	58	44	3	200	49.5	45	38	32	–	–	–	71.5	67	55	4	95
20	180	37	34	29	49	46	39	63	63	48	3	215	51.5	47	39	–	56.5	51	35	77.5	73	60	4	100
21	190	39	36	30	53	50	43	68	68	52	3	225	53.5	49	41	–	58	53	36	81.5	77	63	4	105
22	200	41	38	32	56	53	46	–	–	–	3	240	54.5	50	42	–	63	57	38	84.5	80	65	4	110
24	215	43.5	40	34	61.5	58	50	–	–	–	3	260	59.5	55	46	–	68	62	42	90.5	86	69	4	120
26	230	43.75	40	34	67.75	64	54	–	–	–	4	280	63.75	58	49	–	72	66	44	–	–	–	5	130
28	250	45.75	42	36	71.75	68	58	–	–	–	4	300	67.75	62	53	–	77	70	47	–	–	–	5	140
30	270	49	45	38	77	73	60	–	–	–	4	320	72	65	55		82	75	50	–	–	–	5	150
32	290	52	48	40	84	80	67	–	–	–	4	340	75	68	58	–	–	–	–	–	–	–	5	160
34	310	57	52	43	91	86	71	–	–	–	5	360	80	72	62	–	–	–	–	–	–	–	5	170
36	320	57	52	43	91	86	71	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	–	180
38	340	60	55	46	97	92	75	–	–	–	5													190
40	360	64	58	48	104	98	82	–	–	–	5													200
44	–	–	–	–	–	–	–	–	–	–	–													220
48																								240
52																								260
56																								280
60																								300
64																								320
68																								340
72																								360

[Remark] In the new JIS, new dimension series (classified by contact angle) is also specified in accordance with ISO standards.

[Notes] 1) Bearing group with large contact angle
2) Outer ring width C of bearings with large contact angle is 15 mm.
3) Outer ring width C of bearings with large contact angle is 18 mm.

Supplementary table 3 Boundary dimensions of single direction thrust bearings (with flat back faces) – diameter series 0, 1, 2, 3, 4, 5 –

Unit : mm

Thrust ball brg.									511						512						513				514					
Spherical thrust roller bearings														292						293					294					

Bore dia. No.	Bore dia.	Diameter series 0					Diameter series 1							Diameter series 2							Diameter series 3							Diameter series 4							Diameter series 5		
		Outside dia.	Dimension series			Chamfer	Outside dia.	Dimension series					Chamfer	Outside dia.	Dimension series				Chamfer	Outside dia.	Dimension series				Chamfer	Outside dia.	Dimension series				Chamfer	Outside dia.	*	Chamfer
			70	90	10			71	91	11	11				72	92	12	12			73	93	13	13			74	94	14	14				95	
	d	D	Height		T	r min.	D	Height		T	d_1 max.	D_1 min.	r min.	D	Height		T	d_1 max.	D_1 min.	r min.	D	Height		T	d_1 max.	D_1 min.	r min.	D	Height		T	d_1 max.	D_1 min.	r min.	D	T	r min.
4	4	12	4	–	6	0.3	–	–	–	–	–	–	–	16	6	–	8	16	4	0.3	20	7	–	11	20	4	0.6										
6	6	16	5	–	7	0.3	–	–	–	–	–	–	–	20	6	–	9	20	6	0.3	24	8	–	12	24	6	0.6							* Dimension series		
8	8	18	5	–	7	0.3	–	–	–	–	–	–	–	22	6	–	9	22	8	0.3	26	8	–	12	26	8	0.6									
00	10	20	5	–	7	0.3	24	6	–	9	24	11	0.3	26	7	–	11	26	12	0.6	30	9	–	14	30	10	0.6										
01	12	22	5	–	7	0.3	26	6	–	9	26	13	0.3	28	7	–	11	28	14	0.6	32	9	–	14	32	12	0.6										
02	15	26	5	–	7	0.3	28	6	–	9	28	16	0.3	32	8	–	12	32	17	0.6	37	10	–	15	37	15	0.6										
03	17	28	5	–	7	0.3	30	6	–	9	30	18	0.3	35	8	–	12	35	19	0.6	40	10	–	16	40	19	0.6	–	–	–	–	–	–	–	52	21	1
04	20	32	6	–	8	0.3	35	7	–	10	35	21	0.3	40	9	–	14	40	22	0.6	47	12	–	18	47	22	1	–	–	–	–	–	–	–	60	24	1
05	25	37	6	–	8	0.3	42	8	–	11	42	26	0.6	47	10	–	15	47	27	0.6	52	12	–	18	52	27	1	60	16	21	24	60	27	1	73	29	1.1
06	30	42	6	–	8	0.3	47	8	–	11	47	32	0.6	52	10	–	16	52	32	0.6	60	14	–	21	60	32	1	70	18	24	28	70	32	1	85	34	1.1
07	35	47	6	–	8	0.3	52	8	–	12	52	37	0.6	62	12	–	18	62	37	1	68	15	–	24	68	37	1	80	20	27	32	80	37	1.1	100	39	1.1
08	40	52	6	–	9	0.3	60	9	–	13	60	42	0.6	68	13	–	19	68	42	1	78	17	22	26	78	42	1	90	23	30	36	90	42	1.1	110	42	1.5
09	45	60	7	–	10	0.3	65	9	–	14	65	47	0.6	73	13	–	20	73	47	1	85	18	24	28	85	47	1	100	25	34	39	100	47	1.1	120	45	2
10	50	65	7	–	10	0.3	70	9	–	14	70	52	0.6	78	13	–	22	78	52	1	95	20	27	31	95	52	1.1	110	27	36	43	110	52	1.5	135	51	2
11	55	70	7	–	10	0.3	78	10	–	16	78	57	0.6	90	16	21	25	90	57	1	105	23	30	35	105	57	1.1	120	29	39	48	120	57	1.5	150	58	2.1
12	60	75	7	–	10	0.3	85	11	–	17	85	62	1	95	16	21	26	95	62	1	110	23	30	35	110	62	1.1	130	32	42	51	130	62	1.5	160	60	2.1
13	65	80	7	–	10	0.3	90	11	–	18	90	67	1	100	16	21	27	100	67	1	115	23	30	36	115	67	1.1	140	34	45	56	140	68	2	170	63	2.1
14	70	85	7	–	10	0.3	95	11	–	18	95	72	1	105	16	21	27	105	72	1	125	25	34	40	125	72	1.1	150	36	48	60	150	73	2	180	67	3
15	75	90	7	–	10	0.3	100	11	–	19	100	77	1	110	16	21	27	110	77	1	135	27	36	44	135	77	1.5	160	38	51	65	160	78	2	190	69	3
16	80	95	7	–	10	0.3	105	11	–	19	105	82	1	115	16	21	28	115	82	1	140	27	36	44	140	82	1.5	170	41	54	68	170	83	2.1	200	73	3
17	85	100	7	–	10	0.3	110	11	–	19	110	87	1	125	18	24	31	125	88	1	150	29	39	49	150	88	1.5	180	42	58	72	177	88	2.1	215	78	4
18	90	105	7	–	10	0.3	120	14	–	22	120	92	1	135	20	27	35	135	93	1.1	155	29	39	50	155	93	1.5	190	45	60	77	187	93	2.1	225	82	4
20	100	120	9	–	14	0.6	135	16	21	25	135	102	1	150	23	30	38	150	103	1.1	170	32	42	55	170	103	1.5	210	50	67	85	205	103	3	250	90	4
22	110	130	9	–	14	0.6	145	16	21	25	145	112	1	160	23	30	38	160	113	1.1	190	36	48	63	187	113	2	230	54	73	95	225	113	3	270	95	5
24	120	140	9	–	14	0.6	155	16	21	25	155	122	1	170	23	30	39	170	123	1.1	210	41	54	70	205	123	2.1	250	58	78	102	245	123	4	300	109	5
26	130	150	9	–	14	0.6	170	18	24	30	170	132	1	190	27	36	45	187	133	1.5	225	42	58	75	220	134	2.1	270	63	85	110	265	134	4	320	115	5
28	140	160	9	–	14	0.6	180	18	24	31	178	142	1	200	27	36	46	197	143	1.5	240	45	60	80	235	144	2.1	280	63	85	112	275	144	4	340	122	5
30	150	170	9	–	14	0.6	190	18	24	31	188	152	1	215	29	39	50	212	153	1.5	250	45	60	80	245	154	2.1	300	67	90	120	295	154	4	360	125	6
32	160	180	9	–	14	0.6	200	18	24	31	198	162	1	225	29	39	51	222	163	1.5	270	50	67	87	265	164	3	320	73	95	130	315	164	5	380	132	6
34	170	190	9	–	14	0.6	215	20	27	34	213	172	1.1	240	32	42	55	237	173	1.5	280	50	67	87	275	174	3	340	78	103	135	335	174	5	400	140	6
36	180	200	9	–	14	0.6	225	20	27	34	222	183	1.1	250	32	42	56	247	183	1.5	300	54	73	95	295	184	3	360	82	109	140	355	184	5	420	145	6
38	190	215	11	–	17	1	240	23	30	37	237	193	1.1	270	36	48	62	267	194	2	320	58	78	105	315	195	4	380	85	115	150	375	195	5	440	150	6
40	200	225	11	–	17	1	250	23	30	37	247	203	1.1	280	36	48	62	277	204	2	340	63	85	110	335	205	4	400	90	122	155	395	205	5	460	155	7.5
44	220	250	14	–	22	1	270	23	30	37	267	223	1.1	300	36	48	63	297	224	2	360	63	85	112	355	225	4	420	90	122	160	415	225	6	500	170	7.5
48	240	270	14	–	22	1	300	27	36	45	297	243	1.5	340	45	60	78	335	244	2.1	380	63	85	112	375	245	4	440	90	122	160	435	245	6	540	180	7.5
52	260	290	14	–	22	1	320	27	36	45	317	263	1.5	360	45	60	79	355	264	2.1	420	73	95	130	415	265	5	480	100	132	175	475	265	6	580	190	9.5
56	280	310	14	–	22	1	350	32	42	53	347	283	1.5	380	45	60	80	375	284	2.1	440	73	95	130	435	285	5	520	109	145	190	515	285	6	620	206	9.5
60	300	340	18	24	30	1	380	36	48	62	376	304	2	420	54	73	95	415	304	3	480	82	109	140	475	305	5	540	109	145	190	535	305	6	670	224	9.5
64	320	360	18	24	30	1	400	36	48	63	396	324	2	440	54	73	95	435	325	3	500	82	109	140	495	325	5	580	118	155	205	575	325	7.5	710	236	9.5
68	340	380	18	24	30	1	420	36	48	64	416	344	2	460	54	73	96	455	345	3	540	90	122	160	535	345	5	620	125	170	220	615	345	7.5	750	243	12
72	360	400	18	24	30	1	440	36	48	65	436	364	2	500	63	85	110	495	365	4	560	90	122	160	555	365	5	640	125	170	220	635	365	7.5	780	250	12
76	380	420	18	24	30	1	460	36	48	65	456	384	2	520	63	85	112	515	385	4	600	100	132	175	595	385	6	670	132	175	224	665	385	7.5	820	265	12
80	400	440	18	24	30	1	480	36	48	65	476	404	2	540	63	85	112	535	405	4	620	100	132	175	615	405	6	710	140	185	243	705	405	7.5	850	272	12
84	420	460	18	24	30	1	500	36	48	65	495	424	2	580	73	95	130	575	425	5	650	103	140	180	645	425	6	730	140	185	243	725	425	7.5	900	290	15
88	440	480	18	24	30	1	540	45	60	80	535	444	2.1	600	73	95	130	595	445	5	680	109	145	190	675	445	6	780	155	206	265	775	445	9.5	950	308	15
92	460	500	18	24	30	1	560	45	60	80	555	464	2.1	620	73	95	130	615	465	5	710	112	150	195	705	465	6	800	155	206	265	795	465	9.5	980	315	15
96	480	520	18	24	30	1	580	45	60	80	575	484	2.1	650	78	103	135	645	485	5	730	112	150	195	725	485	6	850	165	224	290	845	485	9.5	1000	315	15
/500	500	540	18	24	30	1	600	45	60	80	595	504	2.1	670	78	103	135	665	505	5	750	112	150	195	745	505	6	870	165	224	290	865	505	9.5	1060	335	15
/530	530	580	23	30	38	1.1	640	50	67	85	635	534	3	710	82	109	140	705	535	5	800	122	160	212	795	535	7.5	920	175	236	308	915	535	9.5	1090	335	15
/560	560	610	23	30	38	1.1	670	50	67	85	665	564	3	750	85	115	150	745	565	5	850	132	175	224	845	565	7.5	980	190	250	335	975	565	12	1150	355	15
/600	600	650	23	30	38	1.1	710	50	67	85	705	604	3	800	90	122	160	795	605	5	900	136	180	236	895	605	7.5	1030	195	258	335	1025	605	12	1220	375	15
/630	630	680	23	30	38	1.1	750	54	73	95	745	634	3	850	100	132	175	845	635	6	950	145	190	250	945	635	9.5	1090	206	280	365	1085	635	12	1280	388	15
/670	670	730	27	36	45	1.5	800	58	78	105	795	674	4	900	103	140	180	895	675	6	1000	150	200	258	995	675	9.5	1150	218	290	375	1145	675	15	1320	388	15
/710	710	780	32	42	53	1.5	850	63	85	112	845	714	4	950	109	145	190	945	715	6	1060	160	212	272	1055	715	9.5	1220	230	308	400	1215	715	15	1400	412	15
/750	750	820	32	42	53	1.5	900	67	90	120	895	755	4	1000	112	150	195	995	755	6	1120	165	224	290	1115	755	9.5	1280	236	315	412	1275	755	15			
/800	800	870	32	42	53	1.5	950	67	90	120	945	805	4	1060	118	155	205	1055	805	7.5	1180	170	230	300	1175	805	9.5	1360	250	335	438	1355	805	15			
/850	850	920	32	42	53	1.5	1000	67	90	120	995	855	4	1120	122	160	212	1115	855	7.5	1250	180	243	315	1245	855	12	1440	–	354	–	–	–	15			
/900	900	980	36	48	63	2	1060	73	95	130	1055	905	5	1180	125	170	220	1175	905	7.5	1320	190	250	335	1315	905	12	1520	–	372	–	–	–	15			
/950	950	1030	36	48	63	2	1120	78	103	135	1115	955	5	1250	136	180	236	1245	955	7.5	1400	200	272	355	1395	955	12	1600	–	390	–	–	–	15			
/1000	1000	1090	41	54	70	2.1	1180	82	109	140	1175	1005	5	1320	145	190	250	1315	1005	9.5	1460	–	276	–	–	–	12	1670	–	402	–	–	–	15			
/1060	1060	1150	41	54	70	2.1	1250	85	115	150	1245	1065	5	1400	155	206	265	1395	1065	9.5								1770	–	426	–	–	–	15			
/1120	1120	1220	45	60	80	2.1	1320	90	122	160	1315	1125	5	1460	–	206	–	–	–	9.5								1860	–	444	–	–	–	15			
/1180	1180	1280	45	60	80	2.1	1400	100	132	175	1395	1185	6	1520	–	206	–	–	–	9.5								1950	–	462	–	–	–	19			
/1250	1250	1360	50	67	85	3	1460	–	–	175	1455	1255	6	1610	–	216	–	–	–	9.5																
/1320	1320	1440	–	–	95	3	1540	–	–	175	1535	1325	6	1700	–	228	–	–	–	9.5																
/1400	1400	1520	–	–	95	3	1630	–	–	180	1620	1410	6																							
/1500	1500	1630	–	–	105	4	1750	–	–	195	1740	1510	6																							
/1600	1600	1730	–	–	105	4	1850	–	–	195	1840	1610	6																							
/1700	1700	1840	–	–	112	4	1970	–	–	212	1960	1710	7.5																							
/1800	1800	1950	–	–	120	4	2080	–	–	220	2070	1810	7.5																							
/1900	1900	2060	–	–	130	5	2180	–	–	220	2170	1910	7.5																							
/2000	2000	2160	–	–	130	5	2300	–	–	236	2290	2010	7.5																							
/2120	2120	2300	–	–	140	5	2430	–	–	243	2420	2130	7.5																							
/2240	2240	2430	–	–	150	5	2570	–	–	258	2560	2250	9.5																							
/2360	2360	2550	–	–	150	5	2700	–	–	265	2690	2370	9.5																							
/2500	2500	2700	–	–	160	5	2850	–	–	272	2840	2510	9.5																							

D 7

D 8

Koyo

Supplementary table 4 Boundary dimensios of double direction thrust ball bearings (with flat back faces)

Unit : mm

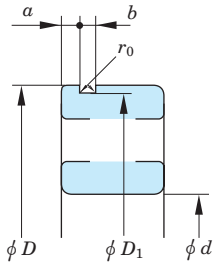
Bore dia. No.	522 Diameter series 2 Dimension series 22									523 Diameter series 3 Dimension series 23									524 Diameter series 4 Dimension series 24									Bore dia. No.
	Bore dia. d_2	Out-side dia. D	Height T_1	Central race height B	d_3 max.	D_1 min.	r min.	r_1 min.	(Refer.) d 1)	Bore dia. d_2	Out-side dia. D	Height T_1	Central race height B	d_3 max.	D_1 min.	r min.	r_1 min.	(Refer.) d 1)	Bore dia. d_2	Out-side dia. D	Height T_1	Central race height B	d_3 max.	D_1 min.	r min.	r_1 min.	(Refer.) d 1)	
02	10	32	22	5	32	17	0.6	0.3	15	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	02
04	15	40	26	6	40	22	0.6	0.3	20	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	04
05	20	47	28	7	47	27	0.6	0.3	25	20	52	34	8	52	27	1	0.3	25	15	60	45	11	60	27	1	0.6	25	05
06	25	52	29	7	52	32	0.6	0.3	30	25	60	38	9	60	32	1	0.3	30	20	70	52	12	70	32	1	0.6	30	06
07	30	62	34	8	62	37	1	0.3	35	30	68	44	10	68	37	1	0.3	35	25	80	59	14	80	37	1.1	0.6	35	07
08	30	68	36	9	68	42	1	0.6	40	30	78	49	12	78	42	1	0.6	40	30	90	65	15	90	42	1.1	0.6	40	08
09	35	73	37	9	73	47	1	0.6	45	35	85	52	12	85	47	1	0.6	45	35	100	72	17	100	47	1.1	0.6	45	09
10	40	78	39	9	78	52	1	0.6	50	40	95	58	14	95	52	1.1	0.6	50	40	110	78	18	110	52	1.5	0.6	50	10
11	45	90	45	10	90	57	1	0.6	55	45	105	64	15	105	57	1.1	0.6	55	45	120	87	20	120	57	1.5	0.6	55	11
12	50	95	46	10	95	62	1	0.6	60	50	110	64	15	110	62	1.1	0.6	60	50	130	93	21	130	62	1.5	0.6	60	12
13	55	100	47	10	100	67	1	0.6	65	55	115	65	15	115	67	1.1	0.6	65	50	140	101	23	140	68	2	1	65	13
14	55	105	47	10	105	72	1	1	70	55	125	72	16	125	72	1.1	1	70	55	150	107	24	150	73	2	1	70	14
15	60	110	47	10	110	77	1	1	75	60	135	79	18	135	77	1.5	1	75	60	160	115	26	160	78	2	1	75	15
16	65	115	48	10	115	82	1	1	80	65	140	79	18	140	82	1.5	1	80	65	170	120	27	170	83	2.1	1	80	16
17	70	125	55	12	125	88	1	1	85	70	150	87	19	150	88	1.5	1	85	65	180	128	29	179.5	88	2.1	1.1	85	17
18	75	135	62	14	135	93	1.1	1	90	75	155	88	19	155	93	1.5	1	90	70	190	135	30	189.5	93	2.1	1.1	90	18
20	85	150	67	15	150	103	1.1	1	100	85	170	97	21	170	103	1.5	1	100	80	210	150	33	209.5	103	3	1.1	100	20
22	95	160	67	15	160	113	1.1	1	110	95	190	110	24	189.5	113	2	1	110	90	230	166	37	229	113	3	1.1	110	22
24	100	170	68	15	170	123	1.1	1.1	120	100	210	123	27	209.5	123	2.1	1.1	120	95	250	177	40	249	123	4	1.5	120	24
26	110	190	80	18	189.5	133	1.5	1.1	130	110	225	130	30	224	134	2.1	1.1	130	100	270	192	42	269	134	4	2	130	26
28	120	200	81	18	199.5	143	1.5	1.1	140	120	240	140	31	239	144	2.1	1.1	140	110	280	196	44	279	144	4	2	140	28
30	130	215	89	20	214.5	153	1.5	1.1	150	130	250	140	31	249	154	2.1	1.1	150	120	300	209	46	299	154	4	2	150	30
32	140	225	90	20	224.5	163	1.5	1.1	160	140	270	153	33	269	164	3	1.1	160	130	320	226	50	319	164	5	2	160	32
34	150	240	97	21	239.5	173	1.5	1.1	170	150	280	153	33	279	174	3	1.1	170	135	340	236	50	339	174	5	2.1	170	34
36	150	250	98	21	249	183	1.5	2	180	150	300	165	37	299	184	3	2	180	140	360	245	52	359	184	5	3	180	36
38	160	270	109	24	269	194	2	2	190	160	320	183	40	319	195	4	2	190	–	–	–	–	–	–	–	–	–	38
40	170	280	109	24	279	204	2	2	200	170	340	192	42	339	205	4	2	200	–	–	–	–	–	–	–	–	–	40
44	190	300	110	24	299	224	2	2	220	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	44

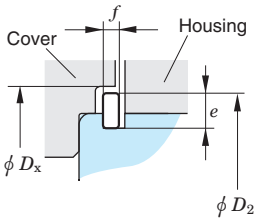
[Note] 1) Nominal bore diameter of single direction bearings of the same diameter series and with the same nominal outside diameter.

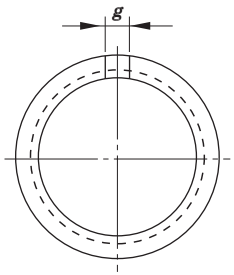
Supplementary table 5 (1) Dimension of snap ring grooves and locationg snap rings – diameter series 18, 19 –

Unit : mm

Applicable bearing			Snap ring groove									Locating snap ring							Housing
Bore dia. d		Outside dia. D	Snap ring groove dia. D_1		Position of snap ring groove a				Snap ring groove width b		Fillet radius of snap ring groove r_0	No.	Section height e		Thickness f		Mounted state		Shoulder bore dia. D_x
Dimension series					Dimension series 18		Dimension series 19										Distance between cut ends g	Locating snap ring O.D. D_2	
18	19		max.	min.	max.	min.	max.	min.	max.	min.	max.		max.	min.	max.	min.	max.	max.	max.
–	10	22	20.8	20.5	–	–	1.05	0.9	1.05	0.8	0.2	NR 1022	2.0	1.85	0.7	0.6	2	24.8	25.5
–	12	24	22.8	22.5	–	–	1.05	0.9	1.05	0.8	0.2	NR 1024	2.0	1.85	0.7	0.6	2	26.8	27.5
–	15	28	26.7	26.4	–	–	1.3	1.15	1.2	0.95	0.25	NR 1028	2.05	1.9	0.85	0.75	3	30.8	31.5
–	17	30	28.7	28.4	–	–	1.3	1.15	1.2	0.95	0.25	NR 1030	2.05	1.9	0.85	0.75	3	32.8	33.5
20	–	32	30.7	30.4	1.3	1.15	–	–	1.2	0.95	0.25	NR 1032	2.05	1.9	0.85	0.75	3	34.8	35.5
22	–	34	32.7	32.4	1.3	1.15	–	–	1.2	0.95	0.25	NR 1034	2.05	1.9	0.85	0.75	3	36.8	37.5
25	20	37	35.7	35.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25	NR 1037	2.05	1.9	0.85	0.75	3	39.8	40.5
–	22	39	37.7	37.4	–	–	1.7	1.55	1.2	0.95	0.25	NR 1039	2.05	1.9	0.85	0.75	3	41.8	42.5
28	–	40	38.7	38.4	1.3	1.15	–	–	1.2	0.95	0.25	NR 1040	2.05	1.9	0.85	0.75	3	42.8	43.5
30	25	42	40.7	40.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25	NR 1042	2.05	1.9	0.85	0.75	3	44.8	45.5
32	–	44	42.7	42.4	1.3	1.15	–	–	1.2	0.95	0.25	NR 1044	2.05	1.9	0.85	0.75	4	46.8	47.5
–	28	45	43.7	43.4	–	–	1.7	1.55	1.2	0.95	0.25	NR 1045	2.05	1.9	0.85	0.75	4	47.8	48.5
35	30	47	45.7	45.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25	NR 1047	2.05	1.9	0.85	0.75	4	49.8	50.5
40	32	52	50.7	50.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25	NR 1052	2.05	1.9	0.85	0.75	4	54.8	55.5
–	35	55	53.7	53.4	–	–	1.7	1.55	1.2	0.95	0.25	NR 1055	2.05	1.9	0.85	0.75	4	57.8	58.5
45	–	58	56.7	56.4	1.3	1.15	–	–	1.2	0.95	0.25	NR 1058	2.05	1.9	0.85	0.75	4	60.8	61.5
–	40	62	60.7	60.3	–	–	1.7	1.55	1.2	0.95	0.25	NR 1062	2.05	1.9	0.85	0.75	4	64.8	65.5
50	–	65	63.7	63.3	1.3	1.15	–	–	1.2	0.95	0.25	NR 1065	2.05	1.9	0.85	0.75	4	67.8	68.5
–	45	68	66.7	66.3	–	–	1.7	1.55	1.2	0.95	0.25	NR 1068	2.05	1.9	0.85	0.75	5	70.8	72
55	50	72	70.7	70.3	1.7	1.55	1.7	1.55	1.2	0.95	0.25	NR 1072	2.05	1.9	0.85	0.75	5	74.8	76
60	–	78	76.2	75.8	1.7	1.55	–	–	1.6	1.3	0.4	NR 1078	3.25	3.1	1.12	1.02	5	82.7	84
–	55	80	77.9	77.5	–	–	2.1	1.9	1.6	1.3	0.4	NR 1080	3.25	3.1	1.12	1.02	5	84.4	86
65	60	85	82.9	82.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4	NR 1085	3.25	3.1	1.12	1.02	5	89.4	91
70	65	90	87.9	87.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4	NR 1090	3.25	3.1	1.12	1.02	5	94.4	96
75	–	95	92.9	92.5	1.7	1.55	–	–	1.6	1.3	0.4	NR 1095	3.25	3.1	1.12	1.02	5	99.4	101
80	70	100	97.9	97.5	1.7	1.55	2.5	2.3	1.6	1.3	0.4	NR 1100	3.25	3.1	1.12	1.02	5	104.4	106
–	75	105	102.6	102.1	–	–	2.5	2.3	1.6	1.3	0.4	NR 1105	4.04	3.89	1.12	1.02	5	110.7	112
85	80	110	107.6	107.1	2.1	1.9	2.5	2.3	1.6	1.3	0.4	NR 1110	4.04	3.89	1.12	1.02	5	115.7	117
90	–	115	112.6	112.1	2.1	1.9	–	–	1.6	1.3	0.4	NR 1115	4.04	3.89	1.12	1.02	5	120.7	122
95	85	120	117.6	117.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4	NR 1120	4.04	3.89	1.12	1.02	7	125.7	127
100	90	125	122.6	122.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4	NR 1125	4.04	3.89	1.12	1.02	7	130.7	132
105	95	130	127.6	127.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4	NR 1130	4.04	3.89	1.12	1.02	7	135.7	137
110	100	140	137.6	137.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6	NR 1140	4.04	3.89	1.7	1.6	7	145.7	147
–	105	145	142.6	142.1	–	–	3.3	3.1	2.2	1.9	0.6	NR 1145	4.04	3.89	1.7	1.6	7	150.7	152
120	110	150	147.6	147.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6	NR 1150	4.04	3.89	1.7	1.6	7	155.7	157
130	120	165	161.8	161.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6	NR 1165	4.85	4.7	1.7	1.6	7	171.5	173
140	–	175	171.8	171.3	3.3	3.1	–	–	2.2	1.9	0.6	NR 1175	4.85	4.7	1.7	1.6	10	181.5	183
–	130	180	176.8	176.3	–	–	3.7	3.5	2.2	1.9	0.6	NR 1180	4.85	4.7	1.7	1.6	10	186.5	188
150	140	190	186.8	186.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6	NR 1190	4.85	4.7	1.7	1.6	10	196.5	198
160	–	200	196.8	196.3	3.3	3.1	–	–	2.2	1.9	0.6	NR 1200	4.85	4.7	1.7	1.6	10	206.5	208





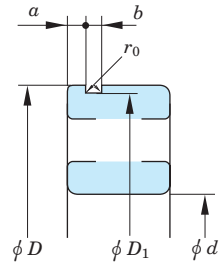


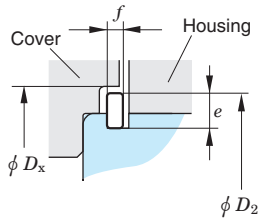
[Remark] Minimum chamfer dimension tolerances on snap ring groove-side outer ring are as follows :
Bearings belonging to dimension series 18 : 0.3 mm for those with nominal outside diameter not more than 78 mm ; 0.5 mm for those with nominal diameter over 78 mm.
Bearings belonging to dimension series 19 : 0.3 mm for those with nominal outside diameter not more than 47 mm ; 0.5 mm for those with nominal diameter over 47 mm.

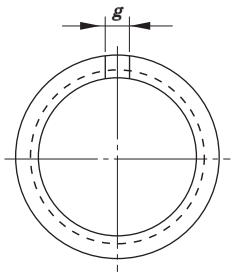
Supplementary table 5 (2) Dimension of snap ring grooves and locationg snap rings – diameter series 0, 2, 3, 4 –

Unit : mm

Applicable bearing					Snap ring groove									Locating snap ring							Housing
Bore dia. d				Outside dia. D	Snap ring groove dia. D_1		Position of snap ring groove a				Snap ring groove width b		Fillet radius of snap ring groove r_0	No.	Section height e		Thickness f		Mounted state		Shoulder bore dia. D_x
							Diameter series												Distance between cut ends g	Locating snap ring O.D. D_2	
Diameter series							0		2, 3, 4												
0	2	3	4		max.	min.	max.	min.	max.	min.	max.	min.	max.		max.	min.	max.	min.	max.	max.	max.
–	10	9	8	30	28.17	27.91	–	–	2.06	1.9	1.65	1.35	0.4	NR 30	3.25	3.1	1.12	1.02	3	34.7	35.5
15	12	–	9	32	30.15	29.9	2.06	1.9	2.06	1.9	1.65	1.35	0.4	NR 32	3.25	3.1	1.12	1.02	3	36.7	37.5
17	15	10	–	35	33.17	32.92	2.06	1.9	2.06	1.9	1.65	1.35	0.4	NR 35	3.25	3.1	1.12	1.02	3	39.7	40.5
–	–	12	10	37	34.77	34.52	–	–	2.06	1.9	1.65	1.35	0.4	NR 37	3.25	3.1	1.12	1.02	3	41.3	42
–	17	–	–	40	38.1	37.85	–	–	2.06	1.9	1.65	1.35	0.4	NR 40	3.25	3.1	1.12	1.02	3	44.6	45.5
20	–	15	12	42	39.75	39.5	2.06	1.9	2.06	1.9	1.65	1.35	0.4	NR 42	3.25	3.1	1.12	1.02	3	46.3	47
22	–	–	–	44	41.75	41.5	2.06	1.9	–	–	1.65	1.35	0.4	NR 44	3.25	3.1	1.12	1.02	3	48.3	49
25	20	17	–	47	44.6	44.35	2.06	1.9	2.46	2.31	1.65	1.35	0.4	NR 47	4.04	3.89	1.12	1.02	4	52.7	53.5
–	22	–	–	50	47.6	47.35	–	–	2.46	2.31	1.65	1.35	0.4	NR 50	4.04	3.89	1.12	1.02	4	55.7	56.5
28	25	20	15	52	49.73	49.48	2.06	1.9	2.46	2.31	1.65	1.35	0.4	NR 52	4.04	3.89	1.12	1.02	4	57.9	58.5
30	–	–	–	55	52.6	52.35	2.08	1.88	–	–	1.65	1.35	0.4	NR 55	4.04	3.89	1.12	1.02	4	60.7	61.5
–	–	22	–	56	53.6	53.35	–	–	2.46	2.31	1.65	1.35	0.4	NR 56	4.04	3.89	1.12	1.02	4	61.7	62.5
32	28	–	–	58	55.6	55.35	2.08	1.88	2.46	2.31	1.65	1.35	0.4	NR 58	4.04	3.89	1.12	1.02	4	63.7	64.5
35	30	25	17	62	59.61	59.11	2.08	1.88	3.28	3.07	2.2	1.9	0.6	NR 62	4.04	3.89	1.7	1.6	4	67.7	68.5
–	32	–	–	65	62.6	62.1	–	–	3.28	3.07	2.2	1.9	0.6	NR 65	4.04	3.89	1.7	1.6	4	70.7	71.5
40	–	28	–	68	64.82	64.31	2.49	2.29	3.28	3.07	2.2	1.9	0.6	NR 68	4.85	4.7	1.7	1.6	5	74.6	76
–	35	30	20	72	68.81	68.3	–	–	3.28	3.07	2.2	1.9	0.6	NR 72	4.85	4.7	1.7	1.6	5	78.6	80
45	–	32	–	75	71.83	71.32	2.49	2.29	3.28	3.07	2.2	1.9	0.6	NR 75	4.85	4.7	1.7	1.6	5	81.6	83
50	40	35	25	80	76.81	76.3	2.49	2.29	3.28	3.07	2.2	1.9	0.6	NR 80	4.85	4.7	1.7	1.6	5	86.6	88
–	45	–	–	85	81.81	81.31	–	–	3.28	3.07	2.2	1.9	0.6	NR 85	4.85	4.7	1.7	1.6	5	91.6	93
55	50	40	30	90	86.79	86.28	2.87	2.67	3.28	3.07	3	2.7	0.6	NR 90	4.85	4.7	2.46	2.36	5	96.5	98
60	–	–	–	95	91.82	91.31	2.87	2.67	–	–	3	2.7	0.6	NR 95	4.85	4.7	2.46	2.36	5	101.6	103
65	55	45	35	100	96.8	96.29	2.87	2.67	3.28	3.07	3	2.7	0.6	NR100	4.85	4.7	2.46	2.36	5	106.5	108
70	60	50	40	110	106.81	106.3	2.87	2.67	3.28	3.07	3	2.7	0.6	NR110	4.85	4.7	2.46	2.36	5	116.6	118
75	–	–	–	115	111.81	111.3	2.87	2.67	–	–	3	2.7	0.6	NR115	4.85	4.7	2.46	2.36	5	121.6	123
–	65	55	45	120	115.21	114.71	–	–	4.06	3.86	3.4	3.1	0.6	NR120	7.21	7.06	2.82	2.72	7	129.7	131.5
80	70	–	–	125	120.22	119.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6	NR125	7.21	7.06	2.82	2.72	7	134.7	136.5
85	75	60	50	130	125.22	124.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6	NR130	7.21	7.06	2.82	2.72	7	139.7	141.5
90	80	65	55	140	135.23	134.72	3.71	3.45	4.9	4.65	3.4	3.1	0.6	NR140	7.21	7.06	2.82	2.72	7	149.7	152
95	–	–	–	145	140.23	139.73	3.71	3.45	–	–	3.4	3.1	0.6	NR145	7.21	7.06	2.82	2.72	7	154.7	157
100	85	70	60	150	145.24	144.73	3.71	3.45	4.9	4.65	3.4	3.1	0.6	NR150	7.21	7.06	2.82	2.72	7	159.7	162
105	90	75	65	160	155.22	154.71	3.71	3.45	4.9	4.65	3.4	3.1	0.6	NR160	7.21	7.06	2.82	2.72	7	169.7	172
110	95	80	–	170	163.65	163.14	3.71	3.45	5.69	5.44	3.8	3.5	0.6	NR170	9.6	9.45	3.1	3	10	182.9	185
120	100	85	70	180	173.66	173.15	3.71	3.45	5.69	5.44	3.8	3.5	0.6	NR180	9.6	9.45	3.1	3	10	192.9	195
–	105	90	75	190	183.64	183.13	–	–	5.69	5.44	3.8	3.5	0.6	NR190	9.6	9.45	3.1	3	10	202.9	205
130	110	95	80	200	193.65	193.14	5.69	5.44	5.69	5.44	3.8	3.5	0.6	NR200	9.6	9.45	3.1	3	10	212.9	215







[Remark] 1. Snap ring groove dimension does not apply to bearings of dimension series 00, 82 and 83.
2. The minimum permissible chamfer dimension for snap ring groove-side outer ring is 0.5 mm, except 0.3 mm for bearings belonging to diameter series 0 with nominal outside diameter not more than 35 mm.

Supplementary table 6 Shaft tolerances (deviation from nominal dimensions)

Unit : μm

Nominal shaft dia. (mm) over	up to	Deviation classes of shaft dia. 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	k 5	k 6	k 7	m 5	m 6	m 7	n 5	n 6	p 6	r 6	r 7	Nominal shaft dia. (mm) over	up to	Δ_{dmp} [1] of bearing (class 0) (Refer.)
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 + 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
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	+ 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
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	+ 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
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	+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
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	+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
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	+15 + 2	+21 + 2	+32 + 2	+24 +11	+30 +11	+ 41 + 11	+33 +20	+ 39 + 20	+ 51 + 32	+ 60 + 41 + 62 + 43	+ 71 + 41 + 73 + 43	50 65	65 80	0 − 15
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	+18 + 3	+25 + 3	+38 + 3	+28 +13	+35 +13	+ 48 + 13	+38 +23	+ 45 + 23	+ 59 + 37	+ 73 + 51 + 76 + 54	+ 86 + 51 + 89 + 54	80 100	100 120	0 − 20
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	+21 + 3	+28 + 3	+43 + 3	+33 +15	+40 +15	+ 55 + 15	+45 +27	+ 52 + 27	+ 68 + 43	+ 88 + 63 + 90 + 65 + 93 + 68	+103 + 63 +105 + 65 +108 + 68	120 140 160	140 160 180	0 − 25
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	+24 + 4	+33 + 4	+50 + 4	+37 +17	+46 +17	+ 63 + 17	+51 +31	+ 60 + 31	+ 79 + 50	+106 + 77 +109 + 80 +113 + 84	+123 + 77 +126 + 80 +130 + 84	180 200 225	200 225 250	0 − 30
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	+27 + 4	+36 + 4	+56 + 4	+43 +20	+52 +20	+ 72 + 20	+57 +34	+ 66 + 34	+ 88 + 56	+126 + 94 +130 + 98	+146 + 94 +150 + 98	250 280	280 315	0 − 35
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	+29 + 4	+40 + 4	+61 + 4	+46 +21	+57 +21	+ 78 + 21	+62 +37	+ 73 + 37	+ 98 + 62	+144 +108 +150 +114	+165 +108 +171 +114	315 355	355 400	0 − 40
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	+32 + 5	+45 + 5	+68 + 5	+50 +23	+63 +23	+ 86 + 23	+67 +40	+ 80 + 40	+108 + 68	+166 +126 +172 +132	+189 +126 +195 +132	400 450	450 500	0 − 45
500	630	−260 −304	−145 −189	− 76 −120	–	−22 −66	–	0 −44	0 −70	0 −110	0 −175	0 −280	–	±22	±35	–	–	–	+44 0	+70 0	–	+70 +26	+ 96 + 26	–	+ 88 + 44	+122 + 78	+194 +150 +199 +155	+220 +150 +225 +155	500 560	560 630	0 − 50
630	800	−290 −340	−160 −210	− 80 −130	–	−24 −74	–	0 −50	0 −80	0 −125	0 −200	0 −320	–	±25	±40	–	–	–	+50 0	+80 0	–	+80 +30	+110 + 30	–	+100 + 50	+138 + 88	+225 +175 +235 +185	+255 +175 +265 +185	630 710	710 800	0 − 75
800	1000	−320 −376	−170 −226	− 86 −142	–	−26 −82	–	0 −56	0 −90	0 −140	0 −230	0 −360	–	±28	±45	–	–	–	+56 0	+90 0	–	+90 +34	+124 + 34	–	+112 + 56	+156 +100	+266 +210 +276 +220	+300 +210 +310 +220	800 900	900 1000	0 −100

[Note] 1) Δ_{dmp} : single plane mean bore diameter deviation

Supplementary table 7 Housing bore tolerances (deviation from nominal dimensions)

Unit : μm

Nominal Bore dia. (mm) over	up to	Deviation classes of housing bore 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	K 5	K 6	K 7	M 5	M 6	M 7	N 5	N 6	N 7	P 6	P 7	R 7	Nominal Bore dia. (mm) over	up to	(Refer.) Δ_{Dmp} 1) of bearing (class 0)
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	+ 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
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	+ 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
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	+ 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
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	+ 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	
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	+ 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	
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	+ 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 − 18 (over to 150) 0 − 25
																												− 50 − 90	140	160	
																												− 53 − 93	160	180	
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	+ 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	
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	+ 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	
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	+ 3 −22	+ 7 −29	+ 17 − 40	−14 −39	− 10 − 46	0 − 57	−30 −55	− 26 − 62	− 16 − 73	− 51 − 87	− 41 − 98	− 87 −144	315	355	0 − 40
																												− 93 −150	355	400	
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	+ 2 −25	+ 8 −32	+ 18 − 45	−16 −43	− 10 − 50	0 − 63	−33 −60	− 27 − 67	− 17 − 80	− 55 − 95	− 45 −108	−103 −166	400	450	0 − 45
																												−109 −172	450	500	
500	630	+189 +145	+120 + 76	+146 + 76	+66 +22	+ 92 + 22	+44 0	+ 70 0	+110 0	+175 0	+280 0	–	±22	±35	–	–	–	0 −44	0 − 70	–	− 26 − 70	− 26 − 96	–	− 44 − 88	− 44 −114	− 78 −122	− 78 −148	−150 −220	500	560	0 − 50
																												−155 −225	560	630	
630	800	+210 +160	+130 + 80	+160 + 80	+74 +24	+104 + 24	+50 0	+ 80 0	+125 0	+200 0	+320 0	–	±25	±40	–	–	–	0 −50	0 − 80	–	− 30 − 80	− 30 −110	–	− 50 −100	− 50 −130	− 88 −138	− 88 −168	−175 −255	630	710	0 − 75
																												−185 −265	710	800	
800	1000	+226 +170	+142 + 86	+176 + 86	+82 +26	+116 + 26	+56 0	+ 90 0	+140 0	+230 0	+360 0	–	±28	±45	–	–	–	0 −56	0 − 90	–	− 34 − 90	− 34 −124	–	− 56 −112	− 56 −146	−100 −156	−100 −190	−210 −300	800	900	0 −100
																												−220 −310	900	1000	
1000	1250	+261 +195	+164 + 98	+203 + 98	+94 +28	+133 + 28	+66 0	+105 0	+165 0	+260 0	+420 0	–	±33	±52.5	–	–	–	0 −66	0 −105	–	− 40 −106	− 40 −145	–	− 66 −132	− 66 −171	−120 −186	−120 −225	−250 −355	1000	1120	0 −125
																												−260 −365	1120	1250	

[Note] 1) Δ_{Dmp} : single plane mean outside diameter deviation

Supplementary table 8 Numerical values for standard tolerance grades IT (ISO 286-1 : 1988)

Basic size (mm)		Standard tolerance grades (IT)																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14[1]	15[1]	16[1]	17[1]	18[1]
over	up to	Tolerances (μm)											Tolerances (mm)						
–	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.10	0.14	0.26	0.40	0.60	1.00	1.40
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.30	0.48	0.75	1.20	1.80
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.90	1.50	2.20
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.70	1.10	1.80	2.70
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.30	2.10	3.30
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1.00	1.60	2.50	3.90
50	80	2	3	5	8	13	19	30	46	74	120	190	0.30	0.46	0.74	1.20	1.90	3.00	4.60
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.40	2.20	3.50	5.40
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.40	0.63	1.00	1.60	2.50	4.00	6.30
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.90	4.60	7.20
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.30	2.10	3.20	5.20	8.10
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.40	2.30	3.60	5.70	8.90
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.50	4.00	6.30	9.70
500	630	–	–	–	–	–	44	70	110	175	280	440	0.70	1.10	1.75	2.80	4.40	7.00	11.00
630	800	–	–	–	–	–	50	80	125	200	320	500	0.80	1.25	2.00	3.20	5.00	8.00	12.50
800	1000	–	–	–	–	–	56	90	140	230	360	560	0.90	1.40	2.30	3.60	5.60	9.00	14.00
1000	1250	–	–	–	–	–	66	105	165	260	420	660	1.05	1.65	2.60	4.20	6.60	10.50	16.50
1250	1600	–	–	–	–	–	78	125	195	310	500	780	1.25	1.95	3.10	5.00	7.80	12.50	19.50
1600	2000	–	–	–	–	–	92	150	230	370	600	920	1.50	2.30	3.70	6.00	9.20	15.00	23.00
2000	2500	–	–	–	–	–	110	175	280	440	700	1100	1.75	2.80	4.40	7.00	11.00	17.50	28.00
2500	3150	–	–	–	–	–	135	210	330	540	860	1350	2.10	3.30	5.40	8.60	13.50	21.00	33.00

[Note] 1) Standard tolerance grades IT 14 to IT 18 (incl.) shall not be used for basic sizes less than or equal to 1 mm.

Supplementary table 9 Greek alphabet list

Name	Roman type	Italic type		Name	Roman type	Italic type	
	Capital	Capital	Lowercase		Capital	Capital	Lowercase
alpha	A	A	α	nu	N	N	ν
beta	B	B	β	xi	Ξ	Ξ	ξ
gamma	Γ	Γ	γ	omicron	O	O	o
delta	Δ	Δ	δ	pi	Π	Π	π
epsilon	E	E	ε	rho	P	P	ρ
zeta	Z	Z	ζ	sigma	Σ	Σ	σ
eta	H	H	η	tau	T	T	τ
theta	Θ	Θ	θ	upsilon	Y	Y	υ
iota	I	I	ι	phi	Φ	Φ	ϕ
kappa	K	K	κ	chi	X	X	χ
lambda	Λ	Λ	λ	psi	Ψ	Ψ	ψ
mu	M	M	μ	omega	Ω	Ω	ω

Supplementary table 10 Prefixes used with SI units

Factor	Prefix		Factor	Prefix	
	Name	Symbol		Name	Symbol
10^{18}	exa	E	10^{-1}	deci	d
10^{15}	peta	P	10^{-2}	centi	c
10^{12}	tera	T	10^{-3}	milli	m
10^{9}	giga	G	10^{-6}	micro	μ
10^{6}	mega	M	10^{-9}	nano	n
10^{3}	kilo	k	10^{-12}	pico	p
10^{2}	hecto	h	10^{-15}	femto	f
10	deka	da	10^{-18}	atto	a

Supplementary table 11 (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° = π /180 rad 1′ = π /10 800 rad 1″ = π /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)]	1Å = 10^{-10}m = 0.1nm = 100pm 1μ = 1 μm 1in = 25.4 mm 1ft = 12 in = 0.304 8 m 1yd = 3 ft = 0.914 4 m 1mile = 5 280 ft = 1 609.344 m	1m = 10^{10}Å 1m = 39.37 in 1m = 3.280 8 ft 1m = 1.093 6 yd 1km = 0.621 4 mile
Area	m^2	a [are(s)] ha [hectare(s)] acre [acre(s)]	1a = 100 m^2 1ha = 10^4 m^2 1acre = 4 840 yd^2 = 4 046.86 m^2	 1km^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 1cc = 1 cm^3 = 10^{-6} m^3 1gal(US)= 231 in^3 = 3.785 41dm^3 1floz(US)= 29.573 5 cm^3 1barrel(US)= 158.987 dm^3	1m^3 = 10^3 ℓ 1m^3 = 10^6 cc 1m^3 = 264.17 gal 1m^3 = 33 814 floz 1m^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 ＊	1kn = 1 852 m/h	1km/h = 0.539 96 kn
Acceleration	m/s^2	G	1G = 9.806 65 m/s^2	1m/s^2 = 0.101 97 G
Frequency	Hz [hertz]	c/s [cycle(s)/second]	1c/s = 1s^{-1} = 1 Hz	
Rotational frequency	s^{-1}	rpm [revolutions per minute] min^{-1} ＊ r/min	1rpm = 1 / 60 s^{-1}	1s^{-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)]	1t = 10^3 kg 1lb = 0.453 592 37 kg 1gr = 64.798 91 mg 1oz = 1/16 lb = 28.349 5 g 1ton(UK) = 1 016.05 kg 1ton(US) = 907.185 kg 1car = 200 mg	1kg = 2.204 6 lb 1g = 15.432 4 gr 1kg = 35.274 0 oz 1t = 0.984 2 ton(UK) 1t = 1.102 3 ton(US) 1g = 5 car

[Note] ＊ : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary table 11 (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]	1dyn = 10^{-5} N 1kgf = 9.806 65 N 1gf = 9.806 65×10^{-3} N 1tf = 9.806 65×10^3 N 1lbf = 4.448 22 N	1N = 10^5 dyn 1N = 0.101 97 kgf 1N = 0.224 809 lbf
Moment of force	N·m [Newton meter(s)]	gf·cm kgf·cm kgf·m tf·m lbf·ft	1gf·cm = 9.806 65×10^{-5} N·m 1kgf·cm = 9.806 65×10^{-2} N·m 1kgf·m = 9.806 65 N·m 1tf·m = 9.806 65×10^3 N·m 1lbf·ft = 1.355 82 N·m	 1N·m = 0.101 97 kgf·m 1N·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_2O, mAq [meter water column] atm [atmosphere] mHg [meter merury column] Torr [torr]	1gf/cm^2 = 9.806 65×10 Pa 1kgf/mm^2 = 9.806 65×10^6 Pa 1kgf/m^2 = 9.806 65 Pa 1lbf/in^2 = 6 894.76 Pa 1bar = 10^5 Pa 1at = 1kgf/cm^2 = 9.806 65×10^4 Pa 1mH_2O = 9.806 65×10^3 Pa 1atm = 101 325 Pa 1mHg = $\frac{101\,325}{0.76}$ Pa 1Torr = 1 mmHg = 133.322 Pa	1MPa = 0.101 97 kgf/mm^2 1Pa = 0.101 97 kgf/m^2 1Pa = 0.145×10^{-3} lbf/in^2 1Pa = 10^{-2} mbar 1Pa = 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	 1Pa·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			

Supplementary table 11 (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	1eV = (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	℃ [Celsius(s)] {t℃ = (t+273.15)K}	℉ [degree(s) Fahrenheit]	t ℉ = $\frac{5}{9}$ (t−32)℃	t ℃ = ($\frac{9}{5}$t+32)℉
Linear expansion coefficient	K^{-1}	$℃^{-1}$ [per degree]		
Heat	J [joule(s)] {1 J=1 N·m}	erg [erg(s)] kgf·m cal_{IT} [I. 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·℃) cal/(s·m·℃)	1 W/(m·℃) = 1 W/(m·K) 1 cal/(s·m·℃) = 4.186 05 W/(m·K)	
Coefficient of heat transfer	W/(m^2·K)	W/(m^2·℃) cal/(s·m^2·℃)	1 W/(m^2·℃) = 1 W/(m^2·K) 1 cal/(s·m^2·℃) = 4.186 05 W/(m^2·K)	
Heat capacity	J/K	J/℃	1 J/℃ = 1 J/K	
Massic heat capacity	J/(kg·K)	J/(kg·℃)		

[Note] ＊ : Unit can be used as an SI unit.
No asterisk : Unit cannot be used.

Supplementary table 11 (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 Oe = $\frac{10^{3}}{4\pi}$ A/m	1 A/m = 4 π × 10^{-3} Oe
Magnetic flux density	T [tesla(s)] {1T=1N/(A·m) =1Wb/m^2 =1V·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} γ
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}			

Supplementary table 12 Inch/millimeter conversion

Inch		Inches 0	1	2	3	4	5	6	7	8	9	10
		mm										
0	0	**0**	**25.4000**	**50.8000**	**76.2000**	**101.6000**	**127.0000**	**152.4000**	**177.8000**	**203.2000**	**228.6000**	**254.0000**
1/64	0.015625	0.3969	25.7969	51.1969	76.5969	101.9969	127.3969	152.7969	178.1969	203.5969	228.9969	254.3969
1/32	0.03125	0.7938	26.1938	51.5938	76.9938	102.3938	127.7938	153.1938	178.5938	203.9938	229.3938	254.7938
3/64	0.046875	1.1906	26.5906	51.9906	77.3906	102.7906	128.1906	153.5906	178.9906	204.3906	229.7906	255.1906
1/16	0.0625	1.5875	26.9875	52.3875	77.7875	103.1875	128.5875	153.9875	179.3875	204.7875	230.1875	255.5875
5/64	0.078125	1.9844	27.3844	52.7844	78.1844	103.5844	128.9844	154.3844	179.7844	205.1844	230.5844	255.9844
3/32	0.09375	2.3812	27.7812	53.1812	78.5812	103.9812	129.3812	154.7812	180.1812	205.5812	230.9812	256.3812
7/64	0.109375	2.7781	28.1781	53.5781	78.9781	104.3781	129.7781	155.1781	180.5781	205.9781	231.3781	256.7781
1/8	0.125	**3.1750**	**28.5750**	**53.9750**	**79.3750**	**104.7750**	**130.1750**	**155.5750**	**180.9750**	**206.3750**	**231.7750**	**257.1750**
9/64	0.140625	3.5719	28.9719	54.3719	79.7719	105.1719	130.5719	155.9719	181.3719	206.7719	232.1719	257.5719
5/32	0.15625	3.9688	29.3688	54.7688	80.1688	105.5688	130.9688	156.3688	181.7688	207.1688	232.5688	257.9688
11/64	0.171875	4.3656	29.7656	55.1656	80.5656	105.9656	131.3656	156.7656	182.1656	207.5656	232.9656	258.3656
3/16	0.1875	4.7625	30.1625	55.5625	80.9625	106.3625	131.7625	157.1625	182.5625	207.9625	233.3625	258.7625
13/64	0.203125	5.1594	30.5594	55.9594	81.3594	106.7594	132.1594	157.5594	182.9594	208.3594	233.7594	259.1594
7/32	0.21875	5.5562	30.9562	56.3562	81.7562	107.1562	132.5562	157.9562	183.3562	208.7562	234.1562	259.5562
15/64	0.234375	5.9531	31.3531	56.7531	82.1531	107.5531	132.9531	158.3531	183.7531	209.1531	234.5531	259.9531
1/4	0.25	**6.3500**	**31.7500**	**57.1500**	**82.5500**	**107.9500**	**133.3500**	**158.7500**	**184.1500**	**209.5500**	**234.9500**	**260.3500**
17/64	0.265625	6.7469	32.1469	57.5469	82.9469	108.3469	133.7469	159.1469	184.5469	209.9469	235.3469	260.7469
9/32	0.28125	7.1438	32.5438	57.9438	83.3438	108.7438	134.1438	159.5438	184.9438	210.3438	235.7438	261.1438
19/64	0.296875	7.5406	32.9406	58.3406	83.7406	109.1406	134.5406	159.9406	185.3406	210.7406	236.1406	261.5406
5/16	0.3125	7.9375	33.3375	58.7375	84.1375	109.5375	134.9375	160.3375	185.7375	211.1375	236.5375	261.9375
21/64	0.328125	8.3344	33.7344	59.1344	84.5344	109.9344	135.3344	160.7344	186.1344	211.5344	236.9344	262.3344
11/32	0.34375	8.7312	34.1312	59.5312	84.9312	110.3312	135.7312	161.1312	186.5312	211.9312	237.3312	262.7312
23/64	0.359375	9.1281	34.5281	59.9281	85.3281	110.7281	136.1281	161.5281	186.9281	212.3281	237.7281	263.1281
3/8	0.375	**9.5250**	**34.9250**	**60.3250**	**85.7250**	**111.1250**	**136.5250**	**161.9250**	**187.3250**	**212.7250**	**238.1250**	**263.5250**
25/64	0.390625	9.9219	35.3219	60.7219	86.1219	111.5219	136.9219	162.3219	187.7219	213.1219	238.5219	263.9219
13/32	0.40625	10.3188	35.7188	61.1188	86.5188	111.9188	137.3188	162.7188	188.1188	213.5188	238.9188	264.3188
27/64	0.421875	10.7156	36.1156	61.5156	86.9156	112.3156	137.7156	163.1156	188.5156	213.9156	239.3156	264.7156
7/16	0.4375	11.1125	36.5125	61.9125	87.3125	112.7125	138.1125	163.5125	188.9125	214.3125	239.7125	265.1125
29/64	0.453125	11.5094	36.9094	62.3094	87.7094	113.1094	138.5094	163.9094	189.3094	214.7094	240.1094	265.5094
15/32	0.46875	11.9062	37.3062	62.7062	88.1062	113.5062	138.9062	164.3062	189.7062	215.1062	240.5062	265.9062
31/64	0.484375	12.3031	37.7031	63.1031	88.5031	113.9031	139.3031	164.7031	190.1031	215.5031	240.9031	266.3031
1/2	0.5	**12.7000**	**38.1000**	**63.5000**	**88.9000**	**114.3000**	**139.7000**	**165.1000**	**190.5000**	**215.9000**	**241.3000**	**266.7000**
33/64	0.515625	13.0969	38.4969	63.8969	89.2969	114.6969	140.0969	165.4969	190.8969	216.2969	241.6969	267.0969
17/32	0.53125	13.4938	38.8938	64.2938	89.6938	115.0938	140.4938	165.8938	191.2938	216.6938	242.0938	267.4938
35/64	0.546875	13.8906	39.2906	64.6906	90.0906	115.4906	140.8906	166.2906	191.6906	217.0906	242.4906	267.8906
9/16	0.5625	14.2875	39.6875	65.0875	90.4875	115.8875	141.2875	166.6875	192.0875	217.4875	242.8875	268.2875
37/64	0.578125	14.6844	40.0844	65.4844	90.8844	116.2844	141.6844	167.0844	192.4844	217.8844	243.2844	268.6844
19/32	0.59375	15.0812	40.4812	65.8812	91.2812	116.6812	142.0812	167.4812	192.8812	218.2812	243.6812	269.0812
39/64	0.609375	15.4781	40.8781	66.2781	91.6781	117.0781	142.4781	167.8781	193.2781	218.6781	244.0781	269.4781
5/8	0.625	**15.8750**	**41.2750**	**66.6750**	**92.0750**	**117.4750**	**142.8750**	**168.2750**	**193.6750**	**219.0750**	**244.4750**	**269.8750**
41/64	0.640625	16.2719	41.6719	67.0719	92.4719	117.8719	143.2719	168.6719	194.0719	219.4719	244.8719	270.2719
21/32	0.65625	16.6688	42.0688	67.4688	92.8688	118.2688	143.6688	169.0688	194.4688	219.8688	245.2688	270.6688
43/64	0.671875	17.0656	42.4656	67.8656	93.2656	118.6656	144.0656	169.4656	194.8656	220.2656	245.6656	271.0656
11/16	0.6875	17.4625	42.8625	68.2625	93.6625	119.0625	144.4625	169.8625	195.2625	220.6625	246.0625	271.4625
45/64	0.703125	17.8594	43.2594	68.6594	94.0594	119.4594	144.8594	170.2594	195.6594	221.0594	246.4594	271.8594
23/32	0.71875	18.2562	43.6562	69.0562	94.4562	119.8562	145.2562	170.6562	196.0562	221.4562	246.8562	272.2562
47/64	0.734375	18.6531	44.0531	69.4531	94.8531	120.2531	145.6531	171.0531	196.4531	221.8531	247.2531	272.6531
3/4	0.75	**19.0500**	**44.4500**	**69.8500**	**95.2500**	**120.6500**	**146.0500**	**171.4500**	**196.8500**	**222.2500**	**247.6500**	**273.0500**
49/64	0.765625	19.4469	44.8469	70.2469	95.6469	121.0469	146.4469	171.8469	197.2469	222.6469	248.0469	273.4469
25/32	0.78125	19.8438	45.2438	70.6438	96.0438	121.4438	146.8438	172.2438	197.6438	223.0438	248.4438	273.8438
51/64	0.796875	20.2406	45.6406	71.0406	96.4406	121.8406	147.2406	172.6406	198.0406	223.4406	248.8406	274.2406
13/16	0.8125	20.6375	46.0375	71.4375	96.8375	122.2375	147.6375	173.0375	198.4375	223.8375	249.2375	274.6375
53/64	0.828125	21.0344	46.4344	71.8344	97.2344	122.6344	148.0344	173.4344	198.8344	224.2344	249.6344	275.0344
27/32	0.84375	21.4312	46.8312	72.2312	97.6312	123.0312	148.4312	173.8312	199.2312	224.6312	250.0312	275.4312
55/64	0.859375	21.8281	47.2281	72.6281	98.0281	123.4281	148.8281	174.2281	199.6281	225.0281	250.4281	275.8281
7/8	0.875	**22.2250**	**47.6250**	**73.0250**	**98.4250**	**123.8250**	**149.2250**	**174.6250**	**200.0250**	**225.4250**	**250.8250**	**276.2250**
57/64	0.890625	22.6219	48.0219	73.4219	98.8219	124.2219	149.6219	175.0219	200.4219	225.8219	251.2219	276.6219
29/32	0.90625	23.0188	48.4188	73.8188	99.2188	124.6188	150.0188	175.4188	200.8188	226.2188	251.6188	277.0188
59/64	0.921875	23.4156	48.8156	74.2156	99.6156	125.0156	150.4156	175.8156	201.2156	226.6156	252.0156	277.4156
15/16	0.9375	23.8125	49.2125	74.6125	100.0125	125.4125	150.8125	176.2125	201.6125	227.0125	252.4125	277.8125
61/64	0.953125	24.2094	49.6094	75.0094	100.4094	125.8094	151.2094	176.6094	202.0094	227.4094	252.8094	278.2094
31/32	0.96875	24.6062	50.0062	75.4062	100.8062	126.2062	151.6062	177.0062	202.4062	227.8062	253.2062	278.6062
63/64	0.984375	25.0031	50.4031	75.8031	101.2031	126.6031	152.0031	177.4031	202.8031	228.2031	253.6031	279.0031

Supplementary table 13 Steel hardness conversion

Rockwell C-scale 1 471.0 N	Vicker's	Brinell Standard ball	Brinell Tungsten carbide ball	Rockwell A-scale 588.4 N	Rockwell B-scale 980.7 N	Shore
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 14 Surface roughness comparison

Arithmetical mean deviation of the profile R_a	Maximum height of the profile R_{max}	Ten-point height of irregularities R_z	Roughness grade numbers N
0.013 a	0.05 S	0.05 Z	–
0.025 a	0.1 S	0.1 Z	N 1
0.05 a	0.2 S	0.2 Z	N 2
0.10 a	0.4 S	0.4 Z	N 3
0.20 a	0.8 S	0.8 Z	N 4
0.40 a	1.6 S	1.6 Z	N 5
0.80 a	3.2 S	3.2 Z	N 6
1.6 a	6.3 S	6.3 Z	N 7
3.2 a	12.5 S	12.5 Z	N 8
6.3 a	25 S	25 Z	N 9
12.5 a	50 S	50 Z	N 10
25 a	100 S	100 Z	N 11
50 a	200 S	200 Z	N 12
100 a	400 S	400 Z	–

[Note] Above table is applicable only when processed surface peaks are of equal height.
Above table is roughly applicable to processed surface for general use.
Numbers are combined only for convenience in deciding surface roughness.

Supplementary table 15 Viscosity conversion

Kinematic viscosity mm^2/s	Saybolt SUS (second)		Redwood R (second)		Engler E (degree)
	100℉	210℉	50℃	100℃	
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℉	210℉	50℃	100℃	
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	1159	1167	1020	1051	32.9
300	1391	1400	1224	1241	39.5

[Remark] $1mm^2/s = 1$ cSt (centi stokes)

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