WBW BEARINGS

DEEP GROOVE BALL BEARING

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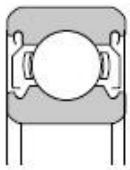
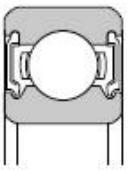
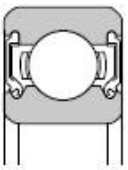
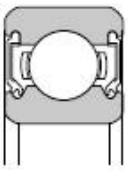
How to understand the code of deep groove ball bearing:

(Bearing number examples)

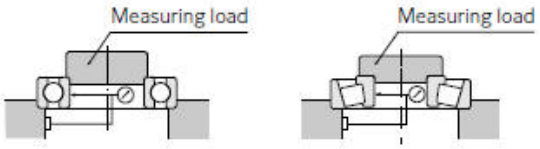
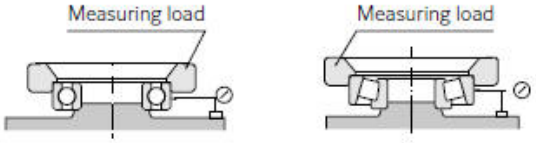
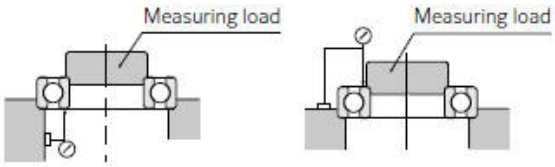
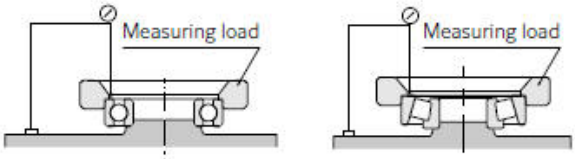
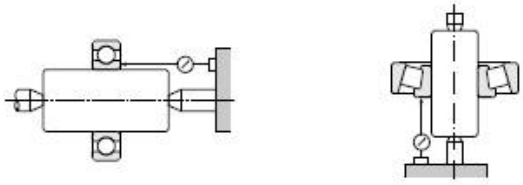
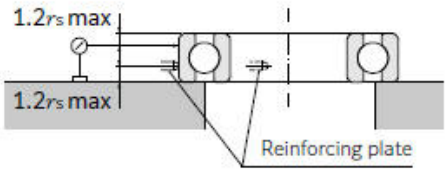
6205ZZC3/2AS

- Grease: Alvania Grease S2
- Radial internal clearance C3
- Double side steel shield
- Nominal bore diameter 25 mm
- Diameter series 2
- **Deep groove ball bearing**

Different types of bearing structures:

Types and codes		Shielded type	Sealed type		
		Non-contact type ZZ	Non-contact type LLB	Contact type LLU	Low torque type LLH
Construction					
		• Metal shield plate is affixed to the outside ring; the inner ring incorporates a V-groove and labyrinth clearance.	• The outer ring incorporates synthetic rubber molded to a steel plate; seal edge is aligned with V-groove along inner ring surface with labyrinth clearance.	• The outer ring incorporates synthetic rubber molded to a steel plate; seal edge contacts V-groove along inner ring surface.	• Basic construction is the same as LLU type, but a specially designed lip on the edge of the seal prevents foreign matter penetration; low torque construction.
Performance comparison	Torque	Small	Small	Higher	Medium
	Dust proofing	Good	Better than ZZ-type	Excellent	Much better than LLB-type
	Water proofing	Poor	Poor	Very good	Good
	High speed capacity	Same as open type	Same as open type	Limited by contact seals	Much better than LLU-type
	Allowable temp. range[1)]	Depends on lubricant	−25 to 120°C	−25 to 110°C	−25 to 120°C

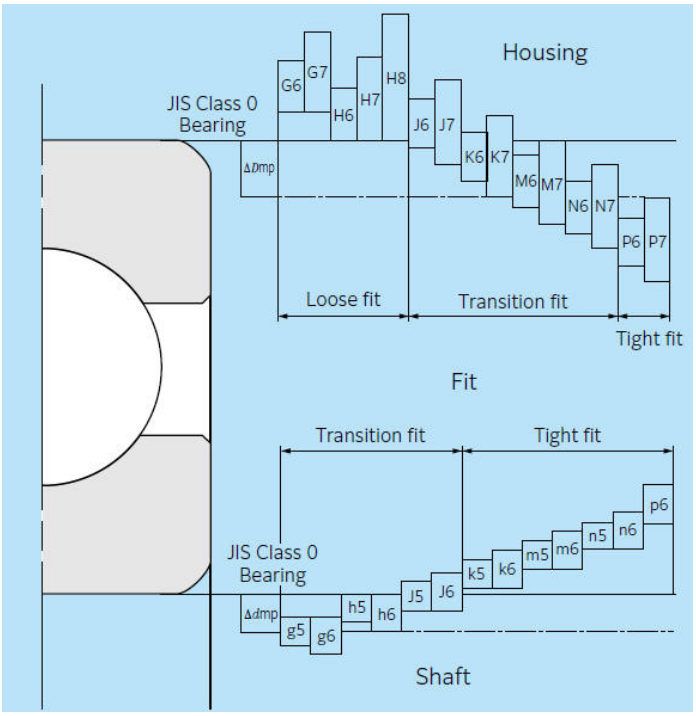
How to measure some critical parameter about the bearing:

Accuracy characteristics	Measurement methods	
Radial runout of inner ring of assembled bearing (K_{ia})		Radial runout of the inner ring is the difference between the maximum and minimum reading of the measuring device when the inner ring is turned one revolution.
Radial runout of outer ring of assembled bearing (K_{ea})		Radial runout of the outer ring is the difference between the maximum and minimum reading of the measuring device when the outer ring is turned one revolution.
Axial runout of inner ring of assembled bearing (S_{ia})		Axial runout of the inner ring is the difference between the maximum and minimum reading of the measuring device when the inner ring is turned one revolution.
Axial runout of outer ring of assembled bearing (S_{ea})		Axial runout of the outer ring is the difference between the maximum and minimum reading of the measuring device when the outer ring is turned one revolution.
Perpendicularity of inner ring face with respect to the bore (S_d)		The squareness of the inner ring side surface is the difference between the maximum and minimum readings of the measuring device when the inner ring is turned one revolution together with the tapered mandrel.
Perpendicularity of outer ring outside surface with respect to the face (S_D)		The squareness of the outer ring outer diameter surface is the difference between the maximum and minimum readings of the measuring device when the outside ring is turned one revolution along the reinforcing plate.

Bearing Precision Level Definitions and Comparison:

Standard	Applicable standard	Accuracy class					Bearing type
Japanese industrial standard (JIS)	JIS B 1514-1	Class 0, 6	Class 6	Class 5	Class 4	Class 2	Radial bearings
	JIS B 1514-2	Class 0	Class 6	Class 5	Class 4	—	Thrust bearings
International Organization for Standardization (ISO)	ISO 492	Normal class Class 6X	Class 6	Class 5	Class 4	Class 2	Radial bearings
	ISO 199	Normal Class	Class 6	Class 5	Class 4	—	Thrust bearings
	ISO 578	Class 4	—	Class 3	Class 0	Class 00	Tapered roller bearings (Inch series)
	ISO 1224	—	—	Class 5A	Class 4A	—	Precision instrument bearings
Deutsches Institut fur Normung (DIN)	DIN 620	P0	P6	P5	P4	P2	All types
American National Standards Institute (ANSI) American Bearing Manufacturer's Association (ABMA)	ANSI/ABMA Std.20 1)	ABEC-1 RBEC-1	ABEC-3 RBEC-3	ABEC-5 RBEC-5	ABEC-7	ABEC-9	Radial bearings (excluding tapered roller bearings)
	ANSI/ABMA Std.19.1	Class K	Class N	Class C	Class B	Class A	Tapered roller bearings (Metric series)
	ANSI/ABMA Std.19	Class 4	Class 2	Class 3	Class 0	Class 00	Tapered roller bearings (Inch series)

How to select bearing – housing tolerance range:



Parameters you often see on a bearing or bearing spare part drawings:

Terms	Quantifiers	Description
Nominal bore diameter	*d*	Reference dimension representing the bore diameter size, and reference value with respect to the dimensional difference of the actual bore diameter surface.
Single bore diameter	*d*s	Distance between two parallel straight lines that are in contact with the intersection line of the actual bearing bore diameter surface and the radial plane.
Deviation of a single bore diameter	Δ *d*s	Difference between *d*s and *d* (difference of nominal diameter serving as the measured bore and standard).
Mean bore diameter in a single plane	*d*mp	Arithmetic mean of the maximum and minimum measured bore diameters within one radial plane. In the model figure, in arbitrary radial plane A*i*, when the maximum bore diameter is *dsi*1 and the minimum bore diameter is *dsi*3, the value is obtained by (*dsi*1 + *dsi*3)/2. There is one value for each plane.
Mean bore diameter	*d*m	Arithmetic mean of the maximum and minimum measured bore diameters obtained from all the cylindrical surfaces. In the model figure, when the maximum measured bore diameter is *d*s11 and the minimum measured bore diameter is *d*s23, which are obtained from the all the planes A1, A2,…Ai, the mean bore diameter is obtained by (*d*s11 + *d*s23)/2. There is one value for one cylindrical surface.
Deviation of mean bore diameter	Δ *d*m	Difference between the mean bore diameter and the nominal bore diameter.
Deviation of mean bore diameter in a single plane	Δ *d*mp	Difference between the arithmetic mean and the nominal bore diameter of the maximum and minimum measured bore diameters within one radial plane. The value is specified in JIS.
Variation of bore diameter in a single plane	*Vd*sp	Difference between the maximum and minimum measured bore diameters within one radial plane. In the model figure, in radial plane A1, when the maximum measured bore diameter is *d*s11 and the minimum measured bore diameter is *d*s13, the difference is *Vd*sp and one value can be obtained for one plane. This characteristic is an index that indicates the roundness. The value is specified in JIS.

Variation of mean bore diameter	*Vd*mp	Difference between the maximum and minimum values of the mean bore diameter within a plane that are obtained from all the planes. A unique value is obtained for each product, and it is near to cylindricity (that is different from geometric cylindricity). The value is specified in JIS.
Nominal inner ring width	*B*	Distance between both theoretical side surfaces of a raceway. This value is a reference dimension that represents the raceway surface (distance between both side surfaces).
Single inner ring width	*B*s	Distance between two intersections. The straight is perpendicular to the plane that is in contact with the inner ring reference side and both actual side surfaces. This value represents the actual width dimension of an inner ring.
Deviation of a single inner ring width	Δ *B*s	Difference between the measured inner ring width and the nominal inner ring width. This value is also the difference between the measured inner ring width dimension and the reference dimension that represents the inner ring width. The value is specified in JIS.
Variation of inner ring width	*VB*s	Difference between the maximum and minimum measured inner ring widths, which are specified in JIS.
Radial runout of inner ring of assembled bearing	*K*ia	Difference between the maximum and minimum values of the radial distance between the inner ring bore diameter at each angle position and one fixed point of the outer ring outer diameter surface with respect to radial runout.
Axial runout of inner ring of assembled bearing	*S*ia	Difference between the maximum and minimum values of the axial distance between the inner ring reference side surface at each angle position and one fixed point of the outer ring outer diameter surface with respect to half the radial distance of the raceway contact diameter from the inner ring central axis and the inner ring of a deep groove ball bearing.

Tolerance of radial bearings (except tapered roller bearings)

Table 6.4 (1) Inner rings

Nominal bore diameter d mm		Deviation of mean bore diameter in a single plane Δ_{dmp}										Variation of bore diameter in a single plane V_{dsp}														
		Class 0		Class 6		Class 5		Class 4 [1]		Class 2 [1]		Diameter series 9					Diameter series 0, 1					Diameter series 2, 3, 4				
												Class 0	Class 6	Class 5	Class 4	Class 2	Class 0	Class 6	Class 5	Class 4	Class 2	Class 0	Class 6	Class 5	Class 4	Class 2
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Max.					Max.					Max.				
0.6 [4]	2.5	0	−8	0	−7	0	−5	0	−4	0	−2.5	10	9	5	4	2.5	8	7	4	3	2.5	6	5	4	3	2.5
2.5	10	0	−8	0	−7	0	−5	0	−4	0	−2.5	10	9	5	4	2.5	8	7	4	3	2.5	6	5	4	3	2.5
10	18	0	−8	0	−7	0	−5	0	−4	0	−2.5	10	9	5	4	2.5	8	7	4	3	2.5	6	5	4	3	2.5
18	30	0	−10	0	−8	0	−6	0	−5	0	−2.5	13	10	6	5	2.5	10	8	5	4	2.5	8	6	5	4	2.5
30	50	0	−12	0	−10	0	−8	0	−6	0	−2.5	15	13	8	6	2.5	12	10	6	5	2.5	9	8	6	5	2.5
50	80	0	−15	0	−12	0	−9	0	−7	0	−4	19	15	9	7	4	19	15	7	5	4	11	9	7	5	4
80	120	0	−20	0	−15	0	−10	0	−8	0	−5	25	19	10	8	5	25	19	8	6	5	15	11	8	6	5
120	150	0	−25	0	−18	0	−13	0	−10	0	−7	31	23	13	10	7	31	23	10	8	7	19	14	10	8	7
150	180	0	−25	0	−18	0	−13	0	−10	0	−7	31	23	13	10	7	31	23	10	8	7	19	14	10	8	7
180	250	0	−30	0	−22	0	−15	0	−12	0	−8	38	28	15	12	8	38	28	12	9	8	23	17	12	9	8
250	315	0	−35	0	−25	0	−18	—	—	—	—	44	31	18	—	—	44	31	14	—	—	26	19	14	—	—
315	400	0	−40	0	−30	0	−23	—	—	—	—	50	38	23	—	—	50	38	18	—	—	30	23	18	—	—
400	500	0	−45	0	−35	—	—	—	—	—	—	56	44	—	—	—	56	44	—	—	—	34	26	—	—	—
500	630	0	−50	0	−40	—	—	—	—	—	—	63	50	—	—	—	63	50	—	—	—	38	30	—	—	—
630	800	0	−75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
800	1 000	0	−100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 000	1 250	0	−125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 250	1 600	0	−160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 600	2 000	0	−200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

1) The dimensional difference Δ_{ds} of the measured bore diameter applied to Classes 4 and 2 is the same as the tolerance of dimensional difference Δ_{dmp} of the mean bore diameter within a plane. However, the dimensional difference is applied to diameter series 0, 1, 2, 3 and 4 for Class 4, and also to all the diameter series for Class 2.

Tolerance of radial bearings (except tapered roller bearings)

Table 6.4 (2) Outer rings

Nominal outside diameter D mm		Deviation of mean outside diameter in a single plane Δ_{Dmp}										Variation of outside diameter in a single plane [6] V_{Dsp} Open bearing														
		Class 0		Class 6		Class 5		Class 4 [5]		Class 2 [5]		Diameter series 9					Diameter series 0, 1					Diameter series 2, 3, 4				
												Class 0	Class 6	Class 5	Class 4	Class 2	Class 0	Class 6	Class 5	Class 4	Class 2	Class 0	Class 6	Class 5	Class 4	Class 2
Over	Incl.	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Max.					Max.					Max.				
2.5[8]	6	0	−8	0	−7	0	−5	0	−4	0	−2.5	10	9	5	4	2.5	8	7	4	3	2.5	6	5	4	3	2.5
6	18	0	−8	0	−7	0	−5	0	−4	0	−2.5	10	9	5	4	2.5	8	7	4	3	2.5	6	5	4	3	2.5
18	30	0	−9	0	−8	0	−6	0	−5	0	−4	12	10	6	5	4	9	8	5	4	4	7	6	5	4	4
30	50	0	−11	0	−9	0	−7	0	−6	0	−4	14	11	7	6	4	11	9	5	5	4	8	7	5	5	4
50	80	0	−13	0	−11	0	−9	0	−7	0	−4	16	14	9	7	4	13	11	7	5	4	10	8	7	5	4
80	120	0	−15	0	−13	0	−10	0	−8	0	−5	19	16	10	8	5	19	16	8	6	5	11	10	8	6	5
120	150	0	−18	0	−15	0	−11	0	−9	0	−5	23	19	11	9	5	23	19	8	7	5	14	11	8	7	5
150	180	0	−25	0	−18	0	−13	0	−10	0	−7	31	23	13	10	7	31	23	10	8	7	19	14	10	8	7
180	250	0	−30	0	−20	0	−15	0	−11	0	−8	38	25	15	11	8	38	25	11	8	8	23	15	11	8	8
250	315	0	−35	0	−25	0	−18	0	−13	0	−8	44	31	18	13	8	44	31	14	10	8	26	19	14	10	8
315	400	0	−40	0	−28	0	−20	0	−15	0	−10	50	35	20	15	10	50	35	15	11	10	30	21	15	11	10
400	500	0	−45	0	−33	0	−23	—	—	—	—	56	41	23	—	—	56	41	17	—	—	34	25	17	—	—
500	630	0	−50	0	−38	0	−28	—	—	—	—	63	48	28	—	—	63	48	21	—	—	38	29	21	—	—
630	800	0	−75	0	−45	0	−35	—	—	—	—	94	56	35	—	—	94	56	26	—	—	55	34	26	—	—
800	1 000	0	−100	0	−60	—	—	—	—	—	—	125	75	—	—	—	125	75	—	—	—	75	45	—	—	—
1 000	1 250	0	−125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 250	1 600	0	−160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1 600	2 000	0	−200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 000	2 500	0	−250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5) The dimensional difference Δ_{Ds} of the measured outer diameter applied to Classes 4 and 2 is the same as the tolerance of dimensional difference Δ_{Dmp} of the mean outer diameter within a plane. However, the dimensional difference is applied to diameter series 0, 1, 2, 3 and 4 for Class 4, and also to all the diameter series for Class 2.

Tolerance of radial bearings (except tapered roller bearings)

Unit: μm

Variation of mean bore diameter V_{dmp}					Radial runout of inner ring of assembled bearing K_{ia}					Perpendicularity of inner ring face with respect to the bore S_d			Axial runout of inner ring of assembled bearing S_{ia} [2]			Deviation of a single inner ring width Δ_{Bs}								Variation of inner ring width V_{Bs}				
																Normal bearings						Duplex bearings [3]								
Class 0	Class 6	Class 5	Class 4	Class 2	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		Class 6		Class 5		Class 4		Class 0	Class 6	Class 5	Class 4	Class 2
Max.					Max.					Max.			Max.			Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Max.				
6	5	3	2	1.5	10	5	4	2.5	1.5	7	3	1.5	7	3	1.5	0	−40	0	−40	0	−40	—	—	0	−250	12	12	5	2.5	1.5
6	5	3	2	1.5	10	6	4	2.5	1.5	7	3	1.5	7	3	1.5	0	−120	0	−40	0	−40	0	−250	0	−250	15	15	5	2.5	1.5
6	5	3	2	1.5	10	7	4	2.5	1.5	7	3	1.5	7	3	1.5	0	−120	0	−80	0	−80	0	−250	0	−250	20	20	5	2.5	1.5
8	6	3	2.5	1.5	13	8	4	3	2.5	8	4	1.5	8	4	2.5	0	−120	0	−120	0	−120	0	−250	0	−250	20	20	5	2.5	1.5
9	8	4	3	1.5	15	10	5	4	2.5	8	4	1.5	8	4	2.5	0	−120	0	−120	0	−120	0	−250	0	−250	20	20	5	3	1.5
11	9	5	3.5	2	20	10	5	4	2.5	8	5	1.5	8	5	2.5	0	−150	0	−150	0	−150	0	−380	0	−250	25	25	6	4	1.5
15	11	5	4	2.5	25	13	6	5	2.5	9	5	2.5	9	5	2.5	0	−200	0	−200	0	−200	0	−380	0	−380	25	25	7	4	2.5
19	14	7	5	3.5	30	18	8	6	2.5	10	6	2.5	10	7	2.5	0	−250	0	−250	0	−250	0	−500	0	−380	30	30	8	5	2.5
19	14	7	5	3.5	30	18	8	6	5	10	6	4	10	7	5	0	−250	0	−250	0	−250	0	−500	0	−380	30	30	8	5	4
23	17	8	6	4	40	20	10	8	5	11	7	5	13	8	5	0	−300	0	−300	0	−300	0	−500	0	−500	30	30	10	6	5
26	19	9	—	—	50	25	13	—	—	13	—	—	15	—	—	0	−350	0	—	—	—	0	−500	0	—	35	35	13	—	—
30	23	12	—	—	60	30	15	—	—	15	—	—	20	—	—	0	−400	0	—	—	—	0	−630	0	—	40	40	15	—	—
34	26	—	—	—	65	35	—	—	—	—	—	—	—	—	—	0	−450	—	—	—	—	—	—	—	—	50	45	—	—	—
38	30	—	—	—	70	40	—	—	—	—	—	—	—	—	—	0	−500	—	—	—	—	—	—	—	—	60	50	—	—	—
55	—	—	—	—	80	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	70	—	—	—	—
75	—	—	—	—	90	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	80	—	—	—	—
94	—	—	—	—	100	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	100	—	—	—	—
120	—	—	—	—	120	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	120	—	—	—	—
150	—	—	—	—	140	—	—	—	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—	140	—	—	—	—

2) Applies to ball bearings such as deep groove ball bearings and angular ball bearings.
3) Applies to individual raceway rings manufactured for combined bearing use.
4) The nominal bore diameter of bearings of 0.6 mm is included in this dimensional division.

Tolerance of radial bearings (except tapered roller bearings)

Unit: μm

Variation of outside diameter in a single plane V_{Dsp}[6] Sealed/shield bearings diameter Diameter series 2,3,4 Class 0	Variation of outside diameter in a single plane V_{Dsp}[6] Sealed/shield bearings diameter Diameter series 0,1,2,3,4 Class 6	Variation of mean outside diameter V_{Dmp} Class 0	Class 6	Class 5	Class 4	Class 2	Radial runout of outer ring of assembled bearing K_{ea} Class 0	Class 6	Class 5	Class 4	Class 2	Perpendicularity of outer ring outside surface with respect to the face S_D Class 5	Class 4	Class 2	Axial runout of outer ring of assembled bearing S_{ea}[7] Class 5	Class 4	Class 2	Deviation of a single outer ring width Δ_{Cs} All classes	Variation of outer ring width V_{Cs} Class 0,6	Class 5	Class 4	Class 2
Max.		Max.					Max.					Max.			Max.				Max.			
10	9	6	5	3	2	1.5	15	8	5	3	1.5	8	4	1.5	8	5	1.5			5	2.5	1.5
10	9	6	5	3	2	1.5	15	8	5	3	1.5	8	4	1.5	8	5	1.5	Depends on tolerance of Δ_{Bs} in relation to d of the same bearing	Depends on tolerance of V_{Bs} in relation to d of the same bearing	5	2.5	1.5
12	10	7	6	3	2.5	2	15	9	6	4	2.5	8	4	1.5	8	5	2.5			5	2.5	1.5
16	13	8	7	4	3	2	20	10	7	5	2.5	8	4	1.5	8	5	2.5			5	2.5	1.5
20	16	10	8	5	3.5	2	25	13	8	5	4	8	4	1.5	10	5	4			6	3	1.5
26	20	11	10	5	4	2.5	35	18	10	6	5	9	5	2.5	11	6	5			8	4	2.5
30	25	14	11	6	5	2.5	40	20	11	7	5	10	5	2.5	13	7	5			8	5	2.5
38	30	19	14	7	5	3.5	45	23	13	8	5	10	5	2.5	14	8	5			8	5	2.5
—	—	23	15	8	6	4	50	25	15	10	7	11	7	4	15	10	7			10	7	4
—	—	26	19	9	7	4	60	30	18	11	7	13	8	5	18	10	7			11	7	5
—	—	30	21	10	8	5	70	35	20	13	8	13	10	7	20	13	8			13	8	7
—	—	34	25	12	—	—	80	40	23	—	—	15	—	—	23	—	—			15	—	—
—	—	38	29	14	—	—	100	50	25	—	—	18	—	—	25	—	—			18	—	—
—	—	55	34	18	—	—	120	60	30	—	—	20	—	—	30	—	—			20	—	—
—	—	75	45	—	—	—	140	75	—	—	—	—	—	—	—	—	—			—	—	—
—	—	—	—	—	—	—	160	—	—	—	—	—	—	—	—	—	—			—	—	—
—	—	—	—	—	—	—	190	—	—	—	—	—	—	—	—	—	—			—	—	—
—	—	—	—	—	—	—	220	—	—	—	—	—	—	—	—	—	—			—	—	—
—	—	—	—	—	—	—	250	—	—	—	—	—	—	—	—	—	—			—	—	—

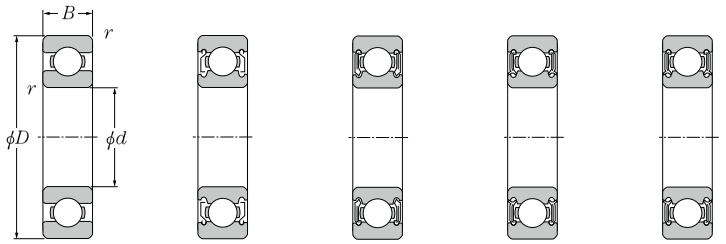
6) Applies to cases where snap rings are not installed on the bearings.
7) Applies to ball bearings such as deep groove ball bearings and angular ball bearings.
8) The nominal bore diameter of bearings of 2.5 mm is included in this dimensional division.

Bearing Damage and Cause

Bearing damage	Damaged parts	Causes														
		Handling		Bearing periphery			Lubrication		Load			Speed			Bearing selection	
		Poor storage condition/ vibration during transportation	Improper handling/ installation	Insufficient accuracy of shaft/housing	Infiltration of bearing by foreign matter (insufficient sealing performance)	Temperature (heat effect)	Lubricant (insufficient/ improper quality)	Lubrication method (insufficient)	Excessively large impact load/preload	Excessively large moment	Excessively small load	High speed/ rapid acceleration and deceleration	Large vibration	Swinging/vibration/ standstill	Excessively large/ small clearance	Excessively large/ small interference
Flaking (separation)	Raceway surface/ rolling element surface		○	○	○	○	○	○	○	○					○	
Seizure	Raceway/ rolling element/cage		○			○	○	○	○	○		○			○	
Cracks/chips	Raceway/rolling element		○	○			○		○	○						○
Cage damage	Rivets break or become loose		○		○		○	○	○	○		○	○			
Rolling path skewing	Raceway surface		○	○											○	
Smearing/ scuffing	Raceway surface/ rolling element surface/ rib surface/ roller end surface		○		○		○	○	○		○					
Rust/ corrosion	Rust on a part of or the entire surface of the rolling element pitch	○	○		○		○	○								
Fretting	Red rust on fitting surface		○						○				○			
	Brinelling indentations form on the raceway of the rolling element pitch	○					○	○						○		○
Wear	Raceway surface/ rolling element surface/ rib surface/ roller end surface		○		○		○	○								
Electrolytic corrosion	Pits form on the raceway. The pits gradually grow into ripples.		○													
Dents and scratches	Raceway surface/ rolling element surface		○		○				○	○						
Creeping	Fitting surface		○	○		○			○							○
Speckles and discoloration	Raceway surface/ rolling element surface				○		○	○								
Peeling	Raceway surface/ rolling element surface				○		○	○								

Cage type for deep groove ball bearings

Cage type Bearing series	Pressed cages	Machined cages
		
67	6700～ 6706	—
68	6800～ 6834	6836～ 68／600
69	6900～ 6934	6936～ 69／500
160	16001～16052	16056～16072
60	6000～ 6052	6056～ 6084
62	6200～ 6244	—
63	6300～ 6344	—
64	6403～ 6416	—

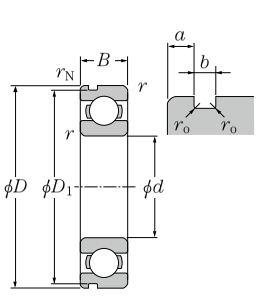


Open type | Shielded type (ZZ) | Non-contact sealed type (LLB, LLF) | Low torque sealed type (LLH) | Contact sealed type (LLU)

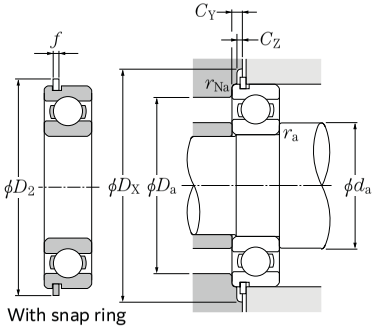
d 10 ～ 20mm

Boundary dimensions mm					Basic load rating dynamic kN		Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease Open type, ZZ, LLB, LLF Z, LB, LF	Oil Open type, Z, LB, LF			Bearing number Open type	Shielded or sealed type [2] (See drawings)			
d	D	B	$r_{s\,min}$ [1]	r_{NS} Min.	C_r	C_{0r}	C_u	f_0			LLH LH	LLU LU					
10	15	3	0.1	—	0.950	0.435	0.018	15.7	10 000	12 000	—	—	6700	—	—	—	—
	19	5	0.3	—	2.03	0.925	0.072	14.8	32 000	38 000	—	24 000	6800	ZZ	LLB	—	LLU
	22	6	0.3	0.3	2.99	1.27	0.099	14.0	30 000	36 000	25 000	21 000	6900	ZZ	LLB	LLH	LLU
	26	8	0.3	—	5.05	1.96	0.138	12.4	29 000	34 000	25 000	21 000	6000	ZZ	LLB	LLH	LLU
	30	9	0.6	0.5	5.65	2.39	0.182	13.2	25 000	30 000	21 000	18 000	6200	ZZ	LLB	LLH	LLU
	35	11	0.6	0.5	9.10	3.50	0.273	11.4	23 000	27 000	20 000	16 000	6300	ZZ	LLB	LLH	LLU
12	18	4	0.2	—	1.03	0.530	0.021	16.2	8 300	9 500	—	—	6701	—	LLF	—	—
	21	5	0.3	—	2.12	1.04	0.080	15.3	29 000	35 000	—	20 000	6801	ZZ	LLB	—	LLU
	24	6	0.3	0.3	3.20	1.46	0.115	14.5	27 000	32 000	22 000	19 000	6901	ZZ	LLB	LLH	LLU
	28	7	0.3	—	5.65	2.39	0.187	13.2	26 000	30 000	—	—	16001JRX	—	—	—	—
	28	8	0.3	—	5.65	2.39	0.182	13.2	26 000	30 000	21 000	18 000	6001JRX	ZZ	LLB	LLH	LLU
	32	10	0.6	0.5	6.75	2.75	0.214	12.7	22 000	26 000	20 000	16 000	6201	ZZ	LLB	LLH	LLU
	37	12	1	0.5	10.8	4.20	0.325	11.1	20 000	24 000	19 000	15 000	6301	ZZ	LLB	LLH	LLU
15	21	4	0.2	—	1.04	0.585	0.024	16.5	6 600	7 600	—	—	6702	—	LLF	—	—
	24	5	0.3	—	2.30	1.26	0.091	15.8	26 000	31 000	—	17 000	6802	ZZ	LLB	—	LLU
	28	7	0.3	0.3	4.05	2.00	0.157	14.8	24 000	28 000	—	16 000	6902	ZZ	LLB	—	LLU
	32	8	0.3	—	6.20	2.84	0.222	13.9	22 000	26 000	—	—	16002	—	—	—	—
	32	9	0.3	0.3	6.20	2.84	0.199	13.9	22 000	26 000	18 000	15 000	6002	ZZ	LLB	LLH	LLU
	35	11	0.6	0.5	8.60	3.60	0.279	12.7	19 000	23 000	18 000	15 000	6202	ZZ	LLB	LLH	LLU
	42	13	1	0.5	12.7	5.45	0.425	12.3	17 000	21 000	15 000	12 000	6302	ZZ	LLB	LLH	LLU
17	23	4	0.2	—	1.11	0.660	0.027	16.3	5 000	6 700	—	—	6703	—	LLF	—	—
	26	5	0.3	—	2.47	1.46	0.102	16.1	24 000	28 000	—	15 000	6803	ZZ	LLB	—	LLU
	30	7	0.3	0.3	5.15	2.58	0.202	14.7	22 000	26 000	—	14 000	6903JRX	ZZ	LLB	—	LLU
	35	8	0.3	—	7.55	3.35	0.263	13.6	20 000	24 000	—	—	16003	—	—	—	—
	35	10	0.3	0.3	7.55	3.35	0.243	13.6	20 000	24 000	16 000	14 000	6003	ZZ	LLB	LLH	LLU
	40	12	0.6	0.5	10.6	4.60	0.355	12.8	18 000	21 000	15 000	12 000	6203	ZZ	LLB	LLH	LLU
	47	14	1	0.5	15.0	6.55	0.510	12.2	16 000	19 000	14 000	11 000	6303	ZZ	LLB	LLH	LLU
	62	17	1.1	—	25.2	10.8	0.840	11.1	14 000	16 000	—	—	6403	ZZ	—	—	—
20	27	4	0.2	—	1.15	0.730	0.031	16.1	5 000	5 700	—	—	6704	—	LLF	—	—
	32	7	0.3	0.3	4.45	2.47	0.185	15.5	21 000	25 000	—	13 000	6804JR	ZZ	LLB	—	LLU
	37	9	0.3	0.3	7.05	3.70	0.288	14.7	19 000	23 000	—	12 000	6904	ZZ	LLB	—	LLU
	42	8	0.3	—	8.75	4.50	0.350	14.5	18 000	21 000	—	—	16004	—	—	—	—
	42	12	0.6	0.5	10.4	5.05	0.355	13.9	18 000	21 000	13 000	11 000	6004	ZZ	LLB	LLH	LLU
	47	14	1	0.5	14.2	6.65	0.505	13.2	16 000	18 000	12 000	10 000	6204	ZZ	LLB	LLH	LLU
	52	15	1.1	0.5	17.6	7.90	0.615	12.4	14 000	17 000	12 000	10 000	6304	ZZ	LLB	LLH	LLU

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove



With snap ring

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19				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	0	0.56	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

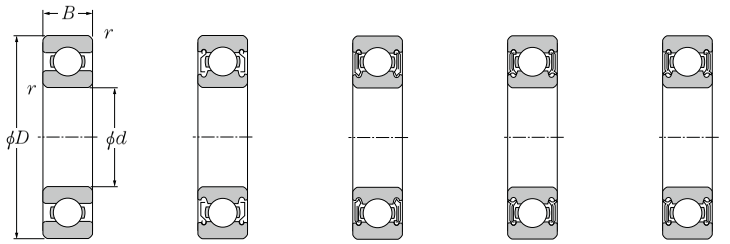
Static equivalent radial load

$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number Groove / Snap ring [3] (See drawings)		Snap ring groove dimensions mm				Snap ring dimensions mm		Installation-related dimensions mm								Mass [5] kg
		D_1 Max.	a Max.	b Min.	r_o Max.	D_2 Max.	f Max.	d_a Min.	d_a Max. [4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	(approx.)
—	—	—	—	—	—	—	—	10.8	—	14.2	—	—	—	0.1	—	0.0015
—	—	—	—	—	—	—	—	12	12.5	17	—	—	—	0.3	—	0.005
N	NR	20.8	1.05	0.8	0.2	24.8	0.7	12	13	20	25.5	1.5	0.7	0.3	0.3	0.009
—[6]	—[6]	—	—	—	—	—	—	12	13.5	24	—	—	—	0.3	—	0.019
N	NR	28.17	2.06	1.35	0.4	34.7	1.12	14	16	26	35.5	2.9	1.2	0.6	0.5	0.032
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	14	17	31	40.5	2.9	1.2	0.6	0.5	0.053
—	—	—	—	—	—	—	—	13.6	13.8	16.4	—	—	—	0.2	—	0.002
—	—	—	—	—	—	—	—	14	14.5	19	—	—	—	0.3	—	0.006
N	NR	22.8	1.05	0.8	0.2	26.8	0.7	14	15	22	27.5	1.5	0.7	0.3	0.3	0.011
—	—	—	—	—	—	—	—	14	—	26	—	—	—	0.3	—	0.019
NX2	NX2RX3	26.44	2.20	0.90	0.3	32.7	0.85	14	16	26	33.4	2.8	0.9	0.3	0.3	0.021
N	NR	30.15	2.06	1.35	0.4	36.7	1.12	16	17	28	37.5	2.9	1.2	0.6	0.5	0.037
N	NR	34.77	2.06	1.35	0.4	41.3	1.12	17	18.5	32	42	2.9	1.2	1	0.5	0.06
—	—	—	—	—	—	—	—	16.6	16.8	19.4	—	—	—	0.2	—	0.0025
—	—	—	—	—	—	—	—	17	17.5	22	—	—	—	0.3	—	0.007
N	NR	26.7	1.3	0.95	0.25	30.8	0.85	17	17.5	26	31.5	1.9	0.9	0.3	0.3	0.016
—	—	—	—	—	—	—	—	17	—	30	—	—	—	0.3	—	0.025
N	NR	30.15	2.06	1.35	0.4	36.7	1.12	17	19	30	37.5	2.9	1.2	0.3	0.3	0.03
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	19	20	31	40.5	2.9	1.2	0.6	0.5	0.045
N	NR	39.75	2.06	1.35	0.4	46.3	1.12	20	23	37	47	2.9	1.2	1	0.5	0.082
—	—	—	—	—	—	—	—	18.6	18.8	21.4	—	—	—	0.2	—	0.0025
—	—	—	—	—	—	—	—	19	19.5	24	—	—	—	0.3	—	0.008
N	NR	28.7	1.3	0.95	0.25	32.8	0.85	19	20	28	33.5	1.9	0.9	0.3	0.3	0.018
—	—	—	—	—	—	—	—	19	—	33	—	—	—	0.3	—	0.032
N	NR	33.17	2.06	1.35	0.4	39.7	1.12	19	21	33	40.5	2.9	1.2	0.3	0.3	0.039
N	NR	38.1	2.06	1.35	0.4	44.6	1.12	21	23	36	45.5	2.9	1.2	0.6	0.5	0.066
N	NR	44.6	2.46	1.35	0.4	52.7	1.12	22	25	42	53.5	3.3	1.2	1	0.5	0.115
—	—	—	—	—	—	—	—	23.5	30	55.5	—	—	—	1	—	0.27
—	—	—	—	—	—	—	—	21.6	22.3	25.4	—	—	—	0.2	—	0.0045
N	NR	30.7	1.3	0.95	0.25	34.8	0.85	22	22.5	30	35.5	1.9	0.9	0.3	0.3	0.019
N	NR	35.7	1.7	0.95	0.25	39.8	0.85	22	24	35	40.5	2.3	0.9	0.3	0.3	0.036
—	—	—	—	—	—	—	—	22	—	40	—	—	—	0.3	—	0.051
N	NR	39.75	2.06	1.35	0.4	46.3	1.12	24	26	38	47	2.9	1.2	0.6	0.5	0.069
N	NR	44.6	2.46	1.35	0.4	52.7	1.12	25	28	42	53.5	3.3	1.2	1	0.5	0.106
N	NR	49.73	2.46	1.35	0.4	57.9	1.12	26.5	28.5	45.5	58.5	3.3	1.2	1	0.5	0.144

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings. 6) See **B-54**.

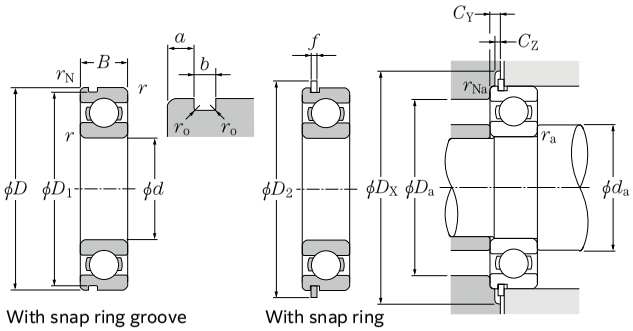


Open type | Shielded type (ZZ) | Non-contact sealed type (LLB, LLF) | Low torque sealed type (LLH) | Contact sealed type (LLU)

d 20 ～ 35mm

Boundary dimensions mm					Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease Open type, ZZ, LLB, LLF Z, LB, LF	Allowable speed min^{-1} Oil Open type, Z, LB, LF	Allowable speed min^{-1} Oil LLH	Allowable speed min^{-1} Oil LLU	Bearing number Open type	Bearing number Shielded or sealed type [2] (See drawings)			
d	D	B	$r_{s\,min}$ [1]	r_{Ns} Min.	C_r	C_{0r}	C_u	f_0			LH	LU					
20	72	19	1.1	—	31.5	13.9	1.09	11.4	12 000	14 000	—	—	**6404**	**ZZ**	—	—	—
22	44	12	0.6	0.5	10.4	5.05	0.395	13.9	17 000	20 000	13 000	10 000	**60/22**	**ZZ**	**LLB**	**LLH**	**LLU**
	50	14	1	0.5	14.3	6.80	0.500	13.5	14 000	17 000	12 000	9 700	**62/22**	**ZZ**	**LLB**	**LLH**	**LLU**
	56	16	1.1	0.5	20.4	9.25	0.725	12.4	13 000	15 000	11 000	9 200	**63/22**	**ZZ**	**LLB**	**LLH**	**LLU**
25	32	4	0.2	—	1.21	0.840	0.036	15.8	4 000	4 600	—	—	**6705**	—	**LLF**	—	—
	37	7	0.3	0.3	4.75	2.95	0.208	16.1	18 000	21 000	—	10 000	**6805JR**	**ZZ**	**LLB**	—	**LLU**
	42	9	0.3	0.3	7.80	4.55	0.345	15.4	16 000	19 000	11 700	9 800	**6905**	**ZZ**	**LLB**	**LLH**	**LLU**
	47	8	0.3	—	9.25	5.10	0.400	15.1	15 000	18 000	—	—	**16005**	—	—	—	—
	47	12	0.6	0.5	11.2	5.85	0.380	14.5	15 000	18 000	11 000	9 400	**6005**	**ZZ**	**LLB**	**LLH**	**LLU**
	52	15	1	0.5	15.5	7.85	0.550	13.9	13 000	15 000	11 000	8 900	**6205**	**ZZ**	**LLB**	**LLH**	**LLU**
	62	17	1.1	0.5	23.5	10.9	0.855	12.6	12 000	14 000	9 700	8 100	**6305**	**ZZ**	**LLB**	**LLH**	**LLU**
	80	21	1.5	—	38.5	17.5	1.36	11.6	10 000	12 000	—	—	**6405**	**ZZ**	—	—	—
28	52	12	0.6	0.5	13.8	7.40	0.580	14.5	14 000	16 000	10 000	8 400	**60/28**	**ZZ**	**LLB**	**LLH**	**LLU**
	58	16	1	0.5	19.8	9.75	0.720	13.4	12 000	14 000	9 700	8 100	**62/28**	**ZZ**	**LLB**	**LLH**	**LLU**
	68	18	1.1	0.5	29.6	14.0	1.10	12.4	11 000	13 000	8 900	7 400	**63/28**	**ZZ**	**LLB**	**LLH**	**LLU**
30	37	4	0.2	—	1.27	0.950	0.041	15.7	3 300	3 800	—	—	**6706**	—	**LLF**	—	—
	42	7	0.3	0.3	5.20	3.65	0.244	16.5	15 000	18 000	10 500	8 800	**6806JR**	**ZZ**	**LLB**	**LLH**	**LLU**
	47	9	0.3	0.3	8.00	5.00	0.365	15.8	14 000	17 000	10 000	8 400	**6906**	**ZZ**	**LLB**	**LLH**	**LLU**
	55	9	0.3	—	12.5	7.35	0.570	15.2	13 000	15 000	—	—	**16006**	—	—	—	—
	55	13	1	0.5	14.7	8.30	0.650	14.8	13 000	15 000	9 200	7 700	**6006**	**ZZ**	**LLB**	**LLH**	**LLU**
	62	16	1	0.5	21.6	11.3	0.795	13.8	11 000	13 000	8 800	7 300	**6206**	**ZZ**	**LLB**	**LLH**	**LLU**
	72	19	1.1	0.5	29.5	15.0	1.14	13.3	10 000	12 000	7 900	6 600	**6306**	**ZZ**	**LLB**	**LLH**	**LLU**
	90	23	1.5	—	48.0	23.9	1.86	12.3	8 800	10 000	—	—	**6406**	**ZZ**	—	—	—
32	58	13	1	0.5	13.1	8.05	0.615	15.4	12 000	15 000	8 700	7 200	**60/32**	**ZZ**	**LLB**	**LLH**	**LLU**
	65	17	1	0.5	23.0	11.6	0.840	13.6	11 000	12 000	8 400	7 100	**62/32**	**ZZ**	**LLB**	**LLH**	**LLU**
	75	20	1.1	0.5	33.0	16.9	1.30	13.1	9 500	11 000	7 700	6 500	**63/32**	**ZZ**	**LLB**	**LLH**	**LLU**
35	47	7	0.3	0.3	5.45	4.05	0.268	16.4	13 000	16 000	—	7 600	**6807JR**	**ZZ**	**LLB**	—	**LLU**
	55	10	0.6	0.5	10.6	6.85	0.495	15.8	12 000	15 000	8 500	7 100	**6907**	**ZZ**	**LLB**	**LLH**	**LLU**
	62	9	0.3	—	12.9	8.20	0.605	15.6	12 000	14 000	—	—	**16007**	—	—	—	—
	62	14	1	0.5	17.7	10.3	0.805	14.8	12 000	14 000	8 200	6 800	**6007**	**ZZ**	**LLB**	**LLH**	**LLU**
	72	17	1.1	0.5	28.4	15.3	1.09	13.8	9 800	11 000	7 600	6 300	**6207**	**ZZ**	**LLB**	**LLH**	**LLU**
	80	21	1.5	0.5	37.0	19.1	1.47	13.1	8 800	10 000	7 300	6 000	**6307**	**ZZ**	**LLB**	**LLH**	**LLU**
	100	25	1.5	—	61.0	31.0	2.43	12.3	7 800	9 100	—	—	**6407**	**ZZ**	—	—	—

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove | With snap ring

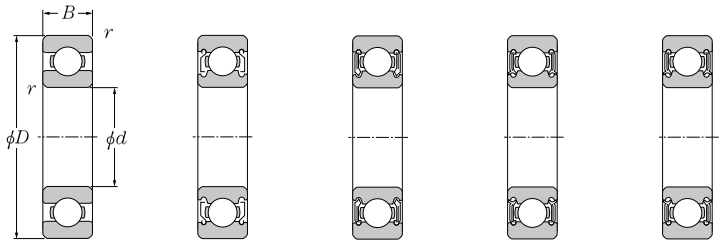
Dynamic equivalent radial load
$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$ X	$\frac{F_a}{F_r} \leqq e$ Y	$\frac{F_a}{F_r} > e$ X	$\frac{F_a}{F_r} > e$ Y
0.172	0.19				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	0	0.56	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

Static equivalent radial load
$P_{0r} = 0.6F_r + 0.5F_a$
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number Groove / Snap ring [3] (See drawings)		Snap ring groove dimensions mm D_1 Max.	a Max.	b Min.	r_o Max.	Snap ring dimensions mm D_2 Max.	f Max.	Installation-related dimensions mm d_a Min.	d_a Max. [4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	Mass [5] kg (approx.)
—	—	—	—	—	—	—	—	26.5	35.5	65.5	—	—	—	1	—	0.4
N	**NR**	41.75	2.06	1.35	0.4	48.3	1.12	26	26.5	40	49	2.9	1.2	0.6	0.5	0.074
N	**NR**	47.6	2.46	1.35	0.4	55.7	1.12	27	29.5	45	56.5	3.3	1.2	1	0.5	0.117
N	**NR**	53.6	2.46	1.35	0.4	61.7	1.12	28.5	31	49.5	62.5	3.3	1.2	1	0.5	0.176
—	—	—	—	—	—	—	—	26.6	27.3	30.4	—	—	—	0.2	—	0.005
N	**NR**	35.7	1.3	0.95	0.25	39.8	0.85	27	28	35	40.5	1.9	0.9	0.3	0.3	0.022
N	**NR**	40.7	1.7	0.95	0.25	44.8	0.85	27	29	40	45.5	2.3	0.9	0.3	0.3	0.042
—	—	—	—	—	—	—	—	27	—	45	—	—	—	0.3	—	0.06
N	**NR**	44.6	2.06	1.35	0.4	52.7	1.12	29	30.5	43	53.5	2.9	1.2	0.6	0.5	0.08
N	**NR**	49.73	2.46	1.35	0.4	57.9	1.12	30	32	47	58.5	3.3	1.2	1	0.5	0.128
N	**NR**	59.61	3.28	1.9	0.6	67.7	1.7	31.5	35	55.5	68.5	4.6	1.7	1	0.5	0.232
—	—	—	—	—	—	—	—	33	41	72	—	—	—	1.5	—	0.53
N	**NR**	49.73	2.06	1.35	0.4	57.9	1.12	32	34	48	58.5	2.9	1.2	0.6	0.5	0.098
N	**NR**	55.6	2.46	1.35	0.4	63.7	1.12	33	35.5	53	64.5	3.3	1.2	1	0.5	0.171
N	**NR**	64.82	3.28	1.9	0.6	74.6	1.7	34.5	38.5	61.5	76	4.6	1.7	1	0.5	0.284
—	—	—	—	—	—	—	—	31.6	32.3	35.4	—	—	—	0.2	—	0.006
N	**NR**	40.7	1.3	0.95	0.25	44.8	0.85	32	33	40	45.5	1.9	0.9	0.3	0.3	0.026
N	**NR**	45.7	1.7	0.95	0.25	49.8	0.85	32	34	45	50.5	2.3	0.9	0.3	0.3	0.048
—	—	—	—	—	—	—	—	32	—	53	—	—	—	0.3	—	0.091
N	**NR**	52.6	2.08	1.35	0.4	60.7	1.12	35	37	50	61.5	2.9	1.2	1	0.5	0.116
N	**NR**	59.61	3.28	1.9	0.6	67.7	1.7	35	39	57	68.5	4.6	1.7	1	0.5	0.199
N	**NR**	68.81	3.28	1.9	0.6	78.6	1.7	36.5	43	65.5	80	4.6	1.7	1	0.5	0.36
—	—	—	—	—	—	—	—	38	49	82	—	—	—	1.5	—	0.735
N	**NR**	55.6	2.08	1.35	0.4	63.7	1.12	37	39	53	64.5	2.9	1.2	1	0.5	0.129
N	**NR**	62.6	3.28	1.9	0.6	70.7	1.7	37	40	60	71.5	4.6	1.7	1	0.5	0.226
N	**NR**	71.83	3.28	1.9	0.6	81.6	1.7	38.5	43.5	68.5	83	4.6	1.7	1	0.5	0.382
N	**NR**	45.7	1.3	0.95	0.25	49.8	0.85	37	38	45	50.5	1.9	0.9	0.3	0.3	0.029
N	**NR**	53.7	1.7	0.95	0.25	57.8	0.85	39	40	51	58.5	2.3	0.9	0.6	0.5	0.074
—	—	—	—	—	—	—	—	37	—	60	—	—	—	0.3	—	0.11
N	**NR**	59.61	2.08	1.9	0.6	67.7	1.7	40	42	57	68.5	3.4	1.7	1	0.5	0.155
N	**NR**	68.81	3.28	1.9	0.6	78.6	1.7	41.5	45	65.5	80	4.6	1.7	1	0.5	0.288
N	**NR**	76.81	3.28	1.9	0.6	86.6	1.7	43	47	72	88	4.6	1.7	1.5	0.5	0.457
—	—	—	—	—	—	—	—	43	56.5	92	—	—	—	1.5	—	0.952

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings.

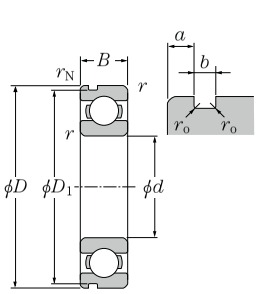


Open type | Shielded type (ZZ) | Non-contact sealed type (LLB) | Low torque sealed type (LLH) | Contact sealed type (LLU)

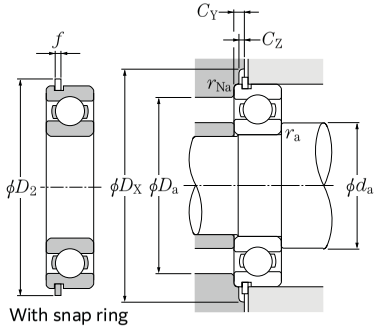
d 40 ～ 60mm

Boundary dimensions mm					Basic load rating dynamic kN	static kN	Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease Open type, ZZ, LLB Z, LB	Oil Open type, Z, LB	LLH LH	LLU LU	Bearing number Open type	Shielded or sealed type [2] (See drawings)			
d	D	B	$r_{s\,min}$ [1]	r_{NS} Min.	C_r	C_{0r}	C_u	f_0									
40	52	7	0.3	0.3	5.65	4.40	0.291	16.3	12 000	14 000	8 000	6 700	6808JR	ZZ	LLB	LLH	LLU
	62	12	0.6	0.5	13.5	8.90	0.645	15.8	11 000	13 000	7 500	6 300	6908	ZZ	LLB	LLH	LLU
	68	9	0.3	—	14.0	9.65	0.685	16.0	10 000	12 000	—	—	16008	—	—	—	—
	68	15	1	0.5	18.6	11.5	0.890	15.2	10 000	12 000	7 300	6 100	6008	ZZ	LLB	LLH	LLU
	80	18	1.1	0.5	32.5	17.8	1.24	14.0	8 700	10 000	6 700	5 600	6208	ZZ	LLB	LLH	LLU
	90	23	1.5	0.5	45.0	24.0	1.83	13.2	7 800	9 200	6 400	5 300	6308	ZZ	LLB	LLH	LLU
	110	27	2	—	70.5	36.5	2.85	12.3	7 000	8 200	—	—	6408	ZZ	—	—	—
45	58	7	0.3	0.3	5.95	4.95	0.325	16.1	11 000	12 000	—	5 900	6809JR	ZZ	LLB	—	LLU
	68	12	0.6	0.5	14.5	10.4	0.730	16.1	9 800	12 000	—	5 600	6909	ZZ	LLB	—	LLU
	75	10	0.6	—	14.3	10.5	0.725	16.2	9 200	11 000	—	—	16009	—	—	—	—
	75	16	1	0.5	23.2	15.1	1.16	15.3	9 200	11 000	6 500	5 400	6009	ZZ	LLB	LLH	LLU
	85	19	1.1	0.5	36.0	20.4	1.60	14.1	7 800	9 200	6 200	5 200	6209	ZZ	LLB	LLH	LLU
	100	25	1.5	0.5	58.5	32.0	2.50	13.1	7 000	8 200	5 600	4 700	6309	ZZ	LLB	LLH	LLU
	120	29	2	—	85.5	45.0	3.50	12.1	6 300	7 400	—	—	6409	ZZ	—	—	—
50	65	7	0.3	0.3	7.30	6.10	0.405	16.1	9 600	11 000	—	5 300	6810JR	ZZ	LLB	—	LLU
	72	12	0.6	0.5	14.9	11.2	0.765	16.3	8 900	11 000	6 100	5 100	6910	ZZ	LLB	LLH	LLU
	80	10	0.6	—	14.7	11.3	0.760	16.4	8 400	9 800	—	—	16010	—	—	—	—
	80	16	1	0.5	24.2	16.6	1.24	15.5	8 400	9 800	6 000	5 000	6010	ZZ	LLB	LLH	LLU
	90	20	1.1	0.5	39.0	23.2	1.82	14.4	7 100	8 300	5 700	4 700	6210	ZZ	LLB	LLH	LLU
	110	27	2	0.5	68.5	38.5	2.99	13.2	6 400	7 500	5 000	4 200	6310	ZZ	LLB	LLH	LLU
	130	31	2.1	—	92.0	49.5	3.85	12.5	5 700	6 700	—	—	6410	ZZ	—	—	—
55	72	9	0.3	0.3	9.75	8.10	0.540	16.2	8 700	10 000	—	4 800	6811JR	ZZ	LLB	—	LLU
	80	13	1	0.5	17.7	13.3	0.915	16.2	8 200	9 600	5 500	4 600	6911	ZZ	LLB	LLH	LLU
	90	11	0.6	—	20.6	15.3	1.06	16.2	7 700	9 000	—	—	16011	—	—	—	—
	90	18	1.1	0.5	31.5	21.2	1.62	15.3	7 700	9 000	—	4 500	6011	ZZ	LLB	—	LLU
	100	21	1.5	0.5	48.0	29.2	2.29	14.3	6 400	7 600	—	4 300	6211	ZZ	LLB	—	LLU
	120	29	2	0.5	79.5	45.0	3.50	13.2	5 800	6 800	—	3 900	6311	ZZ	LLB	—	LLU
	140	33	2.1	—	98.5	54.0	4.20	12.7	5 200	6 100	—	—	6411	ZZ	—	—	—
60	78	10	0.3	0.3	12.7	10.6	0.705	16.3	8 000	9 400	—	4 400	6812	ZZ	LLB	—	LLU
	85	13	1	0.5	18.2	14.3	0.965	16.4	7 600	8 900	—	4 300	6912	ZZ	LLB	—	LLU
	95	11	0.6	—	22.1	17.5	1.20	16.3	7 000	8 300	—	—	16012	—	—	—	—
	95	18	1.1	0.5	32.5	23.2	1.73	15.6	7 000	8 300	—	4 100	6012	ZZ	LLB	—	LLU
	110	22	1.5	0.5	58.0	36.0	2.83	14.3	6 000	7 000	4 500	3 800	6212	ZZ	LLB	LLH	LLU
	130	31	2.1	0.5	90.5	52.0	4.10	13.2	5 400	6 300	—	3 600	6312	ZZ	LLB	—	LLU
	150	35	2.1	—	113	64.5	4.90	12.6	4 800	5 700	—	—	6412	ZZ	—	—	—

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove



With snap ring

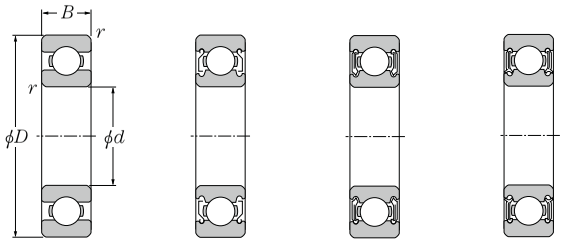
Dynamic equivalent radial load
$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		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

Static equivalent radial load
$P_{0r} = 0.6F_r + 0.5F_a$
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number Groove / Snap ring [3] (See drawings)		Snap ring groove dimensions mm				Snap ring dimensions mm		Installation-related dimensions mm								Mass [5] kg
		D_1 Max.	a Max.	b Min.	r_o Max.	D_2 Max.	f Max.	d_a Min.	d_a Max. [4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	(approx.)
N	NR	50.7	1.3	0.95	0.25	54.8	0.85	42	43	50	55.5	1.9	0.9	0.3	0.3	0.033
N	NR	60.7	1.7	0.95	0.25	64.8	0.85	44	45	58	65.5	2.3	0.9	0.6	0.5	0.11
—	—	—	—	—	—	—	—	42	—	66	—	—	—	0.3	—	0.125
N	NR	64.82	2.49	1.9	0.6	74.6	1.7	45	47	63	76	3.8	1.7	1	0.5	0.19
N	NR	76.81	3.28	1.9	0.6	86.6	1.7	46.5	51	73.5	88	4.6	1.7	1	0.5	0.366
N	NR	86.79	3.28	2.7	0.6	96.5	2.46	48	54	82	98	5.4	2.5	1.5	0.5	0.63
—	—	—	—	—	—	—	—	49	61.5	101	—	—	—	2.0	—	1.23
N	NR	56.7	1.3	0.95	0.25	60.8	0.85	47	48	56	61.5	1.9	0.9	0.3	0.3	0.04
N	NR	66.7	1.7	0.95	0.25	70.8	0.85	49	51	64	72	2.3	0.9	0.6	0.5	0.128
—	—	—	—	—	—	—	—	49	—	71	—	—	—	0.6	—	0.171
N	NR	71.83	2.49	1.9	0.6	81.6	1.7	50	52.5	70	83	3.8	1.7	1	0.5	0.237
N	NR	81.81	3.28	1.9	0.6	91.6	1.7	51.5	55.5	78.5	93	4.6	1.7	1	0.5	0.398
N	NR	96.8	3.28	2.7	0.6	106.5	2.46	53	61.5	92	108	5.4	2.5	1.5	0.5	0.814
—	—	—	—	—	—	—	—	54	66.5	111	—	—	—	2	—	1.53
N	NR	63.7	1.3	0.95	0.25	67.8	0.85	52	54	63	68.5	1.9	0.9	0.3	0.3	0.052
N	NR	70.7	1.7	0.95	0.25	74.8	0.85	54	55.5	68	76	2.3	0.9	0.6	0.5	0.132
—	—	—	—	—	—	—	—	54	—	76	—	—	—	0.6	—	0.18
N	NR	76.81	2.49	1.9	0.6	86.6	1.7	55	57.5	75	88	3.8	1.7	1	0.5	0.261
N	NR	86.79	3.28	2.7	0.6	96.5	2.46	56.5	60	83.5	98	5.4	2.5	1	0.5	0.454
N	NR	106.81	3.28	2.7	0.6	116.6	2.46	59	68.5	101	118	5.4	2.5	2	0.5	1.07
—	—	—	—	—	—	—	—	61	73.5	119	—	—	—	2	—	1.88
N	NR	70.7	1.7	0.95	0.25	74.8	0.85	57	59	70	76	2.3	0.9	0.3	0.3	0.083
N	NR	77.9	2.1	1.3	0.4	84.4	1.12	60	61.5	75	86	2.9	1.2	1	0.5	0.18
—	—	—	—	—	—	—	—	59	—	86	—	—	—	0.6	—	0.258
N	NR	86.79	2.87	2.7	0.6	96.5	2.46	61.5	64	83.5	98	5	2.5	1	0.5	0.388
N	NR	96.8	3.28	2.7	0.6	106.5	2.46	63	67	92	108	5.4	2.5	1.5	0.5	0.601
N	NR	115.21	4.06	3.1	0.6	129.7	2.82	64	74	111	131.5	6.5	2.9	2	0.5	1.37
—	—	—	—	—	—	—	—	66	80	129	—	—	—	2	—	2.29
N	NR	76.2	1.7	1.3	0.4	82.7	1.12	62	64.5	76	84	2.5	1.2	0.3	0.3	0.106
N	NR	82.9	2.1	1.3	0.4	89.4	1.12	65	66.5	80	91	2.9	1.2	1	0.5	0.193
—	—	—	—	—	—	—	—	64	—	91	—	—	—	0.6	—	0.283
N	NR	91.82	2.87	2.7	0.6	101.6	2.46	66.5	69	88.5	103	5	2.5	1	0.5	0.414
N	NR	106.81	3.28	2.7	0.6	116.6	2.46	68	75	102	118	5.4	2.5	1.5	0.5	0.783
N	NR	125.22	4.06	3.1	0.6	139.7	2.82	71	80.5	119	141.5	6.5	2.9	2	0.5	1.73
—	—	—	—	—	—	—	—	71	86	139	—	—	—	2	—	2.77

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings.

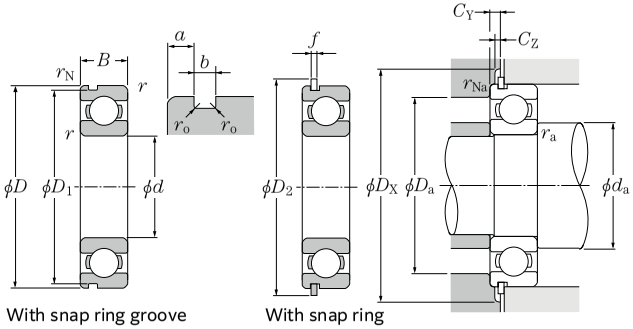


Open type | Shielded type (ZZ) | Non-contact sealed type (LLB) | Contact sealed type (LLU)

d 65 ~ 85mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease		Oil	Bearing number			
					dynamic	static			Open type, ZZ, LLB	Open type, Z, LB	LLU LU	Open type	Shielded or sealed type [2] (See drawings)		
d	D	B	$r_{s\,min}$ [1]	r_{NS} Min.	C_r	C_{0r}	C_u	f_0	Z, LB						
	85	10	0.6	0.5	12.8	11.0	0.730	16.2	7 400	8 700	4 100	**6813**	**ZZ**	**LLB**	**LLU**
	90	13	1	0.5	19.3	16.1	1.07	16.6	7 000	8 200	4 000	**6913**	**ZZ**	**LLB**	**LLU**
	100	11	0.6	—	22.7	18.7	1.26	16.5	6 500	7 700	—	**16013**	—	—	—
65	100	18	1.1	0.5	34.0	25.2	1.83	15.8	6 500	7 700	3 900	**6013**	**ZZ**	**LLB**	**LLU**
	120	23	1.5	0.5	63.5	40.0	3.15	14.4	5 500	6 500	3 600	**6213**	**ZZ**	**LLB**	**LLU**
	140	33	2.1	0.5	103	60.0	4.60	13.2	4 900	5 800	3 300	**6313**	**ZZ**	**LLB**	**LLU**
	160	37	2.1	—	123	72.5	5.35	12.7	4 400	5 200	—	**6413**	—	—	—
	90	10	0.6	0.5	13.4	11.9	0.795	16.1	6 900	8 100	3 800	**6814**	**ZZ**	**LLB**	**LLU**
	100	16	1	0.5	26.3	21.2	1.45	16.3	6 500	7 700	3 700	**6914**	**ZZ**	**LLB**	**LLU**
	110	13	0.6	—	27.0	22.6	1.52	16.5	6 100	7 100	—	**16014**	—	—	—
70	110	20	1.1	0.5	42.0	31.0	2.30	15.6	6 100	7 100	3 600	**6014**	**ZZ**	**LLB**	**LLU**
	125	24	1.5	0.5	69.0	44.0	3.45	14.5	5 100	6 000	3 400	**6214**	**ZZ**	**LLB**	**LLU**
	150	35	2.1	0.5	115	68.0	5.10	13.2	4 600	5 400	3 100	**6314**	**ZZ**	**LLB**	**LLU**
	180	42	3	—	142	89.5	6.25	12.7	4 100	4 800	—	**6414**	—	—	—
	95	10	0.6	0.5	13.9	12.9	0.855	16.0	6 400	7 600	3 600	**6815**	**ZZ**	**LLB**	**LLU**
	105	16	1	0.5	27.0	22.6	1.52	16.5	6 100	7 200	3 500	**6915**	**ZZ**	**LLB**	**LLU**
	115	13	0.6	—	27.6	24.0	1.60	16.6	5 700	6 700	—	**16015**	—	—	—
75	115	20	1.1	0.5	44.0	33.5	2.44	15.8	5 700	6 700	3 300	**6015**	**ZZ**	**LLB**	**LLU**
	130	25	1.5	0.5	73.5	49.5	3.80	14.7	4 800	5 600	3 200	**6215**	**ZZ**	**LLB**	**LLU**
	160	37	2.1	0.5	126	77.0	5.55	13.2	4 300	5 000	2 900	**6315**	**ZZ**	**LLB**	**LLU**
	190	45	3	—	152	99.0	6.70	12.7	3 800	4 500	—	**6415**	—	—	—
	100	10	0.6	0.5	14.0	13.3	0.885	16.0	6 000	7 100	3 400	**6816**	**ZZ**	**LLB**	**LLU**
	110	16	1	0.5	27.6	24.0	1.59	16.6	5 700	6 700	3 200	**6916**	**ZZ**	**LLB**	**LLU**
	125	14	0.6	—	28.1	25.1	1.64	16.4	5 300	6 200	—	**16016**	—	—	—
80	125	22	1.1	0.5	53.0	40.0	2.91	15.6	5 300	6 200	3 100	**6016**	**ZZ**	**LLB**	**LLU**
	140	26	2	0.5	80.5	53.0	3.95	14.6	4 500	5 300	3 000	**6216**	**ZZ**	**LLB**	**LLU**
	170	39	2.1	0.5	136	86.5	6.05	13.3	4 000	4 700	2 700	**6316**	**ZZ**	**LLB**	**LLU**
	200	48	3	—	181	125	8.20	12.3	3 600	4 200	—	**6416**	—	—	—
	110	13	1	0.5	20.7	19.0	1.26	16.2	5 700	6 700	3 100	**6817**	**ZZ**	**LLB**	**LLU**
	120	18	1.1	0.5	35.5	29.6	1.99	16.4	5 400	6 300	3 000	**6917**	**ZZ**	**LLB**	**LLU**
	130	14	0.6	—	28.7	26.2	1.68	16.4	5 000	5 900	—	**16017**	—	—	—
85	130	22	1.1	0.5	55.0	43.0	3.00	15.8	5 000	5 900	2 900	**6017**	**ZZ**	**LLB**	**LLU**
	150	28	2	0.5	92.0	64.0	4.60	14.7	4 200	5 000	2 800	**6217**	**ZZ**	**LLB**	**LLU**
	180	41	3	0.5	147	97.0	6.55	13.3	3 800	4 500	2 600	**6317**	**ZZ**	**LLB**	**LLU**

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove | With snap ring

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19				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	0	0.56	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

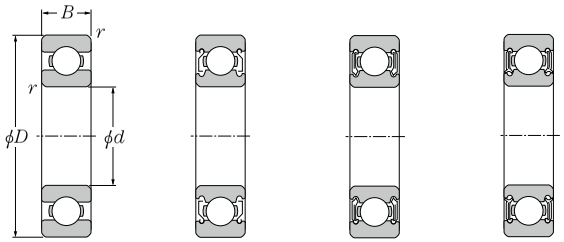
Static equivalent radial load

$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number		Snap ring groove dimensions mm				Snap ring dimensions mm		Installation-related dimensions mm								Mass [5] kg
Groove / Snap ring [3] (See drawings)		D_1 Max.	a Max.	b Min.	r_o Max.	D_2 Max.	f Max.	d_a Min.	d_a Max. [4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	(approx.)
N	**NR**	82.9	1.7	1.3	0.4	89.4	1.12	69	70	81	91	2.5	1.2	0.6	0.5	0.128
N	**NR**	87.9	2.1	1.3	0.4	94.4	1.12	70	71.5	85	96	2.9	1.2	1	0.5	0.206
—	—	—	—	—	—	—	—	69	—	96	—	—	—	0.6	—	0.307
N	**NR**	96.8	2.87	2.7	0.6	106.5	2.46	71.5	74	93.5	108	5	2.5	1	0.5	0.421
N	**NR**	115.21	4.06	3.1	0.6	129.7	2.82	73	80.5	112	131.5	6.5	2.9	1.5	0.5	0.99
N	**NR**	135.23	4.9	3.1	0.6	149.7	2.82	76	86	129	152	7.3	2.9	2	0.5	2.08
—	—	—	—	—	—	—	—	76	—	149	—	—	—	2	—	3.3
N	**NR**	87.9	1.7	1.3	0.4	94.4	1.12	74	75.5	86	96	2.5	1.2	0.6	0.5	0.137
N	**NR**	97.9	2.5	1.3	0.4	104.4	1.12	75	77.5	95	106	3.3	1.2	1	0.5	0.334
—	—	—	—	—	—	—	—	74	—	106	—	—	—	0.6	—	0.441
N	**NR**	106.81	2.87	2.7	0.6	116.6	2.46	76.5	80.5	103.5	118	5	2.5	1	0.5	0.604
N	**NR**	120.22	4.06	3.1	0.6	134.7	2.82	78	85	117	136.5	6.5	2.9	1.5	0.5	1.07
N	**NR**	145.24	4.9	3.1	0.6	159.7	2.82	81	92.5	139	162	7.3	2.9	2	0.5	2.52
—	—	—	—	—	—	—	—	83	—	167	—	—	—	2.5	—	4.83
N	**NR**	92.9	1.7	1.3	0.4	99.4	1.12	79	80	91	101	2.5	1.2	0.6	0.5	0.145
N	**NR**	102.6	2.5	1.3	0.4	110.7	1.12	80	82.5	100	112	3.3	1.2	1	0.5	0.353
—	—	—	—	—	—	—	—	79	—	111	—	—	—	0.6	—	0.464
N	**NR**	111.81	2.87	2.7	0.6	121.6	2.46	81.5	85.5	108.5	123	5	2.5	1	0.5	0.649
N	**NR**	125.22	4.06	3.1	0.6	139.7	2.82	83	90.5	122	141.5	6.5	2.9	1.5	0.5	1.18
N	**NR**	155.22	4.9	3.1	0.6	169.7	2.82	86	99	149	172	7.3	2.9	2	0.5	3.02
—	—	—	—	—	—	—	—	88	—	177	—	—	—	2.5	—	5.72
N	**NR**	97.9	1.7	1.3	0.4	104.4	1.12	84	85	96	106	2.5	1.2	0.6	0.5	0.154
N	**NR**	107.6	2.5	1.3	0.4	115.7	1.12	85	88	105	117	3.3	1.2	1	0.5	0.373
—	—	—	—	—	—	—	—	84	—	121	—	—	—	0.6	—	0.597
N	**NR**	120.22	2.87	3.1	0.6	134.7	2.82	86.5	91.5	118.5	136.5	5.3	2.9	1	0.5	0.854
N	**NR**	135.23	4.9	3.1	0.6	149.7	2.82	89	95.5	131	152	7.3	2.9	2	0.5	1.4
N	**NR**	163.65	5.69	3.5	0.6	182.9	3.1	91	105	159	185	8.4	3.1	2	0.5	3.59
—	—	—	—	—	—	—	—	93	—	187	—	—	—	2.5	—	6.76
N	**NR**	107.6	2.1	1.3	0.4	115.7	1.12	90	91	105	117	2.9	1.2	1	0.5	0.27
N	**NR**	117.6	3.3	1.3	0.4	125.7	1.12	91.5	94	113.5	127	4.1	1.2	1	0.5	0.536
—	—	—	—	—	—	—	—	89	—	126	—	—	—	0.6	—	0.626
N	**NR**	125.22	2.87	3.1	0.6	139.7	2.82	91.5	97	123.5	141.5	5.3	2.9	1	0.5	0.89
N	**NR**	145.24	4.9	3.1	0.6	159.7	2.82	94	103	141	162	7.3	2.9	2	0.5	1.79
N	**NR**	173.66	5.69	3.5	0.6	192.9	3.1	98	112	167	195	8.4	3.1	2.5	0.5	4.23

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings.

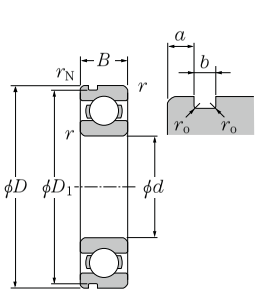


Open type | Shielded type (ZZ) | Non-contact sealed type (LLB) | Contact sealed type (LLU)

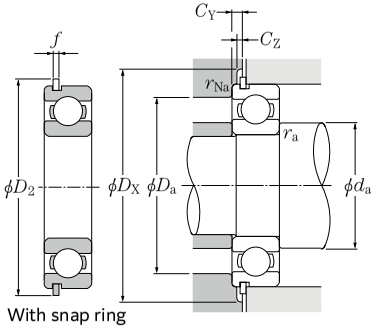
d 90 ～ 120mm

Boundary dimensions mm				Basic load rating kN		Fatigue load limit kN	Factor	Allowable speed min^{-1}			Bearing number			
				dynamic	static			Grease	Oil					
								Open type, ZZ, LLB	Open type, Z, LB	LLU	Open type	Shielded or sealed type [2] (See drawings)		
d	D	B	$r_{s\,min}$ [1]	r_{NS} Min.	C_r	C_{0r}	C_u	f_0	Z, LB		LU			
90	115	13	1	0.5	21.1	19.7	1.30	16.1	5 400	6 300	3 000	**6818**	ZZ	LLB	LLU
	125	18	1.1	0.5	36.5	31.5	2.05	16.5	5 100	6 000	2 900	**6918**	ZZ	LLB	LLU
	140	16	1	—	37.0	33.5	2.07	16.5	4 700	5 600	—	**16018**	—	—	—
	140	24	1.5	0.5	64.5	49.5	3.45	15.6	4 700	5 600	2 800	**6018**	ZZ	LLB	LLU
	160	30	2	0.5	106	71.5	5.00	14.5	4 000	4 700	2 600	**6218**	ZZ	LLB	LLU
	190	43	3	0.5	158	107	7.10	13.3	3 600	4 200	2 400	**6318**	ZZ	LLB	LLU
95	120	13	1	0.5	21.4	20.5	1.31	16.1	5 000	5 900	2 800	**6819**	ZZ	LLB	LLU
	130	18	1.1	0.5	37.5	33.5	2.10	16.6	4 800	5 700	2 800	**6919**	ZZ	LLB	LLU
	145	16	1	—	38.0	35.0	2.13	16.5	4 500	5 300	—	**16019**	—	—	—
	145	24	1.5	0.5	67.0	54.0	3.55	15.8	4 500	5 300	2 600	**6019**	ZZ	LLB	LLU
	170	32	2.1	0.5	121	82.0	5.55	14.4	3 700	4 400	2 500	**6219**	ZZ	LLB	LLU
	200	45	3	0.5	169	119	7.65	13.3	3 300	3 900	2 300	**6319**	ZZ	LLB	LLU
100	125	13	1	0.5	21.7	21.2	1.33	16.0	4 800	5 600	2 700	**6820**	ZZ	LLB	LLU
	140	20	1.1	0.5	45.5	39.5	2.44	16.4	4 500	5 300	2 600	**6920**	ZZ	LLB	LLU
	150	16	1	—	39.0	36.5	2.18	16.4	4 200	5 000	—	**16020**	—	—	—
	150	24	1.5	0.5	66.5	54.0	3.50	15.9	4 200	5 000	2 600	**6020**	ZZ	LLB	LLU
	180	34	2.1	0.5	135	93.0	6.15	14.4	3 500	4 200	2 300	**6220**	ZZ	LLB	LLU
	215	47	3	—	192	141	8.75	13.2	3 200	3 700	2 200	**6320**	ZZ	LLB	LLU
105	130	13	1	0.5	22.0	22.0	1.35	15.9	4 600	5 400	2 500	**6821**	ZZ	—	LLU
	145	20	1.1	0.5	47.0	42.0	2.52	16.5	4 300	5 100	2 500	**6921**	ZZ	LLB	LLU
	160	18	1	—	57.5	50.5	3.00	16.3	4 000	4 700	—	**16021**	—	—	—
	160	26	2	0.5	80.5	65.5	4.15	15.8	4 000	4 700	2 400	**6021**	ZZ	LLB	LLU
	190	36	2.1	0.5	147	105	6.75	14.4	3 400	4 000	2 300	**6221**	ZZ	LLB	LLU
	225	49	3	—	204	153	9.35	13.2	3 000	3 600	2 100	**6321**	ZZ	—	LLU
110	140	16	1	0.5	27.5	28.2	1.68	16.0	4 300	5 100	2 400	**6822**	ZZ	LLB	LLU
	150	20	1.1	0.5	48.5	44.5	2.60	16.6	4 100	4 800	2 400	**6922**	ZZ	LLB	LLU
	170	19	1	—	63.5	56.5	3.25	16.3	3 800	4 500	—	**16022**	—	—	—
	170	28	2	0.5	91.0	73.0	4.55	15.6	3 800	4 500	2 300	**6022**	ZZ	LLB	LLU
	200	38	2.1	0.5	160	117	7.35	14.3	3 200	3 800	2 200	**6222**	ZZ	LLB	LLU
	240	50	3	—	227	179	10.5	13.1	2 900	3 400	1 900	**6322**	ZZ	LLB	LLU
120	150	16	1	0.5	32.0	33.0	1.89	16.0	4 000	4 700	2 200	**6824**	ZZ	LLB	LLU
	165	22	1.1	0.5	59.0	54.0	3.05	16.5	3 800	4 400	2 100	**6924**	ZZ	—	LLU
	180	19	1	—	70.0	63.5	3.50	16.4	3 500	4 100	—	**16024**	—	—	—
	180	28	2	0.5	94.0	79.5	4.65	15.9	3 500	4 100	2 100	**6024**	ZZ	LLB	LLU

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove



With snap ring

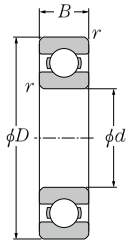
Dynamic equivalent radial load
$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19				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	0	0.56	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

Static equivalent radial load
$P_{0r} = 0.6F_r + 0.5F_a$
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number		Snap ring groove dimensions mm				Snap ring dimensions mm		Installation-related dimensions mm								Mass [5] kg
Groove / Snap ring [3] (See drawings)		D_1 Max.	a Max.	b Min.	r_o Max.	D_2 Max.	f Max.	d_a Min.	d_a Max. [4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	(approx.)
N	NR	112.6	2.1	1.3	0.4	120.7	1.12	95	96	110	122	2.9	1.2	1	0.5	0.285
N	NR	122.6	3.3	1.3	0.4	130.7	1.12	96.5	99	118.5	132	4.1	1.2	1	0.5	0.554
—	—	—	—	—	—	—	—	95	—	135	—	—	—	1	—	0.848
N	NR	135.23	3.71	3.1	0.6	149.7	2.82	98	102	132	152	6.1	2.9	1.5	0.5	1.02
N	NR	155.22	4.9	3.1	0.6	169.7	2.82	99	109	151	172	7.3	2.9	2	0.5	2.15
N	NR	183.64	5.69	3.5	0.6	202.9	3.1	103	118	177	205	8.4	3.1	2.5	0.5	4.91
N	NR	117.6	2.1	1.3	0.4	125.7	1.12	100	101	115	127	2.9	1.2	1	0.5	0.3
N	NR	127.6	3.3	1.3	0.4	135.7	1.12	101.5	104	123.5	137	4.1	1.2	1	0.5	0.579
—	—	—	—	—	—	—	—	100	—	140	—	—	—	1	—	0.885
N	NR	140.23	3.71	3.1	0.6	154.7	2.82	103	109	137	157	6.1	2.9	1.5	0.5	1.08
N	NR	163.65	5.69	3.5	0.6	182.9	3.1	106	116	159	185	8.4	3.1	2	0.5	2.62
N	NR	193.65	5.69	3.5	0.6	212.9	3.1	108	125	187	215	8.4	3.1	2.5	0.5	5.67
N	NR	122.6	2.1	1.3	0.4	130.7	1.12	105	106	120	132	2.9	1.2	1	0.5	0.313
N	NR	137.6	3.3	1.9	0.6	145.7	1.7	106.5	110	133.5	147	4.7	1.7	1	0.5	0.785
—	—	—	—	—	—	—	—	105	—	145	—	—	—	1	—	0.91
N	NR	145.24	3.71	3.1	0.6	159.7	2.82	108	110	142	162	6.1	2.9	1.5	0.5	1.15
N	NR	173.66	5.69	3.5	0.6	192.9	3.1	111	122	169	195	8.4	3.1	2	0.5	3.14
N	NR	208.6	5.69	3.5	1	227.8	3.1	113	133	202	230	8.4	3.1	2.5	0.5	7
N	NR	127.6	2.1	1.3	0.4	135.7	1.12	110	111	125	137	2.9	1.2	1	0.5	0.33
N	NR	142.6	3.3	1.9	0.6	150.7	1.7	111.5	115	138.5	152	4.7	1.7	1	0.5	0.816
—	—	—	—	—	—	—	—	110	—	155	—	—	—	1	—	1.2
N	NR	155.22	3.71	3.1	0.6	169.7	2.82	114	119	151	172	6.1	2.9	2	0.5	1.59
N	NR	183.64	5.69	3.5	0.6	202.9	3.1	116	125	179	205	8.4	3.1	2	0.5	3.7
N	NR	217.0	6.5	4.5	1	237	3.5	118	134	212	239	9.6	3.5	2.5	0.5	8.05
N	NR	137.6	2.5	1.9	0.6	145.7	1.7	115	118	135	147	3.9	1.7	1	0.5	0.515
N	NR	147.6	3.3	1.9	0.6	155.7	1.7	116.5	120	143.5	157	4.7	1.7	1	0.5	0.849
—	—	—	—	—	—	—	—	115	—	165	—	—	—	1	—	1.46
N	NR	163.65	3.71	3.5	0.6	182.9	3.1	119	126	161	185	6.4	3.1	2	0.5	1.96
N	NR	193.65	5.69	3.5	0.6	212.9	3.1	121	132	189	215	8.4	3.1	2	0.5	4.36
N	NR	232.0	6.5	4.5	1	252	3.5	123	149	227	254	9.6	3.5	2.5	0.5	9.54
N	NR	147.6	2.5	1.9	0.6	155.7	1.7	125	128	145	157	3.9	1.7	1	0.5	0.555
N	NR	161.8	3.7	1.9	0.6	171.5	1.7	126.5	132	158.5	173	5.1	1.7	1	0.5	1.15
—	—	—	—	—	—	—	—	125	—	175	—	—	—	1	—	1.56
N	NR	173.66	3.71	3.5	0.6	192.9	3.1	129	136	171	195	6.4	3.1	2	0.5	2.07

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings.



Open type

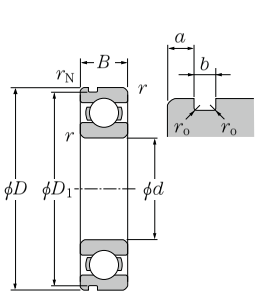
Shielded type (ZZ)

Contact sealed type (LLU)

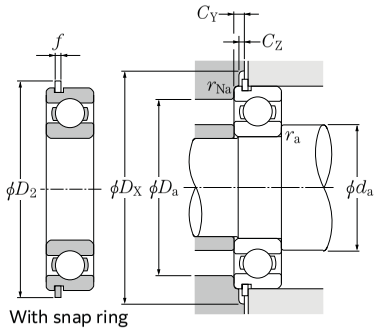
d 120 ～ 170mm

Boundary dimensions mm					Basic load rating kN		Fatigue load limit kN	Factor	Allowable speed min^{-1}			Bearing number		
					dynamic	static			Grease	Oil				
d	D	B	$r_{s\,min}$[1]	r_{NS} Min.	C_r	C_{0r}	C_u	f_0	Open type, ZZ, Z	Open type, Z	LLU LU	Open type	Shielded or sealed type[2] (See drawings)	
120	215	40	2.1	—	172	131	7.95	14.4	2 900	3 400	2 000	6224	ZZ	LLU
	260	55	3	—	229	185	10.5	13.5	2 600	3 100	1 700	6324	ZZ	LLU
130	165	18	1.1	0.5	41.0	41.0	2.25	16.1	3 700	4 300	2 000	6826	ZZ	LLU
	180	24	1.5	0.5	72.0	67.5	3.65	16.5	3 500	4 100	1 900	6926	ZZ	LLU
	200	22	1.1	—	88.5	79.5	4.25	16.2	3 200	3 800	—	16026	—	—
	200	33	2	0.5	118	101	5.70	15.8	3 200	3 800	1 900	6026	ZZ	LLU
	230	40	3	—	185	146	8.55	14.5	2 700	3 100	1 800	6226	ZZ	LLU
	280	58	4	—	254	214	11.7	13.6	2 400	2 800	—	6326	—	—
140	175	18	1.1	0.5	42.5	44.5	2.35	16.0	3 400	4 000	1 900	6828	ZZ	LLU
	190	24	1.5	0.5	74.0	71.5	3.70	16.6	3 200	3 800	1 800	6928	ZZ	LLU
	210	22	1.1	—	91.0	85.0	4.35	16.4	3 000	3 500	—	16028	—	—
	210	33	2	—	122	109	5.85	15.9	3 000	3 500	1 800	6028	ZZ	LLU
	250	42	3	—	184	150	8.40	14.8	2 500	2 900	1 600	6228	ZZ	LLU
	300	62	4	—	280	246	13.0	13.6	2 200	2 600	—	6328	—	—
150	190	20	1.1	0.5	53.0	55.0	2.80	16.1	3 100	3 700	1 700	6830	ZZ	LLU
	210	28	2	—	94.0	90.5	4.55	16.5	3 000	3 500	1 700	6930	ZZ	LLU
	225	24	1.1	—	107	101	5.00	16.4	2 800	3 200	—	16030	—	—
	225	35	2.1	—	139	126	6.55	15.9	2 800	3 200	1 700	6030	ZZ	LLU
	270	45	3	—	195	168	9.05	15.1	2 300	2 700	1 500	6230	ZZ	LLU
	320	65	4	—	305	284	14.5	13.9	2 100	2 400	—	6330	—	—
160	200	20	1.1	0.5	53.5	57.0	2.82	16.1	2 900	3 400	1 600	6832	ZZ	LLU
	220	28	2	—	96.5	96.0	4.65	16.6	2 800	3 300	—	6932	ZZ	LLU
	240	25	1.5	—	109	108	5.10	16.5	2 600	3 000	—	16032	—	—
	240	38	2.1	—	158	144	7.30	15.9	2 600	3 000	1 600	6032	ZZ	LLU
	290	48	3	—	205	186	9.45	15.4	2 100	2 500	—	6232	—	—
	340	68	4	—	310	286	14.2	13.9	1 900	2 300	—	6332	—	—
170	215	22	1.1	—	66.5	70.5	3.35	16.1	2 700	3 200	—	6834	ZZ	—
	230	28	2	—	95.0	95.5	4.50	16.5	2 600	3 100	—	6934	ZZ	—
	260	28	1.5	—	131	128	5.90	16.4	2 400	2 800	—	16034	—	—
	260	42	2.1	—	187	172	8.55	15.8	2 400	2 800	—	6034	ZZ	—
	310	52	4	—	235	223	11.1	15.3	2 000	2 400	—	6234	—	—
	360	72	4	—	360	355	17.0	13.6	1 800	2 100	—	6334	—	—

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



With snap ring groove



With snap ring

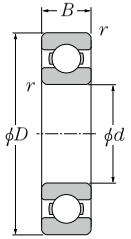
Dynamic equivalent radial load
$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		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

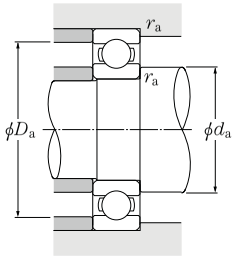
Static equivalent radial load
$P_{0r} = 0.6F_r + 0.5F_a$
When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Bearing number		Snap ring groove dimensions mm				Snap ring dimensions mm		Installation-related dimensions mm								Mass[5] kg
Groove / Snap ring[3] (See drawings)		D_1 Max.	a Max.	b Min.	r_o Max.	D_2 Max.	f Max.	d_a Min.	d_a Max.[4]	D_a Max.	D_X (approx.)	C_Y Max.	C_Z Min.	r_{as} Max.	r_{Nas} Max.	(approx.)
N	NR	217.0	6.5	4.5	1	227.8	3.1	131	143	204	230	9.2	3.1	2	0.5	5.15
—	—	—	—	—	—	—	—	133	162	247	—	—	—	2.5	—	12.4
N	NR	161.8	3.3	1.9	0.6	171.5	1.7	136.5	139.5	158.5	173	4.7	1.7	1	0.5	0.8
N	NR	176.8	3.7	1.9	0.6	186.5	1.7	138	144	172	188	5.1	1.7	1.5	0.5	1.52
—	—	—			—	—	—	136.5	—	193.5	—	—	—	1	—	2.31
N	NR	193.65	5.69	3.5	0.6	212.9	3.1	139	148	191	215	8.4	3.1	2	0.5	3.16
N	NR	222.0	6.5	4.5	1	242	3.5	143	158	217	244	9.6	3.5	2.5	0.5	5.82
—	—	—	—	—	—	—	—	146	—	264	—	—	—	3	—	15.3
N	NR	171.8	3.3	1.9	0.6	181.5	1.7	146.5	150	168.5	183	4.7	1.7	1	0.5	0.85
N	NR	186.8	3.7	1.9	0.6	196.5	1.7	148	154	182	198	5.1	1.7	1.5	0.5	1.62
—	—	—	—	—	—	—	—	146.5	—	203.5	—	—	—	1	—	2.45
—	—	—	—	—	—	—	—	149	158	201	—	—	—	2	—	3.35
N	NR	242.0	6.5	4.5	1	262	3.5	153	173	237	264	9.6	3.5	2.5	0.5	7.57
—	—	—	—	—	—	—	—	156	—	284	—	—	—	3	—	18.5
N	NR	186.8	3.3	1.9	0.6	196.5	1.7	156.5	161	183.5	198	4.7	1.7	1	0.5	1.16
—	—	—	—	—	—	—	—	159	167	201	—	—	—	2	—	2.47
—	—	—	—	—	—	—	—	156.5	—	218.5	—	—	—	1	—	3.07
—	—	—	—	—	—	—	—	161	169	214	—	—	—	2	—	4.08
—	—	—	—	—	—	—	—	163	188	257	—	—	—	2.5	—	9.41
—	—	—	—	—	—	—	—	166	—	304	—	—	—	3	—	22
N	NR	196.8	3.3	1.9	0.6	206.5	1.7	166.5	171	193.5	208	4.7	1.7	1	0.5	1.23
—	—	—	—	—	—	—	—	169	178	211	—	—	—	2	—	2.61
—	—	—	—	—	—	—	—	168	—	232	—	—	—	1.5	—	3.64
—	—	—	—	—	—	—	—	171	183	229	—	—	—	2	—	5.05
—	—	—	—	—	—	—	—	173	—	277	—	—	—	2.5	—	11.7
—	—	—	—	—	—	—	—	176	—	324	—	—	—	3	—	26
—	—	—	—	—	—	—	—	176.5	182	208.5	—	—	—	1	—	1.63
—	—	—	—	—	—	—	—	179	188	221	—	—	—	2	—	2.74
—	—	—	—	—	—	—	—	178	—	252	—	—	—	1.5	—	4.93
—	—	—	—	—	—	—	—	181	196	249	—	—	—	2	—	6.76
—	—	—	—	—	—	—	—	186	—	294	—	—	—	3	—	14.5
—	—	—	—	—	—	—	—	186	—	344	—	—	—	3	—	30.7

3) Sealed and shielded bearings are also available. 4) This dimension applies to sealed and shielded bearings.
5) Does not include bearings with snap rings.



Open type



d 180 ～ 260mm

Boundary dimensions mm				Basic load rating kN dynamic	Basic load rating kN static	Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number Open type
d	D	B	$r_{s\,min}$[1]	C_r	C_{0r}	C_u	f_0			
180	225	22	1.1	67.0	73.0	3.40	16.1	2 600	3 000	**6836**
	250	33	2	122	119	5.45	16.5	2 400	2 900	**6936**
	280	31	2	129	134	5.85	16.5	2 300	2 700	**16036**
	280	46	2.1	210	199	9.70	15.6	2 300	2 700	**6036**
	320	52	4	252	241	11.9	15.1	1 900	2 200	**6236**
	380	75	4	390	405	19.0	13.9	1 700	2 000	**6336**
190	240	24	1.5	81.0	88.0	4.00	16.1	2 400	2 900	**6838**
	260	33	2	125	127	5.65	16.6	2 300	2 700	**6938**
	290	31	2	149	156	6.70	16.6	2 100	2 500	**16038**
	290	46	2.1	218	215	10.1	15.8	2 100	2 500	**6038**
	340	55	4	282	281	13.5	15.0	1 800	2 100	**6238**
	400	78	5	395	415	18.9	14.1	1 600	1 900	**6338**
200	250	24	1.5	82.0	91.5	4.05	16.1	2 300	2 700	**6840**
	280	38	2.1	174	168	7.45	16.2	2 200	2 600	**6940**
	310	34	2	157	160	6.65	16.6	2 000	2 400	**16040**
	310	51	2.1	241	243	11.2	15.6	2 000	2 400	**6040**
	360	58	4	298	310	14.4	15.2	1 700	2 000	**6240**
	420	80	5	455	500	22.3	13.8	1 500	1 800	**6340**
220	270	24	1.5	84.5	98.0	4.15	16.0	2 100	2 400	**6844**
	300	38	2.1	178	180	7.55	16.4	2 000	2 300	**6944**
	340	37	2.1	200	216	8.65	16.5	1 800	2 200	**16044**
	340	56	3	267	289	12.5	15.8	1 800	2 200	**6044**
	400	65	4	330	365	15.8	15.3	1 500	1 800	**6244**
	460	88	5	455	520	22.0	14.3	1 400	1 600	**6344**
240	300	28	2	94.0	112	4.55	15.9	1 900	2 200	**6848**
	320	38	2.1	188	203	8.05	16.5	1 800	2 100	**6948**
	360	37	2.1	197	217	8.30	16.5	1 700	2 000	**16048**
	360	56	3	276	310	12.8	16.0	1 700	2 000	**6048**
260	320	28	2	96.5	120	4.65	15.8	1 700	2 000	**6852**
	360	46	2.1	245	280	10.9	16.3	1 600	1 900	**6952**
	400	44	3	252	299	11.1	16.5	1 500	1 800	**16052**
	400	65	4	325	375	15.1	15.8	1 500	1 800	**6052**

1) Smallest allowable dimension for chamfer dimension r.

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

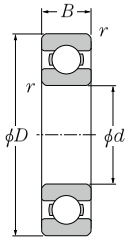
$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22				1.99
0.689	0.26				1.71
1.03	0.28				1.55
1.38	0.30				1.45
2.07	0.34				1.31
3.45	0.38				1.15
5.17	0.42				1.04
6.89	0.44				1.00

Static equivalent radial load

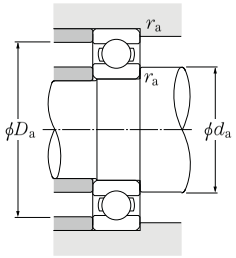
$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Installation-related dimensions mm d_a Min.	D_a Max.	r_{as} Max.	Mass kg (approx.)
186.5	218.5	1	2.03
189	241	2	4.76
189	271	2	6.49
191	269	2	8.8
196	304	3	15.1
196	364	3	35.6
198	232	1.5	2.62
199	251	2	4.98
199	281	2	6.77
201	279	2	9.18
206	324	3	18.2
210	380	4	41
208	242	1.5	2.73
211	269	2	7.1
209	301	2	8.68
211	299	2	11.9
216	344	3	21.6
220	400	4	46.3
228	262	1.5	3
231	289	2	7.69
231	329	2	11.3
233	327	2.5	15.7
236	384	3	30.2
240	440	4	60.8
249	291	2	4.6
251	309	2	8.28
251	349	2	12.1
253	347	2.5	16.8
269	311	2	5
271	349	2	13.9
273	387	2.5	18.5
276	384	3	25



Open type



d 280 ~ 440mm

Boundary dimensions mm				Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number
d	D	B	$r_{s\,min}$[1]	C_r	C_{0r}	C_u	f_0			Open type
280	350	33	2	151	177	6.65	16.1	1 600	1 900	**6856**
	380	46	2.1	252	299	11.1	16.5	1 500	1 800	**6956**
	420	44	3	257	315	11.3	16.5	1 400	1 600	**16056**
	420	65	4	360	420	16.9	15.5	1 400	1 600	**6056**
300	380	38	2.1	179	210	7.60	16.1	1 500	1 700	**6860**
	420	56	3	305	375	13.7	16.2	1 400	1 600	**6960**
	460	50	4	325	410	14.5	16.3	1 300	1 500	**16060**
	460	74	4	395	480	18.4	15.6	1 300	1 500	**6060**
320	400	38	2.1	186	228	7.95	16.1	1 400	1 600	**6864**
	440	56	3	315	405	14.1	16.4	1 300	1 500	**6964**
	480	50	4	335	440	14.9	16.4	1 200	1 400	**16064**
	480	74	4	410	530	19.3	15.7	1 200	1 400	**6064**
340	420	38	2.1	189	236	8.05	16.0	1 300	1 500	**6868**
	460	56	3	325	430	14.4	16.5	1 200	1 400	**6968**
	520	57	4	380	515	17.0	16.3	1 100	1 300	**16068**
	520	82	5	465	610	21.9	15.6	1 100	1 300	**6068**
360	440	38	2.1	207	258	8.55	16.0	1 200	1 400	**6872**
	480	56	3	330	455	14.8	16.5	1 100	1 300	**6972**
	540	57	4	390	550	17.6	16.4	1 100	1 200	**16072**
	540	82	5	485	670	23.0	15.7	1 100	1 200	**6072**
380	480	46	2.1	256	340	10.8	16.1	1 100	1 300	**6876**
	520	65	4	360	510	15.9	16.6	1 100	1 200	**6976**
	560	82	5	505	725	24.1	15.9	990	1 200	**6076**
400	500	46	2.1	251	340	10.6	16.0	1 100	1 200	**6880**
	540	65	4	370	535	16.4	16.5	990	1 200	**6980**
	600	90	5	565	825	26.9	15.7	930	1 100	**6080**
420	520	46	2.1	288	405	12.4	16.1	1 000	1 200	**6884**
	560	65	4	380	560	16.8	16.4	940	1 100	**6984**
	620	90	5	590	895	28.3	15.8	880	1 000	**6084**
440	540	46	2.1	292	420	12.6	16.0	950	1 100	**6888**
	600	74	4	405	615	18.0	16.4	890	1 000	**6988**

1) Smallest allowable dimension for chamfer dimension r.

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

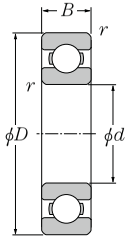
$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22				1.99
0.689	0.26				1.71
1.03	0.28				1.55
1.38	0.30				1.45
2.07	0.34				1.31
3.45	0.38				1.15
5.17	0.42				1.04
6.89	0.44				1.00

Static equivalent radial load

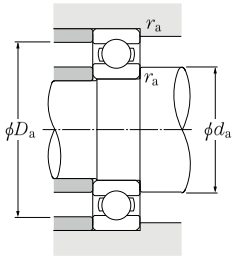
$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Installation-related dimensions mm			Mass kg
d_a Min.	D_a Max.	r_{as} Max.	(approx.)
289	341	2	7.4
291	369	2	14.8
293	407	2.5	23
296	404	3	31
311	369	2	10.5
313	407	2.5	23.5
316	444	3	32.5
316	444	3	43.8
331	389	2	10.9
333	427	2.5	24.8
336	464	3	34.2
336	464	3	46.1
351	409	2	11.5
353	447	2.5	26.2
356	504	3	47.1
360	500	4	61.8
371	429	2	12.3
373	467	2.5	27.5
376	524	3	49.3
380	520	4	64.7
391	469	2	19.7
396	504	3	39.8
400	540	4	67.5
411	489	2	20.6
416	524	3	41.6
420	580	4	87.6
431	509	2	21.6
436	544	3	43.4
440	600	4	91.1
451	529	2	22.5
456	584	3	60



Open type



d 460 ~ 600mm

Boundary dimensions mm				Basic load rating kN dynamic	Basic load rating kN static	Fatigue load limit kN	Factor	Allowable speed min^{-1} Grease lubrication	Allowable speed min^{-1} Oil lubrication	Bearing number Open type
d	D	B	$r_{s\,min}$[1]	C_r	C_{0r}	C_u	f_0			
460	580	56	3	350	515	15.1	16.2	900	1 100	**6892**
	620	74	4	415	645	18.5	16.4	850	1 000	**6992**
480	600	56	3	355	540	15.4	16.1	860	1 000	**6896**
	650	78	5	480	770	21.5	16.5	810	950	**6996**
500	620	56	3	360	560	15.7	16.1	820	970	**68/500**
	670	78	5	490	805	22.2	16.5	770	910	**69/500**
530	650	56	3	365	580	15.9	16.0	770	900	**68/530**
560	680	56	3	370	600	16.1	16.0	710	840	**68/560**
600	730	60	3	415	705	18.2	16.0	660	780	**68/600**

1) Smallest allowable dimension for chamfer dimension r.

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		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

Static equivalent radial load

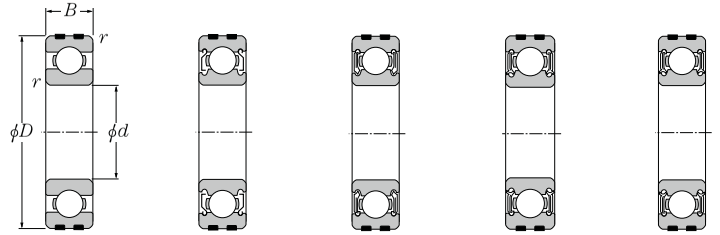
$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Installation-related dimensions mm			Mass kg
d_a Min.	D_a Max.	r_{as} Max.	(approx.)
473	567	2.5	34.8
476	604	3	62.2
493	587	2.5	36.2
500	630	4	73
513	607	2.5	37.5
520	650	4	75.5
543	637	2.5	39.5
573	667	2.5	41.5
613	717	2.5	51.7

Expansion Compensating Bearings

WBW



Open type | Shielded type (ZZ) | Non-contact sealed type (LLB) | Low torque sealed type (LLH) | Contact sealed type (LLU)

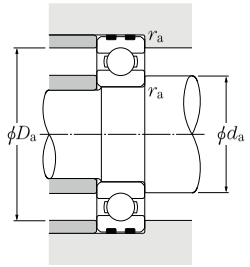
d 10 ～ 50mm

Boundary dimensions mm				Basic load rating dynamic kN		Fatigue load limit kN	Allowable load kN	Factor	Allowable speed min^{-1} Grease Open type, ZZ, LLB Z, LB	Oil Open type, Z, LB	LLH LH	LLU LU	Bearing number Open type	Shielded or sealed type[2] (See drawings)			
d	D	B	$r_{s\,min}$[1]	C_r	C_{0r}	C_u	C_p	f_0									
10	26	8	0.3	5.05	1.96	0.138	1.65	12.4	29 000	34 000	25 000	21 000	EC-6000	ZZ	LLB	LLH	LLU
	30	9	0.6	5.65	2.39	0.182	2.39	13.2	25 000	30 000	21 000	18 000	EC-6200	ZZ	LLB	LLH	LLU
	35	11	0.6	9.10	3.50	0.273	3.45	11.4	23 000	27 000	20 000	16 000	EC-6300	ZZ	LLB	LLH	LLU
12	28	8	0.3	5.65	2.39	0.182	1.78	13.2	26 000	30 000	21 000	18 000	EC-6001JRX	ZZ	LLB	LLH	LLU
	32	10	0.6	6.75	2.75	0.214	2.29	12.7	22 000	26 000	20 000	16 000	EC-6201	ZZ	LLB	LLH	LLU
	37	12	1	10.8	4.20	0.325	3.65	11.1	20 000	24 000	19 000	15 000	EC-6301	ZZ	LLB	LLH	LLU
15	32	9	0.3	6.20	2.83	0.199	2.83	13.9	22 000	26 000	18 000	15 000	EC-6002	ZZ	LLB	LLH	LLU
	35	11	0.6	8.60	3.60	0.279	2.78	12.7	19 000	23 000	18 000	15 000	EC-6202	ZZ	LLB	LLH	LLU
	42	13	1	12.7	5.45	0.425	4.40	12.3	17 000	21 000	15 000	12 000	EC-6302	ZZ	LLB	LLH	LLU
17	35	10	0.3	7.55	3.35	0.263	2.88	13.6	20 000	24 000	16 000	14 000	EC-6003	ZZ	LLB	LLH	LLU
	40	12	0.6	10.6	4.60	0.243	3.45	12.8	18 000	21 000	15 000	12 000	EC-6203	ZZ	LLB	LLH	LLU
	47	14	1	15.0	6.55	0.355	6.55	12.2	16 000	19 000	14 000	11 000	EC-6303	ZZ	LLB	LLH	LLU
20	42	12	0.6	10.4	5.05	0.355	5.05	13.9	18 000	21 000	13 000	11 000	EC-6004	ZZ	LLB	LLH	LLU
	47	14	1	14.2	6.65	0.505	5.05	13.2	16 000	18 000	12 000	10 000	EC-6204	ZZ	LLB	LLH	LLU
	52	15	1.1	17.6	7.90	0.615	7.90	12.4	14 000	17 000	12 000	10 000	EC-6304	ZZ	LLB	LLH	LLU
25	47	12	0.6	11.2	5.85	0.380	5.85	14.5	15 000	18 000	11 000	9 400	EC-6005	ZZ	LLB	LLH	LLU
	52	15	1	15.5	7.85	0.550	6.55	13.9	13 000	15 000	11 000	8 900	EC-6205	ZZ	LLB	LLH	LLU
	62	17	1.1	23.5	10.9	0.855	10.9	12.6	12 000	14 000	9 700	8 100	EC-6305	ZZ	LLB	LLH	LLU
30	55	13	1	14.7	8.30	0.650	8.30	14.8	13 000	15 000	9 200	7 700	EC-6006	ZZ	LLB	LLH	LLU
	62	16	1	21.6	11.3	0.795	9.85	13.8	11 000	13 000	8 800	7 300	EC-6206	ZZ	LLB	LLH	LLU
	72	19	1.1	29.5	15.0	1.14	15.0	13.3	10 000	12 000	7 900	6 600	EC-6306	ZZ	LLB	LLH	LLU
35	62	14	1	17.7	10.3	0.805	10.3	14.8	12 000	14 000	8 200	6 800	EC-6007	ZZ	LLB	LLH	LLU
	72	17	1.1	28.4	15.3	1.09	14.5	13.8	9 800	11 000	7 600	6 300	EC-6207	ZZ	LLB	LLH	LLU
	80	21	1.5	37.0	19.1	1.47	18.5	13.1	8 800	10 000	7 300	6 000	EC-6307	ZZ	LLB	LLH	LLU
40	68	15	1	18.6	11.5	0.890	11.5	15.2	10 000	12 000	7 300	6 100	EC-6008	ZZ	LLB	LLH	LLU
	80	18	1.1	32.5	17.8	1.24	17.5	14.0	8 700	10 000	6 700	5 600	EC-6208	ZZ	LLB	LLH	LLU
	90	23	1.5	45.0	24.0	1.83	23.4	13.2	7 800	9 200	6 400	5 300	EC-6308	ZZ	LLB	LLH	LLU
45	75	16	1	23.2	15.1	1.16	15.1	15.3	9 200	11 000	6 500	5 400	EC-6009	ZZ	LLB	LLH	LLU
	85	19	1.1	36.0	20.4	1.60	20.3	14.1	7 800	9 200	6 200	5 200	EC-6209	ZZ	LLB	LLH	LLU
	100	25	1.5	58.5	32.0	2.50	27.4	13.1	7 000	8 200	5 600	4 700	EC-6309	ZZ	LLB	LLH	LLU
50	80	16	1	24.2	16.6	1.24	16.6	15.5	8 400	9 800	6 000	5 000	EC-6010	ZZ	LLB	LLH	LLU
	90	20	1.1	39.0	23.2	1.82	17.7	14.4	7 100	8 300	5 700	4 700	EC-6210	ZZ	LLB	LLH	LLU
	110	27	2	68.5	38.5	2.99	33.0	13.2	6 400	7 500	5 000	4 200	EC-6310	ZZ	LLB	LLH	LLU

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.

Expansion Compensating Bearings

WBW



Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		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

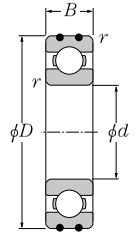
Static equivalent radial load

$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

Installation-related dimensions mm				Mass kg	Bearing number
d_a Min.	d_a Max.[3]	D_a Max.	r_{as} Max.	Open type (approx.)	Shielded or sealed type[2] (See drawings)
12	13.5	24	0.3	0.019	EC-6000 ZZ LLB LLH LLU
14	16	26	0.6	0.031	EC-6200 ZZ LLB LLH LLU
14	17	31	0.6	0.051	EC-6300 ZZ LLB LLH LLU
14	16	26	0.3	0.021	EC-6001JRX ZZ LLB LLH LLU
16	17.5	28	0.6	0.036	EC-6201 ZZ LLB LLH LLU
17	18.5	32	1	0.058	EC-6301 ZZ LLB LLH LLU
17	19	30	0.3	0.029	EC-6002 ZZ LLB LLH LLU
19	20.5	31	0.6	0.043	EC-6202 ZZ LLB LLH LLU
20	23	37	1	0.079	EC-6302 ZZ LLB LLH LLU
19	21	33	0.3	0.037	EC-6003 ZZ LLB LLH LLU
21	23	36	0.6	0.062	EC-6203 ZZ LLB LLH LLU
22	25	42	1	0.11	EC-6303 ZZ LLB LLH LLU
24	26	38	0.6	0.066	EC-6004 ZZ LLB LLH LLU
25	28	42	1	0.101	EC-6204 ZZ LLB LLH LLU
26.5	28.5	45.5	1	0.139	EC-6304 ZZ LLB LLH LLU
29	30.5	43	0.6	0.075	EC-6005 ZZ LLB LLH LLU
30	32	47	1	0.122	EC-6205 ZZ LLB LLH LLU
31.5	35	55.5	1	0.223	EC-6305 ZZ LLB LLH LLU
35	37	50	1	0.11	EC-6006 ZZ LLB LLH LLU
35	39	57	1	0.191	EC-6206 ZZ LLB LLH LLU
36.5	43	65.5	1	0.334	EC-6306 ZZ LLB LLH LLU
40	42	57	1	0.148	EC-6007 ZZ LLB LLH LLU
41.5	45	65.5	1	0.277	EC-6207 ZZ LLB LLH LLU
43	47	72	1.5	0.44	EC-6307 ZZ LLB LLH LLU
45	47	63	1	0.183	EC-6008 ZZ LLB LLH LLU
46.5	51	73.5	1	0.352	EC-6208 ZZ LLB LLH LLU
48	54	82	1.5	0.609	EC-6308 ZZ LLB LLH LLU
50	52.5	70	1	0.233	EC-6009 ZZ LLB LLH LLU
51.5	55.5	78.5	1	0.391	EC-6209 ZZ LLB LLH LLU
53	61.5	92	1.5	0.80	EC-6309 ZZ LLB LLH LLU
55	57.5	75	1	0.246	EC-6010 ZZ LLB LLH LLU
56.5	60	83.5	1	0.444	EC-6210 ZZ LLB LLH LLU
59	68.5	101	2	1.03	EC-6310 ZZ LLB LLH LLU

3) This dimension applies to sealed and shielded bearings.



Open type

Shielded type (ZZ)

Non-contact sealed type (LLB)

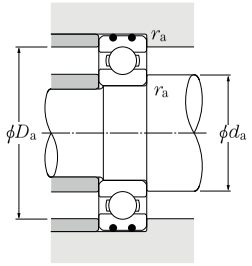
Low torque sealed type (LLH)

Contact sealed type (LLU)

d 10 ～ 45mm

Boundary dimensions mm				Basic load rating kN		Fatigue load limit kN	Allowable load kN	Factor	Allowable speed min^{-1} Grease		Oil		Bearing number				
				dynamic	static				Open type, ZZ, LLB Z, LB		Open type, Z, LB		Open type	Shielded or sealed type [2] (See drawings)			
d	D	B	$r_{s\,min}$ [1]	C_r	C_{0r}	C_u	C_p	f_0			LLH	LLU					
	26	8	0.3	5.05	1.96	0.138	1.53	12.4	29 000	34 000	25 000	21 000	**AC-6000**	**ZZ**	**LLB**	**LLH**	**LLU**
10	30	9	0.6	5.65	2.39	0.182	2.39	13.2	25 000	30 000	21 000	18 000	**AC-6200**	**ZZ**	**LLB**	**LLH**	**LLU**
	35	11	0.6	9.10	3.50	0.273	2.98	11.4	23 000	27 000	20 000	16 000	**AC-6300**	**ZZ**	**LLB**	**LLH**	**LLU**
	28	8	0.3	5.65	2.39	0.182	1.73	13.2	26 000	30 000	21 000	18 000	**AC-6001JRX**	**ZZ**	**LLB**	**LLH**	**LLU**
12	32	10	0.6	6.75	2.75	0.214	2.75	12.7	22 000	26 000	20 000	16 000	**AC-6201**	**ZZ**	**LLB**	**LLH**	**LLU**
	37	12	1	10.8	4.20	0.325	3.00	11.1	20 000	24 000	19 000	15 000	**AC-6301**	**ZZ**	**LLB**	**LLH**	**LLU**
	32	9	0.3	6.20	2.83	0.199	2.43	13.9	22 000	26 000	18 000	15 000	**AC-6002**	**ZZ**	**LLB**	**LLH**	**LLU**
15	35	11	0.6	8.60	3.60	0.279	2.71	12.7	19 000	23 000	18 000	15 000	**AC-6202**	**ZZ**	**LLB**	**LLH**	**LLU**
	42	13	1	12.7	5.45	0.425	3.90	12.3	17 000	21 000	15 000	12 000	**AC-6302**	**ZZ**	**LLB**	**LLH**	**LLU**
	35	10	0.3	7.55	3.35	0.263	2.44	13.6	20 000	24 000	16 000	14 000	**AC-6003**	**ZZ**	**LLB**	**LLH**	**LLU**
17	40	12	0.6	10.6	4.60	0.243	3.50	12.8	18 000	21 000	15 000	12 000	**AC-6203**	**ZZ**	**LLB**	**LLH**	**LLU**
	47	14	1	15.0	6.55	0.355	5.10	12.2	16 000	19 000	14 000	11 000	**AC-6303**	**ZZ**	**LLB**	**LLH**	**LLU**
	42	12	0.6	10.4	5.05	0.355	3.80	13.9	18 000	21 000	13 000	11 000	**AC-6004**	**ZZ**	**LLB**	**LLH**	**LLU**
20	47	14	1	14.2	6.65	0.505	4.20	13.2	16 000	18 000	12 000	10 000	**AC-6204**	**ZZ**	**LLB**	**LLH**	**LLU**
	52	15	1.1	17.6	7.90	0.615	5.40	12.4	14 000	17 000	12 000	10 000	**AC-6304**	**ZZ**	**LLB**	**LLH**	**LLU**
	47	12	0.6	11.2	5.85	0.380	4.50	14.5	15 000	18 000	11 000	9 400	**AC-6005**	**ZZ**	**LLB**	**LLH**	**LLU**
25	52	15	1	15.5	7.85	0.550	5.80	13.9	13 000	15 000	11 000	8 900	**AC-6205**	**ZZ**	**LLB**	**LLH**	**LLU**
	62	17	1.1	23.5	10.9	0.855	7.30	12.6	12 000	14 000	9 700	8 100	**AC-6305**	**ZZ**	**LLB**	**LLH**	**LLU**
	55	13	1	14.7	8.30	0.650	6.85	14.8	13 000	15 000	9 200	7 700	**AC-6006**	**ZZ**	**LLB**	**LLH**	**LLU**
30	62	16	1	21.6	11.3	0.795	7.55	13.8	11 000	13 000	8 800	7 300	**AC-6206**	**ZZ**	**LLB**	**LLH**	**LLU**
	72	19	1.1	29.5	15.0	1.14	11.0	13.3	10 000	12 000	7 900	6 600	**AC-6306**	**ZZ**	**LLB**	**LLH**	**LLU**
	62	14	1	17.7	10.3	0.805	8.95	14.8	12 000	14 000	8 200	6 800	**AC-6007**	**ZZ**	**LLB**	**LLH**	**LLU**
35	72	17	1.1	28.4	15.3	1.09	9.65	13.8	9 800	11 000	7 600	6 300	**AC-6207**	**ZZ**	**LLB**	**LLH**	**LLU**
	80	21	1.5	37.0	19.1	1.47	13.4	13.1	8 800	10 000	7 300	6 000	**AC-6307**	**ZZ**	**LLB**	**LLH**	**LLU**
40	80	18	1.1	32.5	17.8	1.24	11.6	14.0	8 700	10 000	6 700	5 600	**AC-6208**	**ZZ**	**LLB**	**LLH**	**LLU**
	90	23	1.5	45.0	24.0	1.83	16.6	13.2	7 800	9 200	6 400	5 300	**AC-6308**	**ZZ**	**LLB**	**LLH**	**LLU**
45	85	19	1.1	36.0	20.4	1.60	14.7	14.1	7 800	9 200	6 200	5 200	**AC-6209**	**ZZ**	**LLB**	**LLH**	**LLU**
	100	25	1.5	58.5	32.0	2.50	21.8	13.1	7 000	8 200	5 600	4 700	**AC-6309**	**ZZ**	**LLB**	**LLH**	**LLU**

1) Smallest allowable dimension for chamfer dimension r. 2) This bearing number is for double sealed and double shielded type bearings, but single sealed and single shielded type are also available.



Installation-related dimensions mm				Mass kg
d_a		D_a	r_a	
Min.	Max.[3]	Max.	Max.	Open type (approx.)
12	13.5	24	0.3	0.019
14	16	26	0.6	0.031
14	17	31	0.6	0.051
14	16	26	0.3	0.021
16	17.5	28	0.6	0.036
17	18.5	32	1	0.058
17	19	30	0.3	0.029
19	20.5	31	0.6	0.043
20	23	37	1	0.079
19	21	33	0.3	0.037
21	23	36	0.6	0.062
22	25	42	1	0.11
24	26	38	0.6	0.066
25	28	42	1	0.101
26.5	28.5	45.5	1	0.139
29	30.5	43	0.6	0.075
30	32	47	1	0.122
31.5	35	55.5	1	0.223
35	37	50	1	0.11
35	39	57	1	0.191
36.5	43	65.5	1	0.334
40	42	57	1	0.148
41.5	45	65.5	1	0.277
43	47	72	1.5	0.44
46.5	51	73.5	1	0.352
48	54	82	1.5	0.609
51.5	55.5	78.5	1	0.391
53	61.5	92	1.5	0.8

Dynamic equivalent radial load

$P_r = XF_r + YF_a$

$\frac{f_0 \cdot F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leqq e$		$\frac{F_a}{F_r} > e$	
		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

Static equivalent radial load

$P_{0r} = 0.6F_r + 0.5F_a$

When $P_{0r} < F_r$ use $P_{0r} = F_r$.

3) This dimension applies to sealed and shielded bearings.