

The **NTN** ultra-thin section type ball bearings are bearings with an extremely thin design. There are three ultra-thin ball bearing types: radial, 4-point contact, and angular. Bearing seals are available for all types.

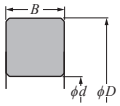
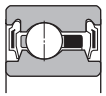
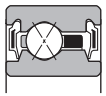
Each bearing type has different characteristics to best support a wide range of applications.

1. Types and features

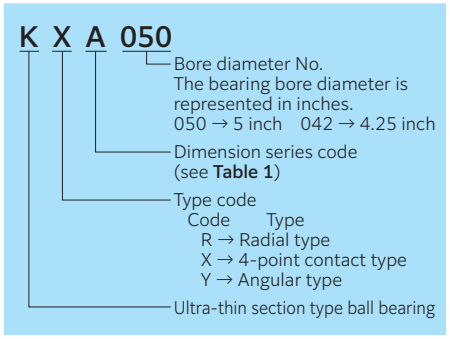
Table 1 shows the types and features of ultra-thin section type ball bearings, corresponding dimension series code, bearing cross section dimension, and bore diameter dimension range.

The dimension table (from C-60 to C-63) shows dimension series codes S and A, and H and J for bearings with seal.

Table 1 Types and features

Types				Dimension series code	Bearing cross section dimension mm	Bore diameter dimension range mm
Radial type	4-point contact type	Angular type				
					$\frac{D-d}{2} \times B$	d
Features: A deep groove is present in both the inner and outer rings of the bearing, allowing them to support radial and axial loads in either direction as well as the complex loads which result from the combination of these forces. Deep groove ball bearings are used in the most applications.	When inner and outer rings are loaded in the radial direction, the ball comes into contact with the inner and outer rings at four points. The bearings are generally suitable for two contact points under a simple axial load or a complex load with a large axial load.	Angular contact ball bearings have a straight line that runs through the point where each ball contacts the inner and outer rings at two points at 30° with respect to the radial direction. The bearings can receive a unidirectional axial load or a complex load of radial load and axial load. The ability to include an increased number of balls increases the load capacity of the bearing. These bearings are normally used in pairs for applications where it is necessary to control the axial movement via axial internal clearance or preload.		S	4.762 × 4.762	25.4– 38.1
				A	6.35 × 6.35	50.8– 304.8
				B	7.938 × 7.938	50.8– 508
				C	9.525 × 9.525	101.6– 762
				D	12.7 × 12.7	101.6– 762
				F	19.05 × 19.05	101.6–1 016
				G	25.4 × 25.4	101.6–1 016
With seal: —	—	 With single-seal		H	9.525 × 11.1	101.6– 304.8
 With double-seal	 With double-seal	—		J	9.525 × 12.7	101.6– 304.8

2. Part number



3. Accuracy and radial internal clearance

Table 2 and **Table 3** show the accuracy and radial internal clearance of ultra-thin section type ball bearings.

Table 2 Accuracy and radial internal clearance of radial type ball bearings

unit: μm

Bearing bore diameter No.	Tolerance and tolerance values: Mean bore diameter deviation Δ_{dmp}	Mean outside diameter deviation Δ_{Dmp}	Dimensional tolerance of inner ring and outer ring widths Δ_{Bs} Δ_{Cs}	Radial runout (Max.) Axial runout: Inner ring K_{ia} S_{ia}	Radial runout (Max.) Axial runout: Outer ring K_{ea} S_{ea}	Radial internal clearance
010	0 −10	0 −13	0 −125	13	20	25– 41
015	0 −13			15		30– 46
020 025	0 −15			20	25	30– 61
030 035		0 −15		25	30	41– 71
040 042 045	0 −20	0 −20			36	
047 050 055 060 065 070	0 −25	0 −25		30	41	51– 86
075 080 090	0 −30	0 −30		41	46	61–107
100 110 120	0 −36	0 −36		46	51	71–122
140	0 −41	0 −41	0 −250			81–132
160 180	0 −46	0 −46				91–142
200	0 −51	0 −51		51		102–152
250 300	0 −76	0 −76				152–203
350 400	0 −102	0 −102				203–254

Table 3 Accuracy and radial internal clearance of 4-point contact type/angular type ball bearings

unit: μm

Bearing bore diameter No.	Tolerance and tolerance values: Mean bore diameter deviation Δ_{dmp}	Mean outside diameter deviation Δ_{Dmp}	Dimensional tolerance of inner ring and outer ring widths Δ_{Bs} Δ_{Cs}	Radial runout (Max.) Axial runout: Inner ring K_{ia} S_{ia}	Radial runout (Max.) Axial runout: Outer ring K_{ea} S_{ea}	Radial internal clearance (4-point contact type)
010	0 −10	0 −13	0 −125	7.5	10	25– 38
015	0 −13			10		30– 43
020 025	0 −15			13	13	30– 56
030 035		0 −15		15	15	41– 66
040 042 045	0 −20	0 −20		20	20	
047 050 055 060 065 070	0 −25	0 −25		25	25	51– 76
075 080 090	0 −30	0 −30		30	30	61– 86
100 110 120	0 −36	0 −36		36	36	71– 97
140	0 −41	0 −41	0 −250	41	41	81–107
160 180 200	0 −46	0 −46		46	46	91–117
250 300	0 −51	0 −51		51	51	102–127
350 400	0 −102	0 −102		102	102	127–152

4. Dimensional tolerance of shaft and housing bores

Table 4 shows the recommended tolerance of shaft and housing bores when using ultra-thin section type ball bearings.

Table 4 Dimensional tolerance of shafts and housings unit: μm

Bearing bore diameter No.	For radial type ball bearings				For 4-point contact type/ angular type ball bearings			
	Inner ring rotation		Outer ring rotation		Inner ring rotation		Outer ring rotation	
	Shaft	Housing	Shaft	Housing	Shaft	Housing	Shaft	Housing
010	+10 0	+13 0	−10 −20	−13 −25	+10 0	+13 0	−10 −20	−13 −25
015	+13 0		−13 −25		+13 0		−13 −25	
020	+15 0	+15 0	−15 −30	−15 −30	+15 0		−15 −30	
025								
030						+15 0		−15 −30
035	+20 0		−20 −40		+20 0		−20 −40	
040								
042		+20 0		−20 −40		+20 0		
045								−20 −40
047	+25 0		−25 −50		+25 0		−25 −50	
050								
055		+25 0		−25 −50		+25 0		−25 −50
060								
065								
070		+30 0		−30 −60		+30 0		−30 −60
075	+30 0		−30 −60		+30 0		−30 −60	
080								
090								
100	+35 0	+35 0	−35 −70	−35 −70	+35 0	+35 0	−35 −70	−35 −70
110								
120								
140	+40 0	+40 0	−40 −80	−40 −80				
160	+45 0	+45 0	−45 −90	−45 −90	+40 0	+40 0	−40 −80	−40 −80
180								
200	+50 0	+50 0	−50 −100	−50 −100	+45 0	+45 0	−45 −90	−45 −90
250	+75 0	+75 0	−75 −150	−75 −150				
300								
350	+100 0	+100 0	−100 −200	−100 −200	+100 0	+100 0	−50 −100	−50 −100
400								

5. Installation-related dimensions of shafts and housings

Table 5 shows the installation-related dimensions of shafts and housings when using ultra-thin section type ball bearings.

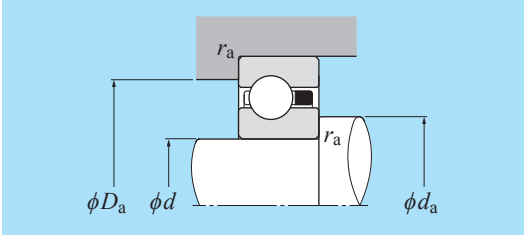
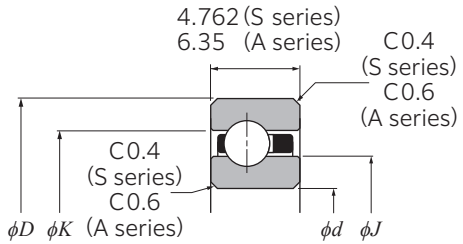


Table 5 Installation-related dimensions of shafts and housings unit: mm

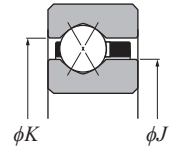
Dimension series code	d_a $d+f$ (Max.) $d+e$ (Min.)		D_a $d+h$ (Max.) $d+g$ (Min.)		r_{as} (Max.)
	e	f	g	h	
S	3.4	5.3	4.2	6.1	0.2
A	4.6	7.3	5.4	8.2	0.4
B	5.7	9.3	6.6	10.2	0.8
C	6.9	11.3	7.7	12.2	0.8
D	9.2	15.3	10.1	16.2	1.3
F	13.9	23.3	14.8	24.2	1.8
G	18.7	31.3	19.5	32.1	1.8
J,H [1)]	6.9	11.3	7.7	12.2	0.2

1) Bearings with seal

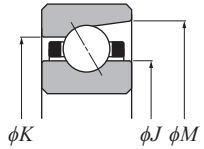
S series
A series



Radial type



4-point contact type



Angular type

d 25.4–304.8 mm

Boundary dimensions mm		Radial type			4-point contact type					Angular type				
		Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Basic load rating dynamic kN	Basic load rating static kN	Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Basic load rating dynamic kN	Basic load rating static kN	Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN
		Radial			Radial		Axial			Radial		Axial		
d	D	C_r	C_{0r}	C_u	C_r	C_{0r}	C_a	C_{0a}	C_u	C_r	C_{0r}	C_a	C_{0a}	C_u
25.4	34.925	2.75	1.94	0.084	2.40	1.66	3.15	5.05	0.181	2.91	2.21	3.80	6.70	0.147
38.1	47.625	3.10	2.60	0.112	2.71	2.23	3.55	6.75	0.243	3.35	3.10	4.40	9.35	0.205
50.8	63.5	5.00	4.30	0.186	4.35	3.70	5.70	11.2	0.400	5.25	4.95	6.90	14.9	0.325
63.5	76.2	5.40	5.20	0.224	4.70	4.45	6.15	13.5	0.485	5.65	5.95	7.45	18.1	0.395
76.2	88.9	5.75	6.10	0.263	5.00	5.25	6.55	15.9	0.570	6.05	7.00	7.95	21.2	0.465
88.9	101.6	6.05	7.00	0.300	5.25	6.00	6.90	18.2	0.655	6.35	8.00	8.35	24.3	0.530
101.6	114.3	6.35	7.85	0.325	5.50	6.80	7.25	20.6	0.710	6.65	9.05	8.75	27.4	0.580
107.95	120.65	6.50	8.30	0.335	5.60	7.15	7.40	21.7	0.730	6.80	9.55	8.95	29.0	0.595
114.3	127	6.60	8.75	0.345	5.75	7.55	7.55	22.9	0.750	6.95	10.1	9.15	30.5	0.610
120.65	133.35	6.75	9.20	0.350	5.85	7.95	7.70	24.1	0.765	7.10	10.6	9.30	32.0	0.625
127	139.7	6.85	9.65	0.360	5.95	8.35	7.85	25.2	0.785	7.20	11.1	9.50	33.5	0.640
139.7	152.4	7.10	10.5	0.375	6.15	9.10	8.10	27.6	0.820	7.45	12.1	9.80	37.0	0.665
152.4	165.1	7.35	11.4	0.390	6.35	9.85	8.35	29.9	0.855	7.70	13.2	10.1	40.0	0.695
165.1	177.8	7.55	12.3	0.405	6.55	10.6	8.60	32.0	0.885	7.90	14.2	10.4	43.0	0.720
177.8	190.5	7.75	13.2	0.420	6.70	11.4	8.80	34.5	0.915	8.10	15.2	10.7	46.0	0.745
190.5	203.2	7.95	14.1	0.435	6.85	12.2	9.05	37.0	0.945	8.30	16.2	10.9	49.0	0.770
203.2	215.9	8.10	15.0	0.445	7.05	13.0	9.25	38.0	0.975	8.50	17.3	11.2	52.5	0.790
228.6	241.3	8.45	16.8	0.470	7.35	14.5	9.65	44.0	1.03	8.90	19.3	11.7	58.5	0.835
254	266.7	8.80	18.6	0.495	7.60	16.0	10.0	48.5	1.08	9.20	21.4	12.1	65.0	0.880
279.4	292.1	8.10	20.3	0.520	7.90	17.6	10.4	53.5	1.13	9.55	23.4	12.6	71.0	0.920
304.8	317.5	9.40	22.1	0.540	8.15	19.1	10.7	58.0	1.18	9.85	25.5	13.0	77.5	0.960

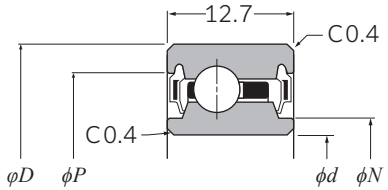
Bearing number			Reference dimensions mm			Mass kg	
Radial type	4-point contact type	Angular type	J	K	M	Radial type / 4-point contact type (approx.)	Angular type
KRS010	**KXS**	**KYS**	29	31.4	32.6	0.012	0.011
KRS015	**KXS**	**KYS**	41.7	44.1	45.2	0.018	0.017
KRA020	**KXA**	**KYA**	55.5	58.8	60.3	0.048	0.045
KRA025	**KXA**	**KYA**	68.2	71.5	73	0.059	0.054
KRA030	**KXA**	**KYA**	80.9	84.2	85.7	0.068	0.064
KRA035	**KXA**	**KYA**	93.6	96.9	98.4	0.082	0.077
KRA040	**KXA**	**KYA**	106.3	109.6	111	0.09	0.086
KRA042	**KXA**	**KYA**	112.7	115.9	117.4	0.095	0.091
KRA045	**KXA**	**KYA**	119	122.3	123.7	0.1	0.095
KRA047	**KXA**	**KYA**	125.4	128.6	130.1	0.104	0.1
KRA050	**KXA**	**KYA**	131.7	135	136.4	0.109	0.104
KRA055	**KXA**	**KYA**	144.4	147.7	149.1	0.118	0.113
KRA060	**KXA**	**KYA**	157.1	160.4	161.8	0.13	0.127
KRA065	**KXA**	**KYA**	169.8	173.1	174.5	0.14	0.136
KRA070	**KXA**	**KYA**	182.5	185.8	187.1	0.15	0.145
KRA075	**KXA**	**KYA**	195.2	198.5	199.8	0.16	0.154
KRA080	**KXA**	**KYA**	207.9	211.2	212.5	0.172	0.163
KRA090	**KXA**	**KYA**	233.3	236.6	237.9	0.2	0.186
KRA100	**KXA**	**KYA**	258.7	262	263.2	0.227	0.204
KRA110	**KXA**	**KYA**	284.1	287.4	288.6	0.236	0.227
KRA120	**KXA**	**KYA**	309.5	312.8	314	0.254	0.245

Note: The upper two rows indicate the **S** series, and the other rows indicate the **A** series.

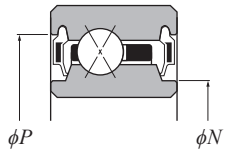
Ultra-Thin Section Type Ball Bearings
NTN

Special Application Bearings

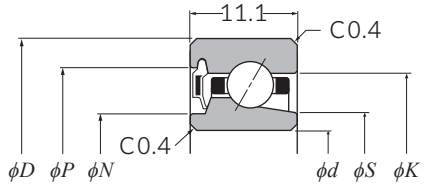
H series (with single-seal)
J series (with double-seal)



Radial type
(with double-seal)



4-point contact type
(with double-seal)



Angular type
(with single-seal)

d 101.6–304.8 mm

Boundary dimensions mm		Radial type			4-point contact type					Angular type				
		Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Basic load rating dynamic kN	Basic load rating static kN	Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN	Basic load rating dynamic kN	Basic load rating static kN	Basic load rating dynamic kN	Basic load rating static kN	Fatigue load limit kN
		Radial			Radial		Axial			Radial		Axial		
d	*D*	C_r	C_{0r}	C_u	C_r	C_{0r}	C_a	C_{0a}	C_u	C_r	C_{0r}	C_a	C_{0a}	C_u
101.6	120.65	11.4	12.4	0.505	9.90	10.6	13.1	32.0	1.10	12.4	14.9	16.3	45.0	0.935
107.95	127	11.7	13.0	0.520	10.1	11.2	13.3	34.0	1.13	12.7	15.8	16.7	48.0	0.965
114.3	133.35	11.9	13.7	0.530	10.3	11.8	13.6	35.5	1.15	13.0	16.6	17.1	50.5	0.990
120.65	139.7	12.1	14.4	0.545	10.5	12.4	13.9	37.5	1.18	13.3	17.5	17.5	53.0	1.02
127	146.05	12.4	15.0	0.555	10.7	12.9	14.1	39.0	1.21	13.5	18.4	17.8	55.5	1.04
139.7	158.75	12.8	16.4	0.580	11.1	14.1	14.6	42.5	1.26	13.9	19.8	18.3	60.0	1.08
152.4	171.45	13.2	17.7	0.600	11.4	15.3	15.0	46.5	1.31	14.4	21.5	18.9	65.5	1.12
165.1	184.15	13.6	19.1	0.620	11.7	16.4	15.5	50.0	1.35	14.8	23.3	19.5	70.5	1.17
177.8	196.85	13.9	20.4	0.640	12.1	17.6	15.9	53.5	1.40	15.1	24.7	19.9	75.0	1.20
190.5	209.55	14.3	21.7	0.660	12.3	18.7	16.2	57.0	1.44	15.5	26.5	20.5	80.0	1.24
203.2	222.25	14.6	23.1	0.680	12.6	19.9	16.7	60.5	1.48	15.9	28.2	21.0	85.5	1.28
228.6	247.65	15.2	25.7	0.720	13.2	22.2	17.3	67.5	1.57	16.6	31.5	21.8	95.0	1.35
254	273.05	15.8	28.4	0.755	13.7	24.5	18.0	74.5	1.64	17.3	35.0	22.7	106	1.43
279.4	298.45	16.3	31.0	0.790	14.1	26.8	18.6	81.5	1.72	17.8	38.0	23.5	115	1.49
304.8	323.85	16.8	34.0	0.820	14.6	29.2	19.2	88.5	1.79	18.4	41.0	24.2	125	1.54

Bearing number			Reference dimensions mm				Mass kg	
Radial type	4-point contact type	Angular type	*N*	*P*	*S*	*K*	Radial type 4-point contact type (approx.)	Angular type
KRJ040LL	**KXJ**	**KYH**	105.5	115.9	106.2	113.6	0.249	0.222
KRJ042LL	**KXJ**	**KYH**	111.8	122.2	112.6	120	0.263	0.236
KRJ045LL	**KXJ**	**KYH**	118.2	128.6	119.1	126.3	0.277	0.254
KRJ047LL	**KXJ**	**KYH**	124.6	135	125.3	132.7	0.295	0.268
KRJ050LL	**KXJ**	**KYH**	130.9	141.3	131.7	139	0.308	0.281
KRJ055LL	**KXJ**	**KYH**	143.6	154	144.4	151.7	0.336	0.304
KRJ060LL	**KXJ**	**KYH**	156.3	166.7	157.1	164.4	0.367	0.331
KRJ065LL	**KXJ**	**KYH**	169	179.4	169.8	177.1	0.395	0.354
KRJ070LL	**KXJ**	**KYH**	181.7	192.1	182.4	189.8	0.422	0.381
KRJ075LL	**KXJ**	**KYH**	194.4	204.8	195.2	202.5	0.45	0.404
KRJ080LL	**KXJ**	**KYH**	207.1	217.5	207.9	215.2	0.481	0.431
KRJ090LL	**KXJ**	**KYH**	232.5	242.9	233.4	240.6	0.535	0.5
KRJ100LL	**KXJ**	**KYH**	257.9	268.3	258.8	266	0.594	0.531
KRJ110LL	**KXJ**	**KYH**	283.3	293.7	284.2	291.4	0.648	0.581
KRJ120LL	**KXJ**	**KYH**	308.7	319.1	309.7	316.8	0.708	0.63

Ultra-Thin Section Type Ball Bearings
NTN

Special Application Bearings