

## 7. BOUNDARY DIMENSIONS AND IDENTIFYING NUMBERS FOR BEARINGS

### 7.1 Boundary Dimensions and Dimensions of Snap Ring Grooves

#### 7.1.1 Boundary Dimensions

The boundary dimensions of rolling bearings, which are shown in Figs.7.1 through 7.5, are the dimensions that define their external geometry. They include bore diameter  $d$ , outside diameter  $D$ , width  $B$ , bearing width(or height)  $T$ , chamfer dimension  $r$ , etc. It is necessary to know all of these dimensions when mounting a bearing on a shaft and in a housing. These boundary dimensions have been internationally standardized (ISO15) and adopted by JIS B 1512 (Boundary Dimensions of Rolling Bearings).

The boundary dimensions and dimension series of radial bearings, tapered roller bearings, and thrust bearings are listed in Table 7.1 to 7.3 (Pages A40 to A49).

In these boundary dimension tables, for each bore number, which prescribes the bore diameter, other boundary dimensions are listed for each diameter series and dimension series. A very large number of series are possible; however, not all of them are commercially available so more can be added in the future. Across the top of each bearing table (7.1 to 7.3), representative bearing types and series symbols are shown (refer to Table 7.5, Bearing Series Symbols, Page A55).

The relative cross-sectional dimensions of radial bearings (except tapered roller bearings) and thrust bearings for the various series classifications are shown in Figs. 7.6 and 7.7 respectively.

### 7.1.2 Dimensions of Snap Ring Grooves and Locating Snap Rings

The dimensions of Snap ring grooves in the outer surfaces of bearings are specified by ISO 464. Also, the dimensions and accuracy of the locating snap rings themselves are specified by ISO 464. The dimensions of snap ring grooves and locating snap ring for bearings of diameter series 8, 9, 0, 2, 3, and 4, are shown in Table 7.4 (Pages A50 to A53).

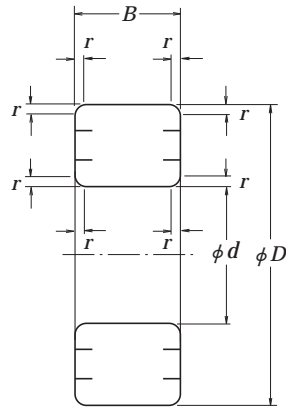


Fig. 7.1 Boundary Dimensions of Radial Ball and Roller Bearings

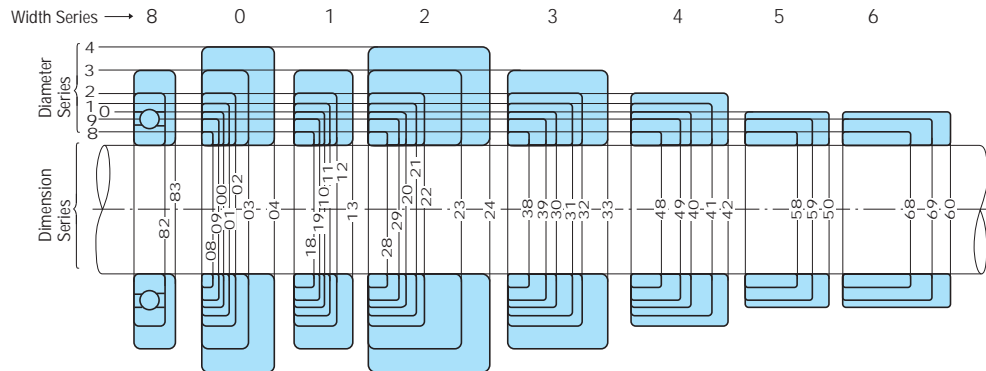


Fig. 7.6 Comparison of Cross Sections of Radial Bearings (except Tapered Roller Bearings) for various Dimensional Series

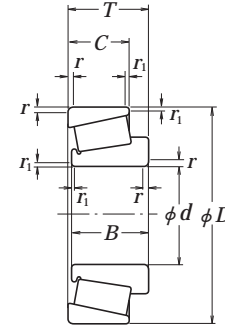


Fig. 7.2 Tapered Roller Bearings

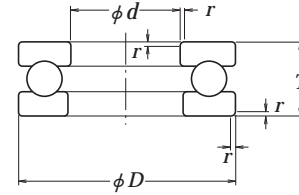


Fig. 7.3 Single-Direction Thrust Ball Bearings

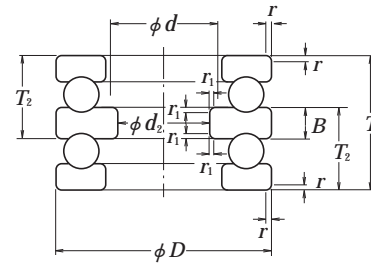


Fig. 7.4 Double-Direction Thrust Ball Bearings

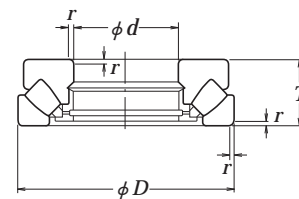


Fig. 7.5 Spherical Thrust Roller Bearings

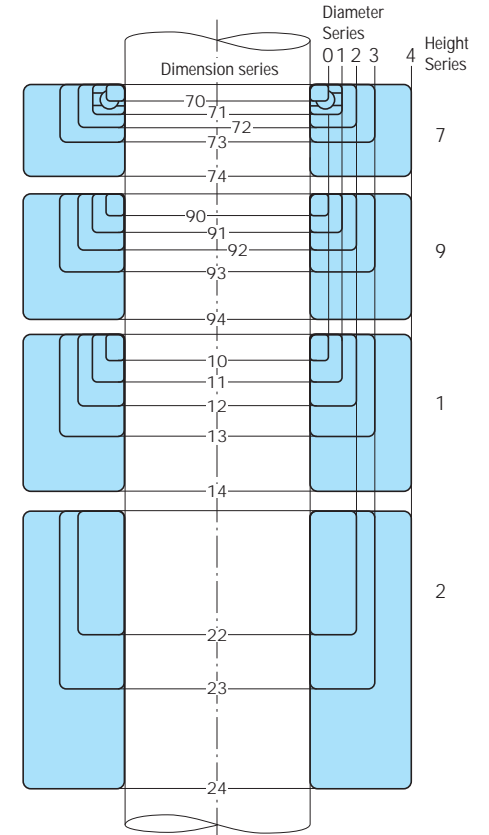


Fig. 7.7 Comparison of Cross Sections of Thrust Bearings (except Diameter Series 5) for Various Dimension Series





Table 7. 2 Boundary Dimensions of

Tapered Roller Bearings

Units: mm

Tapered Roller Brgs.	329										320 X			330			331																				
	Bore Number	d	Diameter Series 9							Diameter Series 0						Diameter Series 1																					
			Dimension Series 29					Chamfer Dimension	Cone	Cup	Dimension Series			Chamfer Dimension	Cone	Cup																					
			I	II	r (min.)						20	30	r (min.)				31	r (min.)																			
00 01 02	10 12 15	—	—	—	—	—	—	—	—	28	11	—	11	13	—	13	0.3	0.3	—	—	—	—	—	—	—	—	—	—									
03 04 22	17 20 22	—	—	—	11.6	12	9	12	0.3	0.3	35	13	—	13	15	—	15	0.3	0.3	—	—	—	—	—	—	—	—	—	—								
05 28 06	25 28 45	11	—	—	11.6	12	9	12	0.3	0.3	47	15	11.5	15	17	14	17	0.6	0.6	—	—	—	—	—	—	—	—	—	—								
32 07 08	32 35 62	—	—	—	15	10	14	0.6	0.6	58	17	13	17	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—									
09 10 11	45 50 55	14	—	—	15	15	12	15	0.6	0.6	75	20	15.5	20	24	19	24	1	1	80	26	20.5	26	1.5	1.5	85	26	20	26	1.5	1.5	95	30	23	30	1.5	1.5
12 13 14	60 65 70	85	16	—	17	17	14	17	1	1	95	23	17.5	23	27	21	27	1.5	1.5	100	30	23	30	1.5	1.5	110	34	26.5	34	1.5	1.5	120	37	29	37	2	1.5
15 16 17	75 80 85	105 19	—	20	20	16	20	1	1	115	25	19	25	31	25.5	31	1.5	1.5	125	37	29	37	2	1.5	130	37	29	37	2	1.5	140	41	32	41	2.5	2	
18 19 20	90 95 100	125 22	—	23	23	18	23	1.5	1.5	140	32	24	32	39	32.5	39	2	1.5	150	45	35	45	2.5	2	160	49	38	49	2.5	2	165	52	40	52	2.5	2	
21 22 24	105 110 120	145 24	—	25	25	20	25	1.5	1.5	160	35	26	35	43	34	43	2.5	2	175	56	44	56	2.5	2	180	56	43	56	2.5	2	200	62	48	62	2.5	2	
26 28 30	130 140 150	180 30	—	32	32	25	32	2	1.5	200	45	34	45	55	43	55	2.5	2	—	—	—	—	—	—	—	—	—	—	—	—							
32 34 36	160 170 180	220 36	—	38	38	30	38	2.5	2	240	51	38	51	—	—	—	3	2.5	—	—	—	—	—	—	—	—	—	—	—	—							
38 40 44	190 200 220	260 42	—	45	45	34	45	2.5	2	290	64	48	64	—	—	—	3	2.5	—	—	—	—	—	—	—	—	—	—	—	—							
48 52 56	240 260 280	320 48	—	51	51	39	51	3	2.5	360	76	57	76	—	—	—	4	3	—	—	—	—	—	—	—	—	—	—	—	—							
60 64 68 72	300 320 340 360	420 48	—	—	—	76	57	76	4	3	460	100	74	100	—	—	—	5	4	—	—	—	—	—	—	—	—	—	—	—	—						

Tapered Roller Brgs.	302									322			332			303 or 303D				313			323				Tapered Roller Brgs.	
	Bore Number	d	Diameter Series 2						Diameter Series 3																			
			Dimension Series 02			Dimension Series 22			Dimension Series 32			Chamfer Dimension	Cone	Cup	Dimension Series 03				Dimension Series 13			Dimension Series 23			Chamfer Dimension	Cone		Cup
			B	C	T	B	C	T	B	C	T				r (min.)	B	C	T	B	C	T	B	C	T				
30 32 35	9 10 11	—	—	—	9.7	14	—	14.7	—	—	—	0.6	0.6	35	11	—	—	11.9	—	—	—	17	—	17.9	0.6	0.6	10 12 15	00 01 02
40 47 50	12 14 14	—	—	—	13.25	16	14	17.25	—	—	—	1	1	47	14	12	—	15.25	—	—	—	19	16	20.25	1	1	17 20 22	03 04 22
52 58 62	15 16 16	—	—	—	15.25	18	15	19.25	—	—	—	0.6	0.6	52	15	13	—	16.25	—	—	—	24	20	25.75	1.5	1.5	25 28 28	05 06 28
65 72 80	17 18 18	—	—	—	18.25	21	18	22.25	26	20.5	26	1	1	75	20	17	15	21.75	—	—	—	28	24	29.75	1.5	1.5	32 35 40	32 07 08
85 90 100	19 20 21	—	—	—	20.75	23	19	24.75	32	25	32	1.5	1.5	100	25	22	18	27.25	—	—	—	36	30	38.25	2	1.5	45 50 55	09 10 11
110 120 125	22 23 24	—	—	—	23.75	28	24	29.75	38	29	38	2	1.5	130	31	26	22	33.5	—	—	—	46	37	48.5	3	2.5	60 65 70	12 13 14
130 140 150	25 26 28	—	—	—	27.25	31	27	33.25	41	31	41	2	1.5	160	37	31	26	40	—	—	—	55	45	58	3	2.5	75 80 85	15 16 17
160 170 180	30 32 34	—	—	—	32.5	40	34	42.5	55	42	55	2.5	2	190	43	36	30	46.5	—	—	—	64	53	67.5	4	3	90 95 100	18 19 20
190 200 215	36 38 40	—	—	—	43.75	54	43	53	68	52	68	3	2.5	225	49	41	—	53.5	53	36	58	77	63	81.5	4	3	105 110 120	21 22 24
230 250 270	40 42 45	—	—	—	47.75	64	54	67.75	—	—	—	4	3	280	58	49	—	63.75	66	44	72	93	78	98.75	5	4	130 140 150	26 28 30
290 310 320	48 52 52	—	—	—	57	80	67	84	—	—	—	5	4	340	68	58	—	75	79	—	87	114	95	121	5	4	160 170 180	32 34 36
340 360 400	55 58 65	—	—	—	60	92	75	97	—	—	—	5	4	400	78	65	—	86	92	—	101	132	109	140	6	5	190 200 220	38 40 44
440 480 500	72 80 80	—	—	—	89	130	106	137	—	—	—	6	5	500	95	80	—	105	114	—	125	155	132	165	6	5	240 260 280	48 52 56
540 580	85 92	—	—	—	104	150	125	159	—	—	—	6	5	—	—	—	—	—	—	—	—	—	—	—	—	—	300 320 340 360	60 64 68 72

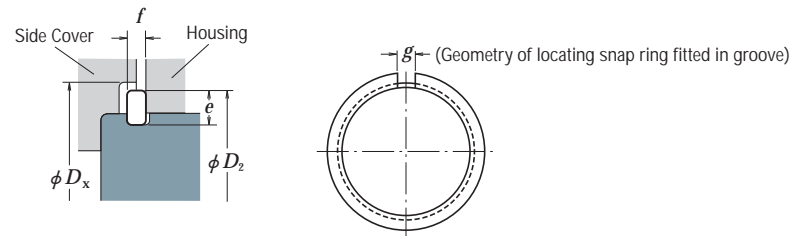
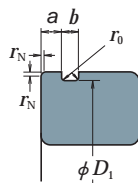
Remarks 1. Other series not conforming to this table are also specified by ISO.  
 2. In the Dimension Series of Diameter Series 9, Classification I is those specified by the old standard, Classification II is those specified by the ISO.  
 2. Dimension Series not classified conform to dimensions (D, B, C, T) specified by ISO.  
 3. The chamfer dimensions listed are the minimum permissible dimensions specified by ISO. They do not apply to chamfers on the front face.

Note (1) Regarding steep-slope bearing 303D, in DIN, the one corresponding to 303D of JIS is numbered 313. For bearings with bore diameters larger than 100 mm, those of dimension series 13 are numbered 313.





Table 7. 4 Dimensions of Snap Ring Grooves and Locating Snap Rings — (1)  
Bearings of Dimension Series 18 and 19



Units: mm

Applicable Bearings		Snap Ring Groove									
Dimension Series	<i>d</i>	<i>D</i>	Snap Ring Groove Diameter		Snap Ring Groove Position <i>a</i>				Snap Ring Groove Width		Radius of Bottom Corners <i>r<sub>0</sub></i>
			<i>D<sub>1</sub></i>		Bearing Dimension Series				<i>b</i>		
			max.	min.	18		19		max.	min.	
—	10	22	20.8	20.5	—	—	1.05	0.9	1.05	0.8	0.2
—	12	24	22.8	22.5	—	—	1.05	0.9	1.05	0.8	0.2
—	15	28	26.7	26.4	—	—	1.3	1.15	1.2	0.95	0.25
—	17	30	28.7	28.4	—	—	1.3	1.15	1.2	0.95	0.25
20	—	32	30.7	30.4	1.3	1.15	—	—	1.2	0.95	0.25
22	—	34	32.7	32.4	1.3	1.15	—	—	1.2	0.95	0.25
25	20	37	35.7	35.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
—	22	39	37.7	37.4	—	—	1.7	1.55	1.2	0.95	0.25
28	—	40	38.7	38.4	1.3	1.15	—	—	1.2	0.95	0.25
30	25	42	40.7	40.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
32	—	44	42.7	42.4	1.3	1.15	—	—	1.2	0.95	0.25
—	28	45	43.7	43.4	—	—	1.7	1.55	1.2	0.95	0.25
35	30	47	45.7	45.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
40	32	52	50.7	50.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
—	35	55	53.7	53.4	—	—	1.7	1.55	1.2	0.95	0.25
45	—	58	56.7	56.4	1.3	1.15	—	—	1.2	0.95	0.25
—	40	62	60.7	60.3	—	—	1.7	1.55	1.2	0.95	0.25
50	—	65	63.7	63.3	1.3	1.15	—	—	1.2	0.95	0.25
—	45	68	66.7	66.3	—	—	1.7	1.55	1.2	0.95	0.25
55	50	72	70.7	70.3	1.7	1.55	1.7	1.55	1.2	0.95	0.25
60	—	78	76.2	75.8	1.7	1.55	—	—	1.6	1.3	0.4
—	55	80	77.9	77.5	—	—	2.1	1.9	1.6	1.3	0.4
65	60	85	82.9	82.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4
70	65	90	87.9	87.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4
75	—	95	92.9	92.5	1.7	1.55	—	—	1.6	1.3	0.4
80	70	100	97.9	97.5	1.7	1.55	2.5	2.3	1.6	1.3	0.4
—	75	105	102.6	102.1	—	—	2.5	2.3	1.6	1.3	0.4
85	80	110	107.6	107.1	2.1	1.9	2.5	2.3	1.6	1.3	0.4
90	—	115	112.6	112.1	2.1	1.9	—	—	1.6	1.3	0.4
95	85	120	117.6	117.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
100	90	125	122.6	122.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
105	95	130	127.6	127.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
110	100	140	137.6	137.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
—	105	145	142.6	142.1	—	—	3.3	3.1	2.2	1.9	0.6
120	110	150	147.6	147.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
130	120	165	161.8	161.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
140	—	175	171.8	171.3	3.3	3.1	—	—	2.2	1.9	0.6
—	130	180	176.8	176.3	—	—	3.7	3.5	2.2	1.9	0.6
150	140	190	186.8	186.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
160	—	200	196.8	196.3	3.3	3.1	—	—	2.2	1.9	0.6

Locating Snap Ring Number	Cross Sectional Height		Thickness		Geometry of snap ring fitted in groove (Reference)		Stepped Bore Diameter (Reference) <i>D<sub>x</sub></i>
	<i>e</i>		<i>f</i>		Slit Width <i>g</i>	Snap Ring Outside Diameter <i>D<sub>2</sub></i>	
	max.	min.	max.	min.			
NR 1022	2.0	1.85	0.7	0.6	2	24.8	25.5
NR 1024	2.0	1.85	0.7	0.6	2	26.8	27.5
NR 1028	2.05	1.9	0.85	0.75	3	30.8	31.5
NR 1030	2.05	1.9	0.85	0.75	3	32.8	33.5
NR 1032	2.05	1.9	0.85	0.75	3	34.8	35.5
NR 1034	2.05	1.9	0.85	0.75	3	36.8	37.5
NR 1037	2.05	1.9	0.85	0.75	3	39.8	40.5
NR 1039	2.05	1.9	0.85	0.75	3	41.8	42.5
NR 1040	2.05	1.9	0.85	0.75	3	42.8	43.5
NR 1042	2.05	1.9	0.85	0.75	3	44.8	45.5
NR 1044	2.05	1.9	0.85	0.75	4	46.8	47.5
NR 1045	2.05	1.9	0.85	0.75	4	47.8	48.5
NR 1047	2.05	1.9	0.85	0.75	4	49.8	50.5
NR 1052	2.05	1.9	0.85	0.75	4	54.8	55.5
NR 1055	2.05	1.9	0.85	0.75	4	57.8	58.5
NR 1058	2.05	1.9	0.85	0.75	4	60.8	61.5
NR 1062	2.05	1.9	0.85	0.75	4	64.8	65.5
NR 1065	2.05	1.9	0.85	0.75	4	67.8	68.5
NR 1068	2.05	1.9	0.85	0.75	5	70.8	72
NR 1072	2.05	1.9	0.85	0.75	5	74.8	76
NR 1078	3.25	3.1	1.12	1.02	5	82.7	84
NR 1080	3.25	3.1	1.12	1.02	5	84.4	86
NR 1085	3.25	3.1	1.12	1.02	5	89.4	91
NR 1090	3.25	3.1	1.12	1.02	5	94.4	96
NR 1095	3.25	3.1	1.12	1.02	5	99.4	101
NR 1100	3.25	3.1	1.12	1.02	5	104.4	106
NR 1105	4.04	3.89	1.12	1.02	5	110.7	112
NR 1110	4.04	3.89	1.12	1.02	5	115.7	117
NR 1115	4.04	3.89	1.12	1.02	5	120.7	122
NR 1120	4.04	3.89	1.12	1.02	7	125.7	127
NR 1125	4.04	3.89	1.12	1.02	7	130.7	132
NR 1130	4.04	3.89	1.12	1.02	7	135.7	137
NR 1140	4.04	3.89	1.7	1.6	7	145.7	147
NR 1145	4.04	3.89	1.7	1.6	7	150.7	152
NR 1150	4.04	3.89	1.7	1.6	7	155.7	157
NR 1165	4.85	4.7	1.7	1.6	7	171.5	173
NR 1175	4.85	4.7	1.7	1.6	10	181.5	183
NR 1180	4.85	4.7	1.7	1.6	10	186.5	188
NR 1190	4.85	4.7	1.7	1.6	10	196.5	198
NR 1200	4.85	4.7	1.7	1.6	10	206.5	208

Remarks The minimum permissible chamfer dimensions *r<sub>N</sub>* on the snap-ring-groove side of the outer rings are as follows:

Dimension series 18 : For outside diameters of 78mm and less, use 0.3mm chamfer.

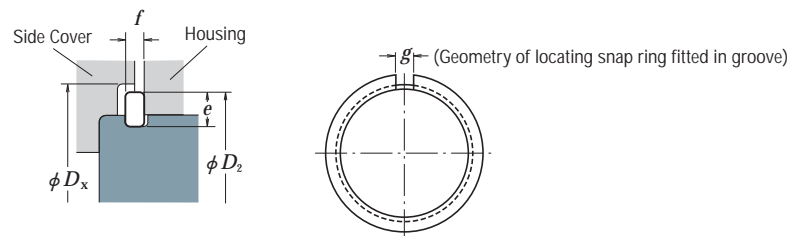
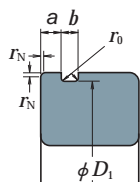
For all others exceeding 78mm, use 0.5mm chamfer.

Dimension series 19 : For outside diameters of 24mm and less, use 0.2mm chamfer.

For 47mm and less, use 0.3mm chamfer.

For all others exceeding 47mm, use 0.5mm chamfer (However, for an outside diameter of 68 mm, use a 0.3 mm chamfer, which is not compliant with ISO 15).

Table 7. 4 Dimensions of Snap Ring Grooves and Locating Snap Rings — (2)  
Bearing of Diameter Series 0, 2, 3, and 4



Units: mm

Applicable Bearings				Snap Ring Groove									
<i>d</i>				<i>D</i>	Snap Ring Groove Diameter <i>D</i> <sub>1</sub>		Snap Ring Groove Position <i>a</i>				Snap Ring Groove Width <i>b</i>		Radius of Bottom Corners <i>r</i> <sub>0</sub>
							Bearing Diameter Series						
							0		2, 3, 4				
Diameter Series				max.	min.	max.	min.	max.	min.	max.	min.	max.	
10	—	—	—	<b>26</b>	24.5	24.25	1.35	1.19	—	—	1.17	0.87	0.2
12	—	—	—	<b>28</b>	26.5	26.25	1.35	1.19	—	—	1.17	0.87	0.2
—	10	9	8	<b>30</b>	28.17	27.91	—	—	2.06	1.9	1.65	1.35	0.4
15	12	—	9	<b>32</b>	30.15	29.9	2.06	1.9	2.06	1.9	1.65	1.35	0.4
17	15	10	—	<b>35</b>	33.17	32.92	2.06	1.9	2.06	1.9	1.65	1.35	0.4
—	—	12	10	<b>37</b>	34.77	34.52	—	—	2.06	1.9	1.65	1.35	0.4
—	—	17	—	<b>40</b>	38.1	37.85	—	—	2.06	1.9	1.65	1.35	0.4
20	—	15	12	<b>42</b>	39.75	39.5	2.06	1.9	2.06	1.9	1.65	1.35	0.4
22	—	—	—	<b>44</b>	41.75	41.5	2.06	1.9	—	—	1.65	1.35	0.4
25	20	17	—	<b>47</b>	44.6	44.35	2.06	1.9	2.46	2.31	1.65	1.35	0.4
—	22	—	—	<b>50</b>	47.6	47.35	—	—	2.46	2.31	1.65	1.35	0.4
28	25	20	15	<b>52</b>	49.73	49.48	2.06	1.9	2.46	2.31	1.65	1.35	0.4
30	—	—	—	<b>55</b>	52.6	52.35	2.08	1.88	—	—	1.65	1.35	0.4
—	—	22	—	<b>56</b>	53.6	53.35	—	—	2.46	2.31	1.65	1.35	0.4
32	28	—	—	<b>58</b>	55.6	55.35	2.08	1.88	2.46	2.31	1.65	1.35	0.4
35	30	25	17	<b>62</b>	59.61	59.11	2.08	1.88	3.28	3.07	2.2	1.9	0.6
—	32	—	—	<b>65</b>	62.6	62.1	—	—	3.28	3.07	2.2	1.9	0.6
40	—	28	—	<b>68</b>	64.82	64.31	2.49	2.29	3.28	3.07	2.2	1.9	0.6
—	35	30	20	<b>72</b>	68.81	68.3	—	—	3.28	3.07	2.2	1.9	0.6
45	—	32	—	<b>75</b>	71.83	71.32	2.49	2.29	3.28	3.07	2.2	1.9	0.6
50	40	35	25	<b>80</b>	76.81	76.3	2.49	2.29	3.28	3.07	2.2	1.9	0.6
—	45	—	—	<b>85</b>	81.81	81.31	—	—	3.28	3.07	2.2	1.9	0.6
55	50	40	30	<b>90</b>	86.79	86.28	2.87	2.67	3.28	3.07	3	2.7	0.6
60	—	—	—	<b>95</b>	91.82	91.31	2.87	2.67	—	—	3	2.7	0.6
65	55	45	35	<b>100</b>	96.8	96.29	2.87	2.67	3.28	3.07	3	2.7	0.6
70	60	50	40	<b>110</b>	106.81	106.3	2.87	2.67	3.28	3.07	3	2.7	0.6
75	—	—	—	<b>115</b>	111.81	111.3	2.87	2.67	—	—	3	2.7	0.6
—	65	55	45	<b>120</b>	115.21	114.71	—	—	4.06	3.86	3.4	3.1	0.6
80	70	—	—	<b>125</b>	120.22	119.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6
85	75	60	50	<b>130</b>	125.22	124.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6
90	80	65	55	<b>140</b>	135.23	134.72	3.71	3.45	4.9	4.65	3.4	3.1	0.6
95	—	—	—	<b>145</b>	140.23	139.73	3.71	3.45	—	—	3.4	3.1	0.6
100	85	70	60	<b>150</b>	145.24	144.73	3.71	3.45	4.9	4.65	3.4	3.1	0.6
105	90	75	65	<b>160</b>	155.22	154.71	3.71	3.45	4.9	4.65	3.4	3.1	0.6
110	95	80	—	<b>170</b>	163.65	163.14	3.71	3.45	5.69	5.44	3.8	3.5	0.6
120	100	85	70	<b>180</b>	173.66	173.15	3.71	3.45	5.69	5.44	3.8	3.5	0.6
—	105	90	75	<b>190</b>	183.64	183.13	—	—	5.69	5.44	3.8	3.5	0.6
130	110	95	80	<b>200</b>	193.65	193.14	5.69	5.44	5.69	5.44	3.8	3.5	0.6

Note (1) The locating snap rings and snap ring grooves of these bearings are not specified by ISO.  
 Remarks 1. The dimensions of these snap ring grooves are not applicable to bearings of dimension series 00, 82, and 83.  
 2. The minimum permissible chamfer dimension *r*<sub>N</sub> on the snap-ring side of outer rings is 0.5mm. However, for bearings of diameter series 0 having outside diameters 35mm and below, it is 0.3mm.

Locating Snap Ring							Side Cover
Locating Snap Ring Number	Cross Sectional Height		Thickness		Geometry of snap ring fitted in groove (Reference)		Stepped Bore Diameter (Reference) <i>D</i> <sub>x</sub>
	<i>e</i>		<i>f</i>		Slit Width <i>g</i>	Snap Ring Outside Diameter <i>D</i> <sub>2</sub>	
	max.	min.	max.	min.			
<b>NR 26</b> (1)	2.06	1.91	0.84	0.74	3	28.7	29.4
<b>NR 28</b> (1)	2.06	1.91	0.84	0.74	3	30.7	31.4
<b>NR 30</b>	3.25	3.1	1.12	1.02	3	34.7	35.5
<b>NR 32</b>	3.25	3.1	1.12	1.02	3	36.7	37.5
<b>NR 35</b>	3.25	3.1	1.12	1.02	3	39.7	40.5
<b>NR 37</b>	3.25	3.1	1.12	1.02	3	41.3	42
<b>NR 40</b>	3.25	3.1	1.12	1.02	3	44.6	45.5
<b>NR 42</b>	3.25	3.1	1.12	1.02	3	46.3	47
<b>NR 44</b>	3.25	3.1	1.12	1.02	3	48.3	49
<b>NR 47</b>	4.04	3.89	1.12	1.02	4	52.7	53.5
<b>NR 50</b>	4.04	3.89	1.12	1.02	4	55.7	56.5
<b>NR 52</b>	4.04	3.89	1.12	1.02	4	57.9	58.5
<b>NR 55</b>	4.04	3.89	1.12	1.02	4	60.7	61.5
<b>NR 56</b>	4.04	3.89	1.12	1.02	4	61.7	62.5
<b>NR 58</b>	4.04	3.89	1.12	1.02	4	63.7	64.5
<b>NR 62</b>	4.04	3.89	1.7	1.6	4	67.7	68.5
<b>NR 65</b>	4.04	3.89	1.7	1.6	4	70.7	71.5
<b>NR 68</b>	4.85	4.7	1.7	1.6	5	74.6	76
<b>NR 72</b>	4.85	4.7	1.7	1.6	5	78.6	80
<b>NR 75</b>	4.85	4.7	1.7	1.6	5	81.6	83
<b>NR 80</b>	4.85	4.7	1.7	1.6	5	86.6	88
<b>NR 85</b>	4.85	4.7	1.7	1.6	5	91.6	93
<b>NR 90</b>	4.85	4.7	2.46	2.36	5	96.5	98
<b>NR 95</b>	4.85	4.7	2.46	2.36	5	101.6	103
<b>NR 100</b>	4.85	4.7	2.46	2.36	5	106.5	108
<b>NR 110</b>	4.85	4.7	2.46	2.36	5	116.6	118
<b>NR 115</b>	4.85	4.7	2.46	2.36	5	121.6	123
<b>NR 120</b>	7.21	7.06	2.82	2.72	7	129.7	131.5
<b>NR 125</b>	7.21	7.06	2.82	2.72	7	134.7	136.5
<b>NR 130</b>	7.21	7.06	2.82	2.72	7	139.7	141.5
<b>NR 140</b>	7.21	7.06	2.82	2.72	7	149.7	152
<b>NR 145</b>	7.21	7.06	2.82	2.72	7	154.7	157
<b>NR 150</b>	7.21	7.06	2.82	2.72	7	159.7	162
<b>NR 160</b>	7.21	7.06	2.82	2.72	7	169.7	172
<b>NR 170</b>	9.6	9.45	3.1	3	10	182.9	185
<b>NR 180</b>	9.6	9.45	3.1	3	10	192.9	195
<b>NR 190</b>	9.6	9.45	3.1	3	10	202.9	205
<b>NR 200</b>	9.6	9.45	3.1	3	10	212.9	215



7.2 Formulation of Bearing Numbers

Bearing numbers are alphanumeric combinations that indicate the bearing type, boundary dimensions, dimensional and running accuracies, internal clearance, and other related specifications. They consist of basic numbers and supplementary symbols. The boundary dimensions of commonly used bearings mostly conform to the organizational concept of ISO, and the bearing numbers of these standard bearings are specified by JIS B 1513 (Bearing Numbers for Rolling Bearings). Due to a need for more detailed classification, NSK uses auxiliary symbols other than those specified by JIS.

Bearing numbers consist of a basic number and supplementary symbols. The basic number indicates the bearing series(type) and the width and diameter series as shown in Table 7.5. Basic numbers, supplementary symbols, and the meanings of common numbers and symbols are listed in Table 7.6 (Pages A56 and A57). The contact angle symbols and other supplementary designations are shown in successive columns from left to right in Table 7.6. For reference, some examples of bearing designations are shown here:

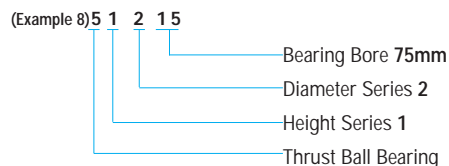
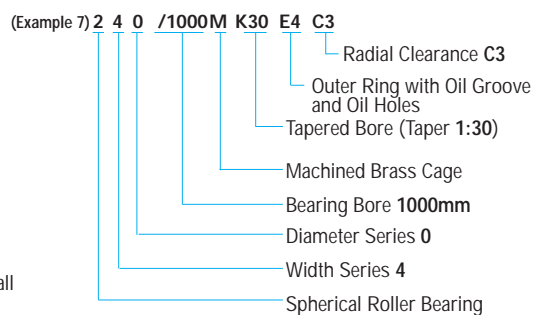
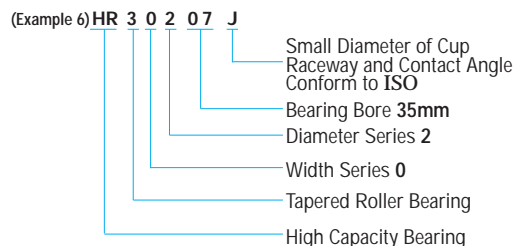
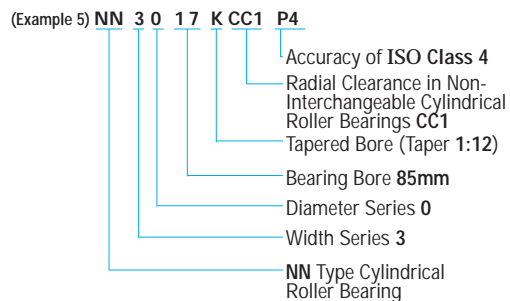
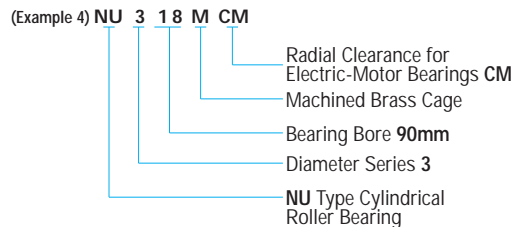
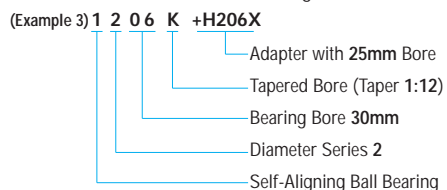
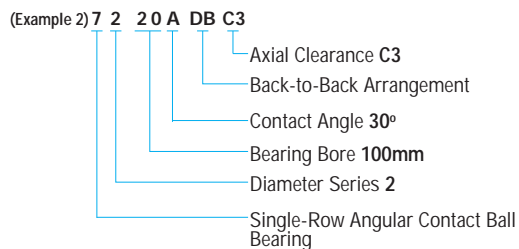
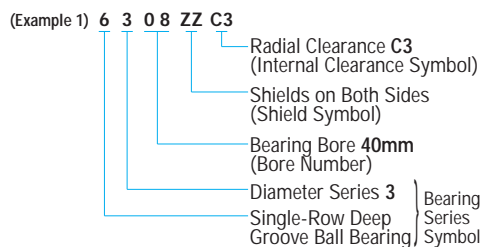


Table 7.5 Bearing Series Symbols

Bearing Type	Bearing Series Symbols	Type Symbols	Dimension Symbols	
			Width Symbols	Diameter Symbols
Single-Row Deep Groove Ball Bearings	<b>68</b>	6	(1)	8
	<b>69</b>	6	(1)	9
	<b>60</b>	6	(1)	0
	<b>62</b>	6	(0)	2
Single-Row Angular Contact Ball Bearings	<b>63</b>	6	(0)	3
	<b>79</b>	7	(1)	9
	<b>70</b>	7	(1)	0
	<b>72</b>	7	(0)	2
Self-Aligning Ball Bearings	<b>73</b>	7	(0)	3
	<b>12</b>	1	(0)	2
	<b>13</b>	1	(0)	3
Tapered Roller Bearings	<b>22</b>	(1)	2	2
	<b>23</b>	(1)	2	3
	<b>NU10</b>	NU	1	0
	<b>NU2</b>	NU	(0)	2
	<b>NU22</b>	NU	2	2
Spherical Roller Bearings	<b>NU3</b>	NU	(0)	3
	<b>NU23</b>	NU	2	3
	<b>NU4</b>	NU	(0)	4
	<b>NJ2</b>	NJ	(0)	2
	<b>NJ22</b>	NJ	2	2
	<b>NJ3</b>	NJ	(0)	3
	<b>NJ23</b>	NJ	2	3
Single-Row Cylindrical Roller Bearings	<b>NJ4</b>	NJ	(0)	4
	<b>NUP2</b>	NUP	(0)	2
	<b>NUP22</b>	NUP	2	2
	<b>NUP3</b>	NUP	(0)	3
Thrust Ball Bearings with Flat Seats	<b>NUP23</b>	NUP	2	3
	<b>NUP4</b>	NUP	(0)	4
	<b>N10</b>	N	1	0
	<b>N2</b>	N	(0)	2
	<b>N3</b>	N	(0)	3
Spherical Thrust Roller Bearings	<b>N4</b>	N	(0)	4
	<b>230</b>	2	3	0
	<b>231</b>	2	3	1
	<b>222</b>	2	2	2
Needle Roller Bearings	<b>232</b>	3	0	2
	<b>322</b>	3	2	2
	<b>332</b>	3	3	2
	<b>303</b>	3	0	3
	<b>323</b>	3	2	3
Double-Row Cylindrical Roller Bearings	<b>213 (1)</b>	2	0	3
	<b>223</b>	2	2	3
	<b>511</b>	5	1	1
	<b>512</b>	5	1	2
Needle Roller Bearings	<b>513</b>	5	1	3
	<b>514</b>	5	1	4
	<b>522</b>	5	2	2
	<b>523</b>	5	2	3
Spherical Thrust Roller Bearings	<b>524</b>	5	2	4
	<b>292</b>	2	9	2
	<b>293</b>	2	9	3
Single-Row Angular Contact Ball Bearings	<b>294</b>	2	9	4
	<b>NF2</b>	NF	(0)	2
	<b>NF3</b>	NF	(0)	3
Single-Row Deep Groove Ball Bearings	<b>NF4</b>	NF	(0)	4

Note (1) Bearing Series Symbol 213 should logically be 203, but customarily it is numbered 213.  
Remarks Numbers in ( ) in the column of width symbols are usually omitted from the bearing number.

Table 7. 6 Formulation of

Basic Numbers													
Bearing Series Symbols (1)		Bore Number		Contact Angle Symbol		Internal Design Symbol		Material Symbol		Cage Symbol		External Features	
Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
68	Single-Row Deep Groove Ball Bearings	1	Bearing Bore 1mm	A	Angular Contact Ball Bearings	A	Internal Design Differs from Standard One	g	Case-Hardened Steel Used in Rings, Rolling Elements	M	Machined Brass Cage	Z	Shield on One Side Only
69	Single-Row Angular Contact Ball Bearings	2	2			J	Smaller Diameter of Outer Ring Raceway, Contact Angle, and Outer Ring Width of Tapered Roller Bearings Conform to ISO 355					ZS	
70	Single-Row Angular Contact Ball Bearings	3	3			J	Smaller Diameter of Outer Ring Raceway, Contact Angle, and Outer Ring Width of Tapered Roller Bearings Conform to ISO 355					ZS	
72	Single-Row Angular Contact Ball Bearings	9	9	A5	Standard Contact Angle of 25°	J	Smaller Diameter of Outer Ring Raceway, Contact Angle, and Outer Ring Width of Tapered Roller Bearings Conform to ISO 355	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	ZZ	Shields on Both Sides
73	Single-Row Angular Contact Ball Bearings	00	10									ZZS	
12	Self-Aligning Ball Bearings	01	12									B	Standard Contact Angle of 40°
13	Self-Aligning Ball Bearings	02	15	DU	Contact Rubber Seal on One Side Only								
22	Self-Aligning Ball Bearings	03	17	DU	Contact Rubber Seal on One Side Only								
NU10	Cylindrical Roller Bearings	/22	22	C	Standard Contact Angle of 15°	J	(For High Capacity) Bearings	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	DDU	Contact Rubber Seals on Both Sides
NJ 2	Cylindrical Roller Bearings	/28	28									DDU	Contact Rubber Seals on Both Sides
N 3	Cylindrical Roller Bearings	/32	32									DDU	Contact Rubber Seals on Both Sides
NA48	Needle Roller Bearings	04(2)	20	Omitted	Contact Angle Less than 17°	J	Spherical Roller Bearings	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	V	Non-Contact Rubber Seal on One Side Only
NA49	Needle Roller Bearings	05	25									CA	Spherical Roller Bearings
NA69	Needle Roller Bearings	06	30									CD	
320	Tapered Roller Bearings	08	440	C	Contact Angle about 20°	J	Cylindrical Roller Bearings	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	EA	Spherical Roller Bearings
322	Tapered Roller Bearings	92	460									EA	
323	Tapered Roller Bearings	96	480									EA	
230	Spherical Roller Bearings	/500	500	D	Contact Angle about 28°	J	Spherical Thrust Roller Bearings	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	E	Cylindrical Roller Bearings
222	Spherical Roller Bearings	/530	530									E	Cylindrical Roller Bearings
223	Spherical Roller Bearings	/560	560									E	Cylindrical Roller Bearings
511	Thrust Ball Bearing with Flat Seats	/2 360	2 360	E	Spherical Thrust Roller Bearings	J	Spherical Thrust Roller Bearings	h	Stainless Steel Used in Rings, Rolling Elements	W	Pressed Steel Cage	VV	Non-Contact Rubber Seals on Both Sides
512	Thrust Ball Bearing with Flat Seats	/2 500	2 500									VV	Non-Contact Rubber Seals on Both Sides
513	Thrust Ball Bearing with Flat Seats											VV	Non-Contact Rubber Seals on Both Sides
292	Thrust Spherical Roller Bearings												
293	Thrust Spherical Roller Bearings												
294	Thrust Spherical Roller Bearings												
HR(4)	High Capacity Tapered Roller Bearings, and others												
Symbols and Numbers Conform to JIS(5)						NSK Symbol						NSK Symbol	
Marked on Bearings										Not Marked on Bearings			

- Notes (1) Bearing Series Symbols conform to Table 7.5.  
 (2) For basic numbers of tapered roller bearings in ISO's new series, refer to Page B111.  
 (3) For Bearing Bore Numbers 04 through 96, five times the bore number gives the bore size (mm) (except double-direction thrust ball bearings).  
 (4) HR is prefix to bearing series symbols and it is NSK's original prefix.

Bearing Numbers

Auxiliary Symbols													
Symbol		Arrangement Symbol		Internal Clearance Symbol		Tolerance Class Symbol		Special Specification Symbol		Spacer or Sleeve Symbol		Grease Symbol	
Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings	Symbol for Design of Rings
Symbol	Meaning	Symbol	Meaning	Symbol	Meaning (radial clearance)	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
K	Tapered Bore of Inner Ring (Taper 1:12)	DB	Back-to-Back Arrangement	C1	Clearance Less than C2	Omitted	ISO Normal	(Bearings treated for Dimensional Stabilization)	+K	Bearings with Outer Ring Spacers	AS2	SHELL ALVANIA GREASE S2	
				C2									Clearance Less than CN
K30	Tapered Bore of Inner Ring (Taper 1:30)	DF	Face-to-Face Arrangement	Omitted	CN Clearance	P6X	ISO Class 6X	X26	Working Temperature Lower than 150 °C	+L	Bearings with Inner Ring Spacers	NS7	NS HI-LUBE
				C3									
E	Notch or Lubricating Groove in Ring	DT	Tandem Arrangement	C4	Clearance Greater than C3	P4	ISO Class 4	X29	Working Temperature Lower than 250 °C	H	Adapter Designation	AH	Withdrawal Sleeve Designation
				C5									
E4	Lubricating Groove in Outside Surface and Holes in Outer Ring	MC1	For Non-Interchangeable Cylindrical Roller Brgs.	CC1	Clearance Less than CC2	Omitted	Class 4	S11	Dimensional Stabilizing Treatment Working Temperature Lower than 200°C				
				CC2									
N	Snap Ring Groove in Outer Ring	MC3	For Extra-Small and Miniature Ball Brgs.	CC3	Normal Clearance	PN3	Class 3						
				CC4									
NR	Snap Ring Groove with Snap Ring in Outer Ring	MC5	For Extra-Small and Miniature Ball Brgs.	CC5	Clearance Greater than CC4	PN00	Class 00						
				MC6									
		CM		CM	Clearance in Deep Groove Ball Bearings for Electric Motors	PN00	Class 00						
				CT									
				(Preload of Angular Contact Ball Bearing)									
				EL									
				L	Light Preload								
				M									
				H	Heavy Preload								
Partially the same as JIS(5)	Same as JIS(5)	NSK Symbol	Partially the same as JIS(5)/BAS(6)	Same as JIS(5)	NSK Symbol, Partially the same as JIS(5)								
In Principle, Marked on Bearings										Not Marked on Bearings			

- Notes (5) JIS : Japanese Industrial Standards.  
 (6) BAS : The Japan Bearing Industrial Association Standard.  
 (7) ABMA : The American Bearing Manufacturers Association.