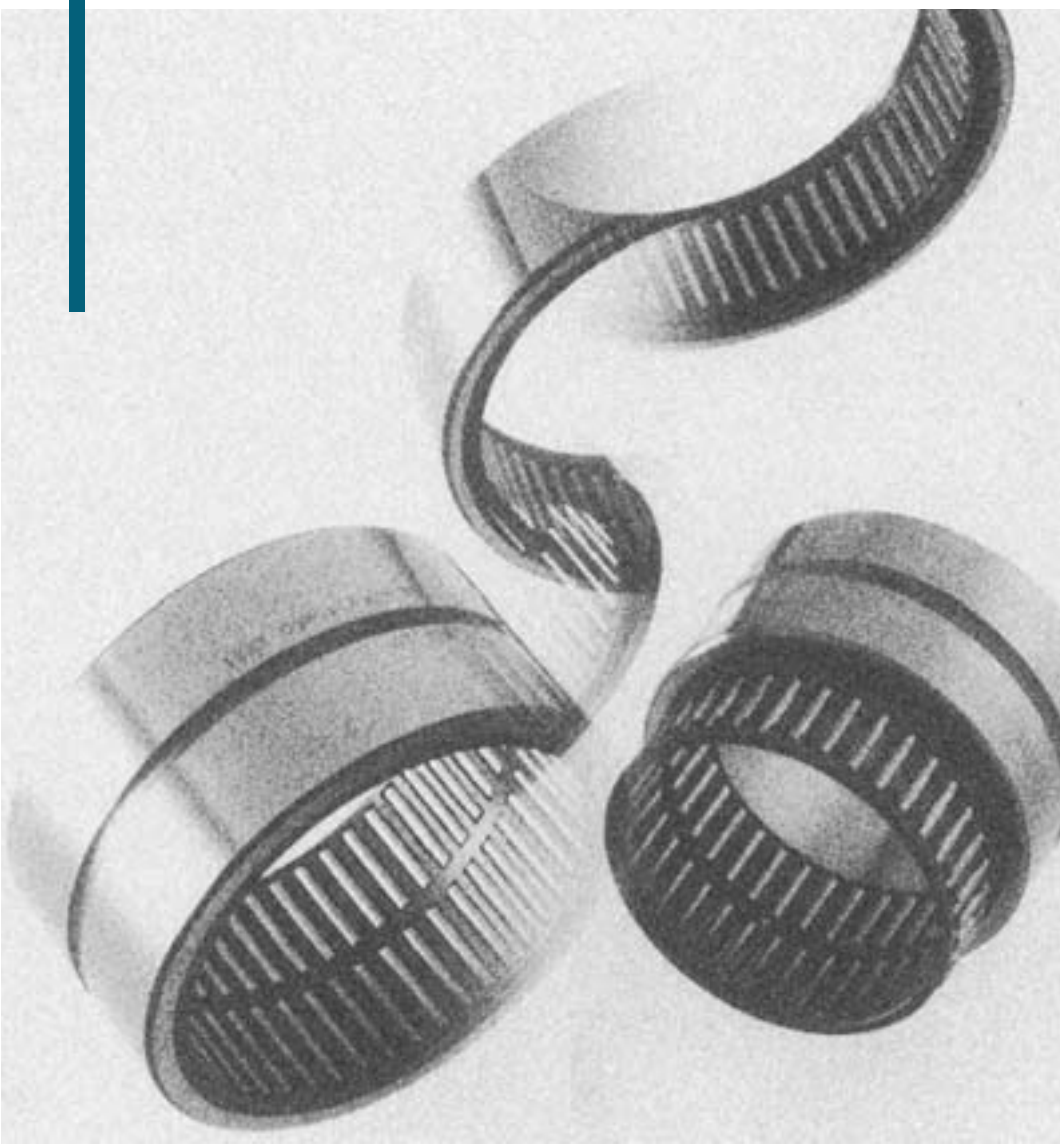
Machined Ring Needle Roller Bearings, Separable Type

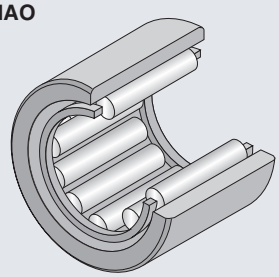
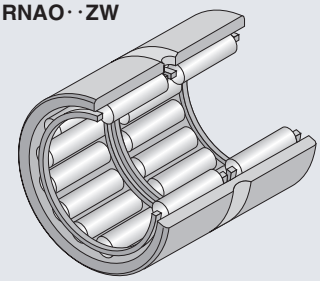
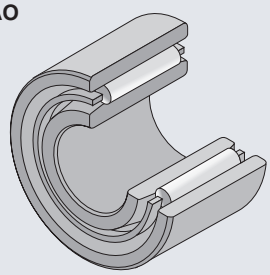
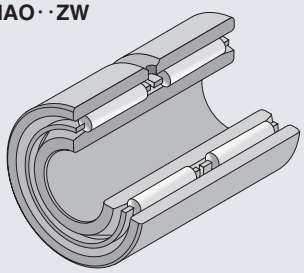


Machined Ring Needle Roller Bearings, Separable Type

The machined ring of this bearing type has no rib or side plate and, hence, the outer ring and the needle roller and cage assembly are separable from each other.

The outer ring can't regulate axial displacement of the needle roller and cage assembly and, therefore, the bearing construction must be so designed that the needle roller and cage assembly can be guided by a shaft or a housing. Furthermore, the outer ring, the needle roller and cage assembly separable from one another, and the inner ring can be press-fitted individually in a shaft or a housing. This could facilitate the bearing mounting work.

This bearing type is suitable for an application requiring high running accuracy because the resultant radial clearance can be retained in a narrow range by selection and combination of appropriate inner ring, outer ring and needle roller and cage assembly.

Bearing type	Applied shaft diameter (mm)	Composition of nominal bearing number	Remarks
Type RNAO 	ϕ5～ϕ100	RNAO－10×17×10 T2 Tail code Width Outer diameter Bore diameter Type code **[Tail code]** T2 : Resin cage ZW: Double-row type	Bearing with tail code T2 uses a polyamide resin cage and, therefore, it shall be used at allowable temperature 120˚C and, under continuous running, at 100˚C and less. For an application requiring high running accuracy, manufacture of the bearings conforming to JIS Class-6, -5 and -4 is also available on special request.
Type RNAO··ZW 	ϕ8～ϕ80		
Type NAO 	ϕ8～ϕ90	NAO－10×17×10 ZW Tail code Width Outer diameter Bore diameter Type code **[Tail code]** T2 : Resin cage ZW: Double-row type	
Type NAO··ZW 	ϕ10～ϕ70		

Accuracy of bearing

The dimensional accuracy, profile accuracy and running accuracy of machined ring needle roller bearing, separate type (with inner ring) are specified in JIS B 1514 (Accuracy of Rolling Bearings). (Refer to **Table 4.3** of Section 4. "**Bearing Tolerances**" on page A-26.) Although the accuracy of **NTN** standard bearings conforms to JIS Class-0, **NTN** can also supply bearings conforming to JIS Class-6, -5 and -4. Feel free to contact **NTN** for the further detail of these bearings.

The dimensional tolerances for the roller inscribed circle diameters (F_w) of the bearing type without inner ring conform to ISO Tolerance Range Class-F6. The outer ring and the needle roller and cage assembly are supplied in set and, therefore, the bearing must be installed with the combination of these two in set remained unchanged.

Particularly when high bearing accuracy is required, a bearing with grinding allowance for its inner ring raceway surface can be supplied upon request from a client. In that case, however, the client is requested to finish the inner ring to the intended dimension after having installed on a shaft.

Radial clearance and bearing fits

Table 5.1 of Subsection 5.1 "**Radial Clearance in Bearings**" (page A-30) shows the radial clearance of bearings with inner ring. Because of the narrow non-interchangeable clearance range, the bearings shipped after adjusted to a specific non-interchangeable clearance must be installed with the clearance remained unchanged.

The respective fitting tolerances for shaft and housing bore on/in which bearing with inner ring is press-fitted are per **Table 6.3** of 6.4 "**Recommended Bearing Fits**" (page A-34) which specifies them according to load characteristic, load magnitude, and shaft and housing bore sizes.

The profile accuracy and surface roughness of shaft and housing to be applied are as specified in **Table 7.3** of 7.3 "**Shaft and Housing Accuracy**" (page A-39).

A shaft is used as the direct raceway surface for a bearing without inner ring and, in this case, the shaft diameter (raceway diameter) tolerance is per Table 1 specifying the tolerances according to each running clearance. And K7 tolerance generally in broad use is applied as the dimensional tolerance for the housing bore. Feel free to contact **NTN** for application of housing bore tolerance other than K7.

For the profile accuracy, surface roughness and hardness of a shaft acting as the raceway surface, refer to **Table 7.4** of 7.4 "**Raceway Surface Accuracy**" (page A-39).

Dimension of oil hole in outer ring

The outer ring of bearing Type ZW is provided with an oil hole and an oil groove to facilitate oil lubrication to bearing.

Table 1 shows the oil hole dimension every outer ring diameter.

Table 1 Oil hole dimension

Outer ring outer diameter		Oil hole dia. (mm)	Number of oil hole
over	incl.		
—	20	2.0	1
20	40	2.5	1
40	80	3.0	1
80	200	3.5	1

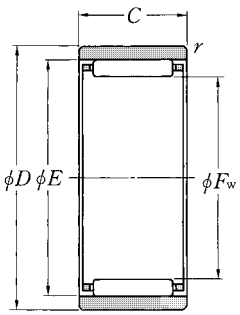
Mounting relations

The inner ring and outer ring of any machined ring needle roller bearing, separable type must both be positioned in axial direction by shoulder or a snap ring.

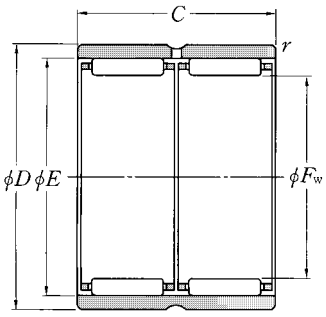
For the shoulder dimension and corner roundness (r_a) of the shaft and the housing are as specified in applicable "Dimensions Table". The cage must be guided by the shaft or the side face of the housing shoulder, but the guide surface must be finished by, at least, grinding for deburring.

Without inner ring

Type RNAO
Type RNAO··ZW



Type RNAO

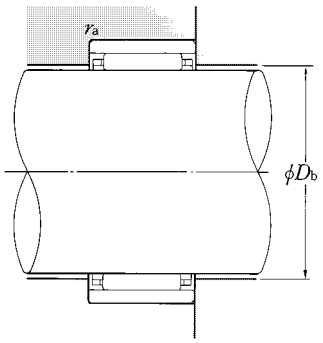


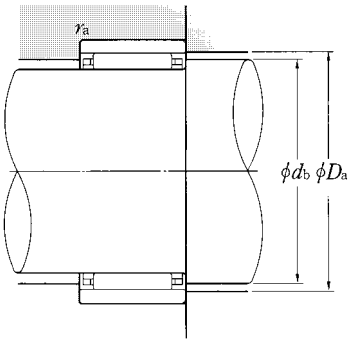
Type RNAO··ZW

F_w 5～20mm

Boundary dimensions mm					Basic load ratings N dynamic	static	kgf dynamic	static	Limiting speeds r/min grease	oil	Bearing numbers
F_w	D	C	$r_{s\,min}$ [1]	E	C_r	C_{or}	C_r	C_{or}			
5 $^{+0.018}_{+0.010}$	10	8	0.15	8	2 640	2 190	269	224	27 000	40 000	**RNAO- 5×10×8T2**
6 $^{+0.018}_{+0.010}$	13	8	0.3	9	2 660	2 280	272	233	25 000	37 000	**RNAO- 6×13×8T2**
7 $^{+0.022}_{+0.013}$	14	8	0.3	10	2 670	2 350	272	239	23 000	34 000	**RNAO- 7×14×8T2**
8 $^{+0.022}_{+0.013}$	15	10	0.3	11	4 000	4 100	410	420	21 000	32 000	**RNAO- 8×15×10T2**
	16	20	0.3	12	7 950	8 350	810	850	21 000	32 000	**RNAO- 8×16×20ZWT2**
10 $^{+0.022}_{+0.013}$	17	10	0.3	13	4 550	5 100	460	520	19 000	28 000	**RNAO-10×17×10T2**
	20	12	0.3	16	7 100	5 950	720	610	19 000	28 000	**RNAO-10×20×12**
12 $^{+0.027}_{+0.016}$	19	13.5	0.3	15	6 000	7 700	615	785	17 000	26 000	**RNAO-12×19×13.5**
	22	12	0.3	18	8 650	8 000	880	815	17 000	26 000	**RNAO-12×22×12**
14 $^{+0.027}_{+0.016}$	22	13	0.3	18	8 300	10 100	845	1 030	16 000	24 000	**RNAO-14×22×13**
	22	20	0.3	18	11 800	16 000	1 210	1 630	16 000	24 000	**RNAO-14×22×20ZW**
	26	12	0.3	20	9 350	9 150	955	930	16 000	24 000	**RNAO-14×26×12**
15 $^{+0.027}_{+0.016}$	23	13	0.3	19	8 250	10 200	840	1 040	15 000	23 000	**RNAO-15×23×13**
	23	20	0.3	19	11 700	16 100	1 200	1 640	15 000	23 000	**RNAO-15×23×20ZW**
16 $^{+0.027}_{+0.016}$	24	13	0.3	20	9 050	11 800	925	1 200	15 000	23 000	**RNAO-16×24×13**
	24	20	0.3	20	12 900	18 500	1 310	1 890	15 000	23 000	**RNAO-16×24×20ZW**
	28	12	0.3	22	11 700	12 500	1 190	1 280	15 000	23 000	**RNAO-16×28×12**
17 $^{+0.027}_{+0.016}$	25	13	0.3	21	9 400	12 600	960	1 280	15 000	22 000	**RNAO-17×25×13**
	25	20	0.3	21	12 800	18 600	1 300	1 900	15 000	22 000	**RNAO-17×25×20ZW**
	25	26	0.3	21	16 100	25 200	1 640	2 570	15 000	22 000	**RNAO-17×25×26ZW**
18 $^{+0.027}_{+0.016}$	26	13	0.3	22	8 900	11 900	910	1 210	14 000	21 000	**RNAO-18×26×13**
	26	20	0.3	22	12 700	18 800	1 290	1 910	14 000	21 000	**RNAO-18×26×20ZW**
	30	12	0.3	24	12 300	13 800	1 250	1 410	14 000	21 000	**RNAO-18×30×12**
	30	24	0.3	24	21 100	27 700	2 150	2 820	14 000	21 000	**RNAO-18×30×24ZW**
20 $^{+0.033}_{+0.020}$	28	13	0.3	24	10 000	14 300	1 020	1 460	13 000	20 000	**RNAO-20×28×13**
	28	26	0.3	24	17 100	28 600	1 750	2 910	13 000	20 000	**RNAO-20×28×26ZW**
	32	12	0.3	26	12 900	15 100	1 320	1 540	13 000	20 000	**RNAO-20×32×12**

Note 1) Allowable minimum chamfer dimension r.

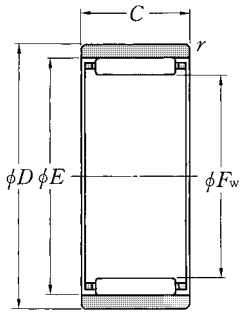




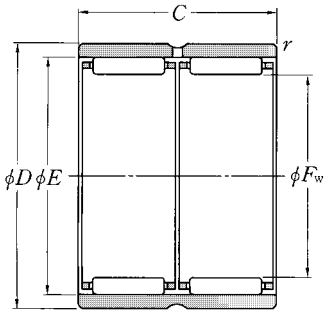
Abutment dimensions mm				Mass kg
d_b	D_a max	D_b	r_{as} max	(approx.)
7.7	8.8	5.3	0.15	0.003
8.7	11	6.3	0.3	0.006
9.7	12	7.3	0.3	0.006
10.7	13	8.3	0.3	0.008
11.7	14	8.3	0.3	0.017
12.7	15	10.3	0.3	0.010
15.7	18	10.3	0.3	0.018
14.7	17	12.3	0.3	0.015
17.6	20	12.3	0.3	0.019
17.6	20	14.4	0.3	0.018
17.6	20	14.4	0.3	0.027
19.6	24	14.4	0.3	0.029
18.6	21	15.4	0.3	0.020
18.6	21	15.4	0.3	0.031
19.6	22	16.4	0.3	0.021
19.6	22	16.4	0.3	0.032
21.6	26	16.4	0.3	0.032
20.6	23	17.4	0.3	0.022
20.6	23	17.4	0.3	0.034
20.6	23	17.4	0.3	0.044
21.6	24	18.4	0.3	0.022
21.6	24	18.4	0.3	0.033
23.6	28	18.4	0.3	0.035
23.6	28	18.4	0.3	0.069
23.6	26	20.4	0.3	0.025
23.6	26	20.4	0.3	0.050
25.6	30	20.4	0.3	0.038

Without inner ring

Type RNAO
Type RNAO··ZW



Type RNAO

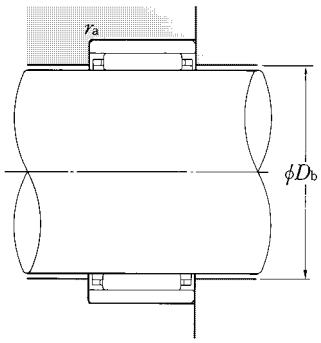


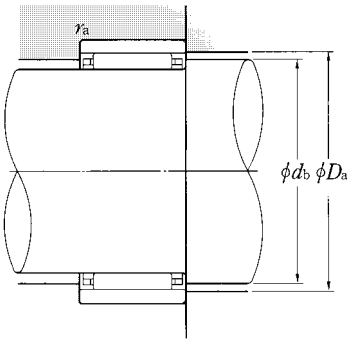
Type RNAO··ZW

F_w 20～40mm

Boundary dimensions mm					Basic load ratings N dynamic	static	kgf dynamic	static	Limiting speeds r/min grease	oil	Bearing numbers
F_w	D	C	$r_{s\,min}$ 1)	E	C_r	C_{or}	C_r	C_{or}			
20 +0.033 +0.020	32	24	0.3	26	22 100	30 000	2 260	3 100	13 000	20 000	**RNAO-20×32×24ZW**
	30	13	0.3	26	10 200	15 200	1 040	1 550	12 000	18 000	**RNAO-22×30×13**
22 +0.033 +0.020	30	26	0.3	26	17 500	30 500	1 790	3 100	12 000	18 000	**RNAO-22×30×26ZW**
	35	16	0.3	29	18 700	22 700	1 910	2 310	12 000	18 000	**RNAO-22×35×16**
	35	32	0.3	29	32 000	45 500	3 300	4 650	12 000	18 000	**RNAO-22×35×32ZW**
	35	17	0.3	29	14 200	24 000	1 450	2 450	11 000	16 000	**RNAO-25×35×17**
25 +0.033 +0.020	35	26	0.3	29	18 400	33 500	1 880	3 450	11 000	16 000	**RNAO-25×35×26ZW**
	37	16	0.3	32	19 500	24 700	1 990	2 520	11 000	16 000	**RNAO-25×37×16**
	37	32	0.3	32	33 500	49 500	3 400	5 050	11 000	16 000	**RNAO-25×37×32ZW**
26 +0.033 +0.020	39	13	0.3	30	11 800	19 200	1 200	1 960	10 000	15 000	**RNAO-26×39×13**
28 +0.033 +0.020	40	16	0.3	35	21 200	28 400	2 160	2 900	9 500	14 000	**RNAO-28×40×16**
	40	32	0.3	35	36 500	57 000	3 700	5 800	9 500	14 000	**RNAO-28×40×32ZW**
	40	17	0.3	35	19 400	32 500	1 970	3 350	9 000	13 000	**RNAO-30×40×17**
30 +0.033 +0.020	40	26	0.3	35	25 200	46 000	2 570	4 650	9 000	13 000	**RNAO-30×40×26ZW**
	42	16	0.3	37	21 900	30 500	2 230	3 100	9 000	13 000	**RNAO-30×42×16**
	42	32	0.3	37	37 500	60 500	3 850	6 200	9 000	13 000	**RNAO-30×42×32ZW**
32 +0.041 +0.025	42	13	0.3	37	14 500	23 000	1 480	2 350	8 500	13 000	**RNAO-32×42×13**
	45	13	0.3	40	15 200	25 100	1 550	2 560	7 500	11 000	**RNAO-35×45×13**
	45	17	0.3	40	20 000	36 000	2 040	3 650	7 500	11 000	**RNAO-35×45×17**
35 +0.041 +0.025	45	26	0.3	40	26 100	50 000	2 660	5 100	7 500	11 000	**RNAO-35×45×26ZW**
	47	16	0.3	42	24 100	36 000	2 450	3 650	7 500	11 000	**RNAO-35×47×16**
	47	18	0.3	42	24 700	37 000	2 510	3 750	7 500	11 000	**RNAO-35×47×18**
	47	32	0.3	42	41 500	71 500	4 200	7 300	7 500	11 000	**RNAO-35×47×32ZW**
37 +0.041 +0.025	47	13	0.3	42	15 900	27 100	1 620	2 770	7 000	11 000	**RNAO-37×47×13**
	52	18	0.3	44	26 300	41 000	2 680	4 150	7 000	11 000	**RNAO-37×52×18**
	50	17	0.3	45	21 800	41 500	2 220	4 250	6 500	10 000	**RNAO-40×50×17**
40 +0.041 +0.025	50	34	0.3	45	37 500	83 000	3 800	8 500	6 500	10 000	**RNAO-40×50×34ZW**
	55	20	0.3	47	31 000	51 500	3 150	5 250	6 500	10 000	**RNAO-40×55×20**

Note 1) Allowable minimum chamfer dimension r.

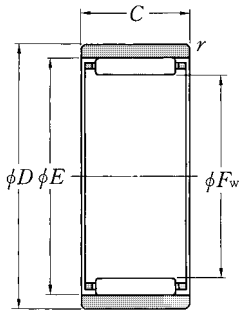




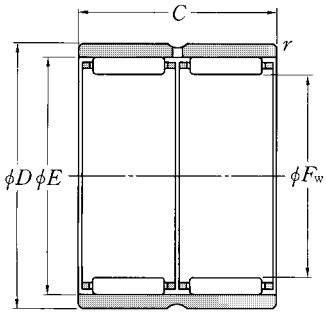
Abutment dimensions mm				Mass kg
d_b	D_a max	D_b	r_{as} max	(approx.)
25.6	30	20.4	0.3	0.080
25.6	28	22.4	0.3	0.027
25.6	28	22.4	0.3	0.054
28.4	33	22.4	0.3	0.059
28.4	33	22.4	0.3	0.118
28.4	33	25.6	0.3	0.053
28.4	33	25.6	0.3	0.076
31.4	35	25.6	0.3	0.060
31.4	35	25.6	0.3	0.119
29.4	37	26.6	0.3	0.060
34.4	38	28.6	0.3	0.061
34.4	38	28.6	0.3	0.122
34.4	38	30.6	0.3	0.060
34.4	38	30.6	0.3	0.094
36.4	40	30.6	0.3	0.069
36.4	40	30.6	0.3	0.137
36.4	40	32.6	0.3	0.049
39.4	43	35.6	0.3	0.053
39.4	43	35.6	0.3	0.069
39.4	43	35.6	0.3	0.091
41.4	45	35.6	0.3	0.078
41.4	45	35.6	0.3	0.089
41.4	45	35.6	0.3	0.156
41.4	45	37.6	0.3	0.056
43.4	50	37.6	0.3	0.125
44.4	48	40.6	0.3	0.074
44.4	48	40.6	0.3	0.152
46.2	53	40.6	0.3	0.145

Without inner ring

Type RNAO
Type RNAO··ZW



Type RNAO

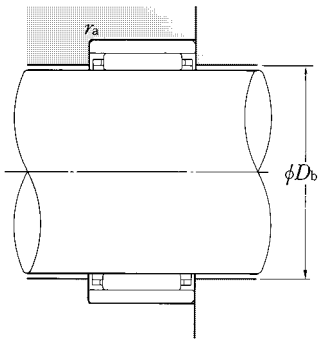


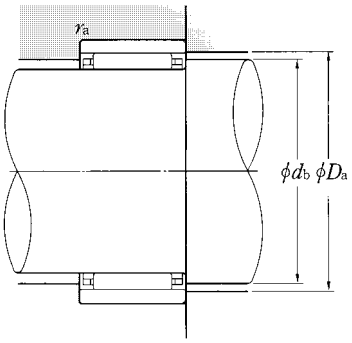
Type RNAO··ZW

F_w 40～85mm

Boundary dimensions mm					Basic load ratings dynamic N	static N	dynamic kgf	static kgf	Limiting speeds r/min grease	oil	Bearing numbers
F_w	D	C	$r_{s\,min}$ [1]	E	C_r	C_{or}	C_r	C_{or}			
40 $^{+0.041}_{+0.025}$	55	40	0.3	48	56 500	102 000	5 750	10 400	6 500	10 000	**RNAO-40× 55×40ZW**
45 $^{+0.041}_{+0.025}$	55	17	0.3	50	22 300	44 500	2 280	4 550	6 000	9 000	**RNAO-45× 55×17**
	55	34	0.3	50	38 500	89 500	3 900	9 100	6 000	9 000	**RNAO-45× 55×34ZW**
	62	20	0.3	53	36 000	59 000	3 650	6 000	6 000	9 000	**RNAO-45× 62×20**
	62	40	0.3	53	61 500	118 000	6 250	12 000	6 000	9 000	**RNAO-45× 62×40ZW**
50 $^{+0.041}_{+0.025}$	62	20	0.3	55	27 900	62 000	2 850	6 300	5 500	8 000	**RNAO-50× 62×20**
	62	40	0.3	55	48 000	124 000	4 900	12 600	5 500	8 000	**RNAO-50× 62×40ZW**
	65	20	0.3	58	38 500	67 500	3 950	6 850	5 500	8 000	**RNAO-50× 65×20**
	65	40	0.6	58	66 500	135 000	6 750	13 700	5 500	8 000	**RNAO-50× 65×40ZW**
55 $^{+0.049}_{+0.030}$	68	20	0.6	60	28 800	66 500	2 940	6 750	4 800	7 500	**RNAO-55× 68×20**
	68	25	0.6	63	50 500	97 500	5 150	9 950	4 800	7 500	**RNAO-55× 68×25**
	68	40	0.6	60	49 500	133 000	5 050	13 500	4 800	7 500	**RNAO-55× 68×40ZW**
	72	20	0.6	63	39 000	70 000	3 950	7 100	4 800	7 500	**RNAO-55× 72×20**
	72	40	0.6	63	66 500	140 000	6 800	14 200	4 800	7 500	**RNAO-55× 72×40ZW**
60 $^{+0.049}_{+0.030}$	75	46	1	68	76 000	170 000	7 750	17 400	4 400	6 500	**RNAO-60× 75×46ZW**
	78	20	1	68	40 000	75 000	4 100	7 650	4 400	6 500	**RNAO-60× 78×20**
	78	40	1	68	69 000	150 000	7 050	15 300	4 400	6 500	**RNAO-60× 78×40ZW**
65 $^{+0.049}_{+0.030}$	85	30	1	73	61 000	132 000	6 200	13 400	4 100	6 000	**RNAO-65× 85×30**
	85	60	1	73	104 000	263 000	10 600	26 800	4 100	6 000	**RNAO-65× 85×60ZW**
70 $^{+0.049}_{+0.030}$	90	30	1	78	65 500	149 000	6 700	15 200	3 800	5 500	**RNAO-70× 90×30**
	90	60	1	78	112 000	297 000	11 500	30 500	3 800	5 500	**RNAO-70× 90×60ZW**
75 $^{+0.049}_{+0.030}$	95	30	1	83	67 500	157 000	6 850	16 100	3 600	5 500	**RNAO-75× 95×30**
	95	60	1	83	115 000	315 000	11 800	32 000	3 600	5 500	**RNAO-75× 95×60ZW**
80 $^{+0.049}_{+0.030}$	95	30	1	86	57 000	159 000	5 800	16 200	3 300	5 000	**RNAO-80× 95×30**
	95	56	1	88	105 000	284 000	10 700	29 000	3 300	5 000	**RNAO-80× 95×56ZW**
	100	30	1	88	69 000	166 000	7 050	17 000	3 300	5 000	**RNAO-80×100×30**
	100	60	1	88	119 000	335 000	12 100	34 000	3 300	5 000	**RNAO-80×100×60ZW**
85 $^{+0.058}_{+0.036}$	105	25	1	93	61 500	146 000	6 250	14 900	3 100	4 700	**RNAO-85×105×25**

Note 1) Allowable minimum chamfer dimension r.

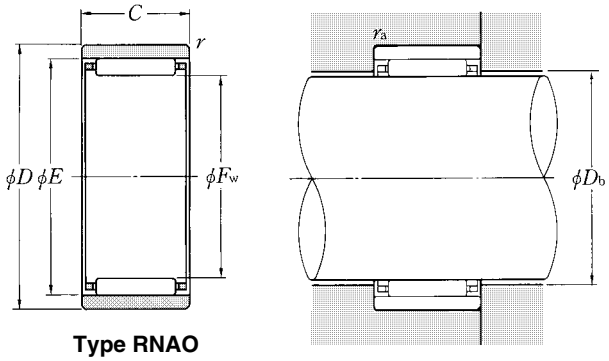




Abutment dimensions mm				Mass kg
d_b	D_a max	D_b	r_{as} max	(approx.)
47.2	53	40.6	0.3	0.275
49.2	53	45.6	0.3	0.083
49.2	53	45.6	0.3	0.165
52.2	60	45.6	0.3	0.175
52.2	60	45.6	0.3	0.377
54.2	60	50.6	0.3	0.140
54.2	60	50.6	0.3	0.295
57.2	63	50.6	0.3	0.168
57.2	61	50.6	0.6	0.355
59.4	64	55.8	0.6	0.166
62.4	64	55.8	0.6	0.200
59.4	64	55.8	0.6	0.310
62.4	68	55.8	0.6	0.216
62.4	68	55.8	0.6	0.425
67.2	70	60.8	1	0.461
67.2	73	60.8	1	0.255
67.2	73	60.8	1	0.500
72.2	80	66	1	0.464
72.2	80	66	1	0.951
77.2	85	71	1	0.499
77.2	85	71	1	1.00
82.2	90	76	1	0.520
82.2	90	76	1	1.04
85.2	90	81	1	0.405
87.2	90	81	1	0.755
87.2	95	81	1	0.580
87.2	95	81	1	1.10
92.2	100	86	1	0.459

Without inner ring

Type RNAO

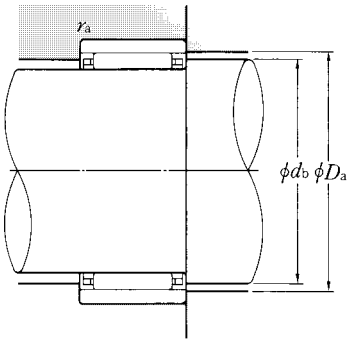


Type RNAO

F_w 85～100mm

Boundary dimensions mm						Basic load ratings N dynamic		kgf dynamic		Limiting speeds r/min grease		Bearing numbers
F_w		D	C	$r_{s\,min}$ [1]	E	C_r	C_{or}	C_r	C_{or}		oil	
85	+0.058 +0.036	105	30	1	93	71 000	175 000	7 200	17 900	3 100	4 700	**RNAO- 85×105×30**
90	+0.058 +0.036	105	26	1	98	64 000	157 000	6 550	16 000	3 000	4 400	**RNAO- 90×105×26**
		110	30	1	98	72 500	184 000	7 400	18 800	3 000	4 400	**RNAO- 90×110×30**
95	+0.058 +0.036	115	30	1	103	74 000	193 000	7 550	19 600	2 800	4 200	**RNAO- 95×115×30**
100	+0.058 +0.035	120	30	1	108	76 000	201 000	7 700	20 500	2 700	4 000	**RNAO-100×120×30**

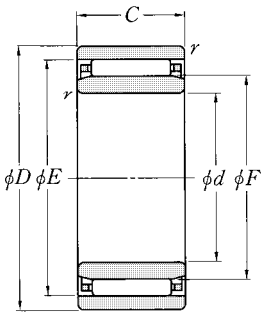
Note 1) Allowable minimum chamfer dimension r.



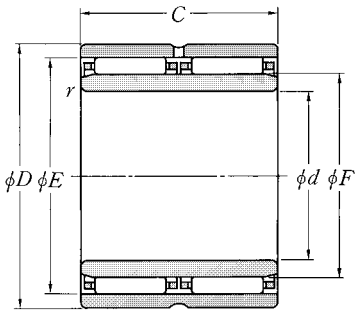
Abutment dimensions mm				Mass kg
d_b	D_a max	D_b	r_{as} max	(approx.)
92.2	100	86	1	0.585
97.2	100	91	1	0.373
97.2	105	91	1	0.610
102.2	110	96	1	0.640
107.2	115	101	1	0.694

With inner ring

Type NAO
Type NAO··ZW



Type NAO

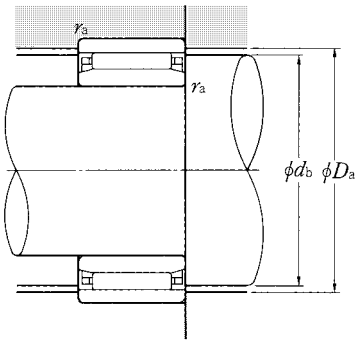


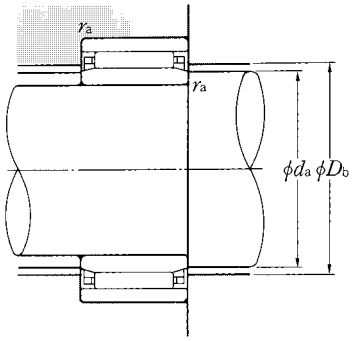
Type NAO··ZW

d 6～30mm

Boundary dimensions mm						Basic load ratings N dynamic		kgf dynamic		Limiting speeds r/min grease	oil	Bearing numbers
d	D	C	$r_{s\,min}$ [1]	F	E	C_r	static C_{or}	C_r	static C_{or}			
6	17	10	0.3	10	13	4 550	5 100	460	520	19 000	28 000	**NAO- 6×17×10T2**
7	20	12	0.3	10	16	7 100	5 950	720	610	19 000	28 000	**NAO- 7×20×12**
9	22	12	0.3	12	18	8 650	8 000	880	815	17 000	26 000	**NAO- 9×22×12**
10	22	13	0.3	14	18	8 300	10 100	845	1 030	16 000	24 000	**NAO-10×22×13**
	22	20	0.3	14	18	11 800	16 000	1 210	1 630	16 000	24 000	**NAO-10×22×20ZW**
	26	12	0.3	14	20	9 350	9 150	955	930	16 000	24 000	**NAO-10×26×12**
12	24	13	0.3	16	20	9 050	11 800	925	1 200	15 000	23 000	**NAO-12×24×13**
	24	20	0.3	16	20	12 900	18 500	1 310	1 890	15 000	23 000	**NAO-12×24×20ZW**
	28	12	0.3	16	22	11 700	12 500	1 190	1 280	15 000	23 000	**NAO-12×28×12**
15	28	13	0.3	20	24	10 000	14 300	1 020	1 460	13 000	20 000	**NAO-15×28×13**
	28	26	0.3	20	24	17 100	28 600	1 750	2 910	13 000	20 000	**NAO-15×28×26ZW**
	32	12	0.3	20	26	12 900	15 100	1 320	1 540	13 000	20 000	**NAO-15×32×12**
17	30	13	0.3	22	26	10 200	15 200	1 040	1 550	12 000	18 000	**NAO-17×30×13**
	30	26	0.3	22	26	17 500	30 500	1 790	3 100	12 000	18 000	**NAO-17×30×26ZW**
	35	16	0.3	22	29	18 700	22 700	1 910	2 310	12 000	18 000	**NAO-17×35×16**
	35	32	0.3	22	29	32 000	45 500	3 300	4 650	12 000	18 000	**NAO-17×35×32ZW**
20	35	17	0.3	25	29	14 200	24 000	1 450	2 450	11 000	16 000	**NAO-20×35×17**
	35	26	0.3	25	29	18 400	33 500	1 880	3 450	11 000	16 000	**NAO-20×35×26ZW**
	37	16	0.3	25	32	19 500	24 700	1 990	2 520	11 000	16 000	**NAO-20×37×16**
	37	32	0.3	25	32	33 500	49 500	3 400	5 050	11 000	16 000	**NAO-20×37×32ZW**
25	40	17	0.3	30	35	19 400	32 500	1 970	3 350	9 000	13 000	**NAO-25×40×17**
	40	26	0.3	30	35	25 200	46 000	2 570	4 650	9 000	13 000	**NAO-25×40×26ZW**
	42	16	0.3	30	37	21 900	30 500	2 230	3 100	9 000	13 000	**NAO-25×42×16**
	42	32	0.3	30	37	37 500	60 500	3 850	6 200	9 000	13 000	**NAO-25×42×32ZW**
29	42	13	0.3	32	37	14 500	23 000	1 480	2 350	8 500	13 000	**NAO-29×42×13**
30	45	13	0.3	35	40	15 200	25 100	1 550	2 560	7 500	11 000	**NAO-30×45×13**
	45	17	0.3	35	40	20 000	36 000	2 040	3 650	7 500	11 000	**NAO-30×45×17**
	45	26	0.3	35	40	26 100	50 000	2 660	5 100	7 500	11 000	**NAO-30×45×26ZW**

Note 1) Allowable minimum chamfer dimension r.

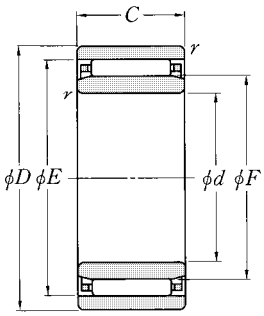




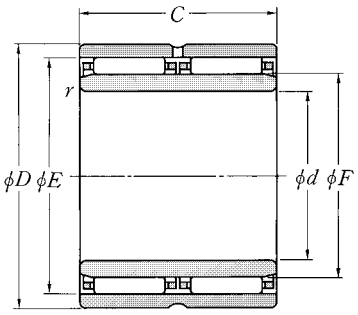
Abutment dimensions mm					Mass kg
d_a min	d_b	D_a max	D_b	r_{as} max	(approx.)
8	12.7	15	10.3	0.3	0.014
9	15.7	18	10.3	0.3	0.022
11	17.6	20	12.3	0.3	0.024
12	17.6	20	14.4	0.3	0.026
12	17.6	20	14.4	0.3	0.039
12	19.6	24	14.4	0.3	0.036
14	19.6	22	16.4	0.3	0.030
14	19.6	22	16.4	0.3	0.044
14	21.6	26	16.4	0.3	0.040
17	23.6	26	20.4	0.3	0.029
17	23.6	26	20.4	0.3	0.075
17	25.6	30	20.4	0.3	0.050
19	25.6	28	22.4	0.3	0.042
19	25.6	28	22.4	0.3	0.081
19	28.4	33	22.4	0.3	0.078
19	28.4	33	22.4	0.3	0.148
22	28.4	33	25.6	0.3	0.076
22	28.4	33	25.6	0.3	0.112
22	31.4	35	25.6	0.3	0.082
22	31.4	35	25.6	0.3	0.155
27	34.4	38	30.6	0.3	0.088
27	34.4	38	30.6	0.3	0.130
27	36.4	40	30.6	0.3	0.086
27	36.4	40	30.6	0.3	0.190
31	36.4	40	32.6	0.3	0.062
32	39.4	43	35.6	0.3	0.077
32	39.4	43	35.6	0.3	0.102
32	39.4	43	35.6	0.3	0.157

With inner ring

Type NAO
Type NAO··ZW



Type NAO

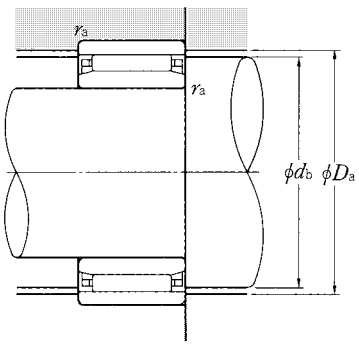


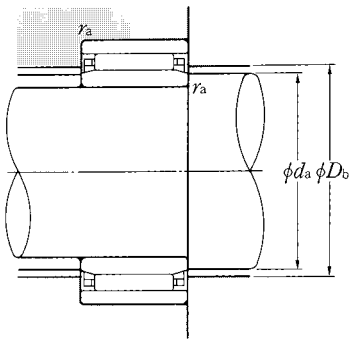
Type NAO··ZW

d 30～65mm

Boundary dimensions mm						Basic load ratings N dynamic		kgf dynamic		Limiting speeds r/min grease	oil	Bearing numbers
d	*D*	*C*	$r_{s\,min}$ [1]	*F*	*E*	C_r	C_{or}	C_r	C_{or}			
30	47	16	0.3	35	42	24 100	36 000	2 450	3 650	7 500	11 000	NAO-30×47×16
	47	18	0.3	35	42	24 700	37 000	2 510	3 750	7 500	11 000	NAO-30×47×18
	47	32	0.3	35	42	41 500	71 500	4 200	3 700	7 500	11 000	NAO-30×47×32ZW
	52	18	0.3	37	44	26 300	41 000	2 680	4 150	7 000	11 000	NAO-30×52×18
33	47	13	0.3	37	42	15 900	27 100	1 620	2 770	7 000	11 000	NAO-33×47×13
35	50	17	0.3	40	45	21 800	41 500	2 220	4 250	6 500	10 000	NAO-35×50×17
	50	34	0.3	40	45	37 500	83 000	3 800	8 500	6 500	10 000	NAO-35×50×34ZW
	55	20	0.3	40	47	31 000	51 500	3 150	5 250	6 500	10 000	NAO-35×55×20
	55	40	0.3	40	48	56 500	102 000	5 750	10 400	6 500	10 000	NAO-35×55×40ZW
40	55	17	0.3	45	50	22 300	44 500	2 280	4 550	6 000	9 000	NAO-40×55×17
	55	34	0.3	45	50	38 500	89 500	3 900	9 100	6 000	9 000	NAO-40×55×34ZW
	62	20	0.3	45	53	36 000	59 000	3 650	6 000	6 000	9 000	NAO-40×62×20
	62	40	0.3	45	53	61 500	118 000	6 250	12 000	6 000	9 000	NAO-40×62×40ZW
	65	20	0.3	50	58	38 500	67 500	3 950	6 850	5 500	8 000	NAO-40×65×20
45	62	20	0.3	50	55	27 900	62 000	2 850	6 300	5 500	8 000	NAO-45×62×20
	62	40	0.3	50	55	48 000	124 000	4 900	12 600	5 500	8 000	NAO-45×62×40ZW
	72	20	0.6	55	63	39 000	70 000	3 950	7 100	4 800	7 500	NAO-45×72×20
	72	40	0.6	55	63	66 500	140 000	6 800	14 200	4 800	7 500	NAO-45×72×40ZW
50	68	20	0.6	55	60	28 800	66 500	2 940	6 750	4 800	7 500	NAO-50×68×20
	68	40	0.6	55	60	49 500	133 000	5 050	13 500	4 800	7 500	NAO-50×68×40ZW
	78	20	1	60	68	40 000	75 000	4 100	7 650	4 400	6 500	NAO-50×78×20
	78	40	1	60	68	69 000	150 000	7 050	15 300	4 400	6 500	NAO-50×78×40ZW
55	85	30	1	65	73	61 000	132 000	6 200	13 400	4 100	6 000	NAO-55×85×30
	85	60	1	65	73	104 000	263 000	10 600	26 800	4 100	6 000	NAO-55×85×60ZW
60	90	30	1	70	78	65 500	149 000	6 700	15 200	3 800	5 500	NAO-60×90×30
	90	60	1	70	78	112 000	297 000	11 500	30 500	3 800	5 500	NAO-60×90×60ZW
65	95	30	1	75	83	67 500	157 000	6 850	16 100	3 600	5 500	NAO-65×95×30
	95	60	1	75	83	115 000	315 000	11 800	32 000	3 600	5 500	NAO-65×95×60ZW

Note 1) Allowable minimum chamfer dimension r.

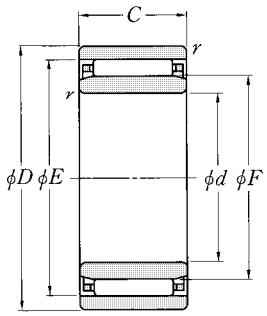




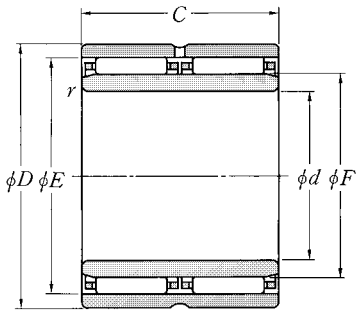
Abutment dimensions mm					Mass kg
d_a min	d_b	D_a max	D_b	r_{as} max	(approx.)
32	41.4	45	35.6	0.3	0.109
32	41.4	45	35.6	0.3	0.119
32	41.4	45	35.6	0.3	0.205
32	43.4	50	37.6	0.3	0.177
35	41.4	45	37.6	0.3	0.085
37	44.4	48	40.6	0.3	0.113
37	44.4	48	40.6	0.3	0.225
37	46.2	53	40.6	0.3	0.190
37	47.2	53	40.6	0.3	0.360
42	49.2	53	45.6	0.3	0.127
42	49.2	53	45.6	0.3	0.250
42	52.2	60	45.6	0.3	0.230
42	52.2	60	45.6	0.3	0.385
42	57.2	63	50.6	0.3	0.279
47	54.2	60	50.6	0.3	0.192
47	54.2	60	50.6	0.3	0.385
49	62.4	68	55.8	0.6	0.335
49	62.4	68	55.8	0.6	0.660
54	59.4	64	55.8	0.6	0.230
54	59.4	64	55.8	0.6	0.440
55	67.2	73	60.8	1	0.410
55	67.2	73	60.8	1	0.755
60	72.2	80	66	1	0.680
60	72.2	80	66	1	1.35
65	77.2	85	71	1	0.720
65	77.2	85	71	1	1.45
70	82.2	90	76	1	0.770
70	82.2	90	76	1	1.54

With inner ring

Type NAO
Type NAO··ZW



Type NAO

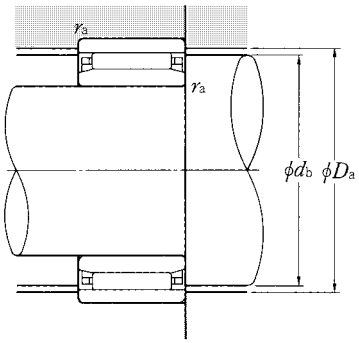


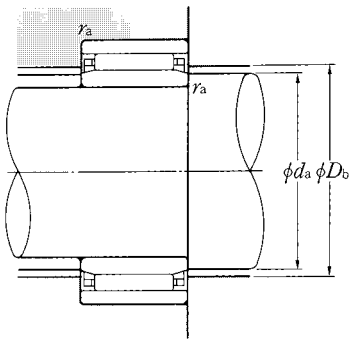
Type NAO··ZW

d 70～90mm

Boundary dimensions mm						Basic load ratings N dynamic		kgf dynamic		Limiting speeds r/min grease	oil	Bearing numbers
d	*D*	*C*	$r_{s\,min}$ [1]	*F*	*E*	C_r	C_{or}	C_r	C_{or}			
70	95	30	1	80	86	57 000	159 000	5 800	16 200	3 300	5 000	NAO-70× 95×30
	95	56	1	80	88	105 000	284 000	10 700	29 000	3 300	5 000	NAO-70× 95×56ZW
	100	30	1	80	88	69 000	166 000	7 050	17 000	3 300	5 000	NAO-70×100×30
	100	60	1	80	88	119 000	335 000	12 100	34 000	3 300	5 000	NAO-70×100×60ZW
75	105	25	1	85	93	61 500	146 000	6 250	14 900	3 100	4 700	NAO-75×105×25
	105	30	1	85	93	71 000	175 000	7 200	17 900	3 100	4 700	NAO-75×105×30
80	110	30	1	90	98	72 500	184 000	7 400	18 800	3 000	4 400	NAO-80×110×30
85	115	30	1	95	103	74 000	193 000	7 550	19 600	2 800	4 200	NAO-85×115×30
90	120	30	1	100	108	76 000	201 000	7 700	20 500	2 700	4 000	NAO-90×120×30

Note 1) Allowable minimum chamfer dimension r.





Abutment dimensions mm					Mass kg
d_a min	d_b	D_a max	D_b	r_{as} max	(approx.)
75	85.2	90	81	1	0.675
75	87.2	90	81	1	1.26
75	87.2	95	81	1	0.850
75	87.2	95	81	1	1.70
80	92.2	100	86	1	0.700
80	92.2	100	86	1	0.880
85	97.2	105	91	1	0.920
90	102.2	110	96	1	0.960
95	107.2	115	101	1	1.04