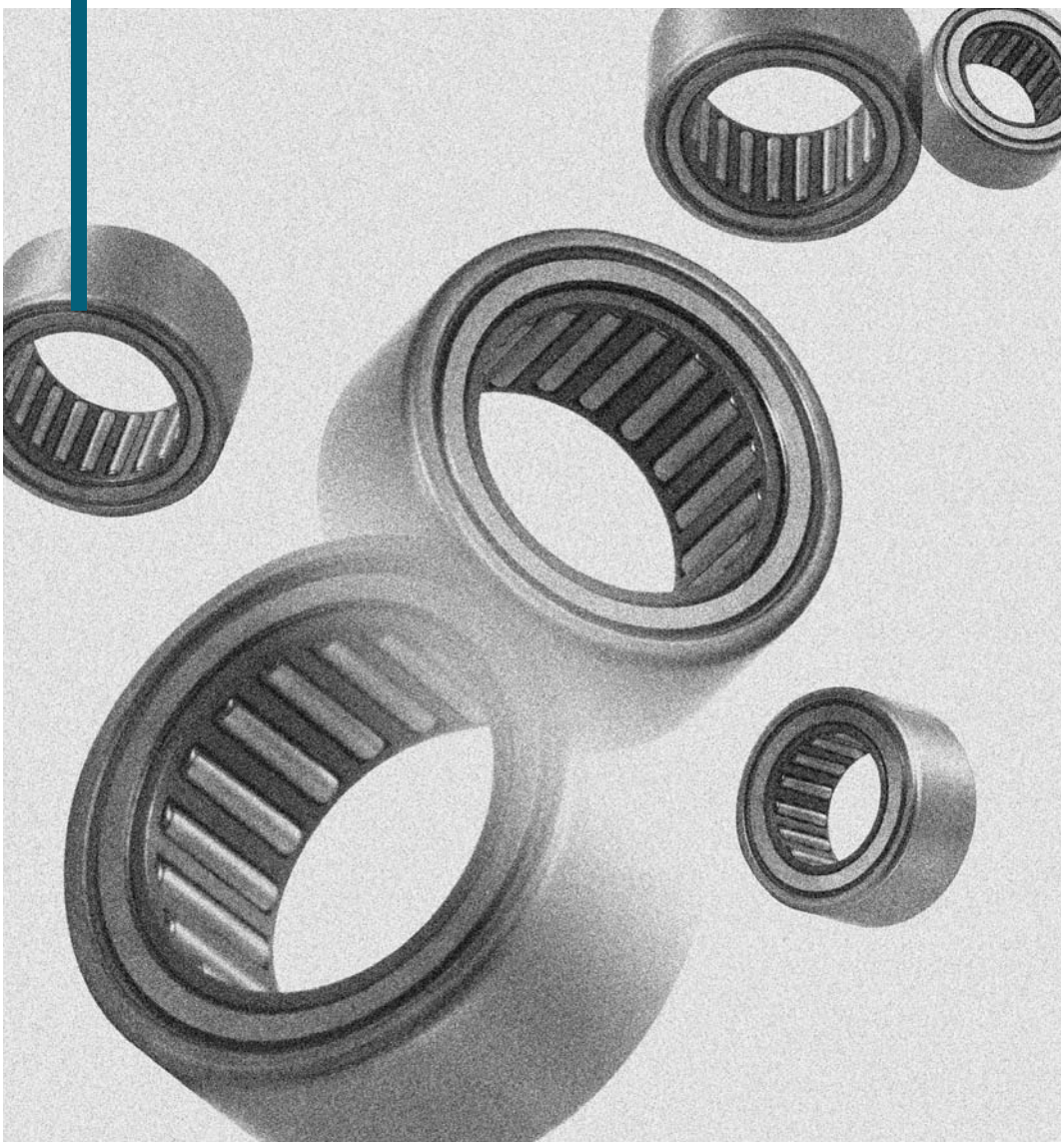
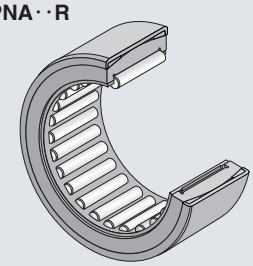
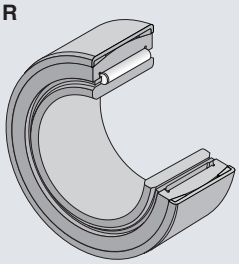
Self-Aligning Needle Roller Bearings



Self-Aligning Needle Roller Bearings

Self-aligning needle roller bearings each comprise an outer ring having spherical outside surface; a deep drawn steel collar around the outside surface of outer ring, and; a resin support ring situated between the outer ring and the collar so that the bearing can be automatically aligned; the inner ring alone can be separated from the bearing.

This bearing product has advantages that it can be used on a highly flexible shaft or in an area where alignment with the housing bore is difficult. Also, this bearing product is easy to handle: for example, it is axially positioned without using a snap ring by simply press-fitting into the housing bore in an appropriate fit mode.

Bearing type	Applicable shaft diameter (mm)	Composition of bearing number	Remarks
Type RPNA··R 	ϕ15– ϕ45	RPNA 20 / 35 R Suffix Outer diameter Roller set bore diameter Type code **[Suffix]** R: Ribbed type	Maximum permissible temperature is limited to 100˚C because the bearing uses a resin-made support ring.
Type PNA··R 	ϕ12– ϕ40		

Bearing accuracy

The dimensional accuracy and profile accuracy of any **NTN** self-aligning needle roller bearing shall be per JIS Class 0 specified in JIS B 1514 “Rolling bearings—Tolerances”. This does not apply to the outside diameter and width of precision drawn collar.

The dimensional tolerances of roller set bore diameter (F_w) of the type RPNA··R (w/o inner ring) shall fall in the range of ISO Tolerance Class F6.

Radial internal clearance and bearing fits

The **NTN** Type PNA··R self-aligning needle roller bearing (w/ inner ring) is manufactured to the tolerance range of radial internal clearance in **Table 5.1** in Sec. **5.1 “Bearing radial internal clearance”** (page A-30). As a self-aligning needle roller bearing is used after being press-fitted into a housing, the fits to the housing and shaft specified in **Table 1** in this page need to be satisfied so that the bearing can function correctly. The bore of this housing needs to satisfy the accuracy specified in **Table 2** in this page. For accuracy of a shaft that uses an inner ring, refer to **Table 8.3** in Sec. **8.3 “Accuracy of shaft and housing”** (page A-40); for accuracy of a shaft that is directly used as a raceway surface, refer to Table 8.4 in Sec. **8.4 “Accuracy of raceway surface”** (page A-40).

For material and hardness of the shaft that functions as raceway surface, refer to Sec. **8.5 “Material and hardness of raceway”** (page A-40).

Table 1 Fits with housing and shaft (recommended)

Housing		Shaft	
Iron	Light alloy	w/o inner ring	w/ inner ring
N6(N7)	R6(R7)	h5(h6)	k5(j6)

Table 2 Accuracy of housing bore (recommended)

Characteristic	Tolerance
Roundness (max.)	IT5/2
Cylindricity (max.)	IT5/2
Surface roughness (max.)	0.8a

Bearing mounting relation dimensions

Self-aligning needle roller bearing with an inner ring must be used within the permissible shift range (S). **(state where the rollers remain in contact with the inner ring in an effective contact length range).** The permissible shift (S) will be found in the relevant dimension table. When the axial shift of the intended bearing is large or a closing seal is used in close vicinity to this bearing, a wider inner ring needs to be adopted. Carefully use a closing seal as its sealing effect may be jeopardized when dimensional errors of fit and/or shaft deflection are large.

When installing a self-aligning needle roller bearing to a housing, place the jig on the marking side of the bearing, and then press-fit the bearing into the correct location in the housing bore.

When installing, NEVER directly hit the bearing with a hard tool such as a steel hammer. Instead, use the press-fit jig that is equipped with a mandrel fitted with an O-ring (see **Fig. 1** in this page). The bearing will be easily press-fitted as it will not be misaligned to the housing or fall.

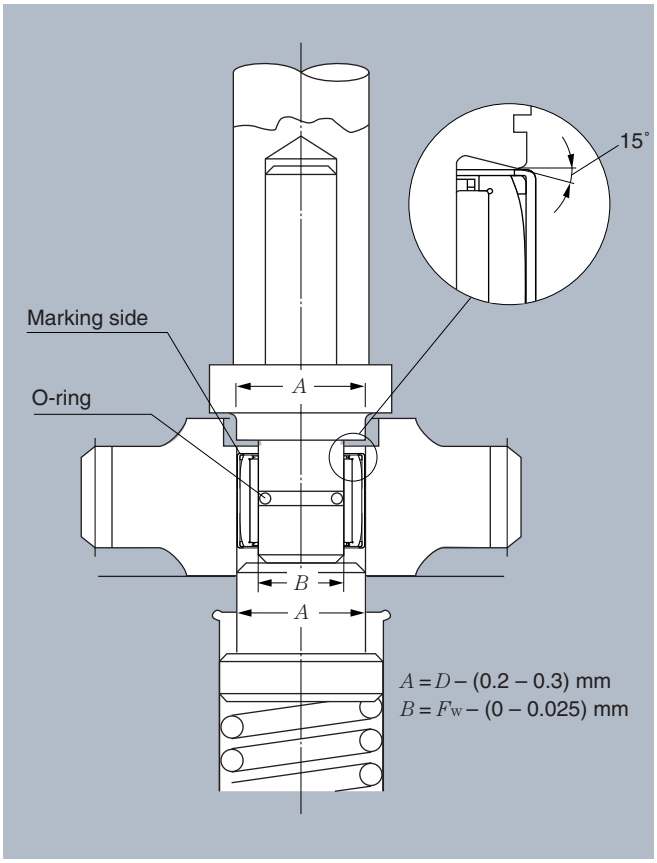
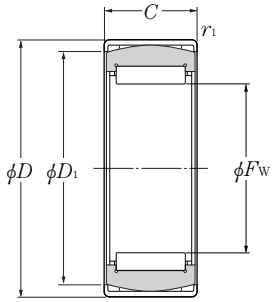


Fig. 1

Without inner ring

Type RPNA··R



Type RPNA··R

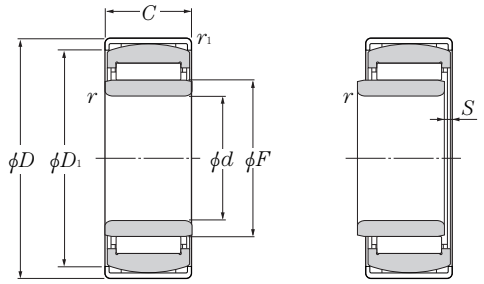
F_W 15～45mm

Boundary dimensions mm						Basic load ratings N dynamic		static		Limiting speeds min^{-1}		Bearing numbers	Mass kg
						kgf dynamic		static					
F_W		D	D_1	C ±0.5	$r_{1\ min}$	C_r		C_{or}		grease	oil		(approx.)
15	+0.027 +0.016	28	24.5	12	0.8	7 050		7 850		715	800	14 000	24 000	**RPNA 15/28R**	0.032
18	+0.027 +0.016	32	27	16	0.8	12 700		16 200		1 300	1 650	13 000	22 000	**RPNA 18/32R**	0.052
20	+0.033 +0.020	35	30.5	16	0.8	13 200		17 500		1 340	1 790	12 500	21 000	**RPNA 20/35R**	0.062
25	+0.033 +0.020	42	36.5	20	0.8	19 200		30 500		1 960	3 100	10 500	18 000	**RPNA 25/42R**	0.109
28	+0.033 +0.020	44	38.5	20	0.8	22 300		34 000		2 280	3 450	9 500	16 000	**RPNA 28/44R**	0.112
30	+0.033 +0.020	47	42	20	0.8	22 900		36 000		2 340	3 650	9 000	15 000	**RPNA 30/47R**	0.125
35	+0.041 +0.025	52	47.5	20	0.8	24 800		41 500		2 520	4 250	7 800	13 000	**RPNA 35/52R**	0.131
40	+0.041 +0.025	55	50.5	20	0.8	26 400		47 000		2 700	4 800	6 600	11 000	**RPNA 40/55R**	0.141
45	+0.041 +0.025	62	58	20	0.8	28 000		52 500		2 860	5 400	6 000	10 000	**RPNA 45/62R**	0.176

Remarks: Type RPNA products are imports from INA (German company in Schaeffler Group).

With inner ring

Type PNA··R



Type PNA··R

d 12～40mm

Boundary dimensions mm								Basic load ratings N		Basic load ratings kgf		Limiting speeds min-1		Bearing numbers	Mass kg
d	D	D1	C ±0.5	rs min 1)	F	r1 min	s 2)	dynamic Cr	static Cor	dynamic Cr	static Cor	grease	oil		(approx.)
12	28	24.5	12	0.3	15	0.8	0.5	7 050	7 850	715	800	14 000	24 000	**PNA 12/28R**	0.037
15	32	27	16	0.3	18	0.8	0.5	12 700	16 200	1 300	1 650	13 000	22 000	**PNA 15/32R**	0.062
17	35	30.5	16	0.3	20	0.8	0.5	13 200	17 500	1 340	1 790	12 500	21 000	**PNA 17/35R**	0.073
20	42	36.5	20	0.3	25	0.8	0.5	19 200	30 500	1 960	3 100	10 500	18 000	**PNA 20/42R**	0.136
22	44	38.5	20	0.3	28	0.8	0.5	22 300	34 000	2 280	3 450	9 500	16 000	**PNA 22/44R**	0.145
25	47	42	20	0.3	30	0.8	0.5	22 900	36 000	2 340	3 650	9 000	15 000	**PNA 25/47R**	0.157
30	52	47.5	20	0.3	35	0.8	0.5	24 800	41 500	2 520	4 250	7 800	13 000	**PNA 30/52R**	0.181
35	55	50.5	20	0.3	40	0.8	0.5	26 400	47 000	2 700	4 800	6 600	11 000	**PNA 35/55R**	0.177
40	62	58	20	0.3	45	0.8	0.5	28 000	52 500	2 860	5 400	6 000	10 000	**PNA 40/62R**	0.227

Note 1) Allowable minimum chamfer dimension r. 2) Allowable axial stroking value of inner ring against outer ring.
Remarks: Type RPNA products are imports from INA (German company in Schaeffler Group).