

COMBINED NEEDLE ROLLER BEARINGS

Overview: Combined bearings incorporate a radial needle roller bearing and a thrust ball or roller bearing into a convenient unitized package.

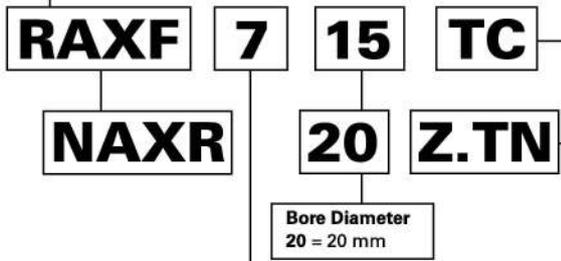
- **Catalogue range:** 5.000 mm – 70.000 mm (0.1966 in – 2.7559 in) bore.
- **Markets:** Industrial applications, machine tools, and automotive transmissions.
- **Features:** Available with ball, needle roller or cylindrical roller thrust component, machined and drawn outer rings are available, some sizes available with integral dust caps.
- **Benefits:** An effective alternative to separate radial and thrust bearings.



NEEDLE ROLLER BEARINGS B-7-1

Combined Needle Roller Bearings – Metric Nominal Dimensions

Prefix
RAX radial needle roller and thrust needle (or cylindrical) roller bearing without inner ring or thrust washer
RAXF closed-end drawn cup design radial needle roller and needle thrust roller bearing without inner ring or thrust washer
RAXZ unitized machined outer ring thrust cylindrical roller and radial needle roller bearing
NAXR machined outer ring thrust cylindrical roller and radial needle roller bearing without inner ring
NAXK machined outer ring thrust ball and radial needle roller bearing without inner ring

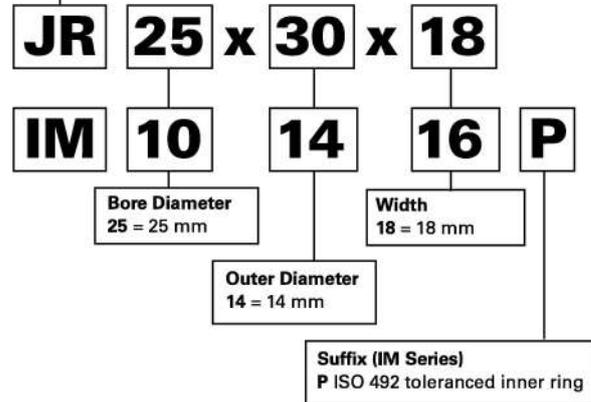


Suffix
TN molded polymer retainer
Z thrust washer retaining dust cap
TB radial play under rollers set to lower half of F6 tolerance
TC radial play under rollers set to upper half of F6 tolerance

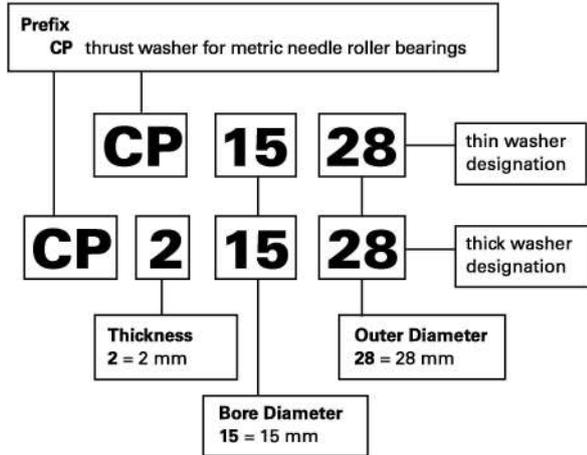
Series (RAX)
700 drawn cup design radial needle roller and needle thrust roller bearing without inner ring or thrust washer
400 machined ring radial needle roller and thrust needle roller bearing without inner ring or thrust washer
500 machined ring radial needle roller and thrust cylindrical roller bearing

Inner Rings for Combined Needle Roller Bearings – Metric Nominal Dimensions

Prefix
JR inner ring for use with NAXR series bearings
IM inner ring for use with RAX series bearings



Thrust Washers for Combined Needle Roller Bearings - Metric Nominal Dimensions



Combined Needle Roller Bearings

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NEEDLE ROLLER BEARINGS B-7-3



NEEDLE ROLLER BEARINGS

COMBINED BEARINGS

METRIC SERIES

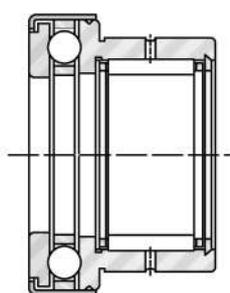
Combined bearings consist of a radial bearing (needle roller bearing) and a thrust bearing (ball, roller or needle bearing). The thrust roller bearing is usually a cylindrical roller thrust bearing.

Combined bearings make an effective alternative in place of two separate bearings—in terms of cost, handling and packaging. Combined bearings can be used with or without matching inner rings and thrust washers—though these are listed opposite the bearing part numbers, where possible, on the following pages of tables for convenience.

REFERENCE STANDARDS ARE:

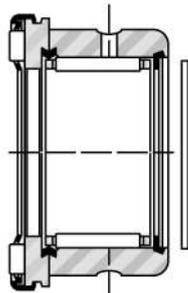
- **DIN 5429, Part 1** – needle roller – thrust cylindrical roller bearings, series NAXR, NAXR.Z.
- **DIN 5429, Part 1** – needle roller – thrust ball bearings, series NAXK, NAXK.Z.
- **ISO 1206** – needle roller bearings – light and medium series – dimensions and tolerances.

Needle roller-ball thrust bearing

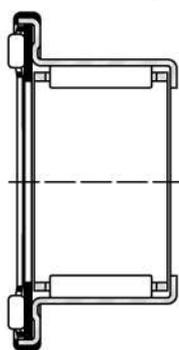


NAXK.Z

Needle roller-needle roller thrust bearings

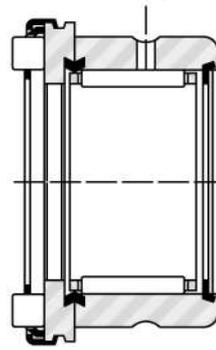


RAX 400

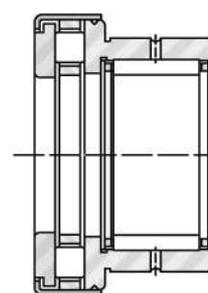


RAX 700

Needle roller-cylindrical roller thrust bearings



RAX 500



NAXR.Z

Fig. B7-1. Types of metric series combined bearings

Suffixes

TN	molded cage of reinforced engineered polymer
Z	retained with a dust cap
Z.TN	retained with a dust cap, molded cage of reinforced engineered polymer
TB	radial play under rollers set to lower half of F6 tolerance limits
TC	radial play under rollers set to upper half of F6 tolerance limits

CONSTRUCTION

Needle roller-cylindrical roller thrust bearings of series NAXR and RAXZ 500 are available with dust caps. They have the highest axial load-carrying capability of all combined bearings. The NAXR and NAXR.Z Series have the same dimensions as needle roller-ball thrust bearings (series NAXK and NAXK.Z).

Combined bearings of series RAX 700 use a thin, one-piece outer ring design, similar in construction to metric drawn cups. The RAX 700 Series is available with an open or closed (RAXF) design, as are standard drawn cups. These bearings use needle rollers for both their radial and thrust complements.

The RAX 400 Series uses needle rollers for both their radial and thrust complements, as with the RAX 700 Series, but are constructed from two separate machined rings, joined with a strong metal insert. The RAX 500 Series, fabricated like the 400 Series, uses heavier cylindrical rollers for their thrust complement.

Both series are available with matching thrust washers and inner rings. These series should be considered for applications requiring higher load capacity and running accuracy.

Each of the previous two bearing types may be best used without inner rings because the radial internal clearances are smaller if the needle roller and cage assemblies operate directly on a hardened and ground shaft. Tolerance class F6 is the normal specification for the needle roller complement bore diameters of the unmounted bearings.

RAX 400 and 500 Series (without inner rings) can be supplied with a smaller radial clearance, if desired. Refer to the suffix options TB and TC, as listed in the chart above.

Quality requirements for shafts, when used as a bearing raceway, are given in the engineering section of this catalog. When it becomes impractical to meet the shaft raceway design requirements, standard inner rings may be used with these bearings.

B-7-4 NEEDLE ROLLER BEARINGS

Combined Needle Roller Bearings

DIMENSIONAL ACCURACY

TOLERANCES

Metric series combined bearings (except Series RAX 700) are manufactured to the normal tolerances which apply to the metric series radial bearings and standard thrust bearings, as shown in the engineering section. The only exceptions are the diameter tolerances of the shaft-piloted washer and the bearing width tolerances. The shaft-piloted washer bore tolerance is E7 for the NAXK, NAXR, NAXK.Z and NAXR.Z Series bearings. The thickness tolerance of the combined bearings thrust component (C₁) can be found in Table B7-2. The matching thrust washer thickness tolerance may be found in the metric unitized thrust bearing section of this catalog.

Because of the nature of the RAX 700 Series design, these bearings must be inspected with suitable plug ("go" and "no go") and ring gage. The plug and ring gage sizes are listed in the inspection columns of the RAX700 Series product table.

BEARING MOUNTING

MOUNTING DIMENSIONS

Simple, through-bored housings are adequate for combined bearings. The mounting tolerances for the mechanical-ring combined bearings are provided in Table B7-1.

The shaft-piloted washers of combined bearings must be supported, at least over half of their width. Other quality requirements for shafts and housings are given in the engineering section. Requirements for fillets, recesses and shoulder heights are the same as for needle roller bearings, as shown in the Mounting Dimensions paragraph on pages B-4-9 and B-4-10.

When mounting these bearings in their housings with a tight fit, relatively high press-in forces will be required which may brinell the raceways of the thrust bearing arrangements. Particular care should be exercised when installing needle roller-cylindrical roller thrust bearings with dust caps – and where the roller assembly of the thrust bearings cannot be removed. In order to avoid brinelling of the thrust bearing raceways, the bearings should be installed with uniform, continuous pressure against the installation tool, avoiding sudden impact forces. At times it may even be desirable to heat the housing before bearing mounting.

Table B7-1. Mounting tolerances

Rotation conditions	ISO tolerance zone for housing	Nominal shaft diameters		With inner ring	Without inner ring
		d			
		>	≤	ISO tolerances zone for shaft	
		mm in	mm in		
Load stationary relative to housing	K6 (M6) ⁽¹⁾	10.000 0.3937	40.000 1.5748	k6	h6
		40.000 1.5748	70.000 2.7559	m6	h6
Load rotates relative to housing	M6 (N6) ⁽¹⁾	All diameters		g6	f6
RAX 700 RAXF 700	H6 (H7)	All diameters		k5	h5 (h6)

⁽¹⁾ Tighter fit for more secure arrangement.

Table B7-2. Thrust component thickness (C₁) tolerances

Bearing series	Tolerances	
	Max.	Min.
	mm in	mm in
NAXK, NAXK.Z	+0.000	-0.200
NAXR, NAXR.Z	+0.000	-0.0078
RAX 400, RAX 500	+0.050 +0.0020	-0.060 -0.0024
RAX 700, RAXF 700	+0.100 +0.0039	-0.100 -0.0039
RAXZ	+0.100 +0.0039	-0.110 -0.0043

LUBRICATION

When the applied axial loads are relatively high and the application allows the use of oil as the desired method of lubrication, bearing types NAXR and NAXK should be given consideration. Combined bearings with a dust cap may use oil lubrication, although their design makes them better suited for use with grease lubrication.

Combined bearings are typically shipped protected with a corrosion-preventive compound that is not a lubricant. The bearings may be used in oil- or grease-lubricated applications, without removal of the corrosion-preventive compound. However, it may be advisable to remove the corrosion-preventive compound before packing the bearings (with a suitable grease) to obtain optimum grease performance and to minimize the possibility of confusing grease bearings with bearings containing corrosion preventive.

LOAD RATINGS

Minimum axial load for combined bearings excluding RAX700:

$$\text{The minimum axial load } F_{a \text{ min.}} = C_{0a} / 2200 \quad (\text{kN})$$

Where:

$$C_{0a} = \text{static load rating} \quad (\text{kN})$$

DYNAMIC EQUIVALENT LOAD

Combined bearings can accommodate radial and axial loads.

Radial needle roller complement

$$P = F_r \quad (\text{kN})$$

Cylindrical or needle roller thrust complement

$$P_a = F_a \quad (\text{kN})$$

STATIC EQUIVALENT LOAD

For all combined bearings series:

Radial needle roller complement

$$P_0 = F_r \quad (\text{kN})$$

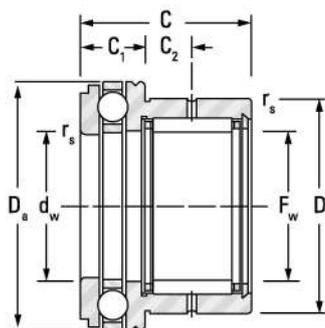
Cylindrical or needle roller thrust complement

$$P_{0a} = F_a \quad (\text{kN})$$

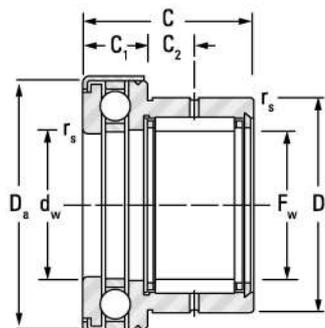


NEEDLE ROLLER BEARINGS

BALL THRUST SERIES
METRIC SERIES



NAXK



NAXK.Z

Shaft Diameter	F _w	D	C	d _w	D _a	C ₁	C ₂	r _{s min.}
				E7				
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
10 0.394	10 0.394	19 0.748	23 0.906	10 0.394	24 0.945	9 0.354	6.5 0.256	0.3 0.012
	10 0.394	19 0.748	23 0.906	10 0.394	25 0.984	9 0.354	6.5 0.256	0.3 0.012
12 0.472	12 0.472	21 0.827	23 0.906	12 0.472	26 1.024	9 0.354	6.5 0.256	0.3 0.012
	12 0.472	21 0.827	23 0.906	12 0.472	27 1.063	9 0.354	6.5 0.256	0.3 0.012
15 0.591	15 0.591	24 0.945	23 0.906	15 0.591	28 1.102	9 0.354	6.5 0.256	0.3 0.012
	15 0.591	24 0.945	23 0.906	15 0.591	29 1.142	9 0.354	6.5 0.256	0.3 0.012
17 0.669	17 0.669	26 1.024	25 0.984	17 0.669	30 1.181	9 0.354	8 0.315	0.3 0.012
	17 0.669	26 1.024	25 0.984	17 0.669	31 1.220	9 0.354	8 0.315	0.3 0.012
20 0.787	20 0.787	30 1.181	30 1.181	20 0.787	35 1.378	10 0.394	10.5 0.413	0.3 0.012
	20 0.787	30 1.181	30 1.181	20 0.787	36 1.417	10 0.394	10.5 0.413	0.3 0.012
25 0.984	25 0.984	37 1.457	30 1.181	25 0.984	42 1.654	11 0.433	9.5 0.374	0.6 0.024
	25 0.984	37 1.457	30 1.181	25 0.984	43 1.693	11 0.433	9.5 0.374	0.6 0.024
30 1.181	30 1.181	42 1.654	30 1.181	30 1.181	47 1.850	11 0.433	9.5 0.374	0.6 0.024
	30 1.181	42 1.654	30 1.181	30 1.181	48 1.890	11 0.433	9.5 0.374	0.6 0.024
35 1.378	35 1.378	47 1.850	30 1.181	35 1.378	52 2.047	12 0.472	9 0.354	0.6 0.024
	35 1.378	47 1.850	30 1.181	35 1.378	53 2.087	12 0.472	9 0.354	0.6 0.024
40 1.575	40 1.575	52 2.047	32 1.260	40 1.575	60 2.362	13 0.512	10 0.394	0.6 0.024
	40 1.575	52 2.047	32 1.260	40 1.575	61 2.402	13 0.512	10 0.394	0.6 0.024
45 1.772	45 1.772	58 2.283	32 1.260	45 1.772	65 2.559	14 0.551	9 0.354	0.6 0.024
	45 1.772	58 2.283	32 1.260	45 1.772	66.5 2.618	14 0.551	9 0.354	0.6 0.024

Combined Needle Roller Bearings

Bearing Designation	Speed Rating Oil	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner ring Designation	Shaft Diameter
		Radial		Thrust		Radial	Thrust			
		Dynamic	Static	Dynamic	Static					
		C	C ₀	C _a	C _{0a}					
	min ⁻¹	kN lbf		kN lbf		kN		kg	mm in	
NAXK10	9500	7.9 1780	8.7 1960	10.0 2250	13.9 3120	1.35	0.630	0.04	JR7x10x16 10 0.394	
NAXK10Z	9500	7.9 1780	8.7 1960	10.0 2250	13.9 3120	1.35	0.630	0.04	JR7x10x16	
NAXK12	9000	7.5 1690	8.5 1910	10.3 2320	15.3 3440	1.30	0.690	0.046	JR9x12x16 12 0.472	
NAXK12Z	9000	7.5 1690	8.5 1910	10.3 2320	15.3 3440	1.30	0.690	0.047	JR9x12x16	
NAXK15	8500	9.7 2180	12.6 2830	10.5 2360	16.7 3750	1.90	0.760	0.047	JR12x15x16 15 0.591	
NAXK15Z	8500	9.7 2180	12.6 2830	10.5 2360	16.7 3750	1.90	0.760	0.05	JR12x15x16	
NAXK17	8500	11.4 2560	16.1 3620	11.3 2540	19.5 4380	2.50	0.880	0.06	JR14x17x17 17 0.669	
NAXK17Z	8500	11.4 2560	16.1 3620	11.3 2540	19.5 4380	2.50	0.880	0.064	JR14x17x17	
NAXK20	7000	14.8 3330	23.7 5330	14.9 3350	26.5 5960	3.65	1.20	0.089	JR17x20x20 20 0.787	
NAXK20Z	7000	14.8 3330	23.7 5330	14.9 3350	26.5 5960	3.65	1.20	0.094	JR17x20x20	
NAXK25	6300	18.9 4250	29.8 6700	18.1 4070	35.5 7980	4.60	1.60	0.134	JR20x25x20 25 0.984	
NAXK25Z	6300	18.9 4250	29.8 6700	18.1 4070	35.5 7980	4.60	1.60	0.141	JR20x25x20	
NAXK30	5600	20.3 4560	34.6 7780	18.8 4230	39.9 8970	5.35	2.15	0.146	JR25x30x20 30 1.181	
NAXK30Z	5600	20.3 4560	34.6 7780	18.8 4230	39.9 8970	5.35	2.15	0.154	JR25x30x20	
NAXK35	5300	22.1 4970	40.8 9170	20.0 4500	46.5 10500	6.35	2.10	0.176	JR30x35x20 35 1.378	
NAXK35Z	5300	22.1 4970	40.8 9170	20.0 4500	46.5 10500	6.35	2.10	0.184	JR30x35x20	
NAXK40	4500	23.9 5370	47 10600	26.9 6050	62.8 14100	7.30	2.85	0.224	JR35x40x20 40 1.575	
NAXK40Z	4500	23.9 5370	47 10600	26.9 6050	62.8 14100	7.30	2.85	0.233	JR35x40x20	
NAXK45	4500	25.0 5620	51.8 11600	27.8 6250	69.1 15500	8.05	3.10	0.262	JR40x45x20 45 1.772	
NAXK45Z	4500	25.0 5620	51.8 11600	27.8 6250	69.1 15500	8.05	3.10	0.275	JR40x45x20	

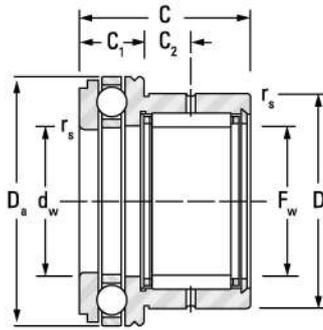
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NEEDLE ROLLER BEARINGS B-7-7

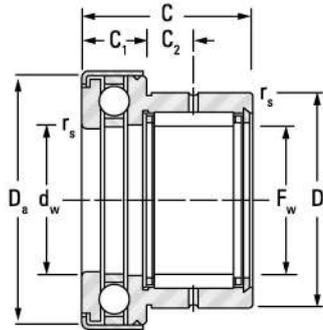


NEEDLE ROLLER BEARINGS

**BALL THRUST SERIES
METRIC SERIES**



NAXK



NAXK.Z

Shaft Diameter	F _w	D	C	d _w	D _a	C ₁	C ₂	r _s min.
				E7				
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
50 1.969	50 1.969	62 2.441	35 1.378	50 1.969	70 2.756	14 0.551	10 0.394	0.6 0.024
	50 1.969	62 2.441	35 1.378	50 1.969	71.5 2.815	14 0.551	10 0.394	0.6 0.024
60 2.362	60 2.362	72 2.835	40 1.575	60 2.362	85 3.346	17 0.669	12 0.472	1 0.039
70 2.756	70 2.756	85 3.346	40 1.575	70 2.756	95 3.740	18 0.709	11 0.433	1 0.039

B

Combined Needle Roller Bearings

Bearing Designation	Speed Rating Oil	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner ring Designation	Shaft Diameter
		Radial		Thrust		Radial	Thrust			
		Dynamic	Static	Dynamic	Static					
		C	C ₀	C _a	C _{0a}					
	min ⁻¹	kN lbf		kN lbf		kN		kg	mm in	
NAXK50	4300	30.2 6790	68.5 15400	28.8 6470	75.4 17000	10.7	3.40	0.316	JR45x50x25 50 1.969	
NAXK50Z	4300	30.2 6790	68.5 15400	28.8 6470	75.4 17000	10.7	3.40	0.332	JR45x50x25	
NAXK60	3600	31.9 7170	78.1 17600	41.4 9310	113 25400	12.2	5.10	0.48	JR50x60x25 60 2.362	
NAXK70	3400	44.9 10100	87.1 19600	40.0 8990	110 24700	13.9	4.95	0.659	JR60x70x25 70 2.756	

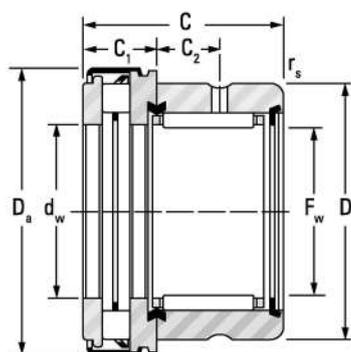


NEEDLE ROLLER BEARINGS B-7-9

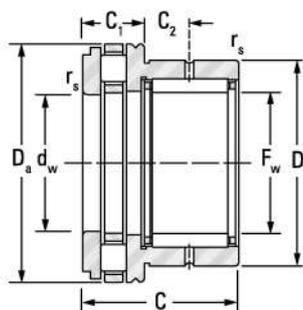


NEEDLE ROLLER BEARINGS

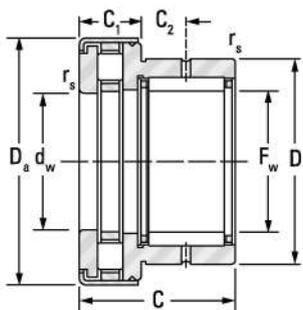
CYLINDRICAL ROLLER THRUST SERIES
METRIC SERIES



RAXZ 500



NAXR



NAXR.Z

Shaft Diameter	F _w	D	C	d _w	D _a	C ₁	C ₂	r _{s min.}
				E7				
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
10 0.394	10 0.394	19 0.748	21.5 0.846	10 0.394	22.4 0.882	7.5 0.295	6 0.236	0.35 0.014
12 0.472	12 0.472	21 0.827	22 0.866	12 0.472	26.4 1.039	8 0.315	6 0.236	0.35 0.014
15 0.591	15 0.591	24 0.945	23 0.906	15 0.591	28 1.102	9 0.354	6.5 0.256	0.3 0.012
	15 0.591	24 0.945	23 0.906	15 0.591	29 1.142	9 0.354	6.5 0.256	0.3 0.012
	15 0.591	24 0.945	22 0.866	15 0.591	28.4 1.118	8 0.315	6 0.236	0.35 0.014
17 0.669	17 0.669	26 1.024	25 0.984	17 0.669	30 1.181	9 0.354	8.0 0.315	0.3 0.012
	17 0.669	26 1.024	25 0.984	17 0.669	31 1.220	9 0.354	8.0 0.315	0.3 0.012
	17 0.669	26 1.024	24 0.945	17 0.669	30.4 1.197	8 0.315	8 0.315	0.65 0.026
20 0.787	20 0.787	30 1.181	30 1.181	20 0.787	35 1.378	10 0.394	10.5 0.413	0.3 0.012
	20 0.787	30 1.181	30 1.181	20 0.787	36 1.417	10 0.394	10.5 0.413	0.3 0.012
	20 0.787	30 1.181	29 1.142	20 0.787	35.4 1.394	11 0.433	9 0.354	0.85 0.033
25 0.984	25 0.984	37 1.457	30 1.181	25 0.984	42 1.654	11 0.433	9.5 0.374	0.6 0.024
	25 0.984	37 1.457	30 1.181	25 0.984	43 1.693	11 0.433	9.5 0.374	0.6 0.024
	25 0.984	37 1.457	29 1.142	25 0.984	43 1.693	11 0.433	9 0.354	0.85 0.033
30 1.181	30 1.181	42 1.654	30 1.181	30 1.181	47 1.850	11 0.433	9.5 0.374	0.6 0.024
	30 1.181	42 1.654	30 1.181	30 1.181	48 1.890	11 0.433	9.5 0.374	0.6 0.024
	30 1.181	42 1.654	29 1.142	30 1.181	48 1.890	11 0.433	9 0.354	0.85 0.033
35 1.378	35 1.378	47 1.850	30 1.181	35 1.378	52 2.047	12 0.472	9.0 0.354	0.6 0.024
	35 1.378	47 1.850	30 1.181	35 1.378	53 2.087	12 0.472	9.0 0.354	0.6 0.024
	35 1.378	47 1.850	30 1.181	35 1.378	54 2.126	12 0.472	9 0.354	0.85 0.033

Combined Needle Roller Bearings

Bearing Designation			Speed Rating	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner Ring Designation	Shaft Diameter
				Radial		Thrust						
RAXZ	NAXR	NAXR.Z		Dynamic	Static	Dynamic	Static	Radial	Thrust			
			min ⁻¹	C	C ₀	C _a	C _{0a}	kN		kg lbs	mm in	
RAXZ 510			15500	6.00 1350	7.40 1660	6.40 1440	13.3 2990	1.15	1.85	0.026 0.057	IM 7 10 16 P	10 0.394
RAXZ 512			13000	6.55 1470	8.65 1940	10.0 2250	22.2 4990	1.30	3.10	0.033 0.073	IM 9 12 16 P	12 0.472
	NAXR15		12000	12.4 2790	15.0 3370	12.0 2700	26.3 5910	2.30	3.70	0.032 0.071	JR12x15x16	15 0.591
		NAXR15.Z	12000	12.4 2790	15.0 3370	12.0 2700	26.3 5910	2.30	3.70	0.035 0.077	JR12x15x16	
RAXZ 515			11500	9.25 2080	11.9 2680	11.0 2470	25.9 5820	1.80	3.65	0.036 0.079	IM 12 15 16 P	
	NAXR17		11000	13.7 3080	17.5 3930	12.6 2830	28.6 6430	2.70	4.05	0.050 0.110	JR14x17x17	17 0.669
		NAXR17.Z	11000	13.7 3080	17.5 3930	12.6 2830	28.6 6430	2.70	4.05	0.053 0.117	JR14x17x17	
RAXZ 517			10500	11.5 2590	16.5 3710	11.9 2680	29.6 6650	2.50	4.15	0.044 0.097	IM 14 17 17 P	
	NAXR20TN		9500	17.5 3930	25.3 5690	23.5 5280	56.8 12800	4.00	8.00	0.090 0.198	JR17x20x20	20 0.787
		NAXR20Z.TN	9500	17.5 3930	25.3 5690	23.5 5280	56.8 12800	4.00	8.00	0.095 0.209	JR17x20x20	
RAXZ 520			9000	14.5 3260	23.0 5170	16.7 3750	39.4 8860	3.55	5.55	0.070 0.154	IM 15 20 20 P	
	NAXR25TN		8000	19.2 4320	30.4 6830	31.2 7010	81.0 18200	4.80	11.4	0.146 0.322	JR20x25x20	25 0.984
		NAXR25Z.TN	8000	19.2 4320	30.4 6830	31.2 7010	81.0 18200	4.80	11.4	0.152 0.335	JR20x25x20	
RAXZ 525			7500	15.7 3530	27.5 6180	19.4 4360	50.7 11400	4.25	7.15	0.105 0.231	IM 20 25 20 P	
	NAXR30TN		6700	24.2 5440	38.3 8610	33.0 7420	91.1 20500	6.10	12.8	0.162 0.357	JR25x30x20	30 1.181
		NAXR30Z.TN	6700	24.2 5440	38.3 8610	33.0 7420	91.1 20500	6.10	12.8	0.169 0.373	JR25x30x20	
RAXZ 530			6500	19.8 4450	33.8 7600	20.3 4560	56.3 12700	5.25	7.90	0.118 0.260	IM 25 30 20 P	
	NAXR35		6000	26.1 5870	44.4 9980	30.8 6920	86.0 19300	7.05	12.1	0.186 0.410	JR30x35x20	35 1.378
		NAXR35.Z	6000	26.1 5870	44.4 9980	30.8 6920	86.0 19300	7.05	12.1	0.195 0.430	JR30x35x20	
RAXZ 535			5500	21.5 4830	39.4 8860	24.1 5420	62.7 14100	6.15	8.80	0.146 0.322	IM 30 35 20 P	

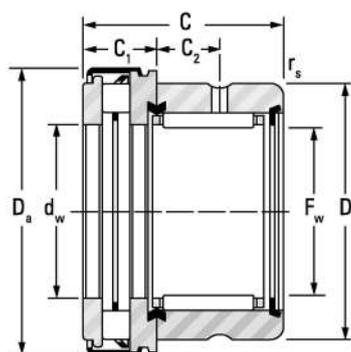
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NEEDLE ROLLER BEARINGS B-7-11

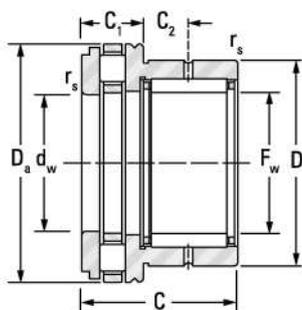


NEEDLE ROLLER BEARINGS

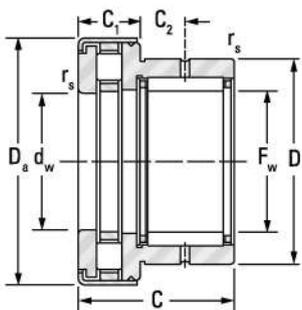
CYLINDRICAL ROLLER THRUST SERIES
METRIC SERIES



RAXZ 500



NAXR



NAXR.Z

Shaft Diameter	F _w	D	C	d _w	D _a	C ₁	C ₂	r _{s min.}
				E7				
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
40 1.575	40	52	32	40	60	13	10.0	0.6
	1.575	2.047	1.260	1.575	2.362	0.512	0.394	0.024
	40	52	32	40	61	13	10.0	0.6
45 1.772	45	58	32	45	65	14	9.0	0.6
	1.772	2.283	1.260	1.772	2.559	0.551	0.354	0.024
	45	58	31	45	66	13	9	0.85
50 1.969	50	62	35	50	70	14	10.0	0.6
	1.969	2.441	1.378	1.969	2.756	0.551	0.394	0.024
	50	62	35	50	71	14	10.0	0.6
60 2.362	60	72	36	60	86	15	11	1.3
	2.362	2.835	1.417	2.362	3.386	0.591	0.433	0.051
	70	85	36	70	96	15	11	1.3
70 2.756	70	85	36	70	96	15	11	1.3
	2.756	3.346	1.417	2.756	3.780	0.591	0.433	0.051

Combined Needle Roller Bearings

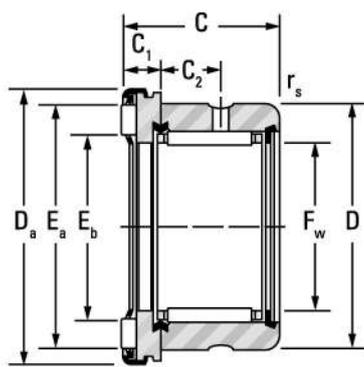
Bearing Designation			Speed Rating	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner Ring Designation	Shaft Diameter
				Radial		Thrust						
RAXZ	NAXR	NAXRZ		Dynamic	Static	Dynamic	Static	Radial	Thrust			
			min ⁻¹	C	C ₀	C _a	C _{0a}	kN		kg lbs	mm in	
				kN lbf	kN lbf	kN lbf	kN lbf					
	NAXR40		5300	27.9 6270	50.4 11300	44.1 9910	126.0 28300	8.05	12.0	0.288 0.635	JR35x40x20	40 1.575
		NAXR40.Z	5300	27.9 6270	50.4 11300	44.1 9910	126.0 28300	8.05	12.0	0.299 0.659	JR35x40x20	
RAXZ 540			5000	23.0 5170	45.1 10100	32.8 7370	85.5 19200	7.00	5.95	0.174 0.384	IM 35 40 20 P	
	NAXR45TN		4800	29.5 6630	56.4 12700	52.3 11800	163.0 36600	9.00	15.5	0.360 0.794	JR40x45x20	45 1.772
		NAXR45Z.TN	4800	29.5 6630	56.4 12700	52.3 11800	163.0 36600	9.00	15.5	0.370 0.816	JR40x45x20	
RAXZ 545			4500	24.5 5510	50.7 11400	34.7 7800	95.0 21400	7.90	6.60	0.206 0.454	IM 40 45 20 P	
	NAXR50		4300	40.8 9170	79.3 17800	49.6 11200	155.0 34800	12.5	14.8	0.432 0.952	JR45x50x25	50 1.969
		NAXR50.Z	4300	40.8 9170	79.3 17800	49.6 11200	155.0 34800	12.5	14.8	0.452 0.996	JR45x50x25	
RAXZ 550			4000	27.4 6160	60.5 13600	36.6 8230	105 23600	9.60	7.25	0.232 0.511	IM 45 50 25 P	
RAXZ 560			3500	30.0 6740	72.2 16200	56.0 12600	192 43200	11.5	18.4	0.327 0.721	IM 55 60 25 P	60 2.362
RAXZ 570			3000	36.2 8140	85.0 19100	60.6 13600	222 49900	13.3	21.2	0.435 0.959	IM 60 70 25 P	70 2.756



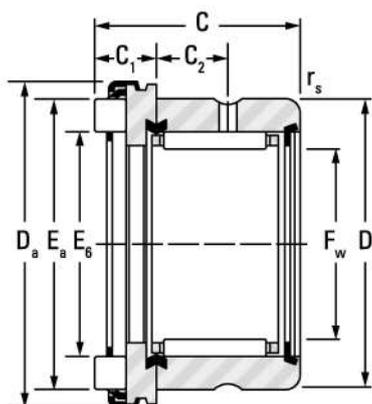


NEEDLE ROLLER BEARINGS

NEEDLE ROLLER AND CYLINDRICAL ROLLER THRUST SERIES
METRIC SERIES



RAX 400



RAX 500

Shaft Diameter	F _w	C	D	D _a	E _b	E _a	C ₁	C ₂	r _{s min.}
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
10 0.3937	10 0.3937	19 0.748	19 0.7480	22 0.8661	12 0.47	18.6 0.73	5 0.197	6 0.236	0.35 0.014
	10 0.3937	19.5 0.768	19 0.7480	22 0.8661	12.2 0.48	18.5 0.73	5.5 0.217	6 0.236	0.35 0.014
12 0.4724	12 0.4724	19 0.748	21 0.8268	26 1.0236	15 0.59	22.6 0.89	5 0.197	6 0.236	0.35 0.014
15 0.5906	15 0.5906	19 0.748	24 0.9449	28 1.1024	17 0.67	24.6 0.97	5 0.197	6 0.236	0.35 0.014
	15 0.5906	20 0.787	24 0.9449	28 1.1024	16.8 0.66	24.9 0.98	6 0.236	6 0.236	0.35 0.014
17 0.6693	17 0.6693	21 0.827	26 1.0236	30 1.1811	19 0.75	26.6 1.05	5 0.197	8 0.315	0.65 0.026
	17 0.6693	22 0.866	26 1.0236	30 1.1811	18.8 0.74	26.9 1.06	6 0.236	8 0.315	0.65 0.026
20 0.7874	20 0.7874	24 0.945	30 1.1811	35 1.3780	22 0.87	31.6 1.24	6 0.236	9 0.354	0.85 0.033
	20 0.7874	26 1.024	30 1.1811	35 1.3780	22 0.87	31.6 1.24	8 0.315	9 0.354	0.85 0.033
25 0.9843	25 0.9843	24 0.945	37 1.4567	42 1.6535	27.7 1.09	37.4 1.47	6 0.236	9 0.354	0.85 0.033
	25 0.9843	26 1.024	37 1.4567	42 1.6535	27.7 1.09	37.4 1.47	8 0.315	9 0.354	0.85 0.033
30 1.1811	30 1.1811	24 0.945	42 1.6535	47 1.8504	32.7 1.29	42.4 1.67	6 0.236	9 0.354	0.85 0.033
	30 1.1811	26 1.024	42 1.6535	47 1.8504	32.7 1.29	42.3 1.67	8 0.315	9 0.354	0.85 0.033
35 1.3780	35 1.3780	24 0.945	47 1.8504	53 2.0866	37.2 1.46	49 1.93	6 0.236	9 0.354	0.85 0.033
	35 1.3780	27 1.063	47 1.8504	53.4 2.1024	37.8 1.49	47.8 1.88	9 0.354	9 0.354	0.85 0.033
40 1.5748	40 1.5748	24 0.945	52 2.0472	60 2.3622	43 1.69	54.9 2.16	6 0.236	9 0.354	0.85 0.033
45 1.7717	45 1.7717	24 0.945	58 2.2835	65 2.5591	48 1.89	59.9 2.36	6 0.236	9 0.354	0.85 0.033
	45 1.7717	28 1.102	58 2.2835	65.4 2.5748	47.8 1.88	59.8 2.35	10 0.394	9 0.354	0.85 0.033

Combined Needle Roller Bearings

Bearing Designation		Speed Rating	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner Ring	Thin Plate	Thick Plate	Shaft Diameter
			Radial		Thrust								
400 Series	500 Series		Dynamic	Static	Dynamic	Static	Radial	Thrust					
		C	C ₀	C _a	C _{0a}								
		min ⁻¹	kN lbf	kN lbf	kN lbf	kN		kg lbs				mm in	
RAX 410		15500	6.00 1350	7.40 1660	5.70 1280	13.2 2970	1.15	1.25	0.025 0.055		CP 10 22	CP 2 10 22	10 0.3937
	RAX 510	15500	6.00 1350	7.40 1660	6.40 1440	13.3 2990	1.15	1.85	0.026 0.057		CP 10 22	CP 2 10 22	
RAX 412		13000	6.55 1470	8.65 1940	7.75 1740	21.1 4740	1.30	2.10	0.032 0.071	IM 9 12 16 P	CP 12 26	CP 2 12 26	12 0.4724
RAX 415		11500	9.25 2080	11.9 2680	8.30 1870	23.8 5350	1.80	2.35	0.034 0.075	IM 12 15 16 P	CP 15 28	CP 2 15 28	15 0.5906
	RAX 515	11500	9.25 2080	11.9 2680	11.0 2470	25.9 5820	1.80	3.65	0.036 0.079	IM 12 15 16 P	CP 15 28	CP 2 15 28	
RAX 417		10500	11.5 2590	16.5 3710	8.80 1980	26.4 5930	2.50	2.60	0.041 0.090	IM 14 17 17 P	CP 17 30	CP 2 17 30	17 0.6693
	RAX 517	10500	11.5 2590	16.5 3710	11.9 2680	29.6 6650	2.50	4.15	0.044 0.097	IM 14 17 17 P	CP 17 30	CP 2 17 30	
RAX 420		9000	14.4 3240	22.9 5150	8.95 2010	28.2 6340	3.55	2.70	0.066 0.146	IM 15 20 20 P	CP 20 35	CP 3 20 35	20 0.7874
	RAX 520	9000	14.4 3240	22.9 5150	8.95 2010	28.2 6340	3.55	3.95	0.070 0.154	IM 15 20 20 P	CP 20 35	CP 3 20 35	
RAX 425		7500	14.8 3330	25.4 5710	13.8 3100	52.8 11900	3.95	5.00	0.099 0.218	IM 20 25 20 P	CP 25 42	CP 3 25 42	25 0.9843
	RAX 525	7500	15.7 3530	27.5 6180	19.4 4360	50.7 11400	4.25	7.15	0.105 0.231	IM 20 25 20 P	CP 25 42	CP 3 25 42	
RAX 430		6500	19.8 4450	33.8 7600	15.0 3370	61.6 13800	5.25	5.85	0.111 0.245	IM 25 30 20 P	CP 30 47	CP 3 30 47	30 1.1811
	RAX 530	6500	19.8 4450	33.8 7600	20.3 4560	56.3 12700	5.25	7.90	0.118 0.260	IM 25 30 20 P	CP 30 47	CP 3 30 47	
RAX 435		5500	21.5 4830	39.4 8860	19.1 4290	88.0 19800	6.15	9.15	0.130 0.287	IM 30 35 20 P	CP 35 52	CP 3 35 52	35 1.3780
	RAX 535	5500	21.5 4830	39.4 8860	24.1 5420	62.7 14100	6.15	8.80	0.146 0.322	IM 30 35 20 P	CP 35 52	CP 3 35 52	
RAX 440		5000	23.3 5240	45.7 10300	20.6 4630	101 22700	7.15	10.5	0.150 0.331	IM 35 40 20 P	CP 40 60	CP 3 40 60	40 1.5748
RAX 445		4500	24.4 5490	50.3 11300	22.1 4970	114 25600	7.90	11.9	0.179 0.395	IM 40 45 20 P	CP 45 65	CP 3 45 65	45 1.7717
	RAX 545	4500	24.4 5490	50.3 11300	34.7 7800	95.0 21400	7.90	13.4	0.206 0.454	IM 40 45 20 P	CP 45 65	CP 3 45 65	

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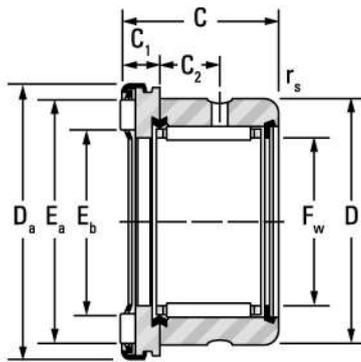




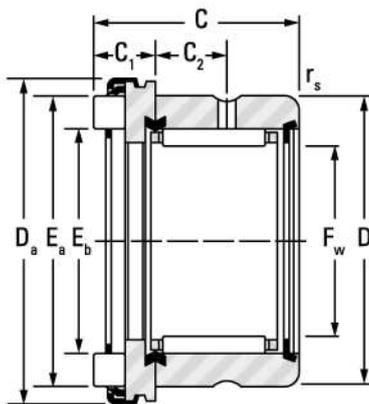
NEEDLE ROLLER BEARINGS

NEEDLE ROLLER AND CYLINDRICAL ROLLER THRUST SERIES
METRIC SERIES

B



RAX 400



RAX 500

Shaft Diameter	F _w	C	D	D _a	E _b	E _a	C ₁	C ₂	r _{s min.}
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in
50 1.9685	50 1.9685	27 1.063	62 2.4409	70 2.7559	53.3 2.10	65.7 2.59	6 0.236	11 0.433	1.3 0.051
	50 1.9685	31 1.220	62 2.4409	70.4 2.7717	52.8 2.08	64.8 2.55	10 0.394	11 0.433	1.3 0.051
60 2.3622	60 2.3622	28 1.102	72 2.8346	85 3.3465	63.5 2.50	79.2 3.12	7 0.276	11 0.433	1.3 0.051
	60 2.3622	32 1.260	72 2.8346	85.4 3.3622	63.5 2.50	79.5 3.13	11 0.433	11 0.433	1.3 0.051
70 2.7559	70 2.7559	28 1.102	85 3.3465	95 3.7402	73.5 2.89	89.2 3.51	7 0.276	11 0.433	1.3 0.051
	70 2.7559	32 1.260	85 3.3465	95.4 3.7559	73.5 2.89	89.5 3.52	11 0.433	11 0.433	1.3 0.051

Combined Needle Roller Bearings

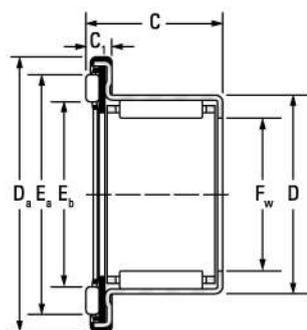
Bearing Designation		Speed Rating	Load Ratings				Fatigue Load Limits C _u		Approx. Wt.	Matching Inner Ring	Thin Plate	Thick Plate	Shaft Diameter
			Radial		Thrust								
400 Series	500 Series		Dynamic	Static	Dynamic	Static	Radial	Thrust					
		C	C ₀	C _a	C _{0a}								
		min ⁻¹	kN lbf	kN lbf	kN lbf	kN		kg lbs				mm in	
RAX 450		4000	27.4 6160	60.5 13600	22.8 5130	123 27700	9.60	12.8	0.205 0.452	IM 45 50 25 P	CP 50 70	CP 3 50 70	50 1.9685
	RAX 550	4000	27.4 6160	60.5 13600	36.6 8230	105 23600	9.60	14.7	0.232 0.511	IM 45 50 25 P	CP 50 70	CP 3 50 70	
RAX 460		3500	30.0 6470	72.2 16200	31.5 7080	197 44300	11.5	20.2	0.282 0.622	IM 55 60 25 P	CP 60 85	CP 4 60 85	60 2.3622
	RAX 560	3500	30.0 6740	72.2 16200	56.0 12600	192 43200	11.5	18.4	0.327 0.721	IM 55 60 25 P	CP 60 85	CP 4 60 85	
RAX 470		3000	36.2 8140	85.0 19100	34.0 7640	228 51300	13.3	23.3	0.386 0.851	IM 60 70 25 P	CP 1,5 70 95	CP 4 70 95	70 2.7559
	RAX 570	3000	36.2 8140	85.0 19100	60.6 13600	222 49900	13.3	21.2	0.435 0.959	IM 60 70 25 P	CP 1,5 70 95	CP 4 70 95	



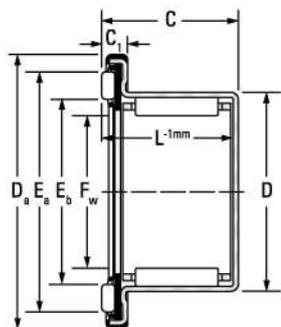


NEEDLE ROLLER BEARINGS

DRAWN CUP, NEEDLE ROLLER THRUST SERIES OPEN AND CLOSED BEARINGS
METRIC SERIES



RAX 700



RAXF 700

Shaft Diameter	F _w	D	C	D _a	E _b	E _a	C ₁	Bearing Designation	
								Open-Ends	Closed-End
mm in	mm in	mm in	mm in	mm in	mm in	mm in	mm in		
5 0.1969	5 0.1969	9 0.3543	11 0.433	15.5 0.6102	7.2 0.28	11.2 0.44	3.3 0.130	RAX 705	
12 0.4724	12 0.4724	18 0.7087	14.2 0.559	27.5 1.0827	15 0.59	22.6 0.89	4.2 0.165	RAX 712	RAXF 712
14 0.5512	14 0.5512	20 0.7874	14.2 0.559	29.5 1.1614	17 0.67	24.6 0.97	4.2 0.165	RAX 714	RAXF 714
15 0.5906	15 0.5906	21 0.8268	14.2 0.559	31.5 1.2402	19 0.75	26.6 1.05	4.2 0.165	RAX 715	RAXF 715
18 0.7087	18 0.7087	24 0.9449	18.2 0.717	33.5 1.3189	21 0.83	28.6 1.13	4.2 0.165	RAX 718	RAXF 718
20 0.7874	20 0.7874	26 1.0236	18.2 0.717	36.5 1.4370	22 0.87	31.6 1.24	4.2 0.165	RAX 720	RAXF 720
25 0.9843	25 0.9843	33 1.2992	22.2 0.874	45.5 1.7913	30 1.18	39.6 1.56	4.2 0.165	RAX 725	RAXF 725
30 1.1811	30 1.1811	38 1.4961	22.2 0.874	50.5 1.9882	35 1.38	44.7 1.76	4.2 0.165	RAX 730	RAXF 730
35 1.3780	35 1.3780	43 1.6929	22.2 0.874	56.5 2.2244	39 1.54	50.9 2.00	4.2 0.165	RAX 735	
40 1.5748	40 1.5748	48 1.8898	22.2 0.874	61.5 2.4213	43 1.69	54.9 2.16	4.2 0.165	RAX 7309	RAXF 7309
45 1.7717	45 1.7717	52 2.0472	22.2 0.874	66.5 2.6181	48 1.89	59.9 2.36	4.2 0.165	RAX 745	

Combined Needle Roller Bearings

L-1	Speed Rating	Load Ratings				Fatigue Load Limits C _i		Approx. Wt.	Inspection			Matching Inner Ring	Thin Plate	Thick Plate	Shaft Diameter
		Radial		Thrust					Ring Gage	Go Plug	No Go Plug				
		Dynamic	Static	Dynamic	Static										
		C	C ₀	C _a	C _{0a}	Radial	Thrust								
mm in	min ⁻¹	kN lbf		kN lbf		kN	kg lbs	mm in	mm in	mm in				mm in	
-	25000	2.55 570	2.10 470	2.85 640	5.60 1260	0.320	0.060	0.005 0.010	9.000 0.3543	5.009 0.1972	5.036 0.1983				
13.2 0.520	13000	7.05 1580	7.40 1660	7.75 1740	21.1 4740	1.15	2.10	0.017 0.036	18.000 0.7087	12.009 0.4728	12.035 0.4738	IM 8 12 12,4	CP 12 26	CP 2 12 26	12 0.4724
13.2 0.520	11500	7.70 1730	8.70 1960	8.30 1870	23.8 5350	1.30	2.35	0.018 0.040	20.000 0.7874	14.009 0.5515	14.035 0.5526	IM 10 14 12,4	CP 14 26	CP 2 14 26	14 0.5512
13.2 0.520	10500	8.20 1840	9.50 2140	8.8 1980	26.4 5930	1.45	2.60	0.020 0.044	21.000 0.8268	15.009 0.5909	15.035 0.5919	IM 12 15 12,4	CP 15 28	CP 2 15 28	15 0.5906
17.2 0.677	10000	12.6 2830	17.7 3980	8.95 2010	27.7 6230	2.70	2.75	0.027 0.060	24.000 0.9449	18.009 0.7090	18.035 0.7100	IM 13 18 16,4	CP 18 30	CP 2 18 30	18 0.7087
17.2 0.677	9000	13.4 3010	19.8 4450	12.2 2740	42.2 9490	3.00	4.00	0.031 0.068	26.000 1.0236	20.009 0.7878	20.035 0.7888	IM 15 20 16,4	CP 20 35	CP 3 20 35	20 0.7874
21.2 0.835	7200	22.3 5010	31.7 7130	14.2 3190	56.3 12700	5.00	5.35	0.055 0.121	33.000 1.2992	20.015 0.7880	25.041 0.9859	IM 20 25 20,4	CP 25 42	CP 3 25 42	25 0.9843
21.2 0.835	6300	24.3 5460	37.3 8390	15.4 3460	65.1 14600	5.90	6.20	0.063 0.139	38.000 1.4961	30.015 1.1817	30.041 1.1827	IM 25 30 20,4	CP 30 47	CP 3 30 47	30 1.1811
21.2 0.835	5500	26.9 6050	44.7 10000	19.6 4410	92.4 20800	7.10	9.60	0.075 0.165	43.000 1.6929	35.015 1.3785	35.041 1.3796	IM 30 35 20,4	CP 35 52	CP 3 35 52	35 1.3780
21.2 0.835	5000	28.5 6410	50.4 11300	20.6 4630	101 22700	8.00	10.5	0.086 0.190	48.000 1.8898	40.015 1.5754	40.041 1.5764	IM 35 40 20,4	CP 40 60	CP 3 40 60	40 1.5748
21.2 0.835	4500	27.0 6070	54.9 12300	22.1 4970	114 25600	8.55	11.9	0.088 0.194	52.000 2.0472	45.015 1.7722	45.041 1.7733	IM 40 45 20,4	CP 45 65	CP 3 45 65	45 1.7717





NEEDLE ROLLER BEARINGS

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