

## NEEDLE ROLLER BEARINGS

**CAGE & NEEDLE ROLLER ASSEMBLIES** Inscribed Circle Diameter 5 – 100mm .... B252

Cage & Needle Roller Assemblies for Connecting Rod Inscribed Circle Diameter 12 – 30mm .... B256

### DRAWN CUP NEEDLE ROLLER BEARINGS

With Cage Inscribed Circle Diameter 4 – 55mm .... B258

Full Complement Type Inscribed Circle Diameter 8 – 55mm .... B258

**SOLID NEEDLE ROLLER BEARINGS** Inscribed Circle Diameter 9 – 390mm .... B264

**THRUST NEEDLE ROLLER BEARINGS** Bore Diameter 10 – 100mm .... B274

**CAM FOLLOWERS** Outside Diameter 16 – 90mm ... B276

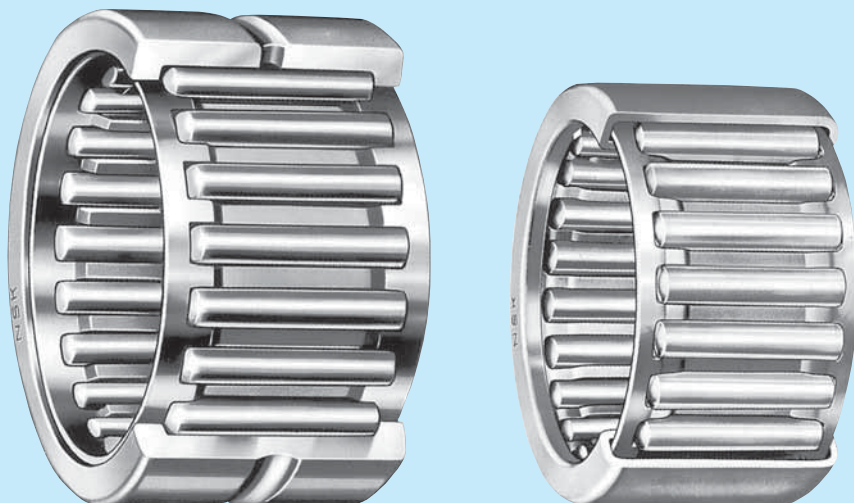
**ROLLER FOLLOWERS** Bore Diameter 5 – 50mm .... B278

### DESIGN AND TYPES

For needle roller bearings, there are many designs and types bearings. Catalog

Specified catalog, NSK Needle Roller Bearings CAT.No.E1419 lists bearings shown in Table 1. Representative examples selected from them, are shown in this catalog. (shown with ■ in Table 1) For details, please refer individual specified catalog.

For bearing selection, please contact NSK.



**Table1 Types of Needle Roller Bearings**

Cage & Needle Roller Assemblies	FWJ, FWF, WJ		FBN, FBNP, WJC, FWJC	
Drawn Cup Needle Roller Bearings	FJ, FJH, J, JH, F, FH, B, BH, FJT, FJTT, MFJT, FJLT, FJLTT, MFJLT		MFJ, MFJH, MJ, MJH, MF, MFH, M, MH, FJP, JP, FIR, IR	
Solid Needle Roller Bearings	RNA 48, RNA 49, RNA 59, RNA 69, HJ		RLM, RNAF, RNA...TT	
Thrust Needle Roller Bearings	FNTA, NTA, FB		FTRA, TRA, FTRB, TRB, FTRC, TRC, FTRD, TRD, FTRE, TRE	
Needle Rollers	A Type, F Type, P Type, T Type, C Type, M Type			
Cam Followers	FCR, FCJ, CR		FCRS, FCJS, YCR, YCRS	
Needle Roller Bearings For Universal Joints	ZY, NSA			
Drawn Cup Roller Clutches	RC, FC, RCB, FCB			

Table 2 is applicable to standard drawn cup needle roller bearings (metric series), and Table 3 shows tolerance of roller inscribed circle diameter based on ISO Standards. For bearings assured by ISO Standards, please order by adding symbol of "-1" at the end of bearing number.

**Table 2 Inspection Gauge Dimensions (General Metric) of Drawn Cup Needle Roller Bearings.**  
(FJ, FJH, MFJ, MFJH)  
(F, FH, MF, MFH)

Nominal Roller Inscribed Circle Diameter, $F_w$	Bore Diameter of Ring Gauge	Units mm	
		Plug Gauge	
		GO Gauge	NO-GO Gauge
4	7.996	4.023	4.048
5	8.996	5.023	5.048
6	9.996	6.028	6.053
7	10.995	7.031	7.056
8	11.995	8.031	8.056
9	12.995	9.031	9.056
10	13.995	10.031	10.056
12	15.995	12.031	12.056
FH 12	17.995	12.031	12.056
13	18.993	13.034	13.059
14	19.993	14.034	14.059
15	20.993	15.034	15.059
16	21.993	16.034	16.059
17	22.972	17.013	17.038
18	23.972	18.013	18.038
20	25.972	20.013	20.038
22	27.972	22.013	22.038
25	31.967	25.013	25.038
28	34.967	28.013	28.038
30	36.967	30.013	30.038
35	41.967	35.013	35.043
40	46.967	40.013	40.043
45	51.961	45.013	45.043
50	57.961	50.013	50.043
55	62.961	55.013	55.043

**Table 3 Ring Gauge of Drawn Cup Needle Roller Bearings and Tolerance of Roller Inscribed Circle Diameter (ISO Standards)**  
(FJ, FJH, MFJ and MFJH)  
(F, FH, MF and MFH)

Nominal Roller Inscribed Circle Diameter, $F_w$	Bore Diameter of Ring Gauge	Units mm	
		Tolerance for Roller Inscribed Circle Diameter, $F_{wmin}^{(1)}$	
		min.	max.
4	7.984	4.010	4.028
5	8.984	5.010	5.028
6	9.984	6.010	6.028
7	10.980	7.013	7.031
8	11.980	8.013	8.031
H 8	13.980	8.013	8.031
9	12.980	9.013	9.031
H 9	14.980	9.013	9.031
10	13.980	10.013	10.031
H 10	15.980	10.013	10.031
12	15.980	12.016	12.034
H 12	17.980	12.016	12.034
13	18.976	13.016	13.034
14	19.976	14.016	14.034
15	20.976	15.016	15.034
16	21.976	16.016	16.034
17	22.976	17.016	17.034
18	23.976	18.016	18.034
20	25.976	20.020	20.041
22	27.976	22.020	22.041
25	31.972	25.020	25.041
28	34.972	28.020	28.041
30	36.972	30.020	30.041
35	41.972	35.025	35.050
40	46.972	40.025	40.050
45	51.967	45.025	45.050
50	57.967	50.025	50.050
55	62.967	55.030	55.060

**Remarks** This is the gauge dimension for inspection of minimum diameter,  $F_{wmin}$ , of roller inscribed circle diameter.

**Note (1)** When using a cylinder instead of an inner ring,  $F_{wmin}$  is the diameter of the cylinder at which the internal clearance is zero in at least one radial direction. ( $F_{wmin}$  is the minimum diameter of each inscribed circle diameter where deviation is assumed.)

**Remarks** To measure the roller inscribed circle diameter, use the following plug gauges:  
GO gauge: The same dimensions as the minimum tolerance of the roller inscribed circle diameter  $F_{wmin}$ .  
NO-GO gauge: The dimensions should be the maximum tolerance of roller inscribed circle diameter,  $F_{wmin}$ , plus 0.002 mm.

**DIMENSIONAL ACCURACY · RUNNING ACCURACY**

**DRAWN CUP NEEDLE ROLLER BEARINGS**

The correct form and dimensional accuracy of outer ring of drawn cup needle roller bearing is achieved only by press fitting into proper housing with appropriate interference. Therefore, roller inscribed circle diameter is measured after press fitted into a standard ring gauge.

The dimension of ring gauge and tolerance of roller inscribed circle diameter are shown in Tables 2 and 3.

**SOLID NEEDLE ROLLER BEARINGS** ..... Table 8. 2 (A60-63 pages)

Tolerance of roller inscribed circle diameter for solid needle roller bearings without inner rings are shown in Table 4.

**Table 4 Inscribed Circle Diameter for Metric Solid Needle Roller Bearings** Units  $\mu\text{m}$

Nominal Inscribed Circle Diameter, $F_w$ (mm)		Deviation (F6) of Minimum Diameter, $F_{w\min}$ , of Roller Inscribed Circle Diameter $F_{w\min}^{(1)}$ $\Delta F_{w\min}$	
over	incl.	high	low
6	10	+ 22	+13
10	18	+ 27	+16
18	30	+ 33	+20
30	50	+ 41	+25
50	80	+ 49	+30
80	120	+ 58	+36
120	180	+ 68	+43
180	250	+ 79	+50
250	315	+ 88	+56
315	400	+ 98	+62
400	500	+108	+68

**Note** (1) When using a cylinder instead of an inner ring,  $F_{w\min}$  is the diameter of the cylinder at which the internal clearance is zero in at least one radial direction. ( $F_{w\min}$  is the minimum diameter of each inscribed circle diameter where deviation is assumed.)

**CAM FOLLOWERS · ROLLER FOLLOWERS** ..... Table 8. 2 (A60-63 pages)

The tolerance zone class of stud diameter  $d$  of cam followers is h7, and the tolerance of assembled width of inner ring of roller followers is shown in bearing table.

These tolerances are applied to the bearings before surface treatment.

Cam Follower Dimensional Tolerances is always applied to the bearing before surface treatment.

**RECOMMENDED FITTING AND BEARING INTERNAL CLEARANCE**

**CAGE & NEEDLE ROLLER ASSEMBLIES**

Recommended fitting of cage & roller under typical operating condition is shown in Table 5. By combining cage & roller, shaft, and housing, appropriate radial internal clearance is obtained. However, the fitting and the radial internal clearance of cage & roller for connecting rod should be determined by the type of engine, characteristic, and driving condition etc.. For details, please refer to specified catalog.

**Table 5 Fitting Tolerances for Shafts and Housing Bores**

Operating Conditions	Fitting Tolerance		housing bore
	shaft		
	$F_w \leq 50 \text{ mm}$	$F_w > 50 \text{ mm}$	
High Accuracy, Oscillating Motion	js5 (j5)	h5	G6
Normal	h5	g5	
High Temperature, Large Shaft Deflection and Mounting Error of Bearings	f6		

**DRAWN CUP NEEDLE ROLLER BEARINGS**

For FJ, FJH, and MFJH types and F, FH, and MFH types, if tolerance of fitting such as shaft:h6, and housing bore:N7 (in case of thick steel housing), are applied under general operating condition, appropriate radial internal clearance is obtained. In case that outer ring rotation, the fitting of shaft : f6, housing bore : R7, and light alloy housing or steel housing of less than 6mm thickness, the housing bore should be smaller than N7 by 0.013 – 0.025 mm.

**SOLID NEEDLE ROLLER BEARINGS**

Recommended fitting for solid needle roller bearings with inner rings

Table 9. 2 (Page A84)

Table 9. 4 (Page A85)

Internal clearance of solid needle roller bearings with inner rings

Table 9. 14 (Page A91)

However, for needle roller bearing of wider bearing width, and with long needle rollers, bearings with CN clearance are not necessarily common, but large clearance is selected frequently. For the solid needle roller bearing without inner ring, it is possible to select radial internal clearance shown in Table 6 by selecting tolerance class of shaft, which is fitting to the bearing.

**Table 6 Fitting Tolerances and Radial Internal clearance of Shafts Assembled with Solid Needle Roller Bearings without Inner Rings**

Nominal Roller Inscribed Circle Diameter $F_w$ (mm)		C2	CN	C3	C4
over	incl.				
6	180	k5	g5	f6	e6
180	315	j6	f6	e6	d6
315	490	h6	e6	d6	c6

**THRUST NEEDLE ROLLER BEARINGS**

Recommended Fitting of Thrust Needle Roller Bearings and Thrust Raceway are shown in Table 7.

**Table 7 Recommended Fitting of Thrust Needle Roller Bearings and Thrust Raceway**

Units  $\text{mm}$

Classification	Type	Cage or raceway guide	Tolerance class or dimension tolerance	
			Shaft	Housing bore
Thrust Needle Bearing Cage & Needle Roller Assemblies	FNTA	Bore	h8	$D_c$ (1)+over 1.0
		Outside	—	H10
Thrust Bearing Rings	FTRA to FTRE	Bore	h8	$D_c$ (1)+over 1.0
		Outside	—	H10

**Note** (1)  $D_c$  represents outside diameter of the cage.

**Remarks** If the cage is guided by outside diameter, to prevent the wear of housing bore, it is necessary to harden the surface at least.

### CAM FOLLOWERS - ROLLER FOLLOWERS

The recommended fittings for the mounting area of cam follower studs are shown in Table 8. Recommended shaft fittings of roller follower are shown in Table 9.

Since cam followers are used with cantilevered mounting, they should be fixed with little clearance of the fitting surface as much as possible.

Since a roller follower is generally used with outer ring rotation, the fitting with shaft is transition or loose fit. In case that heavy loads impose to the roller follower, it is recommended to use the shaft of quench hardening treatment, and with tight fit.

For the details, please refer to specified catalog.

**Table 8 Recommended Fitting for Stud Mounting Part of Cam Followers**

Type	Fitting Tolerance of Mounting Hole
FCR, FCRS FCJ, FCJS	JS7 (J7)

**Table 9 Recommended Shaft Fittings of Roller Followers**

Load	Fitting Tolerance of Shaft
Light Load/Normal Load	g6 or h6
Heavy Load	k6

### SHAFT AND HOUSING SPECIFICATIONS

The specification of shaft and housing for radial needle roller bearings, which are used under general operating condition, is shown in Table 10.

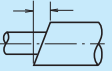
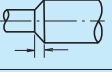
**Table 10 Shaft and housing Specifications of Radial Needle Roller Bearings (Cage & Needle Roller Assemblies/Drawn Cup Bearings/Solid Bearings)**

Category	Shaft		Housing Bore	
	Raceway Surface	Fitting Surface	Raceway Surface	Fitting Surface
Out-of-Roundness Tolerance	$\frac{IT3}{2}$	$\frac{IT3}{2}$ to $\frac{IT4}{2}$	$\frac{IT3}{2}$	$\frac{IT4}{2}$ to $\frac{IT5}{2}$
Cylindricity Tolerance	$\frac{IT3}{2}$	$\frac{IT3}{2}$ to $\frac{IT4}{2}$	$\frac{IT3}{2}$	$\frac{IT4}{2}$ to $\frac{IT5}{2}$
Roughness $R_a$ ( $\mu m$ )	0.4	0.8	0.8	1.6
Hardness	HRC58 to 64 Appropriate depth of hardening layer required	—	HRC58 to 64 Appropriate depth of hardening layer required	—

- Remarks**
1. For the specification of shaft and housing of cage & needle roller assembly for connecting rod, please refer to specified catalog.
  2. These are general recommendation by radius method. For the value of standard tolerance (IT), please refer to Appendix 11 (page C22)

Specifications of Thrust Bearings Raceway Surface are shown in Table 11.

**Table 11 Specifications of Thrust Bearings Raceway Surface**

Squareness A	0.5/1000 incl (mm/mm)	
Squareness B	1.0/1000 incl (mm/mm)	
Roughness $R_a$ ( $\mu m$ )	0.4	—
Hardness	HRC58 to 64 (HRC60 to 64 is favorable)	—

### LIMITING INCLINATION ANGLES

The limiting inclination angle of radial needle roller bearing under general load condition is 0.001 radian (3.4') approximately. For the detail, please refer to specified catalog.

### PERMISSIBLE TRACK LOAD

The permissible load of the track is determined by compression strength or hardness. The permissible load of the track shown in the bearing table is value of a track made of steel with a hardness of HRC40. Table 12 indicates the permissible load coefficient of the track for each hardness.

The permissible load of the track for each hardness can be obtained by multiplying the permissible load coefficient of the track corresponding to each hardness.

### PRE-PACKED GREASE

The cam follower/roller follower with a seal is pre-lubricated with lithium soap-based grease. The range of operating temperature is -10 to +110°C. For the cam follower/roller follower without seal, please lubricate with suitable lubricant.

### MAXIMUM PERMISSIBLE LOAD AND MAXIMUM CLAMP TORQUE OF CAM FOLLOWERS.

The maximum radial Load that the cam follower can carry is determined by the bearing strength and shear strength of the stud rather than the Load rating for neele bearings. This value is given in the bearing table as the maximum permissible Load.

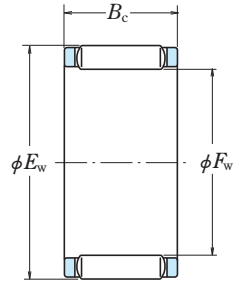
Since the stud of the cam follower receives bending stress and tensile stress from the bearing Load, the screw clamp torque should not exceed the value shown in the bearing table.

### LIMITING SPEED

The limiting speeds of bearings are shown in bearing tables. However, depending on load condition of the bearing, the limiting speeds are necessary to compensate. Also, improvement of lubrication method allows to take higher limiting speed. For the detail, please refer to A37 page.

FWF • FWJ

Inscribed Circle Diameter 5 – 22 mm



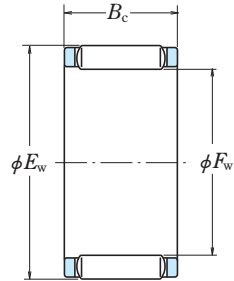
Boundary Dimensions (mm)			Basic Load Ratings				Limiting Speeds	
F <sub>W</sub>	E <sub>W</sub>	B <sub>C</sub> <sup>-0.2 -0.55</sup>	(N)		{kgf}		(min <sup>-1</sup> )	
			C <sub>r</sub>	C <sub>0r</sub>	C <sub>r</sub>	C <sub>0r</sub>	Grease	Oil
5	8	8	2 330	1 860	237	189	60 000	95 000
6	9	8	2 200	1 780	224	182	48 000	75 000
	9	10	3 350	3 050	340	310	48 000	75 000
7	10	8	2 840	2 560	290	261	40 000	67 000
	10	10	3 650	3 550	375	360	40 000	67 000
8	11	10	3 950	4 000	400	410	34 000	56 000
	11	13	4 750	5 150	485	525	34 000	56 000
9	12	10	3 750	3 850	380	395	30 000	50 000
	12	13	5 100	5 750	520	585	30 000	50 000
10	13	10	3 950	4 300	405	435	28 000	45 000
	13	13	5 400	6 350	550	650	28 000	45 000
	14	13	6 500	6 750	660	690	28 000	45 000
12	15	10	4 350	5 100	445	520	22 000	36 000
	15	13	5 950	7 600	605	775	22 000	36 000
	16	13	7 350	8 350	750	850	22 000	38 000
14	18	10	6 750	7 750	690	790	19 000	32 000
	18	13	8 050	9 750	820	995	19 000	32 000
	20	17	13 400	14 600	1 370	1 490	20 000	32 000
15	19	10	7 050	8 400	720	855	18 000	28 000
	19	13	8 400	10 500	860	1 070	18 000	28 000
	21	17	13 400	14 800	1 370	1 510	19 000	30 000
16	20	10	7 350	9 000	750	920	17 000	26 000
	20	13	8 800	11 300	895	1 150	17 000	26 000
	22	17	14 700	16 900	1 500	1 720	17 000	28 000
17	21	10	7 650	9 650	780	985	16 000	26 000
	21	13	10 200	14 000	1 040	1 420	16 000	26 000
	23	17	15 100	17 800	1 540	1 810	16 000	26 000
18	22	10	7 900	10 300	805	1 050	15 000	24 000
	22	13	9 450	12 900	965	1 310	15 000	24 000
	24	17	17 400	21 600	1 770	2 210	15 000	24 000
20	24	10	8 000	10 700	815	1 090	13 000	20 000
	24	13	9 700	13 700	990	1 400	13 000	20 000
	26	17	18 000	23 200	1 830	2 370	14 000	22 000
22	26	10	8 600	12 200	880	1 240	12 000	19 000
	26	13	10 300	15 300	1 050	1 560	12 000	19 000
	28	17	17 300	22 700	1 760	2 310	12 000	20 000

Note (\*) These bearings have polyamide cages. The maximum permissible operating temperature for these bearings is 100 °C for continued operation and 120 °C for short periods.

Bearing Numbers	Mass (g)
	approx.
* FBNP-588	1.0
* FBNP-698	1.2
* FBNP-6910	1.5
* FBNP-7108	1.3
* FBNP-71010	1.6
* FBNP-81110	1.8
* FBNP-81113	2.6
* FBNP-91210	2.0
* FBNP-91213	2.6
FBN-101310	2.2
FBN-101313	2.9
FWF-101413	4.0
FBN-121510	2.6
FBN-121513	3.4
FWF-121613	4.6
FWF-141810	4.1
FWF-141813	5.3
FWF-142017	11
FWF-151910	4.3
FWF-151913	5.6
FWF-152117	12
FWF-162010	4.6
FWF-162013	6.0
FWF-162217	12
FWF-172110	4.8
FWJ-172113	6.3
FWF-172317	14
FWF-182210	5.1
FWF-182213	6.6
FWJ-182417	14
FWF-202410	5.6
FWF-202413	7.3
FWJ-202617	15
FWF-222610	6.1
FWF-222613	7.9
FWF-222817	16

FWF • FWJ

Inscribed Circle Diameter 25 – 100 mm

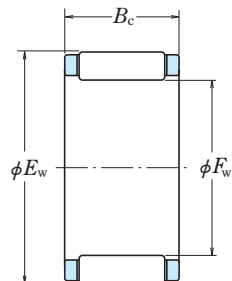


Boundary Dimensions (mm)			Basic Load Ratings				Limiting Speeds	
F <sub>W</sub>	E <sub>W</sub>	B <sub>C</sub> <sup>-0.2 -0.55</sup>	(N)		{kgf}		(min <sup>-1</sup> )	
			C <sub>r</sub>	C <sub>0r</sub>	C <sub>r</sub>	C <sub>0r</sub>	Grease	Oil
<b>25</b>	29	10	9 350	14 100	950	1 440	10 000	17 000
	29	13	11 300	18 000	1 150	1 830	10 000	17 000
	31	17	19 200	26 800	1 950	2 740	10 000	17 000
<b>28</b>	33	13	13 700	20 400	1 400	2 080	9 500	15 000
	33	17	17 600	28 300	1 800	2 890	9 500	15 000
	34	17	19 900	29 100	2 020	2 970	9 500	15 000
<b>30</b>	35	13	14 000	21 600	1 430	2 200	8 500	14 000
	35	17	18 700	31 500	1 910	3 200	8 500	14 000
	37	20	26 000	38 000	2 650	3 850	9 000	14 000
<b>32</b>	37	13	15 100	24 400	1 540	2 480	8 000	13 000
	37	17	18 500	31 500	1 880	3 200	8 000	13 000
	39	20	27 300	41 000	2 780	4 200	8 500	13 000
<b>35</b>	40	13	14 900	24 600	1 520	2 500	7 500	12 000
	40	17	20 500	37 000	2 090	3 750	7 500	12 000
	42	20	30 000	47 500	3 050	4 850	7 500	12 000
<b>40</b>	45	17	21 000	40 000	2 150	4 050	6 300	10 000
	45	27	32 000	68 000	3 250	6 900	6 300	10 000
	48	25	40 500	66 500	4 150	6 800	6 700	10 000
<b>45</b>	50	17	21 600	43 000	2 200	4 350	5 600	9 000
	50	27	34 000	77 500	3 500	7 900	5 600	9 000
	53	25	44 000	77 000	4 500	7 850	5 600	9 500
<b>50</b>	55	20	26 900	59 000	2 750	6 050	5 000	8 000
	55	27	35 000	83 000	3 600	8 450	5 000	8 000
	58	25	48 500	90 500	4 950	9 200	5 300	8 500
<b>55</b>	61	20	31 000	64 000	3 150	6 500	4 500	7 500
	61	30	47 000	109 000	4 750	11 100	4 500	7 500
	63	25	50 000	97 500	5 100	9 950	4 800	7 500
<b>60</b>	66	20	33 000	71 500	3 350	7 300	4 300	6 700
	66	30	50 000	122 000	5 100	12 400	4 300	6 700
	68	25	52 000	105 000	5 300	10 700	4 300	6 700
<b>65</b>	73	30	61 000	132 000	6 200	13 400	4 000	6 300
<b>70</b>	78	30	63 000	140 000	6 400	14 300	3 600	6 000
<b>75</b>	83	30	65 000	151 000	6 650	15 400	3 400	5 600
<b>80</b>	88	30	69 000	166 000	7 050	17 000	3 200	5 000
<b>85</b>	93	30	71 000	176 000	7 250	17 900	3 000	4 800
<b>90</b>	98	30	70 000	177 000	7 150	18 000	2 800	4 500
<b>95</b>	103	30	69 500	177 000	7 100	18 100	2 600	4 300
<b>100</b>	108	30	75 500	201 000	7 700	20 500	2 400	4 000

Bearing Numbers	Mass (g)
	approx.
<b>FWF-252910</b>	6.9
<b>FWF-252913</b>	8.9
<b>FWF-253117</b>	18
<b>FWF-283313</b>	13
<b>FWF-283317</b>	16
<b>FWF-283417</b>	20
<b>FWF-303513</b>	14
<b>FWF-303517A</b>	18
<b>FWF-303720</b>	30
<b>FWF-323713</b>	14
<b>FWJ-323717</b>	19
<b>FWF-323920</b>	32
<b>FWF-354013</b>	16
<b>FWF-354017</b>	20
<b>FWJ-354220</b>	34
<b>FWF-404517A</b>	23
<b>FWF-404527</b>	36
<b>FWF-404825</b>	56
<b>FWF-455017</b>	26
<b>FWF-455027</b>	41
<b>FWF-455325</b>	62
<b>FWF-505520</b>	37
<b>FWF-505527</b>	50
<b>FWF-505825</b>	77
<b>FWF-556120</b>	53
<b>FWF-556130</b>	81
<b>FWF-556325</b>	85
<b>FWF-606620</b>	57
<b>FWF-606630</b>	87
<b>FWF-606825</b>	91
<b>FWF-657330</b>	120
<b>FWF-707830</b>	125
<b>FWF-758330</b>	135
<b>FWF-808830</b>	145
<b>FWF-859330</b>	150
<b>FWF-909830</b>	160
<b>FWF-9510330</b>	175
<b>FWF-10010830</b>	185

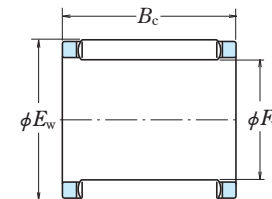
# CAGE & NEEDLE ROLLER ASSEMBLIES

Cage & Needle Roller Assemblies for Large Ends of Connecting Rods  
Inscribed Circle Diameter 12 – 30 mm



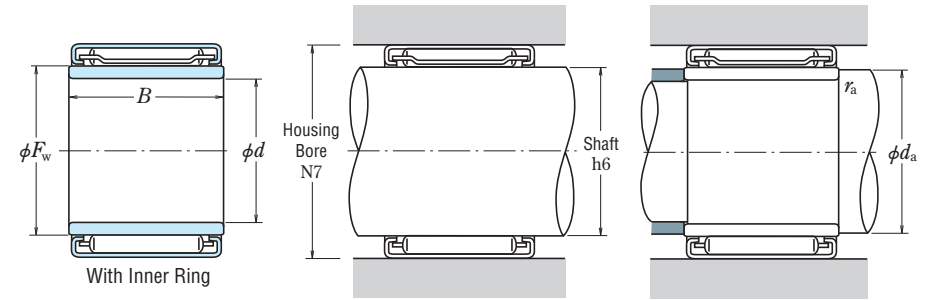
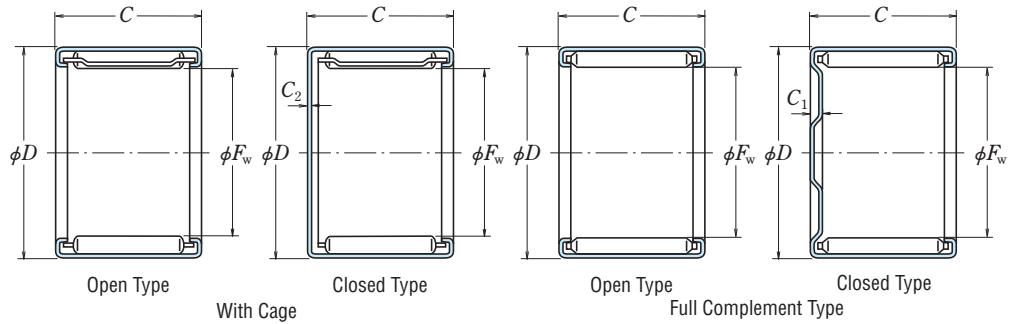
Boundary Dimensions (mm)			Basic Load Ratings (N)				Bearing Numbers	Mass (g) approx.
$F_W$	$E_W$	$B_C^{-0.4}$	$C_r$	$C_{0r}$	{kgf}			
<b>12</b>	16	10	6 100	6 500	620	665	<b>FWF-121610-E</b>	4.0
<b>14</b>	19	10	7 800	8 050	795	820	<b>FWF-141910-E</b>	6.2
	20	12	8 900	8 600	910	880	<b>FWF-142012-E</b>	8.3
<b>15</b>	19	9	5 650	6 250	575	640	<b>FWF-15199-E</b>	4.1
	20	10	7 300	7 600	745	775	<b>FWF-152010-E</b>	6.0
	21	10	7 950	7 500	810	765	<b>FWF-152110-E</b>	8.5
<b>16</b>	21	11	8 650	9 600	880	980	<b>FWF-162111-E</b>	7.5
	22	12	9 500	9 600	965	980	<b>FWF-162212-E</b>	9.5
<b>18</b>	23	14	11 800	14 800	1 200	1 510	<b>FWF-182314-E</b>	10
	24	12	10 000	10 600	1 020	1 080	<b>FWF-182412-E</b>	11
<b>20</b>	26	12	12 200	14 100	1 250	1 440	<b>FWF-202612-E</b>	13
	26	17	16 800	21 200	1 710	2 160	<b>FWF-202617-E</b>	17
	28	18	18 100	19 400	1 840	1 970	<b>FWF-202818-E</b>	25
<b>22</b>	28	14	13 900	17 100	1 420	1 740	<b>FWF-222814-E</b>	14
	29	15	16 300	19 000	1 660	1 930	<b>FWF-222915-E</b>	19
	32	16	19 700	19 400	2 010	1 970	<b>FWF-223216-E</b>	31
<b>23</b>	31	16	17 600	19 400	1 800	1 980	<b>FWF-233116-E</b>	23
<b>24</b>	30	15	15 600	20 300	1 590	2 070	<b>FWF-243015-E</b>	17
	30	17	17 900	24 300	1 830	2 480	<b>FWF-243017-E</b>	19
	31	20	21 600	27 800	2 200	2 840	<b>FWF-243120-E</b>	30
<b>25</b>	32	16	17 700	21 900	1 810	2 230	<b>FWF-253216-E</b>	24
<b>28</b>	35	16	18 400	23 700	1 880	2 410	<b>FWF-283516-E</b>	25
<b>29.75</b>	36.75	16.5	19 600	26 000	1 990	2 650	<b>FWF-293616Z-E</b>	28
<b>30</b>	37	16	21 900	30 500	2 230	3 100	<b>FWF-303716-E</b>	29
	38	18	25 500	34 000	2 600	3 450	<b>FWF-303818-E</b>	35

Cage & Needle Roller Assemblies for Small Ends of Connecting Rods  
Inscribed Circle Diameter 9 – 19 mm



Boundary Dimensions (mm)			Basic Load Ratings (N)				Bearing Numbers	Mass (g) approx.
$F_W$	$E_W$	$B_C^{-0.4}$	$C_r$	$C_{0r}$	{kgf}			
<b>9</b>	12	11.5	4 300	4 650	440	475	<b>FBN-91211Z-E</b>	3.5
<b>10</b>	14	12.7	5 900	5 950	605	610	<b>FBN-101412Z-E</b>	5.0
<b>12</b>	15	14.3	6 400	8 400	655	855	<b>FBN-121514Z-E</b>	4.8
	16	13	7 250	8 200	740	835	<b>FBN-121613-E</b>	6.4
	16	15.5	8 500	10 000	865	1 020	<b>FBN-121615Z-E</b>	7.0
	16	16	8 500	10 000	865	1 020	<b>FBN-121616-E</b>	7.5
<b>14</b>	18	12	6 950	8 050	710	820	<b>FBN-141812-E</b>	6.5
	18	16.5	9 250	11 600	945	1 180	<b>FBN-141816Z-E</b>	8.5
	18	18	10 700	14 000	1 090	1 430	<b>FBN-141818-E</b>	11.5
	18	20	9 550	12 000	975	1 230	<b>FBN-141820-E1</b>	13
<b>15</b>	19	18	11 300	15 300	1 150	1 560	<b>FBN-151918-E</b>	11
	21	18	12 900	13 900	1 310	1 420	<b>FBN-152118-E</b>	13
<b>16</b>	20	22	13 700	20 000	1 400	2 040	<b>FBN-162022-E</b>	14
	20	23.5	14 900	22 300	1 520	2 280	<b>FBN-162023Z-E</b>	15
	21	20	14 200	18 100	1 450	1 840	<b>FBN-162120-E</b>	16
<b>17</b>	21	23	14 800	22 500	1 510	2 290	<b>FBN-172123-E</b>	16
<b>18</b>	22	17	11 500	16 500	1 170	1 680	<b>FBN-182217-E</b>	12
	22	22	14 200	21 600	1 440	2 200	<b>FBN-182222-E</b>	15
	22	23.6	15 400	24 100	1 570	2 460	<b>FBN-182223Z-E</b>	16
<b>19</b>	23	23.7	16 000	25 800	1 630	2 630	<b>FBN-192323Z-E</b>	17

FJ • MFJ (With Cage)  
 F • MF (Full Complement Type)  
 Inscribed Circle Diameter 4 – 16 mm



Boundary Dimensions (mm)	Basic Dynamic Load Ratings (N) {kgf}		Limiting Loads (N) {kgf}		Limiting Speeds (min <sup>-1</sup> )		Bearing				
	$F_w$	$C_r$	$P_{max}$	$C_1, C_2$ max.	Grease	Oil	With Cage				
$D$	$C^{-0.25}$	$C_1, C_2$					Open	Closed			
4	8	8	0.8	1 720	175	675	69	45 000	75 000	* FJP-48	—
5	9	9	0.8	1 860	190	745	76	43 000	71 000	FJ-59	MFJ-59
6	10	9	0.8	2 320	237	985	101	36 000	56 000	FJ-69	MFJ-69
7	11	9	0.8	2 550	260	1 110	113	30 000	48 000	FJ-79	MFJ-79
8	12	10	0.8	2 840	289	1 270	130	26 000	43 000	FJ-810	MFJ-810
	14	10	1.0	4 300	435	1 770	180	28 000	45 000	FJH-810	MFJH-810
	14	10	1.9	5 550	565	2 980	305	6 300	10 000	—	—
9	13	10	0.8	3 300	335	1 600	163	22 000	36 000	FJ-910	MFJ-910
	15	10	1.0	4 550	465	1 910	194	24 000	40 000	FJH-910	MFJH-910
	15	10	1.8	6 100	625	3 350	340	6 000	10 000	—	—
10	14	10	0.8	3 500	360	1 760	179	20 000	32 000	FJ-1010	MFJ-1010
	16	10	1.0	4 900	500	2 100	214	22 000	34 000	FJH-1010	MFJH-1010
	16	10	1.9	6 650	680	3 700	375	5 600	9 000	—	—
12	16	10	0.8	4 150	420	2 210	225	17 000	26 000	FJ-1210	MFJ-1210
	18	12	1.0	6 450	655	3 050	310	17 000	28 000	FJH-1212	MFJH-1212
	18	12	1.9	9 000	920	5 700	580	4 500	7 500	—	—
13	19	12	1.0	6 950	710	3 400	345	16 000	26 000	FJ-1312	MFJ-1312
	19	12	1.9	9 550	975	6 100	625	4 300	7 100	—	—
14	20	12	1.0	6 500	665	3 250	335	15 000	24 000	FJ-1412	MFJ-1412
	20	12	2.2	9 450	965	6 350	645	3 800	6 000	—	—
	20	16	1.0	9 500	970	5 300	540	15 000	24 000	FJ-1416	MFJ-1416
	20	16	2.2	13 300	1 360	9 850	1 000	3 800	6 000	—	—
15	21	12	1.0	7 650	780	3 900	400	14 000	22 000	FJ-1512	MFJ-1512
	21	12	1.8	10 300	1 050	6 900	705	3 800	6 000	—	—
	21	14	1.8	12 400	1 270	8 800	895	3 800	6 000	—	—
	21	16	1.0	11 000	1 120	6 200	635	14 000	22 000	FJ-1516	MFJ-1516
	21	16	1.8	14 500	1 480	10 700	1 090	3 800	6 000	—	—
16	22	12	1.0	7 100	725	3 750	380	12 000	20 000	FJ-1612	MFJ-1612
	22	12	2.2	10 200	1 040	7 100	725	3 400	5 300	—	—
	22	16	1.0	10 400	1 060	6 050	620	12 000	20 000	FJ-1616	MFJ-1616
	22	16	2.2	14 400	1 460	11 100	1 130	3 400	5 300	—	—

Note (\*) These bearing have polyamide cages. The maximum permissible operating temperature for these bearings is 100°C for continued operation and 120°C for short periods.

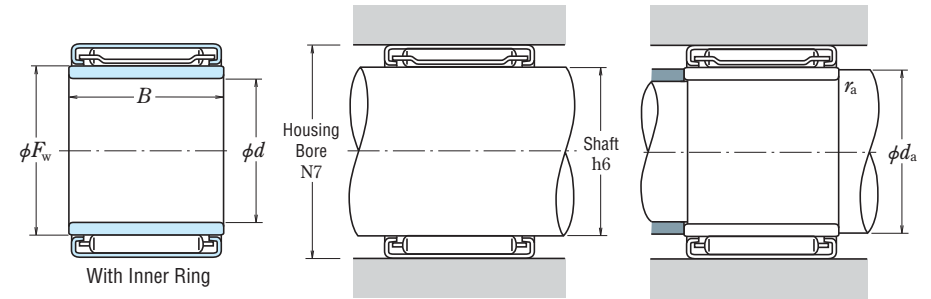
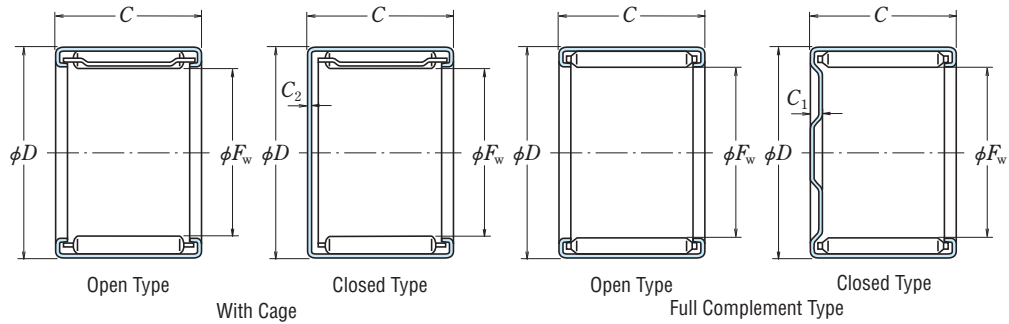
Numbers	In case of inner ring is used				Mass Without Inner Ring (g)			
	Full Complement Type	Bearing Numbers of Inner Ring	Boundary Dimensions (mm)	Abutment and Fillet Dimensions (mm)	approx.			
	Open	Closed	$d$	$B$	$d_a$ (min.)	$r_a$ (max.)	Open	Closed
—	—	—	—	—	—	—	1.3	—
—	—	—	—	—	—	—	1.7	1.9
—	—	—	—	—	—	—	2.2	2.4
—	—	—	—	—	—	—	2.3	2.7
—	—	—	—	—	—	—	2.7	3.2
—	—	—	—	—	—	—	5.2	5.5
FH-810	MFH-810	—	—	—	—	—	6.0	6.3
—	—	—	—	—	—	—	3.2	3.6
—	—	—	—	—	—	—	5.7	6.1
FH-910	MFH-910	—	—	—	—	—	6.4	6.8
—	—	FIR-71010	7	10.5	9	0.3	3.6	4.1
—	—	FIR-71010	7	10.5	9	0.3	6.1	6.6
FH-1010	MFH-1010	FIR-71010	7	10.5	9	0.3	6.9	7.3
—	—	FIR-81210	8	10.5	10	0.3	4.1	4.5
—	—	FIR-81212	8	12.5	10	0.3	7.7	8.2
FH-1212	MFH-1212	FIR-81212	8	12.5	10	0.3	10	11
—	—	FIR-101312	10	12.5	12	0.3	8.6	9.5
F-1312	MF-1312	FIR-101312	10	12.5	12	0.3	11	12
—	—	FIR-101412	10	12.5	12	0.3	10	11
F-1412	MF-1412	FIR-101412	10	12.5	12	0.3	12	14
—	—	FIR-101416	10	16.5	12	0.3	13	14
F-1416	MF-1416	FIR-101416	10	16.5	12	0.3	18	19
—	—	FIR-121512	12	12.5	14	0.3	10	11
F-1512	MF-1512	FIR-121512	12	12.5	14	0.3	12	14
F-1514	MF-1514	—	—	—	—	—	15	16
—	—	FIR-121516	12	16.5	14	0.3	13	14
F-1516	MF-1516	FIR-121516	12	16.5	14	0.3	17	18
—	—	FIR-121612	12	12.5	14	0.3	11	12
F-1612	MF-1612	FIR-121612	12	12.5	14	0.3	14	15
—	—	FIR-121616	12	16.5	14	0.3	14	15
F-1616	MF-1616	FIR-121616	12	16.5	14	0.3	18	20



FJ • MFJ (With Cage)

F • MF (Full Complement Type)

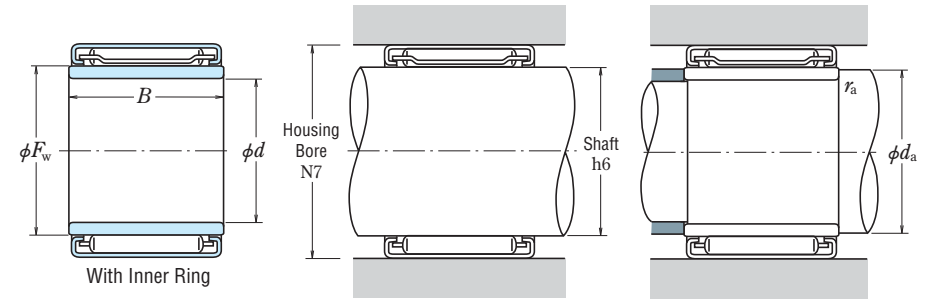
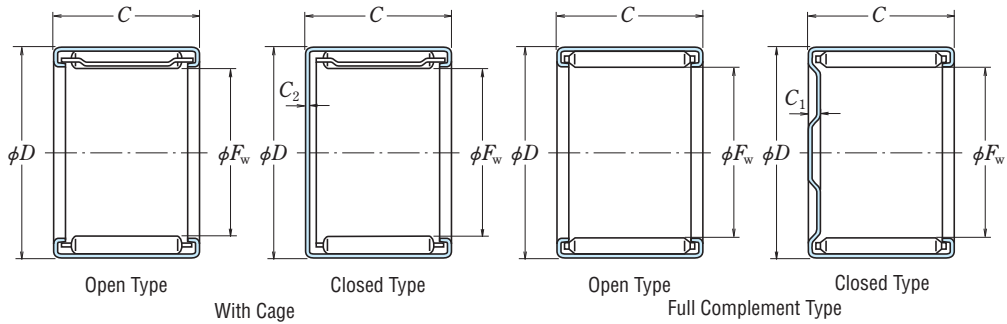
Inscribed Circle Diameter 17 – 28 mm



Boundary Dimensions (mm)	Basic Dynamic Load Ratings (N) {kgf}		Limiting Loads (N) {kgf}		Limiting Speeds (min <sup>-1</sup> )		Bearing				
	F <sub>w</sub>	D	C <sup>-0.25</sup>	C <sub>1, C<sub>2</sub> max.</sub>							
					C <sub>r</sub>	P <sub>max</sub>	Grease	Oil	With Cage		
								Open	Closed		
<b>17</b>	23	12	1.0	8 450	860	4 450	455	12 000	19 000	<b>FJ-1712</b>	<b>MFJ-1712</b>
	23	12	1.8	11 300	1 150	7 750	790	3 400	5 600	—	—
	23	16	1.0	12 100	1 230	7 100	720	12 000	19 000	<b>FJ-1716</b>	<b>MFJ-1716</b>
	23	16	1.8	15 800	1 610	12 000	1 220	3 400	5 600	—	—
<b>18</b>	24	12	1.0	7 650	780	4 200	430	11 000	18 000	<b>FJ-1812</b>	<b>MFJ-1812</b>
	24	12	2.2	10 900	1 110	7 900	805	3 000	5 000	—	—
	24	16	1.0	11 200	1 140	6 800	695	11 000	18 000	<b>FJ-1816</b>	<b>MFJ-1816</b>
	24	16	2.2	15 300	1 560	12 300	1 250	3 000	5 000	—	—
<b>20</b>	26	12	1.0	8 150	835	4 650	475	10 000	16 000	<b>FJ-2012</b>	<b>MFJ-2012</b>
	26	12	2.2	11 500	1 170	8 700	885	2 800	4 500	—	—
	26	16	1.0	11 900	1 210	7 550	770	10 000	16 000	<b>FJ-2016</b>	<b>MFJ-2016</b>
	26	16	2.2	16 200	1 650	13 500	1 380	2 800	4 500	—	—
<b>22</b>	26	20	1.0	15 300	1 560	10 500	1 070	10 000	16 000	<b>FJ-2020</b>	<b>MFJ-2020</b>
	26	20	2.2	20 500	2 090	18 300	1 870	2 800	4 500	—	—
	28	12	1.0	8 650	880	5 150	525	9 000	14 000	<b>FJ-2212</b>	<b>MFJ-2212</b>
	28	12	2.2	12 100	1 230	9 500	970	2 400	4 000	—	—
<b>25</b>	28	16	1.0	12 600	1 290	8 350	850	9 000	14 000	<b>FJ-2216</b>	<b>MFJ-2216</b>
	28	16	2.2	17 100	1 740	14 800	1 510	2 400	4 000	—	—
	28	20	1.0	16 200	1 660	11 500	1 180	9 000	14 000	<b>FJ-2220</b>	<b>MFJ-2220</b>
	28	20	2.2	21 600	2 200	20 000	2 040	2 400	4 000	—	—
<b>28</b>	32	16	1.0	15 200	1 550	9 350	955	8 000	13 000	<b>FJ-2516</b>	<b>MFJ-2516</b>
	32	16	2.5	20 200	2 060	16 200	1 650	2 800	4 500	—	—
	32	20	1.0	19 800	2 020	13 100	1 340	8 000	13 000	<b>FJ-2520</b>	<b>MFJ-2520</b>
	32	20	2.5	25 900	2 640	22 200	2 260	2 800	4 500	—	—
<b>28</b>	32	26	1.0	26 200	2 670	18 800	1 920	8 000	13 000	<b>FJ-2526</b>	<b>MFJ-2526</b>
	32	26	2.5	34 000	3 450	31 500	3 200	2 800	4 500	—	—
	35	16	1.0	15 600	1 590	9 950	1 020	7 100	11 000	<b>FJ-2816</b>	<b>MFJ-2816</b>
	35	16	2.5	21 300	2 170	17 900	1 820	2 400	4 000	—	—
<b>28</b>	35	20	1.0	20 500	2 090	14 200	1 450	7 100	11 000	<b>FJ-2820</b>	<b>MFJ-2820</b>
	35	20	2.5	27 300	2 780	24 600	2 510	2 400	4 000	—	—
	35	26	1.0	26 900	2 750	20 200	2 060	7 100	11 000	<b>FJ-2826</b>	<b>MFJ-2826</b>
	35	26	2.5	35 500	3 650	34 500	3 550	2 400	4 000	—	—

Numbers	In case of inner ring is used				Mass Without Inner Ring (g)			
	Full Complement Type		Bearing Numbers of Inner Ring	Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)		
	Open	Closed		d	B	d <sub>a</sub> (min.)	r <sub>a</sub> (max.)	
						approx. Open	Closed	
—	—	—	—	—	—	10	11	
<b>F-1712</b>	<b>MF-1712</b>	—	—	—	—	14	15	
—	—	—	—	—	—	14	16	
<b>F-1716</b>	<b>MF-1716</b>	—	—	—	—	18	20	
—	—	<b>FIR-151812</b>	15	12.5	17	0.3	12	14
<b>F-1812</b>	<b>MF-1812</b>	<b>FIR-151812</b>	15	12.5	17	0.3	14	16
—	—	<b>FIR-151816</b>	15	16.5	17	0.3	16	18
<b>F-1816</b>	<b>MF-1816</b>	<b>FIR-151816</b>	15	16.5	17	0.3	19	22
—	—	<b>FIR-172012</b>	17	12.5	19	0.3	13	15
<b>F-2012</b>	<b>MF-2012</b>	<b>FIR-172012</b>	17	12.5	19	0.3	17	19
—	—	<b>FIR-172016</b>	17	16.5	19	0.3	17	19
<b>F-2016</b>	<b>MF-2016</b>	<b>FIR-172016</b>	17	16.5	19	0.3	22	25
—	—	<b>FIR-172020</b>	17	20.5	19	0.3	22	24
<b>F-2020</b>	<b>MF-2020</b>	<b>FIR-172020</b>	17	20.5	19	0.3	28	30
—	—	<b>FIR-172212</b>	17	12.5	19	0.3	14	17
<b>F-2212</b>	<b>MF-2212</b>	<b>FIR-172212</b>	17	12.5	19	0.3	18	21
—	—	<b>FIR-172216</b>	17	16.5	19	0.3	19	22
<b>F-2216</b>	<b>MF-2216</b>	<b>FIR-172216</b>	17	16.5	19	0.3	24	27
—	—	<b>FIR-172220</b>	17	20.5	19	0.3	23	26
<b>F-2220</b>	<b>MF-2220</b>	<b>FIR-172220</b>	17	20.5	19	0.3	30	33
—	—	<b>FIR-202516</b>	20	16.5	22	0.3	24	27
<b>F-2516</b>	<b>MF-2516</b>	<b>FIR-202516</b>	20	16.5	22	0.3	31	35
—	—	<b>FIR-202520</b>	20	20.5	22	0.3	31	34
<b>F-2520</b>	<b>MF-2520</b>	<b>FIR-202520</b>	20	20.5	22	0.3	40	43
—	—	<b>FIR-202526</b>	20	26.5	22	0.3	40	43
<b>F-2526</b>	<b>MF-2526</b>	<b>FIR-202526</b>	20	26.5	22	0.3	52	55
—	—	<b>FIR-222816</b>	22	16.5	24	0.3	27	31
<b>F-2816</b>	<b>MF-2816</b>	<b>FIR-222816</b>	22	16.5	24	0.3	35	40
—	—	<b>FIR-222820</b>	22	20.5	24	0.3	34	38
<b>F-2820</b>	<b>MF-2820</b>	<b>FIR-222820</b>	22	20.5	24	0.3	44	48
—	—	<b>FIR-222826</b>	22	26.5	24	0.3	45	49
<b>F-2826</b>	<b>MF-2826</b>	<b>FIR-222826</b>	22	26.5	24	0.3	57	62

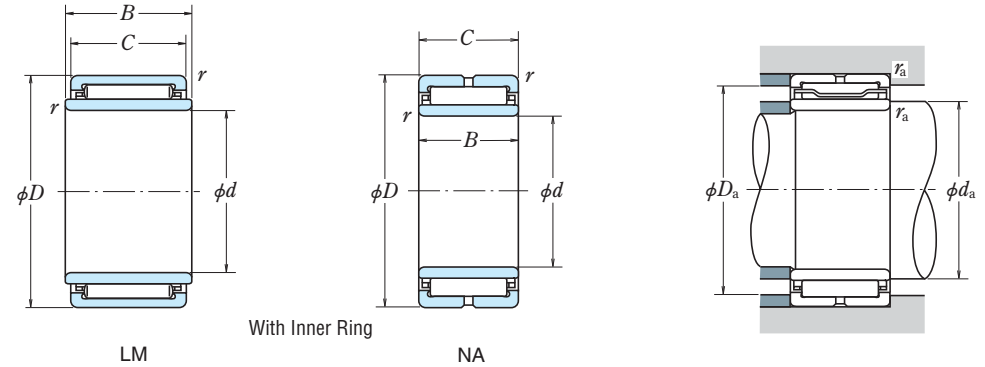
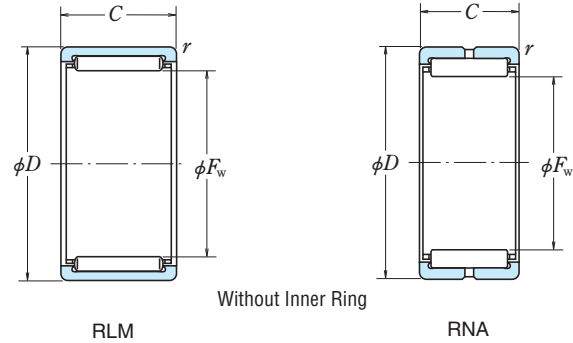
**FJ • MFJ (With Cage)**  
**F • MF (Full Complement Type)**  
 Inscribed Circle Diameter 30 – 55 mm



Boundary Dimensions (mm)	Basic Dynamic Load Ratings (N) {kgf}		Limiting Loads (N) {kgf}		Limiting Speeds (min <sup>-1</sup> )		Bearing				
	F <sub>W</sub>	C <sub>r</sub>	P <sub>max</sub>	Grease	Oil	With Cage					
						Open	Closed				
30	37	16	1.0	15 600	1 590	10 100	1 030	6 700	10 000	<b>FJ-3016L</b>	<b>MFJ-3016</b>
	37	16	2.5	22 100	2 250	18 900	1 930	2 400	3 800	—	—
	37	20	1.0	19 400	1 970	13 300	1 360	6 700	10 000	<b>FJ-3020</b>	<b>MFJ-3020</b>
	37	20	2.5	28 400	2 900	26 200	2 670	2 400	3 800	—	—
	37	26	1.0	26 000	2 660	19 500	1 990	6 700	10 000	<b>FJ-3026</b>	<b>MFJ-3026</b>
	37	26	2.5	37 000	3 800	37 000	3 750	2 400	3 800	—	—
35	42	16	1.0	18 100	1 850	12 800	1 300	5 600	9 000	<b>FJ-3516</b>	<b>MFJ-3516</b>
	42	16	2.5	24 000	2 450	22 000	2 240	2 000	3 400	—	—
	42	20	1.0	23 600	2 410	17 900	1 830	5 600	9 000	<b>FJ-3520</b>	<b>MFJ-3520</b>
	42	20	2.5	31 000	3 150	30 000	3 100	2 000	3 400	—	—
	42	26	1.0	31 500	3 200	25 800	2 630	5 600	9 000	<b>FJ-3526</b>	<b>MFJ-3526</b>
	42	26	2.5	40 000	4 100	42 500	4 350	2 000	3 400	—	—
40	47	16	1.0	18 600	1 890	13 600	1 390	4 800	7 500	<b>FJ-4016</b>	<b>MFJ-4016</b>
	47	16	2.5	25 700	2 620	24 900	2 540	1 800	3 000	—	—
	47	20	1.0	23 500	2 400	18 500	1 890	4 800	7 500	<b>FJ-4020</b>	<b>MFJ-4020</b>
	47	20	2.5	32 500	3 350	34 000	3 450	1 800	3 000	—	—
	47	26	1.0	31 500	3 200	26 900	2 740	4 800	7 500	<b>FJ-4026</b>	<b>MFJ-4026</b>
45	52	16	1.0	19 900	2 030	15 400	1 570	4 300	6 700	<b>FJ-4516</b>	<b>MFJ-4516</b>
	52	16	2.5	27 300	2 790	27 800	2 840	1 600	2 600	—	—
	52	20	1.0	25 500	2 600	21 200	2 160	4 300	6 700	<b>FJ-4520</b>	<b>MFJ-4520</b>
	52	20	2.5	35 000	3 550	38 500	3 900	1 600	2 600	—	—
50	58	20	1.1	28 900	2 940	23 100	2 350	3 800	6 300	<b>FJ-5020L</b>	<b>MFJ-5020</b>
	58	20	2.8	39 500	4 050	41 500	4 250	1 700	2 800	—	—
	58	24	1.1	36 000	3 700	30 500	3 150	3 800	6 300	<b>FJ-5024</b>	<b>MFJ-5024</b>
	58	24	2.8	48 000	4 900	53 000	5 400	1 700	2 800	—	—
55	63	20	1.1	30 000	3 100	25 100	2 560	3 400	5 600	<b>FJ-5520</b>	<b>MFJ-5520</b>
	63	20	2.8	41 500	4 250	45 500	4 650	1 600	2 400	—	—
	63	24	1.1	37 500	3 850	33 500	3 400	3 400	5 600	<b>FJ-5524</b>	<b>MFJ-5524</b>
	63	24	2.8	50 500	5 150	58 000	5 950	1 600	2 400	—	—

Numbers	In case of inner ring is used						Mass Without Inner Ring (g)		
	Full Complement Type		Bearing Numbers of Inner Ring	Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)		approx.	
	Open	Closed		d	B	d <sub>a</sub> (min.)	r <sub>a</sub> (max.)	Open	Closed
—	—	—	—	—	—	—	—	26	31
<b>F-3016</b>	<b>MF-3016</b>	—	—	—	—	—	—	35	40
—	—	<b>FIR-253020</b>	25	20.5	27	0.3	—	35	39
<b>F-3020</b>	<b>MF-3020</b>	<b>FIR-253020</b>	25	20.5	27	0.3	—	46	51
<b>F-3026</b>	<b>MF-3026</b>	<b>FIR-253026</b>	25	26.5	27	0.3	—	46	50
—	—	<b>FIR-253026</b>	25	26.5	27	0.3	—	61	66
—	—	—	—	—	—	—	—	32	38
<b>F-3516</b>	<b>MF-3516</b>	—	—	—	—	—	—	53	60
—	—	<b>FIR-303520</b>	30	20.5	34	0.6	—	41	45
<b>F-3520</b>	<b>MF-3520</b>	<b>FIR-303520</b>	30	20.5	34	0.6	—	42	49
—	—	<b>FIR-303526</b>	30	26.5	34	0.6	—	54	58
<b>F-3526</b>	<b>MF-3526</b>	<b>FIR-303526</b>	30	26.5	34	0.6	—	70	76
—	—	—	—	—	—	—	—	34	43
<b>F-4016</b>	<b>MF-4016</b>	—	—	—	—	—	—	48	56
—	—	<b>FIR-354020</b>	35	20.5	39	0.6	—	46	51
<b>F-4020</b>	<b>MF-4020</b>	<b>FIR-354020</b>	35	20.5	39	0.6	—	60	69
—	—	<b>FIR-354026</b>	35	26.5	39	0.6	—	60	65
—	—	—	—	—	—	—	—	39	50
<b>F-4516</b>	<b>MF-4516</b>	—	—	—	—	—	—	53	64
—	—	<b>FIR-404520</b>	40	20.5	44	0.6	—	53	59
<b>F-4520</b>	<b>MF-4520</b>	<b>FIR-404520</b>	40	20.5	44	0.6	—	67	78
—	—	—	—	—	—	—	—	56	71
<b>F-5020</b>	<b>MF-5020</b>	<b>FIR-455020</b>	45	20.5	49	0.6	—	81	95
—	—	—	—	—	—	—	—	69	84
<b>F-5024</b>	<b>MF-5024</b>	—	—	—	—	—	—	98	110
—	—	—	—	—	—	—	—	60	79
<b>F-5520</b>	<b>MF-5520</b>	—	—	—	—	—	—	88	105
—	—	—	—	—	—	—	—	72	90
<b>F-5524</b>	<b>MF-5524</b>	—	—	—	—	—	—	105	125

RLM • LM  
RNA • NA  
Inscribed Circle Diameter 9 – 22 mm

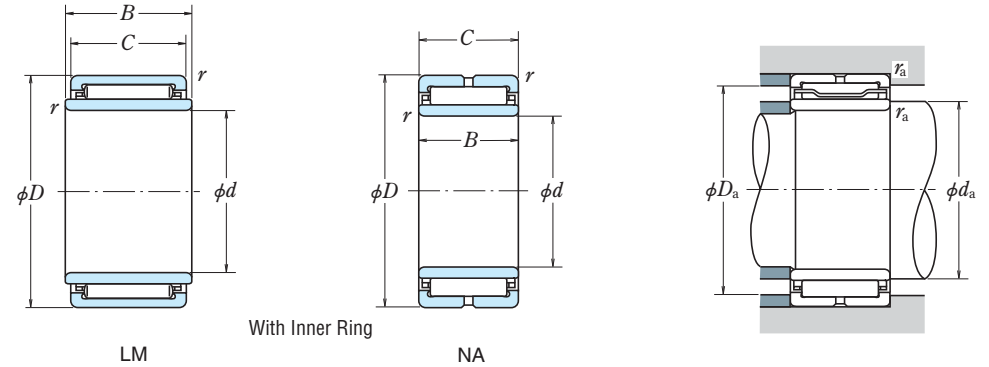
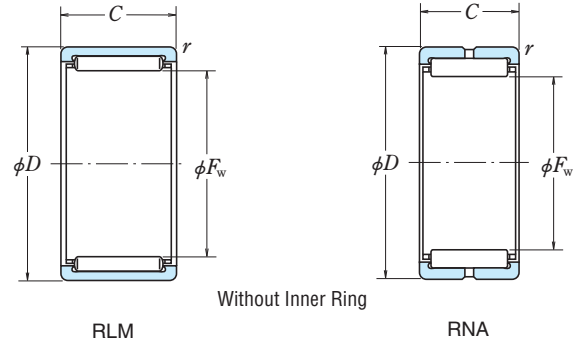


F <sub>W</sub>	Boundary Dimensions (mm)			Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing
	D	C	r min.	C <sub>r</sub> (N)	C <sub>0r</sub> (N)	C <sub>r</sub> (kgf)	C <sub>0r</sub> (kgf)	Grease	Oil	
9	16	12	0.3	6 150	5 400	625	550	24 000	40 000	RLM 912 RLM 916
	16	16	0.3	7 900	7 450	805	760	24 000	40 000	
10	17	10	0.3	5 350	4 650	545	470	22 000	36 000	RLM 101710 RLM 101715
	17	15	0.3	8 050	7 800	820	795	22 000	36 000	
12	17	12	0.3	6 150	7 650	625	780	18 000	30 000	RLM 1212 RLM 121912
	19	12	0.3	7 300	7 150	745	730	18 000	30 000	
14	22	13	0.3	9 150	9 950	930	1 010	20 000	32 000	— RLM 1416 RLM 1420
	22	16	0.3	12 100	12 700	1 230	1 300	15 000	24 000	
	22	20	0.3	15 500	17 500	1 580	1 790	15 000	24 000	
15	20	15	0.3	8 100	11 700	825	1 190	14 000	24 000	RLM 1515 RLM 1520 RLM 152215
	20	20	0.3	11 100	17 400	1 130	1 770	14 000	24 000	
	22	15	0.3	9 900	11 100	1 010	1 140	14 000	24 000	
16	24	13	0.3	10 100	11 700	1 030	1 190	17 000	28 000	— RLM 1616 RLM 1620 —
	24	16	0.3	12 900	14 200	1 310	1 450	13 000	22 000	
	24	20	0.3	16 500	19 500	1 680	1 990	13 000	22 000	
	24	22	0.3	17 900	24 500	1 830	2 500	17 000	28 000	
17	22	10	0.3	5 850	7 950	595	810	13 000	20 000	RLM 1710 RLM 172425
	24	25	0.5	18 200	25 300	1 850	2 580	13 000	20 000	
18	25	15	0.5	11 500	14 300	1 170	1 450	12 000	20 000	RLM 1815 RLM 1820
	25	20	0.5	15 800	21 500	1 610	2 190	12 000	20 000	
20	27	10	0.5	7 950	9 150	810	930	11 000	18 000	RLM 2010 RLM 2015 RLM 2020 RLM 2025 —
	27	15	0.5	11 900	15 400	1 220	1 570	11 000	18 000	
	27	20	0.5	16 400	23 200	1 670	2 370	11 000	18 000	
	27	25	0.5	19 800	29 500	2 010	3 000	11 000	18 000	
	28	13	0.3	10 800	13 600	1 100	1 390	13 000	22 000	
22	28	18	0.3	15 700	21 900	1 600	2 240	13 000	22 000	— — —
	28	23	0.3	19 300	28 600	1 960	2 920	13 000	22 000	
	29	20	0.5	17 700	26 400	1 810	2 690	10 000	16 000	
30	29	25	0.5	21 300	33 500	2 170	3 400	10 000	16 000	RLM 2220 RLM 2225 — — — RLM 223020 —
	30	13	0.3	11 600	15 400	1 190	1 570	12 000	20 000	
	30	18	0.3	16 800	24 800	1 720	2 530	12 000	20 000	
	30	20	0.5	20 000	27 200	2 030	2 780	10 000	16 000	
	30	23	0.3	20 700	32 500	2 110	3 300	12 000	20 000	

Numbers		Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)			Mass (kg)	
Without Inner Ring	With Inner Ring	d	B	d <sub>a</sub> min.	D <sub>a</sub> max.	r <sub>a</sub> max.	Without Inner Ring	With Inner Ring
—	LM 91612-1	6	12	8	14	0.3	0.009	0.013
—	—	—	—	—	14	0.3	0.011	—
—	—	—	—	—	15	0.3	0.008	—
—	—	—	—	—	15	0.3	0.012	—
—	LM 1212	8	12.2	10	15	0.3	0.007	0.013
—	LM 121912	8	12.2	10	17	0.3	0.011	0.017
RNA 4900	NA 4900	10	13	12	20	0.3	0.016	0.024
—	LM 1416	10	16.2	12	20	0.3	0.019	0.028
—	LM 1420	10	20.2	12	20	0.3	0.024	0.036
—	LM 1515	10	15.2	12	18	0.3	0.011	0.022
—	LM 1520	10	20.2	12	18	0.3	0.015	0.03
—	LM 152215	10	15.2	12	20	0.3	0.016	0.027
RNA 4901	NA 4901	12	13	14	22	0.3	0.018	0.027
—	LM 1616	12	16.2	14	22	0.3	0.021	0.032
—	LM 1620	12	20.2	14	22	0.3	0.027	0.041
RNA 6901	NA 6901	12	22	14	22	0.3	0.03	0.045
—	LM 1710	12	10.2	14	20	0.3	0.008	0.017
—	LM 172425	12	25.2	16	20	0.5	0.03	0.052
—	LM 1815	15	15.2	19	21	0.5	0.019	0.028
—	LM 1820	15	20.2	19	21	0.5	0.025	0.037
—	LM 2010	15	10.2	19	23	0.5	0.014	0.025
—	LM 2015	15	15.2	19	23	0.5	0.021	0.037
—	LM 2020	15	20.2	19	23	0.5	0.028	0.049
—	LM 2025	15	25.2	19	23	0.5	0.035	0.061
RNA 4902	NA 4902	15	13	17	26	0.3	0.021	0.035
RNA 5902	NA 5902	15	18	17	26	0.3	0.032	0.051
RNA 6902	NA 6902	15	23	17	26	0.3	0.039	0.064
—	LM 2220	17	20.2	21	25	0.5	0.03	0.054
—	LM 2225	17	25.2	21	25	0.5	0.038	0.068
RNA 4903	NA 4903	17	13	19	28	0.3	0.023	0.038
RNA 5903	NA 5903	17	18	19	28	0.3	0.034	0.055
—	LM 223020	17	20.2	21	26	0.5	0.035	0.06
RNA 6903	NA 6903	17	23	19	28	0.3	0.041	0.068

Remarks If a full complement roller bearing is required, please contact NSK.

RLM • LM  
RNA • NA  
Inscribed Circle Diameter 25 – 35 mm

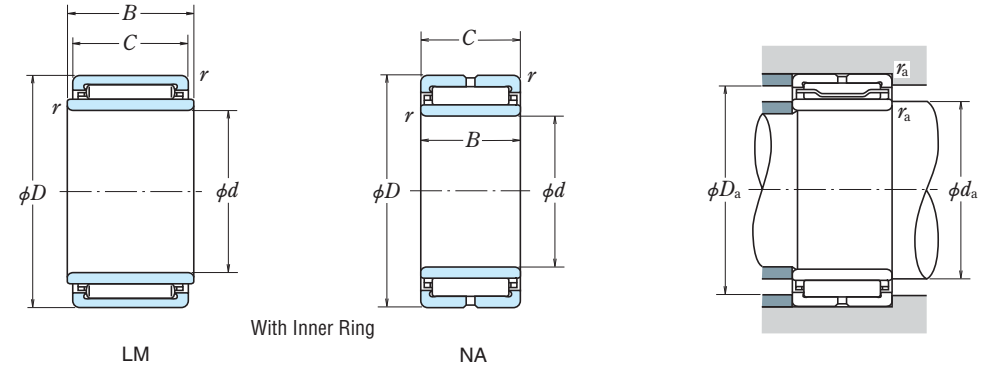
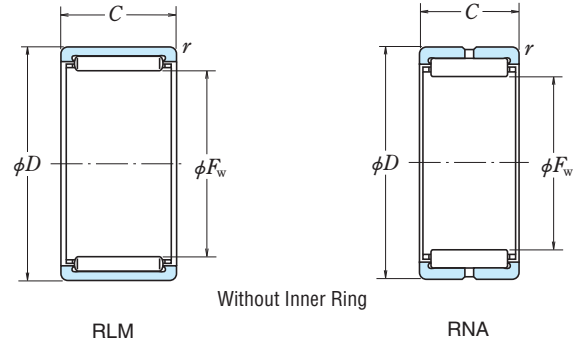


$F_w$	Boundary Dimensions (mm)			Basic Load Ratings (N)				Limiting Speeds ( $\text{min}^{-1}$ )		Bearing
	$D$	$C$	$r$ min.	$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	
25	32	12	0.5	10 300	13 700	1 050	1 400	8 500	14 000	RLM 2512
	32	20	0.5	18 800	29 700	1 920	3 050	8 500	14 000	RLM 2520
	32	25	0.5	22 700	37 500	2 310	3 850	8 500	14 000	RLM 2525
28	37	17	0.3	19 700	22 900	2 010	2 340	11 000	18 000	—
	37	23	0.3	27 800	35 500	2 830	3 650	11 000	18 000	—
	37	30	0.3	36 500	50 500	3 700	5 150	11 000	18 000	—
30	35	20	0.5	19 900	33 000	2 030	3 350	7 500	12 000	RLM 2820
	35	25	0.5	23 900	42 000	2 440	4 250	7 500	12 000	RLM 2825
	37	30	0.5	34 000	52 500	3 450	5 350	7 500	12 000	RLM 283730
32	39	17	0.3	22 400	30 500	2 290	3 150	9 500	15 000	—
	39	23	0.3	28 300	41 500	2 890	4 200	9 500	15 000	—
	39	30	0.3	37 000	58 500	3 800	6 000	9 500	15 000	—
35	40	20	0.5	24 500	44 000	2 490	4 500	7 100	12 000	RLM 3025
	40	25	0.5	25 000	36 000	2 550	3 650	7 100	12 000	RLM 304020
	40	30	0.5	35 000	56 000	3 600	5 700	7 100	12 000	RLM 304030
32	42	17	0.3	21 400	26 800	2 180	2 740	9 000	14 000	—
	42	23	0.3	30 000	41 500	3 100	4 250	9 000	14 000	—
	42	30	0.3	39 500	59 000	4 050	6 050	9 000	14 000	—
33	42	20	0.5	25 800	38 000	2 630	3 900	6 700	11 000	RLM 3220
	42	30	0.5	36 500	59 000	3 700	6 050	6 700	11 000	RLM 3230
	45	17	0.3	22 200	28 700	2 270	2 930	8 500	13 000	—
34	45	23	0.3	31 500	44 500	3 200	4 550	8 500	13 000	—
	45	30	0.3	41 000	63 500	4 200	6 450	8 500	13 000	—
	35	42	20	0.5	22 300	41 000	2 270	4 200	6 300	10 000
42		30	0.5	31 000	63 500	3 200	6 450	6 300	10 000	RLM 3530
45		20	0.5	27 500	42 500	2 800	4 350	6 300	10 000	RLM 354520
36	45	25	0.5	33 000	54 500	3 400	5 550	6 300	10 000	RLM 354525
	45	30	0.5	38 500	66 000	3 950	6 750	6 300	10 000	RLM 354530
	47	17	0.3	23 900	32 500	2 430	3 300	7 500	12 000	—
37	47	23	0.3	33 500	50 500	3 450	5 150	7 500	12 000	—
	47	30	0.3	44 000	71 500	4 500	7 300	7 500	12 000	—

Remarks If a full complement roller bearing is required, please contact NSK.

Numbers		Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)			Mass (kg)	
Without Inner Ring	With Inner Ring	$d$	$B$	$d_a$ min.	$D_a$ max.	$r_a$ max.	approx.	
							Without Inner Ring	With Inner Ring
—	LM 2512	20	12.2	24	28	0.5	0.02	0.036
—	LM 2520	20	20.2	24	28	0.5	0.034	0.061
—	LM 2525	20	25.2	24	28	0.5	0.042	0.076
RNA 4904	NA 4904	20	17	22	35	0.3	0.055	0.077
RNA 5904	NA 5904	20	23	22	35	0.3	0.089	0.12
RNA 6904	NA 6904	20	30	22	35	0.3	0.098	0.14
—	LM 2820	22	20.2	26	31	0.5	0.038	0.062
—	LM 2825	22	25.2	26	31	0.5	0.047	0.092
—	LM 283730	22	30.2	26	33	0.5	0.075	0.13
RNA 49/22	NA 49/22	22	17	24	37	0.3	0.056	0.086
RNA 59/22	NA 59/22	22	23	24	37	0.3	0.091	0.135
RNA 69/22	NA 69/22	22	30	24	37	0.3	0.096	0.15
—	LM 3025	25	25.2	29	33	0.5	0.05	0.092
—	LM 304020	25	20.2	29	36	0.5	0.06	0.093
—	LM 304030	25	30.2	29	36	0.5	0.09	0.14
RNA 4905	NA 4905	25	17	27	40	0.3	0.063	0.091
RNA 5905	NA 5905	25	23	27	40	0.3	0.10	0.14
RNA 6905	NA 6905	25	30	27	40	0.3	0.11	0.16
—	LM 3220	28	20.2	32	38	0.5	0.064	0.09
—	LM 3230	28	30.2	32	38	0.5	0.096	0.14
RNA 49/28	NA 49/28	28	17	30	43	0.3	0.076	0.099
RNA 59/28	NA 59/28	28	23	30	43	0.3	0.11	0.145
RNA 69/28	NA 69/28	28	30	30	43	0.3	0.13	0.175
—	LM 3520	30	20.2	34	38	0.5	0.046	0.085
—	LM 3530	30	30.2	34	38	0.5	0.07	0.13
—	LM 354520	30	20.2	34	41	0.5	0.069	0.11
—	LM 354525	30	25.2	34	41	0.5	0.086	0.135
—	LM 354530	30	30.2	34	41	0.5	0.10	0.16
RNA 4906	NA 4906	30	17	32	45	0.3	0.072	0.105
RNA 5906	NA 5906	30	23	32	45	0.3	0.11	0.15
RNA 6906	NA 6906	30	30	32	45	0.3	0.13	0.19

RLM • LM  
RNA • NA  
Inscribed Circle Diameter 37 – 58 mm

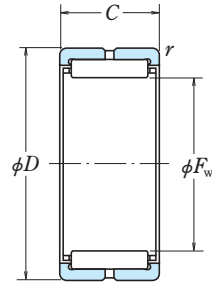


$F_w$	Boundary Dimensions (mm)			Basic Load Ratings (N)				Limiting Speeds ( $\text{min}^{-1}$ )		Bearing
	$D$	$C$	$r$ min.	$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	
37	47	20	0.6	28 200	45 000	2 880	4 550	6 000	9 500	RLM 3720 RLM 3730
	47	30	0.6	39 500	69 500	4 050	7 100	6 000	9 500	
38	48	20	0.6	29 000	47 000	2 960	4 800	5 600	9 000	RLM 3820 RLM 3830
	48	30	0.6	41 000	73 000	4 150	7 450	5 600	9 000	
40	50	20	0.6	29 700	49 000	3 050	5 000	5 300	9 000	RLM 4020 RLM 4030
	50	30	0.6	42 000	76 500	4 250	7 800	5 300	9 000	
42	52	20	0.6	29 900	45 000	3 050	4 600	6 700	10 000	—
	52	27	0.6	40 500	66 000	4 100	6 750	6 700	10 000	
	52	36	0.6	56 000	101 000	5 700	10 300	6 700	10 000	
45	55	20	0.6	30 500	47 500	3 100	4 800	6 300	10 000	—
	55	27	0.6	41 500	69 500	4 200	7 100	6 300	10 000	
	55	36	0.6	57 500	106 000	5 850	10 900	6 300	10 000	
48	62	22	0.6	31 000	53 500	3 150	5 500	4 800	8 000	RLM 4520 RLM 4530
	62	30	0.6	43 500	83 500	4 450	8 500	4 800	8 000	
50	62	22	0.6	39 000	61 500	3 950	6 300	5 600	9 000	—
	62	30	0.6	54 500	95 000	5 550	9 700	5 600	9 000	
	62	40	0.6	72 000	137 000	7 350	13 900	5 600	9 000	
52	62	20	0.6	35 500	60 500	3 600	6 150	4 300	7 100	RLM 506220 RLM 506225
	62	25	0.6	43 000	77 500	4 400	7 900	4 300	7 100	
55	68	22	0.6	41 000	67 500	4 150	6 900	5 000	8 000	—
	68	30	0.6	57 000	104 000	5 800	10 600	5 000	8 000	
	68	40	0.6	76 000	149 000	7 750	15 200	5 000	8 000	
58	65	30	0.6	49 000	104 000	5 000	10 600	4 000	6 300	RLM 5530 RLM 556720
	67	20	0.6	38 000	68 000	3 850	6 900	4 000	6 300	
58	72	22	0.6	42 500	73 500	4 350	7 500	4 500	7 100	—
	72	30	0.6	59 500	113 000	6 050	11 500	4 500	7 100	
	72	40	0.6	79 000	163 000	8 050	16 600	4 500	7 100	

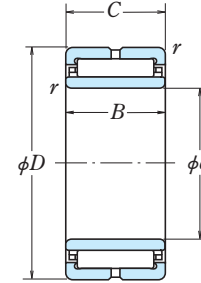
Numbers		Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)			Mass (kg)	
Without Inner Ring	With Inner Ring	$d$	$B$	$d_a$ min.	$D_a$ max.	$r_a$ max.	Without Inner Ring	With Inner Ring
—	LM 3720	32	20.3	36	43	0.6	0.072	0.115
—	LM 3730	32	30.3	36	43	0.6	0.11	0.17
—	LM 3820	32	20.3	36	44	0.6	0.074	0.125
—	LM 3830	32	30.3	36	44	0.6	0.11	0.195
—	LM 4020	35	20.3	39	46	0.6	0.078	0.125
—	LM 4030	35	30.3	39	46	0.6	0.12	0.19
RNA 49/32	NA 49/32	32	20	36	48	0.6	0.092	0.16
RNA 59/32	NA 59/32	32	27	36	48	0.6	0.15	0.24
RNA 69/32	NA 69/32	32	36	36	48	0.6	0.17	0.29
RNA 4907	NA 4907	35	20	39	51	0.6	0.11	0.17
RNA 5907	NA 5907	35	27	39	51	0.6	0.175	0.25
RNA 6907	NA 6907	35	36	39	51	0.6	0.20	0.315
—	LM 4520	40	20.3	44	51	0.6	0.086	0.14
—	LM 4530	40	30.3	44	51	0.6	0.13	0.21
RNA 4908	NA 4908	40	22	44	58	0.6	0.15	0.24
RNA 5908	NA 5908	40	30	44	58	0.6	0.23	0.355
RNA 6908	NA 6908	40	40	44	58	0.6	0.265	0.435
—	LM 506220	42	20.3	46	58	0.6	0.12	0.21
—	LM 506225	42	25.3	46	58	0.6	0.155	0.265
RNA 4909	NA 4909	45	22	49	64	0.6	0.19	0.28
RNA 5909	NA 5909	45	30	49	64	0.6	0.27	0.39
RNA 6909	NA 6909	45	40	49	64	0.6	0.335	0.495
—	LM 5530	45	30.3	49	61	0.6	0.16	0.34
—	LM 556720	45	20.3	49	63	0.6	0.13	0.25
RNA 4910	NA 4910	50	22	54	68	0.6	0.18	0.295
RNA 5910	NA 5910	50	30	54	68	0.6	0.25	0.405
RNA 6910	NA 6910	50	40	54	68	0.6	0.32	0.53

Remarks If a full complement roller bearing is required, please contact NSK.

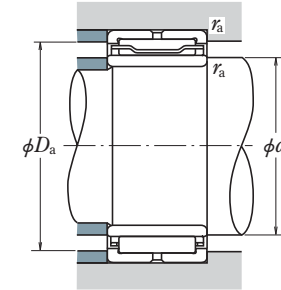
RNA • NA  
Inscribed Circle Diameter 63 – 120 mm



Without Inner Ring  
RNA



With Inner Ring  
NA

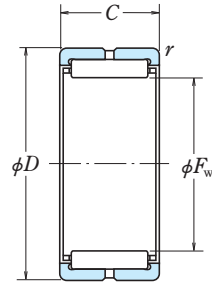


Boundary Dimensions (mm)	Basic Load Ratings				Limiting Speeds		Bearing			
	$F_w$	$D$	$C$	$r$ min.	(N)	(kgf)		(min <sup>-1</sup> )		
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	Without Inner Ring
<b>63</b>	80	25	1	53 500	87 500	5 450	8 950	4 000	6 700	<b>RNA 4911</b>
	80	34	1	73 500	133 000	7 500	13 600	4 000	6 700	<b>RNA 5911</b>
	80	45	1	93 500	181 000	9 550	18 500	4 000	6 700	<b>RNA 6911</b>
<b>68</b>	85	25	1	56 000	95 500	5 700	9 750	3 800	6 300	<b>RNA 4912</b>
	85	34	1	77 500	145 000	7 900	14 800	3 800	6 300	<b>RNA 5912</b>
	85	45	1	98 000	197 000	10 000	20 100	3 800	6 300	<b>RNA 6912</b>
<b>72</b>	90	25	1	58 500	103 000	5 950	10 500	3 600	5 600	<b>RNA 4913</b>
	90	34	1	81 000	157 000	8 250	16 000	3 600	5 600	<b>RNA 5913</b>
	90	45	1	103 000	213 000	10 500	21 800	3 600	5 600	<b>RNA 6913</b>
<b>80</b>	100	30	1	80 500	143 000	8 200	14 600	3 200	5 300	<b>RNA 4914</b>
	100	40	1	107 000	206 000	10 900	21 000	3 200	5 300	<b>RNA 5914</b>
	100	54	1	143 000	298 000	14 500	30 500	3 200	5 300	<b>RNA 6914</b>
<b>85</b>	105	30	1	84 000	155 000	8 600	15 800	3 000	5 000	<b>RNA 4915</b>
	105	40	1	112 000	222 000	11 400	22 700	3 000	5 000	<b>RNA 5915</b>
	105	54	1	149 000	325 000	15 200	33 000	3 000	5 000	<b>RNA 6915</b>
<b>90</b>	110	30	1	87 500	166 000	8 950	17 000	2 800	4 500	<b>RNA 4916</b>
	110	40	1	116 000	239 000	11 900	24 400	2 800	4 500	<b>RNA 5916</b>
	110	54	1	157 000	350 000	16 000	36 000	2 800	4 500	<b>RNA 6916</b>
<b>100</b>	120	35	1.1	104 000	214 000	10 600	21 800	2 600	4 000	<b>RNA 4917</b>
	120	46	1.1	138 000	310 000	14 100	31 500	2 600	4 000	<b>RNA 5917</b>
	120	63	1.1	174 000	415 000	17 800	42 500	2 600	4 000	<b>RNA 6917</b>
<b>105</b>	125	35	1.1	108 000	228 000	11 000	23 300	2 400	4 000	<b>RNA 4918</b>
	125	46	1.1	143 000	330 000	14 600	33 500	2 400	4 000	<b>RNA 5918</b>
	125	63	1.1	181 000	445 000	18 400	45 000	2 400	4 000	<b>RNA 6918</b>
<b>110</b>	130	35	1.1	111 000	242 000	11 400	24 700	2 200	3 800	<b>RNA 4919</b>
	130	46	1.1	148 000	350 000	15 100	35 500	2 200	3 800	<b>RNA 5919</b>
	130	63	1.1	187 000	470 000	19 100	48 000	2 200	3 800	<b>RNA 6919</b>
<b>115</b>	140	40	1.1	144 000	295 000	14 700	30 000	2 200	3 600	<b>RNA 4920</b>
	140	54	1.1	193 000	430 000	19 700	43 500	2 200	3 600	<b>RNA 5920</b>
	140	30	1	99 500	214 000	10 100	21 900	2 000	3 400	<b>RNA 4822</b>

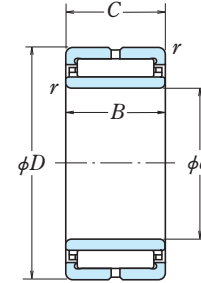
Remarks If a full complement roller bearing is required, please contact NSK.

Numbers	Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)			Mass (kg)	
	$d$	$B$	$d_a$ min.	$D_a$ max.	$r_a$ max.	Without Inner Ring	With Inner Ring
<b>NA 4911</b>	55	25	60	75	1	0.26	0.40
	55	34	60	75	1	0.37	0.56
	55	45	60	75	1	0.475	0.73
<b>NA 4912</b>	60	25	65	80	1	0.28	0.435
	60	34	65	80	1	0.415	0.625
	60	45	65	80	1	0.485	0.76
<b>NA 4913</b>	65	25	70	85	1	0.32	0.465
	65	34	70	85	1	0.48	0.675
	65	45	70	85	1	0.53	0.79
<b>NA 4914</b>	70	30	75	95	1	0.47	0.74
	70	40	75	95	1	0.69	1.05
	70	54	75	95	1	0.89	1.4
<b>NA 4915</b>	75	30	80	100	1	0.5	0.79
	75	40	80	100	1	0.735	1.1
	75	54	80	100	1	0.96	1.5
<b>NA 4916</b>	80	30	85	105	1	0.53	0.835
	80	40	85	105	1	0.75	1.15
	80	54	85	105	1	0.99	1.55
<b>NA 4917</b>	85	35	91.5	113.5	1	0.68	1.25
	85	46	91.5	113.5	1	0.99	1.75
	85	63	91.5	113.5	1	1.2	2.25
<b>NA 4918</b>	90	35	96.5	118.5	1	0.72	1.35
	90	46	96.5	118.5	1	1.05	1.85
	90	63	96.5	118.5	1	1.35	2.45
<b>NA 4919</b>	95	35	101.5	123.5	1	0.74	1.4
	95	46	101.5	123.5	1	1.15	2.0
	95	63	101.5	123.5	1	1.5	2.65
<b>NA 4920</b>	100	40	106.5	133.5	1	1.15	1.95
	100	54	106.5	133.5	1	1.8	2.85
	110	30	115	135	1	0.67	1.1

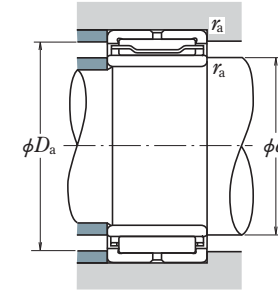
RNA • NA  
Inscribed Circle Diameter 125 – 390 mm



Without Inner Ring  
RNA



With Inner Ring  
NA



Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds		Bearing
$F_w$	$D$	$C$	$r$ min.	(N)		{kgf}		(min <sup>-1</sup> )		
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	Without Inner Ring
<b>125</b>	150	40	1.1	149 000	315 000	15 200	32 500	2 000	3 200	<b>RNA 4922</b> <b>RNA 5922</b>
	150	54	1.1	200 000	460 000	20 300	47 000	2 000	3 200	
<b>130</b>	150	30	1	105 000	238 000	10 700	24 300	1 900	3 200	<b>RNA 4824</b>
<b>135</b>	165	45	1.1	192 000	395 000	19 600	40 500	1 900	3 000	<b>RNA 4924</b> <b>RNA 5924</b>
	165	60	1.1	253 000	565 000	25 800	58 000	1 900	3 000	
<b>145</b>	165	35	1.1	127 000	315 000	12 900	32 000	1 700	2 800	<b>RNA 4826</b>
<b>150</b>	180	50	1.5	228 000	515 000	23 200	52 500	1 700	2 800	<b>RNA 4926</b> <b>RNA 5926</b>
	180	67	1.5	299 000	725 000	30 500	74 000	1 700	2 800	
<b>155</b>	175	35	1.1	133 000	340 000	13 600	35 000	1 600	2 600	<b>RNA 4828</b>
<b>160</b>	190	50	1.5	235 000	545 000	24 000	55 500	1 600	2 600	<b>RNA 4928</b> <b>RNA 5928</b>
	190	67	1.5	310 000	775 000	31 500	79 000	1 600	2 600	
<b>165</b>	190	40	1.1	180 000	440 000	18 300	45 000	1 500	2 400	<b>RNA 4830</b>
<b>175</b> <b>185</b> <b>195</b>	200	40	1.1	184 000	465 000	18 700	47 000	1 400	2 200	<b>RNA 4832</b> <b>RNA 4834</b> <b>RNA 4836</b>
	215	45	1.1	224 000	540 000	22 900	55 000	1 400	2 200	
	225	45	1.1	230 000	570 000	23 500	58 000	1 300	2 000	
<b>210</b> <b>220</b> <b>240</b>	240	50	1.5	268 000	705 000	27 300	72 000	1 200	1 900	<b>RNA 4838</b> <b>RNA 4840</b> <b>RNA 4844</b>
	250	50	1.5	274 000	740 000	27 900	75 500	1 100	1 800	
	270	50	1.5	286 000	805 000	29 100	82 000	1 000	1 700	
<b>265</b> <b>285</b> <b>305</b>	300	60	2	375 000	1 070 000	38 500	109 000	950	1 500	<b>RNA 4848</b> <b>RNA 4852</b> <b>RNA 4856</b>
	320	60	2	395 000	1 160 000	40 000	118 000	900	1 400	
	350	69	2	510 000	1 390 000	52 000	142 000	800	1 300	
<b>330</b> <b>350</b> <b>370</b> <b>390</b>	380	80	2.1	660 000	1 810 000	67 500	185 000	750	1 200	<b>RNA 4860</b> <b>RNA 4864</b> <b>RNA 4868</b> <b>RNA 4872</b>
	400	80	2.1	675 000	1 900 000	69 000	194 000	710	1 100	
	420	80	2.1	690 000	1 990 000	70 500	203 000	670	1 100	
	440	80	2.1	705 000	2 080 000	72 000	212 000	630	1 000	

Remarks If a full complement roller bearing is required, please contact NSK.

Numbers	Boundary Dimensions (mm)		Abutment and Fillet Dimensions (mm)			Mass (kg)	
	$d$	$B$	$d_a$ min.	$D_a$ max.	$r_a$ max.	Without Inner Ring	With Inner Ring
<b>NA 4922</b> <b>NA 5922</b>	110	40	116.5	143.5	1	1.25	2.1
	110	54	116.5	143.5	1	1.95	3.05
<b>NA 4824</b>	120	30	125	145	1	0.71	1.15
<b>NA 4924</b> <b>NA 5924</b>	120	45	126.5	158.5	1	1.9	2.9
	120	60	126.5	158.5	1	2.7	4.05
<b>NA 4826</b>	130	35	136.5	158.5	1	0.92	1.8
<b>NA 4926</b> <b>NA 5926</b>	130	50	138	172	1.5	2.3	4.0
	130	67	138	172	1.5	3.3	5.55
<b>NA 4828</b>	140	35	146.5	168.5	1	0.98	1.9
<b>NA 4928</b> <b>NA 5928</b>	140	50	148	182	1.5	2.45	4.25
	140	67	148	182	1.5	3.55	6.0
<b>NA 4830</b>	150	40	156.5	183.5	1	1.6	2.75
<b>NA 4832</b> <b>NA 4834</b> <b>NA 4836</b>	160	40	166.5	193.5	1	1.75	2.95
	170	45	176.5	208.5	1	2.55	4.0
	180	45	186.5	218.5	1	2.65	4.2
<b>NA 4838</b> <b>NA 4840</b> <b>NA 4844</b>	190	50	198	232	1.5	3.2	5.6
	200	50	208	242	1.5	3.35	5.9
	220	50	228	262	1.5	3.65	6.45
<b>NA 4848</b> <b>NA 4852</b> <b>NA 4856</b>	240	60	249	291	2	5.45	10
	260	60	269	311	2	5.9	11
	280	69	289	341	2	9.5	15.5
<b>NA 4860</b> <b>NA 4864</b> <b>NA 4868</b> <b>NA 4872</b>	300	80	311	369	2	13	22
	320	80	331	389	2	13.5	23.5
	340	80	351	409	2	14	24.5
	360	80	371	429	2	15	26

FNTA (Thrust Cage & Needle Roller Assemblies)

Thrust raceway washers

FTRA (s=1.0)

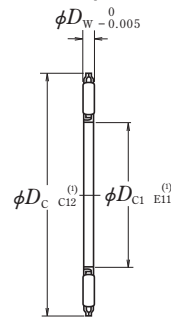
FTRB (s=1.5)

FTRC (s=2.0)

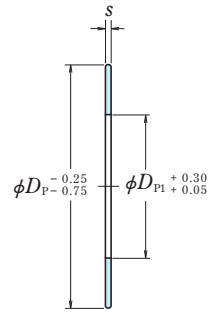
FTRD (s=2.5)

FTRE (s=3.0)

Bore Diameter 10 – 100 mm



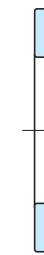
FNTA



FTRA



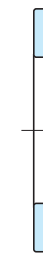
FTRB



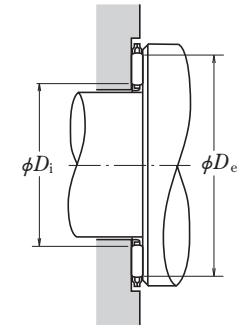
FTRC



FTRD



FTRE



Boundary Dimensions (mm)			Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )	Bearing Numbers	s=1.0 <sup>±0.05</sup>
D <sub>C1</sub> , D <sub>P1</sub>	D <sub>C</sub> , D <sub>P</sub>	D <sub>W</sub>	(N)		{kgf}				
			C <sub>a</sub>	C <sub>0a</sub>	C <sub>a</sub>	C <sub>0a</sub>	Oil		
10	24	2	7 750	23 000	790	2 350	17 000	<b>FNTA-1024</b> *FTRA-1024	
12	26	2	8 350	26 300	855	2 680	16 000	<b>FNTA-1226</b> FTRA-1226	
15	28	2	7 950	25 800	810	2 630	15 000	<b>FNTA-1528</b> FTRA-1528	
16	29	2	8 200	27 100	835	2 770	14 000	<b>FNTA-1629</b> FTRA-1629	
17	30	2	8 400	28 400	855	2 900	14 000	<b>FNTA-1730</b> FTRA-1730	
18	31	2	8 600	29 700	875	3 050	13 000	<b>FNTA-1831</b> FTRA-1831	
20	35	2	11 900	47 000	1 220	4 800	12 000	<b>FNTA-2035</b> FTRA-2035	
25	42	2	14 800	66 000	1 510	6 750	9 500	<b>FNTA-2542</b> FTRA-2542	
30	47	2	16 500	79 000	1 680	8 100	8 500	<b>FNTA-3047</b> FTRA-3047	
35	52	2	17 300	88 000	1 770	8 950	8 000	<b>FNTA-3552</b> FTRA-3552	
40	60	3	26 900	122 000	2 740	12 400	6 700	<b>FNTA-4060</b> FTRA-4060	
45	65	3	28 700	137 000	2 930	14 000	6 300	<b>FNTA-4565</b> FTRA-4565	
50	70	3	30 500	152 000	3 100	15 500	5 600	<b>FNTA-5070</b> FTRA-5070	
55	78	3	37 000	201 000	3 750	20 500	5 300	<b>FNTA-5578</b> FTRA-5578	
60	85	3	43 000	252 000	4 400	25 700	4 800	<b>FNTA-6085</b> FTRA-6085	
65	90	3	45 500	274 000	4 600	28 000	4 500	<b>FNTA-6590</b> FTRA-6590	
70	95	4	59 000	320 000	6 000	33 000	4 300	<b>FNTA-7095</b> FTRA-7095	
75	100	4	60 000	335 000	6 150	34 500	4 000	<b>FNTA-75100</b> FTRA-75100	
80	105	4	63 000	365 000	6 450	37 500	3 800	<b>FNTA-80105</b> FTRA-80105	
85	110	4	64 500	380 000	6 550	39 000	3 600	<b>FNTA-85110</b> FTRA-85110	
90	120	4	80 000	515 000	8 150	52 500	3 400	<b>FNTA-90120</b> FTRA-90120	
100	135	4	98 500	695 000	10 000	71 000	3 000	<b>FNTA-100135</b> FTRA-100135	

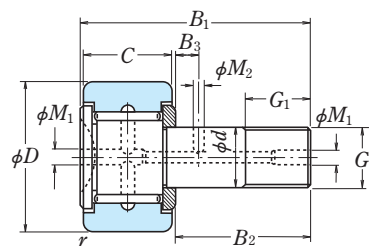
Bearing Numbers of Matching Bearing Rings				Roller Contact Surfaces (mm)		Mass (g)	
s=1.5 <sup>0/-0.08</sup>	s=2.0 <sup>0/-0.08</sup>	s=2.5 <sup>0/-0.08</sup>	s=3.0 <sup>0/-0.08</sup>	Outside Diameter D <sub>e</sub> min.	Bore Diameter D <sub>i</sub> max.	approx.	
						FNTA	FTRA
FTRB-1024	FTRC-1024	—	—	22.0	11.5	2.3	2.9
FTRB-1226	FTRC-1226	—	—	24.0	13.5	3.4	3.3
FTRB-1528	FTRC-1528	FTRD-1528	FTRE-1528	26.0	16.5	3.5	3.5
FTRB-1629	FTRC-1629	FTRD-1629	FTRE-1629	27.0	17.5	3.7	3.6
FTRB-1730	FTRC-1730	FTRD-1730	FTRE-1730	28.0	18.5	3.8	3.8
FTRB-1831	FTRC-1831	FTRD-1831	FTRE-1831	29.0	19.5	4	3.9
FTRB-2035	FTRC-2035	FTRD-2035	FTRE-2035	33.0	21.5	5.4	5.1
FTRB-2542	FTRC-2542	FTRD-2542	FTRE-2542	40.0	26.5	7.7	7
FTRB-3047	FTRC-3047	FTRD-3047	FTRE-3047	45.0	31.5	8.9	7.9
FTRB-3552	FTRC-3552	FTRD-3552	FTRE-3552	50.5	36.5	9.7	9.1
FTRB-4060	FTRC-4060	FTRD-4060	FTRE-4060	57.0	42.0	18	12
FTRB-4565	FTRC-4565	FTRD-4565	FTRE-4565	62.0	47.0	20	13
FTRB-5070	FTRC-5070	FTRD-5070	FTRE-5070	67.0	51.5	22	15
FTRB-5578	FTRC-5578	FTRD-5578	FTRE-5578	75.0	57.0	29	19
FTRB-6085	FTRC-6085	FTRD-6085	FTRE-6085	82.0	61.5	35	22
FTRB-6590	FTRC-6590	FTRD-6590	FTRE-6590	87.5	66.5	38	24
FTRB-7095	FTRC-7095	FTRD-7095	FTRE-7095	92.5	71.5	52	25
FTRB-75100	FTRC-75100	FTRD-75100	FTRE-75100	97.5	76.5	54	27
FTRB-80105	FTRC-80105	FTRD-80105	FTRE-80105	102.5	81.5	58	28
FTRB-85110	FTRC-85110	FTRD-85110	FTRE-85110	107.5	86.5	63	30
FTRB-90120	FTRC-90120	FTRD-90120	FTRE-90120	117.5	91.5	80	38
FTRB-100135	FTRC-100135	FTRD-100135	FTRE-100135	132.5	101.5	105	50

Note (1) For tolerance classes C12 and E11, please refer to ISO 286-1 and 286-2 (ISO system of limits and fits), respectively.

(\*) The tolerance of this bearing bore diameter is +0.025 to +0.175mm and outside diameter tolerance is -0.040 to -0.370mm

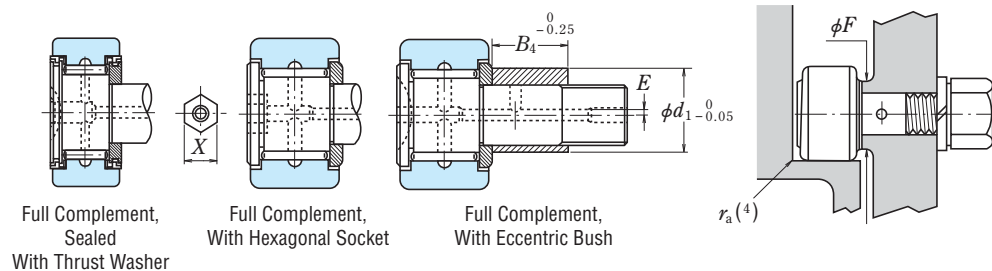


- FCR** (Full Complement)
- FCRS** (Full Complement, Sealed With Thrust Washer)
- FCJ** (With Cage)
- FCJS** (Sealed, with Cage and Thrust Washer)
- Outside Diameter 16 – 90 mm



Full Complement

FCR



Full Complement, Sealed With Thrust Washer

FCRS

Full Complement, With Hexagonal Socket

FCRB

Full Complement, With Eccentric Bush

FCRE

Boundary Dimensions (mm)			Screw G	Dimensions (mm)							Bearing Numbers	
D	C	d		G <sub>1</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	M <sub>2</sub>	M <sub>1</sub>	r min.	FCR FCJ	FCRS FCJS
16	11	6	M 6×1	8	28	16	—	—	4 <sup>(1)</sup>	0.3	<b>FCR-16</b>	<b>FCRS-16</b>
	11	6	M 6×1	8	28	16	—	—	4 <sup>(1)</sup>	0.3	<b>FCJ-16</b>	<b>FCJS-16</b>
19	11	8	M 8×1.25	10	32	20	—	—	4 <sup>(1)</sup>	0.3	<b>FCR-19</b>	<b>FCRS-19</b>
	11	8	M 8×1.25	10	32	20	—	—	4 <sup>(1)</sup>	0.3	<b>FCJ-19</b>	<b>FCJS-19</b>
22	12	10	M10×1.25	12	36	23	—	—	4 <sup>(1)</sup>	0.3	<b>FCR-22</b>	<b>FCRS-22</b>
	12	10	M10×1.25	12	36	23	—	—	4 <sup>(1)</sup>	0.3	<b>FCJ-22</b>	<b>FCJS-22</b>
26	12	10	M10×1.25	12	36	23	—	—	4 <sup>(1)</sup>	0.3	<b>FCR-26</b>	<b>FCRS-26</b>
	12	10	M10×1.25	12	36	23	—	—	4 <sup>(1)</sup>	0.3	<b>FCJ-26</b>	<b>FCJS-26</b>
30	14	12	M12×1.5	13	40	25	6	3	6	0.6	<b>FCR-30</b>	<b>FCRS-30</b>
	14	12	M12×1.5	13	40	25	6	3	6	0.6	<b>FCJ-30</b>	<b>FCJS-30</b>
32	14	12	M12×1.5	13	40	25	6	3	6	0.6	<b>FCR-32</b>	<b>FCRS-32</b>
	14	12	M12×1.5	13	40	25	6	3	6	0.6	<b>FCJ-32</b>	<b>FCJS-32</b>
35	18	16	M16×1.5	17	52	32.5	8	3	6	0.6	<b>FCR-35</b>	<b>FCRS-35</b>
	18	16	M16×1.5	17	52	32.5	8	3	6	0.6	<b>FCJ-35</b>	<b>FCJS-35</b>
40	20	18	M18×1.5	19	58	36.5	8	3	6	1	<b>FCR-40</b>	<b>FCRS-40</b>
	20	18	M18×1.5	19	58	36.5	8	3	6	1	<b>FCJ-40</b>	<b>FCJS-40</b>
47	24	20	M20×1.5	21	66	40.5	9	4	8	1	<b>FCR-47</b>	<b>FCRS-47</b>
	24	20	M20×1.5	21	66	40.5	9	4	8	1	<b>FCJ-47</b>	<b>FCJS-47</b>
52	24	20	M20×1.5	21	66	40.5	9	4	8	1	<b>FCR-52</b>	<b>FCRS-52</b>
	24	20	M20×1.5	21	66	40.5	9	4	8	1	<b>FCJ-52</b>	<b>FCJS-52</b>
62	29	24	M24×1.5	25	80	49.5	11	4	8	1	<b>FCR-62</b>	<b>FCRS-62</b>
	29	24	M24×1.5	25	80	49.5	11	4	8	1	<b>FCJ-62</b>	<b>FCJS-62</b>
72	29	24	M24×1.5	25	80	49.5	11	4	8	1	<b>FCR-72</b>	<b>FCRS-72</b>
	29	24	M24×1.5	25	80	49.5	11	4	8	1	<b>FCJ-72</b>	<b>FCJS-72</b>
80	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCR-80</b>	<b>FCRS-80</b>
	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCJ-80</b>	<b>FCJS-80</b>
85	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCR-85</b>	<b>FCRS-85</b>
	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCJ-85</b>	<b>FCJS-85</b>
90	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCR-90</b>	<b>FCRS-90</b>
	35	30	M30×1.5	32	100	63	15	4	8	1	<b>FCJ-90</b>	<b>FCJS-90</b>

Notes <sup>(1)</sup> Only the head of the stud has on oil hole.

<sup>(2)</sup> Applicable to FCRB only.

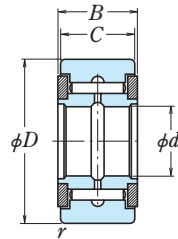
Remarks Standard grease is packed in sealed cam followers, but not in cam followers without seals.

Basic Dynamic Load Ratings (N)		Limiting Loads (N)		Limiting Track Loads (N)		Mass (kg)	Dimensions of Hexagonal Socket <sup>(2)</sup> (width across flats) (mm) X	Eccentric Bush Dimensions <sup>(2)</sup> (mm)			Shoulder Dimensions (mm) F (min.)	Tightening Torque (N-cm) (kgf-cm)	
C <sub>r</sub>	(kgf)	P <sub>max</sub>	(kgf)	(N)	(kgf)			B <sub>4</sub>	d <sub>1</sub>	E		(max.)	(max.)
5 800	590	2 360	240	3 350	340	0.020	4	8	9	0.5	11	226	23
2 830	288	2 360	240	3 350	340	0.018	4	8	9	0.5	11	226	23
6 600	670	4 200	425	4 150	425	0.031	4	10	11	0.5	13	550	56
3 450	355	4 200	425	4 150	425	0.030	4	10	11	0.5	13	550	56
8 550	875	6 550	665	5 300	540	0.047	5	11	13	0.5	15	1 060	108
4 350	445	6 550	665	5 300	540	0.045	5	11	13	0.5	15	1 060	108
8 550	875	6 550	665	6 000	610	0.060	5	11	13	0.5	15	1 060	108
4 350	445	6 550	665	6 000	610	0.058	5	11	13	0.5	15	1 060	108
12 500	1 280	9 250	945	7 800	795	0.088	6	12	17	1	20	1 450	148
7 200	735	9 250	945	7 800	795	0.086	6	12	17	1	20	1 450	148
12 500	1 280	9 250	945	8 050	820	0.099	6	12	17	1	20	1 450	148
7 200	735	9 250	945	8 050	820	0.096	6	12	17	1	20	1 450	148
18 600	1 900	17 000	1 740	11 800	1 200	0.17	10	15.5	22	1	24	4 000	410
9 700	990	17 000	1 740	11 800	1 200	0.165	10	15.5	22	1	24	4 000	410
20 500	2 090	21 700	2 220	14 300	1 460	0.25	10	17.5	24	1	26	5 950	605
10 300	1 050	21 700	2 220	14 300	1 460	0.24	10	17.5	24	1	26	5 950	605
28 200	2 880	26 400	2 690	20 800	2 120	0.39	12	19.5	27	1	31	8 450	860
19 200	1 950	26 400	2 690	20 800	2 120	0.38	12	19.5	27	1	31	8 450	860
28 200	2 880	26 400	2 690	22 900	2 340	0.47	12	19.5	27	1	31	8 450	860
19 200	1 950	26 400	2 690	22 900	2 340	0.455	12	19.5	27	1	31	8 450	860
40 000	4 100	38 500	3 950	34 000	3 450	0.80	14	24.5	34	1	45	15 200	1 550
24 900	2 540	38 500	3 950	34 000	3 450	0.79	14	24.5	34	1	45	15 200	1 550
40 000	4 100	38 500	3 950	38 000	3 860	1.05	14	24.5	34	1	45	15 200	1 550
24 900	2 540	38 500	3 950	38 000	3 860	1.05	14	24.5	34	1	45	15 200	1 550
60 500	6 200	61 000	6 200	52 000	5 300	1.55	17	31	40	1.5	52	30 500	3 120
39 000	4 000	61 000	6 200	52 000	5 300	1.55	17	31	40	1.5	52	30 500	3 120
60 500	6 200	61 000	6 200	55 500	5 650	1.75	17	31	40	1.5	52	30 500	3 120
39 000	4 000	61 000	6 200	55 500	5 650	1.75	17	31	40	1.5	52	30 500	3 120
60 500	6 200	61 000	6 200	59 000	6 000	1.95	17	31	40	1.5	52	30 500	3 120
39 000	4 000	61 000	6 200	59 000	6 000	1.95	17	31	40	1.5	52	30 500	3 120

Notes <sup>(3)</sup> Applicable to FCRE only.

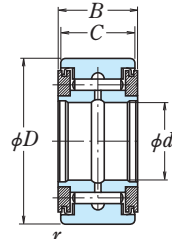
<sup>(4)</sup> Should not be greater than r (min).

- FYCR** (Full Complement)
- FYCRS** (Full Complement, Sealed with Thrust Washer)
- FYCJ** (With Cage)
- FYCJS** (Sealed, with Cage and Thrust Washer)
- Bore Diameter** 5 – 50 mm



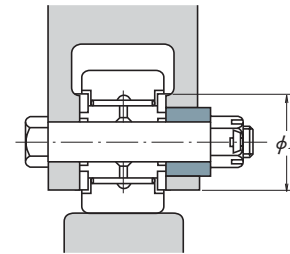
Full Complement

FYCR



Full Complement, Sealed with Thrust Washer

FYCRS



d	Boundary Dimensions (mm)				Basic Load Ratings (N)				Limiting Track Loads (N)	
	D	C	$B^{0-0.38}$	r min.	$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	(N)	(kgf)
5	16	11	12	0.3	5 800	8 000	590	815	3 350	340
	16	11	12	0.3	2 830	2 620	288	267	3 350	340
6	19	11	12	0.3	6 550	9 900	665	1 010	4 150	425
	19	11	12	0.3	3 450	3 600	355	365	4 150	425
8	24	14	15	0.3	10 100	15 000	1 030	1 530	6 500	665
	24	14	15	0.3	5 700	6 000	580	610	6 500	665
10	30	14	15	0.6	11 700	18 500	1 190	1 890	7 800	795
	30	14	15	0.6	6 950	8 200	705	835	7 800	795
12	32	14	15	0.6	12 600	21 000	1 280	2 140	8 050	820
	32	14	15	0.6	7 650	9 650	780	985	8 050	820
15	35	18	19	0.6	18 700	29 300	1 910	2 990	11 800	1 200
	35	18	19	0.6	12 200	14 100	1 250	1 440	11 800	1 200
17	40	20	21	0.6	21 100	35 000	2 160	3 600	14 300	1 460
	40	20	21	0.6	13 700	16 700	1 390	1 700	14 300	1 460
20	47	24	25	1	28 900	50 000	2 940	5 100	20 800	2 120
	47	24	25	1	18 200	22 600	1 850	2 310	20 800	2 120
25	52	24	25	1	32 500	60 000	3 300	6 100	22 900	2 340
	52	24	25	1	22 200	31 000	2 270	3 150	22 900	2 340
30	62	28	29	1	47 500	96 000	4 800	9 800	33 000	3 350
	62	28	29	1	31 500	47 000	3 200	4 800	33 000	3 350
35	72	28	29	1	49 500	106 000	5 050	10 800	36 500	3 700
	72	28	29	1	33 000	52 500	3 400	5 350	36 500	3 700
40	80	30	32	1	54 500	126 000	5 600	12 800	43 500	4 450
	80	30	32	1	38 500	67 500	3 950	6 900	43 500	4 450
45	85	30	32	1	57 500	139 000	5 850	14 100	46 500	4 750
	85	30	32	1	40 000	73 000	4 100	7 450	46 500	4 750
50	90	30	32	1	60 500	152 000	6 150	15 500	49 500	5 050
	90	30	32	1	41 500	78 000	4 200	7 950	49 500	5 050

**Remarks** Standard grease is packed in sealed cam followers, but not in cam followers without seals.

Bearing Numbers		Mass (kg)	Shoulder Dimensions (mm)
FYCR FYCJ	FYCRS FYCJS	approx.	F min.
<b>FYCR-5</b>	<b>FYCRS-5</b>	0.016	10
<b>FYCJ-5</b>	<b>FYCJS-5</b>	0.014	10
<b>FYCR-6</b>	<b>FYCRS-6</b>	0.022	12
<b>FYCJ-6</b>	<b>FYCJS-6</b>	0.020	12
<b>FYCR-8</b>	<b>FYCRS-8</b>	0.044	14
<b>FYCJ-8</b>	<b>FYCJS-8</b>	0.042	14
<b>FYCR-10</b>	<b>FYCRS-10</b>	0.069	17
<b>FYCJ-10</b>	<b>FYCJS-10</b>	0.067	17
<b>FYCR-12</b>	<b>FYCRS-12</b>	0.076	19
<b>FYCJ-12</b>	<b>FYCJS-12</b>	0.074	19
<b>FYCR-15</b>	<b>FYCRS-15</b>	0.105	23
<b>FYCJ-15</b>	<b>FYCJS-15</b>	0.097	23
<b>FYCR-17</b>	<b>FYCRS-17</b>	0.145	25
<b>FYCJ-17</b>	<b>FYCJS-17</b>	0.14	25
<b>FYCR-20</b>	<b>FYCRS-20</b>	0.255	29
<b>FYCJ-20</b>	<b>FYCJS-20</b>	0.245	29
<b>FYCR-25</b>	<b>FYCRS-25</b>	0.285	34
<b>FYCJ-25</b>	<b>FYCJS-25</b>	0.275	34
<b>FYCR-30</b>	<b>FYCRS-30</b>	0.48	51
<b>FYCJ-30</b>	<b>FYCJS-30</b>	0.47	51
<b>FYCR-35</b>	<b>FYCRS-35</b>	0.64	58
<b>FYCJ-35</b>	<b>FYCJS-35</b>	0.635	58
<b>FYCR-40</b>	<b>FYCRS-40</b>	0.88	66
<b>FYCJ-40</b>	<b>FYCJS-40</b>	0.865	66
<b>FYCR-45</b>	<b>FYCRS-45</b>	0.93	72
<b>FYCJ-45</b>	<b>FYCJS-45</b>	0.91	72
<b>FYCR-50</b>	<b>FYCRS-50</b>	0.995	76
<b>FYCJ-50</b>	<b>FYCJS-50</b>	0.965	76