

High-carbon chromium bearing steel is used for needle rollers. The needle rollers are ground and polished after heat treatment. The surface hardness is 60 to 65 HRC.

Needle rollers are provided as rolling elements or pins for operation directly on the shaft.

1. Shape of needle rollers

The standard shape of needle rollers has a flat surface on its end face (referred to as F type). Crowned contact surfaces are also available (suffix code: E) and can reduce the edge load on the rollers. Excessive edge load on rollers can result in premature failure. Contact NTN Engineering for more information.

Table 1 End face shape

Type	Designation	Shape
F	Flat surface	

2. Needle roller part number composition

The needle roller part number is composed of a model code (end face type), a dimension code [diameter (D_w) x length (L_w)], and a suffix code (Refer to Fig. 1).

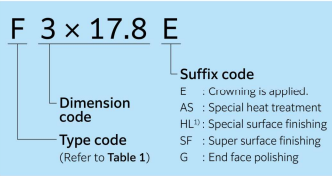


Fig. 1

1) For HL, contact NTN Engineering.

3. Accuracy of needle rollers

The dimensional accuracy of needle rollers is maintained in accordance with JIS B 1506 (Rolling bearings—Rollers). (Refer to Table 2)

Table 2 Accuracy of needle rollers		Unit: μm
Characteristics	Tolerance and tolerance values	
Tolerance of average value of diameter D_w	0 to -10	
Mutual tolerance of lot diameter D_w (max.)	2	
Roundness of diameter D_w , diameter variation in flat surface	1.0 ($L_w/D_w \leq 6$) 1.5 ($L_w/D_w > 6$)	
Tolerance of length L_w	h13	
Accuracy class	Class 2	

Needle rollers are separated into groupings of $2\mu\text{m}$ ranges based on the diameter of the roller and are separately packaged to maintain consistency between supplied rollers. Depending on the tolerance range, the needle rollers are classified by label colors such as red, black, and blue, and then delivered.

Bearing rollers in packages having different label colors must not be mixed.

Table 3 Diameter dimensional tolerance and classification of needle rollers		
Label color	Tolerance range (μm)	Classification
Red	0 to -2	Standard
Navy	-1 to -3	
Blue	-2 to -4	
Black	-3 to -5	
White	-4 to -6	
Gray	-5 to -7	Sub standard
Green	-6 to -8	
Brown	-7 to -9	
Yellow	-8 to -10	

4. Application of needle rollers

When a full complement needle roller bearing is made with a standard needle roller, the shaft diameter (d), the housing bore diameter (D), the circumferential clearance (Δc), and the radial internal clearance (Δr) are calculated from the needle roller diameter (D_w) and the number of rollers (Z) (see Fig. 2).

The minimum value of the circumferential clearance (Δc) is calculated by Equation (1). The radial internal clearance (Δr) is selected based on the shaft diameter and the usage conditions using section "E. Needle roller bearings 2.4 Solid type needle roller bearings Table 9 (E-7)" as guidance. Full complement needle roller bearings generally require a larger radial inner clearance than a needle roller bearing with cage.

$$\Delta c = (0.005 \sim 0.020) \times Z \text{ mm}$$

(minimum value) (1)

The minimum value of the housing bore diameter (D) and the maximum value of the shaft diameter (d) are calculated from Equations (2) and (3).

$$D = \frac{1}{\sin(\frac{\pi}{Z})} \cdot (D_w + \frac{\Delta c}{Z}) + D_w \text{ mm}$$

(minimum value) (2)

$$d = D - 2D_w - \Delta r \text{ mm}$$

(maximum value) (3)

In order to retain the needle rollers in the housing using the keystone method, the maximum value of the housing bore diameter (D) is calculated from the minimum value of the roller diameter ($D_{w \text{ min}}$) and the number of rollers (Z) using Equation (4) (see Fig. 3). Factor K is shown in Table 4.

$$D = K \cdot D_{w \text{ min}} \text{ mm (maximum value) } \cdots (4)$$

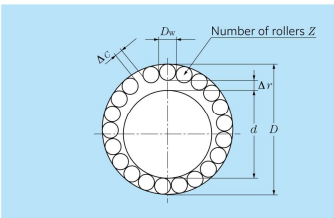


Fig. 2

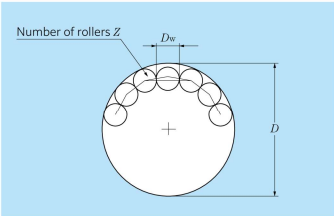
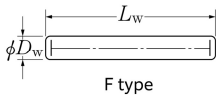


Fig. 3

Table 4 Values of factor K

Z	K	Z	K
8	3.6763333	17	6.4536463
9	3.9709394	18	6.7689303
10	4.2727719	19	7.0846088
11	4.5789545	20	7.4006100
12	4.8879667	21	7.7168786
13	5.1989251	22	8.0333713
14	5.5112799	23	8.3500534
15	5.8246707	24	8.6668970
16	6.1388508	25	8.9838796

F type



d 1.5 ~ 4.5mm

Boundary dimensions mm		Number	Flat type	Mass kg (approx.) 1 000 pieces
D _w	L _w			
1.5	5.8	F1.5 × 5.8		0.080
	6.8	F1.5 × 6.8		0.090
	7.8	F1.5 × 7.8		0.104
	9.8	F1.5 × 9.8		0.131
	11.8	F1.5 × 11.8		0.159
2	13.8	F1.5 × 13.8		0.186
	6.8	F2 × 6.8		0.158
	7.8	F2 × 7.8		0.183
	9.8	F2 × 9.8		0.232
	11.8	F2 × 11.8		0.281
2.5	13.8	F2 × 13.8		0.330
	15.8	F2 × 15.8		0.379
	17.8	F2 × 17.8		0.428
	19.8	F2 × 19.8		0.477
	7.8	F2.5 × 7.8		0.284
3	9.8	F2.5 × 9.8		0.351
	11.8	F2.5 × 11.8		0.438
	13.8	F2.5 × 13.8		0.514
	15.8	F2.5 × 15.8		0.591
	17.8	F2.5 × 17.8		0.668
4	19.8	F2.5 × 19.8		0.745
	21.8	F2.5 × 21.8		0.821
	23.8	F2.5 × 23.8		0.898
	9.8	F3 × 9.8		0.556
5	11.8	F3 × 11.8		0.671
	13.8	F3 × 13.8		0.784
	15.8	F3 × 15.8		0.897
	17.8	F3 × 17.8		1.01
	19.8	F3 × 19.8		1.12
6	21.8	F3 × 21.8		1.23
	23.8	F3 × 23.8		1.34
	25.8	F3 × 25.8		1.45
	27.8	F3 × 27.8		1.56

Boundary dimensions mm		Number	Flat type	Mass kg (approx.) 1 000 pieces
D _w	L _w			
3.5	11.8	F3.5 × 11.8		0.849
	13.8	F3.5 × 13.8		1.00
	15.8	F3.5 × 15.8		1.15
	17.8	F3.5 × 17.8		1.30
	19.8	F3.5 × 19.8		1.45
4.5	21.8	F3.5 × 21.8		1.60
	23.8	F3.5 × 23.8		1.75
	25.8	F3.5 × 25.8		1.90
	29.8	F3.5 × 29.8		2.20
	31.8	F3.5 × 31.8		2.35
5.5	34.8	F3.5 × 34.8		2.58
	13.8	F4 × 13.8		1.27
6.5	15.8	F4 × 15.8		1.50
	17.8	F4 × 17.8		1.70
	19.8	F4 × 19.8		1.89
7.5	21.8	F4 × 21.8		2.09
	23.8	F4 × 23.8		2.26
	25.8	F4 × 25.8		2.48
	27.8	F4 × 27.8		2.68
	29.8	F4 × 29.8		2.87
8.5	31.8	F4 × 31.8		3.07
	34.8	F4 × 34.8		3.31
	37.8	F4 × 37.8		3.62
	39.8	F4 × 39.8		3.82
9.5	17.8	F4.5 × 17.8		2.11
	19.8	F4.5 × 19.8		2.36
	21.8	F4.5 × 21.8		2.61
	23.8	F4.5 × 23.8		2.86
	25.8	F4.5 × 25.8		3.11
10.5	29.8	F4.5 × 29.8		3.62
	31.8	F4.5 × 31.8		3.87
	34.8	F4.5 × 34.8		4.25
	37.8	F4.5 × 37.8		4.63
	39.8	F4.5 × 39.8		4.88
11.5	44.8	F4.5 × 44.8		5.51

d 5mm

Boundary dimensions mm		Number	Flat type	Mass kg (approx.) 1 000 pieces
D _w	L _w			
5	19.8	F5 × 19.8		2.89
	21.8	F5 × 21.8		3.20
	23.8	F5 × 23.8		3.52
	25.8	F5 × 25.8		3.82
	29.8	F5 × 29.8		4.45
6	31.8	F5 × 31.8		4.74
	34.8	F5 × 34.8		5.11
	37.8	F5 × 37.8		5.55
	39.8	F5 × 39.8		5.85
	49.8	F5 × 49.8		7.33

Needle Roller Bearings

Needle Roller Bearings Contents

Needle roller bearings	E- 2
Needle roller and cage assemblies	E-12
Drawn cup needle roller bearings	E-26
Machined-ring needle roller bearings	E-34
Thrust cylindrical roller bearings	E-56
Thrust needle roller bearings	E-62
Cam follower stud type track rollers	E-66
Roller follower yoke type track rollers	E-84



2.2 Needle roller bearing with cage

These needle roller bearings include needle rollers and cages that guide and hold the needle rollers. The structure is lightweight and compact because no inner ring or outer ring is used and the shaft and the housing are used as raceway surfaces.

Table 4 shows recommended fits for this bearing type, and Table 5 shows the diameter dimensional tolerance and classification of needle rollers. See section 2.1 for the accuracy and surface hardness necessary for shafts and housings serving as the raceway surfaces for these bearings.

The needle roller diameter variation included in a single assembly is within $2\text{ }\mu\text{m}$, and the standard classification shown in Table 5 will be supplied if there is no particular designation. When two or more of the same bearings are to be used in tandem arrangement, it is necessary to use bearings having rollers of the same classification promote equal load sharing.

For caged needle roller bearings that are used for the connecting rod of small/medium reciprocating engines, see the catalog "Needle roller bearings (CAT. No. 2300/E)."

Table 4 Fits recommended for needle roller bearings with cage

Shaft diameter mm	Recommended fits					
	Internal clearance less than normal		Normal clearance		Internal clearance greater than normal	
	Shaft	Housing	Shaft	Housing	Shaft	Housing
Up to 80	j5	G6	h5	G6	g6	G6
80 to 140	h5	G6	g5	G6	f6	G6
140 or more	h5	G6	f5	H6	f6	G6

Table 5 Diameter dimensional tolerance and classification of needle rollers

Label color	Tolerance range (μm)	Classification
Red Navy Blue Black White	-0 to -2 -1 to -3 -2 to -4 -3 to -5 -4 to -6	Standard
Gray Green Brown Yellow	-5 to -7 -6 to -8 -7 to -9 -8 to -10	Sub standard

When a caged needle roller bearing is used as a single body to be directly guided in the axial direction by a shaft shoulder (Fig. 2), any part coming into contact with the cage side surface must be sufficiently finished without burrs. For high speed or heavy load operation, the contact surface is hardened and finished by grinding.

When a cage is to be guided in the axial direction with a snap ring (Fig. 2), a thrust ring is used between the cage and the snap ring so that the snap ring lugs do not come in contact with the cage directly.

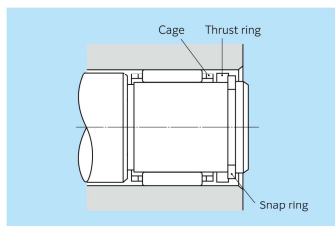


Fig. 2 Fixing using thrust ring

2.3 Drawn cup needle roller bearings

The outer ring of drawn cup needle roller bearings is formed by precision drawing from a thin steel plate, and is designed to have an appropriate accuracy for its intended function when press-fit into a rigid housing.

Therefore, it is meaningless to measure the dimensional accuracy of the bearing itself before press fitting. After pressing into a ring gage (with wall thickness of 20 mm or more) having appropriate dimensions, the bearing accuracy is evaluated by measuring the roller inscribed circle diameter (F_w) with a plug gauge or a tapered gauge.

Recommended fits for drawn cup needle roller bearings are shown in Table 6, and recommended shaft and housing accuracy is shown in Table 7. Tables 8.1 and 8.2 show the dimensional tolerances of the ring gauge inner diameter dimension and the roller inscribed circle diameter (F_w) with respect to the standard metric series HK and BK types and the heavy load series HMK type.

Table 6 Drawn cup needle roller bearing housing and shaft fits

Bearing type	Housing		Shaft	
	Iron-based	Light alloy	No inner ring	With an inner ring
HK, BK	N6(N7)	R6(R7)	h5(h6)	k5(j6)
HMK	J6(J7)	M6(M7)		

Table 7 Recommended shaft and housing accuracy

Characteristics	Shaft	Housing
Dimensional accuracy	IT6 (IT5)	IT7 (IT6)
Roundness Cylindricity (Max.)	IT3	IT4
Abutment squareness (Max.)	IT3	IT3
Fitting surface roughness R_a	0.8	1.6

Note: Accuracy in () applies to bearings of accuracy class 5 and higher.

When a plug gauge is used for the measurement of the roller inscribed circle diameter (F_w), the dimension of the go side is the lower limit of the dimensional tolerance of the roller inscribed circle diameter, and the dimension of the no-go side is the value obtained by adding $2\text{ }\mu\text{m}$ to the upper limit of the dimensional tolerance of the roller inscribed circle diameter.

Since the outer ring is formed by a thin steel plate, the safety factor (S_0) when the bearing is used must be $S_0 \geq 3$ for standard specifications, and $S_0 \geq 2$ must be maintained for the carburized/quenched specification (premium shell bearing¹⁾).

1) Premium shell bearings

For details, see the special catalog issued separately "Premium shell bearings (CAT. No. 3029/JE)." (Suffix code F is added to the bearing number.)

Table 8.1 Accuracy of drawn cup needle roller bearings (1)

Dimensional tolerance of roller inscribed circle diameter (HK and BK types) Unit: mm				
Nominal roller inscribed circle diameter F_w	Nominal outer ring outer diameter D	Ring gauge inner diameter	Dimensional tolerance of roller inscribed circle diameter	
			Upper limit	Lower limit
3	6.5	6.484	3.016	3.006
4	8	7.984	4.022	4.010
5	9	8.984	5.022	5.010
6	10	9.984	6.022	6.010
7	11	10.980	7.028	7.013
8	12	11.980	8.028	8.013
9	13	12.980	9.028	9.013
10	14	13.980	10.028	10.013
12	16	15.980	12.034	12.016
12	18	17.980	12.034	12.016
13	19	18.976	13.034	13.016
14	20	19.976	14.034	14.016
15	21	20.976	15.034	15.016
16	22	21.976	16.034	16.016
17	23	22.976	17.034	17.016
18	24	23.976	18.034	18.016
20	26	25.976	20.041	20.020
22	28	27.976	22.041	22.020
25	32	31.972	25.041	25.020
28	35	34.972	28.041	28.020
30	37	36.972	30.041	30.020
35	42	41.972	35.050	35.025
40	47	46.972	40.050	40.025
45	52	51.967	45.050	45.025
50	58	57.967	50.050	50.025

Table 8.2 Accuracy of drawn cup needle roller bearings (2)

Dimensional tolerance of roller inscribed circle diameter (HMK type) Unit: mm

Nominal roller inscribed circle diameter F_w	Nominal outer ring outer diameter D	Ring gauge inner diameter	Dimensional tolerance of roller inscribed circle diameter	
			Upper limit	Lower limit
8	15	14.995	8.028	8.013
9	16	15.995	9.028	9.013
10	17	16.995	10.028	10.013
12	19	18.995	12.034	12.016
14	22	21.995	14.034	14.016
15	22	21.995	15.034	15.016
16	24	23.995	16.034	16.016
17	24	23.995	17.034	17.016
18	25	24.995	18.034	18.016
19	27	26.995	19.041	19.020
20	27	26.995	20.041	20.020
21	29	28.995	21.041	21.020
22	29	28.995	22.041	22.020
24	31	30.994	24.041	24.020
25	33	32.994	25.041	25.020
26	34	33.994	26.041	26.020
28	37	36.994	28.041	28.020
29	38	37.994	29.041	29.020
30	40	39.994	30.041	30.020
32	42	41.994	32.050	32.025
35	45	44.994	35.050	35.025
37	47	46.994	37.050	37.025
38	48	47.994	38.050	38.025
40	50	49.994	40.050	40.025
45	55	54.994	45.050	45.025
50	62	61.994	50.050	50.025

When a drawn cup needle roller bearing is to be inserted into a housing, the marked side of the bearing must be press-fit into the appropriate position with the use of a jig. (There is no designation for the installation direction of pre-bent specification products¹⁾.)

The bearings must not be directly struck by a hammer when being installed. Use an installation jig like that shown in Fig. 3, having a mandrel equipped with an O-ring for ease of installation, should be used to ensure the bearing will not fall off or become damaged during installation.

When inserting an inner ring or a shaft into a drawn cup needle roller bearing installed in a housing, insert it straightly by aligning the central axis of the inner ring or the shaft with the central axis of the housing.

Since a drawn cup needle roller bearing is positioned by means of the housing, it is unnecessary to provide a snap ring or a shoulder. However, when a drawn cup needle roller bearing is to be press-fitted into a housing having a shoulder, it is necessary to pay attention to prevent the bearing side surface from contacting the shoulder, thereby causing deformation of the bearing.

1) Pre-bent specification

The outer ring flange is hardened on both sides by heat treating the outer ring after inserting the cage and rollers and bending the edge of the ring. Thus, bearings can be press-fitted from any direction compared with conventional products, which required applying a jig on the outer ring marking side. (Suffix code M is added to the bearing number.)

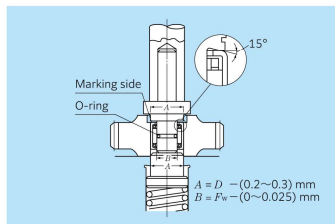


Fig. 3

2.4 Solid type needle roller bearings

These bearings have a non-separable construction held together by flanges or side plates on both sides of the outer ring, with needle rollers and cages contained within a solid (machined) outer ring. Since the outer ring is solid (machined), it has high rigidity and the bearing accuracy can be increased; therefore, the bearings are suitable for applications that require high speed, high load, and high rotational accuracy.

There are two types of solid type needle roller bearings: one having an inner ring and one having no inner ring. Bearings without an inner ring use the shaft directly as a raceway surface, and the required dimensional tolerance of the shaft diameter (raceway diameter) is as shown in Table 9 based on required operating clearance (see Table 1 required accuracy of other parameters). The corresponding dimensional tolerance of the housing bore is set to K7, which is widely used in general. Please consult NTN Engineering when setting the dimensional tolerance of the housing bore to other classes.

Table 9 Dimensional tolerance for shaft (raceway diameter)

Roller inscribed circle diameter F_w mm		Shaft tolerance class		
		Internal clearance less than normal	Normal clearance	Internal clearance greater than normal
Over	Incl.			
80	160	k5	h5	f6
160	180	k5	g5	f6
				e6
180	200	j5	g5	e6
200	250	j5	f6	e6
250	315	h5	f6	e6
315	400	g5	f6	d6

Tables 10.1 and 10.2 show values of the radial internal clearance of bearings with an inner ring. Table 10.1 shows the clearance of interchangeable bearings, and the clearance values are satisfied even if the inner rings and outer rings are intermixed. Table 10.2 shows the clearance of non-interchangeable bearings, and the clearance range is tightly controlled. Therefore, the inner rings and outer rings cannot be intermixed. The clearance codes are C2, normal, C3, and C4 from smallest to largest, and suffix code NA is added for the non-interchangeable clearance.

Table 10.1 Radial internal clearance of solid type needle roller bearings (1) interchangeable bearings Unit: μm

Nominal bearing bore diameter <i>d</i> (mm)		Radial internal clearance									
		C2		Normal ¹⁾		C3		C4			
Over	Incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
—	10	0	30	10	40	25	55	35	65		
10	18	0	30	10	40	25	55	35	65		
18	24	0	30	10	40	25	55	35	65		
24	30	0	30	10	45	30	65	40	70		
30	40	0	35	15	50	35	70	45	80		
40	50	5	40	20	55	40	75	55	90		
50	65	5	45	20	65	45	90	65	105		
65	80	5	55	25	75	55	105	75	125		
80	100	10	60	30	80	65	115	90	140		
100	120	10	65	35	90	80	135	105	160		
120	140	10	75	40	105	90	155	115	180		
140	160	15	80	50	115	100	165	130	195		
160	180	20	85	60	125	110	175	150	215		
180	200	25	95	65	135	125	195	165	235		
200	225	30	105	75	150	140	215	180	255		
225	250	40	115	85	165	155	230	205	280		
250	280	45	125	100	180	175	255	230	310		
280	315	50	135	110	195	195	280	255	340		
315	355	55	145	125	215	215	305	280	370		
355	400	65	160	140	235	245	340	320	415		
400	450	70	190	155	275	270	390	355	465		

1) No clearance code is given to this type of bearings.

Table 10.2 Radial internal clearance of solid type needle roller bearings (2) non-interchangeable bearings Unit: μm

Nominal bearing bore diameter <i>d</i> (mm)		Radial internal clearance									
		C2NA		Normal ¹⁾		C3NA		C4NA			
Over	Incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
—	10	10	20	20	30	35	45	45	55		
10	18	10	20	20	30	35	45	45	55		
18	24	10	20	20	30	35	45	45	55		
24	30	10	25	25	35	40	50	50	60		
30	40	12	25	25	40	45	55	55	70		
40	50	15	30	30	45	50	65	65	80		
50	65	15	35	35	50	55	75	75	90		
65	80	20	40	40	60	70	90	90	110		
80	100	25	45	45	70	80	105	105	125		
100	120	25	50	50	80	95	120	120	145		
120	140	30	60	60	90	105	135	135	160		
140	160	35	65	65	100	115	150	150	180		
160	180	35	75	75	110	125	165	165	200		
180	200	40	80	80	120	140	180	180	220		
200	225	45	90	90	135	155	200	200	240		
225	250	50	100	100	150	170	215	215	265		
250	280	55	110	110	165	185	240	240	295		
280	315	60	120	120	180	205	265	265	325		
315	355	65	135	135	200	225	295	295	360		
355	400	75	150	150	225	255	330	330	405		
400	450	85	170	170	255	285	370	370	455		

1) Only code "NA" is given to this type of bearings. Example: NA4920NA

When there is an oil hole on the raceway surface, bearings should be installed such that the oil hole position is located in the non-loaded region. A bearing with an inner ring must be used within the allowable movement amount (s) (a state in which the rollers are within the range of the inner ring effective contact length). The allowable movement amount (s) is illustrated in Fig. 4, values are listed in the bearing dimension tables.

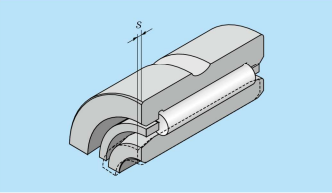


Fig. 4 Allowable movement amount (s)

2.5 Thrust roller bearing

Thrust roller bearings are bearings having a disc-shaped raceway combined with a cage-and-roller assembly having needle rollers or cylindrical rollers radially embedded, and are suitable for axial loads applied in a single direction.

Further, a shaft or housing can be directly used as a raceway surface without using a separate raceway ring. Thereby, size in the axial direction can be minimized, and lightweight and compact designs can be obtained. Table 11 shows fits recommended for thrust roller bearings. See Table 1 for the required accuracy of the raceway surface.

Table 11 Fits recommended for thrust roller bearings

Bearing parts		Type and class	
		Shaft diameter	Housing bore
AXK type, K811 type	Inner diameter guide	h8 1)	—
K812 type, K893 type	Outer diameter guide	—	H9 1)
WS type raceway (inner ring)		h6	—
GS type raceway (outer ring)		—	H7
Steel raceway AS type	Shaft fixing	h10	Clearance with housing
	Housing fixing	Clearance with shaft	Loose H11

1) The guide surface is finished by grinding.

2.6 Cam follower/roller follower

A cam follower is a track roller having a stud in place of an inner ring, and the outer ring rolls on a track. It is a bearing used as an eccentric roller, a guide roller, etc., and it can have a cylindrical shape or a spherical shape for the outer ring outer diameter. Cam follower bearings are offered in both cage type and full complement designs.

When attaching a cam follower do not strike the flange part with a hammer because sharp impact may cause cracks and rotational failure (Fig. 5). In addition, the oil supply hole position on the stud raceway surface of the cam follower is indicated by the NTN mark on the stud flange surface. Install it by rotating the nut while the fixing the stud so that the mark (oil hole) is positioned in the non-loaded region (Fig. 6). The thread part may break if too much tightening torque is applied.

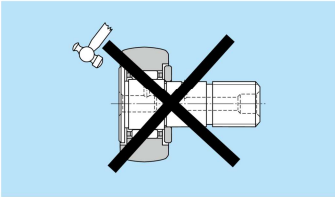


Fig. 5

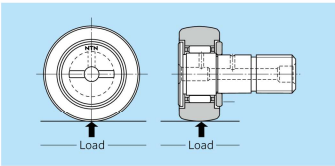


Fig. 6

A roller follower is a bearing in which the outer ring rolls on a track. As with the cam follower, there is a cylindrical shape or a spherical shape for the outer ring outer diameter, and are offered in both cage type and full complement designs. Common uses include use as an eccentric roller, guide roller, rocker arm roller, cam roller, pressure roller, etc.

A roller follower must be installed so that the oil hole is positioned in the non-loaded region because installing the oil hole position of the inner ring in the loaded region may shorten the bearing life.

Table 12 shows the radial internal clearance of cam followers and roller followers, Tables 13 and 14 show the dimensional accuracy and recommended fits of cam followers, and Table 15 shows the recommended fits of roller followers.

Table 12 Radial internal clearance of cam followers and roller followers

Nominal roller inscribed circle diameter mm Over Incl.	Internal clearance μm			
	C2		C4	
	Min.	Max.	Min.	Max.
3 6	0	10	3	17
6 10	0	12	5	20
10 18	0	15	5	25
18 30	0	20	10	30
30 50	0	25	10	40
50 80	0	30	15	50
80 100	0	35	20	55

Table 13 Dimensional accuracy of cam followers

Bearing	Outer ring shape	Stud diameter	Outer ring outer diameter	
			Outer diameter	Outer ring width
Milli series	Spherical surface	h7	0 -50	JIS Class 0
	Cylindrical surface		JIS Class 0	
Inch series	Spherical surface	+25 0	0 -50	0 -130
	Cylindrical surface		0 -25	

Unit: μm

Table 14 Fits recommended for cam followers

Bearing	Type and class of mounting hole
Metric series	H7
Inch series	F7

Note: Assembly must be done without backlash for impact loads.

Table 15 Fits recommended for roller followers

Type and class of shaft	
No inner ring	With an inner ring
k5 or k6	g6 or h6

The maximum radial load that can be statically permitted on the contact surface between the track and the track roller is referred to as the track load capacity, and the value differs depending on the hardness of the track. The track load capacity specified in the dimension table is a value considering a track hardness of 40 HRC, and the load capacity of tracks having different hardness may be obtained by multiplying the track load capacity in the dimension table by the correction coefficient *G* in Table 16. However, when the calculated track load capacity exceeds the basic static rating load *C*_{0r} of the bearing, the track load capacity is equal to the basic static rating load *C*_{0r} of the bearing.

Table 16 Correction coefficient *G*

Hardness (HRC)	Correction coefficient <i>G</i>	
	Cylindrical shape	Spherical shape
20	0.368	0.223
25	0.459	0.311
30	0.583	0.446
35	0.750	0.650
40	1.000	1.000
45	1.414	1.681
50	1.987	2.800
55	2.787	4.652

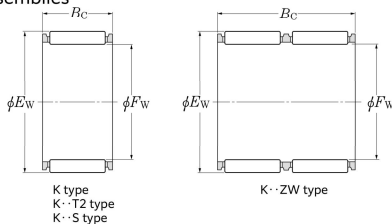
Since NTN cam followers and roller followers are generally installed with cantilever loading, a non-uniform load (one-sided load) may act on the bearing due to the influence of loosening of the fitting caused by continuous use. For stable operation of equipment, it is necessary to pay sufficient attention to the looseness of the fitting.

Further, lubrication is also necessary between the outer ring outer diameter surface and the track of the bearing. Even after lubrication, the bearing and the track may be damaged at an early stage when slippage occurs between the outer ring outer diameter surface and the track of the bearing due to rapid radial load fluctuation or rotational speed fluctuation during use.

For details, see the special catalog "Needle roller bearings (CAT. No. 2300/E)" or "Cam follower & roller follower (CAT. No. 3604/JE)."

Needle roller and cage assemblies

K type
K··T2 type
K··S type
K··ZW type
KMJ··S type
KV··S type

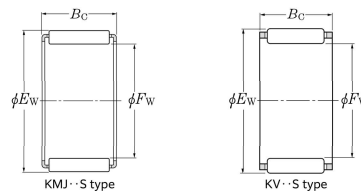


F_w 3 ~ 10mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N C_u	$\min^{-1}$ Grease lubrication	Oil lubrication		
3	6	7 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	1 460	970	118	33 000	50 000	K3×6×7T2T	0.0004
4	6	8 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	1 560	1 330	162	30 000	45 000	K4×6×7.8XT2	0.0003
	7	7 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	1 770	1 270	155	30 000	45 000	K4×7×7T2	0.0005
5	8	8 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	2 640	2 190	267	27 000	40 000	K5×8×8T2	0.0007
	8	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	2 720	2 250	275	27 000	40 000	K5×8×10T2	0.0009
6	9	8	2 660	2 280	278	25 000	37 000	K6×9×8T2T	0.0009
	9	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	3 400	3 150	380	25 000	37 000	K6×9×10T2T	0.0011
	10	13 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	4 400	3 700	455	25 000	37 000	K6×10×13T2	0.0019
7	10	8	2 670	2 350	286	23 000	34 000	K7×10×8T2	0.0009
	10	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	3 400	3 200	390	23 000	34 000	K7×10×10T2	0.0011
	10	13 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 050	5 400	655	23 000	34 000	KV7×10×12.8XS	0.0023
8	11	8	3 150	3 000	365	21 000	32 000	K8×11×8T2T	0.0011
	11	9	3 150	3 000	365	21 000	32 000	8E-KV8×11×8.8XS	0.0019
	11	10	4 000	4 100	500	21 000	32 000	K8×11×10T2	0.0013
	11	12 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	4 450	4 650	570	21 000	32 000	8E-KV8×11×11.8XS	0.0025
	11	13 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	4 850	5 200	635	21 000	32 000	K8×11×13	0.0026
	12	10	4 650	4 150	510	21 000	32 000	K8×12×10T2	0.0020
	12	12	5 600	5 300	650	21 000	32 000	8E-KV8×12×11.8XS	0.0040
	12	13	5 050	4 650	565	21 000	32 000	K8×12×13	0.0036
9	12	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	4 550	5 000	615	20 000	30 000	K9×12×10T2	0.0015
	12	13 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 500	6 400	780	20 000	30 000	K9×12×13T2	0.0021
10	13	10	4 550	5 100	620	19 000	28 000	K10×13×10T2T	0.0016
	13	13	5 450	6 450	790	19 000	28 000	8E-KV10×13×12.8XS	0.0032
	14	8	4 300	3 950	485	19 000	28 000	K10×14×8	0.0027
	14	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 500	5 450	660	19 000	28 000	K10×14×10T	0.0034
	14	11 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 500	5 450	660	19 000	28 000	8E-KV10×14×10.8XS	0.0039
	14	11.5	6 800	7 200	875	19 000	28 000	KMJ10×14×11.3XS	0.0040
	14	13	6 600	6 900	840	19 000	28 000	K10×14×13	0.0044
	14	14	7 150	7 650	930	19 000	28 000	8E-KV10×14×13.8XS	0.0050

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-12



F_w 10 ~ 15mm

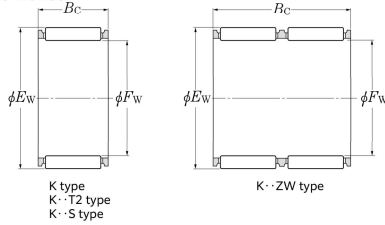
Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N C_u	$\min^{-1}$ Grease lubrication	Oil lubrication		
10	14	17 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	8 050	8 850	1 080	19 000	28 000	8E-K10×14×16.8X1	0.0064
	16	12 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	7 100	5 950	730	19 000	28 000	K10×16×12	0.0066
11	14	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 050	6 000	735	18 000	27 000	K11×14×10	0.0028
12	15	9	4 450	5 250	640	17 000	26 000	K12×15×9	0.0027
	15	10	5 000	6 100	740	17 000	26 000	8Q-K12×15×10	0.0030
	15	13	6 000	7 700	940	17 000	26 000	K12×15×13	0.0038
	15	20	8 550	12 200	1 480	17 000	26 000	K12×15×20ZW	0.0059
	16	8	4 850	4 900	600	17 000	26 000	K12×16×8	0.0034
	16	11.5	6 750	7 400	900	17 000	26 000	KMJ12×16×11.3XS	0.0047
	16	13 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	7 500	8 500	1 040	17 000	26 000	8Q-K12×16×13	0.0080
	16	18	9 800	11 900	1 460	17 000	26 000	8E-K12×16×17.8X1	0.0070
	16	20	10 300	12 800	1 560	17 000	26 000	K12×16×19.8X4	0.010
	17	10	7 350	7 200	880	17 000	26 000	KMJ12×17×9.8XS	0.0050
	17	13	9 000	9 400	1 150	17 000	26 000	K12×17×13	0.0075
	17	18	12 600	14 400	1 760	17 000	26 000	KV12×17×17.8XS	0.0080
14	18	12	8 650	8 000	975	17 000	26 000	8Q-K12×18×12	0.0089
	17	10	5 400	7 050	860	16 000	24 000	KV14×17×10ST	0.0040
	18	10	6 900	8 000	975	16 000	24 000	K14×18×10	0.0046
	18	11	7 600	9 050	1 100	16 000	24 000	K14×18×11	0.0053
	18	13	8 300	10 100	1 240	16 000	24 000	K14×18×13	0.0063
	18	15 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	9 650	12 300	1 500	16 000	24 000	K14×18×15S	0.0076
	18	17 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	10 900	14 400	1 760	16 000	24 000	K14×18×17V5	0.0079
	18	39	18 800	28 900	3 500	16 000	24 000	K14×18×39ZW	0.018
	19	13	8 950	9 650	1 180	16 000	24 000	K14×19×13	0.0080
	20	12	9 350	9 150	1 110	16 000	24 000	K14×20×12	0.0095
15	20	17	13 500	14 600	1 780	16 000	24 000	K14×20×17	0.014
	18	14	7 850	11 600	1 420	15 000	23 000	K15×18×14	0.0060
	19	8 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	5 350	5 850	715	15 000	23 000	KV15×19×7.8XS	0.0033
	19	10 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	6 850	8 050	980	15 000	23 000	K15×19×10T	0.0055
	19	13	8 250	10 200	1 250	15 000	23 000	K15×19×13	0.0067

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-13

Needle roller and cage assemblies

K type
K··T2 type
K··S type
K··ZW type
KMJ··S type

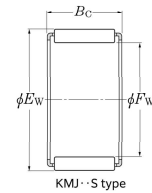


F_w 15 ~ 18mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	Grease lubrication $\min^{-1}$	Oil lubrication		
15	19	17	10 900	14 600	1 780	15 000	23 000	K15×19×17	0.0090
	19	24	14 100	20 400	2 490	15 000	23 000	K15×19×24ZW	0.013
	20	13	10 100	11 500	1 410	15 000	23 000	K15×20×13	0.0088
	20	16	12 600	15 200	1 850	15 000	23 000	KMJ15×20×15.8XS	0.0090
	21	15	11 900	12 500	1 530	15 000	23 000	K15×21×15	0.013
	21	17	14 900	16 800	2 050	15 000	23 000	KMJ15×21×16.8X1SK	0.012
16	21	21	16 500	19 100	2 330	15 000	23 000	K15×21×21	0.017
	20	10	7 500	9 250	1 130	15 000	23 000	K16×20×10T	0.0057
	20	11	8 300	10 500	1 280	15 000	23 000	K16×20×11T	0.0061
	20	13	9 050	11 800	1 430	15 000	23 000	K16×20×13	0.0071
	20	17	11 900	16 800	2 050	15 000	23 000	K16×20×17ST	0.0092
	22	12	11 700	12 500	1 530	15 000	23 000	K16×22×12	0.010
	22	13	12 600	13 900	1 690	15 000	23 000	KMJ16×22×13S	0.011
	22	16	13 600	15 200	1 850	15 000	23 000	K16×22×15.8X	0.014
	22	17	14 400	16 400	2 000	15 000	23 000	K16×22×17	0.015
	22	20	16 000	18 800	2 300	15 000	23 000	K16×22×20	0.017
17	21	10	7 450	9 300	1 140	15 000	22 000	K17×21×10S	0.0056
	21	13	9 400	12 600	1 530	15 000	22 000	K17×21×13S	0.0075
	21	15	10 400	14 400	1 750	15 000	22 000	K17×21×15	0.0089
	21	17	11 800	16 900	2 060	15 000	22 000	K17×21×17	0.0095
	22	20	14 700	19 200	2 340	15 000	22 000	K17×22×20	0.015
	23	17	14 400	16 500	2 020	15 000	22 000	K17×23×17	0.016
18	23	23	16 800	20 200	2 470	15 000	22 000	K17×23×22.8X1T2	0.013
	22	10	7 400	9 400	1 140	14 000	21 000	K18×22×10	0.0061
	22	13	8 900	11 900	1 450	14 000	21 000	K18×22×13	0.0077
	22	17	11 700	17 000	2 070	14 000	21 000	K18×22×17	0.011
	23	20	14 600	19 300	2 360	14 000	21 000	K18×23×20S	0.015
	24	12	12 300	13 800	1 690	14 000	21 000	K18×24×12	0.012
	24	13	11 600	12 800	1 560	14 000	21 000	K18×24×13	0.013

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-14



F_w 18 ~ 22mm

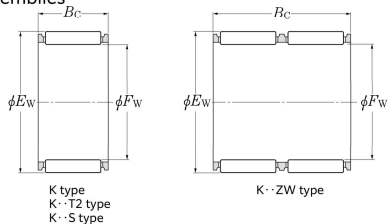
Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	Grease lubrication $\min^{-1}$	Oil lubrication		
18	24	17	16 000	19 300	2 350	14 000	21 000	KMJ18×24×17SV1	0.014
	24	20	17 000	20 900	2 550	14 000	21 000	K18×24×20	0.019
	25	17	18 000	20 400	2 490	14 000	21 000	K18×25×17	0.019
	25	22	22 100	26 600	3 250	14 000	21 000	K18×25×22	0.024
19	23	13	9 650	13 500	1 640	14 000	21 000	K19×23×13	0.0082
	23	17	12 700	19 200	2 340	14 000	21 000	K19×23×17	0.011
20	24	10	8 300	11 200	1 370	13 000	20 000	K20×24×10S	0.0065
	24	11	9 500	13 400	1 640	13 000	20 000	K20×24×11	0.0072
	24	13	10 000	14 300	1 740	13 000	20 000	K20×24×13SV4	0.0086
	24	17	13 200	20 400	2 480	13 000	20 000	K20×24×17S	0.011
	24	45	16 400	27 100	3 300	13 000	20 000	K20×24×45ZW	0.028
	25	40	29 000	48 000	5 880	13 000	20 000	K20×25×40ZWT	0.033
	26	12	12 900	15 100	1 840	13 000	20 000	K20×26×12	0.013
	26	13	14 000	16 700	2 040	13 000	20 000	KMJ20×26×13ST	0.012
	26	14	15 800	19 600	2 390	13 000	13 000	KMJ20×26×13.8X1S	0.013
	26	17	17 800	22 800	2 780	13 000	20 000	KMJ20×26×17S	0.016
	26	20	20 600	27 600	3 350	13 000	20 000	KMJ20×26×20S	0.019
	28	17	21 700	24 600	3 000	13 000	20 000	KMJ20×28×16.8XS	0.022
	28	20	24 600	28 900	3 500	13 000	20 000	KMJ20×28×19.8X4S	0.026
	28	25	27 100	32 500	3 950	13 000	20 000	8Q-K20×28×25	0.039
21	25	13	10 700	15 900	1 940	13 000	19 000	KMJ21×25×12.8X1S	0.0081
	25	17	13 600	21 500	2 630	13 000	19 000	K21×25×17	0.012
22	26	10	8 500	11 900	1 450	12 000	18 000	K22×26×10S	0.0071
	26	11	10 100	14 900	1 820	12 000	18 000	8Q-K22×26×11	0.0090
	26	13	10 200	15 200	1 850	12 000	18 000	K22×26×13	0.0094
	26	17	13 500	21 600	2 640	12 000	18 000	K22×26×17S	0.012
	27	20	17 500	25 900	3 150	12 000	18 000	K22×27×20	0.020
	27	28.5	24 200	39 500	4 800	12 000	18 000	K22×27×28.3X	0.028
	27	40	29 900	51 500	6 300	12 000	18 000	K22×27×40ZW	0.039
	28	17	17 700	23 300	2 850	12 000	18 000	K22×28×17V1	0.020

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-15

Needle roller and cage assemblies

K type
K··T2 type
K··S type
K··ZW type
KMJ··S type
KV··S type

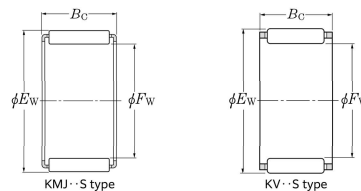


F_w 22 ~ 25mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass kg (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
22	29	16	18 700	22 700	2 770	12 000	18 000	K22×29×16	0.023
	30	15 $-\frac{0.2}{-0.55}$	19 300	21 700	2 640	12 000	18 000	K22×30×15T	0.022
	30	17.5	23 200	27 500	3 350	12 000	18 000	KMJ22×30×17.3XS	0.024
	30	24	31 000	40 000	4 900	12 000	18 000	KMJ22×30×23.8XS	0.035
23	27	13	11 400	17 700	2 160	11 000	17 000	KMJ23×27×12.8XS	0.0086
	28	24 $-\frac{0.2}{-0.55}$	19 800	31 000	3 750	11 000	17 000	K23×28×24	0.023
	29	18	20 600	28 800	3 500	11 000	17 000	KMJ23×29×17.8XS	0.019
24	28	10	9 000	13 200	1 610	11 000	17 000	K24×28×10T	0.0080
	28	13	10 800	16 800	2 050	11 000	17 000	K24×28×13	0.010
	28	17 $-\frac{0.2}{-0.55}$	14 300	23 900	2 920	11 000	17 000	K24×28×17	0.013
	29	13	12 300	16 900	2 060	11 000	17 000	K24×29×13	0.012
	30	17	18 400	25 200	3 050	11 000	17 000	K24×30×17	0.022
	30	31	27 900	43 000	5 200	11 000	17 000	K24×30×31ZW	0.039
25	29	10	8 950	13 300	1 620	11 000	16 000	K25×29×10	0.0083
	29	13	10 800	16 900	2 050	11 000	16 000	K25×29×13	0.010
	29	17	14 200	24 000	2 930	11 000	16 000	K25×29×17S	0.014
	30	13	13 200	18 800	2 290	11 000	16 000	K25×30×13	0.013
	30	17	17 400	26 800	3 250	11 000	16 000	K25×30×17S	0.017
	30	20	19 400	31 000	3 750	11 000	16 000	K25×30×20SV3	0.021
	30	22	22 300	37 000	4 500	11 000	16 000	KMJ25×30×21.8XS	0.020
	30	26 $-\frac{0.2}{-0.55}$	21 800	35 500	4 350	11 000	16 000	K25×30×26ZW	0.027
	30	39	29 800	53 500	6 550	11 000	16 000	K25×30×39ZW	0.040
	31	13	15 200	19 900	2 430	11 000	16 000	K25×31×13V3	0.018
	31	14	16 500	22 100	2 700	11 000	16 000	K25×31×14	0.018
	31	17	18 300	25 300	3 100	11 000	16 000	K25×31×17	0.022
	31	18.5	21 000	30 000	3 650	11 000	16 000	KMJ25×31×18.3XS	0.021
	31	21	22 500	33 000	4 000	11 000	16 000	K25×31×21V3	0.028
	32	16	19 500	24 700	3 000	11 000	16 000	K25×32×16	0.027
	33	24	34 500	47 000	5 750	11 000	16 000	KMJ25×33×24S	0.040

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-16



F_w 26 ~ 30mm

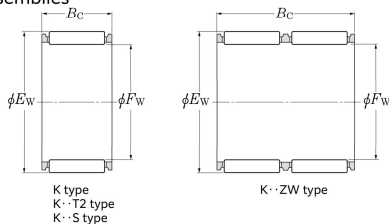
Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass kg (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
26	30	13	11 800	19 200	2 340	10 000	15 000	K26×30×13	0.011
	30	17 $-\frac{0.2}{-0.55}$	15 500	27 400	3 350	10 000	15 000	K26×30×17	0.015
	31	24	21 400	35 500	4 300	10 000	15 000	8E-K26×31×23.8XS	0.029
	34	22	24 200	30 000	3 700	10 000	15 000	K26×34×22	0.041
28	32	17	15 300	27 500	3 350	9 500	14 000	K28×32×17	0.017
	32	21	18 700	35 500	4 350	9 500	14 000	K28×32×21T	0.020
	33	13	13 900	20 900	2 550	9 500	14 000	K28×33×13	0.015
	33	17	18 300	29 800	3 650	9 500	14 000	K28×33×17S	0.020
	33	26 $-\frac{0.2}{-0.55}$	23 900	42 000	5 100	9 500	14 000	K28×33×26ZW	0.033
	33	27 $-\frac{0.2}{-0.55}$	28 300	52 000	6 350	9 500	14 000	K28×33×27	0.032
	34	14	17 500	24 800	3 000	9 500	14 000	K28×34×14	0.020
	34	17	18 100	25 800	3 150	9 500	14 000	K28×34×17V1	0.025
	35	16	21 200	28 400	3 450	9 500	14 000	K28×35×16	0.029
	35	18	21 500	28 900	3 550	9 500	14 000	K28×35×18	0.031
29	34	17 $-\frac{0.2}{-0.55}$	18 900	31 000	3 800	9 500	14 000	K29×34×17S	0.022
	34	27 $-\frac{0.2}{-0.55}$	28 100	52 000	6 350	9 500	14 000	K29×34×27	0.033
30	34	14	12 400	21 500	2 600	8 500	13 000	KV30×34×13.8XS	0.014
	34	23	18 000	34 500	4 200	8 500	13 000	K30×34×22.8XS	0.013
	35	11	12 200	18 000	2 200	8 500	13 000	K30×35×11S	0.014
	35	13	14 700	22 900	2 800	8 500	13 000	KV30×35×13S	0.017
	35	20	21 600	37 500	4 600	8 500	13 000	K30×35×20S	0.025
	35	26 $-\frac{0.2}{-0.55}$	25 200	46 000	5 600	8 500	13 000	K30×35×26ZWV1	0.036
	35	27 $-\frac{0.2}{-0.55}$	29 900	57 000	6 950	8 500	13 000	K30×35×27S	0.033
	37	16	21 900	30 500	3 700	8 500	13 000	K30×37×16	0.029
	37	18	23 300	33 000	4 000	8 500	13 000	K30×37×18	0.034
	37	20	26 200	38 000	4 650	8 500	13 000	KMJ30×37×20S	0.032
	37	48	40 000	65 500	8 000	8 500	13 000	K30×37×48ZW	0.075
	38	18	25 000	33 000	4 000	8 500	13 000	K30×38×18	0.036

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-17

Needle roller and cage assemblies

K type
K··T2 type
K··S type
K··ZW type
KMJ··S type
KV··S type

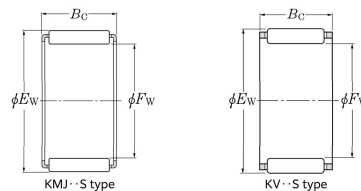


F_w 31 ~ 35mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass kg (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
31	35	24	21 200	43 500	5 300	8 500	13 000	KV31×35×23.8XS	0.022
	36	14	15 800	25 400	3 100	8 500	13 000	KV31×36×13.8XS	0.017
32	36	15	14 300	26 400	3 200	8 500	13 000	K32×36×15ST	0.017
	37	13	14 500	23 000	2 810	8 500	13 000	K32×37×13	0.018
	37	17	19 200	33 000	4 000	8 500	13 000	K32×37×17S	0.022
	37	26	24 900	46 000	5 600	8 500	13 000	K32×37×26ZWV3	0.032
	37	27	29 600	57 500	7 000	8 500	13 000	K32×37×27	0.037
	38	14	19 800	30 500	3 700	8 500	13 000	KMJ32×38×14S	0.022
	38	26	31 500	54 000	6 600	8 500	13 000	K32×38×26	0.041
	39	16	22 600	32 000	3 900	8 500	13 000	K32×39×16V1	0.033
	39	18	24 000	35 000	4 250	8 500	13 000	K32×39×18	0.037
	39	26	29 600	57 500	7 000	8 500	13 000	K32×39×26	0.037
33	38	30.5	28 400	55 000	6 700	8 000	12 000	K33×38×30.3X1T2	0.026
34	40	39.5	39 000	73 500	8 950	8 000	12 000	KV34×40×39.3X1ZWS	0.066
35	39	22.5	21 500	46 000	5 600	7 500	11 000	KV35×39×22.3XS	0.024
	39	24	21 300	45 000	5 500	7 500	11 000	K35×39×23.8X1T2	0.015
	40	13	15 200	25 100	3 050	7 500	11 000	K35×40×13	0.019
	40	17	20 000	36 000	4 350	7 500	11 000	K35×40×17	0.025
	40	19	22 300	41 000	5 000	7 500	11 000	K35×40×19	0.029
	40	26	26 100	50 000	6 100	7 500	11 000	K35×40×26ZW	0.037
	40	30	26 100	50 000	6 100	7 500	11 000	K35×40×30ZW	0.043
	41	14	19 400	30 500	3 700	7 500	11 000	K35×41×14	0.026
	41	15	20 900	33 500	4 050	7 500	11 000	K35×41×15	0.027
	41	24	31 000	55 500	6 800	7 500	11 000	K35×41×23.8X1	0.042
	41	40	43 000	84 000	10 200	7 500	11 000	K35×41×40ZW	0.055
	42	16	24 100	36 000	4 350	7 500	11 000	K35×42×16	0.035
	42	18	24 700	37 000	4 500	7 500	11 000	K35×42×18	0.039

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-18



F_w 35 ~ 42mm

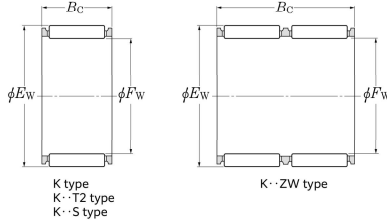
Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass kg (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
35	42	20	26 500	40 500	4 950	7 500	11 000	KV35×42×20SV2	0.040
	42	30	39 500	68 000	8 300	7 500	11 000	K35×42×30	0.062
36	42	45	42 500	74 000	9 000	7 500	11 000	K35×42×45ZW	0.106
	42	46	51 000	106 000	12 900	7 500	11 000	K36×42×46ZW	0.086
37	42	13	15 900	27 100	3 300	7 500	11 000	K37×42×13V4	0.021
	42	17	21 000	38 500	4 700	7 500	11 000	K37×42×17V2	0.026
	43	33.5	39 000	76 000	9 250	7 500	11 000	KV37×43×33.3XS	0.062
	44	18	26 300	41 000	5 000	7 500	11 000	K37×44×18	0.042
	45	25	37 000	58 000	7 050	7 500	11 000	K37×45×24.8XT2	0.039
38	43	17	20 900	38 500	4 700	7 500	11 000	8E-K38×43×17	0.027
	43	27	32 000	67 500	8 250	7 500	11 000	K38×43×27	0.043
	43	29	32 500	68 000	8 300	7 500	11 000	K38×43×28.8X	0.047
	46	32	54 000	95 500	11 600	7 500	11 000	K38×46×32	0.073
40	45	13	16 500	29 200	3 550	6 500	10 000	K40×45×13V2	0.023
	45	17	21 800	41 500	5 100	6 500	10 000	K40×45×17T	0.027
	45	21	26 700	54 000	6 600	6 500	10 000	K40×45×21V2	0.035
	45	27	33 500	72 500	8 850	6 500	10 000	K40×45×27	0.044
	46	17	24 600	43 000	5 200	6 500	10 000	K40×46×17	0.030
	46	34	40 500	80 500	9 850	6 500	10 000	KV40×46×33.8XS	0.063
	47	18	27 700	45 000	5 450	6 500	10 000	K40×47×18	0.045
	47	20	31 000	51 500	6 300	6 500	10 000	K40×47×20	0.048
	48	20	33 000	51 000	6 250	6 500	10 000	K40×48×20	0.052
	48	25	41 000	68 000	8 300	6 500	10 000	KV40×48×25SV1	0.065
41	49	22	30 500	46 000	5 650	6 500	9 500	8E-KV41×49×21.8XS	0.065
42	47	17	22 100	43 000	5 250	6 500	9 500	K42×47×17	0.028
	47	27	34 000	75 500	9 200	6 500	9 500	K42×47×27	0.047
	48	17	25 700	46 000	5 650	6 500	9 500	K42×48×17	0.036
	50	20	34 000	53 500	6 550	6 500	9 500	K42×50×20	0.054

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

E-19

Needle roller and cage assemblies

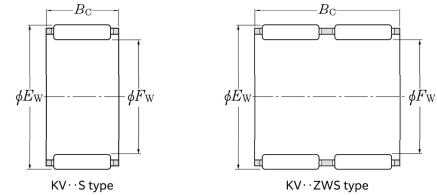
K type
K··T2 type
K··ZW type
KV··S type
KVS··ZWS type



F_w 43 ~ 50mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
mm			dynamic C_r	static C_{0r}	N C_u	$\min^{-1}$ Grease lubrication	Oil lubrication		
F_w	E_w	B_c							kg (approx.)
43	48	17	22 000	43 000	5 250	6 500	9 500	K43×48×17	0.029
	48	27 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	34 000	75 500	9 200	6 500	9 500	K43×48×27	0.046
	48	38	41 000	96 000	11 700	6 500	9 500	KV43×48×37.8XZWS	0.058
	50	18	29 100	49 000	5 950	6 500	9 500	K43×50×18	0.049
44	50	31 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	43 500	91 500	11 100	6 500	9 500	KV44×50×30.8XS	0.067
45	49	19	22 100	52 000	6 350	6 000	9 000	K45×49×19	0.027
	50	17	22 300	44 500	5 450	6 000	9 000	K45×50×17V3	0.033
	50	25.8	30 500	66 500	8 100	6 000	9 000	KV45×50×25.8XS	0.045
	50	27	34 500	78 000	9 500	6 000	9 000	K45×50×27	0.050
	51	27 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	34 500	68 000	8 300	6 000	9 000	KV45×51×26.8XS	0.058
	52	18	29 700	51 000	6 200	6 000	9 000	K45×52×18	0.051
	52	21	32 000	56 500	6 900	6 000	9 000	K45×52×21	0.061
	53	20	36 000	59 000	7 200	6 000	9 000	K45×53×20	0.062
47	53	25	46 500	82 000	10 000	6 000	9 000	K45×53×25	0.077
	52	15.5	19 400	38 000	4 650	5 500	8 500	8E-K47×52×15.3X2	0.031
	52	17 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	23 200	47 500	5 800	5 500	8 500	K47×52×17	0.033
	52	23	29 600	65 500	7 950	5 500	8 500	KV47×52×22.8X2S	0.044
	52	24 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	33 500	76 500	9 350	5 500	8 500	K47×52×23.8X	0.044
48	52	27	35 500	83 000	10 100	5 500	8 500	K47×52×27	0.051
	52	33	38 000	90 500	11 100	5 500	8 500	KV47×52×32.8XZWS	0.064
	53	22.5	31 000	69 500	8 450	5 500	8 500	KV48×53×22.3XS	0.042
	53	26	36 500	86 500	10 600	5 500	8 500	K48×53×25.8X3T2	0.029
	53	30	36 500	85 500	10 400	5 500	8 500	K48×53×29.8X1	0.062
	53	37 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	45 000	112 000	13 700	5 500	8 500	KV48×53×36.8XZWS	0.064
50	53	37.5	41 500	101 000	12 300	5 500	8 500	K48×53×37.5ZW	0.072
	54	19	31 000	61 000	7 450	5 500	8 500	K48×54×19	0.044
	55	24.5	39 000	74 500	9 050	5 500	8 500	KV48×55×24.3XS	0.070
	55	13.5 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	18 100	35 500	4 300	5 500	8 000	K50×55×13.5T	0.023
	55	20 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	27 900	62 000	7 550	5 500	8 000	KV50×55×20S	0.040

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.



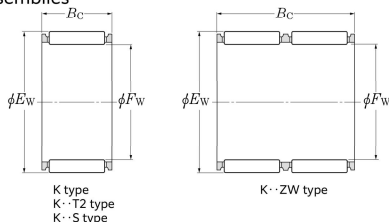
F_w 50 ~ 60mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass
mm			dynamic C_r	static C_{0r}	N C_u	$\min^{-1}$ Grease lubrication	Oil lubrication		
F_w	E_w	B_c							kg (approx.)
50	55	27	37 000	88 500	10 800	5 500	8 000	K50×55×27	0.053
	55	30	39 500	97 000	11 800	5 500	8 000	K50×55×30	0.059
	57	18 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	31 500	57 000	6 950	5 500	8 000	K50×57×18	0.053
	58	20	38 500	67 500	8 200	5 500	8 000	K50×58×20	0.065
	58	25	48 500	90 000	11 000	5 500	8 000	K50×58×25	0.081
	58	58	83 500	181 000	22 100	5 500	8 000	KV50×58×57.8XZWS	0.188
52	57	18	22 800	48 000	5 850	5 000	7 500	KV52×57×17.8XS	0.037
	57	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	30 500	69 500	8 500	5 000	7 500	KV52×57×22.8X1S	0.048
	58	19	32 000	65 500	7 950	5 000	7 500	K52×58×19	0.048
54	59	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	31 500	73 500	8 950	5 000	7 500	KV54×59×22.8XS	0.049
55	60	17	25 800	58 000	7 050	5 000	7 500	K55×60×17	0.043
	60	20	28 800	66 500	8 100	5 000	7 500	K55×60×20T	0.045
	60	30	42 000	108 000	13 200	5 000	7 500	KV55×60×30S	0.069
	60	37	47 500	127 000	15 500	5 000	7 500	K55×60×36.8X	0.086
	61	19	33 000	69 500	8 450	5 000	7 500	K55×61×19	0.051
	61	20 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	33 000	69 500	8 450	5 000	7 500	K55×61×20	0.054
	61	30	48 000	113 000	13 700	5 000	7 500	K55×61×30	0.081
	62	18	33 500	63 000	7 700	5 000	7 500	K55×62×18	0.054
	63	20	39 000	70 000	8 500	5 000	7 500	K55×63×20	0.073
	63	25	50 500	97 500	11 900	5 000	7 500	K55×63×25	0.088
56	63	32	61 000	125 000	15 200	5 000	7 500	K55×63×32	0.117
	66	41 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	90 000	178 000	21 700	5 000	7 500	K56×66×40.8XT2	0.148
	65	40 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	66 000	140 000	17 100	4 700	7 000	KV57×65×39.8XZWS	0.145
	64	19 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	34 000	73 500	8 950	4 700	7 000	K58×64×19	0.052
	65	20	29 800	71 500	8 750	4 300	6 500	K60×65×20	0.051
	65	27 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	40 000	104 000	12 700	4 300	6 500	K60×65×26.8X	0.067
	65	30	43 500	116 000	14 200	4 300	6 500	K60×65×30	0.071
	66	19	33 500	73 500	8 950	4 300	6 500	K60×66×19	0.053
	66	20	33 500	73 500	8 950	4 300	6 500	K60×66×20	0.056

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

Needle roller and cage assemblies

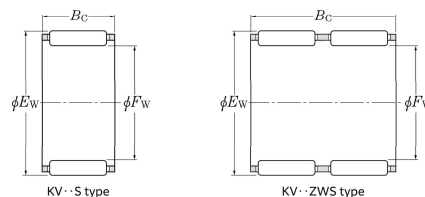
K type
K··T2 type
K··ZW type
KV··S type
KVS··ZWS type



F_w 60 ~ 73mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
60	66	30	49 000	119 000	14 600	4 300	6 500	K60×66×30	0.084
	68	15	27 200	45 500	5 550	4 300	6 500	K60×68×15	0.058
	68	20	40 000	75 000	9 200	4 300	6 500	K60×68×20	0.077
	68	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	44 500	85 000	10 400	4 300	6 500	K60×68×23	0.092
	68	25	52 000	105 000	12 800	4 300	6 500	K60×68×25T	0.097
	68	27	52 000	105 000	12 800	4 300	6 500	K60×68×27	0.098
61	66	20	29 700	71 500	8 750	4 300	6 500	K61×66×20	0.054
	66	30 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	43 500	116 000	14 200	4 300	6 500	K61×66×30	0.073
63	70	21 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	44 500	95 500	11 600	4 300	6 500	K63×70×21	0.075
	71	50.5 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	74 500	167 000	20 400	4 300	6 500	KV63×71×50.3XZWS	0.193
64	70	16 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	28 400	60 500	7 350	4 300	6 500	K64×70×16	0.053
65	70	20	30 500	75 000	9 150	4 000	6 000	K65×70×20	0.055
	70	21.5 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	30 500	75 000	9 150	4 000	6 000	KV65×70×21.3X1S	0.056
	70	30 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	45 000	124 000	15 200	4 000	6 000	K65×70×30	0.083
	73	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	47 000	94 000	11 500	4 000	6 000	K65×73×23	0.100
68	73	30	61 000	132 000	16 000	4 000	6 000	K65×73×30	0.126
	74	20	36 000	83 500	10 200	4 000	6 000	K68×74×20	0.065
	74	30 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	51 500	133 000	16 200	4 000	6 000	K68×74×30	0.097
	74	35 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	49 500	125 000	15 300	4 000	6 000	K68×74×35ZW	0.116
70	75	21	45 500	101 000	12 300	4 000	6 000	K68×75×21	0.077
	76	20	36 500	86 000	10 500	3 700	5 500	K70×76×20	0.070
	76	30	53 000	139 000	17 000	3 700	5 500	K70×76×30	0.100
	77	21 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	45 000	101 000	12 300	3 700	5 500	K70×77×21	0.080
72	78	23	49 500	103 000	12 600	3 700	5 500	K70×78×23	0.107
	78	30	65 500	149 000	18 100	3 700	5 500	K70×78×30	0.136
73	79	21 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	46 500	106 000	12 900	3 700	5 500	K72×79×21	0.085
	79	20 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	37 500	90 000	11 000	3 700	5 500	K73×79×20	0.074
	79	30 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	54 500	146 000	17 800	3 700	5 500	K73×79×30	0.106

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.



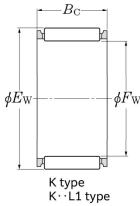
F_w 74 ~ 100mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Mass (approx.)
F_w	E_w	B_c	dynamic C_r	static C_{0r}	N_{Cu}	$\min^{-1}$ Grease lubrication	Oil lubrication		
74	90	50 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	157 000	287 000	35 000	3 700	5 500	K74×90×49.8XT2	0.380
	81	20	40 000	99 500	12 200	3 700	5 500	KV75×81×19.8X1S	0.071
75	81	30	56 000	152 000	18 600	3 700	5 500	K75×81×30	0.108
	82	21 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	46 000	106 000	13 000	3 700	5 500	K75×82×21	0.088
	83	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	50 500	109 000	13 300	3 700	5 500	K75×83×23	0.113
	83	30	67 500	157 000	19 200	3 700	5 500	K75×83×30	0.147
80	86	20	39 000	98 000	11 900	3 300	5 000	KV80×86×20SV1	0.077
	86	30	57 000	159 000	19 400	3 300	5 000	K80×86×30	0.110
	88	23 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	53 000	118 000	14 400	3 300	5 000	K80×88×23	0.125
	88	26	61 000	142 000	17 300	3 300	5 000	K80×88×26	0.131
85	88	30	69 000	166 000	20 300	3 300	5 000	K80×88×30	0.157
	92	30	66 000	176 000	21 500	3 100	4 700	K85×92×30	0.142
	93	27 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	64 000	153 000	18 700	3 100	4 700	K85×93×27	0.145
	93	30	71 000	175 000	21 400	3 100	4 700	8Q-K85×93×30	0.174
90	97	20	46 000	113 000	13 700	2 900	4 400	K90×97×20	0.103
	97	30	67 500	184 000	22 400	2 900	4 400	K90×97×30	0.151
	98	26 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	64 000	157 000	19 200	2 900	4 400	K90×98×26	0.148
	98	27	64 000	157 000	19 200	2 900	4 400	K90×98×27	0.150
95	98	30	72 500	184 000	22 400	2 900	4 400	K90×98×30	0.172
	102	21 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	48 000	122 000	14 900	2 800	4 200	K95×102×21	0.115
	102	31 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	70 500	199 000	24 300	2 800	4 200	K95×102×31	0.172
	103	27 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	65 500	165 000	20 100	2 800	4 200	K95×103×27	0.159
100	103	30	74 000	193 000	23 500	2 800	4 200	K95×103×30	0.165
	107	21	47 500	122 000	14 700	2 700	4 000	KV100×107×21S	0.120
	107	31 $\begin{smallmatrix} -0.2 \\ -0.55 \end{smallmatrix}$	71 500	207 000	24 900	2 700	4 000	K100×107×31	0.173
	108	27 $\begin{smallmatrix} -0.2 \\ -0.65 \end{smallmatrix}$	61 000	153 000	18 400	2 700	4 000	K100×108×27	0.176
	108	30	76 000	201 000	24 300	2 700	4 000	K100×108×30	0.190

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

Needle roller and cage assemblies

K type
K · L1 type



F_w 105 ~ 170mm

Boundary dimensions			Basic load rating		Fatigue load limit N C_u	Allowable speed		Number	Mass kg (approx.)
mm F_w	E_w	B_c	dynamic N C_r	static N C_{0r}		min^{-1} Grease lubrication	Oil lubrication		
105	112	21	48 500	127 000	15 100	2 500	3 800	K105×112×21	0.130
	112	31	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 71 000	207 000	24 600	2 500	3 800	K105×112×31	0.176
	113	30	77 500	210 000	25 000	2 500	3 800	K105×113×30	0.198
110	117	24	54 500	149 000	17 500	2 400	3 600	K110×117×24	0.145
	117	34	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 77 500	235 000	27 600	2 400	3 600	K110×117×34	0.205
	118	30	79 000	219 000	25 700	2 400	3 600	K110×118×30	0.217
115	123	27	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 64 000	170 000	19 700	2 300	3 500	K115×123×27	0.200
	125	34	95 000	241 000	27 800	2 300	3 500	K115×125×34	0.330
120	127	24	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 57 500	165 000	18 900	2 200	3 300	K120×127×24	0.160
	127	34	82 000	260 000	29 800	2 200	3 300	K120×127×34	0.235
125	133	35	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 87 000	260 000	29 300	2 100	3 200	K125×133×35	0.275
	135	34	100 000	265 000	29 800	2 100	3 200	K125×135×34	0.350
130	137	24	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 59 000	175 000	19 600	2 100	3 100	K130×137×24	0.170
	137	34	84 500	277 000	31 000	2 100	3 100	K130×137×34	0.240
135	143	35	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 92 500	288 000	32 000	2 000	3 000	K135×143×35L1	0.313
	150	38	145 000	325 000	36 000	2 000	3 000	K135×150×38	0.590
145	153	26	72 000	214 000	23 100	1 900	2 800	K145×153×26	0.250
	153	28	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 80 500	247 000	26 700	1 900	2 800	K145×153×28	0.252
	153	36	100 000	325 000	35 000	1 900	2 800	K145×153×36	0.335
150	160	46	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 149 000	470 000	50 500	1 800	2 700	K150×160×46	0.550
155	163	26	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 73 500	224 000	23 800	1 700	2 600	K155×163×26	0.270
	163	36	102 000	340 000	36 000	1 700	2 600	K155×163×36	0.355
160	170	46	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 155 000	505 000	53 000	1 700	2 500	K160×170×46	0.570
165	173	26	79 000	251 000	26 100	1 600	2 400	K165×173×26	0.290
	173	32	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 97 000	330 000	34 000	1 600	2 400	K165×173×32	0.340
	173	36	109 000	380 000	39 500	1 600	2 400	K165×173×36	0.375
170	180	46	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 160 000	540 000	55 500	1 600	2 400	K170×180×46	0.620

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

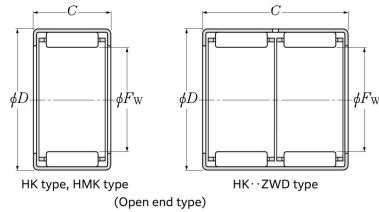
F_w 175 ~ 285mm

Boundary dimensions			Basic load rating		Fatigue load limit N C_u	Allowable speed		Number	Mass kg (approx.)
mm F_w	E_w	B_c	dynamic N C_r	static N C_{0r}		min^{-1} Grease lubrication	Oil lubrication		
175	183	32	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 101 000	350 000	36 000	1 500	2 300	K175×183×32L1	0.379
185	195	37	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 131 000	425 000	43 000	1 500	2 200	K185×195×37L1	0.581
195	205	37	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 135 000	450 000	44 500	1 400	2 100	K195×205×37L1	0.620
210	220	42	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 156 000	560 000	54 000	1 300	1 900	K210×220×42	0.740
220	230	42	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 161 000	590 000	56 500	1 200	1 800	K220×230×42	0.790
240	250	42	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 167 000	635 000	59 000	1 100	1 700	K240×250×42L1	0.849
265	280	50	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 256 000	850 000	77 000	1 000	1 500	K265×280×50L1	1.77
285	300	50	$\begin{smallmatrix} -0.3 \\ -0.65 \end{smallmatrix}$ 268 000	930 000	82 000	950	1 400	K285×300×50	1.97

Note: Bearings may be delivered with a different cage type even if they are ordered by the bearing numbers in the table.

Drawn cup needle roller bearings

HK type, HK · ZWD type
HMK type
BK type, BK · ZWD type

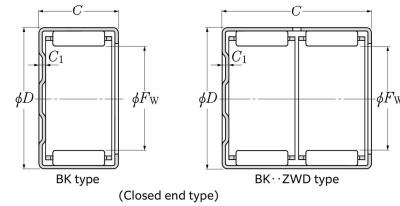


F_w 3 ~ 10mm

Boundary dimensions mm F_w D C C ₁	Basic load rating		Fatigue load limit N C _u	Allowable speed		Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
	dynamic C _r	static C _{0r}		min ⁻¹ Grease lubrication	Oil lubrication	Open end type	Closed end type		
3	6.5 6 —	925 565	69	33 000	50 000	HK0306FT2	—	0.0006	—
	6.5 6 0.8	925 565	69	33 000	50 000	—	BK0306T2	0.0007	—
4	8 8 —	1 770 1 270	155	30 000	45 000	HK0408FT2	—	0.0016	—
	8 8 1.6	1 770 1 270	155	30 000	45 000	—	BK0408T2	0.0018	—
5	9 9 —	2 450 1 990	243	27 000	40 000	HK0509FM	—	0.0019	—
	9 9 1.6	2 450 1 990	243	27 000	40 000	—	BK0509	0.0021	—
6	10 9 —	2 920 2 590	315	25 000	37 000	HK0609FM	—	0.0022	—
	10 9 1.6	2 920 2 590	315	25 000	37 000	—	BK0609T2	0.0024	—
7	11 9 —	3 150 2 930	355	23 000	34 000	HK0709FM	—	0.0025	—
	11 9 1.6	3 150 2 930	355	23 000	34 000	—	BK0709CT	0.0027	—
8	12 10 —	3 850 3 950	480	20 000	30 000	HK0810FM	—	0.0032	IR 5 × 8×12
	12 10 1.6	3 850 3 950	480	20 000	30 000	—	BK0810CT	0.0034	IR 5 × 8×12
9	15 10 —	4 200 3 300	400	20 000	30 000	HMK0810CT	—	0.0067	IR 5 × 8×12
	15 15 —	7 300 6 650	770	20 000	30 000	HMK0815CT	—	0.010	IR 5 × 8×16
10	15 20 —	9 050 8 750	1 070	20 000	30 000	HMK0820T2	—	0.013	—
	13 10 —	4 300 4 650	570	18 000	27 000	HK0910FM	—	0.0035	IR 6 × 9×12
11	13 10 1.6	4 300 4 650	570	18 000	27 000	—	BK0910CT	0.0039	IR 6 × 9×12
	13 12 —	5 400 6 250	765	18 000	27 000	HK0912F	—	0.0042	IR 6 × 9×12
12	13 12 1.6	5 400 6 250	765	18 000	27 000	—	BK0912CT	0.0045	IR 6 × 9×12
	16 12 —	5 300 4 450	545	18 000	27 000	HMK0912	—	0.0087	IR 6 × 9×16
13	16 16 —	7 400 6 850	840	18 000	27 000	HMK0916	—	0.012	—
	14 10 —	4 500 5 100	620	16 000	24 000	HK1010FM	—	0.0038	IR 7×10×10.5
14	14 10 1.6	4 500 5 100	620	16 000	24 000	—	BK1010	0.0042	IR 7×10×10.5
	14 12 —	5 650 6 800	830	16 000	24 000	HK1012F	—	0.0045	IR 7×10×16
15	14 12 1.6	5 900 7 250	880	16 000	24 000	—	BK1012	0.0050	IR 7×10×16
	14 15 —	7 250 9 400	1 140	16 000	24 000	HK1015F	—	0.0056	IR 7×10×16
16	14 15 1.6	7 250 9 400	1 140	16 000	24 000	—	BK1015CT	0.0062	IR 7×10×16
	17 10 —	4 250 3 450	420	16 000	24 000	HMK1010	—	0.0079	IR 7×10×10.5
17	17 12 —	5 600 4 850	590	16 000	24 000	HMK1012	—	0.0094	IR 7×10×16

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK1012F + IR7 × 10 × 16

E-26



F_w 10 ~ 15mm

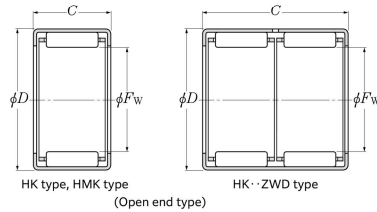
Boundary dimensions mm F_w D C C ₁	Basic load rating		Fatigue load limit N C _u	Allowable speed		Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
	dynamic C _r	static C _{0r}		min ⁻¹ Grease lubrication	Oil lubrication	Open end type	Closed end type		
10	17 15 —	7 400 6 950	850	16 000	24 000	HMK1015	—	0.012	IR 7×10×16
	17 20 —	9 900 10 100	1 240	16 000	24 000	7E-HMK1020CT	—	0.016	—
11	16 10 —	5 050 6 250	760	13 000	20 000	HK1210FM	—	0.0046	IR 8×12×10.5
	16 10 1.6	5 050 6 250	760	13 000	20 000	—	BK1210	0.0052	IR 8×12×10.5
12	18 12 —	6 600 7 300	890	13 000	20 000	HK1212FM	—	0.0091	IR 8×12×12.5
	18 12 2.7	6 600 7 300	890	13 000	20 000	—	BK1212	0.010	IR 8×12×12.5
13	19 12 —	7 100 6 900	845	13 000	20 000	HMK1212	—	0.011	IR 8×12×12.5
	19 15 —	9 400 9 900	1 210	13 000	20 000	7E-HMK1215C	—	0.014	IR 9×12×16
14	19 20 —	12 900 14 900	1 820	13 000	20 000	HMK1220CT	—	0.018	—
	19 25 —	15 300 18 600	2 260	13 000	20 000	HMK1225	—	0.023	—
15	19 12 —	6 950 7 900	965	12 000	18 000	HK1312FM	—	0.010	IR10×13×12.5
	19 12 2.7	6 950 7 900	965	12 000	18 000	—	BK1312	0.011	IR10×13×12.5
16	20 12 —	7 200 8 500	1 040	11 000	17 000	HK1412FM	—	0.011	IR10×14×13
	20 12 2.7	7 200 8 500	1 040	11 000	17 000	—	BK1412	0.012	IR10×14×13
17	20 16 —	10 300 13 400	1 640	11 000	17 000	HK1416F	—	0.015	—
	20 16 2.7	10 300 13 400	1 640	11 000	17 000	—	BK1416CT	0.016	—
18	22 16 —	11 500 12 000	1 460	11 000	17 000	HMK1416C	—	0.019	IR10×14×20
	22 20 —	14 600 16 200	1 980	11 000	17 000	HMK1420C	—	0.024	—
19	21 12 —	7 500 9 100	1 110	11 000	16 000	HK1512FM	—	0.011	IR12×15×12.5
	21 12 2.7	7 500 9 100	1 110	11 000	16 000	—	BK1512	0.013	IR12×15×12.5
20	21 16 —	10 700 14 400	1 750	11 000	16 000	HK1516F	—	0.015	IR12×15×16.5
	21 16 2.7	10 700 14 400	1 750	11 000	16 000	—	BK1516	0.017	IR12×15×16.5
21	22 12 —	12 900 18 200	2 220	11 000	16 000	HK1522ZWF	—	0.020	IR12×15×22.5
	22 12 2.7	12 900 18 200	2 220	11 000	16 000	—	BK1522ZWD	0.022	IR12×15×22.5
22	22 10 —	6 100 6 000	730	11 000	16 000	HMK1510	—	0.011	IR10×15×12.5
	22 12 —	7 950 8 450	1 030	11 000	16 000	HMK1512	—	0.013	IR12×15×12.5
23	22 15 —	10 500 12 100	1 480	11 000	16 000	HMK1515C	—	0.016	IR12×15×16
	22 20 —	15 300 19 700	2 400	11 000	16 000	HMK1520CV6	—	0.022	IR12×15×22.5
24	22 25 —	18 500 25 000	3 050	11 000	16 000	HMK1525	—	0.027	—

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK1312FM + IR10 × 13 × 12.5

E-27

Drawn cup needle roller bearings

HK type, HK · ZWD type
HMK type
BK type, BK · ZWD type

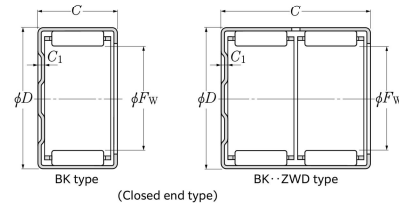


F_w 16 ~ 20mm

Boundary dimensions mm	C		C ₁	Basic load rating		Fatigue load limit N C _u	Allowable speed		Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
	F _w	D		dynamic C _r	static C _{0r}		min ⁻¹ Grease lubrication	Oil lubrication				
16	22	12	—	7 750	9 700	1 180	10 000	15 000	HK1612FM	—	0.012	IR12×16×13
	22	12	2.7	7 750	9 700	1 180	10 000	15 000	—	BK1612	0.014	IR12×16×13
	22	16	—	11 100	15 300	1 870	10 000	15 000	HK1616F	—	0.016	IR12×16×20
	22	16	2.7	11 100	15 300	1 870	10 000	15 000	—	BK1616	0.018	IR12×16×20
	22	22	—	13 300	19 400	2 370	10 000	15 000	HK1622ZWF	—	0.022	—
	22	22	2.7	13 300	19 400	2 370	10 000	15 000	—	BK1622ZWD	0.023	—
	24	16	—	12 400	13 500	1 640	10 000	15 000	HMK1616	—	0.021	IR12×16×20
	24	20	—	15 600	18 200	2 220	10 000	15 000	7E-HMK1620CT	—	0.027	IR12×16×22
	23	12	—	8 050	10 300	1 260	9 500	14 000	HK1712FM	—	0.012	—
	23	12	2.7	8 050	10 300	1 260	9 500	14 000	—	BK1712CT	0.015	—
17	24	15	—	11 600	14 200	1 740	9 500	14 000	7E-HMK1715CT	—	0.018	IR14×17×17
	24	20	—	15 200	20 000	2 440	9 500	14 000	7E-HMK1720CT	—	0.024	IR12×17×20.5
	24	25	—	19 000	26 700	3 250	9 500	14 000	7E-HMK1725CT	—	0.030	IR12×17×25.5
	24	12	—	8 300	10 900	1 330	8 500	13 000	HK1812FM	—	0.013	IR15×18×12.5
18	24	12	2.7	8 300	10 900	1 330	8 500	13 000	—	BK1812	0.015	IR15×18×12.5
	24	16	—	11 800	17 300	2 110	8 500	13 000	HK1816F	—	0.018	IR15×18×16.5
	24	16	2.7	11 800	17 300	2 110	8 500	13 000	—	BK1816	0.020	IR15×18×16.5
	25	13	—	10 200	12 200	1 480	8 500	13 000	HMK1813	—	0.016	IR15×18×16
	25	15	—	12 000	15 100	1 840	8 500	13 000	HMK1815	—	0.019	IR15×18×16
	25	17	—	13 300	17 200	2 100	8 500	13 000	HMK1817C	—	0.021	IR15×18×17.5
	25	19	—	15 500	20 900	2 540	8 500	13 000	HMK1819	—	0.024	IR15×18×20.5
	25	20	—	16 300	22 300	2 720	8 500	13 000	HMK1820	—	0.025	IR15×18×20.5
	25	25	—	20 900	31 000	3 750	8 500	13 000	HMK1825V2	—	0.031	IR15×18×25.5
	27	16	—	13 900	16 300	2 000	8 500	13 000	HMK1916	—	0.025	IR15×19×20
19	27	20	—	18 100	23 000	2 800	8 500	13 000	HMK1920F	—	0.031	—
	26	12	—	8 750	12 100	1 480	8 000	12 000	HK2012FM	—	0.014	IR15×20×13
20	26	12	2.7	9 250	13 000	1 590	8 000	12 000	—	BK2012	0.017	IR15×20×13
	26	16	—	12 500	19 200	2 340	8 000	12 000	HK2016F	—	0.019	IR17×20×16.5
	26	16	2.7	13 000	20 100	2 450	8 000	12 000	—	BK2016	0.022	IR17×20×16.5
	26	20	—	16 000	26 200	3 200	8 000	12 000	HK2020F	—	0.024	IR17×20×20.5

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK1812FM + IR15 × 18 × 12.5

E-28



F_w 20 ~ 25mm

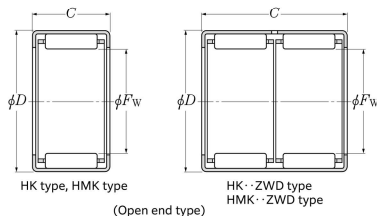
Boundary dimensions mm	C		C ₁	Basic load rating		Fatigue load limit N C _u	Allowable speed		Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
	F _w	D		dynamic C _r	static C _{0r}		min ⁻¹ Grease lubrication	Oil lubrication				
20	26	20	2.7	16 000	26 200	3 200	8 000	12 000	—	BK2020CT	0.027	IR17×20×20.5
	26	30	—	21 500	38 500	4 700	8 000	12 000	HK2030ZWF	—	0.035	IR17×20×30.5
	26	30	2.7	22 200	40 000	4 900	8 000	12 000	—	BK2030ZWD	0.037	IR17×20×30.5
	27	15	—	13 000	17 300	2 110	8 000	12 000	HMK2015CV3	—	0.021	IR17×20×16.5
	27	20	—	17 200	24 800	3 000	8 000	12 000	HMK2020CT	—	0.027	IR17×20×20.5
	27	25	—	22 000	34 000	4 150	8 000	12 000	HMK2025C	—	0.034	IR15×20×26
	27	30	—	26 100	42 000	5 150	8 000	12 000	HMK2030	—	0.041	IR17×20×30.5
	29	16	—	15 300	19 100	2 320	7 500	11 000	HMK2116	—	0.027	IR17×21×20
	29	20	—	19 400	25 800	3 150	7 500	11 000	HMK2120	—	0.033	—
	28	12	—	9 200	13 400	1 630	7 500	11 000	HK2212FM	—	0.013	IR17×22×13
21	28	12	2.7	9 200	13 400	1 630	7 500	11 000	—	BK2212CT	0.015	IR17×22×13
	28	16	—	13 200	21 100	2 570	7 500	11 000	HK2216F	—	0.021	IR17×22×18
	28	16	2.7	13 600	22 100	2 700	7 500	11 000	—	BK2216	0.024	IR17×22×18
	28	20	—	16 800	28 800	3 500	7 500	11 000	HK2220F	—	0.026	IR17×22×20.5
	28	20	2.7	17 200	29 800	3 650	7 500	11 000	—	BK2220	0.030	IR17×22×20.5
	29	10	—	8 400	10 100	1 240	7 500	11 000	HMK2210	—	0.015	IR17×22×13
	29	15	—	12 900	17 600	2 150	7 500	11 000	7E-HMK2215C	—	0.022	IR17×22×16D
	29	20	—	18 200	27 400	3 350	7 500	11 000	HMK2220CV2	—	0.030	IR17×22×20.5
	29	25	—	23 200	37 500	4 550	7 500	11 000	HMK2225CT	—	0.037	IR17×22×26
	29	30	—	26 900	45 000	5 500	7 500	11 000	HMK2230	—	0.045	IR17×22×32
24	31	20	—	18 300	28 200	3 450	6 500	10 000	HMK2420CT	—	0.032	—
	31	28	—	26 000	44 500	5 400	6 500	10 000	HMK2428	—	0.045	IR20×24×28.5
	32	12	—	11 100	15 200	1 850	6 500	9 500	HK2512F	—	0.021	IR20×25×12.5
	32	12	2.7	11 800	16 300	1 990	6 500	9 500	—	BK2512	0.023	IR20×25×12.5
25	32	16	—	15 900	24 000	2 920	6 500	9 500	HK2516F	—	0.027	IR20×25×17
	32	16	2.7	15 900	24 000	2 920	6 500	9 500	—	BK2516	0.031	IR20×25×17
	32	20	—	20 300	33 000	4 000	6 500	9 500	HK2520	—	0.034	IR20×25×20.5
	32	20	2.7	20 300	33 000	4 000	6 500	9 500	—	BK2520	0.039	IR20×25×20.5
	32	26	—	26 400	46 000	5 600	6 500	9 500	HK2526C	—	0.045	IR20×25×26.5
	32	26	2.7	26 400	46 000	5 600	6 500	9 500	—	BK2526C	0.049	IR20×25×26.5

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK2512F + IR20 × 25 × 12.5

E-29

Drawn cup needle roller bearings

HK type, HK · ZWD type
HMK type, HMK · ZWD type
BK type, BK · ZWD type

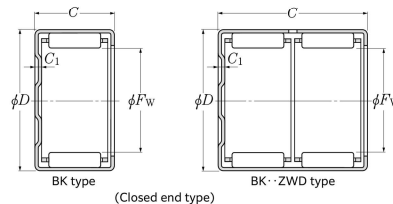


F_w 25 ~ 30mm

Boundary dimensions mm F_w D C C ₁	Basic load rating dynamic N static C _{0r}	Fatigue load limit N C _u	Allowable speed min ⁻¹ Grease lubrication Oil lubrication	Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
				Open end type	Closed end type		
32 38 —	35 000 65 500	8 000	6 500 9 500	HK2538ZWD	—	0.065	IR20×25×38.5
32 38 2.7	35 000 65 500	8 000	6 500 9 500	—	BK2538ZWD	0.069	IR20×25×38.5
33 10 —	9 150 10 400	1 270	6 500 9 500	HMK2510	—	0.019	IR20×25×12.5
25 33 15 —	15 200 19 900	2 430	6 500 9 500	HMK2515CT	—	0.029	IR20×25×16
33 20 —	21 200 30 500	3 750	6 500 9 500	HMK2520CT	—	0.039	IR20×25×20.5
33 25 —	26 700 41 000	5 000	6 500 9 500	HMK2525F	—	0.048	IR20×25×26.5
33 30 —	32 000 52 000	6 350	6 500 9 500	7E-HMK2530C	—	0.058	IR20×25×32
26 34 16 —	17 100 23 400	2 860	6 000 9 000	7E-HMK2616	—	0.032	IR22×26×20
34 20 —	21 100 30 500	3 750	6 000 9 000	7E-HMK2620CT	—	0.040	—
35 16 —	16 700 26 400	3 200	5 500 8 500	HK2816CT	—	0.030	IR22×28×17
35 16 2.7	16 700 26 400	3 200	5 500 8 500	—	BK2816CT	0.034	IR22×28×17
35 20 —	21 300 36 000	4 400	5 500 8 500	HK2820	—	0.038	IR22×28×20.5
35 20 2.7	21 300 36 000	4 400	5 500 8 500	—	BK2820	0.043	IR22×28×20.5
37 20 —	23 600 32 500	4 000	5 500 8 500	HMK2820	—	0.049	IR22×28×20.5
37 30 —	35 000 54 500	6 600	5 500 8 500	7E-HMK2830C	—	0.073	—
29 38 20 —	24 600 35 000	4 250	5 500 8 500	HMK2920	—	0.050	—
38 30 —	34 500 54 000	6 600	5 500 8 500	HMK2930	—	0.075	—
37 12 —	12 300 18 200	2 220	5 500 8 000	HK3012CT	—	0.024	IR25×30×12.5
37 12 2.7	12 300 18 200	2 220	5 500 8 000	—	BK3012CT	0.028	IR25×30×12.5
37 16 —	18 100 30 000	3 650	5 500 8 000	7E-HK3016C	—	0.032	IR25×30×17
37 16 2.7	18 100 30 000	3 650	5 500 8 000	—	BK3016CT	0.037	IR25×30×17
37 20 —	22 300 39 500	4 800	5 500 8 000	HK3020F	—	0.040	IR25×30×20.5
37 20 2.7	22 300 39 500	4 800	5 500 8 000	—	BK3020	0.047	IR25×30×20.5
30 37 26 —	28 500 54 000	6 550	5 500 8 000	HK3026F	—	0.053	IR25×30×26.5
37 26 2.7	28 500 54 000	6 550	5 500 8 000	—	7E-BK3026T	0.059	IR25×30×26.5
37 38 —	38 500 78 500	9 600	5 500 8 000	HK3038ZWD	—	0.076	IR25×30×38.5
37 38 2.7	38 500 78 500	9 600	5 500 8 000	—	BK3038ZWD	0.083	IR25×30×38.5
40 13 —	14 100 17 100	2 090	5 500 8 000	HMK3013	—	0.040	IR25×30×16
40 15 —	17 100 22 100	2 690	5 500 8 000	HMK3015	—	0.044	IR25×30×16
40 20 —	24 200 34 500	4 200	5 500 8 000	HMK3020	—	0.058	IR25×30×20.5

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK2820 + IR22 × 28 × 20.5

E-30



F_w 30 ~ 40mm

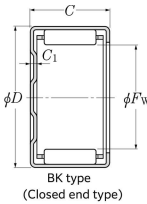
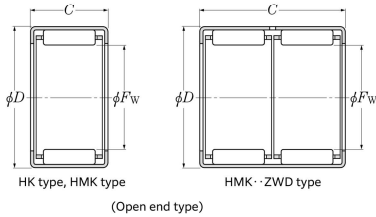
Boundary dimensions mm F_w D C C ₁	Basic load rating dynamic N static C _{0r}	Fatigue load limit N C _u	Allowable speed min ⁻¹ Grease lubrication Oil lubrication	Number		Mass kg (approx.)	Applied inner ring ¹⁾ (approx.)
				Open end type	Closed end type		
30 40 25 —	31 000 47 500	5 800	5 500 8 000	7E-HMK3025CT	—	0.073	IR25×30×26.5
40 30 —	36 000 57 500	7 000	5 500 8 000	HMK3030	—	0.087	IR25×30×32
32 42 20 —	27 500 38 000	4 600	5 000 7 500	7E-HMK3220	—	0.062	—
42 30 —	41 500 64 500	7 850	5 000 7 500	7E-HMK3230	—	0.092	—
42 12 —	13 300 21 300	2 600	4 700 7 000	HK3512CV2	—	0.028	—
42 12 2.7	13 300 21 300	2 600	4 700 7 000	—	BK3512CT	0.033	—
42 16 —	19 000 33 500	4 100	4 700 7 000	HK3516CT	—	0.037	—
42 16 2.7	19 000 33 500	4 100	4 700 7 000	—	BK3516CT	0.044	—
42 20 —	24 800 47 500	5 800	4 700 7 000	HK3520	—	0.046	—
35 42 20 2.7	24 800 47 500	5 800	4 700 7 000	—	BK3520	0.055	—
45 12 —	14 900 17 600	2 150	4 700 7 000	HMK3512	—	0.040	—
45 15 —	20 200 26 200	3 200	4 700 7 000	HMK3515	—	0.050	—
45 20 —	28 400 40 500	4 900	4 700 7 000	7E-HMK3520B	—	0.067	—
45 25 —	36 000 54 500	6 650	4 700 7 000	HMK3525	—	0.083	—
45 30 —	44 000 71 000	8 650	4 700 7 000	HMK3530CV1	—	0.100	—
37 47 20 —	29 300 43 000	5 250	4 300 6 500	HMK3720	—	0.070	—
47 30 —	44 500 73 000	8 900	4 300 6 500	HMK3730	—	0.105	—
48 15 —	21 700 29 300	3 550	4 300 6 500	HMK3815	—	0.054	—
48 20 —	30 500 45 000	5 500	4 300 6 500	HMK3820	—	0.072	—
38 48 25 —	38 500 61 000	7 450	4 300 6 500	HMK3825	—	0.090	—
48 30 —	46 000 77 000	9 400	4 300 6 500	HMK3830	—	0.107	IR32×38×32
48 45 —	62 000 113 000	13 700	4 300 6 500	HMK3845ZWD	—	0.161	—
47 12 —	12 100 19 500	2 380	4 000 6 000	HK4012V2	—	0.031	IR35×40×12.5
47 12 2.7	12 600 20 800	2 530	4 000 6 000	—	7E-BK4012CT	0.038	IR35×40×12.5
47 16 —	20 300 38 500	4 700	4 000 6 000	HK4016CT	—	0.041	IR35×40×17
47 16 2.7	20 300 38 500	4 700	4 000 6 000	—	BK4016CT	0.051	IR35×40×17
47 20 —	25 900 52 500	6 400	4 000 6 000	HK4020F	—	0.052	IR35×40×20.5
47 20 2.7	25 900 52 500	6 400	4 000 6 000	—	BK4020	0.064	IR35×40×20.5
50 15 —	23 100 32 500	3 950	4 000 6 000	HMK4015	—	0.056	IR35×40×17
50 20 —	32 500 50 000	6 100	4 000 6 000	7E-HMK4020	—	0.075	IR35×40×20.5

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK4012 + IR35 × 40 × 12.5

E-31

Drawn cup needle roller bearings

HK type
HMK type, HMK · ZWD type
BK type



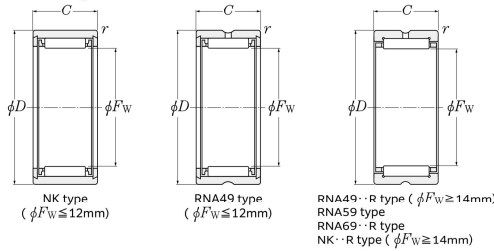
F_W 40 ~ 50mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number		Mass	Applied inner ring ¹⁾	
mm	C_0	C_1	dynamic	static		min ⁻¹	Oil lubrication	Open end type	Closed end type			kg
F_W	D	-0.2	C_r	C_{0r}	C_u	Grease lubrication				(approx.)	(approx.)	
40	50	25	—	41 000	67 500	8 250	4 000	6 000	7E-HMK4025	—	0.094	—
	50	30	—	49 000	85 000	10 400	4 000	6 000	HMK4030	—	0.112	IR35×40×34
	50	40	—	58 500	107 000	13 000	4 000	6 000	HMK4040ZWD	—	0.150	—
45	52	16	—	21 600	43 000	5 250	3 700	5 500	HK4516	—	0.046	IR40×45×17
	52	16	2.7	21 600	43 000	5 250	3 700	5 500	—	BK4516	0.058	IR40×45×17
	52	20	—	27 600	59 000	7 200	3 700	5 500	HK4520	—	0.058	IR40×45×20.5
	52	20	2.7	27 600	59 000	7 200	3 700	5 500	—	BK4520	0.072	IR40×45×20.5
	55	20	—	32 000	51 000	6 200	3 700	5 500	7E-HMK4520CT	—	0.083	IR40×45×20.5
	55	25	—	41 500	71 500	8 700	3 700	5 500	HMK4525	—	0.104	IR40×45×26.5
	55	30	—	49 500	90 000	11 000	3 700	5 500	7E-HMK4530CT	—	0.125	IR40×45×34
	55	40	—	59 500	113 000	13 800	3 700	5 500	HMK4540ZWD	—	0.167	—
50	58	20	—	31 500	63 000	7 700	3 200	4 800	HK5020	—	0.072	IR40×50×22
	58	20	2.7	31 500	63 000	7 700	3 200	4 800	—	BK5020	0.087	IR40×50×22
	58	25	—	38 500	82 000	10 000	3 200	4 800	HK5025	—	0.090	IR45×50×25.5
	58	25	2.7	38 500	82 000	10 000	3 200	4 800	—	BK5025	0.109	IR45×50×25.5
	62	12	—	18 200	23 600	2 880	3 200	4 800	7E-HMK5012	—	0.067	—
	62	15	—	25 900	37 000	4 550	3 200	4 800	7E-HMK5015	—	0.084	—
	62	20	—	37 500	60 000	7 300	3 200	4 800	7E-HMK5020CT	—	0.112	IR40×50×22
	62	25	—	48 000	82 500	10 100	3 200	4 800	7E-HMK5025	—	0.140	IR45×50×25.5
	62	30	—	58 500	105 000	12 800	3 200	4 800	7E-HMK5030CPX1	—	0.168	IR45×50×32
	62	40	—	70 000	134 000	16 300	3 200	4 800	7E-HMK5040ZWD	—	0.224	—
	62	45	—	79 000	156 000	19 100	3 200	4 800	7E-HMK5045ZWCDFX1	—	0.252	—

1) If the bearing has an inner ring, the value indicates HK + IR.
Example: HK4516 + IR40 × 45 × 17

Machined-ring needle roller bearings without an inner ring

RNA49 type
RNA59 type
RNA69 type
NK type

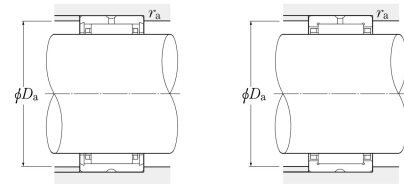


F_w 5 ~ 16mm

Boundary dimensions				Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
mm				dynamic	static	N	min ¹			mm	kg
F_w	D	C	r_3 min ¹⁾	C_r	C_{0r}	N_{Cu}	Grease lubrication	Oil lubrication		D_a Max.	(approx.)
5	10	10	0.15	2 640	2 190	267	27 000	40 000	NK5/10T2	6.5	0.0031
		10	0.15	2 720	2 250	275	27 000	40 000	NK5/12T2	6.5	0.0037
6	12	10	0.15	2 660	2 280	278	25 000	37 000	NK6/10T2	7.5	0.0047
		12	0.15	3 400	3 150	380	25 000	37 000	NK6/12T2	7.5	0.0057
7	13	10	0.15	2 670	2 350	286	23 000	34 000	RNA495T2	8.5	0.0055
	14	10	0.3	2 670	2 350	286	23 000	34 000	NK7/10T2	8.5	0.0069
	14	12	0.3	3 400	3 200	390	23 000	34 000	NK7/12T2	8.5	0.0082
8	15	10	0.15	3 150	3 000	365	21 000	32 000	RNA496T2T	9.5	0.0073
	15	12	0.3	4 000	4 100	500	21 000	32 000	NK8/12T2	9.5	0.0087
	15	16	0.3	4 850	5 200	635	21 000	32 000	NK8/16	9.5	0.012
9	16	12	0.3	4 550	5 000	615	20 000	30 000	NK9/12T2	10.5	0.010
	16	16	0.3	5 500	6 400	780	20 000	30 000	NK9/16T2	10.5	0.013
	17	10	0.15	3 600	3 650	445	20 000	30 000	RNA497	10.5	0.0095
10	17	12	0.3	4 550	5 100	620	19 000	28 000	NK10/12T2	11.5	0.010
	17	16	0.3	5 450	6 450	790	19 000	28 000	8E-NK10/16RCT	11.5	0.013
	19	11	0.15	5 250	5 150	630	19 000	28 000	RNA498CT	12	0.015
12	19	12	0.3	5 000	6 100	740	17 000	26 000	NK12/12	13.5	0.013
	19	16	0.3	6 000	7 700	940	17 000	26 000	NK12/16	13.5	0.016
	20	11	0.3	4 850	4 900	600	17 000	26 000	RNA499	14	0.013
14	22	13	0.3	8 600	9 200	1 120	16 000	24 000	RNA4900R	20	0.017
	22	16	0.3	10 300	11 500	1 400	16 000	24 000	NK14/16RCT	20	0.021
	22	20	0.3	13 000	15 600	1 900	16 000	24 000	NK14/20R	20	0.026
15	23	16	0.3	10 900	12 700	1 550	15 000	23 000	NK15/16R	21	0.022
	23	20	0.3	13 800	17 200	2 100	15 000	23 000	NK15/20R	21	0.027
16	24	13	0.3	9 550	10 900	1 330	15 000	23 000	RNA4901R	22	0.017
	24	16	0.3	12 200	14 900	1 820	15 000	23 000	NK16/16R	22	0.022
	24	20	0.3	14 600	18 800	2 290	15 000	23 000	NK16/20R	22	0.028
	24	22	0.3	15 400	20 000	2 440	15 000	23 000	RNA6901R	22	0.031

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.

E-34



F_w 17 ~ 28mm

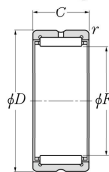
Boundary dimensions				Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
mm				dynamic	static	N	min ¹			mm	kg
F_w	D	C	r_3 min ¹⁾	C_r	C_{0r}	N_{Cu}	Grease lubrication	Oil lubrication		D_a Max.	(approx.)
17	25	16	0.3	12 100	15 000	1 830	15 000	22 000	NK17/16R	23	0.024
		25	0.3	15 400	20 400	2 490	15 000	22 000	NK17/20R	23	0.030
18	26	16	0.3	12 700	16 200	1 980	14 000	21 000	NK18/16R	24	0.025
		26	0.3	16 100	22 000	2 690	14 000	21 000	NK18/20RCT	24	0.031
19	27	16	0.3	13 300	17 400	2 120	14 000	21 000	NK19/16R	25	0.026
		27	0.3	16 000	22 200	2 700	14 000	21 000	NK19/20R	25	0.032
20	28	13	0.3	10 300	12 800	1 560	13 000	20 000	RNA4902R	26	0.022
		16	0.3	13 200	17 500	2 140	13 000	20 000	NK20/16RCT	26	0.027
		18	0.3	14 100	19 100	2 330	13 000	20 000	RNA5902CT	26	0.033
		20	0.3	16 700	23 800	2 900	13 000	20 000	NK20/20R	26	0.034
21	28	23	0.3	17 600	25 300	3 100	13 000	20 000	RNA6902R	26	0.040
		29	0.3	13 700	18 700	2 280	13 000	19 000	NK21/16R	27	0.028
22	30	16	0.3	14 200	19 900	2 430	12 000	18 000	NK22/16R	28	0.034
		20	0.3	18 000	27 000	3 300	12 000	18 000	NK22/20R	28	0.037
		23	0.3	11 200	14 600	1 780	12 000	18 000	RNA4903R	28	0.022
24	32	16	0.3	15 200	21 700	2 650	12 000	18 000	RNA5903	28	0.035
		23	0.3	16 200	27 200	3 300	12 000	18 000	RNA6903R	28	0.042
		32	0.3	15 200	22 300	2 720	11 000	17 000	NK24/16R	30	0.032
25	33	16	0.3	15 100	22 400	2 730	11 000	16 000	NK25/16R	31	0.033
		20	0.3	19 200	30 500	3 700	11 000	16 000	NK25/20RCT	31	0.042
		37	0.3	21 300	25 500	3 100	11 000	16 000	RNA4904RCT	35	0.052
26	34	16	0.3	15 600	23 600	2 880	10 000	15 000	8E-NK26/16RCT	32	0.034
		20	0.3	19 100	30 500	3 700	10 000	15 000	NK26/20R	32	0.042
28	37	20	0.3	22 300	34 000	4 150	9 500	14 000	NK28/20R	35	0.052
		30	0.3	26 700	48 000	5 850	9 500	14 000	NK28/30RCT	35	0.082

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.

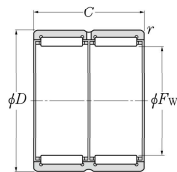
E-35

Machined-ring needle roller bearings without an inner ring

RNA49 type
RNA59 type
RNA69 type
NK type



RNA49···R type, RNA59 type
RNA69···R type ($\phi F_w \leq 35\text{mm}$)
NK···R type



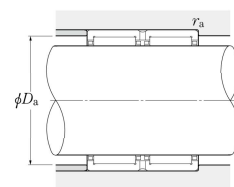
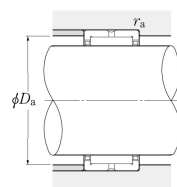
RNA69 type···R type
($\phi F_w \geq 40\text{mm}$)

F_w 28 ~ 40mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
F_w	D	C	$r_{fs} \text{ min}^{1)}$	dynamic N	static C_{0R}	C_u	min^{-1} Grease lubrication Oil lubrication		D_a $r_{as}^{2)}$	kg
									Max. Max.	(approx.)
28	$^{+0.033}_{+0.020}$ 39	23	0.3	23 200	29 300	3 600	9 500 14 000	RNA49/22R	37 0.3	0.050
	39	23	0.3	26 400	37 500	4 600	9 500 14 000	RNA59/22	37 0.3	0.092
	39	30	0.3	40 000	58 500	7 150	9 500 14 000	RNA69/22R	37 0.3	0.100
29	$^{+0.033}_{+0.020}$ 38	20	0.3	22 200	34 000	4 150	9 500 14 000	NK29/20R	36 0.3	0.054
	38	30	0.3	27 500	50 500	6 150	9 500 14 000	NK29/30R	36 0.3	0.084
30	40	20	0.3	22 100	34 000	4 150	8 500 13 000	NK30/20R	38 0.3	0.065
	40	30	0.3	33 000	57 000	6 950	8 500 13 000	NK30/30R	38 0.3	0.098
	$^{+0.033}_{+0.020}$ 42	17	0.3	24 000	31 500	3 800	8 500 13 000	RNA4905R	40 0.3	0.061
	42	23	0.3	30 500	43 000	5 200	8 500 13 000	RNA5905	40 0.3	0.101
32	42	30	0.3	41 500	63 000	7 650	8 500 13 000	RNA6905R	40 0.3	0.112
	42	20	0.3	23 500	37 500	4 600	8 500 13 000	NK32/20R	40 0.3	0.068
	42	30	0.3	34 000	60 500	7 350	8 500 13 000	NK32/30R	40 0.3	0.102
	45	17	0.3	24 800	33 500	4 050	8 500 13 000	RNA49/28RCT	43 0.3	0.073
35	$^{+0.041}_{+0.025}$ 45	23	0.3	32 000	45 500	5 550	8 500 13 000	RNA59/28	43 0.3	0.108
	45	30	0.3	43 000	67 000	8 150	8 500 13 000	RNA69/28R	43 0.3	0.135
	45	20	0.3	24 800	41 500	5 050	7 500 11 000	NK35/20RCT	43 0.3	0.074
	45	30	0.3	36 000	66 500	8 100	7 500 11 000	NK35/30R	43 0.3	0.112
37	$^{+0.041}_{+0.025}$ 47	17	0.3	25 500	35 500	4 300	7 500 11 000	RNA4906R	45 0.3	0.069
	47	23	0.3	32 500	48 500	5 950	7 500 11 000	RNA5906	45 0.3	0.108
	47	30	0.3	42 500	67 500	8 250	7 500 11 000	RNA6906R	45 0.3	0.126
38	$^{+0.041}_{+0.025}$ 47	20	0.3	25 300	43 500	5 300	7 500 11 000	NK37/20R	45 0.3	0.077
	47	30	0.3	36 500	69 500	8 500	7 500 11 000	NK37/30R	45 0.3	0.107
40	48	20	0.3	25 900	45 000	5 500	7 500 11 000	NK38/20R	46 0.3	0.079
	48	30	0.3	37 500	73 000	8 900	7 500 11 000	NK38/30R	46 0.3	0.107
40	50	20	0.3	26 400	47 000	5 750	6 500 10 000	NK40/20R	48 0.3	0.083
	50	30	0.3	38 500	76 000	9 250	6 500 10 000	NK40/30R	48 0.3	0.125
	52	20	0.6	31 500	47 500	5 800	6 500 10 000	RNA49/32R	48 0.6	0.089
	52	27	0.6	38 000	61 000	7 450	6 500 10 000	RNA59/32	48 0.6	0.149
	52	36	0.6	47 500	82 000	10 000	6 500 10 000	RNA69/32R	48 0.6	0.162

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.

E-36



F_w 42 ~ 63mm

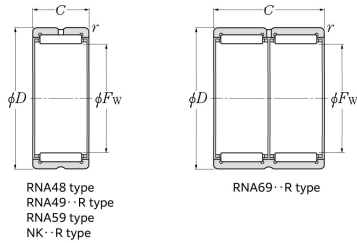
Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
F_w	D	C	$r_{fs} \text{ min}^{1)}$	dynamic N	static C_{0R}	C_u	min^{-1} Grease lubrication Oil lubrication		D_a $r_{as}^{2)}$	kg
									Max. Max.	(approx.)
42	52	20	0.3	26 900	49 000	5 950	6 500 9 500	NK42/20R	50 0.3	0.086
	52	30	0.3	39 000	79 000	9 650	6 500 9 500	NK42/30R	50 0.3	0.130
	$^{+0.041}_{+0.025}$ 55	20	0.6	32 000	50 000	6 100	6 500 9 500	RNA4907R	51 0.6	0.107
	55	27	0.6	39 000	64 500	7 850	6 500 9 500	RNA5907	51 0.6	0.176
	55	36	0.6	49 000	86 500	10 500	6 500 9 500	RNA6907R	51 0.6	0.193
43	$^{+0.041}_{+0.025}$ 53	20	0.3	27 500	51 000	6 200	6 500 9 500	NK43/20R	51 0.3	0.086
	53	30	0.3	40 000	82 000	10 000	6 500 9 500	NK43/30R	51 0.3	0.133
45	$^{+0.041}_{+0.025}$ 55	20	0.3	28 000	52 500	6 450	6 000 9 000	NK45/20R	53 0.3	0.092
	55	30	0.3	41 000	85 500	10 400	6 000 9 000	NK45/30RCT	53 0.3	0.139
47	$^{+0.041}_{+0.025}$ 57	20	0.3	28 800	55 500	6 800	5 500 8 500	NK47/20RCT	55 0.3	0.095
	57	30	0.3	42 500	91 500	11 200	5 500 8 500	NK47/30R	55 0.3	0.142
48	$^{+0.041}_{+0.025}$ 62	22	0.6	43 500	66 500	8 150	5 500 8 500	RNA4908R	58 0.6	0.140
	62	30	0.6	53 000	92 500	11 300	5 500 8 500	RNA5908	58 0.6	0.225
	62	40	0.6	67 000	116 000	14 100	5 500 8 500	RNA6908R	58 0.6	0.256
50	$^{+0.041}_{+0.025}$ 62	25	0.6	38 500	74 500	9 050	5 500 8 000	NK50/25RCT	58 0.6	0.158
	62	35	0.6	51 000	106 000	12 900	5 500 8 000	NK50/35R	58 0.6	0.221
52	$^{+0.049}_{+0.030}$ 68	22	0.6	46 000	73 000	8 950	5 000 7 500	RNA4909R	64 0.6	0.182
	68	30	0.6	56 000	101 000	12 300	5 000 7 500	RNA5909	64 0.6	0.232
	68	40	0.6	70 500	127 000	15 500	5 000 7 500	RNA6909R	64 0.6	0.273
55	$^{+0.049}_{+0.030}$ 68	25	0.6	41 000	82 000	10 000	5 000 7 500	NK55/25R	64 0.6	0.193
	68	35	0.6	54 000	118 000	14 300	5 000 7 500	NK55/35R	64 0.6	0.26
58	$^{+0.049}_{+0.030}$ 72	22	0.6	48 000	80 000	9 750	4 700 7 000	RNA4910R	68 0.6	0.163
	72	30	0.6	58 000	110 000	13 400	4 700 7 000	RNA5910	68 0.6	0.289
	72	40	0.6	74 000	139 000	17 000	4 700 7 000	RNA6910R	68 0.6	0.320
60	$^{+0.049}_{+0.030}$ 72	25	0.6	41 000	85 000	10 400	4 300 6 500	NK60/25R	68 0.6	0.185
	72	35	0.6	57 000	130 000	15 800	4 300 6 500	NK60/35R	68 0.6	0.258
63	$^{+0.049}_{+0.030}$ 80	25	1	58 500	99 500	12 100	4 300 6 500	RNA4911R	75 1	0.255
	80	34	1	76 500	140 000	17 100	4 300 6 500	RNA5911	75 1	0.367
	80	45	1	94 000	183 000	22 300	4 300 6 500	RNA6911R	75 1	0.470

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.

E-37

Machined-ring needle roller bearings without an inner ring

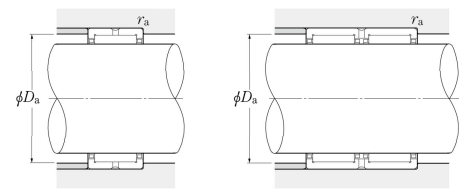
RNA49 type
RNA59 type
RNA69 type
NK type



F_w 65 ~ 90mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
mm			dynamic	static	N	min ⁻¹			mm	kg
F_w	D	C	C_r	C_{0r}	C_u	Grease lubrication	Oil lubrication		D_a Max. $r_{ax}^{(2)}$ Max.	(approx.)
65	78	25	0.6	45 000	98 000	12 000	4 000	6 000	NK65/25R	0.221
	78	35	0.6	60 000	142 000	17 300	4 000	6 000	NK65/35R	0.310
	82	25	1	44 500	89 000	10 800	4 000	6 000	NK68/25R	0.241
68	82	35	0.6	63 000	139 000	17 000	4 000	6 000	NK68/35R	0.338
	85	25	1	61 500	108 000	13 100	4 000	6 000	RNA4912R	0.275
	85	34	1	80 500	153 000	18 600	4 000	6 000	RNA5912	0.408
70	85	45	1	95 500	191 000	23 200	4 000	6 000	RNA6912R	0.488
	85	25	0.6	45 000	91 500	11 200	3 700	5 500	NK70/25R	0.275
	85	35	0.6	64 000	144 000	17 600	3 700	5 500	NK70/35R	0.386
72	90	25	1	62 500	112 000	13 700	3 700	5 500	RNA4913R	0.312
	90	34	1	84 000	165 000	20 100	3 700	5 500	RNA5913	0.462
	90	45	1	97 000	198 000	24 200	3 700	5 500	RNA6913R	0.520
73	90	25	0.6	54 000	100 000	12 200	3 700	5 500	NK73/25R	0.302
	90	35	0.6	76 500	156 000	19 100	3 700	5 500	NK73/35R	0.428
75	92	25	0.6	55 000	104 000	12 600	3 700	5 500	NK75/25R	0.315
	92	35	0.6	78 000	162 000	19 800	3 700	5 500	NK75/35R	0.492
80	95	25	1	57 000	119 000	14 500	3 300	5 000	NK80/25R	0.301
	95	35	1	79 500	184 000	22 400	3 300	5 000	NK80/35R	0.425
	100	30	1	85 500	156 000	19 000	3 300	5 000	RNA4914R	0.460
85	100	40	1	103 000	187 000	22 800	3 300	5 000	RNA5914	0.706
	100	54	1	130 000	267 000	32 500	3 300	5 000	RNA6914R	0.857
90	105	25	1	70 500	123 000	15 000	3 100	4 700	NK85/25R	0.404
	105	30	1	87 000	162 000	19 700	3 100	4 700	RNA4915R	0.489
	105	35	1	100 000	193 000	23 600	3 100	4 700	NK85/35R	0.517
95	105	40	1	109 000	205 000	25 000	3 100	4 700	RNA5915	0.745
	105	54	1	132 000	277 000	34 000	3 100	4 700	RNA6915R	0.935
100	110	25	1	71 500	128 000	15 600	2 900	4 400	NK90/25R	0.426
	110	30	1	90 500	174 000	21 200	2 900	4 400	RNA4916R	0.516
	110	35	1	104 000	208 000	25 400	2 900	4 400	NK90/35R	0.604

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.



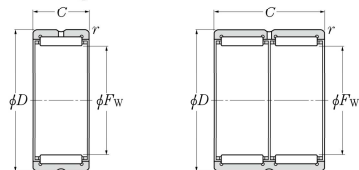
F_w 90 ~ 135mm

Boundary dimensions			Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions	Mass
mm			dynamic	static	N	min ⁻¹			mm	kg
F_w	D	C	C_r	C_{0r}	C_u	Grease lubrication	Oil lubrication		D_a Max. $r_{ax}^{(2)}$ Max.	(approx.)
90	110	40	1	115 000	223 000	27 200	2 900	4 400	RNA5916	0.787
	110	54	1	138 000	298 000	36 500	2 900	4 400	RNA6916R	0.987
95	115	26	1	74 500	137 000	16 600	2 800	4 200	NK95/26R	0.364
	115	36	1	108 000	223 000	27 000	2 800	4 200	NK95/36R	0.652
100	120	26	1	73 500	137 000	16 500	2 700	4 000	NK100/26R	0.487
	120	35	1.1	112 000	237 000	28 400	2 700	4 000	RNA4917R	0.657
	120	36	1	107 000	223 000	26 700	2 700	4 000	NK100/36R	0.679
105	120	46	1.1	137 000	290 000	34 500	2 700	4 000	RNA5917	1.00
	120	63	1.1	169 000	400 000	48 000	2 700	4 000	RNA6917R	1.20
110	125	26	1	76 500	147 000	17 300	2 500	3 800	NK105/26R	0.506
	125	35	1.1	116 000	252 000	29 800	2 500	3 800	RNA4918R	0.697
	125	36	1	111 000	238 000	28 100	2 500	3 800	NK105/36R	0.713
115	125	46	1.1	143 000	310 000	37 000	2 500	3 800	RNA5918	1.04
	125	63	1.1	175 000	425 000	50 500	2 500	3 800	RNA6918R	1.33
120	130	30	1.1	97 500	204 000	23 800	2 400	3 600	NK110/30R	0.612
	130	35	1.1	118 000	260 000	30 500	2 400	3 600	RNA4919R	0.719
	130	40	1.1	129 000	292 000	34 000	2 400	3 600	NK110/40R	0.830
125	130	46	1.1	149 000	335 000	39 000	2 400	3 600	RNA5919	1.13
	130	63	1.1	177 000	440 000	51 000	2 400	3 600	RNA6919R	1.46
130	140	40	1.1	127 000	260 000	29 900	2 300	3 500	RNA4920	1.15
	140	54	1.1	182 000	395 000	45 500	2 300	3 500	RNA5920	1.76
135	140	30	1	93 500	210 000	23 900	2 200	3 300	RNA4822	0.670
	140	40	1.1	113 000	268 000	30 500	2 200	3 300	NK120/40	0.910
140	150	40	1.1	131 000	279 000	31 500	2 100	3 200	RNA4922	1.24
	150	54	1.1	193 000	440 000	49 500	2 100	3 200	RNA5922	1.89
145	150	30	1	99 500	233 000	25 900	2 100	3 100	RNA4824	0.730
	150	40	1.1	116 000	283 000	31 500	2 100	3 100	NK130/40	0.980
150	165	45	1.1	180 000	380 000	41 500	2 000	3 000	RNA4924	1.86
	165	60	1.1	246 000	530 000	57 500	2 000	3 000	RNA5924	2.67

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_a of housing and shaft.

Machined-ring needle roller bearings
without an inner ring

RNA48 type
RNA49 type
RNA59 type
RNA69 type
NK type



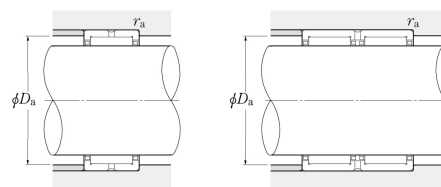
RNA48 type
RNA49 - R type, RNA49 type
RNA59 type
NK - R type, NK type

F_w 145 ~ 245mm

Boundary dimensions				Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions		Mass	
F_w	mm	D	r_s min ¹⁾	dynamic	static	N	C_u	min ⁻¹		Oil lubrication	D_a		r_{ax} 2)
				C_r	C_{0r}			Grease			Max.	Max.	(approx.)
145 ^{+0.068 -0.043}	165	35	1.1	118 000	305 000	32 500	1 900	2 800	RNA4826	158.5	1	0.95	
	170	32	1.5	111 000	238 000	25 600	1 900	2 800	NK145/32	162.5	1.5	1.12	
	170	42	1.5	153 000	360 000	38 500	1 900	2 800	NK145/42	162.5	1.5	1.49	
150 ^{+0.068 -0.043}	180	50	1.5	202 000	455 000	48 000	1 800	2 700	RNA4926	172	1.5	2.21	
	180	67	1.5	296 000	690 000	73 000	1 800	2 700	RNA5926	172	1.5	3.21	
155 ^{+0.068 -0.043}	175	35	1.1	121 000	315 000	33 500	1 700	2 600	RNA4828	168.5	1	1.02	
	180	32	1.5	114 000	252 000	26 500	1 700	2 600	NK155/32	172	1.5	1.20	
	180	42	1.5	156 000	380 000	40 000	1 700	2 600	NK155/42	172	1.5	1.59	
160 ^{+0.068 -0.043}	190	50	1.5	209 000	485 000	50 500	1 700	2 500	RNA4928	182	1.5	2.35	
	190	67	1.5	315 000	760 000	79 000	1 700	2 500	RNA5928	182	1.5	3.48	
165 ^{+0.068 -0.043}	190	32	1.5	117 000	265 000	27 400	1 600	2 400	NK165/32	182	1.5	1.42	
	190	40	1.1	152 000	390 000	40 500	1 600	2 400	RNA4830	183.5	1	1.60	
	190	42	1.5	160 000	400 000	41 000	1 600	2 400	NK165/42	182	1.5	1.66	
170 ^{+0.068 -0.043}	210	60	2	261 000	610 000	62 500	1 600	2 400	RNA4930	201	2	2.98	
175 ^{+0.068 -0.043}	200	40	1.1	160 000	425 000	43 500	1 500	2 300	RNA4832	193.5	1	1.70	
180 ^{+0.068 -0.043}	220	60	2	270 000	650 000	65 500	1 500	2 200	RNA4932	211	2	3.10	
185 ^{+0.079 -0.050}	215	45	1.1	185 000	495 000	49 500	1 500	2 200	RNA4834	208.5	1	2.54	
190 ^{+0.079 -0.050}	230	60	2	279 000	690 000	68 500	1 400	2 100	RNA4934	221	2	3.22	
195 ^{+0.079 -0.050}	225	45	1.1	195 000	540 000	53 500	1 400	2 100	RNA4836	218.5	1	2.68	
205 ^{+0.079 -0.050}	250	69	2	375 000	890 000	86 000	1 300	2 000	RNA4936	241	2	4.48	
210 ^{+0.079 -0.050}	240	50	1.5	227 000	680 000	65 500	1 300	1 900	RNA4838	232	1.5	3.21	
215 ^{+0.079 -0.050}	260	69	2	390 000	945 000	90 500	1 300	1 900	RNA4938	251	2	4.53	
220 ^{+0.079 -0.050}	250	50	1.5	231 000	705 000	67 000	1 200	1 800	RNA4840	242	1.5	3.35	
225 ^{+0.079 -0.050}	280	80	2.1	505 000	1 180 000	111 000	1 200	1 800	RNA4940	269	2	7.20	
240 ^{+0.079 -0.050}	270	50	1.5	244 000	780 000	72 500	1 100	1 700	RNA4844	262	1.5	3.62	
245 ^{+0.079 -0.050}	300	80	2.1	525 000	1 270 000	116 000	1 100	1 600	RNA4944	289	2	7.81	

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_s of housing and shaft.

E-40



F_w 265 ~ 490mm

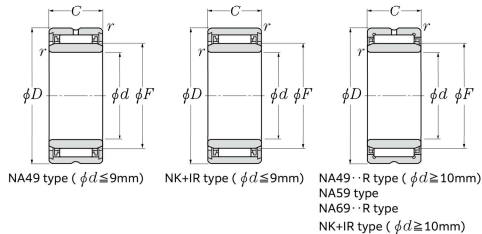
Boundary dimensions				Basic load rating		Fatigue load limit	Allowable speed		Number	Installation-related dimensions		Mass		
F_w	mm	D	C	$r_{s\min}^{1)}$	dynamic	static	N	C_u		min ⁻¹	Oil lubrication		D_a	$r_{ax}^{2)}$
					C_r	C_{0r}			Grease lubrication		Max.	Max.	(approx.)	
265 ^{+0.088 -0.056}	300	60	2		365 000	1 090 000	98 500		1 000	1 500	RNA4848	291	2	5.40
	320	80	2.1		540 000	1 350 000	121 000		1 000	1 500	RNA4948	309	2	8.40
285 ^{+0.088 -0.056}	320	60	2		375 000	1 170 000	103 000		950	1 400	RNA4852	311	2	5.80
	360	100	2.1		810 000	1 920 000	166 000		950	1 400	RNA4952	349	2	15.9
305 ^{+0.088 -0.056}	350	69	2		455 000	1 300 000	112 000		850	1 300	RNA4856	341	2	9.30
	380	100	2.1		840 000	2 050 000	175 000		850	1 300	RNA4956	369	2	16.7
330 ^{+0.088 -0.062}	380	80	2.1		625 000	1 770 000	149 000		800	1 200	RNA4860	369	2	12.7
	420	118	3		1 080 000	2 640 000	219 000		800	1 200	RNA4960	407	2.5	24.0
340 ^{+0.088 -0.062}	400	80	2.1		640 000	1 850 000	153 000		750	1 100	RNA4864	389	2	13.4
	440	118	3		1 120 000	2 820 000	230 000		750	1 100	RNA4964	427	2.5	25.2
370 ^{+0.088 -0.062}	420	80	2.1		655 000	1 940 000	158 000		750	1 100	RNA4868	409	2	14.0
	460	118	3		1 160 000	3 000 000	242 000		750	1 100	RNA4968	447	2.5	26.5
390 ^{+0.088 -0.062}	440	80	2.1		665 000	2 020 000	162 000		650	1 000	RNA4872	429	2	14.8
	480	118	3		1 200 000	3 200 000	253 000		650	1 000	RNA4972	467	2.5	28.2
415 ^{+0.108 -0.068}	480	100	2.1		1 000 000	2 840 000	223 000		650	950	RNA4876	469	2	26.0
	520	140	4		1 400 000	3 750 000	292 000		650	950	RNA4976	504	3	38.6
450 ^{+0.108 -0.068}	540	140	4		1 450 000	4 000 000	306 000		600	900	RNA4980	524	3	40.1
	560	140	4		1 500 000	4 250 000	320 000		550	850	RNA4984	544	3	51.6
490 ^{+0.108 -0.068}	600	160	4		1 750 000	4 600 000	342 000		550	800	RNA4988	584	3	66.9

1) Smallest allowable dimension for chamfer dimension r .
2) Largest allowable dimension for fillet radius r_s of housing and shaft.

E-41

Machined-ring needle roller bearings
with an inner ring

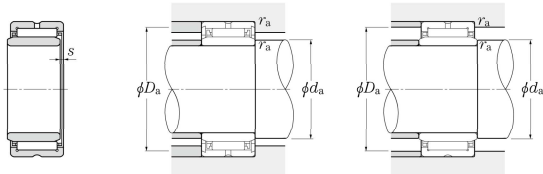
NA49 type
NA59 type
NA69 type
NK+IR type



d 5 ~ 17mm

Boundary dimensions						Basic load rating		Fatigue load limit	Allowable speed		Number
mm						dynamic	static	N	min ⁻¹	Oil	
d	D	C	r _s min ¹⁾	F	s ²⁾	C _r	C _{0r}	N _{Cu}	Grease lubrication	lubrication	
5	13	10	0.15	7	—	2 670	2 350	287	23 000	34 000	NA495T2
	15	12	0.3	8	1.5	4 000	4 100	500	21 000	32 000	NK8/12T2+IR5×8×12
	15	16	0.3	8	2	4 850	5 200	635	21 000	32 000	NK8/16T2+IR5×8×16
6	15	10	0.15	8	—	3 150	3 000	365	21 000	32 000	NA496T2T
	16	12	0.3	9	1.5	4 550	5 000	615	20 000	30 000	NK9/12T2+IR6×9×12
	16	16	0.3	9	2	5 500	6 400	780	20 000	30 000	NK9/16T2+IR6×9×16
7	17	10	0.15	9	—	3 600	3 650	445	20 000	30 000	NA497
	17	12	0.3	10	1.5	4 550	5 100	620	19 000	28 000	NK10/12T2+IR7×10×12
	17	16	0.3	10	2	5 450	6 450	790	19 000	28 000	8E-NK10/16CT+IR7×10×16
8	19	11	0.15	10	—	5 250	5 150	630	19 000	28 000	NA498CT
	19	12	0.3	12	1.5	5 000	6 100	740	17 000	26 000	NK12/12+IR9×12×12
	19	16	0.3	12	2	6 000	7 700	940	17 000	26 000	NK12/16+IR9×12×16
9	20	11	0.3	12	—	4 850	4 900	595	17 000	26 000	NA499
	22	13	0.3	14	0.5	8 600	9 200	1 120	16 000	24 000	NA4900R
	22	16	0.3	14	0.5	10 300	11 500	1 400	16 000	24 000	NK14/16RCT+IR10×14×16
10	22	20	0.3	14	0.5	13 000	15 600	1 900	16 000	24 000	NK14/20R+IR10×14×20
	24	13	0.3	16	0.5	9 550	10 900	1 330	15 000	23 000	NA4901R
	24	16	0.3	16	0.5	12 200	14 900	1 820	15 000	23 000	NK16/16R+IR12×16×16
12	24	20	0.3	16	0.5	14 600	18 800	2 290	15 000	23 000	NK16/20R+IR12×16×20
	24	22	0.3	16	1	15 400	20 000	2 440	15 000	23 000	NA6901R
15	27	16	0.3	19	0.5	13 300	17 400	2 120	14 000	21 000	NK19/16R+IR15×19×16
	27	20	0.3	19	0.5	16 000	22 200	2 700	14 000	21 000	NK19/20R+IR15×19×20
	28	13	0.3	20	0.5	10 300	12 800	1 560	13 000	20 000	NA4902R
17	28	18	0.3	20	0.5	14 100	19 100	2 330	13 000	20 000	NA5902CT
	28	23	0.3	20	1	17 600	25 300	3 100	13 000	20 000	NA6902R
	29	16	0.3	21	0.5	13 700	18 700	2 280	13 000	19 000	NK21/16R+IR17×21×16
17	29	20	0.3	21	0.5	17 400	25 400	3 100	13 000	19 000	NK21/20R+IR17×21×20
	30	13	0.3	22	0.5	11 200	14 600	1 780	12 000	18 000	NA4903R

1) Smallest allowable dimension for chamfer dimension r.
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_s of housing and shaft.
E-42

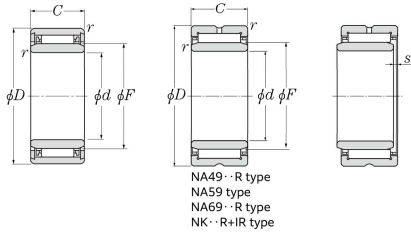


Installation-related dimensions			Mass
d _a	D _a	r _{as} 3)	
Min.	Max.	Max.	(approx.)
6.2	8.5	0.15	0.007
7	9.5	0.3	0.012
7	9.5	0.3	0.016
8	9.5	0.15	0.009
8	10.5	0.3	0.013
8	10.5	0.3	0.017
9	10.5	0.15	0.010
9	11.5	0.3	0.014
9	11.5	0.3	0.018
10	12	0.15	0.016
11	13.5	0.3	0.018
11	13.5	0.3	0.022
11	14	0.3	0.017
12	20	0.3	0.024
12	20	0.3	0.030
12	20	0.3	0.038
14	22	0.3	0.026
14	22	0.3	0.033
14	22	0.3	0.042
14	22	0.3	0.046
17	25	0.3	0.039
17	25	0.3	0.045
17	26	0.3	0.036
17	26	0.3	0.052
17	26	0.3	0.064
19	27	0.3	0.042
19	27	0.3	0.053
19	28	0.3	0.037

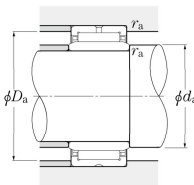
Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings
with an inner ring

NA49 type
NA59 type
NA69 type
NK+IR type



NA49···R type
NA59 type
NA69···R type
NK···R+IR type



d 17 ~ 32mm

Boundary dimensions						Basic load rating		Fatigue load limit N C _u	Allowable speed		Number
d	D	C	r _s min ¹⁾	F	s ²⁾	dynamic N C _r	static N C _{0r}		min ⁻¹ Grease lubrication	Oil lubrication	
17	30	18	0.3	22	0.5	15 200	21 700	2 650	12 000	18 000	NA5903
	30	23	0.3	22	1	18 200	27 200	3 300	12 000	18 000	NA6903R
20	32	16	0.3	24	0.5	15 200	22 300	2 720	11 000	17 000	NK24/16R+IR20×24×16
	32	20	0.3	24	0.5	18 600	28 800	3 500	11 000	17 000	NK24/20R+IR20×24×20
	37	17	0.3	25	0.8	21 300	25 500	3 100	11 000	16 000	NA4904RCT
	37	23	0.3	25	0.8	28 400	37 000	4 500	11 000	16 000	NA5904
	37	30	0.3	25	1	36 500	50 500	6 150	11 000	16 000	NA6904R
22	34	16	0.3	26	0.5	15 600	23 600	2 880	10 000	15 000	8E-NK26/16RCT+IR22×26×16
	34	20	0.3	26	0.5	19 100	30 500	3 700	10 000	15 000	NK26/20R+IR22×26×20
	39	17	0.3	28	0.8	23 200	29 300	3 600	9 500	14 000	NA49/22R
	39	23	0.3	28	0.8	26 400	37 500	4 600	9 500	14 000	NA59/22
	39	30	0.3	28	0.5	40 000	58 500	7 150	9 500	14 000	NA69/22R
25	38	20	0.3	29	1	22 200	34 000	4 150	9 500	14 000	NK29/20R+IR25×29×20
	38	30	0.3	29	1.5	27 500	50 500	6 150	9 500	14 000	NK29/30R+IR25×29×30
	42	17	0.3	30	0.8	24 000	31 500	3 800	8 500	13 000	NA4905R
	42	23	0.3	30	0.8	30 500	43 000	5 200	8 500	13 000	NA5905
	42	30	0.3	30	1	41 500	63 000	7 650	8 500	13 000	NA6905R
28	42	20	0.3	32	1	23 500	37 500	4 600	8 500	13 000	NK32/20R+IR28×32×20
	42	30	0.3	32	1.5	34 000	60 500	7 350	8 500	13 000	NK32/30R+IR28×32×30
	45	17	0.3	32	0.8	24 800	33 500	4 050	8 500	13 000	NA49/28RCT
	45	23	0.3	32	0.8	32 000	45 500	5 550	8 500	13 000	NA59/28
	45	30	0.3	32	1	43 000	67 000	8 150	8 500	13 000	NA69/28R
30	45	20	0.3	35	0.5	24 800	41 500	5 050	7 500	11 000	NK35/20RCT+IR30×35×20
	45	30	0.3	35	1	36 000	66 500	8 100	7 500	11 000	NK35/30R+IR30×35×30
	47	17	0.3	35	0.8	25 500	35 500	4 300	7 500	11 000	NA4906R
	47	23	0.3	35	0.8	32 500	48 500	5 950	7 500	11 000	NA5906
	47	30	0.3	35	1	42 500	67 500	8 250	7 500	11 000	NA6906R
32	47	20	0.3	37	0.5	25 300	43 500	5 300	7 500	11 000	NK37/20R+IR32×37×20
	47	30	0.3	37	1	36 500	69 500	8 500	7 500	11 000	NK37/30R+IR32×37×30
	52	20	0.6	40	0.8	31 500	47 500	5 800	6 500	10 000	NA49/32R

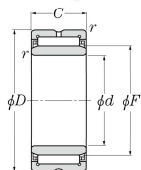
1) Smallest allowable dimension for chamfer dimension r.
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_s of housing and shaft.

Installation-related dimensions			Mass kg (approx.)
d _a mm Min.	D _a mm Max.	r _{as} ³⁾ mm Max.	
19	28	0.3	0.056
19	28	0.3	0.069
22	30	0.3	0.049
22	30	0.3	0.061
22	35	0.3	0.074
22	35	0.3	0.115
22	35	0.3	0.141
24	32	0.3	0.046
24	32	0.3	0.064
24	37	0.3	0.080
24	37	0.3	0.134
24	37	0.3	0.154
27	36	0.3	0.079
27	36	0.3	0.123
27	40	0.3	0.088
27	40	0.3	0.139
27	40	0.3	0.162
30	40	0.3	0.096
30	40	0.3	0.146
30	43	0.3	0.098
30	43	0.3	0.142
30	43	0.3	0.179
32	43	0.3	0.112
32	43	0.3	0.171
32	45	0.3	0.101
32	45	0.3	0.152
32	45	0.3	0.185
34	45	0.3	0.117
34	45	0.3	0.170
36	48	0.6	0.157

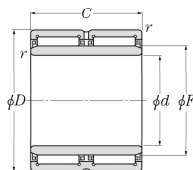
Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings with an inner ring

NA49 type
NA59 type
NA69 type
NK+IR type



NA49-R type
NA59 type
NA69-R type ($\phi d \leq 30\text{mm}$)
NK-R+IR type



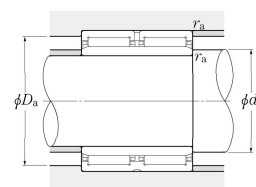
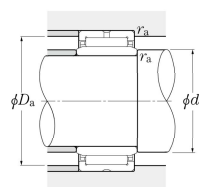
NA69-R type
($\phi d \geq 32\text{mm}$)

d 32 ~ 55mm

Boundary dimensions						Basic load rating		Fatigue load limit	Allowable speed		Number
mm						dynamic	static	N	Grease lubrication	Oil lubrication	
d	D	C	$r_{\text{min}}^{1)}$	F	s ²⁾	C_r	C_{0r}	C_u			
32	52	27	0.6	40	0.8	38 000	61 000	7 450	6 500	10 000	NA59/32
	52	36	0.6	40	0.5	47 500	82 000	10 000	6 500	10 000	NA69/32R
35	50	20	0.3	40	0.5	26 400	47 000	5 750	6 500	10 000	NK40/20R+IR35×40×20
	50	30	0.3	40	1	38 500	76 000	9 250	6 500	10 000	NK40/30R+IR35×40×30
	55	20	0.6	42	0.8	32 000	50 000	6 100	6 500	9 500	NA4907R
	55	27	0.6	42	0.8	39 000	64 500	7 850	6 500	9 500	NA5907
	55	36	0.6	42	0.5	49 000	86 500	10 500	6 500	9 500	NA6907R
38	53	20	0.3	43	0.5	27 500	51 000	6 200	6 500	9 500	NK43/20R+IR38×43×20
	53	30	0.3	43	1	40 000	82 000	10 000	6 500	9 500	NK43/30R+IR38×43×30
40	55	20	0.3	45	0.5	28 000	52 500	6 450	6 000	9 000	NK45/20R+IR40×45×20
	55	30	0.3	45	1	41 000	85 500	10 400	6 000	9 000	NK45/30R+IR40×45×30
	62	22	0.6	48	1	43 500	66 500	8 150	5 500	8 500	NA4908R
	62	30	0.6	48	1	53 000	92 500	11 300	5 500	8 500	NA5908
	62	40	0.6	48	0.5	67 000	116 000	14 100	5 500	8 500	NA6908R
42	57	20	0.3	47	0.5	28 800	55 500	6 800	5 500	8 500	NK47/20R+IR42×47×20
	57	30	0.3	47	1	42 500	91 500	11 200	5 500	8 500	NK47/30R+IR42×47×30
45	62	25	0.6	50	1.5	38 500	74 500	9 050	5 500	8 000	NK50/25R+IR45×50×25
	62	35	0.6	50	2	51 000	106 000	12 900	5 500	8 000	NK50/35R+IR45×50×35
	68	22	0.6	52	1	46 000	73 000	8 950	5 000	7 500	NA4909R
	68	30	0.6	52	1	56 000	101 000	12 300	5 000	7 500	NA5909
	68	40	0.6	52	0.5	70 500	127 000	15 500	5 000	7 500	NA6909R
50	68	25	0.6	55	1.5	41 000	82 000	10 000	5 000	7 500	NK55/25R+IR50×55×25
	68	35	0.6	55	2	54 000	118 000	14 300	5 000	7 500	NK55/35R+IR50×55×35
	72	22	0.6	58	1	48 000	80 000	9 750	4 700	7 000	NA4910R
	72	30	0.6	58	1	58 000	110 000	13 400	4 700	7 000	NA5910
	72	40	0.6	58	0.5	74 000	139 000	17 000	4 700	7 000	NA6910R
55	72	25	0.6	60	1.5	41 000	85 000	10 400	4 300	6 500	NK60/25R+IR55×60×25
	72	35	0.6	60	2	57 000	130 000	15 800	4 300	6 500	NK60/35R+IR55×60×35
	80	25	1	63	1.5	58 500	99 500	12 100	4 300	6 500	NA4911R

1) Smallest allowable dimension for chamfer dimension r.
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_a of housing and shaft.

E-46

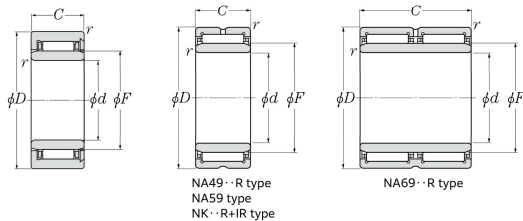


Installation-related dimensions			Mass
d_a	D_a	$r_{as}^{3)}$	
mm	mm	mm	kg
Min.	Max.	Max.	(approx.)
36	48	0.6	0.241
36	48	0.6	0.286
37	48	0.3	0.130
37	48	0.3	0.193
39	51	0.6	0.171
39	51	0.6	0.256
39	51	0.6	0.310
40	51	0.3	0.134
40	51	0.3	0.207
42	53	0.3	0.143
42	53	0.3	0.216
44	58	0.6	0.232
44	58	0.6	0.348
44	58	0.6	0.426
44	55	0.3	0.148
44	55	0.3	0.222
48	58	0.6	0.229
48	58	0.6	0.322
49	64	0.6	0.270
49	64	0.6	0.396
49	64	0.6	0.437
53	64	0.6	0.271
53	64	0.6	0.379
54	68	0.6	0.276
54	68	0.6	0.498
54	68	0.6	0.529
58	68	0.6	0.271
58	68	0.6	0.379
60	75	1	0.396

Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings
with an inner ring

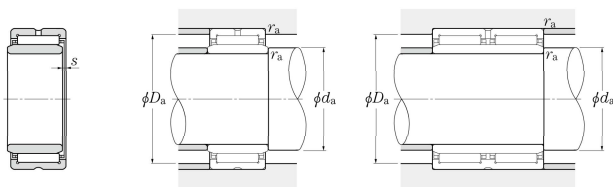
NA49 type
NA59 type
NA69 type
NK+IR type



d 55 ~ 85mm

Boundary dimensions					Basic load rating		Fatigue load limit	Allowable speed		Number	
d	D	C	$r_{s\min}^{1)}$	$F^{2)}$	dynamic C_r	static C_{0r}	N C_u	min ⁻¹ Grease lubrication	Oil lubrication		
55	80	34	1	63	1.5	76 500	140 000	17 100	4 300	6 500	NA5911
	80	45	1	63	1.5	94 000	183 000	22 300	4 300	6 500	NA6911R
	82	25	1	68	1	44 500	89 000	10 800	4 000	6 000	NK68/25R + IR60 × 68 × 25
60	82	35	0.6	68	1	63 000	139 000	17 000	4 000	6 000	NK68/35R + IR60 × 68 × 35
	85	25	1	68	1.5	61 500	108 000	13 100	4 000	6 000	NA4912R
	85	34	1	68	1.5	80 500	153 000	18 600	4 000	6 000	NA5912
	85	45	1	68	1.5	95 500	191 000	23 200	4 000	6 000	NA6912R
	90	25	0.6	73	1	54 000	100 000	12 200	3 700	5 500	NK73/25R + IR65 × 73 × 25
65	90	25	1	72	1.5	62 500	112 000	13 700	3 700	5 500	NA4913R
	90	34	1	72	1.5	84 000	165 000	20 100	3 700	5 500	NA5913
	90	35	0.6	73	1	76 500	156 000	19 100	3 700	5 500	NK73/35R + IR65 × 73 × 35
	90	45	1	72	1.5	97 000	198 000	24 200	3 700	5 500	NA6913R
	95	25	1	80	0.8	57 000	119 000	14 500	3 300	5 000	NK80/25R + IR70 × 80 × 25
70	95	35	1	80	0.8	79 500	184 000	22 400	3 300	5 000	NK80/35R + IR70 × 80 × 35
	100	30	1	80	1.5	85 500	156 000	19 000	3 300	5 000	NA4914R
	100	40	1	80	1.5	103 000	187 000	22 800	3 300	5 000	NA5914
	100	54	1	80	1	130 000	267 000	32 500	3 300	5 000	NA6914R
	105	25	1	85	1	70 500	123 000	15 000	3 100	4 700	NK85/25R + IR75 × 85 × 25
75	105	30	1	85	1.5	87 000	162 000	19 700	3 100	4 700	NA4915R
	105	35	1	85	1	100 000	193 000	23 600	3 100	4 700	NK85/35R + IR75 × 85 × 35
	105	40	1	85	1.5	109 000	205 000	25 000	3 100	4 700	NA5915
	105	54	1	85	1	132 000	277 000	34 000	3 100	4 700	NA6915R
	110	25	1	90	1	71 500	128 000	15 600	2 900	4 400	NK90/25R + IR80 × 90 × 25
80	110	30	1	90	1.5	90 500	174 000	21 200	2 900	4 400	NA4916R
	110	35	1	90	1	104 000	208 000	25 400	2 900	4 400	NK90/35R + IR80 × 90 × 35
	110	40	1	90	1.5	115 000	223 000	27 200	2 900	4 400	NA5916
	110	54	1	90	1.5	138 000	298 000	36 500	2 900	4 400	NA6916R
	115	26	1	95	1.5	74 500	137 000	16 600	2 800	4 200	NK95/26R + IR85 × 95 × 26
85	115	36	1	95	1.5	108 000	223 000	27 000	2 800	4 200	NK95/36R + IR85 × 95 × 36

1) Smallest allowable dimension for chamfer dimension r .
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_a of housing and shaft.
E-48

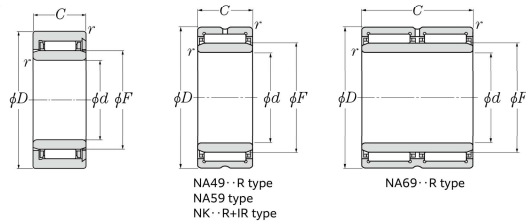


Installation-related dimensions			Mass
d_a	D_a	$r_{as}^{3)}$	kg
Min.	Max.	Max.	(approx.)
60	75	1	0.559
60	75	1	0.726
65	77	0.6	0.393
64	78	0.6	0.551
65	80	1	0.427
65	80	1	0.614
65	80	1	0.758
69	86	0.6	0.466
70	85	1	0.454
70	85	1	0.655
69	86	0.6	0.660
70	85	1	0.779
75	90	1	0.525
75	90	1	0.738
75	95	1	0.727
75	95	1	1.06
75	95	1	1.34
80	100	1	0.642
80	100	1	0.776
80	100	1	0.853
80	100	1	1.13
80	100	1	1.45
85	105	1	0.680
85	105	1	0.820
85	105	1	0.959
85	105	1	1.15
85	105	1	1.53
90	110	1	0.644
90	110	1	1.05

Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings
with an inner ring

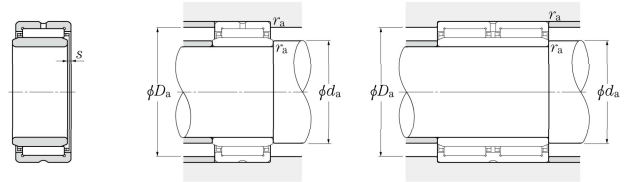
NA48 type
NA49 type
NA59 type
NA69 type
NK+IR type



d 85 ~ 130mm

Boundary dimensions					Basic load rating		Fatigue load limit	Allowable speed		Number	
mm					dynamic	static	N	min ⁻¹	Oil		
d	D	C	r _{s min} ¹⁾	F	S ²⁾	C _r	C _{0r}	C _u	Grease lubrication	lubrication	
85	120	35	1.1	100	1	112 000	237 000	28 400	2 700	4 000	NA4917R
	120	46	1.1	100	1.5	137 000	290 000	34 500	2 700	4 000	NA5917
	120	63	1.1	100	1	169 000	400 000	48 000	2 700	4 000	NA6917R
90	120	26	1	100	1.5	73 500	137 000	16 400	2 700	4 000	NK100/26R+IR90×100×26
	120	36	1	100	1.5	107 000	223 000	26 700	2 700	4 000	NK100/36R+IR90×100×36
	125	35	1.1	105	1	116 000	252 000	29 800	2 500	3 800	NA4918R
	125	46	1.1	105	1	143 000	310 000	37 000	2 500	3 800	NA5918
	125	63	1.1	105	1	175 000	425 000	50 500	2 500	3 800	NA6918R
95	125	26	1	105	1.5	76 500	147 000	17 300	2 500	3 800	NK105/26R+IR95×105×26
	125	36	1	105	1.5	111 000	238 000	28 100	2 500	3 800	NK105/36R+IR95×105×36
	130	35	1.1	110	1	118 000	260 000	30 500	2 400	3 600	NA4919R
	130	46	1.1	110	1	149 000	335 000	39 000	2 400	3 600	NA5919
	130	63	1.1	110	1	177 000	440 000	51 000	2 400	3 600	NA6919R
100	130	30	1.1	110	1.5	97 500	204 000	23 800	2 400	3 600	NK110/30R+IR100×110×30
	130	40	1.1	110	2	129 000	292 000	34 000	2 400	3 600	NK110/40R+IR100×110×40
	140	40	1.1	115	2	127 000	260 000	29 900	2 300	3 500	NA4920
	140	54	1.1	115	2	182 000	395 000	45 500	2 300	3 500	NA5920
110	140	30	1	120	0.8	95 000	214 000	24 400	2 200	3 300	NA4822
	140	40	1.1	120	—	114 000	271 000	31 000	2 200	3 300	NK120/40+IR110×120×40
	150	40	1.1	125	2	131 000	279 000	31 500	2 100	3 200	NA4922
	150	54	1.1	125	2	193 000	440 000	49 500	2 100	3 200	NA5922
120	150	30	1	130	0.8	101 000	237 000	26 400	2 100	3 100	NA4824
	150	40	1.1	130	—	117 000	287 000	32 000	2 100	3 100	NK130/40+IR120×130×40
	165	45	1.1	135	2	180 000	380 000	41 500	2 000	3 000	NA4924
	165	60	1.1	135	2	246 000	530 000	57 500	2 000	3 000	NA5924
130	165	35	1.1	145	1	120 000	310 000	33 000	1 900	2 800	NA4826
	170	32	1.5	145	—	111 000	238 000	25 600	1 900	2 800	NK145/32+IR130×145×32
	170	42	1.5	145	—	153 000	360 000	38 500	1 900	2 800	NK145/42+IR130×145×42
	180	50	1.5	150	1.5	202 000	455 000	48 000	1 800	2 700	NA4926
	180	67	1.5	150	1.5	296 000	690 000	73 000	1 800	2 700	NA5926

1) Smallest allowable dimension for chamfer dimension r .
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_a of housing and shaft.

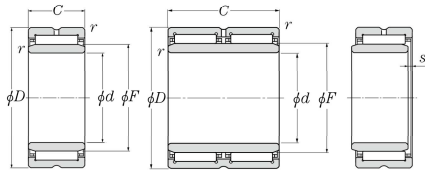


Installation-related dimensions			Mass kg (approx.)
d_a	D_a	$r_{as}^{3)}$	
Min.	Max.	Max.	
91.5	113.5	1	1.24
91.5	113.5	1	1.76
91.5	104	1.1	2.25
95	115	1	0.781
95	115	1	1.09
96.5	118.5	1	1.84
96.5	118.5	1	2.44
96.5	109	1.1	2.37
100	120	1	0.819
100	120	1	1.15
101.5	123.5	1	1.36
101.5	123.5	1	1.98
101.5	123.5	1	2.63
106.5	123.5	1	0.990
106.5	123.5	1	1.34
106.5	133.5	1	1.93
106.5	133.5	1	2.85
115	135	1	1.11
116.5	133.5	1	1.49
116.5	143.5	1	2.08
116.5	143.5	1	2.98
125	145	1	1.17
126.5	143.5	1	1.57
126.5	158.5	1	2.84
126.5	158.5	1	3.92
136.5	158.5	1	1.60
138	162.5	1.5	1.90
138	162.5	1.5	2.54
138	172	1.5	3.90
138	172	1.5	5.60

Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings
with an inner ring

NA48 type
NA49 type
NA59 type
NA69 type
NK+IR type

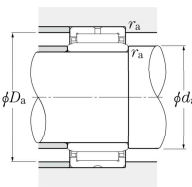


NA48 type
NA49~R type, NA49 type
NA59 type
NK~R+IR type, NK+IR type
NKS+IR type ($\phi d \geq 100\text{mm}$)

d 140 ~ 280mm

Boundary dimensions						Basic load rating		Fatigue load limit	Allowable speed		Number
mm						dynamic	static	N	min ⁻¹	Oil	
d	D	C	r _s min ¹⁾	F	s ²⁾	C _r	C _{0r}	N _{Cu}	Grease lubrication	Lubrication	
140	175	35	1.1	155	1	121 000	315 000	33 500	1 700	2 600	NA4828
	180	32	1.5	155	—	114 000	252 000	26 500	1 700	2 600	NK155/32+IR140×155×32
	180	42	1.5	155	—	156 000	380 000	40 000	1 700	2 600	NK155/42+IR140×155×42
	190	50	1.5	160	1.5	209 000	485 000	50 500	1 700	2 500	NA4928
	190	67	1.5	160	1.5	315 000	760 000	79 000	1 700	2 500	NA5928
150	190	32	1.5	165	—	117 000	265 000	27 500	1 600	2 400	NK165/32+IR150×165×32
	190	40	1.1	165	1.5	152 000	390 000	40 500	1 600	2 400	NA4830
	190	42	1.5	165	—	160 000	400 000	41 000	1 600	2 400	NK165/42+IR150×165×42
	210	60	2	170	1.5	261 000	610 000	62 500	1 600	2 400	NA4930
	200	40	1.1	175	1.5	160 000	425 000	43 500	1 500	2 300	NA4832
160	220	60	2	180	1.5	270 000	650 000	65 500	1 500	2 200	NA4932
	215	45	1.1	185	1.5	185 000	495 000	49 500	1 500	2 200	NA4834
170	230	60	2	190	1.5	279 000	690 000	68 500	1 400	2 100	NA4934
	225	45	1.1	195	1.5	195 000	540 000	53 500	1 400	2 100	NA4836
180	250	69	2	205	1.5	375 000	890 000	86 000	1 300	2 000	NA4936
	240	50	1.5	210	1.5	227 000	680 000	65 500	1 300	1 900	NA4838
190	260	69	2	215	1.5	390 000	945 000	90 500	1 300	1 900	NA4938
	250	50	1.5	220	1.5	231 000	705 000	67 000	1 200	1 800	NA4840
200	280	80	2.1	225	1.5	505 000	1 180 000	111 000	1 200	1 800	NA4940
	270	50	1.5	240	1.5	244 000	780 000	72 500	1 100	1 700	NA4844
220	300	80	2.1	245	1.5	525 000	1 270 000	116 000	1 100	1 600	NA4944
	300	60	2	265	2	365 000	1 090 000	98 500	1 000	1 500	NA4848
240	320	80	2.1	265	2	540 000	1 350 000	121 000	1 000	1 500	NA4948
	320	60	2	285	2	375 000	1 170 000	103 000	950	1 400	NA4852
260	360	100	2.1	290	2	810 000	1 920 000	166 000	950	1 400	NA4952
	350	69	2	305	2.5	455 000	1 300 000	112 000	850	1 300	NA4856
280	380	100	2.1	310	2.5	840 000	2 050 000	175 000	850	1 300	NA4956

1) Smallest allowable dimension for chamfer dimension r.
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_s of housing and shaft.
E-52

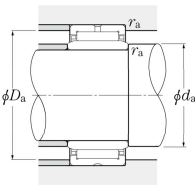
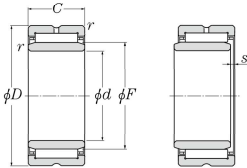


Installation-related dimensions			mm	kg
d _a	D _a	r _{as} 3)		
Min.	Max.	Max.		(approx.)
146.5	168.5	1	1	1.82
148	172	1.5	1	2.04
148	172	1.5	1	2.69
148	182	1.5	1	4.05
148	182	1.5	1	6.18
158	182	1.5	1	2.32
156.5	183.5	1	1	2.72
158	182	1.5	1	2.84
159	201	2	2	5.33
166.5	193.5	1	1	2.90
169	211	2	2	5.60
176.5	208.5	1	1	3.99
179	221	2	2	5.87
186.5	218.5	1	1	4.19
189	241	2	2	8.58
198	232	1.5	1	5.62
199	251	2	2	8.68
208	242	1.5	1	5.84
211	269	2	2	12.2
228	262	1.5	1	6.37
231	289	2	2	13.5
249	291	2	2	10.0
251	309	2	2	14.7
269	311	2	2	10.8
271	349	2	2	25.9
289	341	2	2	15.5
291	369	2	2	27.5

Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Machined-ring needle roller bearings
with an inner ring

NA48 type
NA49 type
NA59 type
NK+IR type



d 300 ~ 440mm

Boundary dimensions						Basic load rating		Fatigue load limit	Allowable speed		Number
mm						dynamic	static	N	min ⁻¹	Oil	
d	D	C	r _s min ¹⁾	F	s ²⁾	C _r	C _{0r}	N _{Cu}	Grease lubrication	lubrication	
300	380	80	2.1	330	2	625 000	1 770 000	149 000	800	1 200	NA4860
	420	118	3	340	2	1 080 000	2 640 000	219 000	800	1 200	NA4960
320	400	80	2.1	350	2	640 000	1 850 000	153 000	750	1 100	NA4864
	440	118	3	360	2	1 120 000	2 820 000	230 000	750	1 100	NA4964
340	420	80	2.1	370	2	655 000	1 940 000	158 000	750	1 100	NA4868
	460	118	3	380	2	1 160 000	3 000 000	242 000	750	1 100	NA4968
360	440	80	2.1	390	2	665 000	2 020 000	162 000	650	1 000	NA4872
	480	118	3	400	2	1 200 000	3 200 000	253 000	650	1 000	NA4972
380	480	100	2.1	415	2	1 000 000	2 840 000	223 000	650	950	NA4876
	520	140	4	430	2	1 400 000	3 750 000	292 000	650	950	NA4976
400	540	140	4	450	2.5	1 450 000	4 000 000	305 000	600	900	NA4980
420	560	140	4	470	2.5	1 500 000	4 250 000	320 000	550	850	NA4984
440	600	160	4	490	2.5	1 750 000	4 600 000	340 000	550	800	NA4988

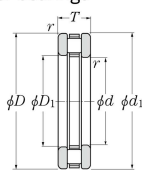
Installation-related dimensions			Mass
d _a	D _a	r _{as} 3)	kg
Min.	Max.	Max.	(approx.)
311	369	2	22.0
313	407	2.5	42.5
331	389	2	23.2
333	427	2.5	45.2
351	409	2	24.1
353	447	2.5	47.3
371	429	2	25.7
373	467	2.5	49.0
391	469	2	44.5
396	504	3	73.6
416	524	3	76.6
436	544	3	89.8
456	584	3	123

1) Smallest allowable dimension for chamfer dimension r.
2) Allowable axial movement amount of the inner ring with respect to the outer ring.
3) Largest allowable dimension for fillet radius r_a of housing and shaft.
E-54

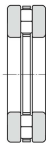
Note: The number of inner rings (IR) is composed of the IR inner diameter dimension × outer diameter dimension × width dimension.

Thrust cylindrical roller bearings

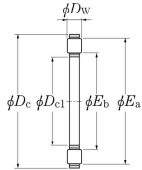
811 type
812 type
893 type



811 type
812 type
(Bearing)



893 type
(Bearing)



K811 type, K812 type
(Thrust cylindrical roller
and cage assembly)

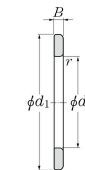
d 10 ~ 60mm

Boundary dimensions										Basic load rating		Fatigue load limit	Allowable speed	
d	D	d ₁	D ₁	T	mm D _{C1} ¹⁾ E11	D _C a13	D _w -0.010	B h11	r _s min ¹⁾	dynamic N C _a	static N C _{0a}	N C _u	min ⁻¹ Grease lubrication	Oil lubrication
10	24	24	10	9	10	24	3.5	2.75	0.3	10 300	20 100	2 450	3 400	13 000
12	26	26	12	9	12	26	3.5	2.75	0.3	10 900	22 300	2 720	3 000	12 000
15	28	28	16	9	15	28	3.5	2.75	0.3	12 200	26 800	3 250	2 800	11 000
17	30	30	18	9	17	30	3.5	2.75	0.3	12 700	29 000	3 550	2 500	10 000
20	35	35	21	10	20	35	4.5	2.75	0.3	20 200	46 500	5 650	2 100	8 500
25	42	42	26	11	25	42	5	3	0.6	27 300	68 000	8 250	1 800	7 000
30	47	47	32	11	30	47	5	3	0.6	27 800	72 500	8 850	1 500	6 000
	52	52	32	16	30	52	7.5	4.25	0.6	53 000	129 000	15 700	1 500	6 000
	60	60	32	18	30	60	5.5	6.25	1	54 000	166 000	20 200	1 300	5 000
35	52	52	37	12	35	52	5	3.5	0.6	31 000	87 000	10 600	1 400	5 500
	62	62	37	18	35	62	7.5	5.25	1	54 500	139 000	17 000	1 200	4 900
	68	68	37	20	35	68	6	7	1	66 500	214 000	26 100	1 200	4 600
40	60	60	42	13	40	60	6	3.5	0.6	43 000	121 000	14 800	1 200	4 800
	68	68	42	19	40	68	9	5	1	74 500	190 000	23 200	1 100	4 400
	78	78	42	22	40	78	7	7.5	1	85 000	277 000	34 000	1 000	4 000
45	65	65	47	14	45	65	6	4	0.6	45 500	135 000	16 500	1 100	4 400
	73	73	47	20	45	73	9	5.5	1	82 000	222 000	27 000	1 000	4 100
	85	85	47	24	45	85	7.5	8.25	1	102 000	345 000	42 000	900	3 600
50	70	70	52	14	50	70	6	4	0.6	48 500	150 000	18 300	1 000	4 000
	78	78	52	22	50	78	9	6.5	1	85 000	238 000	29 000	950	3 800
	95	95	52	27	50	95	8	9.5	1.1	125 000	445 000	54 000	800	3 200
55	78	78	57	16	55	78	6	5	0.6	62 500	215 000	26 200	900	3 600
	90	90	57	25	55	90	11	7	1	121 000	340 000	41 500	830	3 300
	105	105	57	30	55	105	9	10.5	1.1	158 000	570 000	69 500	730	2 900
60	85	85	62	17	60	85	7.5	4.75	1	69 000	215 000	26 200	830	3 300
	95	95	62	26	60	95	11	7.5	1	126 000	365 000	44 500	780	3 100
	110	110	62	30	60	110	9	10.5	1.1	162 000	600 000	73 500	680	2 700

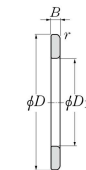
1) Smallest allowable dimension for chamfer dimension r.
2) The tolerance of bearings with suffix code T2 is E12.



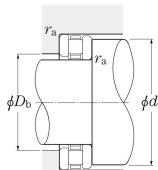
K893 type
(Thrust cylindrical roller
and cage assembly)



WS type raceway
(Inner ring)

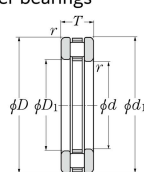


GS type raceway
(Outer ring)

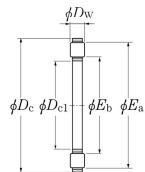


Number				Approx. dimension mm		Installation-related dimensions mm			Mass kg (approx.)			
Bearing	Thrust cylindrical roller and cage assembly	Inner ring	Outer ring	E _b	E _a	d _a Min.	D _b Max.	r _{as} Max.	811	K811 K812 K893	WS811 WS812 WS893	GS811 GS812 GS893
81100T2	K81100T2	WS81100	GS81100	13.5	21.3	21	14	0.3	0.020	0.0035	0.0081	0.0081
81101T2	K81101T2	WS81101	GS81101	15.5	23.3	23	16	0.3	0.022	0.0040	0.0090	0.0090
81102T2	K81102T2	WS81102	GS81102	17.2	25	25	18	0.3	0.024	0.0060	0.0095	0.0090
81103T2	K81103T2	WS81103	GS81103	19.2	27	27	20	0.3	0.028	0.0080	0.010	0.010
81104T2	K81104T2	WS81104	GS81104	22.4	32.3	32	23	0.3	0.039	0.012	0.014	0.013
81105T2	K81105T2	WS81105	GS81105	27.6	38.7	39	28	0.6	0.059	0.018	0.021	0.020
81106T2	K81106T2	WS81106	GS81106	33.1	43.9	44	33	0.6	0.066	0.020	0.024	0.022
81206T2	K81206T2	WS81206	GS81206	32.8	49	48	33	0.6	0.141	0.050	0.047	0.044
89306	K89306	WS89306	GS89306	34	56.4	56	34	1	0.249	0.046	0.104	0.099
81107T2	K81107T2	WS81107	GS81107	38	48.9	49	38	0.6	0.085	0.024	0.032	0.029
81207T2	K81207T2	WS81207	GS81207	39.8	56	56	41	1	0.230	0.065	0.085	0.080
89307	K89307	WS89307	GS89307	40	64.4	64	40	1	0.351	0.064	0.147	0.140
81108T2	K81108T2	WS81108	GS81108	43.2	56.4	56	44	0.6	0.118	0.035	0.043	0.040
81208T2	K81208T2	WS81208	GS81208	43.7	62.9	63	44	1	0.266	0.085	0.093	0.088
89308	K89308	WS89308	GS89308	46	74.4	74	46	1	0.507	0.100	0.207	0.200
81109T2	K81109T2	WS81109	GS81109	48.4	61.6	61	49	0.6	0.144	0.040	0.054	0.050
81209T2	K81209T2	WS81209	GS81209	48.8	68	68	49	1	0.318	0.100	0.112	0.106
89309	K89309	WS89309	GS89309	50.9	81.3	81	51	1	0.660	0.140	0.264	0.255
81110T2	K81110T2	WS81110	GS81110	53.2	66.4	66	54	0.6	0.158	0.045	0.059	0.054
81210T2	K81210T2	WS81210	GS81210	53.7	73.1	73	54	1	0.384	0.105	0.144	0.135
89310	K89310	WS89310	GS89310	58	90.4	90	58	1	0.932	0.180	0.382	0.370
81111T2	K81111T2	WS81111	GS81111	57.8	75.2	75	58	0.6	0.242	0.060	0.094	0.087
81211T2	K81211T2	WS81211	GS81211	60.1	83.4	83	61	1	0.618	0.190	0.219	0.209
89311	K89311	WS89311	GS89311	63.9	100.3	100	64	1	1.26	0.240	0.518	0.503
81112T2	K81112T2	WS81112	GS81112	63.7	80.1	80	65	1	0.288	0.083	0.106	0.099
81212T2	K81212T2	WS81212	GS81212	64.9	88.4	88	66	1	0.690	0.200	0.251	0.240
89312	K89312	WS89312	GS89312	68.9	105.3	105	69	1	1.33	0.250	0.550	0.534

811 type
812 type
893 type



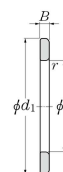
811 type
812 type
(Bearing)

893 type
(Bearing)

K811 type, K812 type
(Thrust cylindrical roller
and cage assembly)



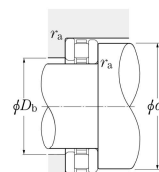
K893 type
(Thrust cylindrical roller
and cage assembly)



WS type raceway
(Inner ring)



GS type raceway
(Outer ring)



Boundary dimensions										Basic load rating		Fatigue load limit	Allowable speed			
<i>d</i>	<i>D</i>	<i>d</i> ₁	<i>D</i> ₁	<i>T</i>	$\frac{\text{mm}}{D_{c1}^{2/3}}$ E11	<i>D</i> _c a13	<i>D</i> _w 8010	<i>B</i> h11	<i>r</i> _s mm ⁽¹⁾	dynamic	N	static	N	$\frac{\text{min}^{-1}}$ Grease lubrication	Oil lubrication	
										<i>C</i> _a		<i>C</i> _{0a}	<i>N</i> <i>C</i> _u			
65	90	90	67	18	65	90	7.5	5.25	1	73 000		236 000	28 800		780	3 100
	100	100	67	27	65	100	11	8	1	130 000		385 000	47 000		730	2 900
	115	115	67	30	65	115	9	10.5	1.1	167 000		635 000	77 500		650	2 600
70	95	95	72	18	70	95	7.5	5.25	1	76 500		257 000	31 500		730	2 900
	105	105	72	27	70	105	11	8	1	134 000		410 000	50 000		680	2 700
	125	125	72	34	70	125	10	12	1.1	205 000		790 000	96 500		600	2 400
75	100	100	77	19	75	100	7.5	5.75	1	78 000		268 000	32 500		680	2 700
	110	110	77	27	75	110	11	8	1	138 000		435 000	53 000		650	2 600
	135	135	77	36	75	135	11	12.5	1.5	239 000		920 000	110 000		550	2 200
80	105	105	82	19	80	105	7.5	5.75	1	79 500		279 000	34 000		650	2 600
	115	115	82	28	80	115	11	8.5	1	143 000		460 000	56 000		630	2 500
	140	140	82	36	80	140	11	12.5	1.5	246 000		970 000	114 000		530	2 100
85	110	110	87	19	85	110	7.5	5.75	1	83 000		300 000	36 500		630	2 500
	125	125	88	31	85	125	12	9.5	1	169 000		550 000	66 500		580	2 300
	150	150	88	39	85	150	12	13.5	1.5	281 000		1 100 000	128 000		500	2 000
90	120	120	92	22	90	120	9	6.5	1	112 000		395 000	47 500		580	2 300
	135	135	93	35	90	135	14	10.5	1.1	213 000		680 000	80 000		530	2 100
	155	155	93	39	90	155	12	13.5	1.5	289 000		1 160 000	132 000		480	1 900
100	135	135	102	25	100	135	11	7	1	158 000		555 000	65 000		500	2 000
	150	150	103	38	100	150	15	11.5	1.1	243 000		795 000	91 000		480	1 900
	170	170	103	42	100	170	13	14.5	1.5	335 000		1 370 000	153 000		430	1 700
110	145	145	112	25	110	145	11	7	1	165 000		605 000	68 500		480	1 900
	160	160	113	38	110	160	15	11.5	1.1	258 000		885 000	98 500		450	1 800
	190	190	113	48	110	190	15	16.5	2	430 000		1 770 000	190 000		400	1 600
120	155	155	122	25	120	155	11	7	1	172 000		655 000	72 500		450	1 800
	170	170	123	39	120	170	15	12	1.1	264 000		930 000	101 000		430	1 700
130	170	170	132	30	130	170	12	9	1	197 000		755 000	81 500		400	1 600
	190	187	133													

1) Smallest allowable dimension for chamfer dimension r ;
2) The tolerance of bearings with suffix code T2 is E12.

K893 type
(Thrust cylindrical roller
and cage assembly)

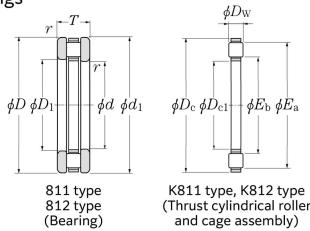
WS type raceway
(Inner ring)

GS type raceway
(Outer ring)

Number				Approx. dimension mm	Installation-related dimensions mm			Mass kg (approx.)				
Bearing	Thrust cylindrical roller and cage assembly	Inner ring	Outer ring		d_B	D_B	r_{AS}	811	kg K811 K812 K893	WS811 WS812 WS893	GS811 GS812 GS893	
				E_B	E_A	Min.	Max.	Min.	Max.			
81113T2	K81113T2	WS81113	GS81113	68.8	85.2	85	70	1	0.332	0.090	0.125	0.117
81213T2	K81213T2	WS81213	GS81213	69.9	93.3	93	71	1	0.772	0.215	0.285	0.272
89313	K89313	WS89313	GS89313	73.9	110.3	110	74	1	1.41	0.260	0.583	0.566
81114T2	K81114T2	WS81114	GS81114	73.7	90.1	90	74	1	0.355	0.097	0.134	0.124
81214T2	K81214T2	WS81214	GS81214	75	98.4	98	76	1	0.815	0.225	0.302	0.288
89314	K89314	WS89314	GS89314	79.8	120.2	120	80	1	1.91	0.340	0.793	0.772
81115T2	K81115T2	WS81115	GS81115	78.7	95.1	95	80	1	0.414	0.115	0.155	0.144
81215T2	K81215T2	WS81215	GS81215	80.1	103.7	103	81	1	0.864	0.240	0.319	0.304
89315	K89315	WS89315	GS89315	84.7	129.2	129	85	1.5	2.39	0.470	0.971	0.948
81116T2	K81116T2	WS81116	GS81116	83.7	100.1	100	85	1	0.945	0.119	0.164	0.152
81216T2	K81216T2	WS81216	GS81216	84.8	108.4	106	86	1	0.438	0.250	0.358	0.341
89316	K89316	WS89316	GS89316	89.8	134.2	134	90	1.5	2.50	0.490	1.02	0.992
81117T2	K81117T2	WS81117	GS81117	88.7	105.3	105	89	1	0.458	0.125	0.173	0.161
81217	K81217	WS81217	GS81217	92.2	116.9	116	92	1	1.25	0.300	0.492	0.462
89317	K89317	WS89317	GS89317	95.8	144.2	144	96	1.5	3.09	0.590	1.27	1.23
81118T2	K81118T2	WS81118	GS81118	94.7	114.3	114	95	1	0.660	0.170	0.252	0.238
81218J	K81218J	WS81218	GS81218	97.9	126.7	126	97	1	1.82	0.540	0.655	0.620
89318	K89318	WS89318	GS89318	100.8	149.2	149	101	1.5	3.23	0.620	1.33	1.28
81120T2	K81120T2	WS81120	GS81120	105.1	128.7	128	106	1	0.993	0.300	0.355	0.338
81220	K81220	WS81220	GS81220	109.2	140	139	109	1	2.35	0.620	0.886	0.843
89320	K89320	WS89320	GS89320	110.6	163	163	110	1.5	4.13	0.810	1.60	1.64
81122T2	K81122T2	WS81122	GS81122	115	138.8	138	116	1	1.08	0.325	0.385	0.366
81222	K81222	WS81222	GS81222	119.2	150	149	119	1	2.55	0.685	0.957	0.910
89322	K89322	WS89322	GS89322	122.5	183	183	122	2	5.96	1.15	2.44	2.37
81124T2	K81124T2	WS81124	GS81124	125	148.8	148	126	1	1.15	0.340	0.415	0.395
81224	K81224	WS81224	GS81224	129.2	160	159	129	1	2.82	0.730	1.07	1.02
81126	K81126	WS81126	GS81126	137.7	162.4	162	137	1	1.72	0.415	0.666	0.637
81226	K81226	WS81226	GS81226	140.1	179	178	140	1.5	4.06	1.14	1.45	1.48

Thrust cylindrical roller bearings

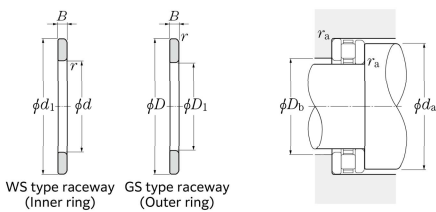
811 type
812 type



d 140 ~ 160mm

Boundary dimensions										Basic load rating		Fatigue	Allowable speed	
d	D	d ₁	D ₁	T	mm D _{c1} E11	D _c a13	D _w -0.010	B h11	r _s min ¹⁾	dynamic N C _a	static N C _{0a}	load limit N C _u	min ⁻¹ Grease lubrication	Oil lubrication
140	180	178	142	31	140	180	12	9.5	1	206 000	815 000	86 000	380	1 500
	200	197	143	46	140	200	19	13.5	1.5	370 000	1 280 000	133 000	350	1 400
150	190	188	152	31	150	190	12	9.5	1	214 000	870 000	90 500	350	1 400
160	200	198	162	31	160	200	12	9.5	1	221 000	930 000	95 000	330	1 300

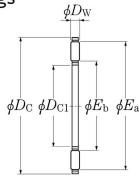
1) Smallest allowable dimension for chamfer dimension r.



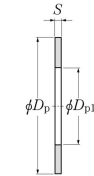
Number				Approx. dimension mm		Installation-related dimensions mm			Mass kg (approx.)			
Bearing	Thrust cylindrical roller and cage assembly	Inner ring	Outer ring	E _b	E _a	d _a Min.	D _b Max.	r _{as} Max.	811	K811 K812 K893	WS811 WS812 WS893	GS811 GS812 GS893
81128	K81128	WS81128	GS81128	147.8	172.5	172	147	1	1.87	0.450	0.708	0.717
81228	K81228	WS81228	GS81228	150.1	189	188	150	1.5	4.43	1.20	1.60	1.63
81130	K81130	WS81130	GS81130	157.7	182.4	182	157	1	1.98	0.470	0.752	0.761
81132	K81132	WS81132	GS81132	167.8	192.5	192	167	1	2.10	0.500	0.797	0.806

Thrust needle roller bearings

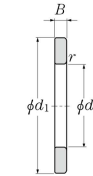
AXK11 type
AS11 type
WS811 type
GS811 type



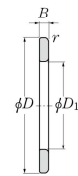
AXK type
(Thrust needle roller
and cage assembly)



AS type raceway
(Washer)



WS type raceway
(Inner ring)



GS type raceway
(Outer ring)

D_3 10 ~ 140mm

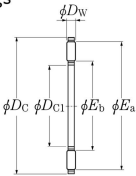
Boundary dimensions													Basic load rating		Fatigue load limit
D_{c1} E11	D_c c12	D_w e13	D_b e13	D_{p1} E12	$S^{(2)}$ E12	d mm	d_1 mm	D mm	D_1 mm	B mm	r_s min ⁽¹⁾	r_s min ⁽¹⁾	dynamic C_a	static C_{0a}	N C_a
10	24	2	24	10	1	10	24	24	10	2.75	$-\frac{0}{-0.060}$	0.3	9 150	25 300	3 100
12	26	2	26	12	1	12	26	26	12	2.75	$-\frac{0}{-0.060}$	0.3	9 850	28 900	3 500
15	28	2	28	15	1	15	28	28	16	2.75	$-\frac{0}{-0.060}$	0.3	11 300	36 000	4 400
17	30	2	30	17	1	17	30	30	18	2.75	$-\frac{0}{-0.060}$	0.3	11 900	39 500	4 800
20	35	2	35	20	1	20	35	35	21	2.75	$-\frac{0}{-0.060}$	0.3	13 200	46 500	5 650
25	42	2	42	25	1	25	42	42	26	3	$-\frac{0}{-0.060}$	0.6	14 600	58 000	7 050
30	47	2	47	30	1	30	47	47	32	3	$-\frac{0}{-0.060}$	0.6	16 300	69 500	8 500
35	52	2	52	35	1	35	52	52	37	3.5	$-\frac{0}{-0.075}$	0.6	17 800	81 500	9 900
40	60	3	60	40	1	40	60	60	42	3.5	$-\frac{0}{-0.075}$	0.6	27 400	110 000	13 500
45	65	3	65	45	1	45	65	65	47	4	$-\frac{0}{-0.075}$	0.6	29 800	128 000	15 600
50	70	3	70	50	1	50	70	70	52	4	$-\frac{0}{-0.075}$	0.6	31 500	143 000	17 400
55	78	3	78	55	1	55	78	78	57	5	$-\frac{0}{-0.075}$	0.6	38 000	186 000	22 700
60	85	3	85	60	1	60	85	85	62	4.75	$-\frac{0}{-0.075}$	1	44 500	234 000	28 600
65	90	3	90	65	1	65	90	90	67	5.25	$-\frac{0}{-0.075}$	1	46 500	254 000	31 000
70	95	4	95	70	1	70	95	95	72	5.25	$-\frac{0}{-0.075}$	1	53 500	253 000	31 000
75	100	4	100	75	1	75	100	100	77	5.75	$-\frac{0}{-0.075}$	1	55 000	266 000	32 500
80	105	4	105	80	1	80	105	105	82	5.75	$-\frac{0}{-0.075}$	1	56 500	279 000	34 000
85	110	4	110	85	1	85	110	110	87	5.75	$-\frac{0}{-0.075}$	1	57 500	291 000	35 500
90	120	4	120	90	1	90	120	120	92	6.5	$-\frac{0}{-0.090}$	1	70 500	390 000	46 500
100	135	4	135	100	1	100	135	135	102	7	$-\frac{0}{-0.090}$	1	90 000	550 000	64 000
110	145	4	145	110	1	110	145	145	112	7	$-\frac{0}{-0.090}$	1	93 500	590 000	67 000
120	155	4	155	120	1	120	155	155	122	7	$-\frac{0}{-0.090}$	1	99 000	650 000	72 000
130	170	5	170	130	1	130	170	170	132	9	$-\frac{0}{-0.090}$	1	140 000	900 000	97 000
140	180	5	180	140	1	140	178	180	142	9.5	$-\frac{0}{-0.090}$	1	145 000	960 000	102 000

1) Smallest allowable dimension for chamfer dimension r .
2) The measured thrust load is 2.04 N or above.

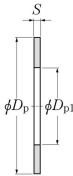
Allowable speed		Number				Approx. dimension		Mass				
Grease lubrication	min ⁻¹	Oil lubrication	Thrust needle roller and cage assembly	Washer	Inner ring	Outer ring	mm		AXK11	AS11	WS811 WS893	GS811 GS893
							E _b	E _a				
3 500	14 000		AXK1100	AS1100	WS81100	GS81100	12.3	21.7	0.0028	0.0029	0.0081	0.0089
3 300	13 000		AXK1101	AS1101	WS81101	GS81101	14.3	23.7	0.0030	0.0033	0.0090	0.0091
2 800	11 000		AXK1102	AS1102	WS81102	GS81102	17.2	26.5	0.0035	0.0034	0.0095	0.0090
2 500	10 000		AXK1103	AS1103	WS81103	GS81103	19.2	28.5	0.0040	0.0038	0.010	0.010
2 100	8 500		AXK1104	AS1104	WS81104	GS81104	21.3	31.3	0.0050	0.0051	0.014	0.013
1 800	7 000		AXK1105	AS1105	WS81105	GS81105	29.5	39.4	0.0070	0.0070	0.021	0.020
1 500	6 000		AXK1106	AS1106	WS81106	GS81106	34.5	44.4	0.0080	0.0081	0.024	0.022
1 400	5 500		AXK1107	AS1107	WS81107	GS81107	39.5	49.4	0.010	0.0091	0.032	0.029
1 200	4 700		AXK1108	AS1108	WS81108	GS81108	44.2	56.2	0.019	0.012	0.043	0.040
1 100	4 300		AXK1109	AS1109	WS81109	GS81109	50.5	62.4	0.021	0.014	0.054	0.050
1 000	3 900		AXK1110	AS1110	WS81110	GS81110	55.5	67.4	0.024	0.015	0.059	0.054
900	3 500		AXK1111	AS1111	WS81111	GS81111	61.0	74.9	0.031	0.019	0.094	0.087
800	3 200		AXK1112	AS1112	WS81112	GS81112	66.0	81.9	0.039	0.022	0.106	0.099
750	3 000		AXK1113	AS1113	WS81113	GS81113	71.0	86.9	0.040	0.024	0.125	0.117
750	2 900		AXK1114	AS1114	WS81114	GS81114	75.5	91.4	0.060	0.025	0.134	0.124
700	2 700		AXK1115	AS1115	WS81115	GS81115	80.5	96.4	0.061	0.027	0.155	0.144
650	2 600		AXK1116	AS1116	WS81116	GS81116	84.4	100.3	0.063	0.029	0.164	0.152
600	2 400		AXK1117	AS1117	WS81117	GS81117	90.5	106.4	0.067	0.030	0.173	0.161
600	2 300		AXK1118	AS1118	WS81118	GS81118	96.5	116.4	0.086	0.039	0.252	0.238
500	2 000		AXK1120	AS1120	WS81120	GS81120	107.5	131.4	0.112	0.051	0.355	0.338
480	1 900		AXK1122	AS1122	WS81122	GS81122	115.5	139.4	0.122	0.055	0.385	0.366
430	1 700		AXK1124	AS1124	WS81124	GS81124	125.5	149.4	0.131	0.059	0.415	0.395
400	1 600		AXK1126	AS1126	WS81126	GS81126	136.0	163.0	0.205	0.074	0.666	0.637
380	1 500		AXK1128	AS1128	WS81128	GS81128	146.0	174.0	0.219	0.079	0.708	0.717

Thrust needle roller bearings

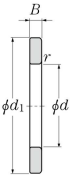
AXK11 type
AS11 type
WS811 type
GS811 type



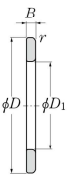
AXK type
(Thrust needle roller
and cage assembly)



AS type raceway
(Washer)



WS type raceway
(Inner ring)



GS type raceway
(Outer ring)

D3 150 ~ 160mm

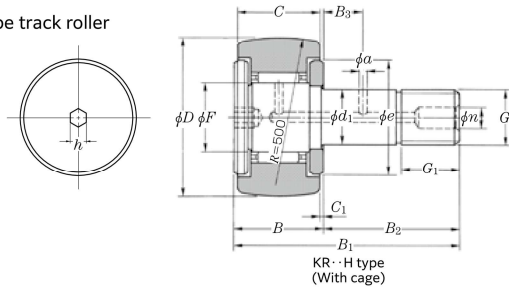
Boundary dimensions												Basic load rating		Fatigue
D_{c1}	D_c	D_w	D_b	D_{p1}	$S^{2)}$	d	d_1	D	D_1	B	$r_s \text{ min}^{1)}$	dynamic	static	load
E11	c12	$\frac{0}{-0.010}$	e13	E12	± 0.05	mm						C_a	C_{0a}	limit
150	190	5	190	150	1	150	188	190	152	9.5	$\frac{0}{-0.090}$	149 000	1 020 000	106 000
160	200	5	200	160	1	160	198	200	162	9.5	$\frac{0}{-0.090}$	154 000	1 070 000	110 000

Allowable speed		Number				Approx. dimension		Mass			
min ⁻¹		Thrust needle roller and cage assembly	Washer	Inner ring	Outer ring	mm		kg(approx.)			
Grease lubrication	Oil lubrication					E_b	E_a	AXK11	AS11	WS811	GS811
350	1 400	AXK1130	AS1130	WS81130	GS81130	156.0	184.2	0.232	0.084	0.752	0.761
330	1 300	AXK1132	AS1132	WS81132	GS81132	166.0	194.2	0.246	0.089	0.797	0.806

1) Smallest allowable dimension for chamfer dimension r.
2) The measured thrust load is 2.04 N or above.

Cam follower stud type track roller metric series

KR··H type
KR··XH type
KR··LLH type
KR··XLLH type

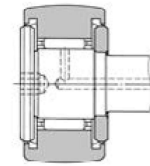


D 10 ~ 90mm

Outer dia. mm D -0.05	Dimensions mm														Basic load rating		Fatigue load limit N Ca
	d1	C	F	B	B1	B2	G	G1	B3	C1	n	a	e	h	dynamic N Cr	static N Cor	
10	3 ⁰ _{-0.010}	7	4	8	17	9	M3×0.5	5	—	0.5	—	—	7	2.5	1 640	1 270	155
12	4 ⁰ _{-0.012}	8	4.8	9	20	11	M4×0.7	6	—	0.5	—	—	8.5	2.5	2 170	1 690	206
13	5 ⁰ _{-0.012}	9	5.75	10	23	13	M5×0.8	7.5	—	0.5	—	—	9.5	3	2 650	2 260	276
16	6 ⁰ _{-0.012}	11	8	12	28	16	M6×1	8	—	0.6	—	—	12	3	4 050	4 200	510
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	—	0.6	—	—	14	4	4 750	5 400	660
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	4	5 300	6 650	810
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	4	5 300	6 650	810
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	6	7 850	9 650	1 180
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	6	7 850	9 650	1 180
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	8	0.8	6	3	27	6	12 200	17 900	2 180
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	8	0.8	6	3	32	6	14 000	22 800	2 790
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	8	20 700	33 500	4 100
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	8	20 700	33 500	4 100
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	8	28 900	55 000	6 700
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	8	28 900	55 000	6 700
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	8	45 000	88 500	10 800
85	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	8	45 000	88 500	10 800
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	8	45 000	88 500	10 800

1) The tolerance of outer ring outer diameter D of KR··XH type and KR··XLLH type having a cylindrical outer diameter surface is JIS 0 class.

E-66



KR··LLH type
(Seal type with cage)

Accessories

Applied bearing number	Grease nipple number	Plug number	Applied hexagonal nut
10~19	—	—	1M3x0.5~1M8x1.25
22~26	NIP-B4	SEN4	1M10x1.25
30~40	NIP-B6	SEN3, SEN6	1M12x1.5~1M18x1.5
47~90	NIP-B8	SEN4, SEN8	1M20x1.5~1M30x1.5



Grease fitting



Plug



Hexagon nut

Track load capacity N		Allowable speed ²⁾ min ⁻¹		Maximum tightening torque N·m	Number ³⁾				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring		
560	1 360	*27 000	*40 000	0.5	KR10T2H/3AS	KR10XT2H/3AS	KR10T2LLH/3AS	KR10XT2LLH/3AS	0.005	3
725	1 790	*25 000	*36 000	1	KR12T2H/3AS	KR12XT2H/3AS	KR12T2LLH/3AS	KR12XT2LLH/3AS	0.008	4
805	2 220	*23 000	*33 000	2	KR13T2H/3AS	KR13XT2H/3AS	KR13T2LLH/3AS	KR13XT2LLH/3AS	0.010	5
1 080	3 400	*19 000	*25 000	3	KR16FDOH/L588	KR16FXDOH/L588	KR16FLDOH/L588	KR16FXLDOH/L588	0.019	6
1 380	4 050	*15 000	*20 000	8	KR19FDOH/L588	KR19FXDOH/L588	KR19FLDOH/L588	KR19FXLDOH/L588	0.031	8
1 690	5 150	*12 000	*16 000	14	KR22FH	KR22FXH	KR22FLLH/3AS	KR22FXLLH/3AS	0.046	10
2 120	6 100	*12 000	*16 000	14	KR26FH	KR26FXH	KR26FLLH/3AS	KR26FXLLH/3AS	0.059	10
2 620	7 700	10 000	*13 000	20	KR30H	KR30XH	KR30LLH/3AS	KR30XLLH/3AS	0.087	12
2 860	8 200	10 000	*13 000	20	KR32H	KR32XH	KR32LLH/3AS	KR32XLLH/3AS	0.097	12
3 200	11 900	8 000	*11 000	52	KR35H	KR35XH	KR35LLH/3AS	KR35XLLH/3AS	0.169	16
3 850	14 500	7 000	9 000	76	KR40H	KR40XH	KR40LLH/3AS	KR40XLLH/3AS	0.248	18
4 700	21 000	6 000	8 000	98	KR47H	KR47XH	KR47LLH/3AS	KR47XLLH/3AS	0.386	20
5 550	23 300	6 000	8 000	98	KR52H	KR52XH	KR52LLH/3AS	KR52XLLH/3AS	0.461	20
6 950	34 500	5 000	6 500	178	KR62H	KR62XH	KR62LLH/3AS	KR62XLLH/3AS	0.790	24
8 050	38 500	5 000	6 500	178	KR72H	KR72XH	KR72LLH/3AS	KR72XLLH/3AS	1.04	24
9 800	53 000	4 000	5 500	360	KR80H	KR80XH	KR80LLH/3AS	KR80XLLH/3AS	1.55	30
10 400	56 000	4 000	5 500	360	KR85H	KR85XH	KR85LLH/3AS	KR85XLLH/3AS	1.74	30
11 400	59 000	4 000	5 500	360	KR90H	KR90XH	KR90LLH/3AS	KR90XLLH/3AS	1.95	30

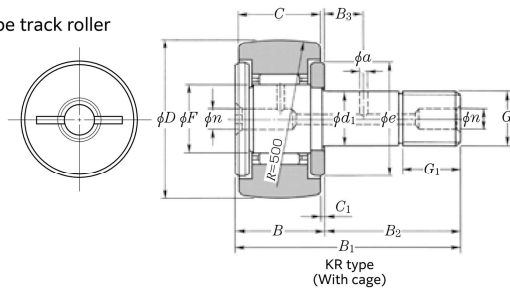
2) The allowable speed of KR··LLH type and KR··XLLH type with a "s" mark seal is about 10 000 min⁻¹.

3) Bearings having T2 after the bearing number have a plastic cage, and the allowable temperature is 120°C and 100°C or below for continuous use.

E-67

Cam follower stud type track roller metric series

KR type
KR··X type
KR··LL type
KR··XLL type



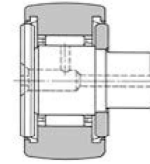
D 16 ~ 90mm

Outer dia. ¹⁾ mm D -0.05	Dimensions mm													Basic load rating		Fatigue load limit N Ca
	d1	C	F	B	B1	B2	G	G1	B3	C1	n	a	e	dynamic N Cr	static N Cor	
16	6 ⁰ _{-0.012}	11	8	12	28	16	M6×1	8	—	0.6	4 ²⁾	—	12	4 050	4 200	510
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	—	0.6	4 ²⁾	—	14	4 750	5 400	660
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	5 300	6 650	810
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	5 300	6 650	810
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	7 850	9 650	1 180
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	7 850	9 650	1 180
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	8	0.8	6	3	27	12 200	17 900	2 180
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	8	0.8	6	3	32	14 000	22 800	2 780
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	20 700	33 500	4 100
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	20 700	33 500	4 100
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	28 900	55 000	6 700
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	28 900	55 000	6 700
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	45 000	88 500	10 800
85	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	45 000	88 500	10 800
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	45 000	88 500	10 800

1) The tolerance of outer ring outer diameter D of KR··X type and KR··XLL type having a cylindrical outer diameter surface is JIS 0 class.

2) A grease filler hole is provided only on the front surface (left side in the above drawing).

E-68



KR··LL type
(Seal type with cage)

Accessories

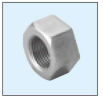
Applied bearing number	Grease nipple number	Plug number	Applied hexagonal nut
16~26	NIP-B4	SEN4	1M 6×1 ~1M10×1.25
30~40	NIP-B6	SEN3, SEN6	1M12×1.5~1M18×1.5
47~90	NIP-B8	SEN4, SEN8	1M20×1.5~1M30×1.5



Grease fitting



Plug



Hexagon nut

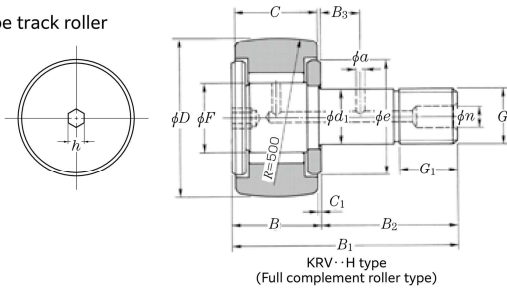
Track load capacity N		Allowable speed ³⁾ min ⁻¹		Maximum tightening torque N·m	Number				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Without seal Spherical outer ring	Cylindrical outer ring	With seal Spherical outer ring	Cylindrical outer ring		
1 080	3 400	*19 000	*25 000	3	KR16F	KR16FX	KR16FLL/3AS	KR16FXLL/3AS	0.019	6
1 380	4 050	*15 000	*20 000	8	KR19F	KR19FX	KR19FLL/3AS	KR19FXLL/3AS	0.031	8
1 690	5 150	*12 000	*16 000	14	KR22F	KR22FX	KR22FLL/3AS	KR22FXLL/3AS	0.046	10
2 120	6 100	*12 000	*16 000	14	KR26F	KR26FX	KR26FLL/3AS	KR26FXLL/3AS	0.059	10
2 620	7 700	10 000	*13 000	20	KR30	KR30X	KR30LL/3AS	KR30XLL/3AS	0.087	12
2 860	8 200	10 000	*13 000	20	KR32	KR32X	KR32LL/3AS	KR32XLL/3AS	0.097	12
3 200	11 900	8 000	*11 000	52	KR35	KR35X	KR35LL/3AS	KR35XLL/3AS	0.169	16
3 850	14 500	7 000	9 000	76	KR40	KR40X	KR40LL/3AS	KR40XLL/3AS	0.248	18
4 700	21 000	6 000	8 000	98	KR47	KR47X	KR47LL/3AS	KR47XLL/3AS	0.386	20
5 550	23 300	6 000	8 000	98	KR52	KR52X	KR52LL/3AS	KR52XLL/3AS	0.461	20
6 950	34 500	5 000	6 500	178	KR62	KR62X	KR62LL/3AS	KR62XLL/3AS	0.790	24
8 050	38 500	5 000	6 500	178	KR72	KR72X	KR72LL/3AS	KR72XLL/3AS	1.04	24
9 800	53 000	4 000	5 500	360	KR80	KR80X	KR80LL/3AS	KR80XLL/3AS	1.55	30
10 400	56 000	4 000	5 500	360	KR85	KR85X	KR85LL/3AS	KR85XLL/3AS	1.74	30
11 400	59 000	4 000	5 500	360	KR90	KR90X	KR90LL/3AS	KR90XLL/3AS	1.95	30

3) The allowable speed of KR··LL type and KR··XLL type with a "*" mark seal is about 10 000 min⁻¹.

E-69

Cam follower stud type track roller metric series

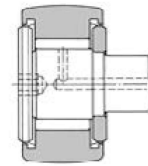
KRV···H type
KRV···XH type
KRV···LLH type
KRV···XLLH type



D 10 ~ 90mm

Outer dia. mm D 3-0.05	Dimensions mm														Basic load rating		Fatigue load limit N Ca
	d1	C	F	B	B1	B2	G	G1	B3	C1	n	a	e	h	dynamic N Cr	static N Cor	
10	3 ⁰ _{-0.010}	7	4	8	17	9	M3×0.5	5	—	0.5	—	—	7	2.5	2 500	2 610	320
12	4 ⁰ _{-0.012}	8	4.8	9	20	11	M4×0.7	6	—	0.5	—	—	8.5	2.5	3 500	3 800	460
13	5 ⁰ _{-0.012}	9	5.75	10	23	13	M5×0.8	7.5	—	0.5	—	—	9.5	3	4 500	5 350	650
16	6 ⁰ _{-0.015}	11	8	12	28	16	M6×1	8	—	0.6	—	—	12	3	6 500	9 350	1 140
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	—	0.6	—	—	14	4	7 450	11 700	1 430
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	4	8 200	14 000	1 700
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	4	8 200	14 000	1 700
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	6	12 000	20 300	2 470
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	6	12 000	20 300	2 470
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	8	0.8	6	3	27	6	17 600	34 000	4 150
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	8	0.8	6	3	32	6	19 400	42 000	5 100
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	8	28 800	61 000	7 450
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	8	28 800	61 000	7 450
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	8	39 500	98 500	12 000
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	8	39 500	98 500	12 000
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	8	58 000	147 000	18 000
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	8	58 000	147 000	18 000

1) The tolerance of outer ring outer diameter D of KRV···XH type and KRV···XLLH type having a cylindrical outer diameter surface is JIS 0 class.



KRV···LLH type
(Full complement roller sealed type)

Accessories

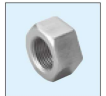
Applied bearing number	Grease nipple number	Plug number	Applied hexagonal nut
10~19	—	—	1M3x0.5~1M8x1.25
22~26	NIP-B4	SEN4	1M10x1.25
30~40	NIP-B6	SEN3, SEN6	1M12x1.5~1M18x1.5
47~90	NIP-B8	SEN4, SEN8	1M20x1.5~1M30x1.5



Grease fitting



Plug



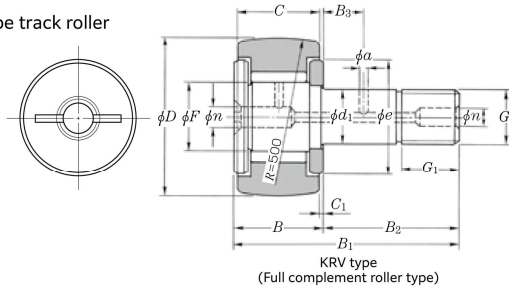
Hexagon nut

Track load capacity N		Allowable speed ²⁾ min ⁻¹		Maximum tightening torque N·m	Number				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Without seal Spherical outer ring	Cylindrical outer ring	With seal Spherical outer ring	Cylindrical outer ring		
560	1 360	*25 000	*32 000	0.5	KRV10H/3AS	KRV10XH/3AS	KRV10LLH/3AS	KRV10XLLH/3AS	0.005	3
725	1 790	*20 000	*27 000	1	KRV12H/3AS	KRV12XH/3AS	KRV12LLH/3AS	KRV12XLLH/3AS	0.008	4
805	2 220	*17 000	*22 000	2	KRV13H/3AS	KRV13XH/3AS	KRV13LLH/3AS	KRV13XLLH/3AS	0.011	5
1 080	3 400	*13 000	*16 000	3	KRV16FDH/L588	KRV16FXDH/L588	KRV16FLDLH/L588	KRV16FXLLDH/L588	0.020	6
1 380	4 050	10 000	*13 000	8	KRV19FDH/L588	KRV19FXDH/L588	KRV19FLDLH/L588	KRV19FXLLDH/L588	0.032	8
1 690	5 150	8 500	*11 000	14	KRV22FH/3AS	KRV22FXH/3AS	KRV22FLLH/3AS	KRV22FXLLH/3AS	0.047	10
2 120	6 100	8 500	*11 000	14	KRV26FH/3AS	KRV26FXH/3AS	KRV26FLLH/3AS	KRV26FXLLH/3AS	0.061	10
2 620	7 700	6 500	8 500	20	KRV30H/3AS	KRV30XH/3AS	KRV30LLH/3AS	KRV30XLLH/3AS	0.089	12
2 860	8 200	6 500	8 500	20	KRV32H/3AS	KRV32XH/3AS	KRV32LLH/3AS	KRV32XLLH/3AS	0.100	12
3 200	11 900	5 500	7 000	52	KRV35H/3AS	KRV35XH/3AS	KRV35LLH/3AS	KRV35XLLH/3AS	0.172	16
3 850	14 500	4 500	6 000	76	KRV40H/3AS	KRV40XH/3AS	KRV40LLH/3AS	KRV40XLLH/3AS	0.252	18
4 700	21 000	4 000	5 000	98	KRV47H/3AS	KRV47XH/3AS	KRV47LLH/3AS	KRV47XLLH/3AS	0.392	20
5 550	23 300	4 000	5 000	98	KRV52H/3AS	KRV52XH/3AS	KRV52LLH/3AS	KRV52XLLH/3AS	0.465	20
6 950	34 500	3 300	4 500	178	KRV62H/3AS	KRV62XH/3AS	KRV62LLH/3AS	KRV62XLLH/3AS	0.800	24
8 050	38 500	3 300	4 500	178	KRV72H/3AS	KRV72XH/3AS	KRV72LLH/3AS	KRV72XLLH/3AS	1.05	24
9 800	53 000	2 600	3 500	360	KRV80H/3AS	KRV80XH/3AS	KRV80LLH/3AS	KRV80XLLH/3AS	1.56	30
11 400	59 000	2 600	3 500	360	KRV90H/3AS	KRV90XH/3AS	KRV90LLH/3AS	KRV90XLLH/3AS	1.97	30

2) The allowable speed of KRV···LLH type and KRV···XLLH type with a "s" mark seal is about 10 000 min⁻¹.

Cam follower stud type track roller metric series

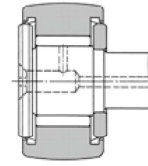
KRV type
KRV··X type
KRV··LL type
KRV··XLL type



D 16 ~ 90mm

Outer dia. mm D	Dimensions mm													Basic load rating		Fatigue load limit N Cu
	d1	C	F	B	B1	B2	G	G1	B3	C1	n	a	e	dynamic N Cr	static N Cor	
16	6 ⁰ _{-0.012}	11	8	12	28	16	M6×1	8	—	0.6	4 ²⁾	—	12	6 500	9 350	1 140
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	—	0.6	4 ²⁾	—	14	7 450	11 700	1 430
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	8 200	14 000	1 700
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	—	0.6	4	—	17	8 200	14 000	1 700
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	12 000	20 300	2 470
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	6	0.6	6	3	23	12 000	20 300	2 470
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	8	0.8	6	3	27	17 600	34 000	4 150
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	8	0.8	6	3	32	19 400	42 000	5 100
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	28 800	61 000	7 450
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	9	0.8	8	4	37	28 800	61 000	7 450
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	39 500	98 500	12 000
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	11	0.8	8	4	44	39 500	98 500	12 000
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	58 000	147 000	18 000
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	15	1	8	4	53	58 000	147 000	18 000

1) The tolerance of outer ring outer diameter D of KRV··X type and KRV··XLL type having a cylindrical outer diameter surface is JIS 0 class.
2) A grease filler hole is provided only on the front surface (left side in the above drawing).



KRV··LL type
(Full complement roller sealed type)

Accessories

Applied bearing number	Grease nipple number	Plug number	Applied hexagonal nut
16~26	NIP-B4	SEN4	1M 6×1 ~1M10×1.25
30~40	NIP-B6	SEN3, SEN6	1M12×1.5~1M18×1.5
47~90	NIP-B8	SEN4, SEN8	1M20×1.5~1M30×1.5



Grease fitting



Plug



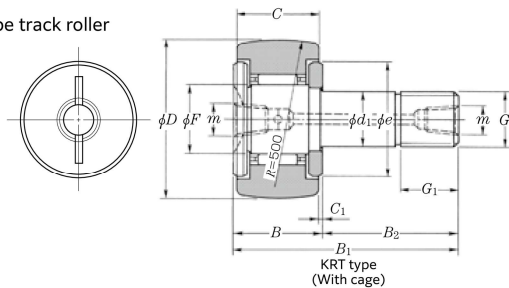
Hexagon nut

Track load capacity N		Allowable speed ³⁾ min ⁻¹		Maximum tightening torque N·m	Number				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Without seal Spherical outer ring	Without seal Cylindrical outer ring	With seal Spherical outer ring	With seal Cylindrical outer ring		
1 080	3 400	*13 000	*16 000	3	KRV16F/3AS	KRV16FX/3AS	KRV16FLL/3AS	KRV16FXLL/3AS	0.020	6
1 380	4 050	10 000	*13 000	8	KRV19F/3AS	KRV19FX/3AS	KRV19FLL/3AS	KRV19FXLL/3AS	0.032	8
1 690	5 150	8 500	*11 000	14	KRV22F/3AS	KRV22FX/3AS	KRV22FLL/3AS	KRV22FXLL/3AS	0.047	10
2 120	6 100	8 500	*11 000	14	KRV26F/3AS	KRV26FX/3AS	KRV26FLL/3AS	KRV26FXLL/3AS	0.061	10
2 620	7 700	6 500	8 500	20	KRV30/3AS	KRV30X/3AS	KRV30LL/3AS	KRV30XLL/3AS	0.089	12
2 860	8 200	6 500	8 500	20	KRV32/3AS	KRV32X/3AS	KRV32LL/3AS	KRV32XLL/3AS	0.100	12
3 200	11 900	5 500	7 000	52	KRV35/3AS	KRV35X/3AS	KRV35LL/3AS	KRV35XLL/3AS	0.172	16
3 850	14 500	4 500	6 000	76	KRV40/3AS	KRV40X/3AS	KRV40LL/3AS	KRV40XLL/3AS	0.252	18
4 700	21 000	4 000	5 000	98	KRV47/3AS	KRV47X/3AS	KRV47LL/3AS	KRV47XLL/3AS	0.390	20
5 550	23 300	4 000	5 000	98	KRV52/3AS	KRV52X/3AS	KRV52LL/3AS	KRV52XLL/3AS	0.465	20
6 950	34 500	3 300	4 500	178	KRV62/3AS	KRV62X/3AS	KRV62LL/3AS	KRV62XLL/3AS	0.800	24
8 050	38 500	3 300	4 500	178	KRV72/3AS	KRV72X/3AS	KRV72LL/3AS	KRV72XLL/3AS	1.05	24
9 800	53 000	2 600	3 500	360	KRV80/3AS	KRV80X/3AS	KRV80LL/3AS	KRV80XLL/3AS	1.56	30
11 400	59 000	2 600	3 500	360	KRV90/3AS	KRV90X/3AS	KRV90LL/3AS	KRV90XLL/3AS	1.97	30

3) The allowable speed of KRV··LL type and KRV··XLL type with a "*" mark seal is about 10 000 min⁻¹.

Cam follower stud type track roller metric series

KRT type
KRT··X type
KRT··LL type
KRT··XLL type

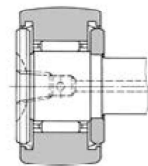


D 16 ~ 90mm

Outer dia. mm D 0.05	Dimensions mm											Basic load rating		Fatigue load limit N Cu
	d1	C	F	B	B1	B2	G	G1	C1	m	e	Cr	Cor	
16	6 ⁰ _{-0.012}	11	8	12	28	16	M6×1	8	0.6	M4×0.7 ²⁾	12	4 050	4 200	510
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	0.6	M4×0.7 ²⁾	14	4 750	5 400	660
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	0.6	M4×0.7	17	5 300	6 650	810
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	0.6	M4×0.7	17	5 300	6 650	810
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	0.6	M6×0.75	23	7 850	9 650	1 180
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	0.6	M6×0.75	23	7 850	9 650	1 180
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	0.8	Rc 1/8	27	12 200	17 900	2 180
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	0.8	Rc 1/8	32	14 000	22 800	2 785
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	37	20 700	33 500	4 100
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	37	20 700	33 500	4 100
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	44	28 900	55 000	6 700
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	44	28 900	55 000	6 700
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	1	Rc 1/8	53	45 000	88 500	10 800
85	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	1	Rc 1/8	53	45 000	88 500	10 800
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	1	Rc 1/8	53	45 000	88 500	10 800

1) The tolerance of outer ring outer diameter D of KRT··X type and KRT··XLL type having a cylindrical outer diameter surface is JIS 0 class.
2) A tapped hole is provided only on the front surface (left side in the above drawing).

E-74



KRT··LL type
(Seal type with cage)

Accessories

Applied Number	Grease nipple number	Number of hex socket screw plug	Applied hexagonal nut Number
16~26	NIP-X30	M4×0.7 ×4 ℓ	1M 6×1 ~1M10×1.25
30~32	JIS 1 type (A-M6F)	M6×0.75 ×6 ℓ	1M12×1.5
35~90	JIS 2 type (A-PT 1/8)	R 1/8 (PT 1/8) ×7 ℓ	1M16×1.5~1M30×1.5



Grease fitting



Grease fitting



Hex socket screw plug



Hexagon nut

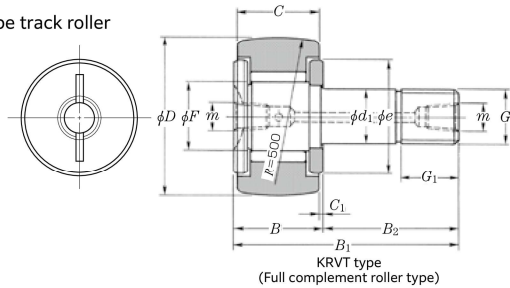
Track load capacity N		Allowable speed ³⁾ min ⁻¹		Maximum tightening torque N · m	Number				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Without seal Spherical outer ring	Cylindrical outer ring	With seal Spherical outer ring	Cylindrical outer ring		
1 080	3 400	*19 000	*25 000	3	KRT16	KRT16X	KRT16LL/3AS	KRT16XLL/3AS	0.019	6
1 380	4 050	*15 000	*20 000	8	KRT19	KRT19X	KRT19LL/3AS	KRT19XLL/3AS	0.031	8
1 690	5 150	*12 000	*16 000	14	KRT22	KRT22X	KRT22LL/3AS	KRT22XLL/3AS	0.046	10
2 120	6 100	*12 000	*16 000	14	KRT26	KRT26X	KRT26LL/3AS	KRT26XLL/3AS	0.059	10
2 620	7 700	10 000	*13 000	20	KRT30	KRT30X	KRT30LL/3AS	KRT30XLL/3AS	0.087	12
2 860	8 200	10 000	*13 000	20	KRT32	KRT32X	KRT32LL/3AS	KRT32XLL/3AS	0.097	12
3 200	11 900	8 000	*11 000	52	KRT35	KRT35X	KRT35LL/3AS	KRT35XLL/3AS	0.169	16
3 850	14 500	7 000	9 000	76	KRT40	KRT40X	KRT40LL/3AS	KRT40XLL/3AS	0.248	18
4 700	21 000	6 000	8 000	98	KRT47	KRT47X	KRT47LL/3AS	KRT47XLL/3AS	0.386	20
5 550	23 300	6 000	8 000	98	KRT52	KRT52X	KRT52LL/3AS	KRT52XLL/3AS	0.461	20
6 950	34 500	5 000	6 500	178	KRT62	KRT62X	KRT62LL/3AS	KRT62XLL/3AS	0.790	24
8 050	38 500	5 000	6 500	178	KRT72	KRT72X	KRT72LL/3AS	KRT72XLL/3AS	1.04	24
9 800	53 000	4 000	5 500	360	KRT80	KRT80X	KRT80LL/3AS	KRT80XLL/3AS	1.55	30
10 400	56 000	4 000	5 500	360	KRT85	KRT85X	KRT85LL/3AS	KRT85XLL/3AS	1.74	30
11 400	59 000	4 000	5 500	360	KRT90	KRT90X	KRT90LL/3AS	KRT90XLL/3AS	1.95	30

3) The allowable speed of KRT··LL type and KRT··XLL type with a "·" mark seal is about 10 000 min⁻¹.

E-75

Cam follower stud type track roller
metric series

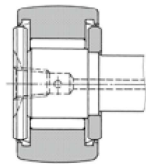
KRVT type
KRVT··X type
KRVT··LL type
KRVT··XLL type



D 16 ~ 90mm

Outer dia. ¹⁾ mm D -0.05	Dimensions												Basic load rating		Fatigue load limit N C _u
	mm												dynamic C _r N	static C _{0r}	
	d ₁	C	F	B	B ₁	B ₂	G	G ₁	C ₁	m	e				
16	6 ⁰ _{-0.012}	11	8	12	28	16	M6×1	8	0.6	M4×0.7 ²⁾	12	6 500	9 350	1 140	
19	8 ⁰ _{-0.015}	11	10	12	32	20	M8×1.25	10	0.6	M4×0.7 ²⁾	14	7 450	11 700	1 430	
22	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	0.6	M4×0.7	17	8 200	14 000	1 700	
26	10 ⁰ _{-0.015}	12	12	13	36	23	M10×1.25	12	0.6	M4×0.7	17	8 200	14 000	1 700	
30	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	0.6	M6×0.75	23	12 000	20 300	2 470	
32	12 ⁰ _{-0.018}	14	15	15	40	25	M12×1.5	13	0.6	M6×0.75	23	12 000	20 300	2 470	
35	16 ⁰ _{-0.018}	18	18	19.5	52	32.5	M16×1.5	17	0.8	Rc 1/8	27	17 600	34 000	4 150	
40	18 ⁰ _{-0.018}	20	22	21.5	58	36.5	M18×1.5	19	0.8	Rc 1/8	32	19 400	42 000	5 100	
47	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	37	28 800	61 000	7 450	
52	20 ⁰ _{-0.021}	24	25	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	37	28 800	61 000	7 450	
62	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	44	39 500	98 500	12 000	
72	24 ⁰ _{-0.021}	29	30	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	44	39 500	98 500	12 000	
80	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	1	Rc 1/8	53	58 000	147 000	18 000	
90	30 ⁰ _{-0.021}	35	38	37	100	63	M30×1.5	32	1	Rc 1/8	53	58 000	147 000	18 000	

1) The tolerance of outer ring outer diameter D of KRVT··X type and KRVT··XLL type having a cylindrical outer diameter surface is JIS 0 class.
2) A tapped hole is provided only on the front surface (left side in the above drawing).



KRVT··LL type
(Full complement roller sealed type)

Accessories

Applied Number	Grease nipple number	Number of hex socket screw plug	Applied hexagonal nut Number
16~26	NIP-X30	M4×0.7 ×4 ϕ	1M 6×1 ~1M10×1.25
30~32	JIS 1 type (A-M6F)	M6×0.75 ×6 ϕ	1M12×1.5
35~90	JIS 2 type (A-PT 1/8)	R 1/8 (PT 1/8) ×7 ϕ	1M16×1.5~1M30×1.5



Grease fitting



Grease fitting



Hex socket screw plug



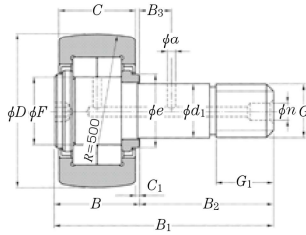
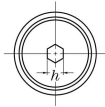
Hexagon nut

Track load capacity N		Allowable speed ³⁾ min ⁻¹		Maximum tightening torque N·m	Number				Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring	Grease lubrication	Oil lubrication		Without seal Spherical outer ring	Cylindrical outer ring	With seal Spherical outer ring	Cylindrical outer ring		
1 080	3 400	*13 000	*16 000	3	KRVT16/3AS	KRVT16X/3AS	KRVT16LL/3AS	KRVT16XLL/3AS	0.020	6
1 380	4 050	10 000	*13 000	8	KRVT19/3AS	KRVT19X/3AS	KRVT19LL/3AS	KRVT19XLL/3AS	0.032	8
1 690	5 150	8 500	*11 000	14	KRVT22/3AS	KRVT22X/3AS	KRVT22LL/3AS	KRVT22XLL/3AS	0.047	10
2 120	6 100	8 500	*11 000	14	KRVT26/3AS	KRVT26X/3AS	KRVT26LL/3AS	KRVT26XLL/3AS	0.061	10
2 620	7 700	6 500	8 500	20	KRVT30/3AS	KRVT30X/3AS	KRVT30LL/3AS	KRVT30XLL/3AS	0.089	12
2 860	8 200	6 500	8 500	20	KRVT32/3AS	KRVT32X/3AS	KRVT32LL/3AS	KRVT32XLL/3AS	0.100	12
3 200	11 900	5 500	7 000	52	KRVT35/3AS	KRVT35X/3AS	KRVT35LL/3AS	KRVT35XLL/3AS	0.172	16
3 850	14 500	4 500	6 000	76	KRVT40/3AS	KRVT40X/3AS	KRVT40LL/3AS	KRVT40XLL/3AS	0.252	18
4 700	21 000	4 000	5 000	98	KRVT47/3AS	KRVT47X/3AS	KRVT47LL/3AS	KRVT47XLL/3AS	0.390	20
5 550	23 300	4 000	5 000	98	KRVT52/3AS	KRVT52X/3AS	KRVT52LL/3AS	KRVT52XLL/3AS	0.465	20
6 950	34 500	3 300	4 500	178	KRVT62/3AS	KRVT62X/3AS	KRVT62LL/3AS	KRVT62XLL/3AS	0.800	24
8 050	38 500	3 300	4 500	178	KRVT72/3AS	KRVT72X/3AS	KRVT72LL/3AS	KRVT72XLL/3AS	1.05	24
9 800	53 000	2 600	3 500	360	KRVT80/3AS	KRVT80X/3AS	KRVT80LL/3AS	KRVT80XLL/3AS	1.56	30
11 400	59 000	2 600	3 500	360	KRVT90/3AS	KRVT90X/3AS	KRVT90LL/3AS	KRVT90XLL/3AS	1.97	30

3) The allowable speed of KRVT··LL type and KRVT··XLL type with a "※" mark seal is about 10 000 min⁻¹.

Cam follower stud type track roller
metric series

NUKR··H type
NUKR··XH type

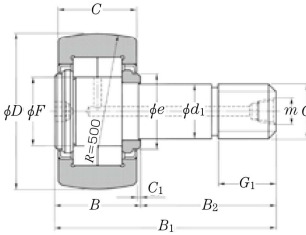


NUKR··H type ($D < 100$ mm)
(Full complement double-row cylindrical roller bearings with shield)

D 30 ~ 180mm

Outer dia. ¹⁾ mm D $\frac{0}{-0.05}$	Dimensions mm															Fatigue load limit N C _u
	d_1	C	F	B	B ₁	B ₂	G	G ₁	B ₃	C ₁	n	m	a	e	h	
	d_1	C	F	B	B ₁	B ₂	G	G ₁	B ₃	C ₁	n	m	a	e	h	
30	12 $\frac{0}{-0.018}$	14	14.5	15	40	25	M12×1.5	13	6	0.6	6	—	3	15	6	1 650
35	16 $\frac{0}{-0.018}$	18	19	19.5	52	32.5	M16×1.5	17	8	0.8	6	—	3	21	6	3 150
40	18 $\frac{0}{-0.018}$	20	21.5	21.5	58	36.5	M18×1.5	19	8	0.8	6	—	3	23	6	3 550
47	20 $\frac{0}{-0.021}$	24	25.5	25.5	66	40.5	M20×1.5	21	9	0.8	8	—	4	27	8	5 900
52	20 $\frac{0}{-0.021}$	24	30	25.5	66	40.5	M20×1.5	21	9	0.8	8	—	4	31	8	7 000
62	24 $\frac{0}{-0.021}$	29	35	30.5	80	49.5	M24×1.5	25	11	0.8	8	—	4	38	8	8 850
72	24 $\frac{0}{-0.021}$	29	41.5	30.5	80	49.5	M24×1.5	25	11	0.8	8	—	4	44	8	10 400
80	30 $\frac{0}{-0.021}$	35	47.5	37	100	63	M30×1.5	32	15	1	8	—	4	51	8	18 400
90	30 $\frac{0}{-0.021}$	35	47.5	37	100	63	M30×1.5	32	15	1	8	—	4	51	8	18 400
100	36 $\frac{0}{-0.025}$	43	48.5	46	120	74	M36×1.5	38	—	1.5	—	Rc $\frac{1}{8}$	—	53	14	20 400
120	42 $\frac{0}{-0.025}$	50	60.5	53	140	87	M42×1.5	44	—	1.5	—	Rc $\frac{1}{8}$	—	66	14	32 400
140	48 $\frac{0}{-0.025}$	57	65	60	160	100	M48×1.5	52	—	1.5	—	Rc $\frac{1}{8}$	—	72.5	14	35 900
150	52 $\frac{0}{-0.030}$	60	75.5	63	170	107	M52×1.5	52	—	1.5	—	Rc $\frac{1}{8}$	—	85.5	17	46 500
160	56 $\frac{0}{-0.030}$	63	80.5	67	180	113	M56×3	58	—	2	—	Rc $\frac{1}{8}$	—	89.5	17	49 000
170	60 $\frac{0}{-0.030}$	66	86	70	190	120	M60×3	58	—	2	—	Rc $\frac{1}{8}$	—	96.5	17	58 000
180	64 $\frac{0}{-0.030}$	72	91.5	76	200	124	M64×3	65	—	2	—	Rc $\frac{1}{8}$	—	103.5	17	67 500

1) The tolerance of outer ring outer diameter D of NUKR··XH type having a cylindrical outer diameter surface is JIS 0 class.



NUKR··H type ($D \geq 100$ mm)

Accessories

Applied Number	Grease nipple number	Plug Number	Applied hexagonal nut
30~40	NIP-B6	SEN3, SEN6	1M12×1.5~1M18×1.5
47~90	NIP-B8	SEN4, SEN8	1M20×1.5~1M30×1.5
100~180	JIS 2 type (A-PT $\frac{1}{8}$)	—	1M36×1.5~1M64×3



Grease fitting



Grease fitting



Plug

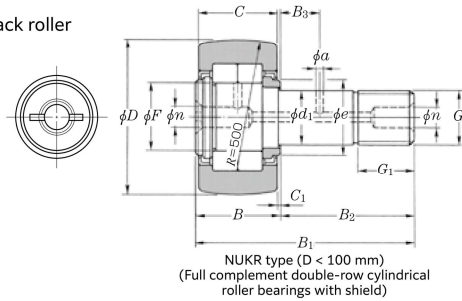


Hexagon nut

Basic load rating		Track load capacity		Allowable speed min ⁻¹ Grease lubrication	Maximum tightening torque N · m	Number		Mass kg (approx.)	Stud dia. mm
dynamic	static	N				Spherical outer ring	Cylindrical outer ring		
C _r	C _{0r}	Spherical outer ring	Cylindrical outer ring						
13 300	13 500	2 620	7 700	6 900	20	NUKR30H/3AS	NUKR30XH/3AS	0.088	12
22 300	25 700	3 200	11 900	5 500	52	NUKR35H/3AS	NUKR35XH/3AS	0.165	16
24 100	29 100	3 850	14 500	4 700	76	NUKR40H/3AS	NUKR40XH/3AS	0.242	18
38 500	48 000	4 700	21 000	4 000	98	NUKR47H/3AS	NUKR47XH/3AS	0.380	20
42 500	57 500	5 550	23 300	3 300	98	NUKR52H/3AS	NUKR52XH/3AS	0.450	20
56 500	72 500	6 950	34 500	2 900	178	NUKR62H/3AS	NUKR62XH/3AS	0.795	24
62 000	85 500	8 050	38 500	2 400	178	NUKR72H/3AS	NUKR72XH/3AS	1.01	24
101 000	151 000	9 800	53 000	2 100	360	NUKR80H/3AS	NUKR80XH/3AS	1.54	30
101 000	151 000	11 400	59 000	2 100	360	NUKR90H/3AS	NUKR90XH/3AS	1.96	30
119 000	167 000	13 000	79 000	2 000	630	NUKR100H/3AS	NUKR100XH/3AS	3.08	36
172 000	266 000	16 400	113 000	1 700	1 020	NUKR120H/3AS	NUKR120XH/3AS	5.17	42
201 000	294 000	20 000	152 000	1 500	1 540	NUKR140H/3AS	NUKR140XH/3AS	7.98	48
258 000	380 000	22 000	173 000	1 300	1 950	NUKR150H/3AS	NUKR150XH/3AS	9.70	52
274 000	400 000	24 000	194 000	1 200	2 480	NUKR160H/3AS	NUKR160XH/3AS	11.7	56
320 000	475 000	26 000	218 000	1 100	3 030	NUKR170H/3AS	NUKR170XH/3AS	13.9	60
365 000	555 000	27 900	253 000	1 000	3 670	NUKR180H/3AS	NUKR180XH/3AS	17.0	64

Cam follower stud type track roller metric series

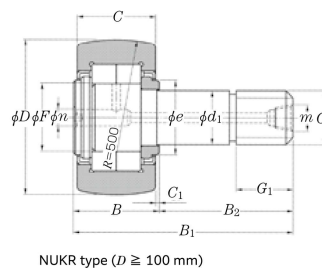
NUKR type
NUKR··X type



D 30 ~ 180mm

Outer dia. mm D 3/05	Dimensions mm														Fatigue load limit N Cu
	d1	C	F	B	B1	B2	G	G1	B3	C1	n	m	a	e	
30	12 ⁰ _{-0.018}	14	14.5	15	40	25	M12×1.5	13	6	0.6	6	—	3	15	1 650
35	16 ⁰ _{-0.018}	18	19	19.5	52	32.5	M16×1.5	17	8	0.8	6	—	3	21	3 150
40	18 ⁰ _{-0.018}	20	21.5	21.5	58	36.5	M18×1.5	19	8	0.8	6	—	3	23	3 550
47	20 ⁰ _{-0.021}	24	25.5	25.5	66	40.5	M20×1.5	21	9	0.8	8	—	4	27	5 900
52	20 ⁰ _{-0.021}	24	30	25.5	66	40.5	M20×1.5	21	9	0.8	8	—	4	31	7 000
62	24 ⁰ _{-0.021}	29	35	30.5	80	49.5	M24×1.5	25	11	0.8	8	—	4	38	8 850
72	24 ⁰ _{-0.021}	29	41.5	30.5	80	49.5	M24×1.5	25	11	0.8	8	—	4	44	10 400
80	30 ⁰ _{-0.021}	35	47.5	37	100	63	M30×1.5	32	15	1	8	—	4	51	18 400
90	30 ⁰ _{-0.021}	35	47.5	37	100	63	M30×1.5	32	15	1	8	—	4	51	18 400
100	36 ⁰ _{-0.025}	43	48.5	46	120	74	M36×1.5	38	—	1.5	8	Rc 1/8	—	53	20 400
120	42 ⁰ _{-0.025}	50	60.5	53	140	87	M42×1.5	44	—	1.5	8	Rc 1/8	—	66	32 500
140	48 ⁰ _{-0.025}	57	65	60	160	100	M48×1.5	52	—	1.5	8	Rc 1/8	—	72.5	36 000
150	52 ⁰ _{-0.030}	60	75.5	63	170	107	M52×1.5	52	—	1.5	8	Rc 1/8	—	85.5	46 500
160	56 ⁰ _{-0.030}	63	80.5	67	180	113	M56×3	58	—	2	8	Rc 1/8	—	89.5	49 000
170	60 ⁰ _{-0.030}	66	86	70	190	120	M60×3	58	—	2	8	Rc 1/8	—	96.5	58 000
180	64 ⁰ _{-0.030}	72	91.5	76	200	124	M64×3	65	—	2	8	Rc 1/8	—	103.5	67 500

1) The tolerance of outer ring outer diameter D of NUKR··X type having a cylindrical outer diameter surface is JIS 0 class.



Accessories

Applied Number	Grease nipple number	Plug Number	Applied hexagonal nut
30~40	NIP-B6	SEN3, SEN6	1M12×1.5~1M18×1.5
47~90	NIP-B8	SEN4, SEN8	1M20×1.5~1M30×1.5
100~180	JIS 2 type (A-PT 1/8)	—	1M36×1.5~1M64×3



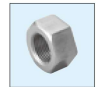
Grease fitting



Grease fitting



Plug

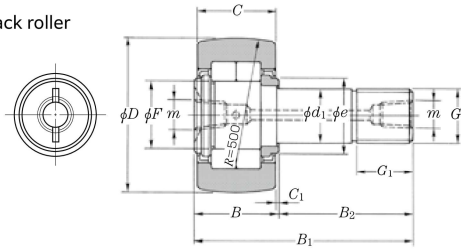


Hexagon nut

Basic load rating		Track load capacity		Allowable speed min ⁻¹ Grease lubrication	Maximum tightening torque N · m	Number		Mass kg (approx.)	Stud dia. mm
dynamic N C _r	static N C _{0r}	Spherical outer ring	Cylindrical outer ring			Spherical outer ring	Cylindrical outer ring		
13 300	13 500	2 620	7 700	6 900	20	NUKR 30/3AS	NUKR 30X/3AS	0.088	12
22 300	25 700	3 200	11 900	5 500	52	NUKR 35/3AS	NUKR 35X/3AS	0.165	16
24 100	29 100	3 850	14 500	4 700	76	NUKR 40/3AS	NUKR 40X/3AS	0.242	18
38 500	48 000	4 700	21 000	4 000	98	NUKR 47/3AS	NUKR 47X/3AS	0.380	20
42 500	57 500	5 550	23 300	3 300	98	NUKR 52/3AS	NUKR 52X/3AS	0.450	20
56 500	72 500	6 950	34 500	2 900	178	NUKR 62/3AS	NUKR 62X/3AS	0.795	24
62 000	85 500	8 050	38 500	2 400	178	NUKR 72/3AS	NUKR 72X/3AS	1.01	24
101 000	151 000	9 800	53 000	2 100	360	NUKR 80/3AS	NUKR 80X/3AS	1.54	30
101 000	151 000	11 400	59 000	2 100	360	NUKR 90/3AS	NUKR 90X/3AS	1.96	30
119 000	167 000	13 000	79 000	2 000	630	NUKR 100/3AS	NUKR 100X/3AS	3.08	36
172 000	266 000	16 400	113 000	1 700	1 020	NUKR 120/3AS	NUKR 120X/3AS	5.17	42
201 000	294 000	20 000	152 000	1 500	1 540	NUKR 140/3AS	NUKR 140X/3AS	7.98	48
258 000	380 000	22 000	173 000	1 300	1 950	NUKR 150/3AS	NUKR 150X/3AS	9.70	52
274 000	400 000	24 000	194 000	1 200	2 480	NUKR 160/3AS	NUKR 160X/3AS	11.7	56
320 000	475 000	26 000	218 000	1 100	3 030	NUKR 170/3AS	NUKR 170X/3AS	13.9	60
365 000	555 000	27 900	253 000	1 000	3 670	NUKR 180/3AS	NUKR 180X/3AS	17.0	64

Cam follower stud type track roller
metric series

NUKRT type
NUKRT··X type



NUKRT type
(Full complement double-row cylindrical roller bearings with shield)

D 30 ~ 180mm

Outer dia. ¹⁾ mm D -0.05	Dimensions												Basic load rating		Fatigue load limit N C _u
	mm												dynamic N C _r	static N C _{0r}	
	d ₁	C	F	B	B ₁	B ₂	G	G ₁	C ₁	m	e				
30	12 ⁰ _{-0.018}	14	14.5	15	40	25	M12×1.5	13	0.6	M6×0.75	15	13 300	13 500	1 650	
35	16 ⁰ _{-0.018}	18	19	19.5	52	32.5	M16×1.5	17	0.8	Rc 1/8	21	22 300	25 700	3 150	
40	18 ⁰ _{-0.018}	20	21.5	21.5	58	36.5	M18×1.5	19	0.8	Rc 1/8	23	24 100	29 100	3 550	
47	20 ⁰ _{-0.021}	24	25.5	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	27	38 500	48 000	5 900	
52	20 ⁰ _{-0.021}	24	30	25.5	66	40.5	M20×1.5	21	0.8	Rc 1/8	31	42 500	57 500	7 000	
62	24 ⁰ _{-0.021}	29	35	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	38	56 500	72 500	8 850	
72	24 ⁰ _{-0.021}	29	41.5	30.5	80	49.5	M24×1.5	25	0.8	Rc 1/8	44	62 000	85 500	10 400	
80	30 ⁰ _{-0.021}	35	47.5	37	100	63	M30×1.5	32	1	Rc 1/8	51	101 000	151 000	18 400	
90	30 ⁰ _{-0.021}	35	47.5	37	100	63	M30×1.5	32	1	Rc 1/8	51	101 000	151 000	18 400	
100	36 ⁰ _{-0.025}	43	48.5	46	120	74	M36×1.5	38	1.5	Rc 1/8	53	119 000	167 000	20 400	
120	42 ⁰ _{-0.025}	50	60.5	53	140	87	M42×1.5	44	1.5	Rc 1/8	66	172 000	266 000	32 500	
140	48 ⁰ _{-0.025}	57	65	60	160	100	M48×1.5	52	1.5	Rc 1/8	72.5	201 000	294 000	36 000	
150	52 ⁰ _{-0.030}	60	75.5	63	170	107	M52×1.5	52	1.5	Rc 1/8	85.5	258 000	380 000	46 500	
160	56 ⁰ _{-0.030}	63	80.5	67	180	113	M56×3	58	2	Rc 1/8	89.5	274 000	400 000	49 000	
170	60 ⁰ _{-0.030}	66	86	70	190	120	M60×3	58	2	Rc 1/8	96.5	320 000	475 000	58 000	
180	64 ⁰ _{-0.030}	72	91.5	76	200	124	M64×3	65	2	Rc 1/8	103.5	365 000	555 000	67 500	

1) The tolerance of outer ring outer diameter D of NUKRT··X type having a cylindrical outer diameter surface is JIS 0 class.

Accessories

Applied Number	Grease nipple number	Number of hex socket screw plug	Applied hexagonal nut
30	JIS 1 type (A-M6F)	M6×0.75×6 ℓ	1M12×1.5
35~180	JIS 2 type (A-PT 1/8)	R 3/8 (PT 1/8) × 7 ℓ	1M16×1.5~1M64×3



Grease fitting



Hex socket
screw plug

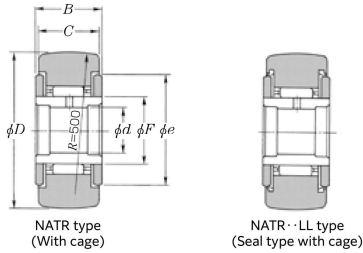


Hexagon nut

Track load capacity N		Allowable speed min ⁻¹ Grease lubrication	Maximum tightening torque N · m	Number		Mass kg (approx.)	Stud dia. mm
Spherical outer ring	Cylindrical outer ring			Spherical outer ring	Cylindrical outer ring		
2 620	7 700	6 900	20	NUKRT 30/3AS	NUKRT 30X/3AS	0.088	12
3 200	11 900	5 500	52	NUKRT 35/3AS	NUKRT 35X/3AS	0.165	16
3 850	14 500	4 700	76	NUKRT 40/3AS	NUKRT 40X/3AS	0.242	18
4 700	21 000	4 000	98	NUKRT 47/3AS	NUKRT 47X/3AS	0.380	20
5 550	23 300	3 300	98	NUKRT 52/3AS	NUKRT 52X/3AS	0.450	20
6 950	34 500	2 900	178	NUKRT 62/3AS	NUKRT 62X/3AS	0.795	24
8 050	38 500	2 400	178	NUKRT 72/3AS	NUKRT 72X/3AS	1.01	24
9 800	53 000	2 100	360	NUKRT 80/3AS	NUKRT 80X/3AS	1.54	30
11 400	59 000	2 100	360	NUKRT 90/3AS	NUKRT 90X/3AS	1.96	30
13 000	79 000	2 000	630	NUKRT 100/3AS	NUKRT 100X/3AS	3.08	36
16 400	113 000	1 700	1 020	NUKRT 120/3AS	NUKRT 120X/3AS	5.17	42
20 000	152 000	1 500	1 540	NUKRT 140/3AS	NUKRT 140X/3AS	7.98	48
22 000	173 000	1 300	1 950	NUKRT 150/3AS	NUKRT 150X/3AS	9.70	52
24 000	194 000	1 200	2 480	NUKRT 160/3AS	NUKRT 160X/3AS	11.7	56
26 000	218 000	1 100	3 030	NUKRT 170/3AS	NUKRT 170X/3AS	13.9	60
27 900	253 000	1 000	3 670	NUKRT 180/3AS	NUKRT 180X/3AS	17.0	64

Roller follower yoke type track roller
metric series

NATR type
NATR···X type
NATR···LL type
NATR···XLL type



D 16 ~ 90mm

Outer dia. ¹⁾ mm D -0.05	Dimensions						Basic load rating		Track load capacity		Fatigue load limit N C _u
	mm						dynamic	static	N		
	d	B	C	e	F		C _r	C _{0r}	Spherical outer ring	Cylindrical outer ring	
16	5	12 ⁰ _{-0.180}	11	12	8		4 050	4 200	1 080	3 400	510
19	6	12 ⁰ _{-0.180}	11	14	10		4 750	5 400	1 380	4 050	660
24	8	15 ⁰ _{-0.180}	14	19	12		6 900	7 700	1 900	6 650	940
30	10	15 ⁰ _{-0.180}	14	23	15		7 850	9 650	2 620	7 700	1 180
32	12	15 ⁰ _{-0.180}	14	25	17		8 400	10 900	2 860	8 200	1 330
35	15	19 ⁰ _{-0.210}	18	27	20		13 300	20 800	3 200	11 900	2 530
40	17	21 ⁰ _{-0.210}	20	32	22		14 000	22 800	3 850	14 500	2 790
47	20	25 ⁰ _{-0.210}	24	37	25		20 700	33 500	4 700	21 000	4 100
52	25	25 ⁰ _{-0.210}	24	42	30		22 800	40 500	5 500	23 300	4 950
62	30	29 ⁰ _{-0.210}	28	51	38		36 000	66 000	6 950	33 000	8 100
72	35	29 ⁰ _{-0.210}	28	58	44.5		39 000	77 000	8 050	37 000	9 400
80	40	32 ⁰ _{-0.250}	30	66	50		49 500	92 500	9 800	44 500	11 300
85	45	32 ⁰ _{-0.250}	30	71	55		51 500	100 000	10 400	47 000	12 200
90	50	32 ⁰ _{-0.250}	30	76	60		53 000	108 000	11 400	50 000	13 200

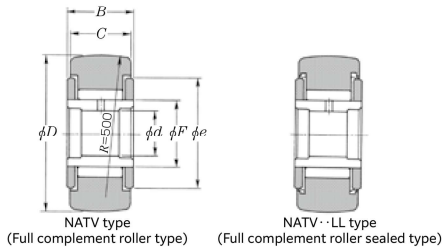
1) The tolerance of outer ring outer diameter D of NATR···X type and NATR···XLL type having a cylindrical outer diameter surface is JIS 0 class.

Allowable speed ²⁾		Number				Mass	Outer dia. ¹⁾ mm D -0.05
min ⁻¹ Grease lubrication	Oil lubrication	Without seal		With seal		kg (approx.)	
		Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring		
*19 000	*25 000	NATR5	NATR5X	NATR5LL/3AS	NATR5XLL/3AS	0.018	16
*15 000	*20 000	NATR6	NATR6X	NATR6LL/3AS	NATR6XLL/3AS	0.025	19
*12 000	*16 000	NATR8	NATR8X	NATR8LL/3AS	NATR8XLL/3AS	0.042	24
10 000	*13 000	NATR10	NATR10X	NATR10LL/3AS	NATR10XLL/3AS	0.061	30
9 000	*12 000	NATR12CT	NATR12XCT	NATR12CLLT/3AS	NATR12XCLLT/3AS	0.069	32
7 500	10 000	NATR15	NATR15X	NATR15LL/3AS	NATR15XLL/3AS	0.098	35
7 000	9 000	NATR17	NATR17X	NATR17LL/3AS	NATR17XLL/3AS	0.140	40
6 000	8 000	NATR20	NATR20X	NATR20LL/3AS	NATR20XLL/3AS	0.246	47
5 000	6 500	NATR25	NATR25X	NATR25LL/3AS	NATR25XLL/3AS	0.275	52
4 000	5 500	NATR30	NATR30X	NATR30LL/3AS	NATR30XLL/3AS	0.470	62
3 300	4 500	NATR35	NATR35X	NATR35LL/3AS	NATR35XLL/3AS	0.635	72
3 000	4 000	NATR40	NATR40X	NATR40LL/3AS	NATR40XLL/3AS	0.875	80
2 700	3 600	NATR45	NATR45X	NATR45LL/3AS	NATR45XLL/3AS	0.910	85
2 500	3 300	NATR50	NATR50X	NATR50LL/3AS	NATR50XLL/3AS	0.960	90

2) The allowable speed of bearings with a "*" mark seal is about 10 000 min⁻¹.

Roller follower yoke type track roller
metric series

NATV type
NATV···X type
NATV···LL type
NATV···XLL type



D 16 ~ 90mm

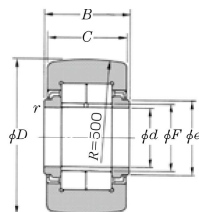
Outer dia. ¹⁾ D mm -0.05	Dimensions					Basic load rating		Track load capacity		Fatigue load limit N C _u
	mm					dynamic	static	N		
	d	B	C	e	F	C _r	C _{0r}	Spherical outer ring	Cylindrical outer ring	
16	5	12 ⁰ _{-0.180}	11	12	8	6 500	9 350	1 080	3 400	1 140
19	6	12 ⁰ _{-0.180}	11	14	10	7 450	11 700	1 380	4 050	1 430
24	8	15 ⁰ _{-0.180}	14	19	12	10 700	16 200	1 900	6 650	1 980
30	10	15 ⁰ _{-0.180}	14	23	15	12 000	20 300	2 620	7 700	2 470
32	12	15 ⁰ _{-0.180}	14	25	17	13 000	23 000	2 860	8 200	2 810
35	15	19 ⁰ _{-0.210}	18	27	20	18 400	38 000	3 200	11 900	4 650
40	17	21 ⁰ _{-0.210}	20	32	22	19 400	42 000	3 850	14 500	5 100
47	20	25 ⁰ _{-0.210}	24	37	25	28 800	61 000	4 700	21 000	7 450
52	25	25 ⁰ _{-0.210}	24	42	30	31 500	73 500	5 500	23 300	8 950
62	30	29 ⁰ _{-0.210}	28	51	38	47 500	115 000	6 950	33 000	14 000
72	35	29 ⁰ _{-0.210}	28	58	44.5	52 000	134 000	8 050	37 000	16 300
80	40	32 ⁰ _{-0.250}	30	66	50	68 500	171 000	9 800	44 500	20 900
90	50	32 ⁰ _{-0.250}	30	76	60	76 000	205 000	11 400	50 000	25 000

1) The tolerance of outer ring outer diameter D of NATV···X type and NATV···XLL type having a cylindrical outer diameter surface is JIS 0 class.

Allowable speed ²⁾		Number				Mass	Outer dia. ¹⁾ mm D -0.05
min ⁻¹ Grease lubrication	Oil lubrication	Without seal		With seal		kg (approx.)	
		Spherical outer ring	Cylindrical outer ring	Spherical outer ring	Cylindrical outer ring		
*13 000	*16 000	NATV5/3AS	NATV5X/3AS	NATV5LL/3AS	NATV5XLL/3AS	0.020	16
10 000	*13 000	NATV6/3AS	NATV6X/3AS	NATV6LL/3AS	NATV6XLL/3AS	0.027	19
8 500	*11 000	NATV8/3AS	NATV8X/3AS	NATV8LL/3AS	NATV8XLL/3AS	0.044	24
6 500	8 500	NATV10/3AS	NATV10X/3AS	NATV10LL/3AS	NATV10XLL/3AS	0.065	30
6 000	7 500	NATV12/3AS	NATV12X/3AS	NATV12LL/3AS	NATV12XLL/3AS	0.074	32
5 000	6 500	NATV15/3AS	NATV15X/3AS	NATV15LL/3AS	NATV15XLL/3AS	0.102	35
4 500	6 000	NATV17/3AS	NATV17X/3AS	NATV17LL/3AS	NATV17XLL/3AS	0.145	40
4 000	5 000	NATV20/3AS	NATV20X/3AS	NATV20LL/3AS	NATV20XLL/3AS	0.254	47
3 300	4 500	NATV25/3AS	NATV25X/3AS	NATV25LL/3AS	NATV25XLL/3AS	0.285	52
2 600	3 500	NATV30/3AS	NATV30X/3AS	NATV30LL/3AS	NATV30XLL/3AS	0.481	62
2 200	2 900	NATV35/3AS	NATV35X/3AS	NATV35LL/3AS	NATV35XLL/3AS	0.647	72
2 000	2 600	NATV40/3AS	NATV40X/3AS	NATV40LL/3AS	NATV40XLL/3AS	0.890	80
1 600	2 100	NATV50/3AS	NATV50X/3AS	NATV50LL/3AS	NATV50XLL/3AS	0.990	90

2) The allowable speed of bearings with a "*" mark seal is about 10 000 min⁻¹.

NUTR2 type
NUTR2 · · X type
NUTR3 type
NUTR3 · · X type



NUTR2 type
NUTR3 type

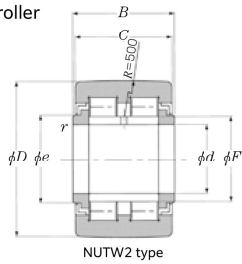
Outer dia. mm D -0.05	Dimensions							Basic load rating		Track load capacity		Fatigue load limit N C_u
	mm							dynamic	static	N		
	d	B	C	e	F	$r_{s, \min}^{(2)}$	C_r	C_{0r}	Spherical outer ring	Cylindrical outer ring		
35	15	19	$0_{-0.210}$	18	20	19	0.3	22 300	25 700	3 200	11 900	3 150
40	17	21	$0_{-0.210}$	20	22	21.5	0.3	24 100	29 100	3 850	14 500	3 550
42	15	19	$0_{-0.210}$	18	20	19	0.3	22 300	25 700	4 100	14 300	3 150
47	17	21	$0_{-0.210}$	20	22	21.5	0.3	24 100	29 100	4 700	17 000	3 550
	20	25	$0_{-0.210}$	24	27	25.5	0.3	38 500	48 000	4 700	21 000	5 900
52	20	25	$0_{-0.210}$	24	27	25.5	0.3	38 500	48 000	5 550	23 300	5 900
	25	25	$0_{-0.210}$	24	31	30	0.3	42 500	57 500	5 550	23 300	7 000
62	25	25	$0_{-0.210}$	24	31	30	0.3	42 500	57 500	6 950	27 800	7 000
	30	29	$0_{-0.210}$	28	38	35	0.3	56 500	72 500	6 950	33 000	8 850
72	30	29	$0_{-0.210}$	28	38	35	0.3	56 500	72 500	8 050	38 500	8 850
	35	29	$0_{-0.210}$	28	44	41.5	0.6	62 000	85 500	8 050	37 000	10 400
80	35	29	$0_{-0.210}$	28	44	41.5	0.6	62 000	85 500	9 800	41 000	10 400
	40	32	$0_{-0.250}$	30	51	47.5	0.6	87 000	125 000	9 800	44 500	15 200
85	45	32	$0_{-0.250}$	30	55	52.5	0.6	92 000	137 000	10 400	47 000	16 700
90	40	32	$0_{-0.250}$	30	51	47.5	0.6	87 000	125 000	11 400	50 000	15 200
	50	32	$0_{-0.250}$	30	60	57	0.6	96 500	150 000	11 400	50 000	18 300
100	45	32	$0_{-0.250}$	30	55	52.5	0.6	92 000	137 000	13 000	55 500	16 700
110	50	32	$0_{-0.250}$	30	60	57	0.6	96 500	150 000	14 700	61 000	18 300

- 1) The tolerance of outer ring outer diameter D of NUTR2-X type and NUTR3-X type having a cylindrical outer diameter surface is JIS U class.
- 2) Smallest allowable dimension for chamfer dimension r .

Allowable speed min ⁻¹ Grease lubrication	Number		Mass	Outer dia. ¹⁾ mm <i>D</i> -0.05
	Spherical outer ring	Cylindrical outer ring	kg (approx.)	
5 500	NUTR202/3AS	NUTR202X/3AS	0.100	35
4 700	NUTR203/3AS	NUTR203X/3AS	0.147	40
5 500	NUTR302/3AS	NUTR302X/3AS	0.160	42
4 700	NUTR303/3AS	NUTR303X/3AS	0.222	47
4 000	NUTR204/3AS	NUTR204X/3AS	0.245	
4 000	NUTR304/3AS	NUTR304X/3AS	0.321	52
3 300	NUTR205/3AS	NUTR205X/3AS	0.281	
3 300	NUTR305/3AS	NUTR305X/3AS	0.450	62
2 900	NUTR206/3AS	NUTR206X/3AS	0.466	
2 900	NUTR306/3AS	NUTR306X/3AS	0.697	72
2 400	NUTR207/3AS	NUTR207X/3AS	0.630	
2 400	NUTR307/3AS	NUTR307X/3AS	0.840	80
2 100	NUTR208/3AS	NUTR208X/3AS	0.817	
1 900	NUTR209/3AS	NUTR209X/3AS	0.883	85
2 100	NUTR308/3AS	NUTR308X/3AS	1.13	90
1 800	NUTR210/3AS	NUTR210X/3AS	0.950	
1 900	NUTR309/3AS	NUTR309X/3AS	1.40	100
1 800	NUTR310/3AS	NUTR310X/3AS	1.69	110

Roller follower yoke type track roller
metric series

NUTW2 type
NUTW···X type



NUTW2 type

D 35 ~ 90mm

Outer dia. ¹⁾ mm D _{-0.05}	Dimensions							Basic load rating		Track load capacity		Fatigue load limit N C _u
	d	B	C	e	F	r _{3 min} ²⁾		dynamic C _r	static C _{0r}	Spherical outer ring	Cylindrical outer ring	
35	15	22 _{-0.210} ⁰	21	20	19	0.3		24 100	28 300	3 200	14 200	3 450
40	17	24 _{-0.210} ⁰	23	22	21.5	0.3		26 000	32 000	3 850	17 100	3 900
47	20	29 _{-0.210} ⁰	28	27	25.5	0.3		40 500	51 500	4 700	25 100	6 300
52	25	29 _{-0.210} ⁰	28	31	30	0.3		45 000	61 500	5 550	27 700	7 500
62	30	35 _{-0.210} ⁰	34	38	35	0.3		59 500	77 000	6 950	41 000	9 400
72	35	35 _{-0.210} ⁰	34	44	41.5	0.6		65 000	91 000	8 050	46 000	11 100
80	40	38 _{-0.250} ⁰	36	51	47.5	0.6		90 500	131 000	9 800	54 500	16 000
85	45	38 _{-0.250} ⁰	36	55	52.5	0.6		95 500	144 000	10 400	58 000	17 600
90	50	38 _{-0.250} ⁰	36	60	57	0.6		100 000	158 000	11 400	61 500	19 200

Allowable speed min ⁻¹ Grease lubrication	Number		Mass kg (approx.)	Outer dia. ¹⁾ mm D _{-0.05}
	Spherical outer ring	Cylindrical outer ring		
5 500	NUTW202/3AS	NUTW202X/3AS	0.115	35
4 700	NUTW203/3AS	NUTW203X/3AS	0.167	40
4 000	NUTW204/3AS	NUTW204X/3AS	0.280	47
3 300	NUTW205/3AS	NUTW205X/3AS	0.322	52
2 900	NUTW206/3AS	NUTW206X/3AS	0.549	62
2 400	NUTW207/3AS	NUTW207X/3AS	0.747	72
2 100	NUTW208/3AS	NUTW208X/3AS	0.953	80
1 900	NUTW209/3AS	NUTW209X/3AS	1.03	85
1 800	NUTW210/3AS	NUTW210X/3AS	1.11	90

1) For bearings having a cylindrical outer ring surface, code "X" is added after the bearing number. In this case, the tolerance of outer ring outer diameter D of cylindrical bearings is JIS 0 class. Example: NUTW203X

2) Smallest allowable dimension for chamfer dimension r.