

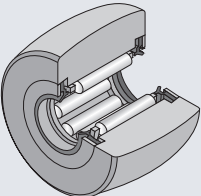
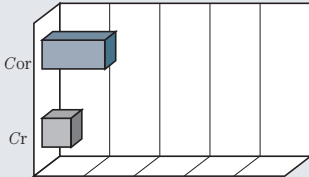
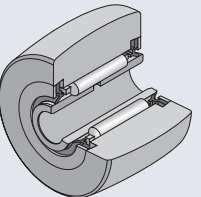
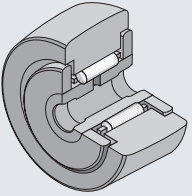
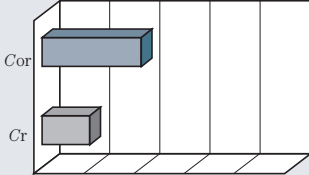
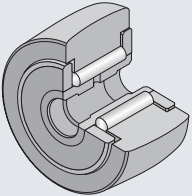
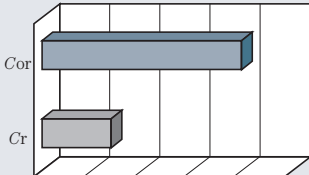
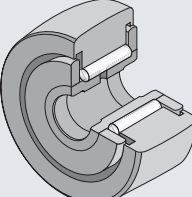
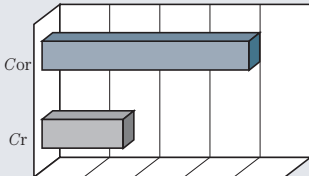
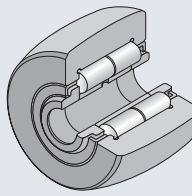
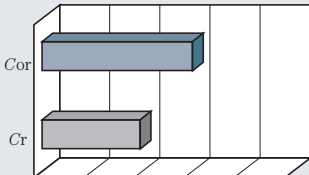
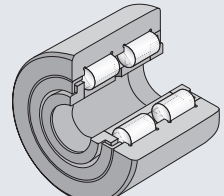
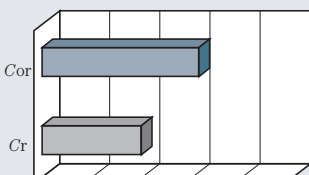
# Roller Followers / Cam Followers



## Roller Followers (Yoke Type Track Rollers)

NTN Yoke Type Track Rollers is the rolling mechanisms whose outer ring rolls on a track. For example, these track rollers are applied to eccentric roller, guide roller, rocker arm roller, cam roller and pressure roller. For that, the outer ring is designed to such a wall thickness as to be resistible to high load and shock load.

Both of spherical outer surface (rolling surface) and cylindrical outer surface are available for the outer ring. The spherical outer ring can damp edge-load acting on the contact surface between the track and the track roller, while the cylindrical outer ring (Tail code: **X**) has track load capacity greater than the spherical outer ring.

Bearing type	Applied shaft diameter (mm)	Load capacity	Composition of nominal bearing number
<b>RNA22</b> 	$\phi 6 \sim \phi 58$		<b>RNA 22 / 6 LL</b> Tail code LL: Seal Dimension code Dimension series code Type code
<b>NA22</b> 			<b>NA 22 06 X LL</b> Tail code LL: Seal Tail code X: Cylinder outer diameter Dimension code Dimension series code Type code
<b>NATR</b> 	$\phi 5 \sim \phi 50$		<b>NATR 30 X LL</b> Tail code LL: Seal Tail code X: Cylinder outer diameter Dimension code Type code
<b>NATV</b> 	$\phi 5 \sim \phi 50$		<b>NATV 25 LL</b> Tail code LL: Seal Dimension code Type code
<b>NACV</b> 	$\phi 6.35 \sim \phi 57.15$		<b>NACV 32 X LL</b> Tail code LL: Seal Tail code X: Cylinder outer diameter Dimension code Type code
<b>NUTR</b> 	$\phi 15 \sim \phi 50$		<b>NUTR 3 10</b> Dimension code Dimension series code Type code
<b>NUTW</b> 	$\phi 15 \sim \phi 50$		<b>NUTW 2 05 X</b> Tail code X: Cylinder outer diameter Dimension code Dimension series code Type code

Each listed load capacity is subject to reference bearing bore diameter of  $\phi 50$  or  $\phi 50.8$

Track roller components	Features
Inscribed circle diameter : $\phi 6$ Type with cage Inner ring : without Outer profile : spherical Seal : with	<ul style="list-style-type: none"> <li>● The needle rollers and the cage are retained in the outer ring with a steel plate reinforced synthetic rubber seal, and these are inseparable from each other.</li> <li>● The needle rollers guided by cage.</li> <li>● Shaft (Pin) must be provided with a thrust washer or a flange to guide the outer ring.</li> </ul>
Inscribed circle diameter : $\phi 30$ Type with cage Inner ring : with Outer profile : cylindrical Seal : with	
Inscribed circle diameter : $\phi 30$ Type with cage Outer profile : cylindrical Seal : with	<ul style="list-style-type: none"> <li>● Needle rollers guided by cage.</li> <li>● The outer ring is guided in axial direction by the thrust washer press-fitted in the inner ring.</li> <li>● Labyrinth is formed between the outer ring and the thrust washer.</li> </ul>
Inscribed circle diameter : $\phi 30$ Full complement roller type Outer profile : cylindrical Seal : with	<ul style="list-style-type: none"> <li>● The outer ring is guided in axial direction by the thrust washer press-fitted in the inner ring.</li> <li>● Great rated load due to the full complement roller type.</li> <li>● Lower allowable running speed than bearing with cage.</li> <li>● Labyrinth is formed between the outer ring and the thrust washer.</li> </ul>
Inscribed circle diameter : $\phi 15.875$ Full complement roller type Outer profile : cylindrical Seal : with	
Inscribed circle diameter : $\phi 50$ Double-row cylindrical Full-complement roller type Labyrinth seal Outer profile : spherical	<ul style="list-style-type: none"> <li>● Greater rated load, best-suited to applications subjected to high load and shock load.</li> <li>● A steel plate is press-fitted in the outer ring to form labyrinth between the plate and the side plates at both sides of the inner ring, whereby the required sealing performance is secured and the side plates are held so as not to separate from one another.</li> <li>● The inner ring and the side plates are tightened together in axial direction for non-clearance.</li> <li>● The outer ring is guided in axial direction by the outer ring ribs and the end faces of cylindrical roller.</li> </ul> Particularly Type NUTW provides the following features. <ul style="list-style-type: none"> <li>● The greatest rated load, of the roller followers.</li> <li>● Due to the outer ring with inner ribs, this type is excellently resistible to axial load and moment load and, in addition, runs smoothly, though depending on actual operating conditions.</li> <li>● Good lubrication effect and longer life are expectable by increasing the grease fill volume.</li> </ul>
Inscribed circle diameter : $\phi 25$ Double-row cylindrical Full-complement roller type with center rib Labyrinth seal Outer profile : spherical	

### Bearing Tolerances

The respective dimensional accuracy, profile accuracy and running accuracy of the bearing bore diameter ( $d$ ), cylindrical roller outer diameter ( $D$ ), and outer ring width ( $C$ ) are as shown in **Table 4.3** of Section 4. "**Bearing Accuracy**" (page A-26). (Conforming to JIS Accuracy Class-0)

On the other hand, the dimensional tolerances for spherical roller outer diameter ( $D$ ) and the roller inscribed circle diameter ( $F_w$ ) of **Type RNA22** are as shown in applicable Dimensions Table.

### Bearing fits and radial clearance

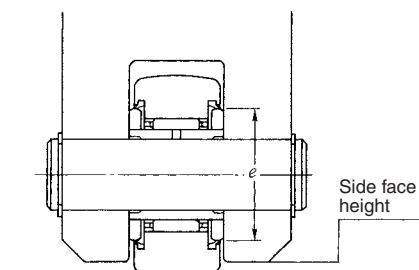
The tolerance range class of shaft against bearing with inner ring shall be g6 (h6) and, where a shaft is used as the direct raceway surface (**Type RNA22**), the tolerance range class of the shaft shall be k5 (k6). In general, the outer ring is not fitted in a housing. Mounting relations

**Table 1 Radial clearances**

Unit:  $\mu\text{m}$

Nominal roller inscribed circle dia. $F_w$ (mm)		Clearance							
over	Incl.	C2		Ordinary		C3		C4	
		min	max	min	max	min	max	min	max
3	6	0	10	3	17	15	30	20	40
6	10	0	12	5	20	15	30	25	45
10	18	0	15	5	25	15	35	30	55
18	30	0	20	10	30	20	40	40	65
30	50	0	25	10	40	25	55	50	80
50	80	0	30	15	50	30	65	60	100
80	100	0	35	20	55	35	75	70	115

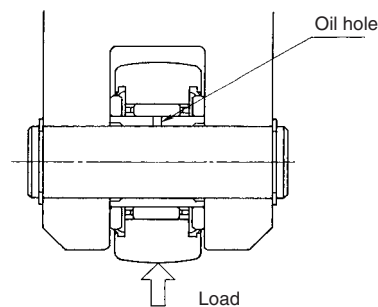
(1) The side face height in the roller follower mount must be made larger than "e" dimension described in applicable Dimensions Table. (**Fig.1**) In mounting, chamfer the mounting surface at R as small as possible (around  $0.5 \times 45^\circ$ ) and bring the inner ring and the end face of side plate in precise contact with one another.



**Fig.1**

(2) Where the roller follower is mounted, locate the inner ring oil hole within the non-load area (load free side). (**Fig. 2**)

If the oil hole locates within the load area, it would cause shorter life.

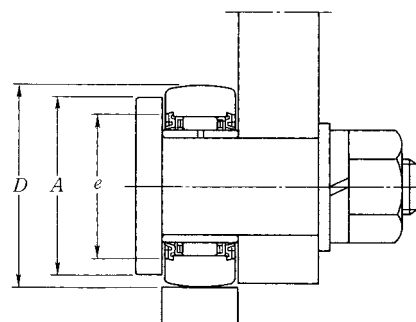


**Fig.2**

(3) **Type NA··22LL** and **RNA22** are of separable type and, hence, the outer ring is guided by flange or thrust washer mounted on shaft (pin). Therefore, the guide surface must be finished more precisely than by lathe-turning and deburred completely for surface smoothing. In addition, when the guide surface is not hardened the outer ring must be guided at  $A$ -dimension shown in **Fig.3**. When it is hardened, even a little smaller guide surface can be used.

$$A \geq \frac{1}{2}(D+e)$$

For  $D$  and  $e$  dimensions refer to applicable Dimensions Table.



**Fig.3**

In assembling this bearing, it must be handled with good care to protect the seal lip from bending and flaw.

**Where any of NTN roller followers was stub-mounted, non-uniform load (bias load) could act on the bearing, inversely affected by fitting loose arising from further continued running. Good care must be exercised of such fitting loose, for stable running of the equipment.**

## Lubrication

The roller followers with synthetic rubber seal (with tail code : **LL**) and the full complement roller type followers are filled up with lithium soap base grease so that they can be used in the temperature range of -25 to +100°C. Lubricant feeding and replenishing into the bearing are done through an oil hole provided on the inner ring. In this case, the inner ring must be fitted so the oil hole locates within non-load area. For the full complement roller type roller followers **NATV**, **NACV**, **NUTR** and **NUTW** with no cage, it is necessary to shorten the grease replenishing interval.

Further, a roller follower with cage and without seal is not filled up with lubrication grease. When needing a follower with grease-filled cage, feel free to contact **NTN**.

**The outer ring outer surface of bearing and the track surface must both be lubricated. Failure to lubricate could result earlier in damage of the bearing.**

## Track load capacity

Statically allowable maximum radial load on the contact surface of track to track roller is referred to as "track load capacity", which differs depending on the track hardness. The track load capacity described in applicable Dimensions Table is subject to track hardness HRC40. If the hardness value is other than HRC40, multiply the track load capacity in the Dimensions Table by the adjustment factor *G* in **Table 2**, for determining the track load capacity. However, the track load capacity shall be  $C_{0r}$  if the calculated track load capacity exceeds the basic static load rating  $C_{0r}$  of bearing.

Refer to page A-55 for the detail.

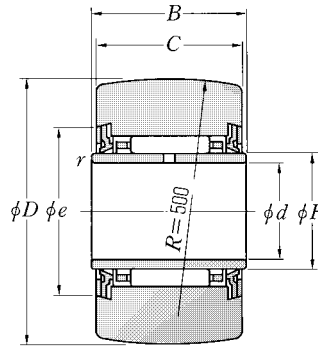
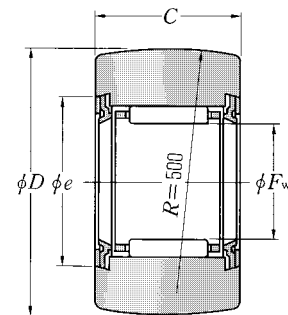
**Table 2 Adjustment factor *G***

Hardness HRC	Adjustment factor <i>G</i>	
	Cylindrical surface	Spherical surface
20	0.37	0.22
25	0.46	0.31
30	0.58	0.45
35	0.75	0.65
40	1.00	1.00
45	1.40	1.70
50	2.00	2.80
55	2.80	4.70

## Metric series

Type NA22·LL

Type RNA22·LL


 Type NA22·LL  
(With inner ring)

 Type RNA22·LL  
(Without inner ring)

D 19~90mm

Boundary dimensions								Basic load ratings				Load ratings of truck				
D 0 -0.05	B	C	d	mm		F	r <sub>s</sub> min <sup>1)</sup>	dynamic	static	dynamic	static	N		kgf		
				C <sub>r</sub>	C <sub>or</sub>			C <sub>r</sub>	C <sub>or</sub>	N	kgf					
19	12	11.8	6	10	$\begin{smallmatrix} +0.022 \\ +0.013 \end{smallmatrix}$	16	10	0.3	4 550	4 250	460	435	1 380	4 400	141	445
24	12	11.8	8	12	$\begin{smallmatrix} +0.027 \\ +0.016 \end{smallmatrix}$	18	12	0.3	5 150	5 250	525	535	1 900	5 500	193	565
30	14	13.8	10	14	$\begin{smallmatrix} +0.027 \\ +0.016 \end{smallmatrix}$	20	14	0.3	7 550	9 000	770	915	2 620	7 550	267	770
32	14	13.8	12	16	$\begin{smallmatrix} +0.027 \\ +0.016 \end{smallmatrix}$	22	16	0.3	8 100	10 300	830	1 050	2 860	8 050	291	820
35	14	13.8	15	20	$\begin{smallmatrix} +0.033 \\ +0.020 \end{smallmatrix}$	26	20	0.3	9 850	14 100	1 010	1 440	3 200	8 800	325	900
40	16	15.8	17	22	$\begin{smallmatrix} +0.033 \\ +0.020 \end{smallmatrix}$	28	22	0.3	10 400	15 600	1 060	1 590	3 850	10 900	390	1 110
47	18	17.8	20	25	$\begin{smallmatrix} +0.033 \\ +0.020 \end{smallmatrix}$	33	25	0.3	16 900	22 900	1 730	2 340	4 700	14 800	480	1 510
52	18	17.8	25	30	$\begin{smallmatrix} +0.033 \\ +0.020 \end{smallmatrix}$	38	30	0.3	17 900	25 900	1 820	2 640	5 550	16 400	565	1 670
62	20	19.8	30	35	$\begin{smallmatrix} +0.041 \\ +0.025 \end{smallmatrix}$	43	35	0.3	21 400	34 500	2 190	3 500	6 950	22 200	710	2 260
72	23	22.7	35	42	$\begin{smallmatrix} +0.041 \\ +0.025 \end{smallmatrix}$	50	42	0.6	26 300	47 500	2 690	4 850	8 050	28 700	820	2 930
80	23	22.7	40	48	$\begin{smallmatrix} +0.041 \\ +0.025 \end{smallmatrix}$	57	48	0.6	28 400	55 000	2 900	5 600	9 800	32 000	1 000	3 250
85	23	22.7	45	52	$\begin{smallmatrix} +0.049 \\ +0.030 \end{smallmatrix}$	62	52	0.6	29 300	58 500	2 990	5 950	10 400	34 000	1 060	3 450
90	23	22.7	50	58	$\begin{smallmatrix} +0.049 \\ +0.030 \end{smallmatrix}$	68	58	0.6	31 000	66 000	3 200	6 700	11 400	36 000	1 160	3 650

 Note 1) Allowable minimum chamfer dimension  $r$ .

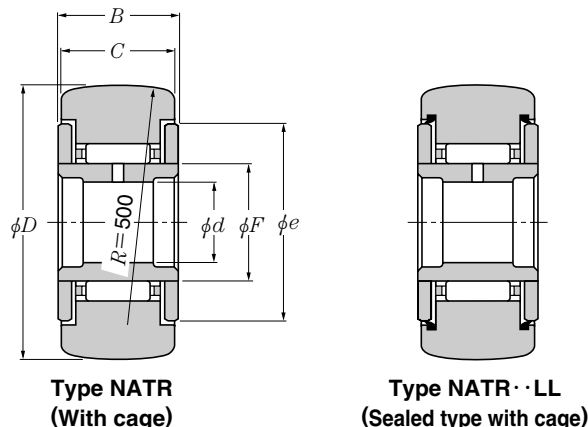
2) For bearing with cylindrical outer surface, the nominal bearing is followed by "X". In this case, the bearing is manufactured with outer ring diameter tolerance conforming to JIS Class-0. Ex. NA2203XLL

## Roller followers : Yoke type truck rollers (sealed type)

Limiting speeds r/min grease	Bearing numbers		Mass (approx.) kg	
	Type NA22··LL <sup>2)</sup>	Type RNA22··LL <sup>2)</sup>	Type NA22··LL	Type RNA22··LL
10 000	NA22/6LL	RNA22/6LL	0.023	0.018
10 000	NA22/8LL	RNA22/8LL	0.035	0.027
10 000	NA2200LL	RNA2200LL	0.060	0.052
9 500	NA2201LL	RNA2201LL	0.067	0.057
7 500	NA2202LL	RNA2202LL	0.075	0.060
7 000	NA2203LL	RNA2203LL	0.113	0.094
6 000	NA2204LL	RNA2204LL	0.176	0.152
5 000	NA2205LL	RNA2205LL	0.209	0.179
4 300	NA2206LL	RNA2206LL	0.322	0.284
3 600	NA2207LL	RNA2207LL	0.506	0.432
3 100	NA2208LL	RNA2208LL	0.623	0.530
2 900	NA2209LL	RNA2209LL	0.638	0.545
2 600	NA2210LL	RNA2210LL	0.682	0.563

## Metric series

- Type NATR
- Type NATR·LL
- Type NATV
- Type NATV·LL



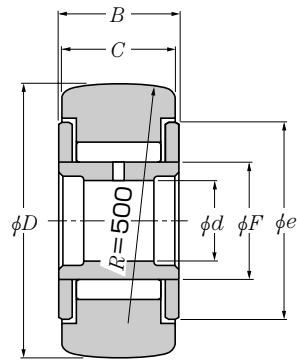
**D** 16~90mm

Boundary dimensions						Basic load ratings				Load ratings of truck				Limiting speeds		
D	B	mm		d	e	F <sub>w</sub>	dynamic	static	dynamic	static	N		kgf		r/min	
		C	C				C <sub>r</sub>	C <sub>or</sub>	C <sub>r</sub>	C <sub>or</sub>	C <sub>r</sub>	C <sub>or</sub>	grease	oil		
16	12 <sup>0</sup> <sub>-0.05</sub>	11	11	5	12	8	4 050	4 200	415	430	1 080	3 400	110	350	※19 000	※25 000
	12 <sup>0</sup> <sub>-0.180</sub>	11	11	5	12	8	6 500	9 350	665	955	1 080	3 400	110	350	※13 000	※16 000
19	12 <sup>0</sup> <sub>-0.05</sub>	11	11	6	14	10	4 750	5 400	480	555	1 380	4 050	141	415	※15 000	※20 000
	12 <sup>0</sup> <sub>-0.180</sub>	11	11	6	14	10	7 450	11 700	760	1 190	1 380	4 050	141	415	10 000	※13 000
24	15 <sup>0</sup> <sub>-0.05</sub>	14	14	8	19	12	6 900	7 700	705	785	1 900	6 650	193	680	※12 000	※16 000
	15 <sup>0</sup> <sub>-0.180</sub>	14	14	8	19	12	10 700	16 200	1 090	1 650	1 900	6 650	193	680	8 500	※11 000
30	15 <sup>0</sup> <sub>-0.05</sub>	14	14	10	23	15	7 850	9 650	800	985	2 620	7 700	267	785	10 000	※13 000
	15 <sup>0</sup> <sub>-0.180</sub>	14	14	10	23	15	12 000	20 300	1 230	2 070	2 620	7 700	267	785	6 500	8 500
32	15 <sup>0</sup> <sub>-0.05</sub>	14	14	12	25	17	8 850	11 700	900	1 190	2 860	8 200	291	835	9 000	※12 000
	15 <sup>0</sup> <sub>-0.180</sub>	14	14	12	25	17	13 000	23 000	1 330	2 350	2 860	8 200	291	835	6 000	7 500
35	19 <sup>0</sup> <sub>-0.05</sub>	18	18	15	27	20	13 300	20 800	1 360	2 120	3 200	11 900	325	1 220	7 500	10 000
	19 <sup>0</sup> <sub>-0.210</sub>	18	18	15	27	20	18 400	38 000	1 870	3 900	3 200	11 900	325	1 220	5 000	6 500
40	21 <sup>0</sup> <sub>-0.05</sub>	20	20	17	32	22	14 000	22 800	1 430	2 330	3 850	14 500	390	1 480	7 000	9 000
	21 <sup>0</sup> <sub>-0.210</sub>	20	20	17	32	22	19 400	42 000	1 980	4 250	3 850	14 500	390	1 480	4 500	6 000
47	25 <sup>0</sup> <sub>-0.05</sub>	24	24	20	37	25	20 700	33 500	2 110	3 450	4 700	21 000	480	2 150	6 000	8 000
	25 <sup>0</sup> <sub>-0.210</sub>	24	24	20	37	25	28 800	61 000	2 940	6 250	4 700	21 000	480	2 150	4 000	5 000
52	25 <sup>0</sup> <sub>-0.05</sub>	24	24	25	42	30	22 800	40 500	2 320	4 100	5 500	23 300	565	2 370	5 000	6 500
	25 <sup>0</sup> <sub>-0.210</sub>	24	24	25	42	30	31 500	73 500	3 200	7 500	5 500	23 300	565	2 370	3 300	4 500
62	29 <sup>0</sup> <sub>-0.05</sub>	28	28	30	51	38	36 000	66 000	3 650	6 750	6 950	33 000	710	3 350	4 000	5 500
	29 <sup>0</sup> <sub>-0.210</sub>	28	28	30	51	38	47 500	115 000	4 850	11 700	6 950	33 000	710	3 350	2 600	3 500
72	29 <sup>0</sup> <sub>-0.05</sub>	28	28	35	58	44.5	39 000	77 000	3 950	7 850	8 050	37 000	820	3 750	3 300	4 500
	29 <sup>0</sup> <sub>-0.210</sub>	28	28	35	58	44.5	52 000	134 000	5 300	13 600	8 050	37 000	820	3 750	2 200	2 900
80	32 <sup>0</sup> <sub>-0.05</sub>	30	30	40	66	50	49 500	92 500	5 050	9 400	9 800	44 500	1 000	4 500	3 000	4 000
	32 <sup>0</sup> <sub>-0.250</sub>	30	30	40	66	50	68 500	171 000	7 000	17 500	9 800	44 500	1 000	4 500	2 000	2 600
85	32 <sup>0</sup> <sub>-0.250</sub>	30	30	45	71	55	51 500	100 000	5 250	10 200	10 400	47 000	1 060	4 800	2 700	3 600
90	32 <sup>0</sup> <sub>-0.05</sub>	30	30	50	76	60	53 000	108 000	5 450	11 000	11 400	50 000	1 160	5 100	2 500	3 300
	32 <sup>0</sup> <sub>-0.250</sub>	30	30	50	76	60	76 000	205 000	7 750	20 900	11 400	50 000	1 160	5 100	1 600	2 100

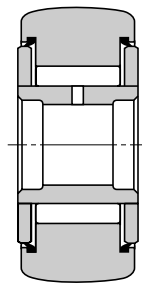
Note 1) For bearing with cylindrical outer surface, the nominal bearing is followed by "X". In this case, the bearing is manufactured with outer ring diameter tolerance conforming to JIS Class-0. Ex. NATR5X

Remarks: For the follower with seal, the maximum revolutions is allowable up to 10 000 r/min.





**Type NATV**  
(Full complement type)



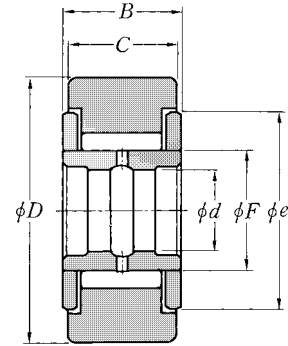
**Type NATV··LL**  
(Full complement type with seals)

Bearing numbers <sup>1)</sup>		Mass
Type NATR	Type NATR··LL	kg
Type NATV	Type NATV··LL	(approx.)
NATR5	NATR5LL	0.018
NATV5	NATV5LL	0.020
NATR6	NATR6LL	0.025
NATV6	NATV6LL	0.027
NATR8	NATR8LL	0.042
NATV8	NATV8LL	0.044
NATR10	NATR10LL	0.061
NATV10	NATV10LL	0.065
NATR12	NATR12LL	0.069
NATV12	NATV12LL	0.074
NATR15	NATR15LL	0.098
NATV15	NATV15LL	0.102
NATR17	NATR17LL	0.140
NATV17	NATV17LL	0.145
NATR20	NATR20LL	0.246
NATV20	NATV20LL	0.254
NATR25	NATR25LL	0.275
NATV25	NATV25LL	0.285
NATR30	NATR30LL	0.470
NATV30	NATV30LL	0.481
NATR35	NATR35LL	0.635
NATV35	NATV35LL	0.647
NATR40	NATR40LL	0.875
NATV40	NATV40LL	0.890
NATR45	NATR45LL	0.910
NATR50	NATR50LL	0.960
NATV50	NATV50LL	0.990

## Inch series

Type NACV···X

Type NACV···XLL

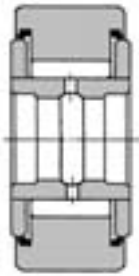


**Type NACV···X  
(Full complement)**

**D** 19.050~152.400mm

Boundary dimensions							Basic load ratings			
D 0 -0.025	B 0 -0.250	mm (1/25.4mm)			e	F <sub>w</sub>	dynamic	static	dynamic	static
		C 0 -0.130	d				N		kgf	
						C <sub>r</sub>	C <sub>or</sub>	C <sub>r</sub>	C <sub>or</sub>	
19.050(3/4)	14.288(9/16)	12.700(1/2)	6.350(1/4)	+0.005 -0.010	15.5	11	8 050	13 300	825	1 360
22.225(7/8)	14.288(9/16)	12.700(1/2)	6.350(1/4)	+0.005 -0.010	15.5	11	8 050	13 300	825	1 360
25.400(1)	17.462(11/16)	15.875(5/8)	7.938(5/16)	+0.005 -0.010	19.5	14	11 700	18 900	1 190	1 920
28.575(1 1/8)	17.462(11/16)	15.875(5/8)	7.938(5/16)	+0.005 -0.010	19.5	14	11 700	18 900	1 190	1 920
31.750(1 1/4)	20.638(13/16)	19.050(3/4)	9.525(3/8)	+0.005 -0.010	25	18.47	17 700	35 000	1 810	3 600
34.925(1 3/8)	20.638(13/16)	19.050(3/4)	9.525(3/8)	+0.005 -0.010	25	18.47	17 700	35 000	1 810	3 600
38.100(1 1/2)	23.812(15/16)	22.225(7/8)	11.112(7/16)	+0.005 -0.010	27	21	21 100	45 500	2 150	4 650
41.275(1 5/8)	23.812(15/16)	22.225(7/8)	11.112(7/16)	+0.005 -0.010	27	21	21 100	45 500	2 150	4 650
44.450(1 3/4)	26.988(1 1/16)	25.400(1)	12.700(1/2)	+0.005 -0.010	31.5	24.65	28 400	60 500	2 900	6 150
47.625(1 7/8)	26.988(1 1/16)	25.400(1)	12.700(1/2)	+0.005 -0.010	31.5	24.65	28 400	60 500	2 900	6 150
50.800(2)	33.338(1 5/16)	31.750(1 1/4)	15.875(5/8)	+0.005 -0.010	36.5	26.71	41 000	87 500	4 200	8 950
57.150(2 1/4)	33.338(1 5/16)	31.750(1 1/4)	15.875(5/8)	+0.005 -0.010	36.5	26.71	41 000	87 500	4 200	8 950
63.500(2 1/2)	39.688(1 9/16)	38.100(1 1/2)	19.050(3/4)	+0.005 -0.010	44	31.15	54 500	119 000	5 600	12 200
69.850(2 3/4)	39.688(1 9/16)	38.100(1 1/2)	19.050(3/4)	+0.005 -0.010	44	31.15	54 500	119 000	5 600	12 200
76.200(3)	46.038(1 13/16)	44.450(1 3/4)	25.400(1)	+0.002 -0.013	53	36.85	76 500	177 000	7 800	18 000
82.550(3 1/4)	46.038(1 13/16)	44.450(1 3/4)	25.400(1)	+0.002 -0.013	53	36.85	76 500	177 000	7 800	18 000
88.900(3 1/2)	52.388(2 1/16)	50.800(2)	28.575(1 1/8)	+0.002 -0.013	60	44.5	84 500	214 000	8 650	21 800
101.600(4)	58.738(2 5/16)	57.150(2 1/4)	31.750(1 1/4)	+0.002 -0.013	63	44.5	106 000	244 000	10 800	24 900
127.000(5)	73.025(2 7/8)	69.850(2 3/4)	44.450(1 3/4)	+0.002 -0.013	89	68.7	189 000	520 000	19 300	53 000
152.400(6)	85.725(3 3/8)	82.550(3 1/4)	57.150(2 1/4)	+0.002 -0.013	110	81.35	260 000	675 000	26 500	68 500

Note 1) For the bearing with spherical outer surface, "X" symbol shall be deleted from the Nominal number. In this case, spherical bearing (R=500) is manufactured with tolerance 0/-0.05 against the outer ring outer diameter "D". Ex. NACV12



**Type NACV··XLL**  
(Full complement sealed type)

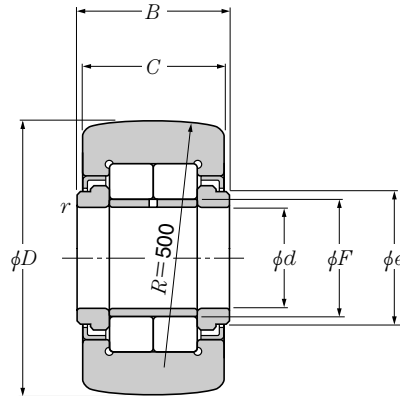
Load ratings of truck				Limiting speeds		Bearing numbers		Mass
N	kgf			r/min		Type NACV··X <sup>1)</sup>	Type NACV··XLL <sup>1)</sup>	(approx.) kg Type NACV··X
	grease	oil	grease	oil				
4 600	1 380	470	140	9 000	※11 000	NACV12X	NACV12XLL	0.027
5 350	1 710	545	174	9 000	※11 000	NACV14X	NACV14XLL	0.036
7 400	2 060	755	210	7 100	9 200	NACV16X	NACV16XLL	0.059
8 350	2 430	850	248	7 100	9 200	NACV18X	NACV18XLL	0.073
11 400	2 840	1 160	290	5 400	7 000	NACV20X	NACV20XLL	0.109
12 500	3 250	1 280	330	5 400	7 000	NACV22X	NACV22XLL	0.132
16 300	3 600	1 660	365	4 800	6 200	NACV24X	NACV24XLL	0.177
17 600	4 050	1 800	410	4 800	6 200	NACV26X	NACV26XLL	0.218
21 600	4 400	2 200	450	4 100	5 300	NACV28X	NACV28XLL	0.281
23 200	4 850	2 360	495	4 100	5 300	NACV30X	NACV30XLL	0.327
31 000	5 300	3 150	540	3 700	4 800	NACV32X	NACV32XLL	0.454
35 000	6 200	3 550	635	3 700	4 800	NACV36X	NACV36XLL	0.585
44 500	7 200	4 550	735	3 200	4 100	NACV40X	NACV40XLL	0.902
49 000	8 250	5 000	840	3 200	4 100	NACV44X	NACV44XLL	1.05
64 000	9 150	6 500	935	2 700	3 500	NACV48X	NACV48XLL	1.39
69 000	10 000	7 050	1 020	2 700	3 500	NACV52X	NACV52XLL	1.66
86 000	11 100	8 800	1 130	2 200	2 800	NACV56X	NACV56XLL	2.19
112 500	13 200	11 500	1 350	2 200	2 800	NACV64X	NACV64XLL	3.22
165 500	17 900	16 900	1 830	1 500	1 900	NACV80X	NACV80XLL	6.08
239 500	22 100	24 400	2 250	1 200	1 500	NACV96X	NACV96XLL	10.0

Remarks: For the follower with seal, the maximum revolutions is allowable up to 10 000 r/min.

## Metric series

Type NUTR2

Type NUTR3



**D** 35~110mm

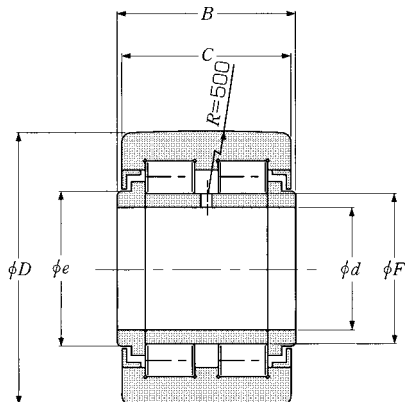
Boundary dimensions mm							Basic load ratings				Load ratings of truck				Limiting speeds r/min grease	Bearing <sup>2)</sup> numbers	Mass kg (approx.)
D	B	C	d	e	F <sub>w</sub>	r <sub>3</sub> min 1)	dynamic N	static N	dynamic kgf	static kgf	N		kgf				
$0_{-0.05}$							C <sub>r</sub>	C <sub>or</sub>	C <sub>r</sub>	C <sub>or</sub>							
35	19 $^0_{-0.210}$	18	15	20	19	0.3	22 300	25 700	2 280	2 620	3 200	11 900	325	1 220	5 500	NUTR202	0.100
40	21 $^0_{-0.210}$	20	17	22	21.5	0.3	24 100	29 100	2 450	2 970	3 850	14 500	390	1 480	4 700	NUTR203	0.147
42	19 $^0_{-0.210}$	18	15	20	19	0.3	22 300	25 700	2 280	2 620	4 100	14 300	415	1 460	5 500	NUTR302	0.160
47	21 $^0_{-0.210}$	20	17	22	21.5	0.3	24 100	29 100	2 450	2 970	4 700	17 000	480	1 740	4 700	NUTR303	0.222
	25 $^0_{-0.210}$	24	20	27	25.5	0.3	38 500	48 000	3 950	4 900	4 700	21 000	480	2 150	4 000	NUTR204	0.245
52	25 $^0_{-0.210}$	24	20	27	25.5	0.3	38 500	48 000	3 950	4 900	5 550	23 300	565	2 370	4 000	NUTR304	0.321
	25 $^0_{-0.210}$	24	25	31	30	0.3	42 500	57 500	4 350	5 850	5 550	23 300	565	2 370	3 300	NUTR205	0.281
62	25 $^0_{-0.210}$	24	25	31	30	0.3	42 500	57 500	4 350	5 850	6 950	27 800	710	2 830	3 300	NUTR305	0.450
	29 $^0_{-0.210}$	28	30	38	35	0.3	56 500	72 500	5 750	7 400	6 950	33 000	710	3 350	2 900	NUTR206	0.466
72	29 $^0_{-0.210}$	28	30	38	35	0.3	56 500	72 500	5 750	7 400	8 050	38 500	820	3 900	2 900	NUTR306	0.697
	29 $^0_{-0.210}$	28	35	44	41.5	0.6	62 000	85 500	6 350	8 700	8 050	37 000	820	3 750	2 400	NUTR207	0.630
80	29 $^0_{-0.210}$	28	35	44	41.5	0.6	62 000	85 500	6 350	8 700	9 800	41 000	1 000	4 150	2 400	NUTR307	0.840
	32 $^0_{-0.250}$	30	40	51	47.5	0.6	87 000	125 000	8 850	12 700	9 800	44 500	1 000	4 500	2 100	NUTR208	0.817
85	32 $^0_{-0.250}$	30	45	55	52.5	0.6	92 000	137 000	9 350	14 000	10 400	47 000	1 060	4 800	1 900	NUTR209	0.883
90	32 $^0_{-0.250}$	30	40	51	47.5	0.6	87 000	125 000	8 850	12 700	11 400	50 000	1 160	5 100	2 100	NUTR308	1.13
	32 $^0_{-0.250}$	30	50	60	57	0.6	96 500	150 000	9 800	15 300	11 400	50 000	1 160	5 100	1 800	NUTR210	0.950
100	32 $^0_{-0.250}$	30	45	55	52.5	0.6	92 000	137 000	9 350	14 000	13 000	55 500	1 330	5 650	1 900	NUTR309	1.40
110	32 $^0_{-0.250}$	30	50	60	57	0.6	96 500	150 000	9 800	15 300	14 700	61 000	1 500	6 200	1 800	NUTR310	1.69

Note 1) Allowable minimum chamfer dimension r.

2) For bearing with cylindrical outer surface, the nominal bearing is followed by "X". In this case, the bearing is manufactured with outer ring diameter tolerance conforming to JIS Class-0. Ex. NUTR208X

## Metric series

### Type NUTW2



**D** 35~90mm

Boundary dimensions mm								Basic load ratings				Load ratings of truck				Limiting speeds r/min grease	Bearing <sup>2)</sup> numbers	Mass kg (approx.)
D	B	C	d	e	F <sub>w</sub>	r <sub>s</sub> min 1)	dynamic N	static N	dynamic kgf	static kgf	N		kgf					
$0_{-0.05}$							C <sub>r</sub>	C <sub>or</sub>	C <sub>r</sub>	C <sub>or</sub>								
35	22 $^0_{-0.210}$	21	15	20	19	0.3	24 100	28 300	2 460	2 880	3 200	14 200	325	1 450	5 500	NUTW202	0.115	
40	24 $^0_{-0.210}$	23	17	22	21.5	0.3	26 000	32 000	2 650	3 250	3 850	17 100	390	1 740	4 700	NUTW203	0.167	
47	29 $^0_{-0.210}$	28	20	27	25.5	0.3	40 500	51 500	4 150	5 250	4 700	25 100	480	2 560	4 000	NUTW204	0.280	
52	29 $^0_{-0.210}$	28	25	31	30	0.3	45 000	61 500	4 600	6 250	5 550	27 700	565	2 830	3 300	NUTW205	0.322	
62	35 $^0_{-0.210}$	34	30	38	35	0.3	59 500	77 000	6 050	7 900	6 950	41 000	710	4 200	2 900	NUTW206	0.549	
72	35 $^0_{-0.210}$	34	35	44	41.5	0.6	65 000	91 000	6 650	9 250	8 050	46 000	820	4 700	2 400	NUTW207	0.747	
80	38 $^0_{-0.250}$	36	40	51	47.5	0.6	90 500	131 000	9 250	13 400	9 800	54 500	1 000	5 550	2 100	NUTW208	0.953	
85	38 $^0_{-0.250}$	36	45	55	52.5	0.6	95 500	144 000	9 750	14 700	10 400	58 000	1 060	5 900	1 900	NUTW209	1.03	
90	38 $^0_{-0.250}$	36	50	60	57	0.6	100 000	158 000	10 200	16 100	11 400	61 500	1 160	6 250	1 800	NUTW210	1.11	