

ROLLER FOLLOWERS



Type and Part Code

Type	Applicable shaft diameter	Feature	Part Code
 RNAST (Separable type)	$\phi 7 \sim \phi 60$	NAST type without inner ring.	RNAST 15 R Type Bore diameter code R : Crowned outer ring None : Cylindrical outer ring
 NAST (Separable type)	$\phi 6 \sim \phi 50$	Thick wall outer ring, inner ring. Separable bearing with combined needle roller with precision cage.	NAST 15 R Type Bore diameter code R : Crowned outer ring None : Cylindrical outer ring
 NAST-ZZ (Separable type)	$\phi 6 \sim \phi 50$	Separable bearing in which labyrinth seal is formed with combined side plate at both sides of inner ring of NAST type. (NAST-ZZUU type comes with seal)	NAST 15 ZZ UU R Type Bore diameter code ZZ : With shield UU : With seal None : With shield R : Crowned outer ring X : Cylindrical outer ring
 NART-R (Non-separable type)	$\phi 5 \sim \phi 50$	Non-separable bearing with fixed side plate at inner ring. Mitigate eccentric load with spherical shape at outer diameter of outer ring (code R). (NART-UUR type comes with seal)	NART 15 UU V R Type Bore diameter code UU : With seal None : With shield V : Full complement None : With cage R : Crowned outer ring X : Cylindrical outer ring

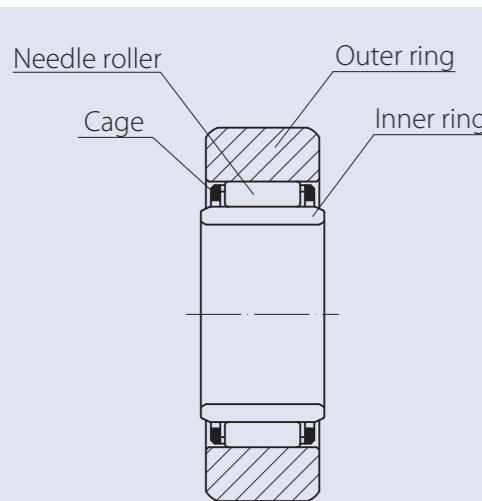
Structure and Features

Roller follower is a bearing with integrated "roller" featuring high rigidity. Its primary application is in a guide roller to have its contacting member travel in linear motion in direction of tangent using rotation of outer ring.

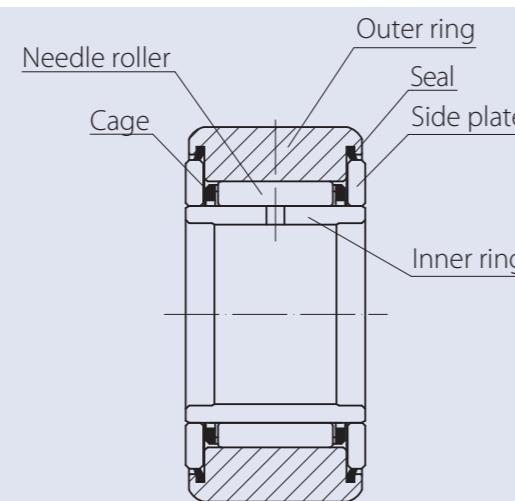
Outer ring of the roller follower is designed with thick ring in order to provide high rigidity to endure heavy load or impact load at portion to contact with the associated objects.

Type of roller follower mainly consists of separate type, which have separated inner ring and outer ring, and non-separate type, whose inner ring has fixed side plate.

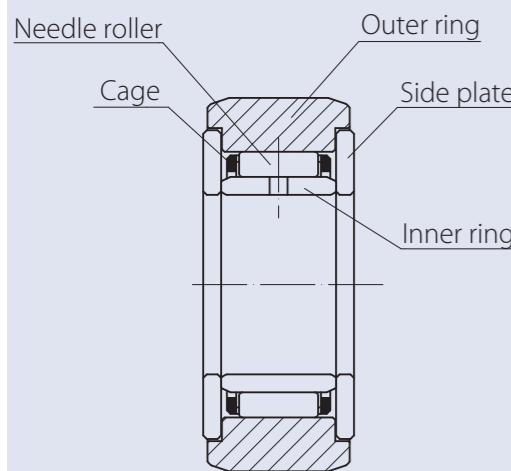
Also, various types with shapes and structures are available in accordance with application. Outer rings have two types – crowned outer ring and cylindrical outer ring. The crowned outer ring is suited for absorbing eccentric load since it absorbs angular misalignment due to a mount error. Cylindrical outer ring is effective for heavy duty since it contacts with large contact area of the associated objects so that can mitigate the contact surface pressure. They have two internal mechanism – one with cage and one with full complement. A roller follower with cage is suitable for high speed application since the guiding feature of cage enables the rotation of "rollers" to be stable. Compared with cage type, full complement type is effective for applications with low-speed operation of heavy load due to its larger load rating. Full complement type also includes double-raw cylindrical roller type which allows moderate axial loading.



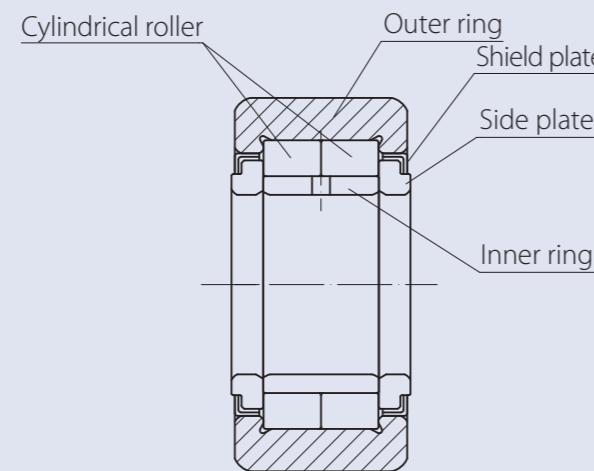
Structure of type NAST



Structure of type NART..UUR



Structure of type NAST..ZZ



Structure of type NURT

Accuracy standard

Roller followers are manufactured in accordance with the following accuracies.

Table-1 Accuracy

Unit: μm

Name	Category	Crowned outer ring	Cylindrical outer ring
Dimension tolerance of outer ring outer diameter (D)	0 -50	0 -50	Refer to Table-3
Dimension tolerance of outer ring width (C)	0 -120	0 -120	
Tolerance of inner ring width (B)	Separable	0 -120	
Tolerance of bearing width (B)	Non-separable	h12	—
Fw	Separable	Refer to Table-11 on page 23	

Table-2 Accuracy of inner ring

Unit: μm

Nominal inner ring bore diameter d (mm)	Deviation of mean bore diameter in a single plane Δ_{dmp}		Tolerance of radial runout of inner ring
	Over	Incl.	
2.5	10	0	-8
10	18	0	-8
18	30	0	-10
30	50	0	-12

Table-3 Accuracy of outer ring

Unit: μm

Nominal outer ring bore diameter D (mm)	Deviation of mean outer diameter in a single plane Δ_{Dmp}		Tolerance of radial runout of outer ring (max.)
	Over	Incl.	
6	18	0	-8
18	30	0	-9
30	50	0	-11
50	80	0	-13
80	120	0	-15

Radial internal clearance

Table below indicates radial internal clearance of roller follower.

Table-4 Radial internal clearance

Unit: μm

Part code			Radial internal clearance	
Separable	Non-separable	Double row cylindrical roller	min.	max.
NAST6	NART5R ~ 6R	—	5	20
NAST8 ~ 12	NART8R ~ 12R	—	5	25
NAST15 ~ 25	NART15R ~ 25R	—	10	30
NAST30 ~ 40	NART30R ~ 40R	—	10	40
NAST45 ~ 50	NART45R ~ 50R	—	15	50
—	—	NURT15R ~ 30-1R	0	25
—	—	NURT35R ~ 40-1R	5	30
—	—	NURT45R ~ 50-1R	5	35

Track load capacity

Track load capacity means a permissive load under which the outer ring of cam follower and the mating surface are allowable to be used over a long period without causing any deformation nor compression mark. Track load capacity depicted in dimension table indicates a value for which hardness of contacting steel member is assumed to be HRC40. In the case that the hardness of contacting member is not HRC40, track load capacity in the dimension table shall be multiplied by value of track capacity factor obtained by Figure-1.

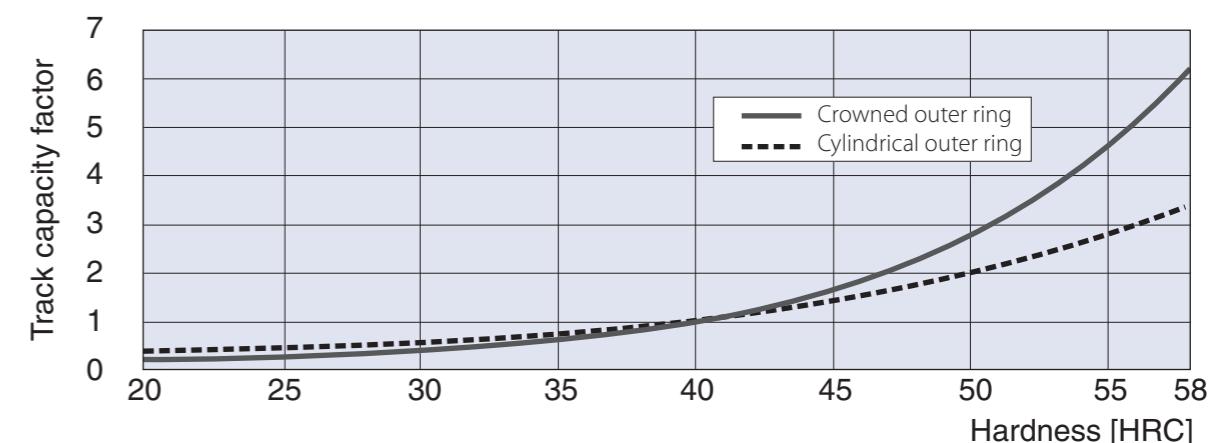


Figure-1 Track capacity factor

Fits

Table below indicates recommended fits between roller follower and its mounting shaft.

Table-5 Shaft fits

Type		Tolerance grade
Separable	Without inner ring	k5,k6
	With inner ring	g6,h6
Non-separable		
Double row cylindrical roller		

Lubrication

All the JNS roller followers are lubricated with pre-packed high quality lithium soap-based grease grade 2 (RoHS compliant) so that they are ready to use. For applications requiring high prevention measure against invasion of foreign matter or leakage of lubricant, products with seal (part code--UU) which integrate special synthetic rubber with high abrasion resistance are also available.

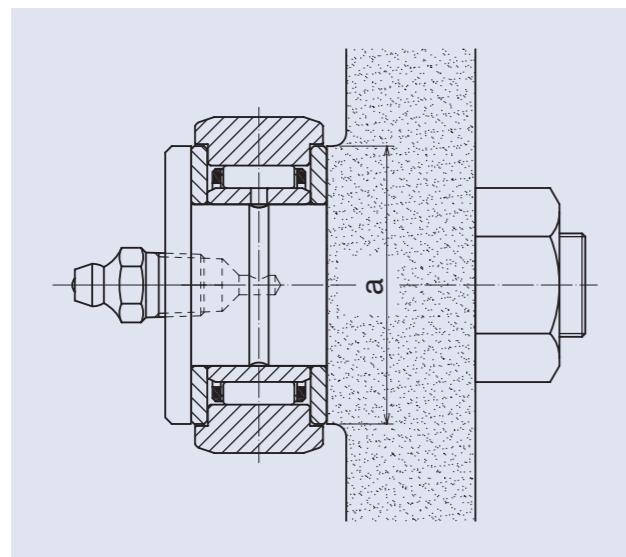
Grease shall be packed up to volume approximately one-third to one-half of internal space of bearing. Lubrication interval varies depending on operation condition. Referential interval may be every six to twenty four months for roller followers with cages and every one to six months for full complement type with grease in the same type.

Some excessive grease may leak at the beginning of usage or immediately after re-greasing even for the products with seal. Aging operation period is recommended prior to application in which no contamination by grease is allowed in and around device. Wipe and clean any leaked extra grease after this operation.

Mounting

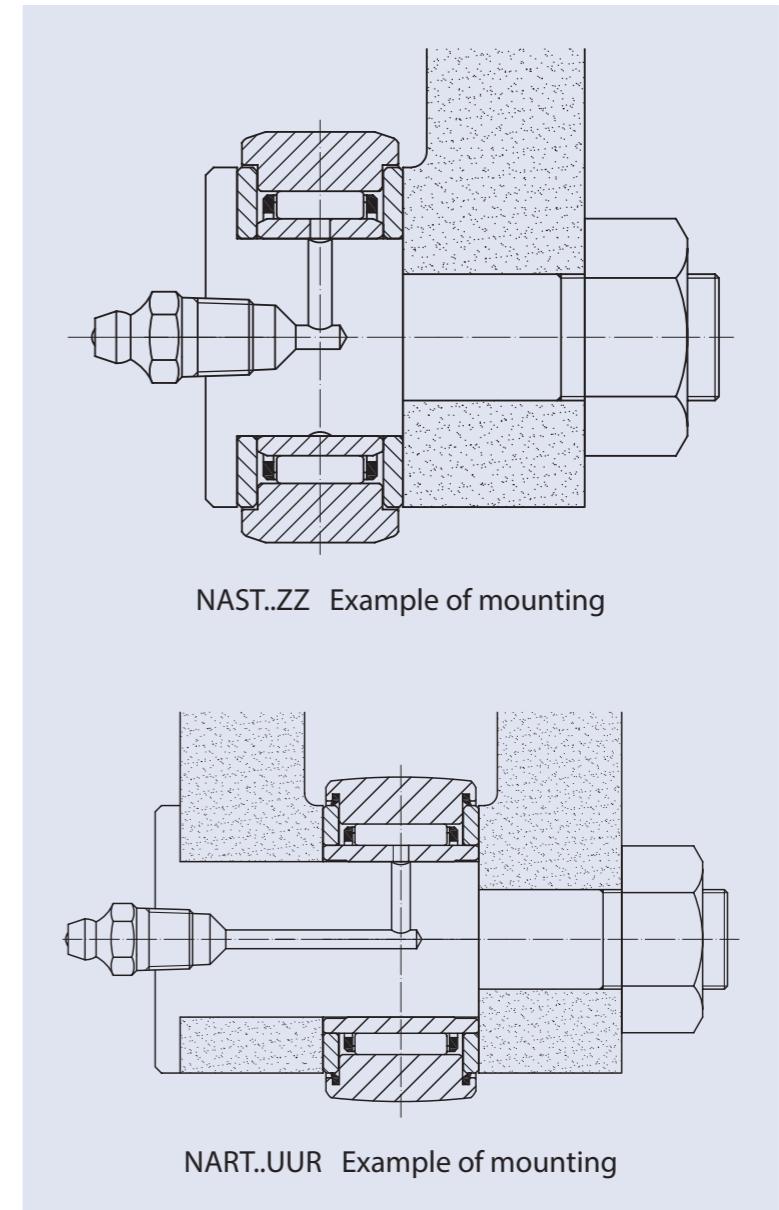
Mounting part

- Thrust load may cause damage to side plate, outer ring or roller follower since it is designed so as to support load in radial direction. It is recommended to design and assemble to avoid thrust load.
- Application with roller follower without inner ring requires heat treatment and grinding finish of shaft. Surface hardness of the shaft shall be HRC58 to 64, and surface roughness shall be R_a 0.2 μ m or less for this application.
- Side plate of non-separate type roller follower is pressed-in to fix it. Application in a manner to push the side plate shall be avoided in order to prevent risk of abnormal rotation under external force.
- Crowned outer ring is recommended in the case that contact between the outer ring and contacting member track surface is not smooth and even.
- When mounting NART, NAST-ZZ and NURT type, dimension "a" must be more than it described in dimension table in order to protect the side plate.



Mounting method

To prevent pre-mature failure of roller follower, lubrication hole of inner ring shall be located outside of loading range (on the side to receive load).

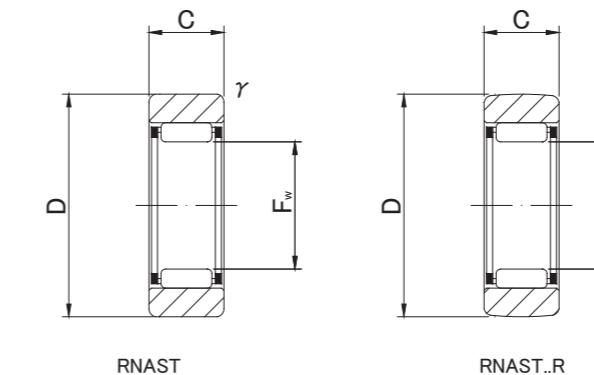


ROLLER FOLLOWERS

SEPARABLE WITHOUT INNER RING



RNAST



RNAST

RNAST..R

RNAST TYPE

Prepacked Grease

Shaft Diameter (mm)	Designation		Dimensions (mm)				Basic dynamic load rating	Basic static load rating	Track load capacity		Limiting speed *	Mass	
	Cylindrical outer ring	Crowned outer ring (R500)							Cr N	Cor N	Cylindrical outer ring N	Crowned outer ring N	
			Fw	D	C	rs min							rpm
7	RNAST 5	RNAST 5R	7 ^{+0.022} _{+0.013}	16	7.8		0.3	2 740	2 390	2 350	1 080	30 000	8.9
10	RNAST 6	RNAST 6R	10 ^{+0.027} _{+0.016}	19	9.8		0.3	4 120	4 550	3 530	1 370	20 000	13.9
12	RNAST 8	RNAST 8R	12 ^{+0.027} _{+0.016}	24	9.8		0.6	5 680	5 890	4 020	1 860	17 000	23.5
14	RNAST10	RNAST10R	14 ^{+0.027} _{+0.016}	30	11.8		1	9 700	9 670	5 590	2 450	15 000	42.5
16	RNAST12	RNAST12R	16 ^{+0.027} _{+0.016}	32	11.8		1	10 400	10 900	5 980	2 740	13 000	49.5
20	RNAST15	RNAST15R	20 ^{+0.033} _{+0.020}	35	11.8		1	12 300	14 300	6 570	3 140	10 000	50
22	RNAST17	RNAST17R	22 ^{+0.033} _{+0.020}	40	15.8		1	17 400	20 900	10 900	3 720	9 500	90
25	RNAST20	RNAST20R	25 ^{+0.033} _{+0.020}	47	15.8		1	19 200	24 500	12 700	4 610	8 500	135
30	RNAST25	RNAST25R	30 ^{+0.033} _{+0.020}	52	15.8		1	20 700	28 400	14 100	5 290	7 000	152
38	RNAST30	RNAST30R	38 ^{+0.041} _{+0.025}	62	19.8		1	30 300	45 400	22 100	6 660	5 500	255
42	RNAST35	RNAST35R	42 ^{+0.041} _{+0.025}	72	19.8		1	32 200	50 600	25 700	8 130	5 000	375
50	RNAST40	RNAST40R	50 ^{+0.041} _{+0.025}	80	19.8		1.5	35 700	61 100	26 900	9 310	4 000	420
55	RNAST45	RNAST45R	55 ^{+0.049} _{+0.030}	85	19.8		1.5	37 100	66 400	28 500	10 100	4 000	460
60	RNAST50	RNAST50R	60 ^{+0.049} _{+0.030}	90	19.8		1.5	38 700	71 800	30 200	11 000	3 500	500

* Suitable for grease lubrication. In case of oil lubrication, up to 130% of this value shall be permissible.

OUTER RINGS TOLERANCE (μm)

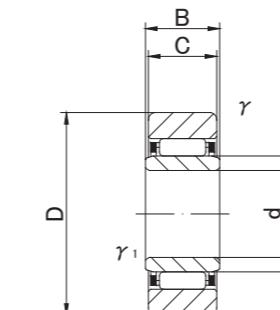
TYPE	Cylindrical outer ring	Crowned outer ring
RNAST5	0/-8	0/-50
RNAST6,RNAST8,RNAST10	0/-9	0/-50
RNAST12,RNAST15,RNAST17,RNAST20	0/-11	0/-50
RNAST25,RNAST30,RNAST35,RNAST40	0/-13	0/-50
RNAST45,RNAST50	0/-15	0/-50

ROLLER FOLLOWERS

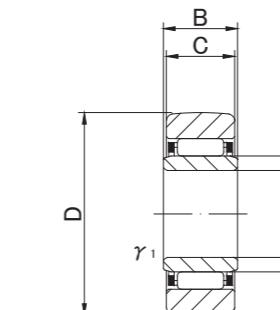
SEPARABLE WITH INNER RING



NAST



NAST



NAST..R

NAST TYPE

Prepacked Grease

Shaft Diameter (mm)	Designation		Dimensions (mm)							Basic dynamic load rating	Basic static load rating	Track load capacity		Limiting speed *	Mass		
	Cylindrical outer ring	Crowned outer ring (R500)	d	D	B	C	r _s min	r _{1s} min	F			Cylindrical outer ring N	Crowned outer ring N				
6	NAST 6	NAST 6R	6 ⁰ _{-0.008}	19	10	9.8	0.3			0.3	10	4 120	4 550	3 530	1 370	20 000	17.8
8	NAST 8	NAST 8R	8 ⁰ _{-0.008}	24	10	9.8	0.6			0.3	12	5 680	5 890	4 020	1 860	17 000	28
10	NAST10	NAST10R	10 ⁰ _{-0.008}	30	12	11.8	1			0.3	14	9 700	9 670	5 590	2 450	15 000	50
12	NAST12	NAST12R	12 ⁰ _{-0.008}	32	12	11.8	1			0.3	16	10 400	10 900	5 980	2 740	13 000	58
15	NAST15	NAST15R	15 ⁰ _{-0.008}	35	12	11.8	1			0.3	20	12 300	14 300	6 570	3 140	10 000	62
17	NAST17	NAST17R	17 ⁰ _{-0.010}	40	16	15.8	1			0.3	22	17 400	20 900	10 900	3 720	9 500	110
20	NAST20	NAST20R	20 ⁰ _{-0.010}	47	16	15.8	1			0.3	25	19 200	24 500	12 700	4 610	8 500	155
25	NAST25	NAST25R	25 ⁰ _{-0.010}	52	16	15.8	1			0.3	30	20 700	28 400	14 100	5 290	7 000	180
30	NAST30	NAST30R	30 ⁰ _{-0.010}	62	20	19.8	1			0.6	38	30 300	45 400	22 100	6 660	5 500	320
35	NAST35	NAST35R	35 ⁰ _{-0.012}	72	20	19.8	1			0.6	42	32 200	50 600	25 700	8 130	5 000	440
40	NAST40	NAST40R	40 ⁰ _{-0.012}	80	20	19.8	1.5			1	50	35 700	61 100	26 900	9 310	4 000	530
45	NAST45	NAST45R	45 ⁰ _{-0.012}	85	20	19.8	1.5			1	55	37 100	66 400	28 500	10 100	4 000	580
50	NAST50	NAST50R	50 ⁰ _{-0.012}	90	20	19.8	1.5			1	60	38 700	71 800	30 200	11 000	3 500	635

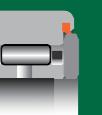
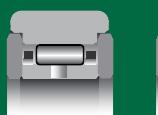
* Suitable for grease lubrication. In case of oil lubrication, up to 130% of this value shall be permissible.

OUTER RINGS TOLERANCE (Outside diameter) (μm)

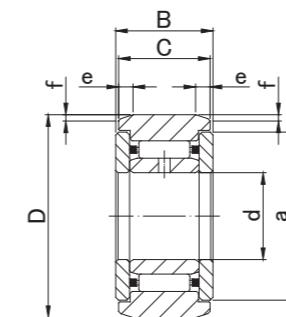
TYPE	Cylindrical outer ring	Crowned outer ring
NAST6,NAST8,NAST10	0/-9	0/-50
NAST12,NAST15,NAST17,NAST20	0/-11	0/-50
NAST25,NAST30,NAST35,NAST40	0/-13	0/-50
NAST45,NAST50	0/-15	0/-50

ROLLER FOLLOWERS

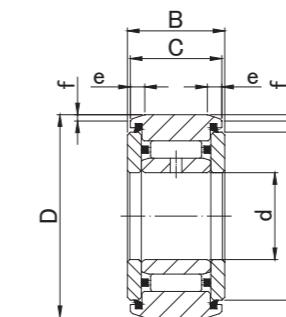
SEPARABLE WITH INNER RING WITH SHIELD



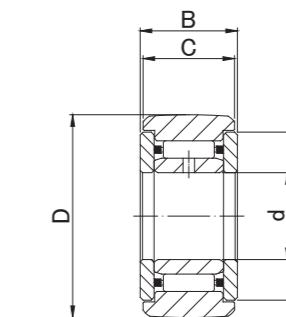
NAST..ZZ



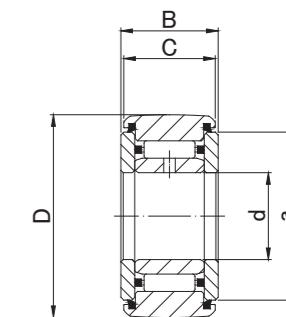
NAST..ZZ



NAST..ZZUU



NAST..ZZR



NAST..ZZUUR

NAST..ZZ TYPE

Prepacked Grease

Shaft Diameter (mm)	Designation				Dimensions (mm)							Basic dynamic load rating	Basic static load rating	Track load capacity		Limiting speed *	Mass				
	Cylindrical outer ring		Crowned outer ring (R500)		d	D	B	C	a	e	f			Cylindrical outer ring N	Crowned outer ring N						
	Without seals	With seals	Without seals	With seals																	
6	NAST 6ZZ	NAST 6ZZUU	NAST 6ZZR	NAST 6ZZUUR	6 ⁰ _{-0.008}	19	14	13.8	14	2.5	0.8	4 120	4 550	3 530	1 370	20 000	24.5				
8	NAST 8ZZ	NAST 8ZZUU	NAST 8ZZR	NAST 8ZZUUR	8 ⁰ _{-0.008}	24	14	13.8	17.5	2.5	0.8	5 680	5 890	4 510	1 860	17 000	39				
10	NAST10ZZ	NAST10ZZUU	NAST10ZZR	NAST10ZZUUR	10 ⁰ _{-0.008}	30	16	15.8	23.5	2.5	0.8	9 700	9 670	6 860	2 450	15 000	65				
12	NAST12ZZ	NAST12ZZUU	NAST12ZZR	NAST12ZZUUR	12 ⁰ _{-0.008}	32	16	15.8	25.5	2.5	0.8	10 400	10 900	7 350	2 740	13 000	75				
15	NAST15ZZ	NAST15ZZUU	NAST15ZZR	NAST15ZZUUR	15 ⁰ _{-0.008}	35	16	15.8	29	2.5	0.8	12 300	14 300	8 040	3 140	10 000	83				
17	NAST17ZZ	NAST17ZZUU	NAST17ZZR	NAST17ZZUUR	17 ⁰ _{-0.010}	40	20	19.8	32.5	3	1	17 400	20 900	11 800	3 720	9 500	135				
20	NAST20ZZ	NAST20ZZUU	NAST20ZZR	NAST20ZZUUR	20 ⁰ _{-0.010}	47	20	19.8	38	3	1	19 200	24 500	13 800	4 610	8 500	195				
25	NAST25ZZ	NAST25ZZUU	NAST25ZZR	NAST25ZZUUR	25 ⁰ _{-0.010}	52	20	19.8	43	3	1	20 700	28 400	15 300	5 290	7 000	225				
30	NAST30ZZ	NAST30ZZUU	NAST30ZZR	NAST30ZZUUR	30 ⁰ _{-0.010}	62	25	24.8	50.5	4	1.2	30 300	45 400	22 100	6 660	5 500	400				
35	NAST35ZZ	NAST35ZZUU	NAST35ZZR	NAST35ZZUUR	35 ⁰ _{-0.012}	72	25	24.8	53.5	4	1.2	32 200	50 600	25 700	8 130	5 000	550				
40	NAST40ZZ	NAST40ZZUU	NAST40ZZR	NAST40ZZUUR	40 ⁰ _{-0.012}	80	26	25.8	61.5	4	1.2	35 700	61 100	30 300	9 310	4 000	710				
45	NAST45ZZ	NAST45ZZUU	NAST45ZZR	NAST45ZZUUR	45 ⁰ _{-0.012}	85	26	25.8	66.5	4	1.2	37 100	66 400	31 100	10 100	4 000	760				
50	NAST50ZZ	NAST50ZZUU	NAST50ZZR	NAST50ZZUUR	50 ⁰ _{-0.012}	90	26	25.8	76	4	1.2	38 700	71 800	34 000	11 000	3 500	830				

* Without seals, suitable for grease lubrication. In case of oil lubrication, up to 130% of this value shall be permissible, and 70% of this value shall apply for types with seals.

OUTER RINGS TOLERANCE (Outside diameter) (μm)

TYPE	Cylindrical outer ring	Crowned outer ring
NAST6,NAST8,NAST10	0/-9	0/-50
NAST12,NAST15,NAST17,NAST20	0/-11	0/-50
NAST25,NAST30,NAST35,NAST40	0/-13	0/-50
NAST45,NAST50	0/-15	0/-50