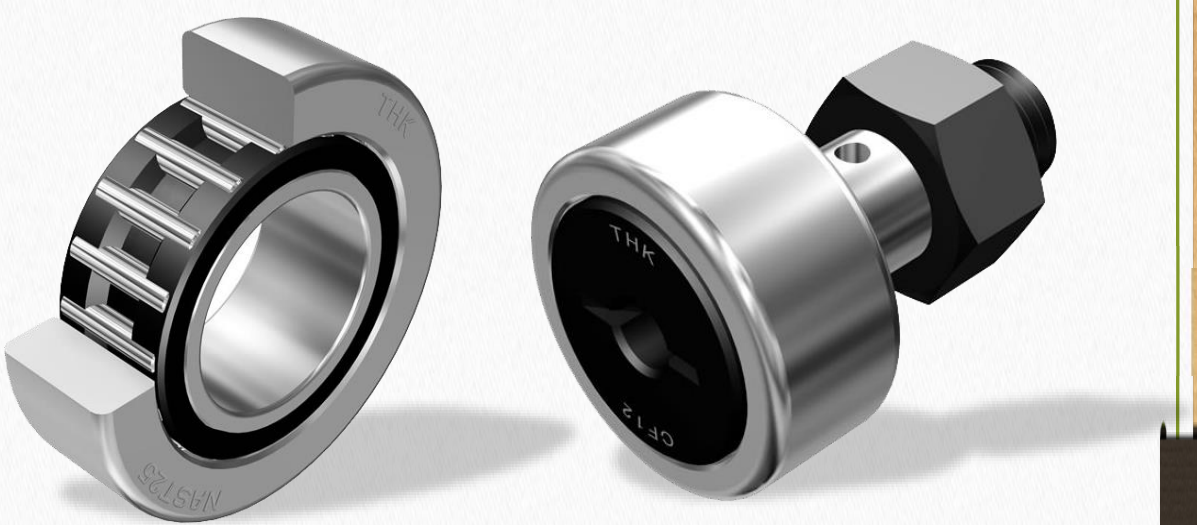
THK
The Mark of Linear Motion



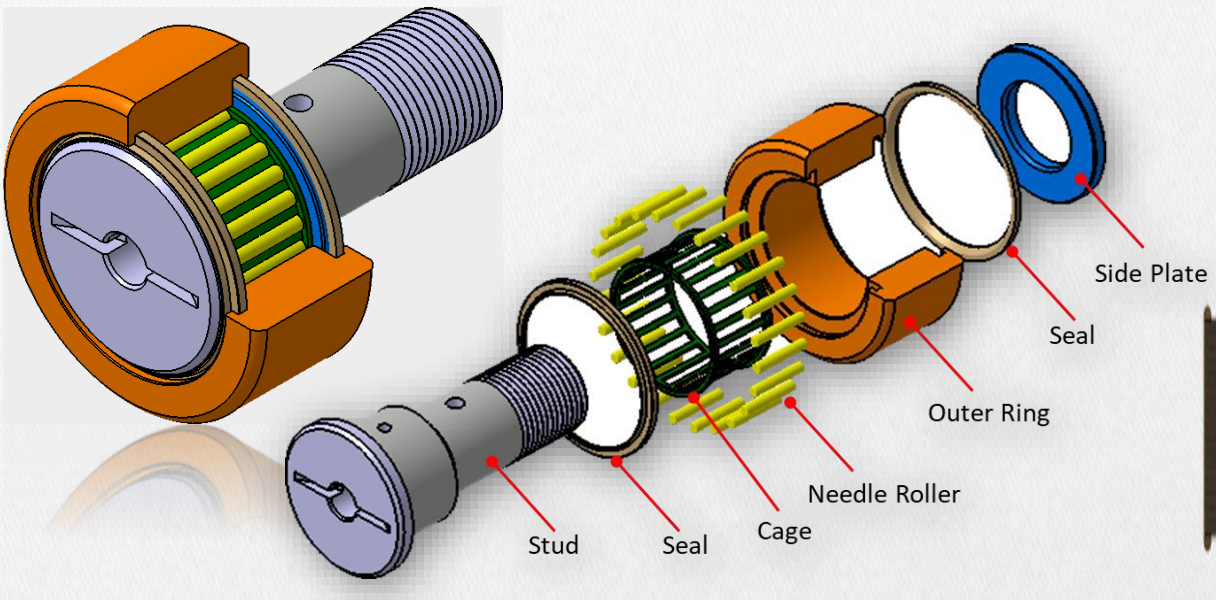
Introduction to THK's Rotational Products

Cam Followers
Roller Followers

CAM FOLLOWER

The Cam Follower is a compact bearing with a high-rigidity shaft and a built-in needle bearing. Most suitable as a guide roller for cam mechanisms and linear motion of automated machines and dedicated machines.

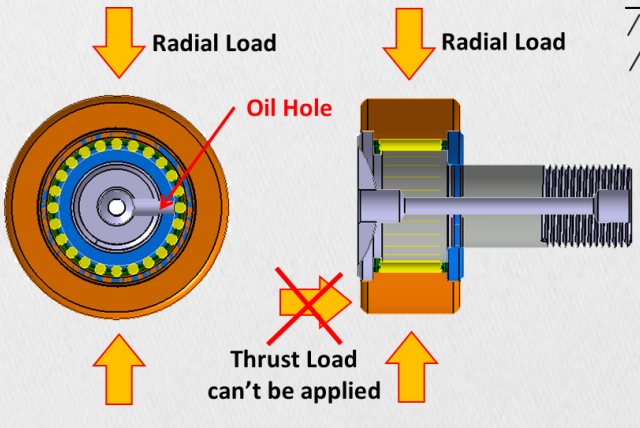
STRUCTURE



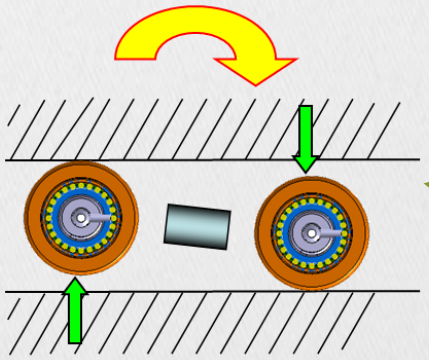
FEATURES

1. LOADING DIRECTION

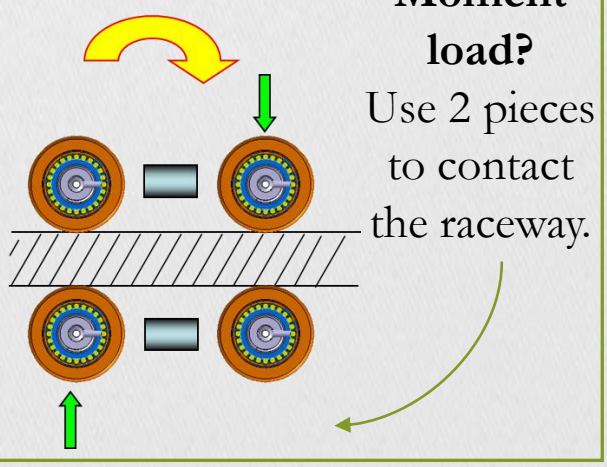
Cam follower can handle only radial load



※ Oil hole of stud should not enter the loading zone



Moment load?
Use 2 pieces to contact the raceway.



FEATURES

2. STANDARD GREASE

Model	Grease
CF,CFH,CFT,CFS, CF-SFU,NUCF	Shell Alvania Grease S2
CFN	AFC Grease

3. GRASE NIPPLE

The grease nipple will be attached, please add the symbol "N" to the end of the part number.
The attachment for the grease gun unit MG70 varies according to the model of cam followers.

Example: CF 10 UUR -N

Dedicated grease nipple

Table Grease nipple correspondence table

Model number Stud diameter(mm)		Nipple	Attachment Type
CF-AB		Embedded(Note1)	Type P
CF	5	NP3.2×3.5	Type N
	6 or more	PB1021B	Type N
CF-A		—(Note2)	—
CFH-AB		Embedded(Note1)	Type P
CFH-A		—(Note2)	—
CFN-A	10 or less	—(Note2)	—
	12	NP6×5	Type N
CFT	12 or less	A-M6F,B-M6F,C-M6F	Type H
	16 or more	A-PT1/8,B-PT1/8,C-PT1/8	Type H
CFS		—(Note2)	—
CF-SFU	6 to 10	PB1021B	Type N
	12 to 18	NP6×5	Type N
	20	NP8×9	Type N
NUCF-AB		Embedded(Note1)	Type P

Note1) CF(H)-AB and NUCF-AB models are pre-fitted with grease nipples. These models come with grease nipples attached even if "N" is not added to the model number when ordering.
Note2) Cannot re-grease

FEATURES

4. RADIAL CLEARANCE

The radial clearance of Cam Followers are based on the values indicated in the table below.
Both **full-roller type** and **caged type** share the same radial clearance.

Table Radial Clearance Unit: μm

CF, CFN, CFH, CFT, CF-SFU	Radial Clearance (Caged type and full-roller type)	
Stud diameter	Min.	Max.
3 to 4	3	17
5 to 8	5	20
10 to 12−1	5	25
16 to 20−1	10	30
24 to 30−2	10	40

Table Radial clearance for model CFS Unit: μm

Stud diameter	Radial Clearance (Caged type and full-roller type)	
	Min.	Max.
2.5 to 5	3	17
6	5	20

Table Radial clearance for model NUCF Unit: μm

Stud diameter	Radial Clearance	
	Min.	Max.
16 to 24	0	25
24-1 to 30-2	5	30

5. ACCURACY

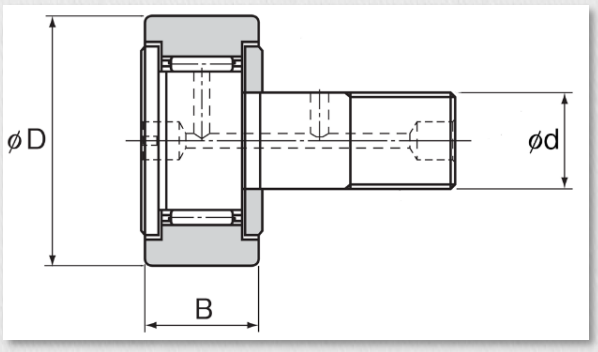
Cam Followers are manufactured with accuracies.

		CF,CFH,CFT,CFS, CF-SFU,NUCF	CFS
The cylindrical outer ring in outer diameter	D	Left Table	0 / -0.008
The spherical outer ring in outer diameter	D	0 / -0.05	---
The Cam Follower in stud diameter	d	h7	h6
The outer ring in width	C	0 / -0.12	0 / -0.12
Radial runout tolerance of the outer ring		Right Table	15μm

Table Accuracy of the Outer Ring (JIS Class 0)
Unit: μm

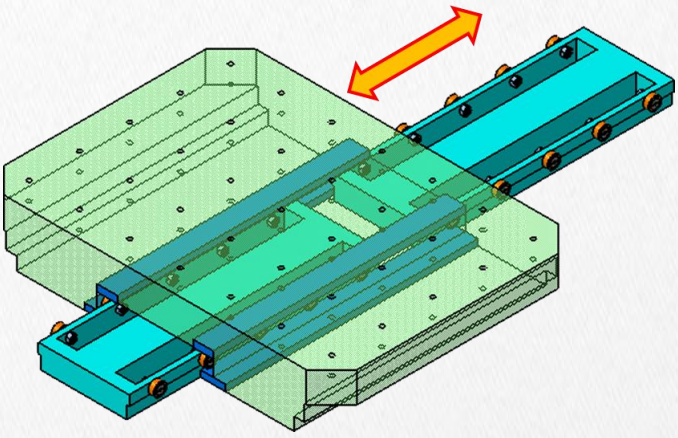
Nominal dimension of the bearing outer diameter (D) (mm)		Tolerance of the bearing in outer diameter (Dm) (note)		Tolerance of the outer ring in radial runout (max)
Above	Or less	Upper	Lower	
6	18	0	–8	15
18	30	0	–9	15
30	50	0	–11	20
50	80	0	–13	25
80	120	0	–15	35

Note) "Dm" represents the arithmetic average of the maximum and minimum diameters obtained in measuring the bearing outer diameter at two points.

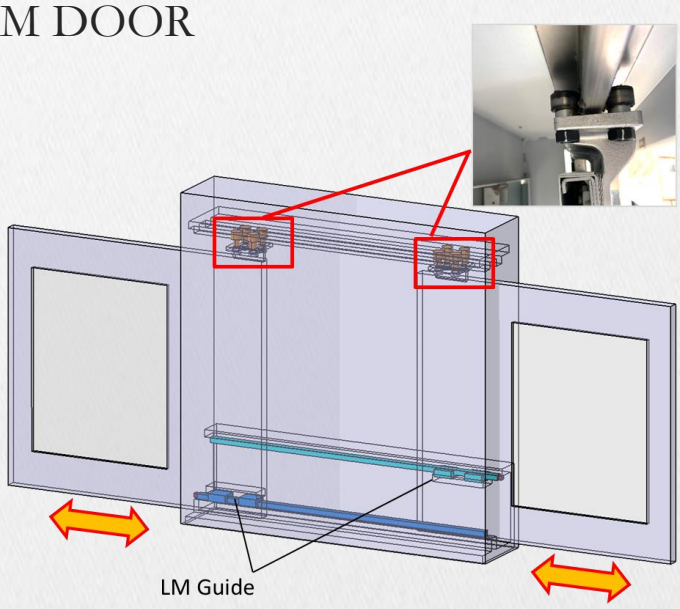


APPLICATION EXAMPLES

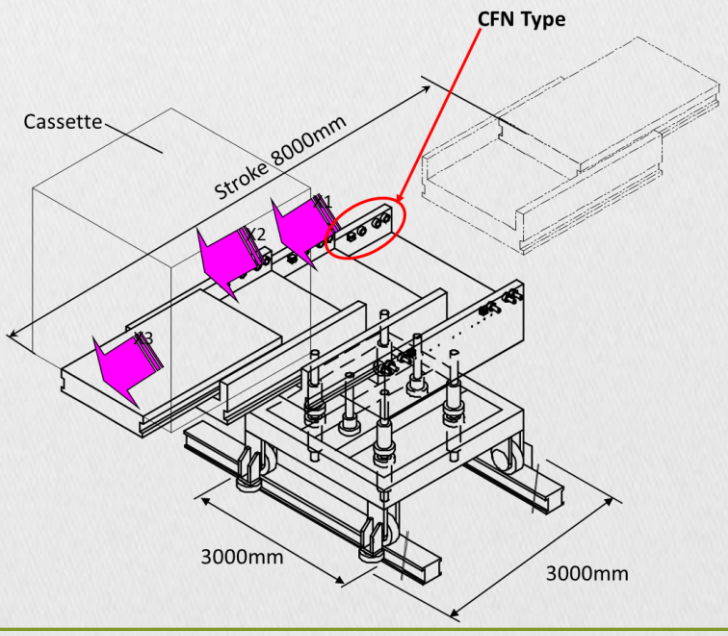
1. PALETTE CHANGER



2. PLATFORM DOOR



3. GLASS SUBSTRATE CONVEYANCE DEVICE

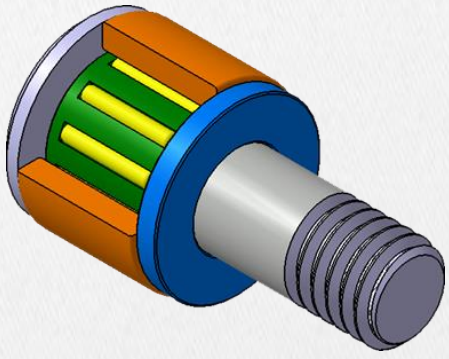


LINE-UP OF CAM FOLLOWERS

TYPES AND MODELS

	Standard **Model CF**	Eccentric **Model CFH**	Containing Thrust Balls **Model CFN**	Outer-ring Compact-type **Model CFS**	Easy-mount **Model CF-SFU**	Double-row Cylindrical-roller **Model NUCF**
Hexagon Socket (both) & Grease Nipple Embedded **(-AB)**	CF-AB	CFH-AB	-	-	-	NUCF-AB
Driver Groove on the Head of the Stud **(No Symbol)**	CF	CFH	-	-	CF-SFU	-
Hexagon Socket on the Head of the Stud **(-A)**	CF-A	CFH-A	CFN-A	CFS-A	-	-
Tapped Hole for Greasing **(-T)**	CFT	-	-	-	-	-

Other types are “Stainless steel (-M)” and ”Full rollers (-V)”.



Compact Outer Ring Model (CFS)

FEATURES

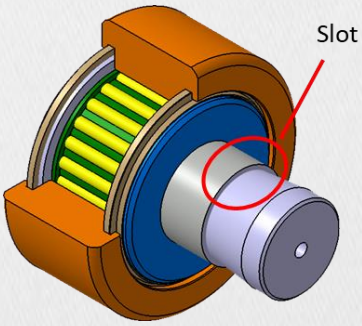
This Cam Follower contains extremely fine needle rollers. The outer ring external diameter is extremely small relative to the stud diameter, allowing a compact design.

Stud Diameter : φ2.5 ～ φ6

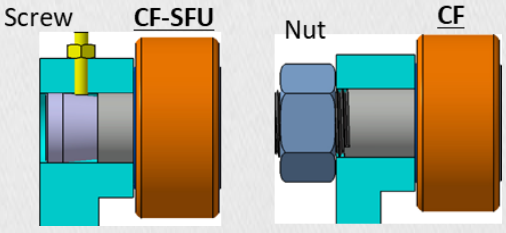
Note:

No greasing hole due to its compactness.

Therefore, it is not suitable where re-lubrication is required.



Example of mounting



Easy-Mount Model (CF-SFU)

FEATURES

For easy mounting, the stud is equipped with a slot enabling it to be secured with a screw. This greatly reduces the time and labor required for installation and is ideal for applications where there is no space to secure the stud with a nut.

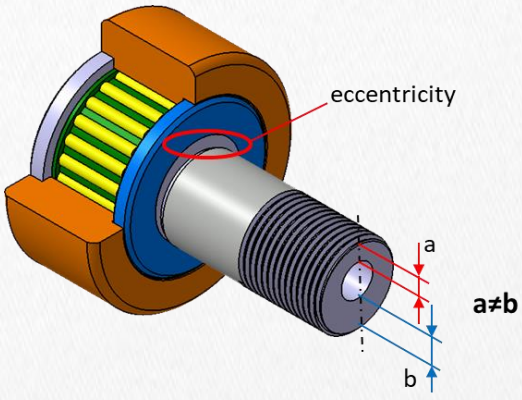
Stud Diameter : φ6 ～ φ20

Note:

Since fastening force is lower than that of nut, it is not suitable where vibration occurs.

LINE-UP OF CAM FOLLOWERS

TYPES AND MODELS



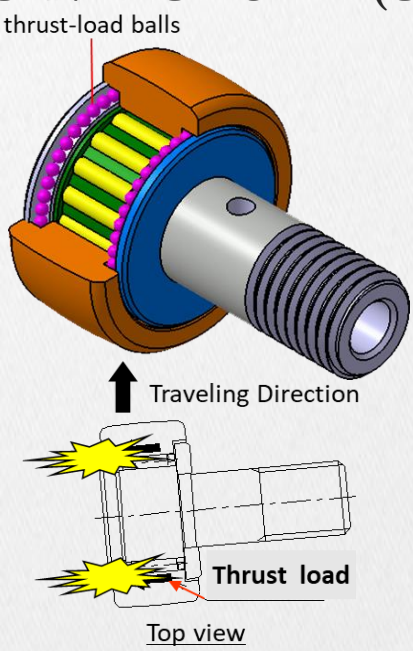
ECCENTRIC MODEL (CFH)

FEATURES

Slight positioning adjustments can be easily made simply by rotating the stud. Since there is eccentricity of 0.25 to 1.0 mm between the mounting shaft of the stud and the stud head.

This eliminates the need to align the cam follower with the cam groove or perform precision machining on the mounting hole, greatly reducing the time and effort required for machining and assembly.

Stud Diameter : φ6 ～ φ30



THRUST BALLS MODEL (CFN)

FEATURES

On the inside, this Cam Follower model is equipped with thrust-load ball bearings. This effectively prevents friction and wear on the slip surface when a thrust load occurs due to faulty installation or the like.

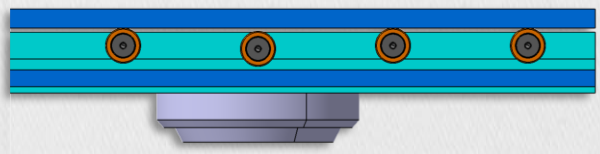
Note:
Only small thrust load caused by mounting error can be received.

Thrust component of force should not be applied (at design stage) and , at the assembling.

Stud Diameter: φ5 ～ φ12
(Special : φ16～φ20)

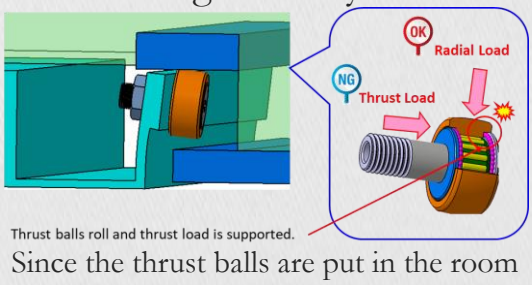
When is the eccentric model (CFH) most effective?

In a case where the quantity of cam followers used per row is large.



When is the thrust balls model (CFN) most effective?

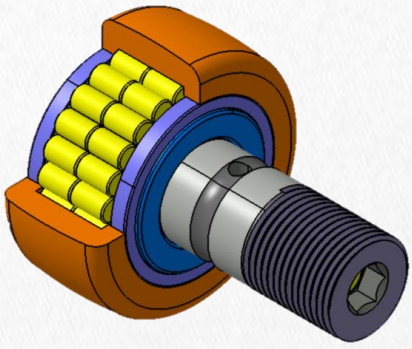
In a case where the rigidity of the peripheral mating member and machining accuracy is low.



Since the thrust balls are put in the room where the seal is installed, seal can't be installed on CFN Model.

LINE-UP OF CAM FOLLOWERS

TYPES AND MODELS



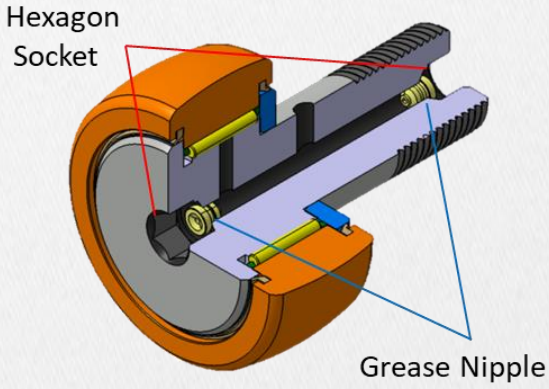
CYLINDRICAL-ROLLER (NUCF)

FEATURES

This model, which employs a double row of cylindrical rollers, can accommodate high radial loads.

Stud Diameter : φ16 ～ φ30

STUD SHAPE



HEXAGON SOCKET & GREASE NIPPLE SYMBOL: "AB"

FEATURES

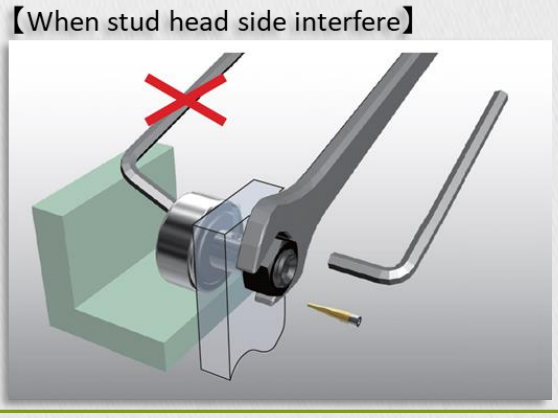
A hexagonal socket is provided on both stud ends, and a grease nipple for greasing is fitted to the inside. Therefore, lubrication and mounting from both directions are possible.

Mounting and maintenance are available as no worry about mounting space, so the operation efficiency will be improved as plug or nipple are not required.

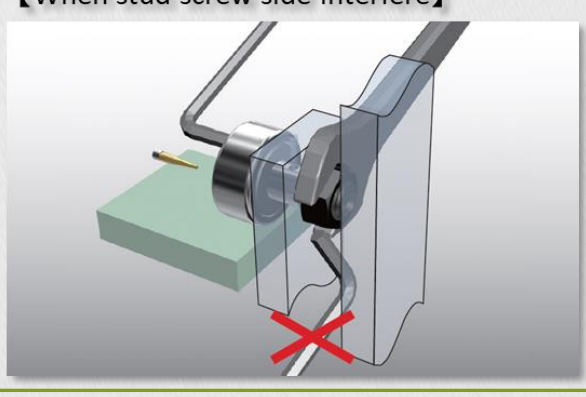
Stud Diameter: CF, CFH

φ12 ～ φ30
NUCF φ16 ～ φ30

【When stud head side interfere】

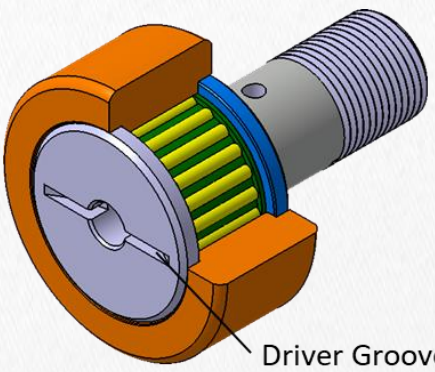


【When stud screw side interfere】



LINE-UP OF CAM FOLLOWERS

STUD SHAPE

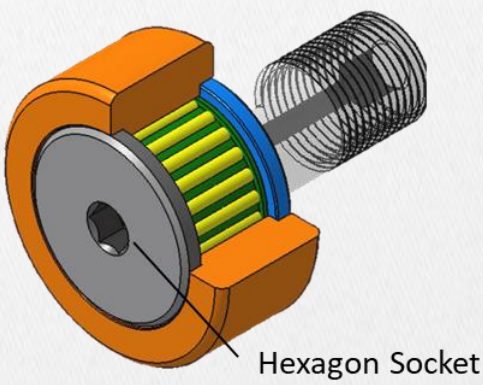


DRIVER GROOVE ON THE HEAD OF THE STUD MODEL

FEATURES

It is a popular type of Cam Follower provided with a driver

Stud Diameter: φ5 ~ φ10 groove on the head of the stud.

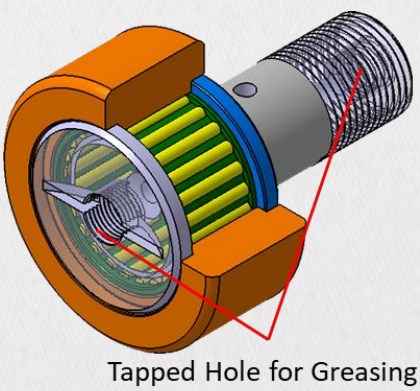


HEXAGON SOCKET ON THE HEAD OF THE STUD MODEL SYMBOL "A"

FEATURES

Since the stud head has a hexagon socket, this type can easily be installed using a hexagon wrench.

Stud Diameter:
φ3 ~ φ10

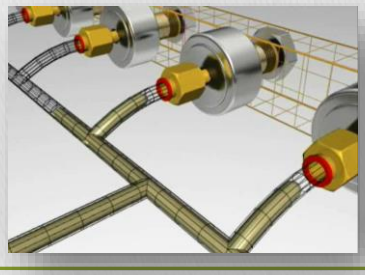


TAPPED HOLE FOR GREASING SYMBOL "T"

FEATURES

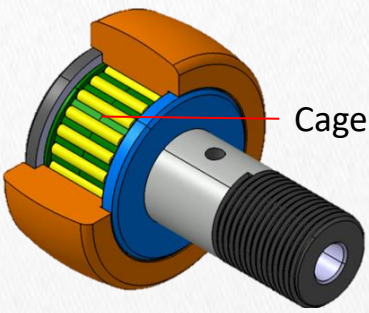
Basically, same as the popular type Cam Follower, this model is provided with tapped holes for piping on the stud head and the thread. It is optimal for locations where an integrated piping for greasing is required.

Stud Diameter:
φ6 ~ φ30



CAM FOLLOWER OPTIONS

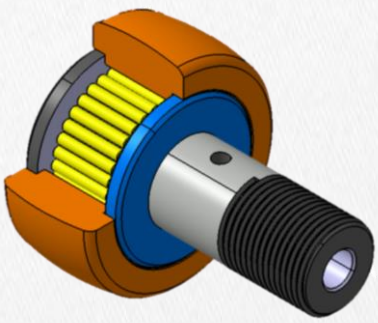
ROLLERS



WITH CAGE

FEATURES

The cage prevents the product from skewing of the rollers. The caged format offers optimal lubrication conditions due to larger space volume which enables to lubricate more grease than that of full roller type, is suitable for high-speed rotation.



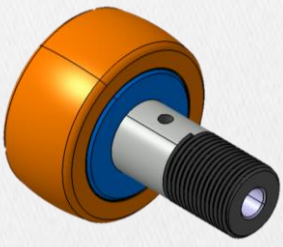
FULL ROLLERS: SYMBOL "V"

FEATURES

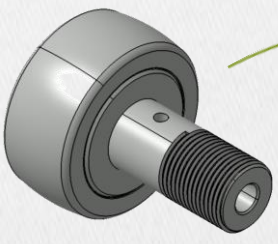
The full-complement roller format is best for low-speed rotation and heavy loads.

Note: Please make sure to follow the lubrication schedule. Stud diameter of 5 mm or less and CFN type are not available for full roller type.

MATERIALS



CARBON STEEL



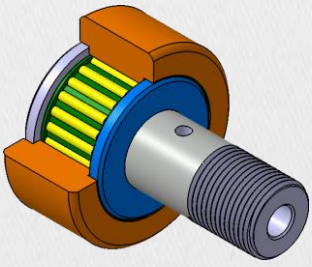
STAINLESS STEEL: SYMBOL "M"

FEATURE

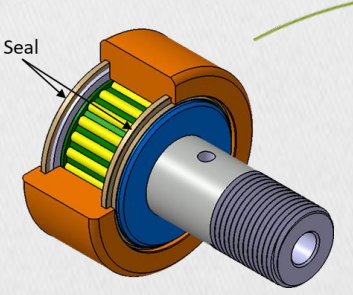
Suitable for non-oily place, water scattering environment and clean room.

* No SUS type for model CFN, CF-SFU and NUCF

SEALS



WITHOUT SEAL



WITH SEAL: SYMBOL "UU"

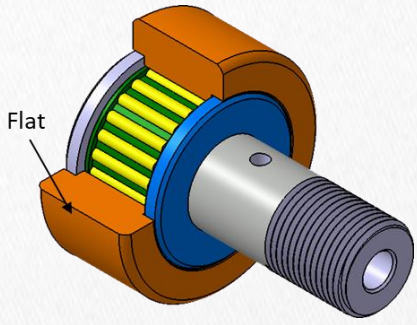
FEATURES

Equipped with a highly wear-resistant synthetic rubber seal to keep foreign matters out of the cam followers' interior.

* Model CF-SFU comes with seal even if without symbol "UU"

CAM FOLLOWER OPTIONS

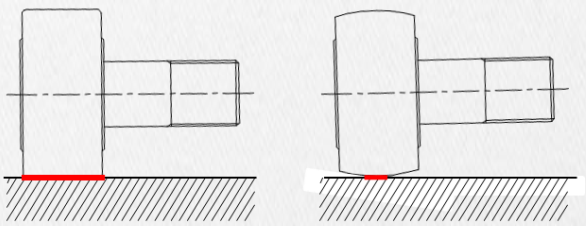
SHAPE OF OUTER RING

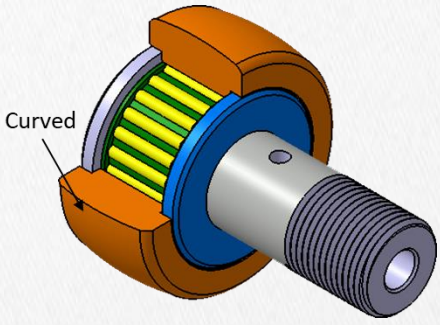


CYNDRICAL OUTER RING

FEATURES

This model offers an expansive area of contact between rolling surfaces and is therefore ideal for heavy loads and low-rigidity rolling surfaces.

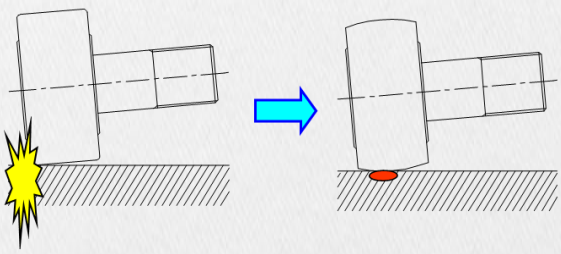




SPERICAL OUTER RING: SYMBOL "R"

FEATURES

This helps alleviate the effects of an eccentric load in the event of adverse conditions around the outer ring and rolling surface.



MODEL NUMBER CODING

- Model
  CF, CFH, CFN, CFT, CFS

CF12	V	M	UU	R	-A	N
Model	①	②	③	④		

N: No symbol: No grease nipple
N: Dedicated grease nipple included

-A: No symbol: Flat-head Slot
-A: Stud head with a hexagon socket

- Model
  CF-AB

CF12	V	M	UU	R	-AB

-AB : Stud With Hexagonal Socket At Both Ends

- Model
  NUCF-AB

NUCF16	R	-AB

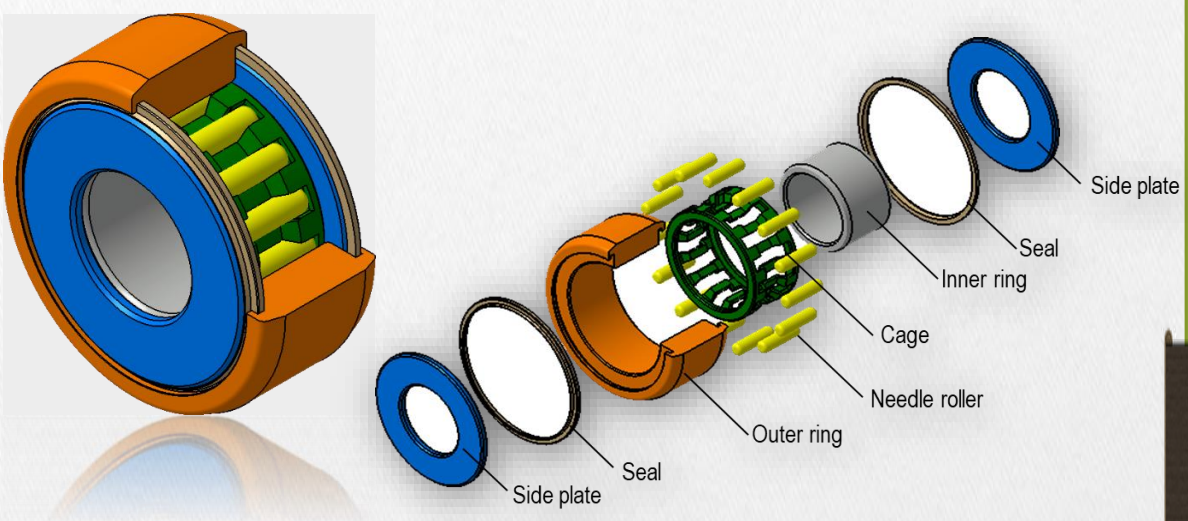
①	②	③	④
No symbol : With cage V: Full-roller type	No symbol: Carbon steel M: Stainless steel	No symbol: Without seal UU : With seal	No symbol: Cylindrical outer ring R: Spherical outer ring

*** Since availability of options vary depending on the model, please refer to the classification table for details.**

ROLLER FOLLOWER

The Roller Follower is a compact and highly rigid bearing system. It contains needle bearings and is used as a guide roller for cam discs and straight motion. Since its outer ring rotates while keeping direct contact with the mating surface, this product is thick-walled and designed to bear an impact load.

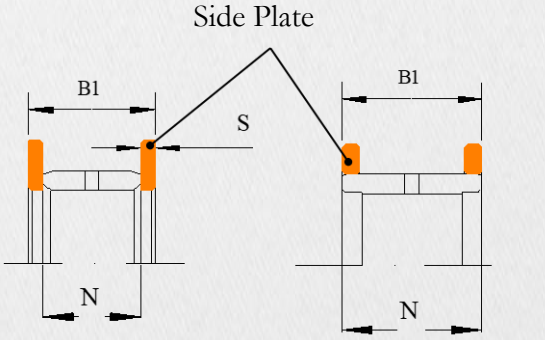
STRUCTURE



FEATURES OF ROLLER FOLLOWER

1. USING NAST-ZZ and NART

Comparison of width tolerance



NAST-ZZ (Separable Type) | NART (Non-Separable Type)

NAST-ZZ :
Inner ring width N and tolerance including of width of side plate 2 × S.

NART :
Width B1 and Inner ring width N are same.

Tolerance of B1 of NART is smaller than that of NAST-ZZ.

To assemble into U-shaped housing, which is better, NAST-ZZ or NART?

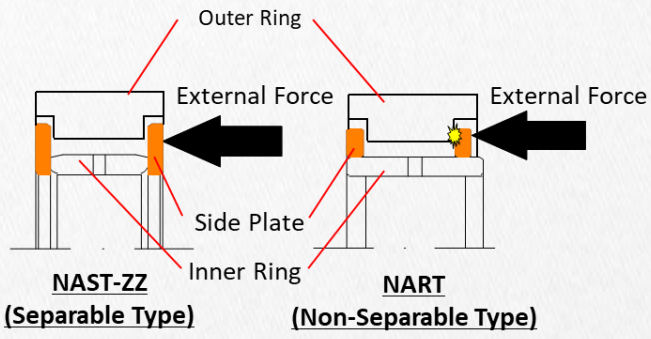
NAST-ZZ (Separable Type) | NART (Non-Separable Type)

Groove dimension W Roller follower fit in NART is narrow W tolerance acceptable.
NART is better as can minimize the clearance in width direction

FEATURES OF ROLLER FOLLOWER

1. USING NAST-ZZ and NART

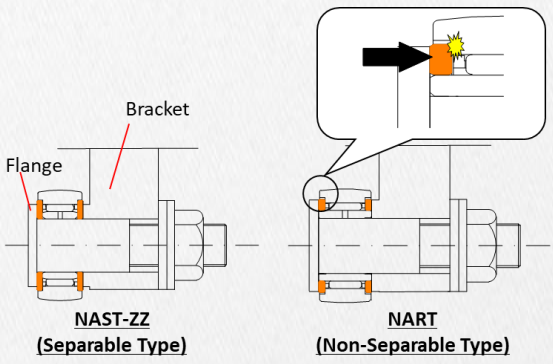
When external force is applied at side plate



NAST-ZZ :
Side plate will not be misaligned as inner ring is hitting the end.

NART :
Inner ring is just press fitted in side plate, side plate will remove, then cause the rotation error by hitting strongly to outer ring.
NART can not accept external force.

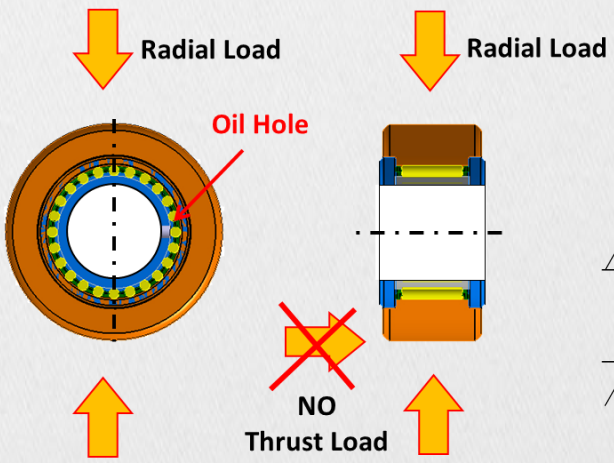
When fastened with the stud, which one is better?



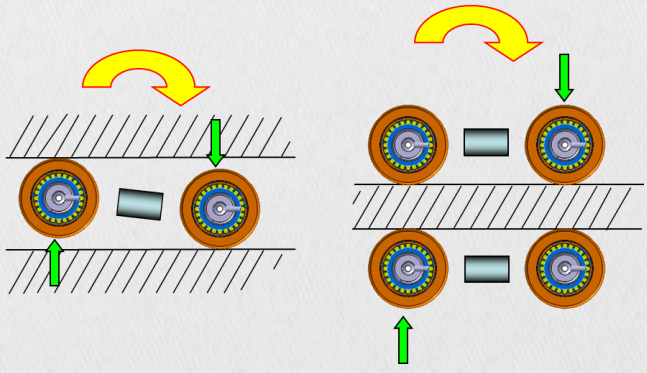
When hitting face shape is inaccurate, flange portion or side plate of bracket screw shaft force of stud will cause external force. Side plate of NART may move inside which will cause the rotation error. Therefore, NAST-ZZ is more suitable when connecting with the stud.

2. USING NAST-ZZ and NART

Roller followers can handle only radial load.



Moment load?
Use 2 pieces to contact at the raceway.



※ Oil hole should not enter the loading zone.

FEATURES OF ROLLER FOLLOWER

3. STANDARD GREASE

Model	Grease
NAST, RNAST	No Grease
NAST-ZZ, NART, NURT	Shell Alvania Grease S2

4. RADIAL CLEARANCE

The radial clearance of Roller Followers is based on the value indicated in Table. Both full-roller type and caged type share the same radial clearance.

Model NAST, NAST-ZZ Unit: μm

Model No.	Radial clearance (with cage)	
	Min.	Max.
6	5	20
8 to 12	5	25
15 to 25	10	30
30 to 40	10	40
45 to 50	15	50

Model NURT Unit: μm

Model No.	Radial Clearance	
	Min.	Max.
15 to 30-1	0	25
35 to 40-1	5	30
45 to 50-1	5	35

Model NART Unit: μm

Model No.	Radial clearance (caged type and full-roller type)	
	Min.	Max.
5 to 6	5	20
8 to 12	5	25
15 to 20	10	30
25 to 40	10	40
45 to 50	15	50

5. ACCURACY

The spherical outer ring in outer diameter	D	0 / -0.05
The model RNAST in inscribed bore diameter	dr	F6
The model NART and NURT in bearing width	B	Right Table
Accuracy of the inner ring and accuracy of the outer ring in width		Left Table
Accuracy of the outer ring		Center Table

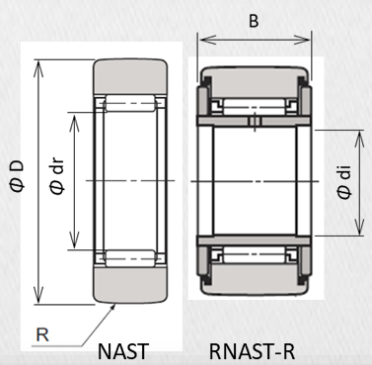


Table Dimensional tolerance of model NART and NURT in bearing width B Unit: μm

Model No.	Dimensional tolerance (h12)	
	Min.	Max.
5 to 12	0	–0.18
15 to 35	5	–0.21
40 to 50	5	–0.25

Table Accuracy of the Inner Ring and Accuracy of the Outer Ring in Width (JIS Class 0) Unit: μm

Nominal dimension of the bearing inner diameter (di) (mm)		Tolerance of the bearing in outer diameter (dm) (note)		Tolerance of the inner ring (or outer ring) in width		Tolerance of the inner ring in radial runout (max)
Above	Or less	Upper	Lower	Upper	Lower	
2.5	10	0	–8	0	–120	10
10	18	0	–8	0	–120	10
18	30	0	–10	0	–120	13
30	50	0	–12	0	–120	15

Note) "dm" represents the arithmetic average of the maximum and minimum diameters obtained in measuring the bearing inner diameter at two points.

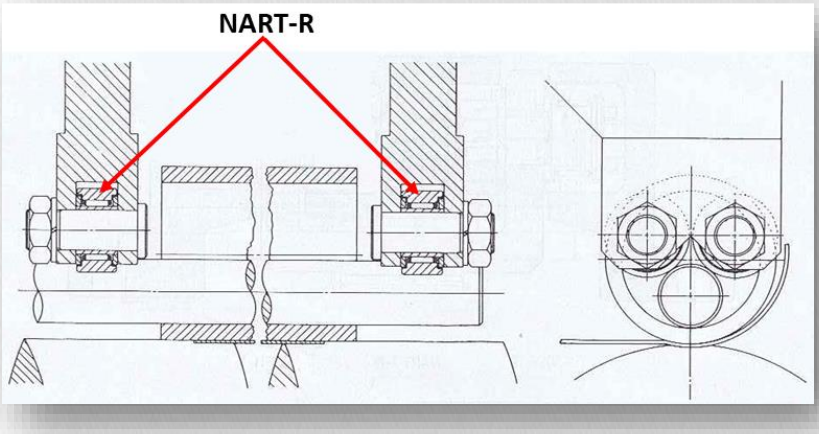
Table Accuracy of the Outer Ring (JIS Class 0) Unit: μm

Nominal dimension of the bearing outer diameter (D) (mm)		Tolerance of the bearing in outer diameter (Dm) (note)		Tolerance of the outer ring in radial runout (max)
Above	Or less	Upper	Lower	
6	18	0	–9	15
18	30	0	–9	15
30	50	0	–11	20
50	80	0	–13	25
80	120	0	–15	35

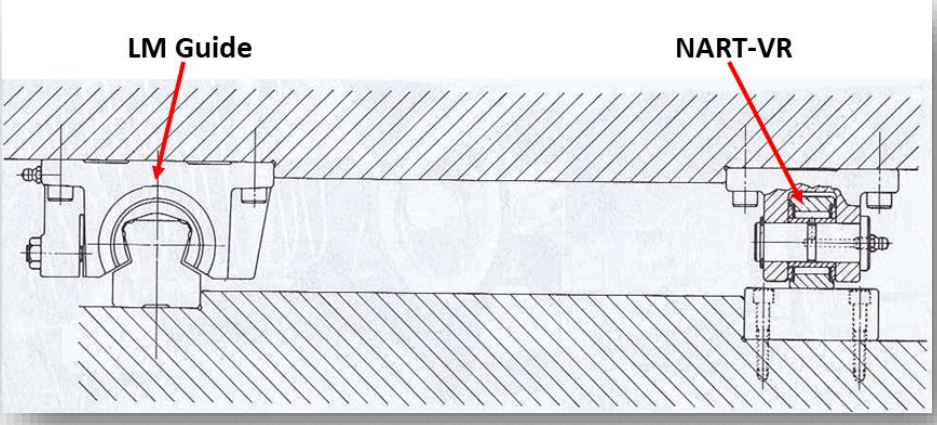
Note) "Dm" represents the arithmetic average of the maximum and minimum diameters obtained in measuring the bearing outer diameter at two points.

APPLICATION EXAMPLES

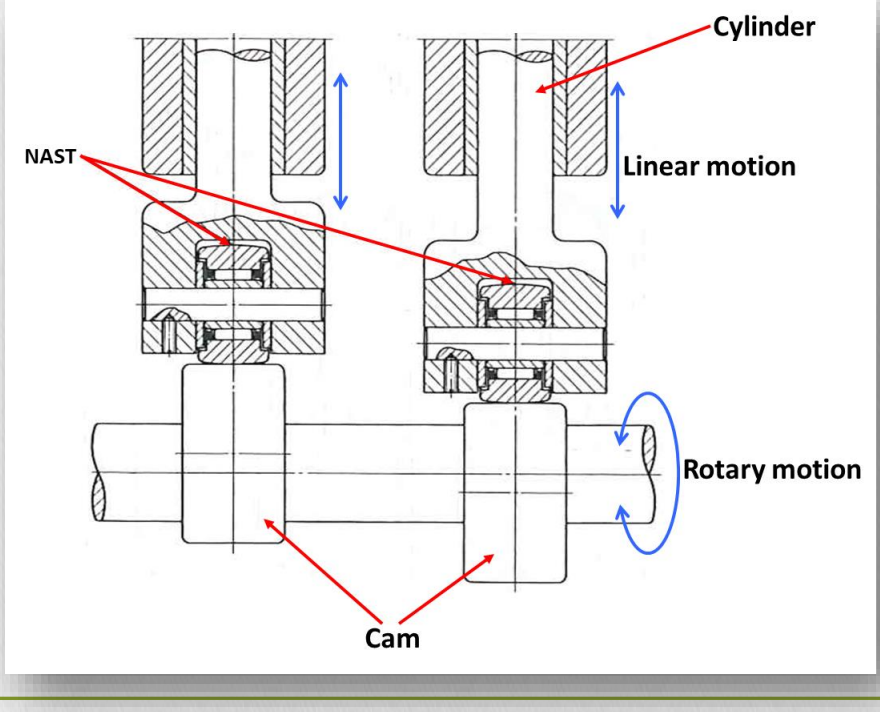
1. NART-R･･･PIPE FORMING APPLICATION



2. NART-VR･･･GUIDE FOR WIDE TABLE



3. NAST･･･VALVES

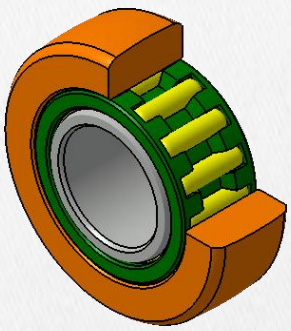


LINE-UP OF ROLLER FOLLOWERS

TYPES AND MODELS

Type		Separable Model - **NAST**			Non-Separable Model - **NART**		Double-row Cylindrical Rollers **NURT**
Type of Outer Ring	W/ WO Seal	Standard **(No Symbol)**	With Side Plates **(-ZZ)**	No Inner Ring **(R-)**	With Cage **(No Symbol)**	Full Rollers **(-V)**	
Cylindrical Outer Ring **(No Symbol or -X)**	Without Seal **(No Symbol)**	NAST	NAST-ZZ	RNAST	NART	NART-V	NURT-X
	With Seal **(-UU)**	-	NAST-ZZUU	-	NART-UU	NART-VUU	-
Spherical Outer Ring **(-R)**	Without Seal **(No Symbol)**	NAST-R	NAST-ZZR	RNAST-R	NART-R	NART-VR	NURT-R
	With Seal **(-UU)**	-	NAST-ZZUUR	-	NART-UUR	NART-VUUR	-

Other type is Stainless steel (-M)

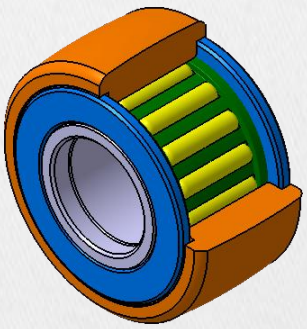


SEPARABLE TYPE (NAST)

FEATURES

Model NAST is a separable type of bearing system that combines a thick-wall outer ring, an inner ring and needle rollers equipped with a precision cage.

Inner diameter : φ6～φ50

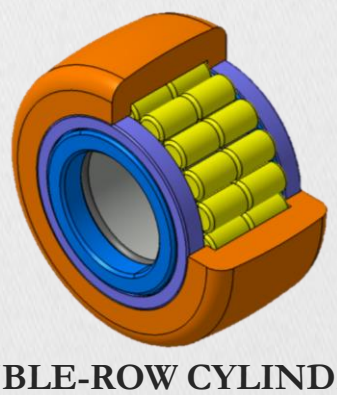


NON-SEPERABLE TYPE (NART)

FEATURES

This model is a non-separable type of bearing system whose inner ring is fixed to the side plates.

Inner diameter : φ5～φ50



DOUBLE-ROW CYLINDRICAL ROLLERS (NURT)

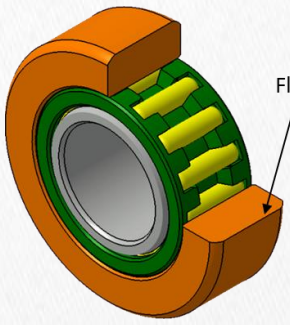
FEATURES

This model, which employs a double row of cylindrical rollers, can accommodate high radial loads.

Inner diameter : φ15～φ50

LINE-UP OF ROLLER FOLLOWERS

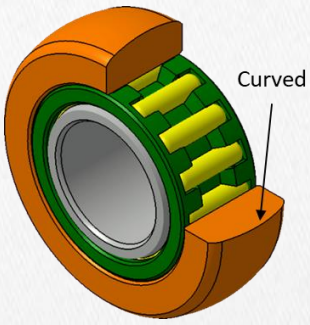
TYPES OF OUTER RING



CYNDRICAL OUTER RING (NO SYMBOL, "-X")

FEATURES

This model offers an expansive area of contact between rolling surfaces and is therefore ideal for heavy loads and low-rigidity rolling surfaces.

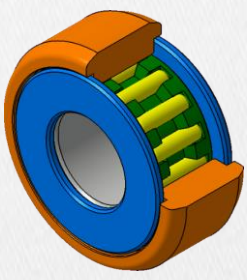


SPHERICAL OUTER RING ("-R")

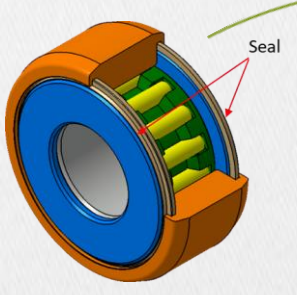
FEATURES

This helps alleviate the effects of an eccentric load in the event of adverse conditions around the outer ring and rolling surface.

SEALS



WITHOUT SEAL

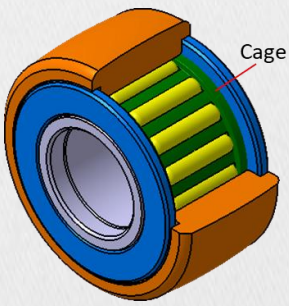


WITH SEAL: SYMBOL "-UU"

FEATURES

Equipped with a highly wear-resistant synthetic rubber seal to keep foreign matter out of the roller Followers' interior.

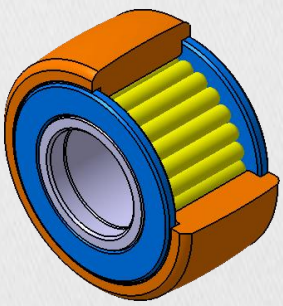
CAGES



WITH CAGE

FEATURES

The caged format, which offers optimal lubrication conditions, is best for high-speed rotation.



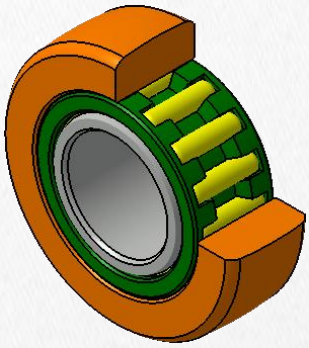
FULL ROLLERS (-V)

FEATURES

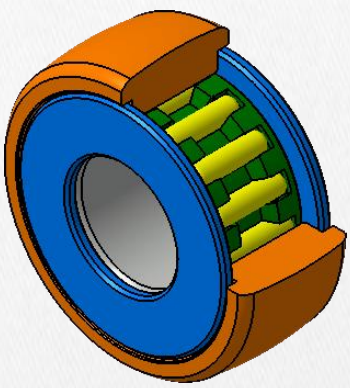
The full-complement roller format is best for low-speed rotation and heavy loads.

LINE-UP OF ROLLER FOLLOWERS

TYPE OF SHAPE (SEPARABLE MODEL: NAST)



STANARD

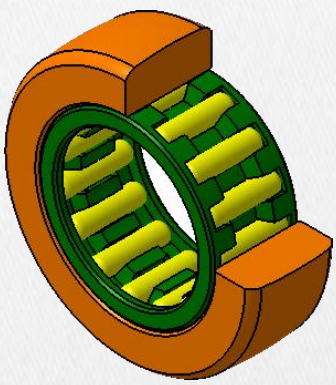


WITH SIDE PLATES (-ZZ)

FEATURES

This separable type of bearing system has a labyrinth seal consisting of a pair of side plates formed on both sides of the inner ring of model NAST.

Inner diameter: φ6～φ50



NO INNER RING (R-)

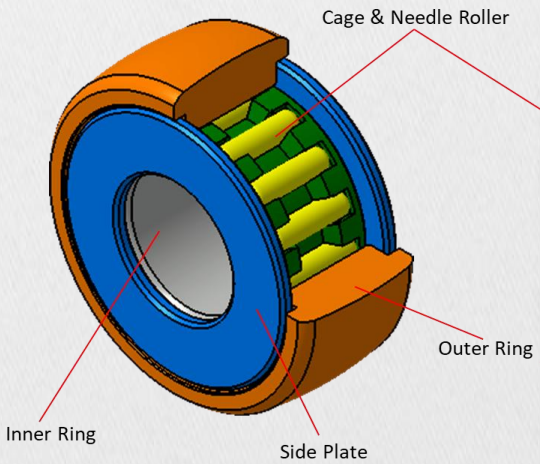
FEATURES

The structure is such that the shaft and roller come into contact.

When using this type, pay attention to the hardness and surface roughness of the shaft, and fitting tolerance.

Inner diameter: φ7～φ60

SEPARABLE MODEL: NAST-ZZ



LINE-UP OF ROLLER FOLLOWERS

MODEL NUMBER CODING

- Model
  NAST, RNAST

NAST25	M				R
Model	①		②	③	④

- Model
  NAST-ZZ

NAST25	M	ZZ	UU		R

- Model
  NART-ZZ

NART25	M		UU	V	R

- Model
  NURT

NURT25					X

①	②	③	④
No symbol : Carbon steel M: Stainless steel	No symbol : Without seal UU : With seal	No symbol : With cage V: Full-roller type	No symbol or X: Cylindrical outer ring R: Spherical outer ring

If you would like to learn more about our Cam and Roller Followers, contact us today!

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Roller Follower Information