CAM FOLLOWERS

Cam follower with pre-installed grease nipple

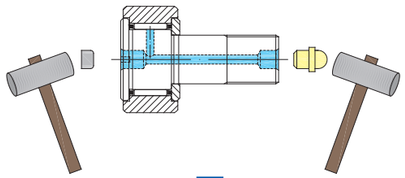
Newly available versatile cam follower which has conquered disadvantages in traditional products!!

CF..AB Standard type | **CF..MAB** Stainless type | **CFH..AB** Eccentric type | **CFH..MAB** Eccentric stainless type

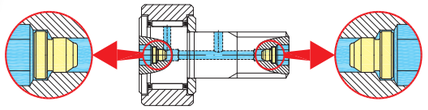
Ready use instantly after unpack the box thanks to pre-installed grease nipple.

Lubrication available from both stud head side and thread side.No restriction for mounting location.

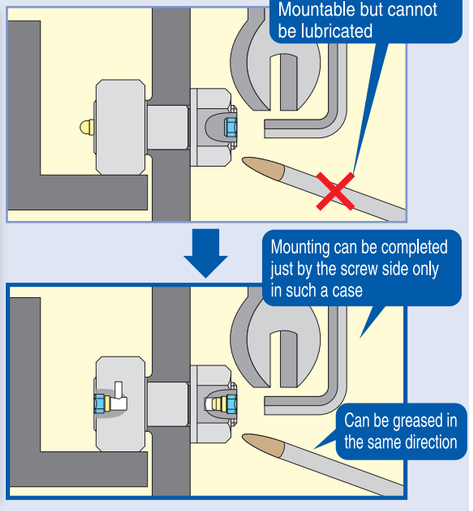
•Conventional type: Need to fit a nipple



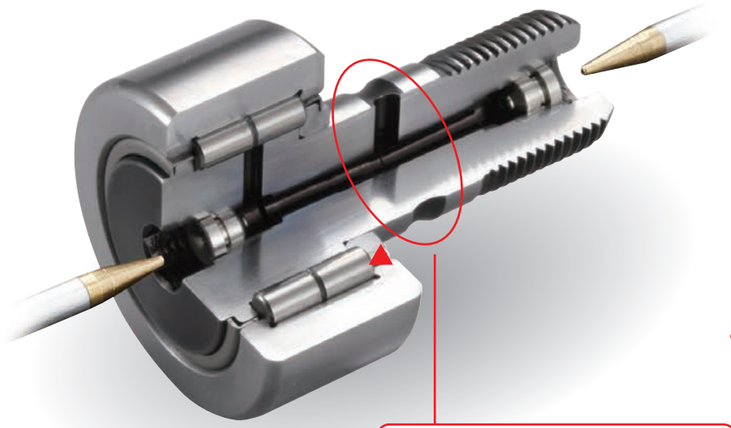
•Grease nipple fitted



No restriction for mounting location thanks to hexagon socket shape in stud head and thread side.Easy mounting and removal is available thanks to having hexagon socket shape in both side.

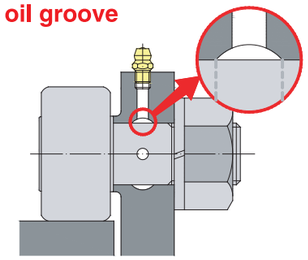


NUCF..AB Double-row cylindrical roller type | stud diameter **16 to 30mm**

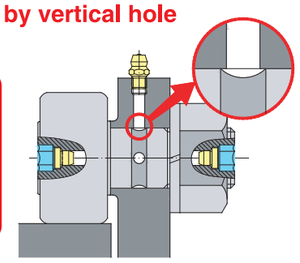


Lubrication area at the side of stud has an oil groove to eliminate bothersome groove machining process in the mounting side(NUCF type).

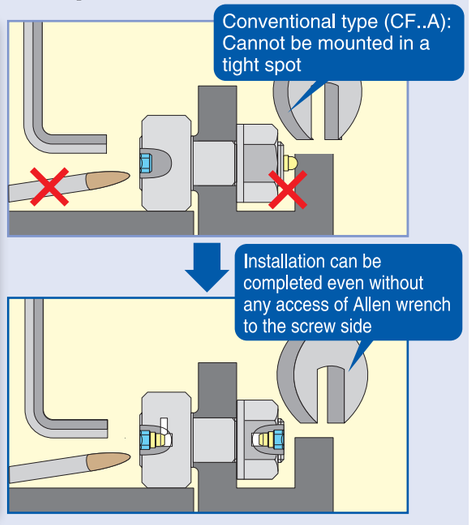
•Need to machine an internal oil groove



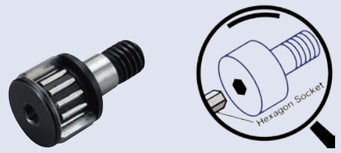
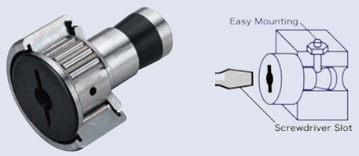
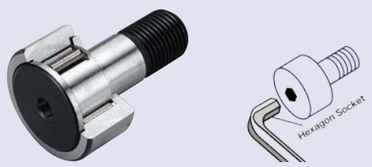
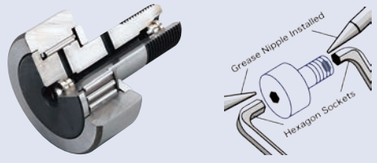
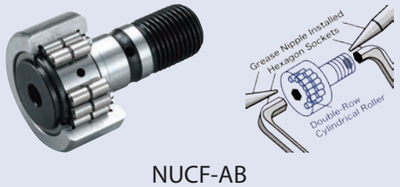
•Lubrication enabled only by vertical hole

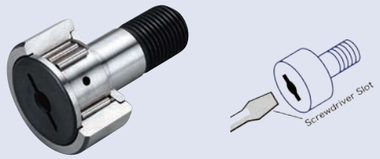
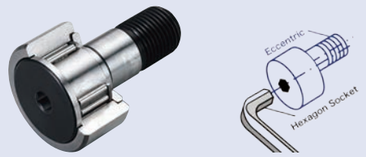
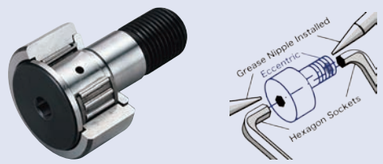
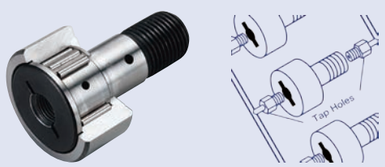


No restriction for mounting location thanks to hexagon socket shape in stud head and thread side.Easy mounting and removal is available thanks to having hexagon socket shape in both side.



Type and Part Code

Type	Applicable axis diameter	Feature	Part Code
 CFS Minuature type	ϕ 2.5 ~ ϕ 6	Built-in very thin needle roller. Enables compact design due to very small outer ring diameter in comparison to stud diameter.	**CFS** (Type) **6** (Stud diameter) **V** (**V**: Full complement / **None**: With cage) **A** (**A**: With hexagon socket on the stud head)
 CF-SFU Easy mounting type	ϕ 6 ~ ϕ 20	A type with step on stud to allow easy mounting. Optimal for devices with limited space for stud tightening. Available with seals only.	**CF-SFU** (Type) **16** (Stud diameter) **V** (**V**: Full complement / **None**: With cage) **R** (**R**: Crowned outer ring / **None**: Cylindrical outer ring)
 CF-A Standard type Hexagon socket on stud head	ϕ 3 ~ ϕ 10	Hexagon socket on the stud head. Easy mounting with hex-wrench.	**CF** (Type) **8** (Stud diameter) **V** (**V**: Full complement / **None**: With cage) **UU** (**UU**: Sealed type / **None**: Shield type) **R** (**R**: Crowned outer ring / **None**: Cylindrical outer ring) **A** (**A**: With hexagon socket on the stud head)
 CF-AB Standard type Hexagon socket on both sides	ϕ 10 ~ ϕ 30	Both of stud head and thread ends have hexagon holes and integrated concave grease nipples. Available for mounting with either hexagon sockets and lubrication from both sides.	**CF** (Type) **16** (Stud diameter) **V** (**V**: Full complement / **None**: With cage) **UU** (**UU**: Sealed type / **None**: Shield type) **R** (**R**: Crowned outer ring / **None**: Cylindrical outer ring) **AB** (**AB**: With hexagon socket on both sides. (With integrated concave nipples))
 NUCF-AB Full complement double row type	ϕ 16 ~ ϕ 30	Cam follower which allows high radial loading and moderate axial loading with integrated cylindrical roller in double rows. Integrated concave grease nipples and hexagon sockets on both sides allow mounting and lubrication from either side.	**NUCF** (Type) **16** (Stud diameter) **R** (**R**: Crowned outer ring / **None**: Cylindrical outer ring) **AB** (**AB**: With hexagon socket both sides. (With integrated concave nipples))

Type	Applicable axis diameter	Feature	Part Code
 CF Standard type Screwdriver slot on stud head	ϕ 5 ~ ϕ 10	General purpose cam follower with screwdriver groove on the stud head.	**V**: Full complement **None**: With cage **UU**: Sealed type **None**: Shield type **CF 8 V** — **UU** — **R** — **N** Type: CF Stud diameter: 8 **R**: Crowned outer ring **None**: Cylindrical outer ring Option: N (Dedicated grease nipple)
 CFH-A Eccentric type Hexagon socket on stud head	ϕ 5 ~ ϕ 10	Available for the same mounting hole as general type. Compact and high accuracy eccentric cam followers with integrated structure enables easy fine positioning adjustment simply by rotating stud due to eccentric stud head shifting 0.2 to 1mm from stud mounting axis.	**V**: Full complement **None**: With cage **UU**: Sealed type **None**: Shield type **CFH 8 V** — **UU** — **R** — **A** Type: CFH Stud diameter: 8 **R**: Crowned outer ring **None**: Cylindrical outer ring **A**: With hexagon socket on the stud head
 CFH-AB Eccentric type Hexagon socket on both sides	ϕ 12 ~ ϕ 30	Eccentric cam follower with integrated concave grease nipples on both sides. Available for mounting and lubrication with hexagon holes on both sides.	**V**: Full complement **None**: With cage **UU**: Sealed type **None**: Shield type **CFH 16 V** — **UU** — **R** — **AB** Type: CFH Stud diameter: 16 **R**: Crowned outer ring **None**: Cylindrical outer ring **AB**: With hexagon socket on both sides (With integrated concave nipples)
 CFT Tap hole type	ϕ 6 ~ ϕ 30	Cam follower with tap for piping at stud head and thread of general type. Optimal for location that requires concentrated lubrication piping.	**V**: Full complement **None**: With cage **UU**: Sealed type **None**: Shield type **CFT 16 V** — **UU** — **R** — **A** Type **CFHT**: Eccentric type Stud diameter: 16 **R**: Crowned outer ring **None**: Cylindrical outer ring **A**: With hexagon socket on the stud head (Applicable shaft diameter ϕ 12 ~ ϕ 30) **None**: Screwdriver slot on the stud head.

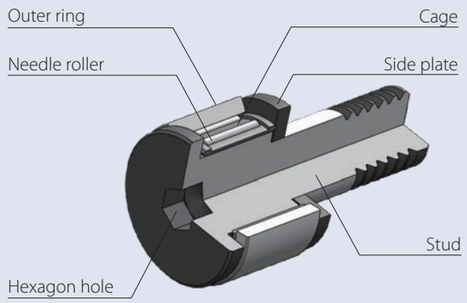
Structure and Features

Cam followers are compact and high rigid bearings with stud. It has a structure that an outer ring with built-in “roller” rolls over a track (raceway) and is utilized as guide roller for cam mechanism or linier motion. The cam follower is designed with a thick-walled outer ring in order to provide high rigidity to endure heavy load or impact load at contact portion with the track.

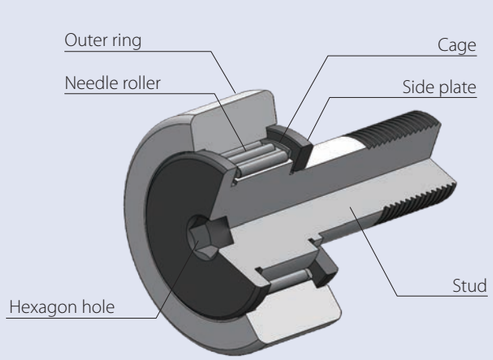
Outer rings have two shapes – crowned outer ring and cylindrical outer ring. The cylindrical outer ring is effective for heavy duty applications since it contacts with large contact area of the associated objects so that can mitigate the contact surface pressure. The crowned outer ring is suited for absorbing eccentric load since it absorbs angular misalignment due to a mount error. They have two internal structures – one with cage and one with full complement. Caged type cam followers are suited for high speed application, since the guiding feature of cage enables the rotation of "rollers" to be stable. Compared with caged type cam followers, 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-row cylindrical roller type which allows moderate axial loading.

Cam followers shall be fixed by tightening hexagon nut at stud thread by holding the stud with screw driver or hex-wrench.

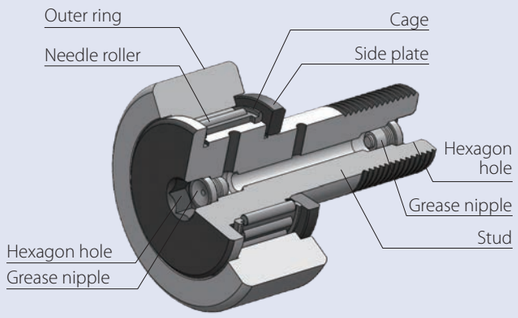
Cam followers with eccentric axis on the stud thread have an advantage to adjust the variation of mounting position within its eccentric range, without requesting high machining accuracy of mounting hole position.



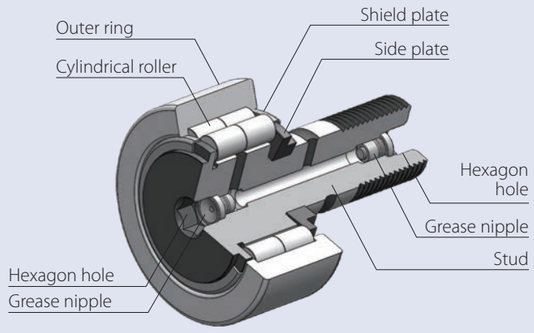
Structure of type CFS..A



Structure of type CF..A



Structure of type CF..AB



Structure of type NUCF..AB

Accuracy standard

Accuracy of cam follower is indicated in Table-1 and Table-2 below.

Table-1 Accuracy Unit: μm

Name \ Category	Cam follower series in metric (CF--, NUCF--)		Compact type (CFS--)
	Crowned outer ring	Cylindrical outer ring	Cylindrical outer ring
Dimension tolerance of outer ring outer diameter (D)	0 -50	Refer to Table-2	Refer to Table-2
Dimension tolerance of stud diameter (d)	h7		h6
Dimension tolerance of outer ring width (C)	0 -120		0 -120

Table-2 Accuracy of outer ring (Metric series and compact type roller outer ring) Unit: μm

Nominal outer ring outer diameter D (mm)		Dimension tolerance of mean outside diameter in a single plane Δ_{Dmp}		Radial runout of outer ring K_{ea}
Over	Incl.	high	low	max.
6 (5 or more)	18	0	-8	15
18	30	0	-9	15
30	50	0	-11	20
50	80	0	-13	25
80	120	0	-15	35

Radial internal clearance

Table below indicates radial internal clearance of cam follower.

Table-3 Radial internal clearance Unit: μm

Part code			Radial internal clearance	
Cam follower series in metric (CF)	Compact type (CFS)	Double-row cylindrical roller cam follower (NUCF)	min.	max.
CF3 ～ 5	CFS2.5 ～ 5		3	17
CF6 ～ 8	CFS6		5	20
CF10 ～ 12-1			5	25
CF16 ～ 20-1			10	30
CF24 ～ 30-2			10	40
		NUCF16 ～ 24	0	25
		NUCF24-1 ～ 30-2	5	30

Fits

Cam followers require machining of mounting hole to eliminate play at fitting portion especially for the portion which is subjected to impact shock due to its application in cantilevered mounting. Table-4 indicates recommended fits between cam follower and its mounting hole.

Table-4 Dimension tolerance of stud mounting hole

Part code	Dimension tolerance of stud mounting hole
Cam follower series in metric (CF)	H7
Compact type (CFS)	H6
Double-row cylindrical roller cam follower (NUCF)	H7

Maximum permissive load

Permissive load of cam follower is subjected to change in accordance with bending strength and shear strength of its stud in addition to standard rating load of needle bearing due to its design with stud. This load is indicated as maximum permissive load.

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 steel mating material is assumed to be HRC40. In the case that the hardness of mating material is not HRC40, track load capacity in the dimension table shall be multiplied by value of track load factor obtained by Figure-1.

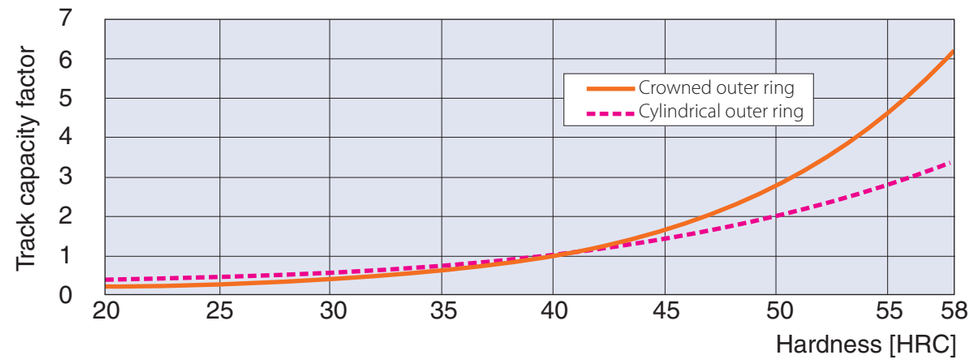


Figure-1 Track capacity factor

Lubrication

All the JNS cam followers are lubricated with pre-packed high quality lithium soap-based grease grade 2 (RoHS compliant) and are ready to use. For applications requiring high prevention measure against invasion of foreign matter or leakage of lubricant, products with seal(part conde--UU) which integrate special synthetic lubber 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 cam 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.

Dedicated grease nipple shall be knocked in onto cam follower by pressing flange portion of the nipple using fixture shown in Figure-2.

Accessories

Accessories for cam follower of standard specification are shown in Table-6. Dedicated grease nipple is available upon customer request by ordering products with suffix "N" added to part code.

Example) CF 8 UUR -N
└Dedicated grease nipple

Also, type CF-AB and type NUCF-AB have integrated dedicated concave grease nipples installed at both sides.

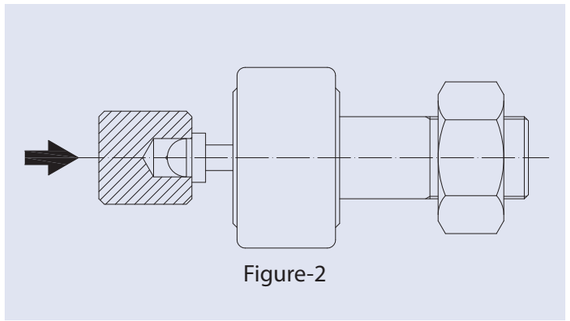


Figure-2

DIMENSIONS OF GREASE NIPPLES

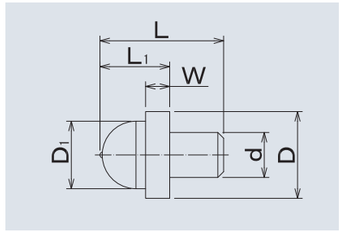


Table-5

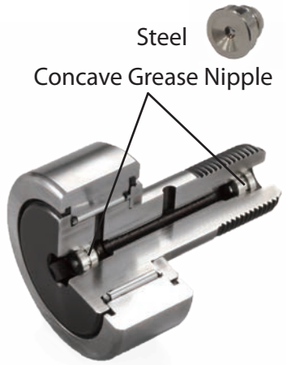
Applicable part code	Nipple dimension					
CF, CFH	d	D	D_1	L	L_1	W
CF5	3.2	7.5	6	9	5.5	1.5
CF6 ～ CF10-1	4	7.5	6	10	5.5	1.5

Table-6 Accessories

Part code		Stop plug*1)	Resin plug*2)	Hexagon nuts style 2	Grease
CF..AB CFH..AB NUCF..AB		—	—	Attached	Prepacked
CF..A CFH..A CFS CFT		—	—	Attached	Prepacked
CF-SFU	6 ～ 10-1	—	Installed	—	Prepacked
	12 ～ 20-1	Attached	Installed	—	Prepacked
CF	5	—	—	Attached	Prepacked
	6 ～ 10-1	—	Attached	Attached	Prepacked
CFH	6 ～ 10-1	—	Attached	Attached	Prepacked

*1) Stop plug is used for plugging unused lubrication hole(s).
*2) Resin plug is used for preventing leakage of grease.

Grease Nipple for CF..AB type



Steel
Concave Grease Nipple

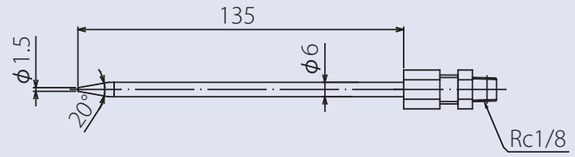
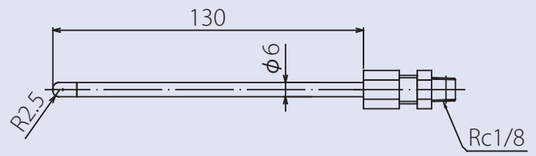
CF..AB, CFH..AB, NUCF..AB
(Steel type)

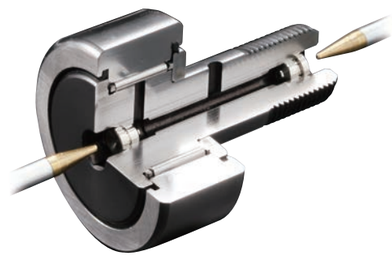
Stainless
Concave Grease Nipple

CF..MAB, CFH..MAB
(Stainless type)

Dimensions of supply nozzle for CF..AB type

Table-8 Dimension of recommended lubrication nozzle (for CF..AB, NUCF..AB)

Type	Dimension and shape	Applied model number	
NPAB-1		CF10ABK(M10 × 1) CF10-1ABK(M10 × 1) CF12AB CF12-1AB CF16AB CF18AB	NUCF16AB NUCF18AB
NPAB-2		CF20AB CF20-1AB CF24AB CF24-1AB CF30AB CF30-1AB CF30-2AB	NUCF20AB NUCF20-1AB NUCF24AB NUCF24-1AB NUCF30AB NUCF30-2AB



Mounting

Mounting part

Hole for stud shall be perpendicular to mounting surface so as to ensure even contact between outer ring and rolling surface of mating material. Corner chamfer of hole shall be as small as around C0.5. Counter bore diameter shall be dimension f or more as described in the dimension table.

Type CF-R with crowned outer ring is recommended in the case of application with insufficient contact between outer ring and rolling surface of mating material.

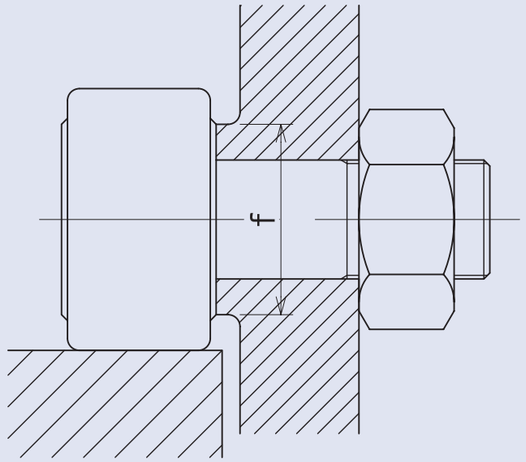


Figure-3

Mounting method

- Cam follower shall be mounted so as not to incline against direction of the motion.
- Mounting method to tighten cam follower directly to bracket by adding female thread to it without using nut as depicted in Figure-4 (A) is NOT recommended. This method may cause damage on stud due to concentration of bending stress in male thread portion in the event of loosening since it is difficult to tighten the stud sufficiently.

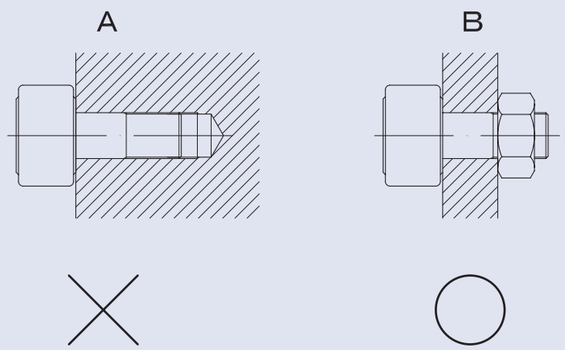


Figure-4

- For application with heavy load, lubrication hole of stud shall be located outside of loading range (on the side to receive load). Location of the lubrication hole is indicated by "JNS" marking on the side of stud flange. (Refer to Figure-5)
  Hole at the center of stud is used as stopper for tightening or lubricant supply hole for grease lubrication.

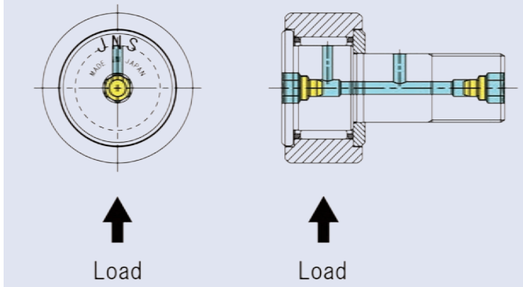


Figure-5

Precaution for using spring washer

It is important to ensure that spring washer used for mounting cam follower has no burr or sharp edge. Debris scraped from nut or mounting bracket by burr or shape edge of washer during tightening can invade stud thread and can cause insufficient tightness or damage to thread.

Tightening torque of stud

Stud of cam follower is subjected to bending stress or tensile stress by bearing load. Tightening torque shall be set not to exceed the value in the dimension table.

Using double spring washers, double thin nut of JIS B 1181 or special nut with locking feature is recommended in the case of possible loosening of mounting screw due to vibration or impact shock.

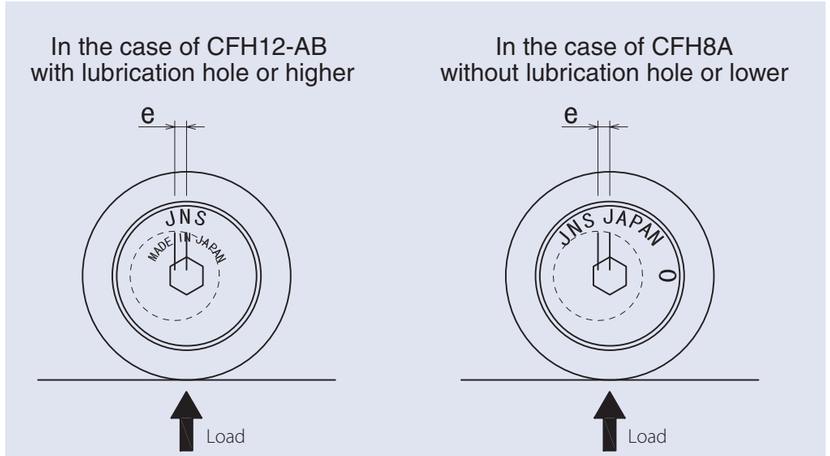
Mounting of eccentric cam follower

Adjustment of eccentric shall be performed in accordance with the following procedure.

(1) Insert stud to mounting hole and tighten nut as the stud can turn loosely. Marking of stud shall face location indicated in Figure-6 in relation to direction of load.

(2) Gap between cam follower and mating contact surface may be adjusted by turning stud using hexagon hole on the stud head.

(3) After completing adjustment, tighten nut with holding rotation of stud. Make it sure not to exceed maximum tightening torque of the nut.



Indicate relationship of location between JNS mark and eccentric direction in the case of CFH12-AB with lubrication hole or higher.

"O" mark indicates eccentric direction in the case of CFH8-A without lubrication hole or lower. No relationship between JNS mark and eccentric direction.

Figure-6

Mounting of CF-SFU type

Refer to Figure-7 for mounting method of easy mounting of CF-SFU type.

Type CF-SFU is NOT recommended for application in the part subjected to vibration or shock impact as much as its mounting is simple. Standard cam followers with nut are recommended for application with possible vibration or shock impact.

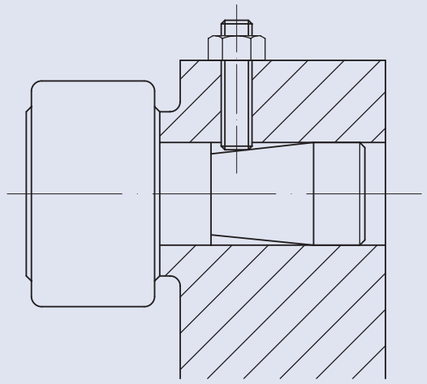


Figure-7