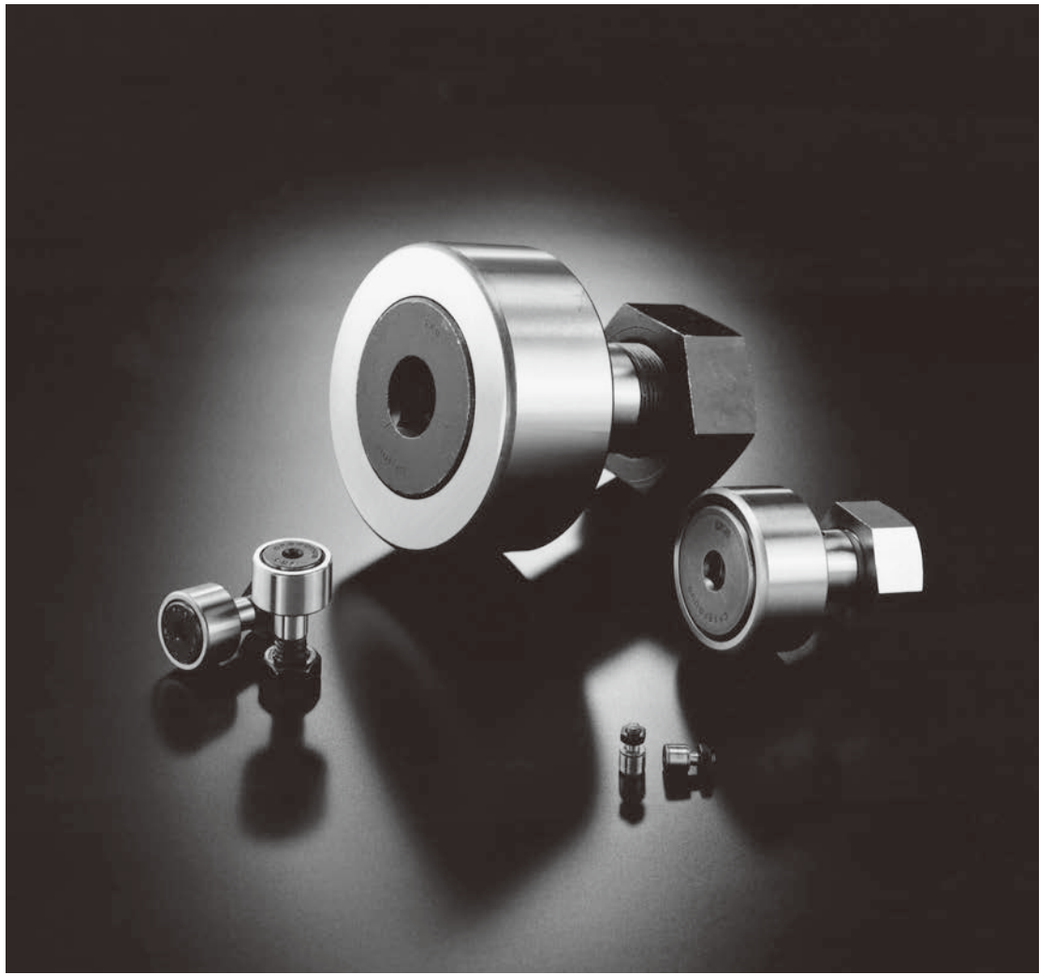
CAM FOLLOWERS

- Standard Type Cam Followers
- Stainless Steel Made Cam Followers
- Double Hex Hole Cam Followers
- Solid Eccentric Stud Type Cam Followers
- Eccentric Type Cam Followers
- Thrust Disk Type Cam Followers
- Centralized Lubrication Type Cam Followers
- Easy Mounting Type Cam Followers
- Cam Follower G
- C-Lube Cam Followers
- Miniature Type Cam Followers
- Stainless Steel Made Miniature Cam Followers
- Thrust Disk Type Miniature Cam Followers
- Cylindrical Roller Cam Followers

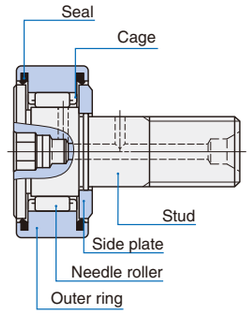


Structure and Features

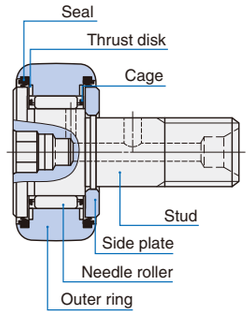
IKO Cam Followers are bearings with a stud incorporating needle rollers in a thick walled outer ring. These bearings are designed for outer ring rotation, and have superior rotational performance with a small coefficient of friction and high load capacity.
As studs already have threads or steps, they are easy to mount.
Cam Followers are follower bearings for cam mechanisms and linear motions and have high rigidity and high accuracy. They are, therefore, used widely for machine tools, industrial robots, electronic devices, and OA equipment.
Stainless steel made Cam Followers are superior in corrosion resistance and suitable for applications in environments where oil cannot be used or water splashed, and in clean rooms.

Structure of Cam Followers

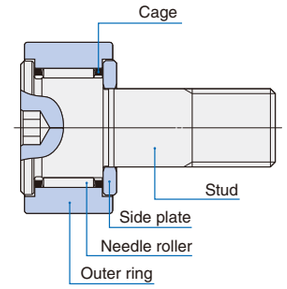
Standard Type Cam Follower(1) CF···BUU



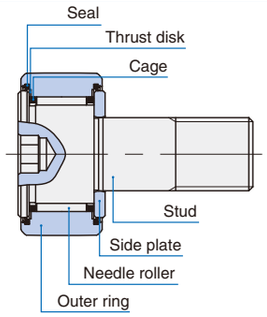
Thrust Disk Type Cam Follower(1) CF···WBUUR



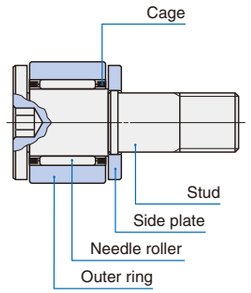
Cam Follower G(2) CF···G



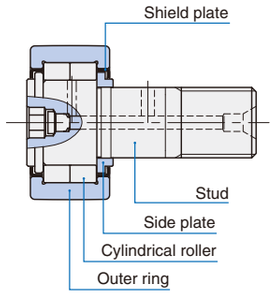
C-Lube Cam Follower(3) CF···WB···/SG



Miniature Type Cam Follower CFS



Cylindrical Roller Cam Follower NUCF···BR



Note(1) In case of the stud diameter (d_1) 5 to 10mm, a re-greasing fitting is provided in the stud head hex hole. The stud diameter (d_1) 12 to 30mm, a grease nipple is provided in the stud head hex hole.
(2) If needed, contact IKO .
(3) Thermosetting solid-type lubricant fills inner space of the bearing.

Types

For Cam Followers, the types shown in Table 1 are available.

Table 1 Type of Cam Followers

Bearing Model				Item	With cage		Full complement	
					Crowned outer ring	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring
Metric CF series	Standard Type Cam Followers CF	High carbon steel made	With hexagon hole	Shield type	CF ⋯ B R	CF ⋯ B	CF ⋯VB R	CF ⋯VB
				Sealed type	CF ⋯ BUUR	CF ⋯ BUU	CF ⋯VBUUR	CF ⋯VBUU
		Stainless steel made	With hexagon hole	Shield type	CF ⋯FB R	CF ⋯FB	—	—
				Sealed type	CF ⋯FBUUR	CF ⋯FBUU	—	—
	Double Hex Hole Cam Followers CFKR	High carbon steel made	With double hexagon hole	Shield type	CFKR⋯ R	CFKR	CFKR⋯V R	CFKR⋯V
				Sealed type	CFKR⋯UUR	CFKR⋯UU	CFKR⋯VUUR	CFKR⋯VUU
	Solid Eccentric Stud Type Cam Followers CFES	High carbon steel made	With hexagon hole	Shield type	CFES⋯ B R	CFES⋯ B	—	—
				Sealed type	CFES⋯ BUUR	CFES⋯ BUU	—	—
	Eccentric Type Cam Followers CFE	High carbon steel made	With hexagon hole	Shield type	CFE ⋯ B R	CFE ⋯ B	CFE ⋯VB R	CFE ⋯VB
				Sealed type	CFE ⋯ BUUR	CFE ⋯ BUU	CFE ⋯VBUUR	CFE ⋯VBUU
	Thrust Disk Type Cam Followers CF⋯W	High carbon steel made	With hexagon hole	Shield type	CF ⋯ WB R	—	—	—
				Sealed type	CF ⋯ WBUUR	—	—	—
		Stainless steel made	With hexagon hole	Shield type	CF ⋯FWB R	—	—	—
				Sealed type	CF ⋯FWBUUR	—	—	—
	Centralized Lubrication Type Cam Followers CF-RU1, CF-FU1	High carbon steel made	With screwdriver slot	Sealed type	CF-RU1	CF-FU1	—	—
	Easy Mounting Type Cam Followers CF-SFU	High carbon steel made	With hexagon hole	Sealed type	—	CF-SFU⋯B	—	—
Cam Follower G CF⋯G		High carbon steel made	With hexagon hole	Shield type	—	CF ⋯ G	—	—
C-Lube Cam Followers CF⋯WB⋯/SG		High carbon steel made	With hexagon hole	Sealed type	CF ⋯WB⋯/SG	—	—	—
Miniature CFS series	Miniature Type Cam Followers CFS	High carbon steel made	With hexagon hole	Shield type	—	CFS	—	CFS ⋯ V
		Stainless steel made	With hexagon hole	Shield type	—	CFS ⋯F	—	CFS ⋯ FV
	Thrust Disk Type Miniature Cam Followers CFS⋯W	High carbon steel made	With hexagon hole	Shield type	—	CFS ⋯ W	—	CFS ⋯ WV
		Stainless steel made	With hexagon hole	Shield type	—	CFS ⋯FW	—	—
Cylindrical Roller Cam Followers NUCF		High carbon steel made	With hexagon hole	Shield type	—	—	NUCF⋯ BR	—
Inch series	Inch Series Cam Followers CR	High carbon steel made	With hexagon hole	Shield type	CR ⋯ B R	CR ⋯ B	CR ⋯VB R	CR ⋯VB
				Sealed type	CR ⋯ BUUR	CR ⋯ BUU	CR ⋯VBUUR	CR ⋯VBUU
			With screwdriver slot	Shield type	CR ⋯ R	CR	CR ⋯V R	CR ⋯V
				Sealed type	CR ⋯ UUR	CR ⋯ UU	CR ⋯V UUR	CR ⋯V UU
	Inch Series Cam Followers CRH	High carbon steel made	With hexagon hole	Shield type	—	—	CRH ⋯VB R	CRH ⋯VB
				Sealed type	—	—	CRH ⋯VBUUR	CRH ⋯VBUU
			With screwdriver slot	Shield type	—	—	CRH ⋯V R	CRH ⋯V
				Sealed type	—	—	CRH ⋯V UUR	CRH ⋯V UU

Standard Type Cam Followers

These are the basic type bearings in IKO Cam Follower series. Models with stud diameters ranging from 3 to 30 mm are prepared, and are suitable for a wide range of applications.

Double Hex Hole Cam Followers

The sockets with hexagon hole on both stud ends allow mounting with a hexagon wrench from either side.

Solid Eccentric Stud Type Cam Followers

The stud of these bearings is eccentric to the center axis of the outer ring. Thus, the position of the outer ring in the radial direction in relation to the mating cam guide surface can easily be adjusted by turning the stud, and the load distribution on a number of cam follower outer rings used on the same cam guide surface can be made uniform.
These are eccentric cam followers with a one-piece stud that can be mounted in the same mounting holes as those for Standard Type Cam Followers.
Eccentricity is 0.25 mm ～ 0.6 mm.

Eccentric Type Cam Followers

In these bearings, an eccentric collar is assembled with the Cam Follower stud, enabling the outer ring to be positioned easily in the radial direction against the mating cam guide surface.
Eccentricity is 0.4 ～ 1.5 mm.

Thrust Disk Type Cam Followers

These bearings have special resin thrust disk washers superior in wear and heat resistance between the sliding contact area of outer ring shoulders, stud head and side plate. These disk washers reduce friction and wear due to axial loads caused by misalignment, etc.

Centralized Lubrication Type Cam Followers

These bearings have one or two pipe-threaded holes in the stud. Thus, this series is suitable when centralized lubrication is required.

Easy Mounting Type Cam Followers

These bearings have a stepped tapered portion on the stud. When mounting the Cam Follower, it is easy to fix its location by tightening a set screw to the stepped portion. Thus, this type is suitable when a large number of Cam Followers are used in a machine such as a pallet changer.

Cam Follower G

Taking over the basic performance of Standard Type Cam Follower, this cam follower realizes a reasonable price. As grease is pre-packed, the unit may be used right after unpacking.

C-Lube Cam Followers

These bearings are lubricated with a newly developed thermosetting solid-type lubricant which fills the inner space of the bearing. This lubricant provides long-term maintenance free.

Miniature Type Cam Followers

These are compactly designed bearings, incorporating very thin needle rollers in an outer ring with a small outside diameter. They are used in electronic devices, OA equipment, small index devices, etc.

Cylindrical Roller Cam Followers

These bearings are full complement type bearings incorporating double rows of full complement cylindrical rollers in the outer ring, and can withstand large radial loads and some axial loads.

Inch series Cam Followers

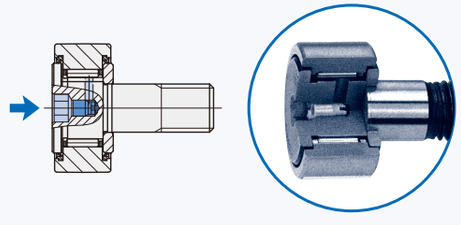
Two types, CR and CRH, are available in the Inch series Cam Followers. Black oxide film treatment is made on CRH models.

Lubrication method of Hex Head Cam Followers

〈Types〉**Standard Type, Double Hex Hole Type, Solid Eccentric Stud Type, Eccentric Type, Thrust Disk Type, Easy Mounting Type, Cylindrical Roller Type.**

1 Way

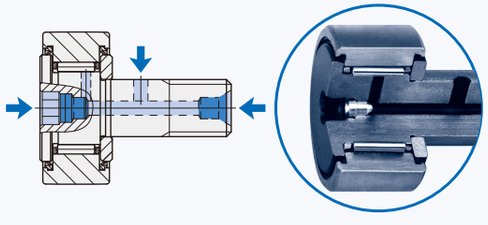
Stud dia. 5～10 mm (1)



Re-greasing fitting is incorporated in the stud head.

3 Ways

Stud dia. 12～30 mm



Grease nipple is incorporated in the stud head.

Remark : All Easy Mounting Type have a 1way port.
Note (1) Lubrication from both thread side and head part is possible for Double Hex Hole Cam Followers only. (2 Way Type)
Also, for Double Hex Hole Cam Followers only, a grease nipple is built into the stud head.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

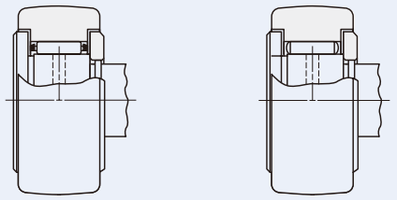
Internal Structures and Shapes

The Cam Follower series includes various types, such as the caged type, full complement type, shield type, sealed type, type with crowned outer ring, type with cylindrical outer ring, type with hexagon hole, type with screwdriver slot, etc.

Roller guide method

Cam Followers include the caged type and the full complement type . The caged type has a small coefficient of friction and is suitable for high speed rotations, while the full complement type is suitable for heavy loads at low speed rotations.

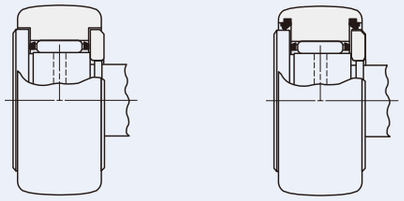
《With cage》 《Full complement》



Seal structure

Cam Followers include the shield type and the sealed type. In the shield type, the narrow clearances between the outer ring and the stud flange and between the outer ring and the side plate form labyrinths .
The sealed type incorporates seals in the narrow clearances to prevent the penetration of foreign particles.

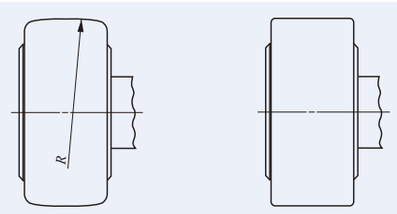
《Shield type》 《Sealed type》



Shape of outer ring outside surface

The outside surface of the outer ring of Cam Followers, which makes direct contact with the mating cam guide surface, is either crowned or cylindrical. The crowned outer rings are effective in moderating the edge load due to mounting errors. The cylindrical outer rings have a large contact area with the mating cam guide surface, and are suitable for applications in which the applied load is large or the cam guide surface hardness is low.

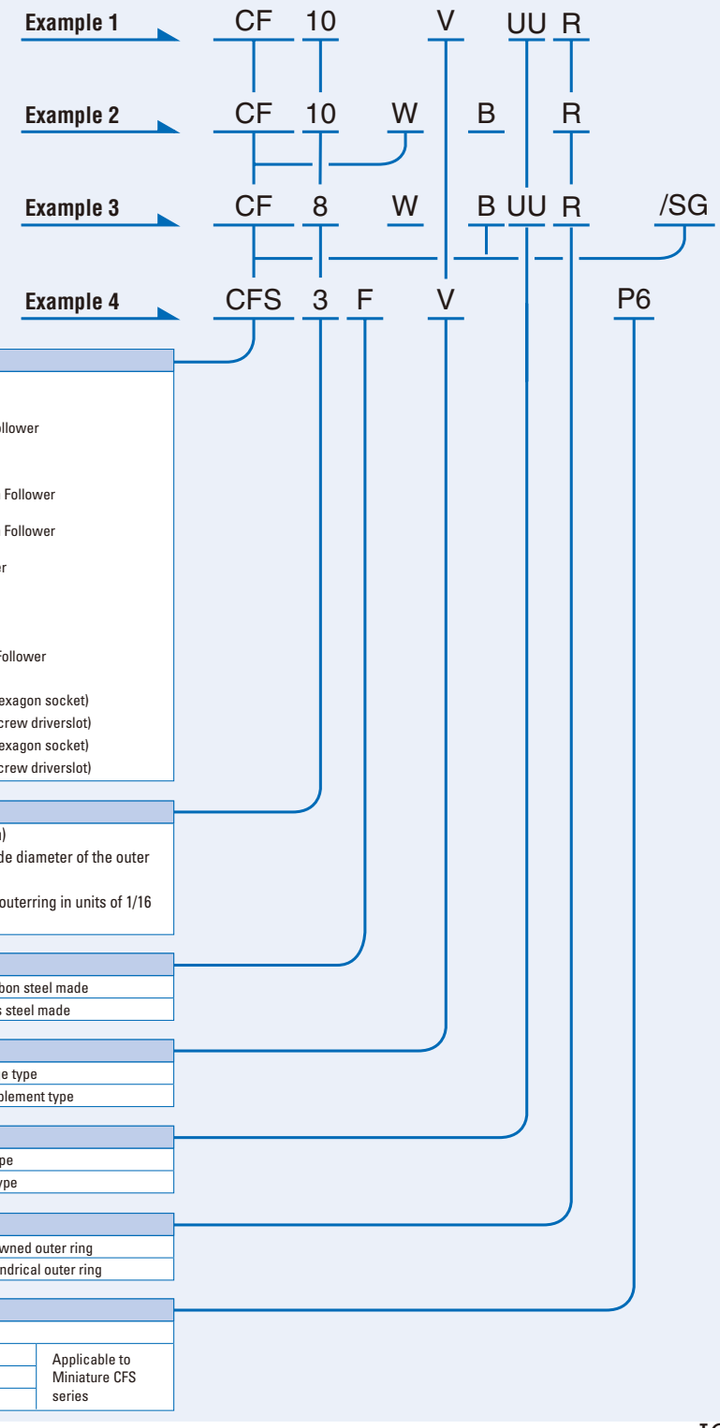
《Crowned outer ring》 《Cylindrical outer ring》



Identification number

Some examples of the identification number of Cam Followers are shown below. For applicable material symbol, roller guide method, seal structure and shape of outer ring outside surface, refer dimension table of each series.

Examples of identification number



Model code	
CF	Standard Type Cam Follower
CFKR	Double Hex Hole Cam Follower
CFES	Solid Eccentric Stud Type Cam Follower
CFE	Eccentric Type Cam Follower
CF···W	Thrust Disk Type Cam Follower
CF-RU1	Centralized Lubrication Type Cam Follower (With crowned outer ring)
CF-FU1	Centralized Lubrication Type Cam Follower (With cylindrical outer ring)
CF-SFU	Easy Mounting Type Cam Follower
CF···G	Cam Follower G
CF···WB···/SG	C-Lube Cam Follower
CFS	Miniature Type Cam Follower
CFS···W	Thrust Disk Type Miniature Cam Follower
NUCF	Cylindrical Roller Cam Follower
CR···B	Inch series Cam Follower(With Hexagon socket)
CR	Inch series Cam Follower(With Screw driverslot)
CRH···B	Inch series Cam Follower(With Hexagon socket)
CRH	Inch series Cam Follower(With Screw driverslot)

Size
The value indicates a stud diameter. (unit: mm) For Double Hex Hole Cam Followers, the outside diameter of the outer ring is indicated. In the inch series, the outside diameter of the outerring in units of 1/16 inch is indicated.

Material	
No symbol	High carbon steel made
F	Stainless steel made

Roller guide method	
No symbol	With cage type
V	Full complement type

Seal structure	
No symbol	Shield type
UU	Sealed type

Shape of outer ring outside surface	
R	With crowned outer ring
No symbol	With cylindrical outer ring

Classification symbol		
No symbol	Class 0	
P6	Class 6	Applicable to Miniature CFS series
P5	Class 5	
P4	Class 4	

Accuracy

The accuracy of Cam Followers is shown in Table 2, Table 3.1, Table 3.2 and Table 3.3. Cam Followers with special accuracy are also available. When they are required, please contact IKO.

Table 2 Tolerances

unit: μm

Dimensions and symbols \ Series	Metric CF series (1)		Miniature CFS series	Inch series	
	Crowned outer ring	Cylindrical outer ring		Crowned outer ring	Cylindrical outer ring
Outside dia. of outer ring D	0 -50	See Table 3.1	See Table 3.2	0 -50	See Table 3.3
Stud dia. d_1	h7		h6	+25 0	
Width of outer ring C	0 -120		0 -120	0 -130	

Note(1) Also applicable to the Cam Follower G, C-Lube Cam Follower and Cylindrical Roller Cam Follower.

Table 3.1 Tolerances and allowable values of outer rings (Metric CF series cylindrical outer rings(1)) unit: μm

D Nominal outside dia. of outer ring mm		Δ_{Dmp} Single plane mean outside dia. deviation		V_{Dsp} Outside dia. variation in a single radial plane (Max.)	V_{Dmp} Mean outside dia. variation (Max.)	K_{ea} Radial runout of assembled bearing outer ring (Max.)
Over	Incl.	High	Low			
6	18	0	- 8	10	6	15
18	30	0	- 9	12	7	15
30	50	0	-11	14	8	20
50	80	0	-13	16	10	25
80	120	0	-15	19	11	35

Note(1) Also applicable to the Cam Follower G.

Table 3.2 Tolerances and allowable values of outer rings (Miniature CFS series)

unit: μm

Δ_{Dmp} Single plane mean outside dia. deviation								K_{ea} Radial runout of assembled bearing outer ring (Max.)			
Class 0		Class 6		Class 5		Class 4		Class 0	Class 6	Class 5	Class 4
High	Low	High	Low	High	Low	High	Low				
0	-8	0	-7	0	-5	0	-4	15	8	5	4

Table 3.3 Tolerances and allowable values of outer rings (Inch series cylindrical outer ring)

unit: μm

D Nominal outside dia. of outer ring mm		Δ_{Dmp} Single plane mean outside dia. deviation		V_{Dsp} Outside dia. variation in a single radial plane (Max.)	V_{Dmp} Mean outside dia. variation (Max.)	K_{ea} Radial runout of assembled bearing outer ring (Max.)
Over	Incl.	High	Low			
6	18	0	-25	10	6	15
18	30			12	7	15
30	50			14	8	20
50	80			16	10	25
80	120			19	11	35

Clearance

The radial internal clearances of Cam Followers are shown in Table 4.

Table 4 Radial internal clearance

unit: μm

Identification number (1)				Radial internal clearance	
Metric CF series (2)	Miniature CFS series (3)	Cylindrical Roller Cam Followers NUCF	Inch series	Min.	Max.
CF 3～CF 5	CFS1.4 ～CFS5	—	CR 8、CR 8-1、CRH 8-1、CRH 9	3	17
CF 6	CFS6	—	CR10、CR10-1、CRH10-1、CRH11	5	20
CF 8～CF12-1 CFKR22～CFKR32	—	—	CR12～CR22、CRH12～CRH22	5	25
CF16～CF20-1 CFKR35～CFKR52	—	—	CR24～CR36、CRH24～CRH36	10	30
CF24～CF30-2 CFKR62～CFKR90	—	—	CR48、CRH40～CRH56	10	40
—	—	—	CRH64	15	50
—	—	NUCF10 R～NUCF24 R	—	20	45
—	—	NUCF24-1R～NUCF30-2R	—	25	50

Note(1) Also applicable to full complement type, crowned outer ring and sealed type.
(2) Only representative types are shown in the table, but this table is applicable to the entire Standard Type Cam Follower, Cam Follower G and C-Lube Cam Follower.
(3) Only representative types are shown in the table, but this table is applicable to the entire Miniature CFS series.

Fit

Tables 5 and 6 show recommended tolerances of mounting holes for Cam Follower studs. Since the Cam Follower is supported in a cantilever position, the mounting hole diameter should be prepared without play between the stud and the hole especially when heavy shock loads are applied.

Table 5 Recommended fit

Type	Tolerance class of mounting hole for stud
Metric CF series	H7
Miniature CFS series	H6
Cylindrical Roller Cam Followers	H7
Inch series	F7

Table 6 Dimensional tolerances of mounting hole

unit: μm

Nominal outside dia. of stud mm		F7		H6		H7	
Over	Incl.	Over	Incl.	Over	Incl.	Over	Incl.
—	3	+16	+ 6	+ 6	0	+10	0
3	6	+22	+10	+ 8	0	+12	0
6	10	+28	+13	+ 9	0	+15	0
10	18	+34	+16	+11	0	+18	0
18	30	+41	+20	+13	0	+21	0
30	50	+50	+25	+16	0	+25	0

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Maximum Allowable Static Load

The applicable load on Cam Followers is, in some cases, limited by the bending strength and shear strength of the stud and the strength of the outer ring instead of the load rating of the needle roller bearing. Therefore, the maximum allowable static load that is limited by these strengths is specified.

Track Capacity

Track capacity is defined as the load which can be continuously applied on a Cam Follower placed on a steel cam guide surface without causing deformation or indentation on the cam guide surface when the outer ring of the Cam Follower makes contact with the mating cam guide surface (plane). The track capacities shown in Tables 7.1 and 7.2 are applicable when the hardness of the mating cam guide surface is 40HRC (Tensile strength 1250N/mm^2). When the hardness of the mating cam guide surface differs from 40HRC, the track capacity is obtained by multiplying the value by the track capacity factor shown in Table 8.

If lubrication between the outer ring and the mating cam guide surface is insufficient, seizure and/or wear may occur depending on the application. Therefore, attention must be paid to lubrication and surface roughness of the mating cam guide especially for high-speed rotations such as cam mechanisms.

For lubrication between the outer ring and the mating cam guide surface, C-Lube Unit for Cam Followers is recommended. (See page I20.)

Table 7.1 Track load capacity

unit: N

Type of bearing	Identification number with crowned outer ring	Track capacity	Identification number with cylindrical outer ring	Track capacity
Metric CF series (1)	CF 3 R	542	CF 3	1 360
	CF 4 R	712	CF 4	1 790
	CF 5 R	794	CF 5	2 210
	CF 6 R	1 040	CF 6	3 400
	CF 8 R	1 330	CF 8	4 040
	CF10 R・CFKR22R	1 610	CF10 ・CFKR22	4 680
	CF10-1R・CFKR26R	2 030	CF10-1・CFKR26	5 530
	CF12 R・CFKR30R	2 470	CF12 ・CFKR30	7 010
	CF12-1R・CFKR32R	2 710	CF12-1・CFKR32	7 480
	CF16 R・CFKR35R	3 060	CF16 ・CFKR35	11 200
	CF18 R・CFKR40R	3 660	CF18 ・CFKR40	14 500
	CF20 R・CFKR52R	5 190	CF20 ・CFKR52	23 200
	CF20-1R・CFKR47R	4 530	CF20-1・CFKR47	21 000
	CF24 R・CFKR62R	6 580	CF24 ・CFKR62	34 300
	CF24-1R・CFKR72R	8 020	CF24-1・CFKR72	39 800
	CF30 R・CFKR80R	9 220	CF30 ・CFKR80	52 700
	CF30-1R・CFKR85R	9 990	CF30-1・CFKR85	56 000
	CF30-2R・CFKR90R	10 800	CF30-2・CFKR90	59 300
Miniature CFS series (2)	—	—	CFS1.4	128
	—	—	CFS2	220
	—	—	CFS2.5	298
	—	—	CFS3	485
	—	—	CFS4	799
	—	—	CFS5	1 210
	—	—	CFS6	1 680

Notes(1) Only representative types are shown in the table, but this table is applicable to the entire Standard Type Cam Follower series. Also applicable to Cam Follower G, C-Lube Cam Follower and Cylindrical Roller Cam Follower.
(2) Only representative types are shown in the table, but this table is applicable to the entire Miniature CFS series.

Table 7.2 Track capacity

unit: N

Type of bearing	Identification number with crowned outer ring	Track capacity	Identification number with cylindrical outer ring	Track capacity	Identification number with crowned outer ring	Track capacity	Identification number with cylindrical outer ring	Track capacity
Inch series (1)	CR 8 R	770	CR 8	2 140	—	—	—	—
	CR 8-1R	770	CR 8-1	2 360	CRH 8-1R	401	CRH 8-1	2 360
	—	—	—	—	CRH 9 R	469	CRH 9	2 650
	CR10 R	1 030	CR10	3 210	—	—	—	—
	CR10-1R	1 030	CR10-1	3 480	CRH10-1R	579	CRH10-1	3 480
	—	—	—	—	CRH11 R	658	CRH11	3 830
	CR12 R	1 340	CR12	4 500	CRH12 R	853	CRH12	4 500
	CR14 R	1 630	CR14	5 250	CRH14 R	1 050	CRH14	5 250
	CR16 R	1 970	CR16	7 280	CRH16 R	1 420	CRH16	7 280
	CR18 R	2 300	CR18	7 710	CRH18 R	1 660	CRH18	7 710
	CR20 R	2 680	CR20	10 700	CRH20 R	2 160	CRH20	10 700
	CR22 R	3 050	CR22	11 800	CRH22 R	2 450	CRH22	11 800
	CR24 R	3 410	CR24	15 400	CRH24 R	3 410	CRH24	15 400
	CR26 R	3 820	CR26	16 700	CRH26 R	3 820	CRH26	16 700
	CR28 R	4 210	CR28	21 000	CRH28 R	4 210	CRH28	21 000
	CR30 R	4 610	CR30	22 500	CRH30 R	4 610	CRH30	22 500
	CR32 R	5 050	CR32	30 900	CRH32 R	5 690	CRH32	30 900
	CR36 R	5 900	CR36	34 700	CRH36 R	6 640	CRH36	34 700
	—	—	—	—	CRH40 R	8 970	CRH40	45 000
	—	—	—	—	CRH44 R	10 200	CRH44	49 500
	—	—	CR48	64 300	CRH48 R	11 400	CRH48	64 300
	—	—	—	—	CRH52 R	12 700	CRH52	69 600
	—	—	—	—	CRH56 R	14 100	CRH56	87 000
	—	—	—	—	CRH64 R	16 800	CRH64	113 000

Notes(1) Only representative types are shown in the table, but this table is applicable to the entire Inch series.

Table 8 Track capacity factor

Hardness HRC	Tensile strength N/mm^2	Track capacity factor	
		With crowned outer ring	With cylindrical outer ring
20	760	0.22	0.37
25	840	0.31	0.46
30	950	0.45	0.58
35	1 080	0.65	0.75
38	1 180	0.85	0.89
40	1 250	1.00	1.00
42	1 340	1.23	1.15
44	1 435	1.52	1.32
46	1 530	1.85	1.51
48	1 635	2.27	1.73
50	1 760	2.80	1.99
52	1 880	3.46	2.29
54	2 015	4.21	2.61
56	2 150	5.13	2.97
58	2 290	6.26	3.39

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Allowable Rotational Speed

The allowable rotational speed of Cam Followers is affected by mounting and operating conditions. For reference, Table 9 shows d_1n values when only pure radial loads are applied. Considering that axial loads also act under actual operating conditions, the recommended d_1n value is 1/10 of the value shown in the table.

In case of C-Lube Cam Follower, d_1n value is 10000 or less.

Table 9 d_1n values of Cam Followers (1)

Type \ Lubricant	Grease	Oil
Caged type	84 000	140 000
Full complement type	42 000	70 000
Cylindrical Roller Cam Follower	66 000	110 000

Note(1) d_1n value $= d_1 \times n$
where, d_1 : Stud diameter mm
n : Rotational speed min^{-1}

Lubrication

Grease-prepacked Cam Followers are shown in Table 10. The lubricating grease prepacked in these bearings is ALVANIA GREASE S2 (SHOWA SHELL SEKIYU K.K.).

For Cam Followers without prepacked grease, grease should be packed through the oil hole in the stud for use. If they are used without grease, wear of rolling contact surfaces may take place, leading to a short bearing life.

Table 10 Bearings with prepacked grease

○ : Prepacked × : Not prepacked

Series / Size of stud diameter d_1 (1) mm \ Item			With cage				Full complement
			Shield type		Sealed type		
			With hexagon hole	With screwdriver slot	With hexagon hole	With screwdriver slot	
Standard Type Cam Followers series	CF CFKR CFES CFE CF···W	3～ 5	○	–	○	–	–
		6～10		–			○
		12～30	×				
	CF-RU1、CF-FU1		–	–	–	○	–
	CF-SFU		–	–	○	–	–
Cam Follower G	CF ···G		○	–	–	–	–
C-Lube Cam Followers	CF ···WB···/SG(2)		–	–	×	–	–
Miniature CFS series	CFS CFS···W		○	–	–	–	○
Cylindrical Roller Cam Followers	NUCF		–	–	–	–	○
Inch series	CR		○	○	○	○	○
	CRH		–	–	–	–	○

Notes(1) For Eccentric Type Cam Followers (CFE), thread diameter G as shown in the dimension table is applicable.
(2) C-Lube, a thermosetting solid-type lubricant, fills the inner space of the bearing.

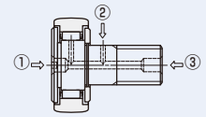
Oil Hole

The position of oil hole is shown in Table 11.
Perform greasing quietly by fitting a lubrication nozzle indicated in Table 12 to a straight type grease gun in JIS B 9808 and pressing the nozzle against the grease nipple or re-greasing fitting.
Due to their structures, lubrication is not possible for CF3/CF4, C-Lube Cam Follower, Cam Follower G and Miniature CFS series.

Table 11 Position of oil hole

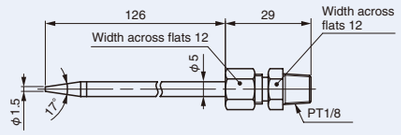
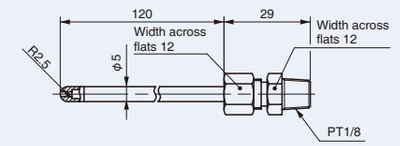
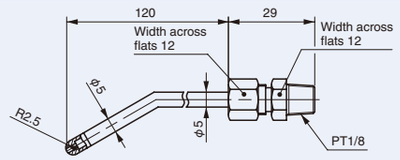
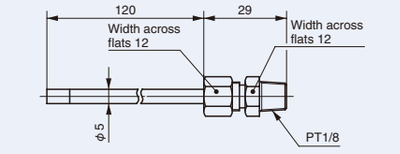
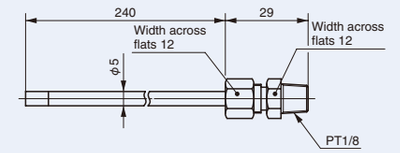
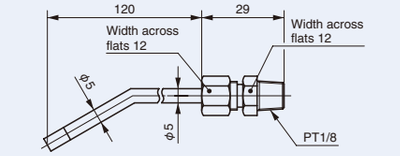
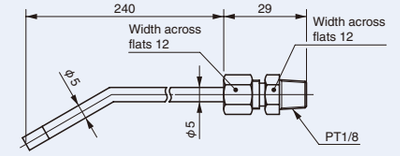
○ : Oil hole is prepared.

Series / Size of stud diameter d_1 (1) mm \ Oil hole position				① Head	② Stud outside surface	③ Stud end
Standard Type Cam Followers series	CF CFKR CFES CFE CF···W	With hexagon hole	$d_1 < 5$	–	–	–
			$5 \leqq d_1 \leqq 10$	○(2)	–	–(3)
			$10 < d_1$	○(4)	○	○
	CF-RU1、CF-FU1(5)		$d_1 \leqq 12$	○	–	–
			$12 < d_1$	○	○	○
	CF-SFU	With hexagon hole	$d_1 \leqq 10$	○(2)	–	–
			$10 < d_1$	○(6)	–	–
Cam Follower G	CF ···G			–	–	–
C-Lube Cam Followers	CF ···WB ···/SG			–	–	–
Miniature CFS series	CFS CFS···W			–	–	–
Cylindrical Roller Cam Followers	NUCF	With hexagon hole	$d_1 \leqq 10$	○(2)	–	–
			$10 < d_1$	○(4)	○	○
Inch series	CR	With hexagon hole	$d_1 \leqq 6.35$	–	–	–
			$6.35 < d_1$	–	○	○
		With screwdriver slot	$d_1 \leqq 6.35$	○	–	–
			$6.35 < d_1$	○	○	○
	CRH	With hexagon hole	$d_1 \leqq 7.938$	–	–	–
			$7.938 < d_1$	–	○	○
		With screwdriver slot	$d_1 \leqq 7.938$	○	–	–
			$7.938 < d_1$	○	○	○

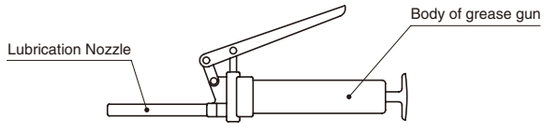


Notes(1) In case of Eccentric Type Cam Followers (CFE), thread diameter G shown in the table of dimensions is applicable in place of stud dia. and the oil hole on the outer surface of the stud cannot be used for lubrication.
(2) Re-lubrication can be made from the re-greasing fitting that is inserted into the hexagon hole. See page I4.
(3) Lubrication from the stud end is possible for Double Hex Hole Cam Followers (CFKR) only.
(4) Grease nipple is incorporated in the hexagon hole. Re-greasing can be made from the stud head and the stud end by press fitting a supplied grease nipple into the stud end. See page I4.
(5) Tapped holes for oil connectors are provided at the stud end and hole of the head.
(6) Re-greasing can be made from the grease nipple in the hexagon hole.

Table 12 Type and Dimension of Lubrication Nozzles

Type	Dimension	Applicable grease nipple and re-grease fitting
A-5126T		NPF3(1) NPF6-1(1) Re-grease fitting(1)
A-5120R		NPF4-1(1) NPF6-1(1)
B-5120R		
A-5120V		
A-5240V		NPT4-1 NPT6-1 NPB2 NPB3 NPB3-1 NPB4
B-5120V		
B-5240V		

Note(1) HSP-3(Yamada Corporation)can be used for them.
Remark The above nozzles can be atached on the standard grease gun shown below.
If required, please consult to IKO with type of lubrication nozzle.



Accessories

Cam Follower accessories are shown in Table 13. Grease nipple dimensions are shown in Table 14 and Table 15. Dimensions of plug for unused oil hole and dimensions of plug inserter are shown in Table 16. Nut dimensions are shown in Table 17 and Table 18.

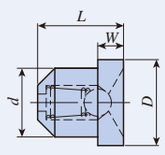
Table 13 Accessories

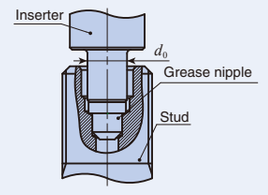
○ : Attached

Series / Size of stud dia. d_1 (1) mm \ Accessories			Grease nipple	Plug	Nut	Spring washer
Standard Type Cam Follower	CF CFKR	$d_1 \leqq 10$	–(2)	–	○	–
		$10 < d_1$	○	–	○	–
Eccentric Type Cam Follower	CFE	$d_1 \leqq 10$	–(2)	–	○	○
		$10 < d_1$	○	–	○	○
Solid Eccentric Stud Type Cam Follower	CFES	$d_1 \leqq 10$	–	–	○	–
Thrust Disk Type Cam Follower	CF…W	$10 < d_1$	○	–	○	–
Centralized Lubrication Type Cam Follower	CF – RU1、CF – FU1		–	–	○	–
Easy Mounting Type Cam Follower	CF – SFU		–	–	–	–
Cam Follower G	CF…G		–	–	○	–
C-Lube Cam Follower	CF…WB…/SG		–	–	○	–
Miniature Type Cam Follower Thrust Disk Type Miniature Cam Follower	CFS CFS…W		–	–	○	–
Cylindrical Roller Cam Follower (With Hexagon socket)	NUCF	$d_1 \leqq 10$	–	–	○	–
		$10 < d_1$	○	–	○	–
Inch series Cam Follower (With Hexagon socket)	CR	$d_1 \leqq 6.35$	–	–	○	–
		$9.525 \leqq d_1$	○	○	○	–
Inch series Cam Follower	CR (With Screw driverslot)		○	○	○	–
Inch series Cam Follower (With Hexagon socket)	CRH	$d_1 \leqq 7.938$	–	–	○	–
		$11.112 \leqq d_1$	○	○	○	–
Inch series Cam Follower	CRH (With Screw driverslot)		○	○	○	–

Note(1) For Eccentric Type Cam Follower CFE, thead diameter G is applied.
(2) For Double Hex Hole Cam Followers (CFKR) only, a grease nipple is included for the thread side.
Remark: The standard grease nipple (brass) is included in the Stainless Steel Made Cam Follower.
We also have the stainless steel grease nipple. Please contact IKO and request the product.

Table 14 Dimensions of grease nipple for Standard Type Cam Followers (1)





Identification number	Dimensions of grease nipple mm				Stud diameter d_1 (2) mm	Dimension of inserter mm
	d	D	L	W		$d_0{}^{+0.05}_{-0.05}$
NPF3(3)	3	4	4.5	1.3	10	4.1
NPF4-1	4	5	5	1.5	12～16	5.3
NPF6-1	6	7	8	2	18～30	7.3

Notes (1) Applicable to Cam Followers other than Inch series Cam Followers.
(2) For Eccentric Type Cam Followers, thread diameter G as shown in the dimension table is applicable.
(3) Only Double Hex Hole Cam Followers (CFKR) sizes 22 and 26 are applicable.
Remark The same grease nipple as the accessory is integrated in the hexagon hole on the head.

Table 15 Dimensions of grease nipple for Inch series Cam Followers

Identification number	Dimensions mm						Applicable Cam Followers
	d	D	D_1	L	L_1	W	
NPB2	3.18	7.5	6	9	5.5	1.5	CR8 ～ CR10-1、CRH8-1 ～ CRH11
NPB3	4.76	7.5	6	10	5.5	1.5	CR12 ～ CR22、CRH12 ～ CRH22
NPB3-1	4.76	7.5	6	12.5	5.5	1.55	CR24 ～ CR36、CRH24 ～ CRH44
NPB4	6.35	8	6	13	6	2	CR48、CRH48 ～ CRH64

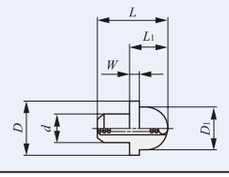
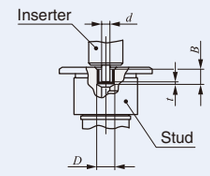


Table 16 Dimensions of plug for Inch series Cam Followers

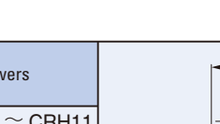
Identification number	Dimensions of plug mm			Dimension of inserter mm	Applicable bearings (1)
	D	t	B	$d\ {}^{0}_{-0.1}$	
USB2F	3.18	0.3	3.3	2.3	CR 8 ～CR10-1
USB3F	4.76	0.4	4.3	3.7	CR12～CR36、CRH12 ～CRH44
USB4F	6.35	0.5	4.8	5.2	CR48、CRH48～CRH64



Note(1) Shows representative types.

Table 17 Metric series nut dimensions

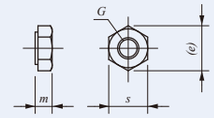
Model of bearing	Stud diameter d_1(1)	Nut dimensions mm			
		G	m	s	e
CF CFKR CFES CFE CF···W CF-RU1 CF-FU1 CF···G CF···WB···/SG CFS CFS···W NUCF	1.4	M 1.4×0.3	1.1	3	3.25
	2	M 2 ×0.4	1.6	4	4.6
	2.5	M 2.5×0.45	2	5	5.8
	3	M 3 ×0.5	2.4	5.5	6.4
	4	M 4 ×0.7	3.2	7	8.1
	5	M 5 ×0.8	4	8	9.2
	6	M 6 ×1	5	10	11.5
	8	M 8 ×1.25	6.5	13	15
	10	M10 ×1.0(2) M10 ×1.25	8	17	19.6
	12	M12 ×1.5	10	19	21.9
	16	M16 ×1.5	13	24	27.7
	18	M18 ×1.5	15	27	31.2
	20	M20 ×1.5	16	30	34.6
	24	M24 ×1.5	19	36	41.6
	30	M30 ×1.5	24	46	53.1



Note(1) For Eccentric Type Cam Followers (CFE), thread diameter G as shown in the dimension table is applicable.
Note(2) Applicable to Double Hex Hole Cam Followers (CFKR).

Table 18 Inch series nut dimensions

Model of bearing	Stud diameter d_1 (inch)	Nut dimensions mm			
		G UNF	m	s	e
CR CRH	4.826	No.10-32	4	8	9.2
	6.35 (1/4)	1/4-28	5.5	10	11.5
	7.938 (5/16)	5/16-24	6.5	12	13.8
	9.525 (3/8)	3/8-24	8	14	16.2
	11.112 (7/16)	7/16-20	10	17	19.5
	12.7 (1/2)	1/2-20	11	19	21.9
	15.875 (5/8)	5/8-18	14	23	26.5
	19.05 (3/4)	3/4-16	16	26	30
	22.225 (7/8)	7/8-14	19	32	37
	25.4 (1)	1 -14UNS	22	36	41.4
	28.575 (1 1/8)	1 1/8-12	24	41	47.1
	31.75 (1 1/4)	1 1/4-12	27	46	53.5
	38.1 (1 1/2)	1 1/2-12	33	55	63.5
	44.45 (1 3/4)	1 3/4-12UN	38	65	75.1
	50.8 (2)	2 -12UN	44	75	86.6



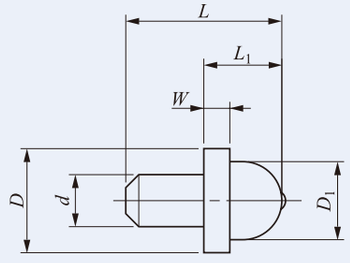
Special Specification

The grease nipple supplied with Metric series Cam Follower with hexagon socket as an accessory may be replaced with the NPT type grease nipple indicated in Table 19 upon your request. If required, please order with supplemental code, "/NP" at the end of identification number.

Example of Identification Number

CF 12 BUU ／ NP

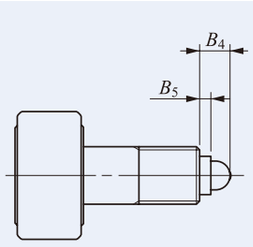
Table 19 Dimension of NPT type grease nipple



Code number	Dimension of grease nipple mm						Size of stud dia. d_1(1) mm
	d	D	D_1	L	L_1	W	
NPT4-1	4	8	6	12	6	2	12 ～ 16
NPT6-1	6	8	6	14	8	4	18 ～ 30

Note(1) For Eccentric Type Cam Follower CFE, thread diameter G is applied.
Remark Not applicable to Double Hex Hole Cam Followers.

Table 20 Dimension of assembled NPT type grease nipple



Code number	Dimension mm		Size of stud dia. d_1(1) mm
	B_4	B_5	
NPT4-1	6	2	12 ～ 16
NPT6-1	8	4	18 ～ 30

Note(1) For Eccentric Type Cam Follower CFE, thread diameter G is applied.

Operating Temperature Range

Operating temperature range of Cam Followers is 20°C ~ +120°C. However, note that the maximum allowable temperature varies in models shown in Table 21.

Table 21 Limitation of operating temperature range

Model / Stud diameter d_1 mm		Item	With cage	
			Shield type	Sealed type
Miniature Type Cam Followers CFS Thrust Disk Type Miniature Cam Followers CFS…W		$d_1 = 2$	− 20°C ~ 110°C(1)	—
Standard Type Cam Followers CF…B		$d_1 = 3, 4$	− 20°C ~ 110°C(1)	− 20°C ~ 80°C
Thrust Disk Type Cam Followers CF…WB		$d_1 = 5$	− 20°C ~ 120°C	− 20°C ~ 80°C
Standard Type Cam Followers / Stainless Steel Made CF…FB Thrust Disk Type Cam Followers / Stainless Steel Made CF…FWB		$3 \leqq d_1 \leqq 5$	− 20°C ~ 110°C(1)	− 20°C ~ 80°C
C-Lube Cam Followers CF…WB…/SG		$5 \leqq d_1 \leqq 20$	—	− 15°C ~ 80°C(2)

Notes(1) 100°C when used continuously.
(2) Below 60°C is recommended for long use.

Mounting

❶Make the center axis of the mounting hole perpendicular to the moving direction of the Cam Follower and match the side shoulder accurately with the seating surface indicated by dimension f in the table of dimensions. (See Fig. 1)
The chamfered mounting hole should be as small as possible (C0.5 or so).
When mounting Cam Followers, do not hit the flange head of the Cam Follower directly with a hammer, etc. This may lead to a bearing failure such as irregular rotation or cracking.
If the Cam Follower outer ring is not in good contact with the mating running surface then we recommend use of a crowned outer ring type.

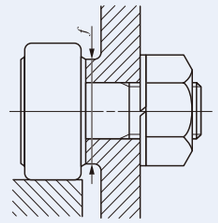


Fig. 1 Seating surface

❷The IKO mark on the flange head of the stud indicates the position of the oil hole on the raceway. Avoid locating the oil hole within the loading zone. This may lead to a short bearing life. (See Fig. 2.) The hole located in the middle part of the stud perpendicular to the stud center axis is used for greasing or locking.

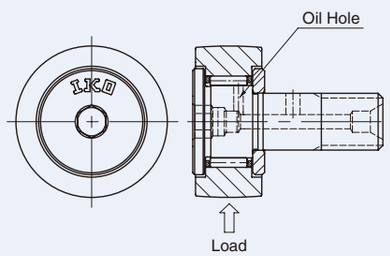


Fig. 2 Oil hole position and loading direction

❸When mounting Cam Followers, fix in place by holding the hexagon hole or screwdriver slot with a hex wrench or slotted screwdriver and use a wrench to tighten on a nut. (See Fig. 3)
If mounting by turning the hexagon hole or screwdriver slot itself, the hexagon hole or screwdriver slot of the Cam Follower may become damaged.

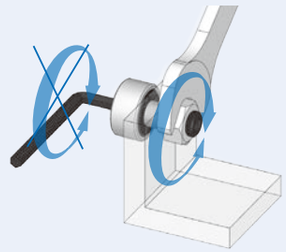


Fig. 3 Methods of mounting

❹When tightening the nut, the tightening torque should not exceed the values shown in the table of dimensions. If the tightening torque is too large, it is possible that the threaded portion of the stud will be broken. When there is a possibility of loosening, a special nut such as a lock nut, spring washer, or self-locking nut should be used.

❺When direct-fixing the Cam Follower without nuts for mounting as shown in Fig. 4, it may be difficult to achieve sufficient tightening torque. If the screw then loosens, stress may concentrate on the thread, causing the stud to break. Such a method is not recommended.

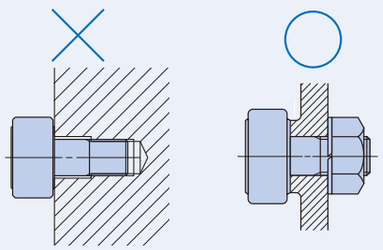


Fig. 4 Methods of mounting

❻Solid Eccentric Stud Type Cam Followers and Eccentric Type Cam Followers, are mounted in reference position where IKO mark on the head of stud is located as Fig.5. The outer ring position can be adjusted appropriately by turning the stud with a screwdriver or hexagon bar wrench using the screwdriver slot or hexagon hole of the stud head. The stud is fixed with a nut and a spring washer, etc. The tightening torque should not exceed the values of maximum tightening torque shown in the table of dimensions.
When shock loads are applied and the adjusted eccentricity has to be ensured, it is recommended to make holes in the housing, stud and eccentric collar, and fix the stud with a dowel pin as shown in Fig. 6. However, when the stud diameter is less than 8 mm (Eccentric collar diameter 11 mm), it is difficult to make a hole in the stud because the stud is through-hardened.

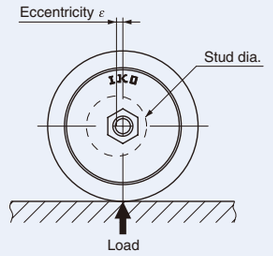


Fig. 5 Reference position for adjusting of Solid Eccentric Stud Type Cam Followers and Eccentric Type Cam Follwers

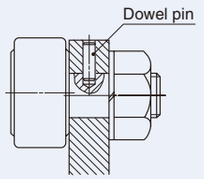


Fig. 6 Mounting example of Solid Eccentric Stud Type Cam Follower

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

❼In case of Eccentric Type Cam Followers (CFE), the length of the mounting hole should be more than 0.5 mm longer than the dimension B_3 (Eccentric collar width) shown in the table of dimensions. (See Fig. 7.)

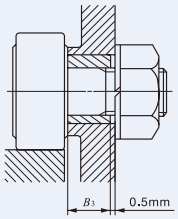
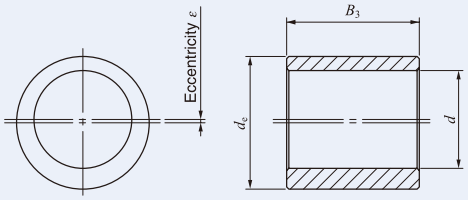


Fig. 7 Length of the mounting hole of Eccentric Type Cam Follower

❽Eccentric callor is available for Inch series Cam Followers.
Cam Followers with Eccentric collars, CRE are also available. If required, please consult with IKO.

Table 20 Eccentric collars for Inch series Cam Followers



unit: mm

Identifical number of collar	Outer diameter of collar de	Length of collar B_3	Eccentricity ε	Stud dia. d	Applicable Cam Followers
EB 8	6.350 (1/4)	6.350 (1/4)	0.250	4.826	CR 8 CR 8-1 (V)(B)(UU)(R)
EB10	9.525 (3/8)	9.525 (3/8)	0.380	6.350 (1/4)	CR10 CR10-1 (V)(B)(UU)(R)
EB12	12.700 (1/2)	12.700 (1/2)	0.380	9.525 (3/8)	CR12 CR14 (V)(B)(UU)(R)
EB16	15.875 (5/8)	15.875 (5/8)	0.760	11.112 (7/16)	CR16 CR18 (V)(B)(UU)(R)
EB20	17.450	17.450	0.760	12.700 (1/2)	CR20 CR22 (V)(B)(UU)(R)
EB24	22.225 (7/8)	22.225 (7/8)	0.760	15.875 (5/8)	CR24 CR26 (V)(B)(UU)(R)
EB28	25.400 (1)	25.400 (1)	0.760	19.050 (3/4)	CR28 CR30 (V)(B)(UU)(R)
EB32	30.150	30.150	0.760	22.225 (7/8)	CR32 CR36 (V)(B)(UU)(R)
EB48	44.450 (1 3/4)	44.450 (1 3/4)	1.520	31.750 (1 1/4)	CR48 VUU

❾For mounting Easy Mounting Type Cam Followers, it is recommended to fix the fixing screw from the upper side to the stepped portion of the stud. (See Fig. 8.)
While M5 - M6 screws are generally used as fixing screws, adjust the size used depending on the usage criteria.

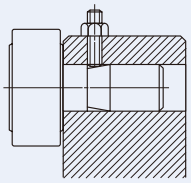


Fig. 8 Mounting example of Easy Mounting Type Cam Follower

Precaution For Use

❶Do not wash C-Lube Cam Follower with organic solvent and/or white kerosene, which have the ability of removing fat nor leave them in contact with the above agents.

❷To ensure normal rotation of the C-Lube Cam Follower, apply a load of 1% or over of the dynamic load rating at use.