CAM FOLLOWERS

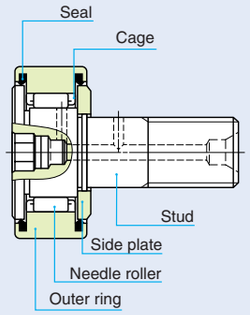
- Standard Type Cam Followers
- Solid Eccentric Stud Type Cam Followers
- Eccentric Type Cam Followers
- Thrust Disk Type Cam Followers
- Capilube Cam Followers
- Centralized Lubrication Type Cam Followers
- Easy Mounting Type Cam Followers
- Heavy Duty Type Cam Followers
- Miniature Type Cam Followers
- Thrust Disk Type Miniature Cam Followers

Structure and Features

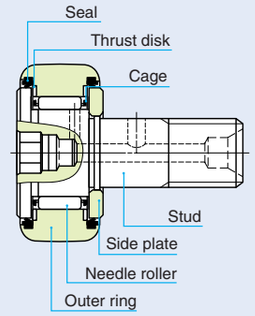
IKO Cam Followers are bearings with a stud incorporating needle rollers in a thick walled outer ring. These bearings are designed for outer ring rotation, and have superior rotational performance with a small coefficient of friction and high load capacity.
As studs already have threads or steps, they 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

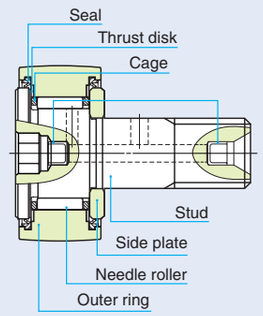
Structure of Standard Type Cam Follower(1)
CF···BUU



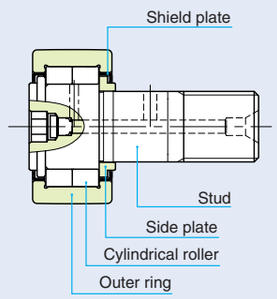
Structure of Thrust Disk Type Cam Follower
CF···WBUUR



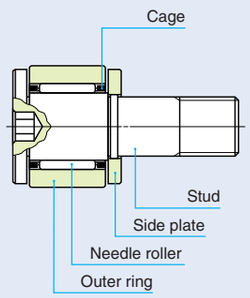
Structure of Capilube Cam Follower(2)
CF···WBUUR/SG



Structure of Heavy Duty Type Cam Follower
NUCF···BR



Structure of Miniature Type Cam Follower
CFS



Note(1) In case of the stud diameter (d_1) 5 to 10mm, a lubrication 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) For the detail of Capilube, please refer page A55.

Types

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

Table 1 Type of Cam Followers

Type					With cage		Full complement	
					Crowned outer ring	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring
Metric CF series	Standard Type Cam Follower 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
			With screwdriver slot	Shield type	CF ··· R	CF ···	CF ···V R	CF ···V
				Sealed type	CF ··· UUR	CF ··· UU	CF ···V UUR	CF ···V UU
		Stainless steel made	With hexagon hole	Shield type	CF ···FB R	CF ···FB	—	—
				Sealed type	CF ···FBUUR	CF ···FBUU	—	—
	Solid Eccentric Stud Type Cam Follower CFES	High carbon steel made	With hexagon hole	Shield type	CFES··· B R	CFES··· B	—	—
				Sealed type	CFES··· BUUR	CFES··· BUU	—	—
			With screwdriver slot	Shield type	CFES··· R	CFES	—	—
				Sealed type	CFES··· UUR	CFES··· UU	—	—
	Eccentric Type Cam Follower 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
			With screwdriver slot	Shield type	CFE ··· R	CFE ···	CFE ···V R	CFE ···V
				Sealed type	CFE ··· UUR	CFE ··· UU	CFE ···V UUR	CFE ···V UU
	Thrust Disk Type Cam Follower 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 Follower CF-RU1, CF-FU1	High carbon steel made	With screwdriver slot	Sealed type	CF-RU1	CF-FU1	—	—
	Easy Mounting Type Cam Follower CF-SFU	High carbon steel made	With hexagon hole	Sealed type	—	CF-SFU···B	—	—
			With screwdriver slot	Sealed type	—	CF-SFU		
Capilube Cam Follower CF···/SG		High carbon steel made	With hexagon hole	Sealed type	CF···WBUUR/SG	—	—	—
Heavy Duty Type Cam Follower NUCF		High carbon steel made	With hexagon hole	Shield type	—	—	NUCF···BR	—
			With screwdriver slot	Shield type	—	—	NUCF···R	
Miniature CFS series	Miniature Type Cam Follower CFS	High carbon steel made	With hexagon hole	Shield type	—	CFS	—	CFS ··· V
		Stainless steel made		Shield type	—	CFS ···F	—	CFS ···FV
	Thrust Disk Type Miniature Cam Follower CFS···W	High carbon steel made	With hexagon hole	Shield type	—	CFS ··· W	—	—
		Stainless steel made		Shield type	—	CFS ···FW	—	—
Inch series	Inch series Cam Follower 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 UUR
	Inch series Heavy Duty Cam Follower 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.

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 track 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 track 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 track 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 surfaces 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.

Capilube Cam Follower

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.

Heavy Duty Type 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.

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.

Inch series Cam Followers

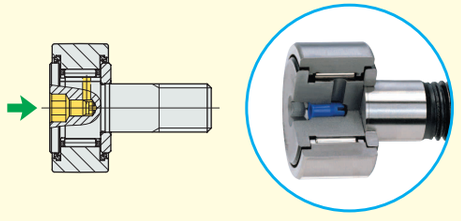
Two types, CR and CRH, are available in the Inch series Cam Followers. Black oxide film treatment is made on CRH models.

Lubrication method of Hex Head Cam Followers

〈Types〉 **Standard Type, Solid Eccentric Stud Type, Eccentric Type, Thrust Disk Type, Easy Mounting Type, Heavy Duty Type.**

1 Way

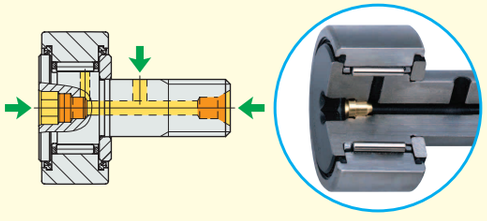
Stud dia. 5～10mm



Re-greasing fitting is imcorporated in the stud head.

3 Ways

Stud dia. 12～30mm



Grease nipple is imcorporated in the stud head.

Remark : All of Easy Mounting Type are 1way port.

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

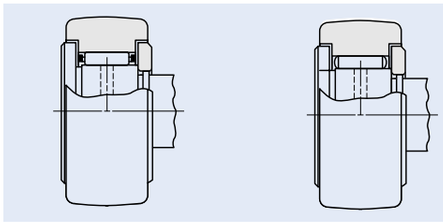
Internal Structures and Shapes

Various types are lined up in Cam Follower series, including the caged type, full complement type, shield type, sealed type, type with crowned outer ring, type with cylindrical outer ring, type with hexagonal hole, 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.

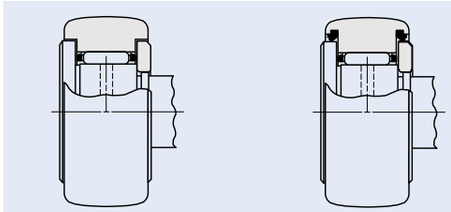
《With cage》 《Full complement》



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.

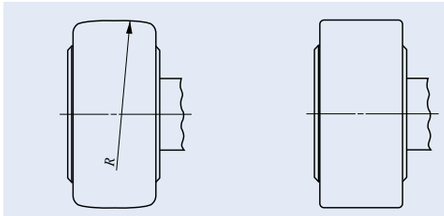
《Shield type》 《Sealed type》



Shape of outer ring outside surface

The outside surface of the outer ring of Cam Followers, which makes direct contact with the mating track 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 track surface, and are suitable for applications in which the applied load is large or the track surface hardness is low.

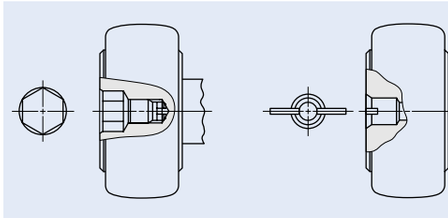
《Crowned outer ring》 《Cylindrical outer ring》



Shape of stud head

Cam Followers are available in two stud head shape types, namely, the type with screwdriver slot and the type with hexagon hole for hexagon bar wrench.

《With hexagon hole》 《With screwdriver slot》



Identification number

Some examples of the identification number of Cam Followers are shown below.

Examples of identification number

Example 1 → CF 10 V UU R

Example 2 → CF 10 W B R

Example 3 → CF 8 W B UU R /SG

Example 4 → CFS 3 F V P6

Model code		
Metric CF series	CF	Standard Type 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···/SG	Capilube Cam Follower
	NUCF	Heavy Duty Type Cam Follower
Miniature CFS series	CFS	Miniature Type Cam Follower
	CFS···W	Thrust Disk Type Miniature Cam Follower
Inch series	CR CRH	Inch series Cam Follower

Size
The value indicates a stud diameter. (unit: mm) In the inch series, the outside diameter 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

Shape of stud head	
B	With hexagon hole
No symbol	With screwdriver slot

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, and Table 3.2. 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	0～-25
Stud dia. d_1	h7		h6	+25～0	
Width of outer ring C	0～-120		0～-120	0～-130	

Note(1) Also applicable to Heavy Duty Type Cam Followers.

Table 3.1 Tolerances and allowable values of outer rings (Metric CF series cylindrical outer rings)

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

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.	Over	Incl.			
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)	Heavy Duty Type Cam Followers NUCF	Miniature CFS series (3)	Inch series	Min.	Max.
CF 3～CF 5	—	CFS2～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	—	—	CR12～CR22,CRH12～CRH22	5	25
CF16～CF20-1	—	—	CR24～CR36,CRH24～CRH36	10	30
CF24～CF30-2	—	—	CRH40～CRH56	10	40
—	—	—	CRH64	15	50
—	NUCF10 R～NUCF24 R	—	—	20	45
—	NUCF24-1R～NUCF30-2R	—	—	25	50

Notes(1) Also applicable to the full complement type, crowned outer ring type, sealed type, and type with hexagon hole.
(2) Only representative types are shown in the table, but this table is applicable to the entire metric CF series.
(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
Heavy Duty Type	H7
Miniature CFS series	H6
Inch series	F7

Table 6 Dimensional tolerances of mounting hole

unit: μm

Nominal outside dia. of stud mm		F7		H6		H7	
Over	Incl.	High	Low	High	Low	High	Low
—	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	40	+50	+25	+16	0	+25	0
40	50						

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 a load which can be continuously applied on a Cam Follower placed on a steel track surface without causing any deformation or indentation on the track surface when the outer ring of the Cam Follower makes contact with the mating track surface (plane). The track capacities shown in Tables 7.1 and 7.2 are applicable when the hardness of the mating track surface is 40HRC (Tensile strength 1250N/mm^2). When the hardness of the mating track 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 track 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 track especially for high-speed rotations such as cam mechanisms.

For lubrication between the outer ring and the mating track surface, C-Lube Unit for Cam Followers is recommended. (Refer page I18)

Table 7.1 Track capacity

unit: N

Type	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	1 610	CF10	4 680
	CF10-1R	2 030	CF10-1	5 530
	CF12 R	2 470	CF12	7 010
	CF12-1R	2 710	CF12-1	7 480
	CF16 R	3 060	CF16	11 200
	CF18 R	3 660	CF18	14 500
	CF20 R	5 190	CF20	23 200
	CF20-1R	4 530	CF20-1	21 000
	CF24 R	6 580	CF24	34 300
	CF24-1R	8 020	CF24-1	39 800
	CF30 R	9 220	CF30	52 700
	CF30-1R	9 990	CF30-1	56 000
	CF30-2R	10 800	CF30-2	59 300
Miniature CFS series (2)	—	—	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 metric CF series, and also to Heavy Duty Type Cam Followers.
(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	Identification number With crowned outer ring	Track capacity	Identification number With cylindrical 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 8-1	2 360
	—	—	—	—	CRH 9	2 650
	CR10 R	1 030	CR10	3 210	—	—
	CR10-1R	1 030	CR10-1	3 480	CRH10-1	3 480
	—	—	—	—	CRH11	3 830
	CR12 R	1 340	CR12	4 500	CRH12	4 500
	CR14 R	1 630	CR14	5 250	CRH14	5 250
	CR16 R	1 970	CR16	7 280	CRH16	7 280
	CR18 R	2 300	CR18	7 710	CRH18	7 710
	CR20 R	2 680	CR20	10 700	CRH20	10 700
	CR22 R	3 050	CR22	11 800	CRH22	11 800
	CR24 R	3 410	CR24	15 400	CRH24	15 400
	CR26 R	3 820	CR26	16 700	CRH26	16 700
	CR28 R	4 210	CR28	21 000	CRH28	21 000
	CR30 R	4 610	CR30	22 500	CRH30	22 500
	CR32 R	5 050	CR32	30 900	CRH32	30 900
	CR36 R	5 900	CR36	34 700	CRH36	34 700
	—	—	—	—	CRH40	45 000
	—	—	—	—	CRH44	49 500
	—	—	—	—	CRH48	64 300
	—	—	—	—	CRH52	69 600
	—	—	—	—	CRH56	87 000
	—	—	—	—	CRH64	113 000

Note(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. Cosidering that axial loads also act under actual operating conditions, the recommended d_1n value is 1/10 of the value shown in the table.

Table 9 d_1n values of Cam Followers (1)(2)

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

Notes(1) d_1n value $= d_1 \times n$
where, d_1 : Stud diameter mm
n : Rotational speed rpm
(2) In case of Capilube Cam Follower, d_1n value is 10000.
In case of Capilube Cam Follower with axial loads, d_1n value is 10000 or 1/10 of the above table values, whichever smaller.

Lubrication

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

○ : With prepacked grease × : Without prepacked grease

Series \ Type / Size of stud dia. d_1 (1) mm			With cage				Full complement type
			Shield type		Sealed type		
			With hexagon hole	With screwdriver slot	With hexagon hole	With screwdriver slot	
Metric CF series	CF CFES CFE CF⋯W	3～5	○	○	○	○	–
		6～10		×			○
		12～30	×				
	CF-RU1, CF-FU1		–	–	–	○	–
	CF-SFU		–	–	×	○	–
Capilube Cam Followers CF⋯/SG (2)			–	–	×	–	–
Heavy Duty Type Cam Followers NUCF			–	–	–	–	○
Miniature CFS series	CFS CFS⋯W		○	–	–	–	○
Inch series	CR		○	○	○	○	○
	CRH		–	–	–	–	○

Notes(1) For Eccentric Type Cam Followers (CFE), thread diameter G shown in the table of dimensions is applicable.
(2) This Cam Follower incorporates Capilube which includes a large amount of lubricating oil.

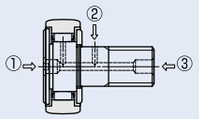
Oil Hole

The position of oil hole is shown in Table 11. Re-greasing cannot be made for models without a oil hole.
Grease should be supplied gently with a straight type grease gun as specified by JIS B 9808:1991, which is applied carefully to the nipple head from the front.

Table 11 Position of oil hole

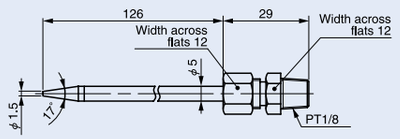
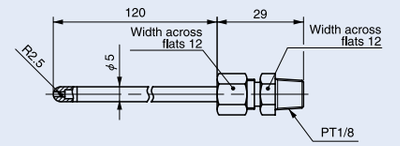
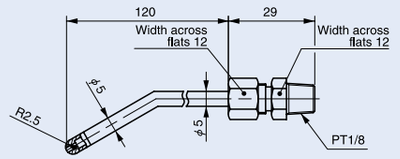
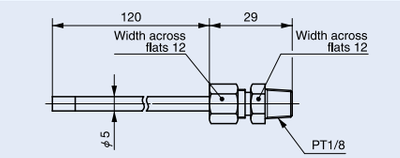
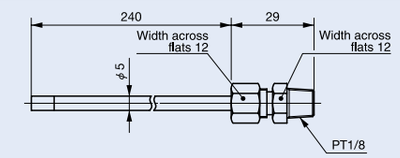
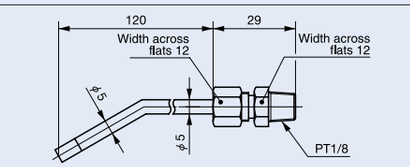
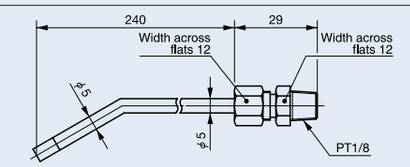
○ : Oil hole is prepared.

Series / Size of stud dia. d_1 (1) mm				Position of oil hole ① Stud head	② Stud outside surface	③ Stud end
Metric CF series	CF CFES CFE CF⋯W	With hexagon hole	$d_1 < 5$	–	–	–
			$5 \leqq d_1 \leqq 10$	○(2)	–	–
			$10 < d_1$	○(3)	○	○
		With screwdriver slot	$d_1 < 5$	–	–	–
			$5 \leqq d_1 \leqq 10$	○	–	–
			$10 < d_1$	○	○	○
	CF-RU1、CF-FU1 (4)		$d_1 \leqq 12$	○	–	–
			$12 < d_1$	○	○	○
	CF-SFU	With hexagon hole	$d_1 \leqq 10$	○(2)	–	–
			$10 < d_1$	○(5)	–	–
		With screwdriver slot		–	–	–
C-Lube Cam Followers CF⋯/SG			$d_1 \leqq 10$	–	–	–
			$10 < d_1$	–	○	–
Miniature CFS series	CFS CFS⋯W			–	–	–
Heavy Duty Type Cam Followers	NUCF	With hexagon hole	$d_1 \leqq 10$	○(2)	–	–
			$10 < d_1$	○(3)	○	○
		With screwdriver slot	$d_1 \leqq 10$	○	–	–
			$10 < d_1$	○	○	○
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	$d_1 \leqq 7.938$	○	–	–
			$7.938 < d_1$	○	○	○

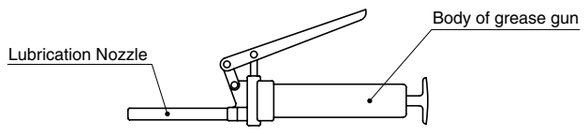


Notes(1) In case of Eccentric Type Cam Followers (CFE), thread diameter G shown in the table of dimensions is applicable in place of stud dia. and the oil hole on the outer surface of the stud cannot be used for lubrication.
(2) Re-lubrication can be made from the re-greasing fitting that is inserted into the hexagon hole. Refer to pge I4.
(3) Grease nipple is incorporated in the hexagon hole. Re-greasing can be made from the stud end by press fitting a supplied grease nipple into the stud end. Refer to page I4.
(4) Tapped holes for oil connectors are provided at the stud end and hole of the head.
(5) Re-greasing can be made from the grease nipple in the hexagon hoe.
(6) Re-greasing is not possible as the bearing internal space is filled with thermosetting solid-type lubricant C-Lube.

Table 12 Types and Dimension of Lubrication Nozzles

Type	Dimension	Applicable grease nipple and re-grease fitting
A-5126T		NPF4-1 (1) NPF6-1 (1) Re-grease fitting
A-5120R		NPF4-1 (1) NPF6-1 (1)
B-5120R		
A-5120V		
A-5240V		NPT4 NPT6 NPT8 NPB2 NPB3 NPB3-1
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.



Accessories

Cam Follower accessories are shown in Table 12. Grease nipple dimensions are shown in Table 13. Dimensions of plug for unused oil hole and dimensions of plug inserter are shown in Table 14.

Table 13 Accessories

○ : Attached

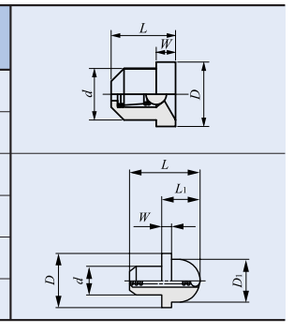
Series / Size of stud dia. d_1 mm (1)				Accessories: Grease nipple	Plug	Nut	Spring washer
Metric CF series	CF CFE CFES CF…W	With hexagon hole	$d_1 \leqq 10$	–	–	○	–(2)
			$10 < d_1$	○	–	○	–(2)
		With screwdriver slot	$d_1 < 5$	–	–	○	–(2)
			$5 \leqq d_1$	○	○	○	–(2)
	CF-RU1, CF-FU1			–	–	○	–
	CF-SFU			–	–	–	–
Capilube Cam Followers	CF…/SG			–	–	○	–
Heavy Duty Type Cam Followers	NUCF	With hexagon hole	$d_1 \leqq 10$	–	–	○	–
			$10 < d_1$	○	–	○	–
		With screwdriver slot	–	○	○	○	–
Miniature CFS series	CFS CFS…W			–	–	○	–
Inch series	CR	With hexagon hole	$d_1 \leqq 6.35$	–	–	○	–
			$6.35 < d_1$	○	○	○	–
		With screwdriver slot	–	○	○	○	–
	CRH	With hexagon hole	$d_1 \leqq 7.938$	–	–	○	–
			$7.938 < d_1$	○	○	○	–
		With screwdriver slot	–	○	○	○	–

Notes(1) For Eccentric Type Cam Follower CFE, thead diameter G is applied.
(2) For CFE, spring washer is supplied.

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

Table 14 Dimensions of grease nipple

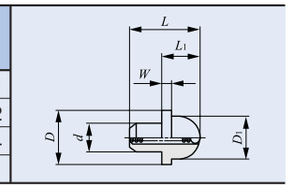
Code number	Dimensions mm						Applicable Cam Followers (1)
	d	D	D_1	L	L_1	W	
NPF4-1	4	5	—	5	—	1.5	CF12B～CF16B
NPF6-1	6	7	—	8	—	2	CF18B～CF30B
NPT4	4	7.5	6	10	5.5	1.5	CF 6～CF10-1
NPT6	6	8	6	11	6	2	CF12～CF18
NPT8	8	10	6	16	7	3	CF20～CF30-2
NPB2	3.18	7.5	6	9	5.5	1.5	CF5



Note(1) Only representative types are shown in the table. This table is also applicable to Heavy Duty Type Cam Followers.

Table 15 Dimensions of Grease nipple for Inch series

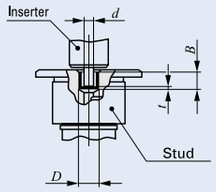
Code number	Dimensions mm						Applicable Cam Followers (1)
	d	D	D_1	L	L_1	W	
NPB2	3.18	7.5	6	9	5.5	1.5	CR8～CR10-1、CRH8-1～CRH11
NPB3	4.76	7.5	6	10	5.5	1.5	CR12～CR22、CRH12～CRH22
NPB3-1	4.76	7.5	6	12.5	5.5	1.55	CR24～CR36、CRH24～CRH44
NPB4	6.35	8.5	6	13	6	2	CR48、CRH48～CRH64



Note(1) Only representative types are shown in the table.

Table 16 Dimensions of plug

Code number	Dimensions of plug mm			Dimension of inserter mm	Applicable Cam Followers (1)
	D	t	B	$d\ {}^{0}_{-0.1}$	
UST4F	4	0.4	3.3	3	CF 6～CF10-1
UST6F	6	0.4	4	5	CF12～CF18
UST8F	8	0.4	5.8	7	CF20～CF30-2
USB2F	3.18	0.3	3.3	2.3	CF5, CR8～CR10-1
USB3F	4.76	0.4	4.3	3.7	CR12～CR36, CRH12～CRH44
USB4F	6.35	0.5	4.8	5.2	CRH48～CRH64



Note(1) Only representative types are shown in the table. This table is also applicable to Heavy Duty Type Cam Followers.

Operating Temperature Range

The operating temperature range for IKO Cam Followers is -20˚C～+120˚C. However, the maximum allowable temperature for the following types is different.

The maximum allowable temperature for the Metric CF series with a stud diameter d_1 of 4 mm or less, Stainless steel mede Cam Followers with a stud diameter d_1 of 5 mm and CFS2 is +110˚C, and +100 ˚C when they are continuously operated.

The maximum allowable temperature for the sealed type with a stud diameter d_1 of 5 mm or less is +80˚C.

Allowable temperature range of C-Lube Cam Followers is -15˚C～+80˚C. For a long term operation, less than +60˚C is recomended.

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.) Then, fix the Cam Follower with the nut. 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.

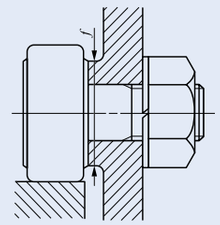


Fig. 1 Seating surface

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.

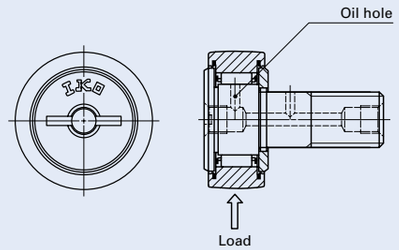


Fig. 2 Oil hole position and loading direction

❸When 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.

❹In the case of Solid Eccentric Stud Type Cam Followers and Eccentric Type Cam Followers, 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. 3. 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.

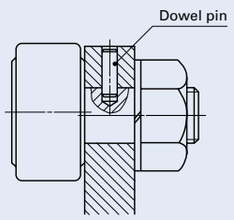


Fig. 3 Mounting example of Solid Eccentric Stud Type Cam Follower

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

❺In 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. 4.)

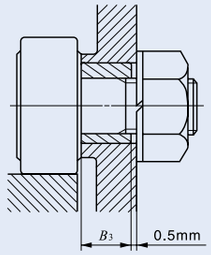


Fig. 4 Length of the mounting hole of Eccentric Type Cam Follower

❻For 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. 5.)

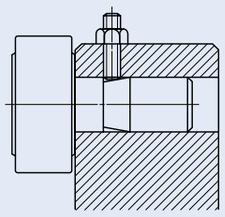


Fig. 5 Mounting example of Easy Mounting Type Cam Follower

Option Parts

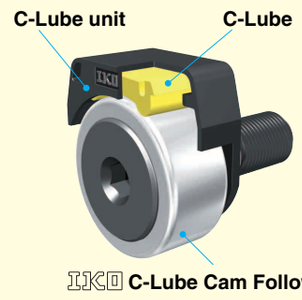
C-Lube Unit for Cam Followers

C-Lube Unit CL is the lubrication-supporting equipment for the track surface and Cam Follower's outer ring to keep both surfaces free of maintenance.

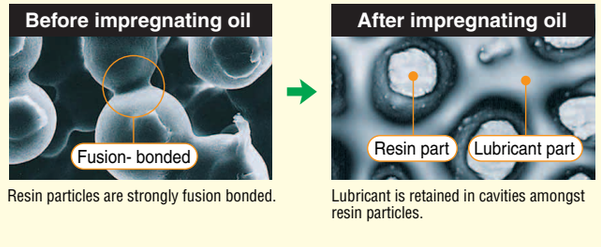
Capillary system IKO has developed is a new type lubrication. It is a porous resin Lube-body or plate with steel backing formed by sintering fine resin powder and impregnating a large amount of lubrication oil in its open pores. Capillary system always supplies proper amount of lubrication oil to the cylindrical rollers and lubrication condition of the raceway can be kept well for long period of time.

Also it prevents oil scattering causing pollution to the surrounding environment, and helps minimizing oil consumption.

Structure of C-Lube Unit for Cam Followers

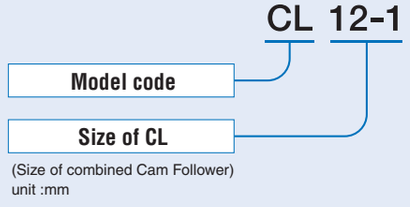


Magnified photos of C-Lube



Identification number

The identification number example of IKO C-Lube Unit is shown below.



Allowable rotation speed

The rotation speed of IKO Cam Follower with C-Lube Unit should not exceeded d_1n=10,000 for reference.

$$d_1n=d_1\times n$$

d : Stud diameter of Cam Follower, mm
n : Rotational speed, rpm

Minimum rotational angle

Lubricating oil is supplied to the whole external diameter surface of the outer ring. Accordingly, use the product in a condition in which the outer ring makes one or more turns.

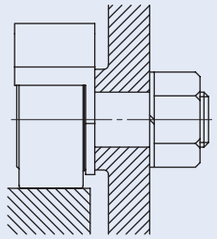
Operating temperature

Allowable operating temperature range of IKO Cam Follower with C-Lube Unit is -15 to 80˚C.

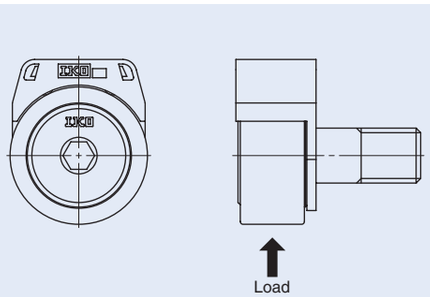
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Mounting

❶Set the C-Lube Unit perpendicularly to the center axis of Cam Follower and fix together with Cam Follower by tightening nut.



❷Position of C-Lube Unit is adjustable. C-Lube Unit must be positioned avoiding loading direction.



❸When tightening the nut, the tightening torque should not be exceeded the value maximum tightening torque on dimension table. In case loosening of the nut is predicted due to vibration, using lock nut, spring washer and other special washer are recommended.

For use

❶The maximum allowable load on IKO Cam Follower with C-Lube Unit is, in some cases, limited by the bending strength and shear strength of the C-Lube Unit instead of the load rating of needle bearing part. In order to safety operation, the maximum allowable static load is specified by the limitations of those strengths.

❷After assemling C-Lube Unit and Cam Followers in the machine, please confirm that C-Lube unit provides oil correctly to the track surface before actual operation.

❸Do not use in the environment which contamination of liquid and/or harmful foreign matter are expected.

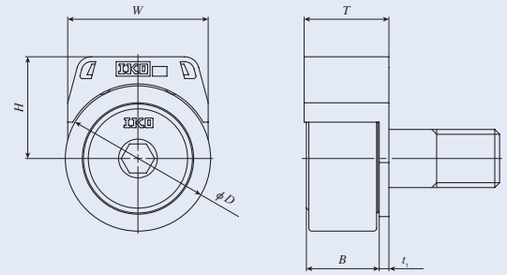
❹Do not wash with organic solvent and/or white kerosene, which have the ability of removing fat nor leave them in contact with the above agents.

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

❻Replace with new C-Lube Unit when inside oil finishes completely. Re-lubrication is not possible.

❼Do not apply a load onto the C-Lube Unit directly.

Table 19 Dimensions of C-Lube Unit for Cam Followers



Model number	Boundary Dimensions mm				Applicable Cam Followers			
	W	H	T	t_1	Model number (1)	Boundary Dimensions mm D	B Max	Maximum (2) allowble static load N
CL 6	15.4	12.6	14	1.5	CF 6 B	16	12.2	1 560
CL 8	18.4	14.2	14	1.5	CF 8 B	19	12.2	3 700
CL 10	21	17	15.5	2	CF 10 B	22	13.2	5 510
CL 10-1	21	19.2	15.5	2	CF 10-1 B	26	13.2	5 510
CL 12	29	21	17.5	2	CF 12 B	30	15.2	7 830
CL 12-1	29	22	17.5	2	CF 12-1 B	32	15.2	7 830

1N ≒ 0.102kgf

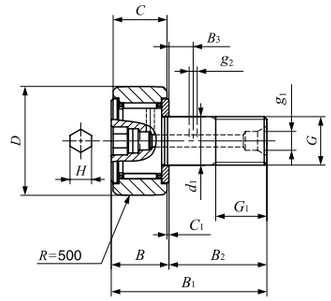
Note(1) Only representative types shown in the table, but also applicable to the same size of standard type, with thrust washer type, centralized lubrication type, C-Lube maintenance free type and heavy duty type.Combine with C-Lube Cam Follower is strongly recommended for full maintenance free.

(2) Actual load should be not exceeded these values.

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

CAM FOLLOWERS

Standard Type Cam Followers With Cage/With Hexagon Hole



CF···BR

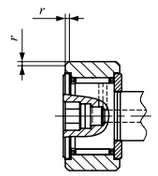
Stud dia. 3—30mm

Stud dia. mm	Identification number: Shield type, With crowned outer ring	Shield type, With cylindrical outer ring	Sealed type, With crowned outer ring	Sealed type, With cylindrical outer ring	Mass (Ref.) g	D	C	d_1	G
3	CF 3 BR	CF 3 B	CF 3 BUUR	CF 3 BUU	4.3	10	7	3	M 3×0.5
4	CF 4 BR	CF 4 B	CF 4 BUUR	CF 4 BUU	7.4	12	8	4	M 4×0.7
5	CF 5 BR	CF 5 B	CF 5 BUUR	CF 5 BUU	10.3	13	9	5	M 5×0.8
6	CF 6 BR	CF 6 B	CF 6 BUUR	CF 6 BUU	18.5	16	11	6	M 6×1
8	CF 8 BR	CF 8 B	CF 8 BUUR	CF 8 BUU	28.5	19	11	8	M 8×1.25
	CF 8 BRM	CF 8 BM	CF 8 BUURM	CF 8 BUUM	28.5	19	11	8	M 8×1
10	CF 10 BR	CF 10 B	CF 10 BUUR	CF 10 BUU	45	22	12	10	M10×1.25
	CF 10 BRM	CF 10 BM	CF 10 BUURM	CF 10 BUUM	45	22	12	10	M10×1
	CF 10-1 BR	CF 10-1 B	CF 10-1 BUUR	CF 10-1 BUU	60	26	12	10	M10×1.25
	CF 10-1 BRM	CF 10-1 BM	CF 10-1 BUURM	CF 10-1 BUUM	60	26	12	10	M10×1
12	CF 12 BR	CF 12 B	CF 12 BUUR	CF 12 BUU	95	30	14	12	M12×1.5
	CF 12-1 BR	CF 12-1 B	CF 12-1 BUUR	CF 12-1 BUU	105	32	14	12	M12×1.5
16	CF 16 BR	CF 16 B	CF 16 BUUR	CF 16 BUU	170	35	18	16	M16×1.5
18	CF 18 BR	CF 18 B	CF 18 BUUR	CF 18 BUU	250	40	20	18	M18×1.5
20	CF 20 BR	CF 20 B	CF 20 BUUR	CF 20 BUU	460	52	24	20	M20×1.5
	CF 20-1 BR	CF 20-1 B	CF 20-1 BUUR	CF 20-1 BUU	385	47	24	20	M20×1.5
24	CF 24 BR	CF 24 B	CF 24 BUUR	CF 24 BUU	815	62	29	24	M24×1.5
	CF 24-1 BR	CF 24-1 B	CF 24-1 BUUR	CF 24-1 BUU	1 140	72	29	24	M24×1.5
30	CF 30 BR	CF 30 B	CF 30 BUUR	CF 30 BUU	1 870	80	35	30	M30×1.5
	CF 30-1 BR	CF 30-1 B	CF 30-1 BUUR	CF 30-1 BUU	2 030	85	35	30	M30×1.5
	CF 30-2 BR	CF 30-2 B	CF 30-2 BUUR	CF 30-2 BUU	2 220	90	35	30	M30×1.5

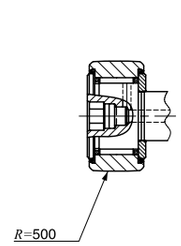
Note(1) Minimum allowable value of chamfer dimension r

Remarks1. Models with a stud diameter d_1 of 4 mm or less have no oil hole. For models with a stud dia. 5 to 10mm, oil hole (re-greasing fitting) is provided at the head. Other models are provided with an oil hole (grease nipple) at the head and an oil hole each on the outside surface and end surface of the stud.

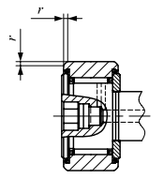
2. Shield type models with a stud diameter d_1 of 10mm or less and the sealed type models are provided with prepacked grease. Other models are not provided with prepacked grease. Perform proper lubrication for use.



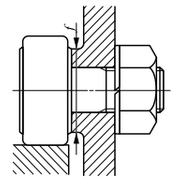
CF···B



CF···BUUR



CF···BUU



Boundary dimensions mm: G_1	B	B_1	B_2	B_3	C_1	g_1	g_2	H	$r_{s\,min}$ (1)	Mounting dimension f Min. mm	Maximum tightening torque N-m	Basic dynamic load rating C N	Basic static load rating C_0 N	Maximum allowable static load N
5	8	17	9	—	0.5	—	—	2	0.2	6.8	0.34	1 500	1 020	384
6	9	20	11	—	0.5	—	—	2.5	0.3	8.3	0.78	2 070	1 590	834
7.5	10	23	13	—	0.5	—	—	3	0.3	9.3	1.6	2 520	2 140	1 260
8	12.2max	28.2max	16	—	0.6	—	—	3	0.3	11	2.7	3 660	3 650	1 950
10	12.2max	32.2max	20	—	0.6	—	—	4	0.3	13	6.5	4 250	4 740	4 620
10	12.2max	32.2max	20	—	0.6	—	—	4	0.3	13	7.1	4 250	4 740	4 620
12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	13.8	5 430	6 890	6 890
12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	14.7	5 430	6 890	6 890
12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	13.8	5 430	6 890	6 890
12	13.2max	36.2max	23	—	0.6	—	—	4	0.3	16	14.7	5 430	6 890	6 890
13	15.2max	40.2max	25	6	0.6	6	3	6	0.6	21	21.9	7 910	9 790	9 790
13	15.2max	40.2max	25	6	0.6	6	3	6	0.6	21	21.9	7 910	9 790	9 790
17	19.6max	52.1max	32.5	8	0.8	6	3	6	0.6	26	58.5	12 000	18 300	18 300
19	21.6max	58.1max	36.5	8	0.8	6	3	8	1	29	86.2	14 800	25 200	25 200
21	25.6max	66.1max	40.5	9	0.8	8	4	8	1	34	119	20 700	34 600	34 600
21	25.6max	66.1max	40.5	9	0.8	8	4	8	1	34	119	20 700	34 600	34 600
25	30.6max	80.1max	49.5	11	0.8	8	4	12	1	40	215	30 500	52 600	52 000
25	30.6max	80.1max	49.5	11	0.8	8	4	12	1	40	215	30 500	52 600	52 000
32	37 max	100 max	63	15	1	8	4	17	1	49	438	45 400	85 100	85 100
32	37 max	100 max	63	15	1	8	4	17	1	49	438	45 400	85 100	85 100
32	37 max	100 max	63	15	1	8	4	17	1	49	438	45 400	85 100	85 100

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