



IKO

Miniature Type Cam Followers



CAT-57164

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IKO Miniature Type Cam Follower series meets miniaturization demands of advanced equipment.

IKO Miniature Type Cam Followers series are designed to be very compact; stud dia. of 1.4mm to 6 mm and outside dia. of outer ring of 4 mm to 13 mm. This series is suitable for light-loaded high-accuracy cam mechanisms and linear motion follower bearings. This series can be used in very wide fields such as equipment for electronic parts, precision measuring devices, and office appliance. Cam Followers with Thrust Washer has particular plastic thrust

washers of high wear and heat resistances in the thrust contact parts between the outer ring and the stud head (and between the outer ring and the end plate). The washers receive axial loads of the outer ring due to mounting errors and prevent friction and abrasion of the sliding surface. Stainless Steel Made Cam Followers excels at corrosion resistance and is also available in oil-inhibited areas, water-mist environment and clean room.

Debut of smallest Cam Followers in the world with a stud dia. of only 1.4 mm

Micro Cam Follower CF1.4WV of stud dia. of 1.4 mm and outside dia. of outer ring of only 4 mm. The built-in thrust washers receive axial loads that may occur due to mounting errors.



NEW

CFS1.4WV

Five major features

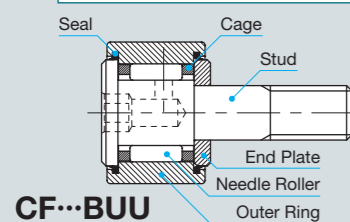
- 1 Stud dia. of only 1.4 mm
- 2 Outside dia. of outer ring of only 4 mm
- 3 With a hexagon socket hole for easy mounting
- 4 Full Complement type of great load capacity
- 5 With thrust washers resistant to mounting errors

Structure

Metric Series CF

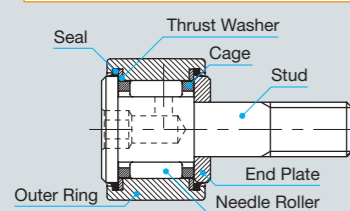
This is a miniature version of metric series CF which is the basic type of IKO Cam Follower. Various shapes and sizes are available.

Standard Type Cam Follower



CF...BUU

Cam Follower with Thrust Washers



CF...WBUUR

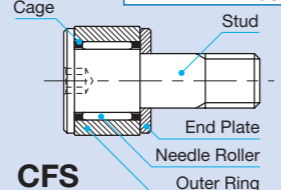


**Resistant to mounting errors
Cam Follower with
Thrust Washers**

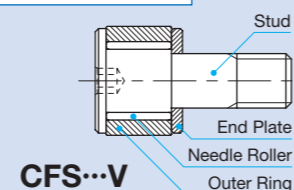
Miniature Series CFS

This series has extremely fine needle rollers assembled in the outer ring so that the outside dia. of outer ring is not so great in comparison with the stud dia.. Cam Followers of this series are used for electronic parts/device, OA equipment, small indexing equipment and so on.

Miniature Type Cam Follower

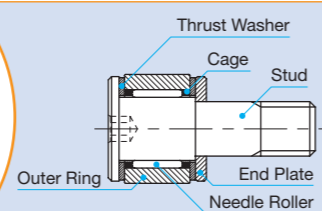


CFS



CFS...V

Miniature Type Cam Follower with Thrust Washers

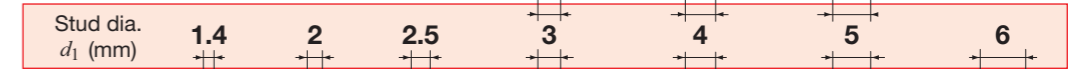
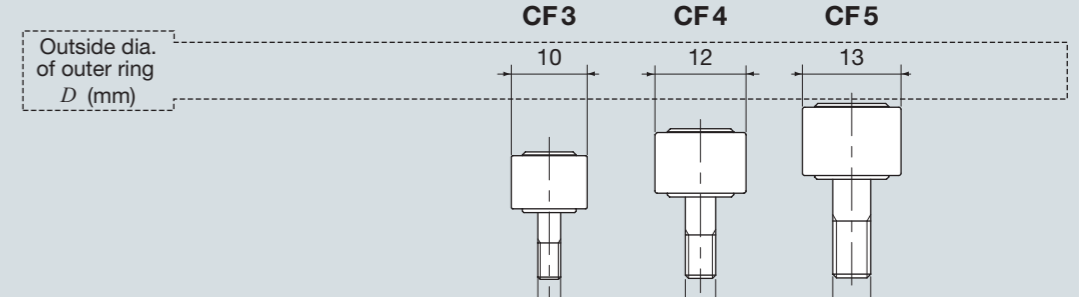


CFS...W

Size Variations

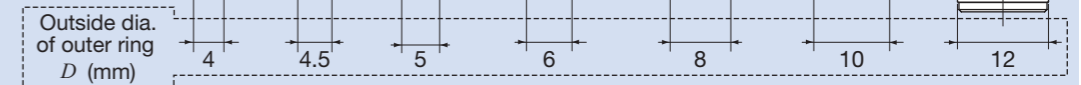
Metric Series CF

CF



Miniature Series CFS

CFS



NEW

New and Wide Variations of IKO Miniature Type Cam Followers

Type	Shape of stud head	Caged or Full complement	Material	Shape of outer ring	Seal structure	Model code	Stud diameter (mm)	
Metric Series CF CF	Standard Type Cam Follower	Caged	High carbon steel	Crowned outer ring	Shield type	CF...BR	3-5	
					Sealed type	CF...BUUR	3-5	
				Cylindrical outer ring	Shield type	CF...B	3-5	
					Sealed type	CF...BUU	3-5	
				Stainless steel	Crowned outer ring	Shield type	CF...FBR	3-5
						Sealed type	CF...FBUUR	3-5
	Cylindrical outer ring	Shield type	CF...FB	3-5				
			Sealed type	CF...FBUU	3-5			
	Cam Follower with Thrust Washers	Caged	High carbon steel	Crowned outer ring	Shield type	CF...WBR	3-5	
					Sealed type	CF...WBUUR	3-5	
				Stainless steel	Crowned outer ring	Shield type	CF...FWBR	3-5
						Sealed type	CF...FWBUUR	3-5

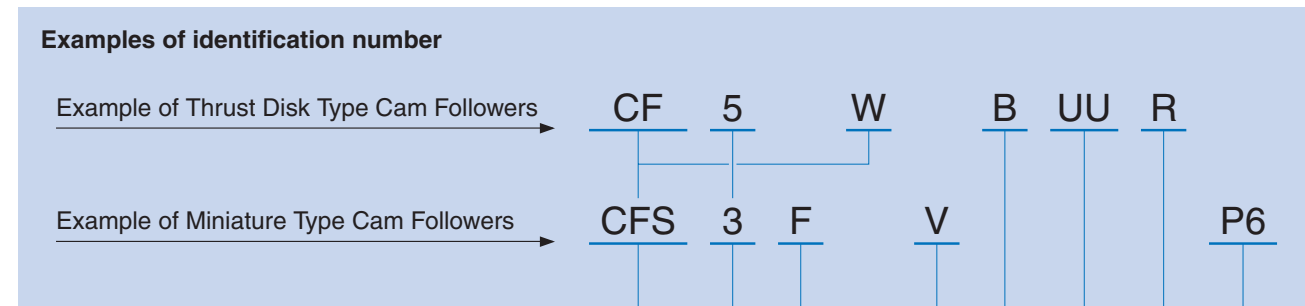
Miniature Series CFS

CFS

Miniature Type Cam Follower	Hex socket	Caged	High carbon steel	Cylindrical outer ring	Shield type	CFS	2-6		
					Shield type	CFS...F	2-6		
				Stainless steel	Cylindrical outer ring	Shield type	CFS...V	2-6	
						Shield type	CFS...FV	2-6	
				Full complement	High carbon steel	Cylindrical outer ring	Shield type	CFS...W	2-6
							Shield type	CFS...FW	2-6
	Hex socket	Caged	High carbon steel	Cylindrical outer ring	Shield type	CFS...WV	1.4 NEW		
					Shield type	CFS...WV	1.4 NEW		
				Stainless steel	Cylindrical outer ring	Shield type	CFS...WV	1.4 NEW	
						Shield type	CFS...WV	1.4 NEW	

Identification Number

The identification number examples of IKO Miniature Type Cam Followers are shown below.



Model code	
Metric Series CF	CF Standard Type Cam Followers
	CF...W Thrust Disk Type Cam Followers
Miniature Series CFS	CFS Miniature Type Cam Followers
	CFS...W Thrust Disk Type Miniature Cam Followers

Size	
Stud dia. (Unit: mm)	

Material code	
No symbol	Carbon steel
F	Stainless steel

Roller guiding method	
No symbol	Caged type
V	Full complement type

Shape of stud head	
B	With Hexagon Hole (CF series)
No symbol	With Hexagon Hole (CFS series)

Seal structure	
No symbol	Shield type
UU	Sealed type

Shape of outer ring	
R	Crowned outer ring
No symbol	Cylindrical outer ring

Accuracy class	
No symbol	Accuracy class / class 0
P6	Accuracy class / class 6
P5	Accuracy class / class 5
P4	Accuracy class / class 4

Applicable to Miniature Series CFS

Accuracy

Tolerances of IKO Miniature Type Cam Followers series are shown in table 1, Table 2.1 and Table 2.2.

Table 1 Tolerances unit: μm

Dimensions and symbols	Metric series CF		Miniature series CFS
	Crowned outer ring	Cylindrical outer ring	
Out side dia. of outer ring	0 -50	See Table 2.1	See Table 2.2
Stud dia. d_1	h7		h6
Width of outer ring C	0 -120		0 -120

Table 2.1 Accuracy of outer ring (for cylindrical outer ring of Metric series CF) unit: μm

ΔD_{mp} Single plane mean outside dia. deviation		V_{Dp} Outside dia. variation in a single radial plane	V_{Dmp} Mean outside dia. variation	K_{ca} Radial runout of assembled bearing outer ring
High	Low			
0	-8	10	6	15

Table 2.2 Accuracy of outer ring (for Miniature series CFS) unit: μm

ΔD_{mp} Single plane mean outside dia. deviation								K_{ca} Radial runout of assembled bearing outer ring			
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

Clearances

Internal clearances of Miniature Type Cam Followers series are shown in Table 3.

Table 3 Radial internal clearance unit: μm

Model code ⁽¹⁾		Radial internal clearance	
Metric series CF	Miniature series CFS	Min.	Max.
CF3~CF5	CFS1.4~CFS5	3	17
—	CFS6	5	20

Note⁽¹⁾ Only representative types are shown in the table, but applicable to all metric series.

Fit

The recommended tolerance of mounting hole for the stud is H7 for Metric Series CF and H6 for Miniature Series CFS.

The mounting hole diameter should be prepared without play between the stud and the hole especially when heavy shock loads may be applied.

Table 4 Tolerances of mounting hole unit: μm

Nominal outside dia. of stud mm		H6		H7	
over	incl	High	Low	High	Low
—	3	+6	0	+10	0
3	6	+8	0	+12	0

Maximum Allowable 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 is specified by the limitations of those strengths.

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 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 Table 5 are applicable when the hardness of the mating track surface is 40HRC (Tensile strength 1250N/mm²). 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 6. 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 the lubrication and the surface roughness of the mating track especially for high-speed operation such as cam mechanisms.

Table 5 Track capacity

unit: N

Type ⁽¹⁾	Model code Crowned outer ring	Track capacity	Model code Cylindrical outer ring	Track capacity
	CF 4 R	712	CF 4	1 790
	CF 5 R	794	CF 5	2 210
Miniature series CFS	—	—	CFS 1.4	128
	—	—	CFS 2	220
	—	—	CFS 2.5	298
	—	—	CFS 3	485
	—	—	CFS 4	799
	—	—	CFS 5	1 210
	—	—	CFS 6	1 680

Note⁽¹⁾ Only representative types are shown in the table, but applicable to all metric series.

Table 6 Track capacity factor

Hardness	Tensile strength N/mm ²	Track capacity factor	
		Crowned outer ring	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

Allowable Rotational Speed

The allowable rotational speed of Miniature Type Cam Followers series are affected by mounting and operating conditions. For reference, Table 7 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.

Table 7 d_1n values of Miniature Type Cam Followers series

Type	Lubricant	Grease
	Caged type	
Full complement type		42 000

Note d_1n value = $d_1 \times n$
 where, d_1 : Stud diameter mm
 n : Rotational speed rpm

Pre-Packed Grease and Operating Temperature

Grease pre-packed Miniature Type Cam Followers series is ALVANIA GREASE S2 (SHELL), which can be used within the temperature range shown in Table 8.

Table 8 Operating temperature range

Size of stud dia. d_1 mm	Type	Caged type		Full complement type	
		Shield type	Sealed type		
Metric series CF	Carbon steel	3, 4	- 20°C ~ 110°C ⁽¹⁾	- 20°C ~ 80°C	—
		5	- 20°C ~ 120°C	- 20°C ~ 80°C	—
	Stainless steel	3~5	- 20°C ~ 110°C ⁽¹⁾	- 20°C ~ 80°C	—
Miniature series CFS		1.4	—	—	- 20°C ~ 120°C
		2	- 20°C ~ 110°C ⁽¹⁾	—	- 20°C ~ 120°C
		2.5~6	- 20°C ~ 120°C	—	- 20°C ~ 120°C

Note⁽¹⁾ The maximum allowable temperature is +100°C when they are continuously operated.

Lubrication Hole

Metric series CF having a stud dia. 5mm has an oil hole in the stud-head. Cam Follower with a hexagon hole in the stud-head is applied through the lubrication plug inside of the hexagon hole in the stud-head. (See Fig. 1)

For replenishing of grease, mount an appropriate supply nozzle (shown in Table 9) on the straight type grease gun of JIS B9808 (1991), push the nozzle against the grease nipple and the lubrication plug, and gently apply the grease. Structurally, other Metric series CF and Miniature series CFS cannot be re-lubricated.

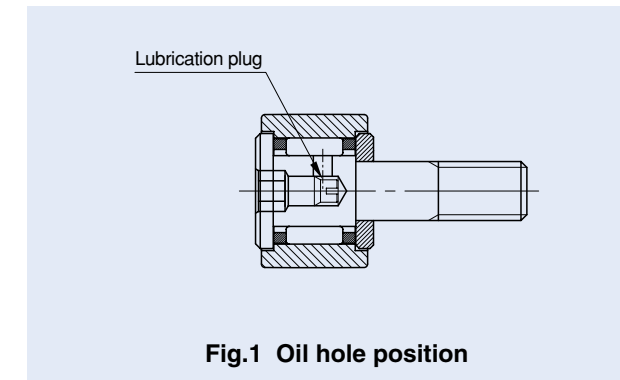


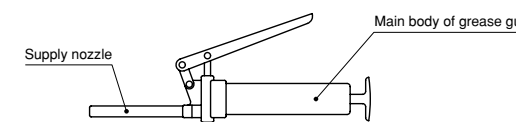
Fig.1 Oil hole position

Table 9 Applicable supply nozzles

Type	Shape and dimension	Applicable grease nipple or lubrication plug
A-5126T	126, 29, Width across flats 12, 12, 1.5, PT1/8	Lubrication plug ⁽¹⁾

Note⁽¹⁾ HSP-3 (by Yamada Corp.) is also available to lubricate.

Remark Supply nozzles shown in the table can be mounted on the main body of a common grease gun available on the market (shown below). If these supply nozzles are required, consult IKO by specifying the supply nozzle type.



Accessories

In Miniature Type Cam Followers series, nuts are attached.

Mounting

① Set the center axis of the mounting hole perpendicularly to the moving direction of the Cam Follower and match the side shoulder accurately with the seating surface indicated by dimension "f" in the dimension tables. (See Fig.2) Then, fix the Cam Followers directly with a hammer, etc. This may lead to a bearing failure such as irregular rotation or cracking.

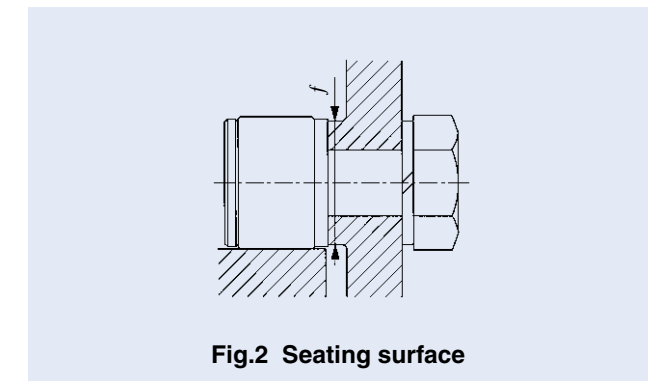


Fig.2 Seating surface

② The IKO mark on the stud-head indicates the position of oil hole on the raceway. Avoid locating the oil hole within the loading zone. This may lead to short a bearing life. (Refer to Fig.3)

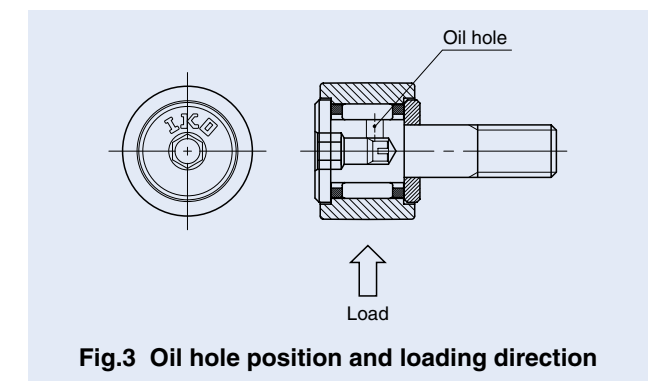
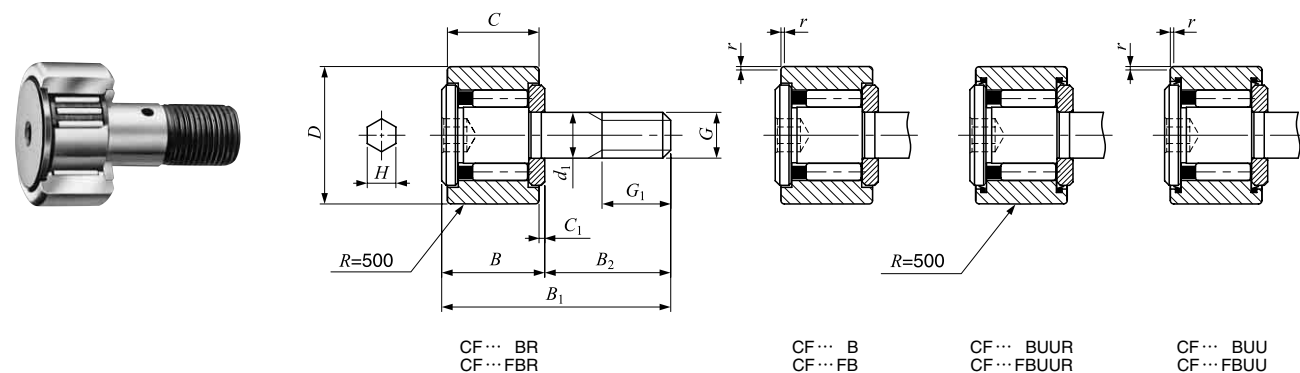


Fig.3 Oil hole position and loading direction

③ When tightening the nut, the tightening torque should not exceed the values shown in the dimension tables. If the tightening torque is too large, it is possible that the threaded portion of the stud can 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.

IKO Standard Type Cam Followers with Hex Head

CF... B (With Cage)
 CF... FB (With Cage / Stainless steel)



Stud dia. 3.4mm⁽¹⁾

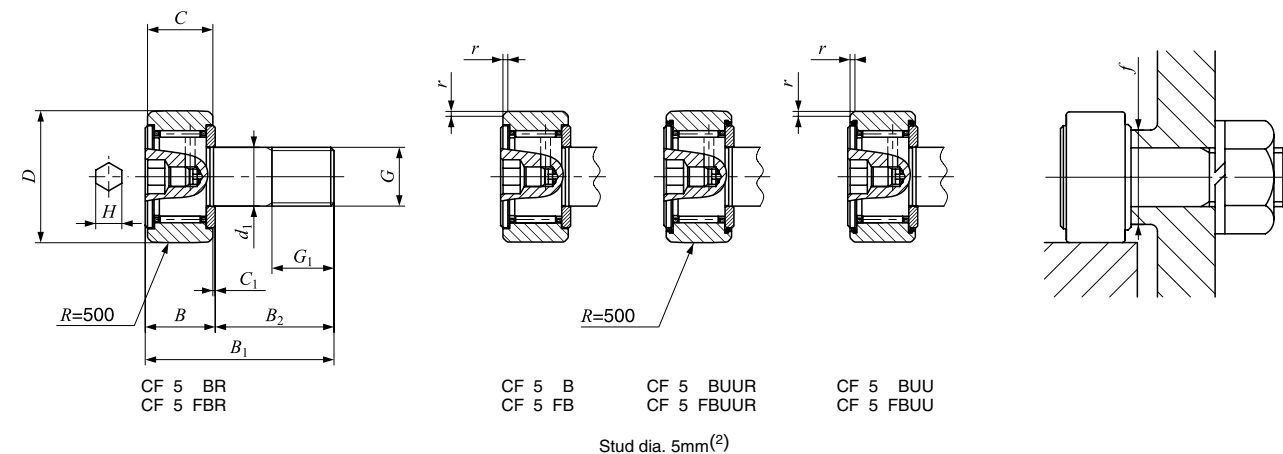
Stud dia. mm	Identification number				Mass (Ref.) g	Boundary dimensions mm				
	Shield type		Sealed type			D	C	d ₁	G	G ₁
	Crowned outer ring	Cylindrical outer ring	Crowned outer ring	Cylindrical outer ring						
3	CF 3 BR	CF 3 B	CF 3 BUUR	CF 3 BUU	4.3	10	7	3	M3 × 0.5	5
	CF 3 FBR	CF 3 FB	CF 3 FBUUR	CF 3 FBUU						
4	CF 4 BR	CF 4 B	CF 4 BUUR	CF 4 BUU	7.4	12	8	4	M4 × 0.7	6
	CF 4 FBR	CF 4 FB	CF 4 FBUUR	CF 4 FBUU						
5	CF 5 BR	CF 5 B	CF 5 BUUR	CF 5 BUU	10.3	13	9	5	M5 × 0.8	7.5
	CF 5 FBR	CF 5 FB	CF 5 FBUUR	CF 5 FBUU						

Note⁽¹⁾ Oil hole is not prepared.

⁽²⁾ The stud-head has an oil hole (lubrication plug).

⁽³⁾ Minimum allowable value of chamfer "r".

Remark Grease is pre-packed.

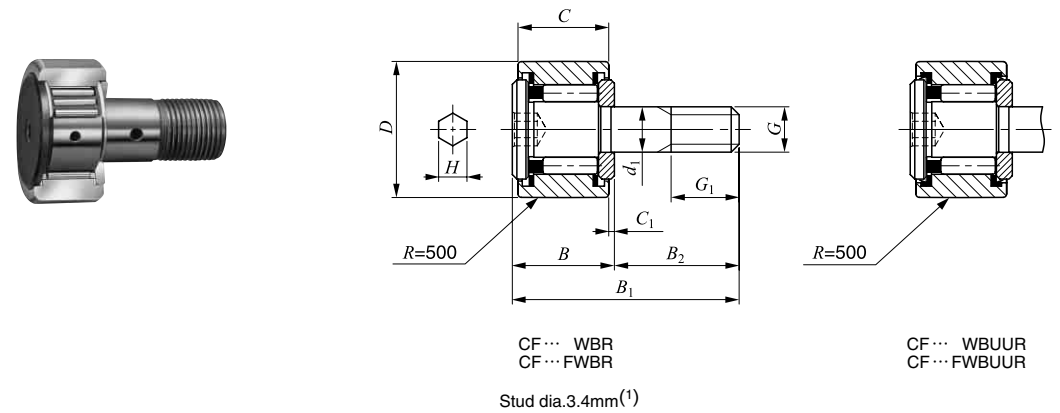


Stud dia. 5mm⁽²⁾

B	B ₁	B ₂	C ₁	H	r ^{min} ⁽³⁾	Mounting dimension f Min. mm	Maximum tightening torque N · m	Basic dynamic load rating	Basic static load rating	Maximum allowable load
								C N	C ₀ N	N
8	17	9	0.5	2	0.2	6.8	0.34	1 500	1 020	384
								1 200	813	384
9	20	11	0.5	2.5	0.3	8.3	0.78	2 070	1 590	834
								1 650	1 270	834
10	23	13	0.5	3	0.3	9.3	1.6	2 520	2 140	1 260
								1 930	1 730	1 260

IKO Cam Followers with Thrust Washer / with Hex Head

CF... WB (With Cage)
 CF... FWB (With Cage / Stainless steel)



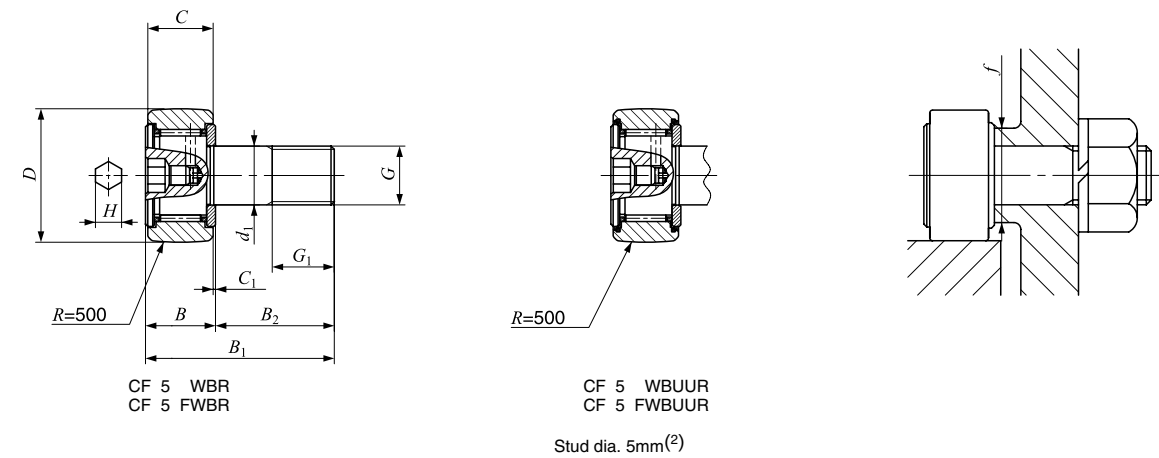
Stud dia. 3.4mm⁽¹⁾

Stud dia. mm	Identification number		Mass (Ref.) g	Boundary dimensions mm					
	Shield type	Sealed type		D	C	d ₁	G	G ₁	B
3	CF 3 WBR	CF 3 WBUUR	4.3	10	7	3	M3 × 0.5	5	8
	CF 3 FWBR	CF 3 FWBUUR							
4	CF 4 WBR	CF 4 WBUUR	7.4	12	8	4	M4 × 0.7	6	9
	CF 4 FWBR	CF 4 FWBUUR							
5	CF 5 WBR	CF 5 WBUUR	10.3	13	9	5	M5 × 0.8	7.5	10
	CF 5 FWBR	CF 5 FWBUUR							

Note⁽¹⁾ Oil hole is not prepared.

⁽²⁾ The stud-head has an oil hole (lubrication plug).

Remark Grease is pre-packed.

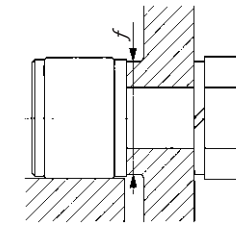
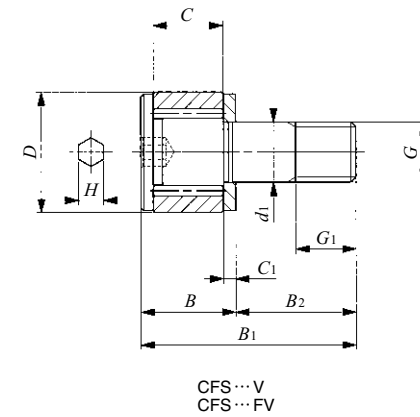
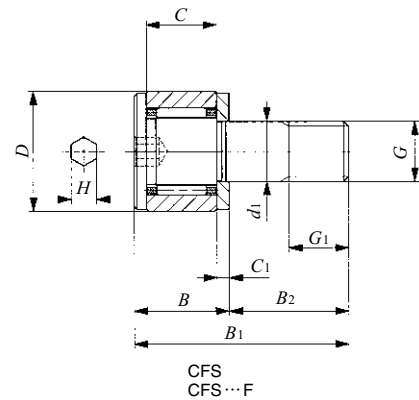


Stud dia. 5mm⁽²⁾

B ₁	B ₂	C ₁	H	Mounting dimension f Min. mm	Maximum tightening torque N · m	Basic dynamic load rating	Basic static load rating	Maximum allowable load
						C N	C ₀ N	
17	9	0.5	2	6.8	0.34	1 500	1 020	384
						1 200	813	384
20	11	0.5	2.5	8.3	0.78	2 070	1 590	834
						1 650	1 270	834
23	13	0.5	3	9.3	1.6	2 520	2 140	1 260
						1 930	1 730	1 260

IKO Miniature Type Cam Followers

CFS (With Cage) CFS... V (Full complement)
 CFS... F (With Cage / Stainless steel) CFS... FV (Full complement / Stainless steel)



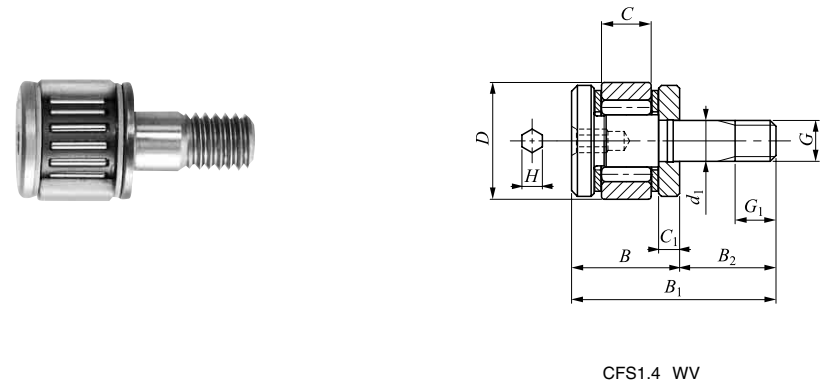
Stud dia. mm	Identification number		Mass (Ref.) g	Boundary dimensions mm					
	With cage	Full complement		D	C	d ₁	G	G ₁	B
2	CFS 2 —	— CFS 2 V	0.6	4.5	2.5	2	M2 × 0.4	2	4
	CFS 2 F —	— CFS 2 FV							
2.5	CFS 2.5 —	— CFS 2.5 V	1	5	3	2.5	M2.5 × 0.45	2.5	4.5
	CFS 2.5 F —	— CFS 2.5 FV							
3	CFS 3 —	— CFS 3 V	2	6	4	3	M3 × 0.5	3	5.5
	CFS 3 F —	— CFS 3 FV							
4	CFS 4 —	— CFS 4 V	4	8	5	4	M4 × 0.7	4	7
	CFS 4 F —	— CFS 4 FV							
5	CFS 5 —	— CFS 5 V	7	10	6	5	M5 × 0.8	5	8
	CFS 5 F —	— CFS 5 FV							
6	CFS 6 —	— CFS 6 V	13	12	7	6	M6 × 1	6	9.5
	CFS 6 F —	— CFS 6 FV							

Remark Oil hole is not prepared.
Grease is pre-packed.

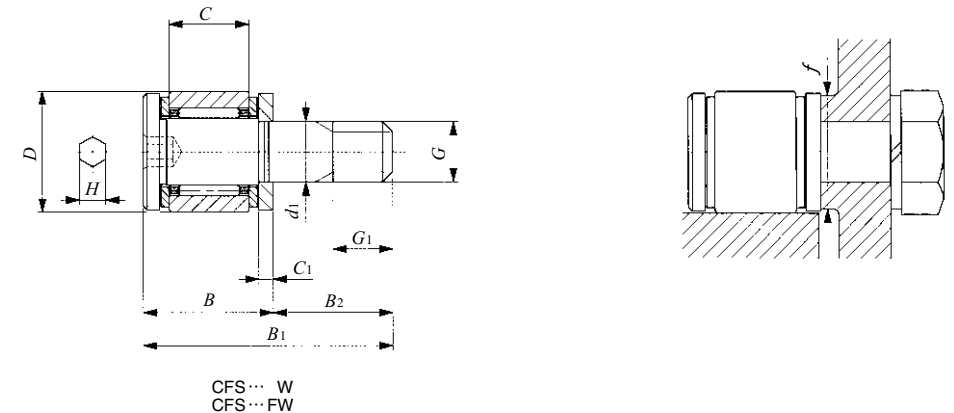
B ₁	B ₂	C ₁	H	Mounting dimension f Min. mm	Maximum tightening torque N • m	Basic dynamic load rating		Basic static load rating C ₀ N	Maximum allowable load N
						C N	C ₀ N		
8	4	0.7	0.9	4.3	9.1	288	202	202	
						768	734	229	
9.5	5	0.7	0.9	4.8	18.7	230	161	161	
						614	587	229	
11.5	6	0.7	1.3	5.8	33.5	428	351	351	
						1 000	1 080	360	
15	8	1.0	1.5	7.7	77.7	342	281	281	
						800	862	360	
18	10	1.0	2	9.6	158	629	611	484	
						1 420	1 790	484	
21.5	12	1.2	2.5	11.6	268	504	488	484	
						1 140	1 430	484	
15	8	1.0	1.5	7.7	77.7	1 120	1 120	919	
						2 370	3 000	919	
18	10	1.0	2	9.6	158	897	894	894	
						1 900	2 400	919	
21.5	12	1.2	2.5	11.6	268	1 570	1 850	1 570	
						3 180	4 700	1 570	
18	10	1.0	2	9.6	158	1 250	1 480	1 480	
						2 540	3 760	1 570	
21.5	12	1.2	2.5	11.6	268	2 090	2 200	2 150	
						4 610	6 250	2 150	
18	10	1.0	2	9.6	158	1 670	1 760	1 760	
						3 690	5 000	2 150	

IKO Miniature Cam Followers with Thrust Washer

CFS... W (With Cage) CFS... WV (Full complement)
 CFS... FW (With Cage / Stainless steel)



CFS1.4 WV



CFS... W
CFS... FW

Stud dia. mm	Identification number		Mass (Ref.) g	Boundary dimensions mm					
	With cage	Full complement		D	C	d ₁	G	G ₁	B
1.4	—	CFS 1.4 WV	0.35	4	1.7	1.4	M1.4 × 0.3	1.4	3.7
2	CFS 2 W	—	0.6	4.5	2.5	2	M2 × 0.4	2	4.5
	CFS 2 FW	—							
2.5	CFS 2.5 W	—	1	5	3	2.5	M2.5 × 0.45	2.5	5
	CFS 2.5 FW	—							
3	CFS 3 W	—	2	6	4	3	M3 × 0.5	3	6.5
	CFS 3 FW	—							
4	CFS 4 W	—	4	8	5	4	M4 × 0.7	4	8
	CFS 4 FW	—							
5	CFS 5 W	—	7	10	6	5	M5 × 0.8	5	9
	CFS 5 FW	—							
6	CFS 6 W	—	13	12	7	6	M6 × 1	6	10.5
	CFS 6 FW	—							

Remark Oil hole is not prepared.
Grease is pre-packed.

B ₁	B ₂	C ₁	H	Mounting dimension f Min. mm	Maximum tightening torque N · cm	Basic dynamic load rating	Basic static load rating	Maximum allowable load
						C N	C ₀ N	
7	3.3	0.7	0.9	3.8	3.0	481	385	105
8.5	4	0.7	0.9	4.3	9.1	288	202	194
						230	161	161
10	5	0.7	0.9	4.8	18.7	428	351	313
						342	281	281
12.5	6	0.7	1.3	5.8	33.5	629	611	399
						504	488	399
16	8	1	1.5	7.7	77.7	1120	1120	785
						897	894	785
19	10	1	2	9.6	158	1570	1850	1370
						1250	1480	1370
22.5	12	1.2	2.5	11.6	268	2090	2200	1920
						1670	1760	1760

Environment-friendly **IKO** C-Lube Bearings Minimizing Lubricant Requirement

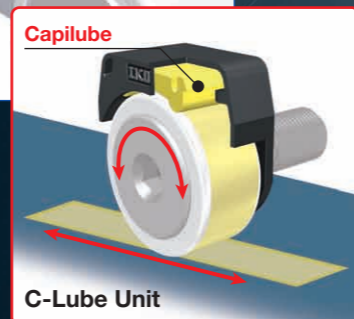
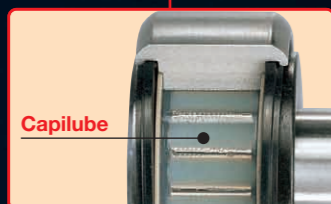
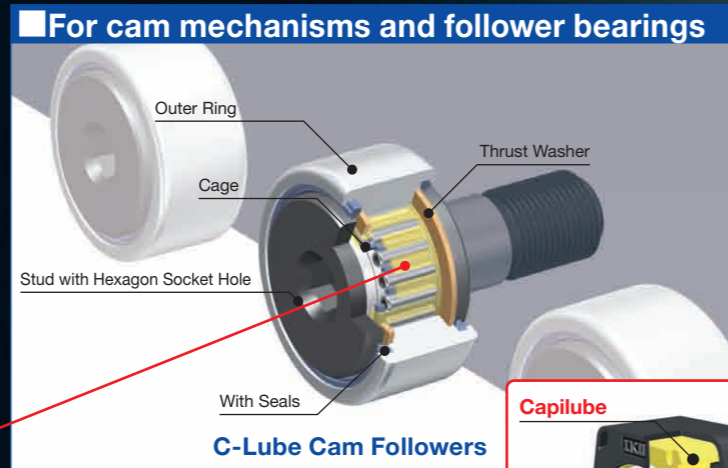
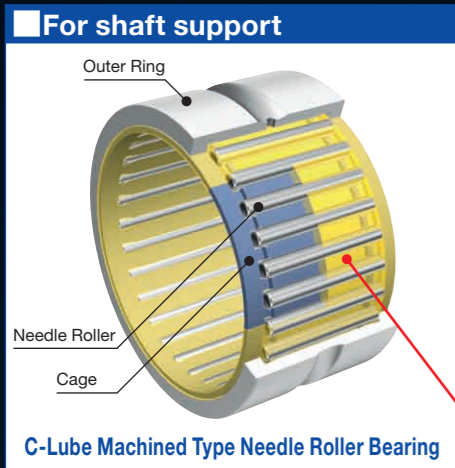


What is your trouble?

- 1 *Hard access to lubricating?*
- 2 *Machines and work places are dirty with lubricant?*
- 3 *Lubricating tools and instruments occupy the working places?*
- 4 *Having problems keeping up with lubrication maintenance schedule?*

Find solutions with **IKO**

"C-Lube bearings" are **IKO**'s unique maintenance free bearing products with thermosetting solid lubricant (Capilube) pre-packed in the bearing space. As the bearing rotates, the lubricating oil oozes out onto needle rollers and raceways in proper quantity keeping the lubrication performance for a long period of time.



IKO Maintenance Free C-Lube Bearing

CAT-57165

Maintenance work can be reduced greatly

Requires no periodical lubrication and increases the productivity.

Minimizes the amount of lubricant and contributes to the earth environment

Contributes to the earth environment and reduces the running cost.

Suppresses machine designing and device costs

Working spaces can be utilized.

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Recognizing that conservation of the global environment is the top-priority challenge for the world's population, **I&K** will conduct its activities with consideration of the environment as a corporate social responsibility, reduce its negative impact on the environment, and help foster a rich global environment.

**ISO 9001 & 14001 Quality system
registration certificate**

