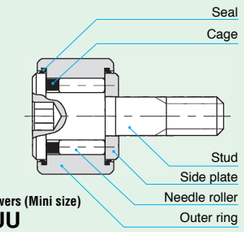
IKO MINICAM series are suitable for a wide range of applications.

IKO MINICAM series are compactly designed cam followers with the stud diameter 2 to 6 mm and the outer ring outside diameter 4.5 to 13mm. They are suitable for use as follower bearings in lightly loaded high precision cam mechanisms and linear motion mechanisms, and used widely in applications such as electric parts manufacturing and inspection equipment, precision measuring instruments, and OA equipment.
Thrust disk type cam followers reduce wear and heat generation due to axial loads caused by misalignment, etc.
Stainless steel made cam followers are highly resistant to corrosion, and best suited for use at places where oil can not be used, in environments exposed to water splashes or in clean rooms.

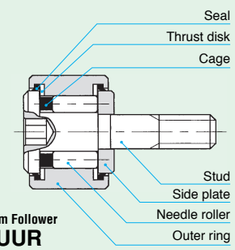
Structure of MINICAM series

Metric series CF

These are small sizes of Metric series IKO Cam Followers. Wide variations in size and shape are available.
Thrust Disk Type Cam Followers have special resin thrust disks superior in wear and heat resistance assembled between the sliding surfaces of outer ring shoulders, stud head and side plate.



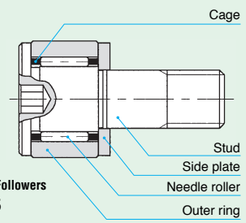
Standard Type Cam Followers (Mini size)
CF···BUU



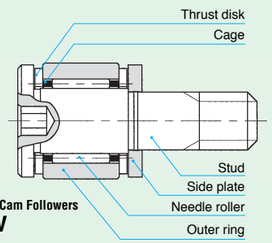
Thrust Disk Type Cam Follower
CF···WBUUR

Miniature series CFS

These are compactly designed bearings, incorporating very thin needle rollers in an outer ring with a smaller outside diameter compared to the standard type with the same stud size. They are used in electronic devices, OA equipment, small-size index devices, etc.
Thrust Disk Type Cam Followers have special resin thrust disks superior in wear and heat resistance assembled between the sliding surfaces of outer ring shoulders, stud head and side plate.



Miniature Cam Followers
CFS



Thrust Disk Type Miniature Cam Followers
CFS···W

(U.S. PATENT No. 5,286,115)

IKO MINICAM series

Type of cam follower		Stud head shape	Roller guide type	Material	Outer ring outer face form	Seal structure	Model
Metric series CF	Standard Type Cam Follower	With hexagon hole	With cage type	High carbon steel made	Crowned outer ring	Shield type	CF··· B R
						Sealed type	CF··· BUUR
					Cylindrical outer ring	Shield type	CF··· B
						Sealed type	CF··· BUU
				Stainless steel made	Crowned outer ring	Shield type	CF···FB R
						Sealed type	CF···FBUUR
					Cylindrical outer ring	Shield type	CF···FB
						Sealed type	CF···FBUU
		With screw driver slot	With cage type	High carbon steel made	Crowned outer ring	Shield type	CF··· R
						Sealed type	CF··· UUR
					Cylindrical outer ring	Shield type	CF
						Sealed type	CF··· UU
	NEW Thrust Disk Type Miniature Cam Followers	With hexagon hole	With cage type	High carbon steel made	Crowned outer ring	Shield type	CF··· WB R
						Sealed type	CF··· WBUUR
				Stainless steel made	Crowned outer ring	Shield type	CF···FWB R
						Sealed type	CF···FWBUUR
Miniature series CFS	Miniature Type Cam Follower	With hexagon hole	With cage type	High carbon steel made	Cylindrical outer ring	Shield type	CFS
				Stainless steel made			CFS···F
			Full complement type	High carbon steel made			CFS··· V
				Stainless steel made			CFS···FV
	NEW Thrust Disk Type Miniature Cam Follower	With hexagon hole	With cage type	High carbon steel made			CFS··· W
				Stainless steel made			CFS···FW

Size variation of IKO MINICAM series

Outer ring outside diameter *D* (mm)			CF 3	CF 4	CF 5	
Metric series CF			10	12	13	
Stud outside diameter d_1 (mm)	2	2.5	3	4	5	6
Miniature series CFS						
Outer ring outside diameter *D* (mm)	4.5	5	6	8	10	12
	CFS 2	CFS 2.5	CFS 3	CFS 4	CFS 5	CFS 6

Identification Number

Examples of identification number of IKO MINICAM series are shown below.

Examples of identification number

Model code		
Metric series CF	CF	Standard Type Cam Follower
	CF…W	Thrust Disk Type Cam Follower
Miniature series CFS	CFS	Miniature Type Cam Follower
	CFS…W	Thrust Disk Miniature Type Cam Follower

Size
Stud diameter is indicated.(unit: mm)

Material	
No symbol	High carbon steel made
F	Stainless steel made

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

Stud head shape	
No symbol	With screw driver slot
B	With hexagon socket hole

Seal structure	
No symbol	Shield type
UU	Sealed type

Outer ring outer face form	
No symbol	Cylindrical outer ring
R	Crowned outer ring

Accuracy	
No symbol	Class 0
P6	Class 6
P5	Class 5
P4	Class 4

Accuracy

Accuracy of IKO MINICAM series are shown in Tables 1, 2.1 and 2.2.

Table 1 Tolerance unit: μm

Item / Series	Metric series CF		Miniature series CFS
	Crowned outer ring	Cylindrical outer ring	
Outside dia. of outer ring D	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 (Metric series CF) unit: μm

Δ_{Dmp} Single plane mean outside dia. deviation		V_{Dp} 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.)
High	Low			
0	−8	10	6	15

Table 2.2 Accuracy of outer ring (Miniature series CFS) 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

Radial internal clearance

Radial internal clearance of IKO MINICAM series is shown in Table 3.

Table 3 Radial internal clearance unit: μm

Indetification number (1)		Radial internal clearance	
Metric series CF	Miniature series CFS	Min.	Max.
CF 3 ～ CF 5	CFS 2 ～ CFS 5	3	17
—	CFS 6	5	20

Note (1): Only representative types are shown, but applicable to all types.

Fit

Mounting hole tolerance for stud is recommended to be H7 for Metric series CF, and H6 for Miniature series CFS. Since Cam Followers are supported in a cantilever position, the mounting hole diameter should be prepared without play between the stud and the mounting hole especially when heavy shock loads are applied.

Table 4 Tolerance 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 Follower is, in some cases, limited by the bending strength, shear strength of stud, and strength of outer ring instead of the load rating of needle roller bearing, because the Cam Follower is mounted in a cantilever position. Maximum allowable loads shown in dimension tables are the allowable loads limited by the bending strength and shear strength.

Track capacity

Track capacity is defined as the load which can be continuously applied on a Cam Follower placed on a steel track surface without causing deformation and indentation (dent) on the track surface. The track capacities shown in Table 5 are applicable when the hardness of the mating track surface is HRC40 (Tensile strength 1250N/mm²). When the hardness of the mating track surface differs from HRC40, the track capacity is obtained by multiplying the value with a 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, it is needed to pay attention to lubrication and surface roughness of mating track especially in case of high speed rotation such as cam mechanisms.

Table 5 Track capacity

Type (1)	Identification Number Crowned outer ring	Track capacity N	Identification Number Cylindrical outer ring	Track capacity N
Metric series CF	CF 3 R	542	CF 3	1 360
	CF 4 R	712	CF 4	1 790
	CF 5 R	794	CF 5	2 210
Miniature series CFS	—	—	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, but applicable to all types.

Table 6 Track capacity factor

Hardness HRC	Tensile strength N／mm²	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

Allowable rotational speeds of IKO MINICAM series are affected by mounting and operating conditions. The d_1n values in general operation under pure radial load are shown in Table 7 for reference. It is recommended to use 1/10 of the table values in actual applications taking account of axial loads that may be applied.

Table 7 d_1n(1) values of IKO MINICAM series

Type \ Lubricant	Grease
With cage type	84 000
Full complement type	42 000

Note(1): $d_1 \times n$
where, d_1: Stud diameter, mm
n: Number of rotations per minute, rpm

Lubricant and temperature

A quality lithium-soap base grease is prepacked in IKO MINICAM series. Allowable temperature ranges are shown in Table 8. Relubrication can not be made in these series, because of their structure.

Table 8 Allowable temperature range

Stud dia. d_1 mm \ Type		With cage type		Full complement type
		Shield type	Sealed type	
Metric series CF	3, 4	− 20˚C～＋110˚C(1)	−20˚C～＋80˚C	—
	5	− 20˚C～＋120˚C	−20˚C～＋80˚C	—
Miniature series CFS	2	− 20˚C～＋120˚C(1)	—	− 20˚C～＋120˚C
	2.5～6	− 20˚C～＋120˚C	—	− 20˚C～＋120˚C

Note(1): For continuous operation, the maximum operating temperature is 100˚C.

Oil hole

The position of oil hole on the "Standard Type Cam Followers with screwdriver slot", CF5R, CF5, CF5UUR, and CF5UU is shown in Fig. 1. Grease should be supplied gently with a straight type grease gun as specified by JIS B 9808:1991, which is to be applied carefully to the nipple head from the front. "Standard Type Cam Followers with screwdriver slot" of other sizes, "Metric series CF with hexagon hole", and "Miniature series CFS" cannot be re-lubricated.

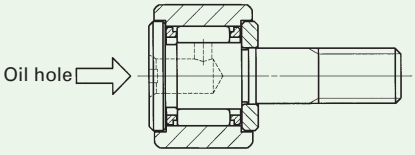


Fig.1 Position of oil hole

Accessories

A nut is appended to the Miniature Type Cam Followers. And a grease nipple (Refer to Fig.2.) and a plug (Refer to Fig.3.) are appended to the Standard Type Cam Followers with screwdriver slot, CF5R, CF5, CF5UUR, and CF5UU.

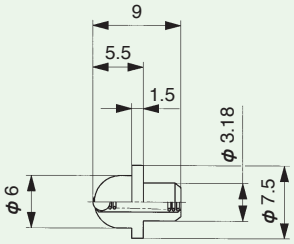


Fig.2 Grease nipple

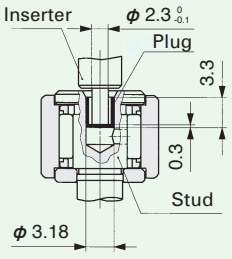


Fig.3 Plug and inserter

Mounting

❶ Make the center axis of 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 dimension tables (Refer to Fig.4.). Then fix the Cam Follower with the nut. DO NOT hit the flange head of Cam Follower directly with a hammer, etc. It may lead to bearing failures such as irregular rotation and crack.

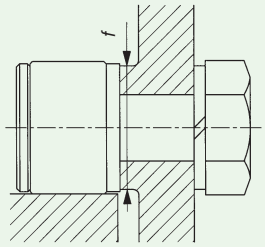


Fig.4 Mounting example

❷ The IKO mark on the stud flange head of the Cam Followers with oil hole indicates the position of oil hole on the raceway. Avoid locating the oil hole within the loading zone. It may lead to short bearing life. (Refer to Fig.5.)

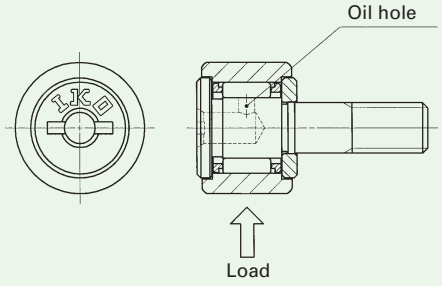
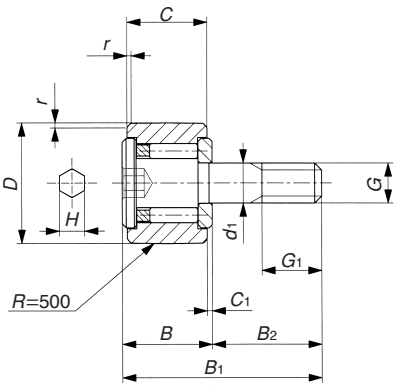


Fig.5 Oil hole position and loading direction

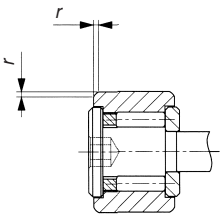
❸ When tightening the nut, the tightening torque should not exceed the values shown in the dimension tables. If the tightening torque is too large, it is possible that the threaded portion of stud will be broken. When there are possibilities of loosening, a special nut such as a lock nut, a spring washer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

IKO Standard Type Cam Followers with Hexagon Hole

CF ··· B With cage type
CF ··· FB With cage type. Stainless steel made



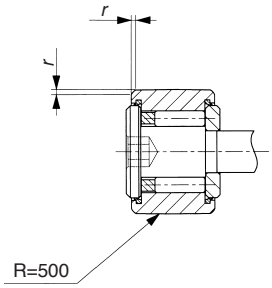
CF ··· BR
CF ···FBR

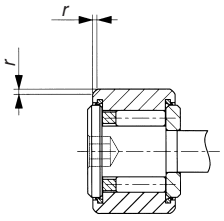


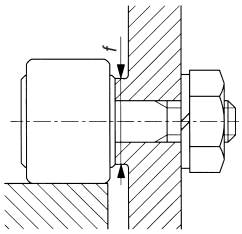
CF ··· B
CF ···FB

Stud dia. mm	Identification number: Shield type, With crowned outer ring	Identification number: Shield type, With cylindrical outer ring	Identification number: Sealed type, With crowned outer ring	Identification number: Sealed type, With cylindrical outer ring	Mass (Ref.) g	Boundary dimensions mm: D	C	d_1	G	G_1
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): Minimum allowable value of chamfer "*r*"







CF··· BUUR
CF···FBUUR

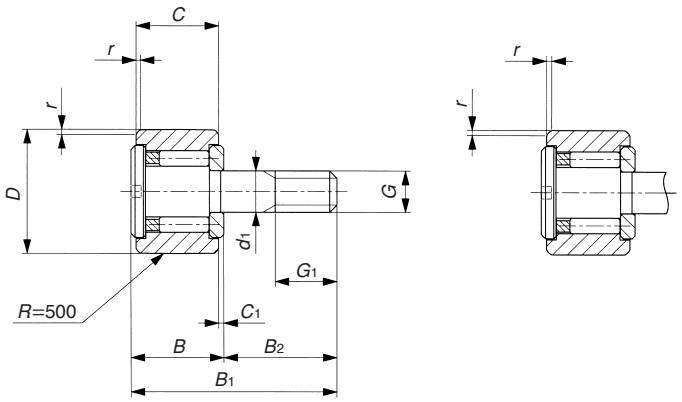
CF··· BUU
CF···FBUU

Dimensions						Mounting dimension	Maximum tightening torque	Basic dynamic load rating	Basic static load rating	Maximum allowable load
B	B_1	B_2	C_1	H	r_{smin}(1)	f Min. mm	N-m	C N	C_0 N	N
8	17	9	0.5	2	0.2	6.8	0.29	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	2.3	2 520	2 140	1 260
								1 930	1 730	1 260

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

IKO Standard Type Cam Followers with Screwdriver Slot

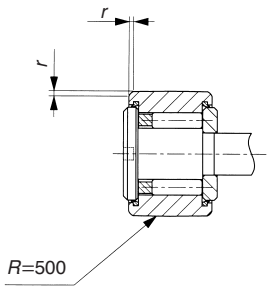
CF With cage type



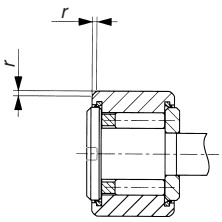
CF···R CF

Stud dia. mm	Identification number				Mass (Ref.) g	Boundary dimensions mm				
	Shield type		Sealed type			D	C	d_1	G	G_1
	With crowned outer ring	With cylindrical outer ring	With crowned outer ring	With cylindrical outer ring						
3	CF 3 R	CF 3	CF 3 UUR	CF 3 UU	4.3	10	7	3	M3 × 0.5	5
4	CF 4 R	CF 4	CF 4 UUR	CF 4 UU	7.4	12	8	4	M4 × 0.7	6
5	CF 5 R	CF 5	CF 5 UUR	CF 5 UU	10.3	13	9	5	M5 × 0.8	7.5

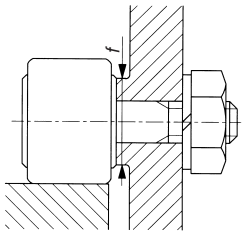
Note(1): Minimum allowable value of chamfer "*r*"



CF ⋯UUR



CF ⋯UU

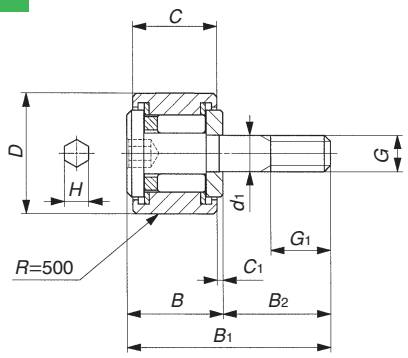


B	B_1	B_2	C_1	r_{smin}(1)	Mounting dimension f Min. mm	Maximum tightening torque N-m	Basic dynamic load rating C N	Basic static load rating C_0 N	Maximum allowable load N
8	17	9	0.5	0.2	6.8	0.29	1 500	1 020	384
9	20	11	0.5	0.3	8.3	0.78	2 070	1 590	834
10	23	13	0.5	0.3	9.3	2.3	2 520	2 140	1 260

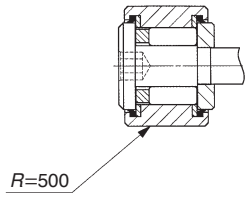
1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

IKO Thrust Disk Type Cam Followers with Hexagon Hole

CF··· WB With cage type
CF···FWB With cage type, Stainless steel made

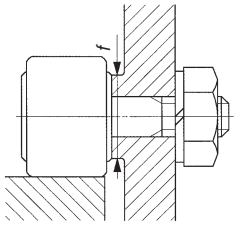


CF··· WBR
CF···FWBR



CF··· WBUUR
CF···FWBUUR

Stud dia. mm	Identification number: Shield type (with crowned outer ring)	Identification number: Sealed type (with crowned outer ring)	Mass (Ref.) g	Boundary dimensions mm: 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							

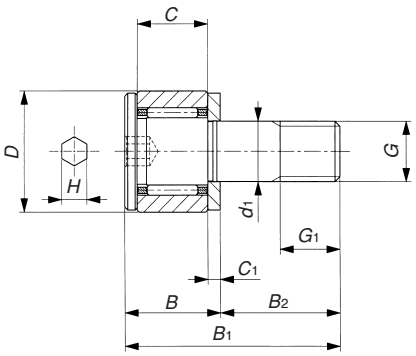


B_1	B_2	C_1	H	Mounting dimension f Min. mm	Maximum tightening torque N-m	Basic dynamic load rating C N	Basic static load rating C_0 N	Maximum allowable load N
17	9	0.5	2	6.8	0.34	1 500	1 020	384
						1 200	813	384
20	11	0.5	2.5	8.3	0.78	2 070	1 590	834
						1 650	1 270	834
23	13	0.5	3	9.3	1.6	2 520	2 140	1 260
						1 930	1 730	1 260

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

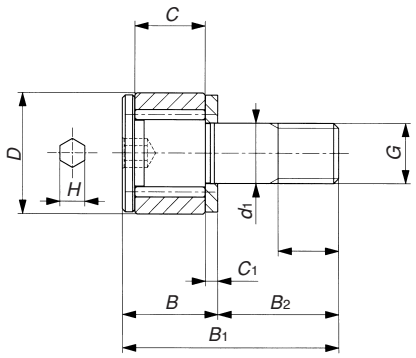
IKO Miniature Type Cam Followers

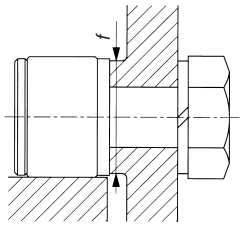
CFS With cage type
CFS…V Full complement type
CFS…F With cage type Stainless steel made
CFS…FV Full complement type Stainless steel made



CFS
CFS…F

Stud dia. mm	Identification number: With cage type	Identification number: Full complement	Mass (Ref.) g	Boundary dimensions mm: 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							





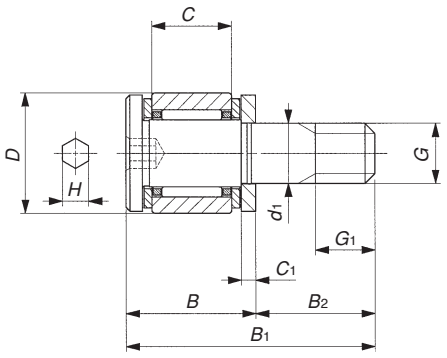
CFS···V
CFS···FV

B_1	B_2	C_1	H	Mounting dimension f Min. mm	Maximum tightening torque N-cm	Basic dynamic load rating C N	Basic static load rating C_0 N	Maximum allowable load N
8	4	0.7	0.9	4.3	9.1	288 768	202 734	202 229
						230 614	161 587	161 161
9.5	5	0.7	0.9	4.8	18.7	428 1 000	351 1 080	351 360
						342 800	281 862	281 360
11.5	6	0.7	1.3	5.8	33.5	629 1 420	611 1 790	484 484
						504 1 140	488 1 430	484 484
15	8	1.0	1.5	7.7	77.7	1 120 2 370	1 120 3 000	919 919
						897 1 900	894 2 400	894 919
18	10	1.0	2	9.6	158	1 570 3 180	1 850 4 700	1 570 1 570
						1 250 2 540	1 480 3 760	1 480 1 570
21.5	12	1.2	2.5	11.6	268	2 090 4 610	2 200 6 250	2 150 2 150
						1 670 3 690	1 760 5 000	1 760 2 150

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

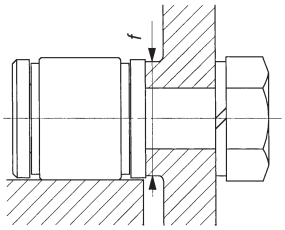
IKO Thrust Disk Type Miniature Cam Followers

CFS··· W With cage type
CFS···FW With cage type. Stainless steel made



CFS··· W
CFS···FW

Stud dia. mm	Identification number	Mass (Ref.) g	Boundary dimensions mm						
			D	*C*	d_1	*G*	G_1	*B*	B_1
2	**CFS 2 W**	0.6	4.5	2.5	2	M2 ×0.4	2	4.5	8.5
	CFS 2 FW								
2.5	**CFS 2.5 W**	1	5	3	2.5	M2.5×0.45	2.5	5	10
	CFS 2.5 FW								
3	**CFS 3 W**	2	6	4	3	M3 ×0.5	3	6.5	12.5
	CFS 3 FW								
4	**CFS 4 W**	4	8	5	4	M4 ×0.7	4	8	16
	CFS 4 FW								
5	**CFS 5 W**	7	10	6	5	M5 ×0.8	5	9	19
	CFS 5 FW								
6	**CFS 6 W**	13	12	7	6	M6 ×1	6	10.5	22.5
	CFS 6 FW								



B_2	C_1	H	Mounting dimension f Min. mm	Maximum tightening torque N-cm	Basic dynamic load rating C N	Basic static load rating C_0 N	Maximum allowable load N
4	0.7	0.9	4.3	9.1	288	202	194
					230	161	161
5	0.7	0.9	4.8	18.7	428	351	313
					342	281	281
6	0.7	1.3	5.8	33.5	629	611	399
					504	488	399
8	1.0	1.5	7.7	77.7	1 120	1 120	785
					897	894	785
10	1.0	2	9.6	158	1 570	1 850	1 370
					1 250	1 480	1 370
12	1.2	2.5	11.6	268	2 090	2 200	1 920
					1 670	1 760	1 760

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