


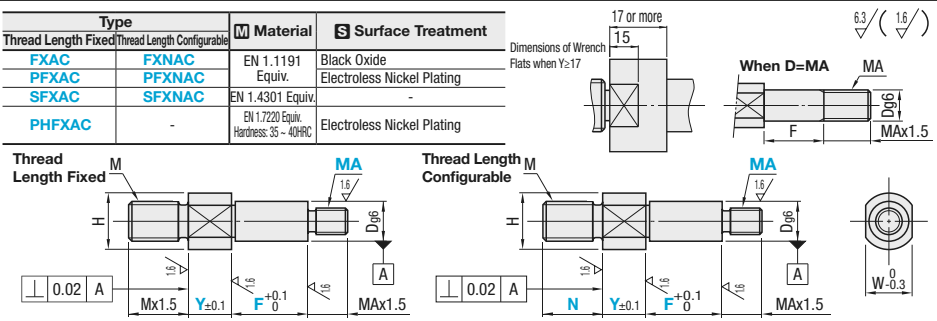
Cantilever Shafts

Threaded with Threaded Ends

Standard



Type	Material	Surface Treatment
FXAC	EN 1.1191 Equiv.	Black Oxide
PFXAC	EN 1.4301 Equiv.	Electroless Nickel Plating
SFXAC	EN 1.4301 Equiv.	-
PHFXAC	EN 1.7220 Equiv. Hardness: 35-40HRC	Electroless Nickel Plating




RoHS

This type may have centering holes depending on dimensions. Refer to the table on P888 for thread undercut dimensions.

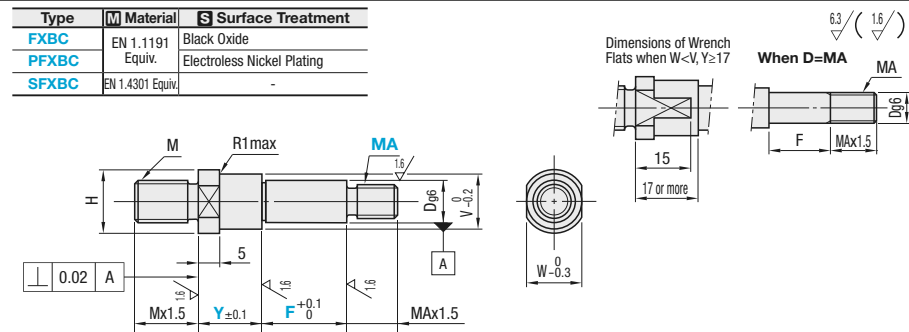
Part Number Type	No.	Dg6	1mm Increment		MA (Coarse) Selection	H	W	M (Coarse)	Unit Price		
			Y	F					N	Thread Length Fixed	Thread Length Configurable
3	3	-0.002			3-6	7	5	M 3			
3A	3	-0.008				11	9	M 3			
4	4		2-30	3-50	4-8	8	6	M 4			
4A	4					12	10	M 4			
5	5	-0.004			5-10	9	7	M 5			
5A	5	-0.012				13	11	M 5			
6	6				6-12	10	8	M 6			
6A	6					14	12	M 6			
8	8				8-16	12	10	M 8			
8A	8	-0.005				16	14	M 8			
10	10	-0.014			10-20	15	13	M10			
10A	10					20	17	M10			
12	12		2-60		6 8 10 12	17	14	M12			
13	13					18	15	M12			
15	15	-0.006			12-24	20	17	M12			
16	16	-0.017				21	18	M12			
17	17				8 10 12 (15)	22	19	M12			
18	18					23	20	M12			
20	20				10 12 (15) 16 20	26	24	M20			
20A	20					28	26	M20			
22	22					31	27	M20			
22A	22	-0.007				36	32	M20			
25	25	-0.020	4-60	20-40	10 12 (15) 16 20 24 (25) 30			M16			
25A	25							M16			
30	30							M16			
30A	30							M16			

MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA. N is available for Thread Length Configurable Type only. PHFXAC is applicable to D6 or larger specifications.

Stepped



Type	Material	Surface Treatment
FXBC	EN 1.1191 Equiv.	Black Oxide
PFXBC	EN 1.4301 Equiv.	Electroless Nickel Plating
SFXBC	EN 1.4301 Equiv.	-




RoHS

This type may have centering holes depending on dimensions. Refer to the table on P888 for thread undercut dimensions.

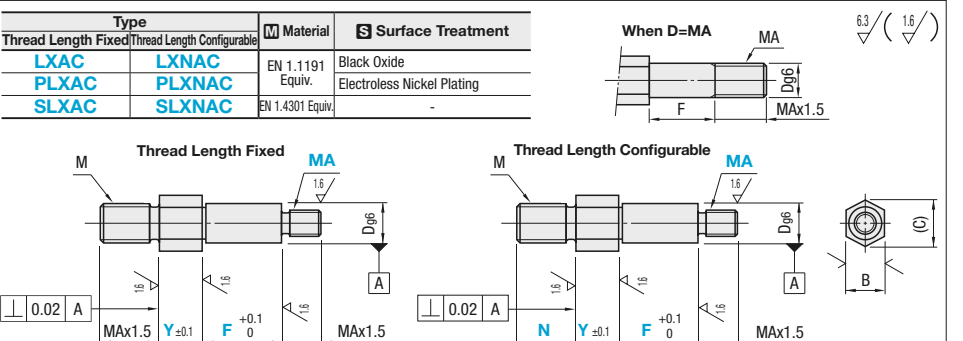
Part Number Type	No.	Dgs	1mm Increment		MA (Coarse) Selection	V	H	W	M (Coarse)	Unit Price		
			Y	F						FXBC	PFXBC	SFXBC
3	3	-0.002			3	5	7	5	M 3			
3A	3	-0.008				9	11	9	M 3			
4	4		7-30	3-50	3 4	6	8	6	M 4			
4A	4					10	12	10	M 4			
5	5	-0.004			3 4 5	7	9	7	M 5			
5A	5	-0.012				11	13	11	M 5			
6	6				4 5 6	8	10	8	M 6			
6A	6					12	14	12	M 6			
8	8				5 6 8	10	12	10	M 8			
8A	8	-0.005				14	16	14	M 8			
10	10	-0.014			6 8 10	13	15	13	M10			
12	12					18	20	17	M10			
13	13				8 10 12 (15)	15	17	14	M12			
15	15	-0.006				16	18	15	M12			
16	16	-0.017				18	20	17	M12			
17	17					20	22	19	M12			
18	18					21	23	20	M12			
20	20				10 12 (15) 16 20	24	26	24	M20			
20A	20					26	28	26	M20			
22	22					29	31	27	M20			
22A	22	-0.007				34	36	32	M20			
25	25	-0.020	7-60	20-100	10 12 (15) 16 20 24 (25) 30				M16			
25A	25								M16			
30	30								M16			
30A	30								M16			

MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA. When W<V, wrench flats W reaches O.D.V.

Hex



Type	Material	Surface Treatment
LXAC	EN 1.1191 Equiv.	Black Oxide
PLXAC	EN 1.4301 Equiv.	Electroless Nickel Plating
SLXAC	EN 1.4301 Equiv.	-



RoHS

This type may have centering holes depending on dimensions. Refer to the table below for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment		MA (Coarse) Selection	B	(C)	M (Coarse)	Unit Price		
			Y	F					N	Thread Length Fixed	Thread Length Configurable
3	3	-0.002			3-6	3		M 3			
3A	3	-0.008						M 3			
4	4		2-30	3-50	4-8	3 4		M 4			
4A	4							M 4			
5	5	-0.004			5-10	3 4 5		M 5			
5A	5	-0.012			6-12	4 5 6		M 6			
6	6				8-16	5 6 8		M 8			
6A	6				10-20	6 8 10		M10			
8	8	-0.005			5-75	6 8 10 12		M12			
10	10	-0.014						M10			
12	12				12-24	8 10 12 (15)		M12			
13	13							M12			
15	15	-0.006						M12			
16	16	-0.017						M12			
17	17				10-75	10 12 (15) 16 20		M20			
18	18							M16			
20	20							M16			
20A	20							M16			
22	22							M16			
22A	22	-0.007						M16			
25	25	-0.020	4-60	20-40	10 12 (15) 16 20 24 (25) 30			M20			
25A	25							M16			
30	30							M16			
30A	30							M16			

MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA. N is available for Thread Length Configurable Type only.

Ordering Example

Part Number - Y - F - N - MA

FXAC12 - 25 - F22 - N10 - MA8

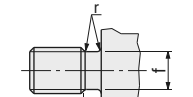
LXAC10 - 30 - F50 - N10 - MA6

Alterations Example

Part Number - Y - F - N - MA (MSC) - (YKC, WSC)

FXAC10 - 53 - F30 - MSC10 - WSC

Alterations	Y Dimension Tolerance	Four Wrench Flats	Fine Thread
		YKC	WSC




Thread Undercut Dimensions

Coarse Thread				Fine Thread			
Thread Dia. (M, MA)	g	r	f	Thread Dia. (MSC)	g	r	f
3				3			
4	1.2-1.5	0.2-0.3	2.1-2.4	4	1.2-1.5	0.2-0.3	2.1-2.4
5			3.9-4.1	5			3.9-4.1
6			4.3-4.9	6			4.3-4.9
8	1.5-2.5	0.2-0.6	6.3-6.6	8	1.5-2.5	0.2-0.6	6.3-6.6
10			8.1-8.3	10			8.3-8.6
12	1.5-3.0	0.2-1.0	9.8-10.1	12	1.5-3.0	0.2-1.0	9.8-10.7
16			13.6-13.8	16			13.6-13.8
20	1.5-4.0		17.0-17.2	20	1.5-4.0		17.2-18.8
24			20.2-20.7	24			20.2-22.2
30	2.5-5.0	0.2-1.5	26.0-26.2	30	2.5-5.0	0.2-1.5	26.2-28.2

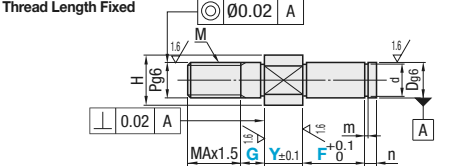
Cantilever Shafts

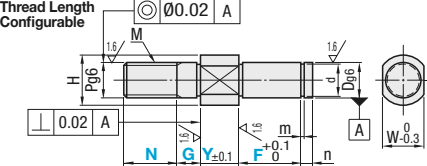
Piloted Thread with Retaining Ring Groove

Standard



Type	Material	Surface Treatment
FXCA, FXNCA	EN 1.1191 Equiv.	Black Oxide
PFXCA, PFXNCA	EN 1.4301 Equiv.	Electroless Nickel Plating
SFXCA, SFXNCA	EN 1.7220 Equiv. Hardness: 35 ~ 40HRC	Black Oxide

Thread Length Fixed: 

Thread Length Configurable: 


RoHS

This type may have centering holes depending on dimensions.

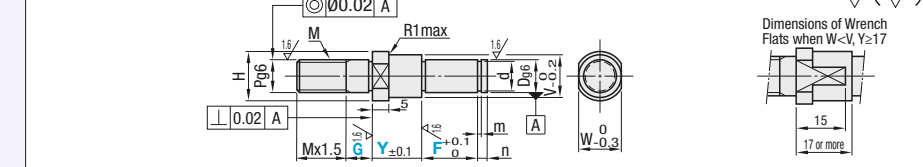
Part Number Type	No.	Dgs	1mm Increment			Pg6	M (Coarse)	H	W	Ref. Dim.	Tolerance	m	n	Unit Price						
			Y	F	G									N	Thread Length Fixed			Thread Length Configurable		
															FXCA	PFXCA	SFXCA	FXNCA	PFXNCA	SFXNCA
Thread Length Fixed																				
FXCA, PFXCA, SFXCA, HFXCA (D≥6)																				
Thread Length Configurable																				
FXNCA, PFXNCA, SFXNCA																				

HFCA is applicable to D6 or larger specifications. N is available for Thread Length Configurable Type only.

Stepped



Type	Material	Surface Treatment
FXDA, PFXDA	EN 1.1191 Equiv.	Black Oxide
SFXDA	EN 1.4301 Equiv.	Electroless Nickel Plating

Thread Length Configurable: 


RoHS

This type may have centering holes depending on dimensions.

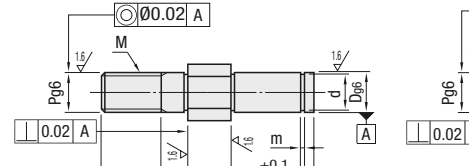
Part Number Type	No.	Dgs	1mm Increment			Pg6	M (Coarse)	V	H	W	Ref. Dim.	Tolerance	m	n	Unit Price		
			Y	F	G										Thread Length Fixed		
															FXDA	PFXDA	SFXDA
Thread Length Fixed																	
FXDA, PFXDA, SFXDA																	
Thread Length Configurable																	
FXDA, PFXDA, SFXDA																	

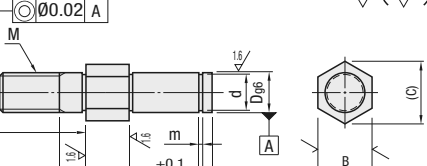
When W<V, wrench flats reach O.D.V.

Hex



Type	Material	Surface Treatment
LXCA, LXNCA	EN 1.1191 Equiv.	Black Oxide
PLXCA, PLXNCA	EN 1.4301 Equiv.	Electroless Nickel Plating
SLXCA, SLXNCA	EN 1.7220 Equiv.	Black Oxide

Thread Length Fixed: 

Thread Length Configurable: 

RoHS

This type may have centering holes depending on dimensions.

Part Number Type	No.	Dgs	1mm Increment			Pg6	M (Coarse)	B	(C)	Ref. Dim.	Tolerance	m	n	Unit Price						
			Y	F	G									N	Thread Length Fixed			Thread Length Configurable		
															LXCA	PLXCA	SLXCA	LXNCA	PLXNCA	SLXNCA
Thread Length Fixed																				
LXCA, PLXCA, SLXCA																				
Thread Length Configurable																				
LXNCA, PLXNCA, SLXNCA																				

N is available for Thread Length Configurable Type only.

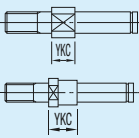
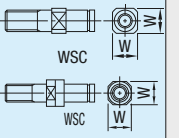
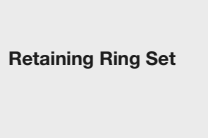
Ordering Example: Part Number - Y - F - G - N

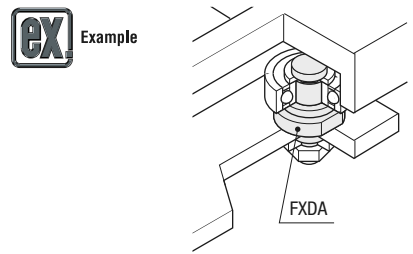
FXCA12 - 12 - F15 - G6 - N40

LXNCA20 - 25 - F30 - G10 - N40

Alterations Example: Part Number - Y - F - G - N - (YKC, WSC, SET)

FXCA25 - 30 - F15 - G8 - N - YKC

Alterations	Y Dimension Tolerance	Four Wrench Flats	Retaining Ring Set
			
Code	YKC	WSC	SET
Spec.	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code YKC	Changes from two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code WSC	Retaining Ring applicable to each shaft diameter is included. Ordering Code SET. Applicable to all types. Retaining Ring Shape: No.=3 ~ 8: E Type Retaining Ring; No.=10 ~ 30A: C Type Retaining Ring. Retaining Ring Material: Cantilever Shafts: EN 1.1191 Equiv. (Black Oxide), EN 1.4301 Equiv. (Electroless Nickel Plating); Retaining Ring: EN 1.4301 (CSP) Equiv. (Spring Steel), EN 1.7220 Equiv. (Black Oxide), EN 1.4301 (CSP) Equiv. (Spring Steel).



Cantilever Shafts

Piloted Thread with Tapped End

Standard

Type	Material	Surface Treatment
FXCB, FXNCB	EN 1.1191 Equiv.	Black Oxide
PFXCB, PFXNCB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXCB, SFXNCB	EN 1.4301 Equiv.	-

RoHS

Please refer to Table 1 to specify dimensions Y and F. This type may have centering holes depending on dimensions.

Hex

Type	Material	Surface Treatment
LXCB, PLXCB	EN 1.1191 Equiv.	Black Oxide
SLXCB	EN 1.4301 Equiv.	Electroless Nickel Plating

RoHS

Please refer to Table 1 to specify dimensions Y and F.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	H	W	Unit Price																
			Y	F	G						FXCB	PFXCB	SFXCB														
Thread Length Fixed FXCB PFXCB SFXCB	6	6	-0.004	2-60	5-100	3	6	M 6	10	8	-																
	6A	-0.012	8-16								4	-															
	8	-0.005										-0.014	10-20	4 5 6	-												
	8A														-												
	10	5-15										10-120	5 6 8	10	M10	-											
	12															-0.006	-0.017	12-24	6 8 10	-							
	13																			-							
	15															4-60	5-20	6 8 10 12	12	M12	-						
	16																				-0.007	-0.020	20-40	8 10 12 16	-		
	17																								-		
18	20-40			20	M20	26	24	-																			
20			-0.007					-0.020	16	M16	28										25	-					
22																						-					
22A			8 10 12 16 20					16	M16	31	27										-						
25		-0.007										-0.020	20	M20	36						32	-					
25A																						-					
30		-																									
30A		-																									

Table 1

MA	Y+F
M 3	Y+F ≥ 11.5
M 4	Y+F ≥ 14.0
M 5	Y+F ≥ 16.2
M 6	Y+F ≥ 18.5
M 8	Y+F ≥ 23.5
M10	Y+F ≥ 28.5
M12	Y+F ≥ 35.5
M16	Y+F ≥ 45.0
M20	Y+F ≥ 55.0

N is available for Thread Length Configurable Type only.

Stepped

Type	Material	Surface Treatment
FXDB, FXNCB	EN 1.1191 Equiv.	Black Oxide
PFXDB, PFXNCB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXDB, SFXNCB	EN 1.4301 Equiv.	-

RoHS

Please refer to Table 1 to specify dimensions Y and F. This type may have centering holes depending on dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	V	H	W	Unit Price																			
			Y	F	G							FXDB	PFXDB	SFXDB																	
FXDB PFXDB SFXDB	6	6	-0.004	7-60	5-100	3	6	M 6	8	10	8	-																			
	6A	-0.012	8-16									4	-																		
	8	-0.005											-0.014	10-20	4 5 6	-															
	8A															-															
	10	5-15											10-120	5 6 8	10	M10	-														
	12																-0.006	-0.017	12-24	6 8 10	-										
	13																				-										
	15																20-40	20	M20	24	26	24	-								
	16																						-0.007	-0.020	16	M16	28	25	-		
	17																												-		
18	8 10 12 16 20			16	M16	29	31	27	-																						
20			-0.007						-0.020	20	M20	34											36	32	-						
22																									-						
22A			-																												
25		-																													
25A		-																													
30		-																													
30A		-																													

Table 1

MA	Y+F
M 3	Y+F ≥ 11.5
M 4	Y+F ≥ 14.0
M 5	Y+F ≥ 16.2
M 6	Y+F ≥ 18.5
M 8	Y+F ≥ 23.5
M10	Y+F ≥ 28.5
M12	Y+F ≥ 35.5
M16	Y+F ≥ 45.0
M20	Y+F ≥ 55.0

When W < V, wrench flats W reaches O.D.V.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	B	(C)	Unit Price																															
			Y	F	G						LXCB	PLXCB	SLXCB																													
LXCB PLXCB SLXCB	6	6	-0.004	2-60	5-100	3	6	M 6	8	9.2	-																															
	8	-0.005	5-10								8	M 8	10	11.5	-																											
	8A	-0.014													4 5 6	10	M10	13	15	-																						
	10	-0.006																		-0.017	5-15	12	M12	14	16.2	-																
	12																									-																
	13	4-60																		5-20	6 8 10	12	M12	17	19.6	-																
	15																									-0.007	-0.020	6 8 10 12	16	M16	19	21.9	-									
	16																																-									
	17																									6 8 10 12 16 20	16	M16	20	M20	24	27.7	-									
	20																																-0.007	-0.020	20	M20	27	31.2	-			
	22																																						-			
	22A																																8 10 12 16 20	16	M16	20	M20	32	36.9	-		
	25																																							-		
	25A																																							-		
	30																																							-		
	30A	-																																								

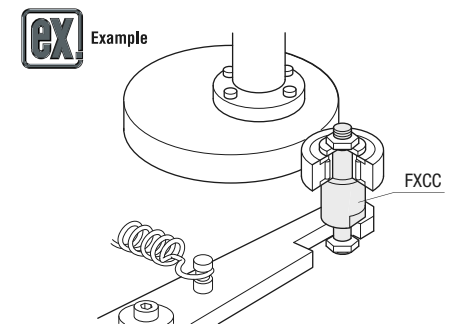
Table 1

MA	Y+F
M 3	Y+F ≥ 11.5
M 4	Y+F ≥ 14.0
M 5	Y+F ≥ 16.2
M 6	Y+F ≥ 18.5
M 8	Y+F ≥ 23.5
M10	Y+F ≥ 28.5
M12	Y+F ≥ 35.5
M16	Y+F ≥ 45.0
M20	Y+F ≥ 55.0

Ordering Example
 Part Number - Y - F - G - N - MA
 FXCB8 - 15 - F25 - G5 - MA4
 PFXNCB10 - 27 - F10 - G5 - N10 - MA5

Alterations Example
 Part Number - Y - F - G - N - MA - (YKC, WSC)
 FXCB15 - 10 - F21 - G7 - MA6 - WSC

	Y Dimension Tolerance	Four Wrench Flats
Alterations		
Code	YKC	WSC
Spec.	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code YKC	Changes from two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code WSC



Cantilever Shafts

Piloted Thread with Threaded Ends

Standard

Type	Material	Surface Treatment
FXCC Thread Length Fixed PFXCC Thread Length Configurable SFXCC	EN 1.1191 Equiv. EN 1.4301 Equiv.	Black Oxide Electroless Nickel Plating

When D=MA
Dimensions of Wrench Flats when Y≥17

⚠ This type may have centering holes depending on dimensions.
⚠ Refer to the table on the next page for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	H	W	Unit Price										
			Y	F	G						N	Thread Length Fixed			Thread Length Configurable						
Thread Length Fixed FXCC PFXCC SFXCC	3	3	-0.002 -0.008	2-30	3- 8	3- 6	3	M 3	7 11 9	5 9											
	4	4	-0.004 -0.012								4- 8	3 4									
	5	5	-0.005 -0.014								5-10	3 4 5									
	6	6	-0.006 -0.017								6-12	4 5 6									
	8	8	-0.006 -0.017								8-16	5 6 8									
	10	10	-0.006 -0.017								10-20	6 8 10									
	12	12	-0.006 -0.017								5-15	6 8 10 12									
	13	13	-0.006 -0.017										12-24	8 10 12 (15)							
	15	15	-0.006 -0.017												10 12 (15) 16						
	17	17	-0.006 -0.017																		
Thread Length Configurable FXNCC PFXNCC SFXNCC	20	20	-0.007 -0.020	10-150	5-20	10 12 (15) 16 20	20	M20	26 24	24											
	22	22	-0.007 -0.020								20-40	10 12 (15) 16 20 24 (25)									
	25	25	-0.007 -0.020										10 12 (15) 16 20 24 (25) 30								
	30	30	-0.007 -0.020																		
	30A	30	-0.007 -0.020																		

Stepped

Type	Material	Surface Treatment
FXDC PFXDC SFXDC	EN 1.1191 Equiv. EN 1.4301 Equiv.	Black Oxide Electroless Nickel Plating

When D=MA
Dimensions of Wrench Flats when W<V, Y≥17

⚠ This type may have centering holes depending on dimensions.
⚠ Refer to the table on the next page for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	V	H	W	Unit Price						
			Y	F	G							FXDC	PFXDC	SFXDC				
Thread Length Fixed FXDC PFXDC SFXDC	3	3	-0.002 -0.008	7-30	3-50	3	3	M 3	5 9 11 9	7 11 9	5							
	4	4	-0.004 -0.012									3 4						
	5	5	-0.005 -0.014									3 4 5						
	6	6	-0.006 -0.017									4 5 6						
	8	8	-0.006 -0.017									8 10 8						
	10	10	-0.006 -0.017									12 14 12						
	12	12	-0.006 -0.017									10 12 10						
	13	13	-0.006 -0.017									14 16 14						
	15	15	-0.006 -0.017									15 17 14						
	17	17	-0.006 -0.017									16 18 15						
Thread Length Configurable FXNCC PFXNCC SFXNCC	20	20	-0.007 -0.020	7-60	5-15	10 12 (15) 16	12	M12	18 20 17	20 17	20							
	22	22	-0.007 -0.020									10 12 (15) 16 20						
	25	25	-0.007 -0.020										10 12 (15) 16 20 24 (25)					
	30	30	-0.007 -0.020															
	30A	30	-0.007 -0.020															

⚠ MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA. ⚠ When W<V, wrench flats W reaches O.D.V.

Hex

Type	Material	Surface Treatment
LXCC PLXCC SLXCC	EN 1.1191 Equiv. EN 1.4301 Equiv.	Black Oxide Electroless Nickel Plating

When D=MA
Dimensions of Wrench Flats when Y≥17

⚠ This type may have centering holes depending on dimensions.
⚠ Refer to the table below for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	Pg6	M (Coarse)	B	(C)	Unit Price					
			Y	F	G						LXCC	PLXCC	SLXCC			
Thread Length Fixed LXCC PLXCC SLXCC	3	3	-0.002 -0.008	2-30	3- 8	3	3	M 3	6	6.9						
	4	4	-0.004 -0.012								3 4					
	5	5	-0.005 -0.014								3 4 5					
	6	6	-0.006 -0.017								4 5 6					
	8	8	-0.006 -0.017								5 6 8					
	10	10	-0.006 -0.017								6 8 10					
	12	12	-0.006 -0.017								5-15	6 8 10 12				
	13	13	-0.006 -0.017										8 10 12 (15)			
	15	15	-0.006 -0.017											10 12 (15) 16 20		
	17	17	-0.006 -0.017													
Thread Length Configurable LXNCC PLXNCC SLXNCC	20	20	-0.007 -0.020	10-150	5-20	10 12 (15) 16 20	20	M20	24	27.7						
	22	22	-0.007 -0.020								10 12 (15) 16 20 24 (25)					
	25	25	-0.007 -0.020									12 (15) 16 20 24 (25) 30				
	30	30	-0.007 -0.020													
	30A	30	-0.007 -0.020													

⚠ MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA.

Ordering Example

Part Number - Y - F - G - N - MA

FXCC8 - 15 - F25 - G5 - MA5
FXNCC10 - 27 - F10 - G5 - N10 - MA6

Alterations

Part Number - Y - F - G - N - MA/MS/SC - (YKC, WSC)

FXCC15 - 10 - F21 - G7 - MSC15 - WSC

	Y Dimension Tolerance	Four Wrench Flats	Fine Thread																																
Alterations																																			
Code	YKC	WSC	MSC																																
Spec.	Changes Y dimension tolerance to ±0.05. ⚠ Applicable to all types. Ordering Code YKC	Changes from two wrench flats to four wrench flats. ⚠ Applicable to Standard and Stepped Types. Ordering Code WSC	Changes Thread MA to Fine Thread in the table below. ⚠ Applicable to all types. ⚠ Specify MSC instead of MA. Ordering Code MSC12																																
			<table border="1"> <thead> <tr> <th colspan="2">MSC Pitch</th> <th colspan="2">MSC Pitch</th> </tr> <tr> <th>M</th> <th>Pitch</th> <th>M</th> <th>Pitch</th> </tr> </thead> <tbody> <tr> <td>M 3</td> <td>0.35</td> <td>M12</td> <td>1.0</td> </tr> <tr> <td>M 4</td> <td>0.5</td> <td>M15</td> <td>1.0</td> </tr> <tr> <td>M 5</td> <td>0.5</td> <td>M20</td> <td>1.5</td> </tr> <tr> <td>M 6</td> <td>0.75</td> <td>M25</td> <td>1.5</td> </tr> <tr> <td>M 8</td> <td>1.0</td> <td>M30</td> <td>1.5</td> </tr> <tr> <td>M10</td> <td>1.0</td> <td></td> <td></td> </tr> </tbody> </table>	MSC Pitch		MSC Pitch		M	Pitch	M	Pitch	M 3	0.35	M12	1.0	M 4	0.5	M15	1.0	M 5	0.5	M20	1.5	M 6	0.75	M25	1.5	M 8	1.0	M30	1.5	M10	1.0		
MSC Pitch		MSC Pitch																																	
M	Pitch	M	Pitch																																
M 3	0.35	M12	1.0																																
M 4	0.5	M15	1.0																																
M 5	0.5	M20	1.5																																
M 6	0.75	M25	1.5																																
M 8	1.0	M30	1.5																																
M10	1.0																																		

EX Example

⚠ Thread Undercut Dimensions

Thread Dia. (M, MA)	Coarse Thread			Fine Thread		
	g	r	f	g	r	f
3			2.1- 2.4	3		2.1-2.4
M 3	1.2-1.5	0.2-0.3	2.9- 3.2	4	1.2-1.5	0.2-0.3
5			3.9- 4.1	5		3.9-4.1
6			4.3- 4.9	6		4.3-4.9
8	1.5-2.5	0.2-0.6	6.3- 6.6	8	1.5-2.5	0.2-0.6
10			8.1- 8.3	10		8.3-8.6
12	1.5-3.0	0.2-1.0	9.8-10.1	12	1.5-3.0	0.2-1.0
16			13.6-13.8	15		13.6-13.8
20	1.5-4.0	0.2-1.5	17.0-17.2	20	1.5-4.0	0.2-1.5
24			20.2-20.7	25		20.2-23.2
30	2.5-5.0	0.2-1.5	26.0-26.2	30	2.5-5.0	0.2-1.5

Cantilever Shafts

Screw Mount with Retaining Ring Groove

Standard

Type	Material	Surface Treatment
FXHA	EN 1.1191 Equiv.	Black Oxide
PFXHA	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXHA	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when $Y \geq 17$

RoHS This type may have centering holes depending on dimensions.

Part Number Type	No.	D96	1mm Increment		M (Coarse)	H	W	Ref. Dim.	d Tolerance	m	n	Unit Price			
			Y	F								FXHA	PFXHA	SFXHA	
FXHA PFXHA SFXHA	6	6	-0.004	5-100	M 3	10	8	5	+0.075 0	0.7	2				
	6A	6	-0.012		M 3	14	12								
	8	8	-0.005		M 4	12	10	7	+0.090 0	0.9	3				
	8A	8	-0.014		M 4	16	14								
	10	10	-0.014		M 6	15	13	9.6	0	-0.090	1.15	4			
	10A	10	-0.014		M 6	20	17								
	12	12	-0.006	10-150	M 8	17	14	11.5	0	-0.110	1.15	4			
	13	13	-0.017		M 8	18	15	12.4							
	15	15	-0.006		M 10	20	17	14.3	0	-0.110	1.35	5			
	16	16	-0.017		M 10	21	18	15.2							
	17	17	-0.007		M 12	23	20	16.2	0	-0.210	1.65				
	18	18	-0.020		M 12	23	20	17							
	20	20	-0.007	4-75	M 8	26	24	19	0	-0.210	1.35	5			
	20A	20	-0.020		M 8	28	26	21							
	22	22	-0.007		M 12	31	27	23.9	0	-0.210	1.65				
	22A	22	-0.020		M 12	31	27	23.9							
	25	25	-0.007		M 16	36	32	28.6	0	-0.210	1.65				
	25A	25	-0.020		M 16	36	32	28.6							
	30	30	-0.007		M 12										
	30A	30	-0.020		M 16										

Stepped

Type	Material	Surface Treatment
FXJA	EN 1.1191 Equiv.	Black Oxide
PFXJA	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXJA	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when $W < V, Y \geq 17$

RoHS This type may have centering holes depending on dimensions.

Part Number Type	No.	D96	1mm Increment		M (Coarse)	a	V	H	W	Ref. Dim.	d Tolerance	m	n	Unit Price		
			Y	F										FXJA	PFXJA	SFXJA
FXJA PFXJA SFXJA	6	6	-0.004	7-60	M 3	8	10	8	5	+0.075 0	0.7	2				
	6A	6	-0.012		M 3	12	14	12								
	8	8	-0.005		M 4	10	12	10	7	+0.090 0	0.9	3				
	8A	8	-0.014		M 4	14	16	14								
	10	10	-0.014		M 6	13	15	13	9.6	0	-0.090	1.15	4			
	10A	10	-0.014		M 6	18	20	17								
	12	12	-0.006	10-100	M 8	15	17	14	11.5	0	-0.110	1.35	5			
	13	13	-0.017		M 8	16	18	15	12.4							
	15	15	-0.006		M 10	18	20	17	14.3	0	-0.110	1.65				
	16	16	-0.017		M 10	19	21	18	15.2							
	17	17	-0.007		M 12	20	23	20	16.2	0	-0.210	1.65				
	18	18	-0.020		M 12	21	23	20	17							
	20	20	-0.007	7-75	M 8	24	26	24	19	0	-0.210	1.65				
	20A	20	-0.020		M 8	26	28	26	21							
	22	22	-0.007		M 12	29	31	27	23.9	0	-0.210	1.65				
	22A	22	-0.020		M 12	29	31	27	23.9							
	25	25	-0.007		M 16	34	36	32	28.6	0	-0.210	1.65				
	25A	25	-0.020		M 16	34	36	32	28.6							
	30	30	-0.007		M 12											
	30A	30	-0.020		M 16											

When $W < V$, wrench flats W reaches O.D.V. When $(Mx1.5)+a \geq Y+F$, the pilot hole for M goes through. When $Mx1.5 \geq Y+F$, M also goes through.

Hex

Type	Material	Surface Treatment
LXHA	EN 1.1191 Equiv.	Black Oxide
PLXHA	EN 1.1191 Equiv.	Electroless Nickel Plating
SLXHA	EN 1.4301 Equiv.	-

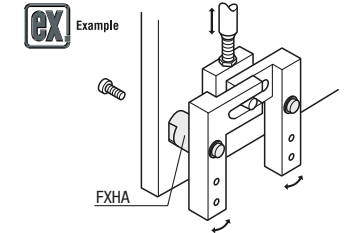
Dimensions of Wrench Flats when $Y \geq 17$

RoHS This type may have centering holes depending on dimensions.

Part Number Type	No.	D96	1mm Increment		M (Coarse)	a	B	(C)	d Ref. Dim.	Tolerance	m	n	Unit Price		
			Y	F									LXHA	PLXHA	SLXHA
LXHA PLXHA SLXHA	6	6	-0.004	5-100	M 3	8	9.2	5	+0.075 0	0.7	2				
	6A	6	-0.012		M 3	10	11.5	7	+0.090 0	0.9	3				
	8	8	-0.005		M 4	13	15.0	9.6	0	-0.090	1.15	4			
	8A	8	-0.014		M 4	14	16.2	11.5							
	10	10	-0.014		M 6	15	17	14.3	0	-0.110	1.35	5			
	10A	10	-0.014		M 6	17	19.6	12.4							
	12	12	-0.006	10-150	M 8	17	18	17	0	-0.110	1.35	5			
	13	13	-0.017		M 8	18	18	17							
	15	15	-0.006		M 10	19	21.9	15.2	0	-0.210	1.65				
	16	16	-0.017		M 10	20	22	16.2							
	17	17	-0.007		M 12	24	27.7	19	0	-0.210	1.65				
	18	18	-0.020		M 12	24	27.7	19							
	20	20	-0.007	4-75	M 16	27	31.2	23.9	0	-0.210	1.65				
	22	22	-0.007		M 16	27	31.2	23.9							
	25	25	-0.007		M 12	32	36.9	28.6	0	-0.210	1.65				
	25A	25	-0.020		M 12	32	36.9	28.6							
	30	30	-0.007		M 16	32	36.9	28.6							
	30A	30	-0.020		M 16	32	36.9	28.6							

When $(Mx1.5)+a \geq Y+F$, the pilot hole for M goes through. When $Mx1.5 \geq Y+F$, M also goes through.

Ordering Example: Part Number - Y - F
 FXHA12 - 5 - F15
 PLXHA10 - 20 - F35



Alterations

Alterations	Y Dimension Tolerance	Four Wrench Flats	Adds a Pilot	Dimensions of Wrench Flats	Adds a Straight Slot	Y Dimension	Retaining Ring Set
							SET
Code	YKC	WSC	APC	FW	MM	YC	SET
Spec.	Changes Y dimension tolerance to ± 0.05 . Applicable to all types. Ordering Code: YKC	Changes from two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code: WSC	Adds a pilot to the shaft seat. Applicable to all types. For 8A and 12A, pilot depth is 2mm. Ordering Code: APC	Applies Wrench Flat Dimension Changes. 1mm Increment Ordering Code: FW3 0.5FW \leq 15 When FW=0, there are no Wrench Flats. Applicable to Standard and Stepped Types.	Adds a straight slot to D. Ordering Code: MM It will not be aligned with wrench flats. Ordering Code: YC10.8	Increases Y dimension by increments. 0.1mm Increment Ordering Code: YC10.8	Retaining Ring applicable to each shaft diameter is included. Ordering Code: SET Retaining Ring Shape No. = 6, 8, E Type Retaining Ring No. = 10 ~ 30A, C Type Retaining Ring Retaining Ring Material

Cantilever Shafts		Retaining Ring
Material	Surface Treatment	Material
EN 1.1191 Equiv.	Black Oxide	Spring Steel
EN 1.4301 Equiv.	Electroless Nickel Plating	EN 1.4301 (CSP) Equiv.

Cantilever Shafts

Screw Mount with Tapped End

Standard

Type	Material	Surface Treatment
FXHB	EN 1.1191 Equiv.	Black Oxide
PFXHB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXHB	EN 1.4301 Equiv.	-
PHFXHB	EN 1.7220 Equiv. Hardness: 35 - 40HRC	Electroless Nickel Plating

6.3 / (1.6 /)

Dimensions of Wrench Flats when Y ≥ 17

RoHS

Part Number Type	No.	D _{φ6}	1mm Increment		MA (Coarse) Selection	M (Coarse)	H	W	Unit Price			
			Y	F					FXHB	PFXHB	SFXHB	PHFXHB
FXHB	6	6	2-60	5-100	3	M 3	10	8				
	6A	6					14	12				
	8	8					12	10				
	8A	8					16	14				
	10	10					15	13				
	10A	10					20	17				
	12	12					17	14				
	13	13					18	15				
	15	15					20	17				
	16	16					21	18				
PFXHB	15	15	2-60	5-100	6 8 10	M 10	20	17				
	16	16					21	18				
	17	17					23	20				
SFXHB	17	17	2-60	5-100	5 6 8	M 8	18	15				
	18	18					20	17				
PHFXHB	20	20	4-75	10-150	6 8 10 12	M 12	26	24				
	20A	20					28	26				
	22	22					28	26				
	22A	22					31	27				
	25	25					31	27				
	25A	25					36	32				
	30	30										
	30A	30										

Stepped

Type	Material	Surface Treatment
FXJB	EN 1.1191 Equiv.	Black Oxide
PFXJB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXJB	EN 1.4301 Equiv.	-

6.3 / (1.6 /)

Dimensions of Wrench Flats when W < V, Y ≥ 17

RoHS

Part Number Type	No.	D _{φ6}	1mm Increment		MA (Coarse) Selection	M (Coarse)	V	H	W	Unit Price			
			Y	F						FXJB	PFXJB	SFXJB	
FXJB	6	6	7-60	5-100	3	M 3	8	10	8				
	6A	6					12	14	12				
	8	8					10	12	10				
	8A	8					14	16	14				
	10	10					13	15	13				
	10A	10					18	20	17				
	12	12					15	17	14				
	13	13					16	18	15				
	15	15					18	20	17				
	16	16					19	21	18				
PFXJB	15	15	7-60	5-100	6 8 10	M 10	20	23	20				
	16	16					20	23	20				
	17	17					21	24	21				
SFXJB	17	17	7-60	5-100	5 6 8	M 8	15	17	14				
	18	18					16	18	15				
PHFXJB	20	20	4-75	10-100	6 8 10 12	M 12	24	26	24				
	20A	20					26	28	26				
	22	22					26	28	26				
	22A	22					29	31	27				
	25	25					29	31	27				
	25A	25					34	36	32				
	30	30											
	30A	30											

When W < V, wrench flats W reaches O.D.V.

Hex

Type	Material	Surface Treatment
LXHB	EN 1.1191 Equiv.	Black Oxide
PLXHB	EN 1.1191 Equiv.	Electroless Nickel Plating
SLXHB	EN 1.4301 Equiv.	-

6.3 / (1.6 /)

RoHS

Part Number Type	No.	D _{φ6}	1mm Increment		MA (Coarse) Selection	M (Coarse)	B	(C)	Unit Price		
			Y	F					LXHB	PLXHB	SLXHB
LXHB	6	6	2-60	5-100	3	M 3	8	9.2			
	8	8					10	11.5			
	10	10					12	14			
	12	12					13	15			
	12	12					14	16.2			
	13	13					17	19.6			
	15	15					17	19.6			
	16	16					19	21.9			
	17	17					19	21.9			
	18	18					24	27.7			
PLXHB	15	15	2-60	5-100	6 8 10	M 10	19	21.9			
	16	16					20	22.2			
	17	17					21	23.1			
SLXHB	20	20	4-60	10-150	6 8 10 12	M 12	24	27.7			
	22	22					25	28.2			
	25	25					27	31.2			
	25A	25					27	31.2			
	30	30					32	36.9			
	30A	30					32	36.9			

Ordering Example: Part Number - Y - F - MA

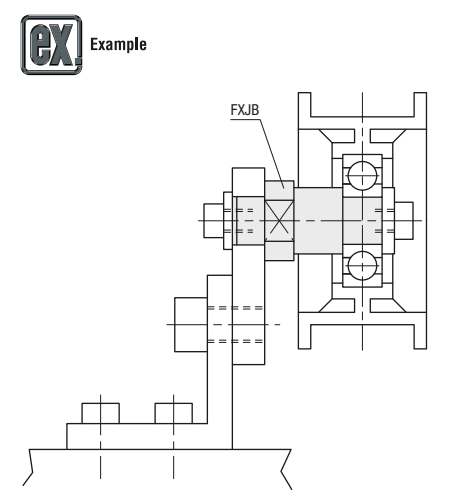
FXHB20 - 17 - F25 - MA10

FXJB12 - 24 - F18 - MA6

Alterations Example: Part Number - Y - F - MA - (YKC, WSC, APC)

FXHB25 - 50 - F32 - MA10 - YKC-APC

Alterations	Y Dimension Tolerance	Four Wrench Flats	Adds a Pilot
Code	YKC	WSC	APC
Spec.	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code: YKC	Changes from two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code: WSC	Adds a pilot to the shaft seat. Applicable to all types. Ordering Code: APC

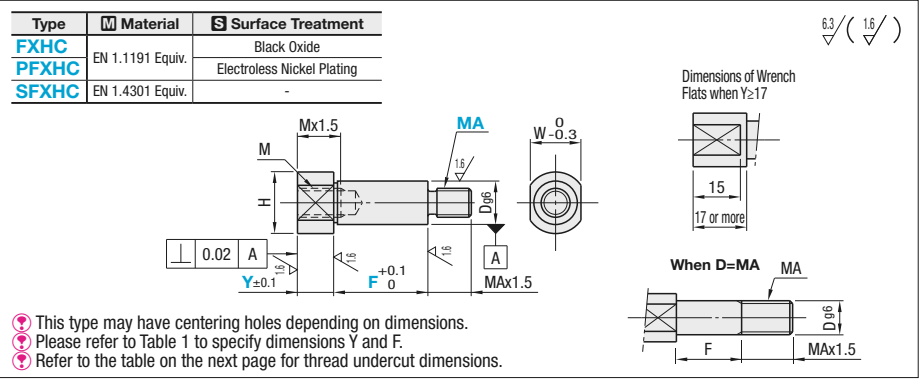


D	M	APC _{φ6}
6	M 3	6
8	M 4	8
10	M 6	10
12	M 8	12
13	M 8	13
15		15
16	M 10	16
17		17
18		18
20	M 12	20
22		22
25	M 16	25
25A	M 12	25
30	M 20	30
30A	M 18	30

Cantilever Shafts

Screw Mount with Threaded End

Standard

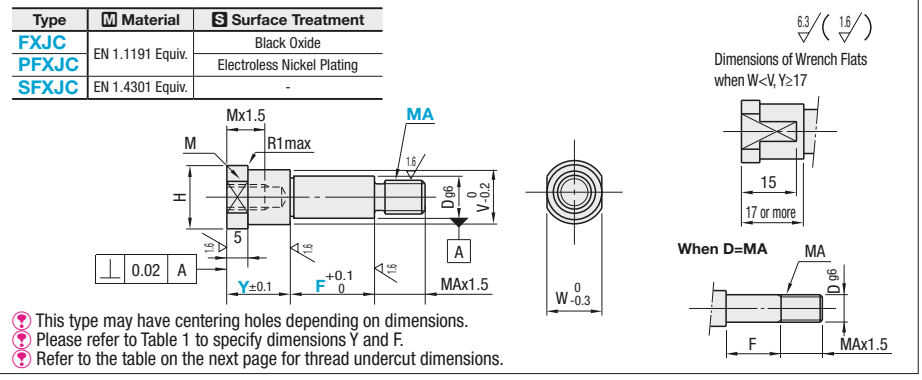


RoHS

Part Number Type	No.	Dg6	1mm Increment		MA (Coarse) Selection	M (Coarse)	H	W	Unit Price		
			Y	F					FXHC	PFXHC	SFXHC
FXHC PFXHC SFXHC	6	6	-0.004	5-100	4 5 6	M 3	10	8			
	6A	6	-0.012		5 6 8	M 4	12	10			
	8	8	-0.005		6 8 10	M 6	16	14			
	8A	8	-0.014		6 8 10 12	M 8	17	14			
	10	10	-0.014		6 8 10 12	M 8	18	15			
	12	12	-0.006		8 10 12 (15)	M 10	20	17			
	13	13	-0.017		10 12 (15) 16	M 10	21	18			
	16	16	-0.017		10 12 (15) 16	M 10	23	20			
	17	17	-0.006	10-150	10 12 (15) 16 20	M 12	26	24			
	18	18	-0.017		10 12 (15) 16 20	M 8	26	24			
	20	20	-0.007		10 12 (15) 16 20	M 16	28	26			
	22	22	-0.020		10 12 (15) 16 20 24 (25)	M 12	28	26			
	22A	22	-0.007		10 12 (15) 16 20 24 (25)	M 16	31	27			
	25	25	-0.020		12 (15) 16 20 24 (25) 30	M 12	31	27			
25A	25	-0.020		M 20	36	32					
30	30			M 16							
30A	30										

⚠ MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA.

Stepped

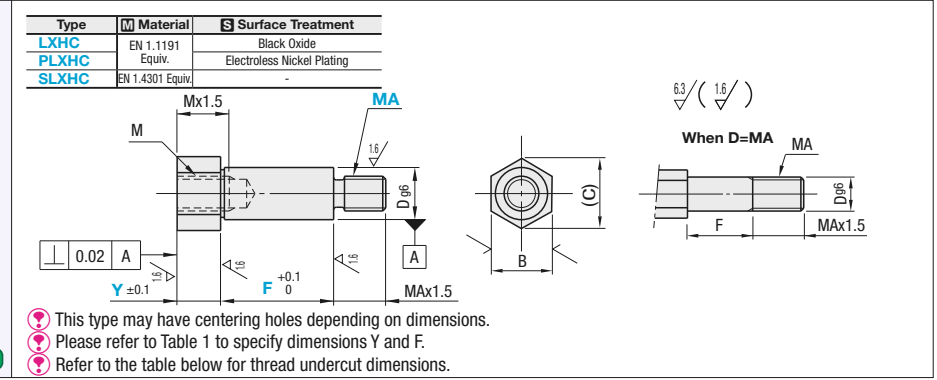


RoHS

Part Number Type	No.	Dg6	1mm Increment		MA (Coarse) Selection	M (Coarse)	V	H	W	Unit Price		
			Y	F						FXJC	PFXJC	SFXJC
FXJC PFXJC SFXJC	6	6	-0.004	5-75	4 5 6	M 3	8	10	8			
	6A	6	-0.012		5 6 8	M 4	12	14	12			
	8	8	-0.005		6 8 10	M 6	14	16	14			
	8A	8	-0.014		6 8 10 12	M 8	15	17	14			
	10	10	-0.014		6 8 10 12	M 8	16	18	15			
	12	12	-0.006		8 10 12 (15)	M 10	18	20	17			
	13	13	-0.017		10 12 (15) 16	M 10	19	21	18			
	16	16	-0.017		10 12 (15) 16	M 10	20	23	20			
	17	17	-0.006	10-75	10 12 (15) 16 20	M 12	24	26	24			
	18	18	-0.017		10 12 (15) 16 20	M 8	26	28	26			
	20	20	-0.007		10 12 (15) 16 20 24 (25)	M 12	26	28	26			
	22	22	-0.020		10 12 (15) 16 20 24 (25)	M 8	29	31	27			
	22A	22	-0.007		12 (15) 16 20 24 (25) 30	M 16	29	31	27			
	25	25	-0.020			M 12	34	36	32			
25A	25	-0.020		M 20								
30	30			M 16								
30A	30											

⚠ MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA.
 ⚠ When $W < V$, wrench flats W reaches O.D.V.

Hex



RoHS

Part Number Type	No.	Dg6	1mm Increment		MA (Coarse) Selection	M (Coarse)	B	(C)	Unit Price		
			Y	F					LXHC	PLXHC	SLXHC
LXHC PLXHC SLXHC	6	6	-0.004	5-100	4 5 6	M 3	8	9.2			
	8	8	-0.005		5 6 8	M 4	10	11.5			
	10	10	-0.014		6 8 10	M 6	13	15			
	12	12	-0.006		6 8 10 12	M 8	14	16.2			
	13	13	-0.017		6 8 10 12	M 8	17	19.6			
	15	15	-0.006		8 10 12 (15)	M 10	19	21.9			
	16	16	-0.017		8 10 12 (15) 16	M 10	19	21.9			
	17	17	-0.017		10 12 (15) 16 20	M 12	24	27.7			
	18	18	-0.007	10 12 (15) 16 20	M 12	24	27.7				
	20	20	-0.020	10 12 (15) 16 20 24 (25)	M 16	27	31.2				
	22	22	-0.020	10 12 (15) 16 20 24 (25)	M 12	27	31.2				
	25	25	-0.007	12 (15) 16 20 24 (25) 30	M 20	32	36.9				
	25A	25	-0.020		M 16						
	30	30									
30A	30										

⚠ MA dimensions with () (M15 and M25) are Fine Thread. Specify MSC instead of MA.

Ordering Example

Part Number - Y - F - MA

FXHC12 - 5 - F15 - MA8

LXHC10 - 20 - F35 - MA6

Alterations

Part Number - Y - F - MA(MSC) - (YKC, WSC, APC)

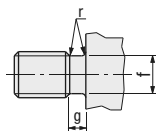
FXHC15 - 20 - F22 - MSC15 - APC

Alterations	Y Dimension Tolerance	Four Wrench Flats	Adds a Pilot	Fine Thread
Code	YKC	WSC	APC	MSC
Spec.	Changes Y dimension tolerance to ±0.05. ⚠ Applicable to all types. Ordering Code YKC	Changes from two wrench flats to four wrench flats. ⚠ Applicable to Standard and Stepped Types. Ordering Code WSC	Adds a pilot to the shaft seat. ⚠ Applicable to all types. Ordering Code APC	Changes Thread MA to Fine Thread in the table below. ⚠ Applicable to all types. ⚠ Specify MSC instead of MA. Ordering Code MSC12

D	M	APC g6
6	M3	6
8	M4	8
10	M6	10
12	M8	12
13	M8	13
15	M10	15
16	M10	16
17	M10	17
18	M12	18
20	M12	20
22	M12	22
25	M16	25
25A	M12	25
30	M20	30
30A	M16	30

Coarse Thread				Fine Thread			
Thread Dia. (MA)	g	r	f	Thread Dia. (MSC)	g	r	f
4	1.2-1.5	0.2-0.3	2.9-3.2	4	1.2-1.5	0.2-0.3	2.9-3.2
5			3.9-4.1	5			3.9-4.1
6			4.3-4.9	6			4.3-4.9
8	1.5-2.5	0.2-0.6	6.3-6.6	8	1.5-2.5	0.2-0.6	6.3-6.6
10			8.1-8.3	10			8.3-8.6
12			9.8-10.1	12			9.8-10.7
16	1.5-3.0	0.2-1.0	13.6-13.8	15	1.5-3.0	0.2-1.0	13.6-13.8
20	1.5-4.0		17.0-17.2	20	1.5-4.0		17.2-18.8
24			20.2-20.7	25			20.2-23.2
30	2.5-5.0	0.2-1.5	26.0-26.2	30	2.5-5.0	0.2-1.5	26.2-28.2

⚠ Thread Undercut Dimensions



Cantilever Shafts

Heavy Load

■ **Features:** This is the highly stable type with a tapped hole mounting on a large base.

Type	Material	Surface Treatment
FXMA	EN 1.1191	Black Oxide
PFXMA	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXMA	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when Y≥17: 15, 17 or more.

⚠ This type may have centering holes depending on dimensions.

Part Number Type	No.	Dg6	1mm Increment		Selection T	M Coarse	V	H	W	d		m	n	Unit Price		
			Y	F						Ref. Dim.	Tolerance			FXMA	PFXMA	SFXMA
FXMA PFXMA SFXMA	6	6	4~60	5~75	1 3 5	M3	8	14	12	5	+0.075	0.7	3			
	8	8				M4	10	17	14	7	+0.090	0.9		1.15		
	10	10				M6	13	21	18	9.6	0-0.090	1.35				
	12	12				M8	15	24	21	11.5	0				1.65	
	15	15					18	28	25	14.3	-0.110					
	17	17	20	32	28		16.2	0								
	20	20	24	36	32		19	-0.120								
	25	25	29	43	38		23.9	0								
	30	30	34	50	44	28.6	-0.120									

⚠ When the pilot hole depth is $\geq Y+F+5$, the pilot for M goes through. Also, when $Mx2 \geq Y+F+5$, M goes through.

Ordering Example

Part Number: FXMA20 - Y - F70 - T5

SFXMA12 - Y - F100 - T2

Type	Material	Surface Treatment
FXMB	EN 1.1191	Black Oxide
PFXMB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXMB	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when Y≥17: 15, 17 or more.

Part Number Type	No.	Dg6	1mm Increment		Selection T	MA (Coarse)	M Coarse	V	H	W	Unit Price			Tap Size	Effective Length	Pilot Hole Depth
			Y	F							FXMB	PFXMB	SFXMB			
FXMB PFXMB SFXMB	6	6	4~60	5~75	1 3 5	3	M3	8	14	12			M3	6	11	
	8	8				4	M4	10	17	14			M4	8	14	
	10	10				4 5 6	M6	13	21	18			M6	12	20	
	12	12				5 6 8	M8	15	24	21			M8	12	25	
	15	15				6 8 10		18	28	25			M10	20	29	
	17	17	20	32	28					M12	24	34				
	20	20	24	36	32					M16	32	44				
	25	25	29	43	38											
	30	30	34	50	44											

Please select Y, F and T so that M and MA don't interfere with each other.

Ordering Example

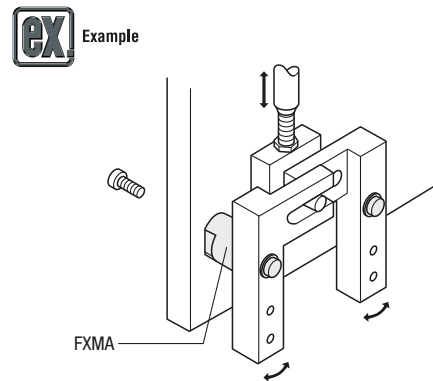
Part Number: FXMB20 - Y - F70 - T5 - MA6

SFXMB12 - Y - F100 - T2 - MA6

Alterations

Part Number: PFXMA15 - Y - F60 - T8 - SET - SC

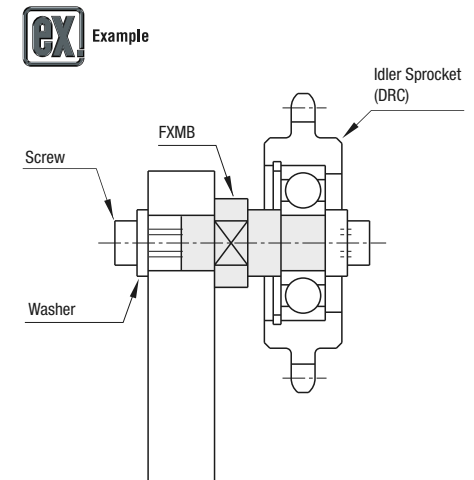
Alterations	Retaining Ring Set	Wrench Flats												
Code	SET	SC												
Spec.	Retaining Ring applicable to each shaft diameter is included. Ordering Code SET Retaining Ring Shape No.=6, 8: E Type Retaining Ring No.10 ~ 30: C Type Retaining Ring Retaining Ring Material	An alteration of wrench flats can be made for a slot hole guide. Ordering Code SC ⚠ For D (Wrench Flats), the tolerance is always positive. ⚠ Y-T≥6												
	<table border="1"> <thead> <tr> <th colspan="2">Cantilever Shafts</th> <th>Retaining Ring</th> </tr> <tr> <th>Material</th> <th>Surface Treatment</th> <th>Material</th> </tr> </thead> <tbody> <tr> <td>EN 1.1191 Equiv.</td> <td>Black Oxide</td> <td>Spring Steel</td> </tr> <tr> <td>EN 1.4301 Equiv.</td> <td>Electroless Nickel Plating</td> <td>EN 1.4301 (CSP) Equiv.</td> </tr> </tbody> </table>	Cantilever Shafts		Retaining Ring	Material	Surface Treatment	Material	EN 1.1191 Equiv.	Black Oxide	Spring Steel	EN 1.4301 Equiv.	Electroless Nickel Plating	EN 1.4301 (CSP) Equiv.	
Cantilever Shafts		Retaining Ring												
Material	Surface Treatment	Material												
EN 1.1191 Equiv.	Black Oxide	Spring Steel												
EN 1.4301 Equiv.	Electroless Nickel Plating	EN 1.4301 (CSP) Equiv.												



Alterations

Part Number: PFXMB15 - Y - F60 - T8 - MA10 - SC

Alterations	Wrench Flats
Code	SC
Spec.	An alteration of wrench flats can be made for a slot hole guide. Ordering Code SC ⚠ For D (Wrench Flats), the tolerance is always positive. ⚠ Y-T≥6



Cantilever Shafts

For Tension

For Idlers, see P1201~.

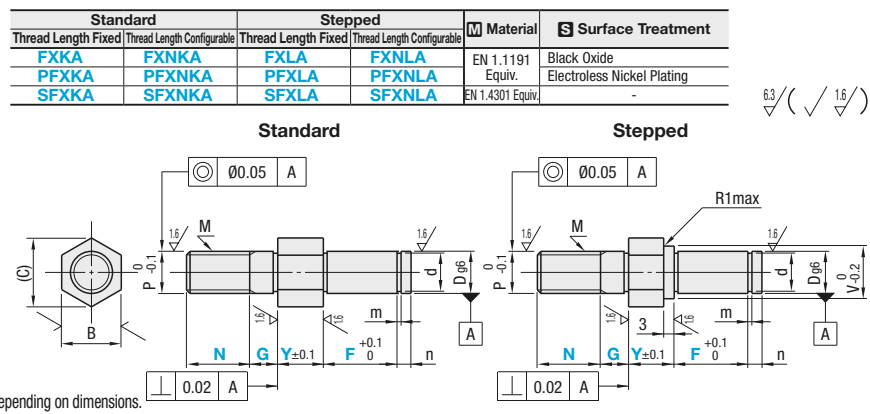
Retaining Ring



RoHS

D Tolerance (g6)	
6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20-30	-0.007 -0.020

This type may have centering holes depending on dimensions.



Part Number Type	No.	D	1mm Increment			N		P	M (Coarse)	V (Stepped only)	B	(C)	Ref. Dim.	d Tolerance	m	n
			Y	F	G	Thread Length Fixed	Thread Length Configurable									
Standard Fixed FXKA PFXKA SFXKA	6	6	5-60	5-100	5-10	9	6-12	6	M 6	8	10	11.5	5	0.7	2	
	8	8				12	8-16	8	M 8	10	12	13.9	7	0.9		
	10	10				15	10-20	10	M10	13	14	16.2	9.6	0.7		
	12	12				15	12-24	12	M12	15	17	19.6	11.5	1.15		
	13	13				16				12.4						
	15	15				18				14.3						
	16	16	19	21.9												
	17	17	20	27.5												
	18	18	21	27.7												
	Stepped Fixed FXLA PFXLA SFXLA	20	20	5-75	10-150	5-20	20	M20	24	27	31.2	19	0	-0.210	1.35	
		22	22				20	M20	26	29	30	34.6				23.9
		25	25				16	M16	29	30	34.6	23.9				
		25A	25A				20	M20	34	36	41.6	28.6				
		30	30				16	M16								
		30A	30A													

Ordering Example: Part Number - Y - F - G - N
 FXKA20A - 20 - F12 - G8
 PFXLA12 - 15 - F21 - G5 - N14

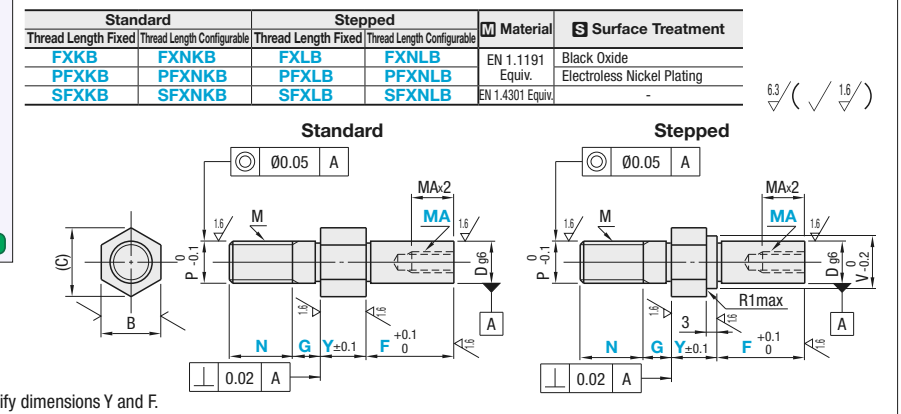
Screw Mount



RoHS

D Tolerance (g6)	
6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20-30	-0.007 -0.020

Please refer to Table 1 to specify dimensions Y and F.



Part Number Type	No.	D	1mm Increment			N		P	M (Coarse)	V (Stepped only)	B	(C)	Ref. Dim.	d Tolerance	m	n	Table 1	
			Y	F	G	Thread Length Fixed	Thread Length Configurable										MA (Coarse) Selection	MA
Standard Fixed FXKB PFXKB SFXKB	6	6	5-60	5-100	5-10	9	6-12	3	6	M 6	8	10	11.5	5	0.7	2	MA 3	Y+F ≥ 11.5
	8	8				12	8-16	4	8	M 8	10	12	13.9	7	0.9	MA 4	Y+F ≥ 14.0	
	10	10				15	10-20	4 5 6	10	M10	13	14	16.2	9.6	0.7	MA 5	Y+F ≥ 16.2	
	12	12				15	12-24	6 8 8	12	M12	15	17	19.6	11.5	1.15			
	13	13				16					12.4							
	15	15				18					14.3							
	16	16	19	21.9														
	17	17	20	27.5														
	18	18	21	27.7														
	Stepped Fixed FXLB PFXLB SFXLB	20	20	5-75	10-120	5-20	20	M20	24	27	31.2	19	0	-0.210	1.35	MA 6	Y+F ≥ 18.5	
		22	22				20	M20	26	29	30	34.6				23.9	MA 8	Y+F ≥ 23.5
		25	25				16	M16	29	30	34.6	23.9				MA 10	Y+F ≥ 28.5	
		25A	25A				20	M20	34	36	41.6	28.6				MA 12	Y+F ≥ 35.5	
		30	30				16	M16								MA 16	Y+F ≥ 45.0	
		30A	30A													MA 20	Y+F ≥ 55.0	

Ordering Example: Part Number - Y - F - G - N - MA
 FXKB20A - 20 - F12 - G8 - N14 - MA6
 FXKNB12 - 15 - F21 - G5 - N14 - MA6

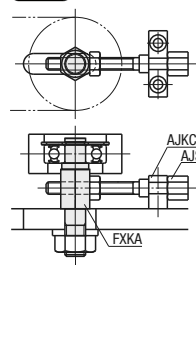
Retaining Ring

No.	Unit Price											
	Standard				Stepped							
	Thread Length Fixed		Thread Length Configurable		Thread Length Fixed		Thread Length Configurable		Thread Length Fixed		Thread Length Configurable	
	FXKA	PFXKA	SFXKA	FXNKA	PFXNKA	SFXNKA	FXLA	PFXLA	SFXLA	FXNLA	PFXNLA	SFXNLA
6												
8												
10												
12												
13												
15												
16												
17												
18												
20												
20A												
22												
22A												
25												
25A												
30												
30A												

Alterations Example: Part Number - Y - F - G - N - (YKC, SC, MTC, SET)
 FXNLA12 - 27 - F15 - G7 - N12 - MTC

EX Example

Alterations	Retaining Ring Set	Y Dimension Tolerance	Wrench Flats	Tapped Hole																														
		YKC	SC	MTC																														
Spec.	Retaining Ring applicable to each shaft diameter is included. Ordering Code SET Applicable to Retaining Ring Type. Retaining Ring Shape No.=6~8: E Type Retaining Ring No.=10~30A: C Type Retaining Ring Retaining Ring Material	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code YKC	An alteration of wrench flats can be made for a slot hole guide. Applicable to all types. Ordering Code SC	An alteration of a tapped hole made for shaft push/pull. Allows combined use of AJST (P.1463) or AJKC (P.1465). (Configurable dimension Y is limited. Refer to the table below.) Ordering Code MTC																														
		<table border="1"> <thead> <tr> <th>D</th> <th>X</th> <th>M</th> <th>Ymin.</th> </tr> <tr> <th></th> <th></th> <th>Standard</th> <th>Stepped</th> </tr> </thead> <tbody> <tr> <td>6</td> <td></td> <td>M 4</td> <td>15</td> </tr> <tr> <td>8</td> <td>10</td> <td>M 5</td> <td>18</td> </tr> <tr> <td>10</td> <td></td> <td>M 6</td> <td>16</td> </tr> <tr> <td>12-18</td> <td></td> <td>M 8</td> <td>18</td> </tr> <tr> <td>20-25A</td> <td></td> <td>M10</td> <td>25</td> </tr> <tr> <td>30, 30A</td> <td></td> <td>M12</td> <td>27</td> </tr> </tbody> </table>	D	X	M	Ymin.			Standard	Stepped	6		M 4	15	8	10	M 5	18	10		M 6	16	12-18		M 8	18	20-25A		M10	25	30, 30A		M12	27
D	X	M	Ymin.																															
		Standard	Stepped																															
6		M 4	15																															
8	10	M 5	18																															
10		M 6	16																															
12-18		M 8	18																															
20-25A		M10	25																															
30, 30A		M12	27																															

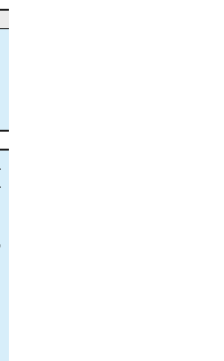


Screw Mount

No.	Unit Price											
	Standard				Stepped							
	Thread Length Fixed		Thread Length Configurable		Thread Length Fixed		Thread Length Configurable		Thread Length Fixed		Thread Length Configurable	
	FXKB	PFXKB	SFXKB	FXNKB	PFXNKB	SFXNKB	FXLB	PFXLB	SFXLB	FXNLB	PFXNLB	SFXNLB
6												
8												
10												
12												
13												
15												
16												
17												
18												
20												
20A												
22												
22A												
25												
25A												
30												
30A												

Alterations Example: Part Number - Y - F - G - N - MA - (YKC, SC, MTC, SET)
 FXLB12 - 27 - F15 - G7 - MA6 - MTC

Alterations	Retaining Ring Set	Y Dimension Tolerance	Wrench Flats	Tapped Hole																														
		YKC	SC	MTC																														
Spec.	Retaining Ring applicable to each shaft diameter is included. Ordering Code SET Applicable to Retaining Ring Type. Retaining Ring Shape No.=6~8: E Type Retaining Ring No.=10~30A: C Type Retaining Ring Retaining Ring Material	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code YKC	An alteration of wrench flats can be made for a slot hole guide. Applicable to all types. Ordering Code SC	An alteration of a tapped hole made for shaft push/pull. Allows combined use of AJST (P.1463) or AJKC (P.1465). (Configurable dimension Y is limited. Refer to the table below.) Ordering Code MTC																														
		<table border="1"> <thead> <tr> <th>D</th> <th>X</th> <th>M</th> <th>Ymin.</th> </tr> <tr> <th></th> <th></th> <th>Standard</th> <th>Stepped</th> </tr> </thead> <tbody> <tr> <td>6</td> <td></td> <td>M 4</td> <td>15</td> </tr> <tr> <td>8</td> <td>10</td> <td>M 5</td> <td>18</td> </tr> <tr> <td>10</td> <td></td> <td>M 6</td> <td>16</td> </tr> <tr> <td>12-18</td> <td></td> <td>M 8</td> <td>18</td> </tr> <tr> <td>20-25A</td> <td></td> <td>M10</td> <td>25</td> </tr> <tr> <td>30, 30A</td> <td></td> <td>M12</td> <td>27</td> </tr> </tbody> </table>	D	X	M	Ymin.			Standard	Stepped	6		M 4	15	8	10	M 5	18	10		M 6	16	12-18		M 8	18	20-25A		M10	25	30, 30A		M12	27
D	X	M	Ymin.																															
		Standard	Stepped																															
6		M 4	15																															
8	10	M 5	18																															
10		M 6	16																															
12-18		M 8	18																															
20-25A		M10	25																															
30, 30A		M12	27																															



Pivot Pins

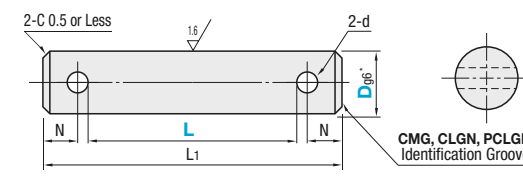
Cotter Pins



RoHS

Type	Material	Hardness	Surface Treatment	Accessory
CMG	EN 1.1191 Equiv.	-	Black Oxide	Cotter Pin 2 pcs.
CMGH	EN 1.1191 Equiv.	40~45HRC	Black Oxide	
-	EN 1.1191 Equiv.	-	Electroless Nickel Plating	M JIS-SWRM
-	EN 1.1191 Equiv.	40~45HRC	Electroless Nickel Plating	M EN 1.4301 Equiv.
-	EN 1.1191 Equiv.	Plating Hardness 750HV-	Hard Chrome Plating: Plating Thickness 3µm or more	M JIS-SWRM
SCMG	EN 1.4301 Equiv.	-	-	M EN 1.4301 Equiv.
-	EN 1.4125 Equiv.	45~50HRC	-	M EN 1.4301 Equiv.

D Tolerance (g6)	
3	-0.002 -0.008
4-6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20-25	-0.007 -0.020



* Dg6 Tolerance is available for L dimensions only. Others are general tolerance.
 There are identification grooves on the side of **CMG**, **CLGN** and **PCLGN** to be distinguished from Hardened Type.
 This type may have centering holes depending on dimensions.
 For L Dimension, Standard Machining Tolerances (Class: Medium) is used.

L Dimension Selectable

Part Number	Type	D	L Selection	L1	N	d	Included Cotter Pin		Unit Price		
							CMG, CMGH	SCMG	CMG	CMGH	SCMG
CMG <small>(The L dimensions marked with * are not available)</small>	3	10	12 14 15 16 18 20	L+4.8	2	0.8	NPN0.8-8	NSPN0.8-8			
	4	10	12 14 15 16 18 20	L+6	2.5	1	NPN1-10	NSPN1-10			
CMGH <small>(Hardened)</small>	5	10	12 14 15 16 18 20	L+7.2	3	1.2	NPN1.2-10	NSPN1.2-10			
	6	15	16 18 20 22 24 25 30	L+8.6	3.5	1.6	NPN1.6-10	NSPN1.6-10			
SCMG <small>(Stainless Steel)</small>	8	18	20 22 24 25 30 35 40 45 50	L+10	4	2	NPN2-12	NSPN2-12			
	10	18	20 22 24 25 30 35 40 45 50	L+12.5	5	2.5	NPN2.5-15	NSPN2.5-15			
	12	22	24 25 30 35 40 45 50	L+15.2	6	3.2	NPN3.2-20	NSPN3.2-20			

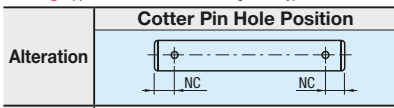
L Dimension Configurable Type (0.1mm Increment)

Part Number	Type	D	L=0.1mm Increment	L1	N	d	Included Cotter Pin		Unit Price															
							CLGN, CLGHN, GCLGN	PCLGN, PCLGHN, SCLGN, SCLGHN	CLGN	CLGHN	PCLGN	PCLGHN	GCLGN	SCLGN	SCLGHN									
CLGN CLGHN PCLGN PCLGHN GCLGN SCLGN SCLGHN	3	10	5.0~ 50.0	L+4.8	2	0.8	NPN0.8-8	NSPN0.8-8																
	4	10	5.0~ 50.0	L+6	2.5	1	NPN1-10	NSPN1-10																
	5	10	10.0~ 70.0	L+7.2	3	1.2	NPN1.2-10	NSPN1.2-10																
	6	15	10.0~ 100.0	L+8.6	3.5	1.6	NPN1.6-10	NSPN1.6-10																
	8	18	10.0~ 100.0	L+10	4	2	NPN2-12	NSPN2-12																
	10	18	15.0~ 110.0	L+12.5	5	2.5	NPN2.5-15	NSPN2.5-15																
	12	22	15.0~ 200.0	L+15.2	6	3.2	NPN3.2-20	NSPN3.2-20																
	13	25	25.0~ 200.0	L+18	7	4		NPN4-20	NSPN4-20															
	14	25																						
	15	25																						
	16	25	30.0~ 200.0	L+22	8.5	5		NPN5-35	NSPN5-35															
	17	25																						
18	25																							
20	25																							

* SCLGHN may be discolored by hardening.

Ordering Example: Part Number - L
 CMG8 - 30
 CLGN15 - 120.3

Alterations: Part Number - L - (NC)
 CLGN15 - 120.3 - NC3
 * Applicable to L Dimension Configurable Type.



Code: NC

Spec.	Ordering Code NC3	
	D	NC (Selection Range)
3	1.5	2
4	1.5	2
5	1.5	2, 2.5
6, 8	2	2.5, 3
10	2.5	3, 4
12		3, 4, 5
13-18		3, 4, 5, 6
20-25		4, 5, 6, 7

* L1=L+NCx2+d

Pivot Pins

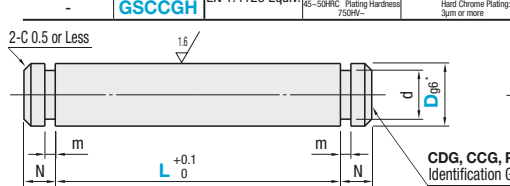
Straight Retaining Ring



RoHS

Type	Material	Hardness	Surface Treatment	Accessory
CDG	EN 1.1191 Equiv.	-	Black Oxide	Retaining Ring 2 pcs.
CDGH	EN 1.1191 Equiv.	40~45HRC	Black Oxide	
-	EN 1.1191 Equiv.	-	Electroless Nickel Plating	M Spring Steel
-	EN 1.1191 Equiv.	40~45HRC	Electroless Nickel Plating	M EN 1.4301 Equiv.
-	EN 1.1191 Equiv.	Plating Hardness 750HV-	Hard Chrome Plating: Plating Thickness 3µm or more	M Spring Steel
SCDG	EN 1.4301 Equiv.	-	-	M EN 1.4301 Equiv.
-	EN 1.4125 Equiv.	45~50HRC	-	M EN 1.4301 Equiv.

D Tolerance (g6)	
2, 3	-0.002 -0.008
4-6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20-25	-0.007 -0.020



* Dg6 Tolerance is available for L dimensions only. Others are general tolerance.
 There are identification grooves on the side of **CDG**, **CCG** and **PCCG** to be distinguished from Hardened Type.
 This type may have centering holes depending on dimensions.

L Dimension Selectable

Part Number	Type	D	L Selection	m	N	d	Included Retaining Ring	Unit Price		
								Shape	JIS Nominal	CDG
CDG	3	10	10 12 14 15 16 18 20 22 24 25 30	0.5	2	2	No. 2			
	4	10	10 12 14 15 16 18 20 22 24 25 30	0.7	2	3	No. 3			
CDGH <small>(Hardened)</small>	5	15	16 18 20 22 24 25 30 35 40 45 50	0.9	3	4	No. 4			
	6	15	16 18 20 22 24 25 30 35 40 45 50	1.15	3	5	No. 5			
SCDG <small>(Stainless Steel)</small>	8	18	20 22 24 25 30 35 40 45 50	1.15	4	7	No. 7			
	10	18	20 22 24 25 30 35 40 45 50	1.15	4	9.6	No. 10			
	12	22	24 25 30 35 40 45 50	1.15	4	11.5	No. 12			

* For details, see P2303.

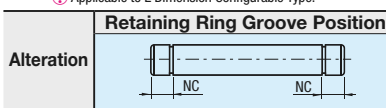
L Dimension Configurable Type (0.1mm Increment)

Part Number	Type	D	L=0.1mm Increment	m	N	d	Included Retaining Ring	Unit Price														
								Shape	JIS Nominal	CCG	CCGH	PCCG	PCCGH	GCCG	SCCG	SCCGH	GSCCGH					
CCG CCGH PCCG PCCGH GCCG SCCG SCCGH GSCCGH	2	10	5.0~ 30.0	0.5	2	1.5	No. 1.5															
	3	10	5.0~ 30.0	0.5	2	2	No. 2															
	4	10	10.0~ 60.0	0.7	2	3	No. 3															
	5	15	10.0~ 60.0	0.7	2	4	No. 4															
	6	15	10.0~ 60.0	0.9	2	5	No. 5															
	8	18	10.0~ 100.0	0.9	3	7	No. 7															
	10	18	15.0~ 100.0	1.15	3	9.6	No. 10															
	12	22	15.0~ 200.0	1.15	3	11.5	No. 12															
	13	25	25.0~ 200.0	1.15	4	12.4	No. 13	C Type														
	14	25																				
	15	25																				
	16	25	30.0~ 200.0	1.35	4	13.4	No. 14	C Type														
17	25																					
18	25																					
20	25																					
22	25																					
25	25																					

* For details, see P2303. * SCCGH and GSCCGH may be discolored by hardening.

Ordering Example: Part Number - L
 CDG8 - 30
 CCG15 - 120.3

Alterations: Part Number - L - (NC)
 CCG15 - 120.3 - NC3
 * Applicable to L Dimension Configurable Type.



Code: NC


Spec.	Ordering Code NC3	
	D	NC (Selection Range)
2-4	1.5	3
5	1.7	3
6	1.9	4
8	2.4	5
10-18	2.7	5
20-25	2.9	5

* Overall Length is L+NCx2.

Pivot Pins

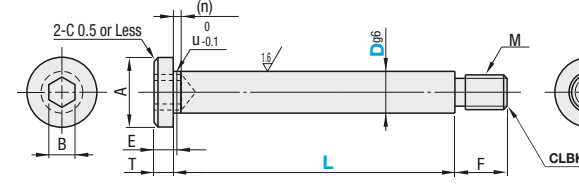
Lock Nut with Extra Low Hex Socket Head

■ Features: Thinner shoulder design ensures use in limited spaces.



Type	M Material	H Hardness	S Surface Treatment	A Accessory
CLBK	EN 1.1191 Equiv.	-	Black Oxide	Nut 1 pc.
CLBKH	EN 1.1191 Equiv.	40~45HRC	Black Oxide	
SCLBK	EN 1.4301 Equiv.	-	-	M EN 1.4301 Equiv.
SCLBKH	EN 1.4125 Equiv.	45~50HRC	-	

There are identification grooves on the side of **CLBK** to be distinguished from Hardened Type.
 Relief dimension under the shoulder is for reference.



For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 This type may have centering holes depending on dimensions.

D Tolerance (g6)	Value
4-6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20-25	-0.007 -0.020

Part Number Type	D	L=0.1mm Increment	A	T	F	B	E	u	(n)	M (Coarse)	Unit Price					
											CLBK	CLBKH	SCLBK	SCLBKH		
CLBK CLBKH SCLBK SCLBKH	4	10.0~50.0	7	1.5	6	2	2	3.9	1.5	M3						
	5	10.0~60.0	9													
	6	10.0~100.0	10													
	8	10.0~100.0	13	2.5	9	3	2	4.9	1.5	M4						
	10	15.0~100.0	16													
	12	15.0~200.0	18													
	13	25.0~200.0	24	18	16	4	3	11.8	1.5	M6						
	14															
	15															
	16	30.0~200.0	27	24	18	5	3	12.8	1.5	M8						
	20															
	25															

⚠ SCLBKH may be discolored by hardening.


Ordering Example: Part Number - L
 CLBK15 - 120.3

Alterations: Part Number - L - (FC...etc.)
 CLBK10 - 50.5 - FC8

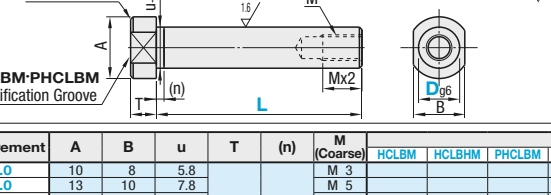
Alterations	Thread Part Length	Thread Diameter	L Dimension Tolerance	Shoulder Diameter Cut
Code	FC	MC	LKC	HC
Spec.	Ordering Code FC4 FC=1mm Increment M(MC)≤FC≤M(MC)×3	Ordering Code MC3 D MC (Selection Range) 5 3 6 3 4 8 3 4 5 10 4 5 6 12 5 6 8 13-16 6 8 10 20 8 10 12 25 10 12 When ordering MC5 for D12, also specify Alteration FC. Not applicable to D4.	Ordering Code LKC Changes L dimension tolerance to ±0.05.	Ordering Code HC D=4~10 HC=A/2-1 D=12~25 HC=A/2-2

Pivot Pins

Tapped with Shoulder / Tapped, Hex Socket Head with Shoulder




Type	M Material	H Hardness	S Surface Treatment	D Tolerance (g6)
HCLBM	EN 1.1191 Equiv.	-	Black Oxide	6 -0.004 -0.012
HCLBHM		40~45HRC	Black Oxide	8, 10 -0.005 -0.014
PHCLBM		-	Electroless Nickel Plating	12~18 -0.006 -0.017
PHCLBHM		40~45HRC	Electroless Nickel Plating	20~25 -0.007 -0.020
GHCLBM	EN 1.4301 Equiv.	-	Hard Chrome Plating: Plating Thickness 3µm or more	-
SHCLBM		45~50HRC	Hard Chrome Plating: Plating Thickness 3µm or more	
SHCLBHM	EN 1.4125 Equiv.	-	Hard Chrome Plating: Plating Thickness 3µm or more	-
GSHCLBHM		45~50HRC	Hard Chrome Plating: Plating Thickness 3µm or more	



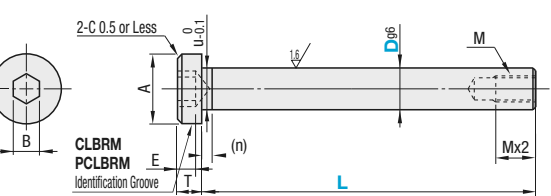
For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 There are identification grooves on the side of **HCLBM** and **PHCLBM** to be distinguished from Hardened Type.
 Relief dimension under the shoulder is for reference.

Part Number Type	D	L=0.1mm Increment	A	B	u	T	(n)	M (Coarse)	Unit Price				
									HCLBM	HCLBHM	PHCLBM	PHCLBHM	
HCLBM HCLBHM PHCLBM PHCLBHM GHCLBM SHCLBM SHCLBHM GSHCLBHM	6	15.0~100.0	10	8	5.8	5	1.5	M3					
	8	15.0~100.0	13	10	7.8								
	10	20.0~100.0	16	13	9.8								
	12	20.0~200.0	18	14	11.8	24	21	M5					
	13	25.0~200.0	24	18	12.8								
	14												
	15												
	16	30.0~200.0	27	24	14.8	15.8	16.8	M6					
	17												
	18												
	20	35.0~200.0	30	27	17.8	19.8	21.8	M8					
	22												
	25												

⚠ SHCLBHM and GSHCLBHM may be discolored by hardening.



Type	M Material	H Hardness	S Surface Treatment	D Tolerance (g6)
CLBRM	EN 1.1191 Equiv.	-	Black Oxide	6 -0.004 -0.012
CLBRHM		40~45HRC	Black Oxide	8, 10 -0.005 -0.014
PCLBRM		-	Electroless Nickel	12~18 -0.006 -0.017
PCLBRHM		40~45HRC	Electroless Nickel	20~25 -0.007 -0.020
GCLBRM	EN 1.4301 Equiv.	-	Hard Chrome Plating: Plating Thickness 3µm or more	-
SCLBRM		45~50HRC	Hard Chrome Plating: Plating Thickness 3µm or more	
SCLBRHM	EN 1.4125 Equiv.	-	Hard Chrome Plating: Plating Thickness 3µm or more	-
SCLBRHM		45~50HRC	Hard Chrome Plating: Plating Thickness 3µm or more	



For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 There are identification grooves on the side of **CLBRM** and **PCLBRM** to be distinguished from Hardened Type.
 Relief dimension under the shoulder is for reference.

Part Number Type	D	L=0.1mm Increment	A	T	B	E	u	(n)	M (Coarse)	Unit Price				
										CLBRM	CLBRHM	PCLBRM	PCLBRHM	
CLBRM CLBRHM PCLBRM PCLBRHM GCLBRM SCLBRM SCLBRHM	6	15.0~100.0	10	5	3	2	5.8	1.5	M3					
	8	20.0~100.0	13											
	10	25.0~100.0	16											
	12	25.0~200.0	18	24	6	4	11.8	1.5	M5					
	13	30.0~200.0	24							18	12.8			
	14													
	15													
	16	35.0~200.0	27	24	14.8	15.8	16.8	M6						
	17													
	18													
	20	40.0~200.0	30	27	17.8	19.8	21.8	M8						
	22													
	25													

⚠ SCLBRHM may be discolored by hardening.

Ordering Example: Part Number - L
 HCLBHM8 - 35.8
 SCLBRHM10 - 50.5

Alterations: Part Number - L - (MC, TC, LKC, HC)
 HCLBHM10 - 50.5 - TC3

Alterations	Thread Diameter	Shoulder Thickness	L Dimension Tolerance	Shoulder Diameter Cut
Code	MC	TC	LKC	HC
Spec.	Ordering Code MC3 D MC (Selection Range) 6 2.6 8 3.4 10, 12 4.5 13-15 5.6 16-18 6.8 20, 22 8.10 25 10.12 FC=0.5mm Increment 2≤TC≤4.5 Not available for Tapped, Hex Socket Head with Shoulder Type.	Ordering Code TC3 Changes L dimension tolerance to ±0.05.	Ordering Code LKC Changes L dimension tolerance to ±0.05.	Ordering Code HC D=6~8 HC=A/2-1 D=10~25 HC=A/2-2

Pivot Pins

Both Ends Tapped, Both Ends Threaded

Pivot Pins / Keys for Precision Pivot Pins

Keyway



Both Ends Tapped

Type	Material	Hardness	Surface Treatment
CLBM	EN 1.1191 Equiv.	40~45HRC	Black Oxide
CLBHM			
PCLBM			
PCLBHM	EN 1.4301 Equiv.	40~45HRC	Electroless Nickel Plating
SCLBM			
SCLBHM			

There are identification grooves on the side of CLBM and PCLBM to be distinguished from Hardened Type.
For L Dimension, Standard Machining Tolerances (Class: Medium) is used.

D	Tolerance (g6)
6	-0.004
8, 10	-0.005
12~18	-0.006
20~25	-0.007

RoHS

Part Number Type	D	L 0.1mm Increment	M (Coarse)	N (Coarse)	Unit Price					
					CLBM	CLBHM	PCLBM	PCLBHM	SCLBM	SCLBHM
CLBM CLBHM PCLBM PCLBHM SCLBM SCLBHM	6	20.0~100.0	M 3	M 3						
	8	20.0~100.0	M 5	M 5						
	10		M 6	M 6						
	12									
	13	35.0~200.0								
	14		M 8	M 8						
	15									
	16	40.0~200.0	M10	M10						
	17									
	18		M12	M12						
	20	50.0~200.0								
	22		M16	M16						
25										

SCLBHM may be discolored by hardening. For full length L, Mx2+Nx2<L is required.

Both Ends Threaded

Type	Material	Hardness	Surface Treatment	Accessory	D Tolerance (g6)
CLBN	EN 1.1191 Equiv.	40~45HRC	Black Oxide	Nut 2 pcs.	MIS-SWRCH
CLBHN					
SCLBN	EN 1.4301 Equiv.	40~45HRC	-	-	-
SCLBN					

For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
There are identification grooves on the side of CLBN to be distinguished from Hardened Type.

D	Tolerance (g6)
6	-0.004
8, 10	-0.005
12~18	-0.006
20~25	-0.007

RoHS

Part Number Type	D	L 0.1mm Increment	F, T	M (Coarse)	Unit Price					
					CLBN	CLBHN	SCLBN	SCLBHN		
CLBN CLBHN SCLBN SCLBHN	6	15.0~100.0	9	M 5						
	8	20.0~100.0		M 6						
	10	25.0~100.0		M 8						
	12	25.0~200.0	16	M10						
	13									
	14									
	15	30.0~200.0	18	M12						
	16									
	17									
	18	35.0~200.0	24	M16						
	20									
	22									
25			M20							

Ordering Example: Part Number - L
CLBM15 - 120.3

Alterations: Part Number - L - (MC, NC, NMC, NNC)
CLBM10 - 50 - MCS

Alterations	Thread Diameter	Thread Diameter																																								
Code	MC, NC	NMC, NNC																																								
Spec.	<table border="1"> <thead> <tr><th>Ordering Code</th><th>MC3</th></tr> </thead> <tbody> <tr><td>D</td><td>MC, NC (Selection Range)</td></tr> <tr><td>8</td><td>3 4</td></tr> <tr><td>10</td><td>4 5</td></tr> <tr><td>12</td><td>4 5</td></tr> <tr><td>13, 14</td><td>5 6</td></tr> <tr><td>15</td><td>5 6 8</td></tr> <tr><td>16~18</td><td>6 8</td></tr> <tr><td>20, 22</td><td>8 10</td></tr> <tr><td>25</td><td>10 12</td></tr> </tbody> </table>	Ordering Code	MC3	D	MC, NC (Selection Range)	8	3 4	10	4 5	12	4 5	13, 14	5 6	15	5 6 8	16~18	6 8	20, 22	8 10	25	10 12	<table border="1"> <thead> <tr><th>Ordering Code</th><th>NMC8</th></tr> </thead> <tbody> <tr><td>D</td><td>NMC, NNC (Selection Range)</td></tr> <tr><td>6</td><td>3 4</td></tr> <tr><td>8</td><td>3 4 5</td></tr> <tr><td>10</td><td>4 5 6</td></tr> <tr><td>12, 13</td><td>4 5 6 8</td></tr> <tr><td>14</td><td>4 5 6 8 10</td></tr> <tr><td>15~17</td><td>5 6 8 10</td></tr> <tr><td>18, 20</td><td>6 8 10 12</td></tr> <tr><td>22, 25</td><td>8 10 12 16</td></tr> </tbody> </table>	Ordering Code	NMC8	D	NMC, NNC (Selection Range)	6	3 4	8	3 4 5	10	4 5 6	12, 13	4 5 6 8	14	4 5 6 8 10	15~17	5 6 8 10	18, 20	6 8 10 12	22, 25	8 10 12 16
	Ordering Code	MC3																																								
D	MC, NC (Selection Range)																																									
8	3 4																																									
10	4 5																																									
12	4 5																																									
13, 14	5 6																																									
15	5 6 8																																									
16~18	6 8																																									
20, 22	8 10																																									
25	10 12																																									
Ordering Code	NMC8																																									
D	NMC, NNC (Selection Range)																																									
6	3 4																																									
8	3 4 5																																									
10	4 5 6																																									
12, 13	4 5 6 8																																									
14	4 5 6 8 10																																									
15~17	5 6 8 10																																									
18, 20	6 8 10 12																																									
22, 25	8 10 12 16																																									
	<p>Not applicable to D6. L: Mx2+Nx2</p> <p>Not applicable to Both Ends Threaded Type.</p>	<p>Not applicable to Both Ends Tapped Type.</p>																																								

Keyway

Type	Material	Hardness	Surface Treatment
CLKK	EN 1.1191 Equiv.	40~45HRC	Black Oxide
CLKKH			
CLKG			
PCLKG	EN 1.4301 Equiv.	40~45HRC	Electroless Nickel Plating
PCLKGH			
PCLKG			
GCLKG	EN 1.4301 Equiv.	45~50HRC	Hard Chrome Plating Plating Thickness: 3um or more
SCLKG			
SCLKGH	EN 1.4125 Equiv.	45~50HRC	-

There are identification grooves on the key groove side of CLKK, CLKG and PCLKG to be distinguished from Hardened Type.
This type may have centering holes depending on dimensions.
For L Dimension, Standard Machining Tolerances (Class: Medium) is used.

D	Tolerance (g6)
3	-0.002
4~6	-0.008
8, 10	-0.005
12~18	-0.006
20~25	-0.007

RoHS

L Dimension Selectable

Part Number Type	D	L Selection			l	M	N	Unit Price		
		CLKK	CLKKH	SCLKK				CLKK	CLKKH	SCLKK
CLKK CLKKH (Hardened)	3	10 14 18 20	12 20	10 15 20	8	2.5	1			
	4	10	10 18 20	10 12 14 15 20						
	5	20	10 12 20	10 20						
	6	15 16 20 30	24 25 30	25 30						
	8	18 30 35 40 45 50	24 25 30 35 40 45 50	20 22 35 40 45 50						
	10	30 35 40 45 50	20 24 30 35 40 45 50	25 30 35 40 45 50						
12	24 30 35 40 45 50	30 35 40 45 50	30 35 40 45 50							

L Dimension Configurable

Part Number Type	D	L=0.1mm Increment	l	M	N	Unit Price					
						CLKG	CLKGHH	PCLKG	PCLKGH	GCLKG	SCLKG
CLKG CLKGHH PCLKG PCLKGH GCLKG SCLKG SCLKGH	3	10.0~ 50.0	8	2.5	1						
	4										
	5										
	6										
	8										
	10										
	12										
	13										
	14										
	15										
	16										
	17										
18	30.0~200.0			3.7	3						
20											
22											
25											

SCLKGH may be discolored by hardening. Part Number CLKGH has been changed to CLKGHH.

Ordering Example: Part Number - L
CLKK8 - 30
CLKG15 - 120.3

Keys for Precision Pivot Pins

1-Hole Type
HPK, SHPK (Stainless Steel)

2-Hole Type
WHPK, WSHPK (Stainless Steel)

HPK, WHPK
Material: EN 1.0330 Equiv.
Surface Treatment: Black Oxide

SHPK, WSHPK
Material: EN 1.4301 (CP) Equiv.

RoHS

Part Number Type	T	Unit Price
HPK	2	30~200
SHPK	2	
WHPK	3	

Ordering Example: Part Number - HPK2

Part Number Type	No.	A	B	C	D	E	T	WHPK		WSHPK	
								Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate
WHPK WSHPK (Stainless Steel)	4	10	18	10	4.5	6	2.0				
	5	14	24	15	5.5	8					
	6	16	30	18	6.5	10					
	7	20	40	25	7	12					
8											

For orders larger than indicated quantity, please check with WOS.

For orders larger than indicated quantity, please check with WOS.

Pivot Pins

Set Screw Flat, Shouldered with Set Screw Flat

Set Screw Flat Type

Type	Material	Hardness	Surface Treatment
CLSG	EN 1.1191 Equiv.	-	Black Oxide
CLSGH		40~45HRC	
PCLSG		-	Electroless Nickel Plating
PCLSGH	EN 1.4301 Equiv.	40~45HRC	
SCLSG		-	
SCLSGH	EN 1.4125 Equiv.	45~50HRC	

There are identification grooves on the side of **CLSG** and **PCLSG** to be distinguished from Hardened Type.
 For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 This type may have centering holes depending on dimensions.

D	Tolerance (g6)
3	-0.002 -0.008
4~6	-0.004 -0.012
8, 10	-0.005 -0.014
12~18	-0.006 -0.017
20~25	-0.007 -0.020

RoHS

Part Number Type	D	L=0.1mm Increment	1mm Increment		N	Unit Price					
			F	E		CLSG	CLSGH	PCLSG	PCLSGH	SCLSG	SCLSGH
CLSG CLSGH PCLSG PCLSGH SCLSG SCLSGH	3	5.0~50.0	F=0 or 2≤F≤L/2	E	0.5						
	4	10.0~60.0									
	5	10.0~100.0									
	6	15.0~100.0									
	8	15.0~200.0									
	10	25.0~200.0									
	12	30.0~200.0									
	13										
	14										
	15										
	16										
	17										
	18										
	20										
	22										
	25										

Example

Shouldered with Set Screw Flat

Type	D Tolerance	Material	Hardness	Surface Treatment	D Tolerance (g6)
HCLSG	g6	EN 1.1191 Equiv.	-	Black Oxide	3 -0.002 -0.008
HCLSGH			40~45HRC		4~6 -0.004 -0.012
PHCLSG			-	Electroless Nickel	8, 10 -0.005 -0.014
PHCLSGH	EN 1.4301 Equiv.	40~45HRC	-	Plating	12~18 -0.006 -0.017
SHCLSG			-		20~25 -0.007 -0.020
SHCLSGH	EN 1.4125 Equiv.	45~50HRC	-		

For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 This type may have centering holes depending on dimensions.
 There are identification grooves on the side of **HCLSG** and **PHCLSG** to be distinguished from Hardened Type.
 Relief dimension under the shoulder is for reference.

RoHS

Part Number Type	D	L=0.1mm Increment	0.1mm Increment		A	u	T	(n)	(N)	Unit Price					
			E	F						HCLSG	HCLSGH	PHCLSG	PHCLSGH	SHCLSG	SHCLSGH
HCLSG HCLSGH PHCLSG PHCLSGH SHCLSG SHCLSGH	3	5.0~50.0	1≤E≤50	F	5.5	2.9	1.5	1.0	0.5						
	4	10.0~60.0			6.5	3.9									
	5	10.0~100.0			8	4.9									
	6	15.0~100.0			9	5.8									
	8	15.0~200.0			12	7.8									
	10	20.0~200.0			14	9.8									
	12	20.0~200.0			17	11.8									
	13				18	12.8									
	14				19	13.8									
	15				20	14.8									
	16				21	15.8									
	17				22	16.8									
	18				23	17.8									
	20				26	19.8									
	22				27	21.8									
	25				30	24.8									

SHCLSGH may be discolored by hardening.

Ordering Example: **CLSGH15 - 100.0 - F20 - E10**

For Set Screw Flat Type and Shouldered with Set Screw Flat Type, specifying order of E and F is reversed.

Alterations	Tapping		Shoulder Thickness	L Dimension Tolerance
	M	F		
Code	MMC	TC	TC	LKC
Spec.	Ordering Code MMC		Ordering Code TC3	Ordering Code LKC
	D	M (Coarse)	z	
	6	M3	6	
	8~14	M4	8	
	15~22	M6	12	
	25	M8	16	

Not applicable to Shouldered with Set Screw Type.
 Not applicable to D3 ~ 5.
 (D-M)/2 When (D-M)/2-N≤1, F>Mx2. L>Mx3

TC=0.5mm Increment
 T<TC≤5
 L1=L+N+d/2+TC
 Not applicable to Set Screw Flat Type.
 Changes L dimension tolerance to ±0.05.
 Not applicable to Set Screw Flat Type.

Alterations Part Number - L - E,F - E,F - (MMC, TC, LKC)
 CLSGH15 - 100.0 - F20 - E10 - MMC

Pivot Pins

D-Cut

Features: Two flats will effectively stop pins from rotating.

Type	Material	Hardness	Surface Treatment
CLSW	EN 1.1191 Equiv.	-	Black Oxide
CLSWH		40~45HRC	
SCLSW	EN 1.4301 Equiv.	-	

There are identification grooves on the side of **CLSW** to be distinguished from Hardened Type.
 For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
 This type may have centering holes depending on dimensions.

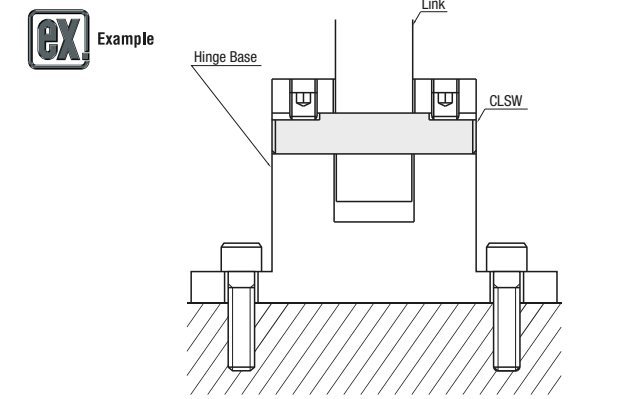
D	Tolerance (g6)
4~6	-0.004 -0.012
8, 10	-0.005 -0.014
12~16	-0.006 -0.017
20, 25	-0.007 -0.020

RoHS

Part Number Type	D	L=0.1mm Increment	1mm Increment		N	Unit Price		
			F	T		CLSW	CLSWH	SCLSW
CLSW CLSWH SCLSW	4	10.0~50.0	2≤F≤20	2≤T≤20	0.5			
	5	10.0~60.0						
	6	10.0~100.0						
	8	10.0~100.0	2≤F≤30	2≤T≤30	1			
	10	15.0~100.0						
	12	15.0~200.0						
	13	25.0~200.0	5≤F≤30	5≤T≤30	2			
	14	25.0~200.0						
	15	30.0~200.0						
	16							
	20							
	25							

F+T≤L

Ordering Example: **CLSWH15 - 120.5 - F30 - T30**



Pivot Pins

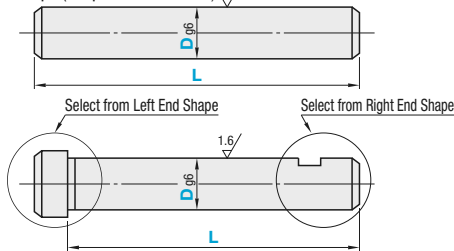
End Shape Combination Selectable



RoHS

Type	Material	Surface Treatment	Hardness
FCL	EN 1.1191 Equiv.	Black Oxide	40-45HRC
FCLH		Electroless Nickel Plating	40-45HRC
PFCLH		Hard Chrome Plating: Plating Thickness 3µm or more	Plating Hardness 750HV
GFCL	EN 1.4301 Equiv.	-	-
FCLS		-	-
FCLSH	EN 1.4125 Equiv.	Hard Chrome Plating: Plating Thickness 3µm or more	45-50HRC
GFCLSH		Hard Chrome Plating: Plating Thickness 3µm or more	45-50HRC Plating Hardness 750HV

Basic Shape (Shape A at Both Ends)



- For L Dimension, Standard Machining Tolerances (Class: Medium) is used.
- When machining is needed at one end only, select Shape A for the other end.
- There are identification grooves on the side of FCL and PFCL to be distinguished from Hardened Type.
- FCLSH and GFCLSH (EN 1.4125 Equiv. equivalent) may be discolored by hardening.
- When selecting shapes B and G or BG and GB for both ends, hole and flat positions are as shown in the catalog. The angle tolerance is $\pm 5^\circ$.
- This type may have centering holes depending on shapes and dimensions.
- When $L \leq$ the depth of tap's pilot hole, the pilot hole might go through.
- Shape D: Relief dimension under the shoulder is for reference.
- Selecting Shape D (FCLDD) for both ends is not available.
- When Shape F is selected, $11 \leq L$.

Shape C: e, m Dimensions for Selection

D	Ref. Dim.	Tolerance	m	e
3	2	+0.06	0.5	
4	3	0		
5	4	+0.075	0.7	
6	5	0		
7	6	0		
8	7	+0.09	0.9	
9	8	0		
10	9.6	-0.09		
11	10.5			
12	11.5			
13	12.4			
14	13.4			
15	14.3	0		
16	15.2	-0.11		
17	16.2			
18	17			
19	18			
20	19	0		
		-0.21		

Shape D: u (n) Dimensions for Selection

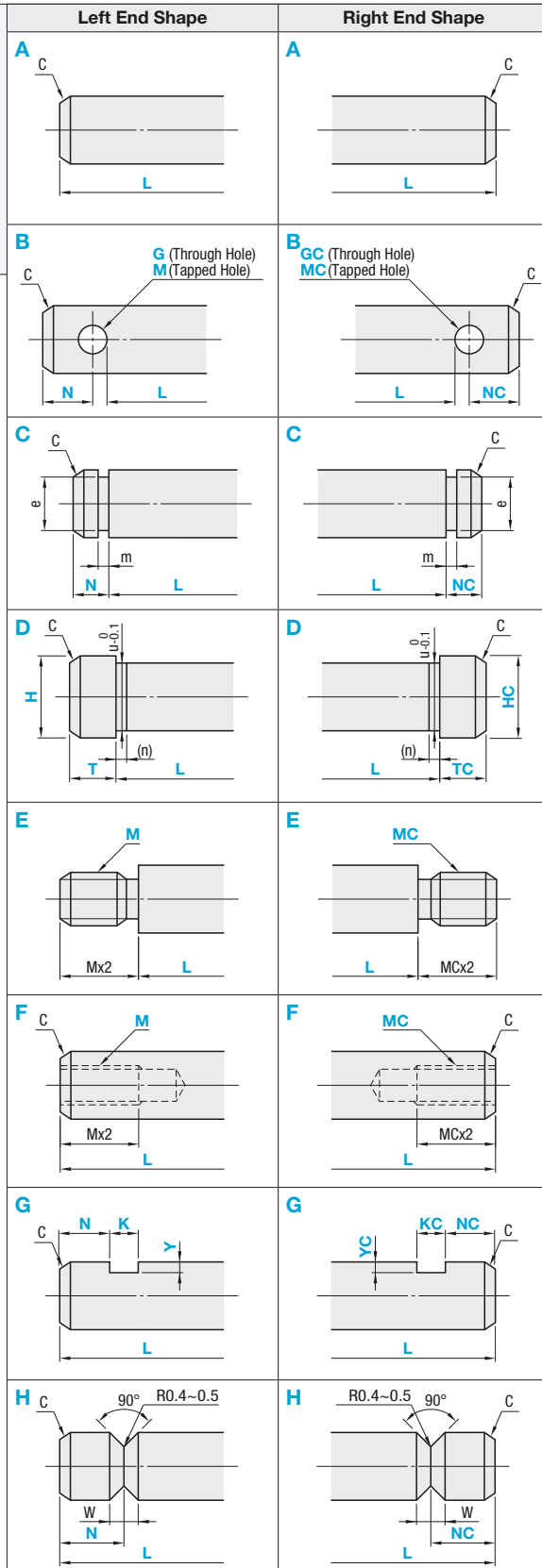
D	u	n
3	2.9	
4	3.9	
5	4.9	
6	5.8	
7	6.8	
8	7.8	
9	8.8	
10	9.8	
11	10.8	
12	11.8	
13	12.8	
14	13.8	
15	14.8	
16	15.8	
17	16.8	
18	17.8	
19	18.8	
20	19.8	

Shape E: Details of Thread Relief Machining

M (Coarse)	MxPitch	g	r	f
3	M3x0.5			
4	M4x0.7	1.2	0.3	0.9
5	M5x0.8			
6	M6x1.0			
8	M8x1.25	2.5	0.6	1.7
10	M10x1.5			
12	M12x1.75			
16	M16x2.0	3	1.0	2.2

Shape H: W Dimension for Selection

D	W
6	
7	
8	1.5
9	
10	
11	
12	2
13	
14	
15	
16	
17	
18	
19	3
20	



Part Number	1mm Increment			0.1mm Increment				0.5mm Increment	Selection	C			
	Type	Left End Shape	Right End Shape	D	L	T (TC)	N (NC)	G (GC)	K (KC)		Y (YC)	H (HC)	M (MC) (Coarse)
FCL	A	A		3-20			$2 \leq N(NC) \leq L/4$ (Shaft End Shape C)					3	0.5 or Less
FCLH	B	B		$4 \leq D$ (Shaft End Shape E)	$5-200$ ($L \leq D \times 20$)	$0.5 \leq T(TC) \leq L/4$	$G(GC) - M(MC)/2 + 1 \leq N(NC) \leq L/4$ (Shaft End Shape B)					4	
PFCL	C	C		$6 \leq D$ (Shaft End Shape B, F, H)			$N(NC) = 0$ or $2 \leq N(NC) \leq L/4$ (Shaft End Shape G)	$D/5 \leq G(GC) \leq D/2$	$2 \leq K(KC) \leq 30$	$Y(YC) \leq D/2$	$D + 1 \leq H(HC) \leq D + 10$	5	
PFCLH	D	D					$2 \leq N(NC) \leq L/4$ (Shaft End Shape H)					6	
GFCL	E	E										8	
FCLS	F	F										10	
FCLSH	G	G										12	
GFCLSH	H	H										16	

Ordering Example: Part Number **D - L - T - N - G - K - Y - H - M - TC - NC - GC - KC - YC - HC - MC**

Example: **FCL D G - D10 - L100 - T2 - H14 - NC10 - KC6.5 - YC1.5**

Type	D	Material Unit Price				Unit Price of Shaft End Machining								
		L5.0-50.0	L50.1-100.0	L100.1-150.0	L150.1-200.0	B	C	D	E	F	G	H		
FCL	3-5													
FCLH	6-10													
PFCL	11-15													
PFCLH	16-20													
GFCL	3-5													
FCLS	6-10													
FCLSH	11-15													
GFCLSH	16-20													

Alterations: Part Number **D - L - T - N - G - K - Y - H - M - TC - NC - GC - KC - YC - HC - MC**

Example: **FCL D G - D10 - L100 - T2 - H14 - NC10 - KC6.5 - YC1.5 - LFC13 - DKC**

Alterations	Shape D: T(TC) Dimension, Wrench Flats		Shape E: M(MC) Length Change		O.D. Tolerance
	Left End Shape	Right End Shape	Left End Shape	Right End Shape	
	LFC	RFC	LBC	RBC	DKC
Code	LFC RFC		LBC RBC		DKC
Spec.	Ordering Code LFC (RFC) 10 LFC (RFC) = 0.5mm Increment $D \leq LFC (RFC) < H (HC)$		Ordering Code LBC (RBC) 20 LBC (RBC) = 0.5mm Increment $4 \leq LBC (RBC) \leq M(MC) \times 3$		Changes O.D. tolerance to h6. Ordering Code DKC

Pivot Pins - Diameter Tolerance Selectable

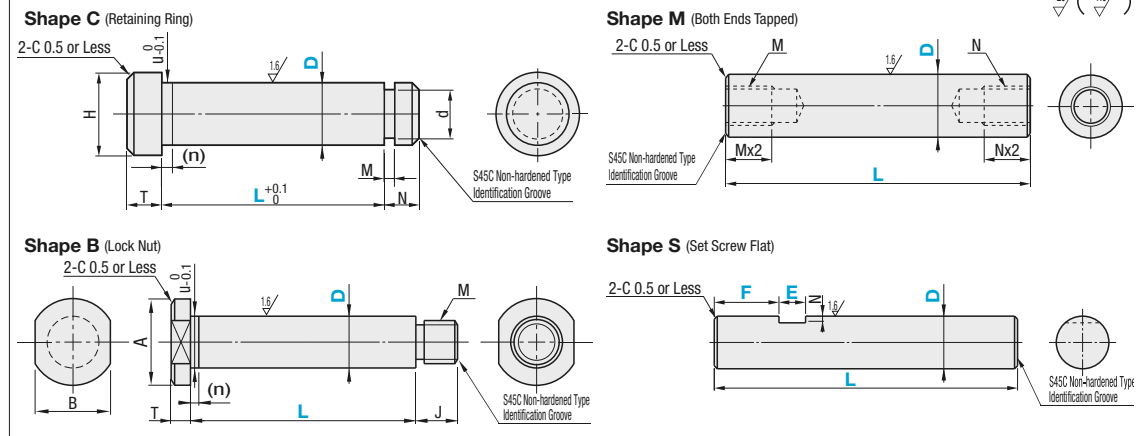


RoHS

Type	M Material	H Hardness	S Surface Treatment	A Accessory Shape C (Retaining Ring)	A Accessory Shape B (Lock Nut)
KCL□□	EN 1.1191 Equiv.	40~45HRC	Black Oxide	Spring Steel	JIS-SWRCH
PKCL□□					
PKCLH□□	EN 1.4301 Equiv.	40~45HRC	Electroless Nickel Plating	EN 1.4301 Equiv.	EN 1.4301 Equiv.
PKCLSH□□					
KCLS□□	EN 1.4125 Equiv.	45~50HRC		EN 1.4301 Equiv.	EN 1.4301 Equiv.
KCLSH□□					

D	Tolerance Selection					*LF
	M	P	H	F	C	
2, 3	+0.008 +0.002	+0.012 +0.006	0 -0.010	-0.006 -0.020	-0.060 -0.085	-0.025 -0.034
4, 5, 6	+0.012 +0.004	+0.020 +0.012	0 -0.012	-0.010 -0.028	-0.070 -0.100	-0.025 -0.037
8, 10	+0.015 +0.006	+0.024 +0.015	0 -0.015	-0.013 -0.035	-0.080 -0.116	-0.025 -0.040
12-18	+0.018 +0.007	+0.029 +0.018	0 -0.018	-0.016 -0.043	-0.095 -0.138	-0.025 -0.043
20-25	+0.021 +0.008	+0.035 +0.022	0 -0.021	-0.020 -0.053	-0.110 -0.162	-0.025 -0.046

* LF tolerances are recommended values for Multi-Layer Oil Free Bushings LF Type (MDZB, MDZF).
 * KCLSH□□ may be discolored by hardening.
 * Relief dimension under the shoulder is for reference.
 * This type may have centering holes depending on dimensions.
 * For L Dimension, Standard Machining Tolerances (Class: Medium) is used.



Alterations Part Number - L - (NC, TC...etc.)
 KCLCF15 - 120.3 - NC3.5 - TC3.5

Alterations	Retaining Ring Groove Position	Shoulder Thickness	Thread Part Length	Thread Diameter	Shoulder Thickness	L Dimension Tolerance
	Shape C NC	Shape C TC	Shape B FC	Shape B MC	Shape B TC	Shape B LKC
Code	NC	TC	FC	MC	TC	LKC
Spec.	Ordering Code] NC3.5 D NC (0.1mm Increment) 2-4 1.5-3 5 1.7-3 6 1.9-4 8 2.4-5 10-18 2.7-5 20-25 2.9-5 Overall Length is L+NC+T.	Ordering Code] TC3 TC=0.5mm Increment T<TC<5 Overall Length is L+N+TC.	Ordering Code] FC4 FC=1mm Increment M (MC) ≤FC≤M (MC) x3	Ordering Code] MC3 D MC (Selection Range) 5 3 6 3 4 8 3 4 5 10 4 5 6 8 12 5 6 8 13-18 6 8 10 20, 22 8 10 12 25 10 12 When ordering MC3 for D12, also specify Alteration FC. Not applicable to D4.	Ordering Code] TC3 TC=0.5mm Increment 2≤TC≤5	Ordering Code] LKC Changes L dimension tolerance to ±0.05.

Alterations	Thread Diameter	Tapping
	Shape M MC NC	Shape S MMC
Code	MC, NC	MMC
Spec.	Ordering Code] MC3 D MC, NC (Selection Range) 8 3 4 10, 12 4 5 13-15 5 6 16-18 6 8 20, 22 8 10 25 10 12 Not applicable to D6. L:MC2+NC2	Ordering Code] MMC D M (Coarse) ℓ 6 M3 6 8 M4 8 13-15 M6 12 25 M8 16 Not applicable to D3-5. (D-M)/2-1, F>Mx2. L>Mx3

Shape C (Retaining Ring)

* For details, see P2303.

Part Number	D Tolerance	L=0.1mm Increment	M Tolerance	N u (n)	d Tolerance	T H	Included Retaining Ring Shape]JIS Nominal]	Unit Price
M (m6)	2 3 4 5 6 8 10 12 13 14 15 16 17	5.0~30.0 5.0~50.0 10.0~60.0 10.0~100.0 15.0~100.0 15.0~200.0	0.5 +0.05 0 0.7 +0.1 0 0.9 +0.14 0 1.35 0	2 1.9 2.9 3.9 4.9 5.8 7.8 9.8 11.8 12.8 13.8 14.8 15.8 16.8 17.8 18.8 19.8 21.8 24.8	1.5 2 3 4 5 7 9.6 11.5 12.4 13.4 14.3 15.2 16.2 17 18 19 20 21 22 23 24.8	1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	No. 1.5 No. 2 No. 3 No. 4 No. 5 No. 7 No. 10 No. 12 No. 13 No. 14 No. 15 No. 16 No. 17 No. 18 No. 19 No. 20 No. 21 No. 22 No. 23 No. 24	KCLC KCLHC PKCLC PKCLHC KCLSC KCLSHC

Shape B (Lock Nut)

Part Number	D Tolerance	L=0.1mm Increment	A B T J u (n)	M (Coarse)	Included Nut	Unit Price	
M (m6)	4 5 6 8 10 12 13 14 15 16 17 18 20 22 25	5.0~ 50.0 5.0~ 60.0 10.0~100.0 15.0~200.0 25.0~200.0 30.0~200.0	7 5 3 9 7 4 10 8 13 10 16 13 18 14 24 21 27 23 30 27	6 9 12 16 18 24	3.9 4.9 5.8 7.8 9.8 11.8 12.8 13.8 14.8 15.8 16.8 17.8 18.8 19.8 21.8 24.8	M 3 M 3x0.5 M 4 M 4x0.7 M 5 M 5x0.8 M 6 M 6x1.0 M 8 M 8x1.25 M10 M10x1.5 M12 M12x1.75 M16 M16x2.0	KCLB KCLHB PKCLB PKCLHB KCLSB KCLSHB

Shape M (Both Ends Tapped)

Part Number	D Tolerance	L=0.1mm Increment	M (Coarse)	N (Coarse)	KCLM	KCLHM	PKCLM	PKCLHM	KCLSM	KCLSHM
M (m6)	6 8 10 12 13 14 15 16 17 18 20 22 25	20.0~100.0 25.0~100.0 25.0~200.0 35.0~200.0 40.0~200.0 50.0~200.0	M 3 M 5 M 6 M 8 M 10 M 12 M 16	M 3 M 5 M 6 M 8 M 10 M 12 M 16						


Shape S (Set Screw Flat)

Part Number	D Tolerance	L=0.1mm Increment	1mm Increment	N	Unit Price
M (m6)	3 4 5 6 8 10 12 13 14 15 16 17 18 20 22 25	5.0~ 50.0 10.0~ 60.0 10.0~100.0 15.0~100.0 15.0~200.0 25.0~200.0 30.0~200.0	F E F=0 or 2≤F≤L/2 1≤E≤50	0.5 1 2	KCLS KCLHS PKCLS PKCLHS KCLSS KCLSHS

Ordering Example Part Number - L - F - E
 Type D Tolerance Selection D
 KCLC M 15 - 120.3
 KCLS F 15 - 50.5 - F0 - E10

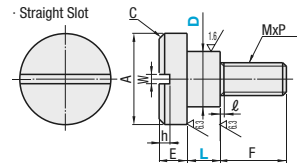
Fulcrum Pins

Selectable

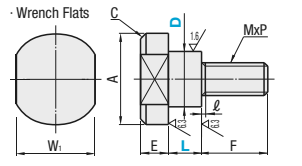


Straight Slot		Hex Socket		Wrench Flats		Hex Head		Material	Hardness	Surface Treatment
Standard Grade	Precision Grade	Standard Grade	Precision Grade	Standard Grade	Precision Grade	Standard Grade	Precision Grade			
D _{±0.04}	Dg6	D _{±0.04}	Dg6	D _{±0.04}	D _{±0.04}	D _{±0.04}	D _{±0.04}	EN 1.1191	-	Black Oxide
CBB	-	CBDBR	CBDG	CBDBR	CBDBR	CBDBW	CBDBL	EN 1.1191	-	Black Oxide
CBBH	-	CBDBRH	-	CBDBWH	-	CBDBWH	-	EN 1.1191	40~45HRC	Black Oxide
CB	CBG	CBDR	CBDR	CBDR	CBDR	CBDW	CBDL	EN 1.4305 Equiv.	-	-

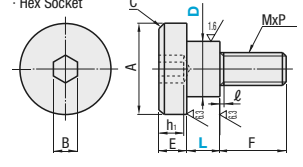
· Straight Slot



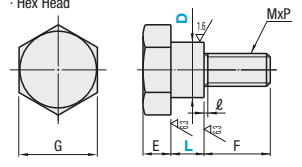
· Wrench Flats



· Hex Socket



· Hex Head



25 / (6.3 / 1.6 /)

Precision Grade	
D Tolerance (g6)	
4-6	-0.004 -0.012
8, 10	-0.005 -0.014
12-15	-0.006 -0.017

■ L Dimension Tolerance

	Standard
Unhardened	+0.15 +0.05
Hardened	+0.2 0

■ L Dimension Tolerance

	Configurable
Unhardened	+0.1 0
Hardened	+0.2 0

Part Number		D	L Selection	A	E		MxP (Coarse)	F	ℓ	W	B	h	h ₁	C	W ₁	G
Type					Straight Slot	Wrench Flats Hex Socket Hex Head										
Straight Slot (Standard)	Wrench Flats (Standard)	4	1 2 3 4 5 6 7 8	6	2	3.5	2.6x0.45	4	0.8	0.8	2	1	2	0.5	5	7
CBB	CBDBW	5	1 2 3 4 5 6 7 8 10	8	2	4	3x0.5	6	1	2.5	3	1.5	3	0.5	7	8
CBBH	CBDBWH															
CB	CBDW	6	2 3 4 5 6 7 8 10	10	2.5	4	4x0.7	8	1.2	1.2	3	1.5	3	-	8	10
Straight Slot (Precision)	Wrench Flats (Precision)	8	5 6 7 8 9 10 12 20	12	3	4.5	5x0.8	10	1.4	1.2	4	1.5	3.5	-	10	13
CBDBR	CBDBR	10	5 6 7 8 9 10 12 15 20	16	4	5	6x1.0	12	1.5	1.5	5	1.8	4	1	13	17
CBDBRH	CBDBL															
CBDR	CBDL	12	6 7 8 9 10 12 13 15 20	18	5	5	8x1.25	12	1.5	1.5	5	2	4	-	14	19
Straight Slot (Precision)	Wrench Flats (Precision)	12	6 7 8 9 10 12 13 15 20	18	5	5	8x1.25	12	1.5	1.5	5	2	4	-	14	19
CBDBGR	CBDBGR															

⚠ For Hex Socket, L≥5

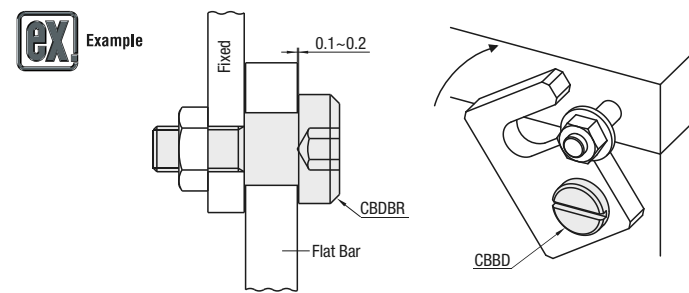
Ordering Example

Part Number - L

CBD6 - 10


CBDGR8 - 12

D	Unit Price													
	Straight Slot			Hex Socket				Wrench Flats			Hex Head			
	CBBD	CBBDH	CB	CBDG	CBDBR	CBDBRH	CBDR	CBDGR	CBDR	CBDBW	CBDBWH	CBDW	CBDBL	CBDL
4														
5														
6														
8														
10														
12														



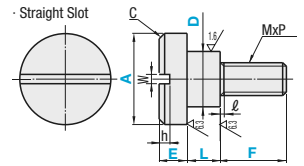
Fulcrum Pins

Configurable

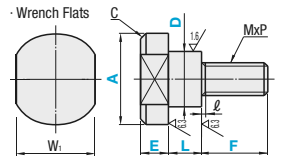


Straight Slot		Hex Socket		Wrench Flats		Hex Head		Material	Hardness	Surface Treatment
Standard Grade	Precision Grade	Standard Grade	Precision Grade	Standard Grade	Precision Grade	Standard Grade	Precision Grade			
D _{±0.04}	Dg6	D _{±0.04}	Dg6	D _{±0.04}	D _{±0.04}	D _{±0.04}	D _{±0.04}	EN 1.1191	-	Black Oxide
FCBB	-	FCBDBR	FCBDG	FCBDBR	FCBDBR	FCBDBW	FCBDBL	EN 1.1191	-	Black Oxide
FCBBH	-	FCBDBRH	-	FCBDBWH	-	FCBDBWH	-	EN 1.1191	40~45HRC	Black Oxide
FCB	FCBG	FCBDR	FCBDR	FCBDR	FCBDR	FCBDW	FCBDL	EN 1.4305 Equiv.	-	-

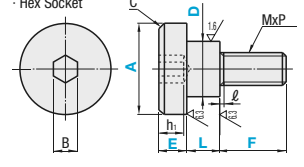
· Straight Slot



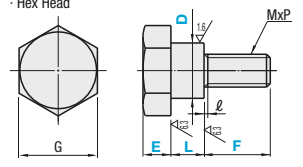
· Wrench Flats



· Hex Socket



· Hex Head



25 / (6.3 / 1.6 /)

Precision Grade	
D Tolerance (g6)	
4-6	-0.004 -0.012
8, 10	-0.005 -0.014
12-15	-0.006 -0.017

■ L Dimension Tolerance

	Configurable
Unhardened	+0.1 0
Hardened	+0.2 0

■ L Dimension Tolerance

	Configurable
Unhardened	+0.1 0
Hardened	+0.2 0

Part Number		D	L=0.1mm Increment	A Selection		E=0.1mm Increment	F=1mm Increment	MxP (Coarse)	ℓ	W	B	h	h ₁	C	W ₁	G
Type				For Hex Head, selection is not needed.												
Straight Slot (Standard)	Wrench Flats (Standard)	4	Straight Slot Wrench Flats Hex Head Hex Socket	6 8		2.0~4.0	3, 4	2.6x0.45	0.8	0.8	2	1	2	0.5	5	7
*FCBB	FCBDBW	5		8 10		3~6	3x0.5	1	0.8	2.5	1	2.5	0.5	7	8	
*FCBBH	FCBDBWH	6		10 12		4~8	4x0.7	1.2	1.2	3	1.5	3		8	10	
*FCB	FCBDW	8		12 16		5~10	5x0.8	1.4	1.2	4	1.5	3.5		10	13	
Hex Socket (Standard)	Hex Head (Standard)	10		16 18 20		6~12	6x1.0	1.4	1.4	4	1.8	3.5		13	17	
FCBDBR	FCBDBL	12		18 20 22 24		8~12	8x1.25	1.5	1.5	5	2	4	1	14	19	
FCBDBRH	FCBDL	13		20 22 24		10~15	10x1.5	1.5	1.5	5	-	-	-	15	19	
FCBDR		15		20 22 24										17		

Machining Conditions ⚠FCBDBR, FCBDBRH and FCBDR, E+L≥2xh1+2 ⚠D13 and D15 are not available for the * marked types.

Ordering Example

Part Number - L - A - E - F

FCBBD6 - 10.0 - A10 - E2.5 - F6

FCBD6 - 10.0 - A12 - E3.0 - F4

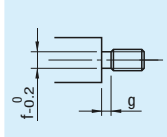
D	Unit Price												
	Straight Slot			Hex Socket				Wrench Flats			Hex Head		
	FCBB	FCBBH	FCB	FCBDBR	FCBDBRH	FCBDR	FCBDGR	FCBDR	FCBDBW	FCBDBWH	FCBDW	FCBDBL	FCBDL
4													
5													
6													
8													
10													
12													
13													
15													

Alterations

Part Number - L - A - E - F - (PC)


FCBBD6 - 12.6 - A10 - E3.0 - F6 - PC

FCBD8 - 16.5 - A12 - E3.5 - F8 - PC

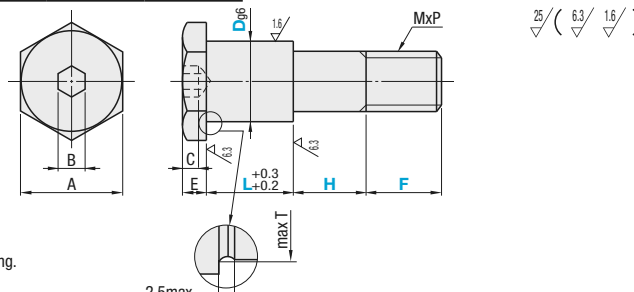
Alteration	Code	Spec.			
	PC	Adds a relief to M.			
		D	MxPitch	g	f
		4	M2.6x0.45	1.2	1.9
		5	M3 x 0.5	1.2	2.3
		6	M4 x 0.7	1.2	3.2
		8	M5 x 0.8	1.4	4.0
10	M6 x 1.0	1.7	4.8		
12, 13	M8 x1.25	1.7	6.5		
15	M10 x 1.5	2	8.2		

Fulcrum Pins

Low Head Stepped, With Lock Nut



Type		M Material	S Surface Treatment	H Hardness
Standard	Configurable	EN 1.7220 Equiv.	Black Oxide	33-38HRC
CMSG	FCMSG	EN 1.7220 Equiv.	Black Oxide	33-38HRC
SCMSG	FSCMSG	EN 1.4301 Equiv.	-	-



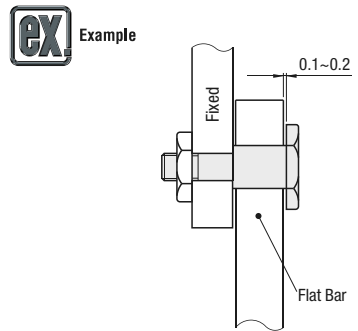
Hex heads A and B are not aligned.
Precaution for Use:
Tighten the external hex A for finishing.

D Tolerance	
6	-0.004 -0.012
8, 10	-0.005 -0.014
12-18	-0.006 -0.017
20	-0.007 -0.020

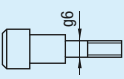
Standard		L Selection		H=0.1mm Increment	A	B	C	E	F	MxP (Coarse)	T	Unit Price	
Part Number	Dgs											CMSG	SCMSG
CMSG	6	5	6	9	10	12			7	4x0.7	6.5		
	8	5	6	9	10	12	16		9	6x1.0	8.7		
	10							5	12	8x1.25	10.8		
	12				10	12	16	19	22	25	12.8		
	13							8	5	6	16	10x1.5	14
SCMSG	15								18	12x1.75	17		
	16				16	19	22	25			19		
	18								24		21		
	20								30	16x2.0	21		

Configurable		L=1mm Increment	H=0.1mm Increment	F=1mm Increment	A	B	C	E	MxP (Coarse)	T	Unit Price	
Part Number	Dgs										FCMSG	FSCMSG
FCMSG	6	5-12	2.0-50.0	4-7	10	3	2	5	4x0.7	6.5		
	8	5-16		6-9	13	5	3		6x1.0	8.7		
	10				17	6	4		8x1.25	10.8		
	12				19	8	5	6	10x1.5	14		
	13											
FSCMSG	15	10-25	3.0-70.0	8-12	24	10	6	7	12x1.75	17		
	16				27					19		
	18									21		
	20				30	14	7	8	16x2.0	21		

Ordering Example: Part Number - L - H - F
 CMSG15 - 16 - 20.5
 FSCMSG12 - 13 - 8 - 10




Alterations Example: Part Number - L - H - F - (HKC)
 CMSG10 - 12 - 15.2 - HKC

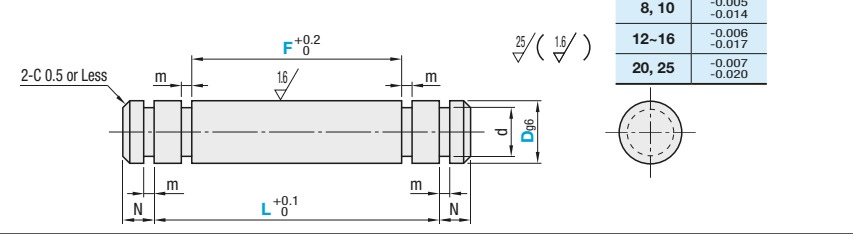
Alterations	Code	Spec.										
	HKC	Dimension H will have an O.D. tolerance of g6. Dimension H Applicable Range										
		<table border="1"> <thead> <tr> <th>D</th> <th>H</th> </tr> </thead> <tbody> <tr> <td>6, 8</td> <td>10-50</td> </tr> <tr> <td>10, 12, 1, 3</td> <td>15-70</td> </tr> <tr> <td>15, 16, 18</td> <td>20-80</td> </tr> <tr> <td>20</td> <td>20-100</td> </tr> </tbody> </table>	D	H	6, 8	10-50	10, 12, 1, 3	15-70	15, 16, 18	20-80	20	20-100
D	H											
6, 8	10-50											
10, 12, 1, 3	15-70											
15, 16, 18	20-80											
20	20-100											

Precision Pivot Pins


Retaining Rings, Tapped Ends



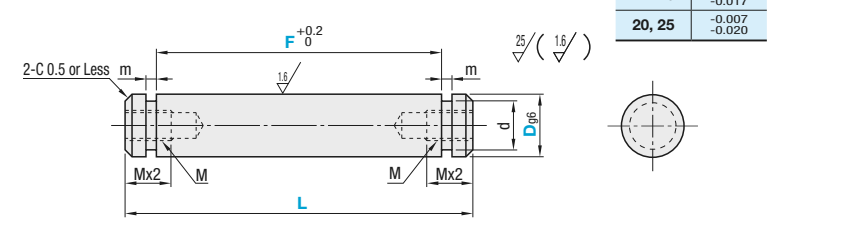
Type	M Material	S Surface Treatment	A Accessory	D Tolerance (g6)
CNPR	EN 1.1191 Equiv.	Black Oxide	Retaining Rings 4 pcs.	3 -0.002 -0.008
SCNPR	EN 1.4301 Equiv.	-	M Spring Steel EN 1.4301 Equiv.	4-6 -0.004 -0.012
				8, 10 -0.005 -0.014
				12-16 -0.006 -0.017
				20, 25 -0.007 -0.020



Part Number		1mm Increment		N	d	Tolerance	m	Tolerance	Unit Price	
Type	D	L	F						CNPR	SCNPR
CNPR SCNPR	3	8-60	5-47	2	2	+0.06 0	0.5	+0.05		
	4	9-60	5-48	2	3	0	0.7	+0.1 0		
	5	14-60	10-56		4	+0.075				
	6	14-100	10-96		5	0				
	8			3	7	+0.09 -0.09	1.15	+0.14 0		
	10	20-100	15-95		9.6	-0.09				
	12	20-200	15-195		11.5					
	13				12.4					
	14	30-200	25-195		13.4	0				
	15			14.3	-0.11					
	16			15.2						
	20	35-200	30-195	19	0					
	25			23.9	-0.21	1.35				

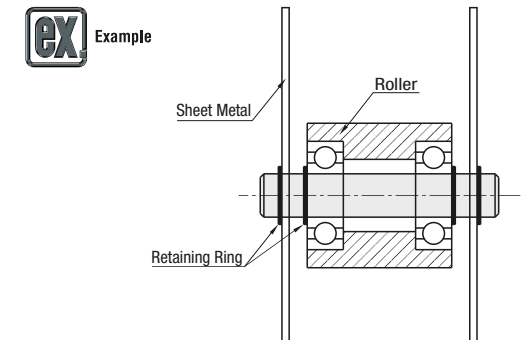


Type	M Material	S Surface Treatment	A Accessory	D Tolerance (g6)
CNPP	EN 1.1191 Equiv.	Black Oxide	Retaining Ring 2 pcs.	8, 10 -0.005 -0.014
SCNPP	EN 1.4301 Equiv.	-	M Spring Steel EN 1.4301 Equiv.	12-16 -0.006 -0.017
				20, 25 -0.007 -0.020



Part Number		1mm Increment		M (Coarse)	d	Tolerance	m	Tolerance	Unit Price	
Type	D	L	F						CNPP	SCNPP
CNPP SCNPP	8	14-100	10-96	M4	7	+0.09 0	0.9	+0.1		
	10	20-100	15-95	M6	9.6	-0.09	1.2	+0.14 0		
	12	20-200	15-195		11.5					
	13				12.4					
	14	30-200	25-195	M8	13.4	0				
	15				14.3	-0.11				
	16				15.2					
	20	35-200	30-195	M10	19	0				
	25			M16	23.9	-0.21	1.4			

Ordering Example: Part Number - L - F
 CNPR15 - 120 - F100
 CNPP20 - 80 - F60



Cantilever Shafts / Pivot Pins / Fulcrum Pins

Cantilever Shafts / Pivot Pins / Fulcrum Pins



Product Name Page	Cantilever Shafts - Threaded with Retaining Ring Groove 883	Threaded with Tapped End 885	Threaded with Threaded Ends 887
-------------------	--	---------------------------------	------------------------------------

Expanded Spec.

Expanded Spec.

Expanded Spec.

Expanded Spec.



Product Name Page	Cantilever Shafts Piloted Thread with Retaining Ring Groove 889	Piloted Thread with Tapped End 891	Piloted Thread with Threaded Ends 893	Screw Mount with Retaining Ring Groove 895
-------------------	--	---------------------------------------	--	---

Expanded Spec.

Expanded Spec.



Product Name Page	Cantilever Shafts - Screw Mount with Tapped End 897	Screw Mount with Threaded End 899	Heavy Load 901
-------------------	--	--------------------------------------	-------------------

Expanded Spec.



Product Name Page	Cantilever Shafts - Shouldered 903	For Tension 905	Pivot Pins - Cotter Pins 907
-------------------	---------------------------------------	--------------------	---------------------------------



Product Name Page	Straight Retaining Ring 908	Cotter Pins with Shoulder 909	Retaining Ring with Shoulder 910	Lock Nut with Shoulder 911	Lock Nut with Hex Socket Head 912
-------------------	--------------------------------	----------------------------------	-------------------------------------	-------------------------------	--------------------------------------



Product Name Page	Lock Nut with Extra Low Hex Socket Head 913	Tapped with Shoulder 914	Tapped, Hex Socket Head with Shoulder 914	Both Ends Tapped 915	Both Ends Threaded 915
-------------------	--	-----------------------------	--	-------------------------	---------------------------



Product Name Page	Keyway 916	Keys for Precision Pivot Pins 916	Pivot Pins - Set Screw Flat 917	Shouldered with Set Screw Flat 917	Pivot Pins - D-Cut 918
-------------------	---------------	--------------------------------------	------------------------------------	---------------------------------------	---------------------------



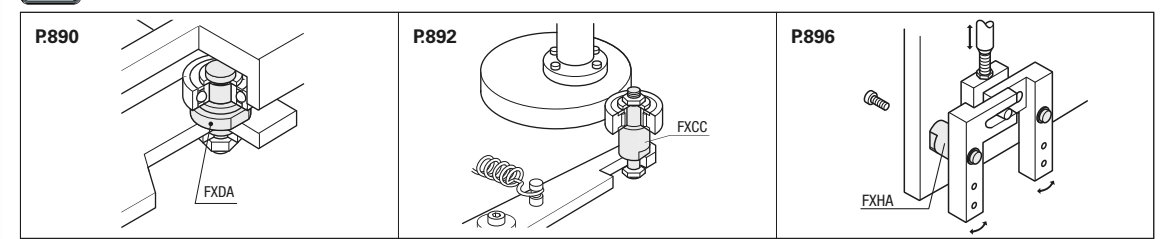
Product Name Page	End Shape Combination Selectable 919	Pivot Pins - Diameter Tolerance Selectable 921	Fulcrum Pins - Selectable 923	Fulcrum Pins - Configurable 924	Fulcrum Pins - Low Head Stepped, With Lock Nut 925
-------------------	---	---	----------------------------------	------------------------------------	---



Product Name Page	Precision Pivot Pins - Retaining Rings 926	Tapped Ends 926	Roller with Pin 886
-------------------	---	--------------------	------------------------

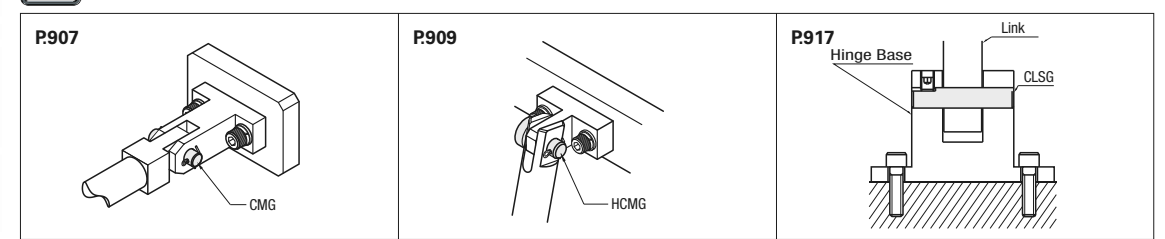
Cantilever Shafts Can be used as a fulcrum for rotary parts such as Idlers. Tension Type is also available.

EX Example



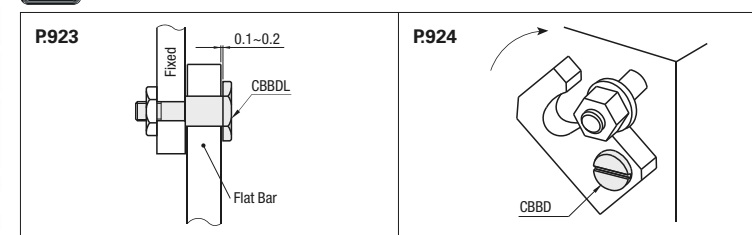
Pivot Pins Can be used as a fulcrum for various types of connections. We offer two types: L Dimension Selectable Type and L Dimension Configurable Type.

EX Example



Fulcrum Pins Can be used as a fulcrum for rotary motions of sheet metal parts. Four types of screw heads are available such as Straight Slot and Hex Sockets.


EX Example



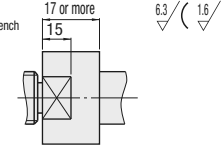
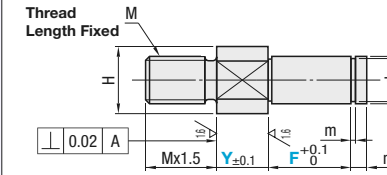
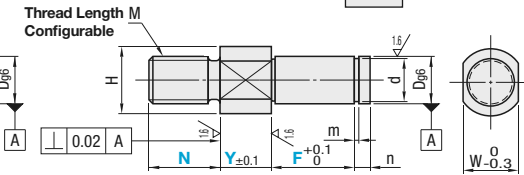
Cantilever Shafts

Threaded with Retaining Ring Groove

Standard



Type	Material	Surface Treatment
FXAA, FXNAA	EN 1.1191 Equiv.	Black Oxide
PFXAA, PFXNAA	EN 1.4301 Equiv.	Electroless Nickel Plating
SFXAA, SFXNAA	EN 1.4301 Equiv.	-
HFXAA	EN 1.7220 Equiv. Hardness: 35 ~ 40HRC	Black Oxide

RoHS


This type may have centering holes depending on dimensions.
Refer to the table on P.884 for thread undercut dimensions.

Part Number	Type	No.	Dg6	1mm Increment		Y	F	N	H	W	M (Coarse)	Ref. Dim.	Tolerance	m	n	Unit Price				
				Y	F											N	FXAA	PFXAA	SFXAA	HFXAA
3	3A	3	-0.002	2-30	3-50	3-6	7	5	M 3	2	+0.060	0.5	2	1.15	4					
4	4A	4	-0.004				8	6	M 4	3	0	0.7								
5	5A	5	-0.012				9	7	M 5	4	+0.075	0				0.9				
6	6A	6	-0.012				10	8	M 6	5	0	0				1.15				
8	8A	8	-0.005	2-60	5-100	8-16	12	10	M 8	7	+0.090	0	3	1.35	5					
10	10A	10	-0.014				14	12	M 10	9.6	0	-0.090				1.65				
12	12	12	-0.006				15	13	M 12	11.5	0	-0.110								
13	13	13	-0.017				16	14	M 12	12.4	0	-0.110								
15	15	15	-0.006	4-60	10-150	20-40	17	17	M 12	14.3	0	5	1.65	1.65						
16	16	16	-0.017				18	18	M 16	15.2	0				-0.210					
17	17	17	-0.007				19	19	M 20	16.2	0				-0.210					
18	18	18	-0.020				20	20	M 20	17	0				-0.210					
20	20A	20	-0.007	7-60	10-150	20-40	21	21	M 20	19	0	5	1.65	1.65						
22	22	22	-0.020				22	22	M 16	21	0				-0.210					
25	25	25	-0.007				23	23	M 20	23.9	0				-0.210					
25A	25A	25	-0.020				24	24	M 16	28.6	0				-0.210					
30	30	30	-0.007				26	26	M 20	28.6	0				-0.210					
30A	30A	30	-0.020				28	28	M 16	28.6	0				-0.210					

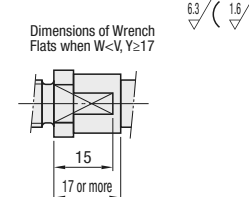
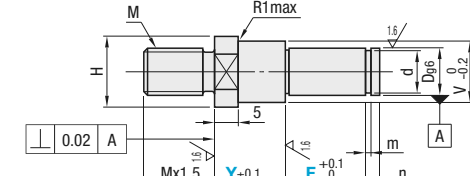
RoHS

HFXAA is applicable to D6 or larger specifications. N is available for Thread Length Configurable Type only.

Stepped



Type	Material	Surface Treatment
FXBA, PFXBA	EN 1.1191 Equiv.	Black Oxide
SFXBA	EN 1.4301 Equiv.	Electroless Nickel Plating
PHFXBA	EN 1.7220 Equiv. Hardness: 35 ~ 40HRC	Electroless Nickel Plating

RoHS


This type may have centering holes depending on dimensions.
Refer to the table on P.884 for thread undercut dimensions.

Part Number	Type	No.	Dg6	1mm Increment		V	H	W	M (Coarse)	Ref. Dim.	Tolerance	m	n	Unit Price					
				Y	F									FXBA	PFXBA	SFXBA	PHFXBA		
3	3A	3	-0.002	7-30	3-50	5	7	5	M 3	2	+0.060	0.5	2	1.15	4				
4	4A	4	-0.008			6	8	6	M 4	3	0	0.7							
5	5A	5	-0.004			7	9	7	M 5	4	+0.075	0				0.9			
6	6A	6	-0.012			8	10	8	M 6	5	0	1.15							
8	8A	8	-0.005	7-60	5-100	10	12	10	M 8	7	+0.090	0	3	1.35	5				
10	10A	10	-0.014			12	14	12	M 10	9.6	0	-0.090				1.65			
12	12	12	-0.006			13	15	13	M 12	11.5	0	-0.110							
13	13	13	-0.017			14	16	14	M 12	12.4	0	-0.110							
15	15	15	-0.006	7-60	10-150	16	18	15	M 16	19	0	5	1.65	1.65					
16	16	16	-0.017			17	17	14	M 16	21	0				-0.210				
17	17	17	-0.007			18	20	17	M 20	21	0				-0.210				
18	18	18	-0.020			19	21	18	M 20	23.9	0				-0.210				
20	20A	20	-0.007			20	22	19	M 20	28.6	0				-0.210				
22	22	22	-0.020			21	23	20	M 16	28.6	0				-0.210				

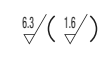
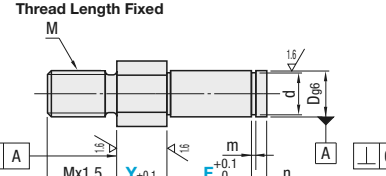
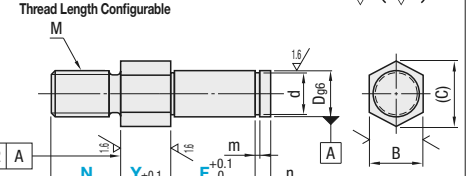
RoHS

When W < V, wrench flats W reaches O.D.V. PHFXBA is applicable to D6 or larger specifications.

Hex



Type	Material	Surface Treatment
LXAA, LXNAA	EN 1.1191 Equiv.	Black Oxide
PLXAA, PLXNAA	EN 1.4301 Equiv.	Electroless Nickel Plating
SLXAA, SLXNAA	EN 1.4301 Equiv.	-

RoHS

This type may have centering holes depending on dimensions.
Refer to the table below for thread undercut dimensions.

Part Number	Type	No.	Dg6	1mm Increment		Y	F	N	B	(C)	M (Coarse)	Ref. Dim.	Tolerance	m	n	Unit Price					
				Y	F											N	LXAA	PLXAA	SLXAA	LXNAA	PLXNAA
3	3A	3	-0.002	2-30	3-50	3-6	7	5	M 3	2	+0.060	0	0.5	2	1.15	4					
4	4A	4	-0.008				8	6	M 4	3	0	0	0.7								
5	5A	5	-0.012				9	7	M 5	4	+0.075	0	0.9								
6	6A	6	-0.012				10	8	M 6	5	0	0	1.15								
8	8A	8	-0.005	2-60	5-100	8-16	12	10	M 8	7	+0.090	0	3	1.35	5						
10	10A	10	-0.014				14	12	M 10	9.6	0	-0.090				1.65					
12	12	12	-0.006				15	13	M 12	11.5	0	-0.110									
13	13	13	-0.017				16	14	M 12	12.4	0	-0.110									
15	15	15	-0.006	4-60	10-150	20-40	17	17	M 12	14.3	0	5	1.65	1.65							
16	16	16	-0.017				18	18	M 16	15.2	0				-0.210						
17	17	17	-0.007				19	19	M 20	16.2	0				-0.210						
18	18	18	-0.020				20	20	M 20	17	0				-0.210						
20	20A	20	-0.007	7-60	10-150	20-40	21	21	M 20	19	0	5	1.65	1.65							
22	22	22	-0.020				22	22	M 16	21	0				-0.210						
25	25	25	-0.007				23	23	M 20	23.9	0				-0.210						
25A	25A	25	-0.020				24	24	M 16	28.6	0				-0.210						
30	30	30	-0.007				26	26	M 20	28.6	0				-0.210						
30A	30A	30	-0.020				28	28	M 16	28.6	0				-0.210						

RoHS

N is available for Thread Length Configurable Type only.

Ordering Example

Part Number - Y - F - N

FXAA10 - 25 - F18

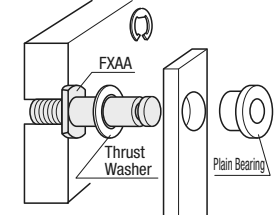
PLXNAA12 - 15 - F25 - N12

Alterations

Part Number - Y - F - N - (YKC, WSC, SET)

FXAA20 - 20 - F20 - YKC

Example



Retaining Ring Set

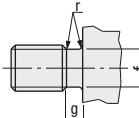
FXAA

Thrust Washer

Plain Bearing

Alterations	YKC	WSC	SET
	Changes Y dimension tolerance to ±0.05. Applicable to all types. Ordering Code YKC	Changes two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code WSC	Retaining Ring applicable to each shaft diameter is included. Ordering Code SET Applicable to all types. Retaining Ring Shape No. = 3 ~ 8A: E Type Retaining Ring No. = 10 ~ 30A: C Type Retaining Ring Retaining Ring Material Cantilever Shafts

Thread Undercut Dimensions



Thread Dia. (M)	g	r	f
3			2.1-2.4
4	1.2-1.5	0.2-0.3	2.9-3.2
5			3.9-4.1
6			4.3-4.9
8	1.5-2.5	0.2-0.6	6.3-6.6
10			8.1-8.3
12	1.5-3.0		9.8-10.1
16		0.2-1.0	13.6-13.8
20	1.5-4.0		17.0-17.2

Cantilever Shafts

Threaded with Tapped End

Standard

Type	Material	Surface Treatment
FXAB	EN 1.1191 Equiv.	Black Oxide
PFXAB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXAB	EN 1.4301 Equiv.	-
PHFXAB	EN 1.7220 Equiv. Hardness: 35 ~ 40HRC	Electroless Nickel Plating

Dimensions of Wrench Flats when $Y \geq 17$

RoHS

This type may have centering holes depending on dimensions.
Please refer to Table 1 to specify dimensions Y and F.
Refer to the table on P.886 for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	H	W	M (Coarse)	Unit Price																
			Y	F	N					Thread Length Fixed		Thread Length Configurable														
Thread Length Fixed FXAB PFXAB SFXAB PHFXAB	6	6	-0.004	2-60	5-100	3	10	8	M 6	FXAB	PFXAB	SFXAB	PHFXAB													
	6A	-0.012	6-12							14	12	FXAB	PFXAB	SFXAB	PHFXAB											
	8	-0.005	8-16							12	10	FXAB	PFXAB	SFXAB	PHFXAB											
	8A	-0.014	16							14	14	FXAB	PFXAB	SFXAB	PHFXAB											
	10	-0.006	10-20							15	13	FXAB	PFXAB	SFXAB	PHFXAB											
	10A	-0.017	20							17	17	FXAB	PFXAB	SFXAB	PHFXAB											
	12	4-75	10-150							6 8 10	17	14	M10	M 8	FXAB	PFXAB	SFXAB	PHFXAB								
	12																		12	12	12	12	FXAB	PFXAB	SFXAB	PHFXAB
	13																		13	13	13	13	FXAB	PFXAB	SFXAB	PHFXAB
	15																		15	15	15	15	FXAB	PFXAB	SFXAB	PHFXAB
16	16			16	16	16	FXAB	PFXAB	SFXAB										PHFXAB							
17	17			17	17	17	FXAB	PFXAB	SFXAB										PHFXAB							
18	18			18	18	18	FXAB	PFXAB	SFXAB										PHFXAB							
20	20			20	20	20	FXAB	PFXAB	SFXAB										PHFXAB							
20A	20			20	20	20	FXAB	PFXAB	SFXAB										PHFXAB							
22	22			22	22	22	FXAB	PFXAB	SFXAB										PHFXAB							
Thread Length Configurable FXNAB PFXNAB SFXNAB	25	25	-0.007	20-40	8 10 12 16	31	27	M12	M 6	FXNAB	PFXNAB	SFXNAB														
	25A	-0.020	26							24	FXNAB	PFXNAB	SFXNAB													
	30	30	30							30	FXNAB	PFXNAB	SFXNAB													
	30A	30	30							30	FXNAB	PFXNAB	SFXNAB													

MA	Y+F
M 3	Y+F ≥ 11.5
M 4	Y+F ≥ 14.0
M 5	Y+F ≥ 16.2
M 6	Y+F ≥ 18.5
M 8	Y+F ≥ 23.5
M10	Y+F ≥ 28.5
M12	Y+F ≥ 35.5
M16	Y+F ≥ 45.0
M20	Y+F ≥ 55.0

N is available for Thread Length Configurable Type only.

Stepped

Type	Material	Surface Treatment
FXBB	EN 1.1191 Equiv.	Black Oxide
PFXBB	EN 1.1191 Equiv.	Electroless Nickel Plating
SFXBB	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when $W < V, Y \geq 17$

RoHS

This type may have centering holes depending on dimensions.
Please refer to Table 1 to specify dimensions Y and F.
Refer to the table on P.886 for thread undercut dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	V	H	W	M (Coarse)	Unit Price													
			Y	F	N						FXBB	PFXBB	SFXBB											
Thread Length Fixed FXBB PFXBB SFXBB	6	6	-0.004	5-75	3	8	10	8	M 6	FXBB	PFXBB	SFXBB												
	6A	-0.012	12							14	12	FXBB	PFXBB	SFXBB										
	8	-0.005	10							12	10	FXBB	PFXBB	SFXBB										
	8A	-0.014	14							16	14	FXBB	PFXBB	SFXBB										
	10	-0.006	13							15	13	FXBB	PFXBB	SFXBB										
	10A	-0.017	18							20	17	FXBB	PFXBB	SFXBB										
	12	7-60	10-75							4 5 6	15	17	M10	M 8	FXBB	PFXBB	SFXBB							
	12																	12	12	12	12	FXBB	PFXBB	SFXBB
	13																	13	13	13	13	FXBB	PFXBB	SFXBB
	15																	15	15	15	15	FXBB	PFXBB	SFXBB
16	16			16	16	16	FXBB	PFXBB	SFXBB															
17	17			17	17	17	FXBB	PFXBB	SFXBB															
18	18			18	18	18	FXBB	PFXBB	SFXBB															
20	20			20	20	20	FXBB	PFXBB	SFXBB															
20A	20			20	20	20	FXBB	PFXBB	SFXBB															
22	22			22	22	22	FXBB	PFXBB	SFXBB															
Thread Length Configurable FXBB PFXBB SFXBB	25	25	-0.007	20-40	6 8 10	24	26	M12	M 6	FXBB	PFXBB	SFXBB												
	25A	-0.020	26							24	FXBB	PFXBB	SFXBB											
	30	30	30							30	FXBB	PFXBB	SFXBB											
	30A	30	30							30	FXBB	PFXBB	SFXBB											

MA	Y+F
M 3	Y+F ≥ 11.5
M 4	Y+F ≥ 14.0
M 5	Y+F ≥ 16.2
M 6	Y+F ≥ 18.5
M 8	Y+F ≥ 23.5
M10	Y+F ≥ 28.5
M12	Y+F ≥ 35.5
M16	Y+F ≥ 45.0
M20	Y+F ≥ 55.0

When $W < V$, wrench flats W reaches O.D.V.

Hex

Type	Material	Surface Treatment
LXAB	EN 1.1191 Equiv.	Black Oxide
PLXAB	EN 1.1191 Equiv.	Electroless Nickel Plating
SLXAB	EN 1.4301 Equiv.	-

Dimensions of Wrench Flats when $Y \geq 17$

RoHS

Please refer to Table 1 to specify dimensions Y and F. Refer to the table below for thread undercut dimensions. This type may have centering holes depending on dimensions.

Part Number Type	No.	Dg6	1mm Increment			MA (Coarse) Selection	B	C	M (Coarse)	Unit Price															
			Y	F	N					Thread Length Fixed		Thread Length Configurable													
Thread Length Fixed LXAB PLXAB SLXAB	6	6	-0.004	2-60	3	8	9.2	M 6	FXAB	PFXAB	SFXAB	PHFXAB													
	6A	-0.012	10						11.5	10	FXAB	PFXAB	SFXAB	PHFXAB											
	8	-0.005	8-16						12	10	FXAB	PFXAB	SFXAB	PHFXAB											
	8A	-0.014	16						14	14	FXAB	PFXAB	SFXAB	PHFXAB											
	10	-0.006	10-20						15	13	FXAB	PFXAB	SFXAB	PHFXAB											
	10A	-0.017	20						17	17	FXAB	PFXAB	SFXAB	PHFXAB											
	12	4-60	10-100						4 5 6	17	14	M10	M 8	FXAB	PFXAB	SFXAB	PHFXAB								
	12																	12	12	12	12	FXAB	PFXAB	SFXAB	PHFXAB
	13																	13	13	13	13	FXAB	PFXAB	SFXAB	PHFXAB
	15																	15	15	15	15	FXAB	PFXAB	SFXAB	PHFXAB
16	16			16	16	16	FXAB	PFXAB										SFXAB	PHFXAB						
17	17			17	17	17	FXAB	PFXAB										SFXAB	PHFXAB						
18	18			18	18	18	FXAB	PFXAB										SFXAB	PHFXAB						
20	20			20	20	20	FXAB	PFXAB										SFXAB	PHFXAB						
20A	20			20	20	20	FXAB	PFXAB										SFXAB	PHFXAB						
22	22			22	22	22	FXAB	PFXAB										SFXAB	PHFXAB						
Thread Length Configurable LXNAB PLXNAB SLXNAB	25	25	-0.007	20-40	6 8 10 12	24	27.7	M12	M 6	FXNAB	PFXNAB	SFXNAB													
	25A	-0.020	26							24	FXNAB	PFXNAB	SFXNAB												
	30	30	30							30	FXNAB	PFXNAB	SFXNAB												
	30A	30	30							30	FXNAB	PFXNAB	SFXNAB												

N is available for Thread Length Configurable Type only.

Ordering Example

Part Number - Y - F - N - MA

FXAB10 - 25 - F18 - N - MA5

PLXNAB12 - 15 - F25 - N12 - MA6

Alterations

Part Number - Y - F - N - MA - (YKC, WSC)

FXAB20 - 20 - F20 - N - MA10 - YKC

Alterations	Y Dimension Tolerance	Four Wrench Flats
	YKC	WSC
Code	YKC	WSC
Spec.	Changes Y dimension tolerance to ± 0.05 . Applicable to all types. Ordering Code: YKC	Changes from two wrench flats to four wrench flats. Applicable to Standard and Stepped Types. Ordering Code: WSC

Example

Thread Undercut Dimensions

Thread Dia. (M)	Coarse Thread		
	g	r	f
6			4.3-4.9
8	1.5-2.5	0.2-0.6	6.3-6.6
10			8.1-8.3
12	1.5-3.0		9.8-10.1
16		0.2-1.0	13.6-13.8
20	1.5-4.0		17.0-17.2