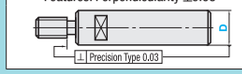
Shafts

One End Threaded with Undercut and Wrench Flats / Cross-Drilled Hole

High Precision Linear Shafts for High Precision Assembly
Features: Perpendicularity ⊥0.03



P.243

For products uncovered by the e-Catalog Standards, see P.131.

■For High Precision Linear Shafts with high perpendicular precision of the shaft end (⊥ 0.03), see P.243. ■For Shafts w/o Wrench Flats or Cross-Drilled Hole, see P.195.

RoHS10

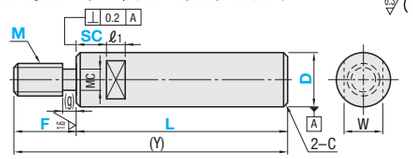
Annealing may lower hardness at wrench flats, cross-drilled hole and shaft end machined areas (effective thread length + approx. 10mm). P.142
Cross-drilled hole areas may be out of O.D. tolerances due to annealing-induced deformation.
L Dimension Tolerance, Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness P.141
Features of Low Temp. Black Chrome Plating P.156

Type					Material	Hardness	Surface Treatment
With Wrench Flats			With Cross-Drilled Hole				
D Tol. g6	D Tol. h5	D Tol. f8	D Tol. g6	D Tol. f8			
SAFS	SFSU	-	SFHS	-	SUJ2 Equivalent	Effective Hardened Depth of Induction Hardening P.142	-
SSAFS	SSFSU	-	SSHFS	-	SUS440C or 13Cr stainless	SUJ2 Equivalent 58HRC~	Hard Chrome Plating - Plating Hardness: HV750 ~, Plating Thickness: 5μ or More
PSAFS	PSFSU	-	PSHFS	-	SUJ2 Equivalent		
PSSAFS	PSSFSU	-	PSSHFS	-	SUS440C or 13Cr stainless	SUS440C or 13Cr stainless 56HRC~	Low Temp. Black Chrome Plating
RSAFS	-	-	RSHFS	-	SUJ2 Equivalent		Hard Chrome Plating - Plating Hardness: HV750 ~, Plating Thickness: 10μ or More
-	-	PSAGS	-	PSHGS	S45C Equivalent	-	
-	-	PSSAGS	-	-	SUS304		

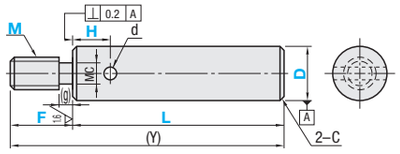
For plated products, the surface roughness of D part is 0.4▽; and for unplated products, it is 6.3▽ (1.6▽ 0.4▽ 0.4▽ G).

D	D Tol. g6	D Tol. h5	D Tol. f8
8	-0.005 -0.014	0 -0.006	-0.013 -0.035
10			
12			
13	-0.006 -0.017	0 -0.008	-0.016 -0.043
15			
16			
18			
20			
25	-0.007 -0.020	0 -0.009	-0.020 -0.053
30			
35			
40	-0.009 -0.025	0 -0.011	-0.025 -0.064
50			

With Wrench Flats



With Cross-Drilled Hole (D≤30, L≤500)



Part Number Type			D	1mm Increments L	F	Selection M (Coarse)	Wrench Flats Dimensions SC	W	ℓ1	Cross-Drilled Hole Dimensions H	d	(Y) Max.	C
			8	25~ 995		6		7	8			800	
		(With Cross-Drilled Hole)	10	25~ 995		6 8		8			3	800	
(With Wrench Flats)		D≤30, L≤500	12	25~1195		6 8 10		10				1000	0.5 or Less
(D Tol. g6)	(D Tol. h5)	(D Tol. g6)	13	25~1195		6 8 10 12		11			4	1000	
SAFS	SFSU	SFHS	15	25~1195		6 8 10 12	SC=1mm Increment	13				1000	
SSAFS	SSFSU	SSHFS	16	25~1195		6 8 10 12	SC+ℓ1≤L SC≥0	14	10	H=1mm Increment L≥H+d/2+2 H≥d/2+2		1200	
PSAFS	PSFSU	PSHFS	18	25~1195	5≤F≤Mx3	6 8 10 12 16		16			6	1200	
PSSAFS	PSSFSU	PSSHFS	20	25~1195		6 8 10 12 16		17				1200	1.0 or Less
RSAFS (D≤30, L≤500)		RSHFS	25	25~1195		8 10 12 16 20 24	Details of Wrench Flats P.142	22			7	1200	
		(D Tol. f8) PSHGS	30	25~1495		8 10 12 16 20 24		27	15			1500	
(D Tol. f8) PSAGS PSSAGS			35	25~1495		10 12 16 20 24 30		30			-	1500	
			40	25~1495		12 16 20 24 30		36	20			1500	
			50	25~1495	F-(g)≥Pitchx3	16 20 24 30		41				1500	

D≤30 and L≤500 are applicable for Shafts with Cross-Drilled Hole.

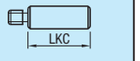
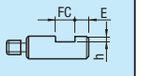
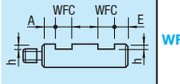
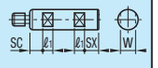
Ordering Example

Part Number	L	F	M	SC	H
SAFS13	800	F23	M10		
SSHFS20	450	F28	M12		H15

Alterations

Part Number	L	F	M(MMC, MMS)	SC	H	(LKC~etc.)
SAFS30	250	F20	M10	SC20		LKC

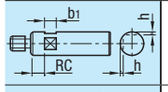
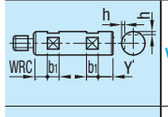
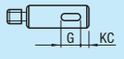
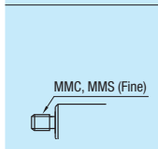
Alteration Details P.143

Alterations	Code	Spec.
	LKC	Alteration to L dimension tolerance Ordering Code LKC L dimensions can be specified in 0.1mm increment for LKC. L<200 ···L±0.03 200≤L<500 ···L±0.05 L≥500 ···L±0.1
	FC	Set Screw Flat at One Location Ordering Code FC10-E8 FC, E=1mm Increment D≤30 : FC≤5xD, D≥35 : FC≥3xD E=0 or E≥2 Not available in combination with WFC.
	WFC	Set Screw Flats at Two Locations Ordering Code WFC8-A8-E4 WFC, A, E=1mm Increment D≤30:WFC≤5xD, D≥35:WFC≥3xD A(E)=0 or A(E)≥2 Orientation between set screw flats is not coplanar. Not available in combination with FC.
	SX	Second Set of Wrench Flats Ordering Code SX15 Application Notes Only applicable to Shafts with Wrench Flats. SX=1mm Increment SC+SX+ℓ1x2<L SX≥0 Orientation between two set screw flats is not coplanar.

D	h
8~18	1
20~40	2
50	3

D	h
8~18	1
20~40	2
50	3

D	W	ℓ1	D	W	ℓ1
8	7	8	20	17	10
10	8		25	22	
12	10		30	27	15
13	11	10	35	30	
15	13		40	36	20
16	14		50	41	
18	16				

Alterations	Code	Spec.
	RC	90-deg. Set Screw Flat at One Location Ordering Code RC10 Application Notes Only applicable to D=10 ~ 30. Not available in combination with WRC.
	WRC	90-deg. Set Screw Flats at Two Locations Ordering Code WRC10-Y10 Application Notes Only applicable to D=10 ~ 30. Not available in combination with RC. Orientation between two set screw flats is not coplanar.
	KC	Keyway is added at one location. Ordering Code KC10-G10 Application Notes Only applicable to D=12, 16, 20, 25 and 30.
	MMC MMS	Change to Fine Thread Ordering Code

For details, see Shaft Alteration Overview. P.143

MMC14 (M is changed to MMC) Undercut Dimensions for Fine Threads ①

MMC NMC	Pitch	MC NC	(g)
6	0.75	4.8	2.0
8	1.0	6.4	
10		8.4	
12		10.4	
15		13.4	
17		15.4	
20		18.4	

MMS14 (M is changed to MMS) Undercut Dimensions for Fine Threads ②

MMS NMS	Pitch	MC NC	(g)
10	1.25	8	3
12	1.5	9.7	
14		11.7	
18		15.7	

Please see Shaft Alteration Overview for details if provided. P.143
When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm. P.144
Alterations may lower hardness. See P.142.

Part Number Type	D	Unit Price Min. L ↓ 50	L51 ↓ 100	L101 ↓ 150	L151 ↓ 200	L201 ↓ 250	L251 ↓ 300	L301 ↓ 350	L351 ↓ 400	L401 ↓ 450	L451 ↓ 500	L501 ↓ 550	L551 ↓ 600	L601 ↓ 650	L651 ↓ 700	L701 ↓ 750	L751 ↓ 800	L801 ↓ 850	L851 ↓ 900	L901 ↓ 950	L951 ↓ 1000	L1001 ↓ 1100	L1101 ↓ 1200	L1201 ↓ 1300	L1301 ↓ 1400	L1401 ↓ 1495
SAFS SFSU SFHS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
	16																							-	-	-
	18																							-	-	-
	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
SSAFS SSFSU SSHFS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
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	18																							-	-	-
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	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
PSAFS PSFSU PSHFS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
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	18																							-	-	-
	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
PSSAFS PSSFSU PSSHFS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
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	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									

For D tolerance h5, add the relevant surcharge to the prices above. For Shafts with Cross-Drilled Hole, subtract the relevant charge from the prices above.

Part Number Type	D	Unit Price Min. L ↓ 100	L101 ↓ 200	L201 ↓ 400	L401 ↓ 600	L601 ↓ 800	L801 ↓ 1000	L1001 ↓ 1200	L1201 ↓ 1495
PSAGS PSHGS	8						-	-	-
	10						-	-	-
	12, 13							-	-
	15, 16								-
	18, 20								-
	25								-
	30								
	35								
	40								
	50								
PSSAGS	8						-	-	-
	10						-	-	-
	12, 13							-	-
	15, 16								-
	18, 20								-
	25								-
	30								
	35								
	40								
	50								

For Shafts with Cross-Drilled Hole, subtract the relevant charge from the prices above.

Part Number Type	D	Unit Price Min. L ↓ 50	L51 ↓ 100	L101 ↓ 150	L151 ↓ 200	L201 ↓ 300	L301 ↓ 400	L401 ↓ 500
RSAFS RSHFS	8							
	10							
	12							
	13							
	15							
	16							
	18							
	20							
	25							
	30							

For Shafts with Cross-Drilled Hole, subtract the relevant charge from the prices above.