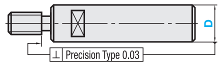
Shafts

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

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

- 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

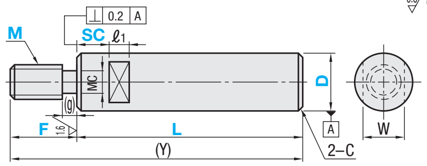
Type					Material	Hardness	Surface Treatment
With Wrench Flats			With Cross-Drilled Hole				
D Tol. g6	D Tol. h5	D Tol. f8	D Tol. g6	D Tol. f8			
SAFS	SFSU	-	SFHS	-	SUJ2	Effective Hardened Depth of Induction Hardening P.142	-
SSAFS	SSFSU	-	SSHFS	-	SUS440C Equivalent		
PSAFS	PSFSU	-	PSHFS	-	SUJ2	SUJ2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

For plated products, the surface roughness of D part is 0.4; and for unplated products, it is 0.4 G.

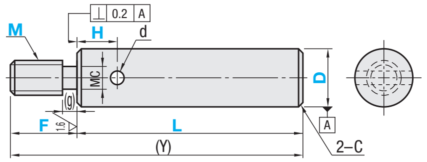
6.3 (1.6 0.4 0.4 G)

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

With Wrench Flats



With Cross-Drilled Hole (D≤30, L≤500)



Part Number – Type

(With Wrench Flats) (D Tol. g6): **SAFS, SSAFS, PSAFS, PSSAFS, RSAFS** (D≤30, L≤500)
(D Tol. h5): **SFSU, SSFSU, PSFSU, PSSFSU**
(With Cross-Drilled Hole) D≤30, L≤500 (D Tol. g6): **SFHS, SSHFS, PSHFS, PSSHFS, RSHFS**
(D Tol. f8): **PSHGS**
(D Tol. f8): **PSAGS, PSSAGS**

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

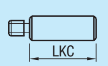
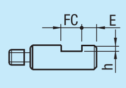
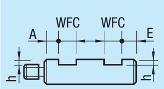
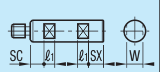
D	L (1mm Increments)	F (1mm Increments)	M (Coarse)	SC	W	ℓ1	H	d	(Y) Max.	C
8	25~ 995	5≤F≤Mx3 F-(g)≥Pitchx3	6	SC=1mm Increment SC+ℓ1≤L SC≥0 Details of Wrench Flats P.142	7	8	H=1mm Increment L≥H+d/2+2 H≥d/2+2	3	800	0.5 or Less
10	25~ 995		6 8		8				800	
12	25~1195		6 8 10		10	10			1000	
13	25~1195		6 8 10 12		11			4	1000	
15	25~1195		6 8 10 12		13				1000	
16	25~1195		6 8 10 12		14				1200	
18	25~1195		6 8 10 12 16		16			6	1200	
20	25~1195		6 8 10 12 16		17				1200	1.0 or Less
25	25~1195		8 10 12 16 20 24		22			7	1200	
30	25~1495		8 10 12 16 20 24		27	15			1500	
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		16 20 24 30		41				1500	

Ordering Example

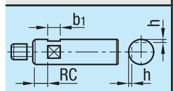
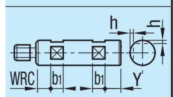
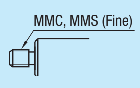
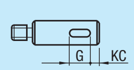
Part Number	-	L	-	F	-	M	-	SC	-	H
SAFS13	-	800	-	F23	-	M10				
SSHFS20	-	450	-	F28	-	M12			-	H15

Alterations

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

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. D 8~18: h 1; D 20~40: h 2; D 50: h 3
	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. D 8~18: h 1; D 20~40: h 2; D 50: h 3
	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 8: W 7, ℓ1 8; D 10: W 8, ℓ1 8; D 12: W 10; D 13: W 11; D 15: W 13; D 16: W 14; D 18: W 16 (ℓ1 10 for D 12–18); D 20: W 17; D 25: W 22 (ℓ1 10); D 30: W 27; D 35: W 30 (ℓ1 15); D 40: W 36; D 50: W 41 (ℓ1 20)

Alteration Details P.143

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.	For details, see Shaft Alteration Overview. P.143
	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.	
	MMC MMS	Change to Fine Thread Ordering Code MMC14 (M is changed to MMC) MMS14 (M is changed to MMS)	
	KC	Keyway is added at one location. Ordering Code KC10-G10 Application Notes Only applicable to D=12, 16, 20, 25 and 30.	

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.

Type	D	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																							-	-	-
	16																							-	-	-
	18																							-	-	-
	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
PSAFS, PSFSU, PSHFS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
	16																							-	-	-
	18																							-	-	-
	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
PSSAFS, PSSFSU, PSSHFS	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
	16																							-	-	-
	18																							-	-	-
	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.

Type	D	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.

Type	D	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.