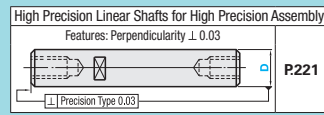


# Shafts

Both Ends Tapped with Wrench Flats / Both Ends Tapped with Cross-Drilled Hole



For High Precision Linear Shafts with high perpendicular precision of the shaft end ( $\perp 0.03$ ), see P.221. For Shafts w/o Wrench Flats or Cross-Drilled Hole, see P.147.

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



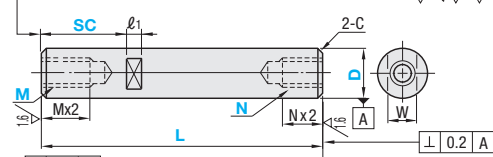
RoHS 10

- 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

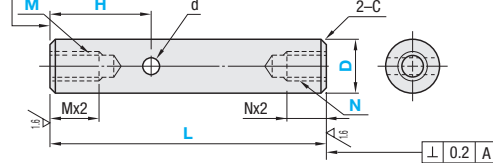
Type				Material	Hardness	Surface Treatment
With Wrench Flats		With Cross-Drilled Hole				
D Tol. g6	D Tol. h5	D Tol. f8	D Tol. g6	D Tol. f8		
SFJZ	SFUZ	SFHZ	SFHZ	SUJ2 Equivalent	Effective Hardened Depth of	
SSFJZ	SSFUZ	SSFHZ	SSFHZ	SUS440C or 13Cr stainless	Induction Hardening P.142	
PSFJZ	PSFUZ	PSFHZ	PSFHZ	SUJ2 Equivalent	SUJ2 Equivalent	Hard Chrome Plating - Plating Thickness: $5\mu$ or More
PSSFJZ	PSSFUZ	PSSFHZ	PSSFHZ	SUS440C or 13Cr stainless	SUS440C or 13Cr stainless	Low Temp. Black Chrome Plating
RSFJZ	RSFUZ	RSFHZ	RSFHZ	SUJ2 Equivalent	SUJ2 Equivalent	Hard Chrome Plating - Plating Thickness: $10\mu$ or More
	PSFGZ	PSGHZ	PSGHZ	S45C Equivalent		
	PSSFGZ			SUS304		

For plated products, the surface roughness of D part is  $\sqrt{0.4}$  and for unplated products, it is  $\sqrt{0.6}$ .

With Wrench Flats



With Cross-Drilled Hole (8 $\leq$ D $\leq$ 30, L $\leq$ 500)



D	D Tol.		
	g6	h5	f8
6	-0.004	0	-0.010
8	-0.012	-0.005	-0.028
10	-0.005	0	-0.013
12	-0.014	-0.006	-0.035
13			
15	-0.006	0	-0.016
16	-0.017	-0.008	-0.043
18			
20	-0.007	0	-0.020
25	-0.020	-0.009	-0.053
30			
35	-0.009	0	-0.025
40	-0.025	-0.011	-0.064
50			

Part Number	Type	D	L specified in 1mm Increments		M (Coarse), N (Coarse) Selection				Wrench Flats Dimensions		Cross-Drilled Hole Dimensions			C
			SC	H	W	$\ell_1$	SC	H	d					
(With Wrench Flats)		6	20-800	3					5					0.5 or Less
		8	20-1000	3, 4, 5					7, 8					
		10	20-1000	3, 4, 5, 6					10					
(D Tol. g6)	(D Tol. h5)	12	20-1200	4, 5, 6, 8					10					
		13	25-1200	4, 5, 6, 8					11					
		15	25-1200	4, 5, 6, 8, 10					13					
		16	30-1200	4, 5, 6, 8, 10					14	10				
		18	30-1200	4, 5, 6, 8, 10, 12					16					
		20	30-1200	4, 5, 6, 8, 10, 12					17					
		25	35-1200	4, 5, 6, 8, 10, 12, 16					22					
		30	35-1500	6, 8, 10, 12, 16, 20					27	15				1.0 or Less
		35	35-1500	6, 8, 10, 12, 16, 20, 24					30					
		40	50-1500	10, 12, 16, 20, 24, 30					36					
		50	65-1500	12, 16, 20, 24, 30					41	20				

8 $\leq$ D $\leq$ 30 and L $\leq$ 500 are applicable for Shafts with Cross-Drilled Hole.  
L requires Mx2+Nx2 $\leq$ L. When Mx2.5+4+Nx2.5+4 $\geq$ L, tap pilot holes may go through and the effective length of the smaller tap part may be shortened.

Ordering Example: SFJZ10 - 200 - M5 - N5 - SC10 - H20

Alterations Example: SFJZ30 - 500 - M8 - N10 - SC10 - LKC

Alterations	Code	Spec.
LKC	LKC	Alteration to L dimension tolerance Ordering Code: LKC L dimensions can be specified in 0.1mm increment for LKC. $L < 200 \rightarrow L \pm 0.03$ $200 \leq L < 500 \rightarrow L \pm 0.05$ $L \geq 500 \rightarrow L \pm 0.1$
FC	FC	Set Screw Flat at One Location Ordering Code: FC10-A8 FC, A=1mm Increment $D \leq 30: FC \leq 5xD$ $D \geq 35: FC \leq 3xD$ $FC \leq L/2$ A=0 or A $\geq$ 2 Not available in combination with WFC.
WFC	WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E2 WFC, A, E=1mm Increment $D \leq 30: WFC \leq 5xD$ $D \geq 35: WFC \leq 3xD$ A(E)=0 or A(E) $\geq$ 2 Orientation between set screw flats is not coplanar. Not available in combination with FC.

Alteration Details P.143

Alterations	Code	Spec.
SX	SX	Second Set of Wrench Flats Ordering Code: SX15 Application Notes: Only applicable to Shafts with Wrench Flats. SX=1mm Increment $SC + SX + \ell_1 \times 2 < L$ SX $\geq$ 0 Orientation between two set screw flats is not coplanar.
MSC, NSC	MSC, NSC	Change to Fine Tapped Thread Ordering Code: MSC14 (M is changed to MSC) NSC14 (N is changed to NSC) Application Notes: Applicable to D=12 or more
RC	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	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.
MD, ND	MD, ND	Change the effective tap depth to M(N)x3. Ordering Code: MD6/ND6 (M is changed to MD, N is changed to ND) Application Notes: Only applicable to D=10 ~ 30 and M (N) = 6 ~ 20 Both Ends Tapped: MDx3.5+4-NDx3.5+4 $\leq$ L

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.  
The distance between wrench flats and cross-drilled holes should be greater than 2mm for alterations.  
Alterations may lower hardness. See P.142.

Part Number	Type	D	Unit Price																									
			Min. L	L51	L101	L151	L201	L251	L301	L351	L401	L451	L501	L551	L601	L651	L701	L751	L801	L851	L901	L951	L1001	L1101	L1201	L1301	L1401	
SFJZ	SFUZ	SFHZ	6																									
			8																									
			10																									
			12																									
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