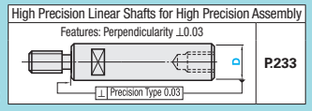
Shafts

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

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



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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.223. ■For Shafts w/o Wrench Flats or Cross-Drilled Hole, see P.173.

RoHS

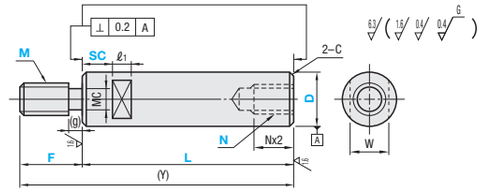
- Annealing may lower hardness at wrench flats, cross-drilled hole and shaft end machined areas (effective thread length + approx. 10mm). P.142
- Cross-drilled hole areas may be out of O.D. tolerances due to annealing-induced deformation.
- L Dimension Tolerance, Circularity, Straightness, Perpendicularity,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

Type: With Wrench Flats D Tol. g6	With Wrench Flats D Tol. h5	With Wrench Flats D Tol. f8	With Cross-Drilled Hole D Tol. g6	With Cross-Drilled Hole D Tol. f8	M Material	H Hardness	S Surface Treatment
SAFZ	SFBU	-	SAHD	-	SUJ2	Effective Hardened Depth of Induction Hardening P.142 SUJ2 58HRC~ SUS440C Equivalent 56HRC~	-
SSAFZ	SSFBU	-	SSAHD	-	SUS440C Equivalent		
PSAFZ	PSFBU	-	PSAHD	-	SUJ2		Hard Chrome Plating - Plating Hardness: HV750 ~, Plating Thickness: 5μ or More
PSSAFZ	PSSFBU	-	PSSAHD	-	SUS440C Equivalent		
RSAFZ	-	-	RSAHD	-	SUJ2		Low Temp. Black Chrome Plating
-	-	PSAGZ	-	PSHGD	S45C Equivalent	-	Hard Chrome Plating - Plating Hardness: HV750 ~, Plating Thickness: 10μ or More
-	-	PSSAGZ	-	-	SUS304		

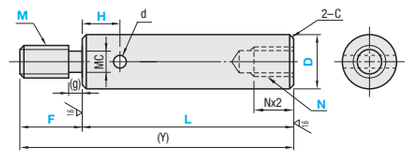
For plated products, the surface roughness of D part is 0.4/; and for unplated products, it is 0.4/ 6.

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

With Wrench Flats



With Cross-Drilled Hole (D≤30, L≤500)



Part Number Type	D	1mm Increments L	F	M (Coarse) Selection	N (Coarse) Selection	Wrench Flats Dimensions SC	W	ℓ1	Cross-Drilled Hole Dimensions H	d	(Y) Max.	C
(With Wrench Flats) (With Wrench Flats) (With Cross-Drilled Hole) D≤30, L≤500 (Tol. g6) (Tol. h5) (Tol. g6) SAFZ SSAFZ PSAFZ PSSAFZ RSAFZ SFBU SSFBU PSFBU PSSFBU SAHD SSAHD PSAHD PSSAHD RSAHD	8	25~ 995	5≤F≤Mx3	6	3 4 5	SC = 1mm Increment SC+ℓ1≤L SC≥0 Details of Wrench Flats P.142	7	8	H=1mm Increment L≥H+d/2+6+Nx2.5 H≥d/2+2	3	800	0.5 or Less
	10	25~ 995		6 8	3 4 5 6		8				800	
	12	25~1195		6 8 10	4 5 6 8		10	10			1000	
	13	25~1195		6 8 10 12	4 5 6 8		11			4	1000	
	15	25~1195		6 8 10 12	4 5 6 8 10		13				1000	
	16	25~1195		6 8 10 12	4 5 6 8 10		14				1200	
	18	25~1195		6 8 10 12 16	4 5 6 8 10 12		16			6	1200	
	20	25~1195		6 8 10 12 16	4 5 6 8 10 12		17				1200	1.0 or Less
(D≤30, L≤500) (Tol. f8) PSAGZ PSSAGZ SHGD	25	25~1193	F-g2≥Pitch×3	8 10 12 16 20 24	4 5 6 8 10 12 16		22	15		7	1200	
	30	25~1493		8 10 12 16 20 24	6 8 10 12 16 20		27				1500	
	35	25~1492		10 12 16 20 24 30	8 10 12 16 20 24		30			-	1500	
	40	40~1490		12 16 20 24 30	10 12 16 20 24 30		36	20			1500	
	50	50~1490		16 20 24 30	12 16 20 24 30		41				1500	

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

Full length L requires Nx2.5+4≤L.

Coarse Thread Undercut Dimensions M	Pitch	MC	Undercut (g)
6	1.0	4.4	2
8	1.25	6.0	3
10	1.5	7.7	
12	1.75	9.4	4
16	2.0	13.0	
20	2.5	16.4	5
24	3.0	19.6	
30	3.5	25.0	

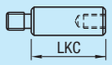
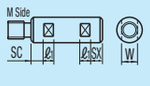
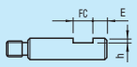
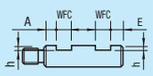
Ordering Example

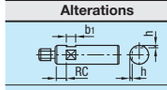
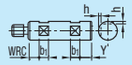
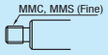
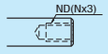
Part Number	L	F	M	N	SC	H
SAFZ20	277	F25	M10	N12	SC10	
SSAHD20	277	F25	M12	N12		H10

Alterations

Part Number	L	F	M(MMC, MMS)	N(NSC, ND)	SC	H	(LKC…etc.)
SAFZ30	250	F40	M20	N20	SC10		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
	SX	Second Set of Wrench Flats Ordering Code SX15 Application Notes Only applicable to Shafts with Wrench Flats. SX=1mm Increment SC+SX+ℓ1×2<L SX≥0 ⊗Orientation between two set screw flats is not coplanar. D: 8, 10, 12, 13, 15, 16, 18 / W: 7, 8, 10, 11, 13, 14, 16 / ℓ1: 8 D: 20, 25, 30, 35, 40, 50 / W: 17, 22, 27, 30, 36, 41 / ℓ1: 10, 15, 20
	FC	Set Screw Flat at One Location Ordering Code FC10-E8FC, 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 20~40 / 2 50 / 3
	WFC	Set Screw Flats at Two Locations Ordering Code WFC8-A6-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 20~40 / 2 50 / 3

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 combinationwith 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.
	MMC MMS	Change to Fine Thread Ordering Code MMC14 (M is changed to MMC) MMS14 (M is changed to MMS)
	NSC	Change to Fine Tapped Thread Ordering Code NSC14 (N is changed to NSC) Application Notes Applicable to D=12 or more
	ND	Change the effective length of tapped part to Nx3. Ordering Code ND6 (N is changed to ND) Application Notes Only applicable to D=10~30 and N=6~20 One End Tapped: NDx3.5+7≤L

For details, see Shaft Alteration Overview. P.143

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.
Alterations may lower hardness. See P.142.

Part Number 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	L1401~1493
SAFZ SFBU SAHD	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
	16																							-	-	-
	18																							-	-	-
	20																							-	-	-
	25																							-	-	-
	30																									
	35																									
	40																									
	50																									
SSAFZ SSFBU SSAHD	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
	13																							-	-	-
	15																							-	-	-
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	40																									
	50																									
PSAFZ PSFBU PSAHD	8																					-	-	-	-	-
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	30																									
	35																									
	40																									
	50																									
PSSAFZ PSFBU PSAHD	8																					-	-	-	-	-
	10																					-	-	-	-	-
	12																							-	-	-
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	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.

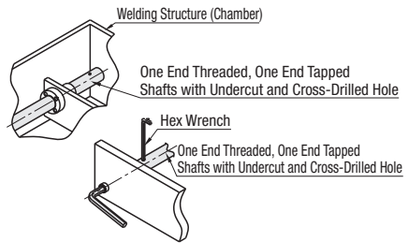
Part Number Type	D	Min. L 50	L51~100	L101~150	L151~200	L201~300	L301~400	L401~500
RSAFZ RSAHD	8							
	10							
	12							
	13							
	15							
	16							
	18							
	20							
	25							
	30							

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

Part Number Type	D	Min. L 100	L101~200	L201~400	L401~600	L601~800	L801~1000	L1001~1200	L1201~1493
PSAGZ PSHGD	8						-	-	-
	10						-	-	-
	12, 13							-	-
	15, 16								-
	18, 20								-
	25								-
	30								
	35								
	40								
	50								
PSSAGZ	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.

Example



• Shafts with Cross-Drilled Hole are suitable for narrow work space.