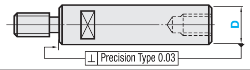
Shafts

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

High Precision Linear Shafts when high precision assembly is needed
Features: Perpendicularity ⊥0.03



P.203

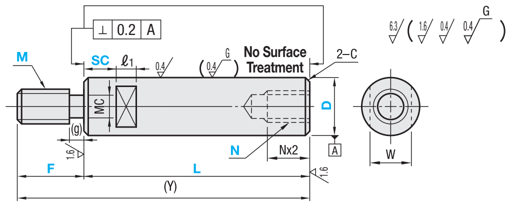
■For High Precision Linear Shafts with high perpendicular precision of the shaft end (⊥ 0.03), see P.203.
■For Shafts w/o Wrench Flats or Cross-Drilled Hole, see P.145.

- Annealing may lower hardness at wrench flats, cross-drilled hole and shaft end machined areas (effective thread length + approx. 10mm). P.112
- 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.111
- Features of LTBC Plating P.128

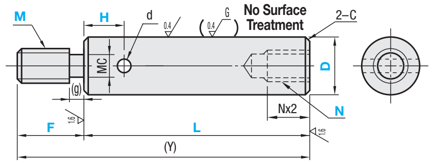
Type					M Material	H Hardness	S Surface Treatment
With Wrench Flats			With Cross-Drilled Hole				
D Tol. g6	D Tol. h5	D Tol. f8	D Tol. g6	D Tol. f8			
SAFZ	SFBU	-	SAHD	-	EN 1.3505 Equiv.	Effective Hardened Depth of Induction Hardening P.112 EN 1.3505 Equiv. 58HRC~ EN 1.4037 Equiv. 56HRC~	-
SSAFZ	SSFBU	-	SSAHD	-	EN 1.4037 Equiv.		
PSAFZ	PSFBU	-	PSAHD	-	EN 1.3505 Equiv.		Hard Chrome Plating Plating Hardness: HV750 ~ Plating Thickness: 5μ or More
PSSAFZ	PSSFBU	-	PSSAHD	-	EN 1.4037 Equiv.		
RSAFZ	-	-	RSAHD	-	EN 1.3505 Equiv.		LTBC Plating
-	-	PSAGZ	-	PSHGD	EN 1.1191 Equiv.	-	Hard Chrome Plating Plating Hardness: HV750 ~ Plating Thickness: 10μ or More
-	-	PSSAGZ	-	-	EN 1.4301 Equiv.		

D Tol.			
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				1mm Increment		M (Coarse) Selection	N (Coarse) Selection	Wrench Flats Dimensions			Cross-Drilled Hole Dimensions		(Y) Max.	C
Type			D	L	F			SC	W	ℓ1	H	d		
(With Wrench Flats) (Tol. g6) SAFZ SSAFZ PSAFZ PSSAFZ RSAFZ (D≤30, L≤500) (Tol. f8) PSAGZ PSSAGZ	(With Wrench Flats) (Tol. h5) SFBU SSFBU PSFBU PSSFBU	(With Cross-Drilled Hole) D≤30, L≤500 (Tol. g6) SAHD SSAHD PSAHD PSSAHD RSAHD (Tol. f8) SHGD	8	25~795	5≤F≤Mx3 F-g≥Pitchx3	6	3 4 5	SC=1mm Increment SC+ℓ1≤L SC≥0 Details of Wrench Flats P.112	7	8	H=1mm Increment L≥H+d/2+6+Nx2.5 H≥d/2+2		800	0.5 or Less
			10	25~795		6 8	3 4 5 6		8			3	800	
			12	25~995		6 8 10	4 5 6 8		10	10			1000	
			13	25~995		6 8 10 12	4 5 6 8		11				1000	
			15	25~995		6 8 10 12	4 5 6 8 10		13			4	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	
			25	25~1193		8 10 12 16 20 24	4 5 6 8 10 12 16		22			7	1200	1.0 or Less
			30	25~1493		8 10 12 16 20 24	6 8 10 12 16 20		27	15			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	

Overall length L requires Nx3≤L.

Coarse Thread Undercut Dimension			
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	

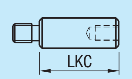
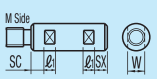
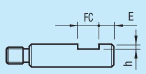
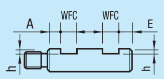
Ordering Example

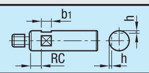
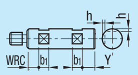
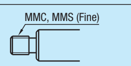
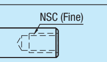
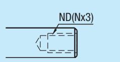
Part Number	-	L	-	F	-	M	-	N	-	SC	-	H
SAFZ20	-	277	-	F25	-	M10	-	N12	-	SC10		
SSAHD20	-	277	-	F25	-	M12	-	N12			-	H10

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.113

Alterations	Code	Spec.
 LKC	LKC	Alteration to L dimension tolerance Ordering Code LKC Not applicable when D-M≤2. 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
 M Side, SC, ℓ1, ℓ1, SX, W	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 / W / ℓ1: 8 / 7 / 8; 10 / 8 / 8; 12 / 10 / 10; 13 / 11 / 10; 15 / 13 / 10; 16 / 14 / 10; 18 / 16 / 10; 20 / 17 / 10; 25 / 22 / 10; 30 / 27 / 15; 35 / 30 / 15; 40 / 36 / 20; 50 / 41 / 20
 FC, E, h	FC	Set Screw Flat at One Location Ordering Code FC10-E8 FC, E=1mm Increment FC≤3xD When 1.5xD<FC, FC≤L/2 E=0 or E≥2 Not available in combination with WFC. D / h: 8~18 / 1; 20~40 / 2; 50 / 3
 A, WFC, WFC, E, h, h	WFC	Set Screw Flats at Two Locations Ordering Code WFC8-A8-E4 WFC,A,E=1mm Increment WFC≤3xD When 1.5xD<WFC, 2WFC≤L/2 A(E)=0 or A(E)≥2 Orientation between set screw flats is not coplanar. Not available in combination with FC. D / h: 8~18 / 1; 20~40 / 2; 50 / 3

Alterations	Code	Spec.
 b1, RC, h, h	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.
 h, h, WRC, b1, b1, Y	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 (Fine)	MMC MMS	Change to Fine Thread Ordering Code MMC14 (M is changed to MMC) MMS14 (M is changed to MMS)
 NSC (Fine)	NSC	Change to Fine Tapped Thread Ordering Code NSC14 (N is changed to NSC) Application Notes Applicable to D=12 or more
 ND(Nx3)	ND	Change the effective length of tapped part to Nx3. Ordering Code ND6 (N is changed to ND) Application Notes Only applicable to D=8~30, N=6~20 One End Tapped: NDx3.5+4≥L

For details, see Shaft Alteration Overview. P.113

- Please see Shaft Alteration Overview for details if provided. P.113
- When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm.
- Alterations may lower hardness. See P.112

Part Number		Unit Price																								
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																					-	-	-	-	-
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	50																									
PSAFZ PSFBU PSAHD	8																	-	-	-	-	-	-	-	-	-
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	12																					-	-	-	-	-
	13																					-	-	-	-	-
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PSSAFZ PSFBU PSAHD	8																	-	-	-	-	-	-	-	-	-
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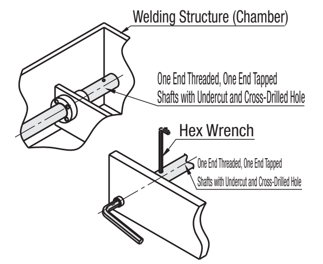
	40																									
	50																									

Part Number		Unit Price						
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							

Part Number		Unit Price							
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								

Example



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