

# High Precision Linear Shafts

One End Threaded One End Tapped / One End Threaded One End Tapped with Wrench Flats

■ Suitable for assemblies of parts requiring high precision and high perpendicular precision of the shaft end ( $\perp 0.03$ ).

**Type**  
 W/o Wrench Flats: VFBD, VSFBD, VPFB, VPSFBD, VRBD  
 With Wrench Flats: VFAZ, VSFAZ, VPFAZ, VPSFAZ, VRAZ

**D Tol.**  
 5: -0.004  
 6: -0.012  
 8: -0.005  
 10: -0.014  
 12: -0.006  
 13: -0.017  
 15: -0.006  
 16: -0.017  
 18: -0.007  
 20: -0.020  
 25: -0.020  
 30: -0.020

**Material**  
 SUJ2, SUS440C Equivalent

**Hardness**  
 Effective Hardened Depth of Induction Hardening  
 P.112  
 58HRC-56HRC-  
 Low Temp. Black Chrome Plating

**Surface Treatment**  
 Hard Chrome Plating  
 Plating Hardness: HV750 ~  
 Plating Thickness: 5 $\mu$  or More

**RoHS 10**

⚠ Annealing may lower hardness at shaft end machined areas (effective thread length + approx. 10mm). P.112  
 ⚠ L Dimension Tolerance, Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness P.111  
 ⚠ Features of Low Temp. Black Chrome Plating P.128

Part Number	Type	1mm Increment				P (Coarse) Selection	N (Coarse) Selection	Wrench Flats Dimensions			(Y) Max.	C	Coarse Thread Dimension	
		D	L	F	B			SC	W	ℓ <sub>1</sub>			M	Pitch
VFBD VSFBD VPFB VPSFBD VRBD	VFAZ VSFAZ VPFAZ VPSFAZ VRAZ	5	25-296			3	2.6 3				300	0.2 or Less		
		6	25-296			3 4	3			5	300		3	0.5
		8	25-296			3 4 5 6	3 4 5			7	300		4	0.7
		10	25-345			4 5 6 8	3 4 5 6			8	350		5	0.8
		12	25-345			5 6 8 10	4 5 6 8			10	350	0.5 or Less	6	1.0
		13	25-345			5 6 8 10	4 5 6 8			11	350		8	1.25
		15	25-345			5 6 8 10 12	4 5 6 8 10			13	350		10	1.5
		16	25-345			5 6 8 10 12	4 5 6 8 10			14	350		12	1.75
		18	25-345			5 6 8 10 12 16	4 5 6 8 10 12			16	350		16	2.0
		20	25-445			6 8 10 12 16	4 5 6 8 10 12			17	450		20	2.5
		25	25-445			8 10 12 16 20	4 5 6 8 10 12 16			22	450	1.0 or Less	24	3.0
		30	25-445			8 10 12 16 20 24	6 8 10 12 16 20			27	15	450		

⚠ Overall length L requires Nx3 $\leq$ L. ⚠ When D=P, specify F=B as B dimensions. However, L and F dimensions have manufacturing priority and B dimension of the product will be F-(Pitchx2).  
 ⚠ Shaft ends may have centering holes.

**Ordering Example**  
 Part Number - L - F - B - P - N - SC  
 VFAZ16 - 200 - F20 - B12 - P10 - N8 - SC10  
 VFBD12 - 277 - F20 - B12 - P8 - N5

**Alterations**  
 Part Number - L - F - B - P (PMC, PMS) - N (NSC, ND) - SC - (LKC-etc.)  
 VFAZ16 - 200 - F20 - B12 - P10 - N8 - SC10 - LKC

Alterations	Code	Spec.	Alterations	Code	Spec.
	LKC	Alteration to L dimension tolerance Ordering Code: LKC ⚠ Not applicable when D-P $\leq$ 2. L dimensions can be specified in 0.1mm increment for LKC. ⚠ L $\leq$ 200 $\dots$ L $\pm$ 0.03		WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E4 WFC, A, E=1mm Increment ⚠ WFC $\leq$ 3xD ⚠ When 1.5xD<WFC, 2WFC $\leq$ L/2 ⚠ A(E)=0 or A(E) $\geq$ 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: Applicable to Shafts with Wrench Flats only. Applicable to D=6 or more. SX=1mm Increment ⚠ SC+SX+ℓ <sub>1</sub> x2<L ⚠ SX $\geq$ 0 ⚠ Only applicable to Shafts with Wrench Flats. ⚠ Orientation between two set screw flats is not coplanar.		PMC PMS	Change to Fine Thread Ordering Code: PMC14 (P is changed to PMC) PMS14 (P is changed to PMS) For details, see Shaft Alteration Overview. P.113
	NSC	Change to Fine Threaded Thread Ordering Code: NSC14 (N is changed to NSC) Application Notes: Applicable to D=12 or more		ND (Nx3)	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, N=6-20 ⚠ One End Tapped: NDx3.5+4 $\leq$ L
	FC	Set Screw Flat at One Location Ordering Code: FC10-E8 FC, E=1mm Increment ⚠ FC $\leq$ 3xD ⚠ When 1.5xD<FC, FC $\leq$ L/2 ⚠ E=0 or E $\geq$ 2 ⚠ Not available in combination with WFC.			

⚠ 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	Type	D	Unit Price				
			Min. L 50	L51 100	L101 200	L201 300	L301 445
5	VFBD	5					
6							
8							
10							
12							
13							
15							
16							
18							
20							
25							
30							
5	VSFBD	5					
6							
8							
10							
12							
13							
15							
16							
18							
20							
25							
30							
5	VPFB	5					
6							
8							
10							
12							
13							
15							
16							
18							
20							
25							
30							
5	VPSFBD	5					
6							
8							
10							
12							
13							
15							
16							
18							
20							
25							
30							
5	VPSFAZ	5					
6							
8							
10							
12							
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15							
16							
18							
20							
25							
30							
5	VRAZ	5					
6							
8							
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12							
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16							
18							
20							
25							
30							

Part Number	Type	D	Unit Price				
			Min. L 50	L51 100	L101 200	L201 300	L301 445
6	VFAZ	6					
8							
10							
12							
13							
15							
16							
18							
20							
25							
30							
6		VSFAZ	6				
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18							
20							
25							
30							
6	VPFAZ		6				
8							
10							
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18							
20							
25							
30							
6		VPSFAZ	6				
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15							
16							
18							
20							
25							
30							
6	VRAZ		6				
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