

High Precision Linear Shafts for High Precision Assembly
Features: Perpendicularity ± 0.03 , Concentricity $\varnothing 0.02$

The drawing shows a shaft with a central section of length 100 and a total length of 120. A feature control frame on the left indicates a perpendicularity tolerance of 0.03. A feature control frame on the right indicates a concentricity tolerance of 0.02. The shaft is labeled 'Precision Type 0.03' and 'Precision Type 0.02'.

P227

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

■ For High Precision Linear Shafts with high perpendicular precision of the shaft end ($\perp$ 0.03), see P.227. ■ For Shafts with Wrench Flats, see P.161.



RoHS10

- ⚙️ Annealing required for wrench flats machining and shaft end threading (effective thread length - approx. 10mm) may lower hardness. **☞ P142**
- ⚙️ L Dimension Tolerance, Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness **☞ P141**
- ⚙️ Features of Low Temp. Black Chrome Plating **☞ P156**

Type				Material	Hardness	Surface Treatment	D Tol.			
One End Stopped, Both Ends Tapped		D Tol. g6	D Tol. h5				D Tol. f8	D	g6	h5
SFPPA	SFUP	-	SFNNA	SUJ2	Effective Hardened Depth of Induction Hardening P.142 SUJ2 58HRC- SU3440C Equivalent 56HRC-	-	-	-	-	
DSFPA	SSFUP	-	SSFNNA	SUS440C Equivalent		-	-	-	-	
PSFPA	PSFUP	-	PSFNNA	SUJ2		-	-	-	-	
PSSFPA	PSSFUP	-	PSSFNNA	SUS440C Equivalent	-	Hard Chrome Plating - Plating Hardness: Hv750 ~, Plating Thickness: 5μ or More ~	-	-	-	
RSFPA	-	-	-	SUJ2	-	Low Temp. Black Chrome Plating	-	-	-	
-	-	PFPGA	-	S45C Equivalent	-	Hard Chrome Plating - Plating Hardness: Hv750 ~, Plating Thickness: 10μ or More ~	-	-	-	
-	-	PSFPGA	-	SUS304	-	-	-	-	-	

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

0.2

A

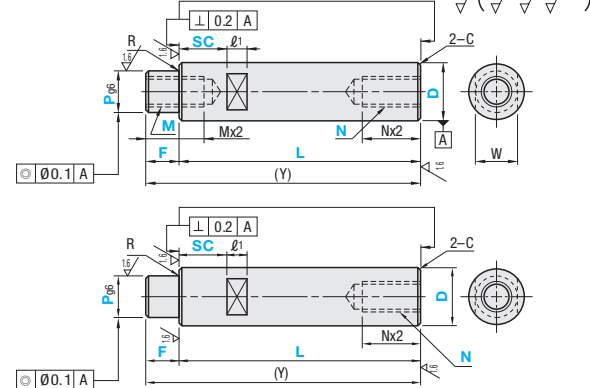
SC

ø1

6.3 / (1.6 / 0.4 / 0.4)

2-C

For plated products, the surface roughness of D part is $\sqrt[0.4]{\frac{G}{F}}$; and for unplated products, it is $\sqrt[0.4]{\frac{G}{F}}$.

[illegible]

When $M \times 2.5 + 4 + N \times 2.5 + 4 \geq (Y)$, tap pilot holes may go through. When $M \times 2 + N \times 2 \geq (Y)$, the effective depth of larger diameter tap has priority.

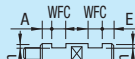


Ordering Example	Part Number	-	L	-	F	-	P	-	M	-	N	-	SC
	SFPPA20	-	400	-	F25	-	P16	-	M10	-	N10	-	SC10
	SSFPA20	-	400	-	F25	-	P16	-	M10	-	N10	-	SC10



Alterations Part Number - L - F - P - M(MD) - N(NSC, ND) - SC - (LKC, NSC...etc.).
SFPPA30 - 400 - F25 - P16 - M10 - N10 - SC10 - LKC

Alteration Details P.143

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 → L ± 0.03 200 ≤ L < 500 → L ± 0.05 L ≥ 500 → L ± 0.1																																																	
 SC SX W	SX	Second Set of Wrench Flats Ordering Code: SX15 SX = 1mm Increment SC + SX + E1 × 2 < L SX = 0 Orientation between two set screw flats is not coplanar.	<table><tr><th>D</th><th>W</th><th>E1</th><th>D</th><th>W</th><th>E1</th></tr><tr><td>8</td><td>7</td><td>20</td><td>17</td><td>10</td><td></td></tr><tr><td>10</td><td>8</td><td>25</td><td>22</td><td></td><td></td></tr><tr><td>12</td><td>10</td><td>30</td><td>27</td><td></td><td></td></tr><tr><td>13</td><td>11</td><td>35</td><td>30</td><td></td><td>15</td></tr><tr><td>15</td><td>13</td><td>40</td><td>36</td><td></td><td>20</td></tr><tr><td>18</td><td>16</td><td>50</td><td>41</td><td></td><td></td></tr><tr><td>18</td><td>16</td><td></td><td></td><td></td><td></td></tr></table>	D	W	E1	D	W	E1	8	7	20	17	10		10	8	25	22			12	10	30	27			13	11	35	30		15	15	13	40	36		20	18	16	50	41			18	16				
D	W	E1	D	W	E1																																														
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13	11	35	30		15																																														
15	13	40	36		20																																														
18	16	50	41																																																
18	16																																																		
 FC E	FC	Set Screw Flat at One Location Ordering Code: FC10-E8 FC, E = 1mm Increment D ≤ 30: FC ≤ 5 × D D ≥ 35: FC ≥ 3 × D E = 0 or E ≥ 2	<table><tr><th>D</th><th>h</th></tr><tr><td>8-18</td><td>1</td></tr><tr><td>20-40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></table>	D	h	8-18	1	20-40	2	50	3																																								
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20-40	2																																																		
50	3																																																		
 A WFC WFC E	WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E4 WFC, A, E = 1mm Increment D ≤ 30: WFC ≤ 5 × D D ≥ 35: WFC ≥ 3 × D A(E) = 0 or A(E) ≥ 2 Orientation between set screw flats is not coplanar. Not available in combination with FC.	<table><tr><th>D</th><th>h</th></tr><tr><td>8-18</td><td>1</td></tr><tr><td>20-40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></table>	D	h	8-18	1	20-40	2	50	3																																								
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Alterations	Code	Spec.												
	RC	90-deg. Set Screw Flat at One Location <u>Ordering Code</u> RC10 <u>Application Notes</u> Only applicable to D=10 ~ 30. ✖ Not available in combination with WRC.												
	WRC	90-deg. Set Screw Flats at Two Locations <u>Ordering Code</u> WRC10-Y10 <u>Application Notes</u> Only applicable to ✖ Not available in combination with RC. ✖ Orientation between two set screw flats is not coplanar.												
	NSC	Change to Fine Tapped Thread <u>Ordering Code</u> NSC14 (N is changed to NSC) <u>Application Notes</u> Applicable to D=12 or more												
	MD ND	Change the effective tap depth to M/Nx3. <u>Ordering Code</u> MD(Nx3) and is changed to MD, N is changed to ND <u>Application Notes</u> Only applicable to D=10~30 and M (N) = 6~20 ⚠ Both Ends Tapped: MDx3.5+4/NDx3.5+4≤L												
	LFC	Set Screw Flat at Step Parts <u>Ordering Code</u> LFC10-A0 ⚠ LFC+A≤F ⚠ D-MIN)≥1 <table border="1" style="float: right;"> <thead> <tr> <th></th><th>P</th><th>H</th></tr> </thead> <tbody> <tr> <td>6~18</td><td>1</td><td>1</td></tr> <tr> <td>20~40</td><td>2</td><td>2</td></tr> <tr> <td>41~</td><td>2</td><td>2</td></tr> </tbody> </table>		P	H	6~18	1	1	20~40	2	2	41~	2	2
	P	H												
6~18	1	1												
20~40	2	2												
41~	2	2												

- ⚠ Please see Shaft Alteration Overview for details if provided. **P143**
- ⚠ When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm.
- ⚠ Alterations may lower hardness. See **P142**.

[illegible]

📌 For D tolerance h5, add the relevant surcharge to the prices above. 📌 For One End Stepped One End Tapped Shafts, subtract the relevant charge from the prices above.

Part Number		Unit Price						
Type	D	Min. L 50	L51 100	L101 150	L151 200	L201 300	L301 400	L401 500
RSFPA	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 1400
PFPGA	8						-	-	-
	10						-	-	-
	12							-	-
	13							-	-
	15, 16								-
	18, 20								-
	25								-
	30								
	35								
	40								
50									

Part Number		Unit Price								
Type	D	Min. L 100	L101 200	L201 400	L401 600	L601 800	L801 1000	L1001 1200	L1201 1496	
PSFPGA	8						-	-	-	
	10						-	-	-	
	12									
	13							-	-	
	15, 16								-	
	18, 20								-	
	25								-	
	30									
	35									
	40									
50										