

Linear Shafts

Hollow Shaft Ends Configurable Type

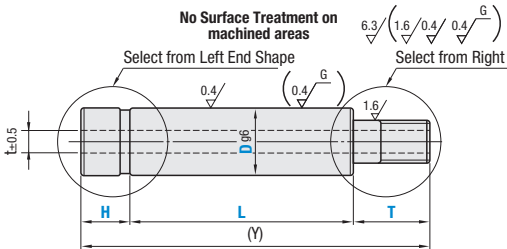
Linear Shafts – Hollow Shaft Ends Configurable Type



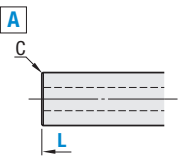
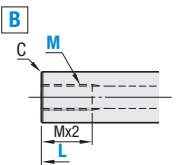
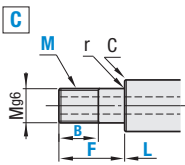
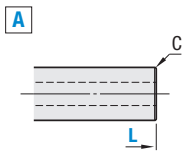
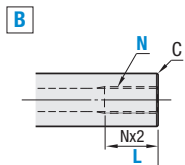
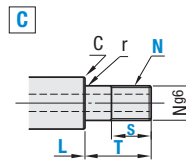
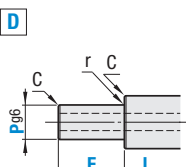
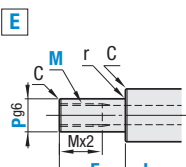
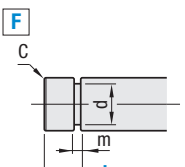
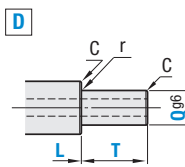
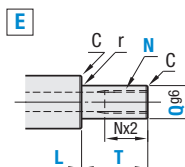
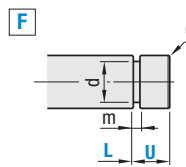
RoHS10

Type	Material	Hardness	Surface Treatment
FSPJ	52100 Bearing Steel	Induction Hardening Effective Hardened Depth P.199 58 HRC min.	—
FPSPJ			Hard Chrome Plating Plating Hardness: 750 HV min. Plating Thickness 5μ or More

No Surface Treatment on machined areas



ⓘ About hollow shaft wall thickness deviations. P.198
ⓘ (Y) dimensions need to be (Y)≤DX50. (Y)≤1500
ⓘ Changes in circularity, straightness, perpendicularity, wall thickness deviations and hardness P.198.

Left End Shape			Right End Shape		
					
					

Machining Conditions ⓘ No alteration condition for Shape A

B When D=6, then M3 When 8≤D≤12, t+1≤M (N)≤D-3 When 13≤D≤25, t+2≤M (N)≤D-3 When 30≤D≤40, t+2≤M (N)≤D-7 Not applicable when D=50 One End Tapped Hollow Shafts P.276 L≥M (N)x4	C <table><thead><tr><th>D</th><th>r</th></tr></thead><tbody><tr><td>6-30</td><td>0.3 or Less</td></tr><tr><td>35-50</td><td>0.5 or Less</td></tr></tbody></table> When 6≤D≤20, t+4≤M (N)≤D When 25≤D≤40, t+6≤M (N)≤D Not applicable when D=50 Both Ends Threaded Hollow Shafts P.280. ⓘ B and S≤Pitchx3 is required.	D	r	6-30	0.3 or Less	35-50	0.5 or Less	D <table><thead><tr><th>D</th><th>r</th></tr></thead><tbody><tr><td>6-30</td><td>0.3 or Less</td></tr><tr><td>35-50</td><td>0.5 or Less</td></tr></tbody></table> One End Stepped Hollow Shafts P.282.	D	r	6-30	0.3 or Less	35-50	0.5 or Less	E <table><thead><tr><th>D</th><th>r</th></tr></thead><tbody><tr><td>6-30</td><td>0.3 or Less</td></tr><tr><td>35-50</td><td>0.5 or Less</td></tr></tbody></table> P (Q)≥M (N)+4	D	r	6-30	0.3 or Less	35-50	0.5 or Less	F For Retaining Ring Groove Detailed Dimensions P.853.
D	r																					
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35-50	0.5 or Less																					
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ⓘ When only one end requires alteration, for the opposite end please select shape A

Part Number			D	t	0.5mm Increments.		1 mm Increments			M / N (Coarse Thread)	C
Type	Left End Shape	Right End Shape			L	F / T	B / S	H / U	P / Q		
FSPJ FPSPJ	A B C D E F	A B C D E F	6	2	20.0-1500.0 (L≤DX5)	2≤F≤P (M)x5 2≤T≤Q(N)x5	2≤B≤Mx3 2≤S≤Nx3 B≤F-2 S≤T-2 (When M and N≤6) B≤F-3 S≤T-3 (When M and N≤8, 10) B≤F-5 S≤T-5 (When M and N≤12)	2≤H / U (When D=6) 3≤H / U (When 6<D≤10) 4≤H / U (When 10<D≤20) 5≤H / U (When 20<D) H-U<1/2	D/4≤P / Q<D	3 4 5 6 8 10 12 16 20 24 30	When D<20, 0.5 or Less When D≥20, 1.0 or Less
			8	3							
			10	4							
			12	6							
			13	7							
			16	10							
			20	14							
			25	16							
			30	17							
			35	19							
			40	20							
			50	26							

Linear Shafts / Linear Shaft Washers

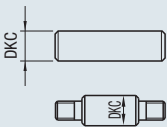
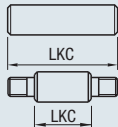
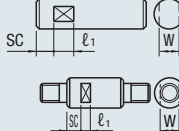
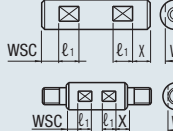
Shaft Ends Configurable Type, continued

Part Number Example

Type	Left End	Right End	D	L	F	M	B	T	N	S	H	U	P	Q
FSPJ	A	C	-	D12	-	L100			-	T20	-	N10	-	S12

Part Number Alterations

Type	Left End	Right End	D	L	F	M	B	T	N	S	H	U	P	Q	(DKC...etc.)
FSPJ	A	C	-	D12	-	L100			-	T20	-	N6	-	S12	- DKC

Alterations	Revise O.D. Tolerance (Precision Grade)	Alteration to L Dimension Tolerance	Wrench Flats	Add Wrench Flats at Two Locations																																										
																																														
Code	DKC	LKC	SC	WSC																																										
Spec.	Outer diameter tolerance is altered to h5. Ordering Code: DKC	Changes L Tolerance. Ordering Code: LKC	Adds a wrench flat. Ordering Code: SC5	Wrench flats are added at two locations. Ordering Code: WSC12-X8																																										
	<table><thead><tr><th>D</th><th>h5 Tolerance</th></tr></thead><tbody><tr><td>6</td><td>0 -0.005</td></tr><tr><td>8-10</td><td>0 -0.006</td></tr><tr><td>12-16</td><td>0 -0.008</td></tr><tr><td>20-30</td><td>0 -0.009</td></tr><tr><td>35-50</td><td>0 -0.011</td></tr></tbody></table>	D	h5 Tolerance	6	0 -0.005	8-10	0 -0.006	12-16	0 -0.008	20-30	0 -0.009	35-50	0 -0.011	① L<200 → L±0.03 200≤L<500 → L±0.05 L≥500 → L±0.1 ① When using LKC, L dimensions can be specified in 0.1 mm increments. ⊗ C Shape When D-M (N)≤2 ⊗ E Shape Not applicable when D-P (Q)≤2	① SC=1 mm Increment ① SC+ℓ₁≤L SC=0 or SC≥1 ① When selecting Shape B When D≤25, SC≥Mx2 SC+ℓ₁≤L-Nx2 <table><thead><tr><th>D</th><th>W</th><th>ℓ₁</th></tr></thead><tbody><tr><td>6</td><td>5</td><td>8</td></tr><tr><td>8</td><td>7</td><td>10</td></tr><tr><td>10</td><td>8</td><td>15</td></tr><tr><td>12</td><td>10</td><td>20</td></tr><tr><td>13</td><td>11</td><td>20</td></tr><tr><td>16</td><td>14</td><td>20</td></tr></tbody></table>	D	W	ℓ₁	6	5	8	8	7	10	10	8	15	12	10	20	13	11	20	16	14	20	① WSC, (X)=Specified in 1 mm increments ① WSC+X+ℓ₁,x2≤L WSC=0 or WSC≥1 X=0 or X≥1 ① When selecting Shape B WSC+X+ℓ₁,x2≤L WSC≥Mx2 X≥Nx2 ① Two wrench flat alterations will not be oriented in a coplanar relationship.									
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	⊗ Not applicable to FPSPJ.			<table><thead><tr><th>D</th><th>W</th><th>ℓ₁</th><th>D</th><th>W</th><th>ℓ₁</th></tr></thead><tbody><tr><td>6</td><td>5</td><td>8</td><td>20</td><td>17</td><td>10</td></tr><tr><td>8</td><td>7</td><td>10</td><td>25</td><td>22</td><td>15</td></tr><tr><td>10</td><td>8</td><td>15</td><td>30</td><td>27</td><td>20</td></tr><tr><td>12</td><td>10</td><td>20</td><td>35</td><td>30</td><td>20</td></tr><tr><td>13</td><td>11</td><td>20</td><td>40</td><td>36</td><td>20</td></tr><tr><td>16</td><td>14</td><td>20</td><td>50</td><td>41</td><td>20</td></tr></tbody></table>	D	W	ℓ₁	D	W	ℓ₁	6	5	8	20	17	10	8	7	10	25	22	15	10	8	15	30	27	20	12	10	20	35	30	20	13	11	20	40	36	20	16	14	20	50	41	20
D	W	ℓ₁	D	W	ℓ₁																																									
6	5	8	20	17	10																																									
8	7	10	25	22	15																																									
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13	11	20	40	36	20																																									
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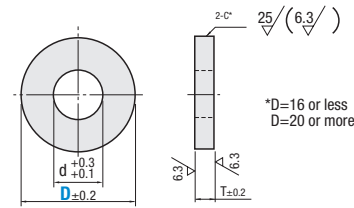
ⓘ Alterations may lower hardness. P.199

Linear Shaft Washers



RoHS10

Type	Material	Surface Treatment
WSF	1045 Carbon Steel Equivalent	Black Oxide



*D=16 or less C0.2 or less
D=20 or more C0.5 or less

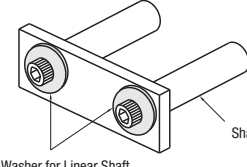
Part Number		d	T
Type	D		
WSF	10	3	3
	12	4	
	13	5	
	16	6	
	20	8	5
	25	10	
	30	12	
	35	12	
	40	16	
	50	16	

ⓘ For Washers other than above, refer to P.2306.

Part Number Example

WSF10

Application Example



End-Washer for Linear Shaft