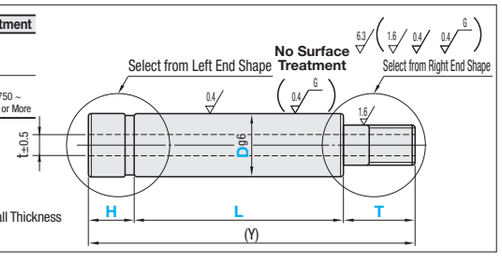
Hollow Shafts / End-Washers for Linear Shafts

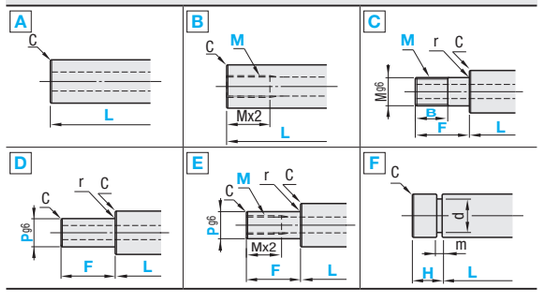
Shaft Ends Configurable

Type	Material	Hardness	Surface Treatment
FSPJ FPSPJ	EN 1.3505 Equiv.	Effective Hardened Depth of Induction Hardening P.112 58HRC~	- Hard Chrome Plating Plating Hardness: HV750 ~ Plating Thickness: 5μ or More

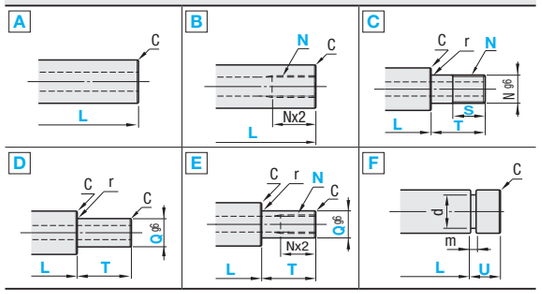


About Hollow Shaft Wall Thickness Deviations See P.111
(Y) dimensions need to be (Y)≤Dx50. (Y)≤1500
L Dimension Tolerance, Circularity, Straightness, Perpendicularity, Wall Thickness Deviations and Changes in Hardness P.111, P.216

Left End Shape



Right End Shape



Machining Conditions

A No alteration condition for Shape.

B
- When D=6, M=3
- 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 to D=50.
- One End Tapped Hollow Shafts See P.215
- L≥M(N)x4

C

D	r
6~30	0.3 or Less
35~50	0.5 or Less

- When 6≤D≤20 t+4≤M(N)≤D
- When 25≤D≤40 t+6≤M(N)≤D
- Not applicable to D=50.
- Both Ends Threaded Hollow See P.217

B, S≤Pitchx3 is required.

D

D	r
6~30	0.3 or Less
35~50	0.5 or Less

One End Stepped Hollow See P.221

E

D	r
6~30	0.3 or Less
35~50	0.5 or Less

P(Q)≥M(N)+4

F

Retaining Ring Detailed Dimensions See P.820

When only one end requires alteration, select Shape A for the opposite end.

Part Number Type	Left End Shape	Right End Shape	Selection D	t	0.5mm Increment L	0.5mm Increment F, T	1mm Increment B, S	1mm Increment H, U	1mm Increment P, Q	Selection M, N (Coarse)	C
FSPJ FPSPJ	A B C D E F	A B C D E F	6 8 10 12 13 16 20 25 30 35 40 50	2 3 4 6 7 10 14 16 17 19 20 26	20.0~1500.0 (L≤Dx50)	2≤F≤P(M)x5 2≤T≤Q(N)x5	2≤B≤Mx3 2≤S≤Nx3 B≤F-2 S≤T-2 (When M, N≤6) B≤F-3 S≤T-3 (When M, N≤8, 10) B≤F-5 S≤T-5 (When M, 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<L/2	t+4≤P, Q<D	3 4 5 6 8 10 12 16 20 24 30	0.5 or less when D<20, 1.0 or less when D≥20

Specify t<M, or t<N.

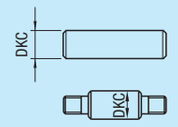
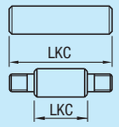
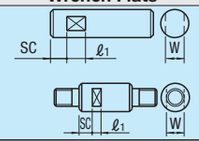
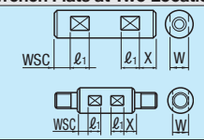
Ordering Example

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

Type	D	Material Unit Price Left End: Shape A Right End: Shape A Min. L ~ 50	50.5~100	100.5~150	150.5~200	200.5~300	300.5~400	400.5~500	500.5~600	600.5~800	800.5~1000	1000.5~1200	1200.5~1500	Shaft End Alteration Unit Price B	C	D	E	F
FSPJ	6~10								-	-	-	-	-					
	12, 13										-	-	-					
	16, 20											-	-					
	25																	
	30																	
	35																	
	40																	
	50	-																
FPSPJ	6~10								-	-	-	-	-					
	12, 13										-	-	-					
	16, 20											-	-					
	25																	
	30																	
	35																	
	40																	
	50	-																

Alterations

Part Number 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

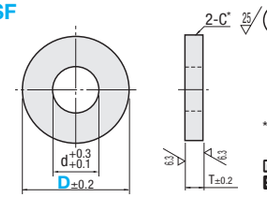
Alterations	Revise O.D. Tolerance (Precision Grade)	Alteration to L dimension tolerance	Wrench Flats	Wrench Flats at Two Locations
				
Code	DKC	LKC	SC	WSC
Spec.	O.D. tolerance is altered to h5. Ordering Code DKC D: h5 Tolerance 6: 0 -0.005 8, 10: 0 -0.006 12~16: 0 -0.008 20~30: 0 -0.009 35~50: 0 -0.011 Not applicable to FPSPJ.	Changes L tolerance. Ordering Code LKC L<200···· L±0.03 200≤L<500 ···· L±0.05 L≥500···· L±0.1 For use of LKC L dimensions can be specified in 0.1mm increment. Not applicable when D-M(N)≤2 for Shape C. Not applicable when D-P(Q)≤2 for Shape E.	Adds wrench flats. Ordering Code SC5 SC=1mm Increment SC+ℓ1≤L SC=0 or SC≥1 When selecting Shape B When D≤25, SC≥Mx2 SC+ℓ1≤L-Nx2 D / W / ℓ1: 6/5/8; 8/7/8; 10/8/8; 12/10/10; 13/11/10; 16/14/10; 20/17/10; 25/22/10; 30/27/15; 35/30/15; 40/36/20; 50/41/20	Adds Wrench Flats at two locations. Ordering Code WSC12-X8 WSC, X=1mm Increment WSC+X+ℓ1x2≤L WSC=0 or WSC≥1 X=0 or X≥1 When selecting Shape B WSC+X+ℓ1x2≤L WSC≥Mx2 X≥Nx2 Orientation between two wrench flats is not coplanar. D / W / ℓ1: 6/5/8; 8/7/8; 10/8/8; 12/10/10; 13/11/10; 16/14/10; 20/17/10; 25/22/10; 30/27/15; 35/30/15; 40/36/20; 50/41/20

Alterations may lower hardness. See P.112

End-Washers for Linear Shafts

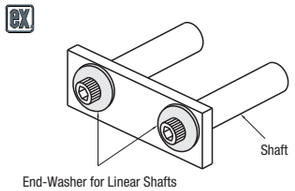
RoHS 10

WSF



*D=16 or Less: C0.2 or Less
D=20 or More: C0.5 or Less
M Material: EN 1.1191 Equiv.
S Surface Treatment: Black Oxide

ex



End-Washer for Linear Shafts

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

Ordering Example: Part Number WSF10

For Washers other than above, see P.2-113.