Rotary Shafts – D Tolerance h9 (Cold-drawn) / h7 (Ground) / g6 (Ground)

One End Stepped and Threaded, One End Tapped

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

■Select from h9 (Cold-drawn), h7 (Ground) and g6 (Ground) for your applications. Furthermore, h7 or g6 can be selected for P part tolerance of h9 (Cold-drawn).

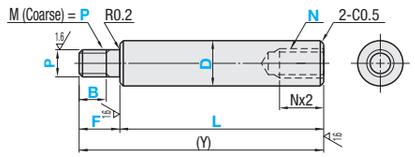
	Type Standard	Type Wrench Flats	Tolerance D	Tolerance P	M Material	S Surface Treatment
(1)	SFRMHD	SFRMHDS	h9 (Cold-drawn)	h7	S45C Equivalent	Black Oxide
	PSFRMHD	PSFRMHDS				Electroless Nickel Plating
	SSFRMHD	SSFRMHDS			SUS304	-
(2)	SFRMGD	SFRMGDS		g6	S45C Equivalent	Black Oxide
	PSFRMGD	PSFRMGDS				Electroless Nickel Plating
	SSFRMGD	SSFRMGDS			SUS304	-
(3)	SFRHD	SFRHDS	h7 (Ground)	h7	S45C Equivalent	Black Oxide
	PSFRHD	PSFRHDS				Electroless Nickel Plating
	SSFRHD	SSFRHDS			SUS304	-
(4)	SFRD	SFRDS	g6 (Ground)	g6	S45C Equivalent	Black Oxide
	PSFRD	PSFRDS				Electroless Nickel Plating
	SSFRD	SSFRDS			SUS304	-

■Tolerance Table

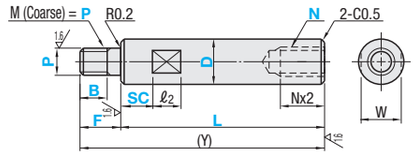
D·P	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
3	0 / -0.025	0 / -0.010	-0.002 / -0.008
3.1~6	0 / -0.030	0 / -0.012	-0.004 / -0.012
6.1~10	0 / -0.036	0 / -0.015	-0.005 / -0.014
10.1~18	0 / -0.043	0 / -0.018	-0.006 / -0.017
18.1~30	0 / -0.052	0 / -0.021	-0.007 / -0.020
30.1~50	0 / -0.062	0 / -0.025	-0.009 / -0.025

Surface roughness of Part D for h9 (Cold-drawn) is 6.3.
Surface roughness for h7 (Ground) and g6 (Ground) is 1.6.

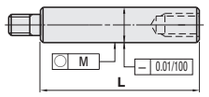
Standard



Wrench Flats



■Circularity and Straightness



Not applicable to h9 (Cold-drawn).

■Circularity of Part D

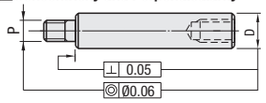
D over	D or Less	Circularity M
5	13	0.004
13	20	0.005
20	40	0.006
40	50	0.007

Not applicable to h9 (Cold-drawn).

■Tolerances of L, Y and Other Dimensions

Dimension over	Dimension or Less	Tolerance
2	6	±0.1
6	30	±0.2
30	120	±0.3
120	400	±0.5
400	1000	±0.8

■Concentricity and Perpendicularity



Not applicable to h9 (Cold-drawn).

(1)D tolerance h9 (Cold-drawn) / P tolerance h7 (2)D tolerance h9 (Cold-drawn) / P tolerance g6

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment B	P Selection	N (Coarse) Selection	1mm Increment SC (Wrench Flats Type only)	W	ℓ2	(Y) max.
(1)D Tol. h9 / P Tol. h7	(1)D Tol. h9 / P Tol. h7	6	15.0~395.0	5≤F≤Px7	When P≤6	3 4 5	2.6 3 4	SC+ℓ2≤L	5	8	400
SFRMHD	SFRMHDS	8	15.0~495.0		B≤Px3 & B≤F-2	3 4 5 6	2.6 3 4 5 6		7		500
PSFRMHD	PSFRMHDS	10	15.0~595.0			4 5 6 8	3 4 5 6		8		600
SSFRMHD	SSFRMHDS	12	15.0~695.0		When P = 8 or 10	5 6 8 10	4 5 6 8	SC=0 or SC≥1	10	10	700
(D6 is not available for SSFRMHD.)	(D6 is not available for SSFRMHDS.)	15	15.0~795.0		B≤Px3 & B≤F-3	5 6 8 10 12	4 5 6 8 10	When SC≤Mx3, W-M≥2	13		800
(2)D Tol. h9 / P Tol. g6	(2)D Tol. h9 / P Tol. g6	20	30.0~995.0			5 6 8 10 12 16	4 5 6 8 10 12 16		17		1000
SFRMGD	SFRMGDS	25	50.0~995.0		When P≥12	5 6 8 10 12 16 20	4 5 6 8 10 12 16		22		
PSFRMGD	PSFRMGDS	30	60.0~995.0		B≤Px3 & B≤F-5	8 10 12 16 20 24	6 8 10 12 16 20		27	15	
SSFRMGD	SSFRMGDS	35	70.0~995.0			8 10 12 16 20 24 30	10 12 16 20 24		30		
(D6 is not available for SSFRMGD.)	(D6 is not available for SSFRMGDS.)										

(3)h7 (Ground)

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment B	P Selection	N (Coarse) Selection	1mm Increment SC (Wrench Flats Type only)	W	ℓ2	(Y) max.
		6	15.0~395.0	5≤F≤Px7	When P≤6	3 4 5	2.6 3 4	SC+ℓ2≤L	5	8	400
		8	15.0~495.0		B≤Px3 & B≤F-2	3 4 5 6	2.6 3 4 5 6		7		500
		10	15.0~595.0			4 5 6 8	3 4 5 6		8		600
SFRHD	SFRHDS	12	15.0~695.0		When P = 8 or 10	5 6 8 10	4 5 6 8	SC=0 or SC≥1	10	10	700
		15	15.0~795.0		B≤Px3 & B≤F-3	5 6 8 10 12	4 5 6 8 10	When SC≤Mx3, W-M≥2	13		800
PSFRHD	PSFRHDS	17	30.0~895.0			5 6 8 10 12 16	4 5 6 8 10 12		14		900
		20	30.0~995.0			5 6 8 10 12 16	4 5 6 8 10 12 16		17		1000
		25	50.0~995.0			5 6 8 10 12 16 20	4 5 6 8 10 12 16		22		
SSFRHD	SSFRHDS	30	60.0~995.0		When P≥12	8 10 12 16 20 24	6 8 10 12 16 20		27	15	
		35	70.0~995.0		B≤Px3 & B≤F-5	8 10 12 16 20 24 30	10 12 16 20 24		30		
		40	80.0~995.0			12 16 20 24 30	10 12 16 20 24 30		36	20	
		50	100.0~995.0			16 20 24 30	12 16 20 24 30		41		

(4)g6 (Ground)

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment B	P Selection	N (Coarse) Selection	1mm Increment SC (Wrench Flats Type only)	W	ℓ2	(Y) max.
		6	15.0~395.0	5≤F≤Px7		3 4 5	2.6 3 4	SC+ℓ2≤L	5	8	400
		8	15.0~495.0			3 4 5 6	2.6 3 4 5 6		7		500
		10	15.0~595.0		When P≤6	4 5 6	3 4 5 6		8		600
		12	15.0~695.0		B≤Px3 & B≤F-2	5 6 8	4 5 6 8	SC=0 or SC≥1	10	10	700
		13	15.0~695.0			5 6 8	4 5 6 8		11		
SFRD	SFRDS	15	15.0~795.0			5 6 8 10	4 5 6 8 10	When L-SC≥Nx3, W-N≥2, W-N≥2	13		800
		16	15.0~895.0		When P = 8 or 10	5 6 8 10	4 5 6 8 10		14		900
PSFRD	PSFRDS	17	30.0~895.0		B≤Px3 & B≤F-3	5 6 8 10 12	4 5 6 8 10 12		15		
		18	30.0~895.0			5 6 8 10 12	4 5 6 8 10 12		17		1000
SSFRD	SSFRDS	20	30.0~995.0			5 6 8 10 12 16	4 5 6 8 10 12 16		19		
(D13, D16, D18 or D22 is not available for SSFRD.)	(D13, D16, D18 or 22 is not available for SSFRDS.)	22	30.0~995.0		When P≥12	5 6 8 10 12 16	4 5 6 8 10 12 16		22		
		25	50.0~995.0		B≤Px3 & B≤F-5	5 6 8 10 12 16	4 5 6 8 10 12 16		27	15	
		30	60.0~995.0			8 10 12 16 20	8 10 12 16 20		30		
		35	70.0~995.0			8 10 12 16 20 24	8 10 12 16 20 24		36	20	
		40	80.0~995.0			12 16 20 24 30	12 16 20 24 30		41		
		50	100.0~995.0			16 20 24 30	16 20 24 30				

When D-P≤2, chamfer C at the step is 0.2 or less. Overall length requires Nx3≤L.

Ordering Example

Part Number	L	F	B	P	N	SC
(1)D part h9 / P part h7 SFRMHD30	250	F30	B8	P10	N8	
(3)h7 (Ground) SFRHDS25	200	F25	B15	P12	N12	SC30
(4)g6 (Ground)						

(1)D tolerance h9 (Cold-drawn) / P tolerance h7 (2)D tolerance h9 (Cold-drawn) / P tolerance g6

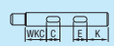
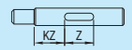
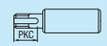
Type D	SFRMHD, SFRMGD (S45C Equivalent, Black Oxide) SFRMHDS, SFRMGDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0	PSFRMHD, PSFRMGD (S45C Equivalent, Electroless Nickel Plating) PSFRMHDS, PSFRMGDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0	SSFRMHD, SSFRMGD (SUS304) SSFRMHDS, SSFRMGDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0
6							-	-	-							-	-	-	-	-	-	-	-	-	-	-	-	-	-
8								-	-									-	-									-	-
10								-	-									-	-									-	-
12									-										-										-
15									-										-										-
20																													
25																													
30	-									-										-									
35	-									-										-									

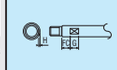
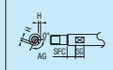
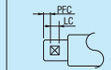
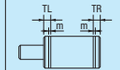
(3)h7 (Ground) (4)g6 (Ground)

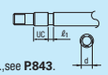
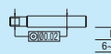
Type D	SFRHD, SFRD (S45C Equivalent, Black Oxide) SFRHDS, SFRDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0	PSFRHD, PSFRD (S45C Equivalent, Electroless Nickel Plating) PSFRHDS, PSFRDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0	SSFRHD, SSFRD (SUS304) SSFRHDS, SSFRDS With wrench flats, add relevant surcharge to the prices shown below. Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	L800.1 ~ 995.0
6							-	-	-							-	-	-	-	-	-	-	-	-	-	-	-	-	-
8								-	-									-	-									-	-
10								-	-									-	-									-	-
12									-										-										-
13									-										-	-	-	-	-	-	-	-	-	-	-
15									-										-										-
16																				-	-	-	-	-	-	-	-	-	-
17																													
18																				-	-	-	-	-	-	-	-	-	-
20																													
22																				-	-	-	-	-	-	-	-	-	-
25																													
30	-									-										-									
35	-									-										-									
40	-									-										-									
50	-									-										-									

Alterations

Part Number	L	F	B	P(PMC)	N	SC	(KC, WKC, FC···etc.)
SSFRHDS10	150	F10	B5	P5	N5	SC20	PKC

	Keyway					
	1	2	1 (for 4th keyway)	Keyway on Step P (Position Zero from End Face)	Keyway on Step P (Position Specified)	Multiple Keyways on Step P
For details, see Alteration Overview P.843 Alterations			 Applicable only when combined with both KC and WKC.			Only when PP is specified, this Alteration is available.
Code	KC	WKC	KZ	PKC	PP	PV
Dimension Increment	KC, A = 0.1mm Increment	WKC, C, E, K = 0.1mm Increment	KZ, Z = 0.1mm Increment	PKC = 0.1mm Increment	PP, PK = 0.1mm Increment	PV, PW = 0.1mm Increment
Ordering Example	KC50-A10	WKC5-C20-K5-E10	KC5-A10-WKC20-C10-K60-E10-KZ100-Z10	PKC10	PP5-PK10	PP5-PK10-PV5-PW10
Conditions	Key Length ≤ 100. *1, *2			Not applicable when P≤5. Key Length ≤ 70. *1, *2		

	Set Screw Flat				Retaining Ring Groove		Threaded	
	1	2	2 Set Screw Flats (Angle Specified)	Set Screw Flat on Step	D dim.	Step	Changes to Left-hand Thread	Changes to Fine Thread
For details, see Alteration Overview P.843 Alterations						For m dim., see P.844.		
Code	FC	WFC	SFC	PFC	TL, TR	TF	PLM	PMC
Dimension Increment	FC, G = 1mm Increment	WFC, J, V, W = 1mm Increment	SFC, SG = 1mm Increment AG = 15° Increment	PFC, LC = 1mm Increment	TL, TR = 0.1mm Increment	TF = 0.1mm Increment	-	-
Ordering Example	FC10-G3	WFC10-J15-W10-V20	SFC10-SG3-AG120	PFC10-LC5	TL10	TF10	PLM	PMC (To specify this Alterations, replace P with PMC.)
Conditions	For H dim., see P.843. G, J, V, SG, LC ≤ 70				2≤TR≤150/TL+F≤150	2≤TF≤150	Cannot be combined with PMC.	Cannot be combined with PLM.

	Slit Cam Groove	L Dimension Tolerance	Concentricity	Undercut Dimensions	Tapped Depth
For details, see Alteration Overview P.843 Alterations	 For d, ℓ1 dim., see P.843.	L<500···L±0.05 L≥500···L±0.1	 D Lmax 6~22 450 25~50 600		ND(Nx3)
Code	UC	LKC	CKC	PC	ND (To specify this Alteration, replace N with ND.)
Dimension Increment	UC = 1mm Increment	-	-	-	-
Ordering Example	UC10	LKC	CKC	PC	ND6
Conditions	Not applicable when D≥13.	Not applicable when L≥800.	Not applicable when D Tol. = h9.	-	Not applicable when N = 2, 2.6, 24 or 30.

For details about Alterations, see Alteration Overview (P.843). When combined with other alterations, ±2 degree phase difference may occur. Provide 2mm or more clearance between this alteration and others.
When multiple keyways or set screw flats are specified, they are added in the same plane. When the distance of the alterations are over 500mm, ±2 degree phase difference may occur.
*1. When multiple keyways are added with 2mm or less clearance between them, keyways will interfere.
*2. When the keyway position is less than 1mm away from the end face, R is not applied. For details, see Alteration Details on P.843.