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

One End Stepped, One End Tapped

■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).

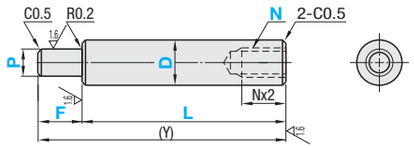
	Type Standard	Type Wrench Flats	Tolerance D	Tolerance P	M Material	S Surface Treatment
①	SFRMHF	SFRMHFS	h9 (Cold-drawn)	h7	EN 1.1191 Equiv.	Black Oxide
	PSFRMHF	PSFRMHFS				Electroless Nickel Plating
	SSFRMHF	SSFRMHFS			EN 1.4301 Equiv.	-
②	SFRMGF	SFRMGFS		g6	EN 1.1191 Equiv.	Black Oxide
	PSFRMGF	PSFRMGFS				Electroless Nickel Plating
	SSFRMGF	SSFRMGFS			EN 1.4301 Equiv.	-
③	SFRHF	SFRHFS	h7 (Ground)	h7	EN 1.1191 Equiv.	Black Oxide
	PSFRHF	PSFRHFS				Electroless Nickel Plating
	SSFRHF	SSFRHFS			EN 1.4301 Equiv.	-
④	SFRF	SFRFS	g6 (Ground)	g6	EN 1.1191 Equiv.	Black Oxide
	PSFRF	PSFRFS				Electroless Nickel Plating
	SSFRF	SSFRFS			EN 1.4301 Equiv.	-
	PHFRF	-			EN 1.7220 Equiv. Hardness: 30 ~ 35HRC	Electroless Nickel Plating

■Tolerance Table

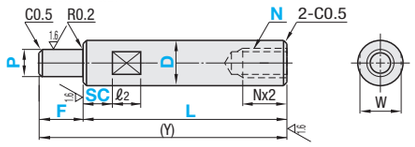
D, P	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
3	0 -0.025	0 -0.010	-0.002 -0.008
3.1~6	0 -0.030	0 -0.012	-0.004 -0.012
6.1~10	0 -0.036	0 -0.015	-0.005 -0.014
10.1~18	0 -0.043	0 -0.018	-0.006 -0.017
18.1~30	0 -0.052	0 -0.021	-0.007 -0.020
30.1~50	0 -0.062	0 -0.025	-0.009 -0.025

Surface roughness of D part for h9 (Cold-drawn) is 0.8S. Surface roughness for h7 (Ground) and g6 (Ground) is 1.6S.

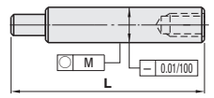
Standard



Wrench Flats



■Circularity and Straightness



Not applicable to h9 (Cold-drawn).

■Circularity of Part D

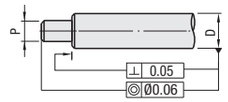
D over	D or Less	Circularity M
5	13	0.004
13	20	0.005
20	40	0.006
40	50	0.007

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	800	±0.8

■Concentricity and Perpendicularity



Not applicable to h9 (Cold-drawn).

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

Part Number Type Standard	Part Number Type Wrench Flats	D	0.1mm Increment L	0.1mm Increment F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
①D part h9 / P part h7	①D part h9 / P part h7	6	20.0~298.0	2≤F≤Px5	3≤P<D	3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8	300
SFRMHF	SFRMHFS	8	20.0~398.0			3 4 5 6		7		400
PSFRMHF	PSFRMHFS	10	20.0~498.0			4 5 6		8		500
SSFRMHF	SSFRMHFS	12	30.0~598.0		5≤P<D	5 6 8		10	10	600
(D6 is not available for SSFRMHF.)	(D6 is not available for SSFRMHFS.)	15	30.0~698.0			5 6 8 10		13		700
②D part h9 / P part g6	②D part h9 / P part g6	20	40.0~798.0			5 6 8 10 12 16		17		800
SFRMGF	SFRMGFS	25	50.0~798.0		10≤P<D	5 6 8 10 12 16		22		
PSFRMGF	PSFRMGFS	30	60.0~798.0			8 10 12 16 20		27	15	
SSFRMGF	SSFRMGFS	35	70.0~798.0		16≤P<D	8 10 12 16 20 24		30		
(D6 is not available for SSFRMGF.)	(D6 is not available for SSFRMGFS.)									

③h7 (Ground)

Part Number Type Standard	Part Number Type Wrench Flats	D	0.1mm Increment L	0.1mm Increment F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	20.0~298.0	2≤F≤Px5	3≤P<D	3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8	300
		8	20.0~398.0			3 4 5 6		7		400
		10	20.0~498.0			4 5 6		8		500
SFRHF	SFRHFS	12	30.0~598.0		5≤P<D	5 6 8		10	10	600
		15	30.0~698.0			5 6 8 10		13		700
PSFRHF	PSFRHFS	17	40.0~798.0			5 6 8 10 12		14		800
		20	40.0~798.0			5 6 8 10 12 16		17		
SSFRHF	SSFRHFS	25	50.0~798.0		10≤P<D	5 6 8 10 12 16		22		
		30	60.0~798.0			8 10 12 16 20		27	15	
		35	70.0~798.0		16≤P<D	8 10 12 16 20 24		30		
		40	80.0~798.0			12 16 20 24 30		36	20	
		50	100.0~798.0			16 20 24 30		41		

④g6 (Ground)

Part Number Type Standard	Part Number Type Wrench Flats	D	0.1mm Increment L	0.1mm Increment F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	20.0~298.0	2≤F≤Px5	3≤P<D	3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8	300
		8	20.0~398.0			3 4 5 6		7		400
		10	20.0~498.0			4 5 6		8		500
SFRF	SFRFS	12	30.0~598.0		5≤P<D	5 6 8		10	10	600
		13	30.0~598.0			5 6 8		11		
PSFRF	PSFRFS	* 15	30.0~698.0			5 6 8 10		13		700
		16	40.0~798.0			5 6 8 10		14		800
SSFRF	SSFRFS	17	40.0~798.0			5 6 8 10 12				
(D13, 16, 18 and 22 are not available for SSFRF.)	(D13, 16, 18 and 22 are not available for SSFRFS.)	18	40.0~798.0			5 6 8 10 12		15		
		* 20	40.0~798.0			5 6 8 10 12 16		17		
*PHFRF		22	40.0~798.0		10≤P<D	5 6 8 10 12 16		19		
(Only * marked sizes are available.)		* 25	50.0~798.0			5 6 8 10 12 16		22		
		* 30	60.0~798.0			8 10 12 16 20		27	15	
		* 35	70.0~798.0		16≤P<D	8 10 12 16 20 24		30		
		* 40	80.0~798.0			12 16 20 24 30		36	20	
		* 50	100.0~798.0			16 20 24 30		41		

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	-	P	-	N	-	SC
①D part h9 / P part h7	PSFRMHF30	-	250	-	F30	-	P10	-	N10		
③h7 (Ground) with Wrench Flat	SFRHFS25	-	200	-	F25	-	P15	-	N12	-	SC30

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

Type	SFRMHF, SFRMGF (EN 1.1191 Equiv., Black Oxide) SFRMHFS, SFRMGFS								PSFRMHF, PSFRMGF (EN 1.1191 Equiv., Electroless Nickel Plating) PSFRMHFS, PSFRMGFS								SSFRMHF, SSFRMGF (EN 1.4301 Equiv.) SSFRMHFS, SSFRMGFS							
D	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 ~ 798.0	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 ~ 798.0	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 ~ 798.0
6						-	-	-						-	-	-	-	-	-	-	-	-	-	-
8							-	-							-	-							-	-
10								-								-								-
12								-								-								-
15																								
20																								
25																								
30	-								-								-							
35	-								-								-							

③h7 (Ground) ④g6 (Ground)

Type	SFRHF, SFRF (EN 1.1191 Equiv., Black Oxide) SFRHFS, SFRFS								PSFRHF, PSFRF (EN 1.1191 Equiv., Electroless Nickel Plating) PSFRHFS, PSFRFS								SSFRHF, SSFRF (EN 1.4301 Equiv.) SSFRHFS, SSFRFS							
D	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 ~ 798.0	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 ~ 798.0	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 ~ 798.0
6						-	-	-						-	-	-						-	-	-
8							-	-							-	-							-	-
10								-								-								-
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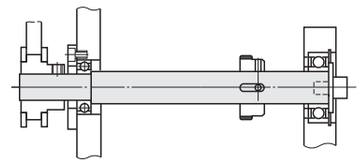
40	-								-								-							
50	-								-								-							

Type	PHFRF (EN 1.7220 Equiv. Hardness 30~35HRC, Electroless Nickel Plating)							
D	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 ~ 798.0
15								
20								
25								
30	-							
35	-							
40	-							
50	-							

ex. Example



Alterations

	Part Number	-	L	-	F	-	P	-	N	-	SC	- (KC, WKC, FC···etc.)
	SSFRHF10	-	150	-	F10	-	P5	-	N5			- SFC10-SG10-AG90

Alterations	Keyway	Keyway on Shaft End	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	L Dimension Tolerance / Concentricity	Retaining Ring Groove
	• 1 Keyway: KC • 2 Keyways: WKC	PKC	• 1 Set Screw Flat: FC • 2 Set Screw Flats: WFC	H, 90°, AG, SFC, SG	UC, ℓ1, d	LKC, Ø0.02	d, m, TA
Code	KC, WKC	PKC	FC, WFC	SFC	UC	LKC, CKC	TA
Spec.	KC:Adds a keyway. Ordering Code KC50-A10 WKC:Adds two keyways. Ordering Code WKC50-C8-K40-E10 KC, A, WKC, C, K, E = 1mm Increment A, E, C≤100 For Keyway Details, refer to P820. If 3 keyways are required, use both KC and WKC. When the keyway position is less than 1mm away from the end face, R is not applied. Ex.	Adds a keyway on the shaft end P. Ordering Code PKC10 PKC = 1mm Increment PKC≤50 PKC≤F(T) Keyway Details P820 Not applicable to P5 or less.	FC:Adds 1 set screw flat. Ordering Code FC10-G3 WFC:Adds 2 set screw flats. Ordering Code WFC10-J3-W10-V3 FC, G, WFC, J, W, V = 1mm Increment G, J, V≤50 D / H 6~17 / 1 18~40 / 2 50 / 3	Adds a set screw flat at any desired angle besides the datum plane (0°). SFC, SG= 1mm Increment AG = 15° Increment SG≤50 Ordering Code SFC10-SG3-AG90 D / H 6~17 / 1 18~40 / 2 50 / 3 When combined with other alterations, ±2 degree phase differential may occur.	Adds a slit cam groove. UC = 1mm Increment Ordering Code UC10 UC+ℓ1≤L UC≥1 Not applicable to D13 or more. D / d / ℓ1 6 / 5 / 4 8 / 7 10 / 8 / 5 12 / 10	LKC: Changes L dimension tolerance. Ordering Code LKC L<500···L±0.05 L≥500···L±0.1 CKC: Changes the concentricity to Ø0.02. Ordering Code CKC Applicable within dimension L range in the table below. Not applicable to D part of h9 (Cold-drawn). D / Lmax 6~22 / 450 25~50 / 600	Adds a retaining ring groove. (Applicable retaining rings are included.) TA = 1mm Increment Ordering Code TA10 4≤TA<L/2 For dimensions of the retaining ring groove, P.820

Keyway(s) and set screw flats are added in the same plane. When the distance of the alterations are over 500mm, ±2 degree phase differential may occur.