

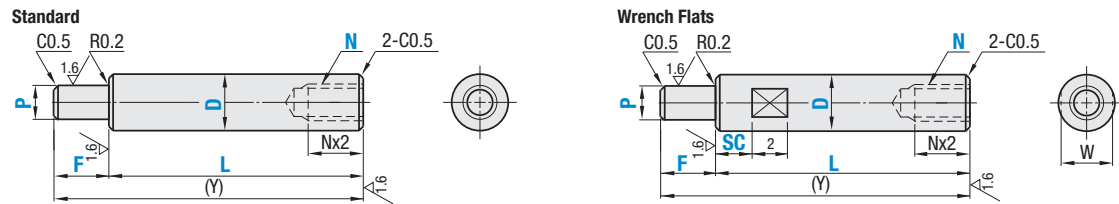
# Rotary Shafts – D Tolerance h9 (Cold-Drawn) / h7 & g6 (Ground)

## One End Stepped, One End Tapped

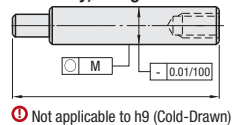
h9 (Cold-Drawn) and h7 (Ground) are newly added. h7 or g6 can be selected for P part tolerance of h9 (Cold-Drawn).

Type	Standard		Wrench Flats		Material	Surface Treatment
	Standard	Wrench Flats	Standard	Wrench Flats		
(1)	NSFRMHF	NSFRMHFS	h9 (Cold-Drawn)	h7	1045 Carbon Steel or Equivalent	Black Oxide Electroless Nickel Plating
	SFRMHF	SFRMHFS				
	PSFRMHF	PSFRMHFS				
	SSFRMHF	SSFRMHFS				
(2)	NSFRMGF	NSFRMGFS	h9 (Cold-Drawn)	g6	1045 Carbon Steel or Equivalent	Black Oxide Electroless Nickel Plating
	SFRMGF	SFRMGFS				
	PSFRMGF	PSFRMGFS				
	SSFRMGF	SSFRMGFS				
(3)	NSFRHF	NSFRHFS	h7 (Ground)	h7	1045 Carbon Steel or Equivalent	Black Oxide Electroless Nickel Plating
	SFRHF	SFRHFS				
	PSFRHF	PSFRHFS				
	SSFRHF	SSFRHFS				
(4)	NSFRF	NSFRFS	g6 (Ground)	g6	1045 Carbon Steel or Equivalent	Black Oxide Electroless Nickel Plating
	SFRF	SFRFS				
	PSFRF	PSFRFS				
	SSFRF	SSFRFS				
PHFRF	—	—	—	—	4137 Alloy Steel or Equivalent Hardness 30-35 HRC min.	Electroless Nickel Plating

Ⓢ Surface roughness of D part for h9 (Cold-Drawn) is  $\frac{1.6}{\sqrt{R}}$ . Surface roughness for h7 (Ground) and g6 (Ground) is  $\frac{0.8}{\sqrt{R}}$ .



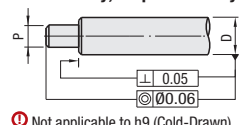
### Circularity, Straightness



### D Part Circularity

Over	D	To	Circularity M
5	13	0.004	
13	20	0.005	
20	40	0.006	
40	50	0.007	

### Concentricity, Perpendicularity



### L, Y & Other Dimensions Tolerances

Over	Dimension	To	Dimension Tolerance
2	6	±0.1	
6	30	±0.2	
30	120	±0.3	
120	400	±0.5	
400	800	±0.8	

### (1) D Tolerance h9 (Cold-Drawn) / P Tolerance h7 (2) D Tolerance h9 (Cold-Drawn) / P Tolerance g6

Part Number	Type	0.1 mm Increment		1 mm Increment		N (Coarse) Selectable	1 mm Increment SC Wrench Flats only	W	ℓ <sub>2</sub>	(Y) max.
		D	L	F	P					
(1) D Tol. h9 / P Tol. h7	NSFRMHF SFRMHF PSFRMHF SSFRMHF	*6	15.0-398.0	2.5F≤Px5	5≤P<D	2.6 3 4	SC+ℓ <sub>2</sub> ≤L SC=0 or SC≥1	5	8	300
			15.0-498.0			2.6 3 4 5 6		7		400
			15.0-598.0			3 4 5 6		8		500
			15.0-698.0			4 5 6 8		10		600
			15.0-798.0			4 5 6 8 10		13		700
(2) D Tol. h9 / P Tol. g6	NSFRMGF SFRMGF PSFRMGF SSFRMGF	*6	30.0-998.0	2.5F≤Px5	5≤P<D	4 5 6 8 10 12 16	SC+ℓ <sub>2</sub> ≤L SC=0 or SC≥1	17	10	800
			50.0-998.0			4 5 6 8 10 12 16		22		
			60.0-998.0			6 8 10 12 16 20		27		
			70.0-998.0			6 8 10 12 16 20 24		30		
			80.0-998.0			10 12 16 20 24 30		36		

### (3) h7 (Ground) Type

Part Number	Type	0.1 mm Increment		1 mm Inc.		N (Coarse) Selectable	1 mm Increment SC Wrench Flats only	W	ℓ <sub>2</sub>	(Y) max.
		D	L	F	P					
NSFRHF SFRHF PSFRHF SSFRHF	NSFRHFS SFRHFS PSFRHFS SSFRHFS	*6	15.0-398.0	2.5F≤Px5	5≤P<D	2.6 3 4	SC+ℓ <sub>2</sub> ≤L SC=0 or SC≥1	5	8	300
			15.0-498.0			2.6 3 4 5 6		7		400
			15.0-598.0			3 4 5 6		8		500
			15.0-698.0			4 5 6 8		10		600
			15.0-798.0			4 5 6 8 10		13		700
			30.0-998.0			4 5 6 8 10 12 16		17		
			50.0-998.0			4 5 6 8 10 12 16		22		
			60.0-998.0			6 8 10 12 16 20		27		
			70.0-998.0			6 8 10 12 16 20 24		30		
			80.0-998.0			10 12 16 20 24 30		36		
			100.0-998.0			12 16 20 24 30		41		

### (4) g6 (Ground) Type

Part Number	Type	0.1 mm Increment		1 mm Increment		N (Coarse) Selectable	1 mm Increment SC Wrench Flats only	W	ℓ <sub>2</sub>	(Y) max.
		D	L	F	P					
NSFRF SFRF PSFRF SSFRF	NSFRFS SFRFS PSFRFS SSFRFS	*6	15.0-398.0	2.5F≤Px5	5≤P<D	2.6 3 4	SC+ℓ <sub>2</sub> ≤L SC=0 or SC≥1	5	8	300
			15.0-498.0			2.6 3 4 5 6		7		400
			15.0-598.0			3 4 5 6		8		500
			15.0-698.0			4 5 6 8		10		600
			15.0-798.0			4 5 6 8 10		13		700
			30.0-998.0			4 5 6 8 10 12 16		17		
			50.0-998.0			4 5 6 8 10 12 16		22		
			60.0-998.0			6 8 10 12 16 20		27		
			70.0-998.0			6 8 10 12 16 20 24		30		
			80.0-998.0			10 12 16 20 24 30		36		
			100.0-998.0			12 16 20 24 30		41		

Ⓢ When D=P=2, chamfer C at the step is 0.2 or less. Ⓢ Overall length requires Nx3sL.

# Rotary Shafts – D Tolerance h9 (Cold-Drawn) / h7 & g6 (Ground)

## One End Stepped, One End Tapped, continued

### Available Types

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

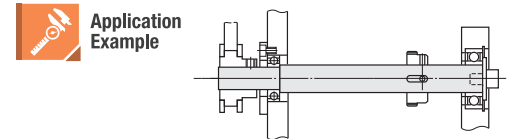
Type	NSFRMHF, NSFRMGF, NSFRMHFS, NSFRMGFS, SFRMHF, SFRMGF, SFRMHFS, SFRMGFS, PSFRMHF, PSFRMGF, PSFRMHFS, PSFRMGFS								SSFRMHF, SSFRMGF, SSFRMHFS, SSFRMGFS									
	Min. L-50.0	L50.1-100.0	L100.1-150.0	L150.1-200.0	L200.1-300.0	L300.1-400.0	L400.1-600.0	L600.1-800.0	L800.1-998.0	Min. L-50.0	L50.1-100.0	L100.1-150.0	L150.1-200.0	L200.1-300.0	L300.1-400.0	L400.1-600.0	L600.1-800.0	L800.1-998.0
D	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
25	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
30	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
35	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
40	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
50	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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

Type	NSFRHF, NSFRF, NSFRHFS, NSFRFHS, SFRHF, SFRF, SFRHFS, SFRFHS, PSFRHF, PSFRF, PSFRHFS, PSFRFHS								SSFRHF, SSFRF, SSFRHFS, SSFRFHS								PHFRF											
	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	L800.1-998.0	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	L600.1-800.0	L800.1-998.0	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	L600.1-800.0	L800.1-998.0	
D	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
25	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
30	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
35	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
40	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
50	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

**Part Number Example**  
 Part Number - L - F - P - N - SC  
 PSFRMHF30 - 250 - F30 - P10 - N10  
 SFRHF25 - 200 - F25 - P15 - N12 - SC30

**Part Number 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	Wrench Flats	L Dimension Tolerance - Concentricity
Code	KC / WKC / KZ	PKC	FC / WFC	SFC	UC	SC	LKC / CKC
Spec.	KC: Adds a keyway. Ordering Code: KC50-A10 WKC: Adds two keyways. Ordering Code: WKC50-C8-K40-E10 Ordering Code: KZ100-Z10 Ⓢ KC, A, WKC, C, E, K, Z, Z=0.1 mm increment Ⓢ A, C, E, Z≤100 Ⓢ For keyway details refer to P.853. Ⓢ If 3 keyways are required use both KC and WKC. If 4th keyway is required use KZ only as addition to KC and WKC. Ⓢ When keyway position is less than 1 mm away from the end face, R is not applied. Ex.	Adds a keyway on the shaft end P. Ordering Code: PKC10 Ⓢ PKC = 1 mm increment Ⓢ PKC≤50 Ⓢ PKC=F(T) Ⓢ For keyway details refer to P.853 or less. Ⓢ 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 = 1 mm increment Ⓢ G, J, V≤50	Adds a set screw flat at any designated angle besides the datum plane (0°). SFC, SG = 1 mm increment AG = 15° increment Ordering Code: SFC10-SG3-AG90	Adds a slit cam groove. UC = 1 mm increment Ordering Code: UC10 Ⓢ UC+ℓ <sub>2</sub> ≤L Ⓢ UC≥1 Ⓢ Not applicable to D13 or more.	Adds a wrench flat. SC = 1 mm increment Ⓢ SC+ℓ <sub>2</sub> ≤L Ⓢ SC=0 or SC≥1	LKC: Changes L Dimension Tolerance. Ordering Code: LKC Ⓢ L<500 L±0.05 L≥500 L±0.1 Ⓢ Not applicable to L=800 or more. CKC: Changes the concentricity to 0.02. Ordering Code: CKC Ⓢ Applicable within dimension L range in the table below. Ⓢ Not applicable to D part of h9 (Cold-Drawn). Ⓢ When combined with other alterations, ±2 degree phase differential may occur.

Alterations	Keyway on Step P	2nd Keyway on Step P	Set Screw Flat on P	Retaining Ring Groove on D	Retaining Ring Groove on P	C Chamfer Change on D	Tapped Depth
Code	PP	PV	PFC	TL, TR	TF	CD	ND
Spec.	PP, PK = 0.1 mm increment. Ordering Code: PP5-PK10 Ⓢ Not applicable when P≤5. Ⓢ Key Length (PK) ≤ 70	PV, PW = 0.1 mm increment. Ordering Code: PV5-PK11-PV5-PW10 Ⓢ Only available when PP specified. Ⓢ Not applicable when P≤5. Ⓢ Key Length (PK) ≤ 71	PFC, LC = 1 mm increment. Ordering Code: PFC10-LC5	TL, TR = 0.1 mm increment. Ordering Code: TL10, TR10 Ⓢ 2≤TL≤150 and TL+F≤150 Ⓢ For dimension m, see P.853.	TF = 0.1 mm increment. Ordering Code: TF10 Ⓢ 2≤TF≤150 Ⓢ For dimension m, see P.853.	CD = Selection from Table below. Ordering Code: CD2 Chamfer (CD) Applicable Dia. C2      ø6-ø51 C3      ø8-ø51 C4      ø10-ø51 C5      ø12-ø51	To specify, replace N with ND Ordering Code: ND6 Ⓢ Not applicable when M = 2, 2.6, 24 or 30.