

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

## One End Stepped, One End Threaded

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).

RoHS 10

Type	Tolerance		Material	Surface Treatment
	Standard	Wrench Flats		
(1) SFRMHN, PSFRMHN, SSFRMHN	h9 (Cold-drawn)	h7	S45C	Black Oxide
			Equivalent	Electroless Nickel Plating
			SUS304	-
(2) PSFRMGN, PSFRMGNS, SSFRMGN, SSFRMGNS	g6	g6	S45C	Black Oxide
			Equivalent	Electroless Nickel Plating
			SUS304	-
(3) SFRHN, PSFRHN, SSFRHN	h7 (Ground)	h7	S45C	Black Oxide
			Equivalent	Electroless Nickel Plating
			SUS304	-
(4) SFRN, PSFRN, SSFRN, HFRN, PHFRN	g6 (Ground)	g6	S45C	Black Oxide
			Equivalent	Electroless Nickel Plating
			SUS304	-

Tolerance Table			
D, P	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
3	0 -0.025	0 -0.001	-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  $\sqrt{1.6}$ .  
Surface roughness for h7 (Ground) and g6 (Ground) is  $\sqrt{0.8}$ .

**Standard**

**Wrench Flats**

**Circularity and Straightness**

**Circularity of Part D**

D	over	or Less	Circularity M
5	13		0.004
8	20		0.005
10	40		0.006
15	50		0.007

**Tolerances of L, Y and Other Dimensions**

Dimension	over	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).

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment SC	W	l2	(Y) max.
Standard	Type	D	L	F	B	Wrench Flats Type only			
SFRMHN, PSFRMHN, SSFRMHN	(1)D Tol. h9 / P Tol. h7	6	15.0-395.0	5 ≤ F ≤ P × 7	When P ≤ 6 B = P × 3 & B = F - 2	SC = 0 or SC ≥ 1	5	8	400
		8	15.0-495.0		3 4 5 6		7	500	
		10	15.0-595.0		4 5 6 8		8	600	
		12	15.0-695.0		5 6 8 10		10	700	
		15	15.0-795.0		5 6 8 10 12		13	800	
		20	30.0-995.0		6 8 10 12 16		17	1000	
		25	30.0-995.0		8 10 12 16 20		22		
		30	30.0-995.0		8 10 12 16 20 24		27		
		35	40.0-995.0		10 12 16 20 24 30		30		
		40	40.0-995.0		12 16 20 24 30		36		
SFRMGN, PSFRMGN, SSFRMGN	(2)D Tol. h9 / P Tol. g6	6	15.0-395.0	5 ≤ F ≤ P × 7	When P ≤ 6 B = P × 3 & B = F - 3	SC = 0 or SC ≥ 1	5	8	400
		8	15.0-495.0		3 4 5 6		7	500	
		10	15.0-595.0		4 5 6 8		8	600	
		12	15.0-695.0		5 6 8 10		10	700	
		15	15.0-795.0		5 6 8 10 12		13	800	
		20	30.0-995.0		6 8 10 12 16		17	1000	
		25	30.0-995.0		8 10 12 16 20		22		
		30	30.0-995.0		8 10 12 16 20 24		27		
		35	40.0-995.0		10 12 16 20 24 30		30		
		40	40.0-995.0		12 16 20 24 30		36		

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment SC	W	l2	(Y) max.
Standard	Type	D	L	F	B	Wrench Flats Type only			
SFRHN, PSFRHN, SSFRHN	(3)h7 (Ground)	6	15.0-395.0	5 ≤ F ≤ P × 7	When P ≤ 6 B = P × 3 & B = F - 2	SC = 0 or SC ≥ 1	5	8	400
		8	15.0-495.0		3 4 5 6		7	500	
		10	15.0-595.0		4 5 6 8		8	600	
		12	15.0-695.0		5 6 8 10		10	700	
		15	15.0-795.0		5 6 8 10 12		13	800	
		20	30.0-995.0		6 8 10 12 16		17	1000	
		25	30.0-995.0		8 10 12 16 20		22		
		30	30.0-995.0		8 10 12 16 20 24		27		
		35	40.0-995.0		10 12 16 20 24 30		30		
		40	40.0-995.0		12 16 20 24 30		36		

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment SC	W	l2	(Y) max.
Standard	Type	D	L	F	B	Wrench Flats Type only			
SFRN, PSFRN, SSFRN	(4)g6 (Ground)	6	15.0-395.0	5 ≤ F ≤ P × 7	When P ≤ 6 B = P × 3 & B = F - 2	SC = 0 or SC ≥ 1	5	8	400
		8	15.0-495.0		3 4 5 6		7	500	
		10	15.0-595.0		4 5 6 8		8	600	
		12	15.0-695.0		5 6 8 10		10	700	
		15	15.0-795.0		5 6 8 10 12		13	800	
		20	30.0-995.0		6 8 10 12 16		17	1000	
		25	30.0-995.0		8 10 12 16 20		22		
		30	30.0-995.0		8 10 12 16 20 24		27		
		35	40.0-995.0		10 12 16 20 24 30		30		
		40	40.0-995.0		12 16 20 24 30		36		

When D-P ≥ 2, chamfer C at the step is 0.2 or less. For HFRN, HFRNS, PHFRN, the upper limit for L dim. is 795.0.

Ordering Example: (1)D part h9 / P part h7 SFRMHN30 - 250 - F30 - B8 - P10 (3)h7 (Ground) with Wrench Flat SFRHNS25 - 200 - F25 - B15 - P12 - SC30 (4)g6 (Ground)

Type	(1)D tolerance h9 (Cold-drawn) / P tolerance h7								(2)D tolerance h9 (Cold-drawn) / P tolerance g6									
	SFRMHN, SFRMGN	SFRMGN	PSFRMHN, PSFRMGNS	PSFRMGNS	SSFRMHN, SSFRMGN	SSFRMGN	Min. L	Max. L	SFRMHN, PSFRMHN	PSFRMGN	SSFRMHN, SSFRMGN	SSFRMGN	Min. L	Max. L				
D	50.0	100.0	150.0	200.0	300.0	400.0	600.0	800.0	995.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	800.0	995.0
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Type	(3)h7 (Ground)								(4)g6 (Ground)							
	SFRHN, SFRNS	SFRNS	PSFRHN, PSFRNS	PSFRNS	SSFRHN, SSFRN	SSFRN	Min. L	Max. L	SFRHN, PSFRHN	PSFRNS	SSFRHN, SSFRN	SSFRN	Min. L	Max. L		
D	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Alterations: SFRHNS10 - 150 - F10 - B5 - P5 - SC20 - PKC

Keyway Example:

Alterations	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
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		

Alterations	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
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	PFC, LC = 1mm Increment	TL, TR = 0.1mm Increment	TF = 0.1mm Increment	-	PMC (Apply the Alteration, replace P with PMC)
Ordering Example	FC10-G3	WFC10-J15-W10-V20	SFC10-SG3-A6120	PFC10-LC5	TL10	TF10	PLM	PMC (Apply the Alteration, replace P with PMC)
Conditions	For H dim., see P843. G, J, V, W, LC ≤ 70				2 ≤ TR ≤ 150 / TL + FS ≤ 150		2 ≤ TF ≤ 150. For H dim., see P844. Cannot be combined with PMC. Cannot be combined with PLM.	

Alterations	Slit Cam Groove	L Dimension Tolerance	Slit Added	Concentricity	C Chamfered Width	Undercut Dimensions
	UC	LKC	MM	CKK	CD	PC
Code	UC	LKC	MM	CKK	CD	PC
Dimension Increment	UC = 1mm Increment	-	-	-	CD = Selectable	-
Ordering Example	UC10	LKC	MM	CKK	CD2	PC
Conditions	Not applicable when D ≥ 13.	Not applicable when L ≥ 800.	Not applicable when D ≥ 35.	Not applicable when D Tol. = h9.	The Part D on the threaded side is not machined.	-

For details about Alterations, see Alteration Overview (P843). 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 P843.