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

Both Ends Stepped & Threaded

Select from h9 (Cold-Drawn), h7 (Ground) and g6 (Ground) for your applications.

Rotary Shafts – Both Ends Stepped and Threaded

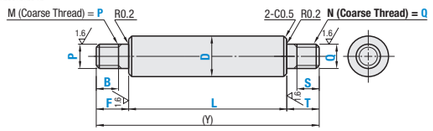
	Type: Standard	Type: Wrench Flats	Tolerance: D	Tolerance: P, Q	Material	Surface Treatment
(1)	NSFRMHM	NSFRMHMS	h9 (Cold-Drawn)	h7	1045 Carbon Steel or Equivalent	—
	SFRMHM	SFRMHMS				Black Oxide
	PSFRMHM	PSFRMHMS				Electroless Nickel Plating
	SSFRMHM	SSFRMHMS			304 Stainless Steel	—
(2)	NSFRMGM	NSFRMGMS		g6	1045 Carbon Steel or Equivalent	—
	SFRMGM	SFRMGMS				Black Oxide
	PSFRMGM	PSFRMGMS				Electroless Nickel Plating
	SSFRMGM	SSFRMGMS			304 Stainless Steel	—
(3)	NSFRHM	NSFRHMS	h7 (Ground)	h7	1045 Carbon Steel or Equivalent	—
	SFRHM	SFRHMS				Black Oxide
	PSFRHM	PSFRHMS				Electroless Nickel Plating
	SSFRHM	SSFRHMS			304 Stainless Steel	—
(4)	NSFRM	NSFRMS	g6 (Ground)	g6	1045 Carbon Steel or Equivalent	—
	SFRM	SFRMS				Black Oxide
	PSFRM	PSFRMS				Electroless Nickel Plating
	SSFRM	SSFRMS			304 Stainless Steel	—
	HFRM	—			4137 Alloy Steel or Equivalent Hardness 30–35 HRC min.	Black Oxide

Tolerance Table

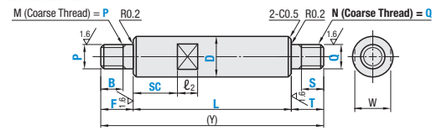
D / P	h9 (Cold-Drawn)	h7 (Ground)	g6 (Ground)
3	0 / -0.025	0 / -0.010	-0.002 / -0.008
3.1–6	0 / -0.030	0 / -0.012	-0.004 / -0.012
6.1–10	0 / -0.036	0 / -0.015	-0.005 / -0.014
10.1–18	0 / -0.043	0 / -0.018	-0.006 / -0.017
18.1–30	0 / -0.052	0 / -0.021	-0.007 / -0.020
30.1–50	0 / -0.062	0 / -0.025	-0.009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

Surface roughness of D part for h9 (Cold-Drawn) is 6.3/. Surface roughness for h7 (Ground) and g6 (Ground) is 1.6/.

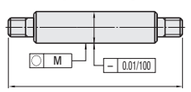
Standard



Wrench Flats



Circularity and Straightness



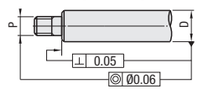
Not applicable to h9 (Cold-Drawn).

Circularity of Part D

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

Not applicable to h9 (Cold-Drawn).

Concentricity and Perpendicularity



Not applicable to h9 (Cold-Drawn).

Tolerances of L, Y and Other Dimensions

Dimension: Over	Dimension: or Less	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, Q tolerance h7 (2) D tolerance h9 (Cold-Drawn) / P, Q tolerance g6

Part Number Type: Standard	Part Number Type: Wrench Flats	D	0.1 mm Increment: L	0.1 mm Increment: F, T	1 mm Increment: B	1 mm Increment: S	P, Q Selection	1 mm Increment SC Wrench Flats Type Only	W	ℓ_2	(Y) max.
(1) D part h9 / P, Q part h7 NSRMHM SFRMHM PSFRMHM SSFRMHM D6 is not available for SSFRMHM.	(1) D part h9 / P, Q part h7 NSRMHMS SFRMHMS PSFRMHMS SSFRMHMS D6 is not available for SSFRMHMS.	6	15.0–390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2 When P=8 or 10 B≤Px3 & B≤F-3 When P≥12 B≤Px3 & B≤F-5	When Q≤6 S≤Qx3 & S≤T-2 When Q=8 or 10 S≤Qx3 & S≤T-3 When Q≥12 S≤Qx3& S≤T-5	3 4 5	SC+ℓ_2≤L SC=0 or SC≥1	5	8	300
(2) D part h9 / P, Q part g6 NSFRMGM SFRMGM PSFRMGM SSFRMGM D6 is not available for SSFRMGM.	(2) D part h9 / P, Q part g6 NSFRMGMS SFRMGMS PSFRMGMS SSFRMGMS D6 is not available for SSFRMGMS	8	15.0–490.0				3 4 5 6		7		400
		10	15.0–590.0				4 5 6 8		8		500
		12	15.0–690.0				5 6 8 10		10	10	600
		15	15.0–790.0				5 6 8 10 12		13		700
		20	30.0–990.0				6 8 10 12 16		17		800
		25	30.0–990.0				8 10 12 16 20		22		
		30	30.0–990.0				8 10 12 16 20 24		27	15	
		35	40.0–990.0				10 12 16 20 24 30		30		

(3) h7 (Ground)

Part Number Type: Standard	Part Number Type: Wrench Flats	D	0.1 mm Increment: L	0.1 mm Increment: F	1 mm Increment: B	1 mm Increment: S	P / Q Selectable	1 mm Increment SC Wrench Flats Type Only	W	ℓ_2	(Y) max.
NSFRHM SFRHM PSFRHM SSFRHM	NSFRHMS SFRHMS PSFRHMS SSFRHMS	6	15.0–390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2 When P=8 or 10 B≤Px3 & B≤F-3 When P≥12 B≤Px3 & B≤F-5	When Q≤6 S≤Qx3 & S≤T-2 When Q=8 or 10 S≤Qx3 & S≤T-3 When Q≥12 S≤Qx3& S≤T-5	3 4 5	SC+ℓ_2≤L SC=0 or SC≥1	5	8	300
		8	15.0–490.0				3 4 5 6		7		400
		10	15.0–590.0				4 5 6 8		8		500
		12	15.0–690.0				5 6 8 10		10	10	600
		15	15.0–790.0				5 6 8 10 12		13		700
		17	30.0–890.0				5 6 8 10 12		14		800
		20	30.0–990.0				6 8 10 12 16		17		
		25	30.0–990.0				8 10 12 16 20		22		
		30	30.0–990.0				8 10 12 16 20 24		27	15	
		35	40.0–990.0				10 12 16 20 24 30		30		
		40	40.0–990.0				12 16 20 24 30		36	20	
		50	40.0–990.0				16 20 24 30		41		

(4) g6 (Ground)

Part Number Type: Standard	Part Number Type: Wrench Flats	D	0.1 mm Increment: L	0.1 mm Increment: F, T	1 mm Increment: B	1 mm Increment: S	P, Q Selectable	1 mm Increment SC Wrench Flats Type Only	W	ℓ_2	(Y) max.
NSFRM SFRM PSFRM SSFRM D13, 16, 18 and 22 are not available for SSFRM. HFRM Only * marked sizes are available.	NSFRMS SFRMS PSFRMS SSFRMS D13, 16, 18 and 22 are not available for SSFRMS.	6	15.0–390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2 When P=8 or 10 B≤Px3 & B≤F-3 When P≥12 B≤Px3 & B≤F-5	When Q≤6 S≤Qx3 & S≤T-2 When Q=8 or 10 S≤Qx3 & S≤T-3 When Q≥12 S≤Qx3& S≤T-5	3 4 5	SC+ℓ_2≤L SC=0 or SC≥1	5	8	300
		8	15.0–490.0				3 4 5 6		7		400
		10	15.0–590.0				4 5 6 8		8		500
		12	15.0–690.0				5 6 8 10		10	10	600
		13	15.0–690.0				5 6 8 10		11		
		*15	15.0–790.0				5 6 8 10 12		13		700
		16	15.0–890.0				5 6 8 10 12		14		800
		17	30.0–890.0				5 6 8 10 12				
		18	30.0–890.0				5 6 8 10 12		15		
		*20	30.0–990.0				6 8 10 12 16		17		
		22	30.0–990.0				6 8 10 12 16		19		
		*25	30.0–990.0				8 10 12 16 20		22		
		*30	30.0–990.0				8 10 12 16 20 24		27	15	
		*35	40.0–990.0				10 12 16 20 24 30		30		
		*40	40.0–990.0				12 16 20 24 30		36	20	
		*50	40.0–990.0				16 20 24 30		41		

When D-P(Q)≤2, chamfer C at the step is 0.2 or less.

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

Both Ends Stepped & Threaded, *continued*

Available Types

(1) D tolerance h9 (Cold-Drawn) / P, Q tolerance h7 (2) D tolerance h9 (Cold-Drawn) / P tolerance g6

Type	NSFRMHM, NSFRMGM, NSFRMHMS, NSFRMGMS, SFRMHM, SFRMGM, SFRMHMS, SFRMGMS, PSFRMHM, PSFRMGM, PSFRMHMS , PSFRMGMS									SSFRMHM, SSFRMGM, SSFRMHMS, SSFRMGMS								
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	L600.1 800.0	L800.1 990.0	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	L800.1 990.0
6	•	•	•	•	•	•	—	—	—	•	•	•	•	•	•	—	—	—
8	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
10	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
12	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
15	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
35	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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

Type	NSFRHM, NSFRM, NSFRHMS, NSFRMS, SFRHM, SFRM, SFRHMS, SFRMS, PSFRHM, PSFRM, PSFRHMS, PSFRMS									SSFRHM, SSFRM, SSFRHMS, SSFRMS								
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	L600.1 800.0	L800.1 990.0	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	L800.1 990.0
6	•	•	•	•	•	•	—	—	—	•	•	•	•	•	•	—	—	—
8	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
10	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
12	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
13	•	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—	—
15	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
16	•	•	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—
17	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
18	•	•	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—
20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
22	•	•	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—
25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
35	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

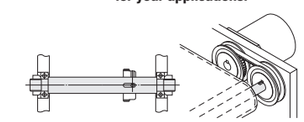
Type	HFRM							
D	Min. L 50.0	L50.1 100.0	L100.1 150.0	L150.1 200.0	L200.1 300.0	L300.1 400.0	L400.1 600.0	L600.1 790.0
15	•	•	•	•	•	•	•	•
20	•	•	•	•	•	•	•	•
25	•	•	•	•	•	•	•	•
30	•	•	•	•	•	•	•	•
35	•	•	•	•	•	•	•	•
40	•	•	•	•	•	•	•	•
50	•	•	•	•	•	•	•	•

Part Number Example

Part Number	- L -	F -	B -	P -	T -	S -	Q -	SC
SFRMHM30	- 250 -	F30 -	B8 -	P10 -	T30 -	S8 -	Q10	
SFRHMS25	- 200 -	F25 -	B15 -	P12 -	T25 -	S15 -	Q12 -	SC30

Application Example

Select from h9 (Cold-Drawn), h7 (Ground) and g6 (Ground) for your applications.



Part Number Alterations

Part Number	- L	- F	- B	- P (PMC)	- T	- S	- Q (QMC)	- SC	- (KC, WKC, FC...etc.)
SSFRHMS10	- 300	- F25	- B15	- P12	- T25	- S15	- Q12	- SC30	- LKC

	Keyway	Keyway on Shaft End, Retaining Ring Groove	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	Undercut, L Dimension Tolerance	Concentricity, Left Hand Thread	Fine Thread
Alterations	One Keyway: KC Two Keyways: WKC	PKC, QKC	1 Set Screw Flat: FC 2 Set Screw Flats: WFC	SFC	UC	LKC	PLM, QLM	QMC (Fine Thread) PMC (Fine Thread)
Code	KC, WKC, KZ	PKC, QKC	FC, WFC	SFC	UC	PC, QC, LKC	CKC, PLM, QLM	PMC, QMC
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, KZ, 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.	PKC / QKC: Adds a Keyway on the shaft end P (Q). PKC10 (QKC10) PKC, QKC = 1 mm Increment PKC, QKC≤50 PKC (QKC)=F (T) For keyway details refer to **P.853**. Not applicable to P (Q) = 5 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, G = 1 mm Increment AG = 15° Increment SG≤50 **Ordering Code:** SFC10-SG3-AG90 When combined with other alterations, ±2 degree phase differential may occur.	Adds a slit cam groove. UC = 1 mm Increment **Ordering Code:** UC10 UC+ℓ_1≤L UC≥1 Not applicable to D13 or more.	PC, QC: Adds an undercut on P and Q. **Ordering Code:** PC For undercut dimension details, refer to **P.853**. F-B≤Mx2 Not applicable to D=P or D=Q. 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 Ø0.02. **Ordering Code:** CKC Applicable within dimension L range in the table below. Not applicable to D part of h9 (Cold-Drawn). PLM, QLM: Changes the threads on shaft end P(Q) to Left-hand Thread. **Ordering Code:** PLM (QLM) Applicable to Both Ends Threaded Type only. Combination with PMC and QMC is not applicable.	Changes threads to Fine Threads in the table below. **Ordering Code:** PMC20 (QMC16)
	Keyways and set screw flats are added in the same plane. When the distance of the alterations are over 500 mm, ±2 degree phase differential may occur.							

KZ

D	d	ℓ_1
6	5	4
8	7	
10	8	5
12	10	

SFC

D	H
6–17	1
18–40	2
50	3

SFC

D	H
6–17	1
18–40	2
50	3

CKC

D	Lmax
6–22	450
25–50	600

PMC, QMC

D						
6	3	4	5			
8	3	4	5	6		
10		4	5	6	8	
12/13			5	6	8	10
15/16			5	6	8	10 12
17/18				6	8	10 12 15
20/22				6	8	10 12 15 17
25					8	10 12 15 17 20
30					8	10 12 15 17 20 25
35						10 12 15 17 20 25 30
40						12 15 17 20 25 30 35
50						15 17 20 25 30 35 40
Pitch	0.35	0.5	0.5	0.75	1.0	1.5

P(Q) dimension is the same as PMC(QMC)

Use PMC(QMC) to specify P(Q) dimension.

For Keyway Details, **P.853**. For detailed undercut dimensions, **P.853**

	Keyway on Step P, Q	2nd Keyway on Step P, Q	Set Screw Flat on P, Q	Retaining Ring Groove on D	Retaining Ring Groove on P, Q
Alterations	PP, PK, QQ, QK	PV, PW, QV, QW	PFC, LC, QFC, RC	TL, TR	TF, TT
Code	PP, QQ	PV, QV	PFC, QFC	TL, TR	TF, TT
Spec.	PP, PK = 0.1 mm increment. QQ, QK = 0.1 mm increment. **Ordering Code:** PP5-PK10 Not applicable when P≤5. Key Length (PK) ≤ 70	PV, PW = 0.1 mm increment. QV, QW = 0.1 mm increment. **Ordering Code:** PP5-PK11-PV5-PW10 Only available when PP(QQ) specified. Not applicable when P≤5. Key Length (PK) ≤ 71	PFC, LC= 1 mm increment. QFC, RC= 1 mm increment. **Ordering Code:** PFC10-LC5	TL, TR= 0.1 mm increment. **Ordering Code:** TL10, TR10 2≤TR≤150 and TL+F≤150 For dimension m, see **P.853**.	TF, TT= 0.1 mm increment. **Ordering Code:** TF10 2≤TF≤150, 2≤TT≤150 For dimension m, see **P.853**.