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

Both Ends Stepped and 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.

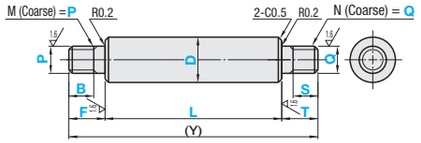
	Type: Standard	Type: Wrench Flats	Tolerance: D	Tolerance: P, Q	M Material	S Surface Treatment
(1)	SFRMHM	SFRMHMS	h9 (Cold-drawn)	h7	S45C Equivalent	Black Oxide
	PSFRMHM	PSFRMHMS				Electroless Nickel Plating
	SSFRMHM	SSFRMHMS			SUS304	-
(2)	SFRMGM	SFRMGMS		g6	S45C Equivalent	Black Oxide
	PSFRMGM	PSFRMGMS				Electroless Nickel Plating
	SSFRMGM	SSFRMGMS			SUS304	-
(3)	SFRHM	SFRHMS	h7 (Ground)	h7	S45C Equivalent	Black Oxide
	PSFRHM	PSFRHMS				Electroless Nickel Plating
	SSFRHM	SSFRHMS			SUS304	-
(4)	SFRM	SFRMS	g6 (Ground)	g6	S45C Equivalent	Black Oxide
	PSFRM	PSFRMS				Electroless Nickel Plating
	SSFRM	SSFRMS			SUS304	-
	HFRM	-			SCM435 H Hardness: 30 ~ 35HRC	Black Oxide

■Tolerance Table

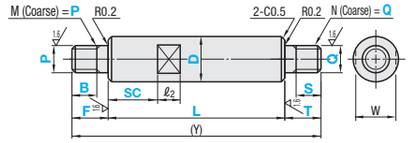
D, P	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
3	0 / -0.025	0 / -0.010	-0.002 / -0.008
3.1~6	0 / -0.030	0 / -0.012	-0.004 / -0.012
6.1~10	0 / -0.036	0 / -0.015	-0.005 / -0.014
10.1~18	0 / -0.043	0 / -0.018	-0.006 / -0.017
18.1~30	0 / -0.052	0 / -0.021	-0.007 / -0.020
30.1~50	0 / -0.062	0 / -0.025	-0.009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

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

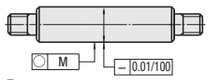
Standard



Wrench Flats



■Circularity and Straightness



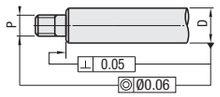
Not applicable to h9 (Cold-drawn).

■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).

■Concentricity and Perpendicularity



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

(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	0.1mm Increment: L	0.1mm Increment: F, T	1mm Increment: B	1mm Increment: S	P, Q Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
(1)D Tol. h9 / P, Q Tol. h7	(1)D Tol. h9 / P, Q Tol. h7	6	15.0~390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2	When Q≤6 S≤Qx3 & S≤T-2	3 4 5	SC+ℓ2≤L SC=0 or SC≥1	5	8	400
SFRMHM	SFRMHMS	8	15.0~490.0				3 4 5 6		7		500
PSFRMHM	PSFRMHMS	10	15.0~590.0				4 5 6 8		8		600
SSFRMHM (D6 is not available for SSFRMHM.)	SSFRMHMS (D6 is not available for SSFRMHMS.)	12	15.0~690.0		When P = 8 or 10 B≤Px3 & B≤F-3	When Q = 8 or 10 S≤Qx3 & S≤T-3	5 6 8 10		10	10	700
(2)D Tol. h9 / P, Q Tol. g6	(2)D Tol. h9 / P, Q Tol. g6	15	15.0~790.0				5 6 8 10 12		13		800
SFRMGM	SFRMGMS	20	30.0~990.0				6 8 10 12 16		17		1000
PSFRMGM	PSFRMGMS	25	30.0~990.0		When P≥12 B≤Px3 & B≤F-5	When Q≥12 S≤Qx3 & S≤T-5	8 10 12 16 20		22		
SSFRMGM (D6 is not available for SSFRMGM.)	SSFRMGMS (D6 is not available for SSFRMGMS.)	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	0.1mm Increment: L	0.1mm Increment: F	1mm Increment: B	1mm Increment: S	P, Q Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	15.0~390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2	When Q≤6 S≤Qx3 & S≤T-2	3 4 5	SC+ℓ2≤L SC=0 or SC≥1	5	8	400
		8	15.0~490.0				3 4 5 6		7		500
		10	15.0~590.0				4 5 6 8		8		600
SFRHM	SFRHMS	12	15.0~690.0		When P = 8 or 10 B≤Px3 & B≤F-3	When Q = 8 or 10 S≤Qx3 & S≤T-3	5 6 8 10		10	10	700
		15	15.0~790.0				5 6 8 10 12		13		800
PSFRHM	PSFRHMS	17	30.0~890.0				5 6 8 10 12		14		900
		20	30.0~990.0				6 8 10 12 16		17		1000
		25	30.0~990.0		When P≥12 B≤Px3 & B≤F-5	When Q≥12 S≤Qx3 & S≤T-5	8 10 12 16 20		22		
SSFRHM	SSFRHMS	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	0.1mm Increment: L	0.1mm Increment: F, T	1mm Increment: B	1mm Increment: S	P, Q Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	15.0~390.0	5≤F≤Px7 5≤T≤Qx7	When P≤6 B≤Px3 & B≤F-2	When Q≤6 S≤Qx3 & S≤T-2	3 4 5	SC+ℓ2≤L SC=0 or SC≥1	5	8	400
		8	15.0~490.0				3 4 5 6		7		500
		10	15.0~590.0				4 5 6 8		8		600
SFRM	SFRMS	12	15.0~690.0		When P = 8 or 10 B≤Px3 & B≤F-3	When Q = 8 or 10 S≤Qx3 & S≤T-3	5 6 8 10		10	10	700
		13	15.0~690.0				5 6 8 10		11		
PSFRM	PSFRMS	*15	15.0~790.0				5 6 8 10 12		13		800
		16	15.0~890.0				5 6 8 10 12		14		900
SSFRM (D13, D16, D18 or D22 is not available for SSFRM.)	SSFRMS (D13, D16, D18 or D22 is not available for SSFRMS.)	17	30.0~890.0				5 6 8 10 12				
		18	30.0~890.0				5 6 8 10 12		15		
*HFRM (Only * marked sizes are available.)		*20	30.0~990.0		When P≥12 B≤Px3 & B≤F-5	When Q≥12 S≤Qx3 & S≤T-5	6 8 10 12 16		17		1000
		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. ⊗For HFRM, the upper limit for L dim. is 790.

Ordering Example

Part Number - L - F - B - P - T - S - Q - SC

(1)D Tol. h9 / P, Q Tol. h7 SFRMHM30 - 250 - F30 - B8 - P10 - T30 - S8 - Q10
(3)h7 (Ground) with Wrench Flat SFRHMS25 - 200 - F25 - B15 - P12 - T25 - S15 - Q12 - SC30
(4)g6 (Ground)

(1)D Tolerance h9 (Cold-drawn) / P, Q Tolerance h7 (2)D Tolerance h9 (Cold-drawn) / P, Q Tolerance g6

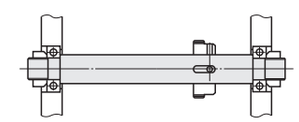
Type	SFRMHM, SFRMGM (S45C Equivalent, Black Oxide) SFRMHMS, SFRMGMS With wrench flats, add relevant surcharge to the prices shown below.									PSFRMHM, PSFRMGM (S45C Equivalent, Electroless Nickel Plating) PSFRMHMS, PSFRMGMS With wrench flats, add relevant surcharge to the prices shown below.									SSFRMHM, SSFRMGM (SUS304) SSFRMHMS, SSFRMGMS With wrench flats, add relevant surcharge to the prices shown below.								
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	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																										

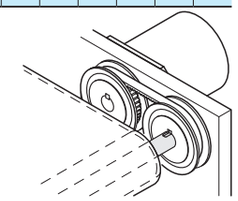
(3)h7 (Ground) (4)g6 (Ground)

Type	SFRHM, SFRM (S45C Equivalent, Black Oxide) SFRHMS, SFRMS With wrench flats, add relevant surcharge to the prices shown below.									PSFRHM, PSFRM (S45C Equivalent, Electroless Nickel Plating) PSFRHMS, PSFRMS With wrench flats, add relevant surcharge to the prices shown below.									SSFRHM, SSFRM (SUS304) SSFRHMS, SSFRMS With wrench flats, add relevant surcharge to the prices shown below.								
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	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 (SCM435 Hardness 30~35HRC, Black Oxide)							
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								

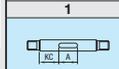
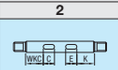
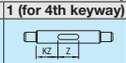
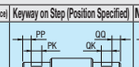
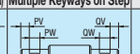
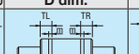
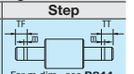
ex Example

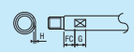
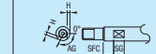
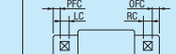
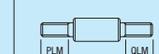


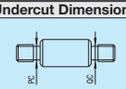
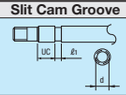
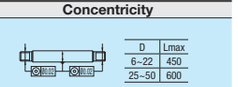


Alterations

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

For details, see Alteration Overview P.843	Keyway: 1	Keyway: 2	Keyway: 1 (for 4th keyway)	Keyway on Step P (Position Zero from End Face)	Keyway on Step (Position Specified)	Multiple Keyways on Step	Retaining Ring Groove: D dim.	Retaining Ring Groove: Step
Alterations			 Applicable only when combined with both KZ and WKC.					 For m dim., see P.844
Code	KC	WKC	KZ	PKC, QKC	PP, QQ	PV, QV	TL, TR	TF, TT
Dimension Increment	KC, A = 0.1mm Increment	WKC, C, E, K = 0.1mm Increment	KZ, Z = 0.1mm Increment	PKC, QKC = 0.1mm Increment	PP, PK = 0.1mm Increment QQ, QK = 0.1mm Increment	PV, PW = 0.1mm Increment QV, QW = 0.1mm Increment	TL, TR = 0.1mm Increment	TF, TT = 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	TL10	TF10
Conditions	Key Length ≤ 100. *1, *2			Not applicable when P≤5. Key Length ≤ 70. *1, *2 Only when PP (QQ) is specified, PV (QV) is available.			F+TL≤150 T+TR≤150	2≤TF, TT≤150

For details, see Alteration Overview P.843	Set Screw Flat: 1	Set Screw Flat: 2	Set Screw Flat: 2 Set Screw Flats (Angle Specified)	Set Screw Flat on Step	Threaded: Changes to Left-hand Thread	Threaded: Changes to Fine Thread
Alterations						
Code	FC	WFC	SFC	PFC, QFC	PLM, QLM	PMC, QMC
Dimension Increment	FC, G = 1mm Increment	WFC, J, V, W = 1mm Increment	SFC, SG = 1mm Increment AG = 15° Increment	PFC, LC = 1mm Increment QFC, RC = 1mm Increment	-	-
Ordering Example	FC10-G3	WFC10-J15-W10-V20	SFC10-SG3-AG120	PFC10-LC5	PLM	PMC
Conditions	For H dim., see P.843. G, J, V, LC, RC, SG ≤ 70					

For details, see Alteration Overview P.843	Undercut Dimensions	Slit Cam Groove	L Dimension Tolerance	Concentricity
Alterations			L<500···→L±0.05 L≥500···→L±0.1	
Code	PC, QC	UC	LKC	CKC
Dimension Increment	-	UC = 1mm Increment	-	-
Ordering Example	PC	UC10	LKC	CKC
Conditions		Not applicable when D≥13. For d, ℓ1 dim., see P.843.	Not applicable when L≥800.	Not applicable when D Tol. = h9.

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.