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

One End Stepped, One End Tapped

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).

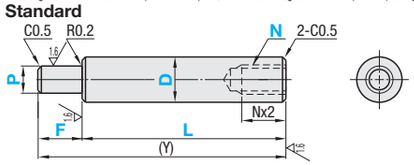
	Type: Standard	Type: Wrench Flats	Tolerance D	Tolerance P	M Material	S Surface Treatment
(1)	SFRMHF	SFRMHFS	h9 (Cold-drawn)	h7	S45C Equivalent	Black Oxide
	PSFRMHF	PSFRMHFS				Electroless Nickel Plating
	SSFRMHF	SSFRMHFS			SUS304	-
(2)	SFRMGF	SFRMGFS		g6	S45C Equivalent	Black Oxide
	PSFRMGF	PSFRMGFS				Electroless Nickel Plating
	SSFRMGF	SSFRMGFS			SUS304	-
(3)	SFRHF	SFRHFS	h7 (Ground)	h7	S45C Equivalent	Black Oxide
	PSFRHF	PSFRHFS				Electroless Nickel Plating
	SSFRHF	SSFRHFS			SUS304	-
(4)	SFRF	SFRFS	g6 (Ground)	g6	S45C Equivalent	Black Oxide
	PSFRF	PSFRFS				Electroless Nickel Plating
	SSFRF	SSFRFS			SUS304	-
	PHFRF	-			SCM435 H Hardness: 30 ~ 35HRC	Electroless Nickel Plating

■Tolerance Table

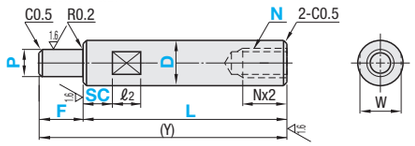
D, P	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
3	0 / -0.025	0 / -0.010	-0.002 / -0.008
3.1~6	0 / -0.030	0 / -0.012	-0.004 / -0.012
6.1~10	0 / -0.036	0 / -0.015	-0.005 / -0.014
10.1~18	0 / -0.043	0 / -0.018	-0.006 / -0.017
18.1~30	0 / -0.052	0 / -0.021	-0.007 / -0.020
30.1~50	0 / -0.062	0 / -0.025	-0.009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

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

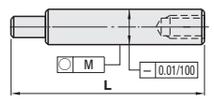
Standard



Wrench Flats



■Circularity and Straightness



Not applicable to h9 (Cold-drawn).

■Circularity of Part D

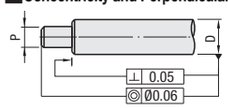
D over	D or Less	Circularity M
5	13	0.004
13	20	0.005
20	40	0.006
40	50	0.007

Not applicable to h9 (Cold-drawn).

■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

■Concentricity and Perpendicularity



Not applicable to h9 (Cold-drawn).

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

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
(1)D Tol. h9 / P Tol. h7	(1)D Tol. h9 / P Tol. h7	6	15.0~398.0	2≤F≤Px5	3≤P<D	2.6 3 4	SC+ℓ2≤L	5	8	400
SFRMHF	SFRMHFS	8	15.0~498.0			2.6 3 4 5 6	SC=0 or SC≥1	7		500
PSFRMHF	PSFRMHFS	10	15.0~598.0			3 4 5 6	For SC≤Mx3, W-M≥2	8		600
SSFRMHF	SSFRMHFS	12	15.0~698.0		5≤P<D	4 5 6 8		10	10	700
(D6 is not available for SSFRMHF)	(D6 is not available for SSFRMHFS.)	15	15.0~798.0			4 5 6 8 10		13		800
(2)D Tol. h9 / P Tol. g6	(2)D Tol. h9 / P Tol. g6	20	30.0~998.0			4 5 6 8 10 12 16		17		1000
SFRMGF	SFRMGFS	25	50.0~998.0		10≤P<D	4 5 6 8 10 12 16		22		
PSFRMGF	PSFRMGFS	30	60.0~998.0			6 8 10 12 16 20		27	15	
SSFRMGF	SSFRMGFS	35	70.0~998.0		16≤P<D	6 8 10 12 16 20 24		30		
(D6 is not available for SSFRMGF)	(D6 is not available for SSFRMGFS.)									

(3)h7 (Ground)

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	15.0~398.0	2≤F≤Px5	3≤P<D	2.6 3 4	SC+ℓ2≤L	5	8	400
		8	15.0~498.0			2.6 3 4 5 6	SC=0 or SC≥1	7		500
		10	15.0~598.0			3 4 5 6	For SC≤Mx3, W-M≥2	8		600
SFRHF	SFRHFS	12	15.0~698.0		5≤P<D	4 5 6 8		10	10	700
		15	15.0~798.0			4 5 6 8 10		13		800
PSFRHF	PSFRHFS	17	30.0~898.0			4 5 6 8 10 12		14		900
		20	30.0~998.0			4 5 6 8 10 12 16		17		
SSFRHF	SSFRHFS	25	50.0~998.0		10≤P<D	4 5 6 8 10 12 16		22		
		30	60.0~998.0			6 8 10 12 16 20		27	15	1000
		35	70.0~998.0		16≤P<D	6 8 10 12 16 20 24		30		
		40	80.0~998.0			10 12 16 20 24 30		36	20	
		50	100.0~998.0			12 16 20 24 30		41		

(4)g6 (Ground)

Part Number Type Standard	Wrench Flats	D	0.1mm Increment L	F	1mm Increment P	N (Coarse) Selection	1mm Increment SC Wrench Flats Type only	W	ℓ2	(Y) max.
		6	15.0~398.0	2≤F≤Px5	3≤P<D	2.6 3 4	SC+ℓ2≤L	5	8	400
		8	15.0~498.0			2.6 3 4 5 6	SC=0 or SC≥1	7		500
		10	15.0~598.0			3 4 5 6	For SC≤Mx3, W-M≥2	8		600
		12	15.0~698.0		5≤P<D	4 5 6 8		10	10	700
SFRF	SFRFS	13	15.0~698.0			4 5 6 8		11		
		* 15	15.0~798.0			4 5 6 8 10		13		800
PSFRF	PSFRFS	16	15.0~898.0			4 5 6 8 10		14		900
		17	30.0~898.0			4 5 6 8 10 12				
SSFRF	SSFRFS	18	30.0~898.0			4 5 6 8 10 12		15		
(D13, D16, D18 or D22 is not available for SSFRF.)	(D13, 16, 18 and 22 are not available for SSFRFS.)	* 20	30.0~998.0			4 5 6 8 10 12 16		17		1000
		22	40.0~998.0		10≤P<D	4 5 6 8 10 12 16		19		
*PHFRF		* 25	50.0~998.0			4 5 6 8 10 12 16		22		
(Only * marked sizes are available.)		* 30	60.0~998.0			6 8 10 12 16 20		27	15	
		* 35	70.0~998.0		16≤P<D	6 8 10 12 16 20 24		30		
		* 40	80.0~998.0			10 12 16 20 24 30		36	20	
		* 50	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 Nx3≤L. For PHFRF, the upper limit for L dim. is 798.0.

Ordering Example

Part Number	L	F	P	N	SC
(1)D part h9 / P part h7	PSFRMHF30	250	F30	P10	N10
(3)h7 (Ground) with Wrench Flat	SFRHFS25	200	F25	P15	N12	SC30
(4)g6 (Ground)					

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

Type	SFRMHF, SFRMGF (S45C Equivalent, Black Oxide) SFRMHFS, SFRMGFS With wrench flats, add relevant surcharge to the prices shown below.									PSFRMHF, PSFRMGF (S45C Equivalent, Electroless Nickel Plating) PSFRMHFS, PSFRMGFS With wrench flats, add relevant surcharge to the prices shown below.									SSFRMHF, SSFRMGF (SUS304) SSFRMHFS, SSFRMGFS 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 ~ 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
6							-	-	-							-	-	-	-	-	-	-	-	-	-	-	-
8								-	-								-	-								-	-
10								-	-								-	-								-	-
12									-									-									-
15									-									-									-
20																											
25																											
30	-									-									-								
35	-									-									-								

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

Type	SFRHF, SFRF (S45C Equivalent, Black Oxide) SFRHFS, SFRFS With wrench flats, add relevant surcharge to the prices shown below.									PSFRHF, PSFRF (S45C Equivalent, Electroless Nickel Plating) PSFRHFS, PSFRFS With wrench flats, add relevant surcharge to the prices shown below.									SSFRHF, SSFRF (SUS304) SSFRHFS, SSFRFS 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 ~ 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
6							-	-	-							-	-	-							-	-	-
8								-	-								-	-								-	-
10								-	-								-	-								-	-
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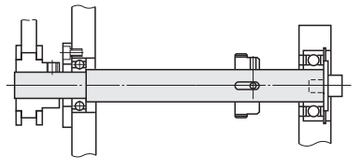
35	-									-									-								
40	-									-									-								
50	-									-									-								

Type	PHFRF (SCM435 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	-							

Example



Alterations

Part Number	L	F	P	N	SC	(KC, WKC, FC··· etc.)
SSFRHF10	150	F10	P5	N5		KFC10-G10-AG90

	Keyway					
For details, see Alteration Overview P.843	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
Alterations	KC A	WKC C E K	KZ Z (Applicable only when combined with both KC and WKC.)	PKC	PP PK	PV PW (Only when PP is specified, this Alteration is available.)
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		

	Set Screw Flat				Retaining Ring Groove	
For details, see Alteration Overview P.843	1	2	2 Set Screw Flats (Angle Specified)	Set Screw Flat on Step	D dim.	Step
Alterations	H FC G	H WFC J V W	H 0° AG SFC SG	PFC LC	TL TR m	TF m
Code	FC	WFC	SFC	PFC	TL, TR	TF
Dimension Increment	FC, G = 1mm Increment	WFC, J, V, W = 1mm Increment	SFC, SG = 1mm Increment AG = 15° Increment	PFC, LC = 1mm Increment	TL, TR = 0.1mm Increment	TF = 0.1mm Increment
Ordering Example	FC10-G3	WFC10-J15-W10-V20	SFC10-SG3-AG120	PFC10-LC5	TL10	TF10
Conditions	For H dim., see P.843. G, J, V, SG, LC ≤ 70				2≤TR≤150/TL+F≤150	2≤TF≤150 For m dim., see P.844.

For details, see Alteration Overview P.843	Slit Cam Groove	L Dimension Tolerance	Concentricity	C Chamfered Width / Step P Chamfering	Tapped Depth
Alterations	UC ℓ1 d For d, ℓ1 dim., see P.843.	LKC L<500··· L±0.05 L≥500··· L±0.1	0.02 D / Lmax: 6~22 / 450; 25~50 / 600	CP Chamfering (CP) / Applicable Dia. (P): C2 / Ø6~Ø49; C3 / Ø8~Ø49; C4 / Ø10~Ø49; C5 / Ø12~Ø49	ND(Nx3)
Code	UC	LKC	CKC	CP	ND (To specify this Alteration, replace N with ND.)
Dimension Increment	UC = 1mm Increment	-	-	CP = Selectable	-
Ordering Example	UC10	LKC	CKC	CP2	ND6
Conditions	Not applicable when D≥13.	Not applicable when L≥800.	Not applicable when D Tol. = h9.	Not applicable when Step Part = Ø3~Ø5. Applicable when P≥6.	Not applicable when N = 2, 2.6, 24 or 30.

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.