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

Both Ends 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.

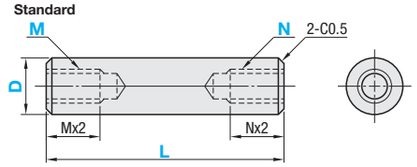
	Type Standard	Type Wrench Flats	D Tolerance	M Material	S Surface Treatment
(1)	SFMRW	SFMRWS	h9 (Cold-drawn)	S45C Equivalent	Black Oxide
	PSFMRW	PSFMRWS			Electroless Nickel Plating
	SSFMRW	SSFMRWS		SUS304	-
(2)	SFHRW	SFHRWS	h7 (Ground)	S45C Equivalent	Black Oxide
	PSFHRW	PSFHRWS			Electroless Nickel Plating
	SSFHRW	SSFHRWS		SUS304	-
(3)	SFRW	SFRWS	g6 (Ground)	S45C Equivalent	Black Oxide
	PSFRW	PSFRWS			Electroless Nickel Plating
	SSFRW	SSFRWS		SUS304	-
	HFRW	HFRWS		SCM435 H Hardness: 30 - 35HRC	Black Oxide
	PHFRW	-			Electroless Nickel Plating

■Tolerance Table

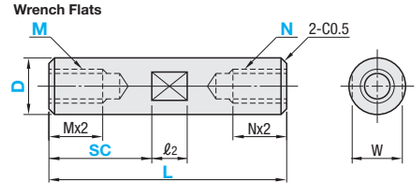
D	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
4~6	0 / -0.030	0 / -0.012	-0.004 / -0.012
8, 10	0 / -0.036	0 / -0.015	-0.005 / -0.014
12~18	0 / -0.043	0 / -0.018	-0.006 / -0.017
20~30	0 / -0.052	0 / -0.021	-0.007 / -0.020
35~50	0 / -0.062	0 / -0.025	-0.009 / -0.025

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

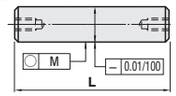
Standard



Wrench Flats



■Circularity and Straightness



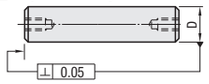
Not applicable to h9 (Cold-drawn).

■Circularity of Part D

D over	D or Less	Circularity M
3	13	0.004
13	20	0.005
20	40	0.006
40	50	0.007

Not applicable to h9 (Cold-drawn).

■Perpendicularity



Not applicable to h9 (Cold-drawn).

■Tolerances of L 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)h9 (Cold-drawn)

Part Number Type Standard	Wrench Flats	D	L 1mm Increment	M (Coarse) / N (Coarse) Selection	SC 1mm Increment Wrench Flats Type only	W	ℓ2
SFMRW	SFMRWS	4	15.0~200.0	2	-	-	-
		5	15.0~250.0	2 2.6 3			
		6	15.0~400.0	2.6 3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8
		8	15.0~500.0	2.6 3 4 5 6		7	
PSFMRW	PSFMRWS	10	15.0~600.0	3 4 5 6		8	
		12	15.0~700.0	4 5 6 8		10	10
		15	15.0~800.0	4 5 6 8 10		13	
SSFMRW (D4, D5 and D6 are not available for SSFMRW.)	SSFMRWS (D4, D5 or D6 is not available for SSFMRWS.)	20	30.0~1000.0	4 5 6 8 10 12 16		17	
		25	50.0~1000.0	4 5 6 8 10 12 16		22	
	(Wrench flats are not available for D4 and D5.)	30	60.0~1000.0	6 8 10 12 16 20		27	15
		35	70.0~1000.0	6 8 10 12 16 20 24		30	
		40	80.0~1000.0	10 12 16 20 24 30		36	20
		50	100.0~1000.0	12 16 20 24 30		41	

For overall length L, Mx2+Nx2≤L is required. When L dimension is less than the pilot hole depth of tapped hole, the pilot hole might go through.

(2)h7 (Ground)

Part Number Type Standard	Wrench Flats	D	L 1mm Increment	M (Coarse) / N (Coarse) Selection	SC 1mm Increment Wrench Flats Type only	W	ℓ2
SFHRW	SFHRWS	4	15.0~200.0	2	-	-	-
		5	15.0~250.0	2 2.6 3			
		6	15.0~400.0	2.6 3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8
		8	15.0~500.0	2.6 3 4 5 6		7	
		10	15.0~600.0	3 4 5 6		8	
		12	15.0~700.0	4 5 6 8		10	10
PSFHRW	PSFHRWS	15	15.0~800.0	4 5 6 8 10		13	
		17	30.0~900.0	4 5 6 8 10 12		14	
SSFHRW	SSFHRWS	20	30.0~900.0	4 5 6 8 10 12 16		17	
		25	50.0~900.0	4 5 6 8 10 12 16		22	
		30	60.0~900.0	6 8 10 12 16 20		27	15
		35	70.0~1000.0	6 8 10 12 16 20 24		30	
	(Wrench flats are not available for D4 and D5.)	40	80.0~1000.0	10 12 16 20 24 30		36	20
		50	100.0~1000.0	12 16 20 24 30		41	

For overall length L, Mx2+Nx2≤L is required. When L dimension is less than the pilot hole depth of tapped hole, the pilot hole might go through.

(3)g6 (Ground)

Part Number Type Standard	Wrench Flats	D	L 1mm Increment	M (Coarse) / N (Coarse) Selection	SC 1mm Increment Wrench Flats Type only	W	ℓ2
SFRW	SFRWS	4	15.0~200.0	2	-	-	-
		5	15.0~250.0	2 2.6 3			
		6	15.0~400.0	2.6 3 4	SC+ℓ2≤L SC=0 or SC≥1 For SC≤Mx3 W-M≥2	5	8
		8	15.0~500.0	2.6 3 4 5 6		7	
		10	15.0~600.0	3 4 5 6		8	
		12	15.0~700.0	4 5 6 8		10	10
PSFRW	PSFRWS	13	15.0~700.0	4 5 6 8		11	
		*15	15.0~800.0	4 5 6 8 10		13	
SSFRW (D13, D16, D18 or D22 is not available for SSFRW.)	SSFRWS (D13, D16, D18 or D22 is not available for SSFRWS.)	16	15.0~900.0	4 5 6 8 10		14	
		17	30.0~900.0	4 5 6 8 10 12			
*HFRW (Only * marked sizes are available.)	*HFRWS (Only * marked sizes are available.)	18	30.0~900.0	4 5 6 8 10 12		15	
		*20	30.0~1000.0	4 5 6 8 10 12 16		17	
		22	40.0~1000.0	4 5 6 8 10 12 16		19	
*PHFRW (Only * marked sizes are available.)		*25	50.0~1000.0	4 5 6 8 10 12 16		22	
		*30	60.0~1000.0	6 8 10 12 16 20		27	15
		*35	70.0~1000.0	6 8 10 12 16 20 24		30	
	(Wrench flats are not available for D4 and D5.)	*40	80.0~1000.0	10 12 16 20 24 30		36	20
		*50	100.0~1000.0	12 16 20 24 30		41	

For overall length L, Mx2+Nx2≤L is required. When L dimension is less than the pilot hole depth of tapped hole, the pilot hole might go through. For HFRW, HFRWS, PHFRW, the upper limit for L dim. is 800.0.

Ordering Example

Part Number	-	L	-	M	-	N	-	SC
SFMRW30	-	250	-	M12	-	N10		
SFHRWS25	-	200	-	M8	-	N12	-	SC20

(1)h9 (Cold-drawn)

Type	SFMRW (S45C Equivalent, Black Oxide) SFMRWS With wrench flats, add relevant surcharge to the prices shown below.									PSFMRW (S45C Equivalent, Electroless Nickel Plating) PSFMRWS With wrench flats, add relevant surcharge to the prices shown below.									SSFMRW (SUS304) SSFMRWS 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 ~ 1000.0	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 ~ 1000.0	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 ~ 1000.0
4					-	-	-	-	-					-	-	-	-	-	-	-	-	-	-	-	-	-	-
5						-	-	-	-						-	-	-	-	-	-	-	-	-	-	-	-	-
6							-	-	-							-	-	-	-	-	-	-	-	-	-	-	-
8								-	-								-	-								-	-
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30	-									-									-								
35	-									-									-								
40	-									-									-								
50	-									-									-								

(2)h7 (Ground) (3)g6 (Ground)

Type	SFHRW, SFRW (S45C Equivalent, Black Oxide) SFHRWS, SFRWS With wrench flats, add relevant surcharge to the prices shown below.									PSFHRW, PSFRW (S45C Equivalent, Electroless Nickel Plating) PSFHRWS, PSFRWS With wrench flats, add relevant surcharge to the prices shown below.									SSFHRW, SSFRW (SUS304) SSFHRWS, SSFRWS 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 ~ 1000.0	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 ~ 1000.0	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 ~ 1000.0
4					-	-	-	-	-					-	-	-	-	-					-	-	-	-	-
5						-	-	-	-						-	-	-	-						-	-	-	-
6							-	-	-							-	-	-							-	-	-
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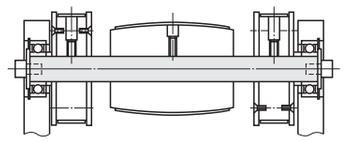
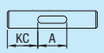
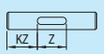
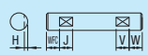
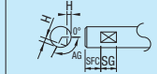
Type	HFRW (SCM435 Hardness 30~35HRC, Black Oxide) HFRWS With wrench flats, add JPY400 to the prices shown below.								PHFRW (SCM435 Hardness 30~35HRC, Electroless Nickel Plating)							
D	Min. L ~ 50.0	L50.1 ~ 100.0	L100.1 ~ 150.0	L150.1 ~ 200.0	L200.1 ~ 300.0	L300.1 ~ 400.0	L400.1 ~ 600.0	L600.1 ~ 800.0	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
15																
20																
25																
30	-								-							
35	-								-							
40	-								-							
50	-								-							

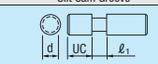
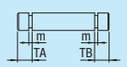
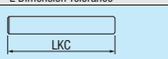
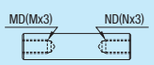
Example



Alterations

Part Number	-	L	-	M	-	N	-	SC	-	(KC, WKC, FC…etc.)
SSFRW10	-	150	-	M4	-	N6	-	SC30	-	LKC

For details, see Alteration Overview P.843 Alterations	Keyway 1	Keyway 2	Keyway 1 (for 4th keyway)	Set Screw Flat 1	Set Screw Flat 2	Set Screw Flat 2 Set Screw Flats (Angle Specified)
			 Applicable only when combined with both KC and WKC.			
Code	KC	WKC	KZ	FC	WFC	SFC
Dimension Increment	KC, A = 0.1mm Increment	WKC, C, E, K = 0.1mm Increment	KZ, Z = 0.1mm Increment	FC, G = 1mm Increment	WFC, J, V, W = 1mm Increment	SFC, SG = 1mm Increment AG = 15° Increment
Ordering Example	KC50-A10	WKC5-C20-K5-E10	KC5-A10-WKC20-C10-K60 -E10-KZ100-Z10	FC10-G3	WFC10-J15-W10-V20	SFC10-SG3-AG120
Conditions	Not applicable when Shaft Dia. ≤ Ø5. Key Length ≤ 100. *1, *2			For H dim., see P.843. G, J, V, SG ≤ 70		

For details, see Alteration Overview P.843 Alterations	Slit Cam Groove	Retaining Ring Groove	L Dimension Tolerance	Tapped Depth
	 For d, ℓ1 dim., see P.843.		 L<500··· L±0.05 L≥500··· L±0.1	
Code	UC	TA, TB	LKC	MD, ND (To specify any of these Alterations, replace M with MD or N with ND.)
Dimension Increment	UC = 1mm Increment	TA, TB = 0.1mm Increment	-	-
Ordering Example	UC10	TA10	LKC	MD6
Conditions	Not applicable when Shaft Dia. ≥ Ø13.	2 ≤ TA, TB ≤ 150 For m dim., see P.844.	Not applicable when L≥800.	Not applicable when M = 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.