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

Both Ends Tapped

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

Rotary Shafts – Both Ends Tapped

RoHS 10

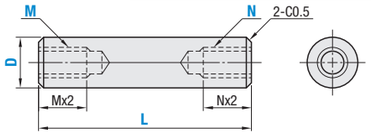
! Surface roughness of D part for h9 (Cold-Drawn) is 6.3▽. Surface roughness for h7 (Ground) and g6 (Ground) is 1.6▽

	Type: Standard	Type: Wrench Flats	D Tolerance	Material	Surface Treatment
(1)	NSFMRW	NSFMRWS	h9 (Cold-Drawn)	1045 Carbon Steel or Equivalent	—
	SFMRW	SFMRWS			Black Oxide
	PSFMRW	PSFMRWS			Electroless Nickel Plating
	SSFMRW	SSFMRWS		304 Stainless Steel	—
(2)	NSFHRW	NSFHRWS	h7 (Ground)	1045 Carbon Steel or Equivalent	—
	SFHRW	SFHRWS			Black Oxide
	PSFHRW	PSFHRWS			Electroless Nickel Plating
	SSFHRW	SSFHRWS		304 Stainless Steel	—
(3)	NSFRW	NSFRWS	g6 (Ground)	1045 Carbon Steel or Equivalent	—
	SFRW	SFRWS			Black Oxide
	PSFRW	PSFRWS			Electroless Nickel Plating
	SSFRW	SSFRWS		304 Stainless Steel	—
	HFRW	HFRWS		4137 Alloy Steel or Equivalent Hardness 30–35 HRC min.	Black Oxide
	PHFRW	—			Electroless Nickel Plating

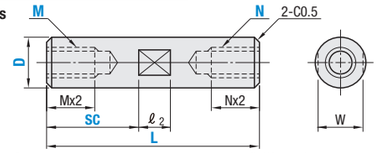
Tolerance Table

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

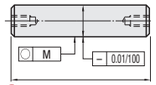
Standard



Wrench Flats



Circularity and Straightness



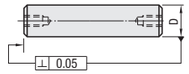
! Not applicable to h9 (Cold-Drawn).

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 & 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	800	±0.8

(1) h9 (Cold-Drawn)

Part Number Type: Standard	Part Number Type: Wrench Flats	D	L=0.1 mm Increment	M (Coarse) · N (Coarse) Selectable	SC 1 mm Increment With Wrench Flats only	W	ℓ2
NSFMRW	NSFMRWS	4	15.0–200.0	2	—	—	—
SFMRW	SFMRWS	5	15.0–250.0	2 2.6 3		5	8
PSFMRW	PSFMRWS	6	15.0–500.0	2.6 3 4	SC+ℓ2≤L	7	
SSFMRW	SSFMRWS	8	15.0–500.0	2.6 3 4 5 6		8	
D4, D5 and D6 are not available for SSFMRW.	D4, D5 and D6 are not available for SSFMRWS.	10	15.0–800.0	3 4 5 6 8	SC=0 or SC≥1	10	10
	Wrench flats are not available for D4 and D5	12	15.0–900.0	3 4 5 6 8		10	
		15	15.0–1000.0	3 4 5 6 8 10		13	
		20	20.0–1000.0	4 5 6 8 10 12 16	! For SC≤Mx3 W-M≥2	17	
		25	20.0–1000.0	4 5 6 8 10 12 16		22	
		30	20.0–1000.0	5 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≤(Mx2+Depth of Pilot Hole)+(Nx2+Depth of Pilot Hole), tap pilot holes may go through and the effective thread length of the smaller tapping may be made shorter to prioritize the effective thread of the larger tapping (With MD or ND, L≤(MDx3+Depth of Pilot Hole)+(NDx3+Depth of Pilot Hole)).

(2) h7 (Ground)

Part Number Type: Standard	Part Number Type: Wrench Flats	D	L=0.1 mm Increment	M (Coarse) · N (Coarse) Selectable	SC 1 mm Increment With Wrench Flats only	W	ℓ2
		4	15.0–200.0	2	—	—	—
		5	15.0–250.0	2 2.6 3		5	8
NSFHRW	NSFHRWS	6	15.0–500.0	2.6 3 4	SC+ℓ2≤L	7	
SFHRW	SFHRWS	8	15.0–500.0	2.6 3 4 5 6		8	
PSFHRW	PSFHRWS	10	15.0–800.0	3 4 5 6 8	SC=0 or SC≥1	10	10
SSFHRW	SSFHRWS	12	15.0–900.0	3 4 5 6 8		10	
	Wrench flats not available for D4 and D5	15	15.0–1000.0	3 4 5 6 8 10		13	
		17	20.0–1000.0	4 5 6 8 10 12		14	
		20	20.0–900.0	4 5 6 8 10 12 16	! For SC≤Mx3 W-M≥2	17	
		25	20.0–900.0	4 5 6 8 10 12 16		22	
		30	20.0–900.0	5 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≤(Mx2+Depth of Pilot Hole)+(Nx2+Depth of Pilot Hole), tap pilot holes may go through and the effective thread length of the smaller tapping may be made shorter to prioritize the effective thread of the larger tapping (With MD or ND, L≤(MDx3+Depth of Pilot Hole)+(NDx3+Depth of Pilot Hole)).

(3) g6 (Ground)

Part Number Type: Standard	Part Number Type: Wrench Flats	D	L=0.1 mm Increment	M (Coarse) · N (Coarse) Selectable	SC 1 mm Increment With Wrench Flats only	W	ℓ2
		4	15.0–200.0	2	—	—	—
		5	15.0–250.0	2 2.6 3		5	8
NSFRW	NSFRWS	6	15.0–500.0	2.6 3 4	SC+ℓ2≤L	7	
SFRW	SFRWS	8	15.0–500.0	2.6 3 4 5 6		8	
PSFRW	PSFRWS	10	15.0–800.0	3 4 5 6	SC=0 or SC≥1	10	10
SSFRW	SSFRWS	12	15.0–900.0	3 4 5 6 8		11	
D13, 16, 18 and 22 are not available for SSFRW.	D13, 16, 18 and 22 are not available for SSFRWS.	*15	15.0–1000.0	3 4 5 6 8 10		13	
HFRW Only * marked sizes are available.	HFRWS Only * marked sizes are available.	16	15.0–1000.0	4 5 6 8 10 12		14	
		17	20.0–1000.0	4 5 6 8 10 12	! For SC≤Mx3 W-M≥2	15	
PHFRW Only * marked sizes are available.	Wrench flats are not available for D4 and D5.	18	20.0–1000.0	4 5 6 8 10 12		17	
		*20	20.0–1000.0	4 5 6 8 10 12 16		19	
		22	20.0–1000.0	4 5 6 8 10 12 16		22	
		*25	20.0–1000.0	4 5 6 8 10 12 16		27	
		*30	20.0–1000.0	5 6 8 10 12 16 20		30	15
		*35	70.0–1000.0	6 8 10 12 16 20 24		36	
		*40	80.0–1000.0	10 12 16 20 24 30		41	20
		*50	100.0–1000.0	12 16 20 24 30			

! For overall length L, Mx2+Nx2≤L is required.

! When L≤(Mx2+Depth of Pilot Hole)+(Nx2+Depth of Pilot Hole), tap pilot holes may go through and the effective thread length of the smaller tapping may be made shorter to prioritize the effective thread of the larger tapping (With MD or ND, L≤(MDx3+Depth of Pilot Hole)+(NDx3+Depth of Pilot Hole)).

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

Both Ends Tapped, *continued*

Available Types

(1) h9 (Cold-Drawn)

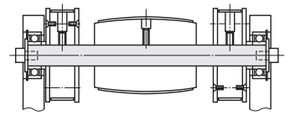
Type	NSFMRW, NSFMRWS, SFMRW, SFMRWS, PSFMRW, PSFMRW									SSFMRW, SSFMRWS								
D	Min. L 50.0	L50.1 100.0	L100.1 150.0	L150.1 200.0	L200.1 300.0	L300.1 400.0	L400.1 600.0	L600.1 800.0	L800.1 Max.	Min. L 50.0	L50.1 100.0	L100.1 150.0	L150.1 200.0	L200.1 300.0	L300.1 400.0	L400.1 600.0	L600.1 800.0	L800.1 Max.
4	•	•	•	•	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	•	•	•	•	•	—	—	—	—	—	—	—	—	—	—	—	—	—
6	•	•	•	•	•	•	•(Max.500)	—	—	—	—	—	—	—	—	—	—	—
8	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
10	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
12	•	•	•	•	•	•	•	•(Max.900)	—	•	•	•	•	•	•	•	•(Max.900)	—
15	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
20	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	—
25	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	—
30	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	—
35	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—
40	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—
50	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—

Type	HFRW, HFRWS, PHFRW							
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 1000.0
15	•	•	•	•	•	•	•	•
20	•(Min.20)	•	•	•	•	•	•	•
25	•(Min.20)	•	•	•	•	•	•	•
30	—	•	•	•	•	•	•	•
35	—	•	•	•	•	•	•	•
40	—	•	•	•	•	•	•	•
50	—	•	•	•	•	•	•	•

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

Type	NSFHRW, NSFHRWS, NSFRW, NSFRWS, SFHRW, SFRW, SFHRWS, SFRWS, PSFHRW, PSFRW, PSFHRWS, PSFRWS									SSFHRW, SSFRW, SSFHRWS, SSFRWS								
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 Max.	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 Max.
4	•	•	•	•	—	—	—	—	—	•	•	•	•	—	—	—	—	—
5	•	•	•	•	•	—	—	—	—	•	•	•	•	•	—	—	—	—
6	•	•	•	•	•	•	•(Max.500)	—	—	•	•	•	•	•	•	•(Max.500)	—	—
8	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	—	—
10	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	—
12	•	•	•	•	•	•	•	•(Max.900)	—	•	•	•	•	•	•	•	•	•(Max.900)
13	•	•	•	•	•	•	•	•(Max.900)	—	—	—	—	—	—	—	—	—	—
15	•	•	•	•	•	•	•	•	—	•	•	•	•	•	•	•	•	•
16	•	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—	—
17	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	•
18	•(Min.20)	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—	—
20	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	•
22	•(Min.20)	•	•	•	•	•	•	•	—	—	—	—	—	—	—	—	—	—
25	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	•
30	•(Min.20)	•	•	•	•	•	•	•	—	•(Min.20)	•	•	•	•	•	•	•	•
35	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	•
40	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	•
50	—	•	•	•	•	•	•	•	—	—	•	•	•	•	•	•	•	•

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



Part Number Alterations

Part Number	-	L	-	M	-	N	-	SC	- (KC, WKC, FC...etc.)
SSFRWS10	-	150	-	M4	-	N6	-	SC30	- LKC

Part Number Example

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

Alterations	Keyway	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	L Dimension Tolerance	Retaining Ring Groove
	One Keyway: KC; Two Keyways: WKC	One Set Screw Flat: FC; Two Set Screw Flats: WFC				
Code	KC / WKC / KZ	FC, WFC	SFC	UC	LKC	TA, TB
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.	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 D: 6–17, H: 1; 18–40, 2; 50, 3 ⊗ Not applicable to D4 and D5.	Adds a set screw flat at any designated angle besides the datum plane (0°). SFC, SG = 1 mm Increment AG = 15° Increment ! SG≤50 **Ordering Code:** SFC10-SG3-AG120 D: 6–17, H: 1; 18–40, 2; 50, 3 ! When combined with other alterations, ±2 degree phase differential may occur. ⊗ Not applicable to D4 and D5.	Adds a slit cam groove. UC = 1 mm Increment **Ordering Code:** UC10 ! UC+ℓ1≤L ! UC≥1 ⊗ Not applicable to D4, D5 and D13 or more. D: 6, d: 5, ℓ1: 4; 8, 7, 4; 10, 8, 5; 12, 10, 5	Changes L Dimension Tolerance. **Ordering Code:** LKC ! L<500 L±0.05 L≥500 L±0.1 ⊗ Not applicable to L=800 or more.	Adds a retaining ring groove. (Applicable retaining rings are included.) TA, TB = 1 mm Increment **Ordering Code:** TA10-TB10 ! 2≤TA, TB<=150 ! For dimensions of the retaining ring groove, please refer to **P.853.**
	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.					

! For Keyway Details, **P.853.** ! For dimensions of the retaining ring groove, **P.853.**

Alterations	Tapped Depth
	MD(M × 3); ND(N × 3)
Code	MD, ND
Spec.	To specify, replace M with MD. **Ordering Code:** MD6-ND6 ! To specify, replace M with MD and N with ND. ⊗ Not applicable when M= 2, 2.6, 24 or 30.