

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

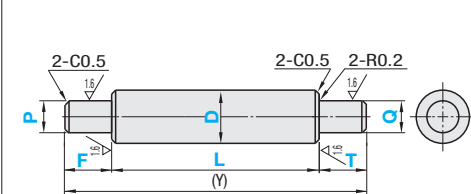
Both Ends Stepped

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



RoHS10

① Surface roughness of D part for h9 (Cold-drawn) is $\sqrt{1.6}$. Surface roughness for h7 (Ground) and g6 (Ground) is $\sqrt{0.4}$.
② For Retaining Ring Groove Type, refer to P857.



Type	Tolerance	Material	Surface Treatment
D	P, Q		
① SFRMHQ PSFRMHQ SSFRMHQ	h9 (Cold-drawn)	h7	EN 1.1191 Equiv. Electroless Nickel Plating
② SFRMGQ PSFRMGQ SSFRMGQ			EN 1.1191 Equiv. Electroless Nickel Plating
③ SFRHQ PSFRHQ SSFRHQ			EN 1.1191 Equiv. Electroless Nickel Plating
④ SFRQ PSFRQ SSFRQ HFRQ PHFRQ	h7 (Ground)	h7	EN 1.1191 Equiv. Electroless Nickel Plating
			EN 1.4301 Equiv. -
			EN 1.4301 Equiv. -
	g6 (Ground)	g6	EN 1.1191 Equiv. Electroless Nickel Plating
			EN 1.4301 Equiv. -
			EN 1.7220 Equiv. 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

Circularity of Part D

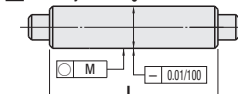
D over or Less	Circularity M
5	13 0.004
13	20 0.005
20	40 0.006
40	50 0.007

① Not applicable to h9 (Cold-drawn).

Tolerances of L, Y and Other Dimensions

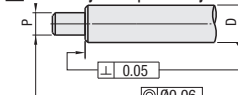
Dimension over or Less	Tolerance
2	6 ±0.1
6	30 ±0.2
30	120 ±0.3
120	400 ±0.5
400	800 ±0.8

Circularity and Straightness



① Not applicable to h9 (Cold-drawn).

Concentricity and Perpendicularity



① Not applicable to h9 (Cold-drawn).

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

Part Number		0.1mm Increment		1mm Increment	(Y) max.
Type	D	L	F, T	P, Q	
① D part h9 / P, Q part h7 SFRMHQ PSFRMHQ SSFRMHQ (D6 is not available for SSFRMHQ)	6	20.0~296.0	2≤F≤Px5 2≤T≤Qx5	3 4 5	300
	8	20.0~396.0		3≤P, Q<D	400
	10	20.0~496.0			500
	12	25.0~596.0			600
	15	25.0~696.0		5≤P, Q<D	700
② D part h9 / P, Q part g6 SFRMGQ PSFRMGQ SSFRMGQ (D6 is not available for SSFRMGQ)	20	30.0~796.0			800
	25	30.0~796.0			
	30	30.0~796.0			
	35	40.0~796.0			

③ h7 (Ground)

Part Number		0.1mm Increment		1mm Increment	(Y) max.
Type	D	L	F, T	P, Q	
SFRHQ	6	20.0~296.0	2≤F≤Px5 2≤T≤Qx5	3 4 5	300
	8	20.0~396.0		3≤P, Q<D	400
	10	20.0~496.0			500
	12	25.0~596.0		5≤P, Q<D	600
	15	25.0~696.0			700
17	30.0~796.0	800			
PSFRHQ	20			30.0~796.0	
SSFRHQ	25			30.0~796.0	
	30			30.0~796.0	10≤P, Q<D
	35			40.0~796.0	16≤P, Q<D
	40		40.0~796.0		
	50		40.0~796.0		

④ g6 (Ground)

Part Number		0.1mm Increment		1mm Increment	(Y) max.	
Type	D	L	F, T	P, Q		
SFRQ PSFRQ SSFRQ (D13, 16, 18 and 22 are not available for SSFRQ.) *HFRQ (Only * marked sizes are available.) *PHFRQ (Only * marked sizes are available.)	6	20.0~296.0	2≤F≤Px5 2≤T≤Qx5	3 4 5	300	
	8	20.0~396.0		3≤P, Q<D	400	
	10	20.0~496.0			500	
	12	25.0~596.0		5≤P, Q<D	600	
	13	25.0~596.0			700	
	*15	25.0~696.0				
	16	25.0~796.0				
	17	30.0~796.0		2≤F≤Px5 2≤T≤Qx5	5≤P, Q<D	800
	18	30.0~796.0				
	*20	30.0~796.0				
	22	30.0~796.0				
	*25	30.0~796.0			10≤P, Q<D	
	*30	30.0~796.0				
	*35	40.0~796.0		16≤P, Q<D		
	*40	40.0~796.0				
	*50	40.0~796.0				

① When D-P (Q)≤2, chamfer C at the step is 0.2 or less. ② For P and Q dimensions, 27, 31, 33, 34, 36, 37, 38, 39, 41, 42, 43, 44, 46, 47, 48 and 49 cannot be specified.



Ordering Example
① D part h9 / P, Q part h7
③ h7 (Ground)
④ g6 (Ground)

Part Number	L	F	P	T	Q
SFRMHQ20	325	F25	P10	T25	Q10
SFRHQ15	150	F15	P8	T15	Q8
SFRQ30	400	F28	P20	T28	Q20

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

Type	SFRMHQ, SFRMGQ (EN 1.1191 Equiv., Black Oxide)								PSFRMHQ, PSFRMGQ (EN 1.1191 Equiv., Electroless Nickel Plating)								SSFRMHQ, SSFRMGQ (EN 1.4301 Equiv.)							
D	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
6	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0
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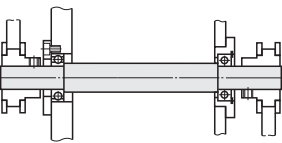
③ h7 (Ground) ④ g6 (Ground)

Type	SFRHQ, SFRQ (EN 1.1191 Equiv., Black Oxide)								PSFRHQ, PSFRQ (EN 1.1191 Equiv., Electroless Nickel Plating)								SSFRHQ, SSFRQ (EN 1.4301 Equiv.)							
D	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
6	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0
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Type	HFRO (EN 1.7220 Equiv. Hardness 30~35HRC, Black Oxide)								PHFRO (EN 1.7220 Equiv. Hardness 30~35HRC, Electroless Nickel Plating)							
D	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
15	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	796.0
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Example



Alterations

Part Number - L - F - P - T - Q - (KC, WKC, FC--etc.)
SFRMHQ30 - 300 - F25 - P10 - T25 - Q10 - KC40 -A20

Alterations	Keyway	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	Wrench Flats	L Dimension Tolerance / Concentricity	Keyway on Shaft End	2 Set Screw Flats at Both Ends	Chamfering Depth Configurable																																																																																						
	• 1 Keyway: KC • 2 Keyways: WKC 	• 1 Set Screw Flat: FC • 2 Set Screw Flats: WFC 	 	 	 	 	 	 																																																																																							
Code	KC, WKC	FC, WFC	KFC	UC	SC	LKC, CKC	PKC, QKC	KWC	WC																																																																																						
Spec.	KC: Adds a keyway. Ordering Code KC50-A10 WKC: Adds two keyways. Ordering Code WKC50-C8-K40-E10 * KC, A, WKC, C, K, E = 1mm Increment * A, E, C ≤ 100 * For Keyway Details, refer to P820 * If 3 keyways are required, use both KC and WKC. * When the keyway position is less than 1mm 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 = 1mm Increment * G, J, V ≤ 50 <table><tr><th>D</th><th>H</th></tr><tr><td>6~17</td><td>1</td></tr><tr><td>18~40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></table>	D	H	6~17	1	18~40	2	50	3	Adds a set screw flat at any desired angle besides the datum plane (0°). KFC, G = 1mm Increment AG = 15° Increment * G ≤ 50 Ordering Code KFC10-G3-AG90 <table><tr><th>D</th><th>H</th></tr><tr><td>6~17</td><td>1</td></tr><tr><td>18~40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></table> * When combined with other alterations, ±2 degree phase differential may occur.	D	H	6~17	1	18~40	2	50	3	Adds a slit cam groove. UC = 1mm Increment Ordering Code UC10 * UC ≤ 1 * Not applicable to D13 or more. <table><tr><th>D</th><th>d</th><th>#1</th></tr><tr><td>6</td><td>5</td><td>4</td></tr><tr><td>8</td><td>7</td><td>4</td></tr><tr><td>10</td><td>8</td><td>5</td></tr><tr><td>12</td><td>10</td><td>5</td></tr></table>	D	d	#1	6	5	4	8	7	4	10	8	5	12	10	5	Adds a wrench flat. SC = 1mm Increment * SC = 1mm Increment SC=0 or SC≤1 <table><tr><th>D</th><th>W</th><th>#2</th></tr><tr><td>6</td><td>5</td><td>8</td></tr><tr><td>8</td><td>7</td><td>8</td></tr><tr><td>10</td><td>8</td><td>8</td></tr><tr><td>12, 13</td><td>10</td><td>10</td></tr><tr><td>15, 16</td><td>13</td><td>10</td></tr><tr><td>17, 18</td><td>14</td><td>10</td></tr><tr><td>20, 22</td><td>17</td><td>10</td></tr><tr><td>25</td><td>22</td><td>15</td></tr><tr><td>30</td><td>27</td><td>15</td></tr><tr><td>35</td><td>30</td><td>15</td></tr><tr><td>40</td><td>36</td><td>20</td></tr><tr><td>50</td><td>41</td><td>20</td></tr></table> * When combined with other alterations, ±2 degree phase differential may occur.	D	W	#2	6	5	8	8	7	8	10	8	8	12, 13	10	10	15, 16	13	10	17, 18	14	10	20, 22	17	10	25	22	15	30	27	15	35	30	15	40	36	20	50	41	20	LKC: Changes L dimension tolerance. Ordering Code LKC * L<500→L±0.05 L≥500→L±0.1 CKC: Changes the concentricity to 0.02. Ordering Code CKC * Applicable within dimension L range in the table below. <table><tr><th>D</th><th>Lmax</th></tr><tr><td>6~22</td><td>450</td></tr><tr><td>25~50</td><td>600</td></tr></table> * Not applicable to D part of h9 (Cold-drawn).	D	Lmax	6~22	450	25~50	600	Adds a keyway on the shaft end and P (Q). Ordering Code PKC10(QKC10) * PKC, QKC = 1mm Increment * PKC, QKC≤50 * Keyway Details P820 * Not applicable to P (Q)=5 or less. * PKC, QKC = 1mm Increment * PKC, QKC≤50 * Keyway Details P820 * Not applicable to P (Q)=5 or less.	Adds 2 Set Screw Flats at both ends. Ordering Code KWC20 * KWC≤F, T * Y≤680 is applicable. <table><tr><th>P, Q</th><th>H</th></tr><tr><td>5</td><td>0.5</td></tr><tr><td>6~17</td><td>1</td></tr><tr><td>18~40</td><td>2</td></tr><tr><td>41~50</td><td>3</td></tr></table> * Not applicable to P(Q)=4 or less.	P, Q	H	5	0.5	6~17	1	18~40	2	41~50	3	Chamfering depth can be specified in 0.1mm increments. Ordering Code WC6.8 * D6 or more is applicable. * Applicable only when KWC alteration is performed.
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