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

Both Ends Stepped

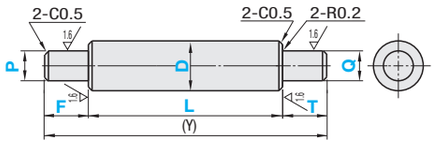
■Select from h9 (Cold-drawn), h7 (Ground) and g6 (Ground) for your applications.

	Type	Tolerance D	Tolerance P, Q	Material	Surface Treatment
①	SFRMHQ	h9 (Cold-drawn)	h7	EN 1.1191 Equiv.	Black Oxide
	PSFRMHQ				Electroless Nickel Plating
	SSFRMHQ			EN 1.4301 Equiv.	-
②	SFRMGQ		g6	EN 1.1191 Equiv.	Black Oxide
	PSFRMGQ				Electroless Nickel Plating
	SSFRMGQ			EN 1.4301 Equiv.	-
③	SFRHQ	h7 (Ground)	h7	EN 1.1191 Equiv.	Black Oxide
	PSFRHQ				Electroless Nickel Plating
	SSFRHQ			EN 1.4301 Equiv.	-
④	SFRQ	g6 (Ground)	g6	EN 1.1191 Equiv.	Black Oxide
	PSFRQ				Electroless Nickel Plating
	SSFRQ			EN 1.4301 Equiv.	-
	HFRQ			EN 1.7220 Equiv. H Hardness: 30 ~ 35HRC	Black Oxide
	PHFRQ				Electroless Nickel Plating

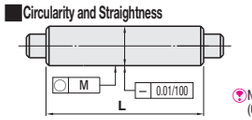
■Tolerance Table

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

(Y) Surface roughness of D part for h9 (Cold-drawn) is 6.3. Surface roughness for h7 (Ground) and g6 (Ground) is 1.6.
(Y) For Retaining Ring Groove Type, refer to **P.857**.

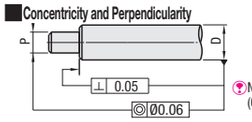


■Circularity and Straightness



(Y) Not applicable to h9 (Cold-drawn).

■Concentricity and Perpendicularity



(Y) 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

(Y) 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	800	±0.8

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

Part Number Type	D	0.1mm Increment L	F, T	1mm Increment P, Q	(Y) max.
①D part h9 / P, Q part h7	6	20.0~296.0	2≤F≤Px5 2≤T≤Qx5	3 4 5	300
SFRMHQ PSFRMHQ SSFRMHQ	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
((D6 is not available for SSFRMHQ)	15	25.0~696.0			700
②D part h9 / P, Q part g6	20	30.0~796.0		10≤P, Q<D	800
SFRMGQ PSFRMGQ SSFRMGQ	25	30.0~796.0			
	30	30.0~796.0		16≤P, Q<D	
(D6 is not available for SSFRMGQ)	35	40.0~796.0			

③h7 (Ground)

Part Number Type	D	0.1mm Increment L	F, T	1mm Increment P, Q	(Y) max.
	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
SFRHQ	12	25.0~596.0		5≤P, Q<D	600
	15	25.0~696.0			700
PSFRHQ	17	30.0~796.0			800
	20	30.0~796.0			
SSFRHQ	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			

④g6 (Ground)

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

(Y) When D-P (Q)≤2, chamfer C at the step is 0.2 or less. (Y) 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

	Part Number	-	L	-	F	-	P	-	T	-	Q
①D part h9 / P, Q part h7	SFRMHQ20	-	325	-	F25	-	P10	-	T25	-	Q10
③h7 (Ground)	SFRHQ15	-	150	-	F15	-	P8	-	T15	-	Q8
④g6 (Ground)	SFRQ30	-	400	-	F28	-	P20	-	T28	-	Q20

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

Type D	SFRMHQ, SFRMGQ (EN 1.1191 Equiv., Black Oxide) 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 ~ 796.0	PSFRMHQ, PSFRMGQ (EN 1.1191 Equiv., Electroless Nickel Plating) 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 ~ 796.0	SSFRMHQ, SSFRMGQ (EN 1.4301 Equiv.) 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 ~ 796.0
6						-	-	-						-	-	-						-	-	-
8							-	-							-	-							-	-
10								-								-								-
12								-								-								-
15																								
20																								
25																								
30																								
35																								

③h7 (Ground) ④g6 (Ground)

Type D	SFRHQ, SFRQ (EN 1.1191 Equiv., Black Oxide) 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 ~ 796.0	PSFRHQ, PSFRQ (EN 1.1191 Equiv., Electroless Nickel Plating) 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 ~ 796.0	SSFRHQ, SSFRQ (EN 1.4301 Equiv.) 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 ~ 796.0
6						-	-	-						-	-	-						-	-	-
8							-	-							-	-							-	-
10								-								-								-
12								-								-								-
13								-								-	-	-	-	-	-	-	-	-
15																								
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17																								
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35																								
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50																								

Type D	HFRQ (EN 1.7220 Equiv. Hardness 30~35HRC, Black Oxide) 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 ~ 796.0	PHFRQ (EN 1.7220 Equiv. Hardness 30~35HRC, Electroless Nickel Plating) 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 ~ 796.0
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20																
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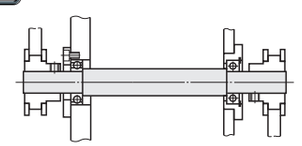
50																

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	SFC	UC	SC	LKC, CKC	PKC, QKC	KWC	WC

KC, WKC

KC: Adds a keyway.
Ordering Code KC50-A10

WKC: Adds two keyways.
Ordering Code WKC50-C8-K40-E10

(Y) KC, A, WKC, C, K, E = 1mm Increment
(Y) A, E, C≤100
(Y) For Keyway Details, refer to **P820**.
(Y) If 3 keyways are required, use both KC and WKC.
(Y) When the keyway position is less than 1mm away from the end face, R is not applied.
Ex.

(Y) Keyway(s) and set screw flats are added in the same plane. When the distance of the alterations are over 500mm, ±2 degree phase differential may occur.

FC, WFC

FC: Adds 1 set screw flat.
Ordering Code FC10-G3

WFC: Adds 2 set screw flats.
Ordering Code WFC10-J3-W10-V3

(Y) FC, G, WFC, J, W, V = 1mm Increment
(Y) G, J, V≤50

D over	D or Less	H
6	17	1
18	40	2
50		3

SFC

Adds a set screw flat at any desired angle besides the datum plane (0°).
SFC, SG= 1mm Increment
AG = 15° Increment
(Y) SG≤50
Ordering Code SFC10-SG3-AG90

D over	D or Less	H
6	17	1
18	40	2
50		3

(Y) When combined with other alterations, ±2 degree phase differential may occur.

UC

Adds a slit cam groove.
UC = 1mm Increment
Ordering Code UC10

(Y) UC+ℓ1≤L
(Y) UC≥1
(⊗) Not applicable to D13 or more.

D over	D or Less	d	ℓ1
6	8	5	4
8	10	7	
10	12	8	5

SC

Adds a wrench flat.
SC = 1mm Increment
(Y) SC+ℓ2≤L
SC=0 or SC≥1

D over	D or Less	W	ℓ2
6	8	5	8
8	10	7	
10	12, 13	8	
12, 13	15, 16	10	10
15, 16	17, 18	13	
17, 18	20, 22	14	
20, 22	25	17	
25	30	22	15
30	35	27	
35	40	30	20
40	50	36	
50		41	

(Y) When combined with other alterations, ±2 degree phase differential may occur.

LKC, CKC

LKC: Changes L dimension tolerance.
Ordering Code LKC
(Y) L<500···L±0.05
L≥500···L±0.1

CKC: Changes the concentricity to Ø0.02.
Ordering Code CKC
(Y) Applicable within dimension L range in the table below.

D over	D or Less	Lmax
6	22	450
25	50	600

(⊗) Not applicable to D part of h9 (Cold-drawn).

PKC, QKC

Adds a keyway on the shaft end P (Q).
Ordering Code PKCT0(QKC10)

(Y) PKC, QKC = 1mm Increment
(Y) PKC, QKC≤50
PKC(QKC)≤F(T)
(Y) Keyway Details **P820**
(⊗) Not applicable to P (Q)=5 or less.

KWC

Adds 2 Set Screw Flats at both ends.
Ordering Code KWC20
(Y) KWC≤F, T
(Y) Y≤680 is applicable.

P, Q over	P, Q or Less	H
5	6	0.5
6	17	1
17	40	2
40	50	3

(⊗) Not applicable to P(Q)=4 or less.

WC

Chamfering depth can be specified in 0.1mm increments.
Ordering Code WC6.8
(Y) P, Q≥5≤WC
(Y) D8 or more is applicable.
(Y) Applicable only when KWC alteration is performed.