

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

Retaining Ring Grooves on Both Ends

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



RoHS 10

Type	Standard		Retaining Ring Groove Outside Datum	D Tolerance	Material	Surface Treatment
	Without Retaining Ring	With Retaining Ring				
①	SFMR	SFMRRA	-	h9 (Cold-drawn)	EN 1.1191 Equiv.	Black Oxide
	PSFMR	PSFMRRA	-		EN 1.4301 Equiv.	Electroless Nickel Plating
	SSFMR	SSFMRRA	-		-	-
②	SFHR	SFHRRA	-	h7 (Ground)	EN 1.1191 Equiv.	Black Oxide
	PSFHR	PSFHRRA	-		EN 1.4301 Equiv.	Electroless Nickel Plating
	SSFHR	SSFHRRA	-		-	-
③	SFR	SFRRA	SFRGA	g6 (Ground)	EN 1.1191 Equiv.	Black Oxide
	PSFR	PSFRA	PSFRGA		EN 1.4301 Equiv.	Electroless Nickel Plating
	SSFR	SSFRA	SSFRGA		-	-
	-	HFRRA	-		EN 1.7220 Equiv.	Black Oxide
	-	PHFRRA	-		H: Hardness 30 ~ 35HRC	Electroless Nickel Plating

For Retaining Ring Groove Dimensions $\geq \text{P820}$

Surface roughness of D part for h9 (Cold-drawn) is $\sqrt{1.6}$. Surface roughness for h7 (Ground) and g6 (Ground) is $\sqrt{0.8}$.

Standard

Circularity and Straightness

Circularity of Part D

Perpendicularity

Tolerances of L and Other Dimensions

① h9 (Cold-drawn)

Part Number		D	L=0.1mm Increment	B, S 1mm Increment	Retaining Ring No. Accessory: Retaining Ring 2 pcs. (Retaining Ring Type only)
Type	Standard				
Without Retaining Ring	With Retaining Ring	3	20.0~150.0	2≤B, S<L/2	NETWS2
		4	20.0~200.0		NETWS3
		5	20.0~250.0		NETWS4
		6	20.0~300.0		NETWS5
		8	20.0~400.0		NETWS7
SFMR	SFMRRA	10	25.0~500.0	3≤B, S<L/2	STWS10
		12	40.0~600.0		STWS12
		15	50.0~700.0		STWS15
		20	70.0~800.0		STWS20
		25	80.0~800.0		STWS25
		30	80.0~800.0	5≤B, S<L/2	STWS30
		35	80.0~800.0		STWS35
		40	80.0~800.0		STWS40
		50	100.0~800.0		STWS50

② h7 (Ground)

Part Number		D	L=0.1mm Increment	B, S 1mm Increment	Retaining Ring No. Accessory: Retaining Ring 2 pcs. (Retaining Ring Type only)
Type	Standard				
Without Retaining Ring	With Retaining Ring	6	20.0~300.0	2≤B, S<L/2	NETWS5
		8	20.0~400.0		NETWS7
		10	25.0~500.0		STWS10
		12	40.0~600.0		STWS12
		15	50.0~700.0		STWS15
SFHR	SFHRRA	17	70.0~800.0	4≤B, S<L/2	STWS17
		20	70.0~800.0		STWS20
		25	80.0~800.0		STWS25
		30	80.0~800.0		STWS30
		35	80.0~800.0	5≤B, S<L/2	STWS35
		40	80.0~800.0		STWS40
		50	100.0~800.0		STWS50

③ g6 (Ground)

Part Number		D	L=0.1mm Increment	B, S 1mm Increment	P 0.1mm Increment	m Tolerance	d Tolerance	Retaining Ring No. Accessory: Retaining Ring 2 pcs. (Retaining Ring Type only)
Type	Standard							
Without Retaining Ring	With Retaining Ring	2	20.0~ 50.0	2≤B, S<L/2	3≤P≤L-4	0.4	1.2	NETWS1.2
		2.5	20.0~ 50.0			0.5	1.5	NETWS1.5
		3	20.0~150.0				2	NETWS2
		4	20.0~200.0			0.7	3	NETWS3
		5	20.0~250.0			0.9	4	NETWS4
SFRR	SFRRRA	6	20.0~300.0	3≤B, S<L/2	5≤P≤L-5		5	NETWS5
		8	20.0~400.0				6	NETWS6
		10	25.0~500.0			1.15	7	NETWS7
		12	40.0~600.0				9.6	STWS10
		13	40.0~600.0	4≤B, S<L/2	7≤P≤L-6		11.5	STWS12
		*15	50.0~700.0				12.4	STWS13
		*16	50.0~800.0				14.3	STWS15
		*17	70.0~800.0				15.2	STWS16
		*18	70.0~800.0				16.2	STWS17
		*20	70.0~800.0			1.35	17	STWS18
PSFRR	PSFRRRA	*22	70.0~800.0	5≤B, S<L/2	10≤P≤L-8		19	STWS20
		*25	80.0~800.0				21	STWS22
		*30	80.0~800.0			1.65	23.9	STWS25
		*35	80.0~800.0				28.6	STWS30
		*40	80.0~800.0				33	STWS35
						1.9	38	STWS40
						2.2	47	STWS50

For NETWS and STWS retaining rings details, refer to P2-265. The material of retaining ring is EN 1.4301 Equiv.

Ordering Example

Part Number - L - B - S - P

SFMR30 - 150 - B6 - S6

PSFMR40 - 230 - B10 - S10

SFRRGA20 - 180 - P150

D	h9 (Cold-drawn)	h7 (Ground)	g6 (Ground)
2, 2.5, 3	-	-	-0.002 -0.008
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

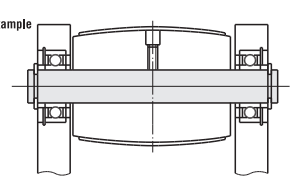
① h9 (Cold-drawn)

Type	SFMRR (EN 1.1191 Equiv., Black Oxide)							PSFMRR (EN 1.1191 Equiv., Electroless Nickel Plating)							SSFMR (EN 1.4301 Equiv.)									
D	SFMRR							PSFMRR							SSFMR									
	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	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
3				-	-	-	-	-				-	-	-	-	-		-	-	-	-	-	-	-
4				-	-	-	-	-				-	-	-	-	-		-	-	-	-	-	-	-
5							-	-							-	-					-	-	-	-
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② h7 (Ground) ③ g6 (Ground)

Type	SFHRR, SFRR (EN 1.1191 Equiv., Black Oxide)							PSFHRR, PSFRR (EN 1.1191 Equiv., Electroless Nickel Plating)							SSFHRR, SSFRR (EN 1.4301 Equiv.)									
	SFHRR, SFRR, SFARGA							PSFHRR, PSFRR, PSFARGA							SSFHRR, SSFRR, SSFARGA									
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	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
2		-	-	-	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-
2.5		-	-	-	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-
3					-	-	-	-						-	-	-		-	-	-	-	-	-	-
4						-	-	-						-	-	-				-	-	-	-	-
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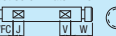
Type	HFRR ♡ With Retaining Ring (EN 1.7220 Equiv. Hardness 30~35HRC, Black Oxide)								PHFRR ♡ With Retaining Ring (EN 1.7220 Equiv. Hardness 30~35HRC, Electroless Nickel Plating)							
D	Min. L 50.0	L50.1 100.0	L100.1 150.0	L150.1 200.0	L200.1 300.0	L300.1 400.0	L400.1 600.0	L600.1 800.0	Min. L 50.0	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Alterations

Part Number - L - B - S - (KC, WKC, FC--etc.)

SFRR30 - 250 - B10 - S20 - KC20-A10

	Keyway	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	Wrench Flats	2 Set Screw Flats at both ends	Chamfering Depth Configurable																																																																																																																																								
Alterations	• 1 Keyway: KC  • 2 Keyways: WKC 	• 1 Set Screw Flat: FC  • 2 Set Screw Flats: WFC  	 			 																																																																																																																																									
Code	KC, WKC	FC, WFC	SFC	UC	SC	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 P829 If 3 Keyways are required, use both KC and WKC. Not applicable to D5 or less. When the keyway position is less than 1mm away from the end face, R is not applied. 	FC: Adds 1 set screw flat. Ordering Code FC10-G3 WFC: Adds 2 set screw flats. Ordering Code WFC10-J8-W10-V3 FC, G, WFC, J, W, V = 1mm Increment G, J, V: <50 Not applicable to D2 and D2.5. <table><thead><tr><th>D</th><th>H</th></tr></thead><tbody><tr><td>3-5</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>50</td><td>3</td></tr></tbody></table>	D	H	3-5	0.5	6-17	1	18-40	2	50	3	Adds a set screw flat at any desired angle besides the datum plane (0°). SFC, SG = 1mm Increment AG = 15° Increment SG: <50 Ordering Code SFC10-SG3-AG120 <table><thead><tr><th>D</th><th>H</th></tr></thead><tbody><tr><td>3-5</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>50</td><td>3</td></tr></tbody></table> Not applicable to D2 and D2.5. When combined with other alterations, ±2 degree phase differential may occur.	D	H	3-5	0.5	6-17	1	18-40	2	50	3	Adds a slit cam groove. UC = 1mm Increment Ordering Code UC10 UC: ±1.5 UC-1 Not applicable to D2 and D2.5. Not applicable to D13 or more. <table><thead><tr><th>D</th><th>d</th><th>#1</th></tr></thead><tbody><tr><td>3</td><td>2</td><td></td></tr><tr><td>4</td><td>3</td><td>4</td></tr><tr><td>5</td><td>4</td><td></td></tr><tr><td>6</td><td>5</td><td></td></tr><tr><td>8</td><td>7</td><td></td></tr><tr><td>10</td><td>8</td><td>5</td></tr><tr><td>12</td><td>10</td><td></td></tr></tbody></table>	D	d	#1	3	2		4	3	4	5	4		6	5		8	7		10	8	5	12	10		Adds a wrench flat. SC = 1mm Increment SC: ±2.5 SC-D or SC≥1 <table><thead><tr><th>D</th><th>W</th><th>#2</th><th>D</th><th>W</th><th>#2</th></tr></thead><tbody><tr><td>6</td><td>5</td><td></td><td>25</td><td>22</td><td>10</td></tr><tr><td>8</td><td>7</td><td>8</td><td>30</td><td>27</td><td></td></tr><tr><td>10</td><td>8</td><td></td><td>35</td><td>30</td><td>15</td></tr><tr><td>12</td><td>10</td><td></td><td>40</td><td>36</td><td></td></tr><tr><td>15</td><td>16</td><td>13</td><td>50</td><td>41</td><td>20</td></tr><tr><td>17</td><td>18</td><td>14</td><td></td><td></td><td></td></tr><tr><td>20</td><td>22</td><td>17</td><td></td><td></td><td></td></tr></tbody></table> Not applicable to D5 or less. When combined with other alterations, ±2 degree phase differential may occur.	D	W	#2	D	W	#2	6	5		25	22	10	8	7	8	30	27		10	8		35	30	15	12	10		40	36		15	16	13	50	41	20	17	18	14				20	22	17				Adds 2 Set Screw Flats at both ends. KWC = 1mm Increment Ordering Code KWC20 KWC: B-m, S-m L: <680 is applicable. <table><thead><tr><th>D</th><th>W</th></tr></thead><tbody><tr><td>8</td><td>7</td></tr><tr><td>10</td><td>5.0 - 7.9</td></tr><tr><td>12</td><td>6.0 - 8.9</td></tr><tr><td>15</td><td>9.0 - 11.9</td></tr><tr><td>20</td><td>13.0 - 15.9</td></tr><tr><td>25</td><td>17.0 - 19.9</td></tr><tr><td>30</td><td>22.0 - 24.9</td></tr><tr><td>35</td><td>27.0 - 29.9</td></tr><tr><td>40</td><td>32.0 - 34.9</td></tr><tr><td>50</td><td>42.0 - 44.9</td></tr></tbody></table> Not applicable for D dimensions other than indicated above	D	W	8	7	10	5.0 - 7.9	12	6.0 - 8.9	15	9.0 - 11.9	20	13.0 - 15.9	25	17.0 - 19.9	30	22.0 - 24.9	35	27.0 - 29.9	40	32.0 - 34.9	50	42.0 - 44.9	Chamfering depth can be specified in 0.1mm increments. Ordering Code W06.8 Applicable only when KWC alteration is performed. <table><thead><tr><th>D</th><th>WC</th></tr></thead><tbody><tr><td>8</td><td>4.0 - 6.9</td></tr><tr><td>10</td><td>5.0 - 7.9</td></tr><tr><td>12</td><td>6.0 - 8.9</td></tr><tr><td>15</td><td>9.0 - 11.9</td></tr><tr><td>20</td><td>13.0 - 15.9</td></tr><tr><td>25</td><td>17.0 - 19.9</td></tr><tr><td>30</td><td>22.0 - 24.9</td></tr><tr><td>35</td><td>27.0 - 29.9</td></tr><tr><td>40</td><td>32.0 - 34.9</td></tr><tr><td>50</td><td>42.0 - 44.9</td></tr></tbody></table> Not applicable for D dimensions other than indicated above	D	WC	8	4.0 - 6.9	10	5.0 - 7.9	12	6.0 - 8.9	15	9.0 - 11.9	20	13.0 - 15.9	25	17.0 - 19.9	30	22.0 - 24.9	35	27.0 - 29.9	40	32.0 - 34.9	50	42.0 - 44.9
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