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

Retaining Ring Grooves on Both Ends with Keyways

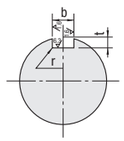
Number of keyways can be specified up to 3.

Rotary Shafts – Retaining Ring Grooves on Both Ends with Keyways

RoHS 10

	Type		D Tolerance	Material	Surface Treatment
	Standard	Retaining Ring			
(1)	NSFMKRR	NSFMKRRA	h9 (Cold-Drawn)	1045 Carbon Steel or Equivalent	—
	SFMKRR	SFMKRRA			Black Oxide
	PSFMKRR	PSFMKRRA			Electroless Nickel Plating
	SSFMKRR	SSFMKRRA		304 Stainless Steel	—
(2)	NSFHKRR	NSFHKRRA	h7 (Ground)	1045 Carbon Steel or Equivalent	—
	SFHKRR	SFHKRRA			Black Oxide
	PSFHKRR	PSFHKRRA			Electroless Nickel Plating
	SSFHKRR	SSFHKRRA		304 Stainless Steel	—
(3)	NSFGKRR	NSFGKRRA	g6 (Ground)	1045 Carbon Steel or Equivalent	—
	SFGKRR	SFGKRRA			Black Oxide
	PSFGKRR	PSFGKRRA			Electroless Nickel Plating
	SSFGKRR	SSFGKRRA		304 Stainless Steel	—

Detailed Keyway Dimensions



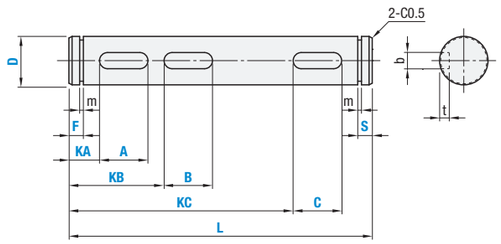
Shaft Diameter	b		t		r
	Reference Dimension	Tolerance (N9)	Reference Dimension	Tolerance	
6	2	-0.004 -0.029	1.2	+0.1 0	0.08–0.16
8 10	3		1.8		
12	4	0 -0.03	2.5		0.16–0.25
13–17	5		3.0		
18–22	6		3.5		
25 30	8	0 -0.036	4.0	+0.2 0	0.25–0.4
35	10		5.0		
40	12	0 -0.043	5.0		
50	14		5.5		

ⓘ When KA=0, KA+A=L, KB+B=L, KC+C=L, keyway shape is as shown below.

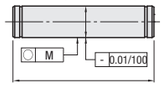
ⓘ Surface roughness of D part for h9 (Cold-Drawn) is 6.3 Surface roughness for h7 (Ground) and g6 (Ground) is 1.6

ⓘ Number of keyways are selectable up to 3.

ⓘ The position of keyways should be specified within inner dimension (L-F-S) of a retaining ring.

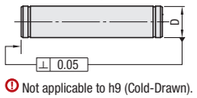


Circularity and Straightness



ⓘ Not applicable to h9 (Cold-Drawn).

Perpendicularity



ⓘ Not applicable to h9 (Cold-Drawn).

Circularity of Part D

D		Circularity M
Over	To	
5	13	0.004
13	20	0.005
20	40	0.006
40	50	0.007

ⓘ Not applicable to h9 (Cold-Drawn).

Tolerances of L & Other Dimensions

Dimension		Dimension Tolerance
Over	To	
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				L	F / S	Keyway (1)	Keyway (2)	Keyway (3)	Retaining Ring No.
Type		D_{h9}		0.1 mm Increment	1 mm Increment	KA, A	KB, B	KC, C	Accessories: Retaining Rings 2 Pcs (Retaining Ring Type Only)
Standard	Retaining Ring		Tolerance			1 mm Increment			
NSFMKRR	NSFMKRRA	6	0 -0.030	15.0–400.0	2≤F, S	KA+A≤L-S KA≥F b≤A≤100	KB+B≤L-S KB≥KA+A b≤B≤100	KC+C≤L-S KC≥KB+B b≤C≤100	NETWS5
SFMKRR	SFMKRRA	8	0 -0.036	15.0–500.0	3≤F, S				NETWS7
PSFMKRR	PSFMKRRA	10		15.0–600.0					STWS10
SSFMKRR D6 is not available for SSFMKRR.	SSFMKRRA D6 is not available for SSFMKRRA.	12	0 -0.043	15.0–700.0	4≤F, S				STWS12
		15		15.0–800.0					STWS15
		20	0 -0.052	30.0–1000.0					STWS20
		25		50.0–1000.0	5≤F, S				STWS25
		30		60.0–1000.0					STWS30
		35	0 -0.062	70.0–1000.0					STWS35

(2) h7 (Ground)

Part Number				L	F / S	Keyway (1)	Keyway (2)	Keyway (3)	Retaining Ring No.
Type		D_{h7}		0.1 mm Increment	1 mm Increment	KA, A	KB, B	KC, C	Accessories: Retaining Rings 2 Pcs (Retaining Ring Type Only)
Standard	Retaining Ring		Tolerance			1 mm Increment			
NSFHKRR	NSFHKRRA	6	0 -0.012	15.0–400.0	2≤F, S	KA+A≤L-S KA≥F b≤A≤100	KB+B≤L-S KB≥KA+A b≤B≤100	KC+C≤L-S KC≥KB+B b≤C≤100	NETWS5
SFHKRR	SFHKRRA	8	0 -0.015	15.0–500.0	3≤F, S				NETWS7
PSFHKRR	PSFHKRRA	10		15.0–600.0					STWS10
SSFHKRR	SSFHKRRA	12	0 -0.018	15.0–700.0	4≤F, S				STWS12
		15		15.0–800.0					STWS15
		17		30.0–900.0					STWS17
		20		30.0–1000.0					STWS20
		25	0 -0.021	50.0–1000.0	5≤F, S				STWS25
		30		60.0–1000.0					STWS30
		35		70.0–1000.0					STWS35
		40	0 -0.025	80.0–1000.0					STWS40
		50		100.0–1000.0					STWS50

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

Retaining Ring Grooves on Both Ends with Keyways, *continued*

(3) g6 (Ground)

Part Number				L	F / S	Keyway (1)	Keyway (2)	Keyway (3)	Retaining Ring No.
Type		D_{g6}		0.1 mm Increment	1 mm Increment	KA, A	KB, B	KC, C	Accessories: Retaining Rings 2 Pcs (Retaining Ring Type Only)
Standard	Retaining Ring		Tolerance			1 mm Increment			
NSFGKRR	NSFGKRRA	6	0.004 -0.012	15.0–400.0	2≤F, S	KA+A≤L-S KA≥F b≤A≤100	KB+B≤L-S KB≥KA+A b≤B≤100	KC+C≤L-S KC≥KB+B b≤C≤100	NETWS5
SFGKRR	SFGKRRA	8	-0.005 -0.014	15.0–500.0	3≤F, S				NETWS7
PSFGKRR	PSFGKRRA	10		15.0–600.0					STWS10
SSFGKRR D13, 16, 18 and 22 are not available for SSFGKRR.	SSFGKRRA D13, 16, 18 and 22 are not available for SSFGKRR.	12	-0.006 -0.017	15.0–700.0	4≤F, S				STWS12
		13		15.0–700.0					STWS13
		15		15.0–800.0					STWS15
		16		15.0–900.0					STWS16
		17		30.0–900.0					STWS17
		18		30.0–900.0					STWS18
		20	-0.007 -0.020	30.0–1000.0	5≤F, S				STWS20
		22		40.0–1000.0					STWS22
		25		50.0–1000.0					STWS25
		30		60.0–1000.0					STWS30
		35	-0.009 -0.025	70.0–1000.0					STWS35
		40		80.0–1000.0					STWS40
		50		100.0–1000.0					STWS50

Available Types

(1) h9 (Cold-Drawn)

Type	NSFMKRR, NSFMKRRA, SFMKRR, SFMKRRA, PSFMKRR, PSFMKRRA								SSFMKRR, SSFMKRRA							
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	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
6	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—
8	●	●	●	●	●	●	●	—	—	●	●	●	●	●	●	●	—	—
10	●	●	●	●	●	●	●	—	—	●	●	●	●	●	●	●	—	—
12	●	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
15	●	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25	—	●	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●
30	—	●	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●
35	—	●	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●

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

Type	NSFHKRR, NSFGKRR, NSFHKRRA, NSFGKRRA, SFHKRR, SFGKRR, SFHKRRA, SFGKRRA, PSFHKRR, PSFGKRR, PSFHKRRA, PSFGKRRA								SSFHKRR, SSFGKRR, SSFHKRRA, SSFGKRRA							
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	L800.1~1000
6	●	●	●	●	●	●	—	—	●	●	●	●	●	●	—	—	—
8	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
10	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
12	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
13	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—
15	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	—	—
16	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—
17	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
18	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—
20	●	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
22	—	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—
25	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
30	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
35	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
40	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●
50	—	●	●	●	●	●	●	—	●	●	●	●	●	●	●	●	●

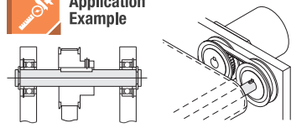
Part Number Example

	Part Number	-	L	-	F	-	S	-	Keyway (1) KA	-	A	-	Keyway (2) KB	-	B	-	Keyway (3) KC	-	C
1 Keyway	SFMKRR10	-	325	-	F10	-	S10	-	KA20	-	A50								
2 Keyways	SFHKRR30	-	300	-	F10	-	S10	-	KA20	-	A20	-	KB120	-	B20				
3 Keyways	SFHKRR25	-	350	-	F10	-	S10	-	KA10	-	A10	-	KB90	-	B30	-	KC210	-	C30

Part Number Alterations

Part Number	-	L	-	F	-	S	-	KA	-	A	-	KB	-	B	-	KC	-	C	- (FC, KFC...etc.)
SFHKRR30	-	300	-	F10	-	S10	-	KA20	-	A50	-	KB120	-	B20					- FC80-G5

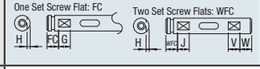
Application Example



Number of keyways can be specified up to 3.

Alterations

Set Screw Flat



Code: FC, WFC

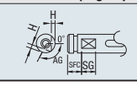
Spec.

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
ⓘ Set screw flat and keyway(s) are added to the same surface.

D	H
6–17	1
18–40	2
50	3

ⓘ Keyway(s) 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.

2 Set Screw Flats (Angle Specified)



Code: SFC

Spec.

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	H
6–17	1
18–40	2
50	3

ⓘ When combined with other alterations, ±2 degree phase ferential may occur.

Slit Cam Groove

Code: UC

Spec.

Adds a slit cam groove.
UC = 1 mm Increment
Ordering Code: UC10
ⓘ UC+ℓ1≤L
ⓘ UC≥1
⊗ Not applicable to D13 or more.

D	d	ℓ1
6	5	4
8	7	
10	8	5
12	10	

Wrench Flats

Code: SC

Spec.

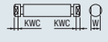
Adds a wrench flat.
SC = 1 mm Increment
ⓘ SC+ℓ2≤L
SC=0 or SC≥1
ⓘ A wrench flat is added to the opposite surface of keyway alteration.

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

ⓘ When combined with other alterations, ±2 degree phase differential may occur.

Alterations

2 Set Screw Flat at Both Ends



Code: KWC

Spec.

Adds 2 Set Screw Flats at both ends.
KWC = 1 mm Increment
Ordering Code: KWC20
ⓘ KWC≤B-m, S-m
ⓘ L≤680 is applicable
⊗ Not applicable to D dimensions other than indicated in the table.

D	W
8	7
10	8
12	9
15	12
20	16
25	20
30	25
35	30
40	35
50	45

Chamfering Depth Configurable

Code: WC

Spec.

Chamfering depth can be specified in 0.1 increments.
Ordering Code: WC6.8
ⓘ Applicable only when KWC alteration is performed.
⊗ Not applicable to D dimensions other than indicated in the table.

D	W
8	4.0–6.9
10	5.0–6.9
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

L Dimension Tolerance

Code: LKC

Spec.

Changes L Dimension Tolerance.
Ordering Code: LKC
ⓘ L<500 L±0.05
L≥500 L±0.1
⊗ Not applicable to L=800 or more.

C Chamfer Change on D

Code: CD

Spec.

CD= Selection from Table below.
Ordering Code: CD2

Chamfer (CD)	Applicable Dia.
C2	ø6 –ø51
C3	ø8 –ø51
C4	ø10 –ø51
C5	ø12 –ø51