

# Diameter Tolerance Selectable Type

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continued

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RoHS 10

Type	Material	Hardness	Surface Treatment	Accessory Shape C (Retaining Ring)	Accessory Shape B (Nut)
KCL	1045 Carbon Steel or Equivalent	—	Black Oxide	Retaining Ring 1 Pc.	Nut 1 Pc.
KCLH		40~45 HRC min.	Black Oxide		
PKCL		—	Electroless Nickel Plating		
PKCLH		40~45 HRC min.	Electroless Nickel Plating		
KCLS	304 Stainless Steel	—	—	304 Stainless Steel	304 Stainless Steel
KCLSH	440C Stainless Steel Equivalent	45~50 HRC min.	—	304 Stainless Steel	304 Stainless Steel

\*LF tolerances are recommended values for Multi-Layer Oil Free Bushings LF Type (MDZB, MDZF).

- ⊖ KCLSH\_ may be discolored by hardening.
- ⊖ Relief dimension under the shoulder is for reference.
- ⊖ This type may have centering holes depending on dimensions.
- ⊖ For L Dimension, Standard Machining Tolerances (Class: Medium) are used.
- ⊖ KCL\_ , PKCL\_ may have identification grooves on the side in order to distinguish them from Hardened Type.

D	Tolerance Selection					
	M m6	P p6	H h7	F f8	C c9	*LF
2, 3	+0.008 +0.002	+0.012 +0.006	0 -0.010	-0.006 -0.020	-0.060 -0.085	-0.025 -0.034
4~6	+0.012 +0.004	+0.020 +0.012	0 -0.012	-0.010 -0.028	-0.070 -0.100	-0.025 -0.037
8, 10	+0.015 +0.006	+0.024 +0.015	0 -0.015	-0.013 -0.035	-0.080 -0.116	-0.025 -0.040
12~18	+0.018 +0.007	+0.029 +0.018	0 -0.018	-0.016 -0.043	-0.095 -0.138	-0.025 -0.043
20~25	+0.021 +0.008	+0.035 +0.022	0 -0.021	-0.020 -0.053	-0.110 -0.162	-0.025 -0.046

**Shape C (Retaining Ring)**

(KCLC\_ PKCLC\_) Identification grooves

**Shape M (Both Ends Tapped)**

(KCLM\_ PKCLM\_) Identification grooves

**Shape B (Nut)**

(KCLB\_ PKCLB\_) Identification grooves

**Shape S (Set Screw Flat)**

(KCLS\_ PKCLS\_) Identification grooves

Alterations	Retaining Ring Groove Position	Shoulder Thickness	Thread Part Length	Thread Diameter	Shoulder Thickness	L Dimension Tolerance																															
Code	NC	TC	FC	MC	TC	LKC																															
Spec.	Ordering Code: NC3.5	Ordering Code: TC3	Ordering Code: FC4	Ordering Code: MC3	Ordering Code: TC3	Ordering Code: LKC																															
	<table border="1"> <thead> <tr> <th>D</th> <th>NC (0.1mm Increment)</th> </tr> </thead> <tbody> <tr><td>2-4</td><td>1.5-3</td></tr> <tr><td>5</td><td>1.7-3</td></tr> <tr><td>6</td><td>1.9-4</td></tr> <tr><td>8</td><td>2.4-5</td></tr> <tr><td>10-18</td><td>2.7-5</td></tr> <tr><td>20-25</td><td>2.9-5</td></tr> </tbody> </table> <p>⊖ Overall Length is L+NC+T.</p>	D	NC (0.1mm Increment)	2-4	1.5-3	5	1.7-3	6	1.9-4	8	2.4-5	10-18	2.7-5	20-25	2.9-5	<p>⊖ TC = 0.5 mm Increment</p> <p>⊖ T &lt; TC ≤ 5</p> <p>⊖ Overall Length is L+N+TC.</p>	<p>⊖ FC = 1 mm Increment</p> <p>⊖ M(MC) ≤ FC ≤ M(MC) × 3</p>	<table border="1"> <thead> <tr> <th>D</th> <th>MC (Selection Range)</th> </tr> </thead> <tbody> <tr><td>5</td><td>3</td></tr> <tr><td>6</td><td>3 4</td></tr> <tr><td>8</td><td>3 4 5</td></tr> <tr><td>10</td><td>4 5 6</td></tr> <tr><td>12</td><td>5 6 8</td></tr> <tr><td>13-18</td><td>6 8 10</td></tr> <tr><td>20, 22</td><td>8 10 12</td></tr> <tr><td>25</td><td>10 12</td></tr> </tbody> </table> <p>⊖ Not applicable to D4.</p> <p>⊖ For D12, MC5, please also use alteration FC</p>	D	MC (Selection Range)	5	3	6	3 4	8	3 4 5	10	4 5 6	12	5 6 8	13-18	6 8 10	20, 22	8 10 12	25	10 12	<p>⊖ TC = 0.5 mm Increment</p> <p>⊖ 2 ≤ TC ≤ 5</p> <p>Changes L dimension tolerance to ±0.05.</p>
D	NC (0.1mm Increment)																																				
2-4	1.5-3																																				
5	1.7-3																																				
6	1.9-4																																				
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8	3 4 5																																				
10	4 5 6																																				
12	5 6 8																																				
13-18	6 8 10																																				
20, 22	8 10 12																																				
25	10 12																																				

Alterations	Thread Diameter	Tapping																												
Code	MC / NC	MMC																												
Spec.	Ordering Code: MC3	Ordering Code: MMC																												
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D	MC / NC (Selection Range)																													
8	3 4																													
10/12	4 5																													
13-15	5 6																													
16-18	6 8																													
20, 22	8 10																													
25	10 12																													
D	M (Coarse)	ℓ																												
6	M3	6																												
8-14	M4	8																												
15-22	M6	12																												
25	M8	16																												

**Part Number Alterations**

Part Number - L - (NC, TC...etc.)

KCLCF15 - 120.3 - NC3.5 - TC3.5

## Shape C (Retaining Ring)

Part Number	Type	D Tolerance	D	L 0.1 mm Increment	M		N	u	(n)	d		T	H	Attached Retaining Ring	
					Tolerance					Tolerance				Shape	JIS Nominal*
KCLC KCLHC PKCLC PKCLHC KCLSC KCLSHC	M (m6)			2	5.0-30.0	0.5	+0.05	2	1.9	1.0	1.5	+0.06	4.5	E Type	No.1.5
															No.2
															No.3
															No.4
															No.5
	P (p6)				3	5.0-50.0	0.7	+0.1	4	3.9	1.0	+0.075	6.5	E Type	No.6
															No.7
															No.8
															No.9
															No.10
	H (h7)				4	10.0-60.0	0.9	0	5	4.9	1.5	0	8	C Type	No.11
															No.12
															No.13
															No.14
															No.15
	F (f8)				5	10.0-100.0	1.15	+0.14	6	5.8	1.5	-0.09	9	C Type	No.16
															No.17
															No.18
															No.19
															No.20
	C (c9)				6	15.0-200.0	1.35	0	7	7.8	1.5	0	12	C Type	No.21
															No.22
															No.23
															No.24
															No.25
LF (for Bushings)				7	25.0-200.0	1.35	0	8	9.8	1.5	-0.11	14	C Type	No.26	
														No.27	
														No.28	
														No.29	
														No.30	

⊖ For details, please refer to P.4021.

## Shape B (Nut)

Part Number	Type	D Tolerance	D	L 0.1 mm Increment	A	B	T	F	(u)	(n)	M (Coarse Thread)		Included Nut	
KCLB KCLHB PKCLB PKCLHB KCLSB KCLSHB	M (m6)			4	5.0-50.0	7	5	3	6	3.9	1.5	M3	M3 x 0.5	
														M4
														M5
														M6
														M8
	P (p6)				5	5.0-60.0	9	7	4	4.9	1.5	M4	M4 x 0.7	
														M5
														M6
														M8
														M10
	H (h7)				6	10.0-100.0	10	8	5	5.8	1.5	M5	M5 x 0.8	
														M6
														M8
														M10
														M12
F (f8)				7	15.0-200.0	13	10	6	7.8	1.5	M6	M6 x 1.0		
													M8	
													M10	
													M12	
													M16	
C (c9)				8	25.0-200.0	16	13	7	8.8	1.5	M8	M8 x 1.25		
													M10	
													M12	
													M16	
													M20	
LF (for Bushings)				9	30.0-200.0	18	14	8	9.8	1.5	M10	M10 x 1.5		
													M12	
													M16	
													M20	
													M25	

## Shape M (Both Ends Tapped)

Part Number	Type	D Tolerance	D	L 0.1 mm Increment	M (Coarse Thread)	N (Coarse Thread)		
KCLM KCLHM PKCLM PKCLHM KCLSM KCLSHM	M (m6)			6	20.0-100.0	M3		
							M5	
							M6	
							M8	
							M10	
	P (p6)				7	25.0-100.0	M5	
								M6
								M8
								M10
								M12
H (h7)				8	35.0-200.0	M8		
							M10	
							M12	
							M16	
							M20	
F (f8)				9	40.0-200.0	M12		
							M16	
							M20	
							M25	
							M30	
C (c9)				10	50.0-200.0	M16		
							M20	
							M25	
							M30	
							M35	
LF (for Bushings)				11	50.0-200.0	M16		
							M20	
							M25	
							M30	
							M35	

## Shape S (Set Screw Flat)

Part Number	Type	D Tolerance	D	L 0.1 mm Increment	1 mm Increment		N			
					F	E				
KCLS KCLHS PKCLS PKCLHS KCLSS KCLSHS	M (m6)			3	5.0-50.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	0.5		
									4	
									5	
									6	
									8	
	P (p6)				4	10.0-60.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	1	
										5
										6
										8
										10
	H (h7)				5	10.0-100.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	1	
										6
										8
										10
										12
F (f8)				6	15.0-100.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	1		
									7	
									8	
									10	
									12	
C (c9)				7	25.0-200.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	1		
									8	
									10	
									12	
									15	
LF (for Bushings)				8	30.0-200.0	0 ≤ F ≤ L/2	1 ≤ E ≤ 50	2		
									9	
									10	
									12	
									15	

**Part Number Example**

Type	D Tolerance Selection	D	L	F	E
KCLC	M	15	- 120.3		
KCLS	F	15	- 50.5 - F0	- E10	