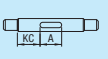
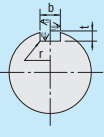

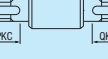

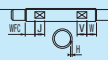
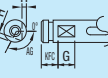
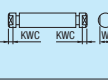
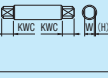

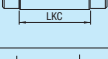


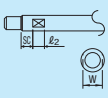
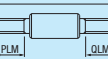
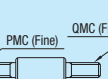
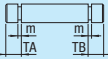
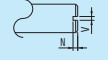
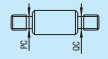


# Rotary Shaft Alterations - Overview

Rotary Shaft Alterations - Overview: For information about whether any alteration is available or not for the current rotary shaft, see the relevant product pages.

Alterations		code	Dimension Increment	Ordering Code Example	Spec.																																																																								
Keyway	Alteration at one place 	KC	KC, A = 1mm Increment	KC50-A10	<ul style="list-style-type: none"> <li>⚡ A, E, C ≤ 100</li> <li>⚡ If 3 keyways are required, use both KC and WKC.</li> <li>⚡ Not applicable to D=2-5.</li> </ul>  <table border="1" data-bbox="967 415 1227 589"> <thead> <tr> <th rowspan="2">Shaft Dia.</th> <th rowspan="2">Reference Dimension</th> <th rowspan="2">b</th> <th rowspan="2">Tolerance (N9)</th> <th colspan="2">t</th> <th rowspan="2">r</th> </tr> <tr> <th>Dimension</th> <th>Tolerance</th> </tr> </thead> <tbody> <tr> <td>6-7</td> <td>2</td> <td>-0.004</td> <td>1.2</td> <td></td> <td></td> <td>0.08-0.16</td> </tr> <tr> <td>8-10</td> <td>3</td> <td>-0.029</td> <td>1.8</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11-12</td> <td>4</td> <td></td> <td>2.5</td> <td>+0.10</td> <td></td> <td></td> </tr> <tr> <td>13-17</td> <td>5</td> <td>-0.03</td> <td>3.0</td> <td></td> <td></td> <td>0.16-0.25</td> </tr> <tr> <td>18-22</td> <td>6</td> <td></td> <td>3.5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>23-30</td> <td>8</td> <td></td> <td>4.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>31-38</td> <td>10</td> <td>-0.036</td> <td>5.0</td> <td>+0.20</td> <td></td> <td>0.25-0.4</td> </tr> <tr> <td>39-44</td> <td>12</td> <td></td> <td>5.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>45-50</td> <td>14</td> <td>-0.043</td> <td>5.5</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Shaft Dia.	Reference Dimension	b	Tolerance (N9)	t		r	Dimension	Tolerance	6-7	2	-0.004	1.2			0.08-0.16	8-10	3	-0.029	1.8				11-12	4		2.5	+0.10			13-17	5	-0.03	3.0			0.16-0.25	18-22	6		3.5				23-30	8		4.0				31-38	10	-0.036	5.0	+0.20		0.25-0.4	39-44	12		5.0				45-50	14	-0.043	5.5			
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Alteration at two places 	WKC	WKC, C, K, E = 1mm Increment	WKC50-C8-K40-E10																																																																										
Shaft End Keyway 	PKC QKC	PKC, QKC = 1mm Increment	PKC10, QKC15																																																																										
Set Screw Flat	Alteration at one place 	FC	FC, G = 1mm Increment	FC10-G3	<ul style="list-style-type: none"> <li>⚡ G, J, V ≤ 50</li> <li>⚡ 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.</li> </ul> <table border="1" data-bbox="1090 647 1227 724"> <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																																																														
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Alteration at two places 	WFC	WFC, J, V = 1mm Increment	WFC10-J3-V10-V3																																																																										
2 Set Screw Flats	2 Set Screw Flats (Angle Specified) 	KFC	KFC, G = 1mm Increment AG = 15° Increment	KFC10-G3-A90	<ul style="list-style-type: none"> <li>⚡ Adds a set screw flat at any desired angle besides the datum plane (0°).</li> <li>⚡ G ≤ 50</li> <li>⚡ Not applicable to D2 and D2.5.</li> <li>⚡ When combined with other alterations, ±2 degree phase differential may occur.</li> </ul> <table border="1" data-bbox="1118 763 1255 840"> <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																																																														
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Both Ends 2 Set Screw Flats (Angle Specified) 	KWC	KWC = 1mm Increment	KWC20	<ul style="list-style-type: none"> <li>⚡ Adds 2 Set Screw Flats at both ends.</li> <li>⚡ KWC ≤ B-m, S-m</li> <li>⚡ L ≤ 680 is applicable.</li> <li>⚡ Not applicable for D dimensions other than indicated on the right</li> </ul> <table border="1" data-bbox="1008 859 1159 937"> <thead> <tr> <th>D</th> <th>W</th> <th>D</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>7</td> <td>25</td> <td>20</td> </tr> <tr> <td>10</td> <td>8</td> <td>30</td> <td>25</td> </tr> <tr> <td>12</td> <td>9</td> <td>35</td> <td>30</td> </tr> <tr> <td>15</td> <td>12</td> <td>40</td> <td>35</td> </tr> <tr> <td>20</td> <td>16</td> <td>50</td> <td>45</td> </tr> </tbody> </table>	D	W	D	W	8	7	25	20	10	8	30	25	12	9	35	30	15	12	40	35	20	16	50	45																																																	
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Both Ends 2 Set Screw Flats (Both Ends Stepped) 	KWC	KWC = 1mm Increment	KWC20	<ul style="list-style-type: none"> <li>⚡ Adds 2 Set Screw Flats at both ends.</li> <li>⚡ KWC ≤ F + T</li> <li>⚡ Y ≤ 680 is applicable.</li> <li>⚡ Not applicable to P(Q) = 4 or less.</li> </ul> <table border="1" data-bbox="1008 956 1159 1033"> <thead> <tr> <th>P-Q</th> <th>(H)</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>0.5</td> <td></td> </tr> <tr> <td>6-17</td> <td>1</td> <td></td> </tr> <tr> <td>18-40</td> <td>2</td> <td>P(Q) · (2 × H)</td> </tr> <tr> <td>41-50</td> <td>3</td> <td></td> </tr> </tbody> </table>	P-Q	(H)	W	5	0.5		6-17	1		18-40	2	P(Q) · (2 × H)	41-50	3																																																											
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Configure Chamfer Depth 	WC	WC = 0.1mm Increment	WC6.8	<ul style="list-style-type: none"> <li>⚡ Chamfering depth can be specified in 0.1mm increments.</li> <li>⚡ Applicable only when KWC alteration is performed.</li> <li>⚡ Applicable to D8 or more.</li> </ul> <table border="1" data-bbox="1022 1052 1227 1110"> <thead> <tr> <th>D</th> <th>WC</th> <th>D</th> <th>WC</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>4.0- 6.9</td> <td>25</td> <td>17.0-19.9</td> </tr> <tr> <td>10</td> <td>5.0- 7.9</td> <td>30</td> <td>22.0-24.9</td> </tr> <tr> <td>12</td> <td>6.0- 8.9</td> <td>35</td> <td>27.0-29.9</td> </tr> <tr> <td>15</td> <td>9.0-11.9</td> <td>40</td> <td>32.0-34.9</td> </tr> <tr> <td>20</td> <td>13.0-15.9</td> <td>50</td> <td>42.0-44.9</td> </tr> </tbody> </table>	D	WC	D	WC	8	4.0- 6.9	25	17.0-19.9	10	5.0- 7.9	30	22.0-24.9	12	6.0- 8.9	35	27.0-29.9	15	9.0-11.9	40	32.0-34.9	20	13.0-15.9	50	42.0-44.9																																																	
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L Dimension Tolerance 	LKC		LKC	<ul style="list-style-type: none"> <li>⚡ Changes L dimension tolerance.</li> <li>⚡ L &lt; 500 -&gt; L ± 0.05</li> <li>⚡ L ≥ 500 -&gt; L ± 0.1</li> </ul>																																																																									
Concentricity 	CKC		CKC	<ul style="list-style-type: none"> <li>⚡ Changes the concentricity to Ø0.02.</li> <li>⚡ Applicable within dimension L range in the table shown on the right.</li> <li>⚡ Not applicable to D part of h9 (Cold-drawn).</li> </ul> <table border="1" data-bbox="1077 1207 1227 1265"> <thead> <tr> <th>D</th> <th>Lmax</th> </tr> </thead> <tbody> <tr> <td>6-22</td> <td>450</td> </tr> <tr> <td>25-50</td> <td>600</td> </tr> </tbody> </table>	D	Lmax	6-22	450	25-50	600																																																																			
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Slit Cam Groove 	UC	UC = 1mm Increment	UC10	<ul style="list-style-type: none"> <li>⚡ Adds a slit cam groove.</li> <li>⚡ UC + ε₁ ≤ L</li> <li>⚡ UC ≥ 1</li> <li>⚡ Not applicable to D2 and D2.5.</li> <li>⚡ Not applicable to D13 or more.</li> </ul> <table border="1" data-bbox="980 1284 1118 1362"> <thead> <tr> <th>D</th> <th>d</th> <th>ε₁</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>2</td> <td rowspan="4">4</td> </tr> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>5</td> <td>4</td> </tr> <tr> <td>6</td> <td>5</td> </tr> <tr> <td>8</td> <td>7</td> <td rowspan="3">5</td> </tr> <tr> <td>10</td> <td>8</td> </tr> <tr> <td>12</td> <td>10</td> </tr> </tbody> </table>	D	d	ε₁	3	2	4	4	3	5	4	6	5	8	7	5	10	8	12	10																																																						
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Wrench Flats 	SC	SC = 1mm Increment	SC10	<ul style="list-style-type: none"> <li>⚡ Adds a wrench flat.</li> <li>⚡ SC + ε₂ ≤ L</li> <li>⚡ SC = 0 or SC ≥ 1</li> <li>⚡ Not applicable to D2 and D2.5.</li> <li>⚡ 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.</li> </ul> <table border="1" data-bbox="1049 1381 1255 1477"> <thead> <tr> <th>D</th> <th>W</th> <th>ε₂</th> <th>D</th> <th>W</th> <th>ε₂</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>5</td> <td></td> <td>30</td> <td>27</td> <td>15</td> </tr> <tr> <td>8</td> <td>7</td> <td>8</td> <td>35</td> <td>30</td> <td></td> </tr> <tr> <td>10</td> <td>8</td> <td></td> <td>40</td> <td>36</td> <td>20</td> </tr> <tr> <td>12</td> <td>10</td> <td></td> <td>50</td> <td>41</td> <td></td> </tr> <tr> <td>15, 16</td> <td>13</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>17, 18</td> <td>14</td> <td>10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>20, 22</td> <td>17</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>25</td> <td>22</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	D	W	ε₂	D	W	ε₂	6	5		30	27	15	8	7	8	35	30		10	8		40	36	20	12	10		50	41		15, 16	13					17, 18	14	10				20, 22	17					25	22																							
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Left-hand Thread / Thread 	PLM QLM		PLM (QLM)	<ul style="list-style-type: none"> <li>⚡ Changes the threads on shaft end P(Q) to Left-hand Thread.</li> <li>⚡ Applicable to Both Ends Threaded Type only.</li> <li>⚡ Combination with PMC and QMC is not applicable.</li> </ul>																																																																									
Fine Thread 	PMC QMC		PMC20 (QMC16)	<ul style="list-style-type: none"> <li>⚡ Changes threads to Fine Thread in the table shown on the right.</li> <li>⚡ P (Q) dimension is the same as PMC (QMC).</li> <li>⚡ Use PMC (QMC) to specify P (Q) dimension.</li> </ul> <table border="1" data-bbox="980 1574 1255 1690"> <thead> <tr> <th>D</th> <th>PMC, QMC</th> <th>D</th> <th>PMC, QMC</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>3 4 5</td> <td>30-32</td> <td>8 10 12 15 17</td> </tr> <tr> <td>8</td> <td>3 4 5 6</td> <td>25</td> <td>8 10 12 15 17 20</td> </tr> <tr> <td>10</td> <td>4 5 6 8</td> <td>30</td> <td>8 10 12 15 17 20 25</td> </tr> <tr> <td>12-13</td> <td>5 6 8 10</td> <td>35</td> <td>10 12 15 17 20 25 30</td> </tr> <tr> <td>15-18</td> <td>5 6 8 10 12</td> <td>40</td> <td>12 15 17 20 25 30 35</td> </tr> <tr> <td>17-18</td> <td>6 8 10 12 15</td> <td>50</td> <td>15 17 20 25 30 35 40</td> </tr> <tr> <td>Fin</td> <td>0.5, 0.75, 1.0</td> <td>Fin</td> <td>1.0, 1.5</td> </tr> </tbody> </table>	D	PMC, QMC	D	PMC, QMC	6	3 4 5	30-32	8 10 12 15 17	8	3 4 5 6	25	8 10 12 15 17 20	10	4 5 6 8	30	8 10 12 15 17 20 25	12-13	5 6 8 10	35	10 12 15 17 20 25 30	15-18	5 6 8 10 12	40	12 15 17 20 25 30 35	17-18	6 8 10 12 15	50	15 17 20 25 30 35 40	Fin	0.5, 0.75, 1.0	Fin	1.0, 1.5																																									
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Fin	0.5, 0.75, 1.0	Fin	1.0, 1.5																																																																										
Retaining Ring Groove 	TA TB	TA, TB = 1mm Increment	TA10-TB10	<ul style="list-style-type: none"> <li>⚡ Adds a retaining ring groove. (Applicable retaining rings are included.)</li> <li>⚡ 4 × TA, TB &lt; L/2</li> <li>⚡ For dimensions of the retaining ring groove, refer P820</li> </ul>																																																																									
Slit Added 	MM		MM	<ul style="list-style-type: none"> <li>⚡ Slot is added to D dimensioned section.</li> <li>⚡ When specified together with WC, in-plane interface is not available.</li> <li>⚡ Not applicable to D35 or more.</li> </ul> <table border="1" data-bbox="1145 1767 1255 1825"> <thead> <tr> <th>D</th> <th>N</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>6-13</td> <td>1.2</td> <td>1.5</td> </tr> <tr> <td>15-20</td> <td>2.0</td> <td>2.5</td> </tr> <tr> <td>22-30</td> <td>3.0</td> <td>3.8</td> </tr> </tbody> </table>	D	N	V	6-13	1.2	1.5	15-20	2.0	2.5	22-30	3.0	3.8																																																													
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Undercut Dimensions 	PC QC		PC (QC)	<ul style="list-style-type: none"> <li>⚡ PC, QC: Adds an undercut on P and Q.</li> <li>⚡ For undercut dimension details, refer P820.</li> <li>⚡ F-B-Mx2</li> <li>⚡ Not applicable when D=P or D=Q.</li> </ul>																																																																									