

# Driving Shafts

## One End Stepped

■ **Features:** Rotary Shafts suitable for driving motion. Accuracies and shapes needed for rotary driving applications are selectable.

Type	D, P Tolerance	Concentricity	Perpendicularity	Material	Hardness	Surface Treatment
KZBE	h7	0.05	0.05	S45C	-	Black Oxide
KZBN						
KZBC				S45C	-	Black Oxide
KZBP	h6	0.01	0.01			Electroless Nickel Plating
KZBF				S45C	Induction Hardened Surface Hardness 50HRC-	

D	Tolerance		D	Circularity M
	h7	h6		
10	0	0	10	0.004
12	0	0	12	0.005
15	0	0	15	0.003
17	-0.018	-0.011	17	0.005
20	0	0	20	0.006
25	0	0	25	0.005
30	-0.021	-0.013	30	0.005
35			35	
40			40	
45			45	
50			50	

⚠ LA ≤ L/2  
 ⚠ The shaft may have centering holes on ends.  
 ⚠ There is an undercut 1.5mm or less in width and 0.3mm or less in depth on the stepped part.  
 ⚠ Step P of KZBE has no grinding undercut. Step R=0.2 or Less

Part Number	D	0.5mm Increment L	1mm Increment P	0.5mm Increment LA
KZBE (D10~30)	10	50.0~300.0	7~9	10.0~50.0
	12		7~11	
	15		10~14	
	17	100.0~400.0	10~16	10.0~70.0
KZBN	20		14~19	
	25		14~24	10.0~100.0
	30	100.0~500.0	20~29	
	*35		20~34	
	*40		20~39	20.0~150.0
KZBP	*45	200.0~500.0	20~44	
	*50		25~49	20.0~200.0

Ordering Example: **KZBN30 - 320 - P25 - LA40**

⚠ **About KZBF (Induction Hardened)**  
 When alterations on the right-hand page are specified, the shafts are induction hardened (except the threaded sections) after machining. As a result, these may occur:  
 ①: Due to thermal conduction to the thread, the threads may be hardened by 2 ~ 3mm.  
 ②: Induction Hardened may shrink the keyway width (around -0.01 ~ -0.02). If the key becomes hard to fit, adjust it by gauging.

\* marked sizes are not available for KZBE.

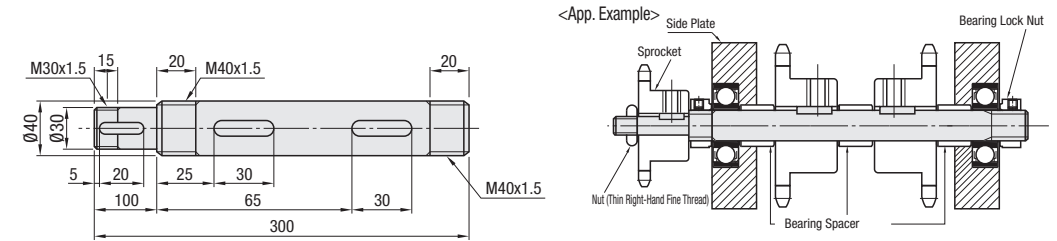
Type	KZBE					KZBN					KZBC				
	Min. L	L100.5	L200.5	L300.5	L400.5	Min. L	L100.5	L200.5	L300.5	L400.5	Min. L	L100.5	L200.5	L300.5	L400.5
10	~100.0	~200.0	~300.0	~400.0	~500.0	~100.0	~200.0	~300.0	~400.0	~500.0	~100.0	~200.0	~300.0	~400.0	~500.0
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Type	KZBP					KZBF				
	Min. L	L100.5	L200.5	L300.5	L400.5	Min. L	L100.5	L200.5	L300.5	L400.5
10	~100.0	~200.0	~300.0	~400.0	~500.0	~100.0	~200.0	~300.0	~400.0	~500.0
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### Selection of Driving Shaft

In selecting a driving shaft, select the basic shape and size from the specification table, then select necessary alterations such as thread machining, keyway addition etc.

- <Selection Example of Part Number>
- Alteration Selection: Three Keyways, Three Threaded Ends (Fine Thread)



Alterations Part Number - L - P - LA - (MA, NA, KA, TA, SA, WA...etc.)  
**KZBN40 - 300 - P30 - LA100 - MSA15 - MSD20 - MSB20 - KA5 - HA20 - KB25 - HB30 - KC65 - HC30**

Alterations	Code		Spec.																																																																												
	Left End	Right End																																																																													
<b>Threaded Ends</b> 	MA, MSA, MMA, MB, MSB, MM, MD, MSD, MMD, MB, MSB, MMB	MA15-MSB15	Adds threads at shaft ends. Specify the length of the threads. (Accuracy, coarse or fine threads can be specified by ordering code.) Ordering Code: MA15-MSB15 1mm Increment 5≤ Thread Length ≤Mx5, LA-2 <table border="1"> <thead> <tr> <th>Code</th> <th>Left End</th> <th>Right End</th> <th>Screw Accuracy</th> <th>M (Coarse)</th> <th>Pitch</th> <th>M (Fine)</th> <th>Pitch</th> <th>M (Fine)</th> <th>Pitch</th> </tr> </thead> <tbody> <tr> <td>MA</td> <td>MD</td> <td>MB</td> <td>Coarse</td> <td>JIS 6h (Class 2)</td> <td>M10</td> <td>1.5</td> <td>M10</td> <td>0.75</td> <td>M30</td> <td>1.5</td> </tr> <tr> <td>MSA</td> <td>MSD</td> <td>MSB</td> <td>Fine (Standard)</td> <td>JIS 6h (Class 2)</td> <td>M12</td> <td>1.75</td> <td>M12</td> <td>1.0</td> <td>M35</td> <td>1.5</td> </tr> <tr> <td>MMA</td> <td>MMD</td> <td>MMB</td> <td>Fine (Precision)</td> <td>JIS 4h (Class 1)</td> <td>M20</td> <td>2.5</td> <td>M17</td> <td>1.0</td> <td>M40</td> <td>1.5</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>M24</td> <td>3</td> <td>M15</td> <td>1.0</td> <td>M45</td> <td>1.5</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>M30</td> <td>3.5</td> <td>M20</td> <td>1.0</td> <td>M50</td> <td>1.5</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>M36</td> <td>4</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Code	Left End	Right End	Screw Accuracy	M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch	MA	MD	MB	Coarse	JIS 6h (Class 2)	M10	1.5	M10	0.75	M30	1.5	MSA	MSD	MSB	Fine (Standard)	JIS 6h (Class 2)	M12	1.75	M12	1.0	M35	1.5	MMA	MMD	MMB	Fine (Precision)	JIS 4h (Class 1)	M20	2.5	M17	1.0	M40	1.5						M24	3	M15	1.0	M45	1.5						M30	3.5	M20	1.0	M50	1.5						M36	4				
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<b>Tapped Ends</b> 	NA, NB	NA5-NB5	Adds taps on shaft ends. Select the thread diameter. Ordering Code: NA5-NB5 ⚠ NA, NB ≤ D(P)-4 <table border="1"> <thead> <tr> <th>Selection</th> <th>NA (Coarse)</th> <th>NB (Coarse)</th> </tr> </thead> <tbody> <tr> <td></td> <td>M3</td> <td>M4</td> </tr> <tr> <td></td> <td>M5</td> <td>M6</td> </tr> <tr> <td></td> <td>M8</td> <td>M10</td> </tr> <tr> <td></td> <td>M12</td> <td>M16</td> </tr> <tr> <td></td> <td>M20</td> <td>M24</td> </tr> </tbody> </table>	Selection	NA (Coarse)	NB (Coarse)		M3	M4		M5	M6		M8	M10		M12	M16		M20	M24																																																										
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<b>Retaining Ring Groove</b> 	TA, TB	TA10-TB10-TC10	Adds a retaining ring groove. Specify the position of a retaining ring groove. Ordering Code: TA10-TB10-TC10 TA, TB, TC = 1mm Increment 4≤TA≤LA-3 ⚠ Retaining rings are included. ⚠ For dimensions of the retaining ring groove, P820 ⚠ P=27, 31, 33, 34, 36~39, 41~44, Not available for 46~49.																																																																												
<b>Keyway Machining</b> 	KA, KB, KC	KA10-HA30-KB100-HB50	Adds a keyway. Specify the position and the length of the keyway. Ordering Code: KA10-HA30-KB100-HB50 KA, HA, KB, HB, KC, HC = 1mm Increment ⚠ 3≤HA, HB, HC≤100 ⚠ Keyway Details P820 ⚠ When more than 2 keyways are added, the tolerances may shift by up to 0.2°.																																																																												
<b>Keyway Machining + Set Screw Flat</b> 	ZA, ZB, ZC	ZA40-HA20-AA90	Adds a flat at any designated angle based on the keyways. Specify the position and the length for each keyway, and the angle for the set screw flats. Ordering Code: ZA40-HA20-AA90 ZA, HA, ZB, HB, ZC, HC = 1mm Increment AA, AB, AC = 30° Increment 30° ≤ AA, AB, AC ≤ 330° ⚠ 3≤HA, HB, HC≤100 ⚠ Keyway Details P820 ⚠ Specify the keyway position more than 2mm away from the stepped part. Ordering Code: <table border="1"> <thead> <tr> <th>Keyway Position Specified</th> <th>Keyway Width Specified</th> <th>Angle Specified</th> <th>D, P</th> <th>7~17</th> <th>18~40</th> <th>41~50</th> </tr> </thead> <tbody> <tr> <td>ZA</td> <td>HA</td> <td>AA</td> <td>H</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>ZB</td> <td>HB</td> <td>AB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>ZC</td> <td>HC</td> <td>AC</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Keyway Position Specified	Keyway Width Specified	Angle Specified	D, P	7~17	18~40	41~50	ZA	HA	AA	H	1	2	3	ZB	HB	AB					ZC	HC	AC																																																				
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<b>Wrench Flats</b> 	SA, SC	SA5	Adds a wrench flat. Specify the position of a wrench flat. Ordering Code: SA5 SA, SC = 1mm Increment 0 ≤ SA, SC ≤ LA-ℓ, L-ℓ <table border="1"> <thead> <tr> <th>D</th> <th>10</th> <th>12</th> <th>15</th> <th>17</th> <th>20</th> <th>25</th> <th>30</th> <th>35</th> <th>40</th> <th>45</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>8</td> <td>10</td> <td>13</td> <td>14</td> <td>17</td> <td>22</td> <td>27</td> <td>30</td> <td>36</td> <td>38</td> <td>41</td> </tr> <tr> <td>ℓ</td> <td>8</td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td></td> <td>15</td> <td></td> <td></td> <td>20</td> </tr> </tbody> </table>	D	10	12	15	17	20	25	30	35	40	45	50	W	8	10	13	14	17	22	27	30	36	38	41	ℓ	8				10			15			20																																								
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<b>2 Set Screw Flats (Angle Specified)</b> 	WA, WB, WC	WA15-GA10-AA0	Adds a flat at any designated angle besides the datum plane 0°. Specify the position, the length and the angle of the set screw flats. When 0° is specified, only one set screw flat is machinable. Ordering Code: WA15-GA10-AA0 WA, WB, WC, GA, GB, GC = 1mm Increment AA, AB, AC = 30° Increment 0° ≤ AA, AB, AC ≤ 330° Ordering Code: <table border="1"> <thead> <tr> <th>Set Screw Flat Position Specified</th> <th>Set Screw Flat Width Specified</th> <th>Angle Specified</th> <th>D, P</th> <th>7~17</th> <th>18~40</th> <th>41~50</th> </tr> </thead> <tbody> <tr> <td>WA</td> <td>GA</td> <td>AA</td> <td>H</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>WB</td> <td>GB</td> <td>AB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>WC</td> <td>GC</td> <td>AC</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified	D, P	7~17	18~40	41~50	WA	GA	AA	H	1	2	3	WB	GB	AB					WC	GC	AC																																																				
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