

Driving Shafts

One End Stepped, One End Double Stepped

Rotary Shafts suitable for driving motion. Accuracies and shapes needed for rotary driving applications are selectable.

Driving Shafts – One End Stepped, One End Double Stepped

Type	D, P, Q Tolerance	Concentricity	Perpendicularity	Material	Hardness	Surface Treatment
KZDE	h7	φ0.05	±0.05	1045 Carbon Steel or Equivalent	—	Black Oxide
KZDN	h6	φ0.01	±0.01	1045 Carbon Steel or Equivalent	—	Black Oxide
KZDC				Electroless Nickel Plating		
KZDP				—		
KZDS				304 Stainless Steel		—
KZDF				1045 Carbon Steel or Equivalent	Induction Hardened Surface Hardness 50 HRC min.	—

D	Tolerance	
	h7	h6
10	0	0
12	-0.015	-0.009
15	-0.018	-0.011
20	0	0
25	-0.021	-0.013
30	—	—
35	—	0
40	—	-0.016
50	—	—

D	Circularity M	
	KZDE	Others
10	0.004	—
12	—	0.003
15	0.005	—
20	—	—
25	0.006	—
30	—	0.005
35	—	—
40	—	—
50	—	—

① $ℓ = L - (LA + LB + LC)$
 ② The shaft may have center holes on ends.
 ③ There is an undercut less than 1.5 mm in width and less than 0.3 mm in depth on the stepped part.
 ④ Step P, Q of KZDE has no grinding undercut. Step R=0.2 or less.

*Ds: Tap dimension of Bearing Inner Race, reference: P.1028.

Type	Part Number	D	0.5 mm Increment	Selection	0.5 mm Increment	1 mm Increment	0.5 mm Increment	Ds
KZDE (D10-30)	KZDN	10	50.0-300.0	6	4.0-40.0	4.0-40.0	5-7	8
		12		8				9.5
		15		8				10
		20		10				11.5
		25		12				14
		30		15				18
		*35		17				19
		*40		20				21
		*50		25				27
				30				29
	35	31						
	40	34						
	45	37						
		39						
		48						
		49						

① * marked sizes are not available for KZDE.

KZDF (Induction Hardened)

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

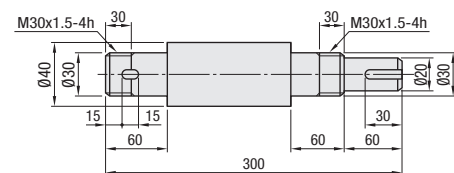
Available Types

Type	D	KZDE				KZDN, KZDC, KZDP, KZDS, KZDF			
		Min. L-100.0	L100.5-200.0	L200.5-300.0	L300.5-400.0	Min. L-100.0	L100.5-200.0	L200.5-300.0	L300.5-400.0
10	•	•	•	•	•	•	•	•	•
12	•	•	•	•	•	•	•	•	•
15	•	•	•	•	•	•	•	•	•
20	•	•	•	•	•	•	•	•	•
25	•	•	•	•	•	•	•	•	•
30	•	•	•	•	•	•	•	•	•
35	•	•	•	•	•	•	•	•	•
40	•	•	•	•	•	•	•	•	•
50	•	•	•	•	•	•	•	•	•

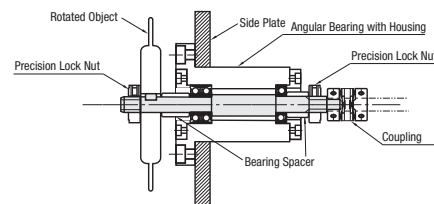
Selection of Driving Shaft

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 No. >
 Alteration Selection: Two Threaded Ends, Two Keyways



Application Example



Driving Shafts

One End Stepped, One End Double Stepped, continued

Part Number Alterations: **Part Number** - L - P - LA - LB - Q - LC - (MA, NA, KA, TA, SA, WA...etc.)
KZDN40 - 300 - P30 - LA60 - LB60 - Q20 - LC60 - MMA30 - MMB30 - KA15 - HA15 - KC0 - HC30

Alterations	Code		Spec.																																																																																						
	Left End	Right End																																																																																							
	MA MSA MMA	MB MSB MMB MC MSC MMC	<p>Adds threads at shaft ends. Specify the length of the threads. (For accuracy, coarse or fine threads can be specified by an ordering code.) Ordering Code: MA15-MSB15 1 mm Increment 5=Thread Length=Msx5 / LA(LB/LC)-2</p> <table border="1"> <thead> <tr> <th colspan="2">Code</th> <th colspan="6">Screw Precision</th> </tr> <tr> <th>Left End</th> <th>Right End</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>MB MC</td><td>Coarse</td><td>JIS6h (Class 2)</td><td>M5</td><td>0.8</td><td>M5</td><td>0.5</td><td>M20</td><td>1.0</td></tr> <tr><td>MSA</td><td>MSB MSC</td><td>Fine (Coarse)</td><td>JIS6h (Class 2)</td><td>M6</td><td>1.0</td><td>M6</td><td>0.75</td><td>M25</td><td>1.5</td></tr> <tr><td>MMA</td><td>MMB MMC</td><td>Fine (Precision)</td><td>JIS4h (Class 1)</td><td>M8</td><td>1.25</td><td>M8</td><td>0.75</td><td>M30</td><td>1.5</td></tr> <tr><td></td><td></td><td></td><td></td><td>M10</td><td>1.5</td><td>M10</td><td>0.75</td><td>M35</td><td>1.5</td></tr> <tr><td></td><td></td><td></td><td></td><td>M12</td><td>1.75</td><td>M12</td><td>1.0</td><td>M40</td><td>1.5</td></tr> <tr><td></td><td></td><td></td><td></td><td>M20</td><td>2.5</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>M30</td><td>3.5</td><td>M17</td><td>1.0</td><td>M50</td><td>1.5</td></tr> </tbody> </table> <p>① When P / Q = M / thread length can be specified. ② Fine (Precision Class) is not available for KZDE.</p>	Code		Screw Precision						Left End	Right End	M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch	MA	MB MC	Coarse	JIS6h (Class 2)	M5	0.8	M5	0.5	M20	1.0	MSA	MSB MSC	Fine (Coarse)	JIS6h (Class 2)	M6	1.0	M6	0.75	M25	1.5	MMA	MMB MMC	Fine (Precision)	JIS4h (Class 1)	M8	1.25	M8	0.75	M30	1.5					M10	1.5	M10	0.75	M35	1.5					M12	1.75	M12	1.0	M40	1.5					M20	2.5	M15	1.0	M45	1.5					M30	3.5	M17	1.0	M50	1.5
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	NA	NC	<p>Adds a tap at the shaft end. Select the thread diameter. Ordering Code: NA5-NC5 ① NA / NC= P (Q)-4</p> <table border="1"> <thead> <tr> <th colspan="2">NA (Coarse) NC (Coarse) Selectable</th> </tr> </thead> <tbody> <tr><td>M3</td><td>M4 M5 M6 M8</td></tr> <tr><td>M10</td><td>M12 M16 M20</td></tr> <tr><td>M24</td><td>M30 M36</td></tr> </tbody> </table>	NA (Coarse) NC (Coarse) Selectable		M3	M4 M5 M6 M8	M10	M12 M16 M20	M24	M30 M36																																																																														
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	KA KB	KC KD	<p>Adds a keyway. Specify the position and the length of the keyway. Ordering Code: KA10-HA30-KB100-HB50 KA / HA / KB / HB / KC / KD / HD = 1 mm Increment ① 3 ≤ HA / HB / HC / HD ≤ 100 ② For keyway details refer to P.853. ③ When more than 2 keyways are added / the tolerances may shift by up to 0.2°. ④ Specify the keyway position more than 2 mm away from the stepped part.</p>																																																																																						
	ZA ZB	ZC ZD	<p>Adds a flat at any designated angle based on the keyways. Specify the length on and width of a keyway / and the angle of a set screw flat. Ordering Code: ZA40-HA20-AA90 ZA / HA / ZB / HB / ZC / HC / ZD / HD=1 mm Increment AA / AB / AC / AD=30° Increment 30°=AA / AB / AC / AD≤330° ① 3≤HA/HB/HC/HD≤100 ② Keyway details refer to P.853. ③ Specify the keyway position more than 2mm away from the stepped part.</p> <table border="1"> <thead> <tr> <th rowspan="2">Keyway Position Specified</th> <th rowspan="2">Keyway Width Specified</th> <th rowspan="2">Angle Specified 30° Increment</th> <th colspan="4">D / P / Q</th> </tr> <tr> <th>5</th> <th>6-17</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>0.5</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><td></td></tr> <tr><td>ZC</td><td>HC</td><td>AC</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>ZD</td><td>HD</td><td>AD</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>④ The length of each set screw flat is the same as that of each keyway. ⑤ Keyway and set screw flat may be shifted by up to ±0.2°.</p>	Keyway Position Specified	Keyway Width Specified	Angle Specified 30° Increment	D / P / Q				5	6-17	18-40	41-50	ZA	HA	AA	H	0.5	1	2	3	ZB	HB	AB						ZC	HC	AC						ZD	HD	AD																																																
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	TA	TB TC	<p>Adds a retaining ring groove. Specify the position of a retaining ring groove. Ordering Code: TA10-TB10-TC10 P, Q=8: Retaining Ring Type E P, Q=9: Retaining Ring Type C TA / TB / TC= 1 mm Increment ① 4≤TA≤LA-3 ② Retaining rings are attached. ③ Detailed "Retaining Ring Groove Dimensions Rotary & Driving Shafts" on P.853. ④ Not available for Q = 27, 31, 33-34, 36-39, 41-44.</p> <table border="1"> <thead> <tr> <th rowspan="2">Driving Shafts</th> <th colspan="2">Retaining Ring</th> </tr> <tr> <th>Material</th> <th>Hardness</th> </tr> </thead> <tbody> <tr><td rowspan="2">1045 Carbon Steel or Equivalent</td><td>—</td><td>Nylon 6 (Glass Fiber 30%)</td></tr> <tr><td>Black Oxide Electroless Nickel Plating</td><td>Spring Steel</td></tr> <tr><td>304 Stainless Steel</td><td>—</td><td>304 Stainless Steel-CSP</td></tr> <tr><td>1045 Carbon Steel or Equivalent</td><td>Surface 50 HRC min.</td><td>Spring Steel</td></tr> </tbody> </table>	Driving Shafts	Retaining Ring		Material	Hardness	1045 Carbon Steel or Equivalent	—	Nylon 6 (Glass Fiber 30%)	Black Oxide Electroless Nickel Plating	Spring Steel	304 Stainless Steel	—	304 Stainless Steel-CSP	1045 Carbon Steel or Equivalent	Surface 50 HRC min.	Spring Steel																																																																						
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	SA SD	SC	<p>Adds a Wrench Flat. Specify the position of a wrench flat. Ordering Code: SA5 SA / SC / SD=1 mm Increment SA / SC / SD=0 SA≤LA-ℓ / SC≤LC-ℓ / SD≤LB-LC-ℓ</p> <table border="1"> <thead> <tr> <th>D</th> <th>10</th> <th>12</th> <th>15</th> <th>20</th> <th>25</th> <th>30</th> <th>35</th> <th>40</th> <th>50</th> </tr> </thead> <tbody> <tr><td>W</td><td>8</td><td>10</td><td>13</td><td>17</td><td>22</td><td>27</td><td>30</td><td>36</td><td>41</td></tr> <tr><td>ℓ</td><td>8</td><td colspan="3">10</td><td colspan="2">15</td><td colspan="3">20</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>P / Q</th> <th>5</th> <th>6</th> <th>7</th> <th>8-10</th> <th>11-13</th> <th>14-15</th> <th>16-18</th> <th>19-21</th> <th>22-25</th> <th>26-28</th> <th>29-31</th> <th>32-37</th> <th>38-41</th> <th>42-45</th> </tr> </thead> <tbody> <tr><td>W₁</td><td>4</td><td>5</td><td>5.5</td><td>7</td><td>10</td><td>13</td><td>14</td><td>17</td><td>19</td><td>22</td><td>27</td><td>30</td><td>36</td><td>38</td></tr> <tr><td>ℓ</td><td colspan="3">8</td><td colspan="3">10</td><td colspan="3">15</td><td colspan="4">20</td></tr> </tbody> </table>	D	10	12	15	20	25	30	35	40	50	W	8	10	13	17	22	27	30	36	41	ℓ	8	10			15		20			P / Q	5	6	7	8-10	11-13	14-15	16-18	19-21	22-25	26-28	29-31	32-37	38-41	42-45	W ₁	4	5	5.5	7	10	13	14	17	19	22	27	30	36	38	ℓ	8			10			15			20															
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	PJ (j6)	PK (k6)	<p>Changes the tolerance of P Dimension of the stepped part to js6 or k6. Ordering Code: PJ or PK ① Both LA and LB tolerances will be changed. ② Not available for KZDE.</p>																																																																																						

① For dimensions of the retaining ring groove P.853. ② For Keyway details, see P.853.