

Driving Shafts

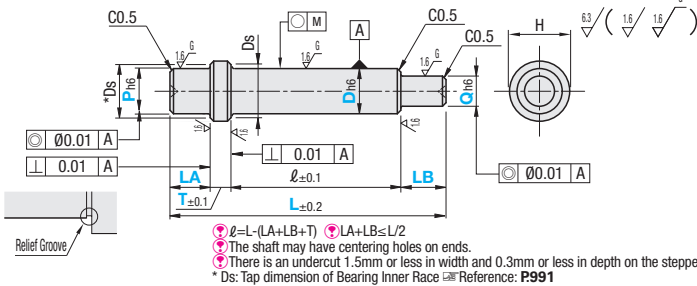
One End Stepped with Shoulder

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



Type	D, P, Q Tolerance	Concentricity	M Material	H Hardness	S Surface Treatment
KZFN	h6	00.01	EN 1.1191 Equiv.	-	-
KZFC			-	Black Oxide	
KZFP			-	Electroless Nickel Plating	
KZFS			EN 1.4301 Equiv.	-	-
KZFF			EN 1.1191 Equiv.	Induction Hardened Surface Hardness 50HRC-	-

D	Tolerance h6	Circularity M
8	0	0.003
10	-0.009	
12, 12A	0	
15	-0.011	
17, 17A		0.005
20	0	
25	-0.013	
30		
35	0	
40	-0.016	
45		



RoHS10

Part Number		0.5mm Increment	Selection	1mm Increment	0.5mm Increment	1mm Increment	0.5mm Increment	H	'Ds
Type	D	L	T	P	LA	Q	LB		
KZFN KZFC KZFP KZFS KZFF	8	50.0~300.0	5	6~9	4.0~40.0	5~7	4.0~40.0	12	10
	10		10	8~12	5.0~50.0	7~9	5.0~50.0	15	13
	12		15	10~13				16	14
	12A		20	12~18	5.0~60.0	7~11	5.0~60.0		16
	15	100.0~400.0	10	12~18	5.0~75.0	10~14	5.0~75.0	20	18
	17		15	14~18					19
	17A		20	14~20	5.0~100.0	10~16	5.0~100.0		21
	20		25	17~23		14~19		25	24
	25			20~28	10.0~125.0	14~24	10.0~125.0	30	29
	30		30	25~33	15.0~150.0	20~29	15.0~150.0	35	34
	35	200.0~500.0	40	28~38		20~34		40	39
	40		50	35~47	20.0~150.0	20~39	20.0~150.0	48	48
45			35~48		20~44		50	49	



Ordering Example **Part Number** - **L** - **T** - **P** - **LA** - **Q** - **LB**
KZFN30 - **350** - **T20** - **P30** - **LA50** - **Q25** - **LB30**

• **About KZFF (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.

Type	KZFN					KZFC					KZFP				
D	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0
8				-	-				-	-				-	-
10				-	-				-	-				-	-
12				-	-				-	-				-	-
12A				-	-				-	-				-	-
15				-	-				-	-				-	-
17				-	-				-	-				-	-
17A				-	-				-	-				-	-
20				-	-				-	-				-	-
25															
30															
35															
40	-					-					-				
45	-					-					-				

Type	KZFS					KZFF				
D	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0
8				-	-				-	-
10				-	-				-	-
12				-	-				-	-
12A				-	-				-	-
15					-					-
17					-					-
17A					-					-
20					-					-
25										
30										
35										
40	-					-				
45	-					-				

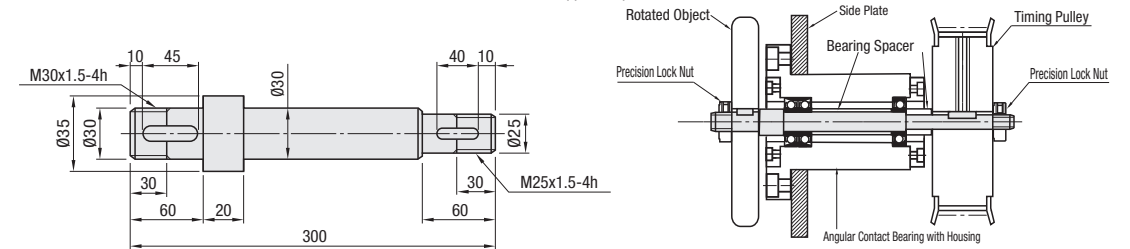
■ Selection of Driving Shaft

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: Two Threaded Ends (Fine Thread, Precision Grade), Two Keyways

<App. Example>



Alterations Part Number - L - T - P - LA - Q - LB - (MA, NA, KA, TA, SA---etc.)
KZFF30 - 300 - T20 - P30 - LA60 - Q25 - LB60 - MMA30 - MMB30 - KA10 - HA45 - KB10 - HB40

Alterations	Code	Spec.																																																																																															
Threaded Ends	MA MSA MMA MD MSD MMD MB MSB MMB	Adds threads at shaft ends. Specify the length of the threads. (Accuracy, coarse or fine threads can be specified by ordering code.) <table border="1"> <tr> <th>Ordering Code</th><th>MA15-MSB15</th><th>1mm Increment</th><th>5s</th><th>Thread Length $\leq M \times 5$, LA(LB)-2</th></tr> <tr> <td>Code</td><td>MA</td><td>MSB</td><td>MD</td><td>MB</td></tr> <tr> <td>Left End</td><td>MA</td><td>MSB</td><td>MD</td><td>MB</td></tr> <tr> <td>Right End</td><td>MSA</td><td>MSB</td><td>MSD</td><td>MSB</td></tr> <tr> <td>Coarse</td><td>MA</td><td>MSB</td><td>MD</td><td>MB</td></tr> <tr> <td>Fine (Standard)</td><td>MSA</td><td>MSB</td><td>MSD</td><td>MSB</td></tr> <tr> <td>Fine (Precision)</td><td>MMA</td><td>MSB</td><td>MMD</td><td>MSB</td></tr> </table> ♀ When D, P, Q=M, thread length can be specified. ♀ Specify Q diameter smaller than MD, MSD and MMD root diameter. <table border="1"> <tr> <th>M (Coarse)</th><th>Pitch</th><th>M (Fine)</th><th>Pitch</th><th>M (Fine)</th><th>Pitch</th></tr> <tr> <td>M5</td><td>0.8</td><td>M5</td><td>0.5</td><td>M25</td><td>1.5</td></tr> <tr> <td>M6</td><td>1.0</td><td>M6</td><td>0.75</td><td>M30</td><td>1.5</td></tr> <tr> <td>M8</td><td>1.25</td><td>M8</td><td>0.75</td><td>M35</td><td>1.5</td></tr> <tr> <td>M10</td><td>1.5</td><td>M10</td><td>0.75</td><td>M40</td><td>1.5</td></tr> <tr> <td>M12</td><td>1.75</td><td>M12</td><td>1.0</td><td>M45</td><td>1.5</td></tr> <tr> <td>M20</td><td>2.5</td><td>M15</td><td>1.0</td><td></td><td></td></tr> <tr> <td>M24</td><td>3</td><td>M17</td><td>1.0</td><td></td><td></td></tr> <tr> <td>M30</td><td>3.5</td><td>M20</td><td>1.0</td><td></td><td></td></tr> <tr> <td>M36</td><td>4</td><td></td><td></td><td></td><td></td></tr> </table>	Ordering Code	MA15-MSB15	1mm Increment	5s	Thread Length $\leq M \times 5$, LA(LB)-2	Code	MA	MSB	MD	MB	Left End	MA	MSB	MD	MB	Right End	MSA	MSB	MSD	MSB	Coarse	MA	MSB	MD	MB	Fine (Standard)	MSA	MSB	MSD	MSB	Fine (Precision)	MMA	MSB	MMD	MSB	M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch	M5	0.8	M5	0.5	M25	1.5	M6	1.0	M6	0.75	M30	1.5	M8	1.25	M8	0.75	M35	1.5	M10	1.5	M10	0.75	M40	1.5	M12	1.75	M12	1.0	M45	1.5	M20	2.5	M15	1.0			M24	3	M17	1.0			M30	3.5	M20	1.0			M36	4				
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Tapped Ends	NA NB	Adds taps on shaft ends. Select the thread diameter. <table border="1"> <tr> <th>Ordering Code</th><th>NA5-NB5</th><th>♀ NA,NB$\leq P(Q)-4$</th></tr> <tr> <td>Selection</td><td>NA (Coarse)</td><td>NB (Coarse)</td></tr> <tr> <td></td><td>M3</td><td>M4</td></tr> <tr> <td></td><td>M5</td><td>M6</td></tr> <tr> <td></td><td>M10</td><td>M12</td></tr> <tr> <td></td><td>M16</td><td>M20</td></tr> <tr> <td></td><td>M24</td><td></td></tr> </table>	Ordering Code	NA5-NB5	♀ NA,NB $\leq P(Q)-4$	Selection	NA (Coarse)	NB (Coarse)		M3	M4		M5	M6		M10	M12		M16	M20		M24																																																																											
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Keyway Machining	KA KB KC KD	Adds a keyway. Specify the position and the length of the keyway. <table border="1"> <tr> <th>Ordering Code</th><th>KA10-HA30-KB100-HB50</th></tr> <tr> <td>KA, HA, KB, HB, KC, HC, KD, HD = 1mm Increment</td><td></td></tr> <tr> <td>♀ 3$\leq$HA,HB,HC,HD$\leq$100</td><td></td></tr> <tr> <td>♀ Keyway Details P820</td><td></td></tr> <tr> <td>♀ When more than 2 keyways are added, the tolerances may shift by up to 0.2°.</td><td></td></tr> <tr> <td>♀ Specify the keyway position more than 2mm away from the shouldered or stepped part.</td><td></td></tr> </table>	Ordering Code	KA10-HA30-KB100-HB50	KA, HA, KB, HB, KC, HC, KD, HD = 1mm Increment		♀ 3 $\leq$ HA,HB,HC,HD $\leq$ 100		♀ Keyway Details P820		♀ When more than 2 keyways are added, the tolerances may shift by up to 0.2°.		♀ Specify the keyway position more than 2mm away from the shouldered or stepped part.																																																																																				
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Keyway Machining + Set Screw Flat	ZA ZB ZC ZD	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. <table border="1"> <tr> <th>Ordering Code</th><th>ZA40-HA20-AA90</th></tr> <tr> <td>ZA, HA, ZB, HB, ZC, HC, ZD, HD = 1mm Increment</td><td></td></tr> <tr> <td>AA, AB, AC, AD = 30° Increment</td><td></td></tr> <tr> <td>30°$\leq$AA, AB, AC, AD$\leq$330°</td><td></td></tr> <tr> <td>♀ 3$\leq$HA,HB,HC,HD$\leq$100</td><td></td></tr> <tr> <td>♀ Keyway Details P820</td><td></td></tr> <tr> <td>♀ Specify the keyway position more than 2mm away from the shouldered or stepped part.</td><td></td></tr> </table> • Ordering Code <table border="1"> <tr> <th>Keyway Position Specified</th><th>Keyway Width Specified</th><th>Angle Specified 30° Increment</th></tr> <tr> <td>ZA</td><td>HA</td><td>AA</td></tr> <tr> <td>ZB</td><td>HB</td><td>AB</td></tr> <tr> <td>ZC</td><td>HC</td><td>AC</td></tr> <tr> <td>ZD</td><td>HD</td><td>AD</td></tr> </table> <table border="1"> <tr> <th>D, P, Q</th><th>5</th><th>6~17</th><th>18~40</th><th>41~48</th></tr> <tr> <td>H</td><td>0.5</td><td>1</td><td>2</td><td>3</td></tr> </table> ♀ The length of each set screw flat is the same as that of each keyway. ♀ For a keyway and the angle of a set screw flat, the tolerances may shift by up to $\pm 0.2^\circ$.	Ordering Code	ZA40-HA20-AA90	ZA, HA, ZB, HB, ZC, HC, ZD, HD = 1mm Increment		AA, AB, AC, AD = 30° Increment		30° $\leq$ AA, AB, AC, AD $\leq$ 330°		♀ 3 $\leq$ HA,HB,HC,HD $\leq$ 100		♀ Keyway Details P820		♀ Specify the keyway position more than 2mm away from the shouldered or stepped part.		Keyway Position Specified	Keyway Width Specified	Angle Specified 30° Increment	ZA	HA	AA	ZB	HB	AB	ZC	HC	AC	ZD	HD	AD	D, P, Q	5	6~17	18~40	41~48	H	0.5	1	2	3																																																								
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Retaining Ring Groove	TA TB TD	Adds a retaining ring groove. Specify the position of a retaining ring groove. <table border="1"> <tr> <th>Ordering Code</th><th>TA10-TB100</th></tr> <tr> <td>TA, TB, TD = 1mm Increment</td><td></td></tr> <tr> <td>4$\leq$TA(TB)$\leq$LA(LB)-3</td><td></td></tr> <tr> <td>♀ Retaining rings are included.</td><td></td></tr> <tr> <td>♀ For dimensions of the retaining ring groove, P820</td><td></td></tr> <tr> <td>♀ P,Q=27,31,33,34,36~39, Not available for 41~44 and 46~48.</td><td></td></tr> </table> <table border="1"> <tr> <th>P, Q, D$\geq$8: Retaining Ring Type E</th><th>P, Q$\geq$9, D$\geq$10: Retaining Ring Type C</th></tr> <tr> <td>Driving Shafts</td><td>Retaining Ring</td></tr> <tr> <td>Material</td><td>Material</td></tr> <tr> <td>EN 1.1191 Equiv.</td><td>-</td></tr> <tr> <td>EN 1.4301 Equiv.</td><td>-</td></tr> <tr> <td>EN 1.1191 Equiv.</td><td>Surface 50HRC.</td></tr> </table>	Ordering Code	TA10-TB100	TA, TB, TD = 1mm Increment		4 $\leq$ TA(TB) $\leq$ LA(LB)-3		♀ Retaining rings are included.		♀ For dimensions of the retaining ring groove, P820		♀ P,Q=27,31,33,34,36~39, Not available for 41~44 and 46~48.		P, Q, D $\geq$ 8: Retaining Ring Type E	P, Q $\geq$ 9, D $\geq$ 10: Retaining Ring Type C	Driving Shafts	Retaining Ring	Material	Material	EN 1.1191 Equiv.	-	EN 1.4301 Equiv.	-	EN 1.1191 Equiv.	Surface 50HRC.																																																																							
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Wrench Flats	SA SH SB	Adds a wrench flat. Specify the position of a wrench flat. <table border="1"> <tr> <th>Ordering Code</th><th>SA5-SB10-SH</th><th>SA, SB = 1mm Increment</th><th>SA, SB ≥ 0</th><th>SA $\leq$LA-ℓ, SB $\leq$LB-ℓ</th></tr> <tr> <td>♀ Specification of the length for SH is not necessary. Adds wrench flats on the shoulder. (ℓ=h)</td><td></td><td></td><td></td><td></td></tr> <tr> <td>D</td><td>8</td><td>10</td><td>12</td><td>15</td><td>17</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td><td>45</td></tr> <tr> <td>W</td><td>7</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></tr> <tr> <td>ℓ</td><td>8</td><td></td><td></td><td>10</td><td></td><td></td><td></td><td>15</td><td></td><td>20</td><td></td></tr> <tr> <td>P, Q</td><td>5</td><td>6</td><td>7</td><td>8~10</td><td>11~13</td><td>14~15</td><td>16~18</td><td>19~21</td><td>22~25</td><td>26~28</td><td>29~31</td></tr> <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></tr> <tr> <td>ℓ</td><td>8</td><td></td><td></td><td></td><td>10</td><td></td><td></td><td></td><td></td><td>15</td><td></td></tr> </table>	Ordering Code	SA5-SB10-SH	SA, SB = 1mm Increment	SA, SB ≥ 0	SA $\leq$ LA- ℓ , SB $\leq$ LB- ℓ	♀ Specification of the length for SH is not necessary. Adds wrench flats on the shoulder. (ℓ =h)					D	8	10	12	15	17	20	25	30	35	40	45	W	7	8	10	13	14	17	22	27	30	36	38	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	W ₁	4	5	5.5	7	10	13	14	17	19	22	27	ℓ	8				10					15														
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2 Set Screw Flats (Angle Specified)	WA WB WD	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. <table border="1"> <tr> <th>Ordering Code</th><th>WA15-GA10-AA0</th></tr> <tr> <td>WA, WB, WD, GA, GB, GD = 1mm Increment</td><td></td></tr> <tr> <td>AA, AB, AC = 30° Increment</td><td></td></tr> <tr> <td>0°$\leq$AA, AB, AC$\leq$330°</td><td></td></tr> </table> • Ordering Code <table border="1"> <tr> <th>Set Screw Flat Position Specified</th><th>Set Screw Flat Width Specified</th><th>Angle Specified 30° Increment</th></tr> <tr> <td>WA</td><td>GA</td><td>AA</td></tr> <tr> <td>WB</td><td>GB</td><td>AB</td></tr> <tr> <td>WD</td><td>GD</td><td>AC</td></tr> </table> <table border="1"> <tr> <th>D, P, Q</th><th>5</th><th>6~17</th><th>18~40</th><th>41~48</th></tr> <tr> <td>H</td><td>0.5</td><td>1</td><td>2</td><td>3</td></tr> </table>	Ordering Code	WA15-GA10-AA0	WA, WB, WD, GA, GB, GD = 1mm Increment		AA, AB, AC = 30° Increment		0° $\leq$ AA, AB, AC $\leq$ 330°		Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified 30° Increment	WA	GA	AA	WB	GB	AB	WD	GD	AC	D, P, Q	5	6~17	18~40	41~48	H	0.5	1	2	3																																																																	
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