


Driving Shafts

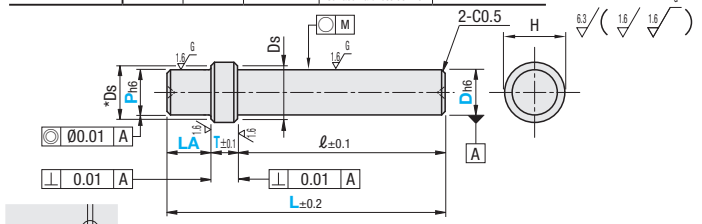
Shouldered

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



Type	D, P Tolerance	Concentricity	Material	Hardness	Surface Treatment
KZEN	h6	Ø0.01	S45C		-
KZEC					Black Oxide
KZEP			Electroless Nickel Plating		
KZES			-		
KZEF			SUS304		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	
20	0	0.005
25	-0.013	
30	0	
35	-0.016	
40	0	
45	-0.016	



Ⓢ $\ell = L - (LA + T)$ Ⓢ $LA + T \leq L/2$
 Ⓢ 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.
 *Ds: Tap dimension of Bearing Inner Race \mathbb{E} Reference: P.991

RoHS10

Part Number Type	0.5mm Increment		1mm Increment		0.5mm Increment		H	*Ds
	D	L	T	P	LA	D		
KZEN KZEC KZEP KZES KZEF	8	50.0-300.0	5	6-9	4.0-40.0	12	10	
	10		10	8-12	5.0-50.0	15	13	
	12		15	10-13		15	14	
	12A	100.0-400.0	20	12-18	5.0-60.0	16	16	
	15		10	12-18	5.0-75.0	20	18	
	17		15	14-18		19	19	
	17A		20	14-20	5.0-100.0	21	21	
	20		25	17-23		24	24	
	25	100.0-500.0	30	20-28	10.0-125.0	30	29	
	30		20	25-33	15.0-150.0	35	34	
35	30		28-38		40	39		
40	40		35-47	20.0-150.0	50	48		
45	50	40-45		50	49			

Ordering Example **Part Number** - L - T - P - LA

KZEN30 - 350 - T20 - P25 - LA50

• **About KZEF (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:

- Due to thermal conduction to the thread, the threads may be hardened by 2 ~ 3mm.
- Induction Hardened may shrink the keyway width (around -0.01 ~ -0.02). If the key becomes hard to fit, adjust it by gauging.

Type	KZEN					KZEC					KZEP				
	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
D	-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
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

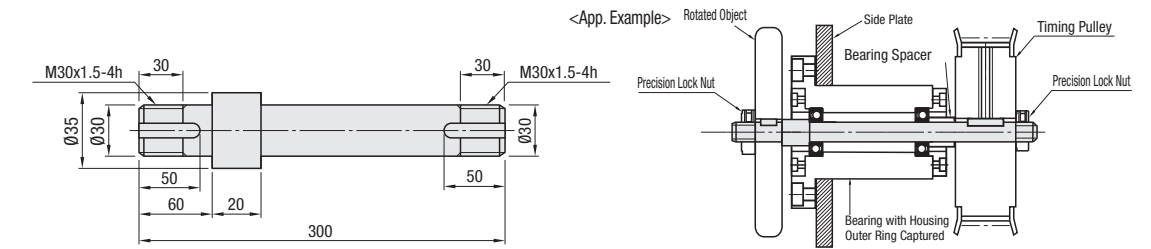
Type	KZES					KZEF				
	Min. L	L100.5	L200.5	L300.5	L400.5	Min. L	L100.5	L200.5	L300.5	L400.5
D	-100.0	-200.0	-300.0	-400.0	-500.0	-100.0	-200.0	-300.0	-400.0	-500.0
8	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-
12A	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-
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.

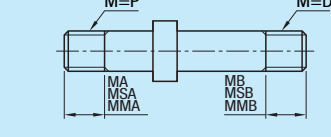
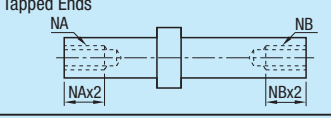
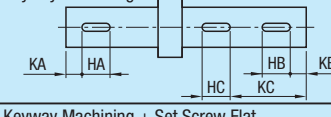
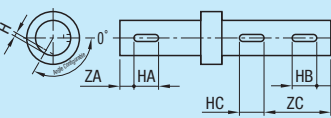
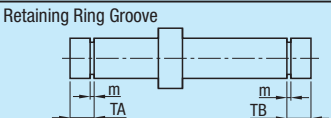
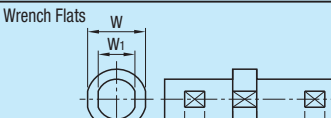
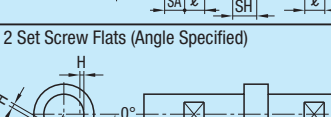
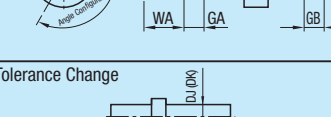
<Selection Example of Part Number>

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



Alterations **Part Number** - L - T - P - LA - (MA, NA, KA, TA, SA, WA--etc.)

KZEF30 - 300 - T20 - P30 - LA60 - MMA30 - MMB30 - KA0 - HA50 - KB0 - HB50

Alterations	Code		Spec.																																																																																	
	Left End	Right End																																																																																		
Threaded Ends 	MA MSA MMA	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.) [Ordering Code] MA15-MSB15 1mm Increment 5≤ Thread Length ≤Mx5, LA-2 <table border="1"> <thead> <tr> <th>Code</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>MB</td> <td>Coarse</td> <td>JIS 6h (Class 2)</td> <td>M6</td> <td>1.0</td> <td>M6</td> <td>0.75</td> </tr> <tr> <td>MSA</td> <td>MSB</td> <td>Fine (Standard)</td> <td>JIS 6h (Class 2)</td> <td>M10</td> <td>1.5</td> <td>M10</td> <td>0.75</td> </tr> <tr> <td>MMA</td> <td>MMB</td> <td>Fine (Precision)</td> <td>JIS 6h (Class 1)</td> <td>M12</td> <td>1.75</td> <td>M12</td> <td>1.0</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> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M24</td> <td>3</td> <td>M17</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M30</td> <td>3.5</td> <td>M20</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>M36</td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table> Ⓢ When D, P=M, thread length can be specified.	Code	Screw Accuracy	M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch	MA	MB	Coarse	JIS 6h (Class 2)	M6	1.0	M6	0.75	MSA	MSB	Fine (Standard)	JIS 6h (Class 2)	M10	1.5	M10	0.75	MMA	MMB	Fine (Precision)	JIS 6h (Class 1)	M12	1.75	M12	1.0					M20	2.5	M15	1.0					M24	3	M17	1.0					M30	3.5	M20	1.0					M36	4																			
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				M36	4																																																																															
Tapped Ends 	NA	NB	Adds taps on shaft ends. Select the thread diameter. [Ordering Code] NA5-NB5 Ⓢ NA, NB ≤ D(P)-4 NA (Coarse) NB (Coarse) Selection M3 M4 M5 M6 M8 M10 M12 M16 M20 M24																																																																																	
Keyway Machining 	KA	KB KC	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 P.820 Ⓢ When more than 2 keyways are added, the tolerances may shift by up to 0.2°.																																																																																	
Keyway Machining + Set Screw Flat 	ZA	ZB ZC	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 flat. [Ordering Code] ZA40-HA20-AA90 ZA, HA, ZB, HB, ZC, HC, ZD, HD = 1mm Increment AA, AB, AC, AD = 30° Increment 30° ≤ AA, AB, AC, AD ≤ 330° Ⓢ 3≤HA, HB, HC, HD≤100 Ⓢ Keyway Details P.820 Ⓢ Specify the keyway position more than 2mm away from the shouldered part. • Ordering Code <table border="1"> <thead> <tr> <th>Keyway Position Specified</th> <th>Keyway Width Specified</th> <th>Angle Specified 30° Increment</th> <th>D, P</th> <th>6-17</th> <th>18-40</th> <th>41-48</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> Ⓢ 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 ±0.2°.	Keyway Position Specified	Keyway Width Specified	Angle Specified 30° Increment	D, P	6-17	18-40	41-48	ZA	HA	AA	H	1	2	3	ZB	HB	AB					ZC	HC	AC																																																									
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Retaining Ring Groove 	TA	TB	Adds a retaining ring groove. Specify the position of a retaining ring groove. [Ordering Code] TA10-TB100 TA, TB = 1mm Increment Ⓢ 4≤TA≤LA-3 Ⓢ Retaining rings are included. Ⓢ For dimensions of the retaining ring groove, P.820 Ⓢ P=27, 31, 33, 34, 36-39. Not available for 41-44 and 46-48.																																																																																	
Wrench Flats 	SA SH	SB	Adds a wrench flat. Specify the position of a wrench flat. [Ordering Code] SA5-SB10-SH SA, SB = 1mm Increment SA, SB ≥ 0 SA ≤ LA-ℓ, SB ≤ L-LA-T-ℓ Ⓢ Specification of the length for SH is not necessary. Adds wrench flats on the shoulder. (ℓ=h) <table border="1"> <thead> <tr> <th>D</th> <th>8</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> </tr> </thead> <tbody> <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></td> <td></td> <td></td> <td></td> <td>15</td> <td></td> <td></td> <td>20</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>P</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> <th>46-48</th> </tr> </thead> <tbody> <tr> <td>W1</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> <td>41</td> </tr> <tr> <td>ℓ</td> <td></td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>10</td> <td></td> <td>15</td> <td></td> <td>20</td> <td></td> <td></td> </tr> </tbody> </table>	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							15			20	P	6	7	8-10	11-13	14-15	16-18	19-21	22-25	26-28	29-31	32-37	38-41	42-45	46-48	W1	5	5.5	7	10	13	14	17	19	22	27	30	36	38	41	ℓ		8						10		15		20		
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ℓ	8							15			20																																																																									
P	6	7	8-10	11-13	14-15	16-18	19-21	22-25	26-28	29-31	32-37	38-41	42-45	46-48																																																																						
W1	5	5.5	7	10	13	14	17	19	22	27	30	36	38	41																																																																						
ℓ		8						10		15		20																																																																								
2 Set Screw Flats (Angle Specified) 	WA	WB	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-AAO WA, WB, GA, GB = 1mm Increment AA, AB = 30° Increment 0° ≤ AA, AB ≤ 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 30° Increment</th> <th>D, P</th> <th>6-17</th> <th>18-40</th> <th>41-48</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> </tbody> </table>	Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified 30° Increment	D, P	6-17	18-40	41-48	WA	GA	AA	H	1	2	3	WB	GB	AB																																																																
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Tolerance Change 	DJ (j6)	DK (k6)	Changes the D dimension tolerance to j6 or k6. [Ordering Code] DJ or DK																																																																																	