

Driving Shafts

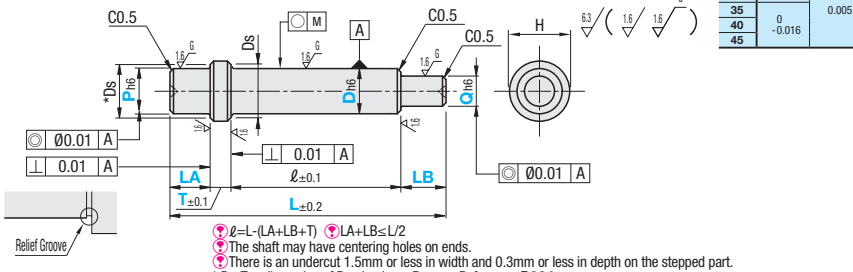
One End Stepped with Shoulder

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



RoHS10

Type	D, P, Q Tolerance	Concentricity	Material	Hardness	Surface Treatment
KZFN	h6	Ø0.01	EN 1.1191 Equiv.	-	-
KZFC			Black Oxide		
KZFP			Electroless Nickel Plating		
KZFS			-		
KZFF			EN 1.1191 Equiv.		Induction Hardened Surface Hardness 50HRC-



Ⓛ=L-(LA+LB+T) ⓁA+LB≤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 ≡ Reference: P991

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	13	13
	12		15	10~13				14	14
	12A		20	12~18	5.0~60.0	7~11	5.0~60.0	16	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	19
	17A		20	14~20	5.0~100.0		5.0~100.0	21	21
	20		25	17~23		14~19		24	24
	25	100.0~500.0	10	20~28	10.0~125.0	14~24	10.0~125.0	30	29
	30		20	25~33		20~29		35	34
35	30		28~38	15.0~150.0	20~34	15.0~150.0	40	39	
40	40		35~47	20.0~150.0	20~39	20.0~150.0	48	48	
45	50	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	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
8	~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
10				-	-				-	-				-	-
12				-	-				-	-				-	-
12A				-	-				-	-				-	-
15				-	-				-	-				-	-
17				-	-				-	-				-	-
17A				-	-				-	-				-	-
20				-	-				-	-				-	-
25				-	-				-	-				-	-
30				-	-				-	-				-	-
35	-			-	-	-			-	-	-			-	-
40	-			-	-	-			-	-	-			-	-
45	-			-	-	-			-	-	-			-	-

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

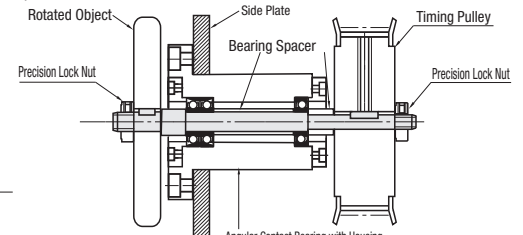
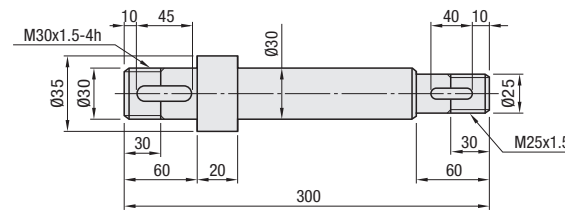
■ Selection of Driving Shaft

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.																																																																																				
		Left End	Right End																																																																																					
Threaded Ends		MA MSA MMA	MB MSB MMB MD MSD MMD	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(LB)-2 <table><tr><th colspan="2">Code</th><th colspan="4">Screw Accuracy</th></tr><tr><th>Left End</th><th>Right End</th><th colspan="2">Coarse</th><th colspan="2">Fine (Standard)</th></tr><tr><td>MA</td><td>MB MD</td><td colspan="2">JIS 6h (Class 2)</td><td colspan="2">JIS 6h (Class 2)</td></tr><tr><td>MSA</td><td>MSB MSD</td><td colspan="2">Fine (Standard)</td><td colspan="2">JIS 6h (Class 2)</td></tr><tr><td>MMA</td><td>MMB MMD</td><td colspan="2">Fine (Precision)</td><td colspan="2">JIS 6h (Class 1)</td></tr></table> ⓁWhen D, P, Q=M, thread length can be specified. ⓁSpecify Q diameter smaller than MD, MSD and MMD root diameter.	Code		Screw Accuracy				Left End	Right End	Coarse		Fine (Standard)		MA	MB MD	JIS 6h (Class 2)		JIS 6h (Class 2)		MSA	MSB MSD	Fine (Standard)		JIS 6h (Class 2)		MMA	MMB MMD	Fine (Precision)		JIS 6h (Class 1)																																																							
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Tapped Ends		NA	NB	Adds taps on shaft ends. Select the thread diameter. [Ordering Code] NA5-NB5 ⓁNA,NB≤P(Q)-4 <table><tr><th colspan="2"></th><th>M (Coarse)</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>			M (Coarse)	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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M36	4																																																																																							
Keyway Machining		KA	KB KC KD	Adds a keyway. Specify the position and the length of the keyway. [Ordering Code] KA10-HA30-KB100-HB50 KA, HA, KB, HB, KC, HC, KD, HD = 1mm Increment Ⓛ3≤HA,HB,HC,HD≤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.																																																																																				
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. [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 P820 ⓁSpecify the keyway position more than 2mm away from the shouldered or stepped part. • Ordering Code <table><tr><th>Keyway Position Specified</th><th>Keyway Width Specified</th><th>Angle Specified</th><th>D, P, Q</th><th>5</th><th>6~17</th><th>18~40</th><th>41~48</th></tr><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></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	D, P, Q	5	6~17	18~40	41~48	ZA	HA	AA	H	0.5	1	2	3	ZB	HB	AB						ZC	HC	AC						ZD	HD	AD																																																	
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Retaining Ring Groove		TA	TB TD	Adds a retaining ring groove. Specify the position of a retaining ring groove. [Ordering Code] TA10-TB100 TA, TB, TD = 1mm Increment 4≤TA(TB)≤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. <table><tr><th colspan="2"></th><th>P, Q, D≤8: Retaining Ring Type E</th><th>P, Q≥9, D≤10: Retaining Ring Type C</th></tr><tr><th colspan="2"></th><th>Driving Shafts</th><th>Retaining Ring</th></tr><tr><th>Material</th><th>Hardness</th><th>Surface Treatment</th><th>Material</th></tr><tr><td>EN 1.1191 Equiv.</td><td>-</td><td>-</td><td>Spring Steel</td></tr><tr><td></td><td></td><td>Black Oxide</td><td></td></tr><tr><td></td><td></td><td>Electroless Nickel Plating</td><td>EN 1.4301 (CSP) Equiv.</td></tr><tr><td>EN 1.4301 Equiv.</td><td>-</td><td>-</td><td>Spring Steel</td></tr><tr><td>EN 1.1191 Equiv.</td><td>Surface 50HRC-</td><td>-</td><td></td></tr></table>			P, Q, D≤8: Retaining Ring Type E	P, Q≥9, D≤10: Retaining Ring Type C			Driving Shafts	Retaining Ring	Material	Hardness	Surface Treatment	Material	EN 1.1191 Equiv.	-	-	Spring Steel			Black Oxide				Electroless Nickel Plating	EN 1.4301 (CSP) Equiv.	EN 1.4301 Equiv.	-	-	Spring Steel	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. [Ordering Code] SA5-SB10-SH SA, SB = 1mm Increment SA, SB ≥ 0 SA ≤LA-ℓ, SB≤LB-ℓ ⓁSpecification of the length for SH is not necessary. Adds wrench flats on the shoulder. (ℓ=h) <table><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><td>32~37</td><td>38~41</td><td>42~45</td><td>46~48</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><td>30</td><td>36</td><td>38</td><td>41</td></tr><tr><td>ℓ</td><td></td><td></td><td>8</td><td></td><td></td><td>10</td><td></td><td></td><td>15</td><td></td><td></td><td>20</td><td></td><td></td><td></td></tr></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			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	46~48	W1	4	5	5.5	7	10	13	14	17	19	22	27	30	36	38	41	ℓ			8			10			15			20			
D	8	10	12	15	17	20	25	30	35	40	45																																																																													
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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. [Ordering Code] WA15-GA10-AA0 WA, WB, WD, GA, GB, GD = 1mm Increment AA, AB, AC = 30° Increment 0°≤AA, AB, AC ≤330° • Ordering Code <table><tr><th>Set Screw Flat Position Specified</th><th>Set Screw Flat Width Specified</th><th>Angle Specified</th><th>D, P, Q</th><th>5</th><th>6~17</th><th>18~40</th><th>41~48</th></tr><tr><td>WA</td><td>GA</td><td>AA</td><td>H</td><td>0.5</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><td></td></tr><tr><td>WD</td><td>GD</td><td>AC</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified	D, P, Q	5	6~17	18~40	41~48	WA	GA	AA	H	0.5	1	2	3	WB	GB	AB						WD	GD	AC																																																									
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Tolerance Change		DJ (js6) DK (k6)		Changes the D dimension tolerance to js6 or k6. [Ordering Code] DJ or DK																																																																																				