


Driving Shafts

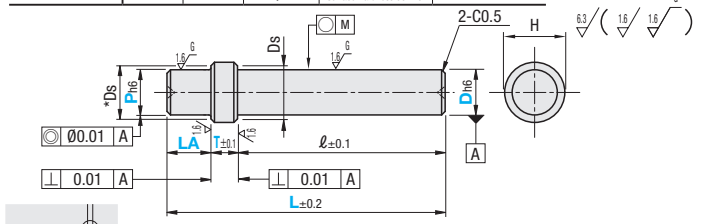
Shouldered

■ **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 | EN 1.1191 Equiv. | - | Black Oxide |
| KZEC | | | EN 1.4301 Equiv. | | Electroless Nickel Plating |
| KZEP | | | EN 1.1191 Equiv. | | Induction Hardened Surface Hardness 50HRC- |
| KZES | | | EN 1.1191 Equiv. | | Induction Hardened Surface Hardness 50HRC- |
| KZEF | | | 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 | |
| 17, 17A | -0.011 | |
| 20 | 0 | 0.005 |
| 25 | -0.013 | |
| 30 | 0 | |
| 35 | 0 | |
| 40 | -0.016 | |
| 45 | 0 | |



Ⓢ $l=L-(LA+T)$ Ⓢ $LA+T \leq L/2$
 Ⓢ 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 \Rightarrow Reference: P.991

RoHS10

| Part Number Type | 0.5mm Increment | | 1mm Increment | | 0.5mm Increment | | H | *Ds |
|------------------|-----------------|-------------|---------------|------------|-----------------|----|----|-----|
| | D | L | T | P | LA | D | | |
| KZEN | 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 | | | | 14 |
| | 12A | 100.0-400.0 | 20 | 12-18 | 5.0-60.0 | 16 | | |
| | 15 | | 10 | 12-18 | 5.0-75.0 | 20 | 18 | |
| | 17 | | 15 | 14-18 | | | | 19 |
| | 17A | | 20 | 14-20 | 5.0-100.0 | 25 | 21 | |
| | 20 | | 25 | 17-23 | | | | 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 | | | | 39 | |
| 40 | 200.0-500.0 | 40 | 35-47 | 20.0-150.0 | 50 | 48 | | |
| 45 | | 50 | 35-48 | | | | 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 | | | | | | | | | | | | | | | |

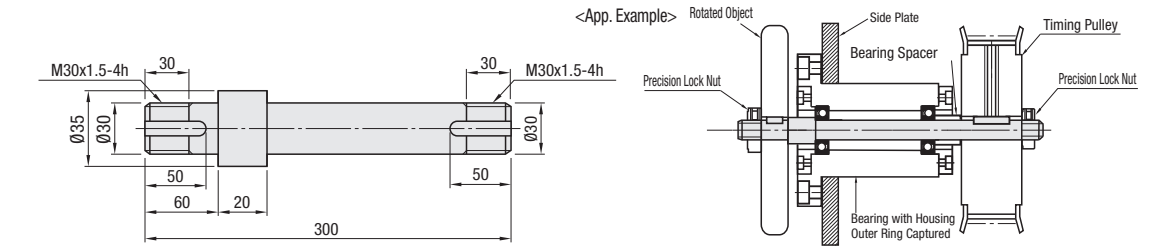
| Type | KZES | | | | | KZEF | | | | |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Min. L | L100.5 | L200.5 | L300.5 | L400.5 | Min. L | L100.5 | L200.5 | L300.5 | L400.5 |
| D | -100.0 | -200.0 | -300.0 | -400.0 | -500.0 | -100.0 | -200.0 | -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.

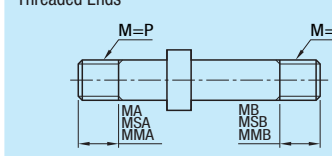
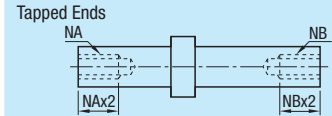
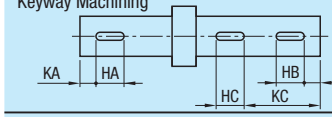
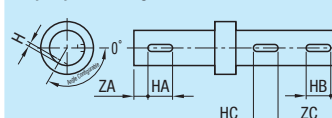
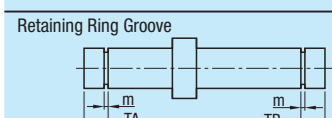
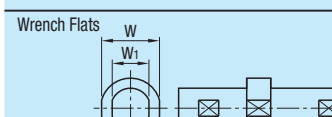
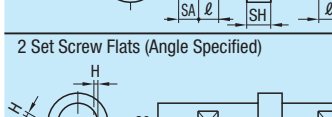
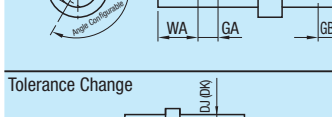
<Selection Example of Part Number>

• 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>M14</td><td>2.0</td><td>M14</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></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 | | | | | M14 | 2.0 | M14 | 1.5 | | | | | M20 | 2.5 | M15 | 1.0 | | | | | M24 | 3 | M17 | 1.0 | | | | | M30 | 3.5 | M20 | 1.0 | | | | | M36 | 4 | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M14 | 2.0 | M14 | 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M20 | 2.5 | M15 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M24 | 3 | M17 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M30 | 3.5 | M20 | 1.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | M36 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tapped Ends  | NA | NB | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Selection | NA (Coarse) | NB (Coarse) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 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, HC, KC = 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tolerance Change  | DJ (j6) | DK (k6) | Changes the D dimension tolerance to j6 or k6. [Ordering Code] DJ or DK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |