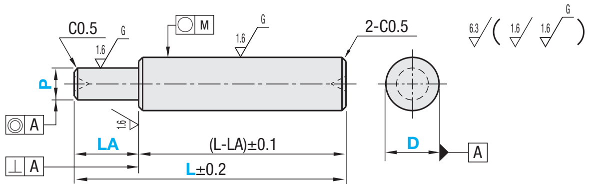
Driving Shafts
One End Stepped

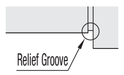
Features: Rotary Shafts suitable for driving motion. Accuracies and shapes needed for rotary driving applications are selectable.

Type	D, P Tolerance	Concentricity	Perpendicularity	M Material	H Hardness	S Surface Treatment
KZBE	h7	Ø0.05	⊥0.05	EN 1.1191 Equiv.	-	Black Oxide
KZBN	h6	Ø0.01	⊥0.01	EN 1.1191 Equiv.	-	-
KZBC						Black Oxide
KZBP						Electroless Nickel Plating
KZBF				EN 1.1191 Equiv.	Induction Hardened Surface Hardness 50HRC~	-

D	Tolerance h7	Tolerance h6
10	0 / -0.015	0 / -0.009
12	0 / -0.018	0 / -0.011
15		
17		
20	0 / -0.021	0 / -0.013
25		
30		
35	-	0 / -0.016
40		
45		
50		

D	Circularity M KZBE	Circularity M Others
10	0.004	0.003
12		
15	0.005	
17		
20		
25	0.006	0.005
30		
35	-	
40		
45		
50		





- LA≤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.
- Step P of KZBE has no grinding undercut. Step R=0.2 or Less

Part Number Type	D	0.5mm Increment L	1mm Increment P	0.5mm Increment LA
KZBE (D10~30) KZBN KZBC KZBP KZBF	10	50.0~300.0	7~9	10.0~50.0
	12		7~11	
	15	100.0~400.0	10~14	10.0~70.0
	17		10~16	
	20		14~19	10.0~100.0
	25	100.0~500.0	14~24	
	30		20~29	20.0~150.0
	*35		20~34	
	*40	200.0~500.0	20~39	
	*45		20~44	
	*50		25~49	20.0~200.0

* marked sizes are not available for KZBE.

Ordering Example

Part Number	-	L	-	P	-	LA
KZBN30	-	320	-	P25	-	LA40

· About KZBF (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.

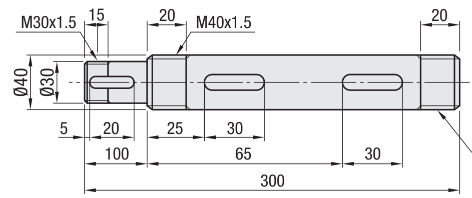
Type	KZBE					KZBN					KZBC				
D	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0	Min. L ~100.0	L100.5 ~200.0	L200.5 ~300.0	L300.5 ~400.0	L400.5 ~500.0
10				-	-				-	-				-	-
12				-	-				-	-				-	-
15					-					-					-
17					-					-					-
20					-					-					-
25															
30															
35	-	-	-	-	-										
40	-	-	-	-	-	-					-				
45	-	-	-	-	-	-					-				
50	-	-	-	-	-	-					-				

Type	KZBP					KZBF				
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
10				-	-				-	-
12				-	-				-	-
15					-					-
17					-					-
20					-					-
25										
30										
35										
40	-					-				
45	-					-				
50	-					-				

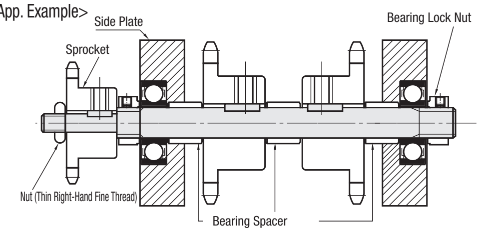
Selection of Driving Shaft

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 Number>
· Alteration Selection: Three Keyways, Three Threaded Ends (Fine Thread)

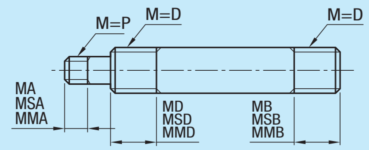
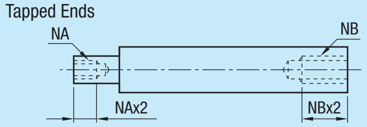
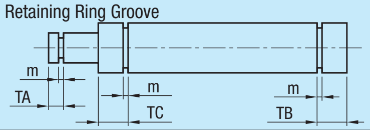
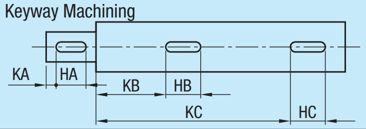
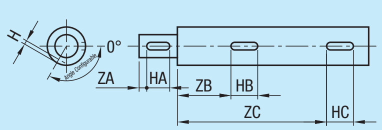
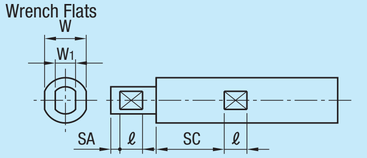
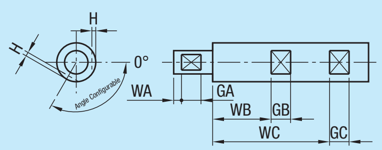


<App. Example>



Alterations

Part Number	-	L	-	P	-	LA	-	(MA, NA, KA, TA, SA, WA···etc.)
KZBN40	-	300	-	P30	-	LA100	-	MSA15 - MSD20 - MSB20 - KA5 - HA20 - KB25 - HB30 - KC65 - HC30

Alterations	Code Left End	Code Right End	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.) Ordering Code MA15-MSB15 1mm Increment 5≤ Thread Length ≤Mx5, LA-2 When D, P=M, thread length can be specified. Fine (Precision Grade) is not available for KZBE.
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
Retaining Ring Groove 	TA TC	TB	Adds a retaining ring groove. Specify the position of a retaining ring groove. Ordering Code TA10-TB10-TC10 TA, TB, TC = 1mm Increment 4≤TA≤LA-3 Retaining rings are included. For dimensions of the retaining ring groove, **P.820** P=27,31,33,34,36~39,41~44, Not available for 46~49.
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°. Specify the keyway position more than 2mm away from the stepped part.
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 flats. Ordering Code ZA40-HA20-AA90 ZA, HA, ZB, HB, ZC, HC= 1mm Increment AA, AB, AC = 30° Increment 30°≤ AA, AB, AC ≤330° 3≤HA,HB,HC≤100 Keyway Details **P.820** Specify the keyway position more than 2mm away from the stepped part. 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°.
Wrench Flats 	SA SC		Adds a wrench flat. Specify the position of a wrench flat. Ordering Code SA5 SA, SC = 1mm Increment 0≤ SA, SC ≤LA-ℓ, L-ℓ
2 Set Screw Flats (Angle Specified) 	WA WB WC		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, WC, GA, GB, GC= 1mm Increment AA, AB, AC = 30° Increment 0°≤ AA, AB, AC ≤330°

Threaded Ends — thread codes:

Code Left End		Code Right End	Screw Accuracy	
MA	MD	MB	Coarse	JIS 6h (Class 2)
MSA	MSD	MSB	Fine (Standard)	JIS 6h (Class 2)
MMA	MMD	MMB	Fine (Precision)	JIS 4h (Class 1)

M (Coarse)	Pitch	M (Fine)	Pitch	M (Fine)	Pitch
M8	1.25	M8	0.75	M25	1.5
M10	1.5	M10	0.75	M30	1.5
M12	1.75	M12	1.0	M35	1.5
M20	2.5	M15	1.0	M40	1.5
M24	3	M17	1.0	M45	1.5
M30	3.5	M20	1.0	M50	1.5
M36	4				

Retaining Ring Groove — P = 7, 8: Retaining Ring Type E P≥9, D≥10: Retaining Ring Type C

Driving Shafts M Material	Driving Shafts H Hardness	Driving Shafts S Surface Treatment	Retaining Ring M Material
EN 1.1191 Equiv.	-	-	Spring Steel
		Black Oxide	
		Electroless Nickel Plating	EN 1.4301 (CSP) Equiv.
	Surface 50HRC~	-	Spring Steel

Keyway Machining + Set Screw Flat — · Ordering Code

Keyway Position Specified	Keyway Width Specified	Angle Specified 30° Increment
ZA	HA	AA
ZB	HB	AB
ZC	HC	AC

D, P	7~17	18~40	41~50
H	1	2	3

Wrench Flats:

D	10	12	15	17	20	25	30	35	40	45	50
W	8	10	13	14	17	22	27	30	36	38	41
ℓ	8	10					15		20		

P	7	8~10	11~13	14~15	16~18	19~21	22~25	26~28	29~31	32~37	38~41	42~45	46~49
W1	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) — · Ordering Code

Set Screw Flat Position Specified	Set Screw Flat Width Specified	Angle Specified 30° Increment
WA	GA	AA
WB	GB	AB
WC	GC	AC

D, P	7~17	18~40	41~50
H	1	2	3