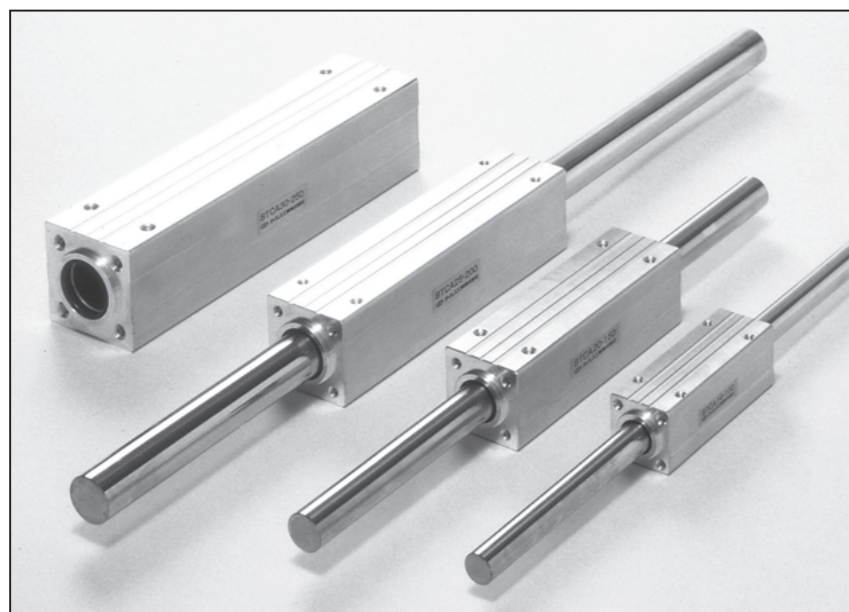
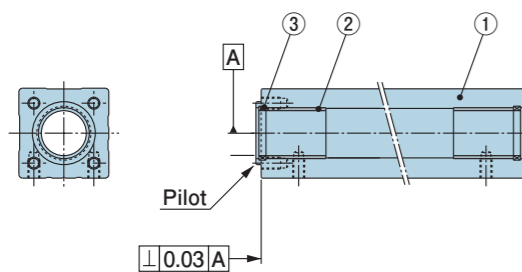


# Oiles Slide Shifter BA Type (Aluminum housing with pilot)

Shaft Hollow shaft  
**BTCA BGS/BGSP**



## Component Parts · Accuracy



### Component Parts

No.	Name	Material
①	Housing	Aluminum
②	Guide bushings	Oiles metal
③	Dust seal	NBR

※Unusable under the condition of water, splashing water and high humidity.

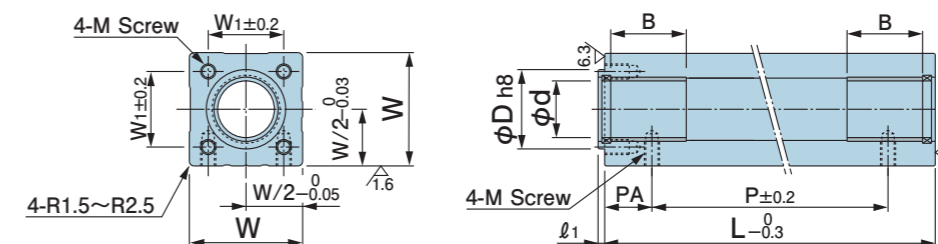
# BTCA Shaft Hollow shaft BGS/BGSP Oiles Slide Shifter BA Type RoHS2 ELV

## Product Identification for Ordering

Specify by **BTCA I.D. - Length**  
Part No.

(e.g.) I.D. is 16mm and length is 75mm. ▶ **BTCA16-75**

## Dimension Table

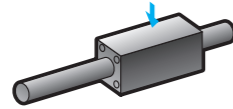


※Exclusive BTCA guide shafts (BGS, BGSP) are available. Refer to page 319 for the detail.

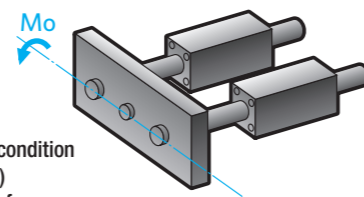
Part No.	φd	L	φD	W	B	ℓ <sub>1</sub>	W <sub>1</sub>	Mounting hole M	P	PA	Weight kg	Tightening torque N·m (kgf·m)	Standard clearance for guide shaft (mm)
BTCA6-50	6	50	12	20	6	2.5	14	M3×5	25	12.5	0.03	0.98 {0.10}	0.035~0.070
BTCA6-75	6	75	12	20	8	2.5	14	M3×5	50	12.5	0.07	0.98 {0.10}	0.035~0.070
BTCA8-50	8	50	14	22	8	2.5	15	M3×5	25	12.5	0.04	0.98 {0.10}	0.018~0.105
BTCA8-75	8	75	14	22	10	2.5	15	M3×5	50	12.5	0.09	0.98 {0.10}	0.018~0.105
BTCA10-50	10	50	16	25	10	2.5	18	M4×6	20	15	0.07	2.4 {0.24}	0.016~0.106
BTCA10-75	10	75	16	25	12	2.5	18	M4×6	45	15	0.11	2.4 {0.24}	0.016~0.106
BTCA10-100	10	100	16	25	12	2.5	18	M4×6	70	15	0.14	2.4 {0.24}	0.016~0.106
BTCA12-50	12	50	20	30	12	3.0	20	M4×6	20	15	0.11	2.4 {0.24}	0.024~0.119
BTCA12-75	12	75	20	30	15	3.0	20	M4×6	45	15	0.16	2.4 {0.24}	0.024~0.119
BTCA12-100	12	100	20	30	15	3.0	20	M4×6	70	15	0.21	2.4 {0.24}	0.024~0.119
BTCA16-50	16	50	25	35	15	3.0	25	M5×8	25	15	0.14	4.9 {0.50}	0.034~0.127
BTCA16-75	16	75	25	35	15	3.0	25	M5×8	40	17.5	0.20	4.9 {0.50}	0.034~0.127
BTCA16-100	16	100	25	35	20	3.0	25	M5×8	65	17.5	0.27	4.9 {0.50}	0.034~0.127
BTCA16-125	16	125	25	35	20	3.0	25	M5×8	90	17.5	0.34	4.9 {0.50}	0.034~0.127
BTCA20-75	20	75	30	45	20	3.0	30	M6×11	40	17.5	0.34	7.8 {0.80}	0.039~0.150
BTCA20-100	20	100	30	45	20	3.0	30	M6×11	60	20	0.45	7.8 {0.80}	0.039~0.150
BTCA20-125	20	125	30	45	20	3.0	30	M6×11	85	20	0.56	7.8 {0.80}	0.039~0.150
BTCA20-150	20	150	30	45	30	3.0	30	M6×11	110	20	0.68	7.8 {0.80}	0.039~0.150
BTCA20-200	20	200	30	45	30	3.0	30	M6×11	160	20	0.91	7.8 {0.80}	0.039~0.150
BTCA20-250	20	250	30	45	30	3.0	30	M6×11	210	20	1.13	7.8 {0.80}	0.039~0.150
BTCA25-75	25	75	35	50	20	3.5	35	M6×11	40	17.5	0.40	7.8 {0.80}	0.042~0.153
BTCA25-100	25	100	35	50	20	3.5	35	M6×11	60	20	0.53	7.8 {0.80}	0.042~0.153
BTCA25-150	25	150	35	50	30	3.5	35	M6×11	110	20	0.80	7.8 {0.80}	0.042~0.153
BTCA25-200	25	200	35	50	35	3.5	35	M6×11	160	20	1.07	7.8 {0.80}	0.042~0.153
BTCA25-250	25	250	35	50	35	3.5	35	M6×11	210	20	1.33	7.8 {0.80}	0.042~0.153
BTCA30-75	30	75	42	60	20	3.5	40	M8×13	35	20	0.58	20 {2.00}	0.045~0.160
BTCA30-100	30	100	42	60	20	3.5	40	M8×13	50	25	0.77	20 {2.00}	0.045~0.160
BTCA30-150	30	150	42	60	30	3.5	40	M8×13	100	25	1.16	20 {2.00}	0.045~0.160
BTCA30-200	30	200	42	60	40	3.5	40	M8×13	150	25	1.55	20 {2.00}	0.045~0.160
BTCA30-250	30	250	42	60	40	3.5	40	M8×13	200	25	1.93	20 {2.00}	0.045~0.160
BTCA30-300	30	300	42	60	40	3.5	40	M8×13	250	25	2.32	20 {2.00}	0.045~0.160
BTCA40-100	40	100	52	70	30	3.5	50	M10×16	40	30	0.97	37 {3.80}	0.050~0.165
BTCA40-150	40	150	52	70	30	3.5	50	M10×16	90	30	1.44	37 {3.80}	0.050~0.165

### Service Range

#### Static and Dynamic Allowable Load for Shift Tables N {kgf}



#### Allowable Moment for two Shift Tables on two shafts N.m {kgf.m}



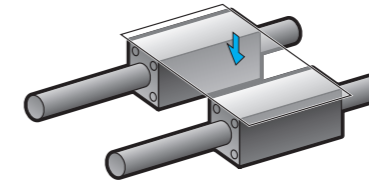
※ Allowable static load: Allowable load when a load is applied at a stationary condition or at quite low speed near stopping (not more than 0.0017 m/s [0.1 m/min.])  
 ※ Allowable dynamic load: Allowable load in the condition with sliding speed of 1.0m/s [60 m/min] or less.

Part No.	Allowable load N {kgf}		Cases	Allowable moment N·m {kgf·m}	Part No.	Allowable load N {kgf}		Cases	Allowable moment N·m {kgf·m}
	Type	Upright				Type	Upright		
BTCA6-50	Static	212 { 22}	2 axes 2 sets	3.9 { 0.4}	BTCA20-150	Static	3,530 {360}	2 axes 2 sets	177.0 {18.0}
	Dynamic	70 { 7}				Dynamic	1,180 {120}		
BTCA6-75	Static	282 { 29}	2 axes 2 sets	6.9 { 0.7}	BTCA20-200	Static	3,530 {360}	2 axes 2 sets	235.0 {24.0}
	Dynamic	94 { 10}				Dynamic	1,180 {120}		
BTCA8-50	Static	382 { 39}	2 axes 2 sets	5.9 { 0.6}	BTCA20-250	Static	3,530 {360}	2 axes 2 sets	294.0 {30.0}
	Dynamic	127 { 13}				Dynamic	1,180 {120}		
BTCA8-75	Static	471 { 48}	2 axes 2 sets	11.8 { 1.2}	BTCA25-75	Static	2,940 {300}	2 axes 2 sets	73.6 { 7.5}
	Dynamic	157 { 16}				Dynamic	981 {100}		
BTCA10-50	Static	588 { 60}	2 axes 2 sets	9.8 { 1.0}	BTCA25-100	Static	2,940 {300}	2 axes 2 sets	98.1 {10.0}
	Dynamic	196 { 20}				Dynamic	981 {100}		
BTCA10-75	Static	706 { 72}	2 axes 2 sets	17.7 { 1.8}	BTCA25-150	Static	4,410 {450}	2 axes 2 sets	221.0 {22.5}
	Dynamic	236 { 24}				Dynamic	1,470 {150}		
BTCA10-100	Static	706 { 72}	2 axes 2 sets	23.5 { 2.4}	BTCA25-200	Static	5,150 {525}	2 axes 2 sets	343.0 {35.0}
	Dynamic	236 { 24}				Dynamic	1,720 {175}		
BTCA12-50	Static	846 { 86}	2 axes 2 sets	13.7 { 1.4}	BTCA25-250	Static	5,150 {525}	2 axes 2 sets	430.0 {43.8}
	Dynamic	282 { 29}				Dynamic	1,720 {175}		
BTCA12-75	Static	1,060 {108}	2 axes 2 sets	26.5 { 2.7}	BTCA30-75	Static	3,530 {360}	2 axes 2 sets	88.3 { 9.0}
	Dynamic	353 { 36}				Dynamic	1,180 {120}		
BTCA12-100	Static	1,060 {108}	2 axes 2 sets	35.3 { 3.6}	BTCA30-100	Static	3,530 {360}	2 axes 2 sets	118.0 {12.0}
	Dynamic	353 { 36}				Dynamic	1,180 {120}		
BTCA16-50	Static	1,410 {144}	2 axes 2 sets	23.5 { 2.4}	BTCA30-150	Static	5,300 {540}	2 axes 2 sets	265.0 {27.0}
	Dynamic	471 { 48}				Dynamic	1,770 {180}		
BTCA16-75	Static	1,410 {144}	2 axes 2 sets	35.3 { 3.6}	BTCA30-200	Static	7,060 {720}	2 axes 2 sets	471.0 {48.0}
	Dynamic	471 { 48}				Dynamic	2,350 {240}		
BTCA16-100	Static	1,880 {192}	2 axes 2 sets	62.8 { 6.4}	BTCA30-250	Static	7,060 {720}	2 axes 2 sets	588.0 {60.0}
	Dynamic	628 { 64}				Dynamic	2,350 {240}		
BTCA16-125	Static	1,880 {192}	2 axes 2 sets	78.5 { 8.0}	BTCA30-300	Static	7,060 {720}	2 axes 2 sets	706.0 {72.0}
	Dynamic	628 { 64}				Dynamic	2,350 {240}		
BTCA20-75	Static	2,350 {240}	2 axes 2 sets	58.8 { 6.0}	BTCA40-100	Static	7,060 {720}	2 axes 2 sets	193.0 {19.7}
	Dynamic	785 { 80}				Dynamic	2,350 {240}		
BTCA20-100	Static	2,350 {240}	2 axes 2 sets	78.5 { 8.0}	BTCA40-150	Static	7,060 {720}	2 axes 2 sets	344.0 {35.1}
	Dynamic	785 { 80}				Dynamic	2,350 {240}		
BTCA20-125	Static	2,350 {240}	2 axes 2 sets	98.1 {10.0}					
	Dynamic	785 { 80}							

### Service Range

#### Allowable load in a correlation with Guide Shaft Length N {kgf}

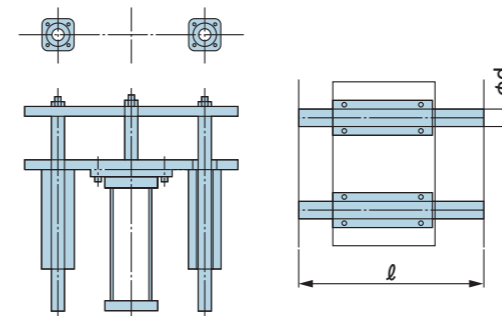
※ Allowable load in condition that the max. amount of deflection is 0.1mm and two tables on two shafts.



(Unit: N{kgf})

Shaft length (mm)	100	200	300	400	500	600	700	800	900	1000
BTCA 6-	140 {14.3}	62.3 { 6.4}	18 { 1.8}	7.3 { 0.7}	3.4 { 0.4}					
BTCA 8-	250 {25.5}	198 { 20.2}	58.1 { 5.9}	24.1 { 2.5}	11.9 { 1.2}					
BTCA10-	392 {40}	392 { 40}	142 { 14.5}	59.3 { 6.1}	29.7 { 3.0}					
BTCA12-	564 {57.6}	564 { 57.6}	296 { 30.2}	124 { 12.6}	62.3 { 6.4}					
BTCA16-	942 {96.1}	942 { 96.1}	940 { 95.9}	395 { 40.3}	201 { 20.5}	115 { 11.7}	71.4 { 7.3}	47 { 4.8}	32.2 { 3.3}	22.7 { 2.3}
BTCA20-		1,570 {160}	1,570 {160}	964 { 98.4}	490 { 50}	281 { 28.7}	173 { 17.8}	115 { 11.7}	78.6 { 8.0}	55.5 { 5.7}
BTCA25-		1,962 {200}	1,962 {200}	1,962 {200}	1,206 {123}	694 { 70.9}	434 { 44.3}	288 { 29.4}	200 { 20.4}	114 { 14.7}
BTCA30-		2,360 {241}	2,360 {241}	2,360 {241}	2,360 {241}	1,445 {147}	906 { 92.4}	603 { 61.5}	420 { 42.9}	303 { 30.9}
BTCA40-		4,700 {480}	4,700 {480}	4,700 {480}	4,700 {480}	4,583 {468}	2,879 {294}	1,922 {196}	1,345 {137}	975 { 99}

#### Calculating formula for the shaft length other than the length shown above.



$$W = \frac{0.1 \times 192 \times E \times I}{l^3} \times 2 - (\text{BTCA weight} \times 2)$$

Solid shaft  $I = \frac{\pi D^4}{64}$ , Hollow shaft  $I = \frac{\pi (D^4 - d^4)}{64}$   
 D : Shaft O.D., d : Shaft I.D. (Incase of hollow shaft)

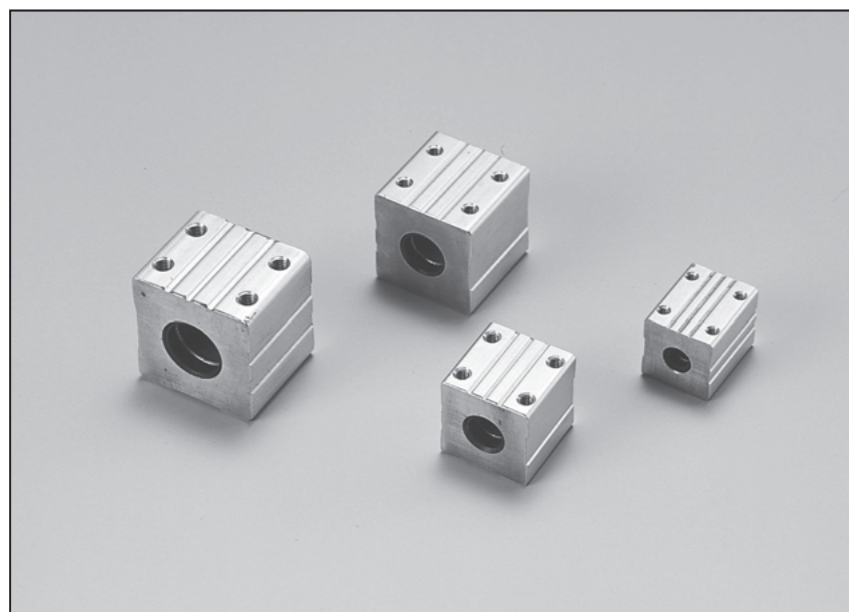
#### Allowable Velocity

Lubrication conditions	Allowable max velocity
Dry	0.65m/s [39m/min]

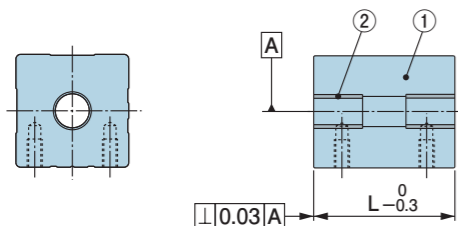
#### Seal Friction Fs

Part No.	BTCA6	BTCA8	BTCA10	BTCA12	BTCA16
Fs	1.2N {0.12kgf}	1.6N {0.16kgf}	2.0N {0.20kgf}	2.5N {0.25kgf}	2.9N {0.30kgf}
Part No.	BTCA20	BTCA25	BTCA30	BTCA40	
Fs	3.9N {0.40kgf}	4.9N {0.50kgf}	5.9N {0.60kgf}	6.9N {0.70kgf}	

# Oiles Slide Shifter BA Type (Aluminum housing) **BTSA** Shaft BGS/BGSP Hollow shaft



## Component Parts · Accuracy



### Component Parts

No.	Name	Material
①	Housing	Aluminum
②	Guide Bushings	Oiles metal

※Unusable under the condition of water, splashing water and high humidity.

## Service Range

### Allowable Velocity

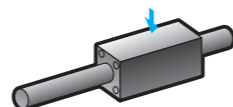
Lubrication conditions	Allowable max velocity
Dry	0.65m/s {39m/min}

### Allowable Load

#### ■ Static and Dynamic Allowable Load for shift Tables N {kgf}

※Allowable static load: Allowable load when a load is applied at a stationary condition or at quite low speed near stopping (not more than 0.0017 m/s [0.1 m/min].)

※Allowable dynamic load: Allowable load in the condition with sliding speed of 1.0m/s {60m/min} or less.



Part No.	Allowable static load	Allowable dynamic load	Part No.	Allowable static load	Allowable dynamic load
<b>BTSA6-25</b>	212N {21kgf}	70N { 7kgf}	<b>BTSA16-30</b>	941N { 96kgf}	314N { 32kgf}
<b>BTSA6-50</b>	212N {21kgf}	70N { 7kgf}	<b>BTSA16-50</b>	1,410N {144kgf}	471N { 48kgf}
<b>BTSA8-25</b>	282N {29kgf}	94N {10kgf}	<b>BTSA20-50</b>	1,410N {144kgf}	471N { 48kgf}
<b>BTSA8-50</b>	376N {38kgf}	126N {13kgf}	<b>BTSA20-75</b>	2,350N {240kgf}	785N { 80kgf}
<b>BTSA10-25</b>	470N {48kgf}	156N {16kgf}	<b>BTSA25-50</b>	1,764N {180kgf}	588N { 60kgf}
<b>BTSA10-50</b>	588N {60kgf}	196N {20kgf}	<b>BTSA25-75</b>	2,940N {300kgf}	981N {100kgf}
<b>BTSA12-30</b>	706N {72kgf}	235N {24kgf}	<b>BTSA30-50</b>	2,116N {216kgf}	705N { 72kgf}
<b>BTSA12-50</b>	848N {87kgf}	282N {29kgf}	<b>BTSA30-75</b>	3,530N {360kgf}	1,180N {120kgf}

※When using shaft lengths other than those listed above.

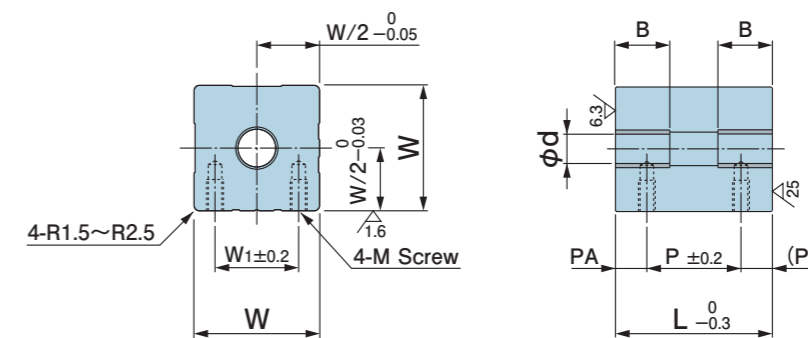
# BTSA Shaft BGS/BGSP Hollow shaft Oiles Slide Shifter BA Type RoHS2 ELV

## Product Identification for Ordering

Specify by **BTSA I.D. - Length**  
Part No.

(e.g.) I.D. is 16mm and length is 30mm. ▶ **BTSA16-30**

## Dimension Table



※Exclusive BTCA guide shafts (BGS, BGSP) are available. Refer to page 319 for the detail.

Part No.	φd	L	W	B	W <sub>1</sub>	P	Screw M	PA	Weight kg	Tightening torque N·m {kgf·m}	Standard clearance for guide shaft (mm)
<b>BTSA6-25</b>	6	25	20	6	14	15	M3×5	5	0.02	0.98 {0.10}	0.035~0.070
<b>BTSA6-50</b>	6	50	20	6	14	25	M3×5	12.5	0.04	0.98 {0.10}	0.035~0.070
<b>BTSA8-25</b>	8	25	22	6	15	15	M3×5	5	0.03	0.98 {0.10}	0.018~0.105
<b>BTSA8-50</b>	8	50	22	8	15	25	M3×5	12.5	0.06	0.98 {0.10}	0.018~0.105
<b>BTSA10-25</b>	10	25	25	8	18	15	M4×6	5	0.04	2.4 {0.24}	0.016~0.106
<b>BTSA10-50</b>	10	50	25	10	18	25	M4×6	12.5	0.08	2.4 {0.24}	0.016~0.106
<b>BTSA12-30</b>	12	30	30	10	20	15	M4×6	7.5	0.08	2.4 {0.24}	0.024~0.119
<b>BTSA12-50</b>	12	50	30	12	20	25	M4×6	12.5	0.13	2.4 {0.24}	0.024~0.119
<b>BTSA16-30</b>	16	30	35	10	25	15	M5×8	7.5	0.10	4.9 {0.50}	0.034~0.127
<b>BTSA16-50</b>	16	50	35	15	25	25	M5×8	12.5	0.17	4.9 {0.50}	0.034~0.127
<b>BTSA20-50</b>	20	50	45	12	30	25	M6×11	12.5	0.23	7.8 {0.80}	0.039~0.150
<b>BTSA20-75</b>	20	75	45	20	30	45	M6×11	15	0.35	7.8 {0.80}	0.039~0.150
<b>BTSA25-50</b>	25	50	50	12	35	25	M6×11	12.5	0.27	7.8 {0.80}	0.042~0.153
<b>BTSA25-75</b>	25	75	50	20	35	45	M6×11	15	0.41	7.8 {0.80}	0.042~0.153
<b>BTSA30-50</b>	30	50	60	12	40	25	M8×13	12.5	0.39	20 {2.00}	0.045~0.160
<b>BTSA30-75</b>	30	75	60	20	40	45	M8×13	15	0.59	20 {2.00}	0.045~0.160

# Oiles Guide Shafts **BGS/BGSP**



- Guide shafts applicable to the Oiles Slide Shifters BTCA, BTSA, BTC, and BTF and Guide Units BK and BT.
- Guide shafts cut to various standard lengths are available.
- Guide shafts of 30 mm or larger diameters are made of hollow shafts effective for weight reduction.
- We also offer various types of end processing of the shafts.



## Variation

Part No.	Type	Shaft diameter	Material	Maximum length	Applications
<b>BGS</b>	Solid	$\phi 8 \sim \phi 12$	S45C+hard chrome-plated (Plating thickness $15\mu$ or more)	1,000mm	General
		$\phi 16 \sim \phi 50$		2,900mm	
<b>BGSP</b>	Hollow shaft	$\phi 30 \sim \phi 50$	STKM13C+hard chrome-plated (Plating thickness $15\mu$ or more)		

# BGS/BGSP Oiles Guide Shafts



## Product Identification for Ordering

Specify by **BGS O.D. - Length**  
Part No.

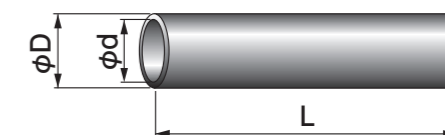
(e.g.) O.D. is 30mm and length is 1000mm. ▶ **BGS30-1000**

## Dimension Table

### ■ BGS



### ■ BGSP



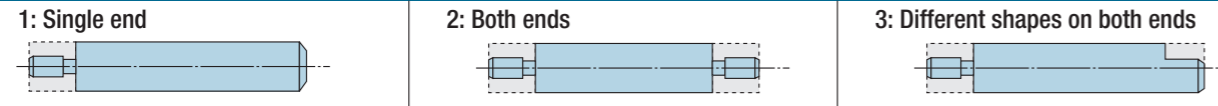
Part No.	O.D.		I.D.	Standard length L (mm)								
	$\phi D$	Tolerance		$\phi d$	300	400	500	600	800	1,000	1,200	1,500
<b>BGS8</b>	8	$-0.013$ $-0.035$	—	0.12		0.20				0.39		
<b>BGS10</b>	10	$-0.013$ $-0.035$	—	0.18		0.31				0.61		
<b>BGS12</b>	12	$-0.016$ $-0.043$	—	0.26		0.44				0.88		
<b>BGS16</b>	16	$-0.025$ $-0.050$	—	0.47	0.63					1.6		
<b>BGS20</b>	20	$-0.030$ $-0.060$	—	0.73	1.0	1.2	1.5			2.5		
<b>BGS25</b>	25	$-0.030$ $-0.060$	—	1.1	1.5	1.9	2.3			3.8		
<b>BGS30</b>	30	$-0.035$ $-0.065$	—	1.7	2.2	2.8	3.3	4.4		5.5		
<b>BGS30P</b>	30	$-0.035$ $-0.065$	20	0.9	1.2	1.5	1.8	2.4		3.0		
<b>BGS35</b>	35	$-0.040$ $-0.070$	—				4.5			7.5		
<b>BGS40</b>	40	$-0.035$ $-0.065$	—		3.9		5.9			9.8	11.8	
<b>BGS40P</b>	40	$-0.035$ $-0.065$	30		1.8		2.6			4.3	5.3	
<b>BGS50</b>	50	$-0.040$ $-0.075$	—		6.1		9.2			15.3		23.0
<b>BGS50P</b>	50	$-0.040$ $-0.075$	35		3.2		4.8			7.8		12.0

※The values shown above in Standard length column are weight (kg).

※Contact us for other length of shaft.

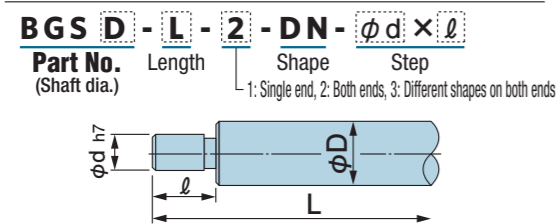
※Product identification methods differ with machining type. Refer to each product identification code entry methods.

## Machining Areas

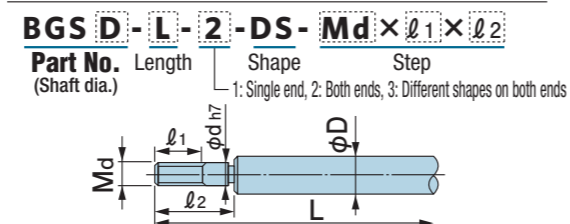


## Machining Shapes and Product Identification Code Entry Methods

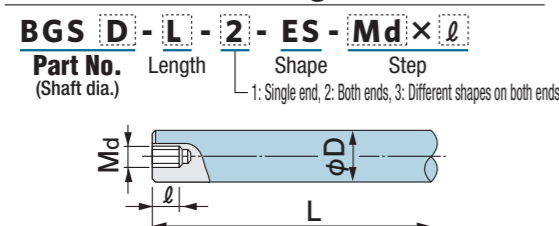
### DN Step machining



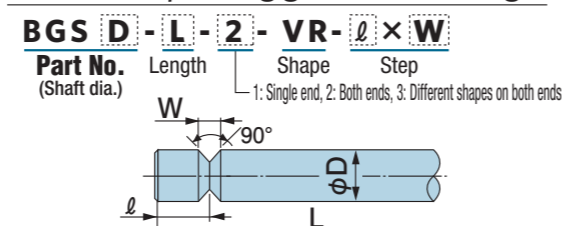
### DS Stepped threading



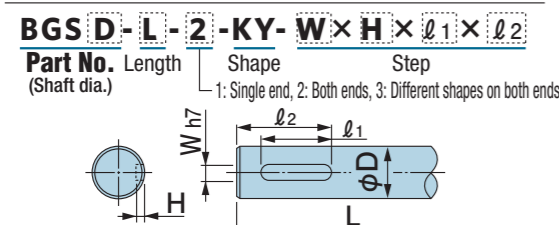
### ES End face threading



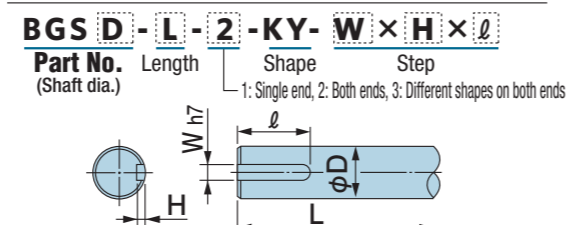
### VR V-shaped ring groove machining



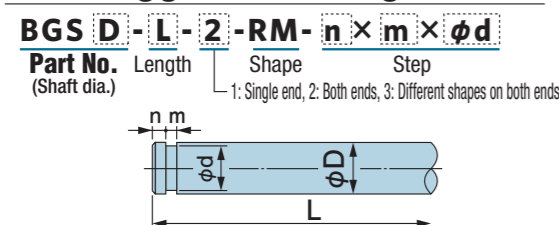
### KY Keyway machining



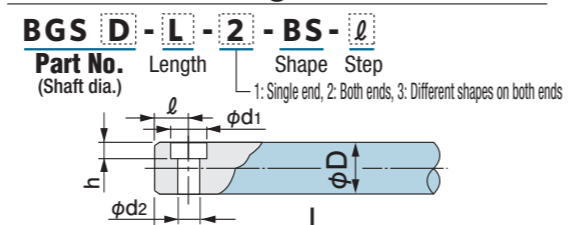
### KY Keyway machining



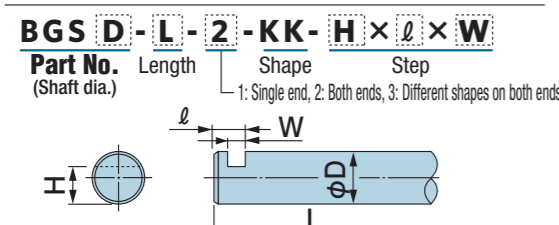
### RM Ring groove machining



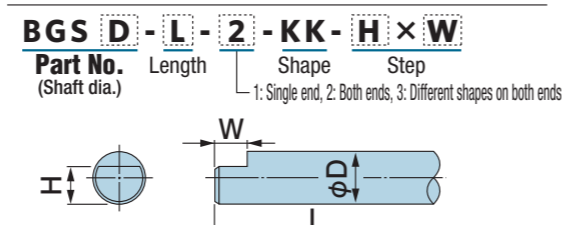
### BS Counter boring (Note 1)



### KK Cutout

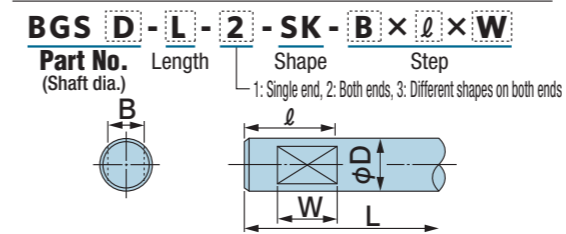


### KK Cutout

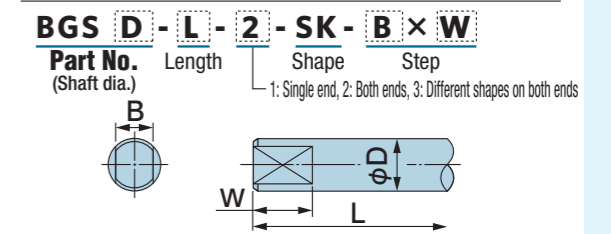


## Machining Shapes and Product Identification Code Entry Methods

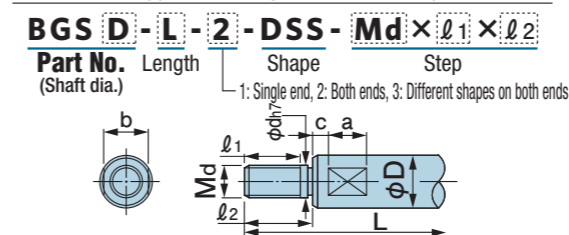
### SK Wrench receptacle machining



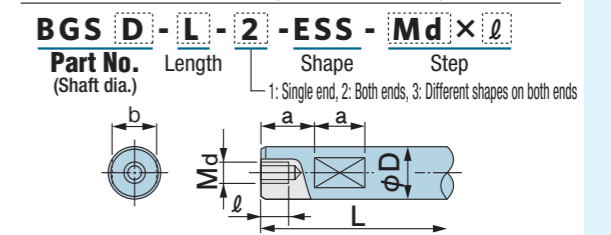
### SK Wrench receptacle machining



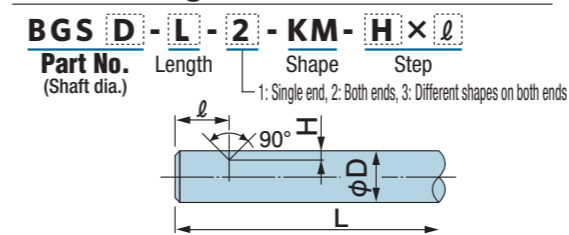
### DSS Stepped threading with wrench receptacle (Note 2)



### ESS End face threading with wrench receptacle (Note 2)



### KM Drilling



- C0.5 unless chamfer dimensions are specified.
- Also specify the thread pitch ( $Md \times P$ ) in the product identification code when fine thread is specified.

Note 1:  $d_1$ ,  $d_2$  and  $h$  of BS (counter boring) are machined in the standard dimensions shown below. BS (counter boring) is applicable to solid shafts (BGS) only. Use hexagonal socket head bolts.

Note 2:  $a$ ,  $b$  and  $c$  of DSS and ESS (threading with wrench receptacle) are machined in the standard dimensions shown below.

#### Standard dimensions of BS (counter boring) (Unit: mm)

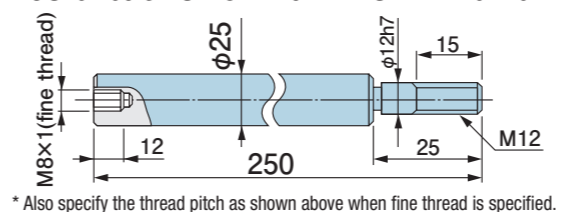
Shaft dia. $\phi D$	8	10	12	16	20	25	30	35	40	50
$\phi d_1$	6.5	8	9.5	11	14	14	14	14	17.5	20
$\phi d_2$	3.4	4.5	5.5	7	9	9	9	9	11	14
$h$	3.5	4.5	5.5	7	9	9	9	9	11	14.7

#### Standard dimensions of DSS and ESS (wrench receptacle machining) (Unit: mm)

Shaft dia. $\phi D$	8	10	12	16	20	25	30	35	40	50
$a$	8	8	10	10	10	10	15	15	20	20
$b$	7	8	10	14	17	22	27	32	36	41
$c$	5	5	5	5	5	5	5	5	10	10

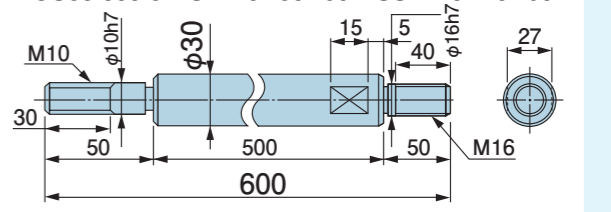
## Examples of Product Identification

Example 1: Single end: end face threading + single end: stepped threading  
**BGS25-250-3-ES-M8×P1.0×12-DS-M12×15×25**

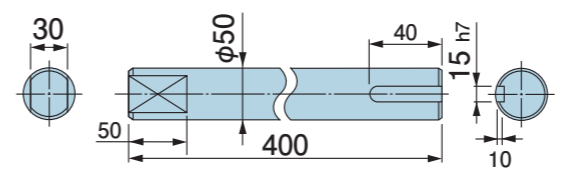


\* Also specify the thread pitch as shown above when fine thread is specified.

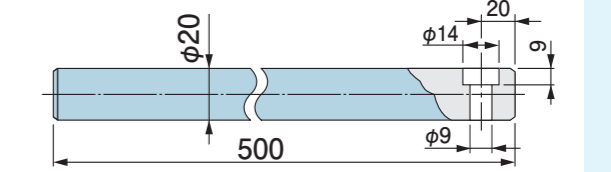
Example 2: Single end: stepped threading + single end: stepped threading with wrench receptacle  
**BGS30-600-3-DS-M10×30×50-DSS-M16×40×50**



Example 3: Single end: wrench receptacle machining + single end: keyway machining  
**BGS50-400-3-SK-30×50-KY-15×10×40**



Example 4: Single end: counter boring  
**BGS20-500-1-BS-20**

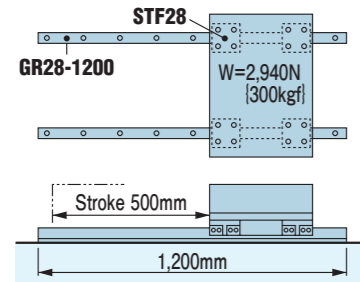


## Durability Test Data / To Prevent Malfunctioning

### Durability Test Data

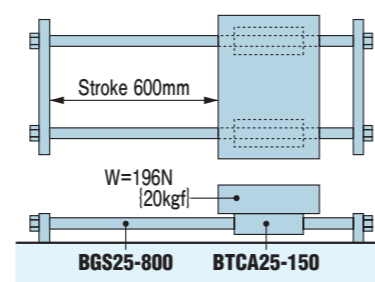
#### S Type

<Testing conditions>	<Result>
Type: STF28 four shift tables GR28-1200 dual-axis	Wear amount on liner: 0.025mm on rail: 0.005mm
Load: 2,940N {300kgf}	Coefficient of friction: 0.08~0.14
Velocity: 0.33m/s {20m/min}	Temperature of friction: 32~42°C
Stroke: 500mm	
Sliding distance: 1,000km	



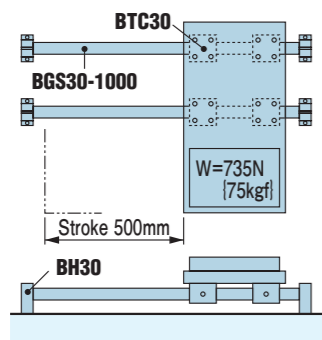
#### BA Type

<Testing conditions>	<Result>
Type: BTCA25-150 one shift table BGS25-800 dual-axis	Wear amount on bushing: 0.055mm on shaft: 0.008mm
Load: 196N {20kgf}	Coefficient of friction: 0.20~0.28
Velocity: 0.50m/s {30m/min}	
Stroke: 600mm	
Sliding distance: 1,000km	



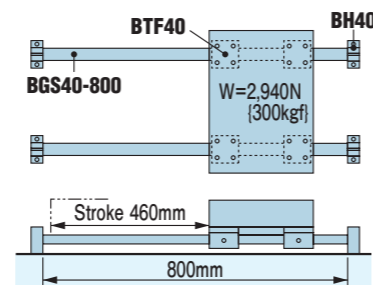
#### BC Type

<Testing conditions>	<Result>
Type: BTC30 four shift tables BGS30-1000 dual-axis	Wear amount on bushing: 0.032mm on shaft: 0.006mm
Load: 735N {75kgf}	Coefficient of friction: 0.12~0.30
Moment: 323N·m {33kgf·m}	
Velocity: 0.25m/s {15m/min}	
Stroke: 500mm	
Sliding distance: 300km (300,000 cycles)	



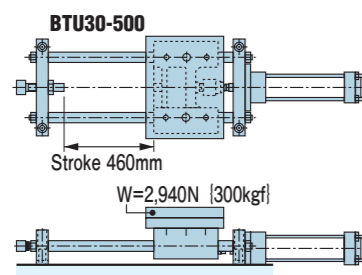
#### BF Type

<Testing conditions>	<Result>
Type: BTF40 four shift tables BGS40-800 dual-axis	Wear amount on bushing: 0.035mm on shaft: 0.008mm
Load: 2,940N {300kgf}	Coefficient of friction: 0.10~0.25
Velocity: 0.42m/s {25m/min}	Temperature of friction: 42~85°C
Stroke: 460mm	
Sliding distance: 1,000km	



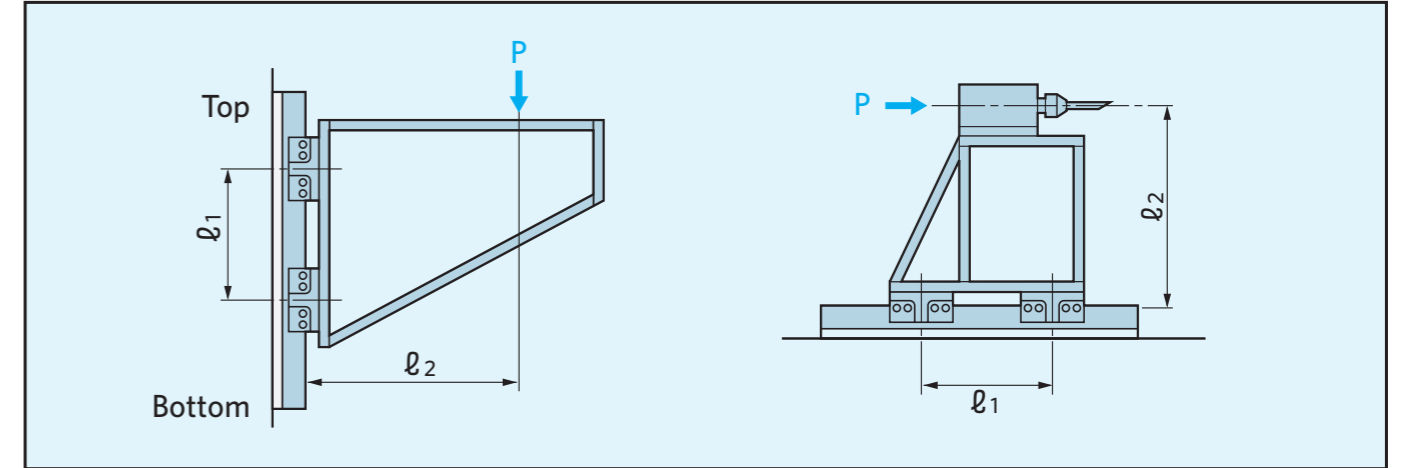
#### BTU Type

<Testing conditions>	<Result>
Type: BTU30-500	Wear amount on bushing: 0.023mm on shaft: 0.012mm
Load: 2,940N {300kgf}	Coefficient of friction: 0.16~0.20
Velocity: 0.42m/s {25m/min}	
Stroke: 460mm	
Sliding distance: 730 (800,000 cycles)	



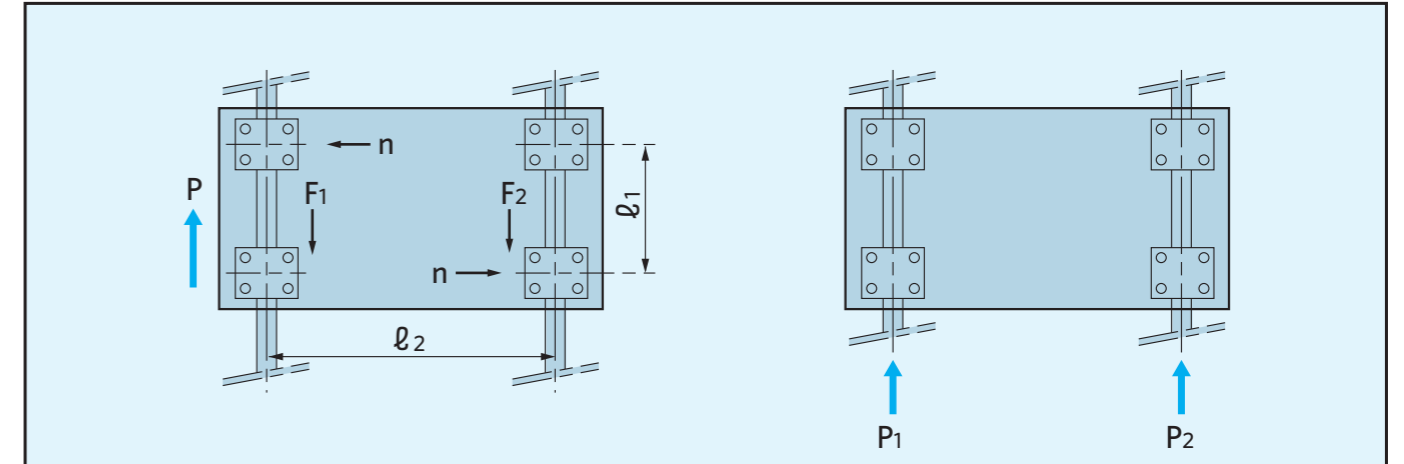
### To Prevent Malfunctioning

- If the point of the drive source is apart from the shift tables



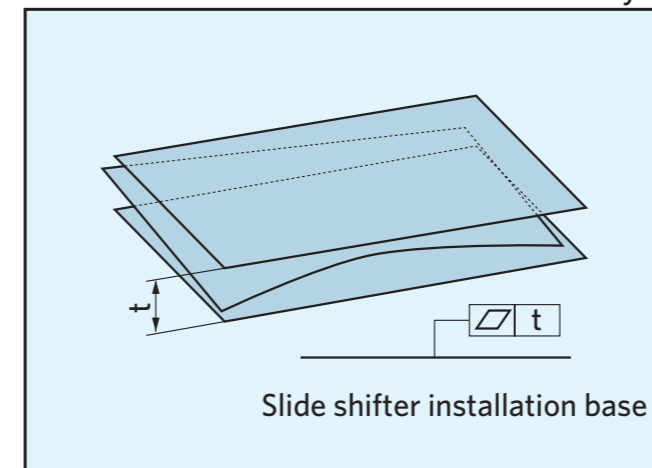
If the position of drive source P is apart from the rail surface by  $l_2$ , of  $l_2/l_1$  exceeds 1.67 when the coefficient of friction  $\mu$  is 0.3, resulting in malfunctioning. Take the allowable moment load into consideration and reduce  $l_2/l_1$  below 1.5.

- If the shift table installation position is apart or the point of the drive source is apart

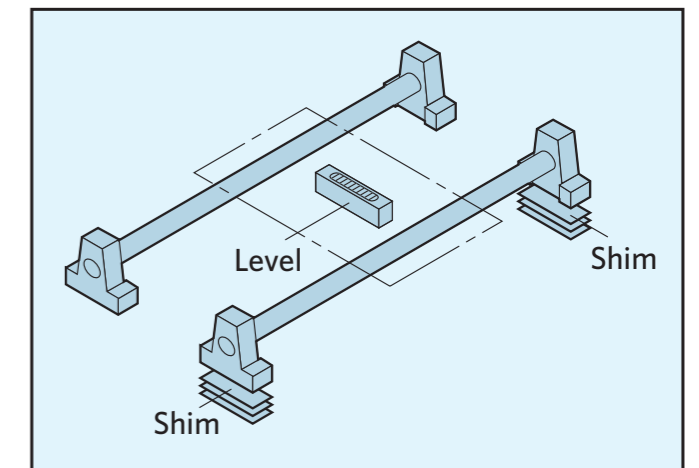


If the  $l_2/l_1$  ratio of dual-axis parallel rails is large, the couple of the drive source P and resistance  $F_1$  and  $F_2$  becomes large and the slide shifter works improperly. Reduce  $l_2/l_1$  below 3. As the point of the drive source becomes apart from the center, the condition becomes worse. Synchronize the drive source with  $P_1$  and  $P_2$  if  $l_2/l_1$  is inevitably larger than 3 for reasons of the structure.

- If the installation base has low accuracy



Do not select the S type if the parallelism  $t$  exceeds 0.3.



Select the B type if the parallelism  $t$  exceeds 0.3. Insert shims under the shaft holders to adjust them. After adjustment, check the parallelism with a level, straight edge, clearance gauge, etc.