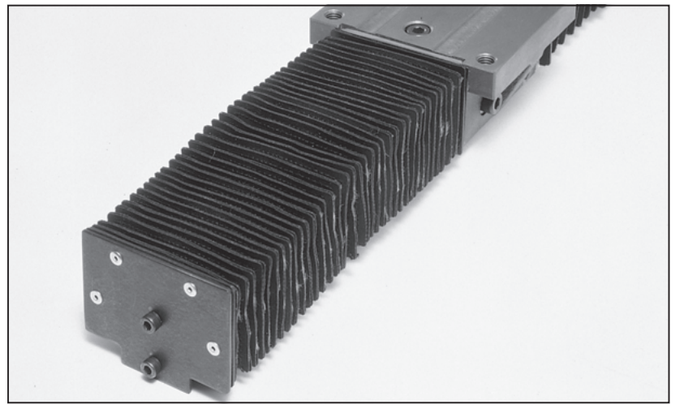
Optional Parts Applicable to S and SE Types



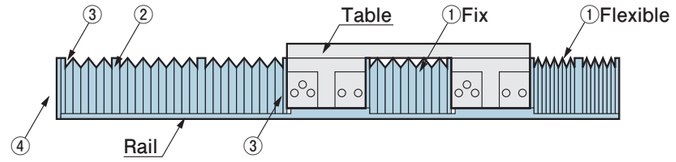
Bellows exclusive for slide shifters

The S and SE types incorporate Oiles bearings on the sliding surfaces and have superior foreign matter resistance. It is recommended to use the exclusive bellows if higher resistance is required. A heat-resistant bellows is also available.

Caps for covering up bolt holes on guide rails

Exclusive caps for preventing dust, etc. from entering the bolt holes for mounting the guide rail are available.

Component Parts for Bellows Exclusive for Slide Shifters

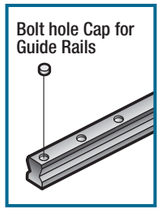


No.	Name	Material
①	Flexible bellows	Neoprene rubber + nylon cloth
	Fix bellows	
	Heat-resistant flexible bellows	GENTEX® + PTFE
	Heat-resistant fix bellows	
②	Slide Plate	PVC
③	Clamp Plate	SPCC
④	End Plate	SPCC

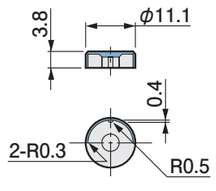
※Determine the positions of the bolts for fixing the rail at both ends when using the 38J or 48J as shown below.

Bolt hole Cap for Guide Rails

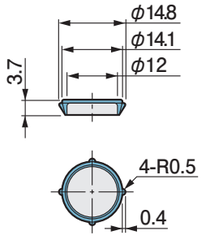
Exclusive bolt hole cap (plastic) is available to keep out the dust from bolt holes.



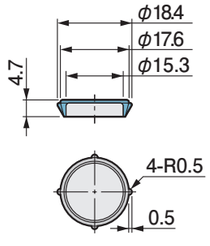
■ **CP-6** (for M6)



■ **CP-8** (for M8)



■ **CP-10** (for M10)



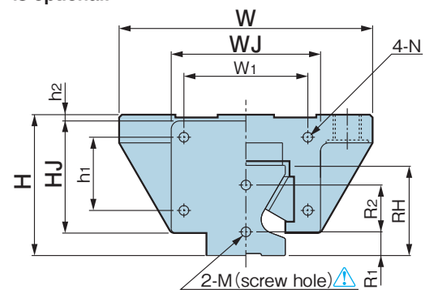
Part No.	Bolt Size	Rails
CP-6	M6	GR20、28、GRE20、28
CP-8	M8	GR38
CP-10	M10	GR48

※Press fit the cap with a plastic hammer.
※Fit CP-6 in the clearance between the rail and the bolt, and twist it to tie up.

Product Identification for Exclusive Bellows for Slide Shifters

⚠CAUTION

■ Mounting screw hole on the guide rail for bellows is optional.



● End plate of 20J sticks out 8mm from the table surface.

■ Flexible Bellows

28J - A - 100 - T
Part No.
- Put T for heat-resistant bellows
- Shortened length of bellows (Lmin)
- Bellows expansion ratio A or B

■ Fix Bellows

28JK - 140 - T
Part No.
- Put T for heat-resistant bellows
- Length of fixed bellows

Part No.	W×H	Bellows size WJ×HJ	Expansion ratio A	Stroke	Expansion ratio B	Stroke	h1	h2	W1	RH	R1	R2	N	M	Applicable tables
20J	45×30	52×32	5	under 1100	3.5	1100 or more	14	凸8	37	22	6	10	M3×10	M4×8	STC20 STE20
28J	90×50	60×40	5	under 1100	3.5	1100 or more	26	凹1	44	32	8	18	M3×10	M4×8	STC28 STF28 STE28 STFE28
38J	110×65	80×52	7	under 1300	5.5	1300 or more	36	凹1	58	42	10	24	M4×12	M5×10	STF38
48J	140×82	101×67	10	under 1300	7.5	1300 or more	50	凹3	74	52	12	30	M6×12	M6×10	STF48

Calculating formula

■ Length of Bellows
(L min=Shortened length, L max=Expanded length)

In case of expansion ratio A

$$L\,min=\frac{S}{A-1},\ L\,max=L\,min\times A$$

In case of expansion ratio B

$$L\,min=\frac{S}{B-1},\ L\,max=L\,min\times B$$

■ Total length of guide rail when using bellows

Using bellows at both ends

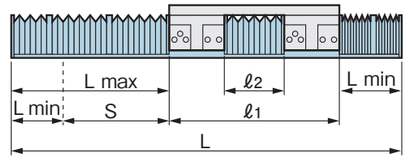
$$L=(L\,min\times 2)+S+\ell_1$$

Using bellows at one end

$$L=L\,min+S+\ell_1$$

In case of standard guid rails, L min dimension needs to be adjusted.

$$L\,min=\frac{L-S-\ell_1}{2}$$



S: Stroke
A, B: Expansion ratio of bellows
L max: Expanded length of bellows
L min: Shortened length of bellows
ℓ_1: Table length
ℓ_2: Fix bellows length
L: Rail length

Calculation example

Expression of calculating the bellows length is $L\,min=\frac{S}{A-1}$

$$L\,min=\frac{400}{5-1}=100mm$$

Required rail length $L_1=(L\,min\times 2)+S+\ell_1$

$$L_1=(100\times 2)+400+300=900mm$$

Bellows length L min when using standard rail length L2 (1000mm)

$$L\,min=(1000-400-300)/2=150mm$$

STF28
Stroke: S=400mm
Expansion ratio: A=5
Table length: ℓ_1=300mm
Fix bellows length: ℓ_2=140mm
Required rail length: L_1
Standard rail length: L_2=1000mm

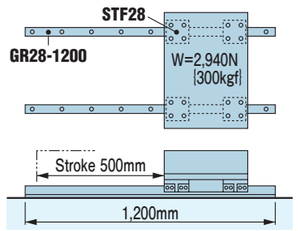
Durability Test Data / To Prevent Malfunctioning

Durability Test Data

S Type

<Testing conditions>
Type: STF28 four shift tables
GR28-1200 dual-axis
Load: 2,940N {300kgf}
Velocity: 0.33m/s {20m/min}
Stroke: 500mm
Sliding distance: 1,000km

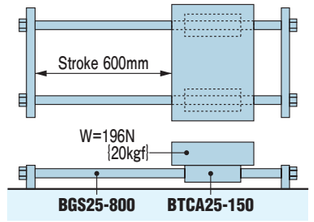
<Result>
Wear amount on liner: 0.025mm
on rail: 0.005mm
Coefficient of friction: 0.08～0.14
Temperature of friction: 32～42℃



BA Type

<Testing conditions>
Type: BTCA25-150 one shift table
BGS25-800 dual-axis
Load: 196N {20kgf}
Velocity: 0.50m/s {30m/min}
Stroke: 600mm
Sliding distance: 1,000km

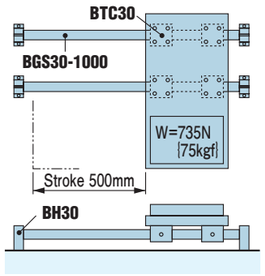
<Result>
Wear amount on bushing: 0.055mm
on shaft: 0.008mm
Coefficient of friction: 0.20～0.28



BC Type

<Testing conditions>
Type: BTC30 four shift tables
BGS30-1000 dual-axis
Load: 735N {75kgf}
Moment: 323N·m {33kgf·m}
Velocity: 0.25m/s {15m/min}
Stroke: 500mm
Sliding distance: 300km (300000 cycles)

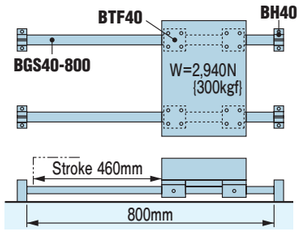
<Result>
Wear amount on bushing: 0.032mm
on shaft: 0.006mm
Coefficient of friction: 0.12～0.30



BF Type

<Testing conditions>
Type: BTF40 four shift tables
BGS40-800 dual-axis
Load: 2,940N {300kgf}
Velocity: 0.42m/s {25m/min}
Stroke: 460mm
Sliding distance: 1,000km

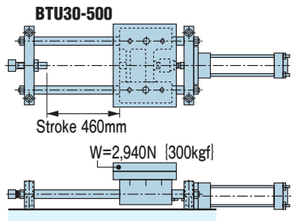
<Result>
Wear amount on bushing: 0.035mm
on shaft: 0.008mm
Coefficient of friction: 0.10～0.25
Temperature of friction: 42～85℃



BTU Type

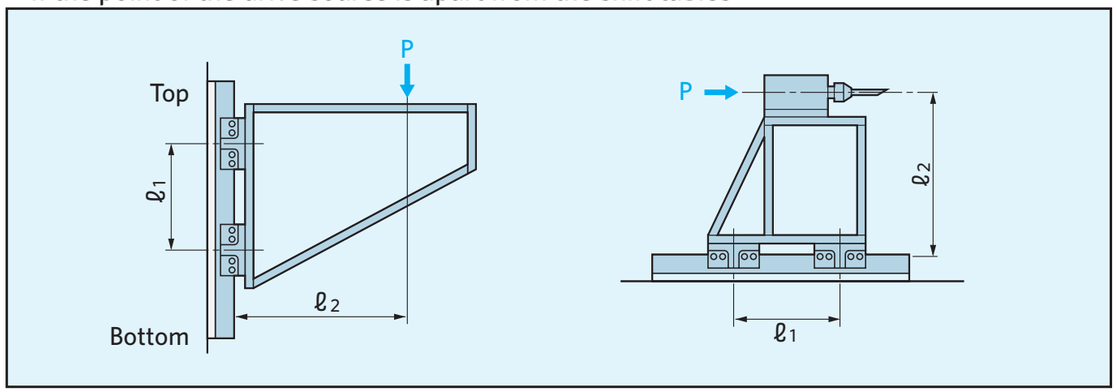
<Testing conditions>
Type: BTU30-500
Load: 2,940N {300kgf}
Velocity: 0.42m/s {25m/min}
Stroke: 460mm
Sliding distance: 730 (800000 cycles)

<Result>
Wear amount on bushing: 0.023mm
on shaft: 0.012mm
Coefficient of friction: 0.16～0.20



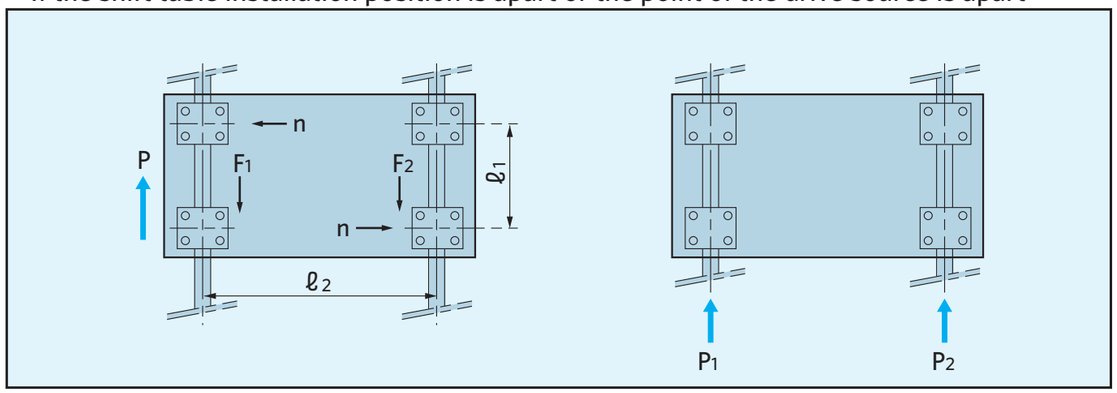
To Prevent Malfunctioning

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



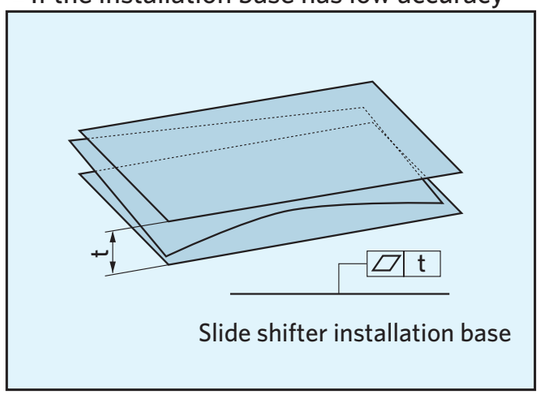
If the position of drive source P is apart from the rail surface by ℓ_2, of ℓ_2/ℓ_1 exceeds 1.67 when the coefficient of friction μ is 0.3, resulting in malfunctioning. Take the allowable moment load into consideration and reduce ℓ_2/ℓ_1 below 1.5.

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

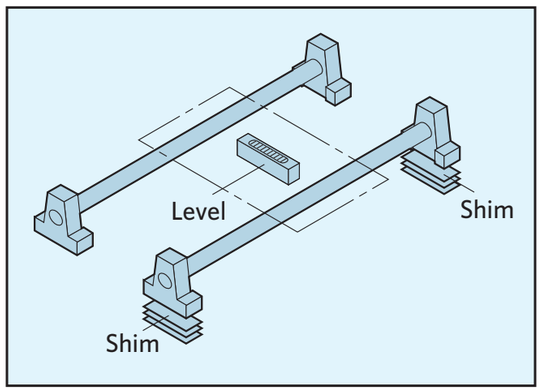


If the ℓ_2/ℓ_1 ratio of dual-axis parallel rails is large, the couple of the drive source P and resistance F_1 and F_2 becomes large and the slide shifter works improperly. Reduce ℓ_2/ℓ_1 below 3. As the point of the drive source becomes apart from the center, the condition becomes worse. Synchronize 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.