1.3. Rated Load and Rated Life

Rated Loads in All Directions

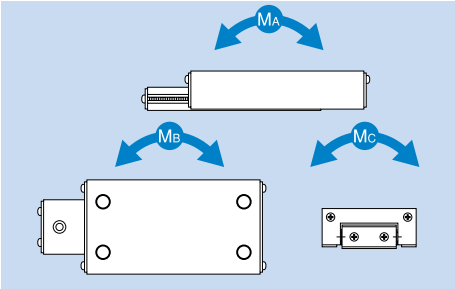
The rated loads of Linear Ball Slide models LS, LSP and LSC are identical in the vertical and horizontal directions.

Static Safety Factor f_s

Linear Ball Slide models LS, LSP or LSC may receive an unexpected external force while it is stationary or operative due to the generation of an inertia caused by vibrations and impact or start-up and stop. It is necessary to consider a static safety factor against such a working load.

$$f_s = \frac{C_0}{P_C} \text{ or } f_s = \frac{M_0}{M}$$

f_s : Static safety factor
C_0 : Basic static load rating (N)
M_0 : Permissible static moment (M_A, M_B and M_C) (N·m)
P_C : Calculated load (N)
M : Calculated moment (N·m)



■Reference value of static safety factor

The static safety factors indicated in table 1 are the lower limits of reference values in the respective service conditions.

Table 1 Reference Values of Static Safety Factors (f_s)

Machine using the LM system	Service conditions	Lower limit of f_s
General industrial machinery	Without vibrations or impact	1 to 1.3
	With vibrations or impact	2 to 7

Rated Life

The service life of the Linear Ball Slide is obtained using the following equation.

$$L = \left(\frac{1}{f_w} \cdot \frac{C}{P_c}\right)^3 \times 50$$

L : Rated life (km)
(The total number of revolutions that 90% of a group of identical Linear Ball Slide units independently operating under the same conditions can achieve without showing flaking)
C : Basic dynamic load rating (N)
P_c : Calculated load (N)
f_w : Load factor (see table 2)

Calculating the Service Life Time

When the rated life (L) has been obtained, if the stroke length and the number of reciprocations per minute are constant, the service life time is obtained using the following equation.

$$L_h = \frac{L \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

L_h : Service life time (h)
ℓ_s : Stroke length (mm)
n_1 : Number of reciprocations per minute (min^{-1})

■f_w : Load factor

In general, reciprocating machines tend to involve vibrations or impact during operation. It is difficult to accurately determine vibrations generated during high-speed operation and impact during frequent start-up and stop. Therefore, when the actual load applied on model VR or VB cannot be obtained, or when speed and vibrations have a significant influence, divide the basic load rating (C or C_0), by the corresponding load factor in table 2 of empirically obtained data.

Table 2 Load Factor (f_w)

Vibrations/impact	Speed (V)	f_w
Faint	Very low V≦0.25m/s	1 to 1.2
Weak	Slow 0.25<V≦1m/s	1.2 to 1.5