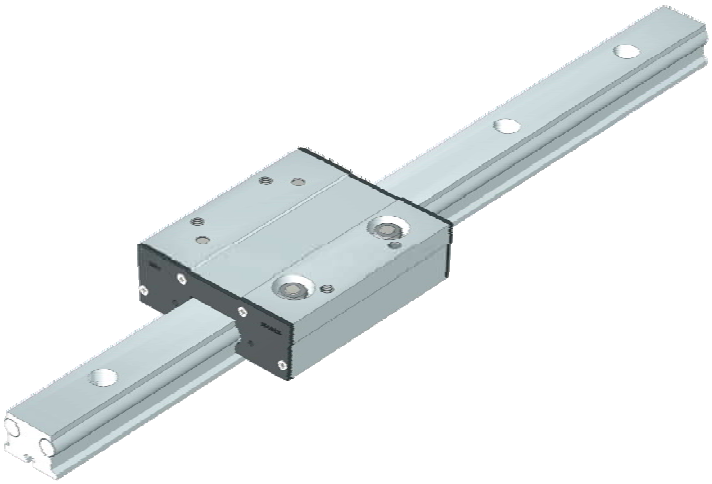
LGA linear guide

Construction LGA linear guide systems are mainly made of lightweight material of aluminum alloy. Four rollers inside the carriage run on railway's hardened shafts. Stable rolling movement are particularly suitable for use in material handling system and automatic production lines. Below picture shows its construction.

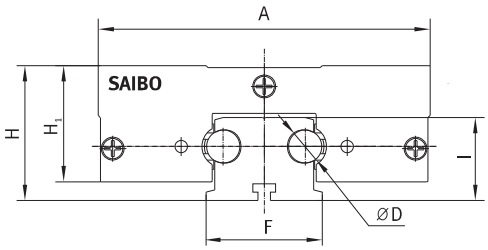


Railway Anodized aluminium alloy body with two Chrome-plated steel shafts

Carriage
Anodized aluminium alloy plate
4 pieces double row balls bearings(Rollers)
2 pieces concentric bolts and 2 pieces eccentric bolts
2 pieces plastic lubrication cover with oil soaked felt wipers

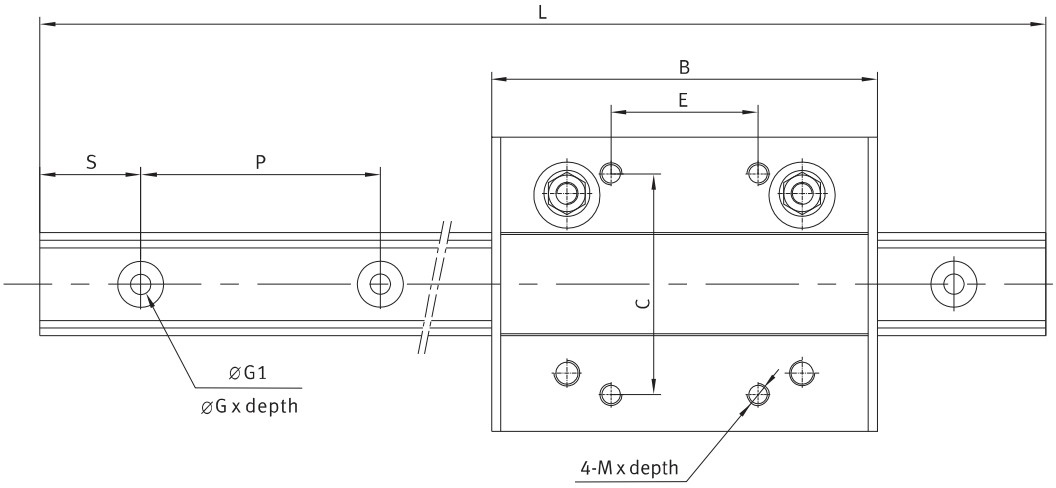
Feature
1.High speed, Low friction and Low noise
2.Clearance/Preload is adjustable
3.Sealed and Lubricated

Top view



Type	Assembly Dimensions		Carriage Dimensions					
	H	F	A	B	C	E	H_1	
SB-LGA20	30	20	63	92	53	40	26	
SB-LGA25	32.5	28	80	105	60	40	28	
SB-LGA30	38.5	34.2	100	120	85	50	33	

Top view



		Railway Dimensions						
	M x depth	D	G x depth	G_1	I	S	P	Lmax
	M6x8	6	9x5.5	5.5	19.5	30	60	1020
	M6x8	8	12.5x5.5	5.5	20	25	50	3000
	M8x10	10	14.5x6.5	6.5	24	25	50	4000

Setting clearance - free

None clearance is necessary for system's rigidity and stability. LGA series use 2 concentric bolts on one side in the direction of railway and 2 eccentric bolts on the other side. These two eccentric bolts are used for setting clearance-free.

1. Tighten concentric bolts.

2. Tighten the eccentric bolts to near the critical point, but not reach the critical point. (This is to rotate the eccentric bolts).

3. Rotate the eccentric bolts with straight screwdriver at the end of the stud to adjust the clearance. Adjust the clearance to zero.

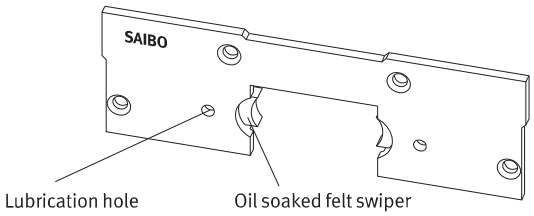
4. Slide the carriage by hand and adjust to the extent where there causes a slight slipping resistance.

5. Keep eccentric bolt's position and tighten the nut.

Setting Pre-load

It is same as Setting clearance-free. First adjust clearance to zero, continue rotating eccentric bolts will get pre-load. Appropriate pre-load should be decided according to the application. Over pre-load will decrease system's life. Please be careful.

Lubrication

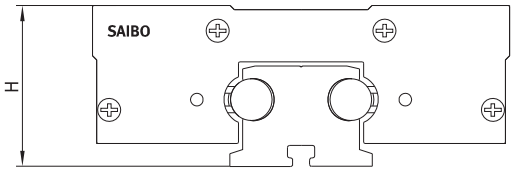


Plastic lubrication cover contains oil soaked felt wipers which can be re-lubricated via lubrication holes.

Working parameter

Max speed:	10m/s
Max acceleration:	50m/s^2
Working temperature :	−20°C ~ +80°C

Accuracy

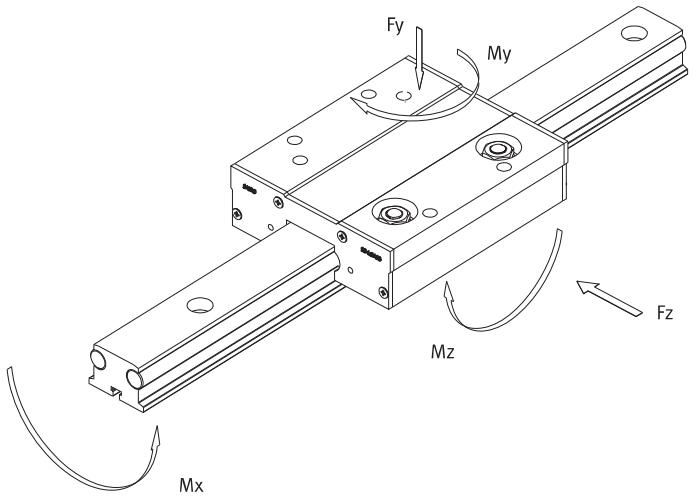


Tolerance H： ±0.20mm

Note: Higher accuracies are available upon request.

Load / life calculation

Due to the hardness of the railway's shaft and fatigue analysis of railway and roller, the railway's life does not determine the system life. It is determined by roller's life. System's life varies by actual combination of load, working status and environment conditions etc. So loading factor should be calculated firstly. Then system's life could be calculated via using below formula.



LF - Loading factor

(LF should be less than 1.0 for any combination of load)

$$LF = \frac{Fy}{Fymax} + \frac{Fz}{Fzmax} + \frac{Mx}{Mxmax} + \frac{My}{Mymax} + \frac{Mz}{Mzmax}$$

Fy - Actual load in Y direction. (N)

Fz - Actual load in Z direction. (N)

Mx - Actual moment in X direction. (N·m)

My - Actual moment in Y direction. (N·m)

Mz - Actual moment in Z direction. (N·m)

Below parameters can be taken from the table of Load capacity.

Fy max - Max load capacity in Y direction. (N)

Fz max - Max load capacity in Z direction. (N)

Mx max - Max moment capacity in X direction. (N·m)

My max - Max moment capacity in Y direction. (N·m)

Mz max - Max moment capacity in Z direction. (N·m)

Load capacity

Railway type	Max Load capacity(N)		Max moment capacity(N·m)		
	Fymax	Fzmax	Mxmax	Mymax	Mzmax
SB-LGA20	330	600	1.8	7	5.8
SB-LGA25	520	1200	7.6	26	15
SB-LGA30	1200	4000	26	78	45

Life calculation

SAIBO designed LGA series load capacity according to basic life of 100km for each type. System's life in km could be calculated via below formula.

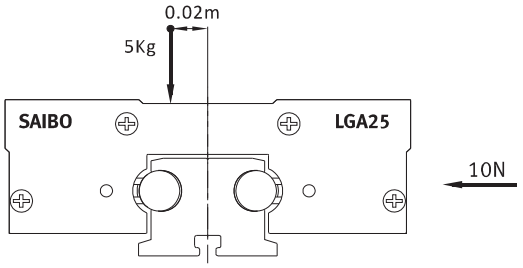
$$\text{Life(km)} = \frac{100}{(0.03+0.97LF*f)^3}$$

f- Reduction coefficient of the application and environment.

None vibration or shock, Low speed (<1m/s), Low frequency shift direction, clean environment.	1-1.5
Light vibration or shock, medium speed (1-2.5m/s) medium frequency shift direction, some dirtiness	1.5-2
Heavy vibration or shock, high speed (>2.5m/s) high frequency shift direction, heavy dirty	2-3.5

Calculation example

Here select SB-LGA25 as calculation example. This system is loaded as below picture. Working condition is clean and there is no vibration or shock.



The load factor LF is calculated use formula

$$LF = \frac{Fy}{Fymax} + \frac{Fz}{Fzmax} + \frac{Mx}{Mxmax} + \frac{My}{Mymax} + \frac{Mz}{Mzmax}$$

Fy = 5 kg x 9.8 (gravity) = 49 N

Fz = 10 N

Mx = 49 x 0.02 = 0.98 N·m

My = 0

Mz = 0

Take parameters Fymax, Fzmax, Mxmax, Mymax, Mzmax from table and then fill in the formula

$$LF = \frac{49}{520} + \frac{10}{1200} + \frac{0.98}{7.60} + \frac{0}{Mymax} + \frac{0}{Mzmax} = 0.2314$$

According to the description of working condition, take f=1.1

$$\text{Life(km)} = \frac{100}{(0.03+0.97LF*f)^3}$$

$$= \frac{100}{(0.03+0.97*0.2314*1.1)^3}$$

$$= 4716\text{km}$$