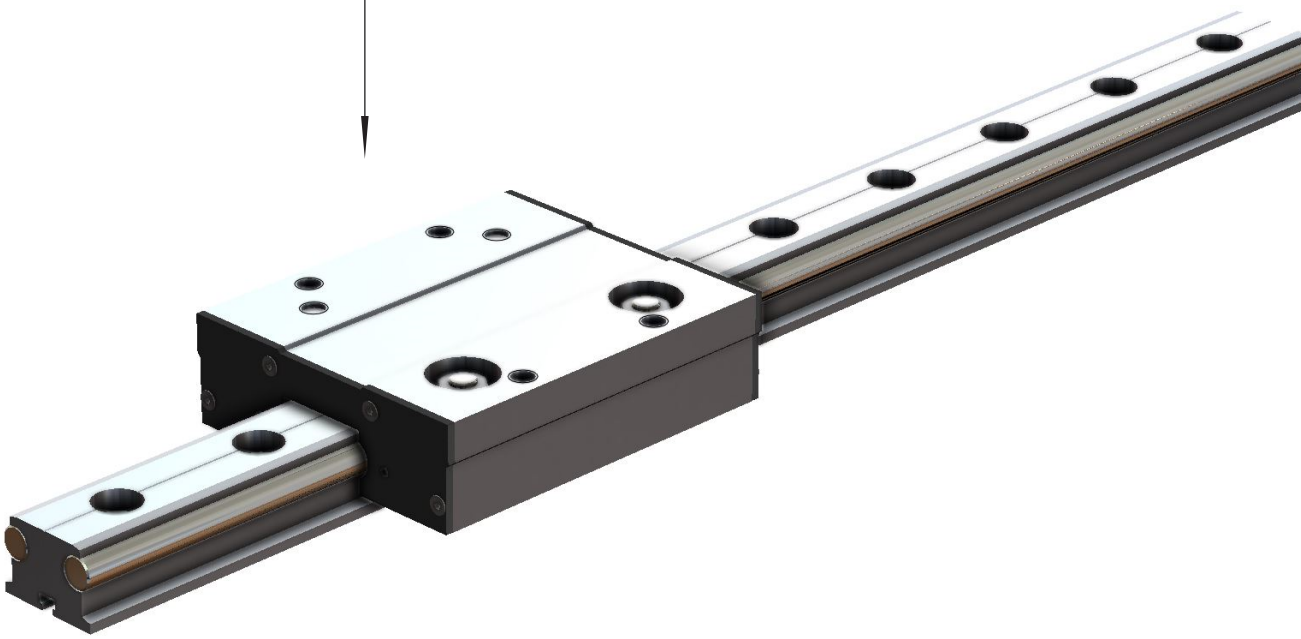
LGA Linear Guide

Construction: The LGA rail body is manufactured from aluminum alloy, with pressed in hardened steel shafts. The carriages consists of four rollers, held within the carriage frame.
This systems low profile, makes it ideally suited for use in material handling and automatic production lines.

Carriage Assembly:

Anodized aluminum alloy plate
Four of double row bearings (Rollers)
Two of concentric bolts and two off eccentric bolts
Two of plastic lubricator covers with felt wipers



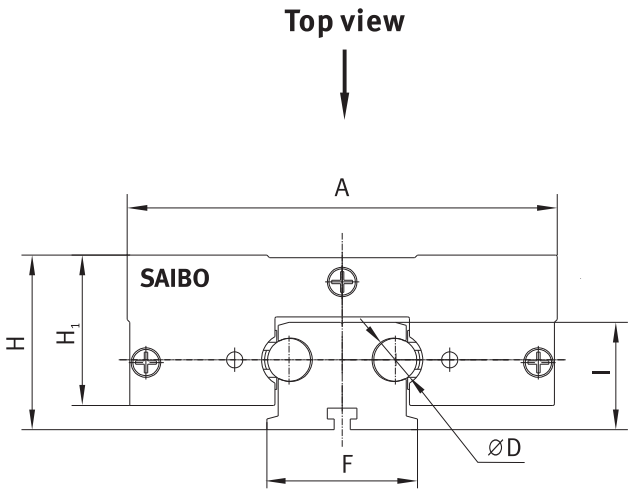
Rail:

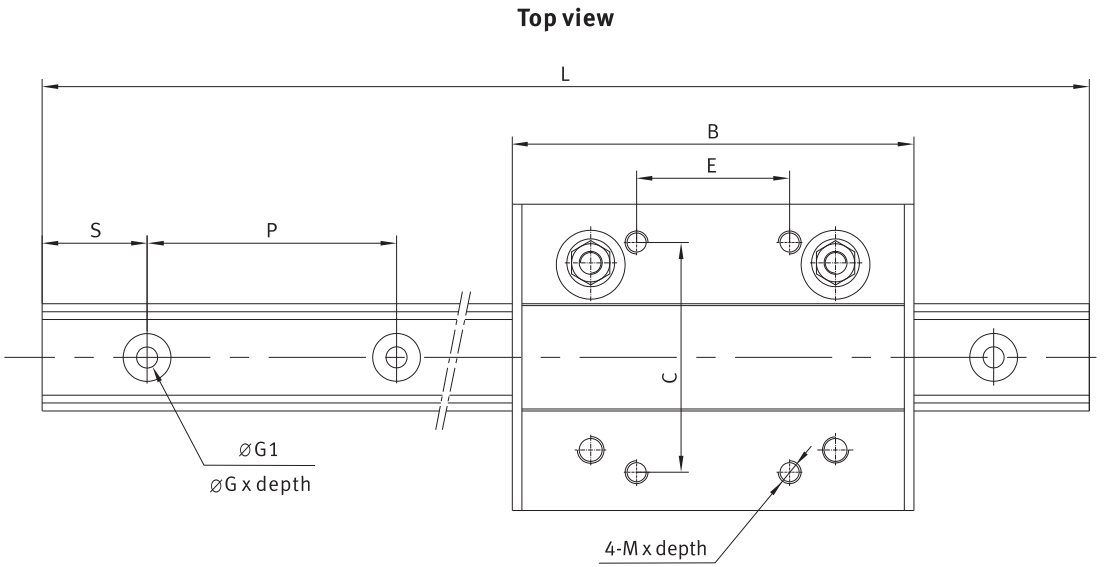
Anodized aluminium body with two chrome-plated steel shafts

Key Features:

High speed, Low friction and Low noise
Clearance and Preload is adjustable
Sealed and Lubricated

Assembly:





Type	Assembly Dimensions		Carriage Dimensions						Railway Dimensions						
	H	F	A	B	C	E	H_1	M x Depth	D	G x Depth	G_1	I	S	P	Lmax
LGA 80	32.5	28	80	105	60	40	28	M6x8	8	12.5x5.5	5.5	20	25	50	3000
LGA 100	38.5	34.2	100	120	85	50	33	M8x10	10	14.5x6.5	6.5	24	25	50	4000

Load / Life Calculation

Due to the hardness of the railway and fatigue analysis of railway and roller, the railway's life does not determine the system life. It is determined by roller's life. Load capacity of the motion guide system varies mainly by the size of bearing and railway, lubricated or not, and the load magnitude and direction. Other factors include speed and acceleration and environment etc. To calculate system life, loading factor LF should be calculated firstly. Here we provide two methods to calculate the loading factor.

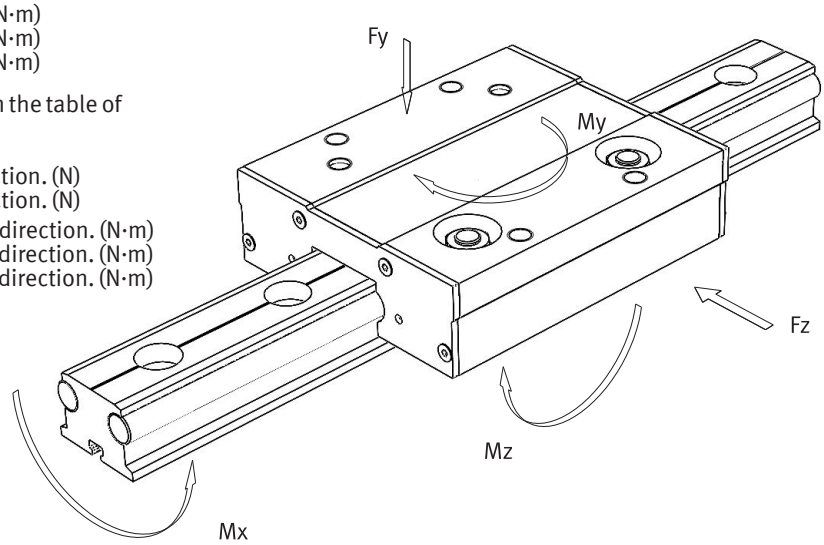
Then the calculation below can be used.

Standard 4 Bearings Carriage:

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)



Life Capacity Calulation:

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

LF should not exceed 1 for any combination of loads.

Maximum Load Capacity:

Railway type	Max Load capacity(N)		Max moment capacity(N·m)		
	Fymax	Fzmax	Mxmax	Mymax	Mzmax
LGA 80	520	1200	7.6	26	15
LGA 100	1200	4000	26	78	45

Life Calculation:

After getting Loading Factor LF, the life in km can be calculated by using the formula below. The basic life for the LGA systems is 100km.

Lubricated system

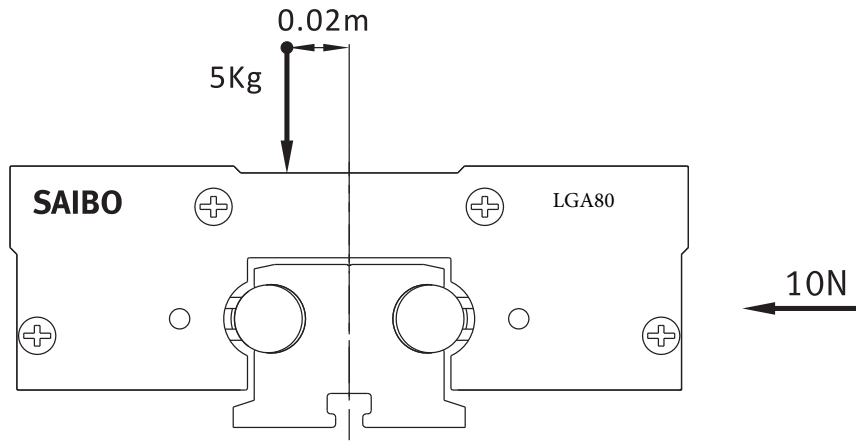
$$\text{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^3}$$

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:

A machine is using an LGA80 railway and carriage. The carriage and work-piece total weight 5 kg. When the carriage moving, there is an external load of 10N exerted as below drawing. Working environment is clean. There is no vibration or shock.



The load factor LF, is calculated using the formula below:

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

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 Fy max, Fz max, Mx max, My max, Mz max from table and then fill in the formula

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

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

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

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

$$= 4716km$$

Setting Free Clearance:

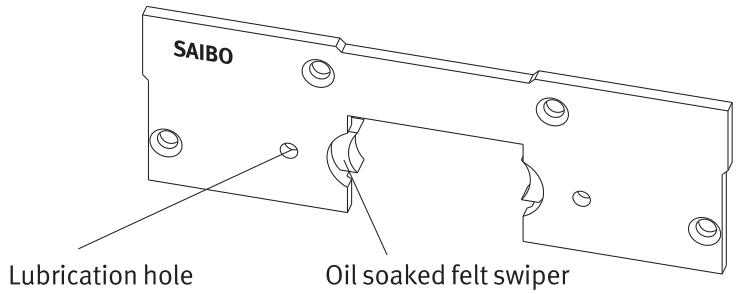
The LGA system does not require any clearance for rigidity or stability. The standard LGA carriage consists of 2 concentric bolts, on one side, with the 2 eccentric bolts on the other. the two eccentric bolts are used for setting free clearance. Please follow the setting procedure bellow:

1. Tighten the concentric bolts.
2. Tighten the eccentric bolts to as close to the critical point as possible, but do not over tighten. (This is done to rotate the eccentric bolts).
3. Rotate the eccentric bolts by using as straight screwdriver in the end of the stud to adjust the clearance. Make sure that the clearance is set to zero.
4. Now slide the carriage along the rail by hand, making adjustment to the eccentric bolts, until the bearings are slightly slipping with resistance.
5. Once you have the required setting, hold the eccentric bolts in place and tighten the securing nut.

Setting Pre-Load:

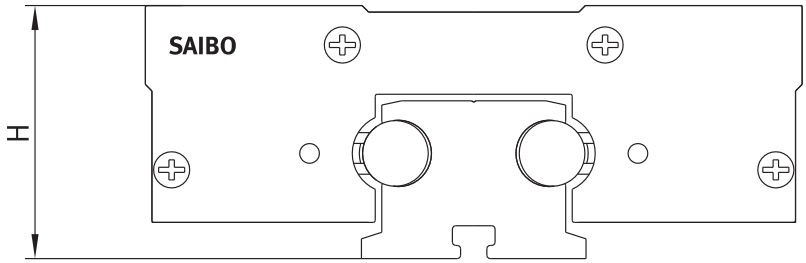
To set the pre-load, first follow steps 1 to 3 above, at this point you are able to set the pre-load of the bearing on the rail.
appropriate pre-load should be decided according to the application.
Over pre-loading the bearings will decrease the systems life.
Please be careful.

Lubrication:



The plastic lubrication covers contain oil soaked felt wiper which can be re-lubricated via lubrication holes shown above.
These lubrication covers will require re-lubrication regularly dependent on the appliaction requirements

Accuracy:



Tolerance H = +/- 0.20mm
Note: Higher accuracies can be achieved upon request

Technical Specifications

Railways:

Material and Finish:	Carbon Steel Shafts, pressed into Aluminum Alloy Body

Bearings:

Material and Finish:	Carbon-chromium bearing steel, hardened and tempered. Niltrile Rubber Seals Plastic Cage High Tensile Steel Studs, Chemical black finish Temperature Range; -20degC to +80degC

Carriage Plate:

Material and Finish:	High Strength Aluminum Alloy

Lubrication Covers:

Material:	Impact Resistant Thermoplastic Elastomer Felt Wipers. Temperature Range; -20degC to +60degC

External Lubrication:

68 cSt viscosity or similar oil should be for all Lubricators
Lubricator can be supplied 'dry' for customers to use there own lubricant.

Maximum Working Parameter:

Maximum Linear Speed	= 10 m/s
Maximum Accerlation	= 50 m/s^2

Higher speeds are possible however, speed is dependent upon stroke, duty and environmental conditions.
Please contact our offices for further assistance with specific applications.

All images contained within this and all other Sliding System Catalogue and Datasheets, have been produced from production 3 Dimensional CAD Models.