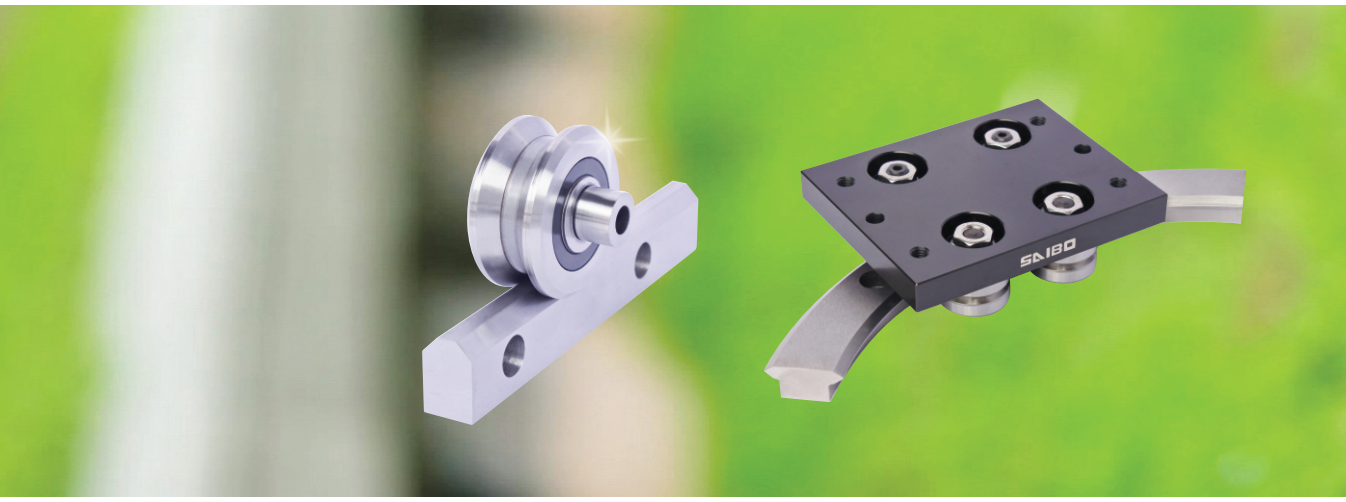
SAIBO



LINEAR AND CURVE TRACK

About US

SAIBO is one of world recognized leaders in design and manufacturing of low friction linear motion components and precision bearings. SAIBO products are exported to over 30 countries and regions. We provide not only standard products, but also customized solutions. SAIBO means “Always reach for higher goals.” SAIBO is committed to excellence and linear motion innovation while guaranteeing its customers the best pricing in our industry.

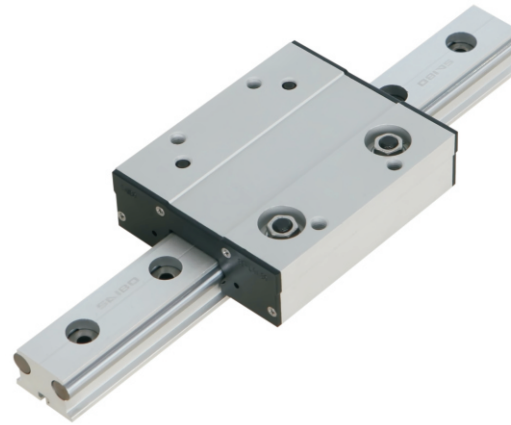
SAIBO actively seeks to work with you on your next design and we promise the following:

- The right product for your application
- A quality product you can trust
- Engineering assistance that is proven and world renown.

SAIBO is located in WUXI, east China. Wuxi is famous for being one of the birthplaces of Chinese modern industry. Welcome you visit us.

LGA linear guide

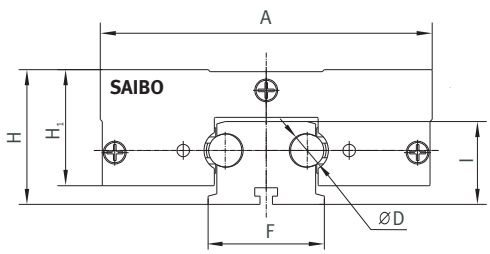
Construction LGA linear guide systems are mainly made of lightweight material of aluminum alloy. Four rollers inside the carriage run on railway's hardened shafts. Stable rolling movement are particularly suitable for use in material handling system and automatic production lines. Below picture shows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



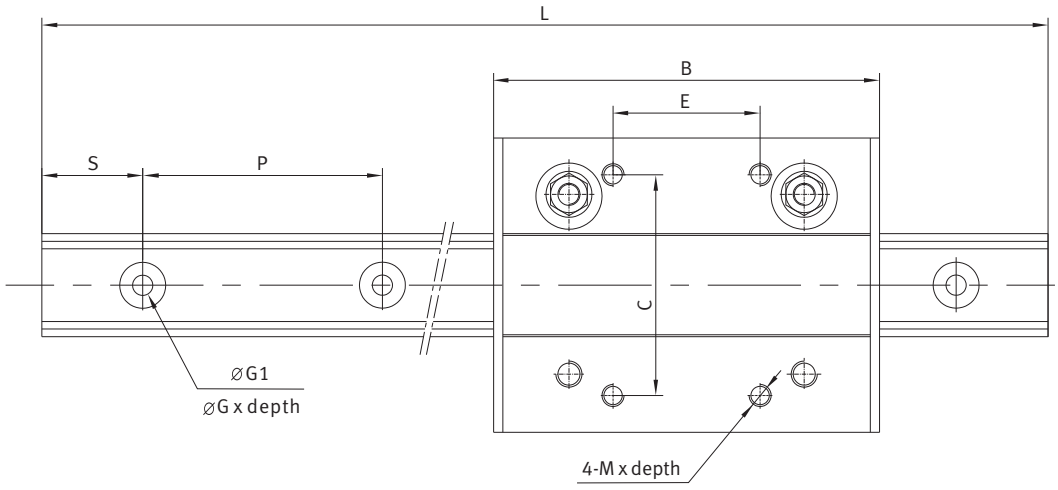
Railway Anodized aluminum alloy body with two Chrome-plated steel shafts

Carriage Anodized aluminum 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.Preload is adjustable
3.Sealed and Lubricated



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	



		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.

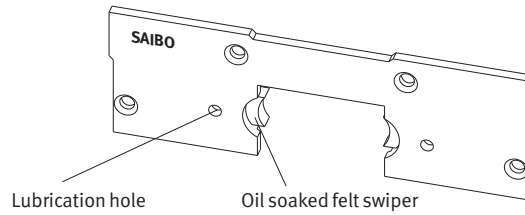
4. Slide the carriage by hand and adjust to the extent where there causes a slight slipping resistance.

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

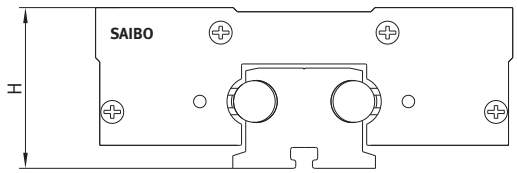


Plastic lubrication cover contains oil soaked felt wipers which can be re-lubricated via lubrication holes.

Working parameter

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

Accuracy

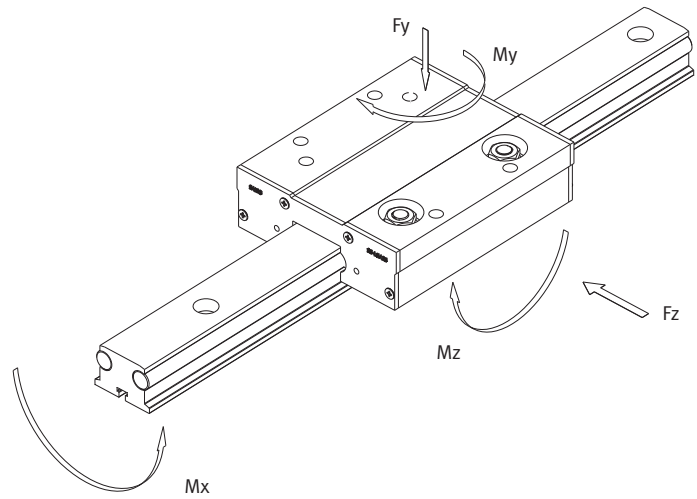


Tolerance H： ±0.20mm

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.

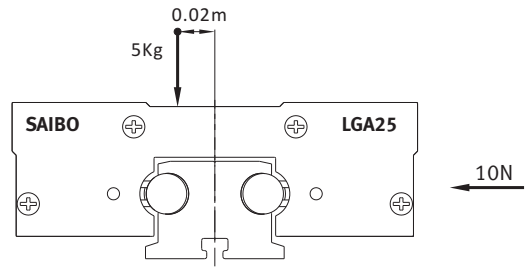
$$\textbf{Life(km)} = \frac{100}{(0.03+0.97LF*f)^3}$$

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 Fy max, Fz max, Mx max, My max, Mz max 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

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

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

$$= 4716\text{km}$$

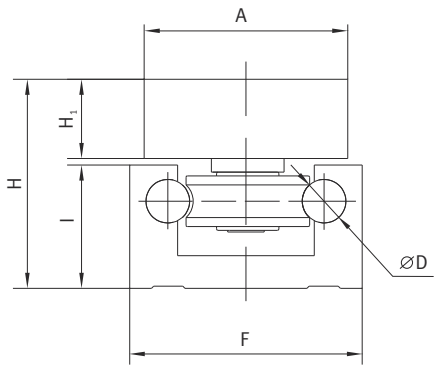
LGB linear guide

Construction LGB linear guide systems are designed for compact space application. The carriages are in narrow structures. Railway, narrow carriage and lubrication cover are its basic construction.

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

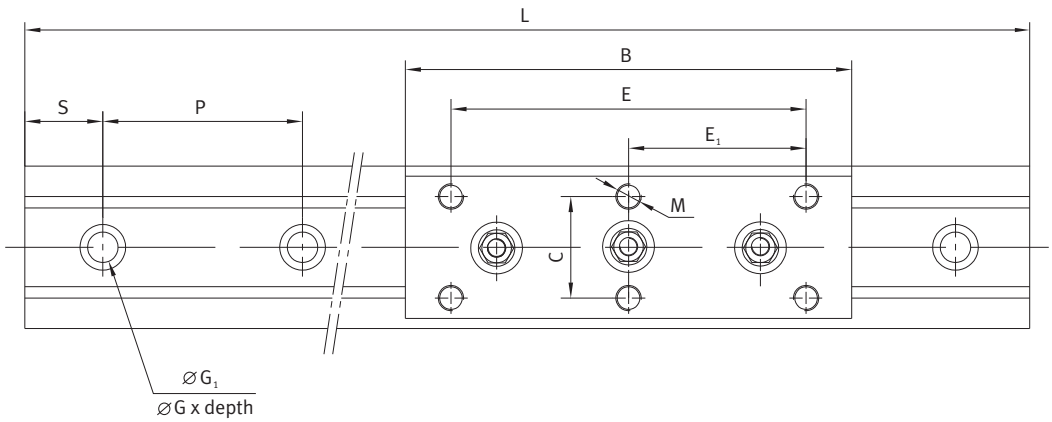
Carriage Anodized aluminum alloy plate
3 pieces double row balls bearings(Rollers)
Eccentric bolt used for adjust the clearane/preload
Optional lubrication covers with oil soaked felt wipers

Feature
1.High speed, Low friction and Low noise
2.Preload is adjustable
3.Narrow body for compact application
4.Optional Lubrication covers



Type	Assembly Dimensions		Carriage Dimensions					
	H	F	A	B*	C	E	E_1	
SB-LGB15	28.8	32	28	88	20	70	—	
SB-LGB20	35.5	47	47	108	38	50	—	
SB-LGB25	43	65	64	150	47	130	65	

* This size does not include plastic cover's thickness. All size plastic cover's thickness is 2.5mm. So covered carriages' length must add 5.0mm to size B.



			Railway Dimensions						
	H_1	M	D	Gxdepth	G_1	I	S	P	Lmax
	10.9	4xM5	6	7.5x2.5	4.5	17	30	60	3000
	11.5	4xM6	8	9.5x5	5.5	21.75	30	60	3000
	14.7	6xM8	10	11x4	6.5	26.5	30	60	3000

Setting clearance - free

None clearance is necessary for system's rigidity and stability. LGB series carriage has two concentric bolts on both sides and one eccentric bolt in the center along the railway. This eccentric bolt is used for setting clearance-free.

1. Tighten concentric bolts.

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

3. Rotate the eccentric bolts with internal hexagonal wrench in the end of the eccentric bolt to adjust the clearance. Adjust the clearance to zero.

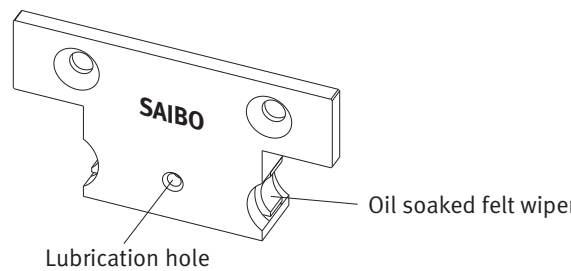
4. Slide the carriage by hand and adjust to the extent where there causes a slight slipping resistance.

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 bolt will get pre-load. Appropriate pre-load should be decided according to application. Over pre-load will decrease system's life. Please be careful.

Lubrication

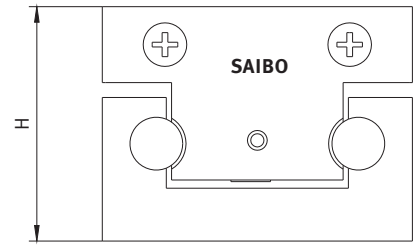


Plastic lubrication cover contains oil soaked felt wipers which can be re-lubricated via lubrication hole. This lubrication cover is optional, not included in standard carriage.

Working parameter

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

Accuracy

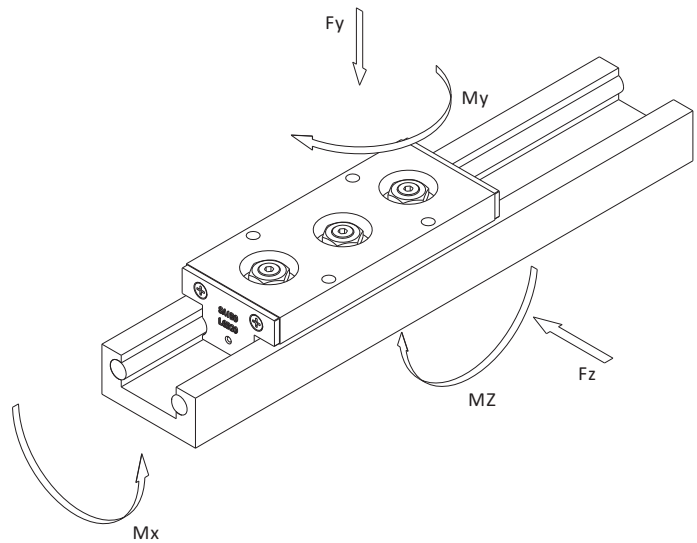


Tolerance H： ±0.20mm

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-LGB15	330	1000	1.8	12	5.5
SB-LGB20	520	1200	6.6	45	15
SB-LGB25	1200	4000	19	120	50

Life calculation

SAIBO designed LGB series load capacity according to basic life of 100km for each type. So after customers designed system's actual load, system's life could be calculated via below formula.

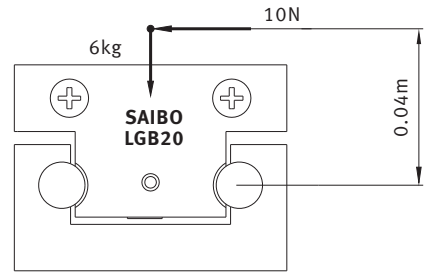
$$\textbf{Life(km)} = \frac{100}{(0.03+0.97LF*f)^3}$$

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-LGB20 as calculation example. This system loaded as blow 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 = 6 kg x 9.8 (gravity) = 58.8 N

Fz = 10 N

Mx = 10 x 0.04 = 0.40 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

$$LF = \frac{58.8}{520} + \frac{10}{1200} + \frac{0.40}{6.60} + \frac{0}{Mymax} + \frac{0}{Mzmax} = 0.182$$

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

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

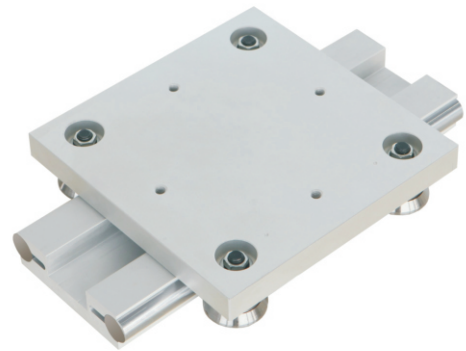
$$= \frac{100}{(0.03+0.97*0.182*1.1)^3}$$

$$= 8849\text{km}$$

LGC linear guide

Construction: LGC railway is wide structure. This linear guide can be used to replace the system built with two railways and has big load capacity and moment capacity. Especially the moment load is much bigger as two shafts' span is big.

Although railway's width is big, light-weight aluminum alloy still keep railway's weight light. In the body of the railway, there is a big U-shape groove. This groove is used for installing driven parts such as rack and gear, timing belt.



Feature:

1.High speed, Low friction and Low noise
2.Big load capacity and moment capacity
3.Pre-load is adjustable
4.Accurate and stable

Advantage compare with two railways

Compare to the structure by using two railways, LGC linear guide's advantages are:

1.Easy to install the railway.

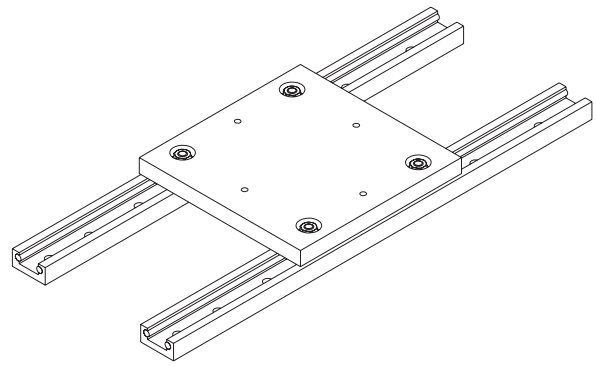
When install two railways, two railways' parallel must be controlled strictly. And it is a trouble. LGC linear guide does not need this job.

2.Dia20 shaft make system's rigidity and strength stronger.

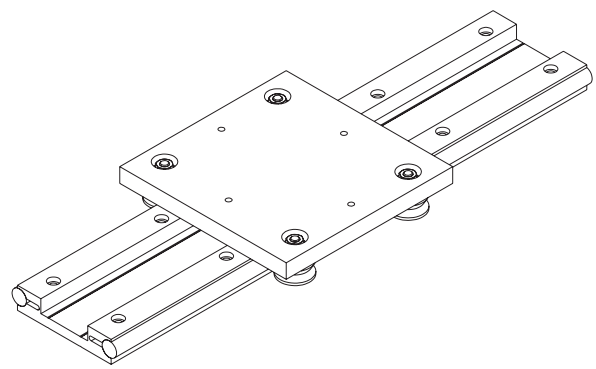
This can make carriage's load capacity much bigger. And also the system's stability will improve a lot.

3.Increase system's life.

According to life calculation formula, Life Factor (LF) is the main determinant of the life. At same load capacity, LGC linear guide's LF will be much smaller than by using two railways. This will increase system's life.



System built with two small railways.



Same size carriage, SB-LGC carriage's load capacity is much bigger than the system built with two railways.

Setting clearance - free

None clearance is necessary for system's rigidity and stability. LGC series use 2 concentric bolts 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 wrench 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.

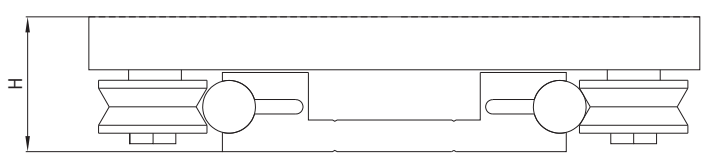
Setting Pre-load

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 application. Over pre-load will decrease system's life. Please be careful.

Working parameter

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

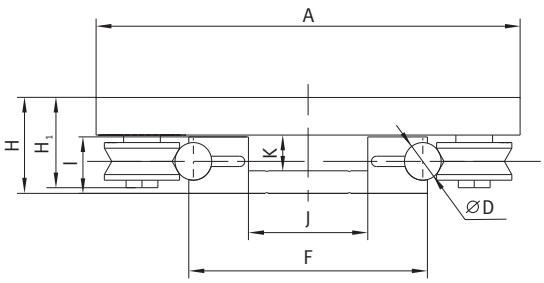
Accuracy



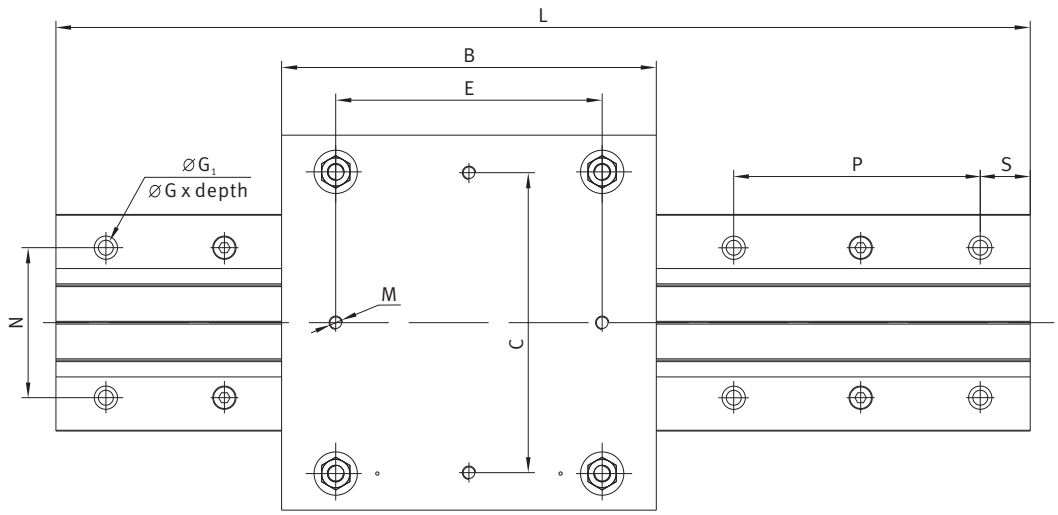
Tolerance H： ±0.20mm

Note: Higher accuracies are available upon request.

Dimension



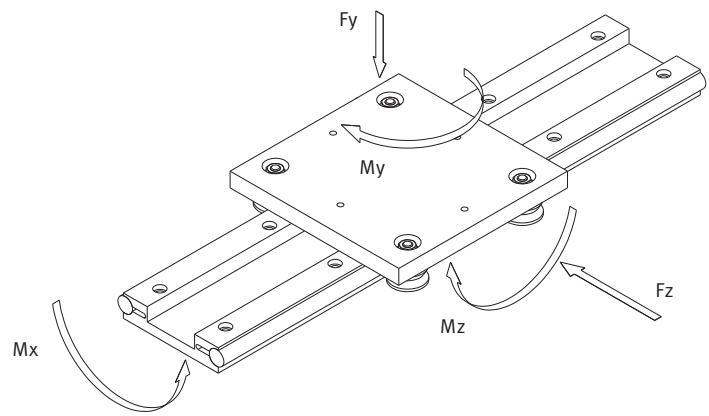
Type	Assembly Dimensions		Carriage Dimensions						
	H	F	A	B	C	E	H_1	M	
SB-LGC100	51	99	200	200	140	140	48	4-M8	
SB-LGC130	51	130	230	230	180	160	48	4-M8	



	Railway Dimensions									
	D	Gxdepth	G_1	I	J	K	N	S	P	Lmax*
	20	14x5.5	9	30	40	18	62	30	300	6000
	20	14x5.5	9	30	65	18	90	30	300	6000

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-LGC100	6000	6000	190	210	210
SB-LGC130	6000	6000	240	240	240

Life calculation

SAIBO designed LGC linear guide load capacity according to basic life of 100km. System's life in km could be calculated using below formula.

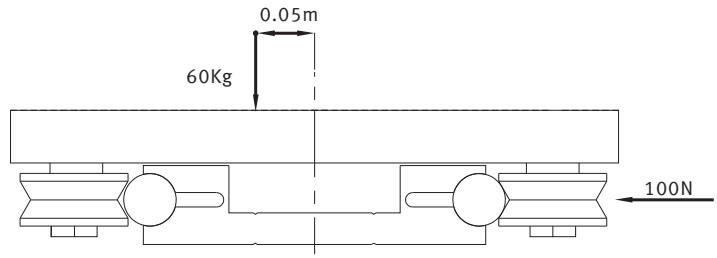
$$\textbf{Life(km)} = \frac{100}{(0.03+0.97LF*f)^3}$$

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 we select a load example to calculate the life. Sample's load is 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 = 60kg x 9.8 (gravity) = 588 N

Fz = 100 N

Mx = 588 x 0.05 = 29.4 N·m

My = 0

Mz = 0

Take parameters Fy max, Fr max, Mx max, My max, Mz max from table and then fill in the formula

$$LF = \frac{588}{6000} + \frac{10}{6000} + \frac{29.4}{240} + \frac{0}{Mymax} + \frac{0}{Mzmax} = 0.2372$$

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

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

$$= \frac{100}{(0.03+0.97*0.2372*1.1)^3}$$

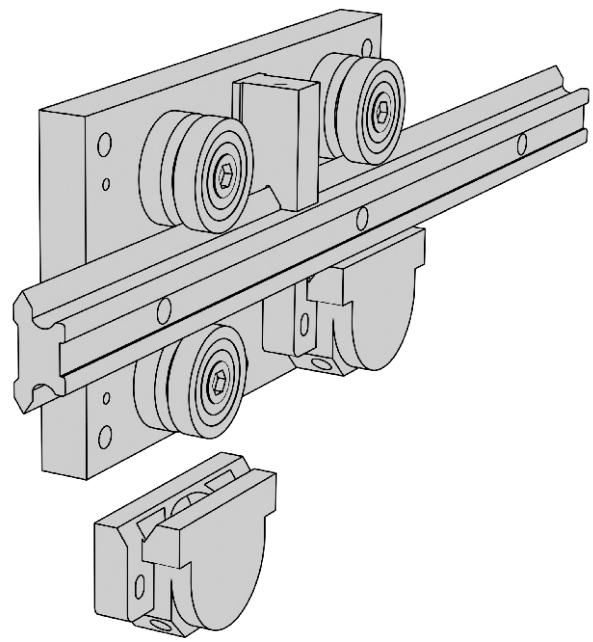
$$= 4405\text{km}$$

PARO TRACK SYSTEM

SAIBO provides a wide choice of sizes and options to build linear, ring and track motion system. All of components including linear guides, ring guides, bearings and lubricate parts are designed standard and modularized. Customer can select and build motion system easy and quickly.

Linear Motion Components

Construction: Please see below figure. This system includes Double Edge Space Rail, Concentric Bearing, Eccentric Bearing, Cap Seals and Lubricator. Rail, bearing and other components are designed interchangeable with all of international standard suppliers.

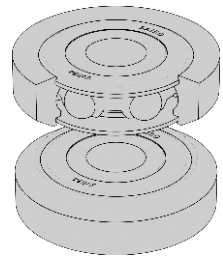


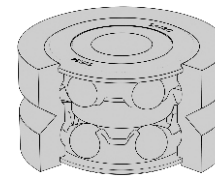
Double Edge Space Rail

Made of European high quality bearing steel
Deep hardened in working surfaces for high wear resistance
Ground Double 70° V working edges together to ensure parallelism
Soft rail body for customization machining process
Provide 3 standard sizes for customer's selection
Any length up to 5.5meters without connection
Longer length (Unlimited) can be achieved by Connection
Supply two precision types, ground and un-ground

Concentric / Eccentric Bearing

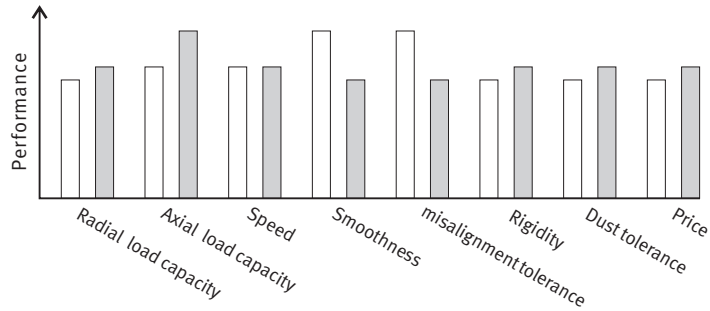
Made of high quality bearing steel
Whole body hardened for high wear resistance
Supply Twin type and Double row type bearings
(See below figure)
Long bolt for thick carriage block
Short bolt for thin carriage block
Concentric / Eccentric bolt supplied





Twin bearing

Double row bearing



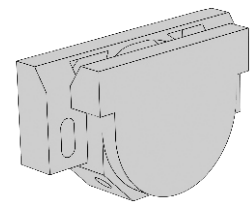
Cap Seal

Protect bearing against dust

Protect operator safety

Lubricated felt wiper contact rail's working surface to increase load capacity and life

Standard and interchangeable



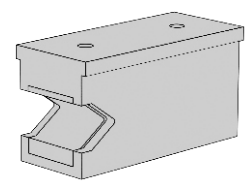
Lubricate Wiper

Lubricated felt wiper contact rail's working surface to increase load capacity and life

Lubricated felt wiper is pushed lightly by a small spring to ensure low friction with the rail's working surface

Easy to fill lubricate oil from its fill hole

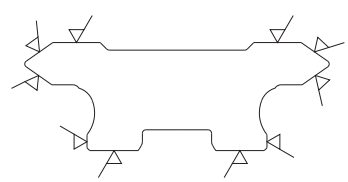
Standard and interchangeable



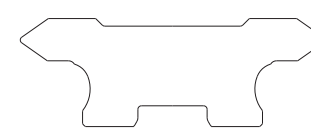
Precision grade

SAIBO provides two grades of precision. P1 ground and P3 unground. Here we must emphasize that P3 grade's motion is also very smooth and stable. It is fit for smooth running without very high precision and low cost request. But when linear rail connect ring rail, it must be P1 grade.

$\sqrt{\nabla}$ Means ground surface

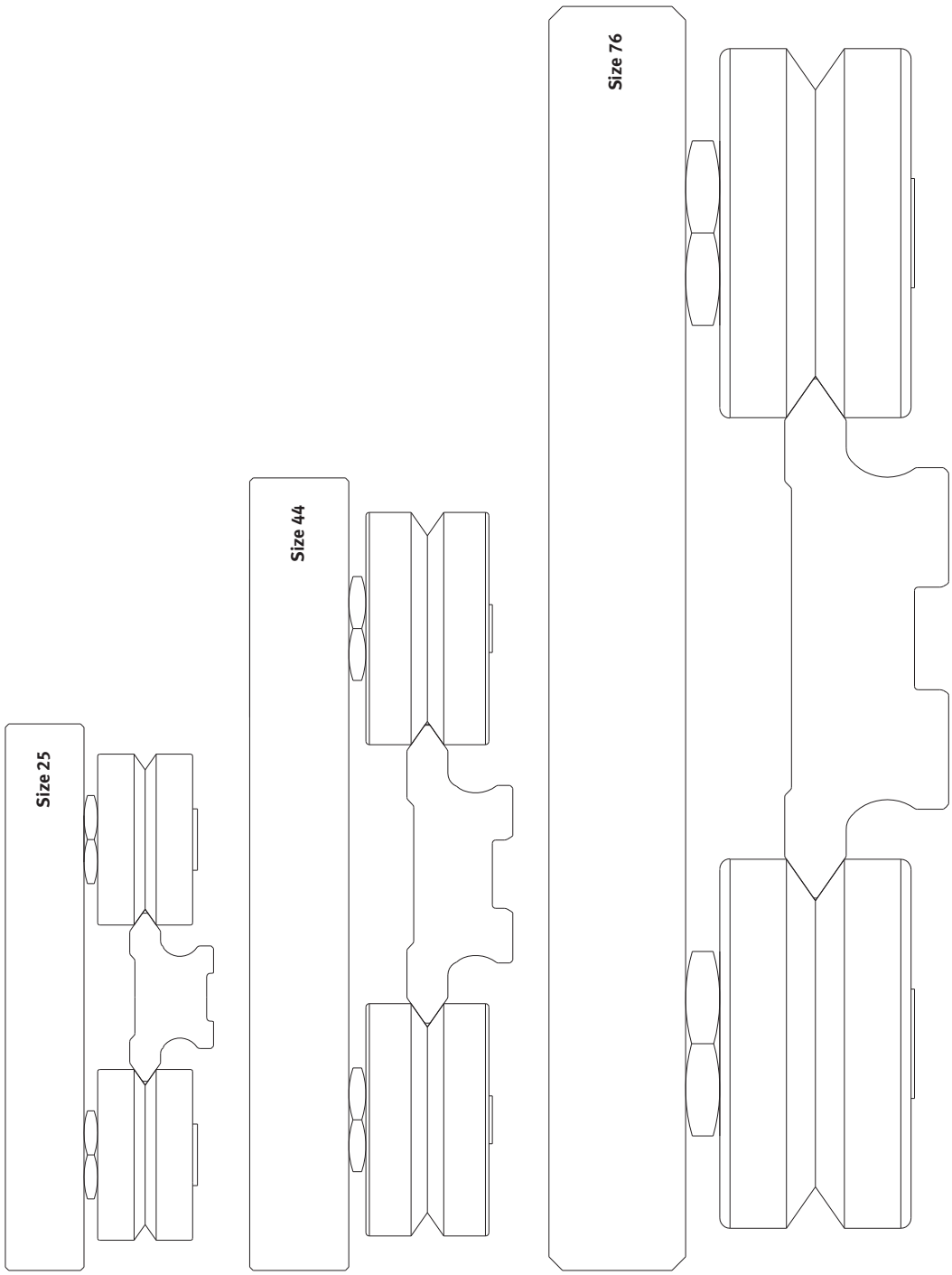


P1 grade

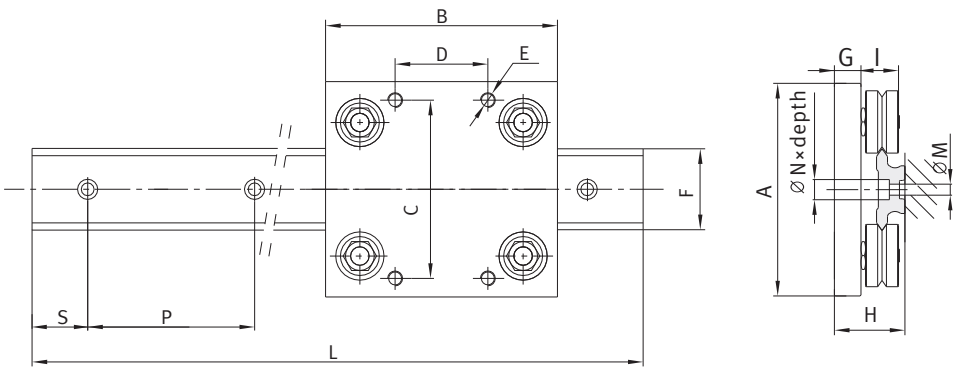


P3 grade

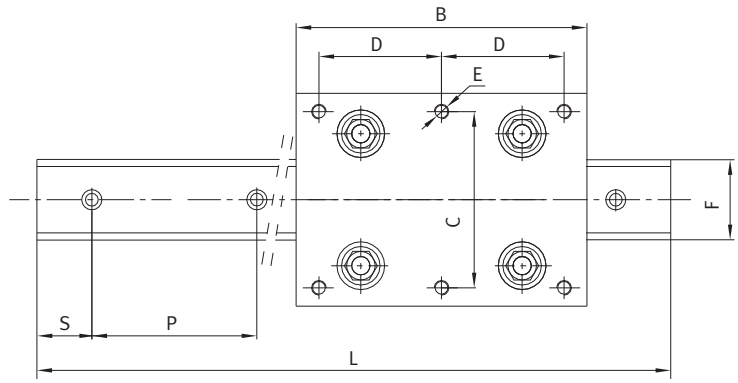
Full size overview



Assembly:



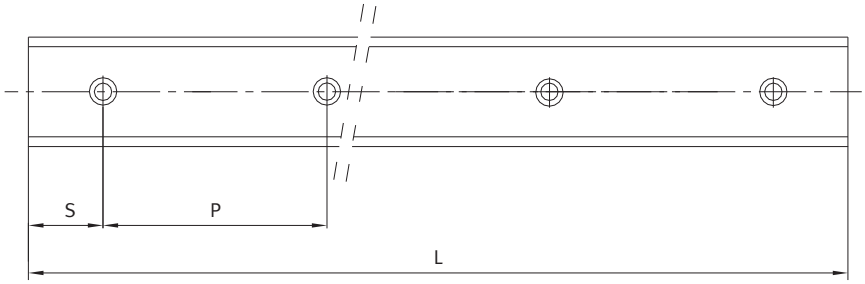
Railway	Carriage						
		A	B	C	D	E	
SB-LGV25XL	**SB-SLC25A**	80	80	65	24	4xM6	
	SB-SLC25B		135		60	6xM6	
	SB-SLC25C		180		82	6xM6	
SB-LGV44XL	**SB-SLC44A**	116	125	96	50	4xM8	
	SB-SLC44B		180		80	6xM8	
	SB-SLC44C		225		103	6xM8	
SB-LGV76XL	**SB-SLC76A**	185	200	160	90	4xM10	
	SB-SLC76B		300		135	6xM10	
	SB-SLC76C		400		185	6xM10	



Dimension											
	F	G	H		I	M	N x depth	P	S	Lmax	
			P1	P3						P1	P3
	25	11.5	30.5	30.85	16.5	5.5	10x5.5	90	45	1500	5500
	44	14.5	38.5	38.85	21	7	11x7	90	45	2000	5500
	76	20	58.5	58.85	33.5	11	20x12	90	45	2000	5500

Components

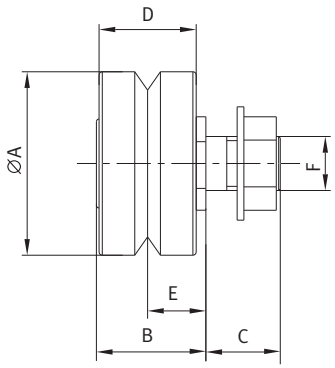
Railway



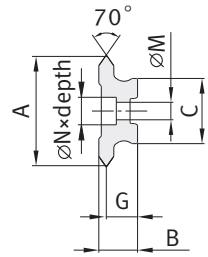
Spacer railway

Type	A		B		C		
	P1	P3	P1	P3	P1	P3	
SB-LGV25XL	25	25.2	12.25	12.9	15	15.5	
SB-LGV44XL	44	44.2	15.5	16.2	26	26.5	
SB-LGV76XL	76	76.2	24	24.7	50	50.5	

Bearing



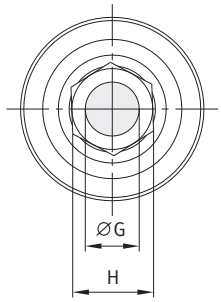
Type	Dimension										
	A	B	C	D	E	F	G	H	I	J	
SVR-25C	25	16.4	11.3	14	9	M8	8	13	3	–	
SVR-25E										0.75	
SVR-34C	34	21	14.3	18	11.5	M10	10	15	4	–	
SVR-34E										1	
SVR-54C	54	33.5	19.8	28	19	M14	14	27	6	–	
SVR-54E										1.5	



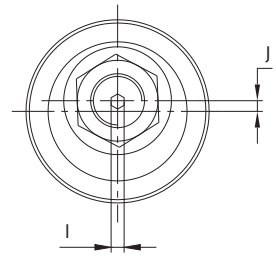
P1

G		M	N x depth	P	S	Lmax	
P1	P3					P1	P3
10	10.35	5.5	10x5.5	90	45	1400	5500
12.5	12.85	7	11x7	90	45	2000	5500
19.5	19.85	11	20x12	90	45	1900	5500

Concentric(C)

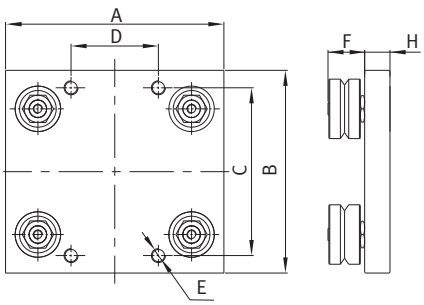


Eccentric(E)

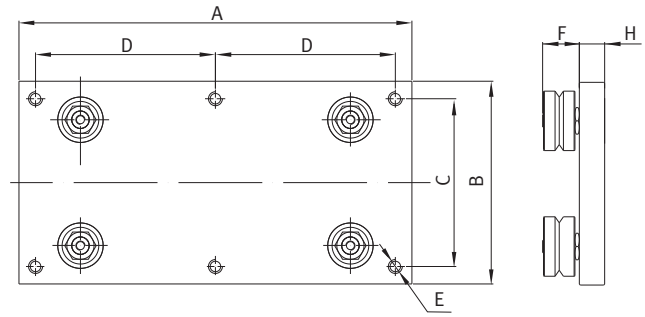


	Max working load capacities(N)				Bearing Static(Co)and Dyna ic(C) Load Capacities(N)							
	Double Row Bearings		Twin Bearings		For Double Row Bearings				For each of two Twin Bearings			
					Radial loads		Axial Loads		Radial loads		Axial Loads	
	Radial	Axial	Radial	Axial	Co	C	Co	C	Co	C	Co	C
	1500	400	600	320	2646	5214	821	1618	1333	3237	326	791
	3000	900	1400	800	5018	9293	1362	2523	2600	5291	557	1270
	5000	2500	3200	1800	12899	21373	2777	4601	6657	13595	1136	2320

Standard Carriage Dimension



SB-SCP A

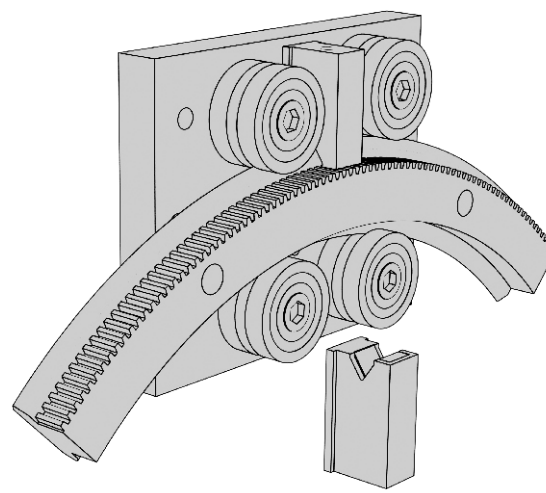


SB-SCP B/C

Type	Applicable railway	Applicable bearing	A	B	C	D	E	F	H	Max working load capacities(N)			
										Double Row Bearings		Twin Bearings	
										Fy	Fz	Fy	Fz
SLC25A	LGV25XL	SVR-25C SVR-25E	80	80	65	24	4xM6	16.5	11.5	1600	3000	1280	1200
SLC25B			135			60	6xM6						
SLC25C			180			82	6xM6						
SLC44A	LGV44XL	SVR-34C SVR-34E	125	116	96	50	4xM8	21	14.5	3600	6000	3200	2800
SLC44B			180			80	6xM8						
SLC44C			225			103	6xM8						
SLC76A	LGV76XL	SVR-54C SVR-54E	200	185	160	90	4xM10	33.5	20	10000	10000	7200	6400
SLC76B			300			135	6xM10						
SLC76C			400			185	6xM10						

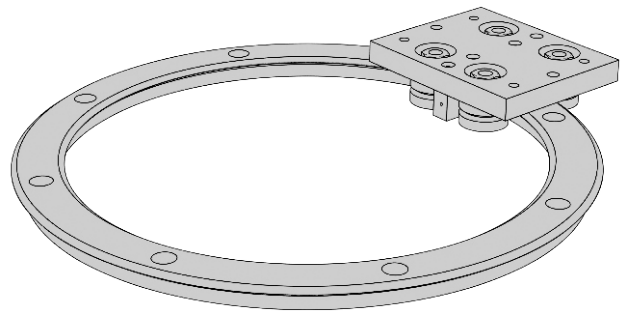
Ring motion components

Construction: Please see below figure. This system includes Double edge V RingRail, Concentric Bearing, Eccentric Bearing, Carriage block, Lubricator. Gear teeth can be cut in the rail's space inside or outside of the rings to make drive compact and easy. Rail, bearing and other components are designed interchangeable with all of international standard suppliers.



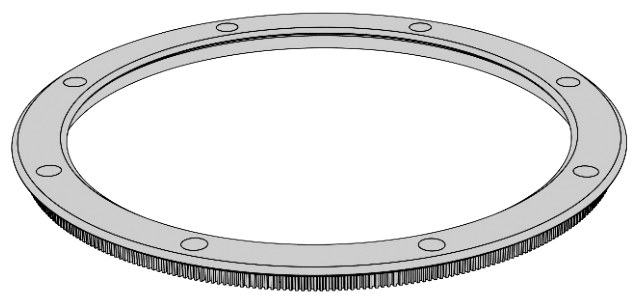
Double V-Edge Ring Rail

Made of high quality bearing steel
Deep hardened in working surfaces for high wear resistance
Ground Double 70° V working edgesensure parallelism
All surfaces are ground for precision
Provide wide range of standard sizes for customer's selection
Customized assembly holes are available



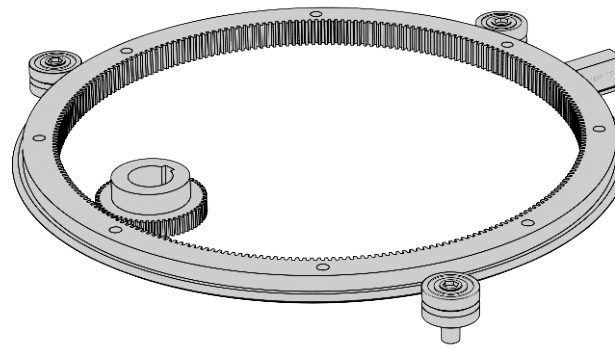
Gear Integrated Double V-Edge Ring Rail

Made of high quality bearing steel
Deep hardened in working surfaces for high wear resistance
Ground Double 70° V working edges ensure parallelism
All surfaces are ground for precision
Provide wide range of standard sizes for customer's selection
Gear teeth are available inside or outside of the ring rail's spacer
Customized assembly holes are available



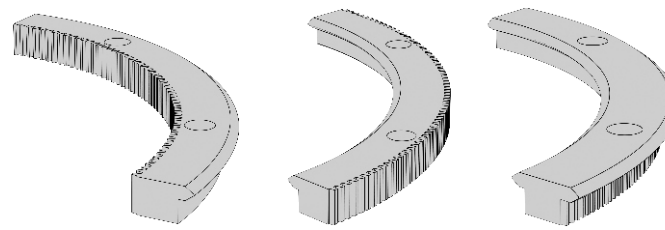
Single V-Edge Ring Rail

Made of high quality bearing steel
Deep hardened in working surfaces for high wear resistance
Ground 70° V working edges
All surfaces are ground for precision
Provide wide range of standard sizes for customer's selection
Gear teeth are available inside or outside of the ring rail's spacer
Customized assembly holes are available



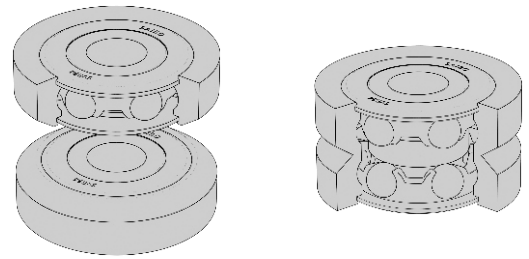
V Ring Rail Segment

All above mentioned ring rails could be cut to segment
Segment length could be customized
Double Edge ring rail Segment could be connected to Linear Double Edge Rail to make circle motion system

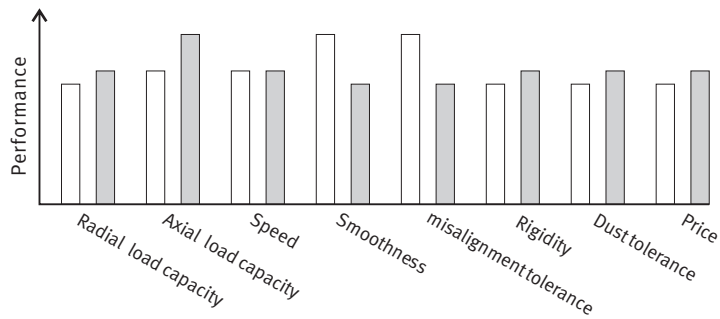


Concentric / Eccentric Bearing

Made of high quality bearing steel
Whole body hardened for high wear resistance
Supply Twin type and Double row type bearings
(See below figure)
Long bolt for thick carriage block
Short bolt for thin carriage block
Concentric / Eccentric bolt supplied

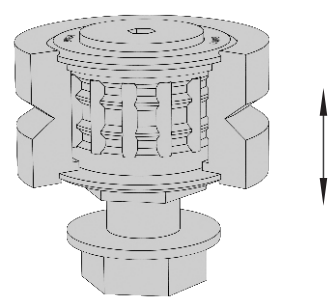


Twin type bearing Double row type bearing



Floating Bearing

Outer ring could float in axial direction for tolerance of height
Made of high quality bearing steel
Whole body hardened for high wear resistance
Long bolt for thick carriage block
Short bolt for thin carriage block
Concentric / Eccentric bolt supplied



Lubricate

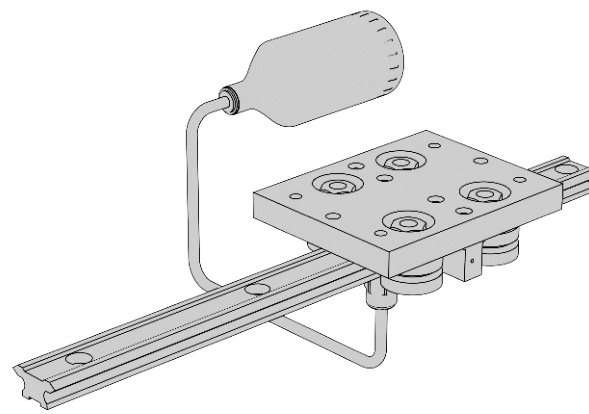
Lubricated felt wiper contact rail's working surface to increase load capacity and life

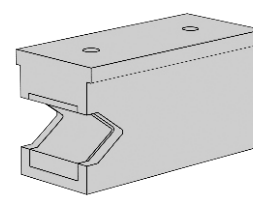
Lubricated felt wiper is pushed lightly by a small spring to ensure low friction with the rail's working surface

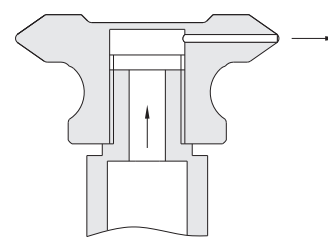
Oil charging holes supplied for the Track Motion System

Automatic lubricate bleed could connect to the rail's oil charging holes very easily.

Standard and interchangeable



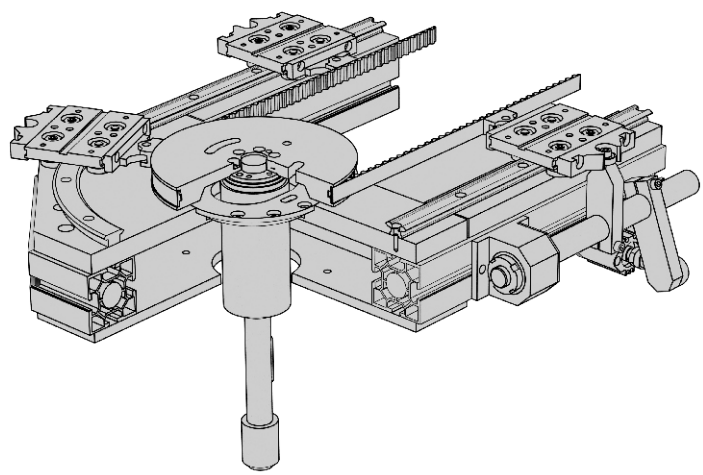




APPLICATION Examples

Track Motion System with Belt Driven

Whole assembled complete machine are available
Whole drive components are available
Position and locking system integrated
Automatic lubricate system integrated
High-load and high-precision angular contact bearings used in driven shaft.
Zero axial play for all driven shafts



Rectangle Circle System with Chain Driven

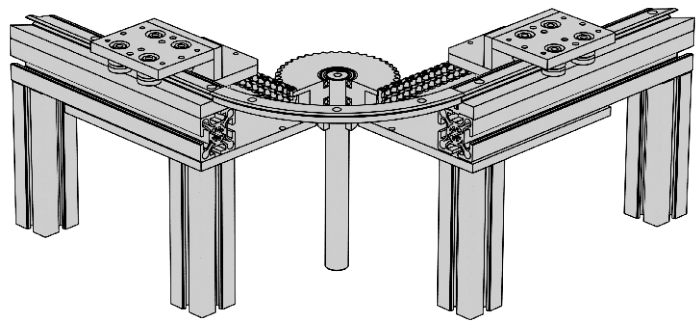
Whole assembled complete machine are available

Whole drive components are available

Torque Limiter to protect overload

Any length available for linear rails in two directions

Carriage could be add or remove very conveniently



Track Motion System Mounted in Parallel

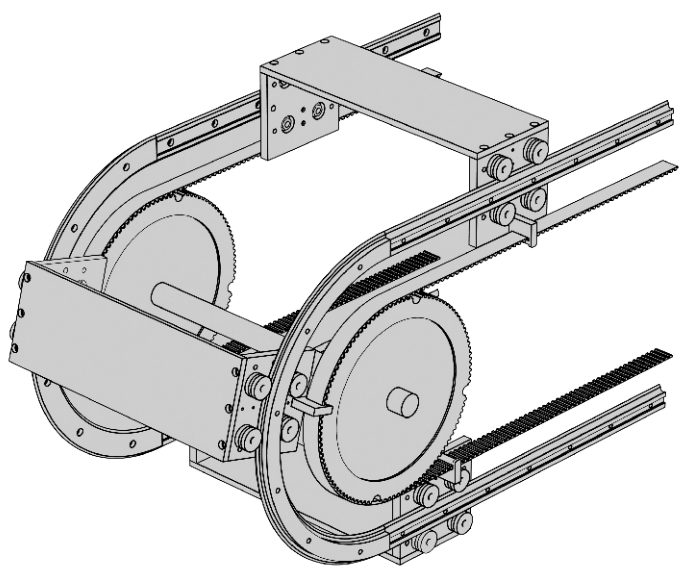
Whole assembled complete machine are available

Whole drive components are available

Floating bearing used in one side to tolerant axial play

Fit for long size component and tooling

Heavy duty teeth belt driven enable motion smooth and quiet



S Bend Track

Bogie frame applied to S bend track and different radii

Heavy load capacity up to 1000Kg

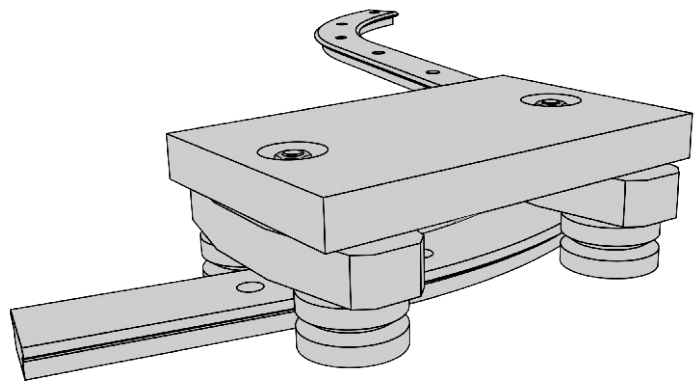
Large platform design for big size mounting

Bogie rotates smooth

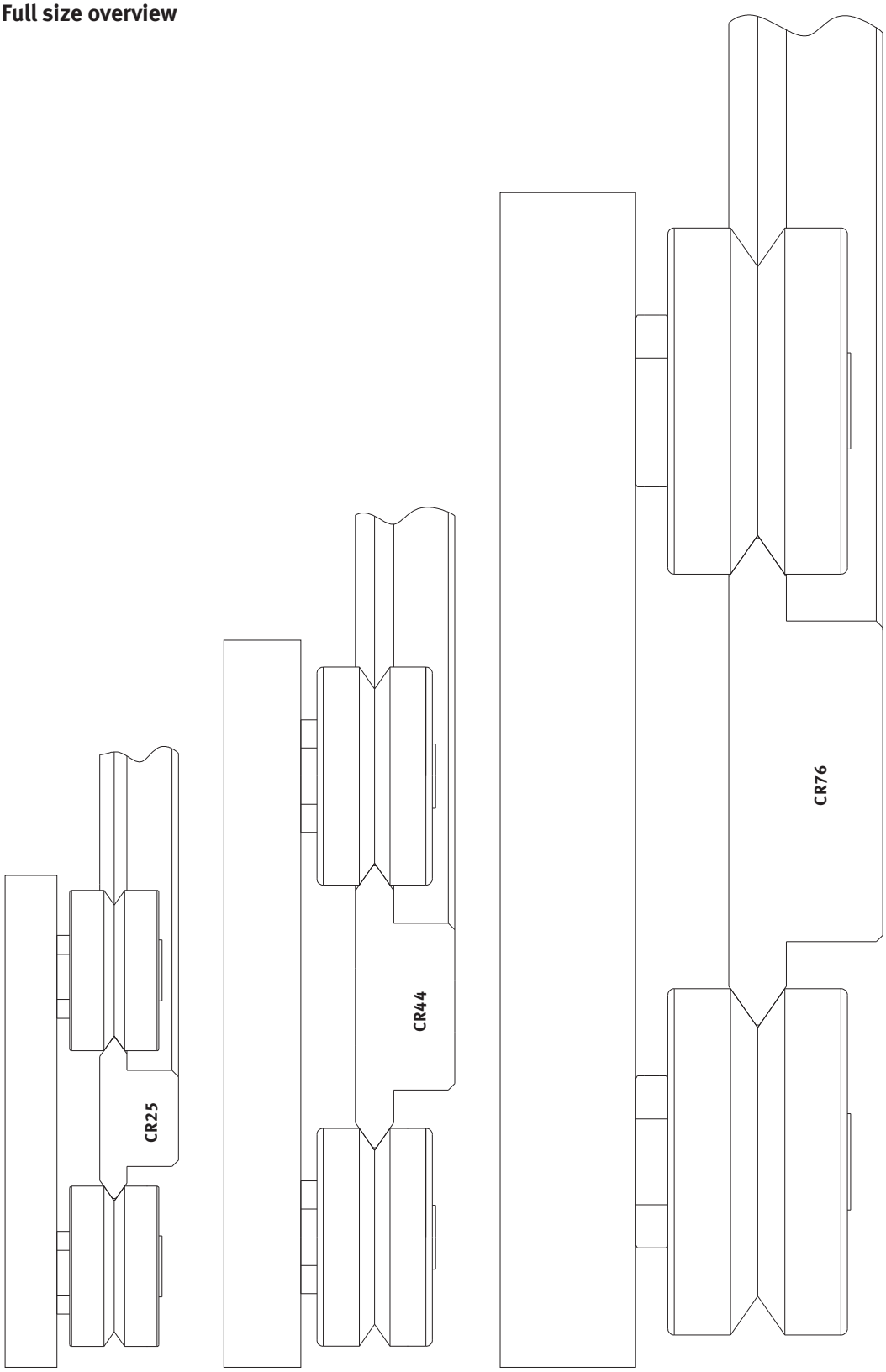
Available for rail size 25, 44, 76

Customized track design

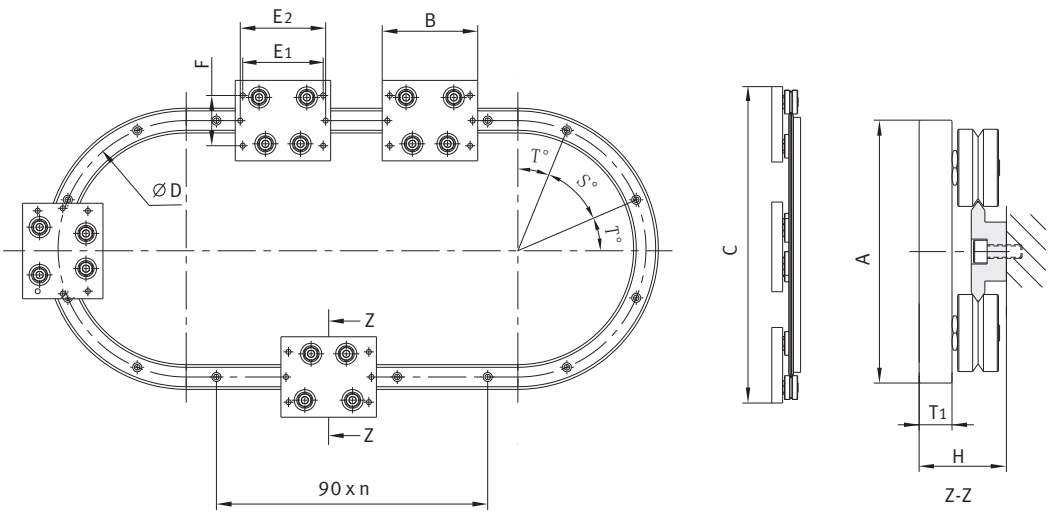
Driven equipment could be supplied according to specific bend track



Full size overview



Oval Track System



Assembly type	Components			
	Linear railway	Ring railway	Carriage	
SB-LGV25XL-CR25 159 R180	**SB-LGV25**	**SB-CR25 159 R180**	**SB-SRC25 159**	
SB-LGV25XL-CR25 255 R180		**SB-CR25 255 R180**	**SB-SRC25 255**	
SB-LGV25XL-CR25 351 R180		**SB-CR25 351 R180**	**SB-SRC25 351**	
SB-LGV44XL-CR44 468 R180	**SB-LGV44**	**SB-CR44 468 R180**	**SB-SRC44 468**	
SB-LGV44XL-CR44 612 R180		**SB-CR44 612 R180**	**SB-SRC44 612**	
SB-LGV76XL-CR76 799 R180	**SB-LGV76**	**SB-CR76 799 R180**	**SB-SRC76 799**	
SB-LGV76XL-CR76 1033 R180		**SB-CR76 1033 R180**	**SB-SRC76 1033**	
SB-LGV76XL-CR76 1267 R180		**SB-CR 1267 R180**	**SB-SRC76 1267**	
SB-LGV76XL-CR76 1501 R180		**SB-CR 1501 R180**	**SB-SRC76 1501**	

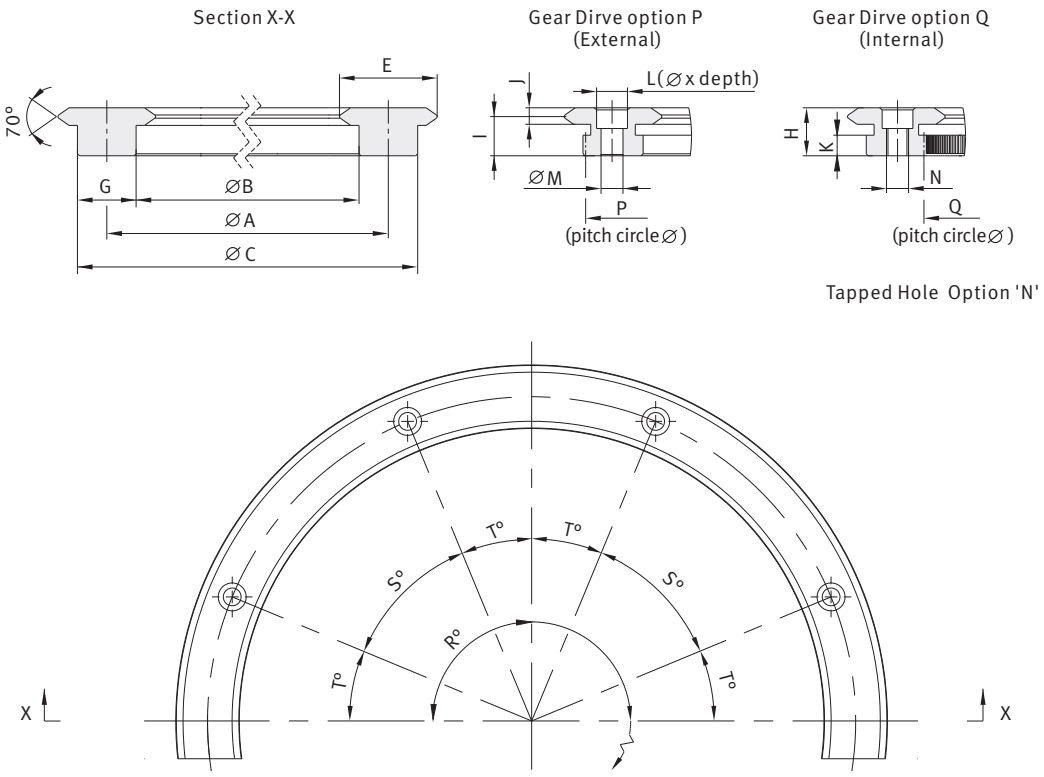
Type Code Details

SB- LGV 25 X2000 -CR25 159 R180

- R180: Segement angular: 180°
- 159: Ring railway diameter
- CR25: Ring railway size
- X2000: Railway length
- 25: Railway size
- LGV: Linear railway
- SB-: SAIBO motion symbol

	Dimension										
	A	B	C	D	E_1	E_2	F	H	T_1	S°	T°
	80	95	239	159	85	80	50	30.5	11.5	45	22.5
		100	335	255	80	85				45	22.5
		105	431	351	85	90				30	15
	116	145	584	468	120	125	75	38.5	14.5	30	15
		150	728	612	125	130				22.5	11.25
	185	190	984	799	160	165	100	58.5	20	22.5	11.25
		210	1218	1033	180	185				18	9
		250	1452	1267	205	225				18	9
		270	1686	1501	225	245				18	9

Ring Rail



Type	Applicable Bearing	A	B	C	E	G	H	I	J	K	L (Ø×depth)	
CR25 159	SVR-25	159	143.6	174.4	25	15	12.25	10	4.2	5.25	9x6	
CR25 255	SVR-25	255	239.6	270.4	25	15	12.25	10	4.2	5.25	9x6	
CR25 351	SVR-25	351	335.6	366.4	25	15	12.25	10	4.2	5.25	9x6	
CR44 468	SVR-34	468	442	494	44	26	15.5	12.5	6	7	11x7	
CR44 612	SVR-34	612	586	638	44	26	15.5	12.5	6	7	11x7	
CR76 799	SVR-54	799	748.5	849.5	76	50	24	19.5	9	12	20x13	
CR76 1033	SVR-54	1033	982.5	1083.5	76	50	24	19.5	9	12	20x13	
CR76 1267	SVR-54	1267	1216.5	1317.5	76	50	24	19.5	9	12	20x13	
CR76 1501	SVR-54	1501	1450.5	1551.5	76	50	24	19.5	9	12	20x13	

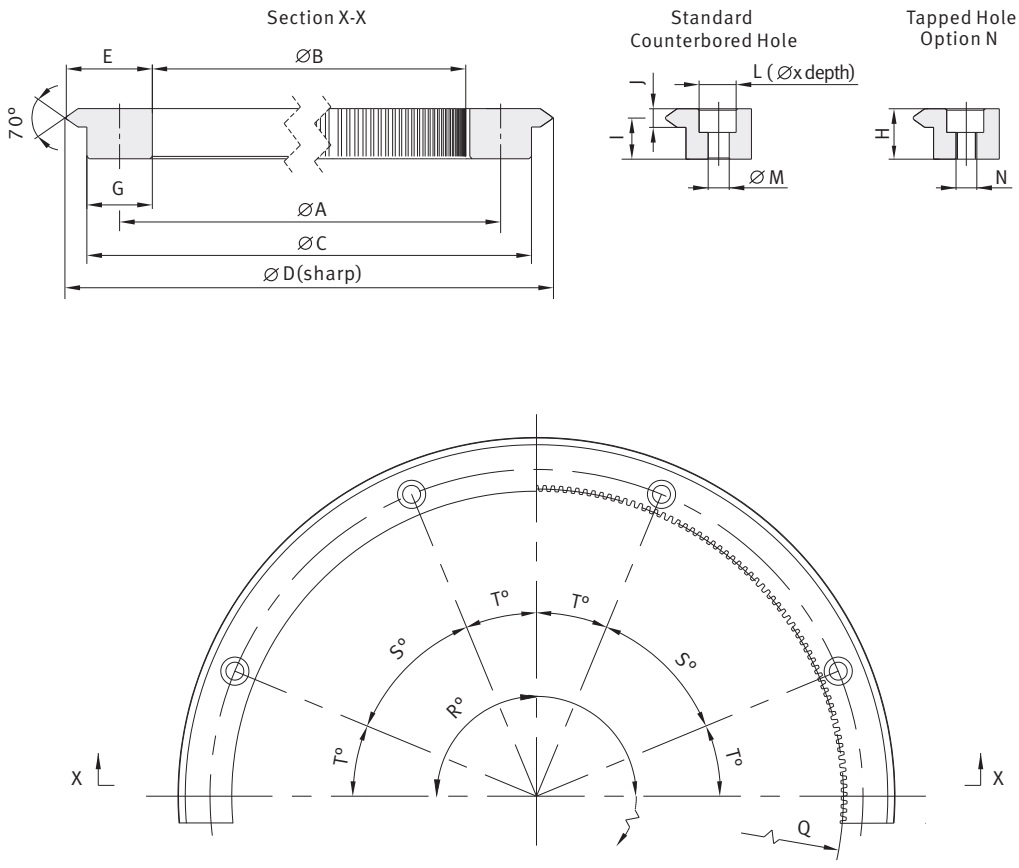
Type Code Details

CR25 351 R180 (P) (Q) (N)

- (N) Screw holes option
- (Q) Internal gear option
- (P) External gear option
- R180 Segement angular 90° 、180° 、full 360° Ring
- CR25 351 Ring rail size

	M	N	External Gear			Internal Gear			Hole number (R=360°)	Holes' Position ±0.2		Weight (kg) (R=360°)
			P	m	Teeth Qty (R=360°)	Q	m	Teeth Qty (R=360°)		S°	T°	
	5.5	M8	172.8	0.8	216	145.6	0.8	182	8	45	22.5	0.77
	5.5	M8	268.8	0.8	336	241.6	0.8	302	8	45	22.5	1.2
	5.5	M8	364.8	0.8	456	337.6	0.8	422	12	30	15	1.65
	7	M8	492	1	492	444	1	444	12	30	15	5.1
	7	M8	636	1	636	588	1	588	16	22.5	11.25	6.7
	11	M16	846	1.5	564	751.5	1.5	501	16	22.5	11.25	25
	11	M16	1080	1.5	720	985.5	1.5	657	20	18	9	32
	11	M16	1314	1.5	876	1219.5	1.5	813	20	18	9	41
	11	M16	1548	1.5	1032	1453.5	1.5	969	20	18	9	48.7

Ring Rail



Type	Applicable Bearing	A	B	C	D	E	G	H	I	
CES 184	SVR-25	159	142	174	184.74	20.8	16	12.25	10	
CES 280	SVR-25	255	238	270	280.74	20.8	16	12.25	10	
CES 376	SVR-25	351	334	366	376.74	20.8	16	12.25	10	
CEM 505	SVR-34	468.5	447.5	487.5	506.24	28.8	20	15.5	12.5	
CEM 655	SVR-34	618.5	597.5	637.5	656.24	28.8	20	15.5	12.5	
CEM 874	SVR-54	820	788	848	874.74	42.8	30	24	19.5	

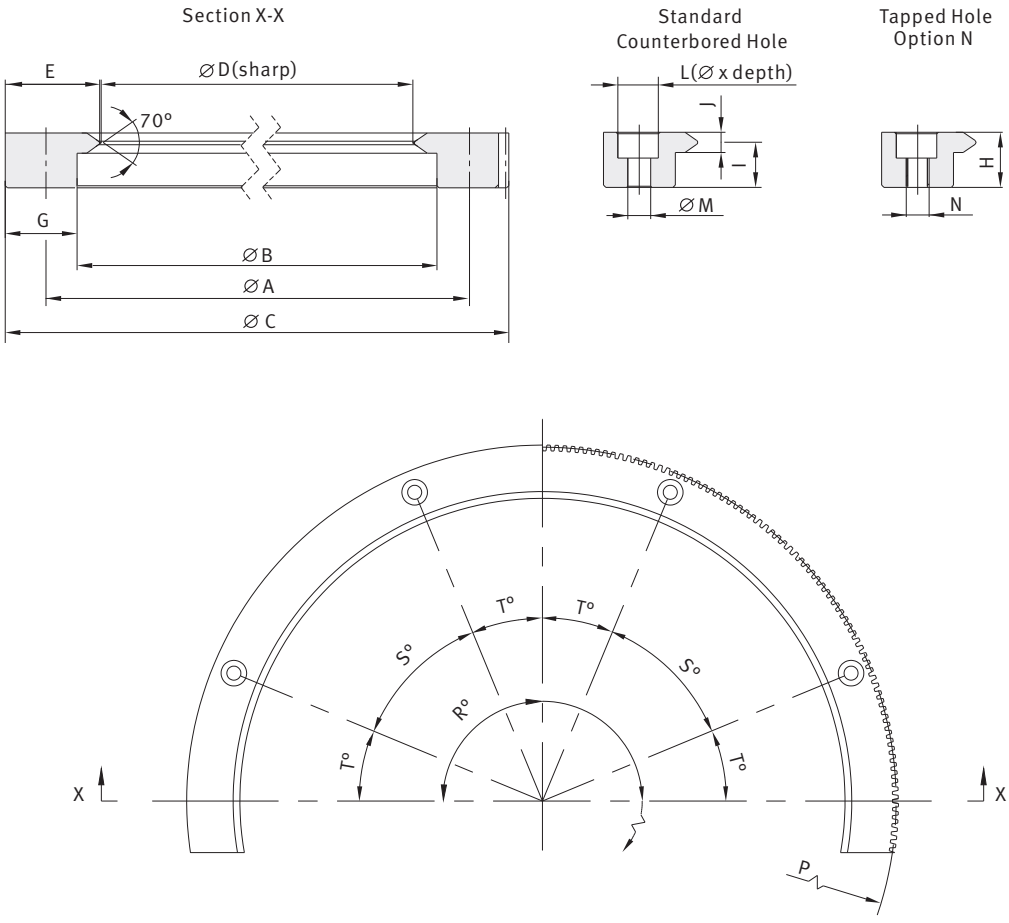
Type Code Details

CES 376 R180 (Q) (N)

- (N) Screw holes option
- (Q) Internal gear option
- R180 Segement angular 90° 、180° 、full 360° Ring
- CES 376 Ring rail size

	J	L (⌀×depth)	M	N	Internal Gear			Hole number (R=360°)	Holes' Position ±0.2		Weight (kg) (R=360°)
					Q	m	Teeth Qty (R=360°)		S°	T°	
	4.5	10×5.5	5.5	M8	144	1	144	8	45	22.5	0.78
	4.5	10×5.5	5.5	M8	240	1	240	8	45	22.5	1.27
	4.5	10×5.5	5.5	M8	336	1	336	12	30	15	1.75
	6	11×6.5	7	M8	450	1.25	360	12	30	15	3.93
	6	11×6.5	7	M8	600	1.25	480	16	22.5	11.25	5.18
	9	18×10.5	11	M16	792	2	396	16	22.5	11.25	15.64

Ring Rail



Type	Applicable Bearing	A	B	C	D	E	G	H	I	
CIS 182	SVR-25	165	150	182	139.26	20.8	16	12.25	10	
CIS 278	SVR-25	261	246	278	235.26	20.8	16	12.25	10	
CIS 374	SVR-25	357	342	374	331.26	20.8	16	12.25	10	
CIM 482	SVR-34	461.5	442.5	482.5	423.76	28.8	20	15.5	12.5	
CIM 627	SVR-34	606.5	587.5	627.5	568.76	28.8	20	15.5	12.5	
CIL 820	SVR-54	788	760	820	733.26	42.8	30	24	19.5	

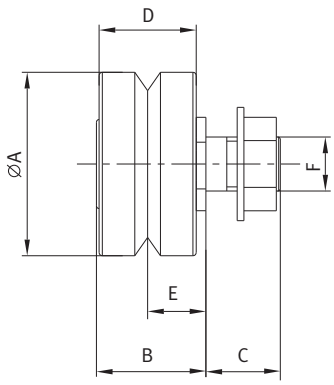
Type Code Details

CIS 374 R180 (P) (N)

- (N) Screw holes option
- (P) External gear option
- R180 Segement angular 90° 、180° 、full 360° Ring
- CIS 374 Ring rail size

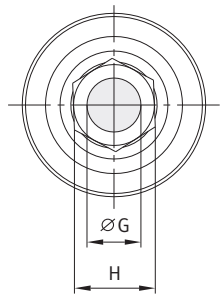
	J	L	M	N	External Gear			Hole number	Holes' Position ±0.2		Weight (kg) (R=360°)
					P	m	Teeth Qty (R=360°)	(R=360°)	S°	T°	
	4.5	10x5.5	5.5	M8	180	1	180	8	45	22.5	0.78
	4.5	10x5.5	5.5	M8	276	1	276	8	45	22.5	1.27
	4.5	10x5.5	5.5	M8	372	1	372	12	30	15	1.75
	6	11x6.5	6.8	M8	480	1.25	384	12	30	15	3.93
	6	11x6.5	6.8	M8	625	1.25	500	16	22.5	11.25	5.18
	9	18x10.5	11	M16	816	2	408	16	22.5	11.25	15.64

Concentric / Eccentric
Bearing Dimension

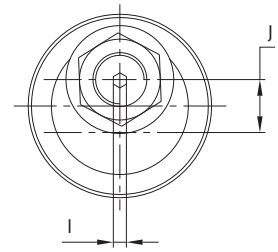


Type	Dimension										
	A	B	C	D	E	F	G	H	I	J	
SVR-25C	25	16.5	11.3	14	9	M8	8	13	3	–	
SVR-25DE										2	
SVR-34C	34	21	14.3	18	11.5	M10	10	15	4	–	
SVR-34DE										2.5	
SVR-54C	54	33.5	19.8	28	19	M14	14	27	6	–	
SVR-54DE										5.5	

Concentric(C)

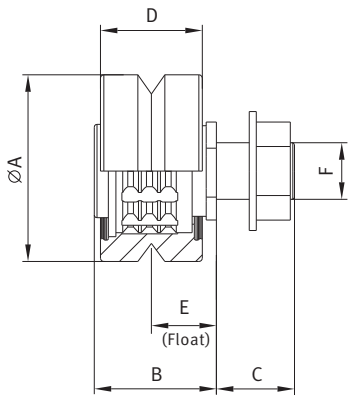


Eccentric(DE)



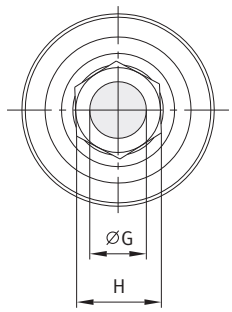
	Max working load capacities(N)				Bearing Static(Co)and Dyna ic(C) Load Capacities(N)							
	Double Row Bearings		Twin Bearings		For Double Row Bearings				For each of two Twin Bearings			
					Radial loads		Axial Loads		Radial loads		Axial Loads	
	Radial	Axial	Radial	Axial	Co	C	Co	C	Co	C	Co	C
	1500	400	600	320	2646	5214	821	1618	1333	3237	326	791
	3000	900	1400	800	5018	9293	1362	2523	2600	5291	557	1270
	5000	2500	3200	1800	12899	21373	2777	4601	6657	13595	1136	2320

Floating Bearing Dimension

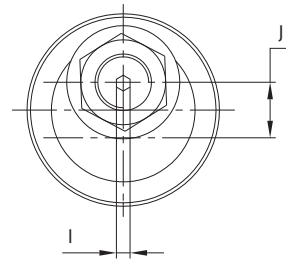


Type	Dimension						
	A	B	C	D	E		
					Max	Min	
FSVR-25C	25	18.1	11.3	14	10.5	9	
FSVR-25E							
FSVR-34C	34	23.2	14.3	18	13.5	11.5	
FSVR-34E							
FSVR-54C	54	37.2	19. 8	28	21.6	19	
FSVR-54E							

Concentric(C)

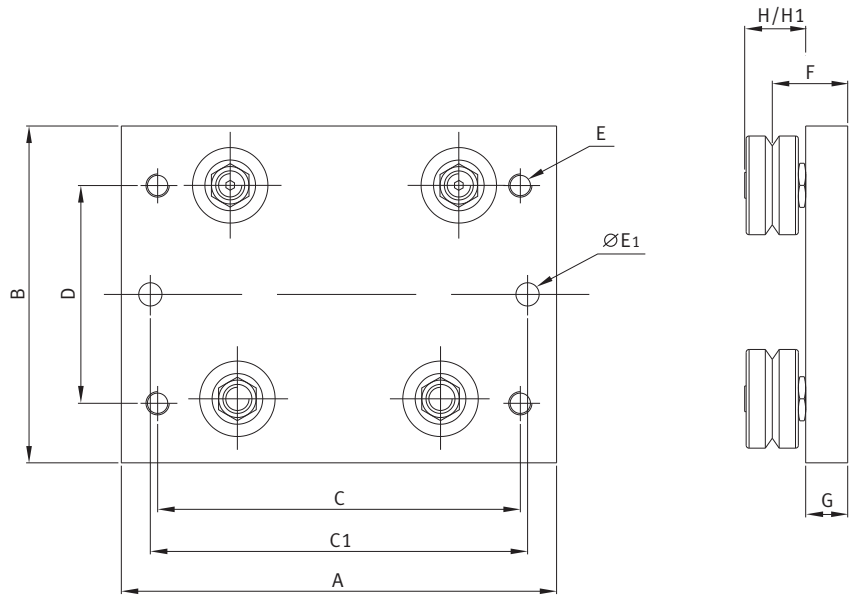


Eccentric(DE)



	F	G	H	I	J	Bearing Static(Co)and Dynamic(C)Load Capacities(N)		Max working load capacities(N)
						Co	C	
	M8	8	13	3	— 2	6100	4900	1500
	M10	10	15	4	— 2.5	12500	11500	3000
	M14	14	27	6	— 5. 5	28900	21500	5000

Standard Carriage Dimension

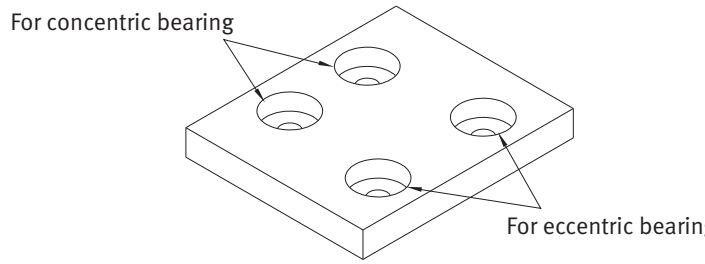


Type	A	B	C	C1	D	E	E1	F	G	H	H1	Weight (kg)
SRC25 159	95	80	85	80	50	4×M6	2×6	20.5	11.5	16.6	18.1	0.4
SRC25 255	100	80	80	85	50	4×M6	2×6	20.5	11.5	16.6	18.1	0.41
SRC25 351	105	80	85	90	50	4×M6	2×6	20.5	11.5	16.6	18.1	0.42
SRC44 468	145	116	120	125	75	4×M8	2×8	26	14.5	21.3	23.2	1.08
SRC44 612	150	116	125	130	75	4×M8	2×8	26	14.5	21.3	23.2	1.1
SRC76 799	190	185	160	165	100	4×M10	2×10	39	20	34.7	37.2	3.46
SRC76 1033	210	185	180	185	100	4×M10	2×10	39	20	34.7	37.2	3.66
SRC76 1267	250	185	205	225	100	4×M10	2×10	39	20	34.7	37.2	4.05
SRC76 1501	270	185	225	245	100	4×M10	2×10	39	20	34.7	37.2	4.25

Assembly manual

1. V track bearing match carriage plate

Please mount the concentric bearing to one side of carriage plate, and eccentric bearing to the other side following the direction of railway. In case of ring type carriage, the concentric bearing should be mounted to the side where mounting-hole distance is shorter. Please refer to below picture.



Circle motion carriage plate

2. Mounting to railway

Carriage assembly should be mounted from the end of railway.Please do not put any overstress when mounting.

3. Adjust the clearance between bearing and railway

-Tighten concentric bearings first.

-Then rotate eccentric bearing via rotate hexagonal key at the end of stud to adjust the clearance between railway and bearing.

-Adjust the clearance to zero.

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

Correct condition is where moving power becomes the recommended value as below table by putting load by push-pull gauge to the running direction of carriage.

Recommended pre-load by push-pull gauge

V track bearing size	Pre-load(N)
25	4
44	8
76	12

-Keep eccentric bearing's position and tighten the nut.

Important note

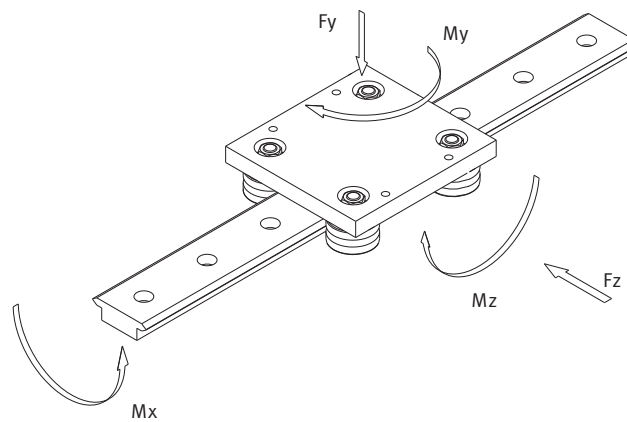
Appropriate pre-load provide the system rigidity. However, over preload will decrease system's life rapidly. Please be careful.

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.

Standard 4 bearings carriage calculation

If the system use SAIBO standard 4 bearings carriage, then calculation can use below formula.



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

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)

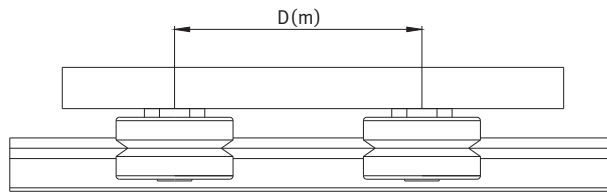
My max - Max moment capacity in Y direction. (N·m)

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

Maximum load capacity

Linear railway's carriage

Carriage Type	Dry system Double Row Bearings and Twin Bearings					Lubricated system/Twin Bearings					Lubricated system/Double Row Bearings				
	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz
	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm
SLC25	400	400	4.5	200xD	200xD	1280	1200	14	600xD	640xD	1600	3000	18	1500xD	800xD
SLC44	800	800	16	400xD	400xD	3200	2800	65	1400xD	1600xD	3600	6000	73	3000xD	1800xD
SLC76	1800	1800	64	900xD	900xD	7200	6400	250	3200xD	3600xD	10000	10000	360	5000xD	5000xD

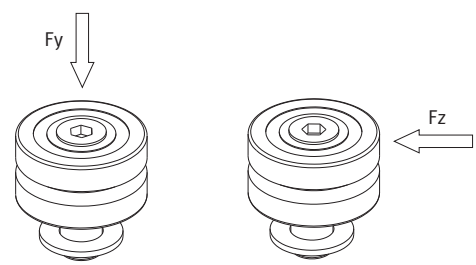


Ring railway's carriage

Carriage Type	Dry system Double Row Bearings and Twin Bearings					Lubricated system/Twin Bearings					Lubricated system/Double Row Bearings				
	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz	Fy	Fz	Mx	My	Mz
	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm
SRC25 159	400	400	4.5	8.5	8.5	1280	1200	14	25	27	1600	3000	18	64	33
SRC25 255	400	400	4.5	8	8	1280	1200	14	23	25	1600	3000	18	60	31
SRC25 351	400	400	4.5	8.5	8.5	1280	1200	14	24	27	1600	3000	18	63	33
SRC44 468	800	800	16	28	28	3200	2800	64	95	110	3600	6000	73	210	120
SRC44 612	800	800	16	29	29	3200	2800	64	100	115	3600	6000	73	220	130
SRC76 799	1800	1800	64	85	85	7200	6400	250	300	340	10000	10000	360	470	470
SRC76 1033	1800	1800	64	105	105	7200	6400	250	360	410	10000	10000	360	570	570
SRC76 1267	1800	1800	64	120	120	7200	6400	250	420	480	10000	10000	360	670	670
SRC76 1501	1800	1800	64	140	140	7200	6400	250	480	550	10000	10000	360	770	770

Individual V track bearing calculation

If the system does not use SAIBO standard 4 bearing carriage, It is necessary to calculate each bearing's loading factor. Biggest loaded bearing's load determines the system's life.



$$LF = \frac{Fy}{Fymax} + \frac{Fz}{Fzmax}$$

LF - Loading factor

LF should be less than 1.0 for any combination of load

Fy - Actual axial capacity. (N)

Fz - Actual radial capacity. (N)

Below parameters can be taken from below table.

Fy max - Max axial load. (N)

Fz max - Max radial load. (N)

Bearing's load capacity

Bearing type	Double Row Bearings				Each of Two Twin Bearings			
	Radial loads		Axial Loads		Radial loads		Axial Loads	
	Co	C	Co	C	Co	C	Co	C
SVR-25C SVR-25E	2646	5214	821	1618	1333	3237	326	791
SVR-34C SVR-34E	5018	9293	1362	2523	2600	5291	557	1270
SVR-54C SVR-54E	12899	21373	2777	4601	6657	13595	1136	2320

Life calculation

After getting Loading Factor LF, the life in km can be calculated by selecting one of below two formulas. The basic life can be taken from table below.

Dry system

$$Life(km) = \frac{Basic\_life}{(0.03+0.97LF*f)^2}$$

Lubricated system

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

Basic_life

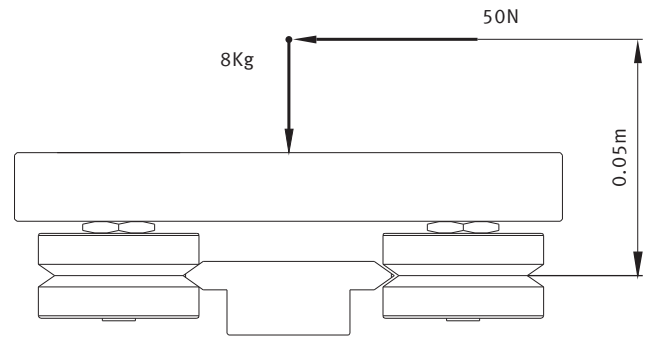
Bearing type	Dry system	Lubricated system
SVR-25	100	150
SVR-34	100	150
SVR-54	150	250

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 use SB-LGV25 spacer railway and standard carriage. The carriage and work-piece total weight 8 kg. When the carriage moving, there is an external load of 50 N exerted as below drawing. Working environment is clean. There is none 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 = 8kg x 9.8 (gravity) = 78.40 N

Fz = 50 N

Mx = 50 x 0.05 = 2.5 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

$$\mathbf{LF} = \frac{78.4}{1280} + \frac{50}{1200} + \frac{2.5}{14} + \frac{0}{\text{Mymax}} + \frac{0}{\text{Mzmax}} = 0.2816$$

Then life (km) calculation can use formula as below:

Dry system

$$\mathbf{Life(km)} = \frac{\text{Basic\_life}}{(0.03+0.97LF*f)^2}$$

Basic life is 100km.

According to the description of working condition, take f=1.3.

$$\mathbf{Life(km)} = \frac{100}{(0.03+0.97*0.2816*1.3)^2} = 674\text{km}$$

Lubricated system

Basic life is 150 km, take f=1.1

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

$$\mathbf{Life(km)} = \frac{150}{(0.03+0.97*0.2816*1.1)^3} = 4155\text{km}$$

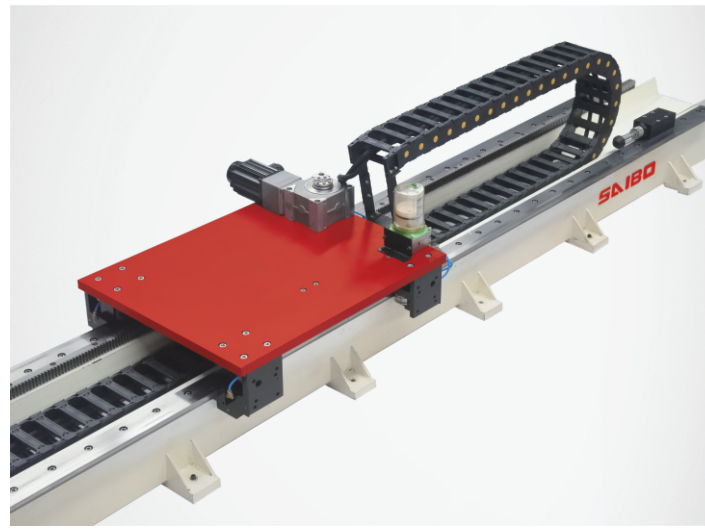
From this example, it shows clearly that lubrication is so important for the life. Please pay attention to install the lubrication system for your system.

Heavy load linear system

Construction

SAIBO heavy load linear system provides a precision, stable and low friction linear guide to the heavy load applications. Typical applications are such as gantry robots' moving frame, jointed-arm robots' moving carriage for the industries like logistic and handling system, flexible producing unit, automobile producing line etc.

SAIBO offers not only single parts, but also customized system solution. Our experienced engineers are pleased to support you in design, build and service for your automatic equipments.

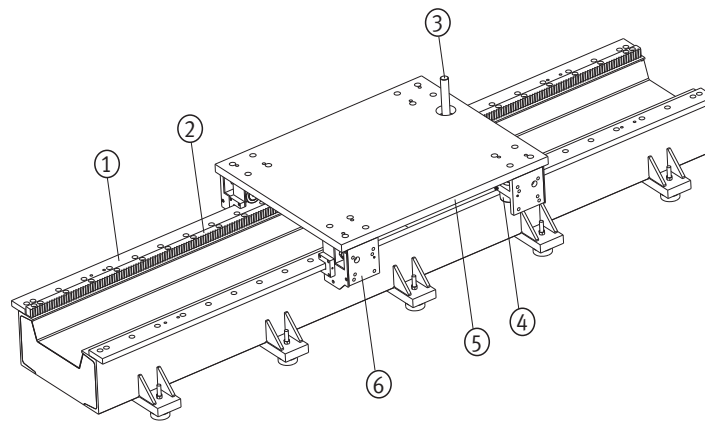


Feature

1. Heavy load capacity.
2. Modular designed components are easy to build different structure.
3. Connectable railway and rack can build to long-distance.
4. Lubrication tube integrated in roller housing.

Standard system

According to load capacity, SAIBO provide 3 sizes standard systems. With these 3 sizes systems' single components, customers are easy to adjust railways' span, carriage sizes and assembly directions. System's main components are listed below.



System's main components

① Railway

② Rack

③ Gear

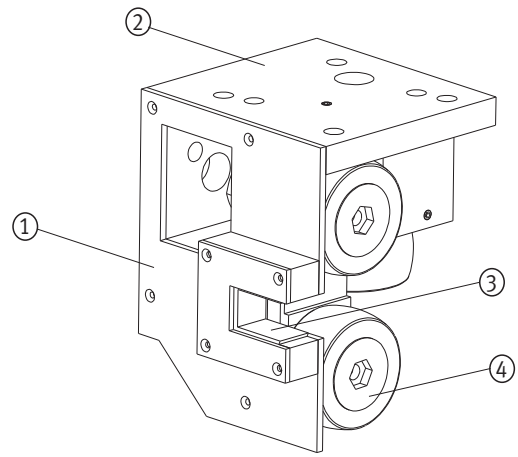
④ Roller

⑤ Carriage plate

⑥ Roller housing

Roller housing

Roller housing is designed according to modular idea. It enables customers to adjust railways' span, carriage's sizes and assemble direction. Roller's inside and railway's wiper lubrication systems are integrated in this roller housing. After installation, customers only fix the automatic lubrication system's nozzle to the lubricate screw holes, the whole system's automatic lubrication will be working.



System's main components

① Wiper cover

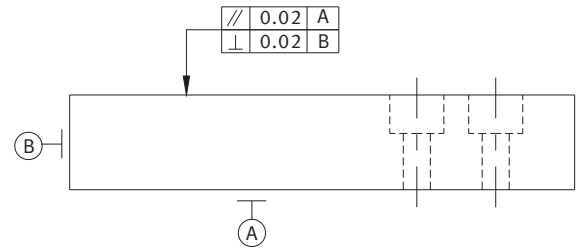
② Roller housing

③ Felt wiper

④ Roller

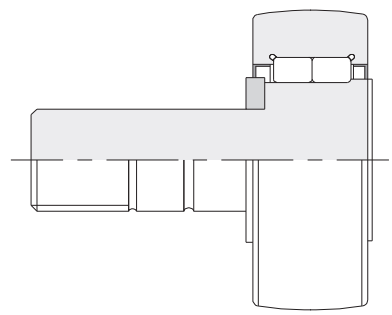
Railway

The railway is made of high carbon bearing steel DIN 100Cr6. Working surface is hardened to over 50HRC. Accuracy is as below picture. Max length is 2000mm, but it can be connected easily to any length.



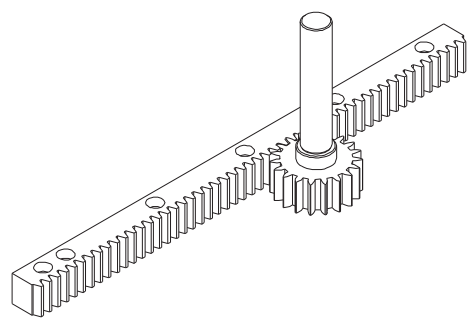
Roller

Roller is precision double rows roller bearing. It is heavy duty designed and treated. Heavy duty lithium soap grease is filled inside the bearing before delivery. Roller's outer diameter surface is spherical where radius is 500mm.



Gear and rack

Gear and rack are precision cut and hardened. Accurancy is optional according to customers' request.

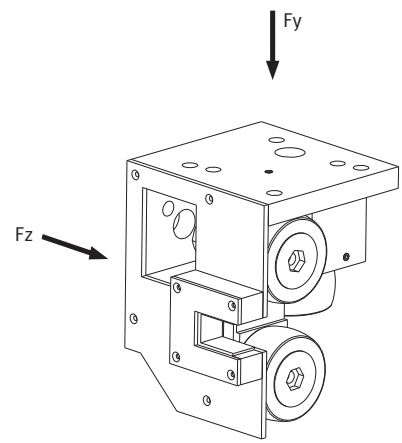


Load capacity

Roller inside is without cages and has the largest possible number of rolling elements. Therefore it has particularly high load capacity. According to designed basic life 1000km, rollers' load capacity is listed as below:

Roller size	Roller load capacity (N)	
	Dynamic	Static
62	41000	59300
90	75000	102300

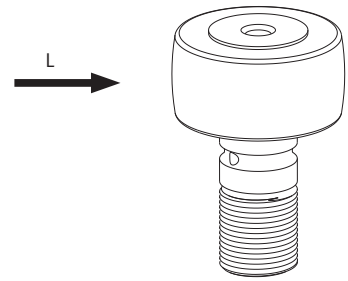
Considering fixed to the roller housing, application's shock, safety factor, each roller housing's load capacity has to be reduced to below values.



Roller size	Roller housing load capacity (N)	
	Fy	Fz
62	13000	13000
90	33000	33000

Load/life calculation

After selected system size, verification calculation is necessary. 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 biggest loaded roller's life. The system life will be equivalent to the shortest roller's life.



$$\textbf{LF} = \frac{L}{Lmax} \quad \text{(LF should be less than 1.0)}$$

L - Actual load (N)

L max - Load capacity for basic life 1000km (N)

Roller size	L max -Load capacity for basic life 1000km (N)
62	41000
90	75000

Then calculate roller's life by using below formula:

$$\textbf{Life(km)} = \frac{1000}{(0.03+0.97LF*f)^3}$$

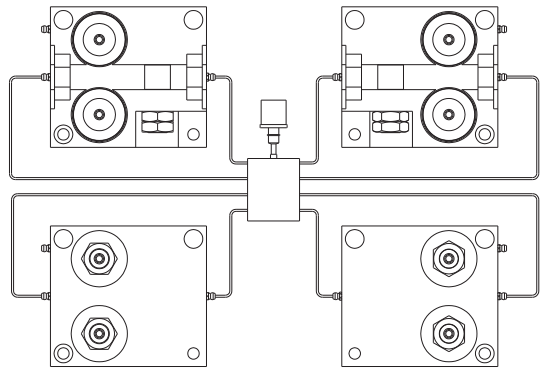
f - Reduction coefficient of the application and environment.

None vibration or shock, Low speed (<1m/s), Low frequency shift direction, clean environment.	1-1.2
Light vibration or shock, medium speed (1-2.5m/s) medium frequency shift direction, some dirtiness	1.2-5
Heavy vibration or shock, high speed (>2.5m/s) high frequency shift direction, heavy dirty	1.5-2.5

Lubrication

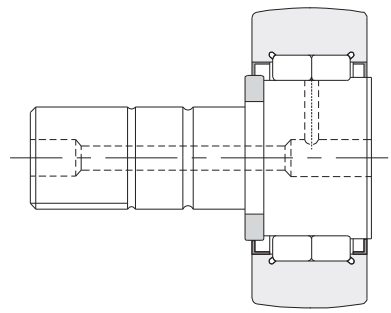
Railway

Lubrication will reduce the friction and increase system's life. Lubrication structure designed in the roller housing where oil soaked felt wipers running on the railways working surface. It should be re-lubricated each 100km running. It is easy to fill oil from the nozzle outside the roller housing. Lubricate should be mineral oil. When the felt wiper wear to a certain extent, it must be replaced. If necessory, nozzle could be connected to the automatic oiling system as below picture.



Roller

Heavy duty lithium soap grease is filled inside the bearing before delivery. We recommend re-lubricate roller after each 1000Km working. In every roller housing, all of three rollers' lubricate holes are connected to roller housing's lubricate tube. So fill grease into the nozzle outside of the roller housing, each bearing will be re-lubricated. According to grease's properties, roller can be used between -30°C and 120°C working conditions.

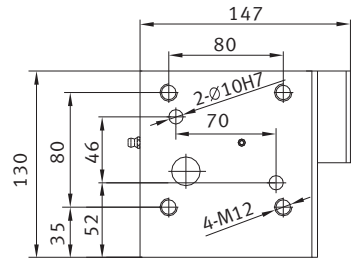


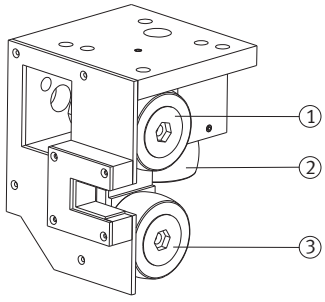
Gear and rack

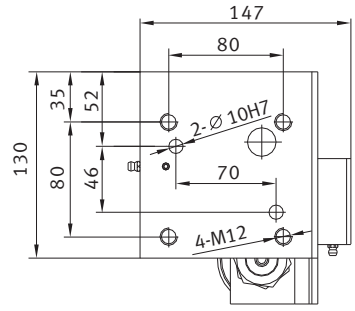
Gear and rack must be lubricated each 100km running. We recommend high viscosity and heavy load mineral oil.

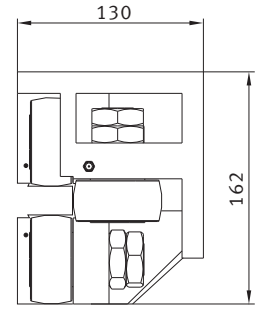
Size 62

Roller housing



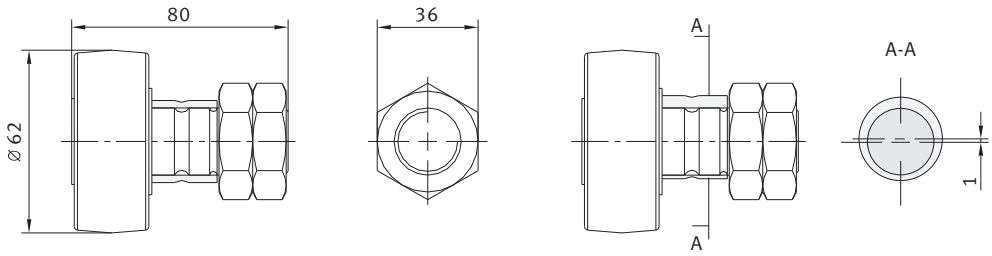




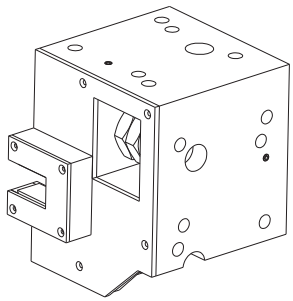


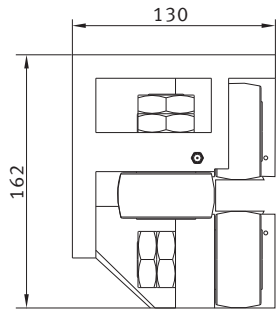
Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV62-RH62.1R	concentric	eccentric	eccentric	13000	4000
SB-HV62-RH62.2R	eccentric	concentric	eccentric	13000	4000
SB-HV62-RH62.3R	eccentric	eccentric	concentric	13000	4000

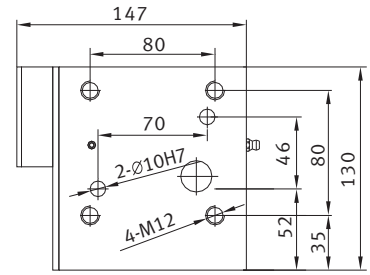
Roller

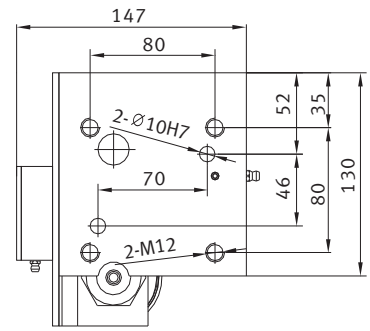


Type	Roller load capacity (N)	
	Dynamic	Static
SB-HV62-RC62	41000	59300
SB-HV62-RE62	41000	59300



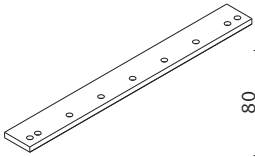


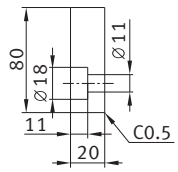


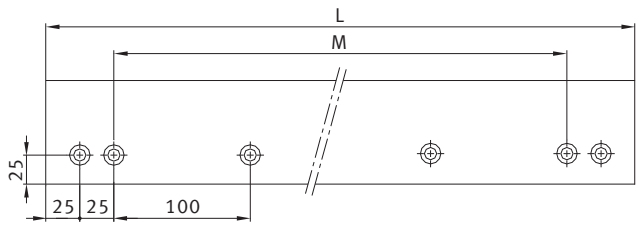


Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV62-RH62.1L	concentric	eccentric	eccentric	13000	4000
SB-HV62-RH62.2L	eccentric	concentric	eccentric	13000	4000
SB-HV62-RH62.3L	eccentric	eccentric	concentric	13000	4000

Railway





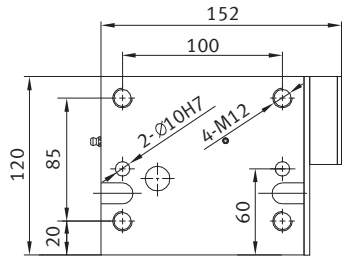


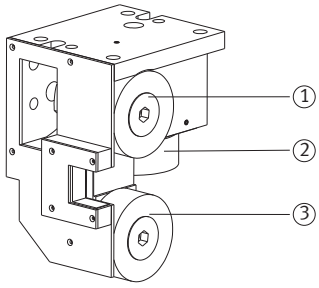
Type	L*	M
SB-HV62-004	2000	1900

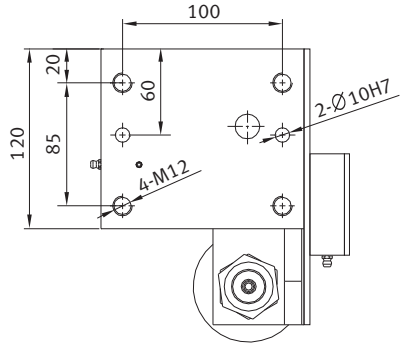
* Railways can be connected.

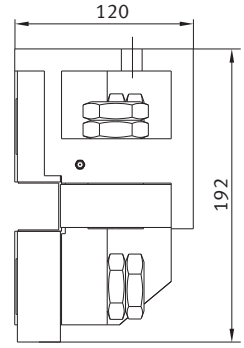
Size 72

Roller housing



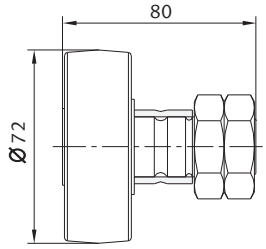


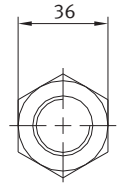


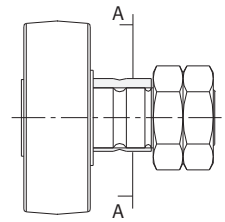


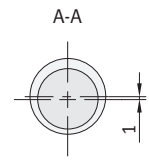
Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV72-RH72.1R	concentric	eccentric	eccentric	17000	5000
SB-HV72-RH72.2R	eccentric	concentric	eccentric	17000	5000
SB-HV72-RH72.3R	eccentric	eccentric	concentric	17000	5000

Roller

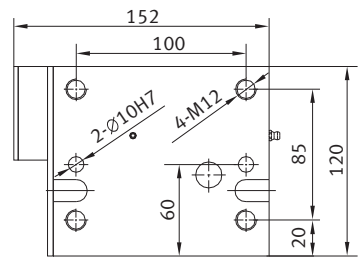


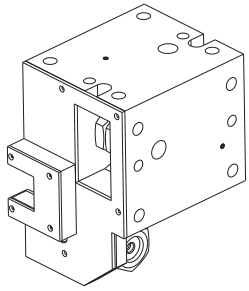


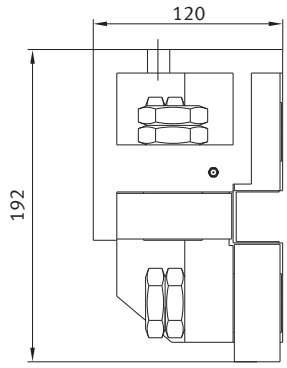


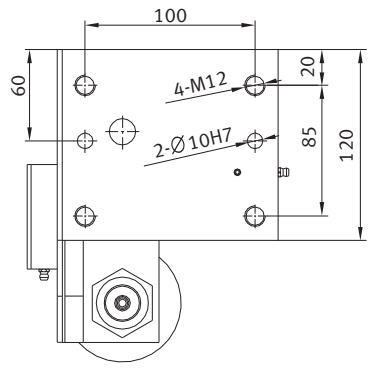


Type	Roller load capacity (N)	
	Dynamic	Static
SB-HV72-RC72	58000	75300
SB-HV72-RE72	58000	75300



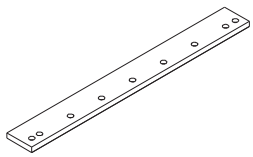


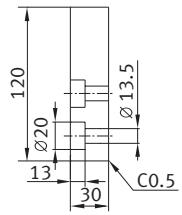


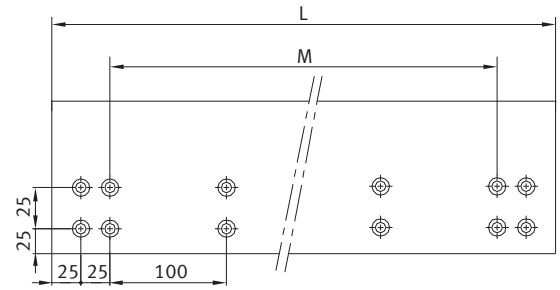


Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV72-RH72.1L	concentric	eccentric	eccentric	17000	5000
SB-HV72-RH72.2L	eccentric	concentric	eccentric	17000	5000
SB-HV72-RH72.3L	eccentric	eccentric	concentric	17000	5000

Railway





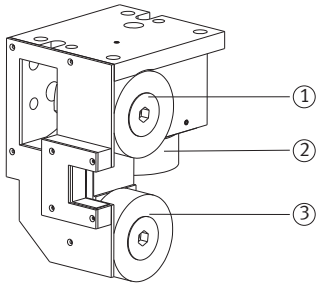


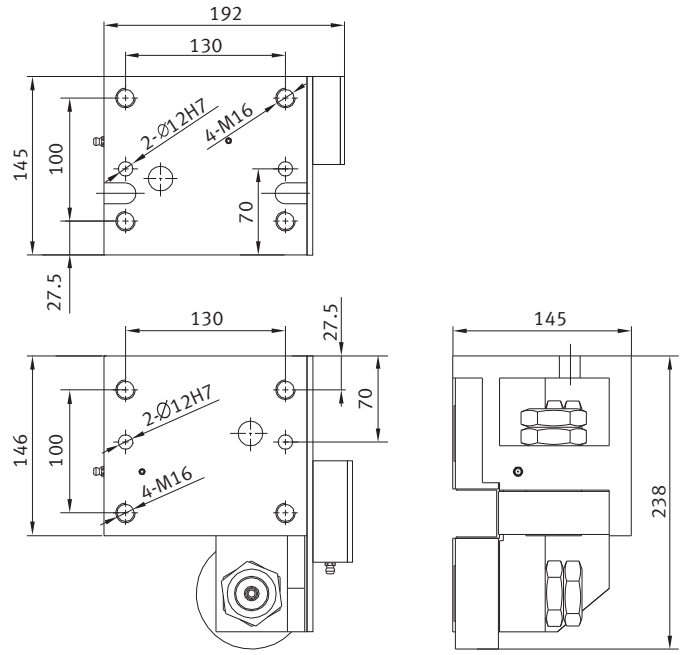
Type	L*	M
SB-HV72-004	2000	1900

* Railways can be connected.

Size 90

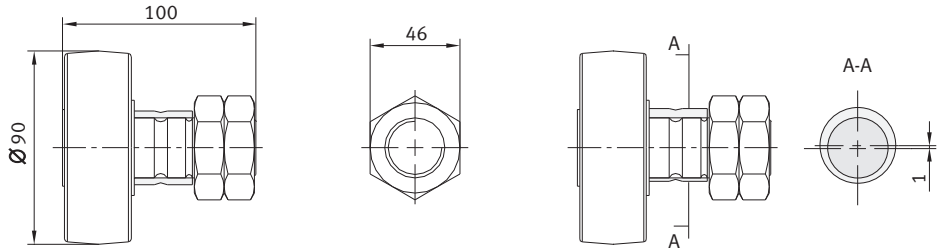
Roller housing



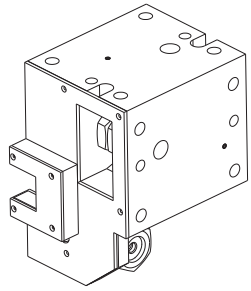


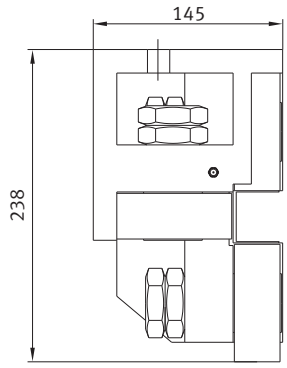
Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV90-RH90.1R	concentric	eccentric	eccentric	33000	8000
SB-HV90-RH90.2R	eccentric	concentric	eccentric	33000	8000
SB-HV90-RH90.3R	eccentric	eccentric	concentric	33000	8000

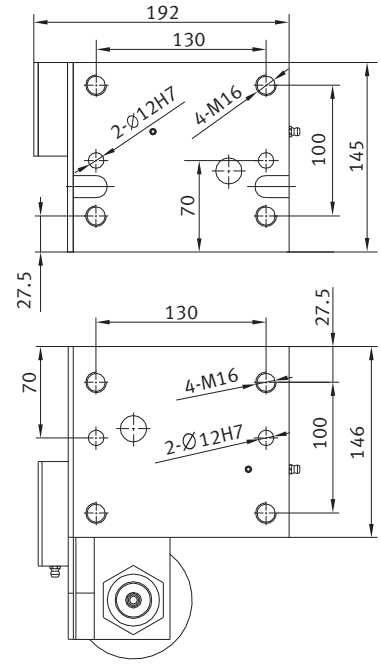
Roller



Type	Roller load capacity (N)	
	Dynamic	Static
SB-HV90-RC90	75000	102300
SB-HV90-RE90	75000	102300

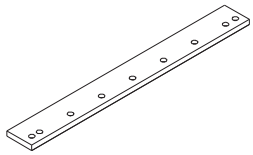


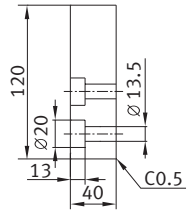


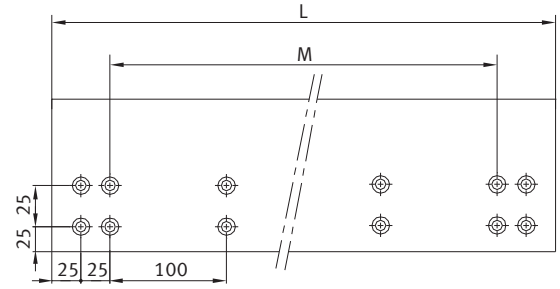


Roller housing type	Concentric/Eccentric roller position			Load capacity (N)	
	Position①	Position②	Position③	Dynamic for concentric roller	Dynamic for eccentric roller
SB-HV90-RH90.1L	concentric	eccentric	eccentric	33000	8000
SB-HV90-RH90.2L	eccentric	concentric	eccentric	33000	8000
SB-HV90-RH90.3L	eccentric	eccentric	concentric	33000	8000

Railway







Type	L*	M
SB-HV90-004	2000	1900

* Railways can be connected.

Shaft

SAIBO shaft is used with linear bearing to obtain high accurate linear motion. The quality and accuracy of the shaft directly affect the performance of the linear bearing. SAIBO focus attention on quality and accuracy during producing.

Material

High carbon bearing steel: DIN 100Cr6

Quality carbon steel: DIN CK45

Stainless steel: SUS440C

Surface could be Chrome-plated if necessary.

Hardness

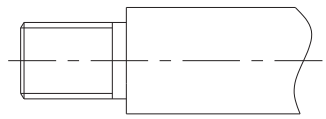
Heat-treatment is treated on the shaft's surface and result enough depth to let SAIBO shaft have excellent wear resistance. Surface hardness reaches 58HRC at least. To get better wear resistance, we can chrome-plate the surface.

Surface roughness

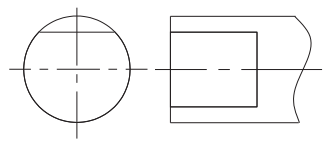
SAIBO use precision grinding method to let surface roughness be less than Ra 0.40

Machining

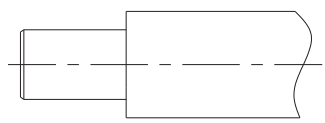
SAIBO perform a wide variety of highly accurate machining processes to provide customized shaft. Such as drill hole and tapping. Please see below picture.



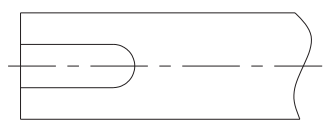
Screw



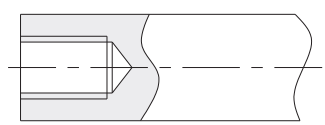
Plane



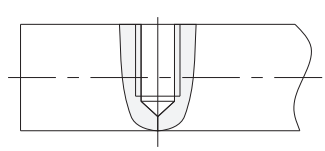
Ladder



Keyway

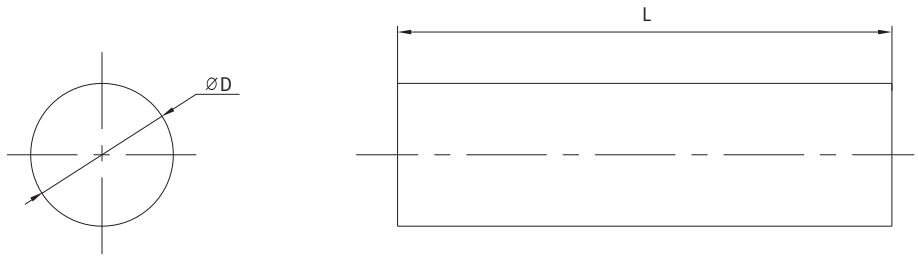


Screw hole



Screw hole

Size



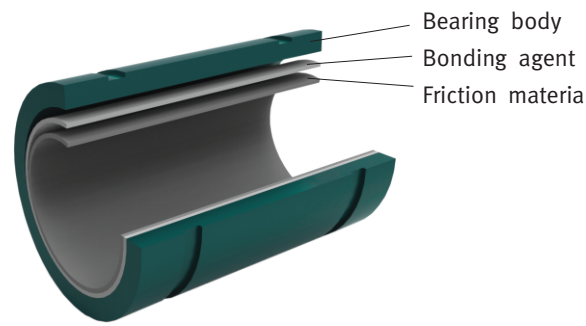
Outer Diameter		Max length	Weight
D	Tolerance g6*	L	Kg/m
3	-2/-8	300	0.06
4	-4	500	0.10
5	-12	1000	0.16
6		3000	0.22
8	-5	4000	0.40
10	-14	4000	0.62
12		4000	0.89
13	-6	4000	1.05
15	-17	4000	1.40
16		4000	1.59
20	-7	4000	2.48
25	-20	4000	3.88
30		4000	5.58
35	-9	4000	7.60
40	-25	4000	9.92
50		4000	15.50
60	-10	4000	22.33
80	-29	4000	39.69

*Tolerances other than g6 are available upon request.

Self-lubricate Linear Bearing

SAIBO self-lubricate linear bearings' application includes a wide range of industries, such as medical equipment, food and package equipment, fitness equipment and precision punch machine.

Structure



1. Bearing body: Colored anodized aluminum alloy
2.Bonding agent: Excellent bonding performance, resist high temperature.
3. Friction material: PTFE and filled anti-friction material

PTFE features

PTFE's excellent physical and chemical performance have been approved after several decades' application. In linear motion, SAIBO selects PTFE to be friction material according to below advantages.

– Self-lubricate

– Resist high and low temperature (–240°C ~ +260°C)

– Soft and can absorb vibration

Friction material feature

After many years' research and explore, SAIBO develops this mixed friction material's performance and quality to the top in the world. PTFE and its mixture have below features:

– Anti-friction

– Good load capacity

– Excellent bonding performance with PTFE

Advantage

Here we compare SAIBO self-lubricate linear bearing with traditional steel ball linear bearing.

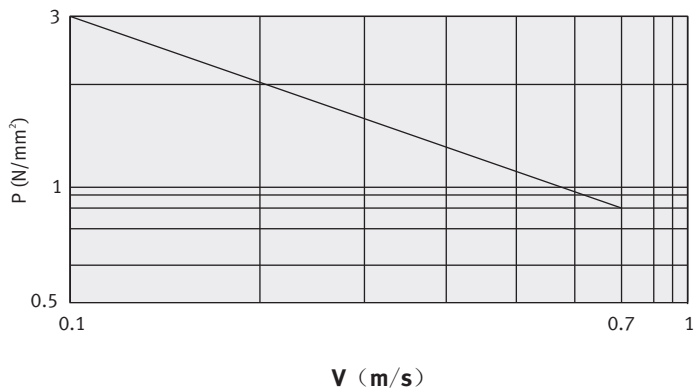
	SAIBO Self-lubricate linear bearing	Steel ball linear bearing
Load capacity	4-20 times load capacity than steel ball linear bearing	Fit for light load
Speed	Low and middle speed	Middle and high speed
Friction Coefficient	0.03-0.20	0.002-0.003
Noise	Quiet	Big noise
Lubrication	Without	Necessary
Anti-Corrosion	Good	None
Anti-vibration and shock	Good	None
Interchangeability	Good	Good
Running ways	Linear, Rotary or combination	Only linear
Acceptable shaft	harden or soft shaft	harden shaft
Machining	Hole can be machined	Can not

PV character

The Pressure Velocity (PV) factor is a key parameter during design and selection of SAIBO self-lubricate linear bearing. PV can define the friction performance between system's pressure and velocity. PTFE's mixture has an intrinsic limiting PV rating while the system running under certain conditions. Put simply, the more load applied to system, the slower it must move to avoid exceeding PV limit. The reverse is also true, more speed, less available load capacity. Overload and exceeding Max speed will cause frictional heat and accelerate wear.

Max PV value:	0.7 N/mm^2×m/s
Load capacity:	20 N/ mm^2 (MPa)
Max speed:	1.5m/s
Working temperature:	−50°C ~ +260°C
Friction Coefficient:	0.03~0.2

Blow table shows SAIBO self-lubricate linear bearing PV limit at 20°C working conditions.



Lubrication

PTFE and it's mixture have self-lubricate character. This is its main application reason where application's environment request without additional oil. But if conditions permit, fill lubrication can reduce friction at least 30%. This is very helpful for extending bearing's life.

Recommended lubricate: Petroleum base oil or grease

Note: PTFE lubrication is forbidden.

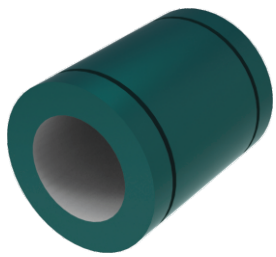
Acceptable shaft

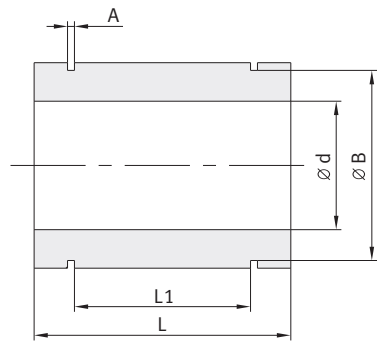
SAIBO Self-lubricate linear bearing's acceptable conditions are not captious to shaft. But considering wear rate, we recommend the best shaft's performance as below:

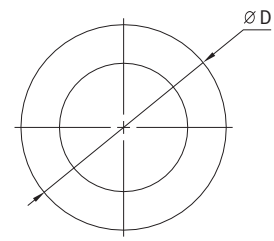
Surface roughness: Ra 0.4

Hardness: 55HRC

Standard type

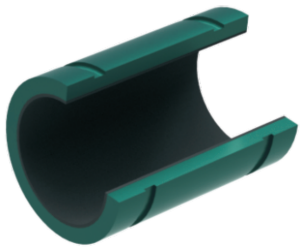


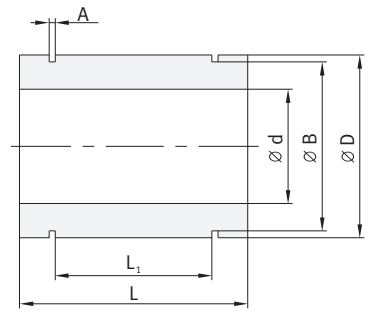


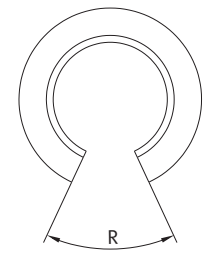


Type	Dimension						Load capacity (N)
	d	D	L	A	B	L1	
SLL06	6	12	19	1.15	11.50	11.30	2280
SLL08	8	15	24	1.15	14.30	15.20	3840
SLL10	10	19	29	1.35	18.00	19.30	5800
SLL12	12	21	30	1.35	20.00	20.30	7200
SLL13	13	23	32	1.35	22.00	20.30	8320
SLL16	16	28	37	1.65	26.60	23.20	11840
SLL20	20	32	42	1.65	30.30	27.20	16800
SLL25	25	40	59	1.85	38.00	37.20	29500
SLL30	30	45	64	1.85	42.50	40.70	38400
SLL35	35	52	70	2.20	49.00	44.80	49000
SLL38	38	57	76	2.20	54.50	54.30	57760
SLL40	40	60	80	2.20	57.00	56.10	64000
SLL50	50	80	100	2.70	76.50	68.60	100000
SLL60	60	90	110	3.15	86.50	78.70	132000
SLL80	80	120	140	4.15	116.00	97.20	224000
SLL100	100	150	175	4.15	145.00	117.20	350000
SLL120	120	180	200	4.15	175.00	150.30	480000
SLL150	150	210	240	5.15	204.00	160.30	720000

Open type

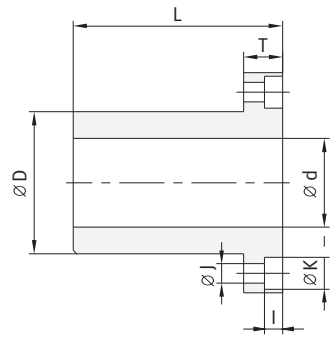


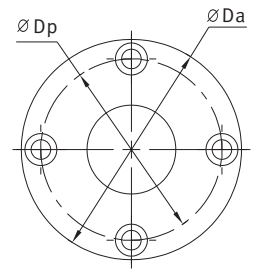




Type	Dimension							Load capacity (N)
	d	D	L	A	B	L1	R	
SLL06 OP	6	12	19	1.15	11.50	11.30	60°	2280
SLL08 OP	8	15	24	1.15	14.30	15.20	60°	3840
SLL10 OP	10	19	29	1.35	18.00	19.30	80°	5800
SLL12 OP	12	21	30	1.35	20.00	20.30	80°	7200
SLL13 OP	13	23	32	1.35	22.00	20.30	80°	8320
SLL16 OP	16	28	37	1.65	26.60	23.20	80°	11840
SLL20 OP	20	32	42	1.65	30.30	27.20	60°	16800
SLL25 OP	25	40	59	1.85	38.00	37.20	50°	29500
SLL30 OP	30	45	64	1.85	42.50	40.70	50°	38400
SLL35 OP	35	52	70	2.20	49.00	44.80	50°	49000
SLL38 OP	38	57	76	2.20	54.50	54.30	50°	57760
SLL40 OP	40	60	80	2.20	57.00	56.10	50°	64000
SLL50 OP	50	80	100	2.70	76.50	68.60	50°	100000
SLL60 OP	60	90	110	3.15	86.50	78.70	50°	132000
SLL80 OP	80	120	140	4.15	116.00	97.20	50°	224000
SLL100 OP	100	150	175	4.15	145.00	117.20	50°	350000
SLL120 OP	120	180	200	4.15	175.00	150.30	80°	480000
SLL150 OP	150	210	240	5.15	204.00	160.30	80°	720000

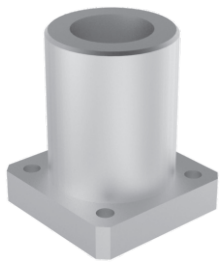
Flange type

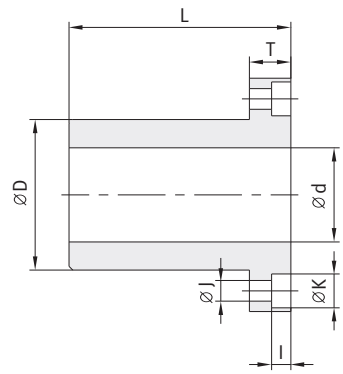


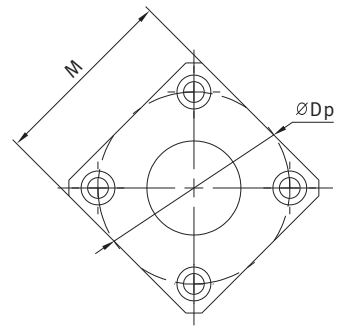


Type	Dimension									Load capacity (N)
	d	D	L	Da	T	Dp	J	K	l	
SLL06 FC	6	12	19	28	8	20	3.50	6.00	3.10	2280
SLL08 FC	8	15	24	32	8	24	3.50	6.00	3.10	3840
SLL10 FC	10	19	29	40	9	29	4.50	7.50	4.10	5800
SLL12 FC	12	21	30	42	9	32	4.50	7.50	4.10	7200
SLL13 FC	13	23	32	43	9	33	4.50	7.50	4.10	8320
SLL16 FC	16	28	37	48	9	38	4.50	7.50	4.10	11840
SLL20 FC	20	32	42	54	11	43	5.50	9.00	5.10	16800
SLL25 FC	25	40	59	62	11	51	5.50	9.00	5.10	29500
SLL30 FC	30	45	64	74	14	60	6.60	11.00	6.10	38400
SLL35 FC	35	52	70	82	14	67	6.60	11.00	6.10	49000
SLL40 FC	40	60	80	96	18	78	9.00	14.00	8.10	64000
SLL50 FC	50	80	100	116	18	98	9.00	14.00	8.10	100000
SLL60 FC	60	90	110	134	24	112	11.00	17.00	11.10	132000
SLL80 FC	80	120	140	164	24	142	11.00	17.00	11.10	224000

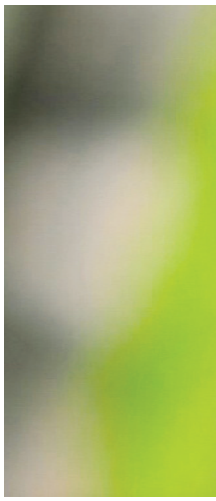
Square flange type







Type	Dimension									Load capacity (N)
	d	D	L	T	M	Dp	J	K	I	
SLL06 FN	6	12	19	8	22	20	3.50	6.00	3.10	2280
SLL08 FN	8	15	24	8	25	24	3.50	6.00	3.10	3840
SLL10 FN	10	19	29	9	30	29	4.50	7.50	4.10	5800
SLL12 FN	12	21	30	9	32	32	4.50	7.50	4.10	7200
SLL13 FN	13	23	32	9	34	33	4.50	7.50	4.10	8320
SLL16 FN	16	28	37	9	37	38	4.50	7.50	4.10	11840
SLL20 FN	20	32	42	11	42	43	5.50	9.00	5.10	16800
SLL25 FN	25	40	59	11	50	51	5.50	9.00	5.10	29500
SLL30 FN	30	45	64	14	58	60	6.60	11.00	6.10	38400
SLL35 FN	35	52	70	14	64	67	6.60	11.00	6.10	49000
SLL40 FN	40	60	80	18	75	78	9.00	14.00	8.10	64000
SLL50 FN	50	80	100	18	92	98	9.00	14.00	8.10	100000
SLL60 FN	60	90	110	24	106	112	11.00	17.00	11.10	132000
SLL80 FN	80	120	140	24	136	142	11.00	17.00	11.10	224000



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