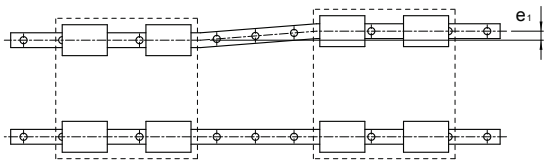
Tolerance between two rails

When mounting two rails that should operate together, it is important that the surface holds the tolerances of parallelism between the two axes as shown below.

The parallel deviation between two rails (e_1).



MSA, MSB series

Unit: µm

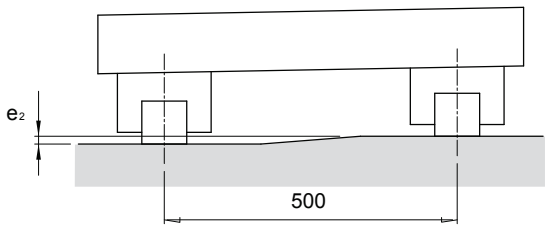
Model No.	e_1
15	25
20	25
25	30
30	40
35	50
45	60

MSC series

Unit: µm

Model No.	e_1
7	12
9	15
12	20
15	25

Level difference between two rails (e_2)



MSA, MSB series

Unit: µm

Model No.	e_2
15	130
20	130
25	130
30	170
35	210
45	250

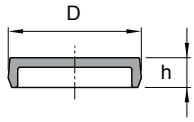
MSC series

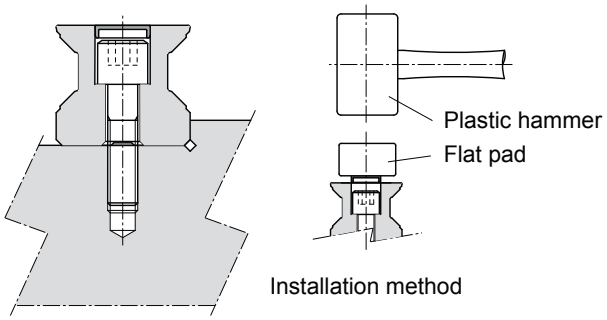
Unit: µm

Model No.	e_2
7	160
9	250
12	300
15	350

Caps for rail

The plastic cap is mounted by using a plastic hammer with a flat pad placed on the top, until the top of the cap flush to the top surface of the rail. The dimension of plastic caps for each series is shown below. Plastic cap is always included in the rail. (No caps for MSC7R and MSC9R)





Code of Plastic Cap	D (mm)	h (mm)	Bolt Size	Rail Model		
M3C	6.3	1.1	M3			MSC12R MSC15R
M4C	7.8	1.1	M4	MSA15R	MSB15U	
M5C	9.8	2.2	M5	MSA20R	MSB20R	
M6C	11.3	2.5	M6	MSA25R	MSB25R MSB30R	
M8C	14.4	3.3	M8	MSA30R MSA35R	MSB35R	
M12C	20.4	4.6	M12	MSA45R		

Tightening torque for rails

An improper tightening torque could affect the mounting accuracy. Tightening the bolts with a torque wrench to the specified torque value is highly recommended. Different types of mounting materials, should have different torque value.

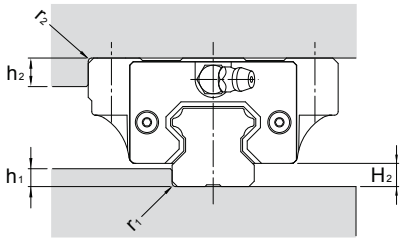
Unit: Nm

Bolt model	Torque Value		
	Iron	Cast iron	Aluminum
M2	0.6	0.4	0.3
M3	2	1.3	1
M4	4	2.7	2
M5	8.8	5.9	4.4
M6	13.7	9.2	6.8
M8	30	20	15
M10	68	45	33
M12	120	78	58

Shoulder height

The mounting surface of rails and carriages are machined precisely for positioning and assembling with high accuracy. The shoulder height and corner radius should provide enough mounting space to not interfere with chamfers made on rails and carriages. The dimensions of shoulder height and corner radius are shown below.

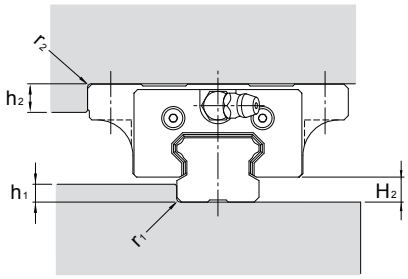
MSA series



Unit: mm

Model No.	r_1 (max.)	r_2 (max.)	h_1	h_2	H_2
15	0.5	0.5	3	4	4.2
20	0.5	0.5	3.5	5	5
25	1	1	5	5	6.5
30	1	1	5	5	8
35	1	1	6	6	9.5
45	1	1	8	8	10

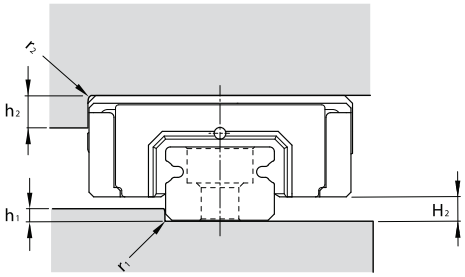
MSB series



Unit: mm

Model No.	r_1 (max.)	r_2 (max.)	h_1	h_2	H_2
15	0.5	0.5	3	4	4.5
20	0.5	0.5	4	5	6
25	1	1	5	5	7
30	1	1	7	5	9.5
35	1	1	8	6	9.5

MSC series

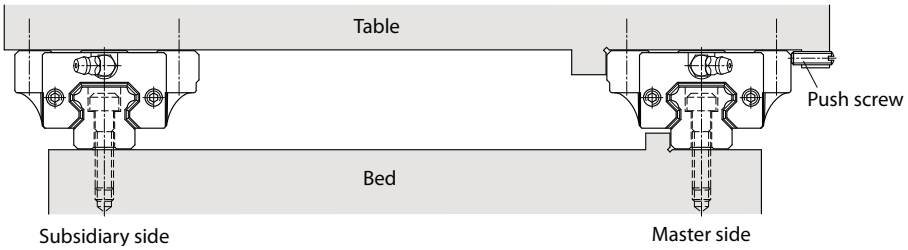


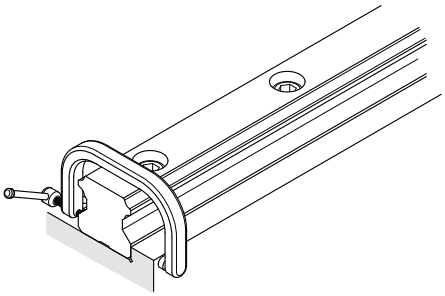
Unit: mm

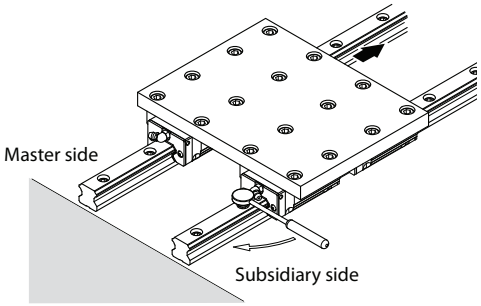
Model No.	r_1 (max.)	r_2 (max.)	h_1	h_2	H_2
7	0.2	0.2	1.0	3	1.5
9	0.2	0.3	1.7	3	2.2
12	0.3	0.4	2.5	4	3.0
15	0.5	0.5	3.5	5	4.0

Installation of rail

Installation of parallell rail and carriage.







Using a vise

First tighten the mounting bolts temporarily, than use a C vise to press the master rail to reference side. Tighten the mounting bolts in sequence to specied torque.

Compare to master rail side

Tighten two master side carriages and one subsidiary side carriage onto the table. Then temporarily tighten another subsidiary carriage and rail to the table and bed. Move the table from one rail, check and align the parallelism of subsidiary rail based on moving resistance. Tighten the bolts in sequence.

Lifetime calculation

Basic Dynamic Load Rating (C)

Even when identical linear guideways are manufactured in the same way or applied under the same condition, the service life may be varied. Thus, the service life is used as an indicator for determining the service life of a linear guideway system. The nominal life (L) is defined as the total running distance that 90% of identical linear guideways, when they are applied under the same conditions, can work without developing aking. The basic dynamic load rating (C) can be used to calculate the service life when linear guideway system response to a load. The basic dynamic load rating (C) is defined as a load in a given direction and with a given magnitude that when a group of linear guideways operate under the same conditions. As the rolling element is ball, the nominal life of the linear guideway is 50 km. Moreover, as the rolling element is roller, the nominal life is 100 km.

Calculation of Nominal Life (L)

The nominal life of a linear guideway can be affected by the actual working load. The nominal life can be calculated based on selected basic dynamic load rating and actual working load. The nominal life of linear guideway system could be influenced widely by environmental factors such as hardness of raceway, environmental temperature, motion conditions, thus these factors should be considered for calculation of nominal life.

$$L = \left(\frac{f_H \times f_T}{f_w} \times \frac{C}{P} \right)^3 \times 50$$

L	Nominal life (km)	f_H	Hardness factor
C	Basic dynamic load rating (N)	f_T	Temperature factor
P	Working load (N)	f_w	Load factor