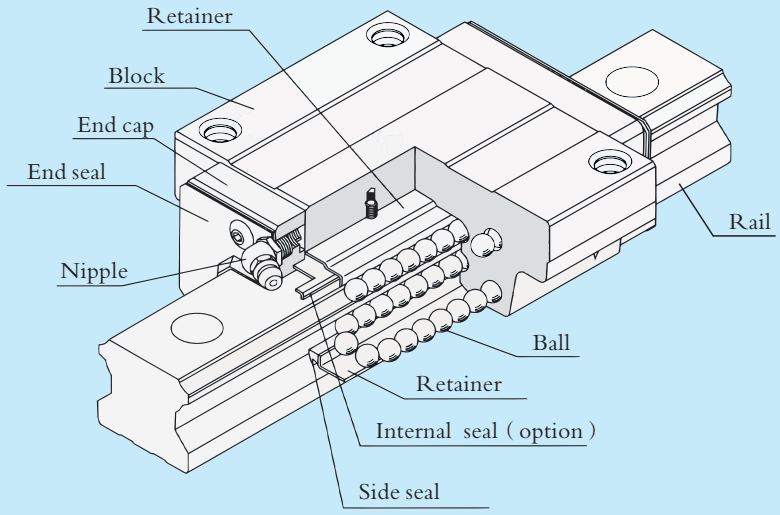
PPC HSR Linear Guide

HSR



PPC HSR STRUCTURE

Advantages and Features of Linear Guide

High positional accuracy

When a load is driven by a linear motion guideway, the frictional contact between the load and the bed is rolling contact. The coefficient of friction is only 1/50th of traditional contact, and the difference between the dynamic and the static coefficient of friction is small. Therefore, there would be no slippage while the load is moving.

Long life with high motion accuracy

With a traditional slide, errors in accuracy are caused by the counter flow of the oil film. Insufficient lubrication causeswear between the contact surfaces, which become increasingly inaccurate. In contrast, rolling contact has little wear,therefore, machines can achieve a long life with highly accurate motion.

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High speed motion is possible with a low driving force

Because linear guideways have little friction resistance, only a small driving force is needed to move a load. This results in greater power savings, especially in the moving parts of a system. This is especially true for the reciprocating parts
.

Equal loading capacity in all directions

With this special design, these linear guides can take loads in either the vertical or horizontal directions. Conventional linear slides can only take small loads in the direction parallel to the contact surface. They are also more likely to become inaccurate when they are subjected to these loads.

Easy installation

Installing a linear guide is fairly easy. Grinding or milling the machine surface, following a recommended installation procedure, and tightening the bolts to their specified torque can achieve highly accurate linear motion.

Easy lubrication

With a traditional sliding system, insufficient lubrication causes wear on the contact surfaces. Also, it can be quite difficult to supply sufficient lubrication to the contact surfaces because finding an appropriate lubrication point is not very easy. With a linear motion guide, grease can be easily supplied through the grease nipple on the linear guide block. It is also possible to utilize a centralized oil lubrication system by piping the lubrication oil to the piping joint.

Rigidity

When using a linear guide system, it is necessary to select a type and a clearance (preload) that meet the service conditions in order to achieve the required rigidity of the machine/equipment.

Interchangeability

Compared with traditional boxways or v-groove slides, linear guide can be easily replaced should any damage occur. For high precision grades consider ordering a matched, non-interchangeable, assembly of a block and rail.

Basic Load Rating

Linear guide system has two types of basic load ratings: basic dynamic load rating (C), which is used to calculate the service life, and basic static load rating (C 0), which defines the static permissible limit.

Basic Dynamic Load Rating C

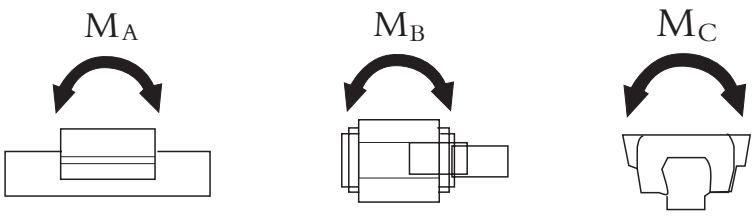
The basic dynamic load rating (C) indicates the load with constant direction and magnitude, under which the rated life (L) is L = 50 km for a linear guide system using balls, when a group of identical linear guide system units independently operate under the same conditions.The basic dynamic load rating (C) is used to calculate the service life when a linear guide system operates under a load.

Basic Static Load Rating C 0

If linear guide system receives an excessively large load or a large impact when it is stationary or operative,permanent deformation occurs between the raceway and the rolling element. If the permanent deformation exceeds a certain limit, it will prevent the system from performing smooth motion.The basic static load rating is a static load with a constant direction and magnitude whereby the sum of the permanent deformation of the rolling element and that of the raceway on the contact area under the maximum stress is 0.0001 times the rolling element diameter. With linear guide system, the basic static load rating is defi ned for the radial load.The basic static load rating C 0 is used for calculating the static safety factor relative to the working load.

Static Permissible Moment M 0

The static permissible moment refers to a moment in a given direction and magnitude when the largest stress of the rolling elements in an applied system equals the stress induced by the Static Load Rating. The staticpermissible moment in linear motion systems is defined for three directions,as follows:



The service life calculation

Nominal life

The service life of an linear guide system is subject to slight variations even under the same operating conditions.Therefore, it is necessary to use the nominal life defined below as a reference value for obtainingthe service life of the system.The nominal life means the total travel distance that 90% of a group of identical system units can achieve without flaking.

$$L = \left(\frac{f_H \; f_T \; f_C}{f_W} \; \frac{C}{P_C}\right)^3 \times 50$$

L	: Nominal life	(km)	f_H :Hardness factor	(Fig.1)
C	: Basic dynamic load rating	(N)	f_T Temperature factor	(Fig.2)
P_c	:Applied load	(N)	f_C : Contact factor	(Talbe 1)
			f_W : Load factor	(Table 2)

Service life

When linear guide system rolls under a load, its raceway and rolling elements constantly receive repetitive stress. If a limit is reached, the raceway fractures from fatigue and part of the surface flakes like scales. This phenomenon is called flaking.The service life of the system refers to the total travel distance until the first event of flaking occurs due to rolling fatigue of the material on the raceway.

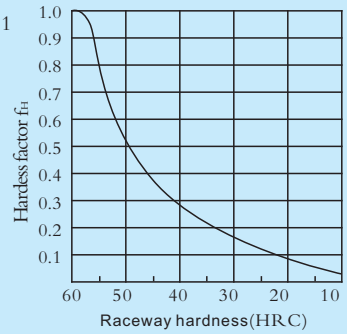
$$L^h = \frac{L \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

L^h	: Service life	(h)
ℓ_s	: Stroke	(mm)
n_1	: S.P.M	(min)$^{-1}$

f_H :Hardness factor

To maximize the load capacity of the linear guide system,the hardness of the raceways needs to be between 58 and 64 HRC.If the hardness is lower than this range, the basic dynamic load rating and the basic static loadrating decrease.Therefore, it is necessary to multiply each rating by the respective hardness factor.$f_{H=1.0}$

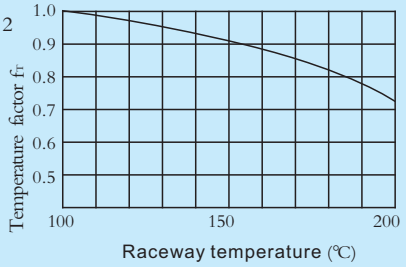
图 1



f_T :Temperature factor

The temperature of the service environment usually not exceeds 80℃. $f_T = 1.0$

图 2



f_C :Contact Factor

If multiple Guide blocks are closely arranged with each other, it is difficult to achieve uniform load distribution due to a moment load and the accuracy of the mounting surface. In such applications, multiply basic load ratings “C”and “C0 ” by the corresponding contact factors in table1.

Note: If uneven load distribution is expected in a large machine,take into account the respective contact factor indicated in Table1.

Table1 Contact factor(f_C)

No. of blocks used in close contact	Contact factor f_C
2	0.81
3	0.72
4	0.66
5	0.61
6 or greater	0.6
Normal use	1

f_W : Load Factor

In general, reciprocating machines tend to involve vibrations or impact during operation. It is extremely difficult to accurately determine vibrations generated during high-speed operation and impact during frequent start and stop.Therefore, where the effects of speed and vibration are estimated to be significant, divide the basic dynamic load rating (C) by a load factor selected from Table2 , which contains empirically obtained data.

Table2 Load factor(f_W)

Vibrations/impact	Speed(V)	f_W
Faint	very low V≤0.25m/s	1 ~1.2
Weak	Slow 0.25<V≤1m/s	1.2~1.5
Medium	Medium 1<V≤2m/s	1.5~2
Strong	High V>2m/s	2 ~3.5

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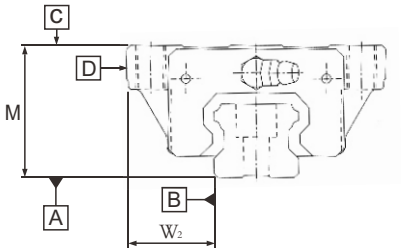
The accuracy of *PPC* HSR series

The accuracy of *PPC* HSR series can be classified into normal (no mark), high (H), precision (P), super precis -ion(SP),ultra precision (UP), five classes. Please cho -ose the class by referring the accuracy of applied equ -ipment.



Unit: mm

Model	Accuracy standard	Normal No Mark	High H	Precision P	Super precision SP	Ultra precision UP
15 20	Dimensional tolerance of height M	± 0.07	± 0.03	$^{0}_{-0.03}$	$^{0}_{-0.015}$	$^{0}_{-0.008}$
	Dimensional tolerance of height double M	0.02	0.01	0.006	0.004	0.003
	Dimensional tolerance of width W_2	± 0.06	± 0.03	$^{0}_{-0.02}$	$^{0}_{-0.015}$	$^{0}_{-0.008}$
	Dimensional tolerance of height double M	0.02	0.01	0.006	0.004	0.003
	Running parallelism of block surface C to surface A	See follow table				
	Running parallelism of block surface D to surface B	See follow table				
25 30 35	Dimensional tolerance of height M	± 0.08	± 0.04	$^{0}_{-0.04}$	$^{0}_{-0.02}$	$^{0}_{-0.01}$
	Dimensional tolerance of height double M	0.02	0.015	0.007	0.005	0.003
	Dimensional tolerance of width W_2	± 0.07	± 0.03	$^{0}_{-0.03}$	$^{0}_{-0.015}$	$^{0}_{-0.01}$
	Dimensional tolerance of height double M	0.025	0.015	0.007	0.005	0.003
	Running parallelism of block surface C to surface A	See follow table				
	Running parallelism of block surface D to surface B	See follow table				
45 55	Dimensional tolerance of height M	± 0.08	± 0.04	$^{0}_{-0.05}$	$^{0}_{-0.03}$	$^{0}_{-0.01}$
	Dimensional tolerance of height double M	0.025	0.015	0.007	0.005	0.003
	Dimensional tolerance of width W_2	± 0.07	± 0.04	$^{0}_{-0.04}$	$^{0}_{-0.025}$	$^{0}_{-0.01}$
	Dimensional tolerance of height double M	0.03	0.015	0.007	0.005	0.003
	Running parallelism of block surface C to surface A	See follow table				
	Running parallelism of block surface D to surface B	See follow table				
65 85 100 120 150	Dimensional tolerance of height M	± 0.08	± 0.04	$^{0}_{-0.05}$	$^{0}_{-0.04}$	$^{0}_{-0.03}$
	Dimensional tolerance of height double M	0.03	0.02	0.01	0.007	0.005
	Dimensional tolerance of width W_2	± 0.08	± 0.04	$^{0}_{-0.05}$	$^{0}_{-0.04}$	$^{0}_{-0.03}$
	Dimensional tolerance of height double M	0.03	0.02	0.01	0.007	0.005
	Running parallelism of block surface C to surface A	See follow table				
	Running parallelism of block surface D to surface B	See follow table				

Accuracy of running parallelism

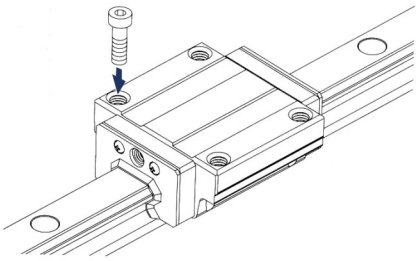
Unit: μm

Rail length (mm)		Values				
from	to	Normal	H	P	SP	UP
–	100	12	7	3	2	2
100	200	14	9	4	2	2
200	300	15	10	5	3	2
300	500	17	12	6	3	2
500	700	20	13	7	4	2
700	900	22	15	8	5	3
900	1100	24	16	9	6	3
1100	1500	26	18	11	7	4
1500	1900	28	20	13	8	4
1900	2500	31	22	15	10	5
2500	3100	33	25	18	11	6
3100	3600	36	27	20	14	7
3600	4000	37	28	21	15	7

The type of PPC linear guide

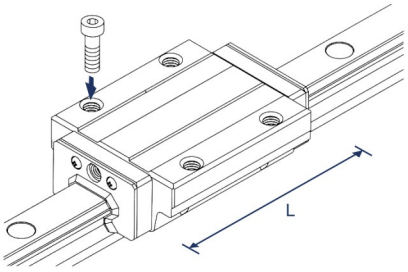
HSR-A

The flange of its block has tapped holes.



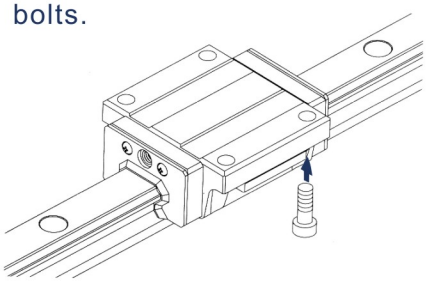
HSR-LA

The block has the same cross-sectional shape as model HSR-A,but has a longer overall block length (L) and a greater rated load.。



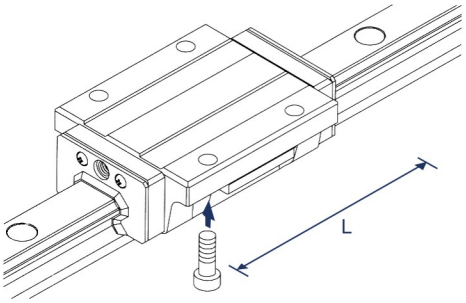
HSR-B

The flange of the block has through holes. Used in places where the table cannot have through holes for mounting bolts.



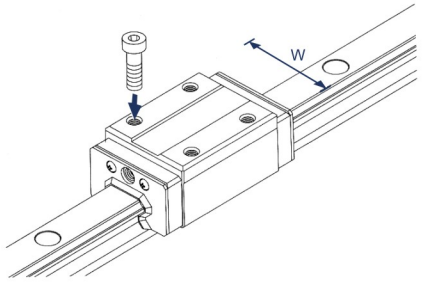
HSR-LB

The block has the same cross-sectional shape as model HSR-B, but has a longer overall block length (L) and a greater rated load.



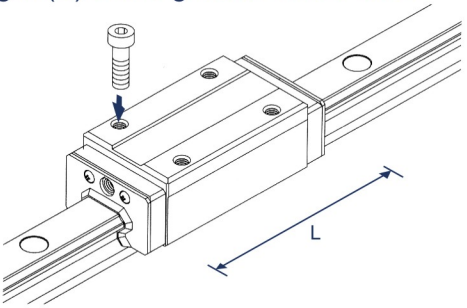
HSR-R

Having a smaller block width (W) and tapped holes, this model is optimal for compact design.



HSR-LR

The block has the same cross -sectional shape as model HSR-R, but has a longer overall block length (L) and a greater rated load.



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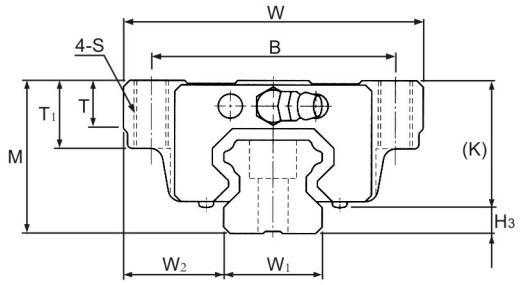
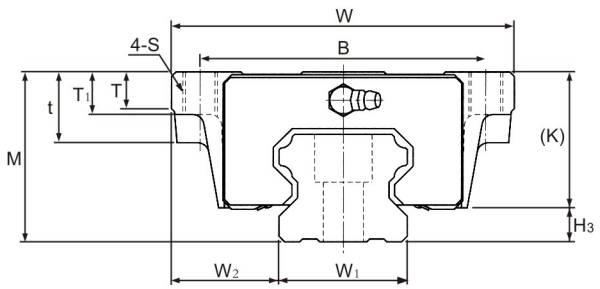
HSR−A , HSR−LA Series



HSR15−35A/LA



HSR45 − 85A/LA

Model	Dimensions			Dimensions of Block											
	M	W	L	B	C	S	L_1	t	T	T_1	K	N	E	Grease Nipple	H_3
HSR 15A	24	47	56.6	38	30	M5	38.8	—	7	11	19.3	4.3	5.5	PB1021B	3.5
HSR 20A	30	63	74	53	40	M6	50.8	—	10	9.5	26	5	12	B-M6F	4
HSR 20LA	30	63	90	53	40	M6	66.8	—	10	9.5	26	5	12	B-M6F	4
HSR 25A	36	70	83.1	57	45	M8	59.5	—	11	16	30.5	6	12	B-M6F	5.5
HSR 25LA	36	70	102.2	57	45	M8	78.6	—	11	16	30.5	6	12	B-M6F	5.5
HSR 30A	42	90	98	72	52	M10	70.4	—	9	18	35	7	12	B-M6F	7
HSR 30LA	42	90	120.6	72	52	M10	93	—	9	18	35	7	12	B-M6F	7
HSR 35A	48	100	109.4	82	62	M10	80.4	—	12	21	40.5	8	12	B-M6F	7.5
HSR 35LA	48	100	134.8	82	62	M10	105.8	—	12	21	40.5	8	12	B-M6F	7.5
HSR 45A HSR 45LA	60	120	139 170.8	100	80	M12	98 129.8	25	13	15	50	10	16	B-PT1/8	10
HSR 55A HSR 55LA	70	140	163 201.1	116	95	M14	118 156.1	29	13.5	17	57	11	16	B-PT1/8	13
HSR 65A HSR 65LA	90	170	186 245.5	142	110	M16	147 206.5	37	21.5	23	76	19	16	B-PT1/8	14
HSR 85A HSR 85LA	110	215	245.6 303	185	140	M20	178.6 236	55	28	30	94	23	16	B-PT1/8	16

Model No. coding

HSR25 A 2 UU CO +1200L P T -II

- HSR25: Model No.
- A: Type of block
- 2: No.of blocks used on the same rail
- UU: Contamination protection
- CO: Radical clearance symbol — Normal (No mark) / Light preload (C1) / Medium preload (C0)
- +1200L: Rail length (in mm)
- P: Precision mark — Normal (No mark) / High grade (H) / Precision grade (P) / Super precison (SP) / Ultra precision (UP)
- T: Jointed mark for rail
- -II: symbol for No.of rails used on the same plane

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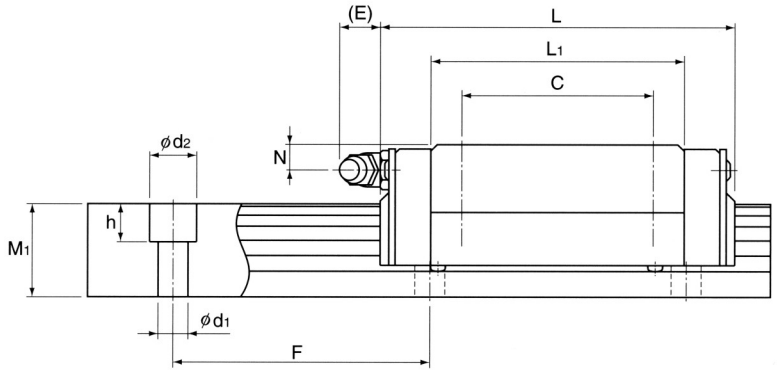
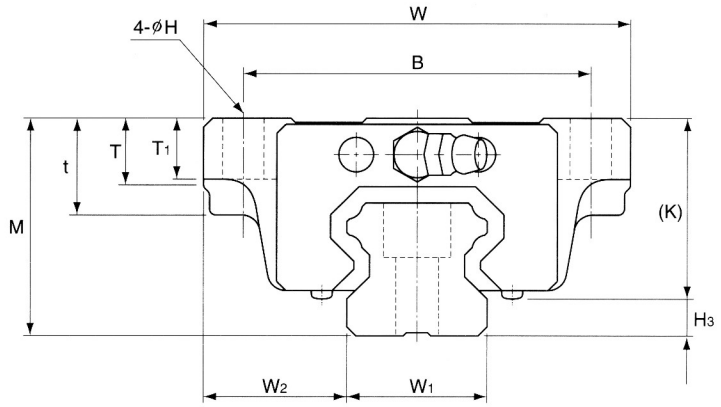


Unit in mm

	Dimensions of rail						Basic load rating		Static rated moment kN−m*						Weight	
						Length	C	C_0	M_A		M_B		M_C		Block	Rail
	W_1 ±0.05	W_2	M_1	F	d_1 X d_2 Xh	MAX.	kN	kN	One block	Double	One block	Double	One block		kg	kg/m
	15	16	15	60	4.5X7.5X5.3	3000	8.33	13.5	0.0805	0.457	0.0805	0.457	0.0844		0.2	1.5
	20	21.5	18	60	6X9.5X8.5	3000	13.8	23.8	0.19	1.04	0.19	1.04	0.201		0.35	2.3
	20	21.5	18	60	6X9.5X8.5	3000	21.3	31.8	0.323	1.66	0.323	1.66	0.27		0.47	2.3
	23	23.5	22	60	7X11X9	3000	19.9	34.4	0.307	1.71	0.307	1.71	0.344		0.59	3.3
	23	23.5	22	60	7X11X9	3000	27.2	45.9	0.529	2.74	0.529	2.74	0.459		0.75	3.3
	28	31	26	80	9X14X12	3000	28	46.8	0.524	2.7	0.524	2.7	0.562		1.1	4.8
	28	31	26	80	9X14X12	3000	37.3	62.5	0.889	4.37	0.889	4.37	0.751		1.3	4.8
	34	33	29	80	9X14X12	3000	37.3	61.1	0.782	3.93	0.782	3.93	0.905		1.6	6.6
	34	33	29	80	9X14X12	3000	50.2	81.5	1.32	6.35	1.32	6.35	1.2		2	6.6
	45	37.5	38	105	14X20X17	3000	60 80.4	95.6 127	1.42 2.44	7.92 12.6	1.42 2.44	7.92 12.6	1.83 2.43		2.8 3.3	11
	53	43.5	44	120	16X23X20	3000	88.5 119	137 183	2.45 4.22	13.2 21.3	2.45 4.22	13.2 21.3	3.2 4.28		4.5 5.7	15.1
	63	53.5	53	150	18X26X22	3000	141 192	215 286	4.8 8.72	23.5 40.5	4.8 8.72	23.5 40.5	5.82 7.7		8.5 10.7	22.5
	85	65	65	180	24X35X28	3000	210 282	310 412	8.31 14.2	45.6 72.5	8.31 14.2	45.6 72.5	11 14.7		17 23	35.2

HSR−B, HSR−LB Series



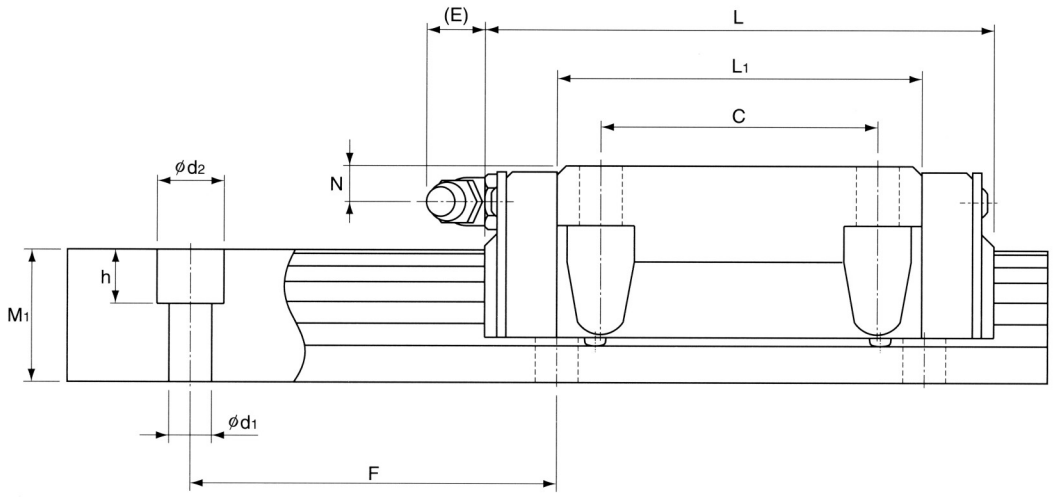
Model	Dimensions			Dimension of blocks											Grease Nipple	H3
	M	W	L	B	C	H	L1	t	T	T1	K	N	E		
HSR 15B	24	47	56.6	38	30	4.5	38.8	11	7	7	19.3	4.3	5.5	PB1021B	3.5
HSR 20B	30	63	74	53	40	6	50.8	10	9.5	10	26	5	12	B-M6F	4
HSR 20LB	30	63	90	53	40	6	66.8	10	9.5	10	26	5	12	B-M6F	4
HSR 25B	36	70	83.1	57	45	7	59.5	16	11	10	30.5	6	12	B-M6F	5.5
HSR 25LB	36	70	102.2	57	45	7	78.6	16	11	10	30.5	6	12	B-M6F	5.5
HSR 30B	42	90	98	72	52	9	70.4	18	9	10	35	7	12	B-M6F	7
HSR 30LB	42	90	120.6	72	52	9	93	18	9	10	35	7	12	B-M6F	7
HSR 35B	48	100	109.4	82	62	9	80.4	21	12	13	40.5	8	12	B-M6F	7.5
HSR 35LB	48	100	134.8	82	62	9	105.8	21	12	13	40.5	8	12	B-M6F	7.5
HSR 45B HSR 45LB	60	120	139 170.8	100	80	11	98 129.8	25	13	15	50	10	16	B-PT1/8	10
HSR 55B HSR 55LB	70	140	163 201.1	116	95	14	118 156.1	29	13.5	17	57	11	16	B-PT1/8	13
HSR 65B HSR 65LB	90	170	186 245.5	142	110	16	147 206.5	37	21.5	23	76	19	16	B-PT1/8	14
HSR 85B HSR 85LB	110	215	245.6 303	185	140	18	178.6 236	55	28	30	94	23	16	B-PT1/8	16

Model No. coding

HSR25 B 2 UU CO +1200L P T -II

- HSR25: Model No.
- B: Type of block
- 2: No.of blocks used on the same rail
- UU: Contamination protection
- CO: Radical clearance symbol — Normal (No mark) / Light preload (C1) / Medium preload (C0)
- +1200L: Rail length (in mm)
- P: Precision mark — Normal (No mark) / High grade (H) / Precision grade (P) / Super precison (SP) / Ultra precision (UP)
- T: Jointed mark for rail
- -II: symbol for No.of rails used on the same plane

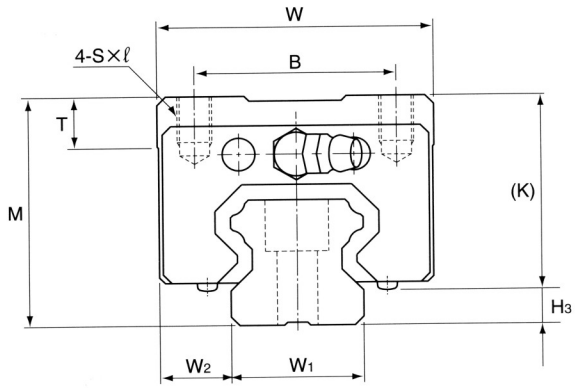
PPC



Unit in mm

	Dimensions of Rail						Basic load rating		static rated moment kN-m*						weight	
	W_1 ±0.05	W_2	M_1	F	d_1 X d_2 Xh	Length Max.	C kN	C_0 kN	M_A One block	M_A Double	M_B One block	M_B Double	M_C One block		Block kg	Rail kg/m
	15	16	15	60	4.5X7.5X5.3	3000	8.33	13.5	0.0805	0.457	0.0805	0.457	0.0844		0.2	1.5
	20	21.5	18	60	6X9.5X8.5	3000	13.8	23.8	0.19	1.04	0.19	1.04	0.201		0.35	2.3
	20	21.5	18	60	6X9.5X8.5	3000	21.3	31.8	0.323	1.66	0.323	1.66	0.27		0.47	2.3
	23	23.5	22	60	7X11X9	3000	19.9	34.4	0.307	1.71	0.307	1.71	0.344		0.59	3.3
	23	23.5	22	60	7X11X9	3000	27.2	45.9	0.529	2.74	0.529	2.74	0.459		0.75	3.3
	28	31	26	80	9X14X12	3000	28	46.8	0.524	2.7	0.524	2.7	0.562		1.1	4.8
	28	31	26	80	9X14X12	3000	37.3	62.5	0.889	4.37	0.889	4.37	0.751		1.3	4.8
	34	33	29	80	9X14X12	3000	37.3	61.1	0.782	3.93	0.782	3.93	0.905		1.6	6.6
	34	33	29	80	9X14X12	3000	50.2	81.5	1.32	6.35	1.32	6.35	1.2		2	6.6
	45	37.5	38	105	14X20X17	3000	60 80.4	95.6 127	1.42 2.44	7.92 12.6	1.42 2.44	7.92 12.6	1.83 2.43		2.8 3.3	11
	53	43.5	44	120	16X23X20	3000	88.5 119	137 183	2.45 4.22	13.2 21.3	2.45 4.22	13.2 21.3	3.2 4.28		4.5 5.7	15.1
	63	53.5	53	150	18X26X22	3000	141 192	215 286	4.8 8.72	23.5 40.5	4.8 8.72	23.5 40.5	5.82 7.7		8.5 10.7	22.5
	85	65	65	180	24X35X28	3000	210 282	310 412	8.31 14.2	45.6 72.5	8.31 14.2	45.6 72.5	11 14.7		17 23	35.2

HSR−R, HSR−LR Series



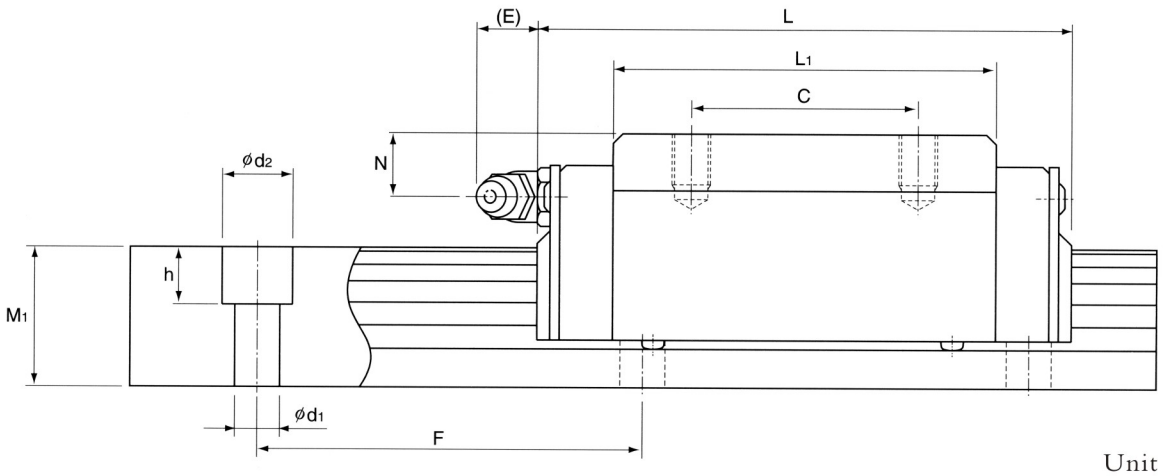
Model	Dimensions			Dimensions of blocks									Grease Nipple	H_3
	M	W	L	B	C	S×ℓ	L_1	T	K	N	E			
HSR 15R	28	34	56.6	26	26	M4X5	38.8	6	23.3	8.3	5.5		PB1021B	3.5
HSR 20R	30	44	74	32	36	M5X6	50.8	8	26	5	12		B−M6F	4
HSR 20LR	30	44	90	32	50	M5X6	66.8	8	26	5	12		B−M6F	4
HSR 25R	40	48	83.1	35	35	M6X8	59.5	9	34.5	10	12		B−M6F	5.5
HSR 25LR	40	48	102.2	35	50	M6X8	78.6	9	34.5	10	12		B−M6F	5.5
HSR 30R	45	60	98	40	40	M8X10	70.4	9	38	10	12		B−M6F	7
HSR 30LR	45	60	120.6	40	60	M8X10	93	9	38	10	12		B−M6F	7
HSR 35R	55	70	109.4	50	50	M8X12	80.4	11.7	47.5	15	12		B−M6F	7.5
HSR 35LR	55	70	134.8	50	72	M8X12	105.8	11.7	47.5	15	12		B−M6F	7.5
HSR 45R HSR 45LR	70	86	139 170.8	60	60 80	M10X17	98 129.8	15	60	20	16		B−PT1/8	10
HSR 55R HSR 55LR	80	100	163 201.1	75	75 95	M12X18	118 156.1	20.5	67	21	16		B−PT1/8	13
HSR 65R HSR 65LR	90	126	186 245.5	76	70 120	M16X20	147 206.5	23	76	19	16		B−PT1/8	14
HSR 85R HSR 85LR	110	156	245.6 303	100	80 140	M18X25	178.6 236	29	94	23	16		B−PT1/8	16

Model No. coding

HSR25 B 2 UU CO +1200L P T -II

- HSR25: Model No.
- B: Type of block
- 2: No.of blocks used on the same rail
- UU: Contamination protection
- CO: Radical clearance symbol
  - Normal (No mark)
  - Light preload (C1)
  - Medium preload (C0)
- +1200L: Rail length (in mm)
- P: Precision mark
  - Normal (No mark) / High grade (H) / Precision grade (P)
  - Super precison (SP) / Ultra precision (UP)
- T: Jointed mark for rail
- -II: Symbol for No.of rails used on the same plane

PPC

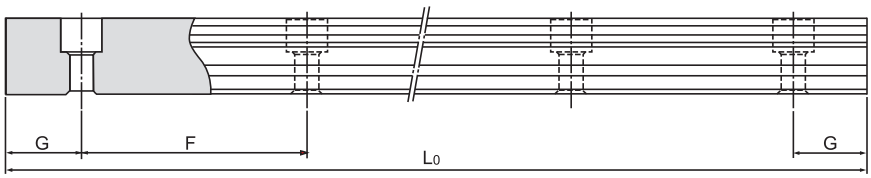


Unit in mm

	Dimensions of rail						Basic load rating		static rated moment kN-m*						Weight	
						Length	C	C_0	M_A		M_B		M_C		Block	Rail
	W_1 ±0.05	W_2	M_1	F	d_1 X d_2 Xh	MAX.	kN	kN	One block	Double	One block	Double	One block		kg	kg/m
	15	9.5	15	60	4.5X7.5X5.3	3000	8.33	13.5	0.0805	0.457	0.0805	0.457	0.0844		0.18	1.5
	20	12	18	60	6X9.5X8.5	3000	13.8	23.8	0.19	1.04	0.19	1.04	0.201		0.25	2.3
	20	12	18	60	6X9.5X8.5	3000	21.3	31.8	0.323	1.66	0.323	1.66	0.27		0.35	2.3
	23	12.5	22	60	7X11X9	3000	19.9	34.4	0.307	1.71	0.307	1.71	0.344		0.54	3.3
	23	12.5	22	60	7X11X9	3000	27.2	45.9	0.529	2.74	0.529	2.74	0.459		0.67	3.3
	28	16	26	80	9X14X12	3000	28	46.8	0.524	2.7	0.524	2.7	0.562		0.9	4.8
	28	16	26	80	9X14X12	3000	37.3	62.5	0.889	4.37	0.889	4.37	0.751		1.1	4.8
	34	18	29	80	9X14X12	3000	37.3	61.1	0.782	3.93	0.782	3.93	0.905		1.5	6.6
	34	18	29	80	9X14X12	3000	50.2	81.5	1.32	6.35	1.32	6.35	1.2		2	6.6
	45	20.5	38	105	14X20X17	3000	60 80.4	95.6 127	1.42 2.44	7.92 12.6	1.42 2.44	7.92 12.6	1.83 2.43		2.6 3.1	11
	53	23.5	44	120	16X23X20	3000	88.5 119	137 183	2.45 4.22	13.2 21.3	2.45 4.22	13.2 21.3	3.2 4.28		4.3 5.4	15.1
	63	31.5	53	150	18X26X22	3000	141 192	215 286	4.8 8.72	23.5 40.5	4.8 8.72	23.5 40.5	5.82 7.7		7.3 9.3	22.5
	85	35.5	65	180	24X35X28	3000	210 282	310 412	8.31 14.2	45.6 72.5	8.31 14.2	45.6 72.5	11 14.7		13 16	35.2

PPC HSR Standard Rail Length and Max. Length

PPC offers standard rail length for customer's needs for non-standard G-values,the recommened dimension should not be greater than 1/2 pitch(F) dimension ,this will prevent an unstable rail end.



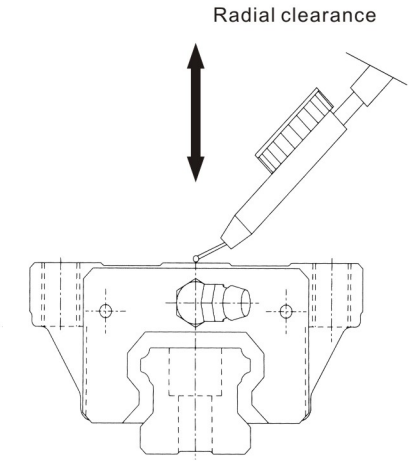
PPC HSR Standard Rail Length and Max. Length

Unit:mm

Model	HSR 15	HSR 20	HSR 25	HSR 30	HSR 35	HSR 45	HSR 55	HSR 65	HSR 85	HSR 100	HSR 120	HSR 150
(L_o)	160 220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600 1720 1840 1960 2080 2200	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540 1600 1720 1840 1960 2080 2200 2320 2440	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	570 675 780 885 990 1095 1200 1305 1410 1515 1620 1725 1830 1935 2040 2145 2250 2355 2460 2565 2670 2775 2880 2985 3000	780 900 1020 1140 1260 1380 1500 1620 1740 1860 1980 2100 2220 2340 2460 2580 2700 2820 2940 3000	1270 1570 2020 2620	1530 1890 2250 2610	1340 1760 2180 2600	1470 1930 2390	1600 2100 2350
Pitch (F)	60	60	60	80	80	105	120	150	180	210	230	250
Distance to end(G)	20	20	20	20	20	22.5	30	35	45	40	45	50
Max.Length	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000

Selecting a Clearance/Preload for Linear Guide

Clearance of a linear guide system is a play between the block (nut), the rail (shaft) and the ball .The sum of vertical clearances is called radial clearance ,With the Guide, a rad -ial clearance refers to the value of a movement of the block center when the block is g -ently moved vertically with constant force applied in the center of the fixed rail in the l -ongitudinal direction.



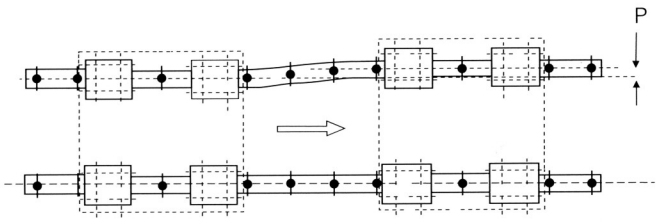
Unit: μm

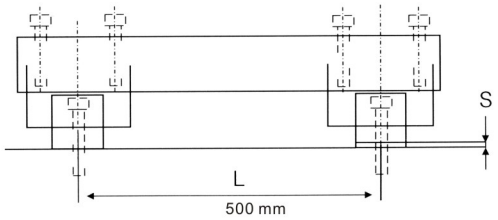
Size \ Mark	Normal	Light preload	Medium preload
	No Mark	C1	C0
15	- 4 ~ + 2	-12 ~- 4	——
20	- 5 ~ + 2	-14 ~- 5	-23 ~ -14
25	- 6 ~ + 3	-16 ~- 6	-26 ~ -16
30	- 7 ~ + 4	-19 ~- 7	-31 ~ -19
35	- 8 ~ + 4	-22 ~- 8	-35 ~ -22
45	-10 ~ + 5	-25 ~-10	-40 ~ -25
55	-12 ~ + 5	-29 ~-12	-46 ~ -29
65	-14 ~ + 7	-32 ~-14	-50 ~ -32
85	-16 ~ + 8	-36 ~-16	-56 ~ -36
100	-19 ~ + 9	-42 ~-19	-65 ~ -42
120	-21 ~ +10	-47 ~-21	-73 ~ -47
150	-23 ~ +11	-51 ~-23	-79 ~ -51

The Accuracy Tolerance of Mounting Surface

The accuracy tolerance of reference surface height

Because of the Circular-arc contact design, linear guide can compensate for some surface-error on installation and still maintain smooth linear motion.As long as the accuracy requirements for the mounting surface are followed, high accuracy and rigidity of linear motion of the guide can be obtained without any difficulty.In order to satisfy the needs of fast installation and smooth movement, PPC offers the normal clearance type of preload to customers of its high absorption ability of the deviation in mounting surface accuracy.





The parallelism tolerance of reference surface

Unit: μm

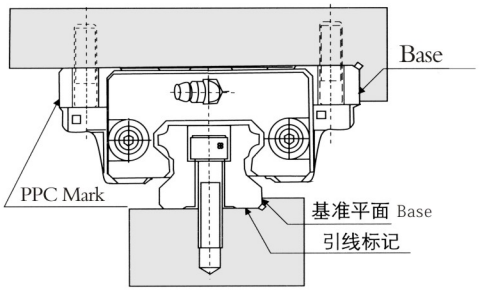
Preload Classes / HSR	Medium Preload	Light Preload	Normal
	C0	C1	No Mark
15		18	25
25	20	22	30
35	30	35	50
55	45	50	70
85	70	75	90

The accuracy tolerance of reference surface height

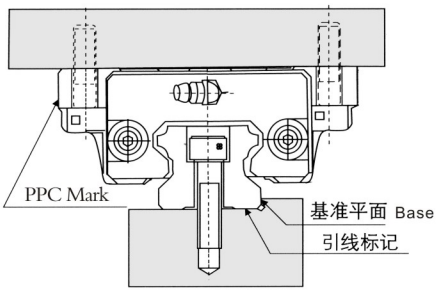
Unit: μm

Preload classes / HSR	Medium Preload	Light Preload	Normal
	C0	C1	No Mark
15		85	130
25	70	85	130
35	120	150	210
55	170	210	300
85	240	290	400

Base of PPC linear guide assembly



Master guide

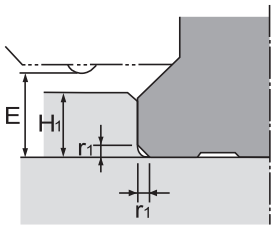


Subsidiary guide

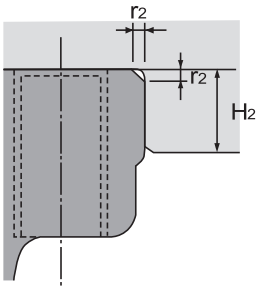
PPC

Cautions for Installation

Improper shoulder heights and fillets of mounting surfaces will cause a deviation in accuracy and the interference with the chamfered part of the rail or block. As long as the recommended shoulder heights and fillets are followed, installation inaccuracies will be eliminated.



Rail shoulder



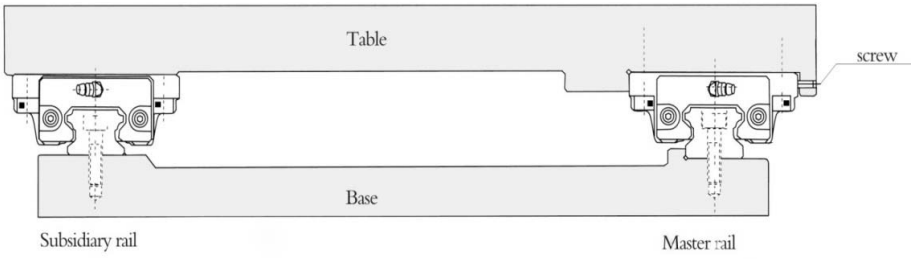
Block shoulder

Unit:mm

Model	r_1 (max)	r_2 (max)	H_1	H_2	E
15	0.5	0.5	3	4	4.7
20	0.5	0.5	3.5	5	4
25	1	1	5	5	5.5
30	1	1	5	5	7
35	1	1	6	6	7.5
45	1	1	8	8	10
55	1.5	1.5	10	10	13
65	1.5	1.5	10	10	14
85	1.5	1.5	12	14	16
100	2	2	16	16	20.5
120	2.5	2.5	17	18	20
150	2.5	2.5	20	20	22.5

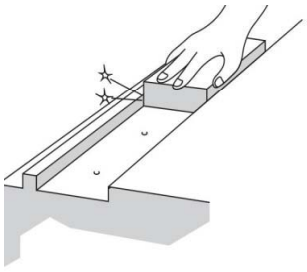
Mounting Procedure

Mounting the *PPC* linear guide when an impact load is applied to the machine and therefore rigidity and high accuracy are required



1. Mounting the *PPC* Rail(s)

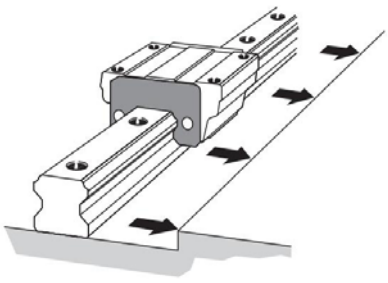
(1) Be sure to remove burr, dent and dust from the mounting surface of the machine to which the linear Guide is to be mounted before installing the Linear Guide.



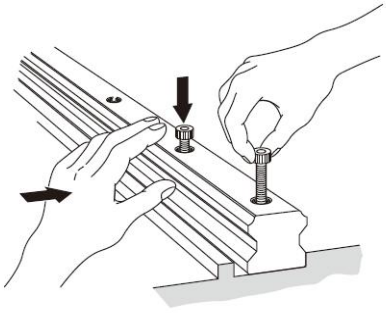
Checking the Mounting Surface

Note:Since the PPC Guide is coated with anti-rust oil,remove it from the reference surface by wiping the surface with washing oil before using the guide.Once the anti-rust oil has been removed, the reference surface is prone to getting rusted. We recommend applying low-viscosity spindle oil.

(2)Gently place the rail onto the base, and temporarily secure the bolts to the extent that the rail lightly contacts the mounting surface (align the line-marked side of the rail with the side reference-surface of the base).



Aligning the LM Rail with the Reference-Surface

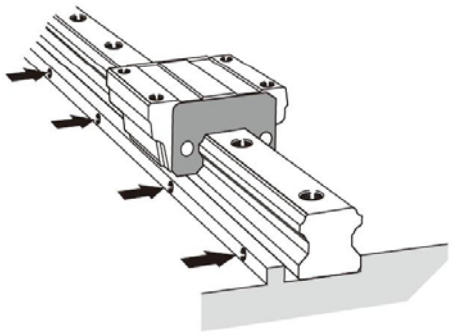


Checking with the Bolt for an Allowance

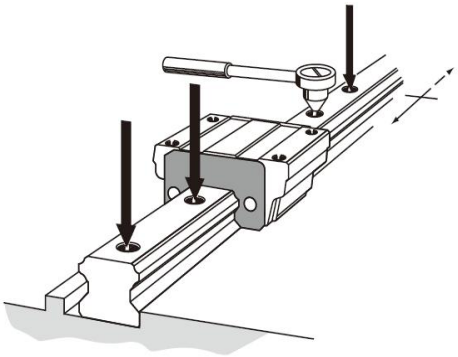
Note:The bolts for securing the *PPC* Linear Guide must be clean.When placing the bolts into the mounting holes of the rail, check if the bolt holes are displaced. Forcibly tightening the bolt into a displaced hole may deteriorate the accuracy.

PPC

(3)Secure the set screws for the *PPC* rail in order with a tightening force just enough to have the rail closely contact the side mounting surface.



(4)Tighten the mounting bolts at the designated torque using a torque wrench.



Note:To achieve stable accuracy when tightening the PPC rail mounting bolts, tighten them in order from the center to the rail ends.

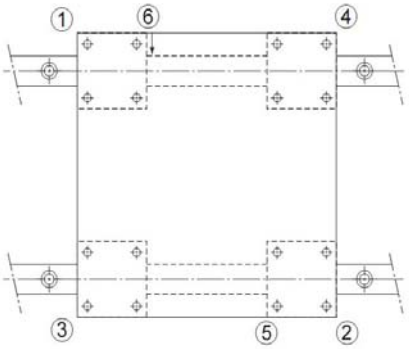
(5) Mount the other *PPC* rail in the same manner to complete the installation of the rails.

(6) Hammer in caps into the bolt holes on the top face of each Linear rail until the top of the cap is on the same level as the top face of the rail.

2. Mounting the *PPC* Blocks

(1) Gently place the table on the *PPC* blocks and temporarily fasten the mounting bolts.
(2) Press the master side *PPC* blocks to the side reference surface of the table using set screws and position the table.

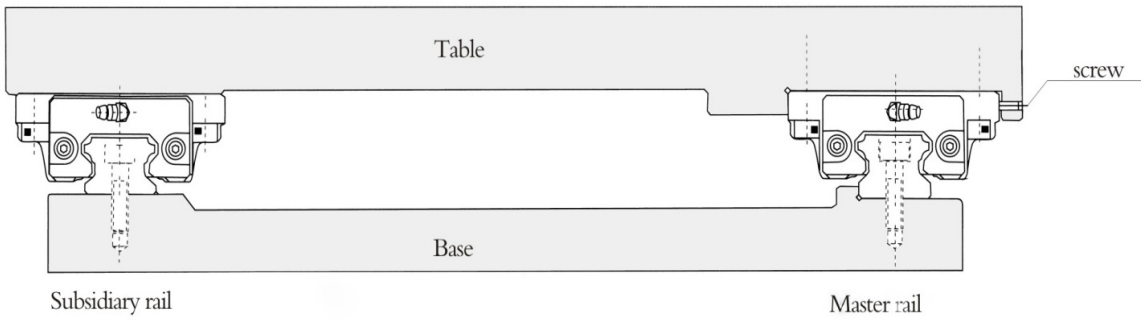
(3) Fully fasten the mounting bolts on the master side and subsidiary side to complete the i



Note:To evenly secure the table, tighten the mounting bolts in diagonal order as shown above.

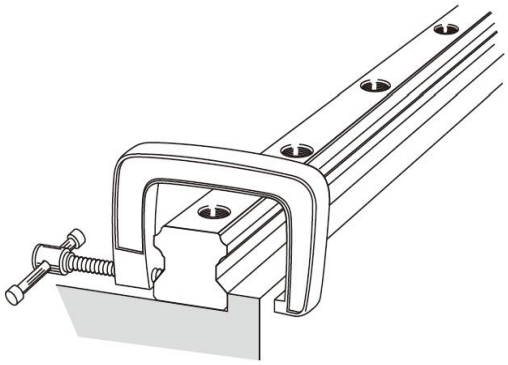
This method saves time in establishing straightness of the Linear rail and eliminates the need to machine securing dowel pins, thus to drastically shorten the installation man-hours.

Mounting the *PPC* linear guide when the master rail is not provided with the set screws



1.Mounting the Master Rail

After temporarily fastening the mounting bolts,firmly press *PPC* rail to the side reference surface at the position of each mounting boltusing a small vice and fully fasten the bolt.Perform this in order from either rail end to the other.

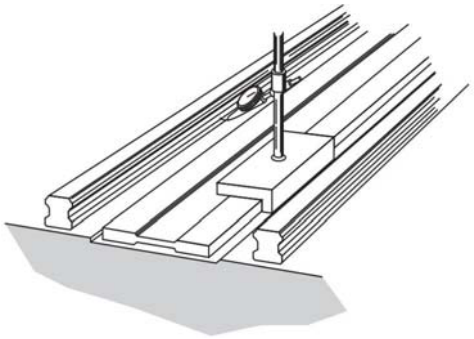


2.Mounting the Subsidiary Rail

To mount the subsidiary rail in parallel with the master rail, which has been correctly installed,we recommend adopting the methods below.

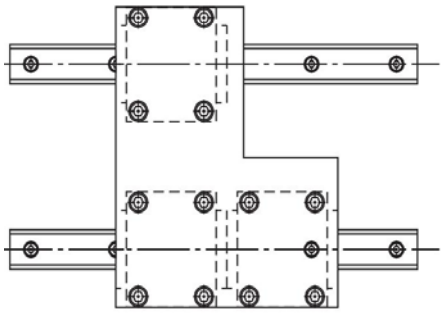
(1) Using a Straight-edge

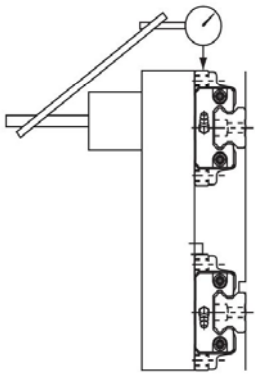
Place straight-edges between the two rails, and arrange the straight-edges in parallel with the side reference surface of the master rail using a dial gauge. Then, secure the mounting bolts in order while achieving straightness of the subsidiary rail with the straight edge as the reference by using the dia lgauge.



(2)Using Parallelism of the Table

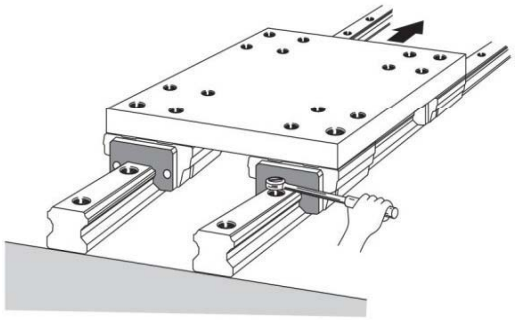
Secure the two *PPC* blocks on the master linear rail with the table (or a temporary table for measurement), and temporarily fasten the rail and the block on the subsidiary rail with the table. Place a dial gauge to the side face of the block on the subsidiary rail from the dial stand fi xed on the table top, then fasten the bolts in order while achieving parallelism of the subsidiary rail by moving the table from the rail end.





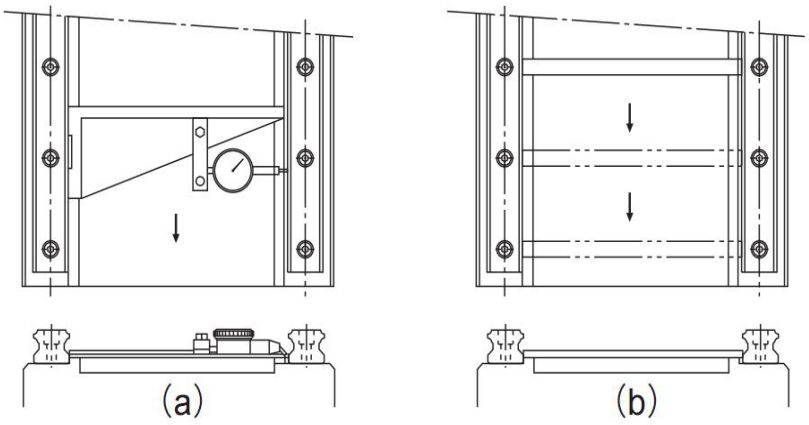
(3)the Subsidiary Rail Follow the Master Rail

Place the table on the blocks of the correctly mounted master rail and the temporarily fastened subsidiary rail, and fully fasten the two blocks on the master rail and one of the two blocks on the subsidiary rail with bolts.Fully tighten the mounting bolts on the subsidiary rail in order while temporarily fastening the remaining block on the subsidiary rail.

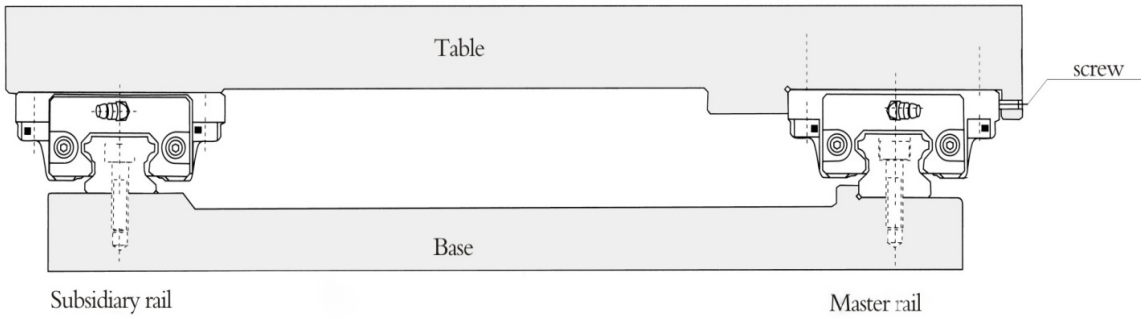


(4) Using a Jig

Use a jig like the one shown to achieve parallelism of the reference surface on the subsidiary side against the side reference surface of the master side from one end of the rail by the mounting pitch, and at the same time, fully fasten the mounting bolts in order.



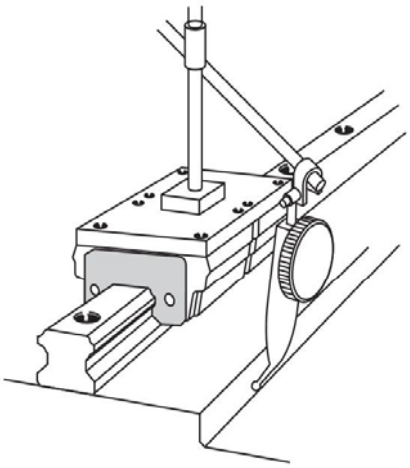
Mounting the linear guide when the master rail does not have a reference surface



Mounting the Master Rail

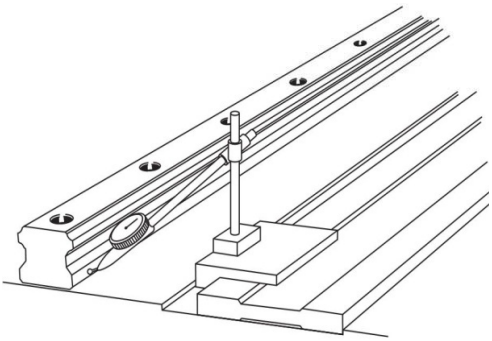
(1）Using a Temporary Reference Surface

You can temporarily set a reference surface near the rail mounting position on the base to achieve straightness of the rail from the rail end. In this method, two blocks must be joined together and attached to a measurement plate, as shown.



（2）Using a Straight-edge

After temporarily fastening the mounting bolts,use a dial gauge to check the straightness of the side reference surface of the rail from the rail end, and at the same time, fully fasten the mounting bolts.



Lubrication

When using Linear guide system, it is necessary to provide effective lubrication. Using the product without lubrication may increase wear of the rolling elements or shorten the service life.A lubricant has the following effects.

1. Minimizes friction in moving elements to prevent seizure and reduce wear.
2. Forms an oil fi lm on the raceway to decrease stress acting on the surface and extend rolling fatigue life.
3. Covers the metal surface to prevent rust formation.

If the mounting orientation is other than horizontal use, the lubricant may not reach the raceway completely.

Even with the linear guide system with seals, the internal lubricant gradually seeps out during operation.Therefore, the system needs to be lubricated at an appropriate interval according to the conditions.

Types of Lubricants

Linear guide systems mainly use grease or sliding surface oil for their lubricants.
The requirements that lubricants need to satisfy generally consist of the following.
(1) High oil film strength
(2) Low friction
(3) High wear resistance
(4) High thermal stability
(5) Non-corrosive
(6) Highly anti-corrosive
(7) Minimal dust/water content
(8) Consistency of grease must not be altered to a significant extent even after it is repeatedly stirred.
Lubricants that meet these requirements include the following products.

Lubricant	Type
Oil	Sliding surface oil or turbine oil ISOVG32~68

精密直线导轨副

Precision Linear Guideway

PPC

Linear Motion Technology

上海雄联精密机械配件有限公司

SHANGHAI SURELEN PRECISION MECHANICAL ACCESSORIES CO., LTD.