

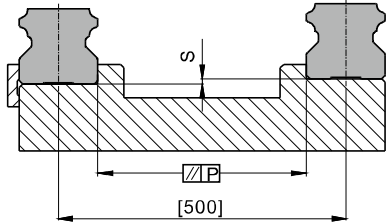
Caged Ball Type Linear Guide

LSQH Series

Installation Illustration

1. Allowable tolerance of mounting surface

LSQH series is an arc-shape, two-point contact design of linear guide. Its self-centering feature allows some tolerance on mounting surface without affecting the smoothness of linear motion. The allowable tolerance is indicated in following table:

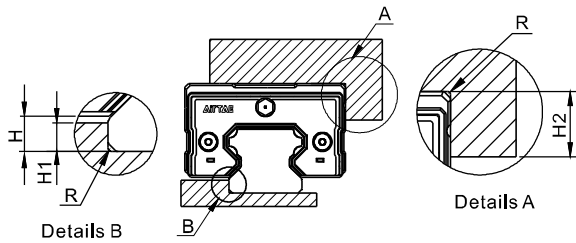


Model	Allowable tolerance of parallelism P(μm)			Allowable tolerance of top and bottom S (μm)		
	Standard clearance(A)	Light Preload(B)	Medium Preload(C)	Standard clearance(A)	Light Preload(B)	Medium Preload(C)
LSQH15	25	18	13	130	85	35
LSQH20	25	20	18	130	85	50
LSQH25	30	22	20	130	85	70
LSQH30	40	30	27	170	110	90
LSQH35	50	35	30	210	150	120

Note: The value in the table is the allowable value when the distance between the two linear guides is 500mm, and the allowable value is proportional to the distance between the two linear guides.

2. Height and Chamfer of Reference Edge

In order to ensure accurate installation of LSQH Linear Guide, the contact space should not exceed the given figures in following table.



Unit : mm

Model	H	H1	H2	R(Max)
LSQH15	3.5	3	4	0.5
LSQH20	4.5	3.7	5	0.5
LSQH25	6.5	5	5	1
LSQH30	6.5	5	5	1
LSQH35	7	6	6	1

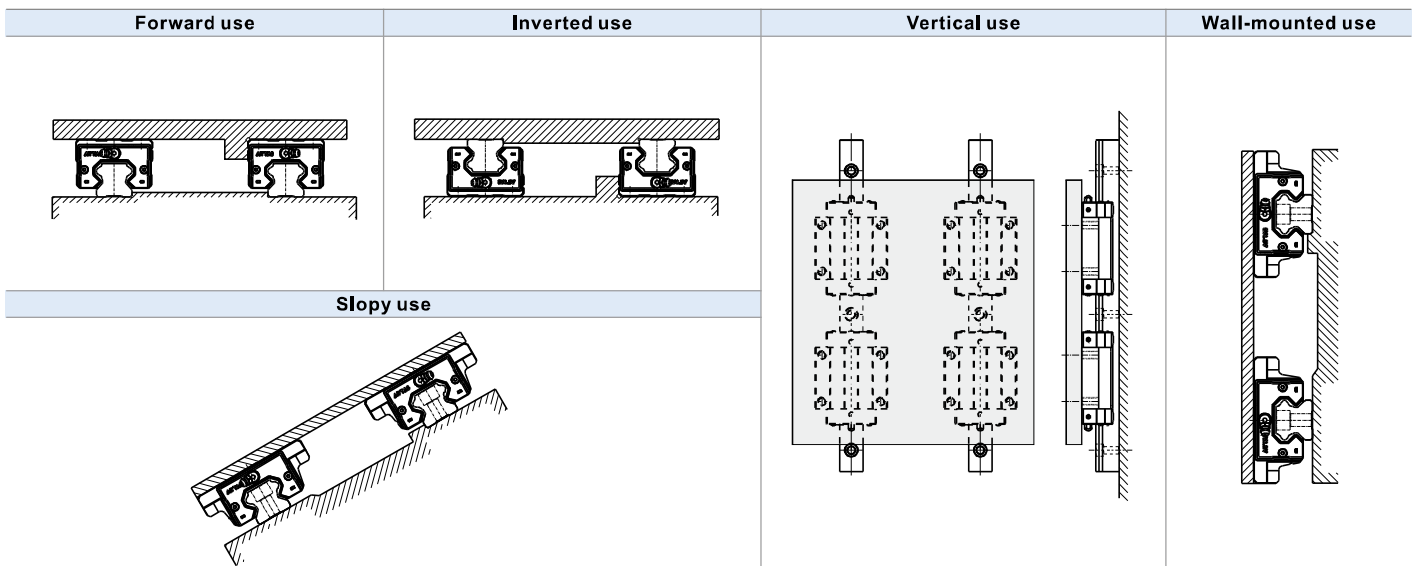
3. Screw Tighten Torque

When installing linear guide, whether the screws are well tighten and surface is well contacted will affect accuracy significantly. Please refer to following table for tightening force to ensure a perfect installation.

Model	Screw size	Tighten Torque(N.cm)		
		Iron	Casting	Aluminum alloy
LSQH15	M4	412	274	206
LSQH20	M5	882	588	441
LSQH25	M6	1370	921	686
LSQH30	M8	3040	2010	1470
LSQH35	M8	3040	2010	1470

4. Installation and Application

Linear guide installation methods can be divided into the followings. For installations other than forward installation, the lubricant may fail.

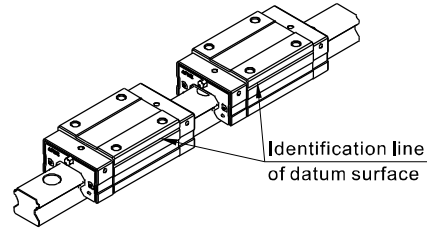


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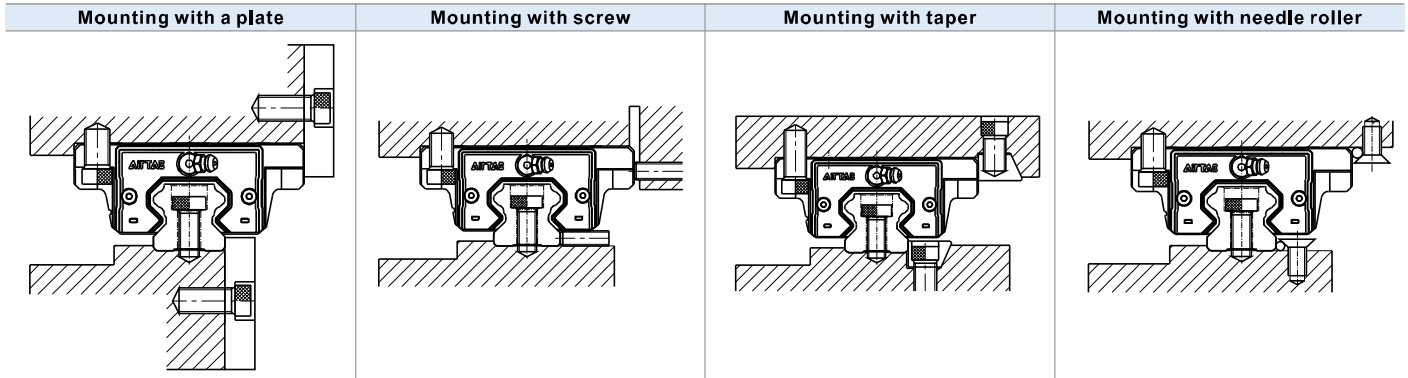
5. Datum plane

- Datum plane for installation must be ground or finely milled to ensure accuracy.
- Both sides of Rail can be used as the datum plane.
- For multi-blocks on a rail, identification line on blocks should be put on the same side to ensure moving accuracy.



6. Fixation Method

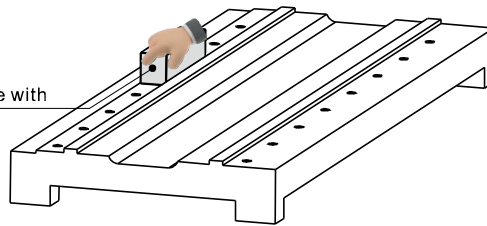
Rails and blocks are possible to be displaced while the machine is subjected to vibrations and impacts thus to affect the accuracy. In order to avoid those difficulties and achieve high running accuracy, the following four methods are recommended for fixing.



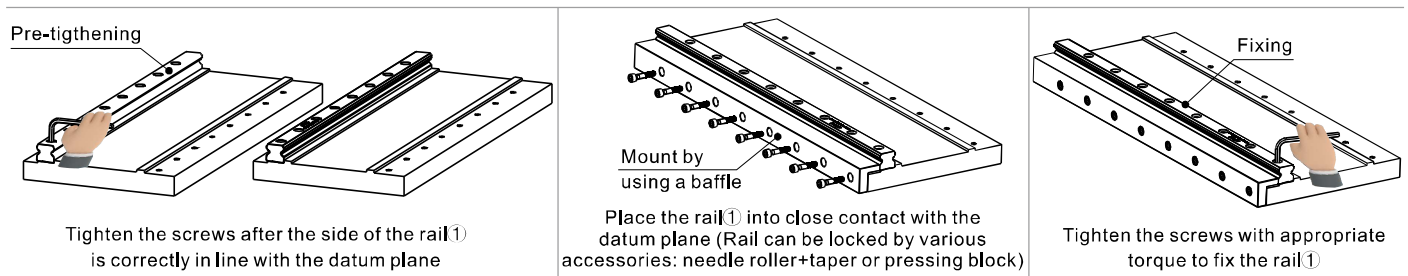
7. Rail Installation

A. Before installing the rail, remove all dirt from the mounting surface with oil stone, and then wipe with a clean cloth.

Remove all dirt from the mounting surface with oil stone, and then wipe with a clean cloth



B. Place the rail gently on the bed firstly, then put the bolts into the mounting holes and pre-tighten them, place the rail ① into close contact with the datum plane of the bed by using the baffle, tighten the bolts with appropriate torque to fix the rail. Refer to "3. Screw tighten torque" for recommended torque value.

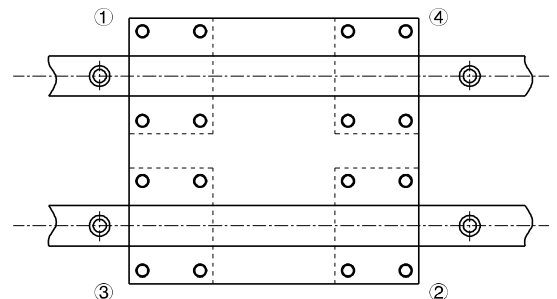
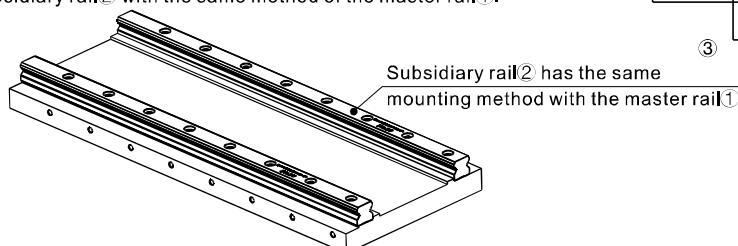


8. Block Installation

- Temporarily fix the table on the block by using the mounting bolts.
- Push the block datum plane against the side datum plane of the table and position the block by tightening the set screws.
- Tighten the mounting bolts in 1 to 4 sequences to fix the table on the block.

9. Subsidiary Rail Installation

Under the condition that the subsidiary rail has a reference datum plane, remove all dirt from the mounting surface with oil stone, and then wipe with a clean cloth, mount the subsidiary rail ② with the same method of the master rail ①.



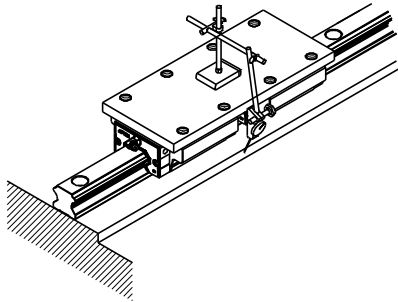
Under the condition that the subsidiary rail ② has a reference datum plane, remove all dirt from the mounting surface with oil stone, and then wipe with a clean cloth.

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10. Rail Installation without Side Datum Surface

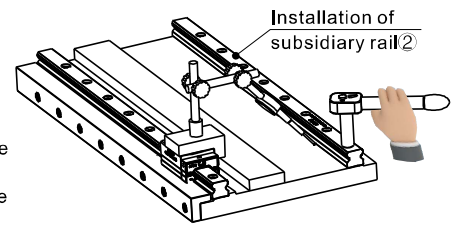
Using a provisional datum plane

Use the datum plane provided on the bed for straight alignment of the rail from one end to the other, attention must be paid to fix two blocks in close contact on the measuring plate.



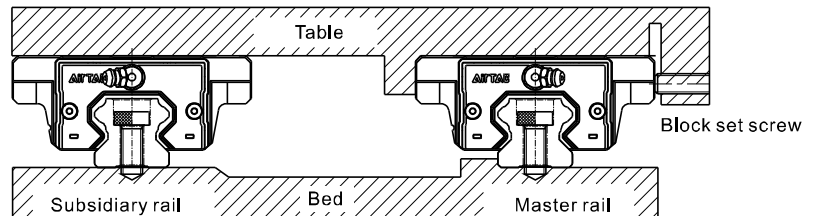
Using a straight-edge

Put the straight-edge between the two rails and use a dial gauge to adjust straight-edge in parallel with the side datum plane of the master rail. Use the dial gauge to ensure the straightness of the subsidiary rail by using the straight-edge as reference, then tighten the mounting bolts in proper sequence when the subsidiary rail is parallel to the master rail.



11. Rail Installation without Set Screws

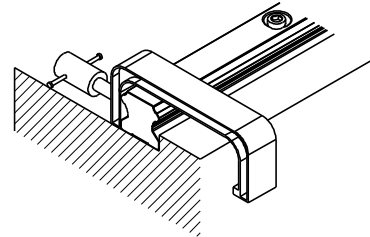
To ensure parallelism between the subsidiary rail and the master rail in the condition without set screws, the following installation methods are recommended, and the installation of the block is the same as mentioned previously.



Installation of the master rail

Using a vice

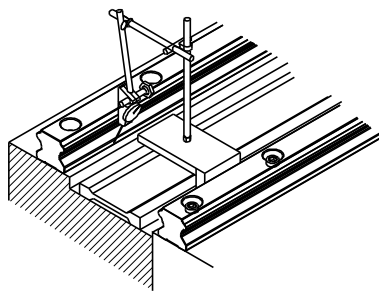
Put the rail on the bed mounting surface and temporarily fasten the mounting bolts, then push the rail against the side datum plane of the bed by using a vice to ensure the rail position. Tighten the mounting bolts in proper sequence with specific torque.



Installation of the subsidiary rail

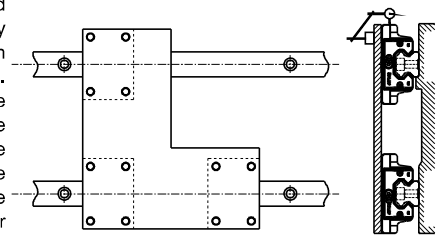
Using a straight-edge

Put the straight-edge between the two rails and use a dial gauge to adjust straight-edge in parallel with the side datum plane of the master rail. Use the straight-edge to ensure the straightness of the subsidiary rail, then tighten the mounting bolts in proper sequence with specific torque.



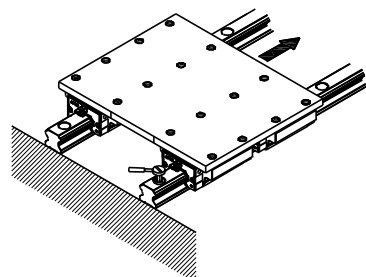
Using a table

Fix two blocks on the master rail to the table, and temporarily fix the subsidiary rail to the bed and one block on the subsidiary rail to the table. Place the gauge against the side surface of the block on the subsidiary rail, move the table from one end of the rail to the other end, then tighten the mounting bolts in proper sequence with specific torque while aligning the subsidiary rail parallel to the master rail.



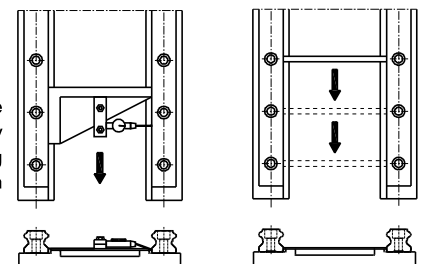
Following the master rail

Fix the table to the two blocks on the master rail and one of the two blocks on the subsidiary rail, temporarily fix the other block on the subsidiary rail to the table and subsidiary rail to the bed. Moving the table from one end of the master rail and tighten the mounting bolts on the subsidiary rail in proper sequence with specific torque at the same time.



Using a jig

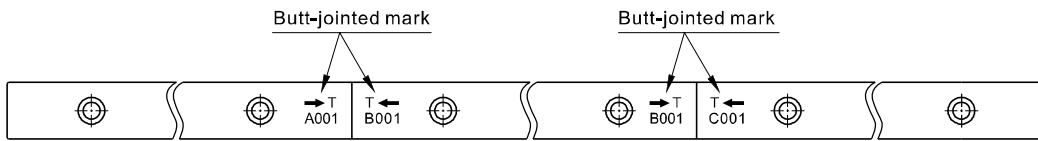
Use a special jig to help ensure the position of the subsidiary rail, and tighten the mounting bolts in proper sequence with specific torque.



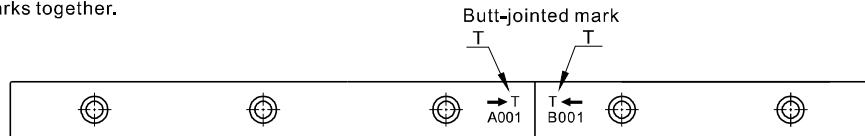
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12. Rail Butt-jointed

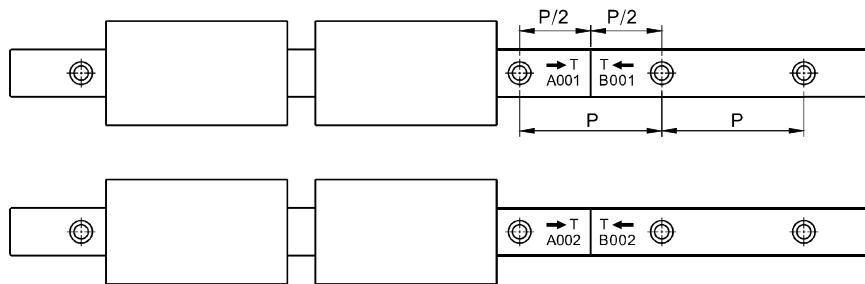
- When it comes to butt-jointed rail installation, it must follow the butt-jointed marks shown below.
- In order to avoid the accuracy caused by installing the matched jointed rails, it is recommended to stagger the butt-jointed positions, see figure below.



- When jointing rails, it must follow group marks on rail to ensure the accuracy of linear guide. These marks are located on the top surface at joint side. Please put the same group marks together.

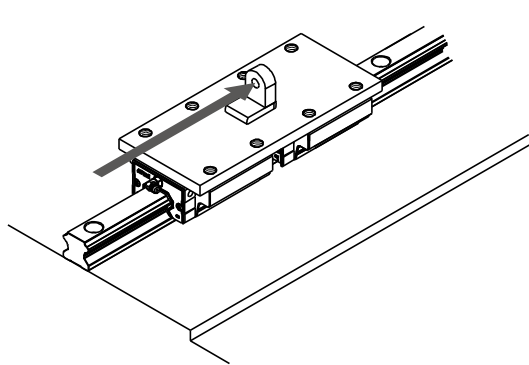


- Be aware serial number of group mark when assemble. A001 and B001 are in a group, so as to A002 and B002 and so on.
- Be aware the installation direction while assembly, the serial numbers are not upside down and arrows point to each other.

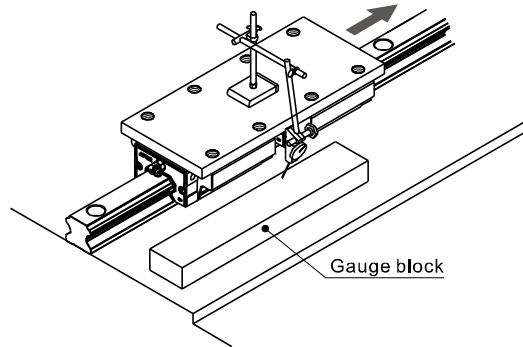


13. Measurement Method after Installation

When measuring running accuracy of the block, two blocks should be fixed on an inspection table in close contact to obtain stable accuracy. When using a dial gauge, a provisional benchmark (like a straight-edge) is recommended to put as close as possible to the block for accurate measurement.



Method using an autocollimator



Method using a dial gauge

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Lubrication method

When a linear guide is well lubricated, it can reduce wear and increase lifespan significantly. Lubrication has the following benefits :

- Reduces friction of the rollers and raceway to minimize wear.
- The grease film between contact surface can prevent roller fatigue.
- Prevent rust.

1. Lubrication Grease

Use the correct grade of lubrication. While lubricating, a grease gun can be used to pump grease into slider through the grease nipple on it. The suitable condition for lube is when working speed is under 60 m/min and not in cooling process.

•Nipple type	L-P-M4	L-P-M6	L-P-SM6
Grease nipple type	<p>LSQH15</p> <p>M4X0.7P</p>	<p>LSQH20 LSQH25 LSQH30 LSQH35</p> <p>M6X0.75P</p>	<p>LSQH20 LSQH25 LSQH30 LSQH35</p> <p>M6X0.75P</p>

•Grease amount

LSQH series linear guide is well lubricated with 'Shell Alvania grease S2' in factory. Customers are recommended to use identical or the same grade of lubricant. After lubrication, block needs to be moved back and forth at least three times for the length of three blocks and repeat at least twice. Check if the surface of rail is well covered by grease film.

Model	Grease amount for the first lubrication(cm ³)		Replenishment amount(cm ³)	
	Standard type	Long type	Standard type	Long type
LSQH15	0.9	-	0.3	-
LSQH20	1.8	2.7	0.6	0.9
LSQH25	3.6	4.5	1.1	1.4
LSQH30	5.4	7.2	1.7	2.2
LSQH35	8.1	10	2.5	3

•Lubrication frequency

Although the linear guides are well lubricated at the factory and retains grease well, frequent lubrication is still necessary to avoid undesirable wear. Recommended lubrication period is every 100km of movement or every 3~6 months. (Refer to table on the top for suggested amount)

2. Lubricating oil

Recommended oil viscosity for lubrication use is about 30 to 150 cst.

Lubrication oil is suitable for all kinds of load and impact application, but not for high temperature use due to its tendency of vaporization.

•Adaptor

L-P-AM6	L-P-AM8	L-P-A01
<p>M6X0.75P</p> <p>M4X0.7P</p> <p>LSQH15</p>	<p>M8X1P</p> <p>Inner bushing (Use with soft tube, for hard tube is unnecessary)</p> <p>M6X0.75P</p> <p>LSQH35 LSQH30 LSQH25 LSQH20</p>	<p>PT1/8</p> <p>M6X0.75P</p> <p>LSQH35 LSQH30 LSQH25 LSQH20</p>
L-P-LM6	L-P-LM8	L-P-L01
<p>M6X0.75P</p> <p>M4X0.7P</p> <p>LSQH15</p>	<p>M8X1P</p> <p>Inner bushing (Use with soft tube, for hard tube is unnecessary)</p> <p>M6X0.75P</p> <p>LSQH35 LSQH30 LSQH25 LSQH20</p>	<p>PT1/8</p> <p>M6X0.75P</p> <p>LSQH35 LSQH30 LSQH25 LSQH20</p>

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Lubrication method

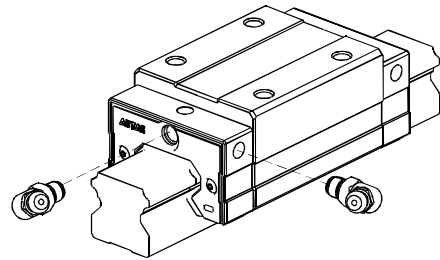
•Oil supply rate

Loss of lubrication oil is faster than lubrication grease. Pay attention to sufficiency of oil while using.

Model	Oil amount for the first lubrication(cm ³)	Feeding Speed(cm ³ /hr)
LSQH15	0.6	0.2
LSQH20	0.6	0.2
LSQH25	0.9	0.3
LSQH30	0.9	0.3
LSQH35	0.9	0.3

3. Grease nipple/adaptor installation

- Grease nipple or adaptor can be installed in the two sides of block for manual or automatic lubrication based on customer's requirement.
- There are a secondary set of lubricating ports on the side of the block. When using, it is not recommended to use the side with datum line unless necessary.
- Lateral nipple installation is not recommended for flange type blocks.
(The grease / oil nipple may interfere with block)
- If lateral lubrication is needed for above spec, please contact us for customization.

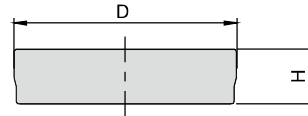


Bolt hole plug

1. Plug type

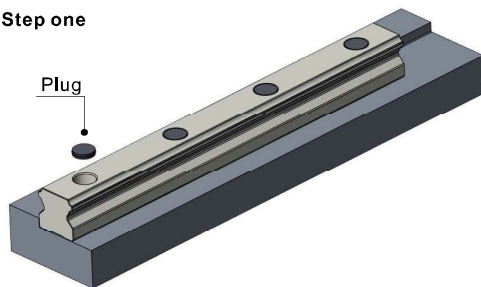
In order to prevent metal swarf or external objects from entering blocks and affecting precision and lifespan, customers must put plugs into holes during installation. Every rail is equipped with default plugs.

Model	Bolt	Diameter(D)(mm)	Thickness(H)(mm)
LSH15	M4	8.15	1.1
LSH20	M5	9.65	2.5
LSH25	M6	11.4	2.5
LSH30	M8	14.4	3.5
LSH35	M8	14.4	3.5



2. Plug installation Steps

Step one

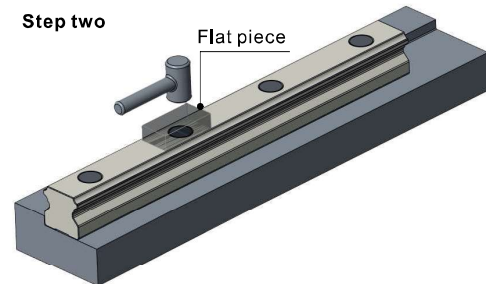


Place the plug in counterbore.

Note :

- Please make sure the plugs do not protrude the rail surface.
- After installation, please clean the surface before use.

Step two



Place the flat piece on mounting hole, hit the piece vertically with a plastic hammer and fix the plug into counterbore.