



THK Linear Motion System

# LM Guide

## Instruction Manual

No. 1030-T34667

THK CO., LTD.

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### 1-1 Foreword

Thank you for purchasing the THK LM Guide. This manual describes the precautions on use, assembly method, and lubrication method that apply to the LM Guide.

### 1-2 About This Manual

#### 1-2-1 Intended Audience

Persons in charge of device design, installation, and maintenance, and persons actually using the product.

#### 1-2-2 Using This Manual

This manual describes the correct handling of this product and precautions on its use. For maximum product performance and long-term use, read this manual carefully and understand its contents so that you use this product safely and properly. When printing this manual for reading, store it in a place where the intended audience can read it when necessary.

#### 1-2-3 Notice and Attention

- Do not handle or use this product in any way other than as described in this manual.
- No part of this manual may be duplicated, reproduced, or loaned without permission.
- Due to a continuing process of product improvement, information contained herein is subject to change without notice.
- Efforts have been made to ensure the accuracy of the information contained herein. If, however, you notice an error or have a concern, notify THK.
- The diagrams contained herein are representative examples and may vary from the actual product.
- THK will not be liable for the effects resulting from the use of this manual for any reason whatsoever.
- This manual also applies to special products, but content specified on the Delivery Specification Diagram takes priority.  
\*Special products are products that differ from standard products listed in the catalog, in material and/or specifications.

**1-3****Scope of Use for This Product**

- Do not use this product for equipment or systems used in life-threatening situations.
- Consult THK beforehand when considering using this product for special applications such as in passenger vehicles or in medical, aviation and space, nuclear power, or electrical power equipment or systems.
- This product was manufactured under strict quality control, but this does not completely rule out product failure. When using this product in equipment where failure of this product could cause a severe accident or damage, install a safety device or backup device to prevent the occurrence of severe accidents or damage.

**1-4****Product Support**

Efforts have been made to ensure the accuracy of the information contained herein. If, however, you have a concern, notify THK.

**1-5****Product Information and THK Information**

For the latest product information and company information, we recommend that you regularly access and view the THK website.

- Website URL: <https://www.thk.com/eng/>
- Technical support site URL: <https://tech.thk.com/>

## 2. Precautions on Use

### 2-1 Safety Related Warning Displays

This manual uses the following safety related warning displays. Descriptions containing safety related warning displays are serious and must be followed.



#### Warning

"A matter which, if mishandled, could result in death or serious injury."



#### Caution

"A matter which, if mishandled, could result in physical injury or material damage."



"Prohibited (never do this)"



"Must (always do this)"

### 2-2 Handling

#### CAUTION



- Please use at least two people to move any product weighing 20 kg or more, or use a dolly or other conveyance. Failure to do so could cause injury or damage the product.

Handle with care



- Do not disassemble the parts. This could impair the product's functions.

Do not disassemble



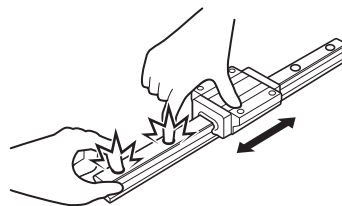
- Tilting an LM block or LM rail may cause it to fall by its own weight.
- Take care not to drop or strike the LM Guide. This could cause injury or damage the product. If the product receives an impact, it could impair the product's functions, even if the product looks intact.

Falling objects



- When assembling, do not let the LM block come off the LM rail.
- Note that if you place your finger in an LM rail mounting hole, it may get jammed by the LM block, risking injury.

Handle with care



- When handling the product, wear safety gloves and safety boots, etc., as appropriate to ensure safety.

### 2-3

### Precautions on Use

## CAUTION



Prevent dust

- Prevent foreign materials, such as cutting chips or coolant, from entering the product. Failure to do so could damage the product.
- Prevent foreign materials, such as cutting chips, coolant, corrosive solvents or water from getting in the product by using a bellows or cover when the product is used in an environment where such a thing is likely.
- If foreign materials such as cutting chips adhere to the product, clean the product and then replenish the lubricant.
- Small strokes can inhibit the formation of an oil film between the raceway and the area of contact for rolling elements, resulting in fretting. Therefore, be sure to use a type of grease with high fretting resistance properties. We recommend periodically adding stroke movement for approximately the LM block length to help ensure that an oil film forms between the raceway and the rolling elements.



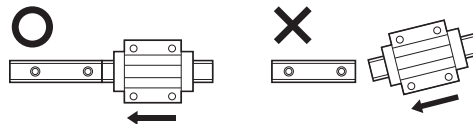
Maximum temperature

- Do not use this product if the external temperature exceeds 80°C. If used in excess of this temperature, there is a risk that the resin and rubber parts may deform or become damaged (except the heat-resistant type).



Handle with care

- Do not forcibly drive a pin, key, or other positioning parts into the product. This could create indentations on the raceway and impair the product's functions.
- When work unavoidably requires removing/mounting the LM block from/onto the LM rail, use the removing/mounting jig to perform the work. (The removing/mounting jig is not provided as standard equipment. To use it, contact THK.) (See Figure 4-4.)
- To use the removing/mounting jig, place the LM rail end surface and the removing/mounting jig end surface in full contact, and insert with the LM rail and the removing/mounting jig in parallel. (See Figure 4-4.)



- When removing the LM block from the LM rail and then replacing the block, an LM block mounting/removing jig that facilitates such installation is available. Contact THK for details. (See Figure 4-4.)
- Inserting the LM block onto the LM rail and using the product while the rolling elements are removed may cause early damage.
- If any of the rolling elements falls from the LM block, discontinue use and contact THK.
- A lack of rigidity and accuracy of mounting components may cause the bearing load to localize, reducing the performance of the bearing significantly. Therefore, consider carefully the rigidity and accuracy of the table and base, and the strength of the securing bolts.



Falling objects

- Inserting the LM block while tilted risks foreign material entering, internal parts being damaged, and rolling elements dropping off.
- If the endplate is damaged due to an accident, etc., balls may fall out of the LM Guide or the LM block may become detached from the LM rail and fall down. If an LM Guide will be used in an inverted position, take preventive measures such as adding a safety mechanism to prevent falls.

### 2-4 Lubrication

#### CAUTION



- Thoroughly remove anti-rust oil and feed lubricant before using the product.
- Do not mix different lubricants. Even grease containing the same type of thickening agent may, if mixed, interact in an adverse manner due to disparate additives or other ingredients.
- When using the product in locations subject to constant vibrations or in special environments such as in clean rooms, vacuums, and under low or high temperatures, be sure to use a lubricant suitable for the specifications and environment.
- When lubricating products that do not feature a grease nipple or oil hole, directly coat the raceway surfaces with lubricant and perform several warm-up strokes to ensure that the grease permeates the interior.  
Grease consistency can vary depending on the temperature. Keep in mind that the LM Guide sliding resistance will be affected by changes in consistency.
- Following greasing, the stirring resistance of the grease can cause the LM Guide to exhibit increased rolling resistance. Before commencing operations, make sure to run the unit through several warm-up cycles to ensure that the grease is adequately integrated and dispersed.
- Excess grease may spatter immediately after lubrication. Wipe off spattered grease as necessary.
- The properties of the grease deteriorate over time, thereby degrading the lubricity. It is necessary to inspect and apply the grease in accordance with the usage frequency.
- How often grease should be replenished varies depending on the usage conditions and environment. We recommend greasing the system approximately every 100 km traveled (three to six months). Final greasing interval/amount should be set at an actual machine.
- If the installation direction is other than horizontal use, the lubricant may not reach the raceway completely. See the general catalog for information regarding installation direction and lubrication.
- When using oil lubrication, the lubricant may not be distributed throughout the LM Guide depending on the installation direction of the LM block. Contact THK for details.

### 2-5 Storage

Store the LM Guide horizontally in its original packaging in an indoor location where it is not exposed to high or low temperatures or high humidity.

Please note that if the product has been kept in storage for an extended period of time, the lubricant inside may have deteriorated. Please therefore ensure that you replenish the lubricant before re-use.

### 2-6 Disposal

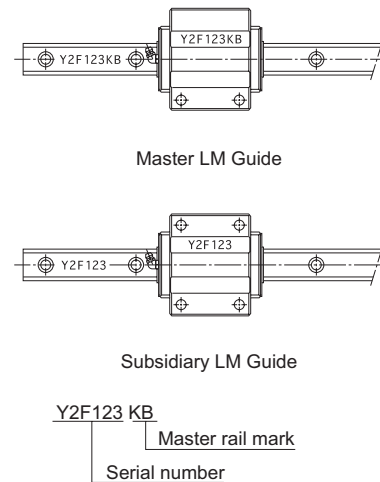
The product should be disposed of appropriately as industrial waste.

### 3. Marking on the Master Rail and Combined Use

#### 3-1 Marking on the Master LM Guide

All LM rails mounted on the same plane are marked with the same serial number. The LM rail marked with "KB" after the serial number is the master LM rail. The LM block on the master LM rail has its reference surface finished to a designated precision, allowing it to serve as the positioning reference for tables. (See Figure 3-1.)

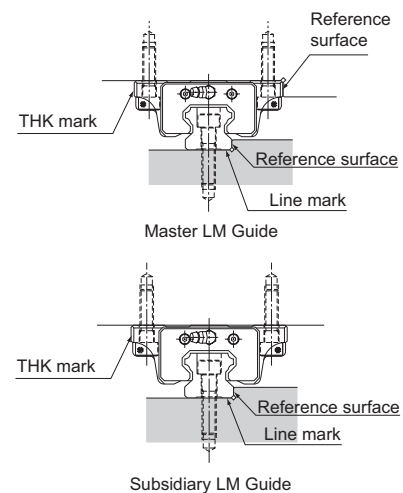
LM Guides of normal grade are not marked with "KB." Therefore, any one of the LM rails having the same serial number can be used as the master LM rail.



**Figure 3-1 Master and Subsidiary LM Guides (For Example, Model HSR-B)**

#### 3-2. Marking on the Reference Surface

In the LM Guide, the reference surface of the LM block is opposite the surface marked with the THK logo, and the reference surface of the LM rail is on the surface marked with a line, as shown in Figure 3-2. If usage requires reversing the relative positioning of the reference surfaces of the LM rail and block, or if the grease nipple must be oriented in the opposite direction, specify it.



**Figure 3-2 Markings on the Reference Surface**



### 3. Marking on the Master Rail and Combined Use

#### 3-3

### Serial Number Marking and Combined Use of an LM Rail and LM Blocks

An LM rail and LM blocks used in combination must have the same serial number. When removing an LM block from the LM rail and reinstalling the LM block, make sure that they have the same serial number and the numbers are oriented in the same direction. (Figure 3-3)

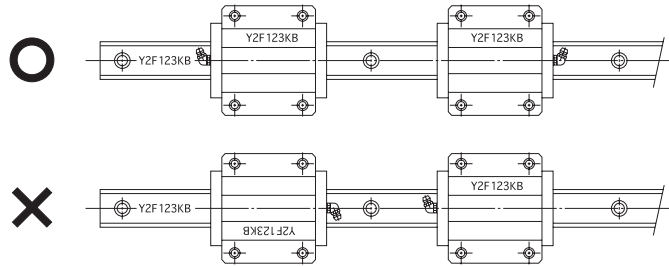


Figure 3-3 Combined Use of an LM Rail and LM Blocks (For Example, Model HSR-A)

#### 3-4

### Use of Jointed Rails

When a long LM rail is ordered, two or more rails will be connected to one another to reach the desired length. When connecting rails together, make sure that the joint matching marks shown in Figure 3-4 are correctly positioned.

When two LM Guides with connected LM rails are to be arranged in parallel to each other, the two LM Guides will be manufactured so that the two LM Guides are axisymmetrically aligned.

If a large load is applied near the LM rail joint, the LM rail may deflect and cause misalignment. Therefore, we recommend securely fastening the LM rail by pressing the joint section against the reference surface using a set screw or the like and keeping the L dimension as short as possible. (Figure 3-4)

Contact THK for details.

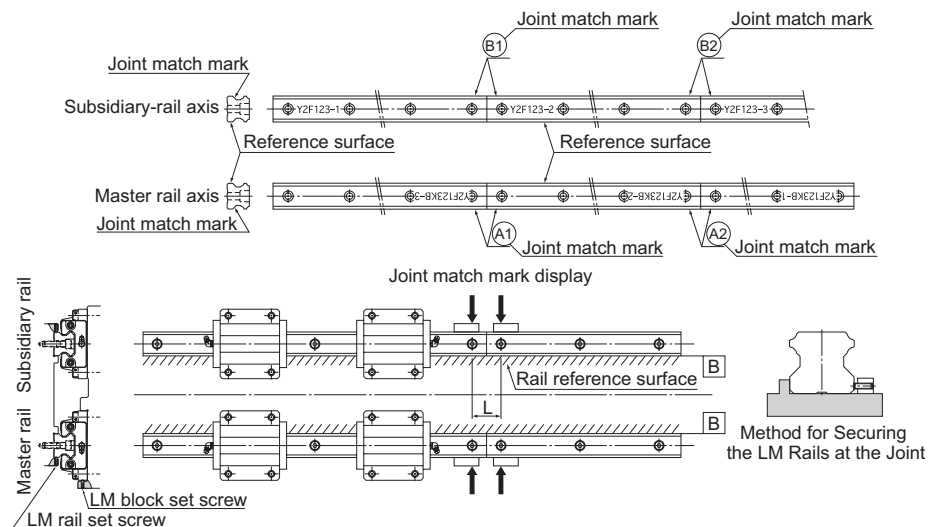
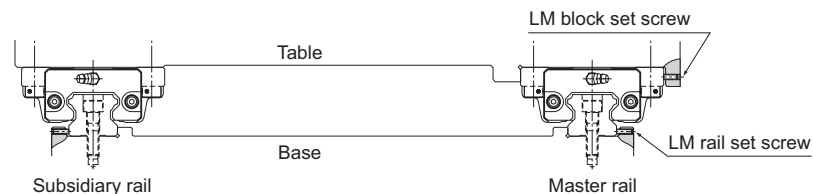


Figure 3-4 Use of Jointed Rails

### 4-1 Mounting Procedure

#### 4-1-1 Example of Mounting the LM Guide When Vibration or Impact Is Applied to the Machine and Therefore Rigidity and High Accuracy Are Required



**Figure 4-1 When Vibration or Impact Is Applied to the Machine**

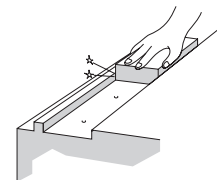
#### Mounting the LM rail(s)

- (1) Be sure to remove burrs, dents and dust from the mounting surface of the machine to which the LM Guide is to be mounted before mounting the LM Guide. (Figure 4-2)

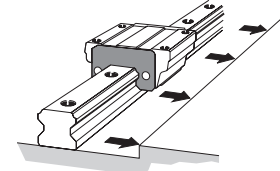
Note: Since the LM Guide is coated with anti-rust oil, remove the oil from the reference surface by wiping the surface with washing oil before using the LM Guide. Once the anti-rust oil has been removed, the reference surface is prone to getting rusted. We recommend applying low-viscosity spindle oil.

- (2) Gently place the LM rail onto the base, and temporarily fasten the bolts to the extent that the LM rail lightly contacts the mounting surface. (Place the line-marked side of the LM rail against the side reference surface of the base.) (Figure 4-3)

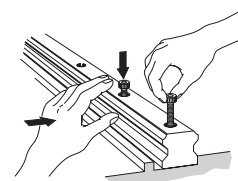
Note: Use clean mounting bolts to secure the LM Guide. Also, check for any misaligned bolt holes when placing bolts into the LM rail mounting holes. (Figure 4-4) Forcing bolts to tighten while holes are misaligned may cause decreased accuracy.



**Figure 4-2 Checking the Mounting Surface**

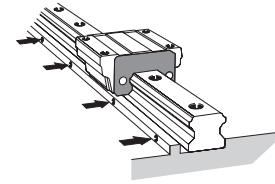


**Figure 4-3 Aligning the LM Rail with the Reference Surface**



**Figure 4-4 Checking the Bolt for Play**

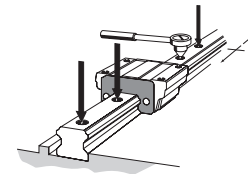
- (3) Secure the set screws for the LM rail in order with a tightening force strong enough to have the rail closely contact the side mounting surface. (Figure 4-5)
- (4) Tighten the mounting bolts at the designated torque using a torque wrench. (See Figure 4-6, Table 4-1, and Table 4-2.)



**Figure 4-5 Tightening the Set Screws**

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

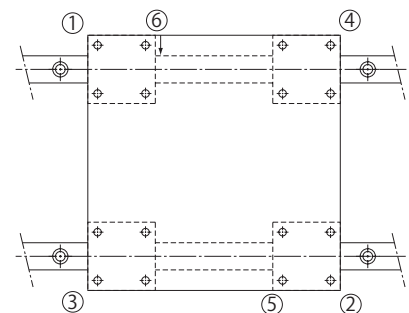
- (5) Mount the other rail in the same manner to complete the mounting of the LM rails.
- (6) Hammer in caps into the bolt holes on the top face of each LM rail until the top of the cap is on the same level as the top face of the rail.



**Figure 4-6 Fully Fastening the Mounting Bolts**

### Mounting the LM Blocks

- (1) Gently place the table on the LM blocks and temporarily fasten the mounting bolts.
- (2) Press the master side LM blocks against the side reference surface of the table using set screws to position the table. (Figure 4-1)
- (3) Fully fasten the mounting bolts on the master side and the subsidiary side to complete the installation.



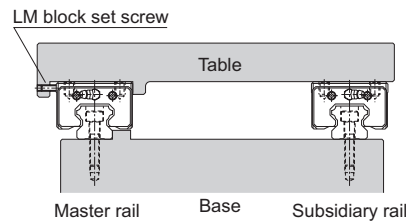
**Figure 4-7 Sequence of Tightening the LM Blocks**

Note: To evenly secure the table, tighten the mounting bolts sequentially in diagonal order as shown in Figure 4-7.

This method saves time in establishing the straightness of the LM rail and eliminates the need to machine secure dowel pins, thus drastically shortening the time required for installation.

## 4-1-2

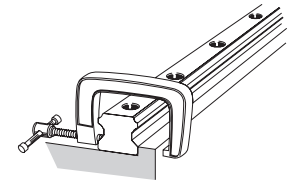
### Example of Mounting the LM Guide When the Master LM Rail Is Not Provided with Set Screws



**Figure 4-8 When the Master LM Rail Is Not Provided with Set Screws**

### Mounting the Master LM Rail

After temporarily fastening the mounting bolts, firmly press the LM rail to the side reference surface at the position of each mounting bolt using a small vise and fully fasten the bolt. Perform this in the proper order from one rail end to the other. (Figure 4-9)



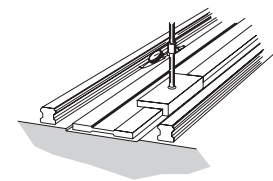
**Figure 4-9**

### Mounting the Subsidiary LM Rail

To mount the subsidiary LM rail in parallel with the correctly mounted master LM rail, we recommend adopting the methods below.

- **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 LM rail using a dial gauge. Then, secure the mounting bolts in the proper order while using the dial gauge to ensure straightness of the subsidiary rail axis, using the straight-edge as the reference. (Figure 4-10)

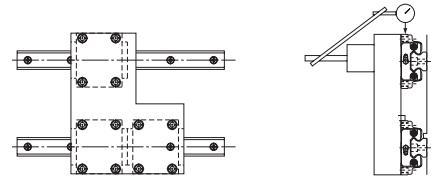


**Figure 4-10**

## 4. Assembly

### ● Using the Parallelism of the Table

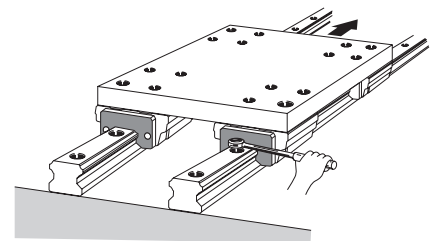
Secure the two LM blocks on the master LM rail to the table (or a temporary table for measurement), and temporarily fasten the subsidiary LM rail and the LM block on the subsidiary LM rail to the table. Place a dial gauge against the side surface of the LM block on the subsidiary rail from the dial stand fixed on the table top, then secure the bolts in proper order while maintaining the parallelism of the subsidiary LM rail by moving the table from the rail end. (Figure 4-11)



**Figure 4-11**

### ● Having the Subsidiary LM Rail Follow the Master LM Rail

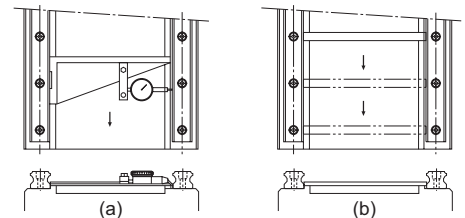
Place the table on the LM blocks of the correctly mounted master LM rail and the temporarily fastened subsidiary LM rail, and fully fasten the two LM blocks on the master rail and one of the two LM blocks on the subsidiary rail with bolts. Fully fasten the mounting bolts on the subsidiary LM rail in order while temporarily fastening the remaining LM block on the subsidiary LM rail. (Figure 4-12)



**Figure 4-12**

### ● Using a Jig

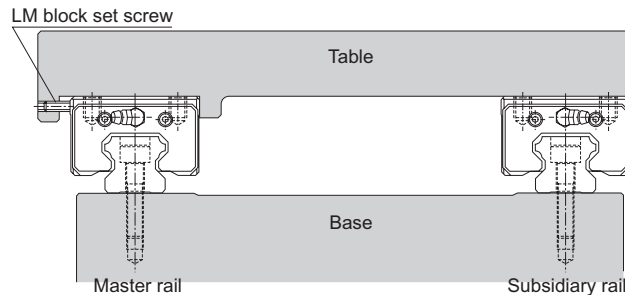
Use a jig like the one shown in Figure 4-9 to maintain the parallelism of the side reference surface of the subsidiary rail with the side reference surface of the master rail, sequentially moving from one end of the rail by the mounting pitch, and at the same time, fully fasten the mounting bolts in order. (Figure 4-13)



**Figure 4-13**

## 4-1-3

### Example of Mounting the LM Guide When the Master LM Rail Does Not Have a Reference Surface

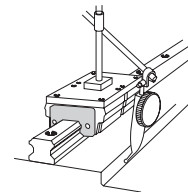


**Figure 4-14**

### Mounting the Master LM Rail

- **Using a Temporary Reference Surface**

You can use a reference surface provided near the LM rail mounting position on the base to achieve straightness of the LM rail from the rail end. In this method, two LM blocks must be joined together and fixed to a measurement plate, as shown in Figure 4-15.

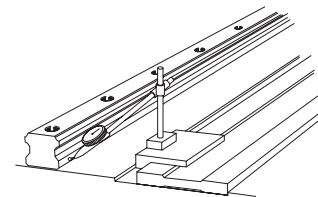


**Figure 4-15**

- **Using a Straight-edge**

After temporarily fastening the mounting bolts, using a straight-edge as a reference as shown in Figure 4-16, use a dial gauge to check the straightness of the side reference surface of the LM rail from the rail end, and at the same time, fully fasten the mounting bolts.

To mount the subsidiary LM rail, follow the procedure described on p. 4-3.

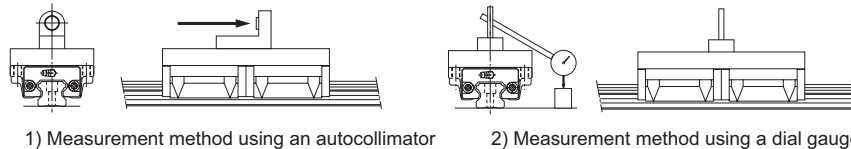


**Figure 4-16**

## 4-2

### When Measuring the Running Accuracy for Single Rail Application

When measuring running accuracy of the LM block, stable accuracy can be obtained by securing two LM blocks on an inspection plate, as shown in Figure 4-17. When using a dial gauge, we recommend placing a straight-edge as close as possible to the LM block in order to perform accurate measurement.



**Figure 4-17 Methods for Measuring Accuracy after Installation**

## 4-3

### Recommended Tightening Torque for LM Rails

On the high-precision LM rails of the LM Guide, the rails are tightened with bolts for the final grinding of the raceways and for the accuracy inspection. When mounting a high-precision LM rail onto a machine, we recommend using the corresponding tightening torque indicated in Table 4-1 or Table 4-2.

**Table 4-1 When Using Pan Head Screws**

Unit: N-cm

Screw model No.	Tightening torque	
	Not hardened	Hardened
M 2	17.6	21.6
M 2.3	29.4	35.3
M 2.6	44.1	52.9

**Table 4-2 When Using Hexagonal-Socket-Head Type Bolts**

Unit: N-cm

Screw model No.	Tightening torque		
	Iron	Casting	Aluminum
M 2	58.8	39.2	29.4
M 2.3	78.4	53.9	39.2
M 2.6	118	78.4	58.8
M 3	196	127	98
M 4	412	274	206
M 5	882	588	441
M 6	1370	921	686
M 8	3040	2010	1470
M 10	6760	4510	3330
M 12	11,800	7840	5880
M 14	15,700	10,500	7840
M 16	19,600	13,100	9800
M 20	38,200	25,500	19,100
M 22	51,900	34,800	26,000
M 24	65,700	44,100	32,800
M 30	130,000	87,200	65,200

## 4-4 Removing/Mounting Jig

When assembling the guide, whenever possible, do not remove the LM block from the LM rail. If LM block removal is inevitable because of the plate cover specifications or the assembly procedure, be sure to use the removing/mounting jig.

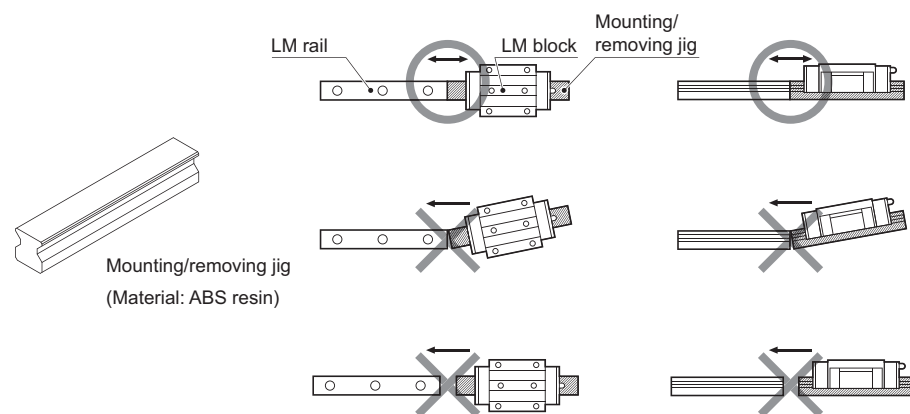
Mounting the LM block without using the removing/mounting jig may cause rolling elements to fall from the LM block due to contamination by foreign material, damage to internal components, or slight inclination. Mounting the LM block with some of the rolling elements missing may cause early damage.

When using the removing/mounting jig, do not incline the jig and be sure to match the ends of both LM rails.

The removing/mounting jig may not support certain model numbers. If so, address this by using an extra LM rail. Contact THK for details.

If any of the rolling elements falls from the LM block, discontinue use and contact THK.

Note that the removing/mounting jig is not included in the LM Guide package as standard. When desiring to use it, contact THK.



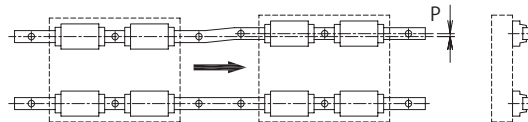


## 5. Dimensional Tolerance of the Mounting Surface

The LM Guide allows smooth straight motion through its self-aligning capability even when there is a slight distortion or error on the mounting surface.

### ● Error Allowance in the Parallelism between Two Rails

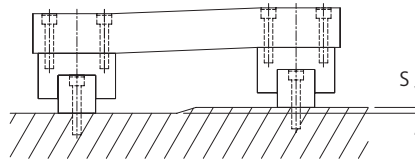
A mounting surface error of the LM Guide may affect the service life. See the general catalog for the error allowance of the mounting surface for each model number in general use.



**Figure 5-1 Error Allowance in the Parallelism (P) between Two Rails**

### ● Error Allowance in Vertical Level between Two Rails

Error allowances in vertical level between two rails per axis-to-axis distance of 500 mm are proportionate to axis-to-axis distances (200 mm for models SRS and RSR).



**Figure 5-2 Error Allowance in Vertical Level (S) between Two Rails**

## 6. Lubrication

It is necessary to use a good quality lubricant when using an LM Guide. Usage with no lubrication may increase wear on the rolling elements and 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 film on the raceway to decrease stress acting on the surface and extend rolling fatigue life.
- (3) Covers the metal surface in an oil film to prevent rust formation.

To fully bring out the LM Guide's functions, it is necessary to provide lubrication according to the usage conditions.

It is necessary to study the mounting positions of the grease nipple and piping joint according to the installation direction.

If the LM Guide installation direction is other than horizontal use, the lubricant may not reach the raceway completely. Be sure to let THK know the installation direction and the exact position in each LM block where the grease nipple or the piping joint will be attached. See the general catalog for the installation direction of the LM Guide.

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

### 6-1

## Lubrication Interval

### 6-1-1

## Grease Lubrication

How often grease should be replenished varies depending on the usage conditions and environment. We recommend greasing the system approximately every 100 km traveled (three to six months). Final greasing interval/amount should be set at an actual machine.

Normally, relubricate using the same grease type and through the lubrication hole or grease nipple provided on the LM Guide. Mixing different types of grease may deteriorate the system's performance due to increased consistency or other such factor.

Lubricant	Type	Brand name
Grease	Lithium-Based Grease Urea-Based Grease Calcium-Based Grease	AFA Grease (THK)
		AFB-LF Grease (THK)
		AFC Grease (THK)
		AFE-CA Grease (THK)
		AFF Grease (THK)
		AFG Grease (THK)
		AFJ Grease (THK)
		L100 Grease (THK)
		L450 Grease (THK)
		L500 Grease (THK)
		L700 Grease (THK)
		Alvania Grease S No.2 (Showa Shell Sekiyu)
		Eponex Grease No.2 (Idemitsu Kosan)
		or equivalent

\*The recommended grease will vary according to the usage conditions and environment.

## 6-1-2 Oil Lubrication

LM systems that require oil lubrication are shipped with only anti-rust oil applied. Please indicate when ordering.

- The amount of oil to be applied varies depending on the stroke length. For a long stroke, increase the lubrication frequency or the amount of oil applied so that an oil film is able to form in the stroke end of the raceway.
- In environments where coolant may spatter, the lubricant may become mixed with the coolant. This could result in the lubricant being emulsified or washed away, causing significantly degraded lubrication performance. In such locations, apply a lubricant with high viscosity (kinematic viscosity: approx. 68 cst) and high emulsification resistance, and adjust the lubrication frequency or the amount of the applied lubricant accordingly.
- For machine tools and similar devices that are subject to heavy loads, require high rigidity, and operate at high speed, oil lubrication is recommended.
- Make sure that lubrication oil discharges normally from the ends of the lubrication piping; that is, the oiling ports that connect to your linear motion system.

Lubricant	Type	Brand name
Oil	Raceway Oil or Turbine Oil ISOVG32 to 68	Daphne Super Multi Oil (Idemitsu Kosan)
		Mobil DTE Oil Series (Exxon Mobil)
		Shell Tonna S3 M (Showa Shell Sekiyu)
		Mobil Vactra Numbered Series (Exxon Mobil)
		Mobil Vactra No. 2 SLC (Exxon Mobil)
		or equivalent

## 6. Lubrication

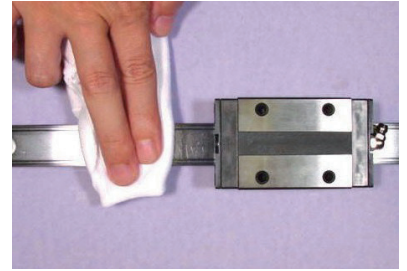
### 6-2 Lubrication Method

There are three methods of lubricating an LM Guide: manual greasing using a grease gun or manual pump; forced oiling with the aid of an automatic pump; and oil-bath lubrication. To achieve efficient lubrication, it is necessary to mount the grease nipple or the piping joint according to the installation direction.

#### 6-2-1 Before Supplying Grease

Check that no foreign materials are adhering to the LM rail. If any foreign materials remain adhered, they may enter inside the LM block.

If you find any foreign materials adhered, please wipe them off with a waste cloth, etc., and then grease the LM block. Then, as shown in the photo on the right, apply a thin layer of grease to the LM rail. This reduces abrasion of the dust prevention seal, and protects the seal.

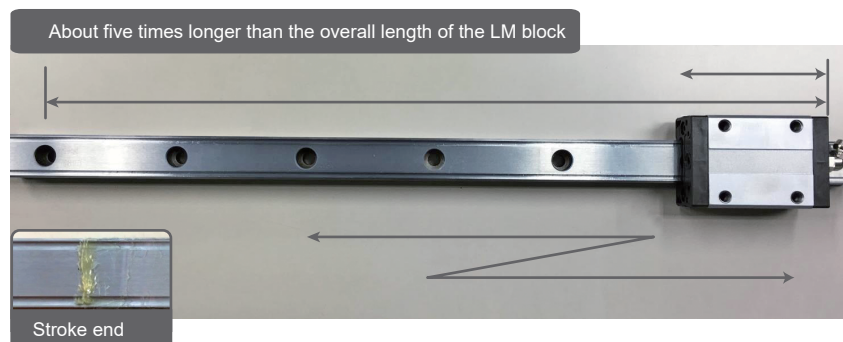


\*When using the LM Guide in an environment where foreign materials can adhere easily to the LM rail, we recommend taking measures such as using a cover.

#### 6-2-2 Supplying Grease

- (1) Stop the equipment and inject one or two shots of grease with a grease gun from the grease nipple.
- (2) Reciprocate a stroke that is five times longer than the overall length of the LM block.
- (3) Repeat (1) and (2) so that sufficient grease is applied to the raceway up to the stroke end.

\*The amount of grease and application frequency will vary according to the product, the environment, and the usage conditions.

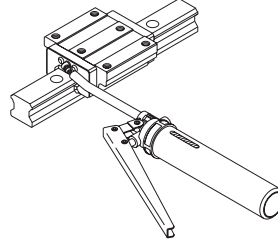


\*The greasing interval will vary depending on the usage conditions and environment. For normal use, we recommend greasing the system approximately every 100 km of travel distance.

## 6. Lubrication

### 6-2-3 Manual Greasing

Generally, replenish grease periodically by feeding it through the grease nipple provided on the LM Guide, using a grease gun. (Figure 6-1)



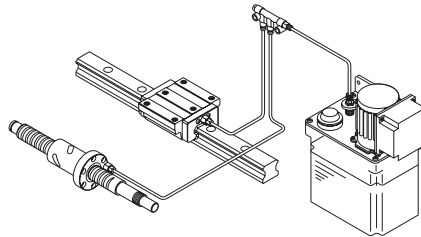
**Figure 6-1 Greasing Using a Grease Gun**

### 6-2-4 Forced Greasing/Lubrication Method

With this method, a given amount of lubricant is forcibly fed at set intervals using an automatic pump. (Figure 6-2)

Although a special lubrication system using a pipe or the like needs to be designed, this method reduces the likelihood of forgetting to replenish lubricant.

This method is used mainly for oil lubrication. If using grease, it is necessary to examine the appropriate pipe diameter and the required grease consistency.



**Figure 6-2 Forced Greasing/Lubrication Method**

# Appendix

## Revision History

The instruction manual number is on the back cover.

Publication Date	Instruction Manual No.	Revisions
December 2017	No. 1030-T34667	First edition

# THK CO., LTD.

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