

## 7. Special Environment Types of LM Systems

THK LM systems can be used in special environments by changing the material or grease, using optional parts or receiving surface treatments. This section describes general measures to adapt to special environments and supported products.

### Clean Rooms

In a clean environment like clean rooms, generation of dust from the LM system has to be reduced and anti-corrosive oil cannot be used. Therefore, it is necessary to increase the corrosion resistance of the LM system. In addition, depending on the level of cleanliness, a dust collector is required.

#### Dust Generation from the LM System

- Measure to prevent dust generation resulting from flying grease

THK AFE Grease/AFF Grease

Use environmentally clean grease that produces little dust.

- Measure to prevent dust generation resulting from metallic abrasion dust

Caged Ball LM Guide

Use of the Caged Ball LM Guide, which has no friction between balls and generates little metallic abrasion dust, to allow generation of dust to be minimized.

#### Corrosion Prevention

- Material-based Measure

Stainless Steel LM Guide

This LM Guide uses martensitic stainless steel, which has an anti-corrosion effect.

Highly Corrosion Resistant LM Guide

It uses austenitic stainless steel, which has a high anti-corrosion effect, in its LM rail.

- Measure through Surface Treatment

THK AP-C Treatment, AP-CF Treatment and AP-HC Treatment

The LM system is surface-treated to increase corrosion resistance.

### Caged Ball LM Guides

Supported models  
SHS SNR/SNS SSR SHW SRS

### Stainless Steel LM Guides

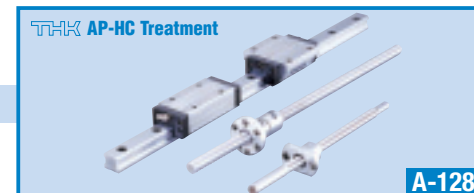
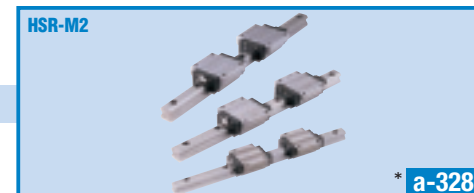
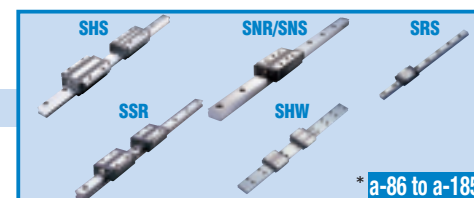
Supported models  
HSR SR SSR HR RSR SHW HRW RSH SRS

### Highly Corrosion Resistant LM Guide

Supported model  
HSR-M2

### Surface Treatment

### Grease



\* These indicate the corresponding reference page numbers of the "THK General Catalog - Product Specifications," provided separately.

## Vacuum

In a vacuum environment, measures to prevent gas from being emitted from a resin and grease from flying are required and anti-corrosive oil cannot be used. Therefore, it is necessary to select a product with high corrosion resistance.

### ■ Measure to Prevent Emission of Gas from Resin

#### Stainless steel LM Guide

It uses stainless steel in the endplate (ball circulation unit made of resin) of the LM block to reduce emission of gas.

### ■ Measure to Prevent Grease from Evaporating

#### Vacuum grease

If a general-purpose grease is used in a vacuum environment, oil contained in the grease evaporates and the grease loses less lubricity. Therefore, use a vacuum grease that uses fluorine-based oil, whose vapor pressure is low, as the base oil.

### ■ Measures to Prevent Corrosion

#### Stainless Steel LM Guide

In a vacuum environment, use a stainless steel LM Guide, which is highly corrosion resistant.

#### High-temperature LM Guide

If the temperature becomes high due to baking, use a high-temperature LM Guide, which is highly resistant to heat and corrosion.

### ■ Highly Corrosion Resistant LM Guide

This LM Guide uses austenitic stainless steel, which has a high anti-corrosion effect, in the LM rail.

## High-temperature LM Guides



HSR-M1 RSR-M1  
SR-M1

## Highly Corrosion Resistant LM Guide



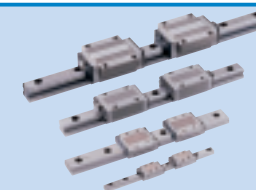
HSR-M2

## Stainless Steel LM Guides

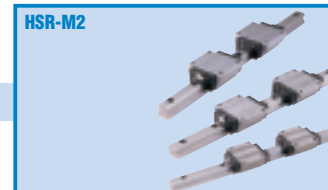


HSR SR SSR HR RSR  
SHW HRW RSH SRS

## Vacuum Grease

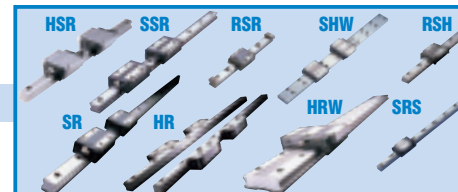


\* a-238  
a-310  
a-438



HSR-M2

\* a-328



## Corrosion Prevention

As with clean room applications, it is necessary to increase corrosion resistance through material selection and surface treatment.

### Material-based Measure

#### Stainless Steel LM Guide

This LM Guide uses martensitic stainless steel, which has an anti-corrosion effect.

#### Highly Corrosion Resistant LM Guide

It uses austenitic stainless steel, which has a high anti-corrosion effect, in its LM rail.

### Measure through Surface Treatment

#### THK AP-C Treatment, AP-CF Treatment and AP-HC Treatment

The LM system is surface-treated to increase corrosion resistance.

## Stainless Steel LM Guides



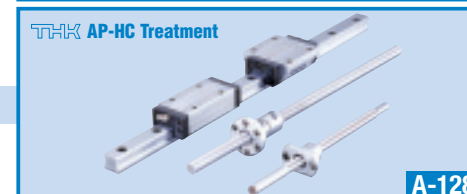
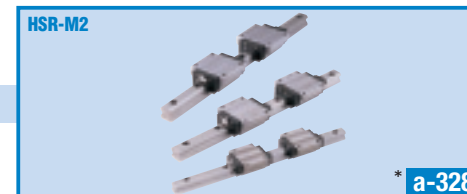
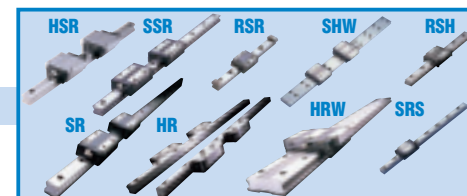
HSR SR SSR HR RSR  
SHW HRW RSH SRS

## Highly Corrosion Resistant LM Guide



HSR-M2

## Surface Treatment



## High Speed

In a high-speed environment, it is necessary to apply an optimum lubrication method that reduces heat generation during high-speed operation and increases grease retention.

### Measures to Reduce Heat Generation

#### Caged Ball LM Guide

Use of a ball cage eliminates friction between balls to reduce heat generation. In addition, grease retention is increased, thus to achieve long service life and high speed operation.

#### High Speed Ball Screw with Ball Cage

Use of a ball cage and an ideal ball circulation structure enables high-speed feeding, which conventional products have not achieved.

#### THK AFG Grease

It reduces heat generation in high-speed operation and has superb lubricity.

### Measure to Improve Lubrication

#### QZ Lubricator

Since it supplements oil loss, the lubrication and maintenance interval can significantly be extended. It also applies the right amount of oil to the raceway, making itself an eco-friendly lubrication system that does not contaminate the surrounding area.

### Caged Ball LM Guides

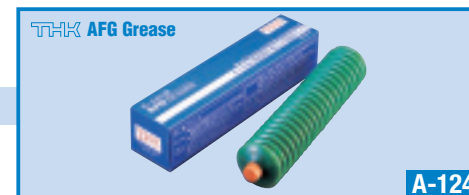
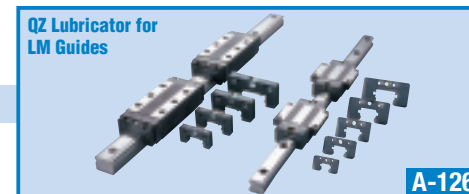
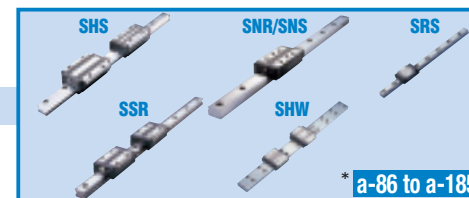
Supported models: SHS SNR/SNS SSR SHW SRS

### High Speed Ball Screw with Ball Cage

Supported models: SBK SBN

### QZ Lubricator

### Grease



## High Temperature

In a high-temperature environment, dimensional alteration caused by heat is problematic. Use a High Temperature LM Guide, which is heat resistant and whose dimensions little change after being heated, and a high-temperature grease.

### Heat Resistance

#### High temperature LM Guide

It is an LM Guide that is highly resistant to heat and whose dimensions little change after being heated and cooled.

### Grease

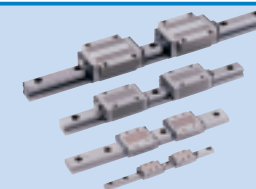
#### High temperature grease

Use a high-temperature grease with which the rolling resistance of the LM system little fluctuates even temperature changes from a normal to high range.

## High Temperature LM Guides



HSR-M1 RSR-M1  
SR-M1



\* a-238  
a-310  
a-438

## High Temperature Grease

## Low Temperature

Use an LM system whose resin component are little affected low temperature, a measure to increase corrosion resistance in transition from normal to low temperature and a grease with a low rolling-resistance fluctuation even at low temperature.

### Impact of Low Temperature on Resin Components

#### Stainless Steel LM Guide

The endplate (ball circulation path normally made of resin) of the LM block is made of stainless steel.

### Corrosion Prevention

Provide surface treatment to the LM system to increase its corrosion resistance.

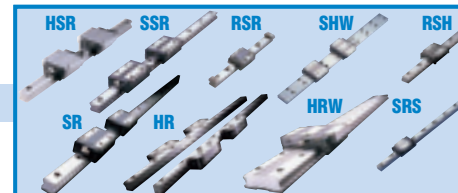
### Grease

Use THK AFC Grease, with which the rolling resistance of the system little fluctuates even at low temperature.

## Stainless Steel LM Guide



HSR SR SSR HR RSR  
SHW HRW RSH SRS



## Surface Treatment



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## Grease



A-118

## Grease



A-118

## Micro Motion

Micro strokes cause oil film break and poor lubrication, resulting in early wear. In such cases, select a grease with which the oil film strength is high and an oil film can easily be formed.

### Grease

#### THK AFC Grease

AFC Grease is a urea-based grease that excels in oil film strength and wear resistance.

## Foreign Matter

If foreign matter enters the LM system, it will cause abnormal wear and shorten the service life. Therefore, it is necessary to prevent such entrance of foreign matter. Especially in an environment containing minute foreign matter or a water-soluble coolant that a telescopic cover or a bellows cannot remove, it is necessary to attach a dust-prevention accessory capable of efficiently removing foreign matter.

### Metal Scraper

It is used to remove relatively large foreign objects such as cutting chips, spatter and sand dust or hard foreign matter that adhere to the LM rail.

### Laminated Contact Scraper LaCS

Unlike a metal scraper, it removes foreign matter while it is in contact with the LM rail. Therefore, it demonstrates a high dust preventive effect against minute foreign matter, which has been difficult to remove with conventional metal scrapers.



### QZ Lubricator

QZ Lubricator is a lubrication system that feeds the right amount of lubricant by closely contacting its highly oil-impregnated fiber net to the ball raceway.



### Wiper Ring W

With the wiper ring, a special resin that is highly wear resistant elastically contacts the circumference of the shaft and the screw groove, and removes foreign matter with 8 slits, thus preventing foreign matter from entering the nut.

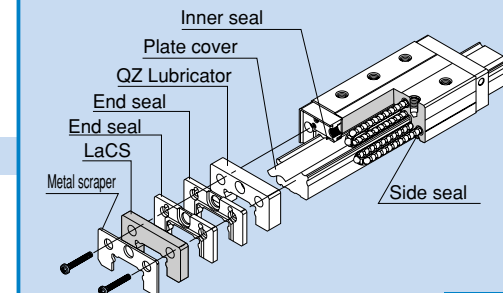


### LM Guide

- + Metal Scraper
- + Laminated Contact Scraper LaCS
- + QZ Lubricator

Supported models

Caged Ball LM Guides:  
SSR SHS SNR/SNS SRS SHW  
Full ball LM Guides:  
HSR NR/NRS



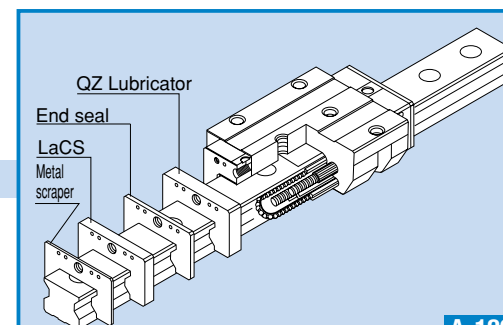
A-129

### Caged Roller LM Guide

- + Metal Scraper
- + Laminated Contact Scraper LaCS
- + QZ Lubricator

Supported model

SRG



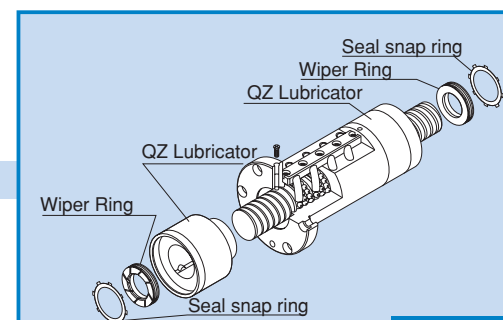
A-129

### Ball Screw

- + QZ Lubricator
- + Wiper Ring W

Supported models

SBN BNFN BIF DK  
BNF DIK BTK



K-98 to K103